

RESOLUTION NO. 17-92
CITY OF CENTERVILLE, OHIO

SPONSORED BY COUNCILMEMBER Sally Beds

ON THE 15th DAY OF June, 1992.

A RESOLUTION ESTABLISHING THE PROCEDURE FOR SOLICITING BIDS FOR THE CONSTRUCTION OF THE CENTERVILLE MUNICIPAL GOLF COURSE KNOWN AS YANKEE TRACE GOLF COURSE.

WHEREAS, the City of Centerville is about to embark upon a major construction project to create a municipal golf course for the use and benefit of its citizens; and

WHEREAS, the Council has been advised and does believe that golf course construction is a highly specialized area of the contracting business which requires a high degree of experience and expertise beyond that normally necessary for most construction projects; and

WHEREAS, the Council of the City of Centerville believes that it is prudent and in the best interests of the citizens of Centerville to take steps to assure that those persons or firms submitting bids for all or part of the golf course construction contemplated are only those who through prior experience and performance have proved that they are qualified to carry out the necessary construction work if awarded the contract or contracts therefor; and

WHEREAS, the contract for golf course construction will be awarded to the lowest and best bidder; and

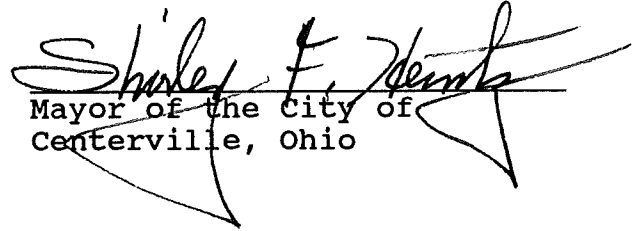
WHEREAS, in determining the lowest and best bidder, the Council will give great consideration to the reputation and past experience of the bidder in the area of golf course construction;

NOW, THEREFORE, in consideration of the foregoing recitations

THE MUNICIPALITY OF CENTERVILLE HEREBY RESOLVES:

Section 1. Attached hereto and incorporated herein by reference are all of the bidding and contract documents and procedure for bidding for the construction of the golf course which the Council of the City of Centerville hereby adopts and which shall govern the bidding and construction procedure for the construction of Yankee Trace Golf Course.

PASSED THIS 15th day of June, 1992.


Mayor of the City of
Centerville, Ohio

ATTEST:

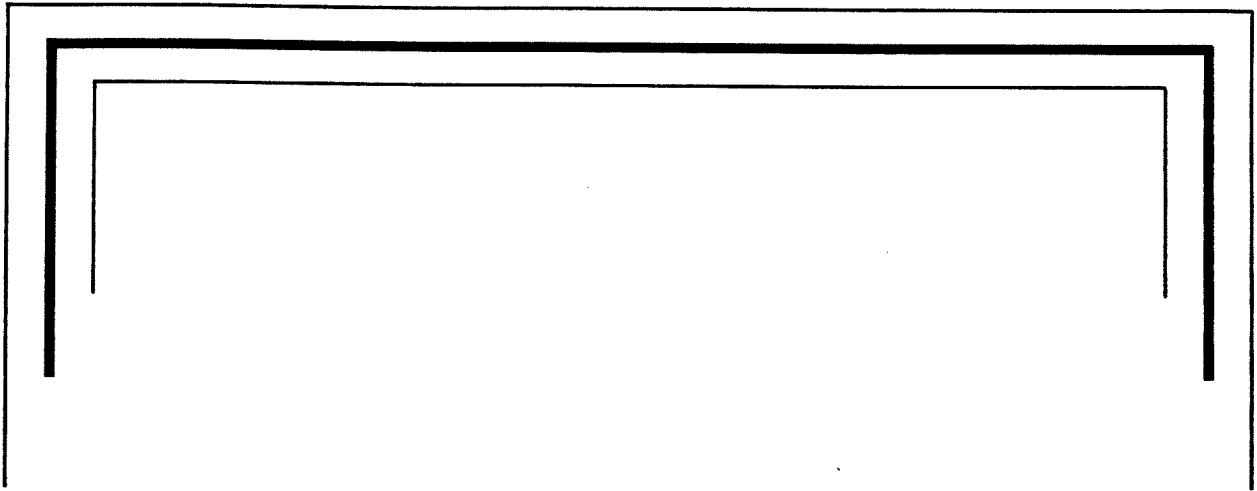

Clerk of Council
City of Centerville, Ohio

CERTIFICATE

The undersigned, Clerk of Council of the City of Centerville, Ohio, hereby certifies the foregoing to be a true and correct copy of Resolution No. 17-92, passed by the Council of the City of Centerville, Ohio on the 15th day of June, 1992.

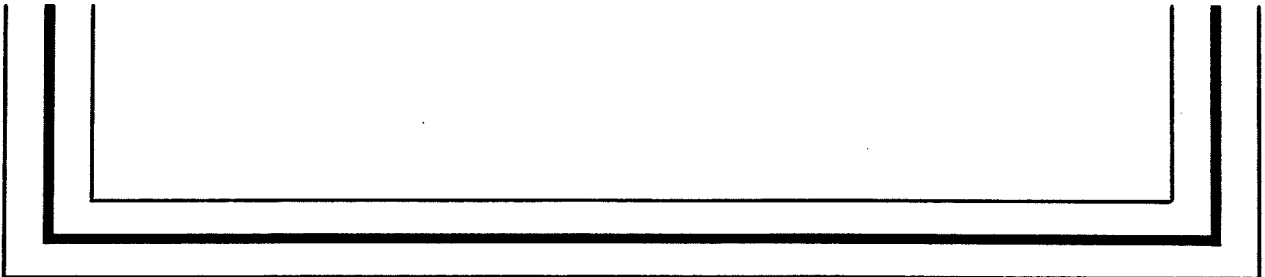

Clerk of the Council

Approved as to form, consistency with existing ordinances, the charter & constitutional provisions.
Department of Law
Robert N. Farquhar
Municipal Attorney



CITY OF CENTERVILLE, OHIO
CONSTRUCTION OF YANKEE TRACE
GOLF COURSE

JUNE, 1992



LEGAL ADVERTISEMENT

Notice to Bidders

Sealed bids will be received at the Office of the City Manager, 100 West Spring Valley Road, Centerville, Ohio, 45458, until 10:00 A.M., E.D.S.T., Tuesday, June 30, 1992, for the Construction of Yankee Trace Golf Course. Yankee Trace Golf Course is a 18 hole, par 72 golf course and includes three additional regulation practice holes, a 400 yard driving range, and practice greens. All bids must be in a sealed opaque envelope, plainly marked "City of Centerville - Yankee Trace Golf Course".

The work for which proposals are invited consists of furnishing all labor and materials to construct Yankee Trace Golf Course located on a tract of land bounded by Yankee Street to the west and Social Row Road to the south. The aforementioned improvements shall include grading, construction of tees, bunkers, and greens, carpaths, stormwater drainage system, irrigation system, sanitary sewer crossings, landscaping, and other facilities and appurtenances that are necessary and proper. The proposed improvements shall be in accordance with the plans, specifications, estimates of cost, and profiles of the improvement, hereto prepared by Gene Bates Golf Design and Barge, Wagonner, Cannon, and Sumner, Inc.

Plans and specifications may be examined at the office of the City Manager or the City Engineer. The deposit for each set of Contract Documents will be \$50.00. Chapter 4115, Wage and Hours on Public Works of the Ohio Revised Code, applies.

Prospective bidders must attend a pre-bid meeting to be held on Tuesday, June 23, 1992 at 2:00 P.M. E.D.S.T. This meeting will be held in the Council Chambers of the Centerville Government Center, 100 West Spring Valley Road, Centerville, Ohio, 45458.

The City reserves the right to accept or reject any or all proposals; to waive any informalities in the bidding; and to enter into a contract with the bidder who, in the City's opinion, offered the lowest and best proposal.

INVITATION TO BID

Sealed bids will be received by the City Manager of the City of Centerville at the Municipal Building, 100 West Spring Road, Centerville, Ohio until 10:00 A.M. E.D.S.T., on Tuesday, June 30, 1992.

The work for which proposals are invited consists of furnishing all labor and materials to construct Yankee Trace Golf Course located on a tract of land bounded by Yankee Street to the west and Social Row Road to the south. Yankee Trace Golf Course is a 18 hole, par 72 golf course and includes three additional regulation practice holes, a 400 yard driving range, and practice greens. The aforementioned improvements shall include grading, construction of tees, bunkers, and greens, cartpaths, stormwater drainage system, irrigation system, sanitary sewer crossings, landscaping, and other facilities and appurtenances that are necessary and proper.

The proposed improvements shall be in accordance with the plans, specifications, and that have been prepared by Gene Bates Golf Design and Barge, Waggoner, Sumner and Cannon.

All materials and workmanship shall conform to the specifications in the Yankee Trace plans and bid document, the Specifications of the City of Centerville, Ohio, and the Specifications of the Montgomery County, Ohio Sanitary Engineering Department (Ohio Department of Transportation Construction and Material Specifications shall cover any item not addressed in the above specifications).

Prospective bidders must attend a pre-bid meeting to be held on Tuesday, June 23, 1992 at 2:00 P.M. E.D.S.T. This meeting will be held in the Council Chambers of the Centerville Government Center, 100 West Spring Valley Road, Centerville, Ohio, 45458.

Bidders may bid on any and all items. The City reserves the right to reject any and all bids. Chapter 4115 (Wage and Hours on Public Works) of the Ohio Revised Code applies. Each bid should contain the full name and address of persons interested in the contract. Bid must be accompanied by a bid bond of 5% of bid amount. Successful bidders shall furnish a 100% Performance Bond.

Bid proposal forms may be obtained at the Office of the City Manager, Centerville, Ohio. Deposit of \$50.00 for each set of bid documents is required. The deposit, if in check form, shall be made payable to the City of Centerville, Ohio. The deposit will be refunded upon return of the contract documents in good condition not later than ten days following the bid opening. All deposits not claimed within that time will be forfeited by the depositor and become the property of the City of Centerville.

INSTRUCTION TO BIDDERS

1.1.00 GENERAL INFORMATION

- .01 Sealed bids for the award of a contract for furnishing the materials and labor described below shall be delivered to City of Centerville, Ohio at the Municipal Building, 100 West Spring Valley Road, Centerville, Ohio until 10:00 A. M. E.S.D.T., on Tuesday, June 30, 1992, at which time they shall be publicly opened and read.
- .02 The project covered by this invitation to Bid is identified as "City of Centerville - Yankee Trace Golf Course", and is located at the northeast corner of the intersection of Yankee Rd. and Social Row Rd. in Montgomery County, Ohio.
- .03 A general description of the labor and material to be furnished is described in the attached specifications.
- .04 Prospective bidders must attend a pre-bid meeting to be held on Tuesday, June 23, 1992 at 2:00 P.M. E.D.S.T. This meeting will be held in the Council Chambers of the Centerville Government Center, 100 West Spring Valley Road, Centerville, Ohio, 45458.
- .05 All bids are subject to the following:
1. Invitation to Bid, including all forms mentioned therein.
 2. Agreement Form
 3. General Conditions.
 4. Plans and Specifications now on file at the offices of the City Manager of the City of Centerville, Ohio and are identified as follows "City of Centerville - Yankee Trace Golf Course.
 5. Such other provisions, representations, certifications, and specifications as are attached hereto or incorporated in any of the documents hereto by reference.
- .06 Any explanation desired by the Bidder regarding the meaning of interpretation of the Invitation to Bid must be requested in writing and with sufficient time allowed for reply to reach bidders before the submission of their bids. Oral explanations or instructions given before the award of the contract will not be binding. Any information given to a prospective bidder concerning a solicitation will be furnished to all prospective bidders as an amendment of

the Invitation to Bid, if such information is necessary in submitting bids or if the lack of such information would be prejudicial to uninformed bidders.

.07 Bidders are invited to be present at the bid opening.

.08 The contract between the City and the successful bidder shall contain a statement requiring that mechanics and laborers be paid a prevailing rate of wage as required in Section 4115.06 of the Ohio Revised Code. The contractor or subcontractor is required to file with the City of Centerville upon completion of the project and prior to the final payment therefor, an affidavit stating he has complied with Chapter 4115 of the Ohio Revised Code.

1.2.00 PREPARATION OF BID.

.01 Attached herewith are duplicate copies of forms identified as BIDDER PRINCIPALS EXPERIENCE AND REFERENCES, GOLF COURSE EXPERIENCE CONTRACTOR VERIFICATION LETTER, PROPOSAL OFFER, BIDDING SCHEDULE FORM, BID BOND, CERTIFICATE OF NON-COLLUSION FORM, CERTIFICATE OF NON-DISCRIMINATION.

.02 Submit all bids on the included Proposal Forms. Be sure that each of the forms identified in the above paragraph are included in your bid package; however, you may substitute a certified check as set out herein in place of the Bid Bond.

.03 All blank spaces on the proposal form must be filled in correctly.

.04 On the bidding schedule of the proposal form the base bid and unit prices shall be written in ink or typed.

.05 The bidder shall sign on the bidding schedule sheet of the proposal form where indicated.

.06 The City shall pay to the bidder for the performance of the contract the amounts listed on the bidder's "Base bid as per plans & specifications" on the "Bidding Schedule Proposal Form". The bidder understands that the quantity takeoffs provided in this document are approximate only and certifies to the City that he has done his own quantity takeoffs and is satisfied that the Base Bid Amounts are for all the work shown and called for per the plans and specifications.

.07 The bidder should note that the "Unit Price Breakdown" amounts shown on the "Bidding Schedule Proposal Form" are solely for the purpose of determining the bidder's compensation for additions or deletions to the Project during construction. The "Unit Price Breakdown" amounts shall

specifically not be used to adjust the quantity takeoffs contained in the "Bidding Schedule" to reflect the actual number of units that are incorporated by the bidder in his work covered by this bid.

- .08 Each proposal must be accompanied by a bid bond or a certified check on a United States of America National Bank for 5% of the amount bid, which amount is agreed to by the bidder as liquidated damages due to the City of Centerville the Bidder shall fail to execute the contract and furnish the required bonds, all within ten days after the acceptance of the proposal and the awarding of the contract by the City.
- .09 When a proposal is made by a corporation, it shall be properly executed by an authorized officer. When a proposal is made by a partnership, the firm name and also the names of the individual members shall be signed in full. Where joint ventures are entered into by contractors, all parties concerned shall be pre-qualified. A letter asking permission to participate in a joint venture must be submitted by the contractors to the City of Centerville and permission granted before bid opening.
- .10 The place of business of every bidder must be given after his signature, and must be written in full.
- .11 Anyone signing a proposal as the agent of another, or others, must file with it legal evidence of his authority to do so.
- .12 Erasures. The bid submitted must not contain any erasures, interlineation or other corrections unless each such correction is suitably authenticated by affixing in the margin immediately opposite the correction the surname or surnames of the person or persons signing the bid.
- .13 All blank spaces in the proposal form must be filled in, but no change shall be made in the phraseology of the proposal, nor shall any additions be made to the items.
- .14 Bids must be enclosed in a sealed envelope and marked: Bid For "City of Centerville - Yankee Trace Golf Course".
- .15 Bids should then be placed in a second envelope addressed to the City of Centerville, 100 West Spring Valley Road, Centerville, Ohio 45458 and delivered or mailed early enough to be at the bid opening as set out herein. The City of Centerville is not obligated to open any bids delivered after the time set for the bid opening regardless of the reason for late delivery.
- 1.3.00 **RULES GOVERNING BIDS.**
- .01 Any bid received after the scheduled closing time for receipt of bids will be

returned to the bidder unopened.

.02 Bidders are warned that they must inform themselves of the character of work to be performed under this contract. Each bidder shall visit the site of the proposed work and fully acquaint himself with the conditions relating to the construction and labor so that he may fully understand the facilities, difficulties, and restrictions attending the execution of the work under the Agreement. Bidders shall thoroughly examine and be familiar with the contract terms, plans and the specifications. The failure or omission of any bidder to receive or examine any form, instrument, addendum or other document or to visit the site and acquaint himself with the conditions there existing shall in no wise relieve any bidder from obligations with respect to his bid or to the Agreement. The submission of a bid shall be taken as prima facie evidence of compliance with this section.

.03 Changes in or additions to the bid form, recapitulations of the work bid upon, alternative proposals, of any other modification of the bid form which is not specifically called for in the contract documents may result in the City's rejection of the bid as not being responsive to the invitation. No oral or telephonic modifications may be considered and a telegraphic modification may be considered only if the postmark evidences that the telegram duly signed by the bidder was sent early enough to arrive prior to the opening of bids.

.04 The City reserves the right to reject any and all proposals, and to waive any informality in the proposal received.

.05 Transfers of contract, or of interests in contract, are prohibited.

.06 If a bidder to whom an award is made fails or refuses to enter into contract as herein provided, or to conform to any of the stipulated requirements in connection therewith, the check (if a check is submitted) shall become the property of the City of Centerville, or if a bid bond is furnished the City of Centerville will exercise its right to the penal sum of the Bid Bond, the award will be annulled, and in the discretion of the City an award may be made to the bidder whose proposal is next most acceptable in the opinion of said City; and such bidder shall fulfill every stipulation embraced herein as if he were the party to whom the first award was made. The check or bid bond of a bidder to whom contract has been awarded will be returned to him within three days after all the acts, for the performance of which said bid bond or check is required, have been fully performed. The bid bonds and check of all bidders will be held until the final approval of the contract or the rejections of all proposals. The liability of the City of Centerville in connection with said checks shall be limited to the return of the checks as herein provided.

.07 A bid shall be valid for 60 days following the date of the bid opening.

1.4.00 GENERAL REQUIREMENTS

.01 A bidder shall be in compliance with all the laws of the State of Ohio to do the type of work required under this agreement. A Bidder shall present satisfactory evidence that he is fully prepared with the necessary finance, equipment, materials and personnel and that he has been regularly engaged in the type of work being let for bid, to the full satisfaction of the City. Bids received from those not qualified as above, at the time of bidding, may be rejected.

.02 All proposals shall be made and received with the express understanding that the bidder accepts the terms and conditions contained in the form of contract bound herewith.

1.5.00 PROPOSAL FORMS ATTACHED HERETO TO BE SUBMITTED WITH BID

- .01 Offer
- .02 Bidding Schedule
- .03 Bid Bond
- .04 Certificate of Non-Collusion
- .05 Certificate of Non-Discrimination
- .06 Bidder Principals, Experience, and References
- .07 Bidder's Plan and Equipment Questionnaire
- .08 Golf Course Experience Contractor Verification Letter (5 projects required)

1.6.00 FORMS ATTACHED HERETO WHICH WILL BE A PART OF THE CONTRACT

- .01 Performance Bond Form
- .02 Payment Bond Form
- .03 Agreement Form
- .04 General Conditions
- .05 Bidding Schedule Form
- .06 Prevailing Wage Determination for Montgomery County, Ohio

BIDDER'S QUALIFICATIONS

Qualifications for Golf Course Contractors

1. Only qualified golf course contractors, as herein specified, will be considered to become the Prime or General Contractor for the Yankee Trace Golf Course project. The General Contractor will be experienced in golf course construction with a sound and reputable background of experience which can be confirmed and verified.

The following are criteria which must be to duly qualify for consideration for bidding the Yankee Trace project.

- (a) Contractor must have been the prime contractor on and completed at least (5) five 18 hole, or equivalent, golf courses within the last 5 years prior to the bid request date. Contractor must provide industry references as well as notarized letters from each of the clients for which the golf courses were built verifying that he was the prime contractor for the golf course construction. These letters will also contain the name & location of the completed project. The construction bid amount & the final construction cost with explanations as to why the final construction cost was higher or lower. The names of the Principals for each project. Phone number and name of person to contact for further information on the project or the Prime Contractor.
 - (b) Contractor must have a qualified staff of construction supervisors and golf course shapers which have the experience to undertake a project of this size and complexity. A list of such personnel, their experience and qualifications shall be provided as part of this bid for evaluation.
 - (c) Contractor shall demonstrate its financial capability for undertaking the construction of an 18 hole golf course and driving range. Included in the financial information, the contractor shall provide the name, address & phone number of their Financial Institution with which they deal together with the name of the bank officer who has been authorized by the institution to discuss contractors financial status. The contractor will also provide the name, address and contact person who will provide the necessary surety requirements for the project. The surety institution must be duly qualified and approved by the State of Ohio for such surety.
2. Proposed sub-contractors must be experienced in their particular area of golf course construction and must have a sound and reputable background of experience that can be confirmed and verified. Contractor shall submit the following on all proposed sub-contractors:
 - (a) The Irrigation Sub-Contractor & the Grassing Sub-Contractor must have completed, in his area of expertise, at least (5) five 18 hole, or equivalent, golf courses in the last 5 years prior to the bid request date. Contractor will provide industry references as well as the names and locations of completed projects, including names of principles on the project, together with phone numbers and names of persons to contact for further information on the golf courses listed.
 - (b) Contractor must be able to demonstrate that each sub-contractor has a qualified staff with the experience to complete its portion of the project. A list of key personnel, their experience and qualifications shall be provided as part of this bid, for evaluation.

3. At the option of the City, prior to final selection & award, its representatives may visit any or all of the golf courses listed in the contractors qualification documents to insure that the contractor has participated in projects of similar scope & cost and have completed these projects with the quality work equal to the quality the City is seeking for its golf course.
4. Any contractor who submits a bid and does not meet all of the above qualifications will be considered non-responsible and will be disqualified.

BIDDER'S PRINCIPALS, EXPERIENCE, AND REFERENCES

Principals

The full names and residences of persons and firms interested in the forgoing Bid as Principals are as follow:

Experience and References

The Bidder shall here state work which he has done of similar nature to that bid for, and three references that will afford the Owner the opportunity to judge as to experience, skill, business standing and financial ability.

BIDDER'S PLAN AND EQUIPMENT QUESTIONNAIRE

(If more space is needed to answer the following questions, provide and attach on your own additional pages.)

- 1. List your and your subcontractor's bank(s) or financial institution(s) and furnishers of materials you intend to use for the construction of Yankee Trace Golf Course. Provide City of Centerville with the appropriate authorization to obtain or verify any information which may be requested in the investigation of this questionnaire.

- 2. Explain, in detail, the manner in which you have inspected the Yankee Trace Golf Course.

- 3. List the names and qualifications of personnel intended to be used on the Yankee Trace Golf Course project.

- 4. Describe your plan for deployment of personnel if the Project is awarded to your firm.

5. State the work which will be performed on the Golf Course by your organization and your proposed subcontractors.

6. List the equipment which you own and which will be available on this Golf Course Project.

7. List the names of firms from whom you have purchased equipment during the last three (3) years, including addresses and telephone numbers.

8. Outline and attach your General Time Schedule plan for constructing the Yankee Trace Golf Course.

9. List the golf course projects you have completed during the last five years.

10. How many years have you been doing Golf Course Construction work of the same character as the work on which you are bidding?

11. State below the status of all uncompleted golf course projects which you have under contract, including all subcontracts.

Proj No.	County	State	Date of Award Contract	Amt of Contract	% of Time Consumed	Describe Work
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**GOLF COURSE EXPERIENCE
CONTRACTOR VERIFICATION LETTER**

To Whom It May Concern,

As the official representative for _____ Golf Course I can verify that the following information is true, to the best of my knowledge.

Name of Golf Course _____

Location of Golf Course _____

Prime Contractor _____

Names of Principles _____

Golf Course Bid Amount \$ _____

Final Construction Cost \$ _____

Explanation of Cost Overruns, if any.

For Further Information Contact:

Name _____

Position _____

Address _____

Phone No. _____

I further verify that the golf course was completed within the last five years and the contractor completed the golf course construction to our satisfaction.

(Attach the appropriate documentation for signing the letter and having it notarized.)

1.7.00 **PROPOSAL FORM** **OFFER**

_____, as a Contractor authorized to do business in the State of Ohio,
proposes to perform the work identified as:

City of Centerville, _____, 19_____.

To the City of Centerville, Ohio

GENTLEMEN:

The undersigned hereby declares, as bidder, that he has personally examined the site of the herein proposed work, that the only persons or parties interested in this proposal are those named herein, that this bid is made without any connection with any other person, or making a bid for the same purpose, that he has read the Invitation to Bid, including Instructions to Bidders, General Conditions, Agreement, Bond forms, Specifications, plans and drawings, and the amendments thereto, that he agrees to all of the stipulations therein contained, and he proposes and agrees that if his bid, as submitted in the attached schedule is accepted, he will contract in the form specified in the Invitation to Bid, perform all the work mentioned in the Invitation to Bid and complete the same within the time therein specified after the date of notification by the City to proceed with the work, and will furnish the required bonds all within ten days after date of mailing Notice of Acceptance to him at his address as given below, and that he will accept in full payment therefor the prices named in the attached schedule. Said prices are to include and cover the furnishing of all material, labor, tools, equipment and all other things necessary to complete the entire work in a proper and workmanlike manner according to the plans identified in the Invitation to Bid and upon the terms and conditions and in the manner set forth in the Invitation to Bid, and under penalty of bond hereto attached, and to the full satisfaction and acceptance of the City of Centerville.

The following is the name and place of the surety company which will sign the bonds each in the amount of 100% of the bid as surety if the work is awarded to the undersigned.

of _____

Local Agent _____

Address _____

It is hereby agreed that the City of Centerville has the right to reject this proposal, or to award the above described work to the undersigned at the prices stipulated. If the proposal is rejected then the enclosed check for 5% of the amount of the bid, (if a bid bond is not included), which is made payable to the City of Centerville shall be returned to the undersigned as provided in Instruction to Bidders. If the proposal is accepted and the work is awarded and the Undersigned shall fail to enter into a contract in the form and terms set out in the invitation to Bid within ten days after the award shall have been made, then the said check shall be cashed and the amount thereof paid into the Treasury of the City of Centerville as liquidation damages for the failure of the undersigned to comply with the terms of this proposal.

Name of Corporation Submitting Bid _____

Name of Partnership Submitting Bid _____

If Partnership, Name of Partners _____

Name of Individual Submitting Bid _____

If Individual, Name of Business _____

Address _____

City _____

Contractor

By _____

PROJECT: YANKEE TRACE GOLF COURSE

Base bid as per plans & specifications:

All bid items below are lump sum and part of the Golf Course Construction. All bids are including but not limited to all work and materials required to complete the work as outlined.

1. Mobilization	\$ _____
2. Clearing, Grubbing & Disposal	\$ _____
3. Earthmoving	\$ _____
4. Features Construction	\$ _____
5. Golf Course Drainage	\$ _____
6. Irrigation	\$ _____
7. Seedbed Preparation	\$ _____
8. Grassing	\$ _____
9. Cart Paths	\$ _____
10. Bridges	\$ _____
11. Bulkheading	\$ _____
12. Control Structures	\$ _____
13. Culverts & Piping for Water Features	\$ _____
TOTAL BASE BID	\$ _____

Important Notice:

Contract will be awarded to the lowest ^{and best-qualified} ~~responsible~~ bidder on the BASE BID.

City reserves the right to award alternate(s), however, the combined total must still be the lowest comparative total bid.

Unit Price Breakdown (see page 3).

Unit Quantity Estimates (see page 8).

I, the undersigned, understand that the quantity takeoffs provided in this document are approximate only and I certify that I have done my own quantity takeoffs and am satisfied that the bid is for the work shown and called for.

If incorporated, the following information must be given:

State Chartered Under _____ Company Name _____

Name of President Address _____

Name of Secretary Title: _____

Name of Treasurer Signature: _____

If partnership, names of partners must be listed below:

For the purpose of determining the Contractor's compensation for additions and deletions to the Project during construction, the following unit prices for fully installed material are hereby offered.

Unit Price Breakdown:

Item No.	Item	Unit Price
EARTH MOVING		
1.	Topsoil Handling (remove & replace)	\$ _____ per cubic yard
2.	Wet Excavation	\$ _____ per cubic yard
3.	Normal Excavation	\$ _____ per cubic yard
4.	Lake Lining	\$ _____ per square foot
5.	Shaping of Golf Course Features	\$ _____
FEATURES CONSTRUCTION		
6.	Greens Construction	\$ _____ per square foot
7.	Tees Construction	\$ _____ per square foot
8.	Bunker Construction	\$ _____ per square foot
9.	Waste Bunkers	\$ _____ per square foot
FIELD DRAINAGE		
10.	4" Perforated ADS type pipe	\$ _____ per Linear Foot
11.	6" Perforated ADS type pipe	\$ _____ per Linear Foot
12.	4" Solid ADS type pipe	\$ _____ per Linear Foot
13.	6" Solid ADS type pipe	\$ _____ per Linear Foot
14.	8" Solid ADS type pipe	\$ _____ per Linear Foot

Unit Price Breakdown Continued:

Item No.	Item	Item Price
15.	10" Solid ADS type pipe	\$ _____ per Linear Foot
16.	12" Solid ADS type pipe	\$ _____ per Linear Foot
17.	15" Solid ADS type pipe	\$ _____ per Linear Foot
18.	18" Solid ADS type pipe	\$ _____ per Linear Foot
19.	24" Solid ADS type pipe	\$ _____ per Linear Foot
20.	12" X 12" Plastic Inlets	\$ _____ each
21.	18" X 18" Plastic Inlets	\$ _____ each
22.	24" X 24" Plastic Inlets	\$ _____ each
23.	36" X 36" Plastic Inlets	\$ _____ each
IRRIGATION PIPE		
24.	2" PVC Pipe (50 MM) Class 200 _____	\$ _____ per foot
25.	4" PVC Pipe (100 MM) Class 200 _____	\$ _____ per foot
26.	6" PVC Pipe (250 MM) Class 200 _____	\$ _____ per foot
27.	8" PVC Pipe (200 MM) Class 200 _____	\$ _____ per foot
28.	10" PVC Pipe (250 MM) Class 200 _____	\$ _____ per foot
29.	12" PVC Pipe (305MM) Class 200 _____	\$ _____ per foot
VALVES		
30.	4" Gate Valve (100 MM) _____	\$ _____ each
31.	6" Gate Valve (150 MM) _____	\$ _____ each
32.	8" Gate Valve (200 MM) _____	\$ _____ each

Unit Price Breakdown Continued:

Item No.	Item	Unit Price
33.	10" Gate Valve (250 MM)	\$ _____ each
34.	2" Lateral Line	\$ _____ each
IRRIGATION EQUIPMENT		
35.	<u>Satellite Controller</u>	\$ _____ each
36.	<u>Full Circle Sprinkler</u>	\$ _____ each
37.	<u>Part Circle Sprinkler</u>	\$ _____ each
38.	<u>Quick Coupling Valve</u>	\$ _____ each
ELECTRICAL		
39.	#14 UF Common (2.5MM)	\$ _____ per foot
40.	#14 UF Signal (2.5MM)	\$ _____ per foot
41.	#6 Power Run (3 wires) (16 MM)	\$ _____ per foot
42.	#8 Power Run (3 wires) (10 MM)	\$ _____ per foot
43.	Communication Cable Wire Path 1	\$ _____ per foot
44.	Communicable Cable Wire Path 2	\$ _____ per foot
45.	#6 Grounding into Fairway (16 MM)	\$ _____ per foot
46.	Grounding Rod Complete	\$ _____ each
47.	Belden Cable	\$ _____ per foot.

Unit Price Breakdown Continued

Item No.	Item	Unit Price
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SPECIALTY

48.	Air Relief Valves _____	\$ _____ each
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The following specialty items are part of the base bid. Please show individual item bid. These items must be complete before release of retention funds.

49.	As Built Record	\$ _____ L.S.
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50.	Final Network 8000 Program/or Maxi System	\$ _____ L.S.
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51.	32" Square of sod at each head	\$ _____ each
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Note: Above unit prices for sprinklers include all wiring, fittings and swing joint necessary for fully installed and operating sprinkler head. The unit prices for the various valves include fittings and valve boxes as required for a complete unit. All items for which no specific breakdown is provided are considered to be subsidiary items to other items of which they form a component part.

GRASSING

52.	Seedbed Preparation	\$ _____ per acre
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53.	Starter Fertilizer	\$ _____ per acre
-----	--------------------	-------------------

54.	Gypsum	\$ _____ per acre
-----	--------	-------------------

55.	Sulfur	\$ _____ per acre
-----	--------	-------------------

56.	Greens	\$ _____ per square foot
-----	--------	--------------------------

57.	Tees	\$ _____ per square foot
-----	------	--------------------------

58.	Fairways	\$ _____ per acre
-----	----------	-------------------

Unit Price Breakdown Continued:

Item No.	Item	Unit Price
59.	Rough	\$ _____ per acre
60.	Sod	\$ _____ per square foot
61.	10' X 40' Bridge	\$ _____ each
62.	10' X 60' Bridge	\$ _____ each
63.	10' X 80' Bridge	\$ _____ each
64.	Vertical Wood Bulkheading	\$ _____ per Linear foot
65.	Concrete Spillway Structures	\$ _____ each
66.	8 ft. wide Asphalt Cart Path	\$ _____ per Linear foot
67.	10 ft. wide Asphalt Cart Path	\$ _____ per Linear foot

UNIT QUANTITY ESTIMATES

The following quantities have been provided as approximate estimates of the scope of quantities required to build the golf course. The bidder is required to satisfy itself of all work and materials required to complete the work as outlined and as per plans and specifications.

I. Clearing, Grubbing and Disposal

A. **Grubbing, Stump Disposal, Small Trees and Underbrush** (excluding wetlands)

14.77 Acres

II. Earthmoving

A. **Topsoil Handling - Remove & Replace**

75,000 Cubic Yards

B. **Cut on Golf Course**

275,000 Cubic Yards

C. **Excavation from Lakes**

60,000 Cubic Yards

D. **Fill on Golf Course**

333,485 Cubic Yards

III. Features Construction**A. Greens Construction (Modified U.S.G.A Specification)**

~~21~~ act

~~18~~ each greens

132,000 square feet of putting surface

B. Tees Construction

179,800 Square Feet

C. Practice Range Tees

47,205 Square Feet

D. Bunker Construction

32 Bunkers

127,100 Square Feet

E. Waste Bunkers (does not include sand)

83,545 Square Feet

IV. Golf Course Fairway & Rough Field Drainage

(including Green & Bunker carry-off pipe)

A. Perforated ADS type pipe

2,591 Linear Feet 4" Advanced Drainage System or equivalent type

835 6" Advanced Drainage System or equivalent type

B. Solid ADS type pipe

1215 Linear Feet 4" ADS

10,450 Linear Feet 6" ADS

6700 Linear Feet 8" ADS

3730 Linear Feet 10" ADS

2830 Linear Feet 12" ADS

1210 Linear Feet 15" ADS

1310 Linear Feet 18" ADS

1230 Linear Feet 24" ADS

C. Plastic Inlets

289 12" X 12"

15 18" X 18"

1 24" X 24"

10 Sump 36"X36"

V. Irrigation

As per Plans & Specifications.

VII. Grassing

A. Seedbed Preparation

(consists of tillage, minor grading, dragging, debris removal, and seedbed preparation without fertilizers or soil amendments)

130.17 Acres

B. Soil Amendment

To be confirmed by soil test by the contractor.

- 1) **Starter Fertilizer** (500lb/AC, Fairway application only)

130.17 Acres

- 2) **Gypsum** (2,000lb/AC, Fairway application only)

130.17 Acres

- 3) **Sulfur** (2,000lb/AC, Fairway application only)

130.17 Acres

C. Greens

(Creeping Bentgrass- SR 1020)

(@ 2.0 lbs. per 1,000 Square Foot)

118,000 Square Feet

D. Tees

(Penncross Creeping Bentgrass seeding on tees)

(@ 2.0 lbs. per 1,000 Square Feet)

228,005 Square Feet

E. Seeding on Fairways

(Penneagle Creeping Bentgrass Seeding on Fairways)

(@ 90 lbs. per 1 Acre)

53.10 Acres

- F. Perennial Ryegrass Blend Seeding on Immediate Rough**
 (34% Palmer, 33% Prelude, 33% Repell)
 (@ 250 lbs. per 1 Acre)

39.18 Acres

- G. Fine Fescue Blend Seeding on Outer Rough and Out of Play Areas**
 (80% Reliant Hard Fescue and 20% Jamestown II Chewings Fescue)
 (@ 175 lbs. per 1 Acre)

37.89 Acres

H. Sod

Pennlinks Creeping Bentgrass
100,000 Square Feet

Penncross Creeping Bentgrass
150,000 Square Feet

250,000 Square Feet

Penneagle Creeping Bentgrass
25,000 Square Feet

Perennial Ryegrass Blend
50,000 Square Feet

Fine Fescue Blend
10,000 Square Feet

VIII. Cart Paths (See Engineer's Specifications)

- A. 8 Ft. wide path - Asphalt**

28,120 Linear Feet

- B. 10 Ft. wide path - Asphalt**

650 Linear Feet

Cart Path Alternate/Allowance (Asphalt)**A. 7 ft. wide path**28,120 Linear Feet**B. 6 ft. wide path**28,120 Linear Feet**C. 10 ft. wide 4" compacted Aggregate Only**28,120 Linear Feet**D. 8 ft. wide 4" compacted Aggregate Only**28,120 Linear Feet**X. Bridges**

Construct 12 bridges as shown on drawings. The cost to include construction and placing of wing walls, footing and bridge placement as required by Engineer's drawings.

4 each 10 ft. wide Cart and Maintenance Crossing

40 Linear Feet each/bridge

6 each 10 ft. wide Cart and Maintenance Crossing

60 Linear Feet each/bridge

2 each 10 ft. wide Cart and Maintenance Crossing

80 Linear Feet each/bridge

XI. Non-Engineered Bulkheading - (Vertical Wood Bulkheading)

1,000 Linear Feet

Alternate: Rockwall, using field cobble & site materials

1,000 Linear Feet

Control No. _____

PROPOSAL FORM

BID BOND

KNOW ALL MEN BY THESE PRESENTS, That we, _____

_____ as Principal and _____

_____ as Surety, are held and firmly bound unto City of Centerville, State of Ohio, hereinafter called the City, in the penal sum of _____ dollars lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

The condition of this obligation is such, that whereas the principal has submitted the accompanying bid, date _____, 19 _____, for satisfactory Bid Bond submitted as per attached copy, covering the following project:

NOW, THEREFORE, if the principal shall not withdraw said bid within the period specified therein after the opening of the same, or if no period be specified, within sixty (60) days after said opening, and shall within the period specified therefor, or, if no period be specified, within ten (10) days after the prescribed forms are presented to him for signature, enter into a written contract with the City in accordance with the bid as accepted, and give bond with good and sufficient surety or sureties, as may be required, for the faithful performance and proper fulfillment of such contract, or in the event of the withdrawal of said bid within the period specified, or the failure to enter into such contract and give such bond within the time specified, if the principal shall pay the City the difference or failure to enter into such contract and give such bond within the time specified, if the principal shall pay the City the difference between the amount specified in said bid and the amount for which the City may procure the required work and/or supplies if the latter amount be in excess of the former, then the above obligation shall be void and of no effect, otherwise to remain in full force and virtue.

IN WITNESS WHEREOF, the above-bounded parties have executed this instrument.

Under their several seals this ___ day of _____, 19 ____, and name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, Two Witnesses (if individual).

Principal

By _____

ATTEST: (If corporation)

Corporate
Seal _____

Title

Surety

ATTEST:
Corporate

Seal _____ By _____

Title _____

CERTIFICATE AS TO CORPORATE PRINCIPAL

I certify that I am the (Assistant) Secretary of the corporation named as Principal in the within bond; that _____

was _____ who signed the said bond on behalf of the Principal, of said corporation; and I know his signature, and his signature thereto is genuine; and that said bond was duly signed, sealed and attested for and in behalf of said corporation by authority of the governing body.

Corporate
Seal

(signature of Secretary or Assistant Secretary)

PROPOSAL FORM
YANKEE TRACE GOLF COURSE

Control No. _____

CERTIFICATE OF NON-COLLUSION

PROJECT NO. _____

LOCATION _____

STATE OF OHIO

CITY OF CENTERVILLE

AFFIDAVIT

The undersigned of lawful age, being first duly sworn, deposes and says:

That ^{as a} ~~is~~ condition precedent to the award of the City of Centerville project as above captioned.

I _____ of _____
(owner) (partner) (officer) or (delegate) (firm)

do solemnly swear that neither I, nor to the the best of my knowledge any member or members of my firm or company have either directly or indirectly restrained free and competitive bidding on this project by entering into any agreement, participating in any collusion, or otherwise taking any action unauthorized by City of Centerville.

Contractor
By _____
Title

Subscribed and sworn to before me this ____ day of _____, 19 ____.

Seal Expires: _____

Notary Public

Control No. _____

PROPOSAL FORM

CERTIFICATE OF NON-DISCRIMINATION

YANKEE TRACE GOLF COURSE

PROJECT NO. _____

STATE OF OHIO

LOCATION _____

CITY OF CENTERVILLE

AFFIDAVIT

The undersigned of lawful age, being first duly sworn, deposes and says:

That as a condition precedent to the award of the City of Centerville Project as above captioned, I _____ of _____
(owner) (partner) (officer or delegate) (firm)

do solemnly swear that neither I, nor to the best of my knowledge any member or members of my firm or company will not discriminate against any employee or applicant for employment because of race, religion, color, sex, ancestry, age handicap or national origin. I will take affirmative action to assure that applicants are employed, and that employees are treated during employment without regard to their race, religion, color, sex, ancestry, age, handicap or national origin. Such action shall include, but not be limited to the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoffs or terminations; rates of pay or other forms of compensation; and selection for training, including apprenticeship. I agree to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the CITY setting forth the provisions of this non-discrimination clause.

I will, in all solicitations or advertisements for employees placed by or on behalf of myself, state that all qualified applicants will receive consideration for employment without regard to race, religion, color, sex, ancestry, age, handicap or national origin.

I will send to each labor union or representative of workers with which I have a collective bargaining agreement or other contract of understanding a notice to be provided by the CITY advertising the labor union or workers representative of my commitments under paragraph 3.9.01 and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

In the event of my noncompliance with the non-discrimination clauses of this contract or with any of such rules, regulations or orders, this contract may be terminated in whole or in part as set forth in the clause entitled Termination for Default.

Contractor

By _____

Title

Subscribed and sworn to before me this ____ day of _____, 19 ____.

My Commission Expires: _____

Notary Public

Residing in _____

SAMPLE CONSTRUCTION AGREEMENT

AGREEMENT

2.1.00 THIS AGREEMENT, made on the ____ day, of _____, 19 ____, by and between City of Centerville, an Ohio Municipal Corporation, party of the first part, hereinafter called the CITY, and _____

_____ party of the second part, hereinafter called the CONTRACTOR.

WITNESSETH, That the Contractor and the City, for the considerations hereinafter named, agree as follows:

2.2.00 **Scope of the Work.**

The Contractor hereby agrees to furnish all of the materials and all of the equipment and labor necessary, and to perform all of the work shown on the drawings and described in the specifications for the project entitled _____

_____ all in accordance with the requirements and provisions of the following Documents which are hereby made a part of this Agreement:

- (a) Plans prepared for same by _____
numbered _____
and dated _____, 19 ____.
- (b) "Standard General Specifications" issued by _____
_____ Edition.
- (c) "Special Specifications" as prepared by _____
_____ dated _____, 19 ____ with the following
Addenda _____
- (d) General Conditions Agreement

95
(e) Performance Bond

(f) Payments Bond

2.3.00 Time of Completion.

(a) The work to be performed under this Contract shall be commenced within _____ calendar days after the Notice to Proceed has been sent to the Contractor.

(b) The work shall be completed within _____ calendar days after the Notice to Proceed has been sent, with an extension of time for completion equal to any time lost due to causes which could not have been foreseen or which were beyond the control of the Contractor and which were not the result of his fault or negligence. Extension of "Time for Completion" shall also be allowed for any delays in the progress of the work caused by any act or neglect of the City or of its Employees or by other Contractors employed by the City, or delay due to an act of Government, or by any delay in the furnishing of plans and necessary information by the City, or by any other cause which in the opinion of the City entitles the Contractor to an extension of time. Strikes and other labor disputes shall be cause for an extension of time for completion.

2.4.00 Consideration.

.01 (a) The City shall pay to the Contractor for the performance of the contract the amounts listed on the Contractor's "Base bid as per plans & specifications" on the "Bidding Schedule Proposal Form". The Contractor understands that the quantity takeoffs provided in this document are approximate only and certifies to the City that he has done his own quantity takeoffs and is satisfied that the Base Bid Amounts are for all the work shown and called for per the plans and specifications.

(b) The Contractor agrees that the "Unit Price Breakdown" amounts shown on the "Bidding Schedule Proposal Form" are solely for the purpose of determining the Contractor's compensation for additions or deletions to the Project during construction. The "Unit Price Breakdown" amounts shall specifically not be used to adjust the quantity takeoffs contained in the "Bidding Schedule" to reflect the actual number of units that are incorporated by the Contractor in his work covered by this contract.

- (c) Extra Work not included in Article I but authorized after the date of the contract that can not be classified as coming under any of the contract units may be done at mutually agreed upon unit prices, or on a lump sum basis, or under the provisions of paragraph No. 3.19.00 of the General Conditions entitled CHANGES.

.02 The City shall pay to the Contractor for the performance of all the obligations set forth herein the sum of \$_____.

2.5.00 Acceptance and Final Payment.

- (a) Upon receipt of written notice that the work is ready for final inspection and acceptance, the City will promptly make such inspection, and when it finds the work acceptable under the Contract and the Contract fully performed it will promptly issue a final certificate, over its signature, stating that the work required by this Contract has been completed and is accepted by it under the terms and conditions thereof, and the entire balance found to be due the Contractor, including the retained percentage, shall be paid to the Contractor by the City within thirty (30) days after the date of said final certificate.
- (b) Before issuance of final certificate the Contractor shall submit evidence satisfactory to the City that all payrolls, material bills, and other indebtedness connected with the work have been paid except that in case of disputed indebtedness or liens the Contractor may submit in lieu of evidence of payment a surety bond satisfactory to the City guaranteeing payment of all such disputed amounts when adjudicated.
- (c) The making and acceptance of the final payment shall constitute a waiver of all claims by the City, other than those arising from unsettled liens, from faulty work appearing within _____ months after final payment, or from manufacturer's guarantees. It shall also constitute a waiver of all claims by the Contractor, except those previously made and still unsettled.
- (d) If after the work has been substantially completed, full completion thereof is materially delayed through no fault of the Contractor, and the City so certifies, the City shall, upon certificate of the City, and without terminating the Contract, make payment of the balance due for that portion of the work fully completed and accepted. Such payment shall be made under the terms and conditions governing final

payment, except that it shall not constitute a waiver of claims.

- (e) The contract between the City and the Contractor requires that mechanics and laborers be paid a prevailing rate of wage as required in Section 4115.06 of the Ohio Revised Code. The Contractor or any of the Contractor's subcontractor is required to file with the City upon completion of the project and prior to the final payment therefor, an affidavit stating he has complied with Chapter 4115 of the Ohio Revised Code.

IN WITNESS WHEREOF the parties hereto have executed this Agreement the day and year first above written.

WITNESS:

CITY OF CENTERVILLE

BY _____
Title

WITNESS:

CONTRACTOR

BY _____
Title

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, THAT WE,

The Contractor named in the Contract hereinafter referred to, as PRINCIPAL.

and _____ as SURETY, are held and firmly bound unto _____ hereinafter called and also being the City of Centerville named in said Contract, in the sum of _____ Dollars, lawful money of the United States for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, assigns, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THE OBLIGATION IS SUCH, that whereas the Principal entered into a certain contract with City of Centerville dated _____, 19 ____, for _____ work in connection with the City's _____ Project, Identified as Project No. _____ in _____ City of Centerville, State of Ohio:

NOW THEREFORE, if the Principal shall well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of said Contract during the original term of said Contract and any extensions thereof that may be granted by City of Centerville, with or without notice to the Surety, and during the life of any guaranty required under the Contract, and shall also well and truly perform and fulfill all the undertakings, covenants, terms, conditions and agreements of any and all duly authorized modifications of said Contract that may hereafter be made, notice of which modifications to the Surety being hereby waived, and furthermore, shall promptly make payment to all persons, firms, or corporations supplying materials or labor, or both, in the performance of such Contract then, this obligation to be void; otherwise to remain in full force and effect.

IN WITNESS WHEREOF, the above-bounded parties have executed this instrument under their several seals this _____ day of _____, 19 ____ the name and corporate seal of each corporate party being hereto affixed and these present signed by its undersigned representative, pursuant to authority of its governing body.

TWO WITNESSES;

Principal

BY _____

TITLE _____

ATTEST (if corporation)
Corporate

Seal By _____

Title _____

Surety

ATTEST:
Corporate
Seal

BY _____

Title _____

BY _____

Title _____

CERTIFICATE AS TO CORPORATE PRINCIPAL

I certify that I am the (Assistant) Secretary of the Corporation named as Principal in the within bond; that _____, who signed the said bond on behalf of the Principal, was _____ of said corporation: that I know his signature, and his signature thereto is genuine; and that said bond was duly signed, sealed and attested for and on behalf of said corporation by authority of its governing body.

Corporate
Seal _____
(Signature of Secretary or Assistant Secretary)

CITY OF CENTERVILLE
STATE OF OHIO

_____, being first duly sworn on oath, deposes and says: That he is the Attorney-in-Fact of the _____ a corporation organized under the laws of the State of _____ and that he is duly authorized to execute and deliver the foregoing obligation; that the said _____ is authorized to execute the same, and has complied in all respects with the Laws of the State of Ohio, in reference to becoming sole surety upon bonds, undertakings and obligation.

Affiant further says that the Commissioner of Insurance of the State of Ohio and his successors in office, whose address in City of Centerville, Ohio has been appointed Attorney, upon whom process for the State of Ohio may be served according to law.

Subscribed and sworn to before me this ____ day of ____, A.D. 19 ____.

My Commission expires;

Notary Public

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENT: That _____, the Principal, and _____, (herein after called the "Principal"), as Principal, and _____, a corporation of the State of _____, with its principal office in the city of _____ (hereinafter called the Surety), as Surety are held and firmly bound unto _____ (hereinafter called the Obligee), for the use and protection of all subcontractors and all persons supplying labor, machinery, materials, and equipment in the prosecution of the work provided for in the contract hereinafter referred to in the full and just sum of \$_____ Dollars, to the payment of which sum, well and truly to be made, the Principal and Surety bind themselves and each of their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these present.

WHEREAS, the Principal has entered into a certain written contract dated the _____ day of _____ A.D., with the Obligee for improvements to (Legal Name of Project), which Contract is by reference made a part hereof.

NOW, THEREFOR, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the Principal shall faithfully perform said Contract according to its terms, covenants and conditions, and shall promptly pay all persons furnishing labor and material for use in the performance of said Contract, then this obligation shall be void; otherwise it shall remain in full force and effect.

ALL persons who have furnished labor, material, machinery or equipment for use in the performance of said Contract shall have a direct right of action of this Bond, provided payment has not been made in full within ninety (90) days after the last day on which labor was performed, materials, machinery, and equipment furnished or subcontract completed, as provided under _____ code.

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this instrument this _____ day of _____, 19 ____.

WITNESS OR ATTESTATION: _____ (SEAL)

_____ (SEAL)

_____ (SEAL)

WITNESS: _____ Principal

_____ (SEAL)

Surety

BY: _____
Attorney-in-Fact

**GENERAL CONDITIONS
FIXED-PRICE CONSTRUCTION CONTRACT
CITY OF CENTERVILLE, STATE OF OHIO**

3.1.00 Definitions: As used throughout this contract, the following terms shall have the meaning set forth below:

.01 THE CITY shall mean City of Centerville, ^{an Ohio Municipal Corporation} ~~a body Corporate and Politie~~, of the State of Ohio.

.02 CONTRACTOR shall mean the individual, firm, partnership, corporation or association contracting to perform the work outlined herein.

.03 SUBCONTRACTOR shall mean those having a direct contract with the contractor for the performance of work called for hereunder, including one who furnishes material worked to a special design according to the plans and/or specifications of this work but shall not include one who merely furnishes material not so worked.

.04 THE CONTRACT shall mean all of the following documents but not limited thereto, and their addendum agreed to by the parties hereto:

- (1) Agreement
- (2) General Conditions
- (3) Performance Bond
- (4) Payment Bond
- (5) Specifications
- (6) Plans and Drawings
- (7) Change Orders

.05 THE SITE shall mean the property as described in the contract upon which the project will be constructed.

.06 THE PROJECT shall mean the complete construction and related activities required to accomplish the intent and meaning of the contract.

3.2.00 CITY REPRESENTATIVE:

The parties agree that the City of Centerville ^{City Manager} ~~Office of Contracts Administration~~ shall act as the owner's representative with respect to the work to be performed under the agreement. The said ~~Office of Contracts Administration~~ ^{City Manager} shall have complete authority to transmit instruction, receive information, interpret and define City's policy and decisions, with respect to materials, equipment, elements and systems pertinent to the work covered by this agreement.

3.3.00 SITE INVESTIGATIONS AND REPRESENTATIONS:

.01 THE CONTRACTOR acknowledges that he has satisfied himself as to the nature and location of the work, the general and local conditions particularly those bearing upon transportation, disposal, handling and storage of materials, availability of labor, water, electric power, roads, uncertainties of weather, the conformation and condition of the ground, the character, quality and quantity of surface and subsurface materials to be encountered, the character of equipment and facilities needed preliminary to and during the prosecution of the work and all other matters which can in any way affect the work or the cost thereof under this contract. Any failure by the CONTRACTOR to have acquainted himself with all the available information concerning these conditions will not relieve him from responsibility for performing the work.

.02 The CITY assumes no responsibility for any understanding or representations made by any of its officers or agents during or prior to the execution of this contract, unless such understandings or representations by the CITY are expressly stated in the contract. Representations made, but not so expressly stated and for which liability is not expressly assumed by the CITY in the contract, shall be deemed to be for the information of the CONTRACTOR and the CITY will not be liable or responsible therefore.

.03 The CONTRACTOR shall give all notices and comply with all Federal, State, and local laws, ordinances and regulations in any manner effecting the conduct of the work, and all such orders and decrees as exist or may be enacted by bodies or tribunals having any jurisdiction or authority over the work, and shall indemnify and save harmless the CITY against any claim or liability arising from or based on, the violation of any such law, ordinance, regulation, order, or decree, whether by himself or his employees.

3.4.00 INTERPRETATION OF SPECIFICATIONS AND DRAWINGS:

.01 The Contract Documents are complementary and what is called for by any one shall be as binding as if called for by all.

- .02 In the event of an inconsistency between provisions of this Invitation for Bids, the inconsistency shall be resolved by giving precedence in the following order: (a) Bidding Instructions, (b) General Conditions, (c) Specifications, and (d) Drawings.
- .03 The intention of the Documents is to include all labor and materials, equipment and transportation necessary for the 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.
- .04 In case of discrepancy either in the figures, in the drawings or in the specifications, the matter shall be promptly submitted to the CITY, which shall promptly make a determination in writing. Any adjustment by the CONTRACTOR without this determination shall be at his own risk and expense.
- .05 The CITY shall furnish from time to time such detail drawings and other information as it may consider necessary, unless otherwise provided.
- .06 Omissions from the drawings or specifications, or the misdescription of details of work which are manifestly necessary to carry out the intent of the drawings or specifications, or which are customarily performed, shall not relieve the CONTRACTOR from performing such omitted or misdescribed details of work, but they shall be performed as if dully and clearly set forth and described in the drawings and specifications.

3.5.00 MATERIALS AND WORKMANSHIP

- .01 Unless otherwise specifically provided for in the specifications, all equipment, materials and articles incorporated in the work covered by this contract are to be new and of the most suitable grade of their respective kinds for the purpose and all workmanship shall be first class. Where equipment, materials, or articles are referred to in the specifications as "equal to" any particular standard, the CITY shall decide the question of equality. The CONTRACTOR shall furnish to the CITY for approval the name of the manufacturer of machinery, mechanical and other equipment which he contemplates incorporating in the work, together with their performance capacities and other pertinent information. When required by the specifications or when called for by the CITY, the CONTRACTOR shall furnish to the CITY for approval full information concerning the materials or articles which he contemplates incorporating in the work. Samples of materials shall be submitted for approval when so directed.

Machinery, equipment, materials and articles installed or used without such approval shall be at the risk of subsequent rejections.

.02 Specific reference in the specifications or drawing to any article device, product, material, fixture, form or type of construction, etc. by name, make or catalogue number shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition, and the CONTRACTOR in such cases, may at his option use any articles, device, product, material, fixture, form or type of construction, etc. which in the judgment of the CITY is equal to that named. When three or more names are mentioned in the specifications and the CONTRACTOR desires to use a product of another manufacturer he shall state the name of the substituted manufacturer or supplier in his bid and shall also state the addition or deduction from the bid if the product submitted is not accepted as equal to the products specified. If the CONTRACTOR submits the name of another manufacturer than mentioned in the specifications before bids are due and this manufacturer is approved by the CITY in writing the addition or deduction from the specified bid need not be stated.

3.6.00 DELIVERY;

Unless otherwise provided in this contract, all materials to be furnished by the CONTRACTOR shall be delivered to the CITY's job site of the work.

3.7.00 OTHER CONTRACTS;

The CITY may undertake or award other contracts for additional work, and the CONTRACTOR shall fully cooperate with such other Contractors and the City employees and carefully fit his own work to such additional work as may be directed by the CITY. The CONTRACTOR shall not commit or permit any act which will interfere with the performance of work by any other contractor or by the city employees.

3.8.00 ROYALTIES AND PATENTS;

If any design, device, material or process covered by letters patent or copyright, or for which letters patent or copyright have been applied, is used by the contractor, he shall provide for such use by legal agreement with the owner of the patent or proposed patent or copyrights or a duly authorized licensee of such owner, and shall save harmless City of Centerville from any and all loss or expense or account thereof including its use by City of Centerville.

3.9.00 EQUAL OPPORTUNITY:

.01 The CONTRACTOR will not discriminate against any employee or applicant for employment because of race, creed, color, sex or national origin. The CONTRACTOR will take affirmative action to assure that applicants are employed, and that employees are treated during employment without regard

to their race, religion, color, sex, ancestry, age, handicap or national origin. Such action shall include but not be limited to the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoffs or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The CONTRACTOR agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the CITY setting forth the provisions of this non-discrimination clause.

.02 The CONTRACTOR will, in all solicitations or advertisements for employees placed by or on behalf of the CONTRACTOR, state that all qualified applicants will receive consideration for employment without regard to race, religion, color, sex, ancestry, age, handicap or national origin.

.03 The CONTRACTOR will send to each labor union or representative of works with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided by the CITY advising the labor union or workers representative of the CONTRACTOR's commitments under paragraph 3.9.01 and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

.04 In the events of the CONTRACTOR'S noncompliance with the nondiscrimination clauses of this contract or with any of such rules, regulations or orders, this contract may be terminated in whole or in part as set forth in the clause entitled Termination for Default.

3.10.00 LABOR REGULATIONS AND REQUIREMENTS:

.01 The CONTRACTOR will comply with provisions set forth in the Labor Laws of the State of Ohio, and comply with current existing Federal and State laws applicable to Contracts on Public Works.

.02 The CITY may in writing require the CONTRACTOR to remove from the work such employee as the CITY deems incompetent, careless, insubordinate, or otherwise objectionable, or whose continued employment on the work is deemed by the CITY to be contrary to the public interest.

3.11.00 DELAYS CAUSED BY CITY:

.01 It is anticipated that there shall be no delays due to operations of the CITY. However, should such delays occur, CONTRACTOR shall immediately notify the CITY in writing as to the cause of delay.

.02 If such delay causes an increase or decrease in the time required for the performance of this contract, an equitable adjustment shall be made and the contract modified in writing accordingly.

.03 The extension of time shall be deemed valid unless a written claim is asserted within fifteen (15) days of the occurrence of the incident(s) giving rise to such occurrence.

3.12.00 POSSESSION PRIOR TO COMPLETION:

The CITY shall have the right to take possession of or use any completed or partially completed part of the work. Such possession or use shall not be deemed an acceptance of any work not completed in accordance with the contract. If such prior possession or use by the CITY delays the progress of the work or causes additional expense to the CONTRACTOR, an equitable adjustment in the contract price and/or the time of completion will be made and the contract will be modified in writing accordingly.

3.13.00 CITY FURNISHED PROPERTY:

The CITY will deliver to the CONTRACTOR for use in connection with and under the terms of the contract only such CITY property as may be specified in the schedule or specifications, together with such related data and information as may reasonably be required for the intended use of such property. The delivery or performance dates for supplies or services to be furnished by the CONTRACTOR under this contract are based upon the expectation that the CITY furnished property suitable for use will be delivered to the CONTRACTOR to meet such delivery or performance dates. In the event that the CITY furnished property is not delivered to the CONTRACTOR by such time or times, the CITY shall, upon timely written request made by the CONTRACTOR make a determination of the delay occasioned the CONTRACTOR and shall equitably adjust the contract price, or delivery or performance dates, or all of them, and any other contractual provisions affected by such delay. In the event that the CITY furnished property is received by the CONTRACTOR in a condition not suitable for the intended use, the CONTRACTOR shall upon request thereof, notify the CITY of such fact and, as directed by the CITY either (1) return such property at the CITY'S expense or otherwise dispose of the property, or (2) effect repairs or modifications. Upon completion of (1) or (2) above, the City shall, upon written request of the CONTRACTOR, equitably adjust the contract price, or delivery or performance dates, or all of them, and any other contractual provisions affected by the return or disposition, or the repair or modification. The foregoing provisions for adjustment are exclusive and the CITY shall not be liable to suit for breach of contract by reason of any delays in delivery of CITY furnished property or delivery of such property in a condition not suitable for its intended use.

3.14.00 SCHEDULE REPORT:

The CONTRACTOR shall within five (5) days after date of commencement of work, prepare and submit to the CITY for approval, a practicable and feasible schedule, showing the order in which the CONTRACTOR proposes to carry on the work, the date on which he will start the several salient features (including procurement of materials, plant, and equipment) and the contemplated dates for completing them. The schedule shall be prepared in the form prescribed by the CITY and of suitable scale to indicate appropriately the percentage of the actual progress at the end of each week or at such intervals as directed by the CITY, and shall immediately deliver to the CITY six (6) copies thereof.

3.15.00 PROSECUTION OF WORK:

.01 The CONTRACTOR shall keep on the site a copy of the drawings and specifications and shall at all times give the CITY access thereto.

.02 The CONTRACTOR shall furnish sufficient forces, construction plant, and equipment, and shall work such hours, including night shifts, overtime operations, and Sunday and holiday work, as may be necessary to insure the prosecution of the work in accordance with the approved progress schedule. If, in the opinion of the CITY, the CONTRACTOR falls behind the progress schedule, the CONTRACTOR shall take such steps as may be necessary to improve his progress, and the CITY may require him to increase the number of shifts, and/or overtime operation days of work, and/or the amount of construction plant, all without additional cost to the CITY.

.03 Failure of the CONTRACTOR to comply with the requirements of the CITY under these provisions shall be grounds for determination by the CITY that the CONTRACTOR is not prosecuting the work with such diligence as will insure completion within the time specified. Upon such determination, the CITY may terminate the CONTRACTOR'S rights to proceed with the work, or any separable part, thereof, in accordance with the clause herein entitled "Termination for Default."

3.16.00 CHANGED CONDITIONS:

The CONTRACTOR shall promptly, and before such conditions are disturbed, notify the CITY in writing of: (a) subsurface or latent physical conditions at the site differing materially from those indicated in this contract, or (b) unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in this contract. The CITY shall promptly investigate the conditions, and if they find that such conditions do so materially differ and cause an increase or decrease in the cost of, or the

time required for, performance of this contract, an equitable adjustment shall be made and the contract modified in writing accordingly. Any claim of the CONTRACTOR for adjustment hereunder shall not be allowed unless he has given notice as above required; provided that the CITY may, if it determines the facts so justify, consider and adjust any such claim asserted before the date of final settlement of the contract.

3.17.00 NOTICE OF LABOR DISPUTES:

Whenever the CONTRACTOR has knowledge that any actual or potential labor dispute is delaying or threatens to delay the time of performance of this contract, the CONTRACTOR shall immediately give notice thereof, including all relevant information with respect thereto, to the CITY.

3.18.00 CERTIFICATION:

The CONTRACTOR shall furnish written certification in the form required by the CITY, that the work was completed in compliance with the plans and specifications.

3.19.00 CHANGES:

.01 The CITY may at any time, by a written order, and without notice to the sureties, make changes in the drawings, specifications, and extra work of this contract and within the general scope thereof. No extra work or change shall be made unless in pursuance of a written order by the CITY, and no claim for an addition to the contract sum shall be valid unless the additional work was so ordered. If such changes cause an increase or decrease in the amount due under this contract, or in the time required for its performance, an equitable adjustment shall be made and the contract shall be modified in writing accordingly. Any claim of the CONTRACTOR for adjustment under this clause must be asserted in writing within fifteen (15) days from the date of receipt by the CONTRACTOR of the notification of change; provided, however, that the CITY, if it determines that the facts justify such action, may receive and consider, and adjust any such claim asserted at any time prior to the date of final settlement of the contract. Nothing provided in this clause shall excuse the CONTRACTOR from proceeding with the prosecution of the work as changed. Except as otherwise herein provided, no charge for any extra work or material will be allowed.

.02 Any interpretation, inference or contrary meaning notwithstanding nothing in this clause or in any other part of this agreement may be construed as authorizing changes or modifications unless the change order is in writing in accordance with the above paragraph.

3.20.00 PAYMENTS:

- .01 The CITY shall make monthly progress payments to the CONTRACTOR in an amount of money equal to ninety (90) percent of incurred costs for labor expended and materials, including overhead on such labor and materials supplied to the job site during the month next proceeding. However, in no event shall the cumulative total of progress payments exceed the Owner's estimate of the percentage of work completed. Said payments will be made upon submission of a progress payment report in the form prescribed by the CITY. The CONTRACTOR shall keep and maintain books and records available to audit by the CITY or its representatives at all reasonable hours.
- .02 In making such partial payments there shall be retained ten (10) percent on the estimated amount until final completion and acceptance of all work covered by the contract; provided, however, that the CITY, at any time after fifty (50) percent of the work has been completed if it finds that satisfactory progress is being made, may make any of the remaining partial payments in full.
- .03 All rights, title and interest in and to material and work covered by partial payments made shall thereupon become the sole property of the CITY, by this provision shall not be construed as relieving the CONTRACTOR from the sole responsibility for all materials and work upon which payments have been made or the restoration of any damaged work, or as a waiver of the right of the CITY to require the fulfillment of all of the terms of the contract.
- .04 Upon completion and acceptance of all work required hereunder, the amount due the CONTRACTOR under this contract will be paid upon the presentation of a properly executed final payment report and a duly certified voucher therefor, and after the CONTRACTOR shall have furnished the CITY with a release, if required, of all claims against the CITY arising under and by virtue of this contract, other than such claims, if any, as may be specifically excepted by the CONTRACTOR from the operation of the release in stated amount to be set forth therein. If the CONTRACTOR'S claim to amounts payable under the contract has been assigned, a release may also be required of the assignee at the option of the CITY.

3.21.00 ACCEPTANCE FOR PAYMENT:

- .01 Within thirty (30) days after completion of all work under this contract, if possible, the work will be given a final examination. When all of the work is found to be satisfactorily completed in accordance with the contract, the entire work will be finally accepted by the CITY and final payment will be made to the CONTRACTOR.
- .02 For purposes of this clause, final acceptance refers only to final acceptance which will allow the CONTRACTOR to be paid and does not refer to the final acceptance in relation to inspection of material, in connection with which the CITY reserves certain rights as set forth in the clause titled "Inspection."

3.22.00 INSPECTION:

- .01 Except as otherwise provided herein all material and workmanship if not otherwise designated by the specification, shall be subject to inspection, examination, and test by the CITY at any and all times during manufacture and/or construction at any and all places where such manufacture and/or construction are carried on. The CITY shall have the right to reject defective material and workmanship or require its correction. Rejected workmanship shall be satisfactorily corrected and rejected material shall be satisfactorily replaced with proper material without charge therefor, and the CONTRACTOR shall promptly segregate and remove the rejected material from the premises. If the CONTRACTOR fails to proceed at once with the replacement of rejected material and/or the correction of defective workmanship the CITY may, by contract or otherwise, replace such material and/or correct such workmanship and charge the cost thereof to the CONTRACTOR, or may terminate the right of the CONTRACTOR to proceed as provided in this contract, the CONTRACTOR surety being liable for any damage to the same extent as provided in said Clause.
- .02 The CONTRACTOR shall furnish promptly without additional charge, all reasonable facilities, labor, and materials necessary for the safe and convenient inspection and tests that may be required by the CITY shall be performed in such manner as not necessarily to delay the work. The CONTRACTOR shall be charged with additional cost of inspection when material and workmanship are not ready at the time inspection is requested by the CONTRACTOR.
- .03 Should it be considered necessary or advisable by the CITY at any time before the final acceptance of the entire work to make an examination of work already completed, by removing or tearing out same, the CONTRACTOR shall, on request, promptly furnish all necessary facilities, labor and material. If such work is found to be defective or nonconforming in any material respect, due to the fault of the CONTRACTOR or his

subcontractors, he shall pay all the expenses of such examination and of satisfactory reconstruction. If, however, such work is found to meet the requirements of the contract, the actual direct cost of labor and material necessarily involved in the examination and replacement, plus 10%, shall be allowed the CONTRACTOR and he shall, in addition, if completion of the work has been delayed thereby, be granted a suitable extension of the time on account of the additional work involved.

3.23.00 TESTS:

Tests or trials to determine effectiveness of performance of completed assembly or fabricated system as set out herein shall be made by the CONTRACTOR, without cost to the CITY.

3.24.00 WARRANTY:

The CONTRACTOR expressly warrants the workmanship, materials and manner of construction provided for and contemplated by this contract and the plans, profiles and specifications accompanying and forming part of the same and agrees that if the improvement contemplated therein does not remain in good condition for a period of one year from the date of final acceptance by the CITY of the entire property, ordinary wear and tear excepted, because of defects in the workmanship, materials or manner of construction, then and in that event CONTRACTOR agrees that any and all repairs necessary to maintain said improvement and each and every part thereof in such good condition shall be made by said CONTRACTOR without additional charge or cost to the property owners or to the CITY.

3.25.00 PROTECTION OF CITY AND PUBLIC PROPERTY:

.01 The CONTRACTOR shall not enter upon private property for any purpose without obtaining permission, and he shall be responsible for the preservation of all public property, trees, monuments, etc. along and adjacent to the street and or right-of-way, and shall use every precaution necessary to prevent damage or injury thereto.

He shall use suitable precautions to prevent damage to the pipes, conduits, and other underground structures and shall protect carefully from disturbance or damage all monuments and property marks until an authorized agent has witnessed or otherwise referenced their location and shall not remove them until directed. The CONTRACTOR shall indemnify and ^{hold acs} ~~save~~ harmless the CITY from and against all losses and all claims, demands, payments, suits, actions, recoveries, and judgments of every nature and description brought or recovered against him by reason of any omission or act of the CONTRACTOR, his agents or employees in the execution of the work or in the guarding of it. The CONTRACTOR shall obtain in the name of the

CITY and shall maintain and pay the premiums for such insurance in such amount and with such provisions as will protect the CITY from contingent liability under this contract and a copy of such insurance policy or policies shall be delivered to the CITY.

.02 Care will be taken by the CONTRACTOR in felling trees authorized for removal to avoid any unnecessary damage to vegetation that is to remain in place. Any limbs or branches or trees broken during such operations shall be trimmed with a clean cut and painted with an approved tree-pruning compound if required to replace or restore at his own expense all vegetation not protected and preserved as required herein that may be destroyed or damaged.

.03 The CONTRACTOR shall provide and maintain all necessary watchmen, barricades, red lights and warning signs and take all necessary precautions for the protection and safety of the public. He shall continuously maintain adequate protection of all work from damage, and shall take all reasonable precautions to protect the CITY'S property from injury or loss arising in connection with this contract. He shall make good any damage, injury or loss to his work and to the property of the CITY resulting from lack of reasonable protective precautions, except such as may be due to errors in the contract documents, or caused by agents or employees of the CITY. He shall adequately protect adjacent private and public property, as provided by law and the contract documents.

.04 In an emergency affecting the safety of life or of the work or of adjoining property, the CONTRACTOR is, without special instructions or authorization from the CITY, hereby permitted to act at his discretion to prevent such threatened loss or injury. The CONTRACTOR shall be entitled to reasonable compensation for emergency work.

3.26.00 OPERATION AND STORAGE AREAS:

.01 All operations of the CONTRACTOR (including storage of materials) upon the CITY'S premises shall be confined to areas authorized or approved by the CITY. No unauthorized or unwarranted entry upon, passage through, or storage or disposal of materials shall be made upon the CITY'S premises. The CITY premises adjacent to the construction will be made available for use by the CONTRACTOR without cost whenever such use will not interfere with the CITY'S other uses or purposes. The CONTRACTOR shall hold and save the CITY, its officers and agents, free and harmless from liability of any nature or kind arising from the use, trespass or damage occasioned by his operations on premises of third person.

.02 Temporary buildings (storage sheds, shops, office, etc.) shall be erected by the CONTRACTOR upon the CITY'S premises only with approval of the CITY,

and shall be built with labor and materials furnished by the CONTRACTOR without expense to the CITY, and will be removed by the CONTRACTOR at the CONTRACTOR'S expense upon the completion of the work. With written consent of the CITY, such buildings and/or utilities may be abandoned and need not be removed.

.03 The CONTRACTOR shall, under regulations prescribed by the CITY, use only established roadways or construct and use such temporary roadways as may be authorized by the CITY. Where materials are transported in the prosecution of the work, vehicles shall not be loaded beyond the loading capacity recommended by the manufacturer of the vehicle or prescribed by any Federal, State or local law or regulation. When it is necessary to cross curbs or sidewalks, protection against damage shall be provided by the CONTRACTOR, and any damaged roads curbing or sidewalks shall be repaired by, and at the expense of the CONTRACTOR.

.04 The CONTRACTOR shall at all times keep the construction area, including storage areas used by him, free from accumulations of waste material or rubbish and prior to completion of the work, remove any rubbish from and about the premises, and all tools, scaffolding, equipment, and materials not the property of the CITY. Upon completion of the construction, the CONTRACTOR shall leave the work and premises in a clean, neat and workmanlike condition satisfactory to the CITY.

3.27.00 LIABILITY OF CONTRACTOR:

The CONTRACTOR shall be responsible for all damages to persons or property that occur as a result of the negligence or fault of the CONTRACTOR in connection with the prosecution of the work. The CONTRACTOR shall also be responsible for all materials delivered and work performed until completion and final acceptance.

3.28.00 INSURANCE

.01 The CONTRACTOR shall secure and maintain such insurance from an insurance company authorized to write casualty insurance in the State of Ohio as will protect himself, his subcontractors and the CITY from fire and extended coverage losses and from claims for bodily injury, death or property damage which may arise from operations under this contract. All such insurance policies must be approved and accepted by the CITY. The CONTRACTOR shall not commence work under this contract until he has obtained all insurance required under this paragraph and shall have filed the policy with the CITY. Each insurance policy shall contain a clause providing that it shall not be cancelled by the insurance company without ten (10) days written notice to the CITY of intention to cancel. The amounts of such insurance shall not be less than the following:

a. Workman's Compensation and Employer's Liability Insurance shall be secured and maintained as required by the State of Ohio.

b. Public Liability, Bodily Injury and Property Damage:

- 1. Injury or death of one person..... \$ ~~100,000~~ ^{1,000,000 act}
- 2. Injury to more than one in single accident.. ~~300,000~~ ^{1,000,000 act}
- 3. Property damage ~~100,000~~ ^{1,000,000 act}

c. Automobile and Truck Liability, Bodily Injury and Property Damages:

- 1. Injury or death of one person..... \$ ~~100,000~~ ^{1,000,000 act}
- 2. Injury to more than one in single accident.. ~~300,000~~ ^{1,000,000 act}
- 3. Property damage ~~100,000~~ ^{1,000,000 act}

.02 In addition to such fire insurance as the CONTRACTOR elects to carry for his protection, he shall secure and maintain in the name of City of Centerville policies upon such structures and materials in such amounts as shall be designated by City of Centerville. The policies shall be secured from a company which is satisfactory to City of Centerville and shall be delivered to the City.

3.29.00 BONDS:

.01 The CONTRACTOR shall furnish a payment bond with good and sufficient surety or sureties in a form acceptable to the CITY for the protection of persons furnishing material or labor in connection with the performance of the work under this Agreement. The penal sum of such payment bond shall be 100% of the contract price.

.02 The CONTRACTOR shall furnish a performance bond with good and sufficient surety or sureties in a form acceptable to the CITY in connection with the performance of the contract work. The penal sum of the performance bond shall be 100% of the contract price.

.03 Bonds required hereunder shall be dated as of the same date as the contract and shall be furnished by the CONTRACTOR to the CITY at the time of execution of this contract.

.04 If any surety upon any bond furnished in connection with this contract becomes unacceptable to the CITY, or if the surety fails to furnish reports as to his financial condition as requested by the CITY, the CONTRACTOR shall promptly furnish additional surety as shall be required to protect the interests of the CITY and of persons supplying labor or materials in the prosecution of the work contemplated by the contract.

.05 In the event any changes, alterations, modifications, or amendments are made from time to time to this contract, or plans or specifications, subsequent to the date of bonds furnished hereunder, the CONTRACTOR shall secure from the Surety, a Bond Rider to the effect that the Surety waives Right of Discharge by reason of such action.

.06 The bonds furnished hereunder shall be in a form acceptable to the CITY and shall contain words to the effect Surety waives notice of any modifications or amendments to this contract, or plans or specifications hereunder.

.07 Bonds will also contain a provision to the effect that, if the CONTRACTOR fails to give the Surety notice of changes, alterations, modifications, or amendments to this contract, Surety shall not be released of liability under existing bonds or any riders issued thereto. The CITY shall have the right to withhold any payments due the CONTRACTOR hereunder until such time as the CONTRACTOR secures the bonds required or riders thereto and the same has been approved by the CITY.

.08 The duty of securing required bonds for this contract and riders thereto shall be upon the CONTRACTOR.

3.30.00 TERMINATION FOR DEFAULT:

.01 If the CONTRACTOR refuses or fails to prosecute the work, or any separate part thereof, with such diligence as will insure its completion within the time specified in this contract or any extension thereof, or fails to complete said work within such time, the CITY may, by written notice to the CONTRACTOR, terminate his right to proceed with the work or such part of the work as to why there has been delay. In such event the CITY may take over the work and prosecute the same to completion, by contract or otherwise and the CONTRACTOR and his sureties shall be liable to the CITY for any excess cost occasioned by the CITY thereby, and for liquidated damages for delay, as fixed in the specifications or accompanying papers, until such reasonable time as may be required for final completion of the work, or if liquidated damages are not so fixed, any actual damages occasioned by delay. If the CONTRACTOR'S right to proceed is ^{or is} ~~is~~ terminated, the CITY may take possession of and utilize in completing the work such materials, appliances and plant as may be on the site of the work and necessary therefor.

.02 If the CITY does not terminate the right of the CONTRACTOR to proceed, as provided in paragraph (.01) hereof, the CONTRACTOR shall continue the work, in which event he and his sureties shall be liable to the CITY, in the amount set forth in the specifications or accompanying papers, for fixed, agreed, and liquidated damages for each calendar day of delay until the work is complete or accepted, or if liquidated damages are not so fixed, any actual damages occasioned by such delay.

.03 The right of the CONTRACTOR to proceed shall not be terminated, as provided in paragraph (.01) hereof, nor the CONTRACTOR charged with liquidated or actual damages, as provided in paragraph (.02) hereof, because of any delays in the completion of the work due to unforeseeable causes beyond the control and without the fault or negligence of the CONTRACTOR, including but not restricted to, acts of God, or of the public enemy, acts of the Government, in either its sovereign or contractual capacity, acts of another contractor in the performance of a contract with the CITY, fires, floods, epidemics, quarantine restrictions, strikes, freight, embargoes, and unusually severe weather, or delays of subcontractors or suppliers due to such causes provided, that the CONTRACTOR shall within ten (10) days from the beginning of any such delay, unless the CITY shall grant a further period of time prior to the date of final settlement of the contract, notify the CITY in writing of the causes of delay. The CITY shall ascertain the facts and the extent of the delay and extend the time for completing the work when in the CITY'S judgment the findings of fact justify such an extension, and the CITY'S finding of facts thereon shall be final and conclusive on the parties hereto.

3.31.00 TERMINATION FOR CONVENIENCE:

.01 The performance of work under this contract may be terminated in whole, or from time to time in part, by the CITY in accordance with this clause. Termination of work hereunder shall be effected by delivery to the CONTRACTOR of a Notice of Termination specifying the extent to which performance of work under the contract is terminated, and date upon which such termination becomes effective.

.02 After receipt of a Notice of Termination and except as otherwise directed by the CITY, the CONTRACTOR shall, (1) stop work under the contract on the date and to the extent specified in the Notice of Termination; (2) place no further orders or subcontracts for materials, services or facilities except as may be necessary for completion of such portions of the work under the contract as may be terminated; (3) terminate all orders and subcontracts to the extent that they are related to the performance of any work terminated by the Notice of Termination; (4) assign to the CITY in the manner, at the times, and to the extent directed by the CITY all of the right, title and interest of the CONTRACTOR under the orders or subcontracts so terminated, in which case the CITY shall have the right, in its discretion, to settle or pay any or all claims arising out of the termination of such orders and subcontracts; (5) settle all outstanding liabilities and all claims arising out of such termination of orders and subcontracts subject to the approval or ratification of the CITY to the extent the CITY may require, which approval or ratification shall be final for all the purpose of this clause; (6) transfer title and deliver to the CITY in the manner, to the extent, at the times directed by the CITY (i) the fabricated or unfabricated parts, work in progress, complete work, supplies

and other material produced as a part of, or required in connection with the performance of the work terminated by the Notice of Termination, and (ii) the completed or partially completed plans, drawings, information, and other property which, if the contract has been completed, would be required to be furnished to the CITY; (7) use its best efforts to sell in the manner, to the extent, at the time, and at the price or prices directed or authorized by the CITY any property of the types referred to in provision (6) of this paragraph, provided, however, that the CONTRACTOR (i) shall not be required to extend credit to any purchaser and (ii) may acquire any such property under the conditions prescribed by and at a price or prices approved by the CITY and provided further that the proceeds of any such transfer or disposition shall be applied in deduction of any payments to be made by the CITY to the CONTRACTOR under this contract or shall otherwise be credited to the price or cost of the work covered by this contract or paid in such other manner as the CITY may direct; (8) complete performance of such part of the work as shall not have been terminated by the Notice of Termination; and (9) take such action as may be necessary or as the CITY may direct for protection and preservation of the property related to this contract, which is in the possession of the CONTRACTOR and in which the CITY has or may acquire an interest.

- .03 After receipt of a Notice of Termination, the CONTRACTOR shall submit to the CITY its termination claim in the form and with the certification prescribed by the CITY. Such claim shall be submitted promptly, but not later than six (6) months from the effective date of termination. Upon failure of the CONTRACTOR to submit its termination claim within the time allowed, the CITY may determine, on the basis of information available to it, the amount, if any, due to the CONTRACTOR in respect to the termination and such determination under this paragraph, it shall pay the CONTRACTOR the amount so determined.
- .04 Subject to the provisions of paragraph (.03) the CONTRACTOR and the CITY may agree upon the whole or any part of the amount or amounts to be paid to the CONTRACTOR by reason of the total or partial termination of work pursuant to this clause, which amount or amounts may include a reasonable allowance for profit on work done and the CITY shall pay the agreed amount or amounts; provided that such agreed amount or amounts exclusive of settlement costs, shall not exceed the total contract price as reduced by the amount of payments otherwise made and as further reduced by the contract price of work not terminated.
- .05 The obligation of the CITY to make any payments under this clause shall be subject to deductions in respects of (1) all unliquidated advance or other payments on account theretofore made to the CONTRACTOR, (2) any claim which the CITY may have against the CONTRACTOR in connection with this contract, and (3) the agreed price for, or the proceeds of sale of, any

materials, supplies, or other things retained by the CONTRACTOR, or sold, and not otherwise recovered by or credited to the CITY.

- .06 If the termination hereunder be partial, prior to the settlement of the terminated portion of this contract, the CONTRACTOR may file with the CITY a request in writing that an equitable adjustment be made in the price or prices specified in the contract for the work in connection with the continued portion not terminated by the Notice of Termination, and the appropriate fair and reasonable adjustment shall be made in such price or prices. However, nothing contained herein shall limit the right of the CITY and the CONTRACTOR for the completion of the continued portion of the contract when said contract does not contain an established contract price for such continued portion.
- .07 The CITY may, from time to time, under such terms and conditions as it may prescribe, make partial payments and payments on account against costs incurred by the CONTRACTOR in respect to the termination portion of the contract, whenever in the opinion of the CITY the aggregate of such payments shall be within the amount to which the CONTRACTOR will be entitled hereunder. If the total of such payments is in excess of the amount finally agreed upon or determined to be due under this clause, such excess shall be payable by the CONTRACTOR to the CITY upon demand, together with interest thereon computed at the rate of 6% per annum, for the period from the date on which such excess payment is received by the CONTRACTOR to the date on which such excess is repaid to the CITY provided however that no interest shall be charged with respect to any such excess payment attributable to a reduction in the CONTRACTOR'S claim by reason of retention or other disposition of termination inventory until ten days after the date of such retention or disposition, or such later date as determined by the CITY by reason of the circumstances.
- .08 Unless otherwise provided for in the contract, or by applicable statute, the CONTRACTOR, for a period of three (3) years after final settlement under the contract shall make available to the CITY at all reasonable times at the office of the CONTRACTOR all its books, records, documents, or other evidence bearing on the costs and expenses of the CONTRACTOR under the contract and in respect to the termination of work hereunder or, to the extent approved by the CITY, photographs, microphotographs, or other authentic reproductions thereof.
- .09 For purposes of paragraph .04 above, the amounts of the payments to be made by the CITY to the CONTRACTOR shall be: (a) The cost of work performed prior to the effective date of the Notice of Termination. (b) The cost of settling and paying claims arising out of the termination of work under subcontracts or orders as provided hereinabove exclusive of the amounts paid or payable on account of supplies or materials delivered or services furnished

by the subcontractor prior to the effective date of the Notice of Termination of work under this contract. (c) A sum of money, as a profit, equal to a maximum amount that the CONTRACTOR can establish from his own records he would have received if the agreement had been carried through to completion, provided however, that in no event shall said profit exceed ten percent (10%) of the total sum of incurred costs. (d) The total sum to be paid to the CONTRACTOR under (a) (b) and (c) above shall not exceed the total contract price as reduced by the amount of payments otherwise made and is further reduced by the contract price of work not terminated.

3.32.00 CITY EMPLOYEES NOT TO SHARE:

No individual or group of official employee(s) or agent(s) of the CITY shall be allowed to any share or part of this contract, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this contract if made with a corporation for its general benefit and said official(s), employee(s), or agent(s) as a group or individually own less than ~~50%~~ 5% of the outstanding stock of said corporation.

3.33.00 EMPLOYEES NOT TO PARTICIPATE:

The CONTRACTOR warrants that no City employee, official, or agent has been retained by the CONTRACTOR to solicit or secure this contract upon an agreement or understanding for a commission, percentage, brokerage, contingent fee, or any other form of compensation. For breach or violation of this warranty the Government shall have the right to terminate this contract for default as set out herein or in its discretion to deduct from the contract price or otherwise recover the full amount of such enumeration.

3.34.00 SUBCONTRACTORS BOUND:

The CONTRACTOR will include the following provisions of this contract in all subcontracts or purchase orders as applicable: 3.8.00, 3.9.00, 3.10.00, 3.27.00, 3.28.00, 3.30.00, 3.31.00.

3.35.00 ASSIGNMENT OF CLAIMS:

The CONTRACTOR shall not assign, transfer or sublet this contract or any interest therein or any part thereof, without prior written consent of the CITY.

GENERAL CONDITIONS

GENERAL CONDITIONS
ARTICLE I
DEFINITIONS

Wherever used in the General Conditions or in the other Contract Documents, the following terms have the meanings indicated which are applicable to both the singular and the plural thereof :

Addenda

Written or graphic instruments issued prior to the opening of Bids which clarify, correct or change the bidding documents or the Contract Documents.

Agreement

The written engagement between the OWNER and the CONTRACTOR covering the Work to be performed, and other Contract Documents which are attached to or referred to by the Agreement and made a part thereof as provided therein.

Application for Payments

The form accepted by the DESIGNER and the OWNER for use by the CONTRACTOR in requesting progress of final payment and which is to include such supporting documentation as is required by the Contract Documents.

Bidder

Any person, firm or corporation submitting a bid for all or any designated portion of the Work.

Bid

The offer or proposal of the Bidder, submitted on the prescribed form, setting forth the prices for the Work to be performed.

Bonds

Bid, performance and payment bonds, as well as other instruments of security.

Change Order

A written order to the CONTRACTOR, signed by the OWNER, authorizing an addition, deletion or revision in the Work, or an adjustment in the Contract Price or the Contract Duration, issued after the effective date of the Agreement.

Contract Documents

The Agreement, Addenda (which pertains to the Contract Documents), Contractor's Bid (including documentation accompanying the Bid and any post-bid documentation submitted prior to the Notice of Award), when attached as an exhibit to the Agreement, the Bond, these General Conditions, the Supplementary Conditions, the Specifications, the Drawings, as the same are more specifically identified in the Agreement, together with all modifications issued after the execution of the Agreement.

Contract Price

The moneys payable by the OWNER to the CONTRACTOR under the Contract Documents as stated in the Agreement.

Contract Time

The number of days (computed as provided in paragraph 17.2) or the date stated in the Agreement for the completion of the Work.

Contractor

The person, firm or corporation with whom the OWNER has entered in to the Agreement.

Day

A calendar day of twenty-four (24) hours measured from midnight to the following midnight.

Defective

An adjective which, when modifying the word Work, refers to Work that is unsatisfactory, faulty, or deficient, or does not conform to the Contract Documents or does not meet the requirements of any inspection, test or approval referred to in the Contract Documents, or has been damaged prior to final payment.

Designer

The person, firm or corporation name as such in the Agreement.

Drawings

The drawings which show the character and scope of the Work to be performed and which have been prepared or approved by the Designer or the Engineer and are referred to in the Contract Documents.

Effective Date of the Agreement

The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.

Engineer

The person, firm or corporation named as such in the Agreement.

Field Order

A written order issued by the DESIGNER which orders minor changes in the Work in accordance with paragraph 10.2 but which does not involve a change in the Contract Price or Contract Time.

Lump Sum

That amount stated in the Bid as a total price for all components required for a particular construction item or project.

Modification

(a) A written amendment of the Contract Documents signed by both parties, or (b) a Change Order, or (c) a Field Order. A modification may only be issued after the effective date of the Agreement.

Notice of Acceptance

Written notice from the OWNER accepting the Project or a portion thereof, and stating the date upon which the Contractor's project warranty will begin.

Notice of Award

The written notice by Owner to the apparent successful Bidder stating that upon compliance by the apparent successful Bidder with the conditions precedent enumerated therein, within the time specified, the OWNER will sign and deliver the Agreement.

Notice to Proceed

The written notice by the OWNER to the Contractor (with a copy to the DESIGNER), fixing the date on which the Contract Time will commence to run and which Contractor(s) shall start to perform his obligation under the Contract Documents.

Owner

The public body or authority, corporation, association, partnership, or individual with whom the Contractor has entered in the Agreement and for whom the Work is to be provided.

Product Data

Illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other printed information furnished by the Contractor to illustrate a material, product or system of some portion of the Work.

Project

The total construction of which the Work to be provided under the Contract Documents may be whole, or a part as indicated elsewhere in the Contract Documents.

Resident Project Representative

The authorized representative of the OWNER or the DESIGNER who is assigned to the site or any part thereof.

Shop Drawings

All drawings, diagrams, illustrations, schedules and other data which are specifically prepared by the Contractor, a subcontractor, manufacturer, fabricator, supplier or distributor to illustrate some portion of the Work and all illustrations, brochures, standard schedules, performance charts, instructions, diagrams and other information prepared by a manufacturer, fabricator, supplier or distributor and submitted by the Contractor to illustrate material or equipment for some portion of the Work.

Specifications

Those portions of the Contract Documents consisting of written technical descriptions of materials, equipment, construction systems, standard and workmanship as applied to the Work and certain administrative details applicable thereto, including descriptions, standards and requirements incorporated by reference in the Contract Documents.

Subcontractor

An individual, firm or corporation having a direct contract with the Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.

Substantial Completion

At such time as the Work (or a specified part thereof) has progressed to the point where it is sufficiently completed, in accordance with the Contract Documents, so that the Work (or specified part thereof) can be utilized for the purposes for which it was intended, and when the final payment is due in accordance with paragraph 14.13. The terms "substantially complete" and "substantially completed" as applied to any Work refer to Substantial Completion thereof.

Supplementary Conditions

Supplements or modifications of these General Conditions as agreed by the parties, in writing. In case of any conflict between the terms or provisions of such Supplementary Conditions and these General Conditions, the Supplementary Conditions shall be controlling.

Supplier

Any person or organization who supplies materials or equipment for the Work, including that fabricated to a special design, but does not perform labor at the site.

Unit Price

An amount stated in the Bid as a price per unit of measurement for materials or services as described in the Contract Documents.

Work

The entire completed construction of the various separately identifiable parts thereof required to be furnished under the Contract Documents. Work is the result of performing services, furnishing labor and furnishing and incorporating materials and equipment into the construction, all as required by the Contract Documents.

"Notice of Commencements"

Prior to the performance of any labor or work or the furnishings of any materials on the public improvement the public authority must prepare a "Notice of Commencement" in the form set forth in the Revised Code Section 1311.25 of the Ohio mechanic's lien.

"Notice of Furnishing"

According to the Ohio mechanic's lien (Revised Code Section 1311.25) every subcontractor and materialman who wishes to exercise a lien right must serve a "Notice of Furnishing" upon the person specified in the "Notice of Commencement" within 21 days after the date the subcontractor or materialman first performed labor or work or furnished materials on the public improvement. An exception applies to any subcontractor or materialman who has a direct contractual relationship with the principal contractor. If a person required to furnish a "Notice of Furnishing" does not do so, no lien rights will arise for the period prior to 21 days before the subsequent service of any such "Notice of Furnishing."

**ARTICLE II
PRELIMINARY MATTERS**

2.1 Delivery of Bonds

When the Contractor delivers executed Agreements to the Owner, with a copy to the Designer, the Contractor shall also deliver to the Owner, with a copy to the Designer, such Bonds as the Contractor may be required to furnish in accordance with Paragraph 5.1.

2.2 Copies of the Contract Documents

The Owner shall furnish to the Contractor up to ten (10) copies (unless otherwise specified in the Agreement) of the Contract Documents. Additional copies will be furnished upon request, at the cost of reproduction.

2.3 Commencement of Contract Time or Notice to Proceed

The Contract Time will commence to run on the thirtieth (30th) day after the effective date of the Agreement, or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed, but, in no event shall the Contract Time commence to run later than the ninetieth (90th) day after the day of Bid opening or the thirtieth (30th) day after the effective date of the Agreement, whichever date is earlier. A Notice to Proceed may be given at any time within thirty (30) days after the effective date of the Agreement.

According to the Ohio mechanic's lien Revised Code Section 1311.25 prior to the performance of any labor or work or the furnishing of any materials on the public improvement the public authority must prepare a "Notice of Commencement" in the form set forth in the statute. That form needs to be made readily available to the public upon request. Every subcontractor and materialman who wishes to exercise a lien right must serve a "Notice of Furnishing" upon the person specified in the "Notice of Commencement" within 21 days after the date the subcontractor or materialman first performed labor or work or furnished materials on the public improvement. An exception applies to any subcontractor or materialman who has

a direct contractual relationship with the principal contractor. If a person required to furnish a "Notice of Furnishing" does not do so, no lien rights will arise for the period prior to ~~32~~²¹ days before the subsequent service of any such notice of furnishing. *acc*

2.4 Starting the Project

The Contractor shall start to perform the Work on the date when the Contract time commences to run, but no Work shall be done at the Site prior to the date on which the Contract Time has commenced to run.

2.5 Before Starting Construction

Before undertaking each part of the Work, the Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures shown thereon and on all applicable field measurements. The Contractor shall promptly report, in writing, to the Designer and the Engineer, any conflict, error or discrepancy which the Contractor may discover.

2.6 Estimated Progress Schedule

Within ten days after the effective date of the Agreement (unless otherwise specified in the Agreement), the Contractor shall submit to the Designer for review and consultation, an estimated progress schedule indicating the starting and completion date of the various stages of the Work, a preliminary schedule of Shop Drawing submissions, and a preliminary schedule of values of the Work. The Progress Schedule shall include the following components:

- 1) A Precedence Diagram
- 2) A Schedule of Values coordinated with the Precedence Diagram
- 3) A Methods Statement

The Contractor shall clearly indicate construction methods and production rates for each critical or significant activity upon which timely completion of the project is contingent (each, a "Salient Feature"), and shall furnish satisfactory evidence of sufficient equipment, materials and labor to guarantee the completion of the project

in accordance with the Contract Documents and within the time set forth in the Agreement.

The Precedence Diagram and coordinated Schedule of Values shall:

- 1) Show the order in which the Contractor proposes to carry out the work, and the time span of activities for each Salient Feature.
- 2) Provide a "Salient Feature to other Salient Feature" type format, indicating when a Salient Feature is controlling and when it is not, by different descriptive plotting methods, and, the total time required to complete all work in the Contract Documents.
- 3) Provide space on the original submission for at least one revision, and space for insertion of actual work performed for each Salient Feature.

2.7 Evidence of Insurance

Before any Work at the site is started, the Contractor shall deliver to the Owner, with a copy to the Designer, certificates of insurance and other evidence of insurance requested by the Owner, which the Contractor is required to purchase and maintain in accordance with paragraphs 5.3 and 5.4. The Contractor shall, also, name the Owner as an additional insured on all such policies.

2.8 Preconstruction Conference

Within twenty (20) days after the effective date of the Agreement, by or before the Contractor commences work at the site, a conference will be held for the Owner's review and acceptance of the schedules referred to in paragraph 2.6, to establish procedures for handling Show Drawings and other submissions, for processing Applications for Payment, and to establish a working understanding among the parties as to the Work.

2.9 Payment

The Revised Section 4113.61 of the Ohio mechanic's lien law carries stiff penalties in the way of allowing a Contractor or subcontractor to collect interest on late payments. This statute also imposes further penalties in the event payment is made not within 30 days. The statute also

2.9 Payment

The Revised Section 4113.61 of the Ohio mechanic's lien law carries stiff penalties in the way of allowing a Contractor or subcontractor to collect interest on late payments. This statute also imposes further penalties in the event payment is made not within 30 days. The statute also provides that it prevails over any contract which provides for longer payment periods or lower interest payments.

ARTICLE III

CONTRACT DOCUMENTS: INTENT AND REUSE

3.1 Intent

The Contract Documents comprise the entire Agreement between the Owner and the Contractor concerning the Work. They may be altered only by a Modification. The Contractor may be furnished additional instructions and detail drawings by the Designer and/or Engineer, as necessary to carry out the Work required by the Contract Documents. The additional drawings and instructions thus supplied will become a part of the Contract Documents and will be subject to all of the terms and conditions thereof. The Contractor shall carry out the Work in accordance with the additional detail drawings and instructions.

3.2 Complementary Contract Documents

The Contract Documents are complementary; what is called for by one is as binding as if called for by all. In case of conflicts between the Drawings and Specifications, the Specifications shall govern. Figure dimensions on Drawings shall govern over scale dimensions and Detail Drawings shall govern over General Drawings. Any discrepancies found between the Drawings and Specifications and the site conditions, or any inconsistencies, conflicts, errors or ambiguities in the Contract Documents shall be reported immediately to the Owner in writing, with copies to the Designer and the Engineer. Any work performed by the Contractor prior to receiving a written revision of the Contract Documents shall be done at the Contractor's sole risk and expense, assuming total responsibility for correction of the Work as required to conform to the revised Documents.

3.3 Specificity of Specifications

It is the intent of the Specifications and Drawings to describe a complete project (or part thereof) to be constructed in accordance with the Contract Documents. Any Work that may reasonably be inferred from the Specifications or Drawings as being necessary to produce the intended result, shall be supplied, whether or not it is specifically called for. When words which have a well-known technical or trade meaning are used to describe Work, materials or equipment, such words shall be

interpreted in accordance with said technical meaning. Reference to standard specifications, manuals or codes of any specific technical society, organization or association, or to the code of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard specification, manual or code in effect at the time of opening of the Bids (or, on the effective date of the Agreement, if there are no bids), except as may be otherwise specifically stated. However, no provision of any referenced standard specification, manual or code (whether specifically incorporated by reference or not, in the Contract Documents) shall change the duties and responsibilities of the Owner, Contractor, Designer or Engineer, or any of their agents or employees from those set forth in the Contract Documents. Clarifications and interpretations of the Contract Documents shall be issued by the Designer as provided for in paragraph 9.3.

3.4 Law of Location

The Contract Documents will be governed by the law of the location of the Project.

3.5 Reuse of Documents

Neither the Contractor, nor any subcontractors, manufacturers, fabricators, suppliers or distributors, shall have or acquire any title to or ownership rights to any of the Drawings, Specifications or other documents (or copies of any thereof) prepared by the Designer or Engineer, and they shall not reuse any of them on extensions of the Project or any other Project.

ARTICLE IV
AVAILABILITY OF LANDS
PHYSICAL CONDITIONS, REFERENCE POINTS

4.1 Land Acquisition

The Owner shall furnish, as indicated in the Contract Documents, the land upon which the Work is to be performed, rights-of-way for access thereto, and such other lands which are designated for the use by the Contractor. Easements for permanent structures or permanent changes in existing facilities will be obtained and paid for by the Owner, unless otherwise provided in the Contract Documents. If the Contractor believes that any delay in the Owner's furnishing this land or easements, entitles him to an extension of the Contract Time, the Contractor may make a claim therefor as provided in Article 12. The Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.2 Pre-bid Testing and Evaluation

In preparation of the Drawings and Specifications, the Designer and the Engineer have relied upon such reports and tests of subsurface and latent physical conditions at the site or elsewhere which might affect the cost, progress or performance of the Work as specifically stated in the Agreement. These reports are available at the Owner's office and may be obtained during working hours for a nominal printing charge. These reports have been used solely for informational purposes during the preparation of the Contract Documents. Such reports are not guaranteed as to accuracy or completeness and do not constitute, in any way, a part of said Contract Documents.

4.3 Unforeseen Physical Conditions

The Contractor shall promptly notify the Owner, Designer and the Engineer, in writing, of any subsurface or latent physical conditions at the site or in any existing structure differing materially from those indicated or referred to in the Contract Documents, and shall recommend the requisite additional investigations and/or tests required to identify same and confirm the existence of a condition which could not have reasonably been anticipated by the Contractor. In this instance, a Change Order shall be issued incorporating the necessary revisions.

4.4 Reference Points

The Owner shall provide engineering surveys for construction to establish reference points which in the Owner's judgment are necessary to enable the Contractor to proceed with the Work. The Contractor shall be responsible for laying out the Work (unless otherwise specified in the Contract Documents), shall protect and preserve the established reference points and shall not make changes or relocations without the prior written approval of the Owner. The Contractor shall report to the Designer and Engineer whenever any reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations, and shall be responsible for the replacement or relocation of such reference points by professionally qualified personnel.

ARTICLE V
BONDS & SECURITIES

5.1 Performance and Other Bonds

The Contractor shall furnish performance and payment Bonds, each in an amount at least equal to the Contract Price, as Security for the faithful performance and payment of all Contractor obligations under the Contract Documents. These Bonds shall remain in effect at least until one year after the date of final payment, except as otherwise provided by law. The Contractor shall also furnish such other Bonds as are required by the Supplementary Conditions and be executed by such Sureties as:

- 1) are licensed to conduct business in the state where the Project is located, and
- 2) are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Audit Staff Bureau of Account, U.S. Treasury Department. All bonds signed by an agent must be accompanied by a certified copy of the authority to act.

5.2 Bankruptcy or Insolvency of Surety on Bonds

If the Surety on any Bond furnished by the Contractor is declared a bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of clauses 1 and 2 of paragraph 5.1, the Contractor shall within five (5) days thereafter substitute another Bond and Surety, both of which shall be acceptable to the Owner.

5.3 Contractor's Liability Insurance

The Contractor shall purchase and maintain such comprehensive general liability and other insurance as will provide protection from claims set forth below which may arise out of, or result from the Contractor's performance of the Work and the Contractor's other obligations under the Contract Documents, whether such performance is by the Contractor, by any Subcontractor, or someone else directly or indirectly employed by any of them, or, by anyone for whose acts any of them may be liable, such as;

- 5.3.1 Claims under Workers' or Workmen's Compensation, disability benefits and other similar employee benefit acts,
- 5.3.2 Claims for damages because of bodily injury, occupational sickness, disease or death to one of the Contractor's employees,
- 5.3.3 Claims for damages because of bodily injury, sickness, disease or death of an individual not in the Contractor's employ,
- 5.3.4 Claims for damages insured by personal injury liability coverage which are sustained by (i) any person as a result of an offense directly or indirectly related to the employment of such person by the Contractor, or (ii) by any other person for any other reason,
- 5.3.5 Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom, and
- 5.3.6 Claims for damages because of bodily injury or death of any person or property arising out of the ownership, maintenance or use of any motor vehicle.

The insurance required by this paragraph 5.3 shall include specific coverages and be written for not less than the limits of liability and coverages provided in Article 15 of the Agreement, or required by law, whichever is greater. The comprehensive general liability insurance shall include completed operation insurance. All such insurance shall contain a provision that the coverage afforded will not be cancelled, materially changed or refused renewal without at least thirty (30) days written notice has been given to the Owner and the Designer. All such insurance shall remain in effect until final payment and at all times thereafter when the Contractor may be correcting, removing or replacing defective Work in accordance with paragraph 13.11. In addition, the Contractor shall maintain such insurance and furnish the Owner with evidence of continuation of such insurance at final payment and one year thereafter.

5.4 Contractual Liability Insurance

The comprehensive general liability insurance required by paragraph 5.3 will include contractual liability insurance applicable to the Contractor's obligations under paragraph 6.29 and 6.30.

5.5 Owner's Liability Insurance

The Owner shall be responsible for purchasing and maintaining his own liability insurance and, at his option, may purchase and maintain such insurance as will protect the Owner against claims which may arise from operations under the Contract Documents.

5.6 Property Insurance

Unless otherwise provided in the Agreement, the Owner shall purchase and maintain property insurance upon the Work at the site to the full insurable value thereof (subject to such deductible amounts as may be provided in the Agreement or required by law). This insurance shall include the interests of the Owner, Contractor and Subcontractors, in the Work; shall insure against the perils of fire and provide extended coverage including "all risk" type insurance for physical loss and damage including theft, vandalism and malicious mischief, collapse and water damage, and any other such perils to the satisfactory and timely completion of the Work specified in the Contract Documents. Also included will be damages, losses and expenses arising out of or resulting from any insured loss or, incurred in the repair or replacement of any insured property (including fees and charges from engineers, architects, attorneys and other professionals). If not covered under "all risk" insurance, or otherwise provided in the Agreement, the Contractor shall purchase and maintain similar property insurance on portions of the Work stored on and off the site or in transit when such portions of the Work are to be included in an Application for Payment. The policies of insurance to be purchased and maintained by the Owner in accordance with paragraphs 5.6 and 5.7 shall contain a provision that the coverage afforded will not be cancelled, revoked or materially changed without thirty (30) days written notice to the Contractor.

5.7 Boiler and Machinery Insurance

The Owner shall purchase and maintain such boiler and machinery insurance as may be required by the Agreement or by law. This insurance shall include the interests of the Owner, Contractor and Subcontractors in the Work.

5.8 Property Insurance

The Owner shall **NOT** be responsible for purchasing and maintaining any property insurance to protect the interests of the Contractor or Subcontractors in the Work to the extent of any deductible amounts that are provided in the Agreement. If the Contractor wishes property insurance coverage within the limits of such amounts, the Contractor may purchase and maintain this insurance at his own expense.

5.9 Additional Insurance Coverage

If the Contractor requests in writing that other special insurance be provided by the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order procedure. Prior to commencement of the Work at the Site, the Owner will, in writing, advise the Contractor whether or not such other insurance has been procured by the Owner.

5.10 Waiver of Rights

The Owner and Contractor waive all rights to legal action against each other and the Subcontractors and their agents and employees, against the Designer or Engineer, and any separate contractors and their subcontractors agents and employees, for damages caused by fire or other perils to the extent covered by insurance provided under paragraphs 5.6 and 5.7, inclusive, or any other property insurance applicable to the Work, except such legal rights as they may have to the proceeds of such insurance held by the Owner as Trustee. The Owner shall require similar written waivers from the Designer, Engineer and each separate contractor, and the Contractor shall require similar written waivers from each Subcontractor, and the Contractor shall require similar written waivers from each Subcontractor (in accordance with paragraph 6.11 as applicable). Each such waiver will be in favor of all other parties enumerated in this paragraph 5.10.

5.11 Receipt and Application of Proceeds

Any insured loss under the policies of insurance required by paragraphs 5.6 and 5.7 shall be adjusted with the Owner and made payable to the Owner as trustee for the insured, as their interests may appear, subject to the requirements of any applicable financing documents covering the Work and of paragraph 5.12. The Owner shall deposit in a separate account any money so received, and the Owner shall distribute it in accordance with such agreement as the parties concerned may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the monies so received applied on account thereof, and the Work and the cost thereof, covered by an appropriate Change Order.

5.12 Owner as Trustee

The Owner as Trustee shall have the power to adjust and settle any loss with the insurers unless one of the parties concerned shall object to the Owner's exercise of such power. Said objection must be made in writing, within fifteen (15) days of the occurrence or loss. If said written objection is made, the Owner as Trustee, shall make settlement with the insurers in accordance with such agreement as the parties concerned shall reach. If any concerned party should require, the Owner, as trustee, shall, in writing, give bond for the proper performance of his duties, as trustee, due to such loss or occurrence.

5.13 Objections to Insurance Coverage

If the Owner has any objection to the coverage afforded by or other provisions of, the insurance required to be purchased and maintained by the Contractor in accordance with paragraphs 5.3 and 5.4, on the basis of its non-compliance with the Contract Documents, then the Owner will notify the Contractor, in writing, within ten (10) days of the date of delivery of such certificates to the Owner, in accordance with paragraph 2.7. If the Contractor has any objections to the coverage afforded by, or other provisions of the policies of insurance required to be purchased and maintained by the Owner, in accordance with paragraphs 5.6 and 5.7, on the basis of their non-compliance with the Contract Documents, the Contractor will notify the Owner, in writing, within ten (10) days of the date of delivery of such certificates to the Contractor, in accordance with paragraph 2.7. The Owner and the Contractor will each provide to the other such additional information in respect to the requisite insurance provided as the other may reasonably request. Failure to give any such

notice of objection within the time frame allotted, by either the Owner or the Contractor, shall constitute acceptance of such insurance policies purchased by the other and acknowledgement of compliance with the intent of the Contract Documents.

5.14 Partial Utilization - Property Insurance

If the Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all Work, such use or occupancy may be accomplished in accordance with paragraph 14.10, provided that the property insurance acknowledges notice thereof and, in writing, provided the changes in coverage necessitated thereby. The Insurer's providing the property insurance shall consent by endorsement of the policy or policies, but the property insurance shall not be cancelled or lapse on account of any such partial use or occupancy.

ARTICLE VI

CONTRACTOR'S RESPONSIBILITIES

6.1 Supervision and Superintendence

The Contractor shall supervise and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. The Contractor shall be solely responsible for the means, methods, techniques, sequences and procedures of construction. The Contractor shall be responsible for seeing that the finished Work complies with the Contract Documents.

6.2 Resident Superintendent

The Contractor shall keep on the Work at all times during its progress, a competent resident Superintendent, who shall not be replaced without written notice to the Owner, Designer and Engineer, except under extraordinary circumstances. The Superintendent will be the Contractor's representative at the site and shall have authority to act on behalf of the Contractor. All communications given to the Superintendent shall be as binding as if given to the Contractor.

6.3 Labor, Materials and Equipment

The Contractor shall provide competent, suitably qualified personnel to survey, layout the Work and perform construction as required by the Contract Documents. The Contractor shall at all times maintain good discipline and order at the site. Except in connection with the safety or protection of the persons, Work or property, at the site or adjacent thereto, and except as otherwise indicated in the Supplementary Conditions, all Work at the site shall be performed during regular working hours, and the Contractor will not permit overtime work or other performance of work on Saturday, Sunday or any legal holiday, without the Owner's written authorization, given after receipt of written notice, from the Contractor, to the Owner and Designer, requesting same.

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6.4 Contractor Responsibility

The Contractor shall furnish all materials, equipment, labor transportation, machinery, tools, appliances, fuel power, light, heat, telephone service, water and sanitary facilities, as well as all other facilities or incidentals necessary for the execution, testing, initial operation and completion of the Work.

6.5 Condition of Construction Materials

All materials and equipment shall be of good quality and new, except as otherwise provided in the Contract Documents. If requested by the Owner, Designer or Engineer, the Contractor shall furnish satisfactory evidence (including reports of required tests), as to the kind and quality of materials and equipment.

6.6 Use of Materials and Equipment

All materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with the instructions of the applicable manufacturer, fabricator, supplier or distributor, except as otherwise provided in the Contract Documents.

6.7 Equivalent Materials and Equipment

Whenever materials or equipment are specified or described in the Drawings or Specifications by using the name of a proprietary item or the name of a particular manufacturer, fabricator, supplier or distributor, the naming of the item is intended to require the use of such item. If the name is followed by words expressly indicating that substitution is permitted, materials or equipment of other manufacturers, fabricators, suppliers or distributors may be accepted by the Owner, if sufficient information is submitted by the Contractor to the Owner, Designer and Engineer, to allow the Owner to determine that the material or equipment proposed is equivalent to that named. Requests for review of substitute items of materials and equipment will not be accepted by the Owner from anyone other than the Contractor. The Owner will be the sole judge of acceptability, and no substitute will be ordered or installed without the Owner's prior written acceptance. The Owner may require the Contractor to furnish, at the Contractor's expense, a special performance guarantee,

or other surety, with respect to any substitute approved by the Owner. Whether or not the Owner accepts a proposed substitute, the Contractor shall reimburse the Owner for the charges of the Designer and Engineer and their consultants for evaluating any proposed substitute.

6.8 Employment in Subcontractor Capacity

The Contractor shall not employ any Subcontractor or other person or organization (including those who are to furnish the principal items of materials or equipment), whether initially or as a substitute, against whom the Owner, Designer or Engineer, might reasonably object. A subcontractor or the person or organization identified in writing to the Owner, Designer and Engineer, by the Contractor prior to the notice of Award and not objected to in writing by the Owner, Designer or Engineer, prior to the notice of Award will be deemed acceptable to the Owner, Designer and Engineer. Acceptance of any Subcontractor, other person or organization by the Owner, Designer or Engineer shall not constitute a waiver of any right the Owner might have to reject defective Work. If the Owner, Designer or Engineer, after due investigation, has a reasonable objection to any Subcontractor, other person or organization after the Notice of Award, the Contractor shall submit an acceptable substitute and the Contract Price shall be increased or decreased by the difference in the cost occasioned by such substitution, and an appropriate Change Order shall be issued. The Contractor shall not be required to employ any Subcontractor, other person or organization, against whom the Contractor has a reasonable objection.

6.9 Contractor Responsibility for Subcontractors

The Contractor shall be fully responsible for all acts and omissions of his Subcontractors and of persons and organizations directly or indirectly employed by them and of persons and organizations for whose acts any of them may be liable, to the same extent that the Contractor is responsible for the acts and omissions of persons directly employed by the Contractor. Nothing in the Contract Documents shall create any contractual relationship between the Owner, Designer or Engineer, and any Subcontractor or other person or organization having a direct contract with the Contractor, nor shall it create any obligation on the part of the Owner, Designer or Engineer, to pay, or to see payment of any moneys due any Subcontractor or other

person or organization, except as may otherwise be required by law. The Owner may furnish to any Subcontractor, or other person or organization, to the extent practical, evidence of amounts paid to the Contractor on account of a specific "Work" done.

6.10 Contractor Privilege

The divisions and sections of the Specifications and the identifications of any Drawings shall not control the Contractor in dividing the Work among Subcontractors, or delineating the Work to be performed by any specific Trade.

6.11 The Subcontractor and the Contract Documents

All Work performed for the Contractor by a Subcontractor will be pursuant to an appropriate agreement between the Contractor and the Subcontractor which specifically binds the Subcontractor to the applicable terms and conditions of the Contractor Documents for the benefit of the Owner, Designer and Engineer, and contains waiver provisions as required by paragraph 5.10. The Contractor shall pay each Subcontractor a just share of any insurance moneys received by the Contractor on account of losses under policies issued pursuant to paragraphs 5.6 and 5.8.

6.12 Patent Fees and Royalties

The Contractor shall pay all license fees and royalties and assume all costs incident to use in the performance of the Work or the incorporation in the Work of any invention, design, process, product or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product or device is specified in the Contract Documents for used in the performance of the Work, and if to the actual knowledge of the Owner, its use is subject to patent rights or copyrights calling for payment of any license fee or royalty to others, the existence of such rights shall be disclosed by the Owner in the Contract Documents. The Contractor shall indemnify and hold harmless the Owner, Designer and Engineer, and anyone else directly or indirectly employed by any of them from and against all claims, damages, losses and expenses (including attorneys' fees) arising out of any infringement of patent rights or copyrights incident to the use in the performance of the Work, or resulting from the incorporation in the Work or any invention, design, process, product or device, and shall defend all such claims in connection with any alleged infringement of such rights.

6.13 Laws and Regulations

The Contractor shall give all notices and comply with all laws, ordinances, rules and regulations applicable to the Work. If the Contractor observes that the Specifications or Drawings are at variance therewith, the Contractor shall give the Designer and Engineer prompt written notice thereof, and any necessary changes shall be adjusted by an appropriate Modification and Change Order. If the Contractor performs any Work knowing or having reason to know that it is contrary to such laws, ordinances, rules and regulations, without such notice to the Designer and Engineer, then the Contractor shall bear all costs arising therefrom. However, the Engineer shall assume joint responsibility to make certain that any of the Specifications and Drawings prepared or approved by the Engineer are in accordance with such laws, ordinances, rules and regulations.

6.14 Taxes

The Contractor shall pay all sales, consumer, used and other similar taxes required to be paid by him in accordance with the law of the location of the Project.

6.15 Use of Premises

The Contractor shall confine construction equipment, the storage of materials and equipment and the operations of workmen to areas permitted by law, ordinance, permit or the Contract Documents, and shall not unreasonably encumber the premises with construction equipment or other materials or equipment.

6.16 Maintenance of Site

During the progress of the Work, the Contractor shall keep the premises free from accumulations of waste materials, rubbish and other debris resulting from the Work. At the completions of the Work, the Contractor shall remove all waste materials, rubbish and debris from and about the premises, as well as all tools, appliances, construction equipment and machinery and surplus materials, and shall leave the site clean and ready for occupancy by the Owner. The Contractor shall restore to their original condition those portions of the site not designated for alteration by the Contract Documents.

6.17 Load Pressure

The Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall the Contractor subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

6.18 Record Documents

The Contractor shall keep one record copy of all Specifications, Drawings, Addenda, Modifications, Shop Drawings and samples at the Site, in good order and annotated to show all changes made during the construction process. Such record documents shall be available to the Designer and Engineer for examination and shall be delivered to the Owner upon completion of the Work.

6.19 Safety and Protection

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. The Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

- 6.19.1** all employees on the Work and other persons who may be affected thereby,
- 6.19.2** all the Work and all materials or equipment to be incorporated therein, whether in storage on or off the site, and
- 6.19.3** other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

The Contractor shall comply with all applicable laws, ordinances, rules, regulations and orders of any public body having jurisdiction for the safety of persons or property, or their protection from damage, injury or loss, and shall erect and maintain all necessary safeguards for such safety and protection. The Contractor shall notify the Owner of

adjacent property and utilities when prosecution of the Work may affect them. All damage, injury or loss to any property referred to in paragraph 6.19.2 or 6.19.3, caused, directly or indirectly, in whole or in part, by the Contractor, or any Subcontractor or anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable shall be remedied by the Contractor (except damage or loss attributable solely to the fault of Drawings or Specifications or to the acts or omissions of the Owner, Designer or Engineer or anyone employed by either of them, or anyone for whose acts any of them may be liable and not attributable, directly or indirectly, in whole or in part, and not to the fault or negligence of the Contractor). The Contractor's duties and responsibilities for the safety and protection of the Work shall continue until such time as all the Work is completed and the Owner has delivered a Notice of Acceptance to the Contractor.

6.20 Contractor's Safety Supervisor

The Contractor shall designate a responsible member of his organization at the site, whose duty shall be the prevention of accidents. This person shall be the Contractor's Superintendent or some other person accepted in writing by the Owner.

6.21 Emergencies

In emergencies affecting the safety or protection of persons or the Work or property at the site or adjacent thereto, the Contractor, without special instruction or authorization from the Designer, Engineer or Owner, is obligated to act to prevent threatened damage, injury or loss. The Contractor shall give the Engineer and Owner, prompt written notice of any significant changes in the Work or deviations from the Contract Documents caused thereby.

6.22 Shop Drawings and Samples

After checking and verifying all field measurements, the Contractor shall submit to the Designer and Engineer, for review and approval, in accordance with the accepted schedule of Shop Drawing submissions (see paragraph 2.6), five copies (unless otherwise specified in the Contract Documents) of the Shop Drawings, which shall have been checked by and stamped with the approval of the Contractor and

identified as the Designer may require. The data shown on the Shop Drawings will be complete with respect to dimensions, design criteria, materials of construction and like information to enable the Designer and Engineer to review the information as required.

6.23 Samples

The Contractor shall also, with such promptness as to cause no delay in Work, submit to the Designer and Engineer for review and approval, all samples required by the Contract Document. All samples will have been checked by and stamped with the approval of the Contractor, identified clearly as to material, manufacturer, any pertinent catalog numbers and the use for which intended.

6.24 Deviations or Changes to Shop Drawings or Samples

At the time of each submission, the Contractor shall, in writing, call the Designer and Engineer's attention to any deviations that the Shop Drawings or Samples may have from the requirements of the Contract Documents.

6.25 Designer/Engineer Review

The Designer or Engineer will review and approve with reasonable promptness, all Shop Drawing and Sample submissions, but the Designer's review and approval shall be only for conformance with the design concept of the project and for compliance with the design information given in the Contract Documents and the Engineer's review and approval shall only be for conformance with the engineering requirements of the Contract Documents. The review and approval of the Designer and Engineer shall not extend to mean methods, sequences, techniques or procedures of construction, or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions. The Contractor shall make any corrections requested by the Designer or Engineer, shall return the required number of corrected copies of Shop Drawings, and resubmit new samples for review and approval. The Contractor shall direct specific attention in writing to revisions other than the submissions. The Contractor's stamp of approval on any Shop Drawing or sample shall constitute a representation to the Owner, Designer and Engineer that the Contractor has reviewed and verified all quantities, dimensions, field construction criteria, materials, catalog numbers, and similar data or assumes full responsibility for doing so, and that

the Contractor has reviewed or coordinated each Shop Drawing or sample with the requirements of the Work and the Contract Documents.

6.26 Review and Approval of a Shop Drawing

Where a Shop Drawing or a Sample is required by the specifications, no related work shall be commenced until the submission has been reviewed and appropriately approved by the Designer and Engineer.

6.27 Overriding Contractor Responsibility

The Designer's and Engineer's review and approval of Shop Drawings or Samples shall not relieve the Contractor from responsibility for any deviations from the Contract Documents unless the Contractor has in writing called the Designer and Engineer's attention to such deviation at the time of submission and the Designer and Engineer have given written concurrence and approval to the specific deviation, nor shall any concurrence or approval by the Designer or Engineer relieve the Contractor from responsibility for errors or omissions in the Shop Drawings.

6.28 Continuing the Work

The Contractor shall carry on the Work and maintain the progress schedule during all disputes or disagreements with the Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as the Contractor and Owner may otherwise agree in writing.

6.29 Indemnification

To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Designer and Engineer, and their agents and employees, without contribution or apportionment of liability to such persons, from and against all claims, damages, losses and expenses, including, but not limited to attorneys' fees arising out of or resulting from the performance of the Work, provided that any such claim, damage, loss or expense (a) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom and (b) is caused in whole or in part by any negligent act or omission of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them

may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder.

6.30 Liability Limits

In any and all claims against the Owner, Designer or Engineer, or any of their agents or employees, by any employee of Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation under paragraph 6.29 shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any Subcontractor under workers' or workmen's compensation acts, disability benefit acts or other employee benefit acts.

ARTICLE VII

WORK BY OTHERS

7.1 Additional Work

The Owner may perform additional work related to the Project by itself, or have additional work performed by utility service companies, or let other direct contracts therefor which shall contain General Conditions similar to these. The Contractor shall afford the utility service companies and other contractors who are parties to such direct contracts (or the Owner, if the Owner is performing the additional work with the Owner's employees) reasonable opportunity for the introduction and storage of materials and equipment and the execution of work, and shall properly connect and coordinate the Contractor's work and theirs.

7.2 Interdependency of Work

If any part of the Contractor's Work depends for proper execution or results upon the work of any such other contractor or utility service company (or the Owner), the Contractor shall inspect and promptly report to the Owner, Designer and Engineer, in writing, any defects or deficiencies in such work that render it unsuitable for such proper execution and results. The Contractor's failure to so report shall constitute an acceptance of the other work as fit and proper for integration with the Contractor's Work.

7.3 Integration of Work

The Contractor shall do all cutting, fitting and patching of his Work that may be required to make its several parts come together properly and integrate with such other work. The Contractor shall not endanger any work of others by cutting, excavating or otherwise altering their work and will only cut or alter their work with the written consent of the Owner and the others whose work will be affected. The Contractor shall be responsible for any damage to work previously installed by any other Contractor, and in the event of any such damage, the Contractor shall repair and/or replace such work to the satisfaction of the Owner and Designer.

7.4 Omissions in the Contract Documents

If the performance of additional work by other contractors or utility service companies or the Owner was not noted in the Contract Documents, written notice thereof shall be given to the Contractor prior to starting any such additional work. If the Contractor believes that the performance of such additional work by the Owner or others involves additional expense to the Contractor or requires an extension of the Contract Time, the Contractor may make a claim therefor as provided in Articles XI and XII.

ARTICLE VIII

OWNER'S RESPONSIBILITIES

8.1 Contractor Communication

The Owner shall provide the Designer with copies of all communications issued to the Contractor, and shall advise the Designer regarding all oral communications to the Contractor.

8.2 Termination of Designer or Engineer

In the case of termination of the employment of the Designer or Engineer, the Owner shall appoint a successor against whom the Contractor makes no reasonable objection, whose status under the Contract Documents shall be that of the former Designer or Engineer. Any dispute in connection with such appointment shall be subject to arbitration.

8.3 Prompt Payment

The Owner shall furnish the data required of the Owner under the Contract Documents promptly and shall make payments to the Contractor promptly after they are due as provided in paragraphs 14.4 and 14.13.

8.4 Land Provision

The Owner's duties in respect to providing lands and easements and providing engineering surveys to establish reference points are set forth in paragraphs 4.1 and 4.4. Paragraph 4.2 refers to the Owner's identifying and making available to the Contractor, copies of reports of investigations and tests of subsurface and latent physical conditions at the site or otherwise affecting performance of the Work which have been relied upon by the Designer or Engineer in preparing the Drawings and Specifications.

8.5 Owner Liability

The Owner's responsibilities in respect to purchasing and maintaining liability and property insurance are set forth in paragraphs 5.5 through 5.7.

8.6 Execution of Change Orders

In connection with the Owner's rights to request changes in the Work in accordance with Article X, the Owner (especially in certain instances as provided in paragraph 10.4) is obligated to execute the Change Orders.

8.7 Tests and Approvals

The Owner's responsibility in respect to certain inspections, tests and approvals is set forth in paragraph 13.4.

8.8 Stopping or Suspending Work

In connection with the Owner's right to stop Work or suspend Work, see paragraphs 13.9 and 15.1. Paragraph 15.2 deals with the Owner's right to terminate the services of the Contractor under certain circumstances.

8.9 Owner's Representatives

The Owner shall designate, in writing, an individual to serve as its representative in connection with the performance of the Work and administration of the Contract Documents. Said Owner's representative shall be duly authorized and empowered to execute documents and to take such other actions on behalf of the Owner as may be required by the Contract Documents. The Designer, Engineer and Contractor shall be entitled to rely upon the authority of the Owner's Representative unless notified, in writing, to the contrary, by the Owner and Designer. The Engineer and Contractor shall not be liable to the Owner for acts taken by them in reliance upon such authority, unless they have actual knowledge of any limitations on such authority.

ARTICLE IX

DUTIES OF THE DESIGNER AND ENGINEER

9.1 Integrity of Design Concepts

During the construction process, the Designer will be responsible for assuring the integrity of the original design concepts of the golf course as set forth in the Contract Documents, and the Engineer will be responsible for assuring the integrity of the engineering concepts as approved by the Engineer in the Contract Documents. The Designer and Engineer will serve as consultants to the Owner in connection with the construction process and shall advise and assist the parties as provided in this Article IX. The duties and responsibilities of the Designer and the Engineer, as set forth in the Contract Documents shall not be extended without written consent of the Owner, Designer and Engineer.

9.2 Visits to the Site

The Designer and Engineer will be on site during the various stages of construction to observe the progress and quality of the executed Work and to determine in general if the Work is proceeding in accordance with the Contract Documents. Neither the Designer nor the Engineer shall be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Designer's and Engineer's efforts will be directed toward providing, for the Owner, a greater degree of confidence in the conformance of the completed work to the Contract Documents. The Designer and Engineer will keep the Owner informed of the progress of the Work and will use their best efforts to inform the Owner regarding any defects and deficiencies in the Work as observed by them.

9.3 Clarifications and Interpretations

The Designer and Engineer will issue, with reasonable promptness, such written clarifications or interpretations of the Contract Documents (in the form of Drawings or otherwise) as the parties may reasonably request. The rights of the parties with respect to any such clarification or interpretation shall be governed by Paragraph 10.2, below.

9.4 Rejecting Defective Work

The Designer and Engineer may recommend that the Owner disapprove or reject Work which is defective, and may recommend that the Owner require special inspection or testing of the Work as provided in paragraph 13.8, whether or not the Work is fabricated, installed or completed.

9.5 Shop Drawings, Change Orders and Payments

In connection with the Designer's and Engineer's responsibility for Shop Drawings and Samples, see paragraphs 6.22 through 6.27 inclusive.

9.6 Change Orders and the Designer/Engineer

In connection with the Designer's and Engineer's responsibilities as to Change Orders, see Articles 10, 11, and 12.

9.7 Applications for Payment and the Designer/Engineer

In connection with the Designer's and Engineer's responsibilities in respect to Applications for Payment, etc., see Article XIV.

9.8 Project Representation

Subject to a separate agreement, the Designer may furnish a Resident Project Representative, approved in writing by the Owner, to assist the Designer in observing the performance of the Work. The duties, responsibilities and limitations of authority of the Resident Project Representative shall be the same as the Designer, unless otherwise provided in the Contract Documents or by written notice to the Owner, Contractor and Engineer.

9.9 Interpretation of the Contract Document Requirements

The Designer will be the initial interpreter of the requirements of the Contract Documents and shall, upon request, advise the parties concerning the Designer's judgement regarding the acceptability of the Work thereunder.

9.10 Limitations on Responsibilities

Neither the grant of authority to act under this Article IX or elsewhere in the Contract Documents to the Designer or Engineer, nor any action or inaction by the Designer or Engineer, in good faith performance of their duties to the Owner, shall

give rise to any duty or responsibility of the Designer or Engineer to the Contractor, any Subcontractor, any manufacturer, fabricator, supplier or distributor, or any of their agents or employees or any other person performing any of the Work.

9.11 Review or Judgment by the Designer or Engineer

Whenever in the Contract Documents the terms "as ordered", "as directed", "as required", "as allowed", or terms of the like effect or import are used, or the adjectives "reasonable", "suitable", "acceptable", "proper", or "satisfactory", or adjectives of like effect or import are used, to describe requirement, direction, review or judgment of the Designer or Engineer as to the Work, it is intended that such requirement, direction, review or judgment will be solely to evaluate the Work for compliance with the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective does not expressly or by implication indicate that the Designer or Engineer shall have authority to supervise or direct performance of the Work, or authority to undertake responsibility contrary to the provisions of paragraphs 9.12 or 9.13.

9.12 Means, Methods & Techniques of Construction

Neither the Designer nor the Engineer will be responsible for the Contractor's means, methods, techniques, sequences or procedures of construction, or the safety precautions and programs incident thereto, and neither the Designer nor the Engineer will be responsible for the Contractor's failure to perform the Work in accordance with the Contract Documents.

9.13 Acts & Omissions of Contractor

Neither the Designer nor the Engineer will be responsible for the acts or omissions of the Contractor or of any Subcontractors, or of the agents or employees of any Contractor or Subcontractor, or of any other persons at the site or otherwise performing any of the Work.

ARTICLE X

CHANGES IN THE WORK

10.1 Additions, Deletions or Revisions in the Work

Without invalidating the Agreement, the Owner may, at any time or from time to time, order additions, deletions or revisions in the Work. These will be authorized by Change Orders. Upon receipt of a Change Order, the Contractor shall proceed with the Work involved. All such Work shall be executed under the applicable conditions of the Contract Documents. If any Change Order causes an increase or decrease in the Contract Price or an extension or shortening of the Contract Time, an equitable adjustment will be made as provided in Article XI or Article XII on the basis of a claim made by either party.

10.2 Minor Changes in the Work

The Designer may authorize minor changes in the Work not involving an adjustment in the Contract Price or the Contract Time, which are consistent with the overall design concept as set forth in the Contract Documents. These may be accomplished by a Field Order and shall be binding on the Owner, and also on the Contractor, who shall perform the change promptly. However, in the event that the Contractor believes that the Field Order would justify an increase in the Contract Price or the Contract Time, or would be inconsistent with any part of the Contract Documents, the Contractor shall notify the Owner and obtain the Owner's written consent to the Field Order prior to performing such Order and shall thereafter apply for a Change Order as provided in Article XI or Article XII. Neither the Designer (nor the Resident Project Representative, if applicable) has any authority to request the Contractor to do any work contrary to the requirements of the Contract Documents, or to authorize any increase in the Contract Price or the Contract Time without the express written consent of the Owner. The Contractor shall be solely responsible for all expenses, losses or damages incurred or caused by the Contractor in his reliance upon requests of the Designer (or the Resident Project Representatives, if applicable) in the event that such requests exceed the limited authority granted by the Owner under this section 10.2.

10.3 Additional Work

Additional Work performed without the authorization of a Change Order, will not entitle the Contractor to an increase in the Contract Price or an extension of the Contract Time, except in the case of an emergency as provided in paragraph 6.21 and except as provided in paragraphs 10.2 and 13.18.

10.4 Execution of Change Orders

The Owner shall execute appropriate Change Orders prepared by the Designer or the Engineer covering changes in the Work which are required by the Owner because of unforeseen physical conditions or emergencies, or as otherwise specifically provided in the Contract Documents.

10.5 Notice of Change

If notice of any change affecting the general scope of the Work or change in the Contract Price is required by the provisions of any Bond to be given to the Surety, it will be the Contractor's responsibility to so notify the Surety and the amount of each applicable Bond shall be adjusted accordingly. The Contractor shall furnish proof of such adjustment to the Owner.

ARTICLE XI

CHANGE OF CONTRACT PRICE

11.1 The Contract Price

The Contract Price constitutes the total compensation (subject to authorized adjustments) payable to the Contractor for performing the Work. All duties, responsibilities and obligations assigned to or undertaken by the Contractor shall be at the Contractor's expense, without change to the Contract Price. All Work to be furnished by the Contractor shall be on a "Turn-key" basis to the Owner, with the Contractor furnishing all Work contemplated by any and all of the Contract Documents, including such Additional Work as may be reasonably inferred from the Contract Documents, in order to deliver the Work to the Owner as a finished product. The Contractor shall make such adaptations or adjustments in his Work as may reasonably be required to make its several parts fit together properly and suitable to receive or be received by work of other parties as shown in or implied from the Contract Documents. The foregoing shall apply, without limitation, to drainage work, sewer work, road work and any other work outside the golf course boundaries which affects the Work as described in the Contract Documents.

11.1.1 Where payment for an activity is stated as being on a "lump sum" basis, the Contract Price will be paid for completion of that activity as per the Contract Documents, including any Additional Work needed for completion of the project.

11.1.2 Where payment for an activity is stated as being on a "unit price" basis, the Contract Price will be paid per unit actually performed, in place and in accordance with the requirements of the Contract Documents. Layout work, clearing and grubbing, grading, and all "burden" items identified in the specifications are considered as incidental to the Work and to be included proportionately in the Unit Price. No additional payment will be made for such items. The Contractor will be expected to install the work at the unit prices quoted regardless of field changes

which may become necessary as the Work progresses. The Designer reserves the right to add or deduct quantities of work or cut and fill locations, and the Contractor agrees to install the Work at the unit prices quoted regardless of quantity or placement, except as provided in paragraph 11.4, below.

- 11.1.3** Any costs or expenses caused by defective or ill-timed Work shall be borne by the Contractor as part of the Contract Price, provided however, that this provision shall not impair any of the Contractor's rights against the person responsible for such Work. Neither the Owner nor the Designer shall be subject to any claim by the Contractor, or any subcontractor or supplier of the Contractor arising out of defective or ill-timed Work by any person, and the Contractor hereby agrees to indemnify and hold harmless, the Owner and Designer of any potential cost, expense or claim due to the above causes as soon as possible, and the Contractor shall not adjust the Work of any other person without the prior written consent of the Owner.

11.2 Changes in the Contract Price

The Contract Price may only be changed by a Change Order. Any claim for an increase in the contract Price shall be based on written notice delivered to the Owner, with a copy to the Designer, within fifteen (15) days of the occurrence of the event giving rise to the claim. Notice of the amount of the claim with supporting data shall be delivered within forty-five (45) days of such occurrence unless the Owner allows an additional period of time to ascertain accurate cost data. All claims for adjustment in the Contract Price shall be determined by the Owner after consultation with the Designer. Any change in the contract Price resulting from any such claim shall be incorporated in a Change Order.

11.3 Change Order Increases/Decreases

The value of any Work covered by a Change Order or of any claim for an increase or decrease in the Contract Price shall be determined in one of the following ways:

11.3.1 Where the Work involved is covered by unit prices contained in the Contract Documents, by application of unit prices to the quantities if the items involved (subject to the provisions of paragraph 11.4), or

11.3.2 By mutual acceptance of a lump sum equitably related to the over all Contract Price.

11.4 Adjustment of Unit Prices

When the character or cost of the work covered by unit prices is materially altered (as defined in paragraph 11.4.1) from that stated in the original Contract Documents, the original unit bid prices may be adjusted by Change Order to compensate for either increased or decreased direct costs of performing the Work. If, in the opinion of the Contractor or the Owner, the character of the Work or the unit costs thereof are materially changed, either party may submit a written request for adjustment to the other party, with a copy to the Designer, within the time allowed for submission of claims under paragraph 11.2, above. The Contractor will furnish such documentation in support of or opposition to such claim as reasonably may be requested by the Owner within the time period allowed for documentation under Paragraph 11.2.

11.4.1 For purposes of determining the materiality of an alteration under paragraph 11.4, above, no adjustment shall be allowed unless the total quantity of an item required in connection with the entire Work, as altered, is in excess of one hundred twenty percent (120%) or less than eighty percent (80%) of a major contract item. For purposes of this section, a major contract item shall be any item where the total bid price (consisting of the total original quantities of that item required by the Contract Documents, multiplied by the original unit price stated in the bid), is in excess of five percent (5%) of the total Contract Price for all items of Work required by the Agreement.

11.4.2 Any adjustment of a unit price shall apply to all units of the adjusted item accepted by the Owner under the Agreement, and the Contractor shall accept as payment in full, so far as such items are concerned, payment at the adjusted contract unit prices for the accepted quantities of work done.

11.4.3 Except as provided in paragraphs 11.3 and 11.4, no allowance will be made by the Owner for any increased expense, loss of expected reimbursement, or loss of anticipated profits suffered or claimed by the Contractor, whether resulting directly from such alterations, indirectly from unbalanced allocation of overhead expense, incorrect amounts of the contract items, or from any other cause. The Contractor shall have no claim against the Owner by reason of any variation between the approximate quantities stated in the Contract Documents and the quantities of an item actually accepted by the Owner, except as specifically provided in paragraphs 11.3 and 11.4.

11.5 Cash Allowances

It is understood that the Contractor has included in the Contract Price all cash allowances so named in the Contract Documents and shall cause the Work so covered to be done by such Subcontractors, manufacturers, fabricators, suppliers or distributors and for such sums within the limit of the allowances as may be acceptable to the Owner. Upon final payment, the Contract Price shall be adjusted as required and an appropriate Change Order issued by the Owner. The Contractor agrees that the original Contract Price includes such sums as the Contractor deems proper for costs and profit on account of cash allowances. No demand for additional cost or profit in connection therewith will be allowed by the Owner.

ARTICLE XII

CHANGE OF THE CONTRACT TIME

12.1 Requests for a Change in the Contract Time

The Contract Time may only be changed by a Change Order. Any claim for an extension in the Contract Time shall be based on written notice delivered to the Owner, with a copy to the Designer, within fifteen (15) days of the occurrence of the event giving rise to the claim. Notice of the extent of the claim with supporting data shall be delivered to the Owner, with a copy to the Engineer, within forty-five (45) days of such occurrence, unless the Owner allows an additional period of time to ascertain more accurate data. All claims for adjustment in the Contract Time shall be determined by the Owner after consultation with the Designer. Any change in the Contract Time resulting from any such claim shall be incorporated in a Change Order.

12.2 Extensions

The Contract Time will be extended in an amount equal to the time lost due to delays beyond the control of the Contractor, if a claim is made therefor as provided in paragraph 12.1. Such delays shall include, but not be limited to, acts of neglect by the Owner, or others performing additional Work as contemplated by Article VII, fires, floods, labor disputes, epidemics, abnormal weather conditions or Acts of God.

12.3 Damage Recovery

All time limits stated in the Contract Documents are of the essence to the Agreement. The provisions of this Article XII shall not exclude recovery for damages incurred (including compensation for additional professional services) due to delay by either party.

ARTICLE XIII

WARRANTY AND GUARANTEE;

TESTS AND INSPECTIONS, CORRECTION,

REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

13.1 Warranty and Guarantee

The Contractor warrants and guarantees to the Owner and the Designer that all Work will be in accordance with the contract Documents and will not be defective. All defective Work, whether or not in place, may be rejected, corrected or accepted as provided in this Article XIII.

13.2 Access to Work

The Owner, Designer, Engineer, and their representatives, and testing agencies and governmental agencies with jurisdictional interests, will have access to the Work at reasonable times for observation, inspection and testing of the Work or any part thereof. The Contractor shall provide proper and safe conditions for such access.

13.3 Tests and Inspection

The Contractor shall give the Owner and Designer timely notice of readiness of the Work for all required inspections, test or approvals.

13.4 Local Laws and Ordinances

If any law, ordinance, rule, regulation, code or order of any public body having jurisdiction requires any Work (or part thereof) to specifically be inspected, tested or approved, the Contractor shall assume full responsibility therefor, pay all costs in connection therewith and furnish the Owner and Designer with the required certificates of inspection, testing or approval. The Contractor shall also be responsible for and shall pay all costs in connection with any inspection or testing required in connection with the Owner's acceptance of a manufacturer, fabricator,

supplier or distributor of materials or equipment proposed for incorporation into the Work, or the acceptance of materials or equipment submitted for approval prior to the Contractor's purchase thereof for incorporation into the Work. The cost of all other inspections, tests and approvals required by the Contract Documents shall be paid by the Owner (unless otherwise specified).

13.5 Testing and Inspection Organizations

All inspections, tests or approvals other than those required by law, ordinance, rule, regulation, code or order of any public body having jurisdiction shall be performed by organizations acceptable to the Owner, Designer and Contractor (or by the Engineer if so specified).

13.6 Covered Inspection

If any Work that is to be inspected, tested or approved according to the Contract Documents is covered without written concurrence of the Owner and Designer, it must, if requested by the Owner or Designer, be uncovered for observation. Such uncovering shall be at the Contractor's expense unless the Contractor has given the Owner and Designer timely notice of the Contractor's intention to cover such Work and the Owner and Designer have not acted with reasonable promptness in response to such notice. If any other Work is covered contrary to written request by the Owner or the Designer to delay such covering in order to allow inspection or observation, it must be inspected or observed, and such covering shall thereafter be replaced, all at the Contractor's expense.

13.7 Contractual Obligation

Neither observations by the Designer or Engineer, nor inspections, tests or approvals by others shall relieve the Contractor from his obligation to perform the Work in accordance with the Contract Documents.

13.8 Observation and Inspection

Notwithstanding the absence of a prior request to delay the covering of any Work for observation, inspection or testing, the Contractor shall uncover, expose or otherwise make available for observation, inspection or testing as the Owner, Designer or Engineer may require, that portion of the Work in question, furnishing all necessary labor, materials and equipment. If it is found that such Work is defective, the

Contractor shall bear all the expenses of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction, including compensation for additional professional services, and an appropriate Change Order shall be issued to deduct such expenses from the Contract Price. If, however, such Work is not found to be defective, the Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to such uncovering, exposure, observation, inspection, testing and reconstruction if he makes a claim therefor as provided in Articles XI and XII.

13.9 The Owner May Stop the Work

If the Work is defective, or the Contractor fails to supply sufficient skilled workmen or suitable materials or equipment, the Owner may order the Contractor to stop the Work or any portion thereof, until the cause for such order has been eliminated. However, that right of the Owner to stop the Work shall not give rise to any duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other party.

13.10 Correction or Removal of Defective Work

If required by the Owner, the Contractor shall promptly, without cost to the Owner, either correct any defective Work, whether or not fabricated, installed or completed, or if the Work has been rejected by the Owner, remove it from the site and replace it with non-defective Work.

13.11 One Year Correction Period

If, within one (1) year after the date of Substantial Completion or such longer period of time as may be prescribed by law or by the terms of any applicable special guarantee required by the Contract Documents or by any specific provisions of the Contract Documents, any Work is found to be defective, the Contractor shall promptly, without cost to the Owner, and in accordance with the Owner's written instructions, either correct such defective Work, or, if it has been rejected by the Owner, remove it from the site and replace it with non-defective Work. If the Contractor does not promptly comply with the terms of such instructions, or in an emergency where delay could cause serious risk of loss or damage, the Owner may have the defective Work corrected or the rejected Work removed and replaced, and all direct and indirect costs of such removal and replacements, including

compensation for additional professional services, shall be paid by the Contractor.

13.12 Acceptance of Defective Work

If the Contractor fails within reasonable time after written notice of the Engineer to proceed to correct defective Work or to remove and replace rejected Work as required by the Owner, in accordance with paragraph 13.10, or if the Contractor fails to perform the Work in accordance with the Contract Documents (including any requirements of the progress schedule), the Owner may, after seven (7) days written notice to the Contractor, with a copy to the Designer, correct and remedy any such deficiency. In exercising his rights under this paragraph, the Owner shall proceed expeditiously. To the extent necessary to complete corrective and remedial action, the Owner may exclude the Contractor from all or part of the site, take possession of all or part of the Work, and suspend the Contractor's services related thereto, take possession of the Contractor's tools, appliances, construction equipment and machinery at the site and incorporate in the Work all materials and equipment stored at the site for which the Owner has paid the Contractor but which are stored elsewhere.

The Contractor shall allow the Owner, the owner's employees, agents and representatives, such access to the site as may be necessary to enable the Owner to exercise his rights under this paragraph. All direct and indirect costs of the Owner in exercising such rights shall be charged against the Contractor, and a Change Order shall be issued incorporating the necessary revisions in the Contract Documents and a reduction in the Contract Price. Such direct and indirect costs shall include, in particular, but without limitation, compensation for additional professional services required and all costs of repair and replacement of work of other destroyed or damaged by correction, removal or replacement of the Contractor's defective Work. The Contractor shall not be allowed an extension of the Contract Time because of any delay in performance of the Work attributable to the exercise by the Owner of the Owner's right hereunder.

ARTICLE XIV

PAYMENTS TO CONTRACTOR AND COMPLETION OF WORK

14.1 Schedules

The Contractor shall be solely responsible for maintaining the Progress Schedule during the course of the Work. The Contractor shall provide the Owner and Designer with a copy of an updated Progress Schedule on a weekly basis, which updated Schedule shall indicate the status of the Work actually completed to date. Said updated Schedule may be provided by the Owner or Designer to other persons involved with the Work as deemed appropriate. The Contractor will notify the Owner and Designer immediately of any cessation of the Work, stating the cause thereof. If the prosecution of the Work ceases for any reason, the Contractor shall give the Owner and Designer at least twenty-four (24) hours advance notice of the resumption of its operation. Representatives of the Contractor, Owner and Designer shall meet on a weekly basis to discuss the Contractor's updated Progress Schedule and plan the current week's activities. Such representatives shall discuss all problems encountered with respect to the Progress Schedule, including any requests for deviations from such Schedule. At any time when the Contractor is behind the planned Progress Schedule, the parties shall discuss appropriate methods for returning to the planned Schedule, including the commitment by the Contractor to short term Progress Schedules designed to return to the original Progress Schedule.

14.2 Applications for Progress Payment

At least ten (10) days after each progress payment falls due (but not more often than once a month), the Contractor shall submit to the Designer for review, an Application for Payment, filled out and signed by the Contractor, covering the work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents, including, without limitation, "as-built" drawings required by the Agreement or Specifications. If payment is requested on the basis of materials and equipment not incorporated in the Work, but delivered and suitably stored at the site or at the location agreed to in writing, the Application for Payment shall also be accompanied by such data,

satisfactory to the Owner, as will establish the Owner's title to the material and equipment and protect the Owner's interest herein, including applicable insurance. Each subsequent Application for Payment shall include an affidavit from the Contractor stating that all previous progress payments received on account of the Work have been applied to discharge in full all of the Contractor's obligations reflected in prior Applications for Payment. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

14.3 Contractor's Warranty of Title

The Contractor warrants and guarantees that title to all Work, materials and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to the Owner at the time of payment, free and clear of all liens, claims, security interests and encumbrances (hereinafter in these General Conditions referred to as "Liens").

14.4 Review of Applications for Progress Payments

The Designer will, within ten (10) days after receipt of each Application for Payment, present the Application to the Owner, with either a recommendation of payment or a written statement of the Designer's reasons for refusing to recommend payment. In the latter case, a copy of the Designer's statement shall be sent to the Contractor, who may make any requested corrections and resubmit the Application to the Designer. The Owner shall, within ten (10) days of presentation to him of the Application for Payment with the Designer's comments, either (i) pay the Contractor the amount requested, or (ii) furnish the Contractor and Designer with a written statement refusing such payment, which may incorporate such comments of the Designer that the Owner, in its sole discretion, may deem appropriate.

14.5 Designer's Recommendations

The Designer's recommendation of or refusal to recommend any payment requested in an Application for Payment shall be of an advisory nature only, and is intended to indicate, to the best of the Designer's knowledge, information and belief, that the Work has progressed to the point indicated and that the quality and quantity of the Work corresponds to the design concepts set forth in the Contract Documents (subject to an evaluation of the Work as a functioning Project upon Substantial Completion, to the results of any subsequent tests called for in the Contract

Documents and any qualifications stated in the recommendation). However, by recommending any such payment, the Designer will not thereby be deemed to have represented that exhaustive or continuous on-site inspections have been made to check the quality or quantity of the Work, or that the means, methods, techniques, sequences, and procedures of construction have been reviewed or that any examination has been made to ascertain how or for what purpose the Contractor has used the moneys paid or to be paid to the Contractor on account of the Contract Price, or that title to any Work, materials or equipment has passed to the Owner free and clear of any Liens. The Owner shall be responsible for calling to the attention of the Designer, any problems or deficiencies relating to the Work or to the performance of the Contractor which may become known to the Owner during the course of construction.

14.6 Designer's Recommendation of Final Payment

The Designer's recommendation of final payment shall indicate, to the best of the Designer's knowledge, information and belief, that the conditions warrant the Contractor's receipt of final payment as set forth in paragraph 14.13.

14.7 Designer's Refusal to Recommend

The Designer may refuse to recommend the whole or any part of any payment in its absolute discretion, if, in its opinion, such payment would not be justified under the circumstances known to or believed by the Designer. Without limiting the generality of the foregoing, the Designer may refuse to recommend any payment, or withdraw his prior recommendation of any payment on the basis of newly discovered information, in a good faith attempt to protect the Owner from loss which may arise in the event that:

- 14.7.1 the Work is defective, or completed Work has been damaged requiring correction or replacement,
- 14.7.2 written claims have been made against the Owner or Liens have been filed in connection with the Work,
- 14.7.3 the Contract Price has been reduced because of Modifications,

- 14.7.4 the Owner has been required to correct defective Work, or complete the Work in accordance with paragraph 13.13,
- 14.7.5 the Contractor fails to satisfactorily prosecute the Work in accordance with the Contract Documents, or
- 14.7.6 the Contractor fails to make payment to Subcontractors, or for labor, materials or equipment.

The Owner shall not be bound by any refusal of the Designer to recommend payment or withdrawal of a prior recommendation, it being understood that the Owner may make payment voluntarily at any time upon such representations or evidence of progress as it may deem to be satisfactory. The Designer shall not be liable to the Contractor or any person claiming by or through the Contractor, for any refusal to recommend payment made pursuant to this paragraph 14.7.

14.8 Substantial Completion

When the Contractor considers the entire Work ready for its intended use the Contractor shall, in writing to the Owner and Designer, certify that the entire Work is substantially complete and request that the Owner issue a certificate of Substantial Completion. Within a reasonable time thereafter, the Owner, Contractor, Designer and Engineer shall make an inspection of the Work to determine the status of completion. If the Owner does not consider the Work substantially complete, the Owner will notify the Contractor, in writing, giving his reasons therefor. If the Owner considers the Work substantially complete, the Owner shall, after consultation with the Designer and Engineer, deliver to the Contractor a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to this certificate a tentative list of items to be completed or corrected before final payment. The Contractor shall have seven (7) days after receipt of the tentative certificate to make written objection to the Owner, with a copy to the Designer and Engineer, as to any provisions of the certificate or attached list. Such objections shall be considered by the Owner and, after consultation with the Designer and Engineer, the Owner shall issue a definitive Certificate incorporating such changes as the Owner may deem appropriate under the circumstances. At the time of delivery of the tentative certificate of Substantial

Completion, the Designer will deliver to the Owner and Contractor, a written recommendation as to division of responsibilities pending final payment between the Owner and the Contractor with respect to security, operation, safety, maintenance, heat, utilities and insurance. The Owner and Contractor shall agree in writing as to the division of such responsibilities prior to the delivery by the Owner of a definitive certificate of Substantial Completion.

14.9 Contractor Exclusion

The Owner shall have the right to exclude the Contractor from the Work after the date of Substantial Completion, but the Owner shall allow the Contractor reasonable access to complete or correct items on the tentative list.

14.10 Partial Utilization

Use by the Owner of completed portions of the Work may be accomplished prior to Substantial Completion of all the Work subject to the following:

14.10.1 The Owner, at any time, may request the Contractor, in writing, to permit the Owner to use any part of the Work which the Owner believes to be substantially complete and which may be so used without significant interference with construction of the other parts of the Work. If the Contractor agrees, the Contractor will certify to the Owner and Engineer that said part of the Work is substantially complete and a certificate of Substantial Completion for that part of the Work will be prepared according to the procedure set forth in Paragraph 14.8, above. The Owner shall have the right to exclude the Contractor from any part of the Work which has been certified to be substantially complete, but the Owner shall allow the Contractor reasonable access to complete or correct items on the tentative list.

14.10.2 In lieu of the issuance of a certificate of Substantial Completion, as to part of the Work, the Owner may take over operation of a facility constituting part of the Work whether or not it is substantially complete if such facility is functionally and separately usable; provided that prior to any such takeover, the Owner and Contractor have agreed in writing to the division of responsibilities between the Owner and

Contractor for security, operation, safety, maintenance, correction period, heat, utilities and insurance with respect to such facility.

- 14.10.3 No occupancy of a part of the Work or taking over operations of a facility, will be accomplished prior to compliance with the requirements of paragraph 5.14 in respect to property insurance.

14.11 Final Inspection

Upon written notice from the Contractor that the Work is complete, the Owner, Designer and Engineer will make a final inspection with the Contractor, and the Owner will notify the Contractor, in writing, of all particulars in which this inspection reveals that the Work is incomplete or defective. The Contractor shall immediately take such measures as are necessary to remedy such deficiencies.

14.12 Final Application for Payment

After the Contractor has completed all such corrections to the satisfaction of the Owner and delivered to the Owner all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, marked-up record documents and all other documents required by the Contract Documents, and after the Owner has indicated that the Work is acceptable (subject to the provisions of paragraph 14.16), the Contractor may make application for the final payment following the procedure for progress payments. The final Application for Payment shall be accompanied by all documentation called for in the Contract Documents and such other data and schedules as the Owner, Designer, or Engineer may reasonably require, together with completed and legally effective releases or waivers (satisfactory by the Owner) of all liens arising out of or filed in connection with the Work. In lieu thereof and as approved of by the Owner, the Contractor may furnish receipts or releases in full; an affidavit of the Contractor that the releases and receipts include all labor, services, material, and equipment for which a lien could be filed, and that all payrolls, material and equipment bills, and other indebtedness connected with the Work for which the Owner or his property might in any way be responsible, have been paid or otherwise satisfied, and consent of the Surety, if any, to final payment. If a Subcontractor, manufacturer, fabricator, supplier or distributor fails to furnish a release or receipt in full, the Contractor may furnish a Bond or other collateral satisfactory to the Owner to indemnify the Owner against any lien.

14.13 Final Payment and Acceptance

If, upon presentation of the Contractor's final application for payment by the Designer, the Owner is satisfied that the Work has been completed and the Contractor has fulfilled all of his obligations under the Contract Documents, the Owner will, within ten (10) days after receipt of the final Application for Payment, send notice of Acceptance of the Application to the Contractor and the Designer stating the amount of the final payment to be made, and that the Work is acceptable subject to the provisions of paragraph 14.16. Otherwise, the Owner will return the Application to the Contractor, indicating in writing, (with a copy to the Designer) the reasons for refusing to recommend final payment, in which case the Contractor shall make the necessary corrections and resubmit the Application. The Owner shall pay the Contractor the amount stated in the Notice of Acceptance within thirty (30) days of the date such Notice is given. If the Contractor overruns the contract time plus authorized extensions thereof, the cost to the Owner of providing design, engineering and project management services, observation of construction, testing and inspection, and supervision of the Contract during the time overrun will be deducted from the final payment to the Contractor.

14.14 Completion Delays

If, through no fault of the Contractor, final completion of the Work is significantly delayed, and if the Owner agrees, the Owner shall have the option, upon receipt of the Contractor's final Application for Payment and recommendation of the Designer, and without terminating the Agreement, to make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by the Owner for the Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if Bonds have been furnished as required in paragraph 5.1, the written consent of the Surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Designer with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

14.15 Contractor's Continuing Obligations

The Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. Neither recommendation of any progress

or final payment by the Designer, nor the issuance of a certificate of Substantial Completion, nor any payment by the Owner to the Contractor under the Contract Documents, nor any use or occupancy of the Work or any part thereof by the Owner, nor any act of acceptance by the Owner, nor any failure to do so, nor the issuance of a notice of acceptance by the Owner pursuant to paragraph 14.13, nor any correction of defective Work by the Owner, shall constitute acceptance of the Work not in accordance with the Contract Documents or a release of the Contractor's obligation to perform the Work in accordance with the Contract Documents.

14.16 Waiver of Claims

The making and acceptance of final payment shall constitute:

14.16.1 a waiver of all claims by the Owner against the Contractor, except claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to paragraph 14.11 or from failure to comply with the Contract Documents or the terms of any special guarantees specified therein; however, it shall not constitute a waiver by the Owner of any rights in respect to the Contractor's continuing obligations under the Contract Documents; and

14.16.2 a waiver of all claims by the Contractor against the Owner other than those previously made in writing and still unsettled.

ARTICLE XV

SUSPENSION OF WORK AND TERMINATION

15.1 The Owner May Suspend Work

The Owner may, at any time and without cause, suspend the Work or any portion thereof for a period of not more than ninety (90) days by notice, in writing, to the Contractor and Designer which shall fix the date on which Work shall be resumed. The Contractor shall resume the Work on the date so fixed.

The Contractor will be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to any suspension if he makes a claim therefor as provided in Articles XI and XII.

15.2 The Owner May Terminate

Upon the occurrence of any one or more of the following:

- 15.2.1 the Contractor is adjudged bankrupt or insolvent,
- 15.2.2 the Contractor makes a general assignment for the benefit of creditors,
- 15.2.3 a Trustee or receiver is appointed for the Contractor, or, of any of the Contractor's property,
- 15.2.4 the Contractor files a petition to take advantage of any debtor's act, or to reorganize under the bankruptcy or similar laws,
- 15.2.5 the Contractor repeatedly fails to supply sufficient skilled workmen or suitable materials or equipment,
- 15.2.6 the Contractor repeatedly fails to make prompt payments to Subcontractors, or for labor, materials or equipment,

- 15.2.7 the Contractor disregards laws, ordinances, rules, regulations or orders of any public body having jurisdiction,
- 15.2.8 the Contractor disregards the authority of the Owner, or
- 15.2.9 the Contractor otherwise violates in any substantial way any provisions of the Contract Documents.

The Owner may, after giving the Contractor and his Surety seven (7) days written notice, terminate the services of the Contractor, exclude the Contractor from the site and take possession of the Work and all of the Contractor's tools, appliances, construction equipment and machinery at the site, and use the same to the full extent they could be used by the Contractor (without liability to the Contractor for trespass or conversion), incorporate in the Work all materials and equipment stored at the site, or for which the Owner has paid the Contractor but which are stored elsewhere, and finish the Work as the Owner 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 exceeds the direct and indirect costs of completing the Work, including compensation for additional professional services, such excess shall be paid to the Contractor. If such costs exceed such unpaid balance, the Contractor shall pay the difference to the Owner. Such costs incurred by the Owner shall be incorporated in a Change Order, but in finishing the Work the Owner shall not be required to obtain the lowest figure for the Work performed.

15.3 Termination Liability

Where the Contractor's services have been so terminated by the Owner, the termination shall not affect any rights of the Owner against the Contractor then existing or which may thereafter accrue. Any retention of payment of moneys due the Contractor from the Owner will not release the Contractor from liability.

15.4 Abandonment of Work

With seven (7) days written notice to the Contractor, Designer and the Engineer, the Owner may, without cause and without prejudice to any other right or remedy, elect

to abandon the Work and terminate the Agreement. In such case, the Contractor shall be paid for all the Work executed and any expense sustained plus reasonable termination expenses.

15.5 Contractor May Stop Work or Terminate

If, through no act or fault of the Contractor, the Work is suspended for a period of more than ninety (90) days by the Owner or under an order of court or other public authority, or the Owner fails to act on any Application for Payment within thirty (30) days after it is submitted, then the Contractor may, with seven (7) days written notice to the Owner and Designer, terminate the Agreement and recover from the Owner, payment for all Work executed and any expense sustained plus reasonable termination expenses. In addition and in lieu of terminating the Agreement, if the Owner has failed to act on any Application for Payment as aforesaid, the Contractor, may, upon seven (7) days notice to the Owner and Designer, stop the Work until payment of all amounts then due have been made. The provisions of this paragraph shall not relieve the Contractor of his obligation under 6.28 to carry on the Work in accordance with the Progress Schedule and without delay during disputes and disagreements with the Owner.

ARTICLE XVI

(Deleted)

ARTICLE XVII

MISCELLANEOUS

17.1 Giving Notice

The Owner, Contractor, Designer and Engineer shall each designate, in writing, the name and business address of an individual officer or agent to whom all written notices and other correspondence required under the Contract Documents may be directed. Whenever any provision of the Contract Documents requires the giving of notices, it shall be deemed to have been validly given, if delivered by hand, or sent prepaid by overnight courier or certified mail, to the designated person at the designated address. The parties may change the designated name or address at any time with ten (10) days written notice given to the other parties as provided herein.

17.2 Computation of Time

When any period of time is referred to in the Contract Documents by days, it shall be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on any day made a legal holiday by the law of the applicable jurisdiction, such day shall be omitted from the computation.

17.3 General

Should the Owner or the Contractor suffer injury or damage to his person or property because of any error, omission or act of the other party or any of the other party's employees or agents or others for whose acts the other party is legally liable, claim shall be made, in writing, to the other party within a reasonable time of the first observance of such injury or damage.

17.4 Limitation of Rights

The duties and obligations imposed by the General Conditions and the rights and remedies available hereunder to the parties hereto, and, in particular, but without limitation, the warranties, guarantees and obligations imposed upon the Contractor

by paragraphs 6.29, 13.1, 13.11, 13.14, 14.3, and 15.2, and all of the rights and remedies available to the Owner, Contractor, Designer and Engineer thereunder, shall be in addition to, and shall not be construed in any way as a limitation of any rights and remedies available to any or all of them which are otherwise imposed or available by law or contract, by special warranty or guaranty or by other provisions of the Contract Documents, and the provisions of this paragraph shall be effective as repeated specifically in the Contract Documents in connection with each particular duty, obligation, right and remedy to which they apply. All representations, warranties and guarantees made in the Contract Documents shall survive final payment and termination or completion of this Agreement.

17.5 Taxes and Charges

The Contractor shall pay all state and local sales and use taxes on such items, and in such manner as required by the laws and statutes of the State where the Project is located and its political subdivisions, and shall be responsible for such other levies, duties, fees, sales or excise taxes or charges as may be applied by any government authority to any purchase made by the Contractor in connection with the Work. The Contractor shall withhold and pay any and all withholding taxes, whether state or federal, and pay all Social Security charges and also all state unemployment compensation charges, and pay or cause to be withheld, as the case may be, any and all taxes, charges, or fees or sums whatsoever, which are now or may hereafter be required to be paid or withheld under any laws applicable to the Contractor, its business or to the Work to be performed.

ADDITIONS & CLARIFICATIONS
TO THE
GENERAL CONDITIONS

ADDITIONS AND CLARIFICATIONS TO THE GENERAL CONDITIONS

The following paragraphs shall be added to and supplemental to the General Conditions.

DEFINITIONS

The term "Designer/Engineer" means the representative of the Owner for services related to the Work. These terms, as used throughout the Contract Document, include authorized representatives of the Owner.

The term "Specifications" shall also include the legal and procedural documents (including the Instructions to Bidders, Form of Proposal, Form of Bid Bond, Form of Contract Agreement, and Form of Performance and Payment Bonds), the General Conditions, Supplemental General Conditions, General Requirements and the Detailed Specifications.

Wherever the words "directed", "required", "permitted", or words of like importance are used, it shall be understood that the direction, requirement or permission of the Owner is intended, and similarly, the words "approval", "acceptable", "satisfactory" or words of like importance shall mean approved by, acceptable or satisfactory to the Owner.

The term "Act of God" means an earthquake, flood, cyclone or other cataclysmic phenomenon of nature. Rain, wind, or other natural phenomenon of normal intensity for the locality shall not be construed as an Act of God under this definition.

SCHEDULES, REPORTS AND RECORDS

A Construction Schedule, showing the work in the order proposed by the Contractor, and the time required to complete each phase, will be required and shall be submitted to the Owner for approval.

Approval of the Construction Schedule is required for initiation and completion of all phases of the Work. This schedule shall be updated and resubmitted with each monthly payment request. If, in the opinion of the Owner, the Contractor falls behind in his schedule or will not be able to complete the project within the time limits, he may require the Contractor to revise his schedule and put additional personnel and/or equipment on the site in an effort to maintain the schedule as approved.

DRAWINGS AND SPECIFICATIONS

1. Copies Furnished.

Except as provided for otherwise, all copies of the Contract Documents reasonably necessary for the execution of the Work shall be furnished to the Contractor without charge.

2. Documents on the Job.

The Contractor shall keep, on the site of the Work, a copy of the Contract Documents including all authorized Change Orders, and shall, at all times, give the Owner access thereto.

3. Errors and Omissions.

The Contractor shall take no advantage of any apparent error or omission in the Contract Documents. If such error or omission does occur, the Owner shall have the authority to make corrections and interpretations deemed necessary to fulfill the intent of the Drawings and Specifications. Such corrections or interpretations, if any, shall not be construed as a waiver of any Contract Provision.

4. Corrections.

Should any portions of the Drawings and Specifications be obscure or in dispute, they shall be referred to the Designer/Engineer and they shall decide as to the true meaning and intent. They shall also have the right to correct any errors or omissions at any time when such corrections are necessary for the proper fulfillment of said Drawings and Specifications.

MATERIALS, SERVICES AND FACILITIES

The Contractor shall furnish the fuel and electrical current required for construction purposes, including any temporary incoming power connections, transformers, poles and metering equipment required therefore.

Unless otherwise specified, all materials and equipment incorporated in the Work under the Contract Documents shall be new. All workmanship shall be of the best possible quality, accomplished by persons well qualified in their respective trades.

All materials of unsound or otherwise unfit character and not in accordance with the terms of the Contract Documents will be condemned by the Owner's representative.

The Contractor shall promptly remove from the premises all condemned materials whether incorporated in the Work or not. The Contractor shall promptly replace the materials to the satisfaction of the Owner. If the Contractor does not remove such condemned materials within a reasonable time, fixed by written notice, the Owner may remove and store them at the expense of the Contractor. If the Contractor does not pay to the Owner, the expense of such removal within ten (10) calendar days time thereafter, the Owner shall account for the net proceeds thereof, after deduction of all cost and expenses that rightfully should have been born by the Contractor.

If it becomes necessary at any time during the construction to move materials which are to enter into the construction, the materials having been temporarily placed, the Contractor or Subcontractor shall, when so directed by the Owner's representatives, move them or cause them to be moved without additional cost to the Owner.

The Contractor shall provide and maintain such sanitary accommodations for the use of his employees and those of his Subcontractors as may be necessary to comply with the health requirements and regulations and as directed by the Owner's representative. Use of existing facilities, or new facilities after the date of substantial completion, is specifically prohibited. No nuisance will be permitted.

INSPECTION AND TESTING

1. Tests.

Compaction tests, if necessary, will be paid for by the Owner. Any other specified laboratory tests of materials and finished articles shall be made by bureaus, laboratories of agencies approved by the Owner's representatives and the certified reports of such tests shall be submitted to the Owner's representatives. All costs in connection with the testing shall be born by the Contractor. Failure of any material to pass the specified tests will be sufficient cause for refusal to consider, under these Contract Documents, any further samples of the same brand or make of the failed material. Samples of various materials delivered on the site or in place may be taken by the Owner's representatives for testing. Samples failing to meet the Contract Documents' requirements will automatically void previous approvals of the items tested.

2. Inspection.

The Contractor shall furnish the Owner and its representatives with every reasonable facility for ascertaining whether or not the work performed, and the materials used, are in accordance with the requirements and intent of the Specifications and Contract Documents. No work shall be done, or materials used, without inspection by the Owner or its representatives. Failure to reject any defective work or materials shall not, in any way, prevent later rejection when such defect is discovered, or obligate the Owner to final acceptance.

All materials furnished and work done, when not in accordance with the Contract Documents, may be rejected and shall immediately be removed and other work done and materials furnished in accordance therewith. If the Contractor fails to remove the work and materials as above ordered within forty-eight (48) hours, then the Owner or his representatives shall have the right and authority to stop the Contractor and his work, at once, and to supply men and material at the cost and expense of the Contractor to remove said work and materials.

3. **Defective Work and Materials.**

The inspection of the work shall not relieve the Contractor of any of his obligations to fulfill his contract and defective work shall be made good, notwithstanding that such work and materials have been previously inspected by the Owner or its representatives, to condemn improper materials or workmanship, and shall not be considered as a waiver of any defect which may be discovered later, or as preventing the Owner, at any time subsequent, from recovering damages for work actually defective.

The Contractor shall give the Owner forty-eight (48) hours notice if he intends to perform work outside of normal working hours. Unless otherwise specifically permitted, no work shall be done between the hours of 7:00 p.m. and 6:00 a.m., nor on Sunday, except as necessary for the proper care and protection of work already performed. If it shall become absolutely necessary to perform work at night, the Owner shall be informed a reasonable time in advance of the beginning of performance of such work. Only such work shall be done at night as can be done satisfactorily, in a quality manner. Good lighting and all other necessary facilities for carrying out and inspecting the work shall be provided and maintained at all points where such work is being done.

4. **Cleaning Up.**

The Contractor shall frequently clean up all refuse, rubbish, scrap materials and debris caused by his operations to the end that the site of the Work shall present a neat, orderly and workman-like appearance at all times. At the completion of the Work, but before the Final Payment is made, the Contractor shall remove all surplus material, and debris of every nature resulting from his operations and put the site in a neat, orderly condition. If he should fail to do so, the Owner shall have the right to perform or have performed, all necessary clean-up and charge the cost to the Contractor.

SURVEYS, PERMITS AND REGULATIONS

The Owner will furnish the original boundary survey and golf course centerline surveys, establish base lines and a permanent bench mark, as indicated on the drawings. All other grades, lines, levels and bench marks shall be established and maintained by the Contractor who shall be responsible for same. The Contractor shall verify all grades, lines, levels and dimensions, as indicated on the Drawings.

The Contractor must exercise proper care and caution to verify the grades and figures given him before proceeding with the work, and shall be responsible for any damage or defective work caused by his failure of such care and caution. He shall promptly notify the Owner's representatives of any errors or discrepancies he may discover in order that the proper corrections may be made. All survey notes shall be recorded in a duplicating field book, and the original notes supplied to the Owner's representatives on a weekly basis.

The Contractor shall keep himself fully informed of all state and local laws, ordinances, and regulations in any manner affecting those engaged or employed in the work, or the materials used in the work, or in any way affecting the conduct of the work, and of all orders and decrees of bodies or tribunals having any jurisdiction or authority over same. If any discrepancy or inconsistency should be discovered in these Contract Documents, or in the Project Documents herein referred to, in relation to any such law, ordinance, regulation, order or decree, he shall forthwith report the same, in writing, to the Owner. He shall, at all times, observe and comply with all such existing and future laws, ordinances and regulations, and shall protect and indemnify the Owner and its agents against any regulation, order or decree, whether by himself or by his employees.

The Contractor shall abide by all local and state laws or ordinances to the extent that such requirements do not conflict with federal laws or regulations.

The Contractor shall be required to obtain applicable permits and business licenses as required by the local authorities and the State of Florida.

Ohio act

PROTECTION OF WORK, PROPERTY AND PERSONS

The Contractor shall comply with the Department of Labor Safety and Health Regulations for construction promulgated under the Occupational Safety and Health Act of 1970 (PL 91-596) and under Section 107 of the Contract Work Hours and Safety Standards Act. (PL91-54).

The Contractor shall provide all barricades, guards, lights, or other such protection and walks around his work as are required by the regulations of the County, State or Federal laws and shall assume all responsibility for same, and keep them in repair. The necessary lighting, if required, to facilitate overtime work shall be provided. All barricades, etc., shall be promptly removed upon completion of the work.

1. **Public Convenience.**

No street, alley, or other roadway shall be closed to the public by the Contractor, except by written permission of the Owner, and except while so closed, the Contractor shall maintain traffic over, through or around work, with the maximum practical convenience for the full twenty-four (24) hours of each day, whether or not work has ceased temporarily. The Contractor shall notify the Owner in writing at the earliest practical date and in any case before starting any construction that might in any way inconvenience or endanger traffic, or regarding each proposed closure and proposed schedule of operations thereon, so that all necessary arrangements can be made.

The convenience of the general public and of residents along the working area shall be provided for in a reasonably adequate and satisfactory manner. Where existing roadways are not available for use as detours, traffic shall be permitted to pass through the work, except as otherwise specified or directed by the Owner. The Contractor shall provide and maintain, at his expense, and in a manner approved and deemed practical by the Owner, such as temporary roads as may be necessary to provide convenient access to work, as well as temporary approaches to and crossings of, intersecting streets and other roadways. The Contractor shall provide, at his

expense, temporary bridges for pedestrians, as required at all street intersections, over ditches, etc.

Materials and equipment, stored along streets and other roadways, shall be so placed and the work at all times shall be conducted, as to insure minimum danger and obstruction to the traveling public.

Fire hydrants in operating condition shall be accessible at all times to the Fire Department. No materials or other obstructions shall be placed closer to an operating fire hydrant than permitted by ordinances, rules or regulations. No operating fire hydrant shall be disconnected, removed or otherwise rendered inoperable without the written permission of the Fire Department.

The Contractor shall give the Chief of the Fire Department at least twenty-four (24) hours notice, in writing, before closure of each street and each street intersection.

2. Crossing Utilities.

When new construction crosses highways, railroads, streets or utilities under the jurisdiction of State, County, City or other public agency, public utility or private entity, the Contractor shall secure written permission, unless previously secured by the Owner, from the proper authority before executing such new construction. A copy of such written permission must be filed with the Owner before any work is started. The Contractor shall be required to furnish a release from the proper authority before final acceptance of the work.

Unless otherwise specified or approved, utility lines shall be maintained in continuous service, and shall be properly supported and protected by the Contractor. In no case shall interruption to water or sewer service be allowed to exist outside of working hours, except as permitted by the Owner, on pipe lines to be altered or replaced under this Contract. Operating fire hydrants shall be kept clear of excavated materials and other materials.

In the event of interruption to water or other utility services as a result of accidental

breakage, the Contractor shall promptly notify the proper authority, and shall cooperate with said authority in the restoration of service as promptly as is practical. In the event that such pipes or other facilities are broken or improperly supported, the Contractor shall be held responsible for their complete and prompt restoration, in a workman-like manner and for any claim for damage which may arise as a result of such interruption of service.

All chemicals used during project construction or furnished for project operation, whether herbicide, pesticide, disinfectant, polymer, reactant or of other classification, must show approval of either the E.P.A., U.S.D.A., or any other governmental agency necessary for approval. Use of all such chemicals and disposal of residues shall be in strict conformance with the manufacturer's instructions and local State and Federal regulations.

SUPERVISION BY CONTRACTOR

The Contractor shall, at all times, have a Superintendent, satisfactory to the Owner, capable of acting as his agent on the work, who shall receive instructions from the Owner or his authorized representatives. The Superintendent shall have full authority to execute the orders or directions of the Owner without delay and to promptly supply such materials, tools, plant equipment and labor as may be required.

The Contractor shall, upon demand from the Owner, immediately remove any Superintendent, Foreman, or Workman whom the Owner may consider incompetent or undesirable.

1. Emergency Work.

The Contractor shall, at all times (nights, weekends or holidays) have a responsible man available to act in case of emergency repairs whom the Owner may contact. Upon notification of any emergency work necessary, the Contractor's representative shall immediately take steps to make such repairs.

CORRECTION OF WORK

If the Owner deems it expedient not to require correction of work which has been injured or was not performed in accordance with the Contract, an appropriate adjustment to the Contract Price may be made thereafter.

PAYMENTS TO CONTRACTOR

The proposed format for use in periodic progress pay requests along with an estimated schedule of progress payment amounts for the full construction period must be submitted for approval before Notice to Proceed will be issued.

The Owner shall make progress payments to the Contractor on the basis of a duly certified and approved estimate of work performed during the preceding pay request period by the Contractor. Progress payment requests from the Contractor shall be submitted to the Owner for approval on or before the 1st day of each pay request period.

Progress payments will be made for:

- a. Work in Place
 - b. Materials and/or equipment which have been delivered to the construction site and when conditional or final acceptance is made by the Owner. It shall be the Contractor's responsibility to provide adequate insurance and appropriate security measures for the protection of the subject materials and/or equipment.
1. **Payments Withheld.**
The Owner may withhold, or on account of subsequently discovered evidence, nullify the whole or a part of any certificate for payment to such extent as may be necessary to protect himself from loss on account of the following reasons:

- a. Defective work not remedied.
- b. Claims filed or reasonable evidence indicating probable filing of claims.
- c. Failure of the Contractor to pay for labor or materials, or to make payments properly to subcontractors.
- d. A reasonable doubt, substantiated by recommendation from the Designer, that the Contract can be completed for the balance then unpaid.
- e. Damage to another contractor.

2. Release of Liens.

The Owner, before making any payment, including the final payment, if he deems such procedure necessary to protect his interests, may require the Contractor to furnish 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, that the releases and receipts include all the labor and materials for which a lien could be filed. The Contractor may, if any subcontractor refuses to furnish a release or receipt in full, furnish bond satisfactory to the Owner, to indemnify him against any lien. However, the Owner may make payments in part or in full to the Contractor without requiring the releases or receipts, and the payments so made shall not impair the obligations of any Surety or Sureties on any bond or bonds furnished under this Contract.

INSURANCE

The Contract shall not be binding upon the Owner until the certificates of insurance or the

insurance policies called for have been filed with and approved by him.

CONTRACT SECURITY

The failure of the said Bidder to execute the Agreement and to supply the required bonds within the stipulated ten day period, or within such extended period as the Owner may grant, shall constitute a default, and the Owner may award the Contract to the next lowest responsible bidder or solicit new bids and may charge against the difference between the amount of the Bid and the amount for which a contract is subsequently executed, up to the total amount of the Bidder's bid security.

SEPARATE CONTRACTS

If the Contractor or any of his subcontractors or employees cause loss or damage to any separate contractor on the work, the Contractor agrees to settle, or make every effort to settle or compromise with such separate contractor by agreement or arbitration. If such separate contractor sues the Owner on account of any loss so sustained, the Owner shall notify the Contractor, who shall indemnify and save the Owner harmless against any expense of judgment arising therefrom.

OWNER'S REPRESENTATIVES' AUTHORITY

The Owner, may suspend by written order any work or any part of the work under this Contract to require the correction of unsatisfactory work, or if work has not been satisfactorily completed in other areas. When work is so suspended it shall not be resumed until the cause for such order has been eliminated to the satisfaction of the Owner, which must be signified in writing. This right of the Owner to suspend the work shall not give rise to any duty on the part of the Owner to exercise this right for the benefit of the contractor or any other party. He shall also have authority to reject all work and materials that do not conform to the Contract and to decide questions that arise in the execution of work.

LAND AND RIGHTS-OF-WAY

The necessary land for the construction of the work will be furnished by the Owner. The Contractor is directed to the Owner for rights-of-way actually acquired. The Owner will provide no right-of-way over other property. The Contractor shall take every possible precaution to inconvenience as little as possible, the owners and tenants of adjacent property. Public highways shall not be obstructed in such a way as to cut off traffic. The Contractor shall, at his own expense, repair any damage or injury to either public or private property during the progress of the work. Wholesale cutting of trees on the right-of-way will not be permitted, except as necessary for construction.

GUARANTY

The Contractor agrees that he will obtain from the manufacturers of equipment and materials furnished under this Contract, guarantees against defective materials and workmanship, and if those guarantees, as furnished by the manufacturer, do not extend for the term of one (1) year from and after the date of final payment by the Owner or other established date, he shall make the necessary arrangements and assume all cost for extending this guaranty for the required period.

CORRECTIONS AFTER FINAL PAYMENT

No certificates for payment and no payment, final or otherwise, nor partial or entire use of occupancy of the Work by the Owner, shall be an acceptance of any work or materials not in accordance with the Contract, nor shall the same relieve the Contractor of responsibility for faulty materials or workmanship or operate to release the Contractor or his Surety from any obligation under the Contract or Performance Bond.

When the Owner deems it necessary, and so orders, any replacements or repairs of defective work shall be undertaken by the Contractor within twenty-four (24) hours after service of notice. If the Contractor unnecessarily delays or fails to make the ordered replacements or

repairs within the time specified, or if any replacements or repairs are of such nature as not to admit of the delay incident to the service of a notice, then the Owner shall have the right to make such replacements or repairs and the expense thereof shall be paid by the Contractor or deducted from any monies due the Contractor.

TAXES

The Contractor assumes and is liable specifically for all State and Federal so-called Payroll or Social Security Taxes and for all State and Federal Sales and Use Taxes that may be in force at the time of the award of the Contract, and guarantees to hold the Owner harmless in every respect against same.

TECHNICAL SPECIFICATIONS

**YANKEE TRACE GOLF COURSE
TECHNICAL SPECIFICATIONS**

- I. Surveys and Layout of Work
- II. Mobilization
- III. Clearing, Grubbing & Disposal
- IV. Earthmoving
 - a. Topsoil
 - b. Excavation
 - c. Embankment/Fill
- V. Shaping
- VI. Features Construction
 - a. Greens
 - b. Tees
 - c. Bunkers
- VII. Irrigation
- VIII. Golf Course Field Drainage
- IX. Grassing
- X. Cart Paths
- XI. Bridging
- XII. Bulkheading
- XIII. Project Record Documents
- XIV. Project Clean-Up
- XVI. Project Close-Out

TECHNICAL SPECIFICATIONS

SECTION I. SURVEYS AND LAYOUT OF WORK

The Owner is responsible for original property boundary survey, master elevation benchmark establishment, original topographic information, golf course boundary survey and staking, original golf course centerline survey and staking, revised centerline survey and staking prior to construction, also survey of any changes in circumstances created by an Owner related action.

The Owner shall make available to the Contractor all data pertinent to the above information and assist the Contractor, should substantial changes occur in the scope or location of work at no fault of the Contractor.

Otherwise, the Contractor will be responsible for maintaining all the original or revised elevations and survey information and locations as established by the Owner or his consultants. The cost of any additional survey work caused by contractor negligence or non-maintenance of the original or revised staking is the obligation of the Contractor(s).

Owner has delineated and the Army Corps of Engineers has accepted the delineation of "wetlands" on the golf course construction site. Since wetlands are protected under Section 404 of the Federal Clear Water Act, it is the obligation of the owner to protect these wetlands. All wetlands to be preserved and protected are shown on the plans and flagged by the Owner or his representative in the field. It is the responsibility of the contractor to provide adequate protection and exercise extreme caution when working adjacent to any wetlands.

If any questions should arise regarding the extent and location of the delineated wetlands prior to or during construction of the golf course, the Contractor must consult with the Owner and his wetlands consultant prior to proceeding with the work.

Should the Contractor or any of its subcontractors or agents encroach into or cause any damage to the delineated wetlands, the Contractor or his subcontractor or agents will be responsible for all fines, penalties, restoration and legal action caused by the encroachment and/or damage into the delineated wetlands.

The Contractor will ask for copies of the Army Corps of Engineers permits prior to proceeding with the work, to satisfy its obligation of acknowledging the fact that the necessary permits have been issued.

SECTION II. MOBILIZATION

This work consists of mobilizing the necessary resources such as labor, equipment, and materials to begin the golf course construction process. In particular it includes the immediate transportation of personnel and equipment to the site, the establishing of construction site headquarters and storage facilities, and all other necessary requirements prior to actual construction activities.

The Contractor shall review with and receive approval from the Owner as to the location size and configuration of the construction office and storage headquarters.

The Contractor will also erect any necessary erosion control devices necessary to coincide with local, state and Federal laws for erosion control protection. It will be the Contractor's responsibility to locate, install and maintain these areas prior to and during construction. Any damage, penalties, fines, clean up or legal action caused by neglect of this responsibility will be the responsibility of the Contractor.

*Filter fabric should be a standard non-woven geo-textile fabric of polypropylene or polyester fibers, or combination to meet the following specifications:

Grab Tensile Strength	145-115 lbs
Grab Tensile Elongation	70-60%
Water Flow Rate	95-110 Gal/min-1/ft ²
Permitivity	1.0-1.3 secs

The mobilization cost shall be substantiated by actual invoice and this item shall not be considered as a profit bearing line item. Mobilization is provided as a method of reducing the carrying time of contractor funding and therefore a tool provided by the Owner for reducing cost.

SECTION III. CLEARING, GRUBBING & DISPOSAL OF ON-SITE MATERIALS

The work covered by this section of the Specifications consists of the clearing and grubbing of the golf course, including satisfactory disposal of all vegetation, trees, down timber, brush, projecting roots, stumps, lapwood, rubbish, debris, buildings, foundations, or any other man made products or any objectionable material within the clearing lines or golf course proper as indicated on the plans and/or those areas designated by the Designer, in strict accordance with this section of the Specifications and the applicable drawings and subject to the terms and conditions of the contract.

Caution and care must be exercised during clearing and grubbing to maintain the wetlands delineations flagging or staking provided by the Owner. The Contractor must stay out of all wetlands designated to be saved and protected.

Certain portions of the following clearing and grubbing process may or may not apply to this particular site or contract, but if it does, the following process applies.

In all respects the Contractor will follow the plans, especially the Clearing and Work Limits Plan.

1. Types of Clearing (Trees)

The first phase, as shown on the plans and/or as directed by the Designer, consists of clearing down the centerline of each hole from tee to green at a width of fifteen (15) feet on each side of the centerline.

The second phase, as shown on the plans and/or as directed by the Designer, consists of extending the centerline clearing a distance of fifty (50) feet on each side of the centerline.

The third phase, as shown on the plans and/or as directed by the Designer, consists of clearing beyond the fairway edge and into the rough area. This final phase also includes additional selective clearing and underbrushing as directed by the Designer. In all cases, the Contractor shall not proceed with any clearing beyond the first phase without the approval of the Designer.

2. **Limits of Work**

It is important that **no areas be disturbed outside the clearing and work area limits.** These limits including wetlands delineation shall also be designated as the limits of work. All equipment traffic shall be maintained within these limits, unless alternate routes are approved by the Owner or Designer.

The areas designated herein shall be cleared and grubbed of all grass, weeds, trees, stumps, roots, bushes, vines, hedgerows and other obstructions as spelled out earlier in this section. All unsound or decayed stumps shall be removed to a depth of thirty-six (36) inches below the original ground. No stumps or other growth will remain under any fill area, unless otherwise designated and approved by the Designer.

Disposal of all grass, weeds, trees, branches, snags, brush, stumps, etc. resulting from the clearing and grubbing shall be the responsibility of the Contractor and shall be disposed of by chipping on-site or taken off site and disposed of, whichever conforms to local codes. All costs in connection with disposal of the materials will be at the Contractor's expense. All liability of any nature resulting from the disposal of the

cleared and grubbed materials shall become the responsibility of the Contractor. The disposal of all materials cleared and grubbed will be in accordance with all laws of the city, county, state or federal government and the securing of permits shall be the responsibility of the Contractor.

Fences, hedgerows, structures and other obstructions shall be removed as directed by the Owner and the cost of such work shall be included in the price bid for clearing and grubbing, unless otherwise shown on the plans.

Upon completion of the first phase clearing, the Designer shall inspect and mark the second phase clearing, saving important trees and following what the topography dictates. The final width of clearing shall generally follow the clearing line as shown around the fairways as indicated on the plans, however, the Designer may adjust this final line in order to produce the most pleasing line of trees to compliment the layout of the golf holes. As stated previously, the Contractor shall not proceed beyond the first phase clearing without the approval of the Designer.

When trees of exceptional aesthetic quality, form, soundness, and/or value are located in the area to be cleared, the Designer is to inspect the trees and determine whether or not they shall be preserved and protected or removed. At any time during the construction, the Designer may designate certain trees to be removed or to be retained.

3. Existing Plant and Wetland Protection

All plants and wetlands on the site, where applicable, will be saved, except those marked specifically to be removed on the plans and those marked on the site by the Owner and Designer during inspection. No plants, either those marked for removal

on the site or any other plants, may be removed from the site prior to the Owner and Designer's inspection and approved by the Army Corps of Engineers or other regulatory agencies. All plants not to be removed will be protected from injury to their roots and to their foliage to a distance of three (3) feet beyond the drip-line and no grading, trenching, pruning or storage of materials may go on in this area, except as approved by a stakeout by the Owner and Designer. The Contractor will pay a penalty for any plant removed from the site which has not specifically been marked on the site by the Designer for removal. The Contractor will also pay for any plant which dies due to damage during construction. This applies to all plants shown on the plans and all plants on the site which may not be shown on the plans.

The Contractor will be held accountable for damage to plants and wetlands resulting from placement of fill or removal of soil, except as directed by the Owner and Designer. Any plant, the trunk of which is within ten (10) feet from any footing, shall be exempt from these penalties as established below, in the event that he or any of his subcontractors cause the loss or removal of plants designated to be saved under the provisions of the Agreement.

The penalty is as determined by the American Arborist Association and/or the Army Corps of Engineers or Environmental Protection Agency or any court of the said jurisdiction.

Plants will be graded by the Designer or the Owner's arborist consultant as to variety, condition, and site importance with the American Arborist Association's figures acting as maximum penalties.

During the grubbing and stump removal operation topsoil shall be protected and saved at all times. Stumps of ten (10) inches and over in diameter must be cleared of all soils before being removed from their original site.

Selective clearing shall be limited to the removal and disposal of plant material less than four (4) inches in diameter, including stumps. However, the Designer may designate certain smaller trees of exceptional form or value to remain or direct matter larger than four (4) inches to be cleared. All of the fallen trees within these areas shall be removed. The selective clearing shall be performed in such a manner that light golf course equipment can carry out the maintenance of this area.

Prior to grubbing any designated area within the golf course, the Contractor shall ascertain the limits of the golf course and wetlands so as not to remove any trees or vegetation that may be located in the adjacent property or within wetlands to be protected. This responsibility shall rest solely with the Contractor and any damage caused by him as a result of such negligence shall be at his own responsibility including restoration and, including any fines, penalties or legal action. The Contractor must confine the operation of this equipment to within the golf course limits, easements and approved haul roads. Any damage occurring outside these areas shall be repaired at the Contractor's expense.

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 Designer and Owner.

In open areas and fields where native and cultivated grasses and plants are growing, prior to topsoil removal and any grading operations, all native grasses, weeds or other low growing vegetation shall be removed from the topsoil. The Contractor

shall consult the Owner and Designer as to the necessity of removing such vegetation prior to bidding the project. Where practical, this plant life shall be mowed, grubbed, raked and burned or removed from the site. If allowable, the above vegetation can be chemically killed by spraying with herbicides such as "Roundup" or any equivalent or selective or non-selective product. If this vegetation is chemically killed or burned and the resulting residue is not degrading to the quality of the topsoil, it may be incorporated in the topsoil and removed during the topsoil handling process. These alternatives shall be approved by the Designer and the Owner. The Contractor shall follow all laws and notify the local fire department if the burning method is used. The Contractor shall follow all manufacturer's label directions and specifications when using any chemicals.

SECTION IV. EARTHMOVING

1. Topsoil

It is important to understand that the topsoil, as a growing medium for the golf course turfgrasses, will greatly influence the quality of the finished golf course, therefore, special care shall be taken during topsoil handling. Generally, 6" to 12" of topsoil is removed. More specific direction will be given in the field by the Designer regarding how deep to remove the top soil. Prior to the removal of any topsoil, random and representative samples of topsoil shall be collected by the Contractor from the site and sent to a **certified** testing laboratory capable of chemical and nutritional evaluation. The laboratory analysis of the topsoil shall be used to determine the necessary nutrients and soil amendments for application prior to planting of any grasses.

The topsoil shall be stripped or excavated to its full depth from all areas that are to be cut or filled. The topsoil should be **friable**, fertile soil of a loamy character, containing an amount of organic matter that is normal to the region, and capable of sustaining healthy turfgrass life. The topsoil shall be reasonably free from subsoils, rocks, heavy or stiff clays, stones larger than two (2) inches in greatest dimension, weeds, sticks, brush, and other deleterious matter. Any topsoil imported from off-site should be consistent in structure and character with the on-site topsoil. **Enough** topsoil must be generated or provided to recover the entire golf course area with a minimum of six (6) inches over all fairways, green and tee slopes, bunker slopes, and all mounds. A minimum of four (4) inches is required for the roughs and non-play areas.

The topsoil, when stockpiled, shall be placed in convenient non-play, non-construction areas for later use. If the Contractor devises a plan of topsoil removal and immediate respreading on areas which have been shaped, readied and approved for topsoil redistribution, this plan must be reviewed and approved by the Designer or his representative and the Owner. Any stockpiled topsoil shall be smoothed and free of water collecting pockets so that it is in a good, dry condition for redistribution. If the topsoil is to remain over the winter or through any rainy season, measures shall be taken to minimize erosion and loss of any topsoil.

Any redistribution of the topsoil can proceed **only after the subgrade elevations, shapes, contours and appearances have been approved by the Designer and the Owner**. Since the redistribution is critical to providing a well shaped and well drained golf course, extra care must be taken to maintain all of the elevations, shapes, contours and appearances which were created by prior subgrading and shaping activities. The topsoil must be redistributed and spread at a consistent depth over all areas affected by construction activities. A minimum of six (6) inches is required over all of the fairways, green and tee slopes, bunker slopes, mounds, and all other playing surfaces except the tee and green surfaces. A minimum of four (4) inches is required for the roughs and any other non-play areas affected by any construction activities. Where the subgrade has been constructed from rocky materials, those areas must be re-topsoiled with a minimum of twelve (12) inches in the above mentioned play areas and a minimum of six (6) inches over rough and non-play areas.

After the topsoil has been redistributed in all areas, it shall be graded and smoothed so that there are no water holding pockets. Surface drainage will follow the plans. Natural drainage shall be used wherever possible to enhance the surface drainage off the golf course.

The topsoil shall be cleaned of all stones, roots, or any debris or unacceptable material greater than one (1) inch in diameter, by stone pickers, rakes, drags, or other equipment or devices which will not disturb the topsoil grade, depth or composition, and accomplish the results desired by the golf course Designer and the Owner. Also during this cleaning process, no water holding pockets shall be created and the surface shall be smoothed to provide for good surface drainage.

After the topsoil redistribution process has been completed and approved by the Designer and the Owner, prescribed soil amendments, as called for by laboratory test results, can be applied prior to planting.

Excavation / Unclassified

Excavation for the golf course will follow the plans provided by the Designer and the Owner. The plans have been developed to balance the excavation and fill requirements for the golf course as closely as possible, but it is the Contractor's responsibility to check and verify, to his satisfaction, the accuracy of the balance. If there are no discrepancies reported to the Designer or the Owner prior to the bidding of the project, it will therefore be concluded that the Contractor accepts the plans and will provide for any additional excavation or fill necessary, to establish the elevations, contours, shapes and appearances shown on the plans or as directed by the Designer. The Owner, through the Designer, reserves the right to modify any proposed grades or locations for the greens, tees, bunkers, mounds, swells, and any other golf course features and to react to field conditions or to enhance the character of the golf course.

Excavated material for the construction of the golf course, especially the features, including greens, tees, bunkers, mounds, and any other golf course features, will be suitable for golf course construction purposes and will be free of peat, muck, rock or any components detrimental to the construction of the golf course. It is the Contractor's responsibility to test all geophysical conditions and soils for their suitability for use on the golf course.

Should off golf course site excavated material be necessary to establish the elevations and contours shown on the plans, the additional excavated materials will be suitable for golf course construction purposes and will be free of peat, muck, rock, or any components detrimental to the construction of the golf course.

Should the Contractor identify any questionable or unsuitable material during excavation, this material shall be brought to the attention of the Owner and Designer prior to being placed on the golf course.

Lake Site Excavation

Lake excavation and the lake outline shall carefully follow the plans, since the lakes add aesthetic beauty as well as a source for excavation material and water storage to the golf course. The Contractor will follow the Engineer's instructions, designs, and specifications for the construction of dams, embankments, overflows, intake and outlet structures as directed in these specifications and on these drawings. The bank slopes above the designated water level shall not be greater than a 3:1 slope unless otherwise directed by the Owner or the Golf Course Architect or as required by law or governing authorities. Slopes below the water level shall not exceed 2:1 except as directed otherwise by the Owner or the Golf Course Architect. It is the responsibility of the Contractor to ensure that he is complying with all local, state,

and Federal regulations for the construction of any impoundment areas and associated structures. The soil liner shall be placed in six- to eight-inch lift thicknesses and have a minimum completed thickness of 12 inches. The soil liner should be compacted to 90 percent of the maximum dry density as determined by the ASTM D-1557 criteria. Following completion of construction of the clay soil liners, the surface clay soils should be covered with a minimum six-inch layer of soil to reduce the potential for drying and cracking.

Borrow Excavation

Should any additional borrow excavation areas become necessary to generate additional fill material within the confines of the golf course, the Contractor shall request and receive written permission from the Owner prior to location and commencement of any work. Should borrow sites become necessary outside the golf course construction limits, copies of a written agreement with the Owner of the property on which the borrow sites are located will be furnished to the Owner prior to the importation of any off site borrow material to the Owner's property.

In all instances the excavation and maintenance of the borrow pit shall be performed in a manner consistent with all other work. The borrow pits shall be excavated in such a way that the surrounding surfaces and slopes are reasonably smooth and adequate drainage is provided over the entire area. Drainage ditches shall be provided wherever necessary for outlet of water to the nearest natural channel or lake, thus preventing the formation of pools or excess water in the pit area. A maximum slope of ~~2:1~~^{3:1 acc} shall be maintained on the pit slopes unless otherwise directed by the Owner or his Engineer.

The borrow pit shall be cleaned, topsoiled, and grassed in a manner consistent with the other areas of the golf course after excavation has been completed.

Rock Excavation

Should rock, boulders, granite or similar bedrock materials be encountered during excavation that cannot be removed or excavated with a Caterpillar 245 size hydraulic excavator or ripped with a Caterpillar D8L size crawler tractor, then the Contractor will immediately notify the Owner's representative and the Designer for further instructions. There will be no use of explosives without first consulting with the Owner's Engineer and obtaining written permission for their use. Should explosives become necessary to use after other methods have failed, then the Contractor will follow all local, state and federal laws pertaining to the use and handling of explosives. The Contractor will also follow specifications for controlled blasting as provided by the Owner's Engineer.

Embankment / Fill / Compaction

Areas that are to be filled, as shown on the plans, shall be constructed with soils which are suitable for stabilized fills and for golf course construction. The embankments or fills shall be so constructed that they will not slip, slide, slump, or move from their deposited location. The fill areas shall be sufficiently compacted to 85% compaction as determined by ASTM D 1557 to prevent future settling or movement. The fill areas shall be constructed of materials free of stumps, logs, roots, or any other perishable, biodegradable organic or non-toxic materials. If the fill is constructed of rocks, weathered limestones, hard shale or hard sandstone, or any other basic or sedimentary geologic materials, the layer thickness shall not

exceed three (3) feet per layer, with the maximum dimensions of boulders or large rock placed in the fill not exceeding three (3) feet vertically and four and one-half (4-1/2) feet horizontally. Rocks with any dimension greater than two (2) feet shall be buried at least two (2) feet below subgrade elevation. Rock shall not be dumped into final position but instead distributed by blading or dozing in a manner that will ensure proper placement in the embankment so that voids, pockets, and bridging will be reduced to a minimum. In areas where layers of rock and hard shale are used in constructing the fill, the layering shall alternate between the rock materials and smaller size soils so that a majority of the void pockets and bridging are minimized or eliminated.

In areas where larger amounts of rock versus soil is encountered for shallow fills, the fills shall be compacted with a vibratory roller so that voids, pockets and bridging is minimized or eliminated. If the fill material is too dry to attain proper compaction then water shall be used to attain the proper moisture level necessary for adequate compaction.

All fill areas are to be filled and rough shaped within six (6) inches of the proposed finished subgrade as shown on the plans. All cut areas are to be excavated to within six (6) inches of finished subgrade. All cut and fill areas must follow closely the Designer's grading plan.

Rough shaping consists of bulldozing into place and form the general golf course elevations, shapes, forms, contours and appearances. This work is normally performed by a large Caterpillar D8L size crawler tractor with a four (4) way hydraulic bulldozer. After the Contractor has roughed in the general golf course elevations etc., the Contractor will notify the Designer of his desire to have the rough shaping reviewed and approved prior to moving to the next step of construction

activity for the given area. The Contractor is required to make all field adjustments as directed by the Designer with appropriate Designer approval prior to proceeding to the next phase of construction for that given area. **Rough shaping is considered as an extension of and inclusive in the earthmoving function and pricing of golf course construction. The tolerance differential for earthmoving and rough shaping is plus or minus six (6) inches.**

SECTION V. SHAPING

Since the shaping of the golf course ultimately reflects the final elevations, shapes, contours and appearances of the golf course less the depth of the topsoil, it is mandatory to follow the Designer's contour plan and the Designer's field adjustments. Field adjustments of the elevations, shapes, forms, contours and appearances will be part of the shaping function and is considered a normal part of golf course construction. During the golf course construction process, the Designer, Gene Bates, will have access to the shaping crawler tractor to either operate the equipment himself, or direct the tractor operator as to the desired shapes and appearances. Since Bates is an experienced equipment operator, the Contractor will allow Bates to operate the equipment, at his discretion, during normal working hours, or during any site visitation requested by the Owner or the Contractor.

Phase I Golf Course Shaping

Golf Course shaping consists of bulldozing into place and form more exact golf course elevations, shapes, forms, contours and appearances. This work is normally performed by an intermediate sized Caterpillar D6D size crawler tractor with a six(6) way hydraulic bulldozer. **The equipment operator for this phase of shaping shall have previous golf course shaping experience and shall be approved by both the Owner and the Designer.** After the Contractor has shaped the more exact golf course elevations etc., the Contractor will notify the Designer of his desire to have the shaping reviewed and approved prior to moving to the next step of construction activity for any given area. The Contractor is required to make all field adjustments as directed by the Designer with appropriate Designer approval prior to proceeding to the next phase of construction for that given area. This phase of shaping brings the golf course to the final elevations, shapes, forms, contours and appearances less

the depth of the topsoil. During this phase there will be adjustment and refinement for the enhancement of the golf course, especially for strategic and drainage purposes. The Contractor is reminded that shaping field adjustments are a normal part of a golf course construction and these adjustments will not change the shaping price stated in the Bid for Contract Form.

Phase II

Finish shaping consists of two (2) parts. First, all general shaping is refined to the degree that it is a mirror image of the finished and grassed golf course as drawn, including field adjustments, and less the topsoil. All areas are shaped and graded in a manner that there are no water holding areas and all elevations, shapes, forms, contours and appearances, tie into the existing surrounding undistributed land as to simulate that the new golf course has always been part of the natural landscape.

Secondly, the same process and results are produced after the redistribution of the topsoil. Refer to the Earthmoving / Topsoil Section of the Specifications for additional explanation.

After the Contractor has shaped the more exact golf course elevations etc., the Contractor will notify the Designer of his desire to have the shaping reviewed and approved prior to moving to the next step of construction activity for any given area. The Contractor is required to make all field adjustments as directed by the Designer with appropriate Designer approval prior to proceeding to the next phase of construction for that given area. This phase of shaping brings the golf course to the final elevations, shapes, forms, contours and appearance, less the depth of the topsoil. During this phase there will be adjustment and refinement for the enhancement of the golf course, especially for strategic and drainage purposes. The Contractor is

reminded that shaping field adjustments are a normal part of golf course construction and these adjustments will not change the shaping price stated in the Bid for Contract Form.

The work is normally performed with a small Caterpillar D-3 size crawler tractor with a six (6) way hydraulic bulldozer accompanied by a 45 HP industrial tractor with a box blade or leveling blade. As the Contractor was previously alerted to the experience level necessary for the equipment operator for golf course shaping, the same is mandatory for finish shaping.

All elevations, shapes, forms, contours and appearances established during the general shaping and golf course shaping must be reproduced as a result of Finishing Shaping. The same elevations etc., must be intact prior to final spreading and smoothing of the topsoil prior to grassing.

All excavated and filled areas, as indicated by the cut/fill plans, shall be subgraded and shaped to elevation, contours, shapes and appearances as shown on the Designer's plans and in a manner that no water holding areas are created.

On occasion, due to golf course design concepts, some areas cannot surface drain properly. These areas shall be drained by field drains which are described in the localized Drainage Section of these Specifications.

The location of localized field drainage will be indicated on the construction drawings but this location may be adjusted or moved in the field during the shaping process.

Shaping for the greens and tees shall be consistent with all other shaping, but it must be remembered that no topsoil will be spread on the putting surfaces or the teeing surfaces. Additional construction activities performed on the greens and tees are fully described in the Features Construction section of these specifications.

If any shaped golf course area or feature is disturbed by any other construction activity, including additional golf course construction, the disturbed areas will be reshaped to conform with the original shaped and approved forms.

SECTION VI. FEATURES CONSTRUCTION

Putting Green Construction

The following are the "Specifications for a Method of Putting Green Construction" as per the 1989 USGA Green Section manual:

In 1960, after years of scientific research sponsored by the USGA and several universities, the Green Section's "Specifications for a Method of Putting Green Construction" were published. At the time, they were considered revolutionary and a major departure from what was then the accepted norm; i.e., a soil mix generally comprised of equal parts sand, soil and organic matter. The new specifications called for the use of locally and readily available sand, soil and organic materials. They are mixed in scientifically determined ratios to insure physical soil characteristics. They are based on scientific data relating to water movement in soils, the physical properties of soils and the causes of compaction and poor internal drainage. They are based on documented research and extensive field experience over many years and by many individuals.

Thousands of putting greens around the world have been successfully built to exact Specifications. They have performed extremely well. At the same time, unfortunately, many other new greens have been built with so-called "modified specifications". The modifications were arbitrarily made by golf course architects, course builders, committees, superintendents and others willing to compromise and risk long term successful results. Invariably, these are the "Green Section Greens" which have failed.

There is nothing complicated about Green Section Specification construction. However, if you intend to build USGA Green Section Greens, every step in the Specifications MUST be followed exactly as outlined.

MAKE AND ACCEPT NO CHANGES. Contact your nearest USGA Green Section Regional Office for assistance or clarification if you have questions. The steps involved must not and cannot be compromised.

Having taken this rigid position, one would think the Specifications found here are the same as those originally put forth in 1960. They are not. Certain small subtle changes and improvements have evolved and are incorporated in today's recommendations. Nevertheless, the original, basic precepts remain. The problem of construction procedures and physical behavior of soils cannot be separated.

The original Specifications emphasized drainage and resistance to compaction. To achieve these characteristics, other desirable, but less immediately important, agronomic qualities had to be sacrificed. For example, a highly permeable soil loose in structure and may, in the early stages, create difficulty when changing cups. These soils require greater skill, at least initially, in managing fertility levels and in developing surface resiliency. Nevertheless, these are minor

problems when weighed against the advantages of rapid drainage, good aeration, deep rooting, lessening disease factors, protection against salt problems and developing a putting surface that holds a proper shot without being overly wet.

The methods and specifications outlined in the following pages represent the best thoughts and practical experiences of the Green Section staff (with over 250 years of accumulated intensive golf course experience) plus soil scientists who have given serious attention to the problem for the past thirty years. The Green Section believes this technique of putting construction will provide the most satisfactory and least troublesome putting greens devised by science and the experience of man. And please remember, change not a step in them.

STEP 1. THE SUBGRADE

A good builder will ensure that the contours of the subgrade (i.e., the sub-base upon which the green will be built) will conform to the contours of the proposed finished grade. Strive diligently for a tolerance of plus or minus one (1) inch. Failure to balance the contour of the subgrade with that of the final grade may cause wet spots in low areas, and droughty areas where the finished grade is substantially greater than the average.

The subgrade should be established approximately 16 to 18 inches below the proposed finished grade. The subgrade should be compacted sufficiently to prevent future settling which might create water-holding depressions and disrupt effective tile line operations.

It is not necessary to elevate or build up the green unless design considerations make it necessary.

Layers of materials above the subgrade will consist of at least four (4) inches of gravel, two (2) to four (4) inches of an intermediate layer of coarse sand, and a minimum of twelve (12) inches (uncompacted) of root zone mix. Thus the total depth will be approximately eighteen (18) inches. Experience indicates that this material will settle to about sixteen (16) inches once it is brought into place. However, the amount of settling will vary according to the materials used. The physical soil testing laboratory will project the amount of shrinkage at the time of soil analysis.

STEP 2. DRAINAGE

The tile line is essential. Tile lines should be at least four (4) inches in diameter and spaced so that water will not have to travel more than ten (10) feet to reach a tile drain. Any suitable pattern of tile line arrangement may be used, but the herringbone or gridiron arrangements will fit most situations.

Cut Ditches or trenches into the thoroughly settled subgrade so tile lines slope uniformly. The tile should be laid on a firm bed of gravel, sized 1/4 to one (1) inch. The depth of the gravel in the trench may be varied to ensure a positive slope [i.e., a definite fall] along the entire run of the tile. Before covering the tile, spot check with a carpenter's level or transit to ensure proper down slope throughout the entire drain line system. The trenches may then be filled with additional gravel, taking care not to displace any of the tile or top covering

over the joints. Be sure all tile lines have a positive grade with a minimum fall of 0.5 percent. Steeper grades can be used but putting green tile lines seldom need grades steeper than three to four percent.

Tile may be agricultural clay tile, concrete, corrugated plastic, or any other satisfactory drainage-type tile. Waffle drainage materials is not advised. Agricultural tile joints should be butted together with no more than 1/4 inch of space between joints. The tops of tile joints should be covered with asphalt-paper, fiberglass composition, or with plastic spacers or covers designed for this purpose. The covering prevents gravel from falling into the tile. Fabric sleeves around tile lines are not recommended.

Even with good subsurface tile drainage, design consideration should be given to putting green surface drainage in at least two or three directions.

STEP 3. GRAVEL AND SAND BASE

At this stage of construction, grade stakes should be placed at frequent spacing through the putting green site. Once driven into the subgrade, each stake should be marked at four (4) inch, six (6) inch to eight (8) inch, and eighteen (18) to twenty (20) inch intervals above the subgrade. These elevations correspond to the planned depth of the gravel, coarse sand and top mix layers required in the green profile. The grade stakes will be invaluable, accurate depth indicators as the various layered materials are added in the construction process.

With grade stakes in place, the entire putting green subgrade should now be covered with a layer of clean, washed gravel or crushed stone to a minimum thickness of four (4) inches. The preferred material for this purpose is washed pea gravel (1/4 to 3/8 inch diameter particle size). If, for economic or other reasons, larger gravel sizes are preferred for use as the gravel over the subsoil, they should be topped off with at least one (1) inch of pea gravel-type material (1/4 inch diameter particle size). It is important that changes in particle size between succeeding layers not be too great. Otherwise, smaller particles from overlying material will wash into the gravel, eventually clogging the pores or drainage ways, and thereby reducing the gravel's effectiveness.

The maximum allowable discrepancy appears to be five to seven diameters. In other words, if stone of one inch diameter is used, it is necessary to include a layer of 1/4 inch pea gravel to prevent smaller soil aggregates from moving into the stone.

When the four inch gravel base is in place and 1/4 inch pea gravel covers the entire surface, spread a layer of coarse, washed sand (in the range of 1.0 mm to 2.0 mm) to a uniform thickness of two (2) to four (4) inches over the entire gravel base. Again, particle size variances should not exceed five (5) to seven (7) diameters. In other words, if 1/4 inch pea gravel [about 6.0 mm is used as the base, then the majority of the particles of the overlying coarse sand should not be less than 1.0 mm in diameter.

A 1 1/2 inch layer of coarse sand is then spread over the entire gravel base. This sand should be within a range of five to seven diameters of the gravel. In other words, if 1/4 inch pea gravel (about 6 mm) is used, then the particles of the overlying sand should not be less than 1.0 mm in diameter. In order to prevent movement of the sand into the gravel, the maximum allowable discrepancy appears to be five to seven diameters.

Note: There are some who vigorously contend that the two to four inch intermediate sand layer is not necessary and is very expensive to

install. The Green Section has studied this particular requirement carefully over the years and now definitely concludes and **POSITIVELY RECOMMENDS INCLUDING THE INTERMEDIATE SAND LAYER IN ALL USGA GREEN SECTION GREENS**. It is an integral part of the perched water table concept. Its function is undeniable, and serious functional consequences may result if it is eliminated. Failure to follow this requirement means you are not building a USGA Green Section green.

Is the installation of the intermediate sand layer excessively costly? No, the facts simply do not support this contention. For example, a 7,000 square foot green will require about 42 cubic yards of coarse sand for the intermediate two inch sand layer. Place sand in piles around the perimeter of the green. Using grade stakes, randomly located throughout the subgrade of the new green and the back of wooden or aluminum rakes to distribute the sand piles, three people can easily move 42 cubic yards of sand uniformly over the gravel base to a two inch depth in less than one hour's time. The cost of materials and labor to install the two to four inch intermediate layer is insignificant, particularly when compared to the total cost of building or rebuilding a modern putting green.

One additional word of caution. The intermediate coarse sand layer must be spread by hand labor, not machine. It is very difficult to uniformly spread a two to four inch layer of sand with a tractor or bulldozer.

Questions are sometimes asked about the use of geotextile fabric as a substitute for the intermediate sand layer. The Green Section does not recommend such a substitution at this time.

STEP 4. THE ROOT ZONE MIXTURE

The success of the Green Section's Method of putting green construction depends on the proper physical characteristics of the root zone mixture and the relationship of that soil to the drainage bed underlying the green.

Native topsoils that meet these physical characteristics are almost non-existent. Therefore, the putting green root zone mixture must be compounded from available sand, soil, and fibrous organic amendments. Because of extreme local variations in these materials, however, a high degree of expertise is necessary to determine which root zone blends have the desired properties. Different lots of sand from the same pit may vary considerably in particle size and shape. Native soils also vary greatly in particle size and shape, as well as in degree of aggregation, acidity, fertility, and soluble salt and organic matter content. Perhaps the most variable of all these materials are the fibrous organic amendments. Laboratory testing is imperative since organic materials may differ in plant material origin, degree of composition, mineral impurities, (such as silt and clay) as well as in acidity and fertility. Manufactured or processed organics also differ widely from natural organics.

It is very unlikely that golf course architects, builders, or superintendents can cope with the variability in construction materials when formulating root zone mixes and topdressings for greens. Therefore, since successful construction depends on the proper combination of physical and hydraulic properties in the root zone, a laboratory physical soil analysis must be made of the available construction materials before they are procured. At this stage, one should also determine whether enough of each material is available to complete the entire job.

A competent physical soil laboratory will be concerned with the following data:

Infiltration and Percolation Capacity. Laboratory infiltration values are used as indicators of potential field behavior. Since this value changes markedly in the field as the green matures, it should not be used as the sole criterion for selection or rejection of a putting green soil mix. An experienced laboratory will evaluate factors before determining if a particular mix is suitable for seed bed use. This is one reason why an experienced laboratory is needed.

Porosity. Compacted root zone mixtures that have been allowed to percolate water for 24 hours and then drained at a tension of 40 cm of water, should have a total pore space volume between 35 and 50 percent. The volume of non-capillary pores at a tension 40 cm of water should not be less than 15 percent, nor more than 25 percent. The permissible levels of capillary pore space have the same limitations.

Bulk Density. Topsoil mixtures compounded with sand as the chief component ideally should have a bulk density between 1.25 and 1.45 grams per cubic cm. The minimum acceptable bulk density for such mixtures should be 1.2 grams per cubic cm and the maximum should be 1.60 grams per cubic cm.

Water Retention Capacity. The water held by a soil against drainage is the water that supports growth of the turf.

The root zone should have a laboratory 40 cm water retention capacity between 12 and 18 percent by weight. Most sand/peat greens should have a 15 percent or less water retention. These are considered to be appropriate values for modern putting greens.

Particle Size. The root zone mixture ideally should contain no particle larger than 2 mm in diameter. Over the past 30 years, field observations indicate the ideal particle size range for sand used in the soil mixture, to be between .25 mm to .75 mm. Fine sands [0.25 to 0.10 mm] should be held to minimum levels and, when present to all, comprise no more than 10 percent of the total mix. In addition, the root zone mixture should contain less than 5 percent silt [smaller than 0.002 mm] and 3 percent clay [smaller than 0.002 mm]. It should be noted here that the percentage of sand particle sizes under .25 mm may have to be less than 10 percent under certain climatic and other circumstances. Due to the wide variety of available materials, it is sometimes necessary to make recommendations outside these strict parameters.

The ultimate test of any sand, however, is its behavior when mixed with fibrous organic materials and the soil being used.

Because of the narrow acceptable limit in the physical properties of the root zone mix, it is extremely important that recommendations based on laboratory analysis be followed carefully when the components for the root zone are being mixed. If it becomes necessary to substitute a new material for one of the original materials, the mixture should be re-tested before proceeding with construction.

When the proper portions of the root zone components have been determined, it is extremely important that they be mixed in the proportions indicated. Note that these recommendations invariably are expressed as volume units, not as weight. A small error in percentages in the case of silt or clay content can lead to serious consequences.

IT IS ABSOLUTELY ESSENTIAL TO MIX ALL ROOT ZONE COMPONENTS OFF-SITE. No valid justification can be made for on-site mixing, since a total homogenous mixture is essential to success. Be sure to read "Tips for Success and Opportunities for Error" found later in these specifications.

During the construction process, quality control checks should be made periodically on all delivered soil components as well as the final mixture. At this time it is also wise to prepare and stockpile at least enough root zone mix to satisfy topdressing requirements for the first year or two.

STEP 5. TOP MIX COVERING, PLACEMENT, SMOOTHING AND FIRMING.

After root zone materials have been thoroughly mixed off-site, the mix should be transported to the green site and dumped at various points around the perimeter. Many techniques are acceptable for spreading the material, including shovels, boards, and small equipment. A small crawler-type tractor suitably equipped with a blade, for example, is useful for pushing the root zone mixture that has been moved onto the site, the base of the green will not be disturbed. Grade stakes installed earlier and spaced at frequent intervals on the green site will help indicate the depth of the twelve (12) inch (uncompacted) minimum of top mix. There must be an absolute minimum of twelve (12) inches of uncompacted top mix spread over the green. Manmade and natural forces will settle this mixture to just over ten (10) inches of compacted mix within a few months time. There is nothing wrong in starting with thirteen (13) or fourteen (14) inches of uncompacted top mix, but twelve (12) inches is the absolute minimum.

When the top mix has been spread uniformly over the surface of the putting green it should be compacted or firmed uniformly. A roller is not satisfactory, because it "bridges" the soft spots. One of the best methods of settling or firming the soil mix is with a wide tire tractor. A small crawler-type tractor will also do an excellent job. The tractor is slowly operated back and forth in numerous cross angles and figure eight patterns until every square inch is firmed. The job must not be rushed. A thorough, deep irrigation of several hours may also be necessary to wet and further firm the entire profile. If the soil is still soft after a day or two, another thorough wheel rolling by the tractor may be necessary. It is impossible to overemphasize that the soil must be uniformly firm before proceeding further.

STEP 6. STERILIZATION OF TOP MIX AND ESTABLISHMENT OF TURF.

Even today, there are those who suggest top mix sterilization is not necessary for new putting green construction. They are as wrong as they can be. In many cases, today's modern green is constructed solely from sand and organic material [no native soil used]. The rationale is that both materials are weed and disease free and, therefore, sterilization is not needed. However, weed seed is easily introduced during the root zone mixing operation. Grading equipment, birds, foot traffic, and any number of other possibilities exist for introducing unwanted seeds and foreign matter. It is virtually unavoidable. **STERILIZATION IS ESSENTIAL.**

The actual steps for top mix sterilization and uniform seed or stolen application are well known and will not be discussed here.

TIPS FOR SUCCESS AND OPPORTUNITIES FOR ERROR

You are now familiar with the USGA Green Section's Specifications for A Method of Putting Green Construction. When this method is carefully followed, exactly as outlined, you have built a foundation that will produce the finest putting green turf possible measured by today's highest standards. It should be again emphasized that each step in construction depends upon all others. It is foolhardy to attempt to incorporate some steps but eliminate others for whatever reason. When that occurs, the green is no longer a USGA Spec Green.

In the thirty-odd years since they were first published, the Specifications have endured untold criticism. Here, step-by-step, let the Green Section staff offer you tips for success and warn you of the opportunities for errors.

THE SUBGRADE - When a new green is built, a considerable amount of fill material may be moved away from or onto the site as design and terrain conditions dictate. In either case the builder must compact the subgrade as thoroughly as possible. Only in this way will future settling be prevented. If uniform layers of gravel, sand and top mix overlay the subgrade, it is obvious that any settling below will result in corresponding settling of the top. Therefore, a thorough compaction of fill areas in the subgrade is of paramount importance if the green is to maintain the architect's intended character of contours.

TILE DRAINAGE - It is commonly believed that the use of a gravel layer provides adequate drainage by itself, and the installation of tile lines is a needless expense. This is scientifically incorrect and functionally untrue. When large amounts of water are

moving through soil under conditions of heavy rain or excess irrigation, and where the water must move a considerable distance to reach an outlet, tile lines aid in speedy removal of the water. Further, the tile lines should directionally carry the water well away from the approach areas to the green, bunker or other nearby playing areas. The tile lines also assist in removing trapped water from pockets within the green.

Also difficult to believe, tile lines are often improperly installed. They must have a positive flow. They must run downhill. Level tile lines are non-functional. Under certain circumstances, the standard herringbone or gridiron tile pattern may be awkward. Putting greens of special design or unusual surface contouring may require a modified drain line pattern. This presents no problem. Tile lines may be installed in any pattern to fit the situation. Just be sure the lateral tile lines are within 15 to 20 feet spacing of each other, and the entire green is included in the tile pattern. Again, all tile lines must have a positive flow and a definite point for water exit well away from the green and play areas.

It is frequently helpful to have some means of flushing or cleaning out a main putting green tile line. One easy technique is to extend the high point of the main tile line to the rear and/or higher elevation outside the actual green perimeter. The extension may be 20 feet or more away from the actual green. At this end of the main line, add a connecting "L", or make a 90 degree upward turn to the surface. Fashion a suitable cover for the tile end and one that may easily be removed. When flushing becomes necessary, simply remove the cover, place a hose in the tile end and flush out the main line.

Putting greens are the most expensive turf on the golf course and require the most exacting standards for excellence. The small additional

cost of a properly installed tile line is well worth the insurance it provides.

GRAVEL AND SAND BASE - In some cases builders save installed tile lines and then assume that there is no need for a gravel layer above the subsoil base. This assumption is wrong. The gravel layer provides a medium whereby water can rapidly move laterally and very easily find its way into the tile lines. The gravel also provides a barrier between the root zone and the soil below to prevent the dry subsoil from drawing water out of the porous top mixture. Furthermore, it prevents salts in the subsoil from moving up into the root zone. The tile and gravel function as a team provide insurance against the water logging within the putting green profile. Tile is normally placed in shallow trenches in the subsoil and is spaced at intervals of 15 to 20 feet, depending on the degree and direction of slope.

The layer of coarse sand used over the gravel base is of utmost importance. It provides the abrupt change in particle size required to create the perched water table upon which this construction method is based. This sharp interface cannot be developed if a top mix of primarily medium sand is placed directly atop 1/4 inch pea gravel. The mixture will sift into the gravel and reduce, if not destroy, the perched water table effect.

The upper 12 inch root zone mix is porous and sandy by design. Sandy soils are naturally droughty soils. However, the interface between the coarse sand layer and the 12 inches of upper soil mix acts as a check on the downward movement of non-capillary water. This interface prevents the further downward movement of water until the point of near saturation is reached, and, when that occurs, gravity overcomes the interface effect. Thus the interface permits a droughty-type soil to remain at or near field capacity for a longer period of time.

This is a desirable situation for turfgrass growth and uniformity of playing conditions. Surface tension prevents water from moving readily from one soil layer to the next. When sufficient water gravitation force [weight] accumulates, the surface tension force is overcome and water drains out through the sand and gravel. It seems paradoxical that the top mix overlying coarser sand can be made to hold more water than it would without the sand layer, but it cannot be made to hold enough water to be harmful to plants [if root zone mix is properly prepared and is the proper depth].

Under no circumstances should the two to four inch intermediate sand layer be eliminated from the Green Section Specifications.

THE COLLAR AREA - Establishing a collar to the same Specifications as the putting green itself will be important to the performance of the total greens area. The collar is subject to heavy traffic and the same management as the green area. Therefore, to realize the best from it, construction should meet the same specifications as prescribed for the putting green proper.

The top mix at the outer edge of the collar will abut the native soil. In some cases, builders have mixed and feathered out the putting green top mix with the native soils at this interface. The blending provides an acceptable transition from the artificial to the native soil and helps eliminate the excessive drying that can occur at the edge of the collar. Extreme care should be taken, however, not to contaminate the root zone mix already on the green.

PREPARING THE ROOT ZONE MIXTURE - The proper blend of available sand, soil and fibrous organic matter in the top mixture can be accurately determined only by extensive physical and laboratory testing. Only then is it possible for soil scientists to advise what proportions of components are to be mixed to meet the specific infiltration and physical requirements. This is **CRITICALLY** essential

and it allows the builder to make the best possible use of materials available within reasonable distance of the construction site.

Loss of volume in mixed materials and in firming greens after materials have been placed can be most important in calculating the quantity of materials needed for the project.

When sand and organic materials are mixed, there is a loss of volume. Four measures of sand, and one measure of peatmoss, for instance, do not total five measures when combined. The organic component is partially consumed as it fills the interstices between sand particles. The resulting volume ranges from about 4 measures to 4 1/2 measures, depending upon the nature of the organic material. This determination should be made in advance of ordering materials, so that adequate amounts can be stockpiled.

Different combinations of materials have very different settled volumes. It is useful to determine in advance of construction how much the materials will settle, to insure that the finished putting green mixture has adequate depth. Some mixes may lose as much as 25 percent of their volume, others as little as 10 percent.

A chemical soil analysis of the recommended root zone mixture will determine the pH and soluble salt levels. The necessary adjustments should then be made, based on laboratory recommendations.

Thoroughly mixing the sand, soil and fibrous organic material to the exact specified laboratory ratio is absolutely essential. Although there are several methods of accurately metering the various components, off-site mixing is the only way of accomplishing a homogeneous mix. A key element in this task is the competence of the worker of the mixing site. If the worker is not conscientious and informed, the mixture will never be recognizable as the one recommended by the laboratory.

The components can be mixed efficiently and inexpensively by a tractor and front-end loader. One operator can accurately mix tremendous quantities of sand, soil and organic matter by metering the proper number of bucketloads of each material into a central pile. This pile is then moved by the tractor/front-end loader two or three additional times before loading it onto a truck for delivery to the green site. Each move produces a more uniform mix. To avoid contamination, a hard surface area, such as a paved parking lot or service road, is ideal for this type of root zone mixing.

Other off-site mixing methods include tumbling in an old concrete mixer; spreading the measured quantities out on a hard surface and then folding it with a blade or disc; or, through commercial blending equipment. Rototilling has proven to be a totally unsatisfactory method for putting green soil mixing, and is definitely NOT recommended.

Once the mixing operation is underway, random samples may be collected and returned to the soil laboratory for a final check before the material is taken to the putting green site.

Wet sand mixes easier and more intimately than does dry sand.

Since the greater percentage of the mixture will be comprised of sand, moistening the sand at intervals during the mixing process may be

necessary. The fibrous organic material also should be slightly moistened for better adhesion. To assure early establishment and early sod formation by the new grass, incorporate a complete fertilizer with the initial root zone mix operation. For example, if a complete fertilizer such as 10-20-20 is used, add 2 1/2 to 3 pounds of the fertilizer to each cubic yard of the mix at the outset of the mixing operation. The fertilizer mixes with the root zone components, producing adequate initial nutrient levels throughout the top mixture profile and encourages deep rooting and early sod formation by the seedling turf.

All physical soil laboratory recommendations are specific and refer to parts by volume. An 8-1-1, for example, refers to an eight parts sand, one part soil and one part fibrous organic matter mixture. Mixing sand, soil and organic matter may cause a loss in volume and this should be kept in mind when ordering the mixture components. Once the root zone mixture is placed on the site, the materials should be settled, firmed and the final grade established by floating, dragging or matting with light equipment.

The green is then ready for the top mix to be sterilized. This procedure is best contracted out to an experienced company with proper agricultural permits and equipment. Methyl bromide is used most frequently, although, other sterilents may be available in your area. Without any doubt, putting green sterilization is another important link to successfully establishing a new green.

ESTABLISHMENT OF TURF - After soil sterilization is complete and adequate ventilation time has elapsed, final grade seedbed preparation is the next step.

The application of a natural organic fertilizer [5-4-0 at 40 pounds per 1,000 square feet] or chemical-type fertilizer [10-10-10 at 20 pounds per 1,000 square feet] should be applied uniformly to the entire putting green and collar surface area. Because the prescribed root zone mixtures are quite porous, it is important to fertilize generously at this time to promote early turfgrass establishment. This is true whether seed, sod or stolons are used. After the fertilizer is applied, lightly drag the surface with a light leaf or garden rake in a long and continuous manner, forming very shallow, continuous grooves in the soil. Avoid normal, short-stroke hand raking because this frequently causes uneven and bumpy surfaces.

You are now ready to seed, sod or stolonize. If you are seeding, apply the seed at the recommended rate and as uniformly as possible [usually at half-rate in two directions]. When sowing is complete, again drag the entire green lightly and continuously with the light leaf or garden rake, avoiding normal short stroke hand raking action. Roll the surface for necessary seed-soil contact. In some cases, hydromulching is used successfully as a means of enhancing seed establishment. Hydromulching greatly reduces erosion caused by thunderstorms, prolonged rains or faulty irrigation. Geotextile covers may also serve this purpose. The use of other mulch-type materials such as straw, sphagnum, or peat moss is discouraged. Layers are too easily formed and weed seeds too easily introduced.

There is an old saying that germinating seed should be treated like a baby; put it to bed dry at night and wake it up with water in the morning. Light and frequent watering throughout each day, just enough to keep the upper 1/4 inch soil surface moist, is essential for germination and rapid seedling development. Once the plants become established, gradually reduce irrigation frequency, but increase the duration of irrigation until it reaches a normal schedule.

New greens should be mowed as soon as there is something worthwhile to mow. A height of 3/8 inch is a good starting point, and will

allow some density and sod formation to take place. Once the new turf is well established, gradually lower the cut to your desired height over a period of several months. The primary objective at this stage is to develop resiliency on the putting surface. A cushion of 1/2 inch thatch intermingled with light topdressing is ideal before the greens are opened to play. Fertilize lightly and frequently every few weeks until the grass matures. **DON'T RUSH THE NEW GREEN INTO EARLY PLAY.** At best, seeded bentgrass greens require six to eight growing months before they are ready for traffic, while Bermuda greens require two to four months of good growing weather. Caution! Do not vertical mow new greens. It is not recommended and not necessary.

Topdressings will be especially important for the new green during its first year of growth. Three or four light topdressings will not only improve the smoothness of the surface, but will encourage a tightly knit, dense turf as well. The topdressing material must be mixed to the same specifications as the original root zone mixture. Never use a different top mixture on any new green. In subsequent years, great care must be taken to adjust topdressing practices to maintain the original soil profile.

If an early opening date is of major importance for a new green, sodding is the answer. There is a trick, however, to laying sod properly, and it must be carefully done. For example, sod for putting green use should be handled flat, never rolled. Furthermore, sodding is only acceptable if the sod is grown on exactly the same root zone mix as the original construction. If grown on any other type soil, and the sod is then laid on a different textured soil mix, soil layering will occur and eventual sod failure is a distinct probability. The only recourse in this case is a prolonged period of intense aeration, core removal and topdressing with the proper root zone mix.

IN CONCLUSION - These steps for constructing putting greens will provide excellent results if they are followed exactly and completely as outlined. There is nothing complicated about them. At the same time, there are no short cuts to excellence.

Some clubs have been deterred from building new greens by the Green Section method because they have been told construction costs will be excessive. This is simply not true. With proper planning and a full understanding of the steps already described, excessive construction costs are completely unnecessary. Furthermore, a properly built green is always the least expensive in the long run. Only greens that are poorly built [no matter what the cost] are expensive. Although it is impossible to list the costs for putting green construction in any specific locale or region, we can offer a list of material quantities that will be helpful in cost estimations. The following quantities of materials are required for each 1,000 square feet of putting surface:

Gravel	4 inch depth	12 cubic yards
Course Sand	2 to 4 inch depth	6-12 cubic yards
Root Zone Mixture	12 inch depth	37 cubic yards
Tile	Approximately 100 linear feet	

Please call on your USGA Green Section regional office if you have questions or need clarifications as you plan new putting green construction on your course.

LABORATORIES FOR PHYSICAL SOIL ANALYSIS - A number of soil laboratories are available today for the physical analysis of putting green components. Inquiries through regional or state Golf Course Superintendents Associations should provide a number of laboratory names and addresses customarily involved with USGA Green Section Specifications.

What the Laboratories Will Need - A laboratory analysis for greens construction requires a minimum of one gallon each of the sand, soil and fibrous organic material you plan to use. If there is a choice of sands, soils and fibrous organic materials, send sufficient samples of each along with a note indicating your preference, costs, accessibility, etc. The laboratory will attempt to use your preferred materials in the recommended mixture.

When collecting representative samples for laboratory testing, use a three inch diameter plastic pipe about six feet long with one end cut at a 45 degree angle, similar to a hypodermic needle. Insert it to almost full depth into the pile to be sampled. Withdraw the pipe and place the material in a clean container. Take a minimum of eight to ten samples in this manner, and place all of them in the same container. Mix the samples thoroughly. From this mix, take a one gallon sample for laboratory testing and another one gallon sample for your own future reference. This may be used in checking all future deliveries of sand or organic material to the job site.

All sampled materials should be packaged separately and securely. Do not mix the sand, soil or fibrous organic matter. Package each one separately and firmly into strong, one gallon, plastic, self-sealing type bags [the kind often used for home freezing purposes]. Paper bags and paper labels are unsatisfactory. They should not be used. With a permanent marker pen, write your name, phone number, address and identification of the enclosed material on the outside of each plastic bag. Insert this bag sideways into a second plastic bag. Seal the second bag. Several of these bags may be packed firmly into a strong shipping carton, using newspapers or other filler material as necessary.

Be sure to include a note carrying information about the samples in the shipping carton. The more information you can provide, the better. For example, include such information as your preference and price of the material [if more than one kind of a particular material is being shipped], where the final mix will be used [greens, tees etc.], expected number of rounds yearly, air movement, summer high temperatures and humidities, winter lows, snow covers, duration of frozen ground, altitude, whether the greens are highly contoured or more traditional, and any other unusual conditions.

Where to Send and How Long it Takes - Laboratories prefer United Parcel Service. U.S. Mail or Greyhound Bus Systems are adequate, but usually take longer. If time is short, ship by air express. The laboratory requires one full week to complete all of the tests. Written reports may take another week to reach you after the tests are completed. If it is urgent, advise the laboratory. Express mail will help speed up the process. Try to anticipate your physical soil testing needs, and allow sufficient time for the work to be properly accomplished.

CLOSING NOTE - Please remember, there are no shortcuts to excellence. The Greens Section Specifications represent years of scientific study and field observations. They are not complicated, and they need not be significantly more expensive than so-called modified versions.

Simply follow each outlined step fully and carefully. Help yourself and your club to the finest putting greens yet devised by science and a half century of USGA Green Section experience.

If indicated within the description of work, the greens will be built using a method which eliminates the "choker layer" or course layer of sand, then all the greens construction methods shall conform with the previously described method with exception to the course sand layer requirements.

Tees Construction

Tees shall be built to follow the Designer's Contour Plan to insure that tee forms and size blend into natural terrain. All filled areas shall be compacted so that no future settling shall occur. Tees will be "capped" or "topped" with 4" of the same sand mix used as root zone mix for greens construction.

Care shall be exercised that no water shall be trapped around the tees. Subgrades will be constructed with sufficient pitch (1%) to allow sub-drainage, but finished surface grades will be perfectly flat.

The tee surfaces will be excavated to a depth of 4" and tile will be installed in the sub-base in the same manner as described in greens construction. The tee cavity will be backfilled with 4" of the same rootzone mix used in greens construction. The same impervious barrier used in greens construction, such as plastic film, shall be installed between the rootzone mix and the adjacent soil. Prior to grassing the tee surface shall be dragged completely level and flat and approved by the designer.

Bunkers - General

All bunkers shall closely follow the size, shape, and depth indicated on the Drawings. Should there be any questions concerning the degree or depth of slope on any

portion of the bunkers, immediately consult with the Designer. All bunkers will be shaped so that there are no water holding areas and all bunkers must have positive surface and subsurface drainage to eliminate any casual water. All slopes shall be constructed so that maintenance can be accomplished with normal golf course mowing equipment. The sand/grass relationship will be defined and marked by the Designer. All bunkers shall drain internally with no water holding areas. Refer to the bunker study plan for detailed construction techniques and relationships. Also refer to Bid for Contract Form for additional information.

Fairway Bunkers

Bunkers shall follow the Designer's outline in size, shape, and depth, and shall be clearly visible from the tees. Drainage trenches for all bunkers shall extend into the low area of each bunker lobe or as directed by the Designer. The trenches shall be 8" in width by 1' in depth, the bottom of which shall produce a constant grade of not less than 0.5% slope. The trenches shall extend to lakes, streams, or other non-play areas and drained with 4" ADS type pipe as specified in the greens. Trenches draining into nearly level non-play areas shall end in pits dug 6'X 6'X 6'. These pits shall be filled with gravel and 4" of topsoil. Washed gravel of 1/4" to 3/8" diameter shall be evenly spread 3" deep in the bottom of all trenches. Upon the gravel blanket shall be laid the same pipe used on the greens. The trenches shall then be covered with a pervious membrane to stop soil movement into them, prior to the completion and placement of sand. The portion outside the bunker shall be covered with topsoil. (The Designer shall designate on the Bid Form if drainage pits are required.)

Green's Bunkers

Bunkers shall follow the Designer's outline in size, shape and depth. They shall be drained in the same manner as fairway bunkers. The bunker pipe shall never

intercept the green pipe off the putting surface. No bunker pipe shall be drained through the putting surface.

Note: See Grassing with regard to all trap banks and slopes to be sodded.

Bunker Sand

Sand for the bunker should be a natural white, and of a consistency approved by the Owner/Designer, unbleached silica sand of the following analysis:

Sieve Analysis-Sand

16 mesh	3.91% Retainage
20 mesh	5.22% Retainage
30 mesh	14.59% Retainage
40 mesh	26.45% Retainage
50 mesh	32.50% Retainage
70 mesh	14.12% Retainage
100 mesh	2.86% Retainage
140 mesh	.36% Retainage

The material will be spread evenly throughout the bunker at a **settled** depth not less than 4" and not more than 6" in a manner suitable to the Owner/Designer. The edging of the bunkers is the responsibility of the Owner, who also has the responsibility of installing the sand.

Practice Green and/or Nursery Areas

Putting surface nursery area of 10,000 square feet will be constructed according to normal greens specifications as contained herein, if so determined by the Owner.

SECTION VII. IRRIGATION

See separate section, Irrigation Specifications.

SECTION VIII. GOLF COURSE FIELD DRAINAGE

There may be some areas on the Golf Course which may not surface drain due to the design character. There may be some areas where, due to soil conditions or other situations, it is desirable to speed up the surface drainage. Wherever these areas are encountered, the Designer, Owner and Contractor shall consult with each other to determine the need for installation of field drainage. The Contractor will provide a Bid, as unit price, for the field drainage.

Field drainage consists of providing and installing drainage pipe as specified in **Drainage** covered under **Greens Construction**. In general, these areas shall be drained by field drains which consist of embedding a minimum of 4" perforated drainpipe in a trench 8" wide and 12" deep, bedded and back-filled with 1/4" to 3/8" washed gravel (the same gravel used in greens construction specifications). A PVC drop inlet structure shall accept the surface drainage water at a low point in the localized area and carry the water to an acceptable discharge point.

Sumps will be constructed as indicated on the plans and as directed in the field to enhance drainage of the golf course.

SECTION IX. GRASSING

GRASSING / GENERAL

The work covered by this section consists of furnishing all labor, equipment, and materials to perform, and of performing all operations in connection with seeding, sprigging or the combination of the two, and completion thereof, in strict accordance with the Specifications and applicable Drawings. The grass species will be defined with these specifications and on the Plan Drawings. The following is a summary of operations:

- a. Limits of all grassing areas as staked by Designer and shown on the Plans.
- b. Tillage, plowed or disked to a 3" depth.
- c. Application of lime, gypsum, basic fertilizer and pesticides as prescribed by the laboratory test results and recommendations.
- d. Disking and dragging.
- e. Removal of stones and debris to a 3/4" diameter.
- f. Application of starter fertilizer.
- g. Final preparation with smoothing harrow or drag.
- h. Seeding.
- i. Compaction.

Grassing will commence only after the irrigation system has been installed and is operational. The irrigation system must be automatically operational for the Owner to accept the grassing unless this condition is waived by the Owner.

GRASSING / SEEDING

Fairways, Greens and Roughs

All seed shall be labeled in accordance with the United States Department of Agriculture Rules and Regulations under the Federal Seed Act and State seed laws. Seed shall be furnished in sealed standard containers unless exception is granted in writing by the Contracting Agency. Each seed container shall bear the date of the last germination, which date shall be within a period of six months prior to commencement of planting operations. Seed which has become wet, moldy, or otherwise damaged in transit or in storage will not be acceptable. All seed under this section shall be certified as to 90% genetic purity and 99% germination by the United States Department of Agriculture or other authorized agency.

The Owner and Designer shall be furnished with duplicate signed copies of the vendor's statement certifying that each container of seed delivered is fully labeled in accordance with the Federal Seed Act, and is at least equal to the requirement for seed in the Materials paragraph of these specifications. This certification shall appear on or with all copies of invoices for the seed. Each lot of seed shall be subject to sampling and testing at the discretion of the Owner and/or the Designer. Sampling and testing will be in accordance with the latest Rules and Regulations under the Federal Seed Act and State seed laws.

Basic fertilizer shall be 10-20-30 grade, uniform in composition, free-flowing, pelleted, or granular and suitable for application with approved equipment. The fertilizer shall be delivered to the site in bags or other convenient containers, each fully labeled, conforming to applicable State fertilizer laws, and bearing the name, or trademark, and warranty of the producer.

Gypsum, lime, sulfur or other soil amendments will be added to the soil as dictated by laboratory soil test results and recommendations.

Preparation of Seedbed

General

The areas to be treated and their respective requirements for seed, fertilizer, lime, gypsum, sulfur, or other treatment shall be as indicated on the drawings. Areas in a satisfactory state of tillage and not requiring further tillage and the areas requiring special tillage or applications of materials are so indicated on the drawings. Equipment necessary for the proper preparation of the ground surface and for handling and placing all required materials shall be on hand, in good condition, and shall be approved before the work is started.

Clearing

Prior to grading and tillage operations, vegetation on the site that might interfere with grading, tillage, or seeding operations shall be mowed, grubbed, raked, or burned and removed from the site, or when suitable, shall be used for mulch as directed. Prior to or during grading and tillage operations, the ground surface shall be cleared of stumps, stones larger than 3/4" in diameter, roots, cable, wire, grade stakes, and other materials that might hinder proper grading, tillage, seeding, or subsequent maintenance operations as specified in the clearing and grubbing section of the Technical Specifications.

Grading

Previously established grades, as shown on drawings of areas to be treated, shall be maintained in a true and even condition. Maintenance shall include necessary repairs to previously graded areas. When grades have not been established, areas shall be graded as shown on the drawings, and surfaces shall be left at the prescribed

grades in an even and properly compacted condition so as to prevent the formation of depressions where water will stand.

Tillage

After areas to be treated have been brought to the grades shown on the drawings, they shall be thoroughly tilled to a depth of at least 6" by plowing, disking, harrowing, or other approved methods until the condition of the soil is acceptable. Work shall be performed only during periods when beneficial results are likely to be obtained. When conditions are such, by reason of drought, excessive moisture, or other factors, that satisfactory results are not likely to be obtained, the work may be stopped by the Owner or the Designer and shall be resumed only when directed. Undulations or irregularities in the surface that would interfere with further construction operations or maintenance shall be leveled before the next specified operation.

Application of Fertilizer and Soil Amendments

Application of Basic Fertilizer

Fertilizer shall be distributed uniformly at a rate of 500 pounds per acre, or at a rate established by the testing laboratory, over the areas to be seeded as indicated on the drawings, and shall be incorporated into the soil to a depth of at least 4" by disking, harrowing, or other acceptable method within 24 hours of the application. (Note: Distribution by means of an approved seed drill equipped to sow seed and distribute fertilizer at the same time will be acceptable, provided fertilizer placement will not retard germination of the seed specified, and where such a drill is authorized.)

Application of Gypsum of Other Soil Amendments

Lime, gypsum, sulfur or other soil amendments shall be distributed uniformly at a rate per acre as directed by the laboratory test results and recommendations and shall be incorporated into the soil to a depth of at least 4" by disking, harrowing, or

other acceptable method within 24 hours of application. Incorporation of amendments may form a part of the tillage operation specified above. (Note: When an amendment is required it will be applied prior to application of fertilizer.) Contractor shall submit a unit price only for sulfur and gypsum. The quantity of sulfur or gypsum shall be determined by soil test results.

Leveling

Undulations or irregularities in the surface resulting from tillage, fertilizing, soil amendment application or other operations shall be leveled before seeding operations are begun.

Clean-Up

After completion of the above operations, the surface shall be cleared of stones, debris, or other objects larger than 3/4" in thickness or diameter and of roots, brush, wire, grade stakes and other objects that might be a hindrance to maintenance operations.

Planting Seed

General

All seeding work shall be done between dates most favorable for planting of such seed or species indicated by these specifications. A satisfactory method of sowing shall be employed, making use of proven and approved mechanical power-drawn seeders, mechanical hand-seeders, or other proven methods. When delays in operations carry the work beyond the most favorable planting season for the species designated, or when conditions are such by reason of drought, high winds, excessive moisture, or other factors, that satisfactory results are not likely to be obtained, the work will be stopped by the Owner and shall be resumed only when directed. If an

inspection either during seeding operations or after seedling emergence shows that strips have been left unplanted, or other areas skipped, the Owner may require a sowing of additional seed on these areas. All areas to be grassed shall have the soil moisture levels necessary for seed germination and growth.

Broadcast Seeding

Seed shall be broadcast by proven sowing equipment at the rates for the types listed below of bulk seed mixtures specified in materials, if seeding is required. The seed shall be uniformly distributed over the designated areas. On areas such as fairways, half the seed shall be sown with the sower moving in one direction, and the remainder shall be sown at right angles to the first sowing. The seed shall be covered to an average depth of 1/2" by means of a cultipacker or other proven device. Broadcast seeding shall not be done during windy weather.

Drill seeding shall be done with approved equipment with drills not more than two (2) inches apart. The seed shall be sown uniformly over the designated areas. The seed shall be sown to an average depth of 1/4" and at a rate determined, if seeding is required.

Compacting

Immediately after seeding, the entire area shall be compacted either with a cultipacker or a roller weighing 60 to 90 pounds per linear foot. If seeding is performed with a cultipacker type seeder, compacting can be eliminated.

Protection

Immediately after seeding, the area shall be protected against traffic or other use by erecting barricades as needed, and by placing approved warning signs at appropriate intervals. If areas require erosion control methods, the Contractor will be

responsible for supplying and installing the control methods at a cost as determined during bidding or as a Change Order.

Seed Application, Species and Rates

Refer to the Bid For Contract Form

Maintenance of Planted Areas

Immediately after all areas have been planted, the Contractor will water the planted areas. After this initial watering, it shall be the Owner's responsibility to maintain the planted areas - only if the irrigation system is operational on a full time basis and in an automatic mode or if the Owner has agreed to accept the irrigation system in a manual operational mode.

No maintenance of the golf course of any type shall be required of the Contractor other than the requirement of the above for initial watering. Should the irrigation system become inoperative through the fault of the Contractor during the critical grass establishment period, the Contractor will be responsible for any loss of planted areas.

Erosion damage or any other type of damage not caused by the Contractor after planting and initial watering is the responsibility of the Owner.

GRASSING / GREENS

If elected by the Owner and/or Designer, after amendments have been applied, all surfaces shall be "floated out" using a Toro sand pro type machine with a keystone type drag mat or other suitable implement. The Contractor shall exercise extreme caution in this operation so as not to bring foreign matter into the putting surface.

IMMEDIATELY prior to the planting, the green putting surfaces and surrounding areas shall be fertilized with a type and at a rate to be determined by soil analysis. The fertilizer shall not be incorporated into the seedbed. All materials and methods of application under this paragraph shall be subject to the Designer's approval.

After all specified areas have been fertilized, these areas shall then be "floated out" to the satisfaction of the Designer, and put in a soft condition for planting. The final seedbed must be smooth and sufficiently soft in order for the seeds or sprigs to be planted therein. The final surfaces must also be free from water-holding depressions or pockets. The condition of the seedbed and the putting surfaces must be approved by the Designer prior to planting.

Planting

Reference is hereby made to "**Fairways, Tees, and Roughs**" planting. All applicable portions of the referenced section shall be deemed as specified for this section unless specifically modified or revoked herein. The green putting surfaces shall be hand planted.

The grass type for the green putting surfaces and collars shall be SR1020, planted at a rate of 2 pounds per 1,000 square feet.

The grass type for the surrounding shoulder mounds and slopes shall be the same as the fairways, planted at the same rate. Trap faces and walls of traps will be sodded with sod of similar grasses as directed and approved by the Designer's representative.

The Designer shall be the final judge as to the condition of all planted areas after sprigging and these areas must meet the Designer's approval.

Starter Fertilization

10-20-30 grade, uniform in composition, free flowing, pelleted or granular and suitable for application with approved equipment. Fertilizer shall be distributed uniformly at a rate of 650 pounds per acre.

GRASSING / SOD

All areas to be sodded shall be prepared in the same manner as areas to be seeded or sprigged, including the application of fertilizers and soil amendments. The Owner and the Designer shall approve all areas to be sodded.

Sod, as specified in the Bid Form included herein, will be placed at the locations indicated by the Designer. In general, sod will be required in areas as follows:

- a. One ring of sod minimum, surrounding the putting surface and collar of the green. This sod is of the same species as the putting surface grass.
- b. One ring of sod minimum, around the bunker perimeter, as directed by the Designer. Sod on the putting surface side of the green bunkers will be the same species as the putting surface species, and the balance of sod will be the same species as fairway or rough grasses.
- c. One ring of sod minimum, around the tee surfaces. Sod around the tee surfaces shall be of the same species as the tee surfaces.
- d. Sod as required and available, on the steep faces of bunkers, as directed by the Designer.

- e. Sod as required and available, on the steep slopes on and around green complexes, as directed by the Designer.
- f. Sod as required and available, on lake banks and drainage swales, as directed by the Designer.

The placement of sod is for the purpose of rapid turfgrass establishment and the minimization of erosion in areas critical to good golf course playing surfaces. The priorities of this sod placement is as previously outlined. Any sod placed on steep faced slopes shall be secured from slipping by pegs or other approved methods.

Sod Storage on the Site

Sod that has been lifted on site and is used for the project, shall be stored spread out, grass side up on a flat surface, other than existing lawn, and maintained in a healthy living condition until re-used. Sod maintenance shall include, but not be limited to watering, as often as necessary, to keep it in a moist condition. No sod shall be stored on the site for longer than two (2) days, unless otherwise approved by designer. Sod that becomes yellow, dry, or broken, shall be removed from the site by the Contractor at his expense.

All new sod brought on to the site for laying operations shall also be stored in the above manner.

Sod Bed Preparation

All areas of fill, i.e., trenches, mounds, etc., shall be compacted and settled as specified in these specifications before any topsoil is placed on areas to be sodded.

Before topsoil is spread, the sub-grade shall be scarified to a depth of four (4) inches to insure proper bonding with applied topsoil if it has been compacted due to weather or equipment. The area shall be leveled and raked free of stones larger than one half (1/2") in diameter and other debris.

Topsoil shall be spread to a depth of four (4") inches or as directed by the designer.

The existing topsoil in all other areas to be sodded shall be loosened and pulverized to a depth of four (4") inches and all stones over one (1") inch in any dimension, sticks, roots, rubbish, or other extraneous matter, shall be removed from the premises. The surface will be fine graded so that when settled, the surface is free from depressions or ridges and will conform to the required grades indicated. The surface shall be smooth, loose, and of uniformly fine texture at the time of sodding.

The Contractor shall prepare no more ground than can be sodded in a twenty-four (24) hour period. Sod shall be placed within 24 hours of ground preparation. The ground shall be re-prepared if weather or traffic has compromised the friability of the prepared area.

No sodding shall be done immediately after a rain storm or if a prepared surface has been compacted without first loosening the surface to a smooth, loose, uniformly fine texture just prior to sodding.

Fertilizer Application

The specified fertilizer shall be applied and incorporated into the upper four (4") inches of topsoil at rates specified in the Bid for Contract Form.

Grade

The new sod shall be laid on the topsoil so that the finished grade shall be one-half (1/2") inch below the top of adjacent paving or meeting exactly the grade of existing grassed surfaces.

Sod Laying

The surface upon which the new sod is to be laid will be prepared as specified above.

The sod shall be placed upon the prepared surface so that joints between courses are matched against the last line laid.

All work shall be done from boards laid on top of the prepared surface or on already laid sod. Care shall be taken to prevent foot prints or other disturbances to the prepared bed, other than absolutely necessary. Any such disturbances shall be promptly repaired so that the sod will be laid on a proper bed to insure the necessary bonding between it and the sod.

Sod shall be tamped lightly as each piece is set to insure that good contact is made between edges and also with the ground. Sod laid on any sloped areas shall be anchored with wooden dowels or other materials which are accepted by the sodding industry.

Top Dressing

All areas which are sodded shall be top dressed with the top dressing specified above. The dressing shall be applied by the completion of each day's work. The top dressing shall be first applied by spreading it over the sod and then carefully working it into the joints with a stiff brush or mat.

All sodded areas shall be thoroughly watered after the top dressing is applied. Watering must be done carefully so as to avoid puddling or washing. Further work shall be curtailed until the area is dried sufficiently to allow sodding continuance without damage to already laid sod or the prepared bed.

Maintenance

The sod shall be maintained immediately after any section of the lawn is sodded, top dressed, and watered and shall continue until acceptance at the end of the guarantee period.

Maintenance shall include any and all operations necessary to establish a close stand of grass of the varieties specified, free of weeds and undesirable coarse native grasses. Such operations shall include, but not be limited to watering, weeding, application of additional top dressings, mowing, and trimming.

Sod Establishment Period

The Contractor shall be responsible for the sodded area during the period when the turf is becoming established. The period shall begin at the time any individual phase of the sodding is completed and continue for a minimum of sixty (60) days. This shall be considered the establishment period.

Final Inspection

An inspection of the turf will be made within ten (10) days after the establishment period (60 days) to determine the status of the sod.

Written notice requesting final inspection shall be submitted to the designer at least three (3) days prior to the anticipated inspection date.

All areas designated for sod shall be covered with a reasonable stand of grass and acceptable to the designer and owner. All spots twelve inches or larger, and any areas found not acceptable, shall be re-sodded as specified herein. Those areas which are sodded shall be maintained and guaranteed the same as the initial lawn sodding.

Final Acceptance

Sod work under this contract shall be considered accepted upon receipt of written approval issued by the designer and owner.

Guarantee and Replacement

All sod work done under this contract shall be left in good order, to the satisfaction of the Designer and the Owner and the Contractor shall guarantee without any additional expense to the owner, to replace any areas which develop defects or die within one (1) year of the date of final payment of the contract. Any outside factors, such as vandalism or lack of maintenance on the part of the owner, shall not be considered in the guarantee.

GRASSING / OUT OF PLAY AREAS

All non-irrigated, out of play areas affected by construction activities shall be prepared for grassing or planting in the same manner as other areas to be seeded, sprigged, or sodded under this section. These areas, as indicated on the grassing plan, shall be planted in native grasses. The native grasses shall be planted under the rates and specifications dictated by the local expert for such grasses.

SECTION X. CART PATHS

All cart paths shall closely follow locations shown on the drawings. The paths must blend into the golf terrain as naturally as possible and all slopes and grades shall be acceptable for golf cart use. All cart paths shall meet any public safety standards applicable.

All cart paths shall be the width specified by the Bid for Contract. The paths shall be constructed so that the finish grade is generally 2" above the surrounding shoulder grade.

No cart paths shall exceed a 12 1/2% grade.

*Asphalt base course shall be:

- 1) Untreated angular crushed natural stone.
- 2) Shall not be lumpy or frozen.
- 3) Free from large concentrations of alkali, salt, shale, and petroleum products, all roots, sod, limbs, and other vegetative matter, slag, cinders, ashes, and rubbish, or other material that in the opinion of the County is objectional or deleterious.
- 4) Base course shall be graded within the following limits:

<u>Sieve Size</u>	<u>Percent Passing</u>
1 inch	100
1/2 inch	79-91
No. 4	49-61
No. 16	27-35
No. 200	1-11

- 5) The abrasion loss shall be no more than 40 percent when subjected to 500 revolutions in a Los Angeles abrasion machine as determined by ASTM C 131.
- 6) That fraction passing the 1 inch sieve and retained on the No. 4 sieve shall have a loss not greater than 12 percent by weighted average at 5 cycles of ASTM C 88.
- 7) The specific gravity shall not be less than 2.54.
- 8) That fraction of the material passing the 3/4 inch sieve and retained on the No. 4 sieve shall contain less than 20 percent by weight of flat and elongated particles.
- 9) The material shall consist of angular particles with not less than 50% of particle count having two or more fractured surfaces.
- 10) The fine aggregate sand equivalent value shall be no lower than 35, or its minus No. 40 sieve size fraction shall have a liquid limit greater than 25 or a plasticity index greater than 4 when tested in accordance with ASTM D 2419, D 423, and D 424.
- 11) The laboratory compacted California Bearing Ration (ASTM D 1883) of the material shall not be less than 75% after 4 days soaking. The test specimens will be compacted at optimum moisture content by the modified method (ASTM D 1557, Method D).

Subgrade:

*Prior to placing base course materials, the subgrade shall be scarified to a depth of 8 inches, moistened or dried to optimum moisture content, and compacted to 90% of the maximum modified Proctor density within 2 percent of optimum moisture content. The subgrade shall then be proofrolled by passing moderately-loaded rubber tire-mounted construction equipment uniformly over the surface continuously

at least twice. If excessively soft, loose or disturbed soils are encountered, they should be removed as directed by County, to a maximum depth of two feet, and replaced with SUBGRADE STABILIZING MATERIAL compacted to 90% of the maximum laboratory dry density determined by ASTM D 1557, within 2 percent of optimum moisture content.

*Ensure subgrade is to required lines and elevations.

*Place material for base course, as required, upon the subgrade to the thickness, after compaction, and grade indicated on the drawings or in the Specifications.

*Handle and spread materials in a manner that will prevent segregation of sizes. When vibrating or other acceptable types of special compacting equipment are used, the entire course may be placed in one layer, provided the ability of such equipment to achieve acceptable condition to the full layer depth is demonstrated.

Base Course:

*When base course is constructed in more than one layer, the previously constructed layers shall be cleaned of loose and foreign matter.

*Maintain optimum moisture content during placement. Moisture content shall not vary more than $\pm 1\frac{1}{2}$ percent of optimum.

*Compact to not less than 92% of the maximum laboratory density maintaining an average of 96% of maximum laboratory density as determined by ASTM D 1557.

*The top surface of the compacted sub-base and/or base course shall be finished by blading or with automated equipment especially designed for the purpose and rolled with a steel-wheeled roller.

*No thin layers of fine materials shall be added to the top layer of the sub-base or base course in order to meet the grade.

SECTION XI. BRIDGES AND CULVERTS

CONCRETE

Forming:

*All concrete work to be done must comply with federal, state and/or local codes and regulations. All work shall be performed by experience and qualified workmen.

*Forms shall be of suitable material and of a type, size, shape, quality and strength to insure construction as designed.

*Metal forms for exposed surfaces may be used when all bolt and rivet holes are countersunk so that a plane, smooth surface of the desired contour is obtained.

*Rough lumber may be used for forming surfaces that will be covered by earth in the finished structure.

*Forms for all structures that will not be completely enclosed or hidden below the permanent surface of the ground shall be made of surfaced lumber, or material which will provide a surface at least equal to surfaced lumber or plywood.

*All lumber shall be free from knotholes, loose knots, cracks, splits, warps, or other defects affecting the strength or appearance of the finished structure. Any lumber or material which becomes badly checked or warped, prior to placing concrete, shall not be used.

*All forms shall be free of bulge and warp, and shall be cleaned thoroughly before being used.

*Forms shall be so constructed that the finished concrete shall be of the form and dimensions shown on the plans and true to line and grade, and sufficiently rigid to resist deflection. Design of formwork and removal of forms and shores are to conform to ACI 318. The responsibility for their adequacy shall rest with the contractor.

*All forms shall be mortar right and so designed and constructed that they may be removed without injuring the concrete.

*If, at any stage of the work, during or after placing the concrete, the forms sag or bulge to such an extent as to allow concrete to fall below the elevation shown on the plans, or outside the true line of the form, the concrete affected shall be removed.

*No concrete may be deposited against the earth as a side form.

Reinforcing:

*Where reinforced concrete structures, all reinforcing bar material used shall be intermediate Grade 60 steel conforming to the requirements of ASTM A 615. All rods shall be deformed and round, and shall be uncoated, free from rust, scale, form oil, etc.

*Welded wire fabric for concrete reinforcement shall conform to ASTM A 185.

*All accessories, including such items as chairs, spacers, saddles, etc., shall be of steel formed in such a manner and with sufficient strength to perform the intended functions. Chairs, spacers, saddles, etc., which are set in contact with forms, are to be galvanized or provided with plastic tips or coating to prevent rust spots on finish concrete surface.

*All tying steel shall not be less than 18 gage annealed iron lacing wire. All wire tie ends shall point away from forms.

*During the installation of reinforced concrete structures, all reinforcement shall be free from loose mill scale, loose or thick rust, dirt, paint, oil, or grease, and shall present a clean surface.

*Reinforcing bars shall be accurately placed as shown on the plans and shall be firmly and securely held in position in accordance with the "Manual of Standard Practice" of the Concrete Reinforcing Steel Institute, using concrete or metal chairs, spacers, metal hangers, supporting wires and other appropriate devices of sufficient strength to resist crushing under full load. Metal chairs which extend to the surface of the concrete (except where shown on the plans) and wooden supports, shall not be used.

*Placing bars on layers of fresh concrete as the work progresses and adjusting bars during the placing of concrete will not be permitted.

*Tack welding of reinforcing bars in place shall not be allowed.

*Bends and hooks in bars shall be made in the manner prescribed in the "Manual of Standard Practice" of the Concrete Reinforcing Steel Institute. Bars shall not be bent or straightened in a manner which will injure the material. Bars with kinks or unspecified bends shall not be used.

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Concrete for bridges, headwalls & water control structure
- B. Finishing placed concrete
- C. Curing and protection

1.02 QUALITY ASSURANCE

- A. Qualifications of Workmen:
 - 1. Use workmen thoroughly trained and experienced in placing and finishing the types of concrete specified.
- B. Comply with Federal, state and local codes and regulations
- C. Comply with hot or cold weather requirements when applicable

1.03 REFERENCES

- A. The American Concrete Institute (ACI):
 - 1. 306R, "Cold Weather Concreting".
 - 2. 305R, "Hot Weather Concreting".
 - 3. 318, "Building Code Requirements".
- B. American Society for Testing Materials (ASTM):
 - 1. D-1751, "Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)".
 - 2. C-150, "Portland Cement".
 - 3. C-33, "Concrete Aggregates".
 - 4. C-94, "Ready-Mixed Concrete".
- C. American Association of State Highway and Transportation Officials (AASHTO):
 - 1. Materials and testing designations.

1.04 SUBMITTALS

A. A mix design and information based on trial batch test results shall be submitted to Owner at least one week prior to commencement of the concrete work.

1.05 DELIVERY AND HANDLING

A. Ready-mixed concrete: Concrete shall be mixed only in such quantities as are required for immediate use. The maximum allowable time between charging of the material in the mixing drum and final placing shall be ninety minutes for air temperatures below 80° F and sixty minutes for temperatures above 80° F. Concrete not placed within these time limits, or if an initial set has developed shall not be used. Tempering concrete by adding water or by other means will not be permitted.

1.06 MEASUREMENT AND PAYMENT

A. No measurement will be made.

B. Payment for work in this section will be included in the bid items listed on the Schedule.

PART 2 - PRODUCTS

2.01 CONCRETE MATERIALS

A. Cement:

1. Portland cement shall be Type II or Type V, complying with ASTM C-150.
2. No air-entraining cement will be allowed.

B. Coarse Aggregates:

1. Shall conform to ASTM C-33.

2. Coarse aggregate shall be graded within the following limits:

Coarse Aggregate Size	Percent Passing (by weight)					
	1-1/2"	1"	3/4"	1/2"	3/8"	No.4
3/4"	-	100	90-100	-	20-55	0-10

3. Coarse aggregate shall consist of gravel, crushed slag, or crushed stone, composed of hard, strong and durable particles, free of injurious coatings.
4. The amount of deleterious substances included in the aggregate shall not exceed the following:

	<u>Percent (by weight)</u>
Soft fragments	2.0
Coal and lignite	0.3
Clay lumps	0.3
Other deleterious substances	2.0

5. The material passing the NO. 200 sieve shall not exceed 1.75 percent by weight.

C. Fine aggregate:

1. Shall conform to ASTM C-33.
2. Fine aggregate shall consist of natural sand, composed of hard, strong and durable particles.
3. The amount of deleterious substances included in the aggregate shall not exceed the following:

	<u>Percent (by weight)</u>
Clay lumps	0.5
Coal and lignite	0.3
Other deleterious substances	2.0

4. The material passing the No. 200 sieve shall not exceed 1.75 percent by weight.
5. Fine aggregate shall be uniformly graded from coarse to fine within the following gradation:

<u>Sieve Size</u>	<u>Percent Passing by Weight</u>
3/8"	100
#4	95-100
#16	45-80
#50	10-30
#100	2-10

D. Water:

1. Water used in washing aggregate and mixing concrete shall be of a potable quality clean and free from oil, acid, salt, injurious amounts of alkali, organic matter or other deleterious substances.

E. Admixtures:

1. No admixture will be permitted to be used in portland cement concrete.

F. Air entraining agent:

1. Shall be used in all concrete.
2. The agent shall conform to ASTM Designation C-175 and be added at the mixer.

G. Concrete curing compound:

1. Liquid membrane curing compound AASHTO Designation M-138, Type II, Class A.

2.02 PORTLAND CEMENT CONCRETE MIX

- A. Portland Cement Concrete shall consist of a mixture of Portland Cement, fine and coarse aggregates, and an air entraining agent.
- B. The proportions of the concrete materials shall produce a mixture that will

work readily into corners and angles of forms and around reinforcing steel.

C. The methods of measuring concrete materials shall permit proportions to be accurately controlled and easily checked. Measurement of materials for ready-mixed concrete shall conform to ASTM C-94.

D. Concrete mix shall comply as follows:

Intended Use	Coarse Aggregate	Minimum Cement	Minimum 28-Day	Slump	Air-En	Walk/Cement
	Size (inches)	Content (sacks/CY)	Comprehensive (psi)	(inches)	Trainment (Percent)	(Ratio)
Curb & Gutter						
Walks						
Storm Drain						
Drive Aprons						
Inlet Boxes	3/4	6.5	4000	4 max.	5-6.5	0.45

E. The contractor shall be responsible for the mix design.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Inspect subgrade surface and verify grade and adequacy of compaction.
- B. Correct grade and compaction deficiencies.
- C. No concrete shall be placed until reinforcement has been inspected by the Owner.

Bridges

All bridges shall follow the locations as indicated on the drawings. The Owner and Designer reserve the right to adjust any bridge elevations prior to construction of footings.

Bridges shall be 10' wide and of the length as drawn on the plans. Bridges shall support a minimum load of 85 PSF. A 42" high pedestrian guardrail shall be included, and shall meet AASHTO specifications. Bridge material shall be laminated Douglas Fir with 100% waterproof glue. Laminated material shall include stringers and railings. Sawn lumber shall be Douglas Fir No. 1, surfaced as required. Laminated beams shall be pressure treated with 0.3 light solvent penta. Sawn lumber shall be pressure treated with 0.4 light solvent penta, all per AWPA specifications.

All hardware and steel required to connect superstructure together including base shoes, steel diaphragms, rod cross bracing, double grip spikes and all miscellaneous nuts and bolts shall be galvanized. Embedded steel not included. Footers are the responsibility of the Golf Course Contractor.

Golf Course Contractor shall provide shop drawings of The Bridge and all structures for support and installation of the Bridge. These drawings shall be stamped by an Engineer licensed in the State of ~~Utah~~.

ors
Ohio

SECTION XII. BULKHEADS

Vertical Wood Bulkhead

All non-engineered vertical wood bulkheading shall follow the locations and flow as indicated on the drawings. The Owner and Designer reserve the right to adjust any final flow or elevations of the bulkhead prior to or during construction.

All work areas shall be properly prepared prior to beginning of installation of the bulkhead and shall be properly drained and kept during installation. The bulkhead shall be installed to the following minimum specifications.

The piling will be at least 8 inches by 8 feet of pressure treated .40 Chromated Copper Arsenate (CCA) Southern pine or equivalent at 5 feet on center. Each piling will be tied back to a continuous concrete dead man of a dimension of 1 foot by 1 foot concrete reinforced with #5 rebar. The concrete footer shall run continuously poured horizontal and parallel with the wall resting 3-5 feet below the top of the wall and 9-14 feet back from the wall so as to create a 30 angle between tieback rod and piling. The tie backs will be 3/8 inch 719 U.S. made galvanized aircraft cable or 5/8" HDG rod with minimum of one (1) foot of thread on each end. All other hardware including nuts and bolts shall be U.S. made and hot dipped galvanized. All pilings will be secured to stringers using 3/8" hot dipped galvanized lag bolts and nuts. No nails will be used in the construction of the bulkhead.

Vertical material consisting of up to 8 feet by 3 inches by 8 inches pressure treated .40 cca Southern pine or equivalent shall be installed at least 12 inches below design or final ground level.

During construction of the bulkhead wall an erosion control type fabric will be installed between the wood wall and the soil and will allow for proper drainage of any water which may accumulate between the barrier and soil. If necessary, weep pipes will be installed to allow for drainage if the ground water accumulation behind the wall is excessive. In all respects the Contractor will allow for proper drainage and minimized accumulation of water behind the wall.

As indicated by the wood treatment method all materials will be treated to a marine grade and quality method and shall carry the commensurate warranty period.

Refer to construction details in the construction drawings.

Typical Non-Engineered Retaining Wall Installation Specifications

Using 5' vertical material, .40 CCA, S4S piling shall be 3 feet deep in stable soil. Each pole shall be tied back with 3/8" galvanized aircraft type cable or 5/8" Hot Dipped Galvanized (HDG) rod with minimum 1 foot threading on each end. Footer shall be 1' by 1' concrete reinforced with #5 rebar running continuously, poured horizontal and parallel with the wall, resting 3 feet to 5 feet below the top of the wall and 9 feet to 14 feet back from the wall so as to create a 30 angle between tieback rod and piling. Top of the footer should be approximately the same depth as the top of the bottom stringer. Vertical material shall be installed a minimum of 1 foot in ground. Two 3/8" galvanized cable clamps shall be used at each cable end. If HDG rod is used, 5/8" galvanized tieback rod with 1 foot of thread of on each end shall be used.

All surrounding grades and conditions shall uniformly tie into the bulkhead elevations and properly surface drain. The Designer reserves the right to adjust any final elevation of the bulkhead during construction.

SECTION XIII. PROJECT RECORD DOCUMENTS

An accurate (to scale with dimensions) As-Built Drawing shall be prepared by the Contractor **throughout** construction of the golf course, indicating **exact** locations of all underground materials installed for drainage and irrigation. A copy of the As-Built condition drawing shall be submitted **monthly**, if requested by the Owner, with the invoice showing the progress of the work.

Drain tile location in all greens and bunkers shall be diagrammed with all flushes and outlets located with dimensions from the sprinkler heads.

Irrigation equipment shall be precisely described as to its location and type of item such as: pipe size, number of tubes, wire size and purpose, any splices, valve locations, head locations, controller locations, etc.

The irrigation program shall be included on the As-Built condition drawing indicating the exact operation of the sprinkler heads and controllers.

SECTION XIV. PROJECT CLEAN-UP

The premises and the golf course site shall be maintained by the Contractor in a reasonably neat and orderly condition free from accumulations of waste materials and rubbish during the entire construction period. Remove all crates, cartons and other flammable waste materials or trash from the work areas at the end of each working day. It shall be the responsibility of the Owner's representative to see that the Contractor maintains a clean job site.

Before acceptance of the job by the Owner, the site and premises shall be thoroughly cleaned by the Contractor to the satisfaction of the Owner.

SECTION XV. PROJECT CLOSEOUT

The Contractor shall notify the Owner, Engineer, and Designer that the golf course is substantially completed, in the Contractor's estimation, and the Contractor is ready for the preparation of the punchlist.

The Owner, Engineer and the Designer shall prepare a working punchlist of items which need to be addressed, adjusted or completed by the Contractor prior to completion and turnover of the golf course to the Owner. The Contractor shall be responsible for satisfying all items on the punchlist unless the Contractor objects to any of the punchlist items. If there is an objection to any of the punchlist items, the Contractor will immediately notify the Owner in writing, within five (5) working days after receipt of the punchlist. If a dispute exists concerning the punchlist, that dispute will be settled according to the Owner/Contractor agreement and the Plan Document. In any event, all the other punchlist items shall be completed without delay.

Certificates

The Contractor shall obtain certificates of approval, acceptance and compliance from all authorities having jurisdiction over the work and shall deliver these certificates to the Owner's representative. The work shall not be deemed complete nor will final payment be made until such certificates have been delivered.

Guarantees

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

The contractor shall deliver to the Owner, upon completion of all work under this Contract, and before final payment is made, his written guarantees; made

out to the Owner, in a form satisfactory to the Owner, guaranteeing all 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 Owner, without cost, delay or hardship to the Owner, such work, materials, appliances or equipment, as may be found to be defective or faulty.

The Contractor's overall guarantee shall cover a period of one (1) year. With this guarantee, the Contractor shall obtain and deliver to the Owner his subcontractor's guarantees as listed in the respective sections covering the work and materials of these specifications.

Operating Instructions

Wiring diagrams, piping diagrams, installation instructions, parts lists and similar information shall be furnished for mechanical and electrical systems, 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.

The Contractor shall furnish the services of qualified supervisory personnel to start-up the equipment which has been Contractor furnished and to instruct the Owner's operating employees as to the procedures to be used in starting up, operating, shutting down, lubricating, oiling, adjusting and maintaining said equipment - as covered more completely under "Irrigation" in the Plan Documents. 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 with operable equipment.

The Contractor is cautioned that the operating instructions called for in the above two (2) paragraphs are a specific requirement and that the 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 system and of the component parts of same.

The Contractor shall install on the inside door of each controller which heads each station controls. This shall be done with Dymo tape or equal, that will not deteriorate.

Tests

Before acceptance of the whole or any part of the work, it shall be subject to tests to determine that it is in accordance with the Plan Document. The Contractor shall be required to maintain all work in first-class condition for a 30 day operating period after the same has been completed as a whole and the Owner has notified the Contractor in writing that the work has been finished to his satisfaction. The retained percentage, as provided herein, will not be due or payable to the Contractor until after the 30 day operating period has expired.

IRRIGATION SPECIFICATIONS

IRRIGATION GENERAL SPECIFICATIONS

GENERAL

The irrigation system has been conceptually designed based on the graphic representation of the golf course layout and the golf course grading plans. There will be situations in the field that will require deletion or addition of irrigation heads. In the case of deletion and addition, there will be a deduction or addition to the contract price according to the unit price as stated in the bid proposal.

GENERAL INSTALLATION REQUIREMENTS

The work covered in this section defines the responsibilities of the IRRIGATION CONTRACTOR with respect to the general installation requirements of a complete underground golf course irrigation system. The system so defined in these Plans, Specifications and Instructions and Contract Documents.

The CONTRACTOR will notify the GCA in writing of any inconsistencies in the Plans, Specifications and Instructions and Contract Documents prior to any construction or installation covered under this contract.

At any time during the installation phase, the CONTRACTOR is invited to suggest, in writing, and recommend to the OWNER and GCA any field changes or modifications that he feels will improve the overall efficiency or installation economics of the system. Any changes made but not approved in writing by the GCA or OWNER'S representative cannot be considered an extra.

Sprinkler lines, heads, valves, controllers, etc., shown on the drawings are essentially diagrammatic. The exact location for the installation of components of the system shall be adjusted and established on site by the CONTRACTOR with the approval of the GCA or his representative.

The CONTRACTOR shall provide a project superintendent who shall be on the site during all phases of the installation of the irrigation system. The CONTRACTOR will provide a list of projects of similar scope that the above-mentioned SUPERINTENDENT performed.

It is highly recommended by the GCA that the OWNER hire and employ, full-time, an individual or individuals that will be trained and instructed by the CONTRACTOR as to the proper and technical responsibilities necessary for the operation and maintenance of the irrigation system. This individual can be the golf course superintendent or his assistant. A weekly report will be submitted to the GCA and OWNER'S representative each week by the responsible person.

Any changes, additions, deletions, etc., will not invalidate the original contract and will be mutually agreed upon, as to price change only, between the OWNER and CONTRACTOR prior to the construction or installation of said change.

Throughout the installation phase the CONTRACTOR shall be responsible to coordinate and cooperate with other CONTRACTORS on the site to insure no unnecessary delays or destruction of completed work and proper scheduling for the timely completion of the project. Prior to the start of the installation the CONTRACTOR must submit his intended progress report in writing, as to the procedures from the very beginning of the installation.

TECHNICAL INSTALLATION REQUIREMENTS

The work covered under this section outlines and defines all specific and required materials that will be necessary for the complete installation of the designed and specified underground automatic irrigation system and irrigation system pumping station.

The water supply shall be taken from the location as indicated on the Irrigation Routing Plan as defined and supplied by OWNER.

The system utilizes satellite controllers with 11 or more stations per controller, with all designed areas of coverage being watered. The satellite controllers (master controller if required) will be located and installed where indicated on the Irrigation Routing Plan.

It shall be the CONTRACTOR'S responsibility to order, load, transport, receive, unload, store and handle all materials to be used in the installation of irrigation system and irrigation pumping station. An area to be used for storage will be established and secured at all times by the OWNER.

The CONTRACTOR will personally verify all quantity totals and materials listed and notify the GCA and OWNER of any inconsistencies or changes he feels should be made prior to his execution of this contract.

It is mutually agreed between the OWNER and CONTRACTOR that at such time as the materials arrive on-site the CONTRACTOR presents delivery and acceptance invoice, the OWNER shall pay (within 30 days) for said material.

In addition to the actual materials listed, the CONTRACTOR shall be responsible to include and provide any extras necessary for contingencies, due on his part, during the installation phase.

Equipment differing from that stated on the specified and approved material list may be proposed by the CONTRACTOR. For consideration of proposed equal equipment, the CONTRACTOR shall submit to the designer not less than 14 days prior to the bid opening a list of material under consideration.

The CONTRACTOR shall submit (4) copies of a material list, complete with manufacturer's name and product numbers. Four (4) lists of comparable installations in operation, including customer address and location of installation. Any engineering drawings that would alter the system design of the proposed changes.

Notification of the submitted data for consideration of "as-equal" to the equipment specified herein, will be by the designer three days prior to the bid opening.

DRAWINGS OF RECORD

Throughout the installation phase the CONTRACTOR shall provide and keep up to date, a complete set of drawings of record which shall be modified daily indicating any and all changes or deviations from the original design plan. The plan must be available on a weekly basis in order for the GCA to approve requisition payments.

The CONTRACTOR will prepare a Daily Plan of Record recording the progress of the golf course irrigation system including pump state installation.

The irrigation plan and specifications submitted by the GCA will be used as a basis for the plan of record. All installation modifications or changes in materials, equipment or location will be recorded on the plan of record.

It is understood and agreed between OWNER, GCA and CONTRACTOR that during the installation process possible changes, modifications, additions or deletions may be required to improve the system. Any and all changes, modifications, etc., must first be approved by the OWNER and GCA.

The plan of record will include:

- 1) Type, quantity and location of all materials and equipment installed.
- 2) Additions or deletions from original plan.

- 3) Estimate of time remaining to completion installation.
- 4) Approval of OWNER or OWNER'S representative and GCA.

The CONTRACTOR shall furnish to the OWNER a drawing of record zone drawing, inside the cover of each satellite controller, indicating that zone's coverage (hole by hole) and a master drawing of record (all zones) plan.

Upon completion of the work covered under this contract, the CONTRACTOR shall furnish to the programming consultant one (1) set of drawings of record showing the total completed irrigation system as installed.

Upon completion of the work covered under this contract, and prior to final payment, the CONTRACTOR shall furnish to the OWNER two (2) sets of drawings of record showing the total completed irrigation system as installed. This plan will be approved by the GCA or OWNER or their appointed representative prior to approval of final payment, and must be drawn on Mylar. A reproducible copy must also be provided to the GCA.

The CONTRACTOR shall also provide to the OWNER the name of the agent or local distributor, including address, telephone number and name of contact person, for materials and equipment installed. The CONTRACTOR shall provide the OWNER with all manufacturer's warranties and any additional warranties provided by local suppliers.

ROUTING - STAKING REQUIREMENTS

As set forth in the Bid Documents, the CONTRACTOR shall have thoroughly examined and familiarized himself with the site and all conditions pertaining to the implementation of this contract.

It shall be the responsibility of the OWNER to locate, mark and maintain any underground utilities, wiring or structures prior to any routing and excavation by the CONTRACTOR. Any damage to underground utilities not located by OWNER shall be the responsibility of the OWNER.

The routing and staking shall be in general accord with the irrigation routing plan.

Prior to any trenching, construction or installation of the irrigation system components, the CONTRACTOR will stake out the area to insure the best location of runs of pipe, sprinkler heads, valves, controller slabs, etc.

Pipe lines around greens are shown diagrammatically on the IRRIGATION PLAN. The CONTRACTOR shall determine on-site the best routing and placement of heads to insure the proper and designed coverage. Pipe lines and heads are to be a minimum of two (2) feet from the putting surface and no line is to run through the bed of any sandtrap or under the green's surface.

The CONTRACTOR shall have the right to adjust the routing of the pipe lines in order to avoid obstacles or to achieve better coverage. In no case shall any adjustment of this nature invalidate the original contract or affect the price of the contract.

Any adjustments recommended by the CONTRACTOR that necessitates more pipe or material than originally planned shall be approved by the OWNER and GCA, or his representative, prior to the actual installation of the adjusted area.

Any adjustments, changes, additions or deletions that have been approved by the OWNER and that affects the price of the original contract will be governed by the provisions set forth in the Contract Documents.

TRENCHING AND BACKFILLING REQUIREMENTS

All trenching, installation of pipe, valves, sprinkler heads, construction of thrust blocks, etc., will be in accordance with manufacturer's recommended installation requirements or where soil conditions dictate otherwise. The CONTRACTOR shall consider all excavation standard or unclassified and will include all material encountered with the exception of material that cannot be excavated by normal chain trenching excavation means or normal backhoe excavation means. Any exceptions will be brought to the attention of the GCA, or his representative, and the OWNER, and a price adjustment shall be agreed upon before excavation of these areas proceed.

The CONTRACTOR shall be responsible for the disposal of any unsuitable excavated material. He shall haul to a site on the property any such material or bury on-site in an area approved by the GCA or his representative. When buried on-site the CONTRACTOR shall be responsible for the preparation of the burial pit and the backfilling of same.

When excavated material is determined by OWNER and GCA to be unsuitable for backfill, it shall be the CONTRACTOR'S responsibility to obtain and insure the prompt delivery of the additional backfill material to the site so as to not delay the trenching and backfilling process. It will be the OWNER's responsibility to pay for the suitable backfill material and hauling to the site as quoted under unit costs in the bid proposal.

Mechanical trench diggers shall provide trenches with straight sides and shall be no wider at any point than is necessary to lay and bed the pipe properly.

The depths to which all pipe is to be laid will be determined between the CONTRACTOR and the GCA, complying with the OWNER'S request and requirements and local conditions. Approximate minimum depths of cover over all mainline pipe will be 30" and laterals 18". When soil conditions require, the CONTRACTOR shall take special care in hand backfilling and hand tamping around and over the pipe to a depth of 6" over the pipe.

Trenching that will be required to go through existing roadways, cart paths, sidewalks, etc., will be the CONTRACTOR'S responsibility as well as the replacement and repair of same, including the paving of same.

Solid rock that cannot be avoided by routing adjustment and must be blasted must first be approved by OWNER, GCA, or his representative, and the CONTRACTOR. Blasting shall be done by a licensed person and shall be considered extra work in terms of payment and the CONTRACTOR shall be reimbursed by the OWNER in accordance with the provisions set forth in the Contract Documents. The backfill material shall be clean, free from rocks, debris and any other unsuitable material. The imported material, whether from on-site or imported from off-site, will be at the OWNER'S expense. It will be dropped at the trench site and the responsibility for spreading will be the CONTRACTOR'S.

The finishing layer of backfill on all trench lines shall be slightly crowned above finished fairway grade. The CONTRACTOR shall be responsible to bring back to finished grade any undue settlement in the trench lines, pavement, sprinkler head, etc., for a period of one (1) year at no additional cost to the OWNER. Minor settling after the system has been installed will be the responsibility of OWNER.

Throughout the installation phase, the CONTRACTOR shall refill any trenches that have settled due to incomplete compaction. The OWNER, however, shall reimburse the CONTRACTOR for the raising and repair of trenches eroded by rainfall and runoff or acts of vandalism.

In the event the seedbed preparation and grassing become necessary prior to the natural settling and compaction of the trenchline, or if the grassing CONTRACTOR removes the crown above the trenchline, the OWNER shall be responsible to repair same, or shall reimburse the CONTRACTOR for the repair of any undue settlement.

Should the CONTRACTOR encounter any unsuitable obstacles or material, such as logs, limbs, stump, debris pile, etc., that has been buried by another CONTRACTOR in a prior construction phase, the OWNER and GCA will be immediately notified.

If conditions arise as described in the preceding paragraph, the CONTRACTOR shall be reimbursed for the removal and disposal of the unsuitable obstacles or material by the OWNER.

The CONTRACTOR will insure that all installed pipe is backfilled and tamped properly at the conclusion of each working day. No trenches with installed pipe will remain open overnight.

PIPING AND INSTALLATION REQUIREMENTS

All piping (unless specified otherwise) to be unplasticized poly-vinyl chloride (PVC), ring-tite, Type L, Class 160, 200, DR 18 or DR25 (as specified) and as manufactured by John-Manville, Certainteed or equal.

Solvent weld type PVC pipe will be permitted on Sizes 2" (50 mm) and under.

All PVC pipe installed to be in accordance with the manufacturer's installation guide and recommendations.

Depth of pipe installation to be governed by OWNER'S requirements or in accordance with the minimum depths of cover as specified in Trenching and Backfilling Requirements of these specifications.

All street and road pipe crossings shall be handled in accordance with local codes.

In areas where PVC pipe cannot be covered, such as ditch, stream, bridge, lagoon, and pond crossing, galvanized or 20 mil wrapped Sch 40 steel pipe shall be used.

SPRINKLER HEADS

The sprinkler head assembly shall be connected to the lateral line by installing a DURA or LASCO "O"-ring swing joint, or triple swing joint as shown or detail.

Spacing of all heads are diagrammatically indicated on plan. Exact location of heads to be determined on-site by the CONTRACTOR'S SUPERVISOR and approved by the GCA, OWNER and OWNER'S representative.

The CONTRACTOR shall mark all installed sprinkler heads and boxes with "irrigation flags".

CONTRACTOR to set sprinkler heads and boxes 3" above grade when turf has yet been established. Owner is responsible for setting sprinklers and boxes to grade after turf is established on golf course.

An alternate price will be furnished to set all heads and quick couplers to finish grade and install 32" square minimum of sod at each head and quick coupler.

All rotary pop-up sprinklers and quick coupler valves, as specified on the plan, shall be attached to the irrigation system piping with swing joints at the location and grades as indicated on the plan. The specifications for the sprinkler heads to be used on this project are listed on the plans.

FITTINGS

Fittings, in general, for all installations shall be considered incidental to the contract price and shall be the CONTRACTOR'S responsibility to provide all of the required fittings to complete the contract.

All fittings for pipe 2" (50 mm) and smaller will be Schedule 40 as manufactured by Dura or LASCO.

All fittings for pipe 4" (100 mm) thru 8" (200 mm) will be cast iron or ductile iron, push-on or mechanical joint type for PVC.

All fittings for pipe 10" (250 mm) and larger will be cast iron or ductile iron mechanical joint or push on type with appropriate transition gaskets.

All reductions in PVC pipe sizes 4" (100 mm) and larger will be cast iron or ductile iron reducers. All reduction connections shall be thrust blocked.

All tees for the installation of swing joints will be Schedule 40 solvent weld. Threaded Schedule 40 fittings will not be allowed.

VALVES

Gate valves 2" (50 mm) and smaller shall be bronze threaded, Class 150 W.O.G. with cross top handle. Gate valves to be Nibco T-113 or equal. Contractor shall furnish four (4) keys to the Owner.

Gate valves 3" (80 mm) and larger shall be cast iron, high resilient wedge, epoxy coated iron inside and out, with a 2" (50 mm) non-rising operating nut. Gate valves to be Waterous Series 500 or equal.

Each valve placed underground shall be placed in a valve box. The box cover shall be marked "WATER". All valve boxes shall be similar or equal to Ametek Box No. 595.

For the operation of underground valves with nut mounted stems, the CONTRACTOR shall furnish two (2) socket wrench for each size of valve nut in the system. The cost of such wrenches shall be merged in the total bid price. Valve wrenches shall be 4' (100 mm) in length and furnished with sockets to fit 2" (50 mm) square nuts. All wrenches shall have tee handles and be constructed of steel pipe with welded connections.

The location and type of all valves are shown on the layout routing plan. The implementation of the plan should be followed as closely as possible. However, the CONTRACTOR, with prior approval from the OWNER or GCA, shall make on-site adjustment in routing and location of valves for better implementation of the plan.

ELECTRICAL SERVICE

The OWNER shall furnish the electrical services necessary for supplying required electrical voltage to pumping system and electrical control system at designated points indicated on plans. The electrical services to consist of all necessary transmission lines, transformers, poles, main power disconnects and wiring of same. The power requirements shall be 3 Phase, 480 Volt 60 HZ Power. Any changes in voltage which require additional or different voltage control switches and/or motors will be at the OWNER'S expense.

It is the OWNER'S responsibility to provide the physical hook-up at the 120 volt source disconnect of the irrigation system power wires.

WIRE

The CONTRACTOR shall provide and install all of the required electrical wiring necessary for the implementation of the golf course irrigation plan.

All wiring (control lines) shall be assembled, connected and installed in accordance with the manufacturer's recommended instructions.

Care and caution should be taken in making splices and connections and should be made permanently waterproof. All splices and connections will be done with the insulated SCOTCH 82A-1 or DBY as manufactured by 3M Company, and specified on plans.

All underground splices not located at control valve sites will be housed in a valve box for isolation and inspection. Splices will only be allowed if shown on plan or approved by GCA.

All wire shall be installed in trench lines and shall not be yanked, stretched or excessively pulled during installation. Wire shall be laid on a firm, even bed which shall support the entire length.

All wiring crossing streams, lakes, lagoons, bridges or under roads, etc., shall be placed in PVC pipe or conduits and all joints will be made waterproof.

Wire should be laid on the same side of the trench, as much as possible, throughout the system and will be bundled and tied together every 200 feet.

Power supply at indicated sources, to be no less than 120 volt, 60 cycle, with source supply and service hook-up provided by OWNER. Power supply sources are indicated on plans.

Valve control and common wires from satellite/remote controllers shall be single strand, solid conductor, direct burial wire, Type UF and UL approved. Control and common wires are sized on plans and details. Common wire shall be different color for identification. Each controller shall have a separate common.

Systems containing master to satellite controls, control wiring from master to satellites to be as recommended by controller manufacturer.

AUTOMATIC CONTROLLERS

The location of all satellite controllers shall be staked in the field for prior approval of the OWNER, GCA and their representatives.

Satellite controllers shall be completely automatic for normal operation. They shall also have the capability of being operated manually.

Satellite controllers are to be mounted and wired according to manufacturer's recommended instructions and in accordance with local and state electrical code requirements.

Satellite controllers shall be mounted on concrete pads of sufficient size and strength to adequately support the controller and provide the stability necessary to protect it from weather and vandalism.

All controllers shall be grounded by a copper clad grounding rod (96" minimum) driven into the ground. The rod shall be attached by #6 bare copper from the satellite lug to the rod clamp. The wire shall be clamped and permanently attached to the rod by the fusion method. Additionally 200' (60 M) of #6 (16 mm) bare copper shall be installed from the satellite lug into the Fairway at a depth of 10"-12" (25-30 cm).

The ground shall have a resistance reading of 10 OHMS or less. The reading must be accomplished with the meter connection from the satellite lug and not the rod top. The bare equipment ground as specified on the electrical plan must be disconnected when testing for 10 OHMS or less.

If 10 OHMS or less cannot be achieved the contractor shall notify the GCA or his representative, to determine other methods of accomplishing the required grounding, and to authorize any additional changes.

SET & ADJUST SYSTEM

Upon completion of the installation of the total system, the CONTRACTOR will set and adjust all component parts of the system to insure that the overall operation of the system is functioning at peak efficiency. This

includes the programming and adjustments of all pumps, controllers, sprinkler heads, pressure regulators, valves, etc. All of the above work should be in conjunction with the superintendent of the golf course or his appointed irrigation personnel.

When all work under this contract has been completed, including adjustments, additions or deletions, the CONTRACTOR will notify the OWNER and GCA for their inspection and approval. Final acceptance by the OWNER does not relieve the CONTRACTOR of his responsibility of WARRANTY.

Minor adjustments (Leveling and clearing sprinkler heads, valve boxes, etc., including protection of vandalism will be made by the OWNER after acceptance of the system and during the warranty period.

CLEAN UP

The CONTRACTOR shall be responsible throughout the construction and installation phase to maintain a clean job site.

Waste materials, crates, rubbish, cartons and all trash shall be removed or disposed of in all work areas at the end of each working week.

Materials storage site, fuel tanks or trucks and all construction equipment shall be centralized and in a orderly manner at the end of each working week.

Upon completion and before acceptance of the job by the OWNER, the site shall be cleaned to the satisfaction of the OWNER and GCA.

PRE-FABRICATED PUMPING STATION (2 REQ.)
YANKEE TRACE GOLF COURSE

PUMP STATION DESIGN REQUIREMENTS

[] VERTICAL TURBINE

FLOW: 1100 G.P.M.

DISCHARGE PRESSURE: 115 P.S.I.

PUMPS: 1[] 2~~[]~~ 3[] 4[] 5[]

WATER LEVEL: _____

PAD ELEVATION: _____

TOTAL PUMP LENGTH: 11'-0"

WET WELL SIZE: 48" Φ x 12'-0"

INLET PIPE SIZE: 18" ULTRA RIB

CONCRETE PAD SIZE: 14'-0" X 22'-0" \pm

IRRIGATION PIPE CONNECTION SIZE: 10"

POWER CONDUIT SIZE: AS PER MFG.

AUXILIARY POWER SIZE: 2"

FOOTINGS & FOUNDATION REQUIRED: Yes ~~[]~~ No []

BUILDING: Contractor [] Owner ~~[]~~

[] CENTRIFUGAL BOOSTER

FLOW: _____ G.P.M. + JOCKEY PUMP

DISCHARGE PRESSURE: _____

PUMPS: 1[] 2[] 3[] 4[] 5[]

SUCTION PIPE AVAILABLE: _____

SUCTION PIPE LENGTH: _____

SUCTION PIPE SIZE: _____

SUCTION PIPE MATERIAL: _____

CONCRETE PAD SIZE: _____

IRRIGATION PIPE CONNECTION SIZE: _____

POWER CONDUIT SIZE: _____

AUXILIARY POWER SIZE: _____

FOOTINGS & FOUNDATION REQUIRED: Yes [] No []

BUILDING: Contractor [] Owner []

THE PUMP STATION SHALL BE CONSTRUCTED WITH THE FOLLOWING:

- STANDARD RELAY LOGIC
- PROGRAMMABLE CONTROL
- VARIABLE FREQUENCY TYPE: PWM/MIN. BASE EFF.: 98%/TEMP. RATING: 50 DEGREE
 TYPE: PWM/MIN. BASE EFF.: 94%/TEMP. RATING: 40 DEGREE
- ENCLOSURE COOLING AIR-CONDITIONER/DE-HUMIDIFIER HEAT EXCHANGER

OTHER: _____

POWER: 480 VOLTS 3 PHASE 60 HERTZ

LINE FILTER: ISOLATION TRANSFORMER LINE REACTOR

DRIVE ONLY COMPLETE PUMP STATION

PRIMARY VAC 480 X SECONDARY VAC 480

NON-OVERLOADING MOTORS AT ANY POINT: Yes No

HP: 1 50 2 50 3 _____ 4 _____ 5 _____

RPM: 1 1800 2 1800 3 _____ 4 _____ 5 _____

MAINTENANCE PUMP: 1-1/2 HP 2 HP 3 HP 5 HP

STANDARD METAL - PAINT CONSTRUCTION

GALVANIZED & CORROSIVE ATMOSPHERE CONSTRUCTION

INDIVIDUAL PUMP ISOLATION VALVE: Yes No

INDIVIDUAL PUMP PRESSURE RELIEF: Yes No

INDIVIDUAL PUMP HEAD AIR RELIEF: Yes No

1/8" PUMP HEAD TO DECK GASKET: Yes No

GAUGES: Valve Mounted Panel Mounted

STARTER PANELS: Individual Other

NEMA RATING: 3 3R 4 SS Other

WIRE WAY: Internal External

STARTER DISCONNECT: Circuit Breaker Fusible

ACROSS THE LINE: 1 2 3 4 5

PART WINDING: 1 2 3 4 5

WYE DELTA: 1 2 3 4 5

AB SMC-150 START: 1 2 3 4 5

CONTROL PANEL: Individual (No line voltage devices) OTHER

NEMA RATING: 3 3R 4 SS INSULATED

ENCLOSURE NEMA RATING INTACT PER U.L. YES NO

MAIN STATION DISCONNECT: Circuit Breaker Fusible

NEMA RATING: 3[] 3R[] 4~~X~~ SS[] Other []

UL LISTED: Starters Panel [] MCD [] Control Panel []

Complete Panel ~~X~~

LIGHTNING ARRESTOR ~~X~~

NON REGULATED POWER SUPPLY: 5.0 KVA, 220/120 SECONDARY CONNECTED WITH
PRIMARY AND SECONDARY CIRCUIT BREAKER

10 AMP (4) QTY. 120 VAC CIRCUIT BREAKER

 AMP () QTY. 220 VAC CIRCUIT BREAKER

DUPLEX RECEPTACLE W/GROUND FAULT: Yes ~~X~~ No []

PHASE FAILURE/LOW VOLTAGE: Auto ~~X~~ Manual []

REGULATED POWER SUPPLY TO IRRIGATION CONTROLLERS: Yes [] No ~~X~~

 KVA, 220/120 SECONDARY CONNECTED

 AMP () QTY. 120 VAC CIRCUIT BREAKER

 AMP () QTY. 220 VAC CIRCUIT BREAKER

REMOTE REGULATED POWER SUPPLY PANEL FOR

IRRIGATION CONTROLLERS: Yes [] No ~~X~~ QTY.

 KVA () AMP Breakers

NEMA RATING: 3R [] 4 [] S.S. []

THERMOSTAT FAN COOLING: Yes [] No []

LOW LEVEL SAFETY: Yes ~~X~~ No []

LOW SYSTEM PRESSURE: Yes ~~X~~ No []

HIGH SYSTEM PRESSURE: Yes ~~X~~ No []

LOW TEMP SAFETY: Yes [] No ~~X~~

LOW TEMP CIRCULATION: Yes [] No ~~X~~

ALARM LIGHT: Yes ~~X~~ No [] Remote []

MOTOR RUNNING TIME METERS: Yes ~~X~~ No []

RESERVOIR FILL (S.S. PROBE): Yes ~~X~~ No [] QTY. 2

COMPUTER INTERFACE: TORO [] RAINBIRD ~~X~~

PUMP WATCH PROGRAM: Yes ~~X~~ No [] FURNISH COMPUTER Yes [] No ~~X~~

TELEPHONE LINK [] HARD WIRE ~~X~~

SKID TO COMPLETELY COVER WET WELL WITH HATCH: Yes No
 PIPING DRAINS & DRAINS PIPED TO WET WELL: Yes No
 HYDRO TANK: Size _____ Yes No Asmestamp
 SYSTEM RELIEF: Yes No SIZE AS PER MFG. STD.
 SYSTEM RELIEF PIPED TO: Wet Well Atmosphere
 STATION ISOLATION VALVE: Yes No Size 10"
 MANIFOLD STRAINER: Yes No Auto Perforation _____
 WYE STRAINER: Yes No Auto Size _____
 SEPARATOR: (PUMPING SYSTEMS, Inc.) Yes No
 AUTO BACK WASH: ALL MANIFOLDED & SKID MOUNTED
 AUTO FLUSH MANIFOLD STRAINER Barrels 3 Mesh 60 MAX
 (FILMAT) Barrels _____ Mesh _____
 (AMIAD) Barrels 1 Mesh 60 MAX
 SAND MEDIA Barrels _____ Mesh _____
 INDIVIDUAL BARREL ISOLATION: Yes No

MANIFOLD AIR RELIEF: Yes No
 LOW FLOW BYPASS WITH ISOLATION: Yes No Size
 FLOW METER: Turbine Propeller Sensor
 FLOW METER 4/20 MA SIGNAL: Yes No
 DUAL FEED & BACKFLUSH: Yes No RELIEF VALVE
 STATION PRESSURE RECORDED DUAL PIN: Yes No
 STATION PRESSURE RECORDER ENCLOSURE: Yes No
 HYDRAULIC SUPPLY - DUAL FILTER: Yes No
 MOTOR NON-REVERSE RATCHET: Yes No
 PANEL & MOTOR SPACE HEATER: Yes No
 STATION LIGHTING PACKAGE: Yes No
 STATION HEATER: Yes No Size 5KW
 LAKE INLET SCREEN: Yes No Size 16"
 SCREEN CONSTRUCTION: STD SS EPOXY
 FERTILIZER INJECTOR FULL PROPORTIONAL: Yes No
 1" TAP WITH PLUG - DOWN STREAM OF CONTROL VALVE: Yes No
 SUPERVISION OF INSTALLATION: Yes No
 SUPERVISION OF START-UP: Yes No

OWNER TRAINING: Yes No

ADDITIONAL OWNER TRAINING: Yes No

OPERATION MANUALS: Yes No

FREIGHT: Yes No

THE FOLLOWING MANUFACTURERS ARE APPROVED BUT MUST MEET THE SPECIFICATIONS ABOVE:

- A. PUMPING SYSTEMS INC.
- B. FLOWTRONICS
- C. SYNCFLO

SPECIFIED AND APPROVED MATERIALS: YANKEE TRACE

IRRIGATION EQUIPMENT:	RAINBIRD <i>or Toro act</i>
MAIN LINE VALVES:	WATEROUS #500
MAIN LINE FITTINGS:	HARCO
MAIN LINE PIPE:	JM - CERTAINTEED
LATERAL LINE PIPE:	JM - CERTAINTEED
LATERAL LINE ISOLATION VALVES:	NIBCO - HAMMOND
VALVE BOXES:	AMETEK - BROOKS
SCH 40 PVC FITTINGS:	LASCO - DURA
SCH 80 PVC NIPPLES	AMS
SWING JOINTS:	LASCO - DURA
SOLVENT CEMENT/PRIMER:	IPS P-70 IPS 711
DRAIN VALVES:	ORISEAL
AIR RELIEF VALVES:	VALVMATIC 201 - C
PUMP STATION(3):	FLOWTRONICS PUMPING SYSTEMS, INC. SYNCROFLO
WIRE:	ARIZONA FABRICATIONS - REGENCY
COMMUNICATION CABLE:	ARIZONA FABRICATIONS - REGENCY
PUMP WATCH CABLE:	BELDEN
SPLICES:	SCOTCH 82 A1 - DBY
FILTRATION:	AMID SYNCROFLO

8.1.00 ENGINEERING SPECIFICATIONS

Montgomery County Sanitary Engineering

Specifications

SANITARY SEWER

MATERIAL SPECIFICATIONSGENERALSTANDARDS

All material furnished by the Contractor to be installed on the Project shall conform to the minimum requirements of the latest revisions of the standard specification of the described organizations, unless other requirements are stated in these specifications. The standard specifications are combined under a single caption, for the sake of brevity, whenever referred to in the specifications as follows":

American Society of Testing Materials	ASTM
American National Standards Institute	ANSI
American Water Works Association	AWWA
American Concrete Institute	ACI
American Association of the State Highway Officials	AASHO
Construction and Materials Specifications of the State of Ohio, Department of Transportation	OHIO CM
Federal Specifications	FED
American Railway Engineering Association	AREA
National Fire Protection Association	NFPA

INSPECTION AND TESTING

The manufacturer of the specific materials shall establish the necessary quality control and inspection practice to assure compliance with the individual specification outlined above for the particular material. The manufacturer shall, if required by these specifications, furnish a sworn statement that the inspection and all of the specified tests have been made and the results therefore comply with the requirements of the particular standard specified. Certified copies of such test results shall be furnished by the manufacturer if so stipulated in these specifications.

These material specifications also designate that some tests and inspection shall be performed by independent testing laboratories selected by the Owner on specific construction materials. The tests and inspections, as well as what party, either the Contractor or the Owner, shall pay the cost of such tests and inspections are designated in these specifications.

SAMPLES

The Contractor will be required to furnish, for the approval of the County, samples of any or all materials or equipment he proposes to use if the specifications require that they shall meet certain standards.

No material or equipment of which samples are required to be submitted for approval shall be used on the work until they have been approved by the County.

Samples of materials or equipment submitted for approval shall have a label indicating the material represented, its place of origin, and the name of the producer, the Contractor expecting to use the equipment and the work for which the material will be used. Samples of finished materials shall be marked to indicate where they are required by the drawings and specifications. Each delivery of samples shall be accompanied under separate cover by a letter, in duplicate, from the Contractor, containing a list of samples, as indication of where the materials are intended to be used and the brands of materials and names of the manufacturer.

Approval of any samples shall not be taken in itself to change or modify any specification requirement, for approval shall be only for the characteristics or for the use of the material. After a material has been approved, no change in brand or make will be permitted. Approved samples of hardware in good condition may be suitably marked for identification and later used in the work. Failure of any material to pass these specified tests will be sufficient cause for refusal to consider any further samples of the same brand of that material for use under these specifications. The County, whenever it may deem it necessary, may take test samples from the various materials or equipment delivered to the site of the work by the Contractor. If any such test sample fails to meet the specification requirements, any previous approvals will be withdrawn and such material or equipment shall be subject to removal and replacement by the Contractor with material or equipment meeting the specification requirements.

GRAVITY PIPE AND SERVICES

VITRIFIED CLAY GRAVITY PIPE AND FITTINGS

General

Vitrified clay sewer pipe and fittings shall be extra strength and conform to the requirements of ASTM C700 except for the revisions to Table I and Table II described in these specifications. The vitrified pipe may be glazed or unglazed.

Strength Requirements

The crushing strengths of extra strength clay pipe prescribed in Table I of ASTM C700, shall be increased to the following values.

Nominal Size Inches	Minimum Strength, Minimum in Pounds per Linear Foot Three Edge Bearing Method
4	2,000
6	2,400
8	2,400
10	2,400
12	2,750
15	3,150
18	3,200

Test specimens must meet the average strength requirements for both the Three Edge Bearing Method and the Sand Bearing Method, however, the Engineer may waive the requirements for one of the methods.

Dimensions

The schedule of dimensions for extra strength clay pipe in ASTM C700 (Table II) shall be replaced with the following schedule of dimensions:

Inside Dia. of Pipe - Inch	Min. Length Ft.	Max. Length Ft.	Limit of Minus Va. Per Ft. of Length-In.	Max. Diff. in Length of Two Opp. Sides-In.	Allowable Range Min. Inside Diameter of Pipe Barrel Max. Inches	Min. Inside Dia. of Socket 1/2 Above Base In.	Min. Depth of Socket In.	Min. Thickness of Barrel In.	Thickness of Socket 1/2" From Outer End Min. In.	Max. O. D. Spigot In.
4	4	6	1/4	3/8	3-7/8 4-1/8	6-1/4	2	9/16	7/16	5-9/16
6	4	6	1/4	3/8	5-13/16 6-3/16	8-9/16	2-1/2	11/16	1/2	7-13/16
8	5	6	1/4	7/16	7-3/4 8-1/4	10-7/8	2-3/4	13/16	5/8	10-1/8
10	5	6	1/4	7/16	9-3/4 10-1/4	13-1/4	2-3/4	1	3/4	12-1/2
12	5	6	1/4	7/16	11-11/16 12-5/16	15-11/16	3	1-1/8	7/8	14-15/16
15	5	7	1/4	1/2	14-11/16 15-5/16	19-1/2	3	1-1/2	1-3/16	18-11/16
18	5	7	1/4	1/2	17-9/16 18-7/16	23-3/16	3-1/4	1-7/8	1-7/16	22-7/16

Joints

The pipe joints for vitrified clay pipe shall conform to the requirements of ASTM Specifications C425 "Compression Joints for Vitrified Clay Bell-and-Spigot Pipe". Lubricants of the type recommended by the manufacturer of the pipe shall be used to assemble all the pipe joints".

Service Connections

Service connections to a vitrified clay sewer shall be made through vitrified "Wye" branches for eight inch (8") diameter sewer and "Tees" for ten inch (10") and large diameter sewer.

Each branch or tee shall be furnished with a vitrified clay stopper which shall be sealed and banded into the branch opening until the service line is installed. The stopper joint will be suitable to withstand an internal pressure of five (5) p.s.i. without leaking.

Testing and Inspection

The vitrified clay sewer pipe and fittings shall be tested and inspected by the Owner and by a competent independent testing company selected by the Owner. Pipe and fittings to be tested will be selected at the point of delivery.

All of the tests and inspections outlined in ASTM C700 shall be performed, except the acid resistance test. The procedure for testing clay pipe for crushing strength and absorption shall conform to the requirements of ASTM C301 using the minimum values of crushing strength outlined in these specifications. No less than 0.5 percent of the number pipe to be supplied in each size, but in no case less than two specimens, shall be selected by the inspector for the crushing test. One specimen of each pipe broken in the strength test shall be tested for absorption.

All pipe shall be subjected to visual inspection by the Owner on the project for size and dimension, straightness, blisters, and finish of ends. Pipe shall be rejected for any of the reasons outlined in the appropriate ASTM Specification. Revised Table II in these specifications shall be used for size and dimension.

The testing company shall submit three (3) certified copies of the inspection and testing report to the Engineer not later than fifteen (15) days after the inspections and tests were made.

The costs for the initial testing and inspections shall be paid by the Owner, but the Contractor shall pay all costs for re-testing, if the initial tests and inspections indicate that such re-testing is justified.

REINFORCED CONCRETE GRAVITY PIPE AND FITTINGS

General

Reinforced concrete sewer pipe and fittings shall conform in all respects to the requirements of ASTM Specifications C76, or where designs are not given in ASTM C76 the pipe shall meet the requirements of the Ohio Department of Transportation Construction and Material Specifications. Pipe manufactured according to these specifications shall be of five (5) classes, identified as Class I, Class II, Class III, Class IV, and Class V. The minimum wall thickness shall be Wall "B" as given in ASTM C76 for pipe sizes up to and including 84-inch diameter pipe, and Wall "A" as given in ASTM C76 for pipe sizes 90-inch diameter and larger.

Joints

The pipe joints for reinforced concrete pipe shall conform to ASTM Specification C443 "Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets". Lubricants and/or adhesives required for assembling the completed joint shall be supplied in sufficient quantities. The joint material shall be capable of supporting the superimposed loading without leakage.

Service Connections

Service connections to a reinforced concrete sewer shall be made through a Wye or Tee saddle of the appropriate service connection pipe which shall be securely cast into or on the reinforced concrete sewer at the point of manufacture.

Each Wye or Tee shall be furnished with a stopper which shall be sealed and banded into the branch opening until the service line is installed. The stopper joint shall be capable of withstanding an internal pressure of five (5) p.s.i. without leaking.

Testing and Inspection

The reinforced concrete sewer pipe and fittings shall be tested and inspected by the Owner and by a competent independent testing company selected by the Owner. Pipe and fittings to be tested will be selected at the point of delivery.

All of the tests and inspections outlined in ASTM C76, shall be performed by the inspector, except compression tests for concrete design strength. The compression strength may be required by the Owner. The procedure for testing the reinforced concrete sewer pipe for crushing strength and absorption shall conform to the requirements of ASTM C497. At least 0.5 percent of the number of pipe to be supplied in each size, but in no case less than two specimens, shall be selected by the inspector for the crushing test. One specimen of each pipe broken in the strength test shall be tested for absorption.

All pipe shall be subjected to visual inspection by the inspector on the project for size and dimension; fractures or cracks; defects that indicate imperfect proportioning, mixing, and molding; surface defects indicating honey-combed or open texture; or damaged ends where such damage would prevent making a satisfactory joint. The pipe shall be rejected for failure to pass the required tests or for any of the reasons outlined in "Inspection and Rejection" in ASTM C497.

The testing company shall submit three (3) certified copies of the inspection and testing report to the Engineer not later than fifteen (15) days after the inspection and tests were made.

The costs for the initial testing and inspections shall be paid by the Owner, but the Contractor shall pay all costs of re-testing, if the initial tests and inspections indicate that such re-testing is justified.

"SHORTS"

General

"Shorts" shall mean lengths of gravity pipe which are shorter than the standard full lengths produced. They must be available in lengths of four feet or less and each short shall have the same joints on each end of the pipe as utilized on full length pipe. The number of "shorts" supplied will be determined by the Engineer. "Shorts" shall be installed at the following typical places:

Adjacent to other structures,
Changes in the gradient of the original trench excavation,
Changes from rock excavation to earth excavation-
Providing the proper location of services,
Elsewhere, as directed by the Engineer.

Strength

The strength classification for the "shorts" shall be no less than the strength classification of pipe specified for the full length pipe in the respective spans.

GRAVITY SERVICE LINES

General

Sanitary sewer service pipe shall be vitrified clay, cement asbestos, or cast iron. This service pipe shall meet the other sections of these specifications covering the respective type of material and joints.

Service connections to a gravity pipe sewer main shall be made through a wye or tee in the sewer main. The wye or tee shall include such adapters as may be approved by the Engineer to provide connection to the service line.

Each wye or tee shall be furnished with a stopper which shall be sealed and banded into the branch opening until the service line is installed. The stopper joint will be suitable to withstand an internal pressure of five (5) p.s.i. without leaking.

PIPE CONNECTORS

Pipe connectors for joining one type of service pipe to another shall be the flexible coupling type manufactured from virgin poly vinyl chloride with #305 stainless steel bands. The connector shall be similar to or equal to the Fernco Joint Sealer Co., Ferndale, Michigan, Series 1001 through 1056.

MANHOLES

GENERAL

Manholes shall be watertight structures constructed by one of the following methods:

- Precast manhole bases, riser sections, cones and/or flat slab tops.
- Monolithic concrete (cast-in-place) bases, used in combination with precast riser sections, cones and/or flat slab tops.
- Monolithic concrete (cast-in-place)

The configuration of all manholes shall be as shown on the applicable standard drawings in these specifications.

BASES

Monolithic or precast manhole bases shall be constructed of concrete with a minimum compressive strength of 4,200 p.s.i. concrete.

All precast concrete manhole bases shall conform to the material provisions of ASTM Specification C473 "Precast Reinforced Concrete Manhole Sections". The bases shall be reinforced as shown on the applicable standard drawings in these specifications. The bottom invert of all pipe entering a precast base shall be at least three (3) inches above the top of the base slab so that the finished sewer channel may be installed and shaped. The installation of the final sewer channel may be done either in the field or at the point of fabrication of the precast base. The top of the precast base shall extend above the top of the main line pipe.

Where pipe 24-inch diameter or smaller enter manhole bases, the connection shall be made through a flexible watertight joint. Manhole bases for sewer pipe up to and including 18-inch diameter shall have a minimum inside diameter of four feet. Manhole bases for sewer pipe of 21-inch and 24-inch diameter shall have a minimum inside diameter of five feet.

Precast manhole bases for sewer pipes 27-inch through 33-inch in diameter shall have a minimum inside diameter of five feet and shall have precast holes in the base of sufficient size to allow installation of the pipe sewer with proper grouting of pipes with nonsrink grout.

Precast manhole bases for sewer pipe sized 36-inch through 48-inch diameter shall be tee sections with an integral 48-inch diameter riser. Changes in pipe size and/or alignment shall be made by installation of an eccentric reducer and a bend of the same diameter as the main line pipe installed on the high side and immediately adjacent to the manhole tee section.

Precast manhole bases for 54-inch diameter sewer pipe and larger shall be integrally cast tee sections with main line being largest size pipe and "tee" being an integrally cast 48-inch offset stub in line with the inside wall of the main line pipe at the springline. Changes in pipe size and/or alignment shall be made by installation of an eccentric reducer and a bend of the same diameter as main line pipe installed on the high side and immediately adjacent to the manhole tee sections.

CONES, RISERS AND TRANSITION SECTIONS

Monolithic concrete cones and risers shall be constructed of concrete with a minimum compressive strength of 4,200 p.s.i. concrete.

Transition sections used to change from a manhole base greater than four-feet in diameter shall be a minimum length of sixteen (16) inches. The transition sections shall be eccentric and shall be reinforced in accordance with the largest diameter of the transition section. Manhole steps shall be cast into the transition sections.

Precast manhole risers and cones shall conform to the requirements of ASTM C478. The riser sections shall be a minimum of 48-inches in diameter. The lengths of the riser sections shall be in increments of sixteen (16) inches. The cone sections may be eccentric or concentric and shall be a minimum of thirty-two (32) inches in length. The cone sections shall taper from a 48-inch diameter at the bottom to a minimum opening of 24-inches at the top. The wall thickness of the cone section shall be eight (8) inches thick around the opening at the top of the section. Manhole steps shall be cast into all riser and cone sections.

FLAT SLAB MANHOLE TOPS

When a manhole is too shallow to permit the use of a cone section a precast flat slab top shall be furnished. The flat slab top shall conform to the requirements of ASTM C478.

JOINTS

Joints between all precast manhole sections shall conform to the requirements of ASTM C443.

MANHOLE STEPS

"Manhole steps shall be made of aluminum alloy conforming to ASTM Designation B221, "Aluminum Alloy Extruded Bars, Rods, Shapes, and Tubes," Alloy 6061-T6. The steps shall be a minimum of three-quarter (3/4) inch square bars with two (2) non-skid grooves. The steps shall be spaced sixteen (16) inches apart, vertically. The steps shall be straight bars grouted into the wall of the manhole with non-shrinking grout."

CASTINGS

General

Castings for manhole cover assemblies shall be first quality gray iron or high strength semi-steel, in accordance with ASTM A48, Class 30. The compound materials shall produce a tough, gray metal, close and even grained, soft enough to permit drilling and machining and capable of showing indentations from a sharp blow of a hammer without flaking.

The castings shall be free from dirt, grease, sand, scale, or other foreign substances. After the castings have been inspected, they shall be thoroughly painted with one heavy, uniform coat of coal tar pitch varnish, or asphalt base paint.

All types of castings for manholes shall be approved by the Engineer prior to installation.

Standard Manhole Covers and Frames

The standard manhole covers and frames shall be manufactured to the dimensions and weights shown on the standard drawings of these specifications. Variation of one-eighth (1/8) of an inch will be allowed on the standard dimensions, except that the thickness of metal shall not be less than one-sixteenth (1/16) of an inch from that specified. The manhole cover and frame shall not weigh less than ninety-five (95) percent of the estimated weights shown on the drawings. Standard covers without ventilating holes shall be furnished with a notch for a pick.

Four (4) ventilation holes, one (1) inch in diameter, shall be located in the manhole cover as shown on the standard drawings. Twenty-five (25) percent of the manhole covers supplied for each project shall be of the non-ventilating type (without ventilation holes) and shall be installed in the locations directed by the Engineer. Standard covers without ventilating holes, shall be furnished with a notch or hole to make removal of the cover easy with a pick.

All manhole covers, seating frames, and adapter rings shall be machined to a firm and even bearing and fit truly into the frames.

The manufacturer's name shall be cast upon the manhole covers and frames in one (1) inch letters, one-eighth (1/8) inch in relief.

Watertight Manhole Covers and Frames

Watertight manhole covers shall be supplied with four (4) three-quarters (3/4) inch hexagonal silicon bronze cap screws and washers and a one-quarter (1/4) inch flat rubber gasket. The manhole cover shall be a solid type with countersunk holes for the cap screws.

The watertight manhole frames and covers shall conform to the weight and dimension tolerances, machining, and manufacturer's name as set forth above for Standard Manhole Covers and Frames.

CONCRETE

PORTLAND CEMENT

Portland Cement for concrete, mortar or grout shall be of the type specified and shall conform in all respects with ASTM C150, "Portland Cement". If no type is specified, then Type II shall be used.

PORTLAND CEMENT, AIR-ENTRAINING

Air-entraining Portland Cement shall be of the type specified and shall conform in all respects with ASTM C175, "Air-Entraining Portland Cement". If no type is specified, then Type II-A shall be used.

CONCRETE AGGREGATE

Fine and coarse aggregate for Portland Cement shall conform with ASTM C33, for "Concrete Aggregates".

FINE AGGREGATE (or sand)

Fine aggregate for Portland Cement Concrete shall conform with ASTM C33, for "Fine Aggregate for Portland Cement Concrete".

COARSE AGGREGATE

Coarse aggregate for Portland Cement Concrete shall conform with ASTM C33, for "Coarse Aggregate for Portland Cement Concrete". The coarse aggregate shall be graded in accordance with the requirements of Size 57, in Table II of ASTM C33.

WATER

Water for washing aggregate and for mixing and curing concrete shall be clean, free from oil, acid, alkalies, (organic) vegetable matter, or other deleterious substances. Salt or sea water, or water containing an excessive amount of sodium sulphate, magnesium sulphate, sodium chloride, or magnesium chloride shall not be used.

PORTLAND CEMENT CONCRETE

Portland Cement Concrete shall be composed of Portland Cement, fine and coarse aggregates and water proportioned and mixed as required to produce a smooth, workable mixture and shall be designated by classes according to compressive strength. It shall have a minimum ultimate compressive strength for each class, as determined by testing 6" x 12" cylinder samples of the concrete in accordance with the requirements of ASTM C39, "Standard Method of Test for Compressive Strength of Molded Concrete Cylinders". Compression tests will be required of all pours in excess of five (5) cubic yards of Class "A" Concrete. Each test will consist of four (4) cylinders. Two cylinders shall be tested after seven (7) days and two (2) cylinders after twenty-eight (28) days. A certified copy of the results of all cylinder compression tests shall be furnished to the Engineer. The costs of the compression tests shall be at the Contractor's expense.

JOB-MIXED CONCRETE

Except for small quantities, concrete mixed on the job shall conform with ACI-614, "Recommended Practice for Measuring, Mixing, and Placing Concrete". The design of job-mixed concrete shall be approved by the Engineer.

READY-MIXED CONCRETE

Ready-mixed concrete shall conform with ASTM C94, "Ready-Mixed Concrete".

STRENGTH

All concrete shall have a twenty-eight (28) day compressive strength of 4,200 pounds per square inch, and is intended for structures designed for strength and impermeability.

PIPE BEDDING

A cradle of aggregate shall be furnished for all gravity sewer pipe and shall conform to size No. 7 of Ohio - CM Table 703-1, Size of Coarse Aggregate, AASHTO M-43. It may consist of crushed stone, crushed air cooled blast furnace slag or gravel. The aggregate shall be furnished with not less than ninety-five (95) percent passing a one-half (1/2) inch screen and not less than ninety-five (95) percent retained on a number eight screen.

GRAVEL TRENCH BACKFILL

Gravel used for backfill shall consist of gravel having durable particles and shall conform to grading A of Ohio - CM Item 310.02 materials except that none shall pass a No. 200 sieve. The gravel shall be graded from fine to coarse in a reasonably uniform combination with no boulders or stones larger than two and one-half (2-1/2) inches in size. It shall be free from slag, cinders, ashes, refuse or other deleterious or objectionable materials and shall be approved by the Engineer.

CONCRETE ENCASEMENT AND CRADLES

The concrete used for encasement and cradles shall have a minimum twenty-eight (28) day compressive strength of 4,200 p.s.i. and meet all of the requirements of section 2.6.0 - "Concrete" of these specifications.

CONCRETE REINFORCEMENT

All steel bars and wire used for reinforcement of concrete shall be of the shape, weights, and sizes shown on the construction drawings and shall conform to the following applicable specifications:

- ASTM A15 - Billet Steel Concrete Reinforcement Bars
- ASTM A16 - Rail Steel Concrete Reinforcement Bars
- ASTM A160 - Axle Steel Concrete Reinforcement Bars
- ASTM A185 - Welded Steel Wire Fabric for Concrete Reinforcement
- ASTM A305 - Minimum Requirements for the Deformations of Deformed Steel Bars for Concrete Reinforcement

All shaped bars shall be shop bent, and no structural grade steel shall be used.

The Contractor shall furnish the certified test results of one (1) bending test and one (1) tensile test for each ten (10) tons of reinforcing steel supplied to the project. No reinforcement bars shall be permitted to be placed until the Engineer has approved the test reports. The cost of the tests shall be at the Contractor's expense.

GROUT AND MORTAR

Grout and Mortar for sealing around pressure pipe lines passing through walls, gravity pipelines passing through manholes, sealing cover pipes and liner plates, pipe joints, concrete block laying, plastering

and grouting shall be mixed in a suitable mixer or in a watertight mixing box. The materials must be thoroughly mixed dry until the mass assumes a uniform color and then sufficient water added to bring the mixture to a workable consistency. No mortar or grout which has begun to set (or has been mixed for over one-half hour) shall be used, and the tempering thereof will not be permitted. Materials shall be as specified and shall be mixed in the proportions by volume of one (1) part cement to one and one-half (1-1/2) parts sand.

Grout and Mortar shall consist of the following materials:

- | | |
|---------------------|--|
| a. Fine Aggregate | Fine aggregate shall conform to Ohio Department of Transportation, Construction and Material Specification Section 703.03. |
| b. Coarse Aggregate | Coarse aggregate shall conform to Ohio Department of Transportation, Construction and Material Specification Section 702.02, Size Number 89. |
| c. Portland Cement | Portland cement shall conform to Ohio Department of Transportation, Construction, and Material Specification Section 701.04. |
| d. Admixture | An admixture equal to "Embico", as manufactured by Master Builders, to prevent shrinking of the grout shall be added according to the manufacturer's instructions. |
| . Strength | The grout shall have a minimum twenty-eight (28) days compressive strength of 2,500 p.s.i. |

CONSTRUCTION METHODS AND UNITS

GENERAL

The intent of the Plans and these Specifications is to prescribe a complete work or improvement which the Contractor undertakes to do, in full compliance with the Plans, these Specifications, the Special Provisions, Proposal and Contract. They are to be cooperative and what is called for by either is as binding as if called for by both. Should any misunderstanding arise as to the intent or meaning of the work described the quantities on the Plans shall control. The unit price on an item shall be used to determine the amount paid on a revised quantity.

The Contractor shall perform all items of work covered and stipulated in the Proposal and perform altered and extra work, all in accordance with the lines, grades, typical cross sections, and dimensions shown on the Plans, and shall furnish, unless otherwise provided in the Special Provisions or in the Contract, all materials, implements, machinery, equipment, tools, supplies, transportation and labor necessary to the prosecution of The Work.

EXCAVATION AND BACKFILL FOR BURIED PIPELINES

General

The Contractor shall furnish all labor, materials, and equipment for the excavation and backfilling of pipe trenches, manholes, and other structures as shown on the construction drawings, standard drawings and specified on the proposal sheets. This item of work includes trench excavation, other than rock; disposal of excavated material; sheeting and shoring; disposal of surface and ground water; protection of existing streets and structures; pipe embedment; trench backfill; the maintenance of streets, driveways, sidewalks, curbs and gutter; reseeding and re-sodding; removal of trees; restoration of agricultural land; and the maintenance of the construction area during progress of the work and the complete restoration of the construction area to its original condition at the completion of the work. The construction area is the site of all the actual phases of the work described including delivery and storing of material and all vehicular traffic related thereto. The construction area shall be confined to the limits of the public right-of-way in streets and the limits of the construction easements on private property as set forth by the Owner.

Pipe lines trenches shall be excavated so that the pipes and appurtenances can be installed to the alignments and grades required. Two types of excavation and backfill are specified. The two classifications are "Excavate and use the excavated material as trench backfill" and "Excavate dispose of excavated material, and backfill with gravel".

Pipe line trenches within dedicated right-of-way and in all types of roadways, drives and parking areas shall be backfilled with gravel. Pipeline trenches within areas to be restored with sod or seed shall be backfilled with top soil at the top of the trench for a minimum of six (6) inches.

The proposal sheets and/or construction drawings indicate trenches which shall be completely backfilled with an approved type gravel. In these cases, the excavated material shall be disposed of directly from the equipment excavating the trench into appropriate type carriers which will transport the excavated material from the site of the construction. The street surface will be brushed and cleaned during the construction period so that excess material is immediately removed as it drops from the construction trucks and equipment. The Contractor shall exercise extreme care to protect the existing street surface and base adjacent to the open trench excavation from failures due to the loads of the construction trucks and equipment.

It will be the Contractor's responsibility to dispose of all the excavated material when trenches are completely backfilled with gravel unless the plans or the specifications show or direct otherwise.

When excavated material is to be used as trench backfill, the excavated material shall be placed so that free access may be had at any time to all parts of the work. The excavated material shall be contained within the working easement.

_____ Open Excavation

The amount of excavation open at any one time will be controlled by the working conditions, but shall always be confined to the limits prescribed by the Engineer. In the case of excavations to determine the location of underground utilities the excavation shall be backfilled before the end of the working day on which it is begun. All excavation shall be completely backfilled at all times where a delay in the progress of the work is expected to or actually does exceed three (3) calendar days. Excavation openings having time stipulations because of traffic or other conditions shall be shown on the plans.

_____ Sheeting and Shoring

The Contractor shall furnish, put in place, and maintain such piling, sheeting, bracing, etc., as is required by the Industrial Commission of the Department of Industrial Relations, State of Ohio, in their Bulletin #202, #IC-3, "Specific Safety Requirements Relating to Building and Construction Work," as revised.

Such piling, sheeting, bracing, etc., shall be furnished, put in place, and maintained as may be required to support the sides of all excavation to prevent any movement which could cause injury to person,

structures, utilities or property, either public or private or any portion of the work being performed under this contract. Trench widths shall not be reduced when such reduction will cause injury to/or delay the work. Trench width shall be wide enough to provide a minimum of four (4) inches between the bell of the pipe and the sheeting or side of trench and to permit adequate backfilling.

Trench sheeting, if required, shall remain in place until the pipe has been laid, tested for defects and repaired if necessary, and the backfill compacted to a depth of two (2) feet over the top of the pipe.

The Contractor shall leave in place any and all sheeting, bracing, etc., which the Engineer may direct him, in writing, to leave in place at any time during the progress of the work for the purpose of preventing injury to structures, utilities or property, either public or private. He shall be paid for all timber used for sheeting, bracing, etc., in this category as provided under "Changes in Work, Extra Work, or Damages to the Contractor," or by unit price quoted for this item, if so stated on the proposal sheet.

Disposal of Ground and Surface Water

The Contractor shall provide at all times during the construction, proper and approved equipment including pumps and well points of sufficient capacity to meet the maximum requirements for the removal of water and like wastes from all excavations. The disposal of the water and wastes shall be in such a manner as not to interfere with the proper construction of pipe lines or masonry. This disposal shall not withdraw sand or cement from concrete work or affect the prosecution of work under his own or adjacent contracts.

The Contractor shall not dispose of ground and/or surface water into existing sanitary sewers. The newly constructed sanitary sewers may be used as a collector for ground water if a plug is installed to keep the ground water from entering the existing sanitary sewer system. The plug shall be furnished by the Contractor and installed under the supervision of the Engineer. Use of this method for ground water disposal does not relieve the Contractor of any responsibility for the sanitary sewer including cleaning.

Pumping sumps shall be excavated outside the trench or structure excavation lines and be of sufficient size to meet the requirements of the location. The Contractor shall pump out or otherwise remove and dispose of, as fast as it may collect any water or like wastes which may be found or may accumulate in the excavations. Underdrains, if required to keep the excavations dry, shall lead to pumping sumps.

All excavations must be kept dry as specified for laying pipe or for placing concrete.

Rock Excavation

Rock excavation is defined as material which is either solid or stratified and which cannot be removed by recognized standard excavating methods. This material will require drilling, blasting, or some other mechanical means of shattering. Boulders one (1) cubic yard and over in volume required to be removed are classified as rock excavation. Loam, sand, gravel, clay or other material will not be classified as rock excavation even though portions of it may be stratified or laminated, or may be as hard as portions of sandstone or limestone. No excavated rock shall be used for backfill for any trench excavation.

The Contractor shall excavate by blasting only with the approval of the Engineer and shall exercise all possible care to avoid injury to persons and adjacent property. The rock shall be well covered and sufficient warning shall be given to all persons in the vicinity of the work before blasting. Proper care shall be exercised to avoid injury to water pipes or other structures either below or above ground. Caps or other exploders shall not be kept in the same place in which dynamite or other explosives are stored. All Federal, State, or local regulations covering the use of explosives shall be strictly observed; and in addition, the Contractor shall conform to any further regulations which the Engineer may deem necessary in this respect.

All structures, pipe lines, water mains, conduits, etc., below and above ground that are damaged due to blasting of rock are to be replaced or repaired by the Contractor at his expense and to the satisfaction of the Engineer.

Rock excavation shall be to the depth required to provide a minimum of four (4) inches of clearance below all parts of the pipe, valves, or fittings. The Contractor shall provide pipe bedding to the required grade with fine granular material in rock excavation. Trench widths in rock excavations shall be eight (8) inches wider than the outside diameter of the bell of the pipe. Any excavations and backfill beyond these limits will be at the expense of the Contractor.

The quantity of rock excavation to be paid for shall be the number of lineal feet of ledge rock or boulders in place as measured by the Engineer, along the center line of the pipe before excavation, that are required to be removed to meet the specified depth and width limitations. No extra allowance shall be made for additional rock excavation around manholes, valves, or other appurtenances in the water or sewer line. The payment shall include the removal of the rock, the required material for pipe bedding, and trench backfill, and the disposal of all excavated rock into spoil banks, or other approved locations. Rock excavation shall be paid as an additional item and not included in the quantities calculated for payment of trench excavation and disposal of trench excavation and backfill for sewer or water mains.

Existing Facilities

Attention is directed to the sections of the General Provisions of these Contract Documents with respect to use of and protection of all existing facilities and structures both private and public.

Tunneling under existing curbs, sidewalks or driveways shall not be permitted.

CONSTRUCTION METHODS FOR GRAVITY PIPE

General

The Contractor shall furnish all labor equipment, and materials necessary to properly construct and test the gravity pipes, manholes, and all other gravity line appurtenances and connections. The location, material, and size of the gravity lines, manholes, and other structures are shown on the construction drawings or as specified herein. The estimated quantities of construction units are tabulated on the proposal sheets.

Handling Gravity Pipe

Gravity pipe shall be protected during shipping, unloading, and installation against impact, shocks, and free fall. Lifting hooks or other handling devices which may damage the sealing surfaces of the pipe shall not be used.

Backfill and Preparation of Trench

Trench Depth - Gravity pipe trench excavation shall follow lines parallel to grade lines set by the Engineer at a predetermined location from the centerline of the pipe agreed on between the Contractor and the Engineer. Angle points, intersection points, and manholes shall be staked on the pipe centerline by the Engineer.

The Engineer shall place grade stakes at approximately twenty-five (25) foot intervals on the offset lines for gravity pipe construction. The vertical distance between the top of the grade stake, as set, and the invert of the gravity pipe at the station of the grade stake will be placed on the grade stake. The Contractor shall excavate the gravity pipe trench below the invert line in conformity with the following table for various size pipes:

Gravity Pipe Dia. Inches	Depth of Excavation Below Invert Line	
	Inches	Feet
8 - 10	4	0.33
12 - 15 - 18	5	0.42
21 - 24 - 27	6	0.50
30 - 33 - 36	8	0.67
42 - 48	9	0.75

For gravity pipe sizes in excess of 48-inches in diameter, the trench depth will be shown on the construction drawings.

If, in the opinion of the Engineer, the material at or below the normal grade of the bottom of the trench, or other excavation is unsuitable for foundation, it shall be removed to such depths and widths as he may direct and be replaced by the Contractor with gravel, crushed stone or other acceptable materials.

Trench Width - Gravity pipe trenches shall generally be excavated with sides corresponding to parallel, vertical planes, and with a trench width wide enough to provide a minimum clearance of four (4) inches between the bell of the pipe and the sheeting or side of trench. Sewer pipe trenches may be sloped above the top of the pipe to prevent the banks from caving, if sheeting is not required for surface and easement conditions.

Bedding - A cradle of granular bedding material, as specified in Section "Pipe Bedding" shall be furnished for all gravity pipe. The Contractor shall place, compact and shape the pipe cradle for embedding and supporting the pipe barrel. The pipe shall be placed to the invert grade and the bedding material thoroughly compacted by hand tamping up to the spring line of the pipe in layers not to exceed three (3) inches. Bedding shall extend laterally to the limits of the trench width and to the specified depth.

Backfill - The backfill material from the top of the sewer pipe cradle, springline of the pipe, to a point one (1) foot above the top of the pipe shall consist of gravel backfill as specified in Section "Gravel Trench Backfill" of these specifications. The backfill shall be compacted by hand or mechanical means. The Contractor shall use special care in placing this portion of the backfill so as to avoid injuring or moving the pipe.

Where an approved gravel backfill is required care shall be taken to secure adequate compaction of the backfill material from one (1) foot above the pipe to the street or shoulder grade (or subgrade of pavement).

When excavated material is permitted for backfill from one (1) foot above the top of the pipe to the top of the trench. Care shall be taken to carry the backfill up evenly compacted in the trench. The backfill shall be mounded over the top of the trench to a sufficient height to allow for settlement to grade consolidation.

The Engineer reserves the right to condemn any portion of the work during the term of this contract, should any gravel backfilled trench settle or any other evidence so indicate that the backfill has been improperly placed. The Contractor will be ordered to reopen the trench at those locations and replace the backfill in the proper manner without additional compensation.

The Contractor shall provide and maintain temporary access to all properties to which such access was interrupted by the excavation and backfill construction.

Installing Gravity Pipe

The Contractor shall visually check each sewer pipe for damage and defects before the pipe is lowered into the trench. Defective or damaged pipe or jointing material shall be rejected and removed from the site of construction.

All sewer pipe shall be laid in a finished trench commencing at the low point with the spigot ends pointing in the direction of flow. The sewer pipe shall be placed on a dry, stable bedding material shaped to support the barrel and provide clearance for the bell of the pipe. The

pipe embedment on the trench bottom shall be properly graded to provide a continuous barrel support for the full length of the pipe, and form a straight sewer with a uniform grade true to the established line and grade.

Adequate mechanical means shall be provided to insure that the pipe shall not move after the joint is completed.

As soon as possible after the joint is made, the balance of the bedding material shall be placed up to the spring line of the pipe to offset conditions that might tend to move the pipe off from line or grade. Disturbing the pipe in any manner, after the joints have been made, shall not be permitted.

Nonreinforced sewer pipes connecting to manholes or other rigid structures shall not extend beyond the wall of the manhole or structure more than approximately three (3) feet. Short sections of pipe shall be used at these locations:

Line and grade for the sewer shall be established by the Contractor by the use of batter boards, grade strings, plumb lines, and grade rods. The batter boards shall be placed at each station set by the Engineer. Three (3) consecutive batter boards shall be in place at all times. Laser equipment shall be used only under the express permission of the Engineer. Grade shall be checked within fifty (50) feet of the manholes and at each manhole.

_____ Concrete Encasement for Gravity Pipe

Sewer pipes shall be encased in 4,200 p.s.i. concrete at the locations shown on the construction drawings. The trench shall be excavated only as wide and as deep as required to provide a six (6) inch layer of concrete between the wall of the pipe and the sides and bottom of the trench. No other bedding is required when concrete encasement is required. The depth of concrete over the pipe will be as shown on the construction drawing. The construction drawings shall show the locations, lengths, sizes, and numbers of reinforcing bars required.

_____ Flushing, Cleaning and Check for Alignment

The Contractor shall clean out the completed sanitary sewer of all sand, gravel, stones, or other debris. The flushing method may be used for cleaning the sewer if water is available with sufficient velocity to transport the materials between manholes. If flushing is used, only one span of sewer shall be cleaned at a time with adequate screens placed in the downstream manhole to prevent any solids from entering the sewer downstream for the section being cleaned. Particular care shall be taken at the location where a connection is made to an existing system to prevent any foreign material from entering an operating sewer. The outlet for a new sanitary sewer shall be plugged at the time the connec-

tion is made into the existing sewer and shall be securely maintained until the new sewer has been cleared, tested and accepted by the Owner.

The Contractor and the Inspector will then check the sewer between manholes for alignment by means of lamps and/or mirrors. If the illuminated interior of the pipe shows any misalignment, displaced pipe, or any other defects, the defects, designated by the Inspector shall be remedied by the Contractor.

Tests for Gravity Pipe Leakage

The Contractor shall furnish all labor, equipment, and materials, which are required to test the sections of the sanitary sewer for tightness. Either the infiltration test, the hydrostatic test, or the air test* may be accepted by the Engineer. All tests shall be conducted under the supervision of the Engineer or his representative. All sanitary service laterals shall be installed and tested as part of the main line sewer test.

The Contractor shall determine the locations where excess water is entering or leaving sewer and where air is leaving the sewer, if the amount of leakage exceeds the allowable in the infiltration test, the drop in water level, exceeds the value in the table on the hydrostatic test or the drop in air pressure exceeds the value in the table on the air test. The sanitary sewer and/or manholes shall be repaired and retested until the leakage of the system is within the allowable limits as specified.

Infiltration/Exfiltration Test

The infiltration test shall be made by installing a weir or other measuring device approved by the Engineer in the lower end of the sewer section to be tested. The incoming sewer or sewers in the upper end of the test section shall be securely sealed. The quantity of ground water infiltrating into the test section shall be measured. The allowable leakage for sanitary sewers shall not exceed two hundred (200) gallons per day per mile of pipe per inch of sewer diameter.

The infiltration test generally will be conducted on the portion of the sewage collection system when the ground water table is above the elevation of the sanitary sewer.

Hydrostatic/Exfiltration Test

The hydrostatic test or exfiltration test shall be conducted between two (2) successive manholes. The lower end of the sewer and all inlet sewers of the upper manhole shall be sealed with pipe stoppers. The span of sewer to be tested shall be filled with water to a point four (4) feet above the invert of the upper manhole, or the outside water table,

* If the air test is used, the National Clay Pipe Institute air test tables shall prevail.

Maximum allowable drop in inches in 20 minutes in 4' Diameter Manhole

Diameter	50'	100'	150'	200'	250'	300'	350'	400'	450'	500'
4"					1/16"					1/8"
8"		1/16"		1/8"	1/8"	3/16"		3/16"		1/4"
10"		1/16"		1/8"	3/16"	3/16"		1/4"		5/16"
12"		1/8"		3/16"	3/16"	1/4"		5/16"		3/8"
15"		1/8"	3/16"	1/4"	1/4"	5/16"		7/16"	9/16"	1/2"
18"		1/8"	3/16"	1/4"	5/16"	3/8"	7/16"	1/2"		5/8"
21"		3/16"		5/16"	3/8"	7/16"		9/16"		11/16"
24"		1/4"		5/16"	3/8"	7/16"		5/8"		3/4"
27"		3/16"		5/16"	7/16"	1/2"		11/16"		7/8"
30"		3/16"	5/16"	7/16"	1/2"	5/8"		13/16"		1"
33"		1/4"		7/16"	9/16"	11/16"		15/16"		1-1/8"
36"		1/4"	3/8"	1/2"	5/8"	3/4"		1"		1-1/4"
42"		1/4"	3/8"	1/2"	11/16"	13/16"		1-1/16"		1-3/8"
48"	3/16"	5/16"	1/2"	5/8"	13/16"	1"	1-1/8"	1-5/16"	1-7/16"	1-5/8"
54"	3/16"	3/8"	9/16"	11/16"	7/8"	1-1/16"	1-1/4"	1-3/8"	1-9/16"	1-3/4"
60"	3/16"	3/8"	5/8"	13/16"	1"	1-3/16"	1-3/8"	1-5/8"	1-13/16"	2"

whichever is higher. The water shall stand in the pipe and manhole so that allowable absorption can take place, if the concrete in the manhole or sewer is dry.

The hydrostatic test shall be conducted over a twenty (20) minute period. Water for testing shall be supplied by the Contractor.

The elevation of the level of the water in the manhole and the drop in the level of the water in the upper manhole shall be carefully measured during the twenty minutes duration of the test. The maximum allowable drop, measured in inches, in a four (4) foot internal diameter manhole during the twenty (20) minute period shall not exceed that shown in the following table for the size sewer and length of span. The table shall be used for a difference in elevation between the invert of the closed sewer in the lower manhole and the surface of the water in the upper manhole up to and including eight (8) feet. If the total head exceeds eight (8) feet, the allowable drop shall be increased ten (10) percent for each two (2) foot increment in excess of eight (8) feet. The allowable leakage measurement for a span of sewer is between the standard spans indicated on the table:

Television Inspection

The Engineer may require a television inspection of the sewer for locating irregularities or incorrect installation of the lines. This television inspection may be required even though the project has passed all of the preceding inspections.

GRAVITY SERVICE LINES

General

House service connections to main line sewers shall not be installed until their location has been indicated or approved by the Engineer, and the Contractor has accurately measured and recorded the distance from the centerline of the service to the centerline of downstream manhole and obtained the necessary permits.

Sanitary sewer service pipe shall be vitrified clay, cement-asbestos or cast iron pipe. The service pipe shall meet the specifications for this type of materials and shall use the same type of joints as on the sewer lines. However, no laterals shall be installed until the Engineer has given the depth and location of the upper end.

House service connections to an asbestos-cement sewer line shall be made through a cast iron "cut-in" 45 degree or 90 degree branch connection. The "cut-in" piece shall be installed on the asbestos-cement sewer in the manner described in the manufacturers' specifications DS, Series 370, or latest revisions thereto. The upper end of the completed service shall be sealed with an asbestos plug.

Service lines shall begin at the wye or other special fitting in the main sewer line and terminate one (1) foot inside the property line with the upper end completely sealed with a vitrified stopper. Connections to the main line sewer at other than a wye or special fitting shall be approved by the Engineer and made only by the Owner's trained personnel. The Contractor shall pay the Owner for each connection at the Owner's current rate on file at the Sanitary Department office. The lateral invert at the upper end shall meet property topographic conditions. The slope toward the main sewer line shall be two percent (2%). If necessary, because of the depth of the main sewer line a bend may be installed in the lateral in order to turn it down to meet the wye or the connection in the main sewer and to eliminate excessive excavation.

Gravity service pipe shall be installed and tested in accordance with the "Construction Methods for Gravity Pipe" section of these specifications. If the service line is within a dedicated right-of-way, roadway, drive or parking area the excavated material shall be disposed of and the trench backfilled with approved type gravel.

The Contractor shall set a Y-pole above the upper end of each service line or riser, if services are not included in the contract, which shall extend above the backfilling. After they have been located by the Engineer, the Contractor shall cut them off to a point immediately below finished grade. The Contractor shall be responsible for maintaining the proper location of all poles during the backfilling process and any pole disturbed during this process shall be replaced in its proper location.

Pipe Connectors

Extension of the sewer service line from its termination point to a point of connection with the house or building sanitary lateral shall be joined together by a flexible coupling manufactured from virgin poly vinyl chloride with #305 stainless steel bands. The connector shall be similar or equal to the Fernco Joint Sealer Co., Ferndale, Michigan, Series 1001 through 1056.

MANHOLES

GENERAL

Sanitary sewer manholes shall be watertight structures of the monolithic concrete or precast concrete type. The materials, size, form, and dimensions are shown on the standard drawings and/or specified herein. Special manhole structures are described on the construction drawings. The type of manhole shall be approved by the Engineer prior to construction if not specified in these documents or shown on the construction drawings.

The manholes shall be installed at the locations and elevations as shown on the construction drawings unless directed otherwise by the Engineer. All incoming and outgoing sewer lines shall be an extension of the alignment of those lines in the manhole base.

The cost of any additional excavation including rock excavation, or backfill, including gravel backfill, for manhole construction over the pipe trench requirements shall be included in the unit cost of the manhole.

MANHOLE BASES

Changes of direction of flow within the manhole shall be made with a channel with as long a radius as possible. All incoming pipelines into a manhole shall discharge into the outgoing pipeline through channels formed in such a manner as to prevent flow turbulence.

The flow channel shall be constructed within the precast base using 4,000 p.s.i. concrete.

The flow channel shall conform to the configurations shown in the standard drawings of these specifications. The upper portion of the channel shall be constructed with sloping sides so that the width of the channel at the walkway is one (1) inch larger than the inside diameter of the sewer pipe. The walkway around the channel shall be at the elevation of the crown of the mainline gravity pipeline at the channel edge and slope up and away from the channel at one (1) inch per foot.

When pipelines of different sizes enter and leave a manhole, the channel cross section shall vary uniformly to provide a smooth transition from inlet to outlet.

Care shall be taken to prevent any possible bond between the concrete channel and a sewer pipe connected to the manhole base through a flexible rubber joint in order to preserve full flexibility of the joint.

All gravity pipelines, 24-inch diameter and smaller, shall connect to precast manhole bases with a flexible watertight joint. This joint shall be installed in the field according to the instructions of the manufacturer of the joint material. Grouting around the pipe entering the manhole base to prevent leakage of the joint shall not be permitted.

Precast bases for gravity pipelines 33-inch diameter and smaller shall be installed level and true to established line and grade on a six (6) inch layer of thoroughly compacted bedding material. The bedding material shall be properly shaped to provide continuous bearing and support for the bottom slab of the precast base.

Precast bases for gravity pipelines 36-inch diameter and larger shall be tee sections installed on a concrete foundation. The tee section shall be securely blocked and braced true to established horizontal and vertical alignment while the concrete foundation is poured in place. The concrete foundation shall extend a minimum of eight (8) inches beneath the lowermost dimension of the tee section.

The initial backfill for all precast manhole bases shall be gravel thoroughly compacted by hand tamping and extending laterally to the outermost limits of the trench. Initial backfill shall extend from the trench bottom, bedding material or concrete foundation upward to within one (1) inch of the uppermost limit of the precast base or tee section.

MANHOLE CONES, RISERS, AND TRANSITION SECTIONS

The cone sections shall be either eccentric or concentric unless specifically specified on the construction drawings.

Riser and cone sections shall not be installed on tee sections for a minimum of forty-eight (48) hours after the concrete foundation has been placed.

Riser and cone sections shall not be installed on precast bases or tee sections until the initial backfill has been placed.

Care shall be taken to insure that the balance of the backfill material be brought-up evenly around the riser and cone sections to prevent movement or misalignment of these manhole components.

Non-shrinking grout shall be used in filling any lifting or handling holes in precast bases, risers or cones.

MANHOLE TOPS

The tops of manholes shall be finished with a minimum of two (2) courses of mortared concrete brick, so that the top of the casting will be at the precast or concrete adjusting ring. On agricultural land the top of the manhole shall be as shown on the construction drawings or as required by the Engineer.

MANHOLE STEPS

Manhole steps shall be set into the monolithic concrete manholes in a vertical alignment spaced sixteen (16) inches apart as shown on the standard drawing.

Manhole steps in precast manhole risers and barrels shall be furnished with those manholes in the manner described in ASTM C478.

CASTINGS

General

The manhole frames and covers shall be of the type specified and shown on the standard drawings. The frames shall be centered accurately on the top of the manhole. Care shall be exercised during the backfilling operation so that the casting remains in position.

Standard Manhole Covers and Frames

The standard ventilated cover will normally be supplied in areas not affected by flood waters. Twenty-five (25) percent of the manhole covers shall be of the non-ventilating type and shall be installed in the locations directed by the Engineer.

Watertight Manhole Covers and Frames

The locations of watertight manhole structures are shown on the construction drawings. Watertight manhole frames shall be firmly connected directly to the concrete of the manhole with four (4) one-half inch anchor bolts as shown on the standard drawing. Concrete bricks shall not be used on watertight manholes. The anchor bolts and sleeves shall be inserted into the fresh concrete on monolithic manholes. Precast manhole cone sections or flat slab top sections shall be furnished with the four (4) anchor bolts and sleeves cast in place.

Non-shrinking grout shall be used in filling any lifting or handling holes in precast bases, risers or cones.

MANHOLE TOPS

The tops of manholes shall be finished with a minimum of two (2) courses of mortared concrete brick, so that the top of the casting will be at the precast or concrete adjusting ring. On agricultural land the top of the manhole shall be as shown on the construction drawings or as required by the Engineer.

MANHOLE STEPS

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CASTINGS

General

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Standard Manhole Covers and Frames

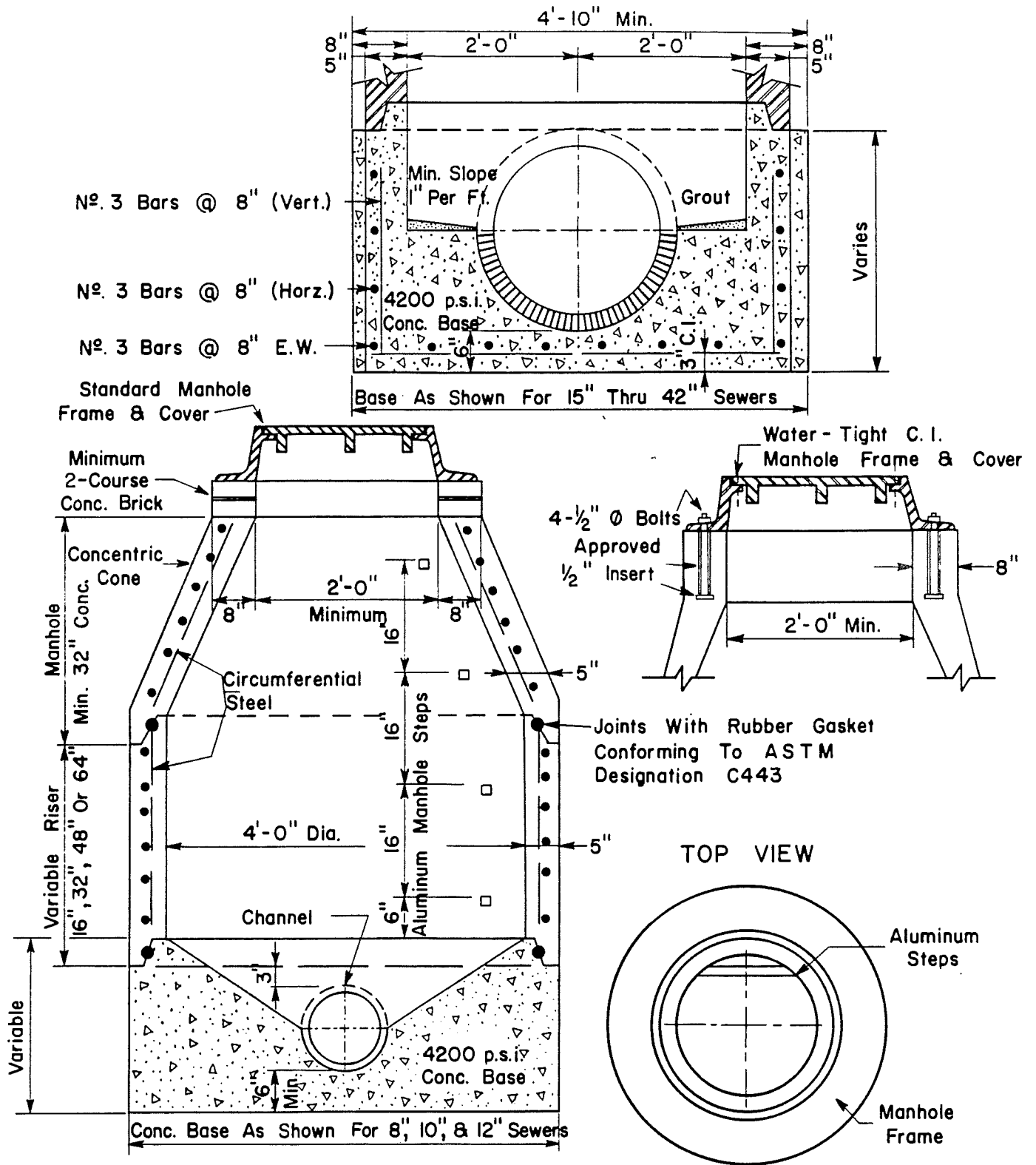
The standard ventilated cover will normally be supplied in areas not affected by flood waters. Twenty-five (25) percent of the manhole covers shall be of the non-ventilating type and shall be installed in the locations directed by the Engineer.

Watertight Manhole Covers and Frames

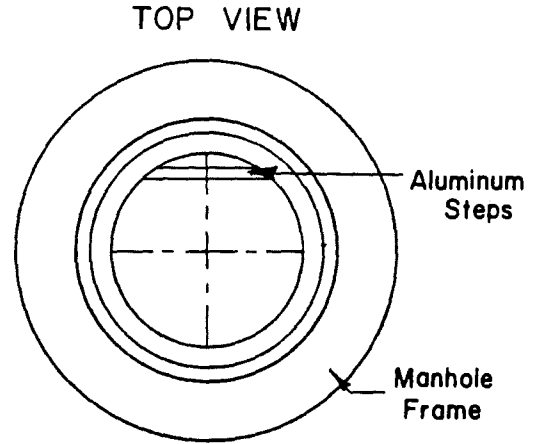
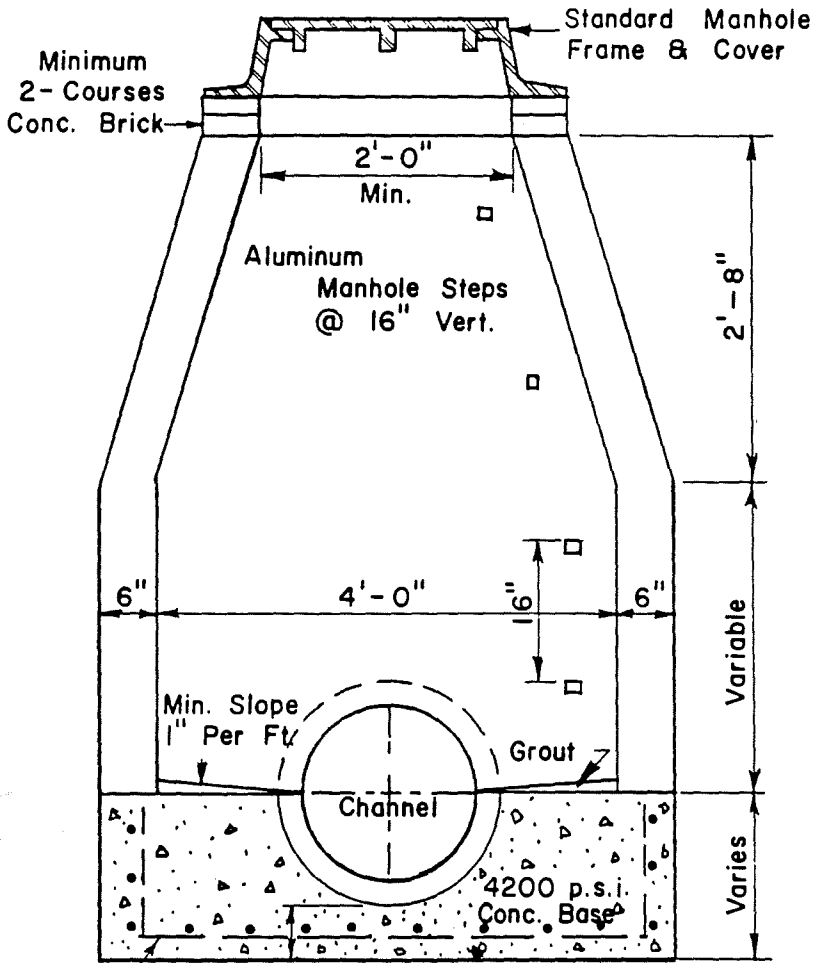
The locations of watertight manhole structures are shown on the construction drawings. Watertight manhole frames shall be firmly connected directly to the concrete of the manhole with four (4) one-half inch anchor bolts as shown on the standard drawing. Concrete bricks shall not be used on watertight manholes. The anchor bolts and sleeves shall be inserted into the fresh concrete on monolithic manholes. Precast manhole cone sections or flat slab top sections shall be furnished with the four (4) anchor bolts and sleeves cast in place.

FUGITIVE DUST

Air Pollution Control Regulation, Section 145, Restriction of Fugitive Dust, is applicable to all projects. Contractor shall comply with this regulation.



PRECAST MANHOLE
 SHALL CONFORM TO ASTM DESIGNATION C478
 SCALE: 3/4" = 1'-0"

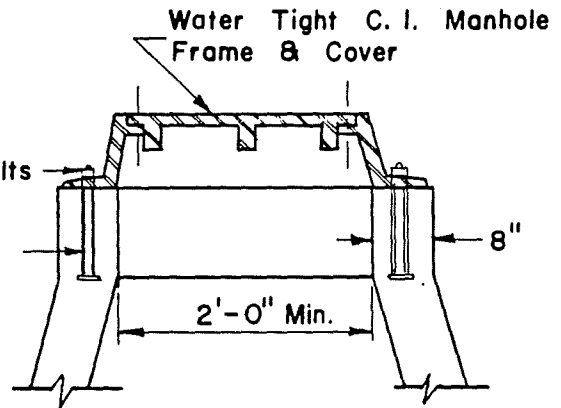


NOTE: For Sewers 15" Thru 18"
 Use No. 3 Bars @ 8"
 Horz. & Vert. In Conc. Base,
 3" C.L. From Outside.

See Note On Reinforcing

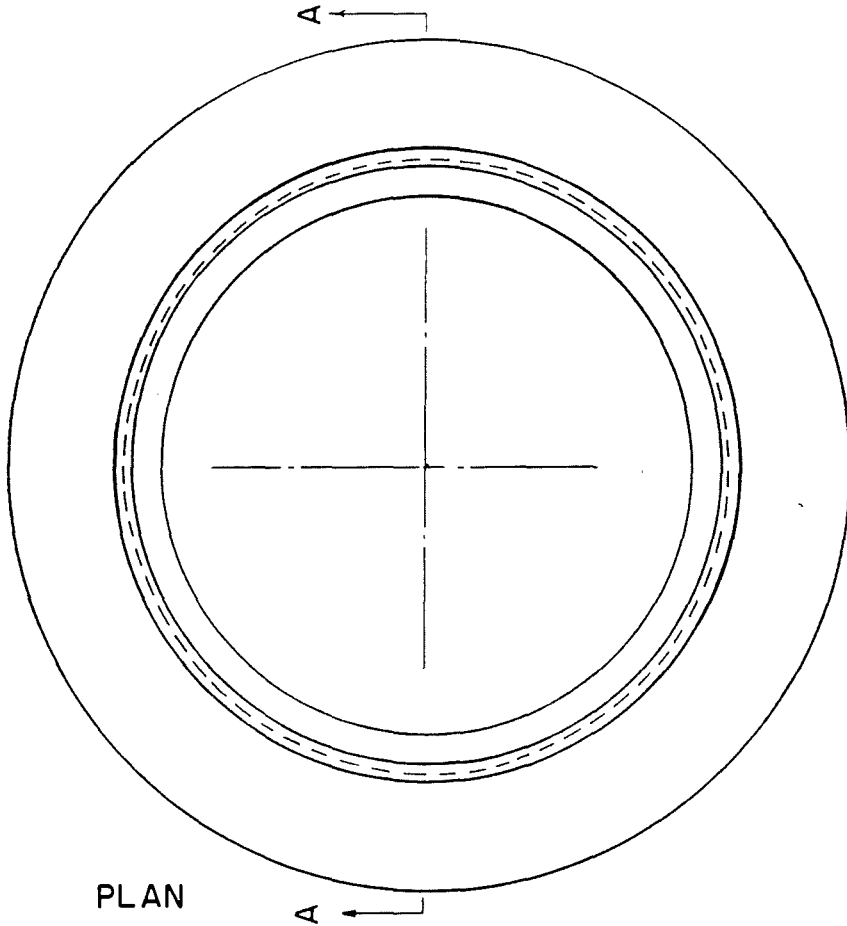
4-1/2" Ø Bolts

Approved
 1/2" Inserts



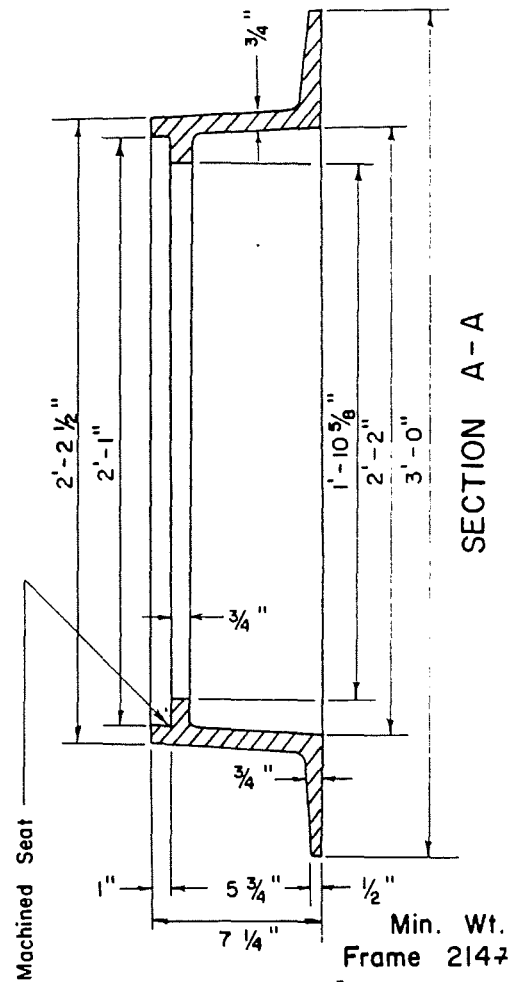
Monolithic Conc.
 4200 p.s.i.
 Both Inside & Outside
 Forms Shall Be Used

MONOLITHIC CONCRETE MANHOLE
 SCALE: 3/4" = 1'-0"



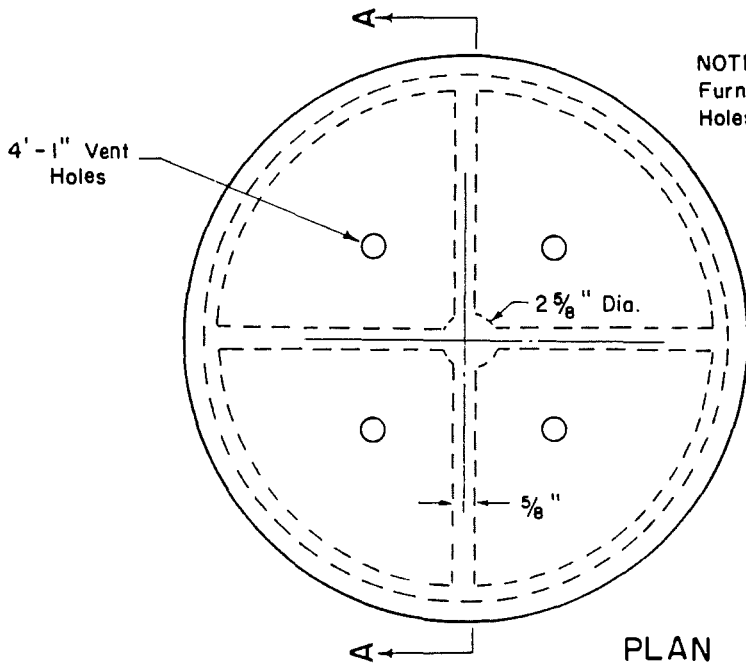
PLAN

STANDARD CAST IRON FRAME
SCALE: 1 1/2" = 1'-0"



SECTION A-A

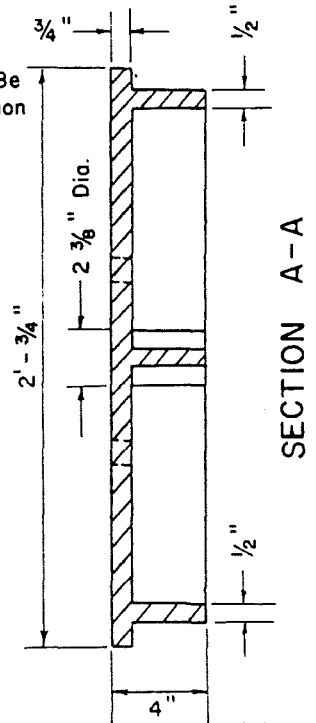
Min. Wt.
Frame 2147



PLAN

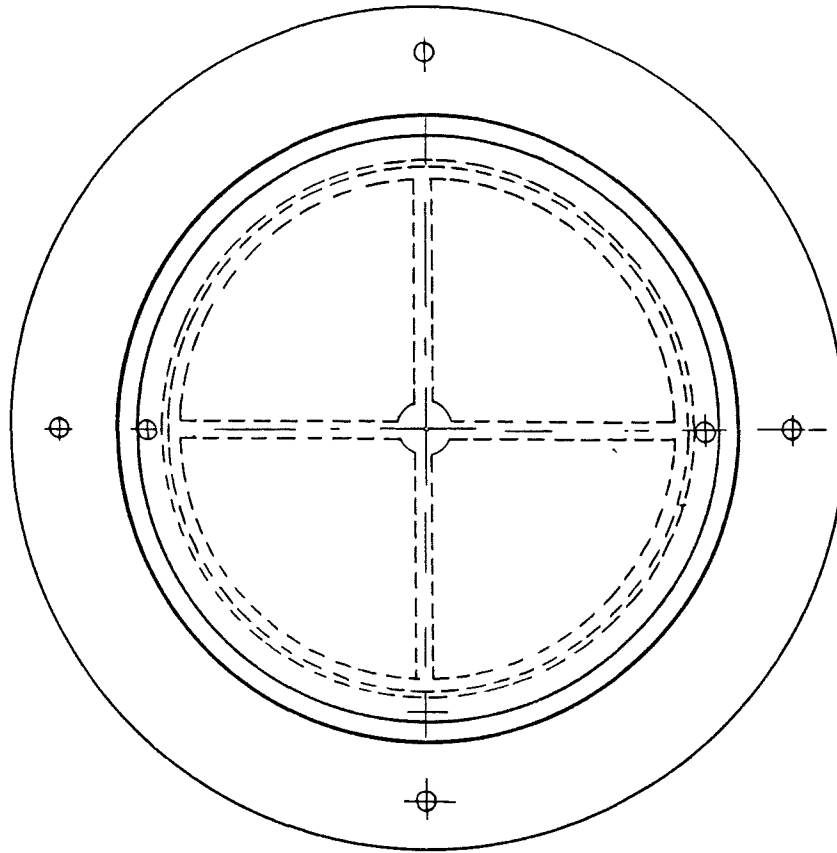
STANDARD CAST IRON MANHOLE COVER
SCALE: 1 1/2" = 1'-0"

NOTE: Solid Covers May Be
Furnished Without Ventilation
Holes If Specified.



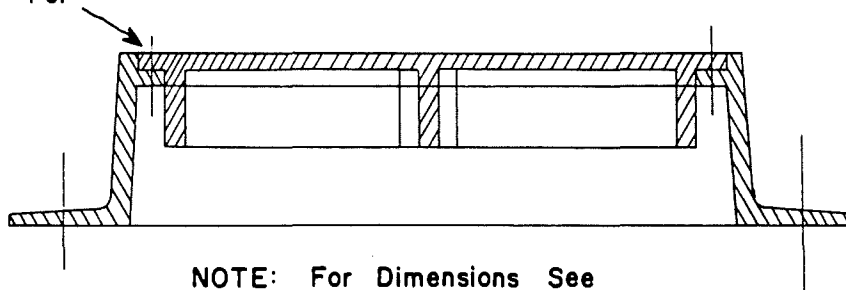
SECTION A-A

Min. Wt.
Cover 1557



PLAN

4- $\frac{3}{4}$ " Hex-Hd. ~ Silicon
Bronze Cap Screws &
Washers & $\frac{1}{4}$ " Rubber
Gasket - Solid Cover With
Countersunk Holes For
Screws.



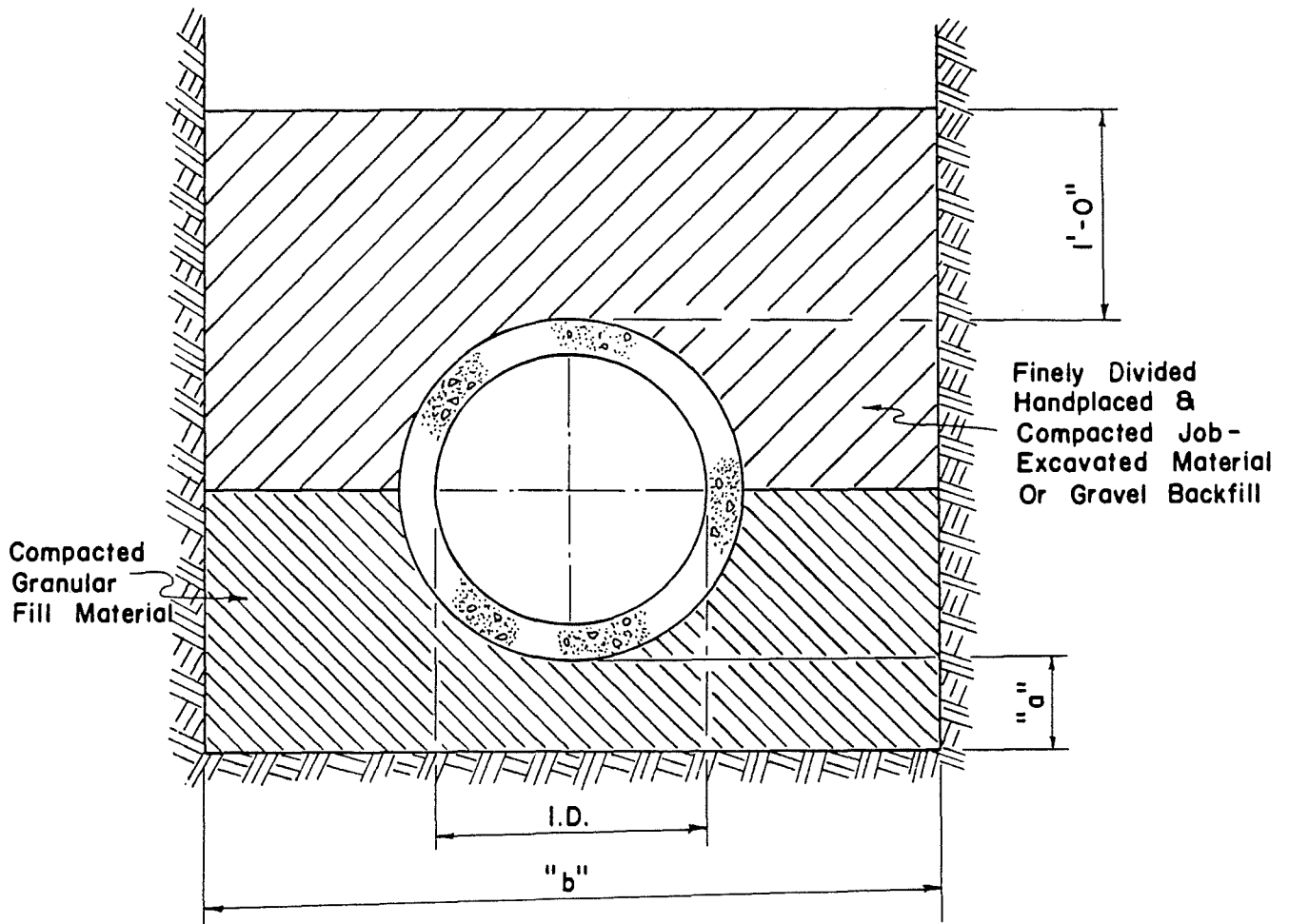
(Fin. Holes)
4- $\frac{1}{2}$ " Dia.
Anchor Bolts
12" Long

NOTE: For Dimensions See
Dwg. "Std. Cast Iron Manhole
Frame & Cover."

SECTION

WATERTIGHT MANHOLE FRAME & COVER
SCALE: $\frac{1}{2}$ " = 1'-0"

I.D. Inches	"a" Inches	"b" Min. Inches
8	4	22
10	4	24
12	5	26
15	5	30
18	5	34
21	6	38
24	6	42
27	6	46
30	8	49
33	8	52
36	8	56
42	9	59
48	9	66



SEWER PIPE
TRENCH WIDTH, & EMBEDMENT

8.2.00 STORM SEWERS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes

1. Storm drainage piping, fittings, and accessories.
- B. Forty-eight (48) hours before digging is to commence, the Contractor shall notify the following agencies: The Ohio Utilities Protection Service (OUPS) at 1-800-362-2764; the Dayton Power and Light Company at (513) 227-2192; the Montgomery County Sanitary Department at (513) 297-5020; and all other agencies which might have underground utilities involving this project and are non-members of OUPS.

1.02 REFERENCES

- A. ANSI/ASTM C14 - Concrete sewer Storm Drain, and Culvert Pipe.
- B. ANSI/ASTM C76 - Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.
- C. ANSI/ASTM C443 - Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets.
- D. AASHTO M36 - Corrugated Steel Pipe, Metallic Coated, for Sewers and Drains.

1.03 DELIVERY, STORAGE AND HANDLING

- A. Products shall be lifted by lifting devices (slings, cradles, forks, etc.) designed for lifting concrete structures. Any device which crushes edges, cracks, or otherwise damages the material, leaving a permanent mark on the product shall not be used.
- B. Products showing signs of physical abuse such as cracks, crushed edges, chipped concrete, abraded surfaces shall be removed from site immediately.
- C. Products shall be stored off the ground away from traffic areas and other possible damage.

2.01 MATERIALS

A. Concrete Pipe

1. Reinforced Concrete Pipe: ANSI/ASTM C76, Class III with Wall Type B.
2. Reinforced Concrete Pipe Joint Device: ANSI/ASTM C443, rubber compression gasket joint.
3. Circular concrete pipe with elliptical reinforcement is not included in these specifications and will not be accepted.
4. All concrete pipe shall be a minimum of three feet long for pipe and with an internal diameter of six inches or less and a minimum of four feet long for pipe with an internal diameter of eight inches or more, unless otherwise indicated on the drawings. All concrete pipe with an internal diameter of 12 inches or less shall have bell and spigot joints. All concrete pipe larger than 15 inches in internal diameter shall have tongue and groove joints.

B. Corrugated Metal Pipe

1. Corrugated metal culvert pipe shall conform to the requirements of AASHTO M36 specifications for corrugated metal culvert pipe. The gauges for various sizes of pipe shall be as follows unless otherwise noted on the plans:

8.2.00 STORM SEWERS

Gauges

<u>Diameter</u>	<u>(2-2/3 Inch x 1/2 Inch) Corrugation)</u>
15 inches	16
18 inches	16
24 inches	16
30 inches	14
36 inches	14
42 inches	12
17 inch x 13 inch pipe arch	14
21 inch x 15 inch pipe arch	14
28 inch x 20 inch pipe arch	14
35 inch x 24 inch pipe arch	14
42 inch x 29 inch pipe arch	14
49 inch x 33 inch pipe arch	12
57 inch x 38 inch pipe arch	12

2.02 ACCESSORIES

- A. Rubber Gaskets: Rubber or neoprene joints shall be Tylox Type CR, Type C., O-ring, or approved equal; the bell and spigot and the tongue and groove of the pipe shall be specially manufactured and prepared for the use of the type of joint selected. The rubber gaskets shall meet the requirements of ASTM C443. Submit the shape and design to the Owner for his approval.
- B. Corrugated Steel Pipe Couplings: Shall conform to AASHTO M36 except that coupling bands shall not be more than two nominal sheet thicknesses thinner than the thickness of the pipe to be connected. Bands shall be a minimum of 16 gauge and have at least one annular corrugation that indexes into the inboard corrugation of each pipe section joined.

8.2.00 STORM SEWERS

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that trench cut is ready to receive work, and excavations, dimensions, and elevations are as indicated on shop drawings.
- B. Beginning of installation means acceptance of existing conditions.

3.02 PREPARATION

- A. Hand trim excavations to required elevations. Correct over excavation with fill material of coarse aggregate.
- B. Remove large stones or other hard matter which could damage drainage tile or impede consistent backfilling or compaction.
- C. Before placing sewer pipe in position in the trench, carefully prepare the bottom and sides of the trench, and install any necessary bracing and sheeting as provided in Section 8.3.00.

3.03 INSTALLATION

A. Pipe

- 1. General - Except where otherwise directed by the Owner for special conditions, the conduit shall be laid starting at the outlet end with the bell or groove end laid upgrade. The lower segment of the conduit shall be in contact with the shaped bedding throughout its full length. Metal conduits shall be placed with longitudinal laps or seams at the side and by lapping the circumferential seams on the inside in the direction of flow.

8.2.00 STORM SEWERS

2. All conduits shall begin and end with pipe ends as normally fabricated by the manufacturer. If field cutting is found to be necessary, the cut end shall be located at an interior joint and cradle, collar, or band shall be provided to assure a stable joint.
3. Carefully inspect each piece of pipe and special fitting before it is placed, and lay no defective pipe in the trench. Pipe laying shall proceed upgrade, starting at the lower end of the grade and with the bells upgrade.
4. Bell holes shall be large enough to allow ample room for the pipe joints to be properly made. Cut bell holes out not more than ten joints ahead of the pipe laying. Carefully grade the bottom of the trench between bell holes so that each pipe barrel will rest on a solid foundation for its entire length. Lay each pipe joint so as to form a close concentric joint with adjoining pipe and to avoid sudden offsets or inequalities in the flow line.
5. Place pipe on minimum 6 inch deep bed of bedding material.
6. Backfill for pipe trenches, shall be in accordance with Section 8.3.00.
7. Jointing operations shall follow pipe laying very closely; failure to comply with this provision will result in the Owner's stopping all pipe laying operations until jointing operation catch up.
8. Rubber gaskets and the method of joint construction shall be in strict accordance with the manufacturer's directions and requirements. Adequately lubricate the gaskets with special cement provided for this purpose, and pipe joints shall be adequately and thoroughly driven home or seated.

8.2.00 STORM SEWERS

9. The method of joining conduit sections shall be such that the ends are fully entered and the inner surfaces are reasonably flush and even. Sealed, banded or bolted joints shall be provided for all conduits. Corrugated conduits shall be jointed with coupling bands which match and mesh with the corrugations of the pipes (bands with projections, i.e. dimple bands, shall not be used). Conduits shall have open joints only if shown on Contract Drawings.

3.04 FIELD QUALITY CONTROL

- A. General - The testing of joints shall be performed by the Contractor in accordance with approved methods. Should any section of conduit fail to meet the test requirements, corrections shall be made until the test requirements for the section are met. The costs of all materials, equipment, labor, and incidentals necessary for performing the tests and making any necessary corrections and replacements shall be included.
- B. Gaskets - When resilient and flexible gasket joints are specified, they shall sustain a maximum limit of 0.6 gallon per inch of internal diameter over 100 feet per hour when field tested for infiltration. As an alternate, they may be field tested for exfiltration, in which case the joints shall perform equally well except that an allowance of an additional 10 percent of gallonage will be permitted for each additional two-foot head over a basic two-foot minimum internal head.
- C. Accurately record location of pipe runs, and invert elevations.
- D. Identify and describe unexpected variations to subsoils conditions or discovery of uncharted utilities.

3.05 PROTECTION

- A. Protect pipe and filter aggregate cover from damage or displacement until backfilling operation is in progress.

8.2.00 STORM SEWERS

- B. Adequate precautions shall be taken to prevent concrete and/or mortar from freezing. Brick, concrete block, precast concrete, etc. having a temperature of 40 degrees F. or less shall not be set with mortar until heated for a period sufficient to insure a temperature of 50 degrees F. to 80 degrees F. throughout the entire mass of the material.

END OF SECTION

8.2.00 STORM SEWERS

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8.3.00 UNCLASSIFIED EXCAVATION FOR STORM SEWERS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes

1. Excavate trenches for storm sewer.
2. Compacted bedding under storm sewer.
3. Backfilling and compaction.

1.02 REFERENCES

- A. ANSI/ASTM C136 - Method for Sieve Analysis of Fine and Coarse Aggregates.
- B. ANSI/ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb Rammer and 18 inch Drop.

1.03 PROJECT/SITE CONDITIONS

A. FIELD MEASUREMENTS

1. Verify that survey benchmark and intended elevations for the Work are as shown on Contract Drawings.

PART 2 PRODUCTS

2.01 MATERIALS

A. Backfill Materials

1. Granular material shall be full depth crushed stone ODOT No. 57 under paved areas.
2. Subsoil may be reused under turfed areas.
3. Crushed stone shall be ODOT 304 Aggregate Base.

8.3.00 UNCLASSIFIED EXCAVATION FOR STORM SEWERS

B. Bedding Materials

1. Class B bedding shall consist of ODOT No. 57 Stone.

PART 3 EXECUTION

3.01 PREPARATION

A. Location of Existing Lines

1. Prior to start of trenching excavation, Contractor shall accurately locate and mark (stakes) all intersections of trench and existing buried lines shown on Project Drawings.
2. Whenever a buried line is encountered (whether shown or not shown on Project Drawings) -- all work shall stop until Owner positively identifies line.

B. Identify required lines, levels, contours, and datum.

C. Maintain and protect existing utilities remaining, which pass through work area.

D. Protect plant life, lawns, and other features remaining as a portion of final landscaping.

E. Protect bench marks, existing structures, fences, sidewalks, paving, and curbs from excavation equipment and vehicular traffic.

F. Protect above and below grade utilities which are to remain.

G. Cut out soft areas of subgrade not capable of in situ compaction. Backfill with crushed stone and compact to density equal to or greater than requirements for subsequent backfill material. Wherever muck, quicksand, soft clay, swampy ground, or other material unsuitable for foundations, subgrade, or backfilling is encountered, remove it and continue excavation until suitable material is encountered. The material removed shall be disposed of in the manner described below. Then refill the areas excavated for this reason with 1 inch to 2 inches crushed stone up to the level of the lines, grades, and/or cross sections shown on the drawings.

8.3.00 UNCLASSIFIED EXCAVATION FOR STORM SEWERS

3.02 APPLICATION

A. Excavation

1. Before starting construction, remove from the work site all vegetable growth (except as hereinafter excluded), debris, and/or other objectionable matter as well as any buildings and/or other structures that the drawings and/or the Owner specifically indicate are to be removed. Dispose of this refuse material in a manner acceptable to the Owner.
2. Excavate subsoil required for storms sewer.
3. Excavation shall not interfere with normal 45 degree bearing splay of foundations.
4. Hand trim excavation. Hand trim for bell and spigot pipe joints. Remove loose matter.
5. Remove lumped subsoil, boulders, and rock up to 1/3 cu yd, measured by volume.
6. Correct unauthorized excavation at no cost to Owner.
7. Correct areas over-excavated by error by placing either crushed stone or concrete at the direction of the Owner.
8. Stockpile excavated material in area designated on site and remove excess material not being used.
9. The Contractor may, if he chooses, use a motor powered trenching machine. If he does, however, he shall be fully responsible for the preservation or repair of existing utility service connections.
10. Unless the construction of lines by tunneling, jacking, or boring is called for by the drawings or specifically authorized by the Owner, make excavations for pipelines in open cut and true to the lines and grades shown on the drawings or established by the Owner on the ground. Cut the banks of trenches between vertical parallel planes equidistant from the pipe centerline. The horizontal distance between the vertical planes (or, if

8.3.00 UNCLASSIFIED EXCAVATION FOR STORM SEWERS

sheeting is used, between the inside faces of that sheeting) shall vary with the size of the pipe to be installed, but shall not be more than the distance determined by the formula $4/3d + 24$ " for pipes 24" in diameter or less, and $4/3d + 30$ " for larger pipes, where "d" represents the internal pipe diameter. When approved in writing by the Owner, the banks of trenches from the ground surface down to a depth not closer than 1 foot above the top of the pipe, may be excavated to nonvertical and nonparallel planes, provided the excavation below that depth is made with vertical and parallel sides equidistant from the pipe centerline in accordance with the formula given above. Any cut made in excess of the above formula shall be at the expense of the Contractor and may be cause for the Owner to require that stronger pipe and/or a higher class of bedding be used at no cost to the Owner.

11. Excavate bell holes for bell and spigot pipe at proper intervals so that the barrel of the pipe will rest for its entire length upon the bottom of the trench. Bell holes shall be large enough to permit proper jointing of the pipe. Do not excavate bell holes more than 2 joints ahead of pipe laying.
12. Excavation for manholes, inlets, and other incidental structures shall not be greater in horizontal area than that required to allow a 2 foot clearance between the outer surface of the structure and the walls of the adjacent excavation or of the sheeting used to protect it. The bottom of the excavation shall be true to the required shape and elevation shown on the drawings. No earth backfilling will be permitted under manholes, inlets, headwalls, or similar structures. Should the Contractor excavate below the elevations shown or specified, he shall, at his own expense, fill the void with either concrete or granular material approved by the Owner.
13. Do not excavate pipe trenches more than 200 feet ahead of the pipe laying, and perform all work so as to cause the least possible inconvenience to the public. Construct temporary bridges or crossings when and where the Owner seems necessary to maintain vehicular or pedestrian traffic.

8.3.00 UNCLASSIFIED EXCAVATION FOR STORM SEWERS

14. In all cases where materials are deposited along open trenches, place them so that in the event of rain or surcharge loading from such deposits no damage will result to the work and/or to adjacent property.
15. Provide and keep in operation enough suitable pumping equipment whenever necessary or whenever directed to do so by the Owner. Give special attention to excavations for those structures that, prior to proper backfilling, are subject to flotation from hydrostatic uplift.

B. Bedding

1. Bed Sub-Grade - The foundation for the conduit bed shall be firm for its full length. Where unstable material is encountered below the plan foundation it shall be removed to the depth directed by the Owner under the conduit and for a width on each side equal to the diameter or span of the conduit and replaced with granular material. Rock or boulders encountered at the conduit bed shall be removed at least six inches below at the bottom of the conduit and replaced with granular material. In case the flow line is changed not to exceed one foot, or it becomes necessary to remove unsuitable material at the direction of the Owner in an amount not to exceed one foot, the same shall be done for no additional compensation. When the flow line is lowered more than 1 foot or if it becomes necessary to remove more than 1 foot of unsuitable material below the bottom of the trench, work will be considered as a Contract Change Notice.
2. Bedding Material
 - a. Class A bedding shall consist of a continuous concrete cradle conforming to the plan details.
 - b. Class B bedding shall consist of a bed of crushed stone at least 6" deep below the bottom of the conduit. Once pipe has been laid, backfill pipe to one foot above the top of the pipe to complete the bedding and backfill requirements for the first one foot. Above this point, see backfill requirements.

8.3.00 UNCLASSIFIED EXCAVATION FOR STORM SEWERS

C. Backfilling

1. Backfill trenches to contours and elevations with unfrozen materials.
2. Do not backfill over porous, wet, frozen or spongy subgrade surfaces.
3. Granular Fill: Place and compact materials in continuous layers not exceeding 6 inches compacted depth.
4. Subsoil Fill: Place and compact material in continuous layers not exceeding 8 inches compacted depth.
5. Maintain optimum moisture content of backfill materials to attain required compaction density.
6. Leave fill material stockpile areas completely free of excess fill materials.
7. Backfill shall consist of full depth crushed stone underneath areas to receive pavement.
8. Backfill underneath turfed areas shall consist of crushed stone up to one foot above the top of pipe. The remainder of backfill shall consist of suitable soil which may contain some broken stone (3/4 of total volume).
9. Wherever trenches have been cut across or along existing pavement, temporarily pave the backfill of such trenches by placing ODOT 304 crushed stone as the top 12 inches of the backfill. Maintain this temporary pavement either until the permanent pavement is installed.
10. Conduct backfilling around manholes, inlets, outfalls, and/or structures in the same manner as specified above for pipelines except that even greater care is necessary to prevent damage to the utility structure.
11. Wherever pipes have diameters of 15 inches or less, do not use power operated tampers to tamp that portion of the backfill around the pipe within one foot above the pipe.

12. Perform backfilling so as not to disturb or injure any pipe and/or structure against which the backfill is being placed. If any pipe or structure is damaged and/or displaced during backfilling, open up the backfill and make whatever repairs are necessary, whenever directed to do so by the Owner.
13. Backfilling and clean-up operations shall closely follow pipe laying, failure to comply with this provision will result in the Owner's requiring that the Contractor's other activities be suspended until backfilling and clean-up operations catch up with pipe laying.

3.03 PROTECTION

A. Finished Work

1. Recompact fills subjected to vehicular traffic.
2. Seed and maintain in good condition all excavated areas, trenches, fills, embankments, and channels until final acceptance by the Owner.
3. Maintain trench backfill at the approximate level of the original ground surface by periodically adding backfill material wherever necessary and whenever directed to do so by the Owner. Continue such maintenance until final acceptance of the project, or until the Owner issues a written release.
4. Clearing Site and Restoring Damaged Surfaces - After the backfilling has been completed, the Contractor shall immediately remove and dispose of all surplus material including rubbish. Unless otherwise called for on the plans, the Contractor shall replace all pavement, sidewalks, sod, or other surface disturbed, to a condition equal to that existing before the work was started.
5. Construction Equipment Overburden - Lightweight dozers and graders may be operated over culverts having two feet or compacted cover, but heavy earth moving and compaction equipment shall not be operated closer than one pipe until a cover of four feet has been placed and properly compacted over the top of the conduit.

8.3.00 UNCLASSIFIED EXCAVATION FOR STORM SEWERS

B. Sheeting, Shoring, and Bracing

1. Take special care to avoid damage wherever excavation is being done. Sufficiently sheet, shore, and brace the sides of all excavations to prevent slides, cave-ins, settlement, or movement of the banks and to maintain the specified trench widths. Use solid sheets in wet, saturated, or flowing ground. All sheeting, shoring, and bracing shall have enough strength and rigidity to withstand the pressures exerted, to keep the walls of the excavation properly in place, and to protect all persons and property from injury or damage. Separate payment will not be made for sheeting, shoring, and bracing, which are considered an incidental part of the excavation work.
2. Wherever employees may be exposed to moving ground or cave-ins, shore and lay back exposed earth excavation surfaces more than five feet high to a stable slope, or else provide some equivalent means of protection. Effectively protect trenches less than five feet deep when examination of the ground indicates hazardous ground movement may be expected. Guard the walls and faces of all excavations in which employees are exposed to danger from moving ground by a shoring system, sloping of the ground, or some equivalent protection.
3. Comply with all OSHA standards in determining where and in what manner sheeting, shoring, and bracing are to be done. The sheeting, shoring, and bracing system shall be designed by a professional engineer licensed in the State of Ohio and shall be subject to approval by the Owner. However, such approval does not relieve the Contractor of the sole responsibility for the safety of all employees, the effectiveness of the system, and any damages or injuries resulting from the lack or inadequacy of sheeting, shoring, and bracing.
4. Where excavations are made adjacent to existing buildings or structures or in paved streets or alleys, take particular care to sheet, shore, and brace the sides of the excavation so as to prevent any undermining of or settlement beneath such structures or pavement. Underpin adjacent structures wherever necessary, with the approval of the Owner.

8.3.00 UNCLASSIFIED EXCAVATION FOR STORM SEWERS

5. Do not leave sheeting, shoring, or bracing materials in place unless this is called for by the drawings, ordered by the Owner, or deemed necessary or advisable for the safety or protection of the new or existing work or features. Remove these materials in such a manner that the new structure or any existing structures or property, whether public or private, will not be endangered or damaged and that cave-ins and slides are avoided.
6. Fill and compact all holes and voids left in the work by the removal of sheeting, shoring, or bracing as specified herein.
7. The Contractor may use a trench box, which is a prefabricated movable trench shield composed of steel plates welded to a heavy steel frame. The trench box shall be designed to provide protection equal to or greater than that of an appropriate shoring system.

END OF SECTION

8.3.00 UNCLASSIFIED EXCAVATION FOR STORM SEWERS

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WAGE DETERMINATION

MONTGOMERY	COUNTY
05-14-92	DETERMINATION DATE
08-13-92	EXPIRATION DATE

THE FOLLOWING PAGES ARE PREVAILING RATES OF WAGES ON PUBLIC IMPROVEMENTS FAIRLY ESTIMATED OVER \$4,000.00, AS ASCERTAINED BY THE DEPARTMENT OF INDUSTRIAL RELATIONS FOR THE COUNTY AND ON THE DATE LISTED ABOVE AND AS PROVIDED FOR IN THE SECTIONS 4115.03 THROUGH 4115.16 OF THE OHIO REVISED CODE.

Section 4115.05 provides, in part: "Where contracts are not awarded or construction undertaken within ninety days from the date of the establishment of the prevailing wages, there shall be a redetermination of the prevailing rate of wages before the contract is awarded. "The expiration date of this wage schedule is listed above for your convenience only. This wage determination is not intended as a blanket determination to be used for all projects during this period without prior approval of this Department.

Section 4115.04, Ohio Revised Code provides, in part: "Such schedule of wages shall be attached to and made a part of the specifications for the work and shall be printed on the bidding blanks where the work is done by contract. . . ."

The contract between the letting authority and the successful bidder shall contain a statement requiring that mechanics and laborers be paid a prevailing rate of wage as required in Section 4115.06, Ohio Revised Code.

The contractor or subcontractor is required to file with the contracting public authority upon completion of the project and prior to final payment therefor, an affidavit stating he has complied with Chapter 4115. of the Ohio Revised Code.

The wage rates contained in this schedule are the "Prevailing Wages" as defined by Section 4115.03, Ohio Revised Code; The basic hourly rates plus certain fringe benefits. These rates and fringes shall be a minimum to be paid under a contract regulated by Chapter 4115. of the Ohio Revised Code, by contractors and subcontractors or by a letting authority if the work is done by force account. The prevailing wage rates contained in this schedule include the effective dates and wage rates currently on file. In cases where future effective dates are not included in this schedule, modifications to the wage schedule will be furnished to the the Prevailing Wage Coordinator appointed by the public authority as soon as prevailing wage rates increases are received by this office.

There shall be posted in a prominent and accessible place on the site of work a legible statement of the schedule of wage rates specified in the contract to the various classifications of laborers, workmen and mechanics employed, said statement to remain posted during the life of such contract." Section 4115.07, Ohio Revised Code.

Apprentices will be permitted to work only under a bona fide apprenticeship program if such program exists and if such program is registered with the Ohio apprenticeship council.

Section 4115.071 provides that no later than ten days before the first payment of wages is due to any employee of any contractor or subcontractor working on a contract regulated by Chapter 4115, Ohio Revised Code, the contracting public authority shall appoint one of his own employees to act as the prevailing wage coordinator for said contract. The duties of the prevailing wage coordinator are outlined in Section 4115.071 of the Ohio Revised code. SECTION 4115.05 PROVIDES FOR AN ESCALATOR IN THE PREVAILING WAGE RATE. EACH TIME A NEW RATE IS ESTABLISHED, THAT RATE IS REQUIRED TO BE PAID ON ALL ONGOING PUBLIC IMPROVEMENT PROJECTS.

A further requirement of Section 4115.05, Ohio Revised Code, is: "On the occasion of the first pay date under a contract, the contractor shall furnish each employee not covered by a collective bargaining agreement or understanding between employers and bona fide organizations of labor with individual written notification of the job classification to which the employee is assigned, the prevailing wage determined to be applicable to that classification, separated into the hourly rate of pay and the fringe payments, and the identity of the prevailing wage coordinator appointed by the public authority. The contractor or subcontractor shall furnish the same notification to each affected employee every time the job classification of the employee is changed."

* ALL WORK PERFORMED IN CONNECTION WITH THE INSTALLATION OF MODULAR FURNITURE MAY BE SUBJECT TO PREVAILING WAGE.
Specific circumstances should be determined by the public authority and/or the department.

This packet is not to be separated but is to remain complete as it is submitted to you.

(SAMPLE)

AFFIDAVIT OF CONTRACTOR
OR SUB-CONTRACTOR

PREVAILING WAGES

I, _____,
(Name of person signing affidavit) (Title)

of the _____, do hereby certify that the wages paid to all employees for the full number of hours worked in connection with the Contract to the Improvement, Repair and Construction of:

(Project and Location)

during the following period from _____ to _____ is in accordance with the prevailing wage prescribed by the contract document.

I further certify that no rebates of deductions for any wages due any person have been directly or indirectly made other than those provided by law.

(Signature of Officer or Agent)

Sworn to and subscribed in my presence this _____ day of _____, 19 _____.

(Notary Public)

The above affidavit must be executed and sworn to by the officer or agent or the Contractor or Subcontractor who supervises the payment of employees, before the owner will release the surety and/or make a final payment due under the terms of the Contract.

<input type="checkbox"/> Name of Contractor <input type="checkbox"/> or Subcontractor										Address							
Payroll No.					For Week Ending					Project and Location					County		
EMPLOYEE'S NAME CURRENT ADDRESS AND SOCIAL SECURITY NUMBER	WORK CLASSIFICATION	DAY AND DATE						Total Project Hours	Hourly Rate of Pay	Gross Amount Paid	Fringe Benefits Paid Per Hour					Total Deductions	Net Wages Paid
											H & W	Pens.	Vac.	App. Tr.	Others		
		HOURS WORKED EACH DAY															

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CERTIFICATION

Date _____

I, _____
(Name of signatory part) _____
(Title)

do hereby certify:

(1) That I pay or supervise the payment of the persons employed by

_____ on the _____
(Contractor or subcontractor) _____
(Building or work)

; that during payroll period commencing on the

_____ day of _____ 19__ and ending the _____ day of

_____, 19__ all laborers and mechanics employed on said project

have been paid at the prevailing rate of wages for laborers and mechanics for the class of work called for by said project, and that no rebates have been or will be made either directly or indirectly to or on behalf of said

(Contractor or subcontractor)

from the total wages earned by any person and that no deduction have been made either directly or indirectly from the total wages earned by any person, other than permissible deductions as defined in Chapter 4115. Ohio Revised Code, and described below:

(2) That this and all payrolls required to be submitted for the above period are correct and complete; that the prevailing wage rates for laborers and mechanics are not less than the prevailing wage rates then payable in the same trade or occupation in the locality where the work is being performed, as determined by the Ohio Department of Industrial Relations; and, that the classifications set forth for each laborer and mechanic conform with the work performed,

(3) That apprentices employed during the above period are duly registered in a bona fide apprenticeship program registered with the State Apprenticeship Council.

(4) That:

(a) WHERE FRINGE BENEFITS ARE PAID TO APPROVED PLANS, FUNDS, OR PROGRAMS

In addition to the base hourly wage rates paid to each laborer or mechanic listed in the above referenced payroll, payments of fringe benefits as determined by the Ohio Department of Industrial Relations have been made to

in the amount of: \$ _____ for the benefit of such employees, except as noted in Section 4(c) below.

(b) WHERE FRINGE BENEFITS ARE PAID IN CASH

Each laborer or mechanic listed in the above referenced payroll has been paid, as indicated on the payroll, an amount not less than the sum of the applicable basic hourly wage rate plus the amount of the required fringe benefits as determined by the Ohio Department of Industrial Relations, except as noted in Section 4(c) below.

(c) EXCEPTIONS

EXCEPTION (CRAFT)	EXPLANATION

Remarks:

Name and Title _____
Signature

CLASSIFICATIONS

EFFECTIVE DATE	BASIC HOURLY RATES	FRINGE BENEFIT PAYMENT				
		H & W	PENS.	VAC.	APP. TR.	OTHERS
ASBESTOS WORKERS:						
Asbestos Workers -----	05-01-92	19.37	1.87	2.05		.05
Working 40' or Higher -----	05-01-92	19.62	1.87	2.05		.05
Boatswain Chair -----	05-01-92	19.77	1.87	2.05		.05
Hazardous Waste Handlers ---	05-01-92	8.25	1.55	.25		
RATIO:						
4 Hazardous Waste Handlers to 1 Craftsman						
APPRENTICES:						
1st Year -----	40% of Craftsman's Rate Plus Fringes (same as above)					
2nd Year -----	50% of Craftsman's Rate Plus Fringes (same as above)					
3rd Year -----	60% of Craftsman's Rate Plus Fringes (same as above)					
4th Year -----	75% of Craftsman's Rate Plus Fringes (same as above)					
RATIO:						
1 Apprentice to 1 Craftsman						
1 Apprentice to 4 Craftsmen when employed in a shop						
Note:						
"The removal of all insulation materials, whether they contain asbestos or not, from mechanical systems (pipes, boilers, ducts, flues, breechings, etc.) is recognized as being the exclusive work of the Asbestos Workers.						
On all mechanical systems (pipes, boilers, ducts, flues, breechings, etc.) that are going to be scrapped, the removal of all insulating materials whether they contain asbestos or not shall be the exclusive work of the Laborers.						
NOTE:						
continued on next page						
***** NOTICE ***** Rates for classifications and/or ratios not appearing on this list must be obtained from the Department of Industrial Relations 050192						

CLASSIFICATIONS

EFFECTIVE DATE	BASIC HOURLY RATES	FRINGE BENEFIT PAYMENT				
		H & W	PENS.	VAC.	APP. TR.	OTHERS
<p><u>ASBESTOS WORKERS:(cont.:)</u></p> <p>NOTE: The removal of all asbestos-containing materials from walls, ceilings, floors, columns and all other nonmechanical structures and surfaces, etc., is recognized as being the exclusive work of the Laborers.</p> <p>The term "removal" as used in this Agreement shall include the sealing, labeling and dropping of scrap material into the appropriate containers. After drop, final disposal shall be the work of the Laborers'.</p> <p>The loading at the designated area of all materials that have been removed, bagged and tagged, as well as cleanup and all unloading, burying and other work required at the disposal site is recognized as being the exclusive work of the Laborers.</p> <p style="text-align: center;">***** NOTICE ***** Rates for classifications and/or ratios not appearing on this list must be obtained from the Department of Industrial Relations 050192</p>						

CLASSIFICATIONS

CLASSIFICATIONS	EFFECTIVE DATE	BASIC HOURLY RATES	FRINGE BENEFIT PAYMENT					
			H & W	PENS.	VAC.	APP. TR.	OTHERS	
B. S. & O. IRONWORKERS: Within 25 mile radius of downtown Dayton:								
B.S. & O. Ironworkers -----	11-15-91	17.34	2.50	3.75			.15	
	05-01-92	+ .50 to	be allocated				.15	
	05-01-93	+ .50 to	be allocated				.15	
Fence Erectors -----	11-15-91	17.34	2.50	3.75			.15	
	05-01-92	+ .50 to	be allocated				.15	
	05-01-93	+ .50 to	be allocated				.15	
Reinforcing Placers -----	11-15-91	17.34	2.50	3.75			.15	
	05-01-92	+ .50 to	be allocated				.15	
	05-01-93	+ .50 to	be allocated				.15	
Riggers & Machinery Movers -	11-15-91	17.34	2.50	3.75			.15	
	05-01-92	+ .50 to	be allocated				.15	
	05-01-93	+ .50 to	be allocated				.15	
Sheeters -----	11-15-91	17.34	2.50	3.75			.15	
	05-01-92	+ .50 to	be allocated				.15	
	05-01-93	+ .50 to	be allocated				.15	
Steel Sash Erectors -----	11-15-91	17.34	2.50	3.75			.15	
	05-01-92	+ .50 to	be allocated				.15	
	05-01-93	+ .50 to	be allocated				.15	
Welders -----	11-15-91	17.34	2.50	3.75			.15	
	05-01-92	+ .50 to	be allocated				.15	
	05-01-93	+ .50 to	be allocated				.15	

NOTE:

Continued on next page

***** NOTICE *****

Rates for classifications and/or ratios not appearing on this list must be obtained from the Department of Industrial Relations

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CLASSIFICATIONS

B.S. & O IRONWORKERS:(cont.):

Beyond 25 mile radius of
downtown Dayton:

B.S. & O. Ironworkers -----

CLASSIFICATIONS	EFFECTIVE DATE	BASIC HOURLY RATES	FRINGE BENEFIT PAYMENT			
			H & W	PENS.	VAC.	APP. TR. OTHERS
B.S. & O. Ironworkers -----	11-15-91	17.49	2.50	3.75		.15
	05-01-92	+ .50 to be allocated				.15
	05-01-93	+ .50 to be allocated				.15
Fence Erectors -----	11-15-91	17.49	2.50	3.75		.15
	05-01-92	+ .50 to be allocated				.15
	05-01-93	+ .50 to be allocated				.15
Reinforcing Placers -----	11-15-91	17.49	2.50	3.75		.15
	05-01-92	+ .50 to be allocated				.15
	05-01-93	+ .50 to be allocated				.15
Riggers & Machinery Movers -	11-15-91	17.49	2.50	3.75		.15
	05-01-92	+ .50 to be allocated				.15
	05-01-93	+ .50 to be allocated				.15
Sheeters -----	11-15-91	17.49	2.50	3.75		.15
	05-01-92	+ .50 to be allocated				.15
	05-01-93	+ .50 to be allocated				.15
Steel Sash Erectors -----	11-15-91	17.49	2.50	3.75		.15
	05-01-92	+ .50 to be allocated				.15
	05-01-93	+ .50 to be allocated				.15
Welders -----	11-15-91	17.49	2.50	3.75		.15
	05-01-92	+ .50 to be allocated				.15
	05-01-93	+ .50 to be allocated				.15
Apprentices:						
1st Year -----		50% of Craftsman's Rate	Plus Fringes (same as above)			
2nd Year -----		60% of Craftsman's Rate	Plus Fringes (same as above)			
3rd Year -----		70% of Craftsman's Rate	Plus Fringes (same as above)			
4th Year -----		80% of Craftsman's Rate	Plus Fringes (same as above)			
Apprentices will receive no pension payments until they complete 2nd & no increment						
RATIO:						
Reinforcing and rigger work:						
1 Apprentice to 3 Craftsmen						
Ornamental work:						
1 Apprentice to 2 Craftsmen						
Spinning Cable on Bridge:						
1 Apprentice to 1 Craftsman						
			***** NOTICE *****			
			Rates for classifications and/or ratios not appearing on this list must be obtained from the Department of Industrial Relations			
						111591

CLASSIFICATIONS

CLASSIFICATIONS	EFFECTIVE DATE	BASIC HOURLY RATES	FRINGE BENEFIT PAYMENT				
			H & W	PENS.	VAC.	APP. TR.	OTHERS
BOILERMAKERS:							
Boilermakers -----	10-01-89	20.25	2.25	1.50		.12	
Blacksmiths -----	10-01-89	20.25	2.25	1.50		.12	
APPRENTICES:							
First 1000 Hours -----	60% of Craftsman's		Rate Plus Fringes (same as above)				
Up to 2000 Hours -----	65% of Craftsman's		Rate Plus Fringes (same as above)				
Up to 3000 Hours -----	70% of Craftsman's		Rate Plus Fringes (same as above)				
Up to 4000 Hours -----	75% of Craftsman's		Rate Plus Fringes (same as above)				
Up to 5000 Hours -----	80% of Craftsman's		Rate Plus Fringes (same as above)				
Up to 6000 Hours -----	85% of Craftsman's		Rate Plus Fringes (same as above)				
Up to 7000 Hours -----	90% of Craftsman's		Rate Plus Fringes (same as above)				
Up to 8000 Hours -----	95% of Craftsman's		Rate Plus Fringes (Same as above)				
RATIO:							
1 Apprentice to 5 Craftsmen							

***** NOTICE *****
 Rates for classifications and/or ratios
 not appearing on this list must be obtained
 from the Department of Industrial Relations

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CLASSIFICATIONS	EFFECTIVE DATE	BASIC HOURLY RATES	FRINGE BENEFIT PAYMENT					
			H & W	PENS.	VAC.	APP. TR.	OTHERS	
BRICKLAYERS:								
BlockLayers -----	01-10-92	17.99	2.30	2.20		.05		
	05-01-92	18.29	2.30	2.20		.05		
	11-01-92	18.49	2.30	2.20		.05		
	05-01-93	18.79	2.30	2.20		.05		
	11-01-93	18.99	2.30	2.20		.05		
BrickLayers -----	01-10-92	17.99	2.30	2.20		.05		
	05-01-92	18.29	2.30	2.20		.05		
	11-01-92	18.49	2.30	2.20		.05		
	05-01-93	18.79	2.30	2.20		.05		
	11-01-93	18.99	2.30	2.20		.05		
BrickLayers, Sewer -----	01-10-92	17.99	2.30	2.20		.05		
	05-01-92	18.29	2.30	2.20		.05		
	11-01-92	18.49	2.30	2.20		.05		
	05-01-93	18.79	2.30	2.20		.05		
	11-01-93	18.99	2.30	2.20		.05		
Flagstone Layers -----	01-10-92	17.99	2.30	2.20		.05		
	05-01-92	18.29	2.30	2.20		.05		
	11-01-92	18.49	2.30	2.20		.05		
	05-01-93	18.79	2.30	2.20		.05		
	11-01-93	18.99	2.30	2.20		.05		
Granite Masons -----	01-10-92	17.99	2.30	2.20		.05		
	05-01-92	18.29	2.30	2.20		.05		
	11-01-92	18.49	2.30	2.20		.05		
	05-01-93	18.79	2.30	2.20		.05		
	11-01-93	18.99	2.30	2.20		.05		
Granite Setters -----	01-10-92	17.99	2.30	2.20		.05		
	05-01-92	18.29	2.30	2.20		.05		
	11-01-92	18.49	2.30	2.20		.05		
	05-01-93	18.79	2.30	2.20		.05		
	11-01-93	18.99	2.30	2.20		.05		
Stonemasons -----	01-10-92	17.99	2.30	2.20		.05		
	05-01-92	18.29	2.30	2.20		.05		
	11-01-92	18.49	2.30	2.20		.05		
	05-01-93	18.79	2.30	2.20		.05		
	11-01-93	18.99	2.30	2.20		.05		

NOTE:

continued on next page

***** NOTICE *****
 Rates for classifications and/or ratios
 not appearing on this list must be obtained
 from the Department of Industrial Relations 011092

CLASSIFICATIONS

EFFECTIVE DATE	BASIC HOURLY RATES	FRINGE BENEFIT PAYMENT				
		H & W	PENS.	VAC.	APP. TR.	OTHERS
BRICKLAYERS: (continued):						
Stonemason Cutters -----	01-10-92	17.99	2.30	2.20		.05
	05-01-92	18.29	2.30	2.20		.05
	11-01-92	18.49	2.30	2.20		.05
	05-01-93	18.79	2.30	2.20		.05
	11-01-93	18.99	2.30	2.20		.05
APPRENTICES:						
1st 6 Months -----	01-10-92	40%	*	1.30		
2nd 6 Months -----	01-10-92	50%	*	1.30		
3rd 6 Months -----	01-10-92	55%	2.30	1.30		
4th 6 Months -----	01-10-92	60%	2.30	1.30		
5th 6 Months -----	01-10-92	65%	2.30	1.30		
6th 6 Months -----	01-10-92	75%	2.30	1.30		
7th 6 Months -----	01-10-92	85%	2.30	1.30		
8th 6 Months -----	01-10-92	95%	2.30	1.30		
* no H&W for the first 60 days on apprentices.						
RATIO:						
1 Apprentice to 5 Craftsmen						
Pointer, Cleaner & Caulker:						
1st 6 Months -----	01-10-92	50%	*	1.30		
2nd 6 Months -----	01-10-92	55%	*	1.30		
3rd 6 Months -----	01-10-92	60%	2.30	1.30		
4th 6 Months -----	01-10-92	70%	2.30	1.30		
5th 6 Months -----	01-10-92	80%	2.30	1.30		
6th 6 Months -----	01-10-92	90%	2.30	1.30		
* no H&W first 60 days for apprentices.						
RATIO:						
1 Apprentice to 6 Craftsmen						
Apprentice Improver:						
1st 6 Months -----	01-10-92	65%	*	*		
2nd 6 Months -----	01-10-92	75%	2.30	1.30		
3rd 6 Months -----	01-10-92	85%	2.30	1.30		
4th 6 Months -----	01-10-92	95%	2.30	1.30		
* no benefits will be paid on apprentice for first 25 working days.						
RATIO:						
1 Apprentice to 6 Craftsmen						

***** NOTICE *****
 Rates for classifications and/or ratios
 not appearing on this list must be obtained
 from the Department of Industrial Relations 011092

SKILLED CRAFTS

MONTGOMERY

COUNTY

CLASSIFICATIONS

	EFFECTIVE DATE	BASIC HOURLY RATES	FRINGE BENEFIT PAYMENT				
			H & W	PENS.	VAC.	APP. TR.	OTHERS
<u>BRICKLAYERS: (continued):</u>							
Marble Masons -----	01-10-92	17.17	2.30	1.30		.03	
	05-01-92	17.67	2.30	1.30		.03	
	05-01-93	18.17	2.30	1.30		.03	
Terrazzo & Mosaic -----	01-10-92	17.17	2.30	1.30		.03	
	05-01-92	17.67	2.30	1.30		.03	
	05-01-93	18.17	2.30	1.30		.03	
Tile Setters -----	01-10-92	17.17	2.30	1.30		.03	
	05-01-92	17.67	2.30	1.30		.03	
	05-01-93	18.17	2.30	1.30		.03	
<u>APPRENTICES:</u>							
1st 6 Months -----	01-10-92	50%	*	1.30			
2nd 6 Months -----	01-10-92	55%	*	1.30			
3rd 6 Months -----	01-10-92	60%	2.30	1.30			
4th 6 Months -----	01-10-92	65%	2.30	1.30			
5th 6 Months -----	01-10-92	70%	2.30	1.30			
6th 6 Months -----	01-10-92	75%	2.30	1.30			
7th 6 Months -----	01-10-92	85%	2.30	1.30			
8th 6 Months -----	01-10-92	95%	2.30	1.30			
* no H&W for first 60 days on apprentices.							
<u>RATIO:</u>							
1 Apprentice to 4 Craftsmen							
Base Machinery Grinders ----	02-28-92	16.99		1.30			
	05-01-93	17.42		1.30			
Marble Mason Helpers -----	02-28-92	16.21		1.30			
	05-01-93	16.62		1.30			
Terrazzo Helpers -----	02-28-92	16.21		1.30			
	05-01-93	16.62		1.30			
Tile Setter Helpers -----	02-28-92	16.21		1.30			
	05-01-93	16.62		1.30			

***** NOTICE *****
 Rates for classifications and/or ratios
 not appearing on this List must be obtained
 from the Department of Industrial Relations 022892

CLASSIFICATIONS

EFFECTIVE DATE	BASIC HOURLY RATES	FRINGE BENEFIT PAYMENT				
		H & W	PENS.	VAC.	APP. TR.	OTHERS
<u>CARPENTERS:</u> Carpenters -----	06-01-91 18.40	1.80	2.00		.12	
<u>REGISTERED BEFORE 1-1-90</u>						
<u>APPRENTICES:</u> 1st 6 Months -----	45% of Craftsman's	Rate Plus Fringes (same as above)				
2nd 6 Months -----	50% of Craftsman's	Rate Plus Fringes (same as above)				
3rd 6 Months -----	55% of Craftsman's	Rate Plus Fringes (same as above)				
4th 6 Months -----	60% of Craftsman's	Rate Plus Fringes (same as above)				
5th 6 Months -----	65% of Craftsman's	Rate Plus Fringes (same as above)				
6th 6 Months -----	70% of Craftsman's	Rate Plus Fringes (same as above)				
7th 6 Months -----	80% of Craftsman's	Rate Plus Fringes (same as above)				
8th 6 Months -----	95% of Craftsman's	Rate Plus Fringes (same as above)				
<u>REGISTERED AFTER 1-1-90</u>						
<u>APPRENTICES:</u> 1st 6 Months -----	45% of Craftsman's	Rate Plus Fringes (except pension)				
2nd 6 Months -----	50% of Craftsman's	Rate Plus Fringes (except pension)				
3rd 6 Months -----	55% of Craftsman's	Rate Plus Fringes (except pension)				
4th 6 Months -----	60% of Craftsman's	Rate Plus Fringes (except pension)				
5th 6 Months -----	65% of Craftsman's	Rate Plus Fringes (same as above)				
6th 6 Months -----	70% of Craftsman's	Rate Plus Fringes (same as above)				
7th 6 Months -----	80% of Craftsman's	Rate Plus Fringes (same as above)				
8th 6 Months -----	95% of Craftsman's	Rate Plus Fringes (same as above)				
<u>RATIO:</u> 1 Apprentice to 2 Craftsmen 1 Apprentice to each 3 additional Craftsmen						
Floor Layers, Soft -----	05-08-87 15.30	1.80	2.00		.10	
Floor Layers, Resilient ----	05-08-87 15.30	1.80	2.00		.10	
Floor Scrapers, Sanders ----	05-08-87 15.30	1.80	2.00		.10	
Linoleum Layers -----	05-08-87 15.30	1.80	2.00		.10	
<u>APPRENTICES:</u> 1st Year -----	40% of Craftsman's	Rate Plus Fringes (same as above)				
2nd Year -----	55% of Craftsman's	Rate Plus Fringes (same as above)				
3rd Year -----	70% of Craftsman's	Rate Plus Fringes (same as above)				
4th Year -----	85% of Craftsman's	Rate Plus Fringes (same as above)				
<u>RATIO:</u> 1 Apprentice to 2 Craftsmen						

***** NOTICE *****
Rates for classifications and/or ratios
not appearing on this List must be obtained
from the Department of Industrial Relations

112489

CLASSIFICATIONS

	EFFECTIVE DATE	BASIC HOURLY RATES	FRINGE BENEFIT PAYMENT			
			H & W	PENS.	VAC.	APP. TR.
CEMENT MASONS:						
Cement Masons -----	08-04-89	16.88	1.80	1.50		.10
	06-01-90	17.38	1.80	1.50		.10
	06-01-91	17.78	1.80	1.50		.10
Cement Masons operating a grinder -----	08-04-89	+ .30	1.80	1.50		.10
Cement Masons on outriggers, swing or hanging scaffold up to 25' -----	08-04-89	+ .25	1.80	1.50		.10
\$.25 per hour for each additional 25' or part of same						
APPRENTICES:						
1st Year -----	45% of Craftsman's Rate Plus Fringes (same as above)					
2nd Year -----	65% of Craftsman's Rate Plus Fringes (same as above)					
3rd Year -----	85% of Craftsman's Rate Plus Fringes (same as above)					
RATIO:						
1 Apprentice to 4 Craftsmen						
<p>***** NOTICE *****</p> <p>Rates for classifications and/or ratios not appearing on this list must be obtained from the Department of Industrial Relations</p>						
						060489

CLASSIFICATIONS

ELECTRICIANS:

CLASSIFICATIONS	EFFECTIVE DATE	BASIC HOURLY RATES	FRINGE BENEFIT PAYMENT				
			H & W	PENS.	VAC.	APP. TR.	OTHERS
Electricians -----	10-15-91	18.74	2.90	2.45		.10	
	06-01-92	19.44	2.90	2.47		.10	

APPRENTICES REGISTERED BETWEEN JUNE 1, 1987 & JUNE 1, 1988:

0000 - 1000 hours -----	10-04-91	30%	2.90	a			
1001 - 2000 hours -----	10-04-91	33%	2.90	a			
2001 - 3000 hours -----	10-04-91	38%	2.90	a			
3001 - 4000 hours -----	10-04-91	45%	2.90	a			
4001 - 5000 hours -----	10-04-91	50%	2.90	a			
5001 - 6000 hours -----	10-04-91	55%	2.90	a			
6001 - 7000 hours -----	10-04-91	66%	2.90	a			
7001 - 8000 hours -----	10-04-91	83%	2.90	a			

APPRENTICES REGISTERED AFTER JUNE 1, 1988:

0000 - 1000 hours -----	10-04-91	30%	2.90				
1000 - 2000 hours -----	10-04-91	30%	2.90				
2000 - 3500 hours -----	10-04-91	40%	2.90	a			
3500 - 5000 hours -----	10-04-91	50%	2.90	a			
5000 - 6500 hours -----	10-04-91	60%	2.90	a			
6500 - 8000 hours -----	10-04-91	75%	2.90	a			

NOTE:

Continued on next page

***** NOTICE *****
 Rates for classifications and/or ratios not appearing on this List must be obtained from the Department of Industrial Relations 11591

CLASSIFICATIONS

ELECTRICIANS:
(continued):

RATIO:

- 1 Apprentice 1 Craftsman
- 1 Apprentice & 1 1st yr.
Apprentice* 1 Craftsman
- 1 Apprentice 1 1st yr.
Apprentice* 2 Craftsmen
- 1 Apprentice 1 1st yr.
Apprentice* 3 Craftsmen
- 2 Apprentices 1 1st yr.
Apprentice* 4 Craftsmen
- 1 Apprentice 2 1st yr.
Apprentices* 4 Craftsmen
- 2 Apprentices 1 1st yr.
Apprentice* 5 Craftsmen
- 1 Apprentice 2 1st yr.
Apprentices* 5 Craftsmen
- 2 Apprentices 1 1st yr.
Apprentice* 6 Craftsmen
- 1 Apprentice 2 1st yr.
Apprentices* 6 Craftsmen
- * Apprentice in 1st or 2nd
Period.

FOOTNOTE:

a - Same percentage factor of \$1.89 as used in determining hourly rate plus 3% of gross monthly labor payroll.

EFFECTIVE DATE	BASIC HOURLY RATES	FRINGE BENEFIT PAYMENT				
		H & W	PENS.	VAC.	APP. TR.	OTHERS

***** NOTICE *****
Rates for classifications and/or ratios
appearing on this list must be obtained
the Department of Industrial Relations

11591

CLASSIFICATIONS

EFFECTIVE DATE	BASIC HOURLY RATES	FRINGE BENEFIT PAYMENT				
		H & W	PENS.	VAC.	APP. TR.	OTHERS
<u>ELEVATOR CONSTRUCTORS:</u>						
Elevator Constructors ----- 08-23-91	17.645	3.495	2.09	a	.085	
Elevator Helpers ----- 08-23-91	12.35	3.495	2.09	a	.085	
Elevator Probationary Helpers * ----- 08-23-91	8.82	No fringe benefit payments required				
* Limited to one 6 month period provided probationary helper works at least 100 hours in each 30 day period during the 6 months						
<u>APPRENTICES:</u>						
Not applicable						
<u>RATIO:</u>						
1 Mechanic to 1 Helper						
2 Mechanics to 3 Helpers						
5 Mechanics to 7 Helper						
<u>FOOTNOTES:</u>						
a - 6% of Rate -- Less than 5 years service						
8% of Rate -- More than 5 years service						
***** NOTICE ***** Rates for classifications and/or ratios not appearing on this list must be obtained from the Department of Industrial Relations						
					082391	

CLASSIFICATIONS

	EFFECTIVE DATE	BASIC HOURLY RATES	FRINGE BENEFIT PAYMENT				
			H & W	PENS.	VAC.	APP. TR.	OTHERS
GLAZIERS:							
Glaziers -----	01-31-92	15.70		1.20		.05	
Swingstage Glaziers -----	01-31-92	16.70		1.20		.05	
APPRENTICES:							
1st 6 Months -----	45% of Craftsman's Rate (No fringe payment required)						
2nd 6 Months -----	50% of Craftsman's Rate (No fringe payment required)						
3rd 6 Months -----	55% of Craftsman's Rate (Plus Pension Listed above)						
4th 6 Months -----	60% of Craftsman's Rate (Plus Pension Listed above)						
5th 6 Months -----	65% of Craftsman's Rate (Plus Pension Listed above)						
6th 6 Months -----	70% of Craftsman's Rate (Plus Pension Listed above)						
7th 6 Months -----	75% of Craftsman's Rate (Plus Pension Listed above)						
8th 6 Months -----	85% of Craftsman's Rate (Plus Pension Listed above)						
RATIO:							
1 Apprentice to 2 Craftsmen							
2 Apprentices to 6 Craftsmen							
3 Apprentices to 8 or more Craftsmen							
<p>***** NOTICE *****</p> <p>Rates for classifications and/or ratios not appearing on this list must be obtained from the Department of Industrial Relations</p>							
						013192	

CLASSIFICATIONS

EFFECTIVE DATE	BASIC HOURLY RATES	FRINGE BENEFIT PAYMENT				
		H & W	PENS.	VAC.	APP. TR.	OTHERS
LATHERS:						
Lathers -----	11-24-89	17.45	1.80	2.00		.12
	12-01-89	17.70	1.80	2.00		.12
	06-01-90	18.10	1.80	2.00		.12
	06-01-91	18.40	1.80	2.00		.12
APPRENTICES INDENTURED PRIOR TO JANUARY 1, 1990:						
1st 6 Months -----	45% of Craftsman's Rate Plus Fringes (same as above)					
2nd 6 Months -----	50% of Craftsman's Rate Plus Fringes (same as above)					
3rd 6 Months -----	55% of Craftsman's Rate Plus Fringes (same as above)					
4th 6 Months -----	60% of Craftsman's Rate Plus Fringes (same as above)					
5th 6 Months -----	65% of Craftsman's Rate Plus Fringes (same as above)					
6th 6 Months -----	70% of Craftsman's Rate Plus Fringes (same as above)					
7th 6 Months -----	80% of Craftsman's Rate Plus Fringes (same as above)					
8th 6 Months -----	95% of Craftsman's Rate Plus Fringes (same as above)					
APPRENTICES INDENTURED AFTER TO JANUARY 1, 1990:						
1st 6 Months -----	45% of Craftsman's Rate Plus Fringes (except pension)					
2nd 6 Months -----	50% of Craftsman's Rate Plus Fringes (except pension)					
3rd 6 Months -----	55% of Craftsman's Rate Plus Fringes (except pension)					
4th 6 Months -----	60% of Craftsman's Rate Plus Fringes (except pension)					
5th 6 Months -----	65% of Craftsman's Rate Plus Fringes (same as above)					
6th 6 Months -----	70% of Craftsman's Rate Plus Fringes (same as above)					
7th 6 Months -----	80% of Craftsman's Rate Plus Fringes (same as above)					
8th 6 Months -----	95% of Craftsman's Rate Plus Fringes (same as above)					
RATIO:						
1 Apprentice to 2 Craftsmen						
1 Apprentice to 3 Craftsmen, thereafter						
<p>***** NOTICE *****</p> <p>Rates for classifications and/or ratios not appearing on this list must be obtained from the Department of Industrial Relations</p>						
						112489

SKILLED CRAFTS

MONTGOMERY
COUNTY

CLASSIFICATIONS

	EFFECTIVE DATE	BASIC HOURLY RATES	FRINGE BENEFIT PAYMENT				
			H & W	PENS.	VAC.	APP. TR.	OTHERS
LINEMEN:							
Linemen -----	10-04-91	18.74	2.90	a		.10	
	06-01-92	19.44	2.90	a		.10	
Technician -----	10-04-91	18.74	2.90	a		.10	
	06-01-92	19.44	2.90	a		.10	
Heavy Equipment Operator: Hole Digging, Cranes, Hydraulic Lift or Bucket ----							
	11-15-91	18.74	2.90	a		.10	
	06-01-92	19.44	2.90	a		.10	
Line Truck with Winch or Pole & Steel Handling -----							
	11-15-91	14.18	2.90	a		.10	
	06-01-92	14.88	2.90	a		.10	
Non-Specialized Trucks & Misc. Equipment -----							
	11-15-91	11.44	2.90	a		.10	
	06-01-92	12.14	2.90	a		.10	
Groundmen - Truck Driver: 0 - 1 Year Experience -----							
	11-15-91	10.53	2.90	a		.10	
	06-01-92	11.23	2.90	a		.10	
Over 1 Year -----	11-15-91	11.44	2.90	a		.10	
	06-01-92	12.14	2.90	a		.10	
APPRENTICES:							
0 to 1000 Hours -----	60% of Craftsman's Rate Plus Fringes (same as above)						
1001 to 2000 Hours -----	65% of Craftsman's Rate Plus Fringes (same as above)						
2001 to 3000 Hours -----	70% of Craftsman's Rate Plus Fringes (same as above)						
3001 to 4000 Hours -----	75% of Craftsman's Rate Plus Fringes (same as above)						
4001 to 5000 Hours -----	80% of Craftsman's Rate Plus Fringes (same as above)						
5001 to 6000 Hours -----	85% of Craftsman's Rate Plus Fringes (same as above)						
6001 to 7000 Hours -----	90% of Craftsman's Rate Plus Fringes (same as above)						

NOTE:

Continued on next page

***** NOTICE *****
Rates for classifications and/or ratios
not appearing on this list must be obtained
from the Department of Industrial Relations

111591

CLASSIFICATIONS

EFFECTIVE DATE	BASIC HOURLY RATES	FRINGE BENEFIT PAYMENT				
		H & W	PENS.	VAC.	APP. TR.	OTHERS
<p><u>LINEMEN: (continued):</u></p> <p>RATIO: 1 Apprentice 1 Craftsman 1 Apprentice & 1 1st yr. Apprentice* 1 Craftsman 1 Apprentice 1 1st yr. Apprentice* 2 Craftsmen 1 Apprentice 1 1st yr. Apprentice* 3 Craftsmen 2 Apprentices 1 1st yr. Apprentice* 4 Craftsmen 1 Apprentice 2 1st yr. Apprentices* 4 Craftsmen 2 Apprentices 1 1st yr. Apprentice* 5 Craftsmen 1 Apprentice 2 1st yr. Apprentices* 5 Craftsmen 2 Apprentices 1 1st yr. Apprentice* 6 Craftsmen 1 Apprentice 2 1st yr. Apprentices* 6 Craftsmen</p> <p>* Apprentice in 1st or 2nd Period.</p> <p>FOOTNOTE: a - \$1.89 per. hour + 3% of gross monthly labor payroll</p>						
<p>***** NOTICE *****</p> <p>Rates for classifications and/or ratios not appearing on this List must be obtained from the Department of Industrial Relations</p>						
					111591	

CLASSIFICATIONS

	EFFECTIVE DATE	BASIC HOURLY RATES	FRINGE BENEFIT PAYMENT				
			H & W	PENS.	VAC.	APP. TR.	OTHERS
AMERICAN LINE BUILDERS							
OUTSIDE POWER, DISTRIBUTION & TRANSMISSION RATES:							
Linemen -----	01-10-92	18.75	a	b		.05	
Cable Splicers -----	01-10-92	19.61	a	b		.05	
APPRENTICES:							
1st 1000 Hours -----	60% of Craftsman's		Rate Plus Fringes (same as above)				
2nd 1000 Hours -----	65% of Craftsman's		Rate Plus Fringes (same as above)				
3rd 1000 Hours -----	70% of Craftsman's		Rate Plus Fringes (same as above)				
4th 1000 Hours -----	75% of Craftsman's		Rate Plus Fringes (same as above)				
5th 1000 Hours -----	80% of Craftsman's		Rate Plus Fringes (same as above)				
6th 1000 Hours -----	85% of Craftsman's		Rate Plus Fringes (same as above)				
7th 1000 Hours -----	90% of Craftsman's		Rate Plus Fringes (same as above)				
RATIO:							
1 Apprentice to 3 Craftsmen							
Equipment Repairman -----	01-10-92	13.59	a	b		.05	
Equipment Servicemen -----	01-10-92	10.43	a	b		.05	
Operators: All Mechanized Equipment Used in Line Construction							
0 - 1/2 year -----	01-10-92	10.95	a	b		.05	
1/2 - 1 year -----	01-10-92	13.59	a	b		.05	
1 year or more -----	01-10-92	16.38	a	b		.05	
Operators of 45 ton cranes or larger -----							
01-10-92	18.75	a	b		.05		
Digging Equipment -----							
01-10-92	16.38	a	b		.05		
Line Truck with Power Earth Boring Auger (Distribution work only) -----							
01-10-92	13.41	a	b		.05		
Truck with Winch or Pole & Steel Handling -----							
01-10-92	10.41	a	b		.05		
Truck without Winch -----							
01-10-92	7.73	a	b		.05		
Groundmen:							
0 - 3 months -----	01-10-92	7.73				.05	
3 - 6 months -----	01-10-92	7.73	a	b		.05	
6 months - 1 year -----	01-10-92	9.53	a	b		.05	
1 year or more -----	01-10-92	10.47	a	b		.05	

FOOTNOTE:

- a - Health & Welfare \$1.95
- b - 3% of gross monthly labor payroll + 5% of employees gross wage for pension

***** NOTICE *****

Rates for classifications and/or ratios not appearing on this list must be obtained from the Department of Industrial Relations

011092

SKILLED CRAFTS

WORK FOR MUNICIPALLY OWNED POWER PLANT

STATEWIDE

COUNTY

CLASSIFICATIONS

CLASSIFICATIONS	EFFECTIVE DATE	BASIC HOURLY RATES	FRINGE BENEFIT PAYMENT				
			H & W	PENS.	VAC.	APP. TR.	OTHERS
<u>AMERICAN LINE BUILDERS</u>							
<u>HIGH TENSION PIPE TYPE</u>							
<u>CABLE INSTALLATION RATES:</u>							
Linemen -----	01-10-92	19.76	a	b		.05	
Certified Linemen Welder ---	01-10-92	19.76	a	b		.05	
Certified Cable Splicer -----	01-10-92	19.76	a	b		.05	
X-Ray Technician -----	01-10-92	19.76	a	b		.05	
<u>APPRENTICES:</u>							
1st 1000 Hours -----	60% of Craftsman's Rate Plus Fringes (same as above)						
2nd 1000 Hours -----	65% of Craftsman's Rate Plus Fringes (same as above)						
3rd 1000 Hours -----	70% of Craftsman's Rate Plus Fringes (same as above)						
4th 1000 Hours -----	75% of Craftsman's Rate Plus Fringes (same as above)						
5th 1000 Hours -----	80% of Craftsman's Rate Plus Fringes (same as above)						
6th 1000 Hours -----	85% of Craftsman's Rate Plus Fringes (same as above)						
7th 1000 Hours -----	90% of Craftsman's Rate Plus Fringes (same as above)						
<u>RATIO:</u>							
1 Apprentice to 3 Craftsmen							
Equipment Repairman -----	01-10-92	13.68	a	b		.05	
Equipment Servicemen -----	01-10-92	10.35	a	b		.05	
<u>Operators:</u>							
0 - 1/2 year -----	01-10-92	11.03	a	b		.05	
1/2 to 1 year -----	01-10-92	13.68	a	b		.05	
1 year or more -----	01-10-92	16.98	a	b		.05	
Operators of 45 ton cranes							
or larger -----	01-10-92	19.76	a	b		.05	
Hole Digging Equipment -----	01-10-92	16.98	a	b		.05	
Truck with Winch or Pole &							
Steel Handling -----	01-10-92	10.58	a	b		.05	
Truck without Winch -----	01-01-92	8.39	a	b		.05	
<u>Groundmen:</u>							
0 - 3 months -----	01-10-92	8.39				.05	
3 months - 1 year -----	01-10-92	8.39	a	b		.05	
1 year or over -----	01-10-92	10.58	a	b		.05	

FOOTNOTE:

- a - Health & Welfare \$1.95
- b - 3% of gross monthly Labor payroll + 5% of employees gross wage for pension

***** NOTICE *****

Rates for classifications and/or ratios not appearing on this list must be obtained from the Department of Industrial Relations 011092

CLASSIFICATIONS

	EFFECTIVE DATE	BASIC HOURLY RATES	FRINGE BENEFIT PAYMENT				
			H & W	PENS.	VAC.	APP. TR.	OTHERS
<u>AMERICAN LINE BUILDERS</u>							
<u>UNDERGROUND:</u>							
Linemen -----	12-20-85	15.20	1.00	a			
Technician -----	12-20-85	15.20	1.00	a			
Cable Splicer -----	12-20-85	15.90	1.00	a			
Equipment Operators:							
0 - 6 months -----	12-20-85	11.08	1.00	a			
6 months or more -----	12-20-85	13.31	1.00	a			
Truck Drivers -----	12-20-85	9.12	1.00	a			
Groundmen, Class A -----	12-20-85	9.12	1.00	a			
Groundmen, Class B -----	12-20-85	8.56	1.00	a			

FOOTNOTE:

a - 3% of gross monthly
 labor payroll + 5% of
 employees gross wage

***** NOTICE *****
 Rates for classifications and/or ratios
 not appearing on this List must be obtained
 from the Department of Industrial Relations

122085

CLASSIFICATIONS

METAL FINISHERS:

Metal Finishers -----

EFFECTIVE DATE	BASIC HOURLY RATES	FRINGE BENEFIT PAYMENT				
		H & W	PENS.	VAC.	APP. TR.	OTHERS
06-13-86	7.00	.10	.10			
02-01-87	7.50	.10	.20			
02-01-88	8.00	.10	.30			

APPRENTICES:

Not Applicable

RATIO:

Not Applicable

***** NOTICE *****
Rates for classifications and/or ratios not appearing on this List must be obtained from the Department of Industrial Relations

061386

CLASSIFICATIONS

EFFECTIVE DATE	BASIC HOURLY RATES	FRINGE BENEFIT PAYMENT				
		H & W	PENS.	VAC.	APP. TR.	OTHERS
<u>MILLWRIGHTS:</u>						
Millwrights -----	01-18-91	18.65	1.80	2.00		.175
	03-01-91	18.85	1.90	2.00		.175
	09-01-91	18.95	2.10	2.00		.175
	03-01-92	19.15	1.80	2.10		.175
	09-01-92	19.35	1.80	2.20		.175
	03-01-93	19.55	1.80	2.30		.175
APPRENTICES REGISTERED BEFORE JUNE 1, 1984						
<u>APPRENTICES</u>						
1st Six Months -----	01-18-91	10.12	1.80	2.00		.175
2nd Six Months -----		10.98	1.80	2.00		.175
2nd Year -----		13.48	1.80	2.00		.175
3rd Year -----		15.25	1.80	2.00		.175
4th Year -----		16.11	1.80	2.00		.175
<u>APPRENTICES</u>						
1st Six Months -----	03-01-91	10.42	1.90	2.00		.175
2nd Six Months -----		11.28	1.90	2.00		.175
2nd Year -----		13.78	1.90	2.00		.175
3rd Year -----		15.55	1.90	2.00		.175
4th Year -----		16.41	1.90	2.00		.175
<u>APPRENTICES</u>						
1st Six Months -----	09-01-91	10.72	2.10	2.00		.175
2nd Six Months -----		11.58	2.10	2.00		.175
2nd Year -----		14.08	2.10	2.00		.175
3rd Year -----		15.85	2.10	2.00		.175
4th Year -----		16.71	2.10	2.00		.175
<u>APPRENTICES</u>						
1st Six Months -----	03-01-92	11.02	1.80	2.10		.175
2nd Six Months -----		11.88	1.80	2.10		.175
2nd Year -----		14.38	1.80	2.10		.175
3rd Year -----		16.15	1.80	2.10		.175
4th Year -----		17.01	1.80	2.10		.175

NOTE:

(continued on next page.)

***** NOTICE *****
Rates for classifications and/or ratios
not appearing on this list must be obtained
from the Department of Industrial Relations

040591

CLASSIFICATIONS

EFFECTIVE DATE	BASIC HOURLY RATES	FRINGE BENEFIT PAYMENT				
		H & W	PENS.	VAC.	APP. TR.	OTHERS
<u>MILLWRIGHTS: (cont.):</u>						
<u>APPRENTICES</u>						
<u>09-01-92</u>						
1st Six Months-----	11.32	1.80	2.20		.175	
2nd Six Months-----	12.18	1.80	2.20		.175	
2nd Year-----	14.68	1.80	2.20		.175	
3rd Year-----	16.45	1.80	2.20		.175	
4th Year-----	17.31	1.80	2.20		.175	
<u>APPRENTICES</u>						
<u>03-01-93</u>						
1st Six Months-----	11.62	1.80	2.30		.175	
2nd Six Months-----	12.48	1.80	2.30		.175	
2nd Year-----	14.98	1.80	2.30		.175	
3rd Year-----	16.75	1.80	2.30		.175	
4th Year-----	17.61	1.80	2.30		.175	
<u>RATIO:</u>						
1 Apprentice to 3 Craftsmen						
<u>APPRENTICES REGISTERED AFTER JUNE 1, 1984</u>						
<u>APPRENTICE HIRED BEFORE</u>						
<u>01-18-91</u>						
<u>JUNE 1, 1984. ALL FRINGES</u>	10.12	1.80			.175	
<u>AS LISTED ABOVE.</u>	10.98	1.80			.175	
* - no pension contribution	13.48	1.80			.175	
during the first four year	15.25	1.80			.175	
period of apprentice.	16.11	1.80			.175	
<u>NOTE:</u>						
(continued on next page)						
*****NOTICE***** Rates for classifications and/or ratios not appearing on this list must be obtained from the Department of Industrial Relations						
						040591

CLASSIFICATIONS

MILLNRIGHTS: (cont.):

EFFECTIVE DATE	BASIC HOURLY RATES	FRINGE BENEFIT PAYMENT				
		H & W	PENS.	VAC.	APP. TR.	OTHERS
<u>APPRENTICES REGISTERED AFTER JUNE 1, 1984</u>						
<u>03-01-91</u>						
<u>APPRENTICES</u>						.175
1st Six Months-----	10.42	1.80				.175
2nd Six Months-----	11.28	1.80				.175
2nd Year-----	13.78	1.80				.175
3rd Year-----	15.55	1.80				.175
4th Year-----	16.41	1.80				.175
<u>09-01-91</u>						
<u>APPRENTICES</u>						.175
1st Six Months-----	10.72	1.80				.175
2nd Six Months-----	11.58	1.80				.175
2nd Year-----	14.08	1.80				.175
3rd Year-----	15.85	1.80				.175
4th Year-----	16.71	1.80				.175
<u>03-01-92</u>						
<u>APPRENTICES</u>						.175
1st Six Months-----	11.02	1.80				.175
2nd Six Months-----	11.88	1.80				.175
2nd Year-----	14.38	1.80				.175
3rd Year-----	16.15	1.80				.175
4th Year-----	17.01	1.80				.175

NOTE:

continued on next page

***** NOTICE *****
 Rates for classifications and/or ratios
 not appearing on this list must be obtained
 from the Department of Industrial Relations

011891

CLASSIFICATIONS

EFFECTIVE DATE	BASIC HOURLY RATES	FRINGE BENEFIT PAYMENT				
		H & W	PENS.	VAC.	APP. TR.	OTHERS
<u>MILLWRIGHTS: (cont.):</u>						
<u>09-01-92</u>						
<u>APPRENTICES</u>						
1st Six Months-----	11.32	1.80			.175	
2nd Six Months-----	12.18	1.80			.175	
2nd Year -----	14.68	1.80			.175	
3rd Year -----	16.15	1.80			.175	
4th Year-----	17.31	1.80			.175	
<u>03-01-93</u>						
<u>APPRENTICES</u>						
1st Six Months-----	11.62	1.80			.175	
2nd Six Months-----	12.48	1.80			.175	
2nd Year -----	14.98	1.80			.175	
3rd Year -----	16.75	1.80			.175	
4th Year-----	17.61	1.80			.175	

***** NOTICE *****
 Rates for classifications and/or ratios
 not appearing on this list must be obtained
 from the Department of Industrial Relations

011891

SKILLED CRAFTS

MONTGOMERY

COUNTY

CLASSIFICATIONS

	EFFECTIVE DATE	BASIC HOURLY RATES	FRINGE BENEFIT PAYMENT				
			H & W	PENS.	VAC.	APP. TR.	OTHERS
<u>PAINTERS:</u>							
<u>COMMERCIAL AND INDUSTRIAL:</u>							
Brush and Roller -----	11-24-89	16.80	.95	1.50		.06	
	05-01-90	17.10	.95	1.50		.06	
	05-01-91	17.40	.95	1.50		.06	
Spray -- Steam Cleaning & Sandblast -----	11-24-89	17.55	.95	1.50		.06	
	05-01-90	17.85	.95	1.50		.06	
	05-01-91	18.15	.95	1.50		.06	
Wall Covering-Vinyl-Paper---	11-24-89	17.15	.95	1.50		.06	
	05-01-90	17.45	.95	1.50		.06	
	05-01-91	17.75	.95	1.50		.06	
Dry Wall, Taping and Spackling -----	11-24-89	17.15	.95	1.50		.06	
	05-01-90	17.45	.95	1.50		.06	
	05-01-91	17.75	.95	1.50		.06	
Steeplejack Work -----	11-24-89	17.75	.95	1.50		.06	
	05-01-90	18.05	.95	1.50		.06	
	05-01-91	18.35	.95	1.50		.06	
Swing - Scaffolding-----	11-24-89	17.20	.95	1.50		.06	
	05-01-90	17.50	.95	1.50		.06	
	05-01-91	17.80	.95	1.50		.06	
<u>APPRENTICES:</u>							
Starting Pay -----	11-24-89	6.00	.95	1.50		.06	
2nd 6 Months -----	11-24-89	6.30	.95	1.50		.06	
3rd 6 Months -----	11-24-89	6.61	.95	1.50		.06	
4th 6 Months -----	11-24-89	6.94	.95	1.50		.06	
5th 6 Months -----	80% of Craftsmen's Rate Plus Fringes (same as above)						
6th 6 Months -----	90% of Craftsmen's Rate Plus Fringes (same as above)						
<u>RATIO:</u>							
1 Apprentice to 2 Craftsmen							
1 Apprentice to 3 Craftsmen							
1 Apprentice to 4 Craftsmen, thereafter							
<p>***** NOTICE *****</p> <p>Rates for classifications and/or ratios not appearing on this list must be obtained from the Department of Industrial Relations</p>							
						112489	

CLASSIFICATIONS

EFFECTIVE DATE	BASIC HOURLY RATES	FRINGE BENEFIT PAYMENT				
		H & W	PENS.	VAC.	APP. TR.	OTHERS
PILE DRIVERS:						
Pile Drivers -----	11-24-89	17.45	1.80	2.00		.12
	12-01-89	17.70	1.80	2.00		.12
	06-01-90	18.10	1.80	2.00		.12
	06-01-91	18.40	1.80	2.00		.12
APPRENTICES INDENTURED PRIOR TO JANUARY 1, 1990:						
1st 6 Months -----	45% of Craftsman's Rate Plus Fringes (same as above)					
2nd 6 Months -----	50% of Craftsman's Rate Plus Fringes (same as above)					
3rd 6 Months -----	55% of Craftsman's Rate Plus Fringes (same as above)					
4th 6 Months -----	60% of Craftsman's Rate Plus Fringes (same as above)					
5th 6 Months -----	65% of Craftsman's Rate Plus Fringes (same as above)					
6th 6 Months -----	70% of Craftsman's Rate Plus Fringes (same as above)					
7th 6 Months -----	80% of Craftsman's Rate Plus Fringes (same as above)					
8th 6 Months -----	95% of Craftsman's Rate Plus Fringes (same as above)					
APPRENTICES INDENTURED AFTER TO JANUARY 1, 1990:						
1st 6 Months -----	45% of Craftsman's Rate Plus Fringes (except pension)					
2nd 6 Months -----	50% of Craftsman's Rate Plus Fringes (except pension)					
3rd 6 Months -----	55% of Craftsman's Rate Plus Fringes (except pension)					
4th 6 Months -----	60% of Craftsman's Rate Plus Fringes (except pension)					
5th 6 Months -----	65% of Craftsman's Rate Plus Fringes (same as above)					
6th 6 Months -----	70% of Craftsman's Rate Plus Fringes (same as above)					
7th 6 Months -----	80% of Craftsman's Rate Plus Fringes (same as above)					
8th 6 Months -----	95% of Craftsman's Rate Plus Fringes (same as above)					
RATIO:						
1 Apprentice to 2 Craftsmen						
1 Apprentice to each 3 additional Craftsmen						
<p>***** NOTICE *****</p> <p>Rates for classifications and/or ratios not appearing on this List must be obtained from the Department of Industrial Relations</p>						
112489						

SKILLED CRAFTS

MONTGOMERY

COUNTY

CLASSIFICATIONS

	EFFECTIVE DATE	BASIC HOURLY RATES	FRINGE BENEFIT PAYMENT				
			H & W	PENS.	VAC.	APP. TR.	OTHERS
PLASTERERS:							
Plasterers -----	08-18-89	17.95	1.80	1.50		.10	
	05-01-90	18.45	1.80	1.50		.10	
	05-01-91	18.95	1.80	1.50		.10	
	05-01-92	19.45	1.80	1.50		.10	
	05-01-93	19.95	1.80	1.50		.10	
APPRENTICES:							
1st 6 Months -----	35% of Craftsman's		Rate Plus Fringes (same as above)				
2nd 6 Months -----	40% of Craftsman's		Rate Plus Fringes (same as above)				
3rd 6 Months -----	45% of Craftsman's		Rate Plus Fringes (same as above)				
4th 6 Months -----	50% of Craftsman's		Rate Plus Fringes (same as above)				
5th 6 Months -----	60% of Craftsman's		Rate Plus Fringes (same as above)				
6th 6 Months -----	70% of Craftsman's		Rate Plus Fringes (same as above)				
7th 6 Months -----	80% of Craftsman's		Rate Plus Fringes (same as above)				
8th 6 Months -----	90% of Craftsman's		Rate Plus Fringes (same as above)				
RATIO:							
1 Apprentice to 3 Craftsmen							
<p>***** NOTICE *****</p> <p>Rates for classifications and/or ratios not appearing on this List must be obtained from the Department of Industrial Relations</p>							
						081889	

CLASSIFICATIONS

	EFFECTIVE DATE	BASIC HOURLY RATES	FRINGE BENEFIT PAYMENT				
			H & W	PENS.	VAC.	APP. TR.	OTHERS
<u>PLUMBERS:</u>							
Plumbers & Pipefitters -----	06-22-90	19.37	2.29	1.85		.08	
<u>APPRENTICES:</u>							
1st Year -----	06-22-90	5.81	2.29	.55		.08	
2nd Year -----	06-22-90	7.75	2.29	1.85		.08	
3rd Year -----	06-22-90	9.69	2.29	1.85		.08	
4th Year -----	06-22-90	11.62	2.29	1.85		.08	
5th Year -----	06-22-90	13.56	2.29	1.85		.08	
<u>RATIO:</u>							
1 Apprentice to 1 Craftsmen							
1 Apprentice to 4 Craftsmen Thereafter							
<p>***** NOTICE *****</p> <p>Rates for classifications and/or ratios not appearing on this list must be obtained from the Department of Industrial Relations</p>							
						062290	

CLASSIFICATIONS

	EFFECTIVE DATE	BASIC HOURLY RATES	FRINGE BENEFIT PAYMENT				
			H & W	PENS.	VAC.	APP. TR.	OTHERS
ROOFERS:							
Roofers, Composition -----	06-07-91	16.05	2.00	1.85		.24	
	05-01-92	.25 to	be allocated at a later date.				
Roofers, Dampproofers/Spray --	06-07-91	16.05	2.00	1.85		.24	
	05-01-92	.25 to	be allocated at a later date.				
Roofers, Waterproofers -----	06-07-91	16.05	2.00	1.85		.24	
	05-01-92	.25 to	be allocated at a later date.				
Roofers, Slate & Tile -----	06-07-91	16.27	2.00	1.85		.24	
	05-01-92	.25 to	be allocated at a later date.				
APPRENTICES:							
1st 6 Months -----	35% of Craftsman's		Rate Except Pension		.50	Contribution.	
2nd 6 Months -----	45% of Craftsman's		Rate Except Pension		.50	Contribution.	
3rd 6 Months -----	50% of Craftsman's		Rate Except Pension		.50	Contribution.	
4th 6 Months -----	55% of Craftsman's		Rate Except Pension		.50	Contribution.	
5th 6 Months -----	60% of Craftsman's		Rate Except Pension		.50	Contribution.	
6th 6 Months -----	65% of Craftsman's		Rate Except Pension		.50	Contribution.	
7th 6 Months -----	70% of Craftsman's		Rate Except Pension		.50	Contribution.	
RATIO:							
2 Apprentice to 3 Craftsmen							

***** NOTICE *****
 Rates for classifications and/or ratios
 not appearing on this List must be obtained
 from the Department of Industrial Relations

060791

CLASSIFICATIONS

EFFECTIVE DATE	BASIC HOURLY RATES	FRINGE BENEFIT PAYMENT					
		H & W	PENS.	VAC.	APP. TR.	OTHERS	
SHEET METAL WORKERS:							
Sheet Metal Workers -----	04-10-92	18.00	2.96	1.94		.51	.69
APPRENTICES:							
1st Year -----	04-10-92	6.30	1.67			.51	.28
3rd 6 Months -----	04-10-92	7.20	2.96	1.94		.51	.36
4th 6 Months -----	04-10-92	8.10	2.96	1.94		.51	.39
5th 6 Months -----	04-10-92	9.00	2.96	1.94		.51	.42
6th 6 Months -----	04-10-92	9.90	2.96	1.94		.51	.45
7th 6 Months -----	04-10-92	10.80	2.96	1.94		.51	.48
8th 6 Months -----	04-10-92	11.70	2.96	1.94		.51	.50
9th 6 Months -----	04-10-92	12.60	2.96	1.94		.51	.53
10th 6 Months -----	04-10-92	13.50	2.96	1.94		.51	.56

RATIO:

1 Apprentice to 2 Craftsmen

***** NOTICE *****
 Rates for classifications and/or ratios
 not appearing on this list must be obtained
 from the Department of Industrial Relations

041092

SKILLED CRAFTS

MONTGOMERY
COUNTY

CLASSIFICATIONS

	EFFECTIVE DATE	BASIC HOURLY RATES	FRINGE BENEFIT PAYMENT				
			H & W	PENS.	VAC.	APP. TR.	OTHERS
<u>SIGN PAINTERS:</u>							
Sign Painters Inside -----	02-16-90	10.41		.63			
	08-01-90	10.51		.63			
Sign Painters Outside -----	02-16-90	12.14		.63			
	08-01-90	12.26		.63			
General Worker -----	02-16-90	6.31		.63			
	08-01-90	6.37		.63			
<u>APPRENTICES:</u>							
None							
<u>RATIO:</u>							
1 General Worker to 3 Craftsmen							
<u>TRAINEES:</u>							
1st 1,000 Hours -----	02-16-90	6.76		.63			
	08-01-90	6.83		.63			
2nd 1,000 Hours -----	02-16-90	7.72		.63			
	08-01-90	7.80		.63			
3rd 1,000 Hours -----	02-16-90	8.70		.63			
	08-01-90	8.79		.63			
4th 1,000 Hours -----	02-16-90	9.70		.63			
	08-01-90	9.80		.63			
5th 1,000 Hours -----	02-16-90	10.31		.63			
	08-01-90	10.41		.63			
6th 1,000 Hours -----	02-16-90	10.96		.63			
	08-01-90	11.07		.63			
7th 1,000 Hours -----	02-16-90	12.13		.63			
	08-01-90	12.25		.63			

NOTE:

No National or Local Pension contribution is to be made on a Trainee under 25 years of age.

***** NOTICE *****
Rates for classifications and/or ratios not appearing on this List must be obtained from the Department of Industrial Relations

021690

SKILLED CRAFTS

MONTGOMERY

COUNTY

CLASSIFICATIONS

SPRINKLER FITTERS:

Sprinkler Fitters -----

EFFECTIVE DATE	BASIC HOURLY RATES	FRINGE BENEFIT PAYMENT				
		H & W	PENS.	VAC.	APP. TR.	OTHERS
04-01-90	19.90	2.40	2.50		.10	
01-01-91	19.90	2.65	2.75		.10	

APPRENTICES REGISTERED AFTER APRIL 1, 1985

Grade 1 Apprentices

Class 1 *-----

Class 2 *-----

Class 3 *-----

Class 4 *-----

30% of Craftsman's	Rate Plus Fringes (same as above)
35% of Craftsman's	Rate Plus Fringes (same as above)
40% of Craftsman's	Rate Plus Fringes (same as above)
45% of Craftsman's	Rate Plus Fringes (same as above)

Grade 2 Apprentices

Class 1 *-----

Class 2 *-----

Class 3 *-----

Class 4 *-----

Class 5 *-----

Class 6 *-----

Class 7 *-----

Class 8 *-----

50% of Craftsman's	Rate Plus Fringes (same as above)
55% of Craftsman's	Rate Plus Fringes (same as above)
60% of Craftsman's	Rate Plus Fringes (same as above)
65% of Craftsman's	Rate Plus Fringes (same as above)
70% of Craftsman's	Rate Plus Fringes (same as above)
75% of Craftsman's	Rate Plus Fringes (same as above)
80% of Craftsman's	Rate Plus Fringes (same as above)
85% of Craftsman's	Rate Plus Fringes (same as above)

APPRENTICES REGISTERED AFTER APRIL 1, 1988

Grade 1 Apprentices

Class 1 *-----

Class 2 *-----

Class 3 *-----

Class 4 *-----

35% of Craftsman's	Rate Plus Fringes (same as above)
39% of Craftsman's	Rate Plus Fringes (same as above)
43% of Craftsman's	Rate Plus Fringes (same as above)
47% of Craftsman's	Rate Plus Fringes (same as above)

Grade 2 Apprentices

Class 1 *-----

Class 2 *-----

Class 3 *-----

Class 4 *-----

Class 5 *-----

Class 6 *-----

Class 7 *-----

Class 8 *-----

50% of Craftsman's	Rate Plus Fringes (same as above)
55% of Craftsman's	Rate Plus Fringes (same as above)
60% of Craftsman's	Rate Plus Fringes (same as above)
65% of Craftsman's	Rate Plus Fringes (same as above)
70% of Craftsman's	Rate Plus Fringes (same as above)
75% of Craftsman's	Rate Plus Fringes (same as above)
80% of Craftsman's	Rate Plus Fringes (same as above)
85% of Craftsman's	Rate Plus Fringes (same as above)

RATIO:

1 Apprentice to 1 Craftsmen

1 Apprentice to each 2

Craftsmen thereafter

* Means Every Six (6) Months

***** NOTICE *****
 Rates for classifications and/or ratios
 not appearing on this List must be obtained
 from the Department of Industrial Relations

101290

CLASSIFICATIONS

EFFECTIVE DATE	BASIC HOURLY RATES	FRINGE BENEFIT PAYMENT				
		H & W	PENS.	VAC.	APP. TR.	OTHERS
TRUCK DRIVERS, BUILDING:						
Straight Flat; Dump truck;						
Winch Truck -----	01-06-89	11.50	2.17	33.00a		
Ready mix & Dump Crete -----	01-06-89	11.50	2.17	33.00a		
Tandem Truck & Tractor						
Trailer Combination -----	01-06-89	11.50	2.17	33.00a		
Euclid Truck up to & including 12 yards -----	01-06-89	11.50	2.17	33.00a		
Euclid Truck over 12 yards -	01-06-89	11.55	2.17	33.00a		
FOOTNOTE:						
a -- Per employee per week						
<p>***** NOTICE *****</p> <p>Rates for classifications and/or ratios not appearing on this list must be obtained from the Department of Industrial Relations</p>						
					010688	

CLASSIFICATIONS

CLASSIFICATIONS	EFFECTIVE DATE	BASIC HOURLY RATES	FRINGE BENEFIT PAYMENT				
			H & W	PENS.	VAC.	APP. TR.	OTHERS
TRUCK DRIVERS - HIGHWAY & HEAVY CONSTRUCTION:							
Driver, including, but not limited to, 4-wheel service truck; 4-wheel dump truck; batch truck; oil distributor; Asphalt Distributor -----	03-16-90	14.49	2.17	1.75			
	05-01-90	14.84	2.17	1.75			
	05-01-91	15.14	2.27	1.75			
Driver, Tandem Truck & Tri-Axle -----	03-16-90	14.54	2.17	1.75			
	05-01-90	14.89	2.17	1.75			
	05-01-91	15.19	2.27	1.75			
Driver, Tractor-Trailer Combination, 4 Axle, including, but not limited to, Semi Tractor Truck; Pole Trailer; Ready Mix Truck; Fuel Truck; Asphalt-Oil Spray-Bar Man when operated from Cab* -----	03-16-90	14.59	2.17	1.75			
	05-01-90	14.94	2.17	1.75			
	05-01-91	15.24	2.27	1.75			
ALL Trucks Five (5) Axle & Over -----	03-16-90	14.69	2.17	1.75			
	05-01-90	15.04	2.17	1.75			
	05-01-91	15.34	2.27	1.75			
*Asphalt-Oil Spray-Bar Man when operated from Cab -----	03-16-90	14.79	2.17	1.75			
	05-01-90	15.14	2.17	1.75			
	05-01-91	15.44	2.27	1.75			
Driver, Euclid Wagon; Euclid End Dump; Low Boy & Heavy Duty Equipment over 12 Cubic Yard Capacity (Irrespective of load carried) When used Exclusively for Transportation; Truck Mechanic (When Needed) -----	03-16-90	14.96	2.17	1.75			
	05-01-90	15.31	2.17	1.75			
	05-01-91	15.61	2.27	1.75			
***** NOTICE *****							
Rates for classifications and/or ratios not appearing on this list must be obtained from the Department of Industrial Relations							
031690							

SKILLED CRAFTS

STATEWIDE

COUNTY

CLASSIFICATIONS

	EFFECTIVE DATE	BASIC HOURLY RATES	FRINGE BENEFIT PAYMENT				
			H & W	PENS.	VAC.	APP. TR.	OTHERS
WELL DRILLER:							
Collector Well							
Driller -----	03-22-91	16.98	1.50	1.00			
Assistant Collector							
Well Driller -----	03-22-91	14.53	1.50	1.00			
Trainee:							
(a) First Year -----	03-22-91	10.44	1.50	1.00			
(b) Second Year -----	03-22-91	12.16	1.50	1.00			
Pump Installer/Well							
Driller -----	03-22-91	13.70	1.50	1.00			
Semi Truck Driver -----	03-22-91	11.09	1.50	1.00			
Pump Installer/Well							
Driller Helper -----	03-22-91	9.20	1.50	1.00			
(a) Trainee (12 months active work) -----	03-22-91	8.20	1.50	1.00			
APPRENTICES:							
None							
RATIO:							
None							

***** NOTICE *****
 Rates for classifications and/or ratios
 not appearing on this list must be obtained
 from the Department of Industrial Relations 032291

HQD CARRIERS AND COMMON LABORERS - BUILDING CONSTRUCTION

FRINGE BENEFITS:	<u>H & W</u>	<u>PENS.</u>	<u>VAC.</u>	<u>APP.TR.</u>	<u>OTHERS</u>
	1.40	1.50		.10	

CLASSIFICATIONS

RATES PER HOUR

10-27-89

Laborers, Including Asbestos -----					\$13.92
Tenders for Bricklayers, & Masons, & Flexicore -----					14.52
Tenders for Plasterers & Lathers -----					14.59
Tender Operator -----					14.80

06-01-90 06-01-91 06-01-92 06-01-93

Laborers, Including Asbestos ---	14.32	14.72	15.22	15.72
Tenders for Bricklayers, & Masons, & Flexicore -----	14.92	15.32	15.82	16.32
Tenders for Plasterers & Lathers -----	14.99	15.39	15.89	16.39

05-01-90 05-01-91 05-01-92 05-01-93

Tender Operator -----	15.16	15.56	16.06	16.56
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Effective in the following Counties: **Darke, Greene, Miami, Montgomery, & Preble**

102789

***** NOTICE *****
 Rates for classifications and/or ratios
 not appearing on this List must be obtained
 from the Department of Industrial Relations

HOD CARRIERS AND COMMON LABORERS - HIGHWAY, HEAVY, SEWER, WATERWORKS, UTILITY, AIRPORT, RAILROAD, INDUSTRIAL AND BUILDING SITE, SEWAGE PLANT, WASTE WATER TREATMENT FACILITIES CONSTRUCTION

FRINGE BENEFITS:	H & W	PENS.	VAC.	APP. TR.	OTHERS
	1.60	1.50		.10	

ZONE J

CLASSIFICATIONS

RATES PER HOUR

06-07-91

Laborer (Construction); Flagman, Plant Laborer or Yardman; Right-of-Way Laborer; Land- scape Laborer; Utility Man or Handyman; Carpenter Helper; Waterproofing Laborer; Grade Checker; Sign Installer; Slurry Seal; Seal Coating; Surface Treatment or Road Mix Laborer; Rip Rap Laborer & Grouter; Asphalt Laborer; Dump Man (Batch Truck); Guard Rail & Fence Installer; Mesh Handler & Placer; Joint Setter; Concrete Curing Applicator; Scaffold Erector -----	\$15.42
Asphalt Raker; Concrete Puddler; Kettle Man (Pipeline); All Machine-Driven Tools (Gas, Electric, Air); Mason Tender; Mortar Mixer; Sheeting & Shoring Man; Surface Grinder Man; Power Buggy or Power Wheelbarrow; Kettle Man (Pipeline); Paint Striper; Plastic Fusing Machine Operator; Rodding Machine Operator -----	15.55
Form Setter; Bottom Man; Welder Helper (Pipeline); Concrete Saw Man; Cutting with Burning Torch; Pipe Layer; Hand Spiker (Railroad); Car Pusher (Without air); Underground Man (working in Sewer & Waterline, Cleaning, Repairing & Reconditioning); Air Track & Wagon Drill; Tunnel Laborer (Without Air); & Caisson, Cofferdam (Below 25' Deep); Sandblaster Nozzleman -----	15.62
Blaster & Powder Man; Muckers; Top Lander; Wrencher (Mechanical Joints & Utility Pipeline); Yarnner -----	15.77
Curb Setter & Cutter; Miner without Air; Gunnite Nozzleman; Concrete Crew in Tunnel; Utility Pipeline Tapper; Waterline Caulker; Gunnite Nozzleman; Welder -----	16.07
Watchmen (Pay overtime over 40 hours at time & one-half)-----	350.00wk
Signalman will receive the rate equal to the rate paid the laborer classification for which he is signaling.	

Effective in the following Counties: Adams, Allen, Ashland, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford Darke, Defiance, Delaware, Fairfield, Fayette, Franklin, Fulton, Gallia, Greene, Guernsey, Hamilton, Hancock, Hardin, Harrison, Henry, Highland, Hocking, Holmes, Jackson, Jefferson, Knox, Lawrence, Licking, Logan, Madison, Marion, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Paulding, Perry, Pickaway, Pike, Preble, Putnam, Richland, Ross, Sandusky, Scioto, Seneca, Shelby, Tuscarawas, Union, Van Wert, Vinton, Warren, Washington, Wayne, Williams, & Wyandot. 060791

***** NOTICE *****
 Rates for classifications and/or ratios
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OPERATING ENGINEERS - BUILDING CONSTRUCTION

FRINGE BENEFITS:	H & W	PENS.	VAC.	APP. TR.	OTHERS
08-18-89	2.16	2.00		.25	

CLASSIFICATIONS

RATES PER HOUR

08-18-89

Master Mechanics -----	\$18.54 *
Barrier Moving Machine; Boiler Operators or Compressor Operators, when compressor or boiler is mounted on crane (Piggyback Operation); Operators of: Boom Trucks (ALL Types); Cableways; Cherry Pickers; Combination Concrete Mixers & Towers; Concrete Pumps (except Trailer Pumps); Cranes (all Types) Derricks (ALL Types) Draglines; Dredges (dipper, clam or suction) 3-man crew; Elevating Graders or Euclid Loaders; Floating Equipment; Gradalls; Helicopter Operators Hoisting Building Materials; Helicopter Winch Operators, Hoisting Building Materials; Hoes (ALL Types); Hoists (with 2 or more drums in use); Hydraulic Gantry (Lift system); Lift Slab or Panel Jack Operators; Locomotives; (ALL Types); Maintenance Engineers (Mechanic &/or Welder); Mixers, Paving Multiple Drum; Mobile Concrete Pumps with Booms; Panelboards (ALL Types on site); Pile Drivers; Power Shovels; Prentice Loader; Rail Tamper (with automatic lifting and aligning device); Rotary Drills (ALL) used on Caisson for foundations & sub-structure work; Side Booms; Slip Form Pavers; Straddle Carriers (Building Construction on site); Trench Machines (over 24" wide); Tug Boats -----	18.29 *
Boom & Jib 150' -----	18.54
Boom & Jib over 180' -----	18.79
Operators of: Asphalt Pavers; Bulldozers; CMI Type Equipment; Concrete grinder/planer; Endloaders; Kolman-type Loaders (Dirt Loading); Lead Greasemen; Mucking Machines; Pettibone-Rail Equipment; Power Graders; Power Scoops; Power Scrapers; Push Cats, Vermeer Type Concrete Saw -----	18.17 *
Operators of: A-Frames, Air Compressors, Pressurizing Shafts or Tunnels; All Asphalt Rollers; Boilers (15 lbs. pressure & over); Fork Lifts (except Masonry); Hoisting Engines (1 Drum); House Elevators (except those automatic call button controlled); Man Lifts; Mudjacks; Pressure Grouting; Pump Operators, installing or operating Well Points or other Dewatering Systems; Pumps (4" & over discharge); Submersible Pumps (4" & over discharge); Switch & Tie Tampers (without Lifting and aligning device); Trailer Concrete Pumps (without Booms); Trench Machines (24" & Under); Utility Operators -----	17.13 *

* 05-01-90

05-01-91 *

Master Mechanic ---	19.04	Master Mechanic --	19.54
Group A -----	18.79	Group A -----	19.29
Boom & Jib 150' ---	19.04	Boom & Jib 150' --	19.54
Boom & Jib over 180' -----	19.29	Boom & Jib over 180' -----	19.79
Group B -----	18.67	Group B -----	19.17
Group C -----	17.63	Group C -----	18.13

NOTE: CONTINUED ON NEXT PAGE

Effective in Zone III, as follows: Akron: Ashland, Belmont, Carroll, Coshocton, Guernsey, Harrison, Holmes, Jefferson, Monroe, Noble, Richland, Stark, Tuscarawas, Washington and Wayne Counties. Cincinnati: Adams, Athens, Brown, Clermont, Gallia, Hamilton, Highland, Jackson, Lawrence, Meigs, Morgan, Ross, Scioto, and Vinton. Columbus: Crawford, Delaware, Fairfield, Franklin, Hocking, Knox, Licking, Marion, Morrow, Muskingum, Perry, Pickaway, Pike, Union and Wyandot. Dayton: Auglaize, Butler, Champaign, Clark, Clinton, Darke, Fayette, Greene, Logan, Madison, Mercer, Miami, Montgomery, Preble, Shelby and Warren. Toledo: Allen, Defiance, Fulton, Lucas, Hardin, Henry, Ottawa, Paulding, Putnam, Sandusky, Seneca, Van Wert, and Williams.

091589

***** NOTICE *****

Rates for classifications and/or ratios not appearing on this list must be obtained from the Department of Industrial Relations

OPERATING ENGINEERS - BUILDING CONSTRUCTION

FRINGE BENEFITS:	<u>H & W</u>	<u>PENS.</u>	<u>VAC.</u>	<u>APP. TR.</u>	<u>OTHERS</u>
08-18-89	2.16	2.00		.25	

CLASSIFICATIONS

RATES PER HOUR
08-18-89

Operators of: Ballast Re-locator; Backfillers and Tampers; Batch Plant Operators; Bar and Joint Installing Machines; Bobcat Type and/or Skid Steer Loader; Bull Floats; Burlap and Curing Machines; Clefplanes; Compressors, on Building Construction; Concrete Spreading Machines; Conveyors, used for handling Building Material; Concrete Mixers, capacity more than one bag; Concrete Mixers, one bag capacity (Side Loaders); Crushers; Deckhands; Drum Firemen in Asphalt Plants; Farm-type Tractors, pulling attachments; Finishing Machines; Form Trenchers; Generators; Guniting Machines; Hydro-seeders; Pavement Breakers (hydraulic or Cable); Post Drivers; Post Hole Diggers; Pressure Pumps (over 1/2" discharge); Road Widening Trenchers; Rollers (except Asphalt); Self-Propelled Power Spreaders; Self-Propelled Sub-graders; Tire Repairmen; Tractors, pulling sheepfoot rollers or graders; Vac-Alls; Vibratory Compactors with integral power; Welder Operators ----- 16.70

Operators of: Boilers (less than 15 lbs. pressure); Inboard-Outboard Motor Boat Launch; Light Plant Operators; Oiler, Helpers; Signalmen; Power Driven Heaters (Oil Fired); Pumps (under 4" discharge); Submersible Pumps, (under 4" discharge); Power Sweepers; Power Scrubbers; Masonry Fork Lifts ----- 12.84 *

* <u>05-01-90</u>		<u>05-01-91</u>	*
Group D -----	17.20	Group D -----	17.70
Group E -----	13.34	Group E -----	13.84

Effective in Zone III, as follows: Akron: Ashland, Belmont, Carroll, Coshocton, Guernsey, Harrison, Holmes, Jefferson, Monroe, Noble, Richland, Stark, Tuscarawas, Washington and Wayne Counties. Cincinnati: Adams, Athens, Brown, Clermont, Gallia, Hamilton, Highland, Jackson, Lawrence, Meigs, Morgan, Ross, Scioto, and Vinton. Columbus: Crawford, Delaware, Fairfield, Franklin, Hocking, Knox, Licking, Marion, Morrow, Muskingum, Perry, Pickaway, Pike, Union and Wyandot. Dayton: Auglaize, Butler, Champaign, Clark, Clinton, Darke, Fayette, Greene, Logan, Madison, Mercer, Miami, Montgomery, Preble, Shelby and Warren. Toledo: Allen, Defiance, Fulton, Hancock, Hardin, Henry, Ottawa, Paulding, Putnam, Sandusky, Seneca, Van Wert, and Williams.
091589

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from the Department of Industrial Relations

OPERATING ENGINEERS - HEAVY, HIGHWAY, RAILROAD UTILITY AIRPORT

FRINGE BENEFITS:	<u>SEWER & WATERWORKS CONSTRUCTION</u>				
	H & W	PENS.	VAC.	APP.TR.	OTHERS
08-18-89	2.16	2.00		.25	.04

CLASSIFICATIONS

RATES PER HOUR

Master Mechanics ----- 08-18-89 \$18.54

Air Compressors on Steel Erection; Barrier Moving Machines; Boiler Operators, on Compressors or Generators when mounted on a Rig; Cableways; Combination Concrete Mixers & Towers; Concrete Plants (Over 4 yd. Capacity); Concrete Pumps; Cranes (ALL types, including Boom Trucks, Cherry Pickers); Derricks; Draglines; Dredges (dipper, clam or suction); Elevating Graders or Euclid Loaders; Floating Equipment (ALL Types); Gradalls; Helicopter Crew (Operator-Hoist or Winch); Hoes (ALL Types); Hoisting Engines on Shaft or Tunnel Work; Hydraulic Gantry (Lifting system); Industrial Type Tractors; Jet Engine Dryers (D-8 or D-9) Diesel Tractors; Locomotives (Standard Gauge); Maintenance Operators, (Class A); Mixer, Paving (Single or Double Drum); Mucking Machines; Multiple Scrapers; Piledriving Machines (ALL Types); Power Shovels; Prentice Loader, Quad 9 (Double Pusher); Rail Tamper (with auto lifting & aligning device); Refrigerating Machines (Freezer Operation); Rotary Drills, on Caisson Work; Side Booms; Slip-Form Pavers; Tower Derricks; Tree Shredders; Trench Machines (Over 24" Wide); Truck Mounted Concrete Pumps; Tug Boats; Tunnel Machines and/or Mining Machines; Wheel Excavators ----- 18.29

Asphalt Pavers; Automatic Subgrade Machines, self-propelled (CMI Type); Boring Machine Operators (More than 48"); Bulldozers; Concrete Grinder/planer; EndLoaders; Kolman Loaders (Production Type-Dirt); Le Greaseman; Maintenance Operators, Class B; Pettibone-Rail Equipment; Power Graders; Power Scrapers; Pl Cats; Trench Machines (24" wide & under) Vermeer Type concrete saw ----- 18.17

A-Frames; Air Compressors on Tunnel Work, Low Pressure; Asphalt Plant Engineers; Bobcat Type and/or skid steer Loader; Locomotives (Narrow Gauge); Mixers, Concrete (More than 1 Bag Capacity); Mixers, 1 Bag Capacity (Side Loader); Power Boilers (over 15 lb. Pressure); Pump Operators, Installing & Operating Well-points; Pumps (4" & over Discharge); Rollers, Asphalt; Switch & type tampers (without lifting & aligning device); Utility Operators (Small Equipment); Welding Machines and Generators ----- 17.13

Backfillers; Ballast Re-Locator; Bars, Joint & Mesh Installing Machines; Batch Plants; Boring Machine Operators (48" or less); Bull Floats; Burlap & Curing Machines; Compressors (Portable, Sewer, Heavy & Highway); Concrete Plants (Capacity 4 yds. & Under); Concrete Saws (Multiple); Conveyors (Highway); Crushers; Deckhands; Drills (Highway) With Integral Power; Farm Type Tractors, with Attachments (Highway) Except Masonry; Finishing Machines; Firemen, Floating Equipment (ALL Types); Fork Lifts (Highway); Form Trenchers; Hydro Hammers; Hydro Seeders; Pavement Breakers; Plant Mixers; Post Driver; Post Hole Digger (Power Auger); Road Widening Trenchers; Rollers Rollers (brick, grade, macadam); Self-Propelled Power Spreaders; Self-Propelled Power Subgraders; Steam Firemen; Tractors Pulling Sheepfoot roller or grader) ----- 16.70

Drum Firemen (Asphalt Plant); Inboard-Outboard Motor Boat Launches; Masonry Fork Lifts; Oil Heaters (Asphalt Plant); Oilers Helpers; Power Driven Heaters; Power Sweepers & Scrubbers; Pumps (Under 4" Discharge); Signalmen; Tire Repairman; Vac/ALLS ----- 12.84

<u>GENERAL</u>			
<u>05-01-90</u>		<u>05-01-91</u>	
Master Mechanic ----	19.04	Master Mechanic ----	19.54
Class A -----	18.79	Class A -----	19.29
Class B -----	18.67	Class B -----	19.17
CL C -----	17.63	Class C -----	18.13
CL D -----	17.20	Class D -----	17.70
Class E -----	13.34	Class E -----	13.84

***** NOTICE *****
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**OPERATING ENGINEERS - INDUSTRIAL & BUILDING SITE; POWER PLANT; ATHLETIC STADIUM SITE;
POLLUTION CONTROL; SEWAGE PLANT; WASTE PLANT & WATER TREATMENT FACILITIES**

FRINGE BENEFITS:	H & W	PENS.	VAC.	APP.TR.	OTHERS
07-17-87	2.16	1.75		.25	.04

CLASSIFICATIONS

Master Mechanics ----- **07-17-87**
\$17.94

Air Compressors on Steel Erection; Boiler Operators, Compressors or Generators when mounted on a Rig; Cableways; Combination Concrete Mixers & Towers; Concrete Plants (over 4 yd. capacity); Concrete Pumps; Cranes (ALL Types, including Boom Trucks, Cherry Pickers); Derricks; Draglines; Dredges (dipper, clam or suction); Elevating Graders or Euclid Loaders; Floating Equipment, (ALL Types); Gradalls; Helicopter Crew (Operator-Hoist or Winch); Hoes (ALL Types); Hoisting Engines; Hoisting Engines, on Shaft or Tunnel Work; Industrial-Type Tractors; Jet Engine Dryer (08 or 09) Diesel Tractors; Locomotives (Standard Gauge); Maintenance Operators (Class A); Mixers, Paving (Single or Double Drum); Mucking Machines; Multiple Scrapers; Piledriving Machines (ALL Types); Power Shovels; Quad 9 (Double Pusher); Refrigerating Machines (Freezer Operation); Rotary Drills on Caisson Work; Side Booms; Slip-Form Pavers; Tower Derricks; Tree Shredders; Trench Machines (over 24" Wide); Truck Mounted Concrete Pumps; Tug Boats; Tunnel Machine and/or Mining Machine; Wheel Excavators ----- 17.62

Asphalt Pavers; Automatic Subgrade Machines, self-propelled CMI Type; Boring Machine Operators (more than 48"); Bulldozers; End Loaders; Kolman-Loaders (Production Type-Dirt); Lead Greasemen; Maintenance Operator (Class B); Power Graders; Power Scrapers; Push Cats; Trench Machines (24" wide & under) ----- 17.49

Locomotives (Narrow Gauge); A-Frames ----- 17.04

Air Compressors on Tunnel Work (Low pressure); Power Boilers (over 15 lbs.pressure); Pump Operators, installing & operating wellpoints; Pumps (4" & over discharge); Rollers, Asphalt; Utility Operators (small equipment); ----- 16.63

Mixers, concrete (more than 1 bag capacity); Mixers, 1 bag capacity (side loader); Welding Machines & Generators ----- 16.32

Pavement Breakers; Post Drivers; Post Hole Diggers (Power Auger); Road Widening Trenchers; Rollers (brick, grade, macadam); Backfillers; Bars, Joint & Mesh Installing Machines; Batch Plants; Boring Machine Operators (48" or less); Bull Floats; Burlap & Curing Machines; Compressor (portable, sewer, heavy & highway); Concrete Plants (capacity 4 yd. & under); Concrete Saws (multiple); Conveyors (highway); Crushers; Deckhands; Drill Highways, with integral power; Farm-Type Tractors, with attachments (Highway); Finishing Machines; Fireman, Floating Equipment (all types); Fork Lifts (highway); Form Trenchers; Hydro-Hammers; Hydro Seeders; Plant Mixers; Power Brush Burners; Power Form Handling Equipment; Self-Propelled Power Spreaders; Self-Propelled Power Subgraders; Steam Fireman; Tractors, pulling sheepfoot roller or Grader; Vibratory Compactors (With Integral Power) ----- 16.105

Drum Fireman (asphalt plant); Tire Repairmen ----- 14.175

Helpers; Inboard-Outboard Motor Boat-Launches; Masonry Fork Lifts; Oil Heaters (asphalt plants); Oilers; Power Driven Heaters; Power Sweepers & Scrubbers; Pumps (under 4' discharge) Signalmen; Jac/ALLs ----- 12.34

Effective in the following counties: Adams, Athens, Auglaize, Brown, Butler, Champaign, Clark, Clermont, Clinton, Crawford, Darke, Delaware, Fairfield, Fayette, Franklin, Gallia, Greene, Hamilton, Highland, Jackson, Knox, Lawrence, Licking, Logan, Madison, Marion, Meigs, Mercer, Miami, Montgomery, Morgan, Morrow, Muskingum, Perry, Pickaway, Pike, Preble, Ross, Scioto, Shelby, Union, Vinton, Warren & Wyandot

***** NOTICE *****

Rates for classifications and/or ratios
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**HIGHWAY, SEWER, WATERWORKS, UTILITY, INDUSTRIAL AND BUILDING SITE,
HEAVY, AIRPORT AND RAILROAD CONSTRUCTION**

FRINGE BENEFITS:	<u>H & W</u>	<u>PENS.</u>	<u>VAC.</u>	<u>APP.TR.</u>	<u>OTHERS</u>
	1.80	1.85		.05	
				<u>05-01-90</u>	<u>05-01-51</u>
Cement Masons -----				\$16.68	\$16.83

**POWER PLANT, ATHLETIC STADIUM SITE, POLLUTION CONTROL, SEWAGE PLANT,
WASTE PLANT AND WATER TREATMENT FACILITIES**

Cement Masons -----	\$16.57	\$16.99
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Effective in District 3,
comprising the following counties:

ADAMS	FAIRFIELD	LICKING	PICKAWAY
ALLEN	FAYETTE	LOGAN	PIKE
ASHLAND	FRANKLIN	MADISON	PREBLE
ATHENS	GALLIA	MARION	RICHLAND
AUGLIAZE	GREENE	MEIGS	ROSS
BELMONT	GUERNSEY	MERCER	SCIOTO
CARROLL	HARDIN	MIAMI	SHELBY
CHAMPAIGN	HARRISON	MONROE	TUSCARAWAS
CLARK	HOCKING	MONTGOMERY	UNION
CLINTON	HOLMES	MORGAN	VAN WERT
COSHOCTON	JACKSON	MORROW	VINTON
CRAWFORD	JEFFERSON	MUSKINGUM	WASHINGTON
DARKE	KNOX	NOBLE	WAYNE
DELAWARE	LAWRENCE	PERRY	WYANDOT

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HIGHWAY, AIRPORT, HEAVY, RAILROAD, SEWER, WATERWORKS AND UTILITY,
 INDUSTRIAL & BUILDING SITE, POWER PLANT, ATHLETIC STADIUM SITE,
 POLLUTION CONTROL, SEWAGE PLANT, WASTE PLANT & WATER TREATMENT
FACILITIES CONSTRUCTION

FRINGE BENEFITS:	<u>H & W</u>	<u>PENS.</u>	<u>VAC.</u>	<u>APP.TR.</u>	<u>OTHERS</u>
	1.80	2.00		.175	

RATES PER HOUR
03-16-90

Carpenters -----	\$17.40
Pile Drivers -----	17.40
Pile Drivers, Certified Welders -----	17.65

PILEDRIVERS, CERTIFIED
WELDERS
RATES PER HOUR

<u>CARPENTERS</u>		<u>PILEDRIVERS</u>		<u>WELDERS</u>	
<u>RATES PER HOUR</u>		<u>RATES PER HOUR</u>		<u>RATES PER HOUR</u>	
05-01-90	17.80	05-01-90	17.80	05-01-90	18.05
05-01-91	18.10	05-01-91	18.10	05-01-91	18.35

Effective in the following Counties:

DARKE	MONTGOMERY
GREENE	PREBLE
MIAMI	SHELBY

031690

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