

CASE

NUMBER:

99-302

INDEX FOR CASE: 99-302
CARROLL COUNTY WATER DISTRICT #1
Construct, Finance; 278.023

IN THE MATTER OF THE APPLICATION OF CARROLL COUNTY WATER
DISTRICT NO. 1 OF CARROLL, GALLATIN AND OWEN COUNTIES,
KENTUCKY, FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND
NECESSITY TO CONSTRUCT AND FINANCE PURSUANT TO KRS 278.023

SEQ NBR	ENTRY DATE	REMARKS
0001	07/13/99	Application.
0002	07/19/99	Acknowledgement letter.
M0001	07/19/99	RANDALL JONES CARROLL CO WD-RURAL DEV LETTER OF CONCURRENCE IN THE CONSTRUCTION BID AWARD
M0002	07/21/99	JAMES WEST CARROLL CO WD-PLANS & SPECS FOR DIVISION A-1 & A-2 & B
0003	07/22/99	Def. letter; info due 8/6
0004	07/27/99	Def. cured letter
0005	08/06/99	FINAL ORDER; GRANTS CONSTRUCTION; AUTHORIZES FINANCING
M0003	09/14/99	RANDALL JONES CARROLL CO WD-MOTION TO REOPEN CASE & ISSUE AN AMENDED ORDER
0006	10/06/99	AMENDED FINAL ORDER; GRANTS CONSTRUCTION; AUTHORIZES FINANCING; APPROVES RATES



COMMONWEALTH OF KENTUCKY
PUBLIC SERVICE COMMISSION

730 SCHENKEL LANE
POST OFFICE BOX 615
FRANKFORT, KY. 40602
(502) 564-3940

CERTIFICATE OF SERVICE

RE: Case No. 99-302
CARROLL COUNTY WATER DISTRICT #1

I, Stephanie Bell, Secretary of the Public Service Commission, hereby certify that the enclosed attested copy of the Commission's Order in the above case was served upon the following by U.S. Mail on October 6, 1999.

See attached parties of record.

Stephanie J. Bell

Secretary of the Commission

SB/sa
Enclosure

James L. Smith
Manager
Carroll County Water District #1
101 Main Cross
P. O. Box 350
Ghent, KY. 41045

Thomas G. Fern
State Director
Rural Development
771 Corporate Drive, Suite 200
Lexington, KY. 40503 5477

Terry Loper
Rural Development
1900 Midland Trail
Shelbyville, KY. 40065 9113

Jim West
Sieco, Inc.
629 Washington Street
P. O. Box 407
Columbus, IN. 47202

Honorable Ruth H. Baxter
Crawford & Baxter, P.S.C.
523 Highland Avenue
P. O. Box 353
Carrollton, KY. 41008

Honorable W. Randall Jones
Rubin & Hays
First Trust Centre
200 South Fifth Street
Louisville, KY. 40202

COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

THE APPLICATION OF CARROLL COUNTY)
WATER DISTRICT NO. 1 OF CARROLL, GALLATIN,)
AND OWEN COUNTIES, KENTUCKY, FOR A)
CERTIFICATE OF PUBLIC CONVENIENCE AND) CASE NO. 99-302
NECESSITY TO CONSTRUCT AND FINANCE)
PURSUANT TO KRS 278.023)

O R D E R

On July 19, 1999, Carroll County Water District ("Carroll District") submitted an application for a Certificate of Public Convenience and Necessity to construct a \$1,469,300 waterworks improvement project and for approval of its plan of financing for this project. On August 6, 1999, Carroll District was granted a Certificate of Public Convenience and Necessity to proceed with the construction to provide new service to 326 additional customers.

On September 14, 1999, Carroll District submitted a motion to reopen the case and issue an amended order to provide additional funding to cover construction cost overruns and to increase its rates and charges for water service. Amended project funding is an \$1,510,000 bond issue to be purchased pursuant to an agreement with the U.S. Department of Agriculture's Rural Development ("RD"), a \$615,000 grant from the RD, a \$100,000 contribution from Glenwood Hall, and a \$54,300 contribution from the Applicant.

Carroll District's application was made pursuant to KRS 278.023, which requires the Commission to accept agreements between water utilities and the U. S. Department of Agriculture or the U. S. Department of Housing and Urban Development and to issue the necessary orders to implement the terms of such agreements within 30 days of satisfactory completion of the minimum filing requirements. Given that minimum filing requirements were met in this case on September 14, 1999, KRS 278.023 does not grant the Commission any discretionary authority to modify or reject any portion of this agreement.

IT IS THEREFORE ORDERED that:

1. Carroll District is hereby granted a Certificate of Public Convenience and Necessity for the proposed construction project.
2. Carroll District's proposed plan of financing with RD is accepted.
3. Carroll District is authorized to issue bonds not to exceed \$1,510,000.
4. Carroll District shall file a copy of the "as-built" drawings and a certified statement that the construction has been satisfactorily completed in accordance with the contract plans and specifications within 60 days of the substantial completion of the construction certificated herein.
5. The rates set out in Appendix A, which is attached hereto and incorporated herein, are the rates approved for service rendered on and after the date of this Order.
6. Carroll District shall submit its revised tariff setting out the rates in Appendix A within 30 days of the date of this Order.
7. Three years from the effective date of this Order Carroll District shall file an income statement, along with any pro forma adjustments, in sufficient detail to demonstrate

that the rates approved herein are sufficient to meet its operating expenses and annual debt service requirements.

Nothing contained herein shall be deemed a warranty of the Commonwealth of Kentucky, or any agency thereof, of the financing herein accepted.

Done at Frankfort, Kentucky, this 6th day of October, 1999.

By the Commission

ATTEST:


Executive Director

APPENDIX A

APPENDIX TO AN ORDER OF THE KENTUCKY PUBLIC SERVICE COMMISSION IN CASE NO. 99-302 DATED OCTOBER 6, 1999

The following rates and charges are prescribed for the customers in the area served by Carroll County Water District No. 1. All other rates and charges not specifically mentioned herein shall remain the same as those in effect under authority of the Commission prior to the effective date of this Order.

Monthly Water Rates

First	1,000 gallons	\$ 12.50	Minimum bill
Next	1,000 gallons	5.75	per 1,000 gallons
Next	3,000 gallons	4.75	per 1,000 gallons
Next	5,000 gallons	4.40	per 1,000 gallons
Next	10,000 gallons	3.50	per 1,000 gallons
Next	20,000 gallons	3.00	per 1,000 gallons
Over	40,000 gallons	2.35	per 1,000 gallons

Meter Connection Fees

5/8 Inch x 3/4 Inch Meter	\$ 465.00
1 Inch Meter	500.00
Meters Larger than 1 Inch	Actual Cost

Rubin & Hays

ATTORNEYS AT LAW

First Trust Centre, 200 South Fifth Street, Louisville, Kentucky 40202-3236
Telephone (502) 569-7525 Telefax (502) 569-7555 Email: rh@rubinhays.com

CHARLES S. MUSSON
W. RANDALL JONES
CHRISTIAN L. JUCKETT

OF COUNSEL
WM. CARL FUST

PARALEGAL
MARY M. EMBRY

September 13, 1999

RECEIVED

SEP 14 1999

PUBLIC SERVICE
COMMISSION

Ms. Helen C. Helton, Executive Director
Public Service Commission
P.O. Box 615
Frankfort, Kentucky 40602

Re: **Carroll County Water District No. 1, Case No. 99-302**

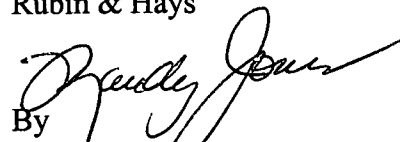
Dear Ms. Helton:

Enclosed please find the original and ten (10) copies of Carroll County Water District's Motion to Reopen Case and Issue an Amended Order. We have scheduled a pre-closing of the Rural Development Bond issue for October 5, 1999 and would appreciate your expediting this Motion.

If you need any additional information or documentation, please let us know.

Sincerely,

Rubin & Hays

By 
W. Randall Jones

WRJ:jkm
Enclosures

cc: Distribution List

DISTRIBUTION LIST

Re: Carroll County Water District No. 1 Waterworks Revenue Bonds, Series 1999

Account No. 1670.0000

Mr. Thomas G. Fern
State Director
Rural Development
771 Corporate Drive, Suite 200
Lexington, Kentucky 40503-5477

(606) 224-7336
Fax (606) 224-7340

Mr. Terry Loper
Rural Development
1900 Midland Trail
Shelbyville, Kentucky 40065-9113

Telephone: (502) 633-0891
Fax: (502) 633-0552

Mr. James L. Smith, Manager
Carroll County Water District No. 1
P.O. Box 333
Carrollton, Kentucky 41008

Telephone: (502) 347-9470
Fax: (502) 347-9333

Mr. Jim West
SIECO, INC.
629 Washington Street
P.O. Box 407
Columbus, Indiana 47202

(812) 372-9911
Fax (812) 372-7190

Ruth H. Baxter, Esq.
Crawford & Baxter, P.S.C.
523 Highland Avenue
P.O. Box 353
Carrollton, Kentucky 41008

(502) 732-6688
Fax (502) 732-6920

W. Randall Jones, Esq.
Rubin & Hays
First Trust Centre
200 South Fifth Street
Louisville, Kentucky 40202

(502) 569-7534
Fax (502) 569-7555

COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

RECEIVED

SEP 14 1999

**PUBLIC SERVICE
COMMISSION**

In the Matter of:

**THE APPLICATION OF CARROLL COUNTY WATER)
DISTRICT NO. 1 OF CARROLL, GALLATIN AND)
OWEN COUNTIES, KENTUCKY, FOR A CERTIFICATE) NO. 99-302
OF PUBLIC CONVENIENCE AND NECESSITY TO)
CONSTRUCT AND FINANCE PURSUANT TO KRS 278.023.)**

MOTION TO REOPEN CASE AND ISSUE AMENDED ORDER

This Motion of the Carroll County Water District No. 1 ("Applicant") of Carroll, Gallatin and Owen Counties, Kentucky, respectfully shows:

1. That Applicant is a water district of Carroll, Gallatin and Owen Counties, Kentucky, created and existing under and by virtue of Chapter 74 of the Kentucky Revised Statutes.

2. That the post office address of Applicant is:

Carroll County Water District No. 1
c/o Mr. Dennis Crawford, Chairman
P.O. Box 333
Carrollton, Kentucky 41008

3. That Applicant submitted an Application on July 19, 1999, pursuant to the provisions of KRS 278.020 and 278.023, seeking (i) a Certificate of Public Convenience and Necessity, permitting Applicant to construct a waterworks construction project, consisting of extensions, additions, and improvements (the "Project") to the existing waterworks system of Applicant; and (ii) approval of the proposed plan of financing said Project.

4. That the Commission issued its Order granting a Certificate of Public Convenience and Necessity and approving the financing of the Project on August 6, 1999.

5. That subsequent to August 6, 1999, the U.S. Department of Agriculture, acting through Rural Development ("RD") issued an Amendment to its original Letter of Conditions, which Amendment provides for additional funding to cover Applicant's construction cost overrun and requires Applicant to increase its rates and charges for water service.

6. That Applicant proposes to finance the construction of the Project through (i) the issuance of \$700,000 of its Series A Waterworks Revenue Bonds and \$810,000 of its Series B Waterworks Revenue Bonds, (ii) an RD grant in the amount of \$615,000, (iii) a Glenwood Hall contribution in the amount of \$100,000, and (iv) an Applicant contribution in the amount of \$54,300. Applicant has a commitment from the Rural Development (the "RD") to purchase said \$700,000 of Series A Bonds and \$810,000 of Series B Bonds, maturing over a 40-year period, at an interest rate of not exceeding 4.50% per annum, as set out in Amendment No. 1 to the RD Letter of Conditions filed herewith as an Exhibit.

7. That Applicant files herewith the following Exhibits pursuant to 807 KAR 5:069 in support of this Motion:

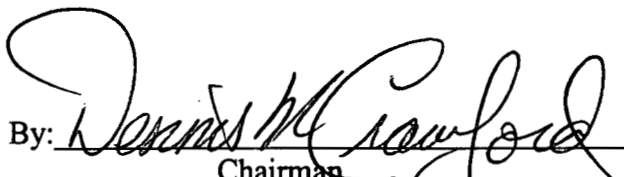
- A. Copy of Amendment No. 1 to the original RD Letter of Conditions.
- B. Certified statement from the Chairman of Applicant, based upon statements of the Engineers for Applicant, concerning the following:
 - (1) The proposed plans and specifications for the Project have been designed to meet the minimum construction and operating requirements set out in 807 KAR 5:066, Section 4(3) and (4); Section 5(1); Sections 6 and 7; Section 8(1) through (3); Section 9(1) and Section 10;
 - (2) All other state approvals or permits have already been obtained;
 - (3) The proposed rates of Applicant shall produce the total revenue requirements set out in the engineering reports; and
 - (4) Setting out the dates when it is anticipated that construction will begin and end.

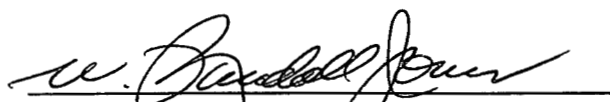
8. That Applicant has arranged for the publication, prior to or at the same time this Motion is filed, of a Notice of Proposed Rate Increase pursuant to Section 4 of 807 KAR 5:069, in the *News Democrat*, the *Gallatin County News* and the *News Herald*, which are the newspapers of general circulation in Applicant's service area. Said Notice sets out the current rates and the proposed rates of Applicant and a short description of the Project. A copy of said Notice is filed herewith as an Exhibit.

WHEREFORE, Applicant, the Carroll County Water District No. 1, asks that the Public Service Commission of the Commonwealth of Kentucky grant to Applicant the following:

- a. An Order reopening Case No. 99-302 relating to the Carroll County Water District No. 1;
- b. An Order approving the financing arrangements made by Applicant, viz., the issuance of (i) \$700,000 of Carroll County Water District No. 1 Waterworks Revenue Bonds, Series A and \$810,000 of Carroll County Water District No. 1 Waterworks Revenue Bonds, Series B, at an interest rate of not exceeding 4.50% per annum, (ii) a Rural Development grant in the amount of \$615,000, (iii) a Glenwood Hall contribution in the amount of \$100,000, and (iv) an Applicant contribution in the amount of \$54,300; and
- c. An Order approving the proposed increased rates as set out in Section 22 of Amendment No. 1 to the RD Letter of Conditions, filed herewith as an Exhibit.

CARROLL COUNTY WATER DISTRICT
NO. 1

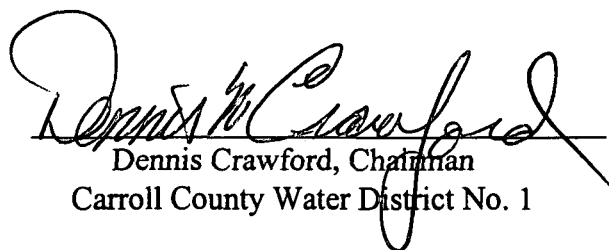
By: 
Chairman
Board of Water Commissioners


W. RANDALL JONES, ESQ.
Rubin & Hays
Counsel for Applicant
First Trust Centre
200 South Fifth Street
Louisville, Kentucky 40202
(502) 569-7525

COMMONWEALTH OF KENTUCKY)
) SS:
COUNTY OF CARROLL)

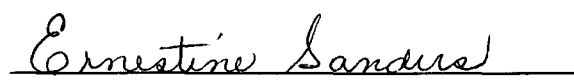
The undersigned, DENNIS CRAWFORD, being duly sworn, deposes and states that he is the Chairman of the Board of Commissioners of the Carroll County Water District No. 1 of Carroll, Gallatin and Owen Counties, Kentucky, Applicant, in the above proceedings; that he has read the foregoing Motion and has noted the contents thereof; that the same is true of his own knowledge, except as to matters which are therein stated on information or belief, and as to those matters, he believes same to be true.

IN TESTIMONY WHEREOF, witness the signature of the undersigned on this September 10, 1999.


Dennis Crawford, Chairman
Carroll County Water District No. 1

Subscribed and sworn to before me by Dennis Crawford, Chairman of the Board of Commissioners of the Carroll County Water District No. 1, on this September 10, 1999.

My Commission expires: 2/23/03.


Notary Public
In and for said County and State

(Seal of Notary)

A





United States
Department of
Agriculture

Rural
Development

771 Corporate Drive, Suite 200
Lexington, KY 40503-8477
(606) 224-7338 TTY (800) 224-7422

August 13, 1999

Mr. Dennis M. Crawford, Chairman
Carroll County Water District No. 1
P.O. Box 333
Carrollton, Kentucky 41008

Re: Letter of Conditions Dated March 29, 1996

Dear Mr. Crawford:

This letter shall serve as Amendment No. 1 to your Letter of Conditions dated March 29, 1996. The purpose of the amendment is to revise the following items:

1. Cost of Facility due to a construction bid overrun;
2. Number of Users;
3. Funded Depreciation Reserve Account;
4. Rates and Charges; and
5. Make other editorial changes in accordance with Rural Development Instructions.

The Second Paragraph on Page One is revised to read as follows:

" This letter is not to be considered as loan or grant approval or as a representation as to the availability of funds. The docket may be completed on the basis of a RUS loan not to exceed \$1,510,000 and a RUS grant not to exceed \$615,000, and a cash contribution from Glenwood Hall in the amount of \$100,000. "

Paragraph numbered "1" is revised to read as follows:

" 1. Number of Users and Their Contribution:

There shall be 2,184 water users, of which 1,858 are existing users and 326 are new users contributing \$54,300 in connection fees toward the cost of the project. The connection fees will be collected prior to advertising for construction bids and will be placed in the construction account at loan pre-closing, unless spent for authorized purposes prior to loan pre-closing. The Rural Development Manager will review and authenticate the number of users and amount of connection fees prior to advertising for construction bids. "

Paragraph numbered "3" is revised to read as follows:

" 3. Funded Depreciation Reserve Account:

The Water District will be required to deposit \$700.00 per month into a "Funded Depreciation Reserve Account" until the account reaches \$84,000. The deposits are to be resumed any time the account falls below the \$84,000.

The required monthly deposits to the Reserve Account and required Reserve Account levels are in addition to the requirements of the Water District's prior bond resolutions.

The monthly deposits to the Reserve Account are required to commence with the first month of the first full fiscal year after the facility becomes operational. "

Paragraph numbered "10. C" is revised to read as follows:

"10. C. Fidelity Bond - The Water District will provide Fidelity Bond Coverage for all persons who have access to funds. Coverage may be provided either for all individual positions or persons, or through "blanket" coverage providing protection for all appropriate employees and/or officials. The amount of coverage required for all RUS loans is \$308,000. "

Paragraph numbered "20" is revised to read as follows:

" 20. Cost of Facility:

Breakdown of Costs:

Development	\$ 1,945,000
Legal and Administrative	34,400
Engineering	236,900
Interest	51,600
Contingencies	11,400
TOTAL	\$ 2,279,300

Financing:

RUS Loan	\$ 1,510,000
RUS Grant	615,000
Glenwood Hall Contribution	100,000
Applicant Contribution	54,300
TOTAL	\$ 2,279,300 "

Paragraph numbered "21" is revised to read as follows:

" 21. Use of Remaining Project Funds:

The applicant contribution and Glenwood Hall contribution shall be considered as the first funds expended. After providing for all authorized costs, any remaining RUS project funds will be considered to be RUS grant funds and refunded to RUS. If the amount of unused RUS project funds exceeds the RUS grant, that part would be RUS loan funds. "

Paragraph numbered "22" is revised to read as follows:

" 22. Rates and Charges:

Rates and charges for facilities and services rendered by the Water District must be at least adequate to meet cost of maintaining, repairing and operating the water system and meeting required principal and interest payments and the required deposits to debt service and/or depreciation reserve.

Water rates will be at least:

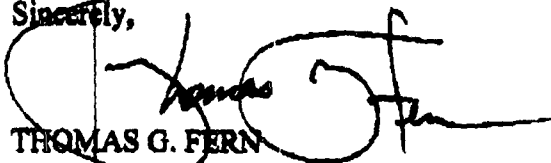
First	1,000 gallons @ \$	12.50 - Minimum Bill.
Next	1,000 gallons @ \$	5.75 - per 1,000 gallons.
Next	3,000 gallons @ \$	4.75 - per 1,000 gallons.
Next	5,000 gallons @ \$	4.40 - per 1,000 gallons.
Next	10,000 gallons @ \$	3.50 - per 1,000 gallons.
Next	20,000 gallons @ \$	3.00 - per 1,000 gallons.
All Over	40,000 gallons @ \$	2.35 - per 1,000 gallons.

Meter Connection Fees:

5/8" x 3/4" Meter	\$465.00
1" Meter	\$500.00
Larger than 1" Meter	Actual Cost "

All other provisions of the referenced Letter of Conditions remain in full force and unchanged.

Sincerely,



THOMAS G. FERN
State Director
Rural Development

- cc: Rural Development Manager - Shelbyville, Kentucky
- Community Development Manager - Campbellsburg, Kentucky
- Northern Kentucky ADD - Florence, Kentucky
- Rubin and Hayll - Louisville, Kentucky
- Jim Crawford - Carrollton, Kentucky
- Sieco, Inc. - Columbus, Kentucky
- PSC - ATTN: Claude Rhorer - Frankfort, Kentucky

B



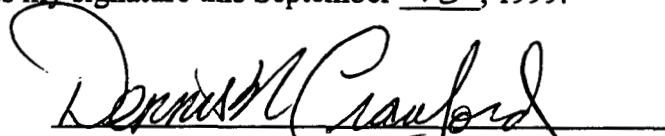
**CERTIFICATE OF CHAIRMAN OF
CARROLL COUNTY WATER DISTRICT NO. 1
AS TO STATEMENT REQUIRED BY SECTION 3(2)(D) OF 807 KAR 5:069**

I, DENNIS CRAWFORD, hereby certify that I am the duly qualified and acting Chairman of the Carroll County Water District No. 1 of Carroll, Gallatin and Owen Counties, Kentucky, and that said District is in the process of arranging to finance the construction of extensions, additions and improvements to the existing waterworks system of the District (the "Project"), in cooperation with SIECO, Inc., Columbus, Indiana, the Engineers for the District (the "Engineers").

Based on information furnished to me by said Engineers for the District, I hereby certify as follows:

1. That the proposed plans and specifications for the Project have been designed to meet the minimum construction and operating requirements set out in 807 KAR 5:066, Section 4(3) and (4); Section 5(1); Sections 6 and 7; Section 8(1) through (3); Section 9(1) and Section 10.
2. That all other state approvals and/or permits have already been obtained.
3. That the proposed rates of the District shall produce the total revenue requirements set out in the engineering reports.
4. That it is now contemplated that construction of the Project will begin on or about August 12, 1999, and will end on or about May 12, 2000.

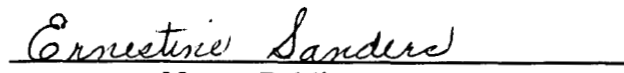
IN TESTIMONY WHEREOF, witness my signature this September 10, 1999.



Chairman
Carroll County Water District No. 1

STATE OF KENTUCKY)
) SS
COUNTY OF CARROLL)

Subscribed and sworn to before me by Dennis Crawford, Chairman of the Board of Commissioners of the Carroll County Water District No. 1, on this September 10, 1999.



Notary Public
In and For Said State and County

(Seal of Notary)



NOTICE OF PROPOSED RATE INCREASE

In accordance with the requirements of the Public Service Commission of the Commonwealth of Kentucky as set out in 807 KAR 5:069, Section 4, notice is hereby given to the customers of the Carroll County Water District No. 1 of Carroll, Gallatin and Owen Counties, Kentucky, of an increase to the District's rate schedule as set forth herein.

The proposed rate increase is required by the Rural Development in connection with a loan by the RD to the District in the amount of \$1,510,000 to be evidenced by the issuance by the District of its Waterworks Revenue Bonds in such amount, which the RD has agreed to purchase provided the District meets certain conditions of the RD, including increasing water rates as set forth below:

Current Monthly Rates

First 1,000 gallons	\$10.00 minimum bill
Next 1,000 gallons	4.40 per 1,000 gallons
Next 3,000 gallons	4.30 per 1,000 gallons
Next 5,000 gallons	4.20 per 1,000 gallons
Next 10,000 gallons	3.30 per 1,000 gallons
Next 20,000 gallons	2.50 per 1,000 gallons
All over 40,000 gallons	2.35 per 1,000 gallons

Current Connection Charges

5/8" x 3/4" meter	\$350.00
1" meter	500.00
Larger than 1" meter	Actual Cost

Proposed Monthly Rates

First 1,000 gallons	\$12.50 minimum bill
Next 1,000 gallons	5.75 per 1,000 gallons
Next 3,000 gallons	4.75 per 1,000 gallons
Next 5,000 gallons	4.40 per 1,000 gallons
Next 10,000 gallons	3.50 per 1,000 gallons
Next 20,000 gallons	3.00 per 1,000 gallons
All over 40,000 gallons	2.35 per 1,000 gallons

Proposed Connection Charges

5/8" x 3/4" meter	\$465.00
1" meter	500.00
Larger than 1" meter	Actual Cost

The RD loan proceeds will be used in conjunction with an RD Grant in the amount of \$615,000, a Glenwood Hall contribution in the amount of \$100,000 and a cash contribution from the District in the minimum amount of \$54,300, to finance the cost of extensions, additions and improvements to the existing waterworks system of the District, consisting of the installation of approximately 32 miles of 3, 4, 6 and 8 inch water transmission mains; a 171,000 gallon elevated water storage tank; and 2 booster pump stations, in order to serve approximately 326 new rural customers.

Signed: Dennis Crawford, Chairman
Carroll County Water District No. 1
Carrollton, Kentucky 41008



COMMONWEALTH OF KENTUCKY
PUBLIC SERVICE COMMISSION
730 SCHENKEL LANE
POST OFFICE BOX 615
FRANKFORT, KY. 40602
(502) 564-3940

CERTIFICATE OF SERVICE

RE: Case No. 99-302
CARROLL COUNTY WATER DISTRICT #1

I, Stephanie Bell, Secretary of the Public Service Commission, hereby certify that the enclosed attested copy of the Commission's Order in the above case was served upon the following by U.S. Mail on August 6, 1999.

See attached parties of record.

Stephanie D. Bell

Secretary of the Commission

SB/sa
Enclosure

James L. Smith
Manager
Carroll County Water District #1
101 Main Cross
P. O. Box 350
Ghent, KY. 41045

Thomas G. Fern
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771 Corporate Drive, Suite 200
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1900 Midland Trail
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Honorable Ruth H. Baxter
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COMMONWEALTH OF KENTUCKY
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In the Matter of:

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WATER DISTRICT NO. 1 OF CARROLL, GALLATIN)
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NECESSITY TO CONSTRUCT AND FINANCE)
PURSUANT TO KRS 278.023)

O R D E R

On July 19, 1999, Carroll County Water District ("Carroll District") submitted an application for a Certificate of Public Convenience and Necessity to construct a \$1,469,300 waterworks improvement project and for approval of its plan of financing for this project. This project will provide new service to 326 additional customers. Project funding is a \$700,000 bond issue to be purchased pursuant to an agreement with the U. S. Department of Agriculture's Rural Development ("RD"), a \$615,000 grant from the RD, and a \$154,300 contribution from the Applicant.

Carroll District's application was made pursuant to KRS 278.023, which requires the Commission to accept agreements between water utilities and the U. S. Department of Agriculture or the U. S. Department of Housing and Urban Development and to issue the necessary orders to implement the terms of such agreements within 30 days of satisfactory completion of the minimum filing requirements. Given that minimum filing requirements

were met in this case on July 19, 1999, KRS 278.023 does not grant the Commission any discretionary authority to modify or reject any portion of this agreement.

IT IS THEREFORE ORDERED that:

1. Carroll District is hereby granted a Certificate of Public Convenience and Necessity for the proposed construction project.

2. Carroll District's proposed plan of financing with RD is accepted.

3. Carroll District is authorized to issue bonds not to exceed \$700,000.

4. Carroll District shall file a copy of the "as-built" drawings and a certified statement that the construction has been satisfactorily completed in accordance with the contract plans and specifications within 60 days of the substantial completion of the construction certificated herein.

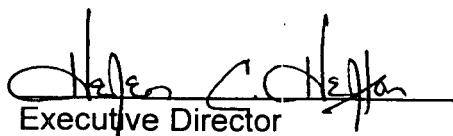
5. Three years from the effective date of this Order Carroll District shall file an income statement, along with any pro forma adjustments, in sufficient detail to demonstrate that the rates approved herein are sufficient to meet its operating expenses and annual debt service requirements.

Nothing contained herein shall be deemed a warranty of the Commonwealth of Kentucky, or any agency thereof, of the financing herein accepted.

Done at Frankfort, Kentucky, this 6th day of August, 1999.

By the Commission

ATTEST:


Executive Director



COMMONWEALTH OF KENTUCKY
PUBLIC SERVICE COMMISSION

730 SCHENKEL LANE
POST OFFICE BOX 615
FRANKFORT, KY. 40602
(502) 564-3940

July 27, 1999

To: All parties of record

RE: Case No. 99-302
CARROLL COUNTY WATER DISTRICT #1

The Commission staff has reviewed your response of July 19, 1999 and has determined that your application in the above case now meets the minimum filing requirements set by our regulations. Enclosed please find a stamped filed copy of the first page of your filing. This case has been docketed and will be processed as expeditiously as possible.

If you need further information, please contact my staff at 502/564-3940.

Sincerely,

Stephanie Bell

Stephanie Bell
Secretary of the Commission

SB/sa
Enclosure

James L. Smith
Manager
Carroll County Water District #1
101 Main Cross
P. O. Box 350
Ghent, KY. 41045

Thomas G. Fern
State Director
Rural Development
771 Corporate Drive, Suite 200
Lexington, KY. 40503 5477

Terry Loper
Rural Development
1900 Midland Trail
Shelbyville, KY. 40065 9113

Jim West
Sieco, Inc.
629 Washington Street
P. O. Box 407
Columbus, IN. 47202

Honorable Ruth H. Baxter
Crawford & Baxter, P.S.C.
523 Highland Avenue
P. O. Box 353
Carrollton, KY. 41008

Honorable W. Randall Jones
Rubin & Hays
First Trust Centre
200 South Fifth Street
Louisville, KY. 40202

Rubin & Hays

ATTORNEYS AT LAW

First Trust Centre, 200 South Fifth Street, Louisville, Kentucky 40202-3236
Telephone (502) 569-7525 Telefax (502) 569-7555 Email: rh@rubinhays.com

CHARLES S. MUSSON
W. RANDALL JONES
CHRISTIAN L. JUCKETT

OF COUNSEL
WM. CARL FUST

PARALEGAL
MARY M. EMBRY

RECEIVED
JUL 13 1999
PUBLIC SERVICE
COMMISSION

July 12, 1999

FILED

JUL 19 1999

PUBLIC SERVICE
COMMISSION

Ms. Helen C. Helton, Executive Director
Public Service Commission
P.O. Box 615
Frankfort, Kentucky 40602

Re: Carroll County Water District No. 1 *CASE 99-302*

Dear Ms. Helton:

Enclosed please find the original and ten (10) copies of the Application of the Carroll County Water District No. 1 for a Certificate of Public Convenience and Necessity to construct and finance pursuant to KRS 278.023.

Also enclosed are eleven (11) copies of the exhibits required pursuant to 807 KAR 5.069, with the exception of the Preliminary and Final Engineering Reports, of which two copies are enclosed and the letter of Rural Development concurring in the construction bid award, which we shall file as soon as it is available.

If you need any additional information or documentation, please let us know.

Sincerely,

Rubin & Hays

By 

W. Randall Jones

WRJ:jkm
Enclosures

cc: Distribution List



COMMONWEALTH OF KENTUCKY
PUBLIC SERVICE COMMISSION
730 SCHENKEL LANE
POST OFFICE BOX 615
FRANKFORT, KENTUCKY 40602
www.psc.state.ky.us
(502) 564-3940
Fax (502) 564-3460

Ronald B. McCloud, Secretary
Public Protection and
Regulation Cabinet

Helen Helton
Executive Director
Public Service Commission

Paul E. Patton
Governor

July 22, 1999

Honorable W. Randall Jones
Rubin & Hays
First Trust Centre
200 South Fifth Street
Louisville, KY 40202-3236

James L. Smith
Manager
Carroll County Water District #1
101 Main Cross
P.O. Box 350
Ghent, KY 41045

Re: Case No. 99-302
Filing Deficiencies

Gentlemen:

The Commission staff has conducted an initial review of your filing in the above case. This filing is rejected pursuant to 807 KAR 5:001, Section 2, as it is deficient in certain filing requirements. The items listed below are either required to be filed with the application or must be referenced if they are already on file in another case or will be filed at a later date.

Filing deficiencies pursuant to 807 KAR 5:069, Section 1(3):

Copy of the letter of concurrence in bid award.

The statutory time period in which the Commission must process this case will not commence until the above-mentioned information is filed with the Commission. You are requested to file 10 copies of this information within 15 days of the date of this letter.



If you need further information, please contact James Rice of my staff at (502)564-3940, ext. 411.

Sincerely,

Stephanie Bell

Stephanie Bell
Secretary of the Commission

sa

cc: Parties of Record



Rubin & Hays

ATTORNEYS AT LAW

First Trust Centre, 200 South Fifth Street, Louisville, Kentucky 40202-3236
Telephone (502) 569-7525 Telefax (502) 569-7555 Email: rh@rubinhays.com

CHARLES S. MUSSON
W. RANDALL JONES
CHRISTIAN L. JUCKETT

OF COUNSEL
WM. CARL FUST

PARALEGAL
MARY M. EMBRY

July 16, 1999

Ms. Helen C. Helton, Executive Director
Public Service Commission
P.O. Box 615
Frankfort, Kentucky 40602

RECEIVED
JUL 19 1999
PUBLIC SERVICE
COMMISSION

Re: **Carroll County Water District No. 1, Case No. 99-302**

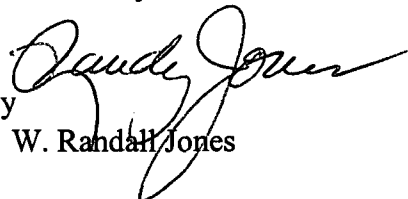
Dear Ms. Helton:

Enclosed please find the original and ten (10) copies of Rural Development's Letter of Concurrence in the Construction Bid Award, which is a required submittal. Please file the letter with the Application.

If you need any additional information or documentation, please let us know.

Sincerely,

Rubin & Hays

By 
W. Randall Jones

WRJ:jkm
Enclosures

cc: Distribution List

DISTRIBUTION LIST

Re: Carroll County Water District No. 1 Waterworks Revenue Bonds, Series 2000

Account No. 1670.0000

Mr. Thomas G. Fern
State Director
Rural Development
771 Corporate Drive, Suite 200
Lexington, Kentucky 40503-5477

(606) 224-7336
Fax (606) 224-7340

Mr. Terry Loper
Rural Development
1900 Midland Trail
Shelbyville, Kentucky 40065-9113

Telephone: (502) 633-0891
Fax: (502) 633-0552

Mr. James L. Smith, Manager
Carroll County Water District No. 1
P.O. Box 333
Carrollton, Kentucky 41008

(502) 347-9470

Mr. Jim West
SIECO, INC.
629 Washington Street
P.O. Box 407
Columbus, Indiana 47202

(812) 372-9911
Fax (812) 372-7190

Ruth H. Baxter, Esq.
Crawford & Baxter, P.S.C.
523 Highland Avenue
P.O. Box 353
Carrollton, Kentucky 41008

(502) 732-6688
Fax (502) 732-6920

W. Randall Jones, Esq.
Rubin & Hays
First Trust Centre
200 South Fifth Street
Louisville, Kentucky 40202

(502) 569-7534
Fax (502) 569-7555



July 13, 1999

RECEIVED
JUL 19 1999
PUBLIC SERVICE
COMMISSION

SUBJECT: Carroll County Water District No. 1
Concurrence in Contract Award

TO: Rural Development Manager
Shelbyville, Kentucky

Based on the bids received and the recommendation of the consulting engineer, Rural Development concurs in the award of the following contracts:

DIVISION A-1 - Water Main Extensions - Low Bid:

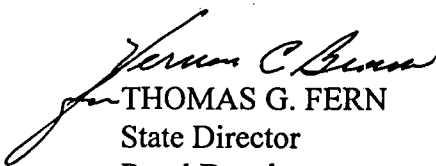
Howard Engineering and Construction, London, KY in the amount of \$294,185.00

DIVISION A-2 - Water Main Extensions, Booster Stations, Main MPRV's, Master Meters
and Telemetry - Low Bid:

Kenney, Inc., Mt. Sterling, KY in the amount of \$1,410,211.50

DIVISION B - Standpipe Water Storage Tank and Related Work - Low Bid:

Welding, Inc., Charleston, WV in the amount of \$148,000.00


THOMAS G. FERN
State Director
Rural Development

cc: ✓ Rubin and Hays
Louisville, Kentucky



COMMONWEALTH OF KENTUCKY
PUBLIC SERVICE COMMISSION

730 SCHENKEL LANE
POST OFFICE BOX 615
FRANKFORT, KY. 40602
(502) 564-3940

July 19, 1999

To: All parties of record

RE: Case No. 99-302
CARROLL COUNTY WATER DISTRICT #1
(Construct, Finance; 278.023)

This letter is to acknowledge receipt of initial application in the above case. The application was date-stamped received July 13, 1999 and has been assigned Case No. 99-302. In all future correspondence or filings in connection with this case, please reference the above case number.

If you need further assistance, please contact my staff at 502/564-3940.

Sincerely,

A handwritten signature in cursive script that reads "Stephanie D. Bell".

Stephanie Bell
Secretary of the Commission

SB/jc

James L. Smith
Manager
Carroll County Water District #1
101 Main Cross
P. O. Box 350
Ghent, KY. 41045

Thomas G. Fern
State Director
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CHRISTIAN L. JUCKETT

OF COUNSEL
WM. CARL FUST

PARALEGAL
MARY M. EMBRY

RECEIVED
JUL 13 1999
PUBLIC SERVICE
COMMISSION

July 12, 1999

FILED

JUL 19 1999

PUBLIC SERVICE
COMMISSION

Ms. Helen C. Helton, Executive Director
Public Service Commission
P.O. Box 615
Frankfort, Kentucky 40602

Re: Carroll County Water District No. 1 *CASE 99-302*

Dear Ms. Helton:

Enclosed please find the original and ten (10) copies of the Application of the Carroll County Water District No. 1 for a Certificate of Public Convenience and Necessity to construct and finance pursuant to KRS 278.023.

Also enclosed are eleven (11) copies of the exhibits required pursuant to 807 KAR 5.069, with the exception of the Preliminary and Final Engineering Reports, of which two copies are enclosed and the letter of Rural Development concurring in the construction bid award, which we shall file as soon as it is available.

If you need any additional information or documentation, please let us know.

Sincerely,

Rubin & Hays

By


W. Randall Jones

WRJ:jkm
Enclosures

cc: Distribution List

DISTRIBUTION LIST

Re: Carroll County Water District No. 1 Waterworks Revenue Bonds, Series 2000

Account No. 1670.0000

Mr. Thomas G. Fern
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W. Randall Jones, Esq.
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200 South Fifth Street
Louisville, Kentucky 40202

(502) 569-7534
Fax (502) 569-7555

COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

RECEIVED
JUL 13 1999
PUBLIC SERVICE
COMMISSION

In the Matter of:

THE APPLICATION OF CARROLL COUNTY WATER)
DISTRICT NO. 1 OF CARROLL, GALLATIN AND)
OWEN COUNTIES, KENTUCKY, FOR A CERTIFICATE) NO. 99-302
OF PUBLIC CONVENIENCE AND NECESSITY TO)
CONSTRUCT AND FINANCE PURSUANT TO KRS 278.023.)

APPLICATION

This Application of the Carroll County Water District No. 1 ("Applicant") of Carroll, Gallatin and Owen Counties, Kentucky, respectfully shows:

1. That Applicant is a water district of Carroll, Gallatin and Owen Counties, Kentucky, created and existing under and by virtue of Chapter 74 of the Kentucky Revised Statutes.

2. That the post office address of Applicant is:

Carroll County Water District No. 1
c/o Mr. Dennis Crawford, Chairman
P.O. Box 333
Carrollton, Kentucky 41008

3. That Applicant, pursuant to the provisions of KRS 278.020 and 278.023, seeks (i) a Certificate of Public Convenience and Necessity, permitting Applicant to construct a waterworks construction project, consisting of extensions, additions, and improvements (the "Project") to the existing waterworks system of Applicant; and (ii) approval of the proposed plan of financing said Project.

4. That the Project consists of the installation of approximately 32 miles of 3, 4, 6 and 8 inch water transmission mains; a 171,000 gallon elevated water storage tank; and 2 booster pump stations, in order to serve approximately 326 new rural customers.

5. That Applicant proposes to finance the construction of the Project through (i) the issuance of \$700,000 of its Waterworks Revenue Bonds, (ii) a Rural Development ("RD") grant in the amount of \$615,000, and (iii) an Applicant contribution in the amount of \$154,300. Applicant has a commitment from the Rural Development (the "RD") to purchase said \$700,000 of bonds

maturing over a 40-year period, at an interest rate of not exceeding 4.50% per annum, as set out in the RD Letter of Conditions filed herewith as an Exhibit.

6. That the Project, as bid, had a cost overrun of approximately \$800,000. Applicant requested additional funding from RD to cover the cost overrun but was informed that RD monies would not be available until October, 1999 (the beginning of RD's 1999-2000 fiscal year). Applicant applied to and received permission from RD to use its internal funds to supplement the Project funding (and accordingly to proceed with construction of the Project) until such time as additional RD monies become available. RD issued a letter to Applicant stating that the Project will receive funding priority for the 1999-2000 fiscal year funding cycle. Applicant is hereby advising the Commission that it fully expects to petition the Commission for an Amendment to any Order issued in this Case, such petition being filed to request approval of the additional RD funding and approval of increased rates pursuant to the anticipated RD Amendment to the Letter of Conditions.

7. That Applicant does not contemplate having the Project constructed with any deviation from minimum construction standards of this Public Service Commission.

8. That Applicant files herewith the following Exhibits pursuant to 807 KAR 5:069 in support of this Application:

- A. Copy of RD Letter of Conditions.
- B. Copy of RD Letter of Concurrence in Bid Award.
- C. Copy of Preliminary and Final Engineering Reports.
- D. Certified statement from the Chairman of Applicant, based upon statements of the Engineers for Applicant, concerning the following:
 - (1) The proposed plans and specifications for the Project have been designed to meet the minimum construction and operating requirements set out in 807 KAR 5:066, Section 4(3) and (4); Section 5(1); Sections 6 and 7; Section 8(1) through (3); Section 9(1) and Section 10;
 - (2) All other state approvals or permits have already been obtained;
 - (3) The current rates of Applicant shall produce the total revenue requirements set out in the engineering reports; and
 - (4) Setting out the dates when it is anticipated that construction will begin and end.


- E. Copy of Letter from RD as to the priority status of Applicant's request for additional funding.

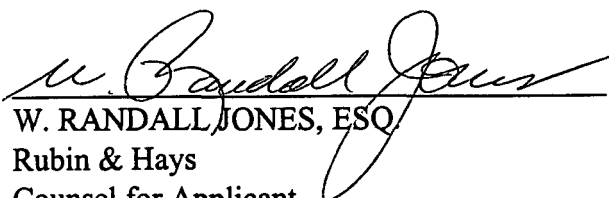
9. That the foregoing constitutes the documents necessary to obtain the approval of the Public Service Commission in accordance with Section 278.023 of the Kentucky Revised Statutes and in accordance with the "Minimum Filing Requirements" set forth and specified in 807 KAR 5:069, Section 3.

WHEREFORE, Applicant, the Carroll County Water District No. 1, asks that the Public Service Commission of the Commonwealth of Kentucky grant to Applicant the following:

- a. A Certificate of Public Convenience and Necessity permitting Applicant to construct a waterworks project consisting of extensions, additions, and improvements to the existing waterworks system of Applicant.
- b. An Order approving the financing arrangements made by Applicant, viz., the issuance of (i) \$700,000 of Carroll County Water District No. 1 Waterworks Revenue Bonds at an interest rate of not exceeding 4.50% per annum, (ii) a Rural Development grant in the amount of \$615,000, and (iii) an Applicant contribution in the amount of \$154,300.

CARROLL COUNTY WATER DISTRICT
NO. 1

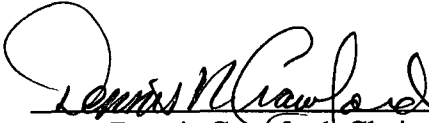
By: 
Chairman
Board of Water Commissioners


W. RANDALL JONES, ESQ
Rubin & Hays
Counsel for Applicant
First Trust Centre
200 South Fifth Street
Louisville, Kentucky 40202
(502) 569-7525

COMMONWEALTH OF KENTUCKY)
) SS:
COUNTY OF CARROLL)

The undersigned, DENNIS CRAWFORD, being duly sworn, deposes and states that he is the Chairman of the Board of Commissioners of the Carroll County Water District No. 1 of Carroll, Gallatin and Owen Counties, Kentucky, Applicant, in the above proceedings; that he has read the foregoing Application and has noted the contents thereof; that the same is true of his own knowledge, except as to matters which are therein stated on information or belief, and as to those matters, he believes same to be true.

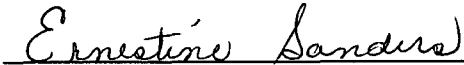
IN TESTIMONY WHEREOF, witness the signature of the undersigned on this July 8, 1999.



Dennis Crawford, Chairman
Carroll County Water District No. 1

Subscribed and sworn to before me by Dennis Crawford, Chairman of the Board of Commissioners of the Carroll County Water District No. 1, on this July 8, 1999.

My Commission expires: Feb. 23, 2003.



Ernestine Sanders
Notary Public
In and for said County and State

(Seal of Notary)



United States
Department of
Agriculture

Rural Economic
and Community
Development
Service

771 Corporate Drive, Suite 200
Lexington, KY 40503-5477
(606) 224-7336
TTY: (606) 224-7422

March 29, 1996

Mr. Dennis M. Crawford, Chairman
Carroll County Water District No. 1
Carrollton, Kentucky 41008

Dear Mr. Crawford:

This letter establishes conditions which must be understood and agreed to by you before further consideration may be given to the application. Any changes in project cost, source of funds, scope of services or any other significant changes in the project or applicant must be reported to and approved by the United States Department of Agriculture (USDA), acting through the Rural Utilities Service (RUS), by written amendment to this letter. Any changes not approved by RUS all be cause for discontinuing processing of the application. It should also be understood that the RUS is under no obligation to provide additional funds to meet an overrun in construction costs.

This letter is not to be considered as loan or grant approval or as a representation as to the availability of funds. The docket may be completed on the basis of an RUS loan not to exceed \$700,000 RUS grant not to exceed \$615,000.

If RUS makes the loan, you may make a written request that the interest rate be the lower of the rate in effect at the time of loan approval or the time of loan closing. If you do not request the lower of the two interest rates, the interest rate charged will be the rate in effect at the time of loan approval. The loan will be considered approved on the date a signed copy of Form FmHA 1940-1, "Request for Obligation of Funds," is mailed to you. If you want the lower of the two rates, your written request should be submitted to RUS as soon as practical. In order to avoid possible delays in loan closing, such a request should ordinarily be submitted at least 30 days before loan closing.

Please complete and return the attached Form FmHA 1942-46, "Letter of Intent to Meet Conditions," if you desire that further consideration be given to your application.

The "Letter of Intent to Meet Conditions" must be executed within three weeks from the date of this letter or it becomes invalid unless a time extension is granted by RUS.

If the conditions set forth in this letter are not met within 240 days from the date hereof, RUS reserves the right to discontinue the processing of the application.

In signing Form FmHA 1942-46, you are agreeing to complete the following as expeditiously as possible:

1. Number of Users and Their Contribution:

There shall be 2,071 water users, of which 1,745 are existing users and 326 are new users contributing \$154,300 in connection fees toward the cost of the project. The connection fees will be collected prior to advertising for construction bids and will be placed in the construction account at loan pre-closing, unless spent for authorized purposes prior to loan pre-closing. The Rural Development Manager will review and authenticate the number of users and amount of connection fees prior to advertising for construction bids.

1a. Grant Agreement:

Attached is a copy of Form FmHA 1942-31, "Association Water or Sewer System Grant Agreement," for your review. You will be required to execute a completed form at the time of grant closing.

1b. Drug-Free Work Place:

Prior to grant approval, the District will be required to execute Form AD-1049, "Certification Regarding Drug-Free Workplace Requirements (Grants) Alternative I - For Grantees Other Than Individuals."

2. Repayment Period:

The loan will be scheduled for repayment over a period not to exceed 40 years from the date of the bond. Principal payment will not be deferred for a period in excess of two years from the date of the bond. Payments will be in accordance with applicable KRS which requires interest to be paid semi-annually (March 1st and September 1st) and principal will be due on or before the first of September each year. RUS may require the District to adopt a supplemental payment agreement providing for monthly payments of principal and interest so long as the bond is held or insured by RUS. Monthly payments will be approximate amortized installments.

3. Funded Depreciation Reserve Account:

The District will be required to deposit \$325.00 per month into a "Funded Reserve Depreciation Account" until the account reaches \$39,000. The deposits are to be resumed any time the account falls below the \$39,000.

The required monthly deposits to the Reserve Account and required Reserve Account levels are in addition to the requirements of the District's prior bond resolutions.

The monthly deposits to the Reserve Account are required to commence with the first month of the first full fiscal year after the facility becomes operational.

4. Security Requirements:

A combined pledge of gross water revenue will be provided in the Bond Resolution. Bonds shall rank on a parity with existing bonds, if possible. If this is not possible, the bond will be subordinate and junior to the existing bonds, in which case the District will be required to abrogate its right to issue additional bonds ranking on a parity with the existing bonds, so long as any unpaid indebtedness remains on this bond issue.

5. Land Rights and Real Property:

The District will be required to furnish satisfactory title, easements, etc., necessary to install, maintain and operate the facility to serve the intended users. The pipelines will be on private rights-of-way where feasible. State and County rights-of-way will be used only in instances where necessary and properly justified. Easements and options are to be secured prior to advertising for construction bids.

6. Organization:

The District will be legally organized under applicable KRS which will permit them to perform this service, borrow and repay money.

7. Business Operations:

The District will be required to operate the system under a well-established set of resolutions, rules and regulations. A budget must be established annually and adopted by the District after review by RUS. At no later than loan pre-closing, the District will be required to furnish a prior approved management plan to include, as a minimum, provisions for management, maintenance, meter reading, miscellaneous services, billing, collecting, bookkeeping, making and delivering required reports and audits.

8. Accounts, Records and Audits:

The District will be required to maintain adequate records and accounts and submit statistical and financial reports in accordance with subsection 1942.17(q) of FmHA Instruction 1942-A, a copy of which is enclosed. Annual audits, budgets, and reports will be submitted to RUS showing separate accounts for each system, if applicable.

9. Accomplishing Audits for Years in Which Receive Federal Financial Assistance:

The District will accomplish audits in accordance with OMB Circular A-128 during the years in which federal funds are received. The District will provide copies of the audits to the District Office and the appropriate Federal cognizant agency as designated by OMB Circular A-128.

10. Insurance and Bonding:

The following insurance and bonding will be required:

- A. Adequate Liability and Property Damage Insurance including vehicular coverage, if applicable, must be obtained and maintained by the District. The District should obtain amounts of coverage as recommended by its attorney, consulting engineer and/or insurance provider.
- B. Worker's Compensation - The District will carry worker's compensation insurance for employees in accordance with applicable state laws.
- C. Fidelity Bond - The District will provide Fidelity Bond Coverage for all persons who have access to funds. Coverage may be provided either for all individual positions or persons, or through "blanket" coverage providing protection for all appropriate employees and/or officials. The amount of coverage required for all RUS loans is \$137,000.
- D. Real Property Insurance - The District will obtain and maintain adequate fire and extended coverage on all structures including major items of equipment or machinery located in the structures. The amounts of coverage should be based on recommendations obtained by the District from its attorney, consulting engineer and/or insurance provider. Subsurface lift stations do not have to be covered except for the value of electrical and pumping equipment therein.
- E. Flood Insurance - The District will obtain and maintain adequate coverage on any facilities located in a special flood and mudslide prone areas.

11. Planning and Performing Development:

- A. The engineer should not be authorized to commence work on final plans and specifications until a determination has been made that the project can be planned and constructed within the estimated cost shown in paragraph "20" of this letter. When this determination has been made, RUS should be so advised by letter. The engineer may then proceed to develop final plans and specifications to be completed no later than 210 days from this date, and prepare bid documents. The Rural Development Manager is prepared to furnish the necessary guide for him to follow so as to keep the project plans and documents within our guidelines and requirements. The project should not be advertised for construction bids until all easements and enforceable options have been obtained, and total funds are committed or available for the project.

- B. The following documents will be submitted to RUS for review and must be concurred in by RUS prior to advertisement for construction bids:
1. Final plans and specifications.
 2. Contract documents and bid documents, with applicant's letter on efforts to encourage small business and minority-owned business participation.
 3. Legal Service Agreements.
 4. Engineering Agreements.

Revision in these documents will be subject to RUS concurrence. Any agreements, contracts, etc. not reviewed and approved by RUS will not be eligible for payment from project funds or revenues from facilities financed by RUS.

Prior to receipt of an authorization to advertise for construction bids, the District will obtain advance clearance from Bond Counsel regarding compliance with KRS 424 pertaining to publishing of the advertisement for construction bids in local newspapers and the period of time the notice is required to be published.

12. Compliance with Section 504 of the Rehabilitation Act of 1973:

The District will be required to comply with Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), in order to make sure no handicapped individual, solely by reason of their handicap, is excluded from participation in the use of the water system, be denied the benefits of the water system, or be subjected to discrimination.

13. Closing Instructions:

The Office of General Counsel, our Regional Attorney, will be required to write closing instructions in connection with this loan. Conditions listed therein must be met by the District.

14. Compliance with Special Laws and Regulations:

The District will be required to conform with any and all state and local laws and regulations affecting this type project.

15. Treatment Plant/System Operator:

The District is reminded that the treatment plant and/or system operator must have an Operator's Certificate issued by the State.

16. Prior to Pre-Closing the Loan, the District will be Required to Adopt:

- A. Form FmHA 1942-47, "Association Loan Resolution (Public Body)."
- B. Form FmHA 400-1, "Equal Opportunity Agreement."

- C. Form FmHA 400-4, "Assurance Agreement."
- D. Form AD-1047, "Certification Regarding Debarment, Suspension, and Other Responsibility Matters - Primary Covered Transaction."
- E. Form FmHA 1910-11, "Applicant Certification Federal Collection Policies for Consumer or Commercial Debts."
- F. FmHA Instruction 1940-Q, Exhibit A-1, "Certification for Contracts, Grants and Loans."

The District must offer the opportunity for all residents in the service area to become users of the facilities regardless of race, creed, color, religion, sex, national origin, marital status, physical or mental handicap, or level of income.

17. Refinancing and Graduation Requirements:

The District is reminded that if at any time it shall appear to the Government that the District is able to refinance the amount of the RUS indebtedness then outstanding, in whole or in part, by obtaining a loan from commercial sources at reasonable rates and terms, upon the request of the Government, the District will apply for and accept such loan in sufficient amount to repay the Government.

18. Commercial Interim Financing:

The District will be required to use commercial interim financing for the project during construction for the RUS loan portion of the financing, if available at reasonable rates and terms.

Before the loan is closed, the District will be required to provide RUS with statements from the contractor, engineer and attorneys that they have been paid to date in accordance with their contract or other agreements and, in the case of the contractor, that he has paid his suppliers and sub-contractors. Any exceptions must be authorized under FmHA Instruction 1942-A, subsection 1942.17(n)(3).

19. Disbursement of Project Funds:

A construction account for the purpose of disbursement of project funds (RUS) will be established by the District prior to start of construction. The position of officials entrusted with the receipt and disbursement of RUS project funds will be covered by a "Fidelity Bond," with USDA-RECD as Co-Obligee, in the amount of construction funds on hand at any one time during the construction phase.

During construction, the District shall disburse project funds in a manner consistent with subsection 1942.17(p)(5) of FmHA Instruction 1942-A. Form FmHA 1924-18, "Partial Payment Estimate," or similar form approved by RUS, shall be used for the purpose of documenting periodic construction estimates, and shall be submitted to RUS for review and acceptance. Prior to disbursement of funds by the District, the Board of Commissioners shall review and approve each payment estimate. All bills and vouchers must be approved by RUS prior to payment by the District.

Form FmHA 440-11, "Estimate of Funds Needed for 30-Day Period Commencing _____," will be prepared by the District and submitted to RUS in order that a periodic advance of federal cash may be requested.

Monthly audits of the District's construction account records shall be made by RECD.

20. Cost of Facility:

Breakdown of Costs:

Development	\$ 1,177,300
Legal and Administrative	20,000
Engineering	162,900
Interest	30,000
Contingencies	<u>79,100</u>
TOTAL	\$ 1,469,300

Financing:

RUS Loan	\$ 700,000
RUS Grant	615,000
Applicant Contribution	<u>154,300</u>
TOTAL	\$ 1,469,300

21. Use of Remaining Project Funds:

The applicant contribution shall be considered as the first funds expended. After providing for all authorized costs, any remaining RUS project funds will be considered to be RUS grant funds and refunded to RUS. If the amount of unused RUS project funds exceeds the RUS grant, that part would be RUS loan funds.

22. Rates and Charges:

Rates and charges for facilities and services rendered by the District must be at least adequate to meet cost of maintaining, repairing and operating the water system and meeting required principal and interest payments and the required deposits to debt service and/or depreciation reserve.

Water rates will be at least:

- First 1,000 gallons @ \$10.00 - Minimum Bill.
- Next 9,000 gallons @ \$ 4.00 - per 1,000 gallons.
- Next 10,000 gallons @ \$ 3.00 - per 1,000 gallons.
- All Over 20,000 gallons @ \$ 2.00 - per 1,000 gallons.

23. Floodplain Construction:

The District will be required to pass and adopt an Resolution or amend its By-Laws whereby the District will deny any water service to any future customer wishing to build within a designated floodplain.

24. Endangered Species:

Prior to loan and grant pre-closing, the District will be required to hire a qualified Botanist to complete a survey (within the project area) identifying any evidence of the endangered species, the Small Rock Crest.

Botanist Name _____

25. Water Withdrawal Permit:

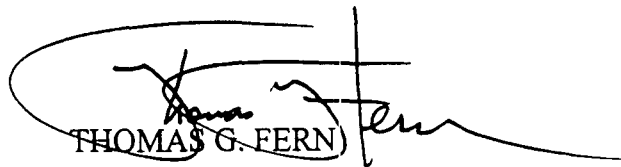
The District will be required to obtain satisfactory evidence that the District has secured a revised water withdrawal permit from the Division of Water. The permit must be obtained prior to the commencement of construction on the water project.

26. Final Approval Conditions:

Final approval of this loan will depend on your willingness, with the assistance of all your co-workers, to meet the conditions of this letter in an orderly and systematic manner. Then too, final approval will depend on funds being available.

If you desire to proceed with your application, the Rural Development Manager will allot a reasonable portion of his time to provide guidance in application processing.

Sincerely,

A handwritten signature in black ink, appearing to read "Thomas G. Fern", is written over a rectangular stamp.

THOMAS G. FERN

State Director

Rural Economic and Community Development

Enclosures

- cc: Rural Development Manger - Shelbyville, KY
- Community Development Manger - LaGrange, KY
- Northern Kentucky ADD - Florence, KY
- Rubin Hays and Foley - Louisville, KY
- Jim Crawford - Carrollton, KY
- Sieco, Inc. - Columbus, KY
- PSC - ATTN: Claude Rhorer - Frankfort, KY

B



EXHIBIT B

Carroll County Water District No. 1

Letter of Rural Development Concurring in the Construction Bid Award

To Be Filed As Soon As Available



9



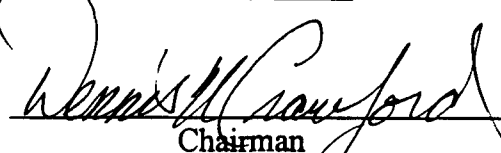
**CERTIFICATE OF CHAIRMAN OF
CARROLL COUNTY WATER DISTRICT NO. 1
AS TO STATEMENT REQUIRED BY SECTION 3(2)(D) OF 807 KAR 5:069**

I, DENNIS CRAWFORD, hereby certify that I am the duly qualified and acting Chairman of the Carroll County Water District No. 1 of Carroll, Gallatin and Owen Counties, Kentucky, and that said District is in the process of arranging to finance the construction of extensions, additions and improvements to the existing waterworks system of the District (the "Project"), in cooperation with SIECO, Inc., Columbus, Indiana, the Engineers for the District (the "Engineers").

Based on information furnished to me by said Engineers for the District, I hereby certify as follows:

1. That the proposed plans and specifications for the Project have been designed to meet the minimum construction and operating requirements set out in 807 KAR 5:066, Section 4(3) and (4); Section 5(1); Sections 6 and 7; Section 8(1) through (3); Section 9(1) and Section 10.
2. That all other state approvals and/or permits have already been obtained.
3. That the existing rates of the District shall produce the total revenue requirements set out in the engineering reports.
4. That it is now contemplated that construction of the Project will begin on or about August 12, 1999, and will end on or about May 12, 2000.

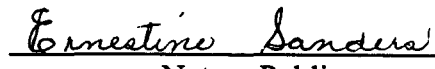
IN TESTIMONY WHEREOF, witness my signature this July 8, 1999.



Chairman
Carroll County Water District No. 1

STATE OF KENTUCKY)
) SS
COUNTY OF CARROLL)

Subscribed and sworn to before me by Dennis Crawford, Chairman of the Board of Commissioners of the Carroll County Water District No. 1, on this July 8, 1999.



Notary Public
In and For Said State and County

(Seal of Notary)

99-302

RECEIVED
JUL 18 1999

PUBLIC SERVICE
COMMISSION

REVISED

PRELIMINARY ENGINEERING REPORT

PROPOSED WATER SYSTEM EXPANSION PROJECT OF 1996

WATER MAIN EXTENSIONS, TELEMETRY CONTROL, BOOSTER STATION,
WATER STORAGE TANK AND METERED SERVICES

PREPARED FOR

Carroll County Water District No. 1
P.O. Box 333
Carrollton, Kentucky 41008

BOARD OF COMMISSIONERS

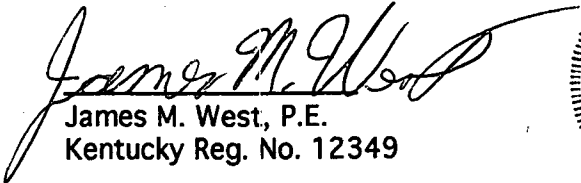
Dennis Crawford.....Chairman
Steven D. Terry.....Secretary-Treasurer
Bennie D. Wilson.....Commissioner
Robert Dickerson.....Commissioner
Mona Kindoll.....Commissioner

Ruth Baxter.....Attorney
James Smith.....Manager
Darrell Lykins.....Superintendent

1996
Revised 10/98

PREPARED BY

SIECO, Inc.
629 Washington Street
P.O. Box 407
Columbus, Indiana 47202


James M. West, P.E.
Kentucky Reg. No. 12349



Oct. 26, 1998
Date

*This is a revision of the March 13, 1995 Preliminary Engineering Report and
March 14, 1996 Revised Preliminary Engineering Report.*

1.0 INTRODUCTION

The Carroll County Water District No. 1 was created and established by order of the Carroll County Fiscal Court, Carrollton, Kentucky on January 9, 1961, as set forth in KRS 74.010.

The District's service area is generally that portion of Carroll County east of the Kentucky River excluding the area presently served by Carrollton Utilities (City of Carrollton, Kentucky), a portion of Gallitin County between I-71 and the Ohio River east of and along the Carroll-Gallitin line and a small portion of Owen County in the northwest corner along the Kentucky River.

The service area is bounded on the north by the Ohio River, on the south by the Owen County line and on the west by the Kentucky River (West Carroll County Water District).

The Carroll County Water District No. 1 has recently completed a project which added 207 retail customers, 100,000 gallons of additional storage, seven (7) miles of 6" water main, five (5) miles of 4" water main, five (5) miles of 3" water main, a water booster station, metered services and a telemetry pump-tank level control system. The project has been funded by a Community Development Block Grant and a Farmers Home Administration (RDA) Loan.

This report describes and details the water system improvements project proposed by the District to add twelve (12) separate main extensions, a water storage tank, two (2) booster stations, telemetry controls and metered services for 326 residents requesting service, including Glenwood Hall and the Town of Gratz along KY. Hwy. No. 355.

2.0 PRESENT FACILITIES AND CAPACITIES

The Carroll County Water District presently serves 2,057 customers of which 101 are considered commercial or large users, over 20,000 gallons per month, and 11 industrial users.

The District's 110 miles of water distribution mains include 2,000 ft. 12" D.I. pipe, 7,500 ft. of 10" D.I. pipe, 45,000 feet of 8" PVC and D.I. pipe, 135,000 feet of 6" C.I., D.I. and PVC pipe, 312,000 feet of 4" C.A. and PVC pipe and 82,000 feet of 3" and smaller PVC pipe.

The system's water storage is provided by the following:

One (1) 200,000 gallon standpipe on Dividing Ridge Road near Interstate I-71.

One (1) 150,000 gallon elevated tank on Sharon Blackrock Road.

One (1) 120,000 gallon standpipe on Jackson Ridge Road.

Four (4) 50,000 gallon ground storage tanks, located at Ghent, Sanders, Worthville and M&T Road at U.S. Highway 42.

The Carroll County Water District No. 1 owns and operates a water treatment plant and raw water supply source, consisting of the following:

Well No. 1, 350 gpm maximum yield, gravel pack design

Well No. 2, 350 gpm maximum yield, gravel pack design

Well No. 3, 300 gpm maximum yield, gravel pack design

Well No. 7, 500 gpm gravel pack design

Well No. 8, 500 gpm gravel pack design

Clearwell Storage, 24,000 gallon capacity, concrete in-ground.

Clearwell Storage, 80,000 gallon capacity, ground storage - steel

High Service Pump No. 1, 450 gpm capacity, drawing from clearwell

High Service Pump No. 2, 450 gpm capacity, drawing from clearwell

Water Plant Building, masonry structure over clearwell

Chlorination and Fluoridation Equipment, feeding to clearwell

Booster Station

The potential growth for the District is primarily normal residential growth along existing mains of the District at a rate of 3% per year. Some commercial growth can be expected in the Town of Ghent, along U.S. Highway No. 227 near the I-71 interchange and the industrial area between Ghent and Carrollton on Highway 42 along the Ohio River.

3.0 OPERATIONAL STATUS OF SYSTEM

The District has experienced several problems at the water plant located in the Town of Ghent, Kentucky, since January of 1993, as follows:

80,000 gallon above ground clearwell is not piped to permit chlorination.

High service pumps have exceeded reliable operational life.

Electrical service to plant will not permit two high-service pumps to operate simultaneously.

The District's plant high service pumps discharge into the distribution system along U.S. Highway No. 42 and State Highway No. 47 in the Ohio River bottoms providing average demand flows to two (2) ground storage tanks and some peak flow to the industry located near the plant. One of the ground storage tanks provides suction head to the 450 gpm booster station located on Buck Run Road just off Highway No. 47 south of Ghent. This booster station provides average flows via an 8" main from the river bottom area (elevation 470) south to higher ridge area (elevation 850) along Dividing Ridge Road to the system's main 150,000 gallon standpipe storage tank.

The District has experienced problems in its distribution system during the peak months of 1993 and 1994, listed as follows:

Main storage tank on Dividing Ridge Road water level drops 50%.

High ground to the west of main tank experiences minimum pressure.

Buck Run booster station runs 24 hours a day with low suction pressure.

Frequent pump replacement required in Buck Run booster station.

The District has recently completed system improvements to eliminate the aforementioned operation deficiencies. A partial list of said improvements are as follows:

Develop two (2) 500-750 gpm raw water supply wells.

Construct a 17,500 gallon clearwell with chemical feed system, high service pumps (min. 500 gpm each) and telemetry control system.

Construct 8", 10" and 12" transmission mains between the new treatment facility and the system's main storage tank.

Construct a 200,000 gallon storage tank near existing main tank on Dividing Ridge Road.

Install a main radio telemetry system to provide control of all pumps and wells.

Eliminate existing Buck Run Booster Station from normal system's operation.

4.0 EXISTING WATER SERVICE RATE SCHEDULE

This monthly rate for water sold by the Carroll County Water District No. 1 as ordered by PSC, is scheduled as follows:

First 1,000 gallons	\$10.00 (minimum bill)
Next 1,000 gallons	\$4.40 per 1,000 gallons
Next 3,000 gallons	\$4.30 per 1,000 gallons
Next 5,000 gallons	\$4.20 per 1,000 gallons
Next 10,000 gallons	\$3.30 per 1,000 gallons
Next 20,000 gallons	\$2.50 per 1,000 gallons
Over 40,000 gallons	\$2.35 per 1,000 gallons

5.0 PROPOSED PROJECT DESCRIPTION

As proposed, this project generally consists of extending water service to approximately 321 residences in twelve (12) separate road areas in Carroll County, Owen County and Gallatin County from existing mains of the Carroll County Water District No. 1 system. The twelve areas proposed for main extensions and the Town of Gratz area are more fully described as follows:

Ghent-Eagle Station Road - Area No. 1

This area in Carroll County includes seven (7) residences requesting service. The proposed main begins at an existing 6" main on Dividing Ridge Road north along Ghent-Eagle Station Road approximately 2.2 miles to State Highway No. 47. This extension falls off from elevation 830 to 500 and will require a main pressure reducing valve.

State Highway No. 47 South - Area No. 2

This area in Carroll County includes eight (8) residences requesting service. The proposed main begins at a point just west of State Highway No. 184 on Highway 47 and a 3" main and extends southwest under I-71 along Highway 47 approximately 2.2 miles to an existing main just north of the Town of Sanders. This road slopes from elevation 600 gradually to elevation 480 elevation and will require individual pressure reducing valves.

U.S. Highway No. 227 - Area No. 3

This area in Owen County includes nine (9) residences requesting service. The proposed main begins at a 6" main near the intersection of U.S. 22 and State Highway No. 355 and extends southeasterly along U.S. 227 toward Wheatly approximately 2.2 miles. This road rises slightly near the end. This area must be annexed into the Carroll County service area by Fiscal Court.

Kendall Road - Area No. 4

This county road area in Carroll County includes approximately five (5) residences requesting service. The proposed main extends from a 4 " main on Whites Run Road (State Rd. #1112), south approximately 0.7 of a mile to an existing 3" main, extended north off Goose Creek Road. This road rises from elevation 500 to elevation 773 and then falls to 575 at the end. This area requires a booster station.

Boone Road - Area No. 5

This county road area in Carroll County includes seven (7) residences requesting service. The proposed main begins at an existing 3" main on Boone Road at a point approximately 0.8 mile southwest of the community of Easterday and extends southeasterly approximately two (2) miles to an existing main branching off State Highway No. 36. Boone road drops from elevation 760 to elevation 485 and will require a main pressure reducing valve.

Marvin Chapel Road - Area No. 6

This county road in Carroll County includes eight (8) residences requesting service. The proposed main begins at an existing 8" main along State Highway No. 36 two miles east of Easterday and extends southerly along Marvin Chapel Road 1.9 miles ending just north of I-71. The ground elevation on this road rises from 730 to 800.

Indian Creek - Area No. 7

This county road in Carroll County includes four (4) residences requesting service. The proposed main begins at an existing 4" main along Ghent-Eagle Station Road at a point 1.5 miles south of I-71 and extends north along Indiana Creek Road approximately 1.2 miles to a point just south of I-71. This road varies in elevation from 650 to 750.

Walnut Valley - Area No. 8

This State Highway No. 184 area located in Gallatin County includes nine (9) residences requesting service. The proposed main begins at a 4" main proposed at the intersection of State Highway No. 47 and 184 near I-71 on the Carroll-Gallatin county line extending north along Highway 184 approximately one (1) mile and branching off along Knox Lillard Road (County Road) approximately 0.8 mile. This area ranges in elevation from 590 to 750.

Fourmile County Road - Area No. 9

This county road area located in Carroll County includes four (4) residences requesting service. The proposed main begins at an existing 6" main at the intersection of KY. Highway No. 36 and Fourmile County Road and extends northeasterly along Fourmile Road approximately 0.75 miles. This road begins with a ground elevation of 741 and ends at 650.

KY. Highway No. 355 - Area No. 10, including Service to Glenwood Hall

This State Highway No. 355 Area located in Owen County includes approximately 235 residences requesting service. The proposed main begins at an existing 6" main (elevation 530) which now ends at the Eagle Creek Resort on the Kentucky River. Said 6" main to be extended approximately 5.2 miles and then reduced to 4" main. A booster station is required at this point (elevation 550) to pump water along Highway No. 355 approximately 2.3 miles to a proposed water storage tank on high ground (USGS elevation 860) above the Town of Gratz (elevation 480) on the Kentucky River. A short 6" main extending west off KY. 355 into Glenwood Hall (Perry Park) is also included and requires an MPRV. A new 3" line will be extended to the Town of Gratz from the standpipe and will include an MPRV.

U.S. Highway No. 227 Extension - Area No. 11

A transmission main will connect Whitis Run Road (Highway 1112) along Highway No. 227 with Highway 355 with a 6" PVC transmission main.

Knox Lillard Extension - Area No. 12 (Drury Chapel Road)

This country road area located in Gallatin Co. includes residences requesting service. Approximately 5,000 ft of 3" PVC will be installed for this service area.

Town of Gratz

The Town of Gratz is located in Owen County along the Kentucky River at the intersection of KY. Highway No. 355 and KY. No. 22 which runs between Eminence, Kentucky, in Henry County and the City of Owenton. Thirty (30) of the potential 40 homes are requesting water service. The Town's main square would receive a 6" water main loop with maintenance hydrants. The 6" loop would be supplied by approximately one mile of main from the water storage tank on high ground north of Town on KY Highway No. 355. Four inch (4") mains are proposed to extend west and south from the Town's main loop along Highway 22 and Highway 355, approximately 0.5 mile outside the Town's corporation limits. The Gratz standpipe to be located north on KY. 355 will have a minimum capacity of 170,000 gallons. A master pressure reducing valve vault is required on the proposed main supplying the Town (elevation 484) to provide a pressure range of 75-85 psi at customer's meter.

The Owen County Fiscal Court has granted Carroll County Water District No. 1 permission to provide water service to Area No. 3 (KY. Hwy No. 227), Area No. 10 (U.S. Hwy. No. 355), the Town of Gratz and one-half mile strip of land about the entire perimeter of the Town.

Refer to proposed Project Location Map "Attachment A" to this report.

Master Meters

Five master meters will be installed in the system to provide monitoring points for the new telemetry system. These meters will assist in determining water loss in various areas of the system and water leaks will be detected much sooner.

6.0 PROJECT CONSTRUCTION COST ESTIMATE

CARROLL COUNTY WATER DISTRICT NO. 1 WATER SYSTEM IMPROVEMENTS PROJECT OF 1997 ENGINEER'S PRE-BID CONSTRUCTION COST ESTIMATE

DIVISION A-1 WATER MAINS AND APPURTENANCES

Item No.	Description	Quantity	Unit Price	Total
1	4" PVC, SDR 21/ft	22,300	\$5.00	\$111,500
2	3" PVC, SDR 13.5/ft	2,600	\$5.50	\$14,300
3	3" PVC, SDR 17/ft	9,500	\$5.00	\$47,500
4	3" PVC, SDR 21/ft	28,300	\$4.50	\$127,350
5	6" Gate Valve & Box	1	\$450.00	\$450
6	4" Gate Valve & Box	6	\$400.00	\$2,400
7	3" Gate Valve & Box	9	\$350.00	\$3,150
8	4" Air Release Valve	2	\$450.00	\$900
9	3" Air Release Valve	1	\$425.00	\$425
10	2" Flush Hydrant w/Valve	7	\$700.00	\$4,900
11	Detectable Flagging/ft	62,700	\$.10	\$6,270
12	Bore & Jack 4" Water Main/ft	200	\$75.00	\$15,000
13	Bore & Jack 3" Water Main/ft	50	\$75.00	\$3,750
14	4" Class B Stream Crossing/ft	50	\$40.00	\$2,000
15	4" Class C Stream Crossing/ft	205	\$30.00	\$6,150
16	3" Class B Stream Crossing/ft	80	\$30.00	\$2,400
17	3" Class C Stream Crossing/ft	225	\$20.00	\$4,500
18	4" Service Tap	20	\$60.00	\$1,200
19	3" Service Tap	34	\$50.00	\$1,700
20	5/8" x 3/4" Meter	54	\$250.00	\$13,500
21	IPRV	39	\$100.00	\$3,900
22	Type "B" Conn. to Ex. 6", Sht. 3/LS	1	\$1,000.00	\$1,000
23	Type "B" Conn. to Ex. 6", Sht. 8/LS	1	\$1,000.00	\$1,000
24	Type "B" Conn. to Ex. 8", Sht. 14/LS	1	\$1,200.00	\$1,200
25	Type "B" Conn. to Ex. 6", Sht. 21/LS	1	\$1,000.00	\$1,000
26	Type "C" Conn. to Ex. 4", Sht. 6/LS	1	\$500.00	\$500
27	Type "C" Conn. to Ex. 3", Sht. 19/LS	1	\$500.00	\$500
28	Type "C" Conn. to Ex. 3", Sht. 43/LS	1	\$500.00	\$500
29	Cut & Repair Asphalt Road, 4" Main/ft	20	\$25.00	\$500.00
30	Cut & Repair Asphalt Road, 3" Main/ft	20	\$25.00	\$500
31	Cut & Repair Gravel Road, 4" Main/ft	260	\$12.00	\$3,120
32	Cut & Repair Gravel Road, 3" Main/ft	275	\$12.00	\$3,300
33	Master Meter Eagle Sta. Rd./LS	1	\$10,000.00	\$10,000
34	Master Meter Montgomery Rd./LS	1	\$10,000.00	\$10,000
35	Master Meter KY Highway 36/LS	1	\$10,000.00	\$10,000
36	Master Meter KY Highway 1112/LS	1	\$10,000.00	\$10,000
37	1" Service Line/ft.	2,540	\$2.00	\$5,080
38	1" Service Bore/ft.	415	\$20.00	\$8,300

CARROLL COUNTY WATER DISTRICT NO. 1
 WATER SYSTEM IMPROVEMENTS PROJECT OF 1997
 ENGINEER'S PRE-BID CONSTRUCTION COST ESTIMATE

DIVISION A-1 WATER MAINS AND APPURTENANCES

Item No.	Description	Quantity	Unit Price	Total
39	Cut & Repair Gravel Rd, 1" Service/ft	20	\$10.00	\$200
40	1" Service, Class "C" Strm Cross./ft	40	\$15.00	\$600
41	6" PVC, SDR 21,Open Cut Enc.Pipe/ft	50	\$40.00	\$2,000
42	8" PVC, SDR 21,Open Cut Enc.Pipe/ft	200	\$50.00	\$10,000
43	Telernetry Master Meter Eagle Sta. Rd	1	\$16,000.00	\$16,000
44	Telernetry Master Meter Montg. Rd.	1	\$5,000.00	\$5,000
45	Telern. Mstr. Meter KY36 & KY 1112	1	\$18,000.00	\$18,000
Estimated Total Div. A-1 Construction Cost				\$491,545

DIVISION A-2 WATER MAINS AND APPURTENANCES

Item No.	Description	Quantity	Unit Price	Total
1	8" PVC, SDR 17/ft.	22,800	\$9.50	\$216,600
2	6" PVC, SDR 17 /ft.	24,600	\$8.00	\$196,800
3	6" PVC, SDR 21/ft.	16,700	\$7.50	\$125,250
4	4" D.I., CL. 350/ft.	13,950	\$7.50	\$104,625
5	4" PVC, SDR 21/ft.	19,400	\$5.00	\$97,000
6	3" PVC, SDR 17/ft.	4,400	\$5.00	\$22,000
7	3" PVC, SDR 21/ft.	35,000	\$4.50	\$157,500
8	8" Gate Valve & Box	5	\$550.00	\$2,750
9	6" Gate Valve & Box	5	\$450.00	\$2,250
10	4" Gate Valve & Box	6	\$400.00	\$2,400
11	3" Gate Valve & Box	13	\$350.00	\$4,550
12	8" Main Air Release Valve	3	\$500.00	\$1,500
13	6" Main Air Release Valve	7	\$475.00	\$3,325
14	3" Main Air Release Valve	1	\$425.00	\$425
15	6" Flush Hydrant w/Valve	7	\$1,800.00	\$12,600
16	2" Flush Hydrant w/Valve	11	\$700.00	\$7,700
17	Detectable Flagging/ft.	136,850	\$0.10	\$13,685
18	Bore & Jack 16" Steel Casing,R.R./ft.	100	\$125.00	\$12,500
19	Bore & Jack 8" Water Main/ft.	90	\$100.00	\$9,000
20	Bore & Jack 6" Water Main/ft.	196	\$75.00	\$14,700
21	Bore & Jack 4" Water Main/ft.	100	\$75.00	\$7,500
22	Bore & Jack 3" Water Main/ft.	90	\$75.00	\$6,750
23	6" Class "B" Stream Crossing/ft.	320	\$50.00	\$16,000
24	6" Class "C" Stream Crossing/ft.	330	\$40.00	\$13,200
25	4" Class "C" Stream Crossing/ft.	330	\$30.00	\$9,900
26	3" Class "B" Stream Crossing/ft.	160	\$30.00	\$4,800
27	3" Class "C" Stream Crossing/ft.	100	\$20.00	\$2,000
28	6" Service Tap	22	\$75.00	\$1,650

DIVISION A-2 WATER MAINS AND APPURTENANCES

Item No.	Description	Quantity	Unit Price	Total
29	4" Service Tap	14	\$60.00	\$840
30	3" Service Tap	40	\$50.00	\$2,000
31	5/8" x 3/4" Meter	38	\$250.00	\$9,500
32	5/8" x 3/4" Double Meter	4	\$500.00	\$2,000
33	IPRV	33	\$100.00	\$3,300
34	Type "B" Conn. to Ex. 6", Sht. 9/LS	1	\$1,000.00	\$1,000
35	Type "B" Conn. to Ex. 6", Sht. 22/LS	1	\$1,000.00	\$1,000
36	Type "B" Conn. to Ex. 6", Sht. 38/LS	1	\$1,000.00	\$1,000
37	Type "B" Conn. to Ex. 6", Sht. 42/LS	1	\$1,000.00	\$1,000
38	Type "C" Conn. to Ex. 3", Sht. 11/LS	1	\$500.00	\$500
39	Type "C" Conn. to Ex. 3", Sht. 12/LS	1	\$500.00	\$500
40	Type "C" Conn. to Ex. 3", Sht. 13/LS	1	\$500.00	\$500
41	Type "C" Conn. to Ex. 6", Sht. 37/LS	1	\$600.00	\$600
42	Cut & Repair Asphalt Rd., 8" Main/ft.	100	\$25.00	\$2,500
43	Cut & Repair Asphalt Rd., 6" Main/ft.	20	\$25.00	\$500
44	Cut & Repair Asphalt Rd., 4" Main/ft.	40	\$25.00	\$1,000
45	Cut & Repair Asphalt Rd., 3" Main/ft.	1,530	\$25.00	\$38,250
46	Cut & Repair Gravel Rd., 8" Main/ft.	320	\$15.00	\$4,800
47	Cut & Repair Gravel Rd., 6" Main/ft.	320	\$15.00	\$4,800
48	Cut & Repair Gravel Rd., 4" Main/ft.	495	\$12.00	\$5,940
49	Cut & Repair Gravel Rd., 3" Main/ft.	1,080	\$12.00	\$12,960
50	MPRV Glenwood Hall/LS	1	\$8,000.00	\$8,000
51	MPRV Gratz/LS	1	\$8,000.00	\$8,000
52	MPRV Boone Rd./LS	1	\$8,000.00	\$8,000
53	Booster Station Perry Park/LS	1	\$60,000.00	\$60,000
54	Booster Station Kendall Rd./LS	1	\$30,000.00	\$30,000
55	Master Meter Glenwood Hall/LS	1	\$10,000.00	\$10,000
56	1" Service Line/ft.	2,760	\$2.00	\$5,520
57	1" Service Bore/ft.	670	\$20.00	\$13,400
58	Cut & Repair Gravel Rd., 1" Service/ft	280	\$10.00	\$2,800
59	Cut & Repair Asph. Rd., 1" Service/ft.	300	\$20.00	\$6,000
60	Bridge Crossing, 8" Main/ft.	620	\$80.00	\$49,600
61	6" PVC, SDR 21, Open Cut Enc. Pipe/ft	35	\$40.00	\$1,400
62	Telemetry Perry Pk. Booster Sta./LS	1	\$16,000.00	\$16,000
63	Telemetry Kendall Rd. Booster Sta./LS	1	\$16,000.00	\$16,000
64	Telem. Glenwood Hall Mstr. Meter/LS	1	\$2,000.00	\$2,000
65	Telemetry Central Control Unit/LS	1	\$30,000.00	\$30,000
ESTIMATED TOTAL DIV. A-2 CONSTRUCTION COST				\$1,430,170

DIVISION B - WATER STORAGE TANK

Item No	Description	Quantity	Unit Price	Total
1	170,000 Gallon Standpipe 18' Dia., 89' High to Overflow/LS	1	\$127,285.00	\$127,285
ESTIMATED TOTAL DIVISION B CONSTRUCTION COST				\$127,285

7.0 ESTIMATED PROJECT COST AND FUNDING

Project Cost

Development (Construction Cost include 5% nearly contingency)	\$2,151,450.
Administrative and Legal	\$34,400.
Basic Design Engineering	\$172,100.
Preliminary Engineering	\$12,900.
Construction Observation and Reporting	\$86,000.
Additional Engineering	\$9,300.
Interest During Construction	\$51,600.
Contingencies (3% of Non-Construction Cost)	<u>\$11,000.</u>
TOTAL ESTIMATED PROJECT COST	\$2,528,750

Project Funding

District's Cash Contribution	\$54,300.
Glennwood Hall Contributing	\$100,000.
USDA, RECD Loan Required	\$1,759,450.
USDA, RECD Grant Requested	<u>\$615,000.</u>
TOTAL PROJECT FUNDING	\$2,528,750

8.0 REVENUE REQUIRED FOR DEBT SERVICE

Requirements for first full year operation - 2000:

Scheduled Annual Bond Retirement Requirements,	
1965 Bond Issue	\$25,600.
1994 Bond Issue	\$29,040.
1997 Bond Series A and Series B	\$130,967.
Refinance Loan, Star Bank	\$116,778.
Proposed \$1,860,000 Bond Issue of 1999, Annual Requirement @ 5% for 38 yrs. Debt service on \$1,759,450 x 0.0592842	\$104,307.
Required Reserve of 20% Annual Debt Service (\$412,654 x 0.20)	<u>\$82,531.</u>
Total Average Revenue Required to meet Bond Principle, Interest and Reserve Requirements	\$489,223.

9.0 REVENUE REQUIREMENTS FOR OPERATION AND MAINTENANCE

Requirements for first full year operation - 2000:

Labor/Pr Tax/Employee Benefits	\$335,000.
Purchased Water	\$5,000.
Pumping Expense	\$64,000.
Insurance Premiums	\$21,000.
Transmission and Distribution Expenses	\$80,000.
Water Treatment	\$16,000.
Administrative and General Expense	<u>\$55,000.</u>
Total Estimated Annual Revenue Required for Operation and Maintenance	\$576,000.

10.0 SUMMARY OF TOTAL ANNUAL REVENUE REQUIREMENTS

Requirement for first full year of operation - 2000:

Bond principle and interest and reserve	\$489,223.
Operation and maintenance expense	<u>\$576,000.</u>
Total Annual Average Revenue Requirement	\$1,065,223.

11.0 PROPOSED MONTHLY WATER SERVICE RATE SCHEDULE

<u>Billing Class</u>	<u>Proposed Rate/1,000 gallons</u>
First 1,000 gallons.....	\$13.00 (minimum bill)
Next 1,000 gallons.....	\$6.00 per 1,000 gallons
Next 3,000 gallons.....	\$5.00 per 1,000 gallons
Next 5,000 gallons.....	\$4.40 per 1,000 gallons
Next 10,000 gallons	\$3.50 per 1,000 gallons
Next 20,000 gallons	\$3.00 per 1,000 gallons
Over 40,000 gallons	\$2.35 per 1,000 gallons

12.0 PROJECTED WATER USAGE AND INCOME

Based on usage study/test period June 1, 1997 thru June 1, 1998, and projected as detailed on revenue charts, pages 14 through 17 of this report.

Existing System at Proposed Rates

21,325 bills, totaling 193,921,100 gallons generating \$912,580.

New Customers at Proposed Rates

*3,912 bills, totaling 24,072,864 gallons, generating \$132,530.

TOTAL REVENUE GENERATED AT PROPOSED RATES \$1,045,110.

*Indicates projected billings for 12 separate road extensions, Glenwood Hall, and Town of Gratz in Owen County KY. proposed to serve 326 users.

13.0 PROJECTED OPERATING AND NON-OPERATING INCOME

Existing system water sales	\$912,580.
Projected water sales-new customers	\$132,530.
Disconnect/reconnect/late charge/hydrant fees	\$20,000.
Interest on deposits	\$5,000.
TOTAL PROJECT INCOME	\$1,070,110.

14.0 PROJECTED COVERAGE

By using the proposed rate schedule and applying the rates to the projected consumption data, a total income of \$1,070,110 is anticipated, as shown above. This is an adequate amount to cover the expected annual debt service and operation and maintenance requirements of \$988,654 and produces the following coverage:

$$\text{Coverage} = \frac{\text{Revenue} - \text{O \&M}}{\text{Principal \& Interest}} = \frac{\$1,070,110 - \$576,000}{\$406,692} = 1.21$$

CARROLL COUNTY WATER DISTRICT #1
PROJECTED REVENUE FROM MULTIFAMILY USERS OF RECORD 6/1/98

Billing Class	% of Bills	Bills	Avg. Bill	Gallons	1st 1000	next 1000	next 3000	next 5000	next 10000	next 20000	over 40000	Total
First 1000	9.3%	24	242	5,800	5,800							5,800
Next 1000	1.2%	3	1,400	4,200	3,000	1,200						4,200
Next 3000	17.9%	46	3,833	176,300	46,000	84,300						176,300
Next 5000	26.5%	68	7,074	481,000	68,000	204,000	141,000					481,000
Next 10000	27.6%	71	14,699	1,043,600	71,000	213,000	355,000	333,600				1,043,600
Next 20000	12.1%	31	28,216	874,700	31,000	93,000	155,000	310,000	254,700			874,700
Over 40000	5.4%	14	171,457	2,400,400	14,000	42,000	70,000	140,000	280,000	1,840,400		2,400,400
total	100%	257		4,986,000	238,800	231,200	636,300	721,000	783,600	534,700	1,840,400	4,986,000
Usage Bracket		Bills		Gallons	Rate	Existing Revenue	Proposed rate	Proposed Revenue				
First 1000		257		238,800	\$10.00	\$2,570.00	\$13.00	\$3,341				
Next 1000				231,200	\$4.40	\$1,017.28	\$6.00	\$1,387				
Next 3000				636,300	\$4.30	\$2,736.09	\$5.00	\$3,182				
Next 5000				721,000	\$4.20	\$3,028.20	\$4.00	\$2,884				
Next 10000				783,600	\$3.30	\$2,585.88	\$3.50	\$2,743				
Next 20000				534,700	\$2.50	\$1,336.75	\$3.00	\$1,604				
Over 40000				1,840,400	\$2.35	\$4,324.94	\$2.35	\$4,325				
subtotal						\$17,599.14		\$19,465				
multicharge		2016			\$10.00	\$20,160.00	\$13.00	\$26,208				
total						\$37,759.14		\$45,673				

For Period: June 1, 1997-June 1, 1998

CARROLL COUNTY WATER DISTRICT #1
PROJECTED REVENUE FROM EXISTING SINGLE METERS OF RECORD 6/1/98

Billing Class	% of Bills	Bills	Avg. Bill	Gallons	1st 1000	next 1000	next 3000	next 5000	next 10000	next 20000	over 40000	Total
First 1000	22.6%	4,771	288	1,376,100	1,376,100							1,376,100
Next 1000	11.8%	2495	1,564	3,902,000	2,495,000	1,407,000						3,902,000
Next 3000	35.6%	7502	3,473	26,055,400	7,502,000	11,051,400						26,055,400
Next 5000	21.0%	4430	6,845	30,324,000	4,430,000	13,290,000	8,174,000					30,324,000
Next 10000	5.5%	1161	13,425	15,586,600	1,161,000	3,493,000	5,805,000	3,976,600				15,586,600
Next 20000	1.3%	283	28,068	7,943,200	283,000	849,000	1,415,000	2,830,000	2,283,200			7,943,200
Over 40000	2.0%	426	243,539	103,747,800	426,000	1,278,000	2,130,000	4,260,000	8,520,000	86,707,800		103,747,800
total	100%	21068		188,935,100	17,673,100	15,209,000	29,951,400	17,524,000	11,066,600	10,803,200	86,707,800	188,935,100
Usage Bracket		Bills		Gallons	Rate	Existing Revenue	Proposed rate	Proposed Revenue				
First 1000		21,068		17,673,100	\$10.00	\$210,680	\$13.00	\$273,884				
Next 1000				15,209,000	\$4.40	\$66,920	\$6.00	\$91,254				
Next 3000				29,951,400	\$4.30	\$128,791	\$5.00	\$149,757				
Next 5000				17,524,000	\$4.20	\$73,601	\$4.40	\$77,106				
Next 10000				11,066,600	\$3.30	\$36,520	\$3.50	\$38,733				
Next 20000				10,803,200	\$2.50	\$27,008	\$3.00	\$32,410				
Over 40000				86,707,800	\$2.35	\$203,763	\$2.35	\$203,763				
total		21,068		188,935,100		\$747,283		\$866,907				

CARROLL COUNTY WATER DISTRICT #1
 PROJECTED REVENUE FROM 326 PROPOSED RESIDENTIAL METERS
 FOR THE 12 WATERMAIN EXTENSIONS PLUS GLENWOOD HALL AND THE TOWN OF GRATZ

Billing Class	% of Bills	Bills	Avg. Bill	Gallons	1st 1000	next 1000	next 3000	next 5000	next 10000	next 20000	over 40000	Total
First 1000	22.5%	880	452	397,518	397,518							397,518
Next 1000	11.7%	457	1,606	734,118	457,000	277,118						734,118
Next 3000	35.4%	1384	3,306	4,574,856	1,384,000	1,806,856						4,574,856
Next 5000	21.1%	824	6,985	5,755,640	824,000	2,472,000	1,635,640					5,755,640
Next 10000	5.8%	227	10,352	2,350,000	227,000	681,000	1,135,000	80,000				2,350,000
Next 20000	1.5%	59	20,376	1,202,166	59,000	177,000	295,000	590,000	22,166			1,202,166
Over 40000	2.1%	81	111,834	9,058,566	81,000	243,000	405,000	810,000	1,620,000	5,818,566		9,058,566
total	100%	3912		24,072,864	3,429,518	2,852,118	5,379,856	3,470,640	1,480,000	1,642,166	5,818,566	24,072,864
Usage Bracket		Bills		Gallons	Rate	Existing Revenue	Proposed rate	Proposed Revenue				
First 1000		3,912		3,429,518			\$13.00	\$50,856				
Next 1000				2,852,118			\$6.00	\$17,113				
Next 3000				5,379,856			\$5.00	\$26,899				
Next 5000				3,470,640			\$4.00	\$13,883				
Next 10000				1,480,000			\$3.50	\$5,180				
Next 20000				1,642,166			\$3.00	\$4,926				
Over 40000				5,818,566			\$2.35	\$13,674				
total		3,912		24,072,864				\$132,531				

CARROLL COUNTY WATER DISTRICT #1
PROJECTED REVENUE

Revenue Totals		
	Existing Revenue	Proposed Revenue
Carroll County Water		
Revenue from single users	\$747,283	\$866,907
Revenue from 31 Multi-family meters	\$37,759	\$45,673
Revenue from new users	\$0	\$132,530
Total	\$785,042	\$1,045,110
Actual 6/1/97-6/1/98 revenue error	\$785,598	-0.07%

7. Where possible, when in road right-of-way, the water line shall be installed between the ditch and the right-of-way line.
8. If a trencher is used, the trench shall be a minimum of two (2) feet off the edge of the pavement.
9. Division A Contractor to furnish and install all materials and labor for installation of radio controlled equipment including electric service.
10. All hydrants to be field located.
11. Pipe utilized on the project shall be NSF and/or AWWA approved pipe.
12. Pressure testing on pipe shall be in accordance with methods outlined in AWWA C600.
13. Disinfection of water lines shall be performed in accordance with AWWA C651.
14. Separation of the proposed water lines and any sewers shall be a minimum of 18" vertical and 10' horizontal.
15. Depth proposed for water line (36" Min.) unless otherwise shown.

LEGEND

- Existing Water Main
- Proposed Water Main
- Stationing
- Gate Valve
- Service
- Stream Crossing and Bores
- Flushing Device w/Valve
- Property Line and Right-of-Way
- Gas Line
- Telephone Line
- Electrical Line
- Booster Station
- Air Release Valve
- MPRV
- Master Meter

PROJECT NAME

Carroll County Water District No. 1

Water Main Extensions 1997

P. O. Box 333

Carrollton, Kentucky

Project Location Map and General Notes

DRAWN BY: _____
CHECKED BY: _____
CERTIFIED BY: *James M. West*
SCALE: _____
DATE: 11/20/97



REVISIONS

NO.	DESCRIPTION	DATE
1	Added note that Extension No. 12 is not part of Div. A-1	1/99

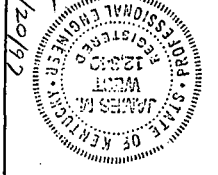


GENERAL NOTES

1. Existing underground utilities, etc., are generally located where it is known that they exist. The contractor is responsible for the accurate location of all utilities and hazards whether shown or not. The contractor shall include the cost of all fittings that are required to avoid existing utilities structure.
2. The contractor shall be responsible for the repair and/or replacement of all damaged utilities.
3. The contractor shall be responsible for notifying all residents of interruption to their utilities that will be caused by the construction.
4. The owner shall obtain road permits, but the contractor shall be responsible for meeting all requirements of each agency.
5. Meters and service lines shall be installed at locations indicated by the Resident Inspector in accordance with the standard details and the construction specification.
6. U. S. and State Highway crossings shall be bored and encased according to these plans, construction specifications, and Commonwealth of Kentucky Transportation Cabinet. County and Township roads shall be bored and encased unless otherwise noted in accordance with these plans and specifications. Prior to construction in rights-of-way, the contractor shall provide minimum 7 day notice to the proper agency.
7. Where possible, when in road right-of-way, the water line shall be installed between the ditch and the right-of-way line.
8. If a trencher is used, the trench shall be a minimum of two (2) feet off the edge of the pavement.
9. Division A Contractor to furnish and install all materials and labor for installation of electric service.
10. All hydrants to be field located.
11. Pipe utilized on the project shall be NSF and/or AWWA approved pipe.
12. Pressure testing on pipe shall be in accordance with methods outlined in AWWA C600.
13. Disinfection of water lines shall be performed in accordance with AWWA C651.
14. Separation of the proposed water lines and any sewers shall be a minimum of 18' vertical and 10' horizontal.
15. Depth proposed for water line (36" Min.) unless otherwise shown.

LEGEND

- Existing Water Main
- Proposed Water Main
- Stationing
- Gate Valve
- Service
- Stream Crossing and Bores



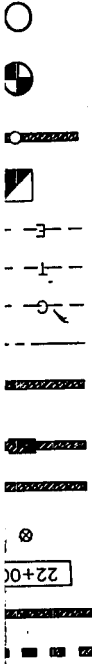
Added note that Extension No. 12 is not part of Div. A-1

NO.	DESCRIPTION	DATE
1	Added note that Extension No. 12 is not part of Div. A-1	1/99

stedco, inc.
 COLUMBUS, IN. MICHIGAN CITY, IN. LANCASTER, OH.

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- 9. Divisic
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Columbus, IN 47202
 Mr. James West (812)372-9911
 Mr. Fred Marsh (812)866-3410
 Raisor, Zopp & Woods (Accountants)
 P.O. Box 354
 Carrollton, KY 41008
 Mr. Dennis Raisor

Ms. Ruth Baxter, Attorney
 Berry & Floyd
 523 Highland Avenue
 Carrollton, KY 41008
 (502)732-6688

Kentucky Utilities
 11th Street
 Carrollton, KY 41008
 (502)738-4441
 Mr. Gene McCarty

Owen County Rural Electric Cooperative
 510 South Main Street
 Owenton, KY 40359
 (800)372-7612
 Mr. Frank Downing

Note:
 Extension No. 12 is not a part
 of the Div. A-1 Contract.



ELECTRIC

U N T Y

1. Existing generally accurate whether include required
2. The con repair utilities.
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15. Depth unless:

EXISTING UTILITIES AND CONTRACTS

The contractor is advised to contact the following representatives to familiarize himself with the existing and related requirements involved prior to start of construction.

TELEPHONE

American Telephone and Telegraph
 308 Gynthian Street
 Williamsstown, KY 41097
 (800)752-6007 Toll Free B.U.D.
 South Central Bell Telephone Company
 U.S. Highway No. 227
 Corrollton, KY 41008
 (502)732-4424
 Mr. Mike Cutshaw

GAS

Texas Gas Transmission Corporation
 Suite 475, Mail Office Center
 400 Sherburn Lane
 Louisville, KY 40207
 (502)491-0251
 Mr. Joe Aisup
 Mr. Don Roe
 Mr. Phil Acres
 Mid Valley Pipeline Co.
 Longview, Texas
 1-800-753-5531

ELECTRIC

Kentucky Utilities
 11th Street
 Corrollton, KY 41008
 (502)738-4441
 Mr. Gene McCarty
 Owen County Rural Electric Cooperative
 510 South Main Street
 Owenton, KY 40359
 (800)372-7612
 Mr. Frank Downing

CONTACTS

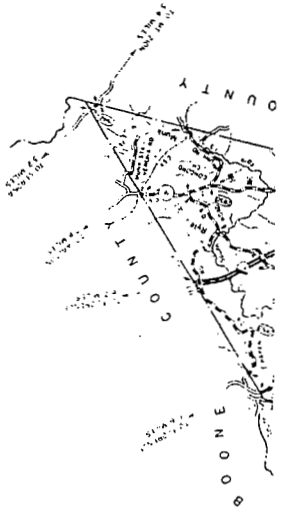
Underground Protection Service
 BUD 800-752-6007
 All Kentucky
 SIECO, INC. (Engineers)
 629 Washington Street
 P.O. Box 407
 Columbus, IN 47202
 Mr. James West (812)372-9911
 Mr. Fred Marsh (812)866-3410
 Raisor, Zapp & Woods (Accountants)
 P.O. Box 354
 Corrollton, KY 41008
 Mr. Dennis Raisor
 Ms. Ruth Baxter, Attorney
 Berry & Floyd
 523 Highland Avenue
 Corrollton, KY 41008
 (502)732-6688

HIGHWAYS

Corroll County Water District No. 1
 P.O. Box 333
 Corrollton, KY 41008
 (502)347-9470
 Mr. James Smith, Manager
 Office: Ernestine Saunders
 (502)732-4034

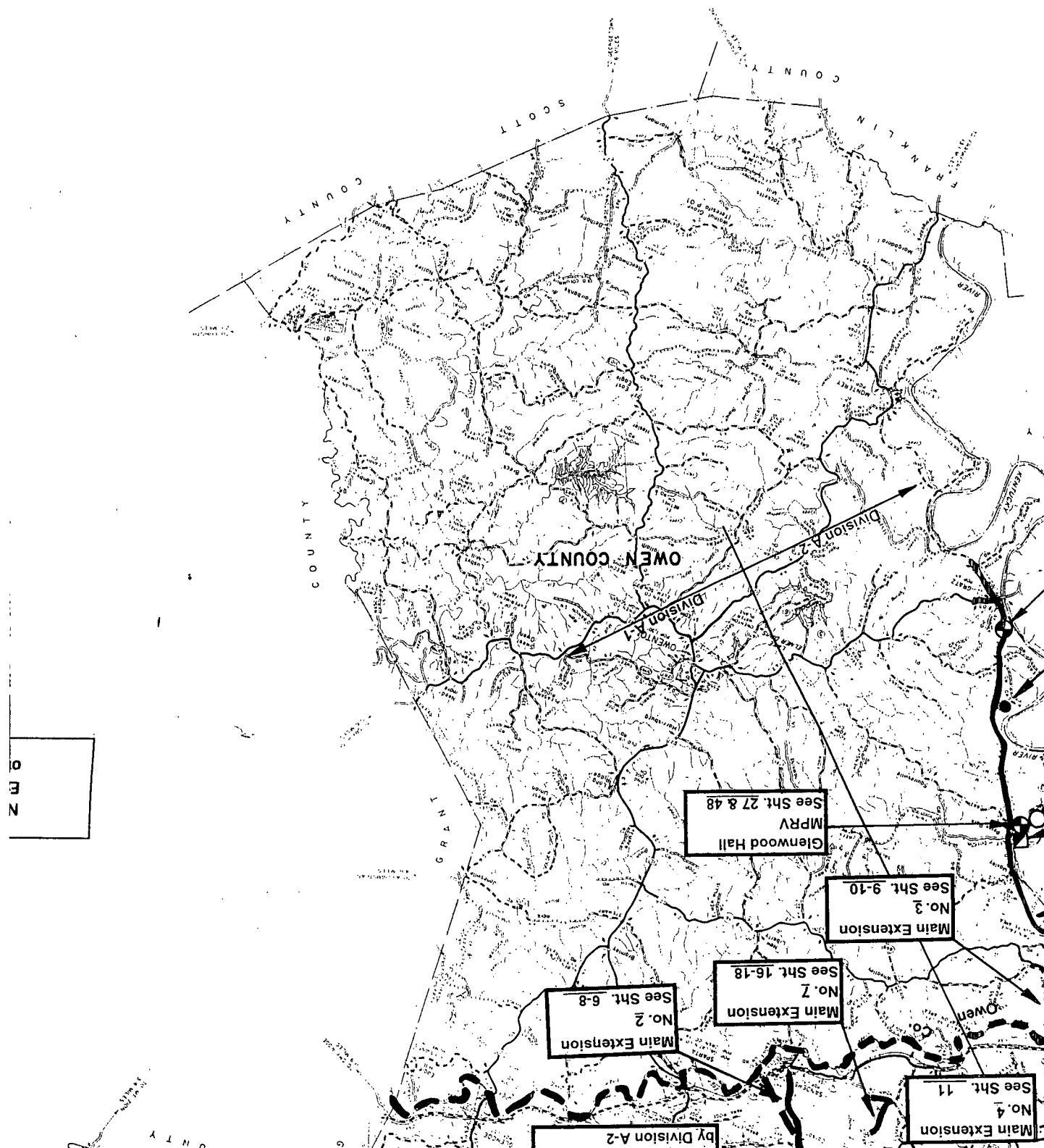
WATER

Note:
 Extension No. 12 is not a part
 of the Div. A-1 Contract.

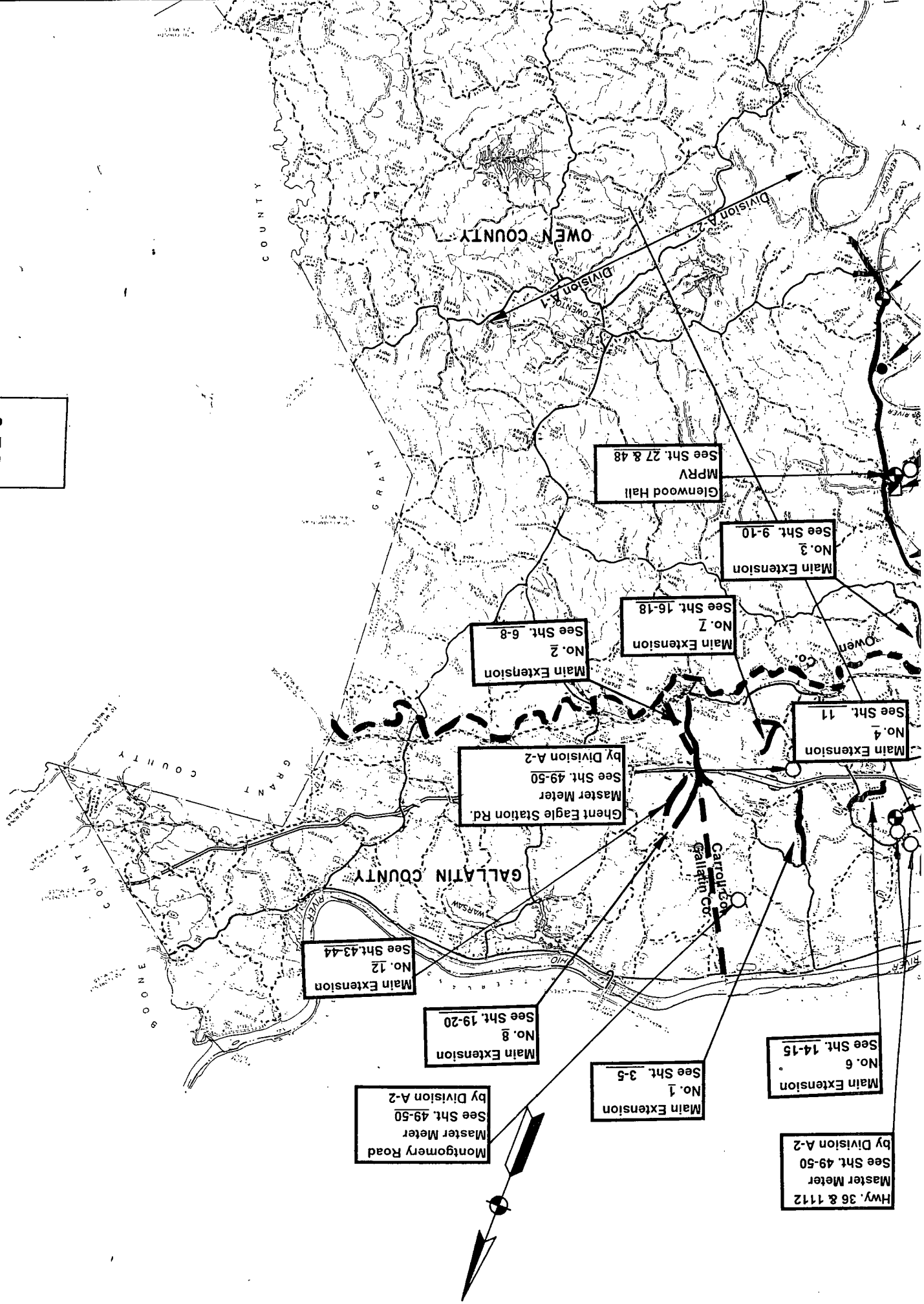


General Site & Project Location Map

SCALE: 1" = 2.15 Miles

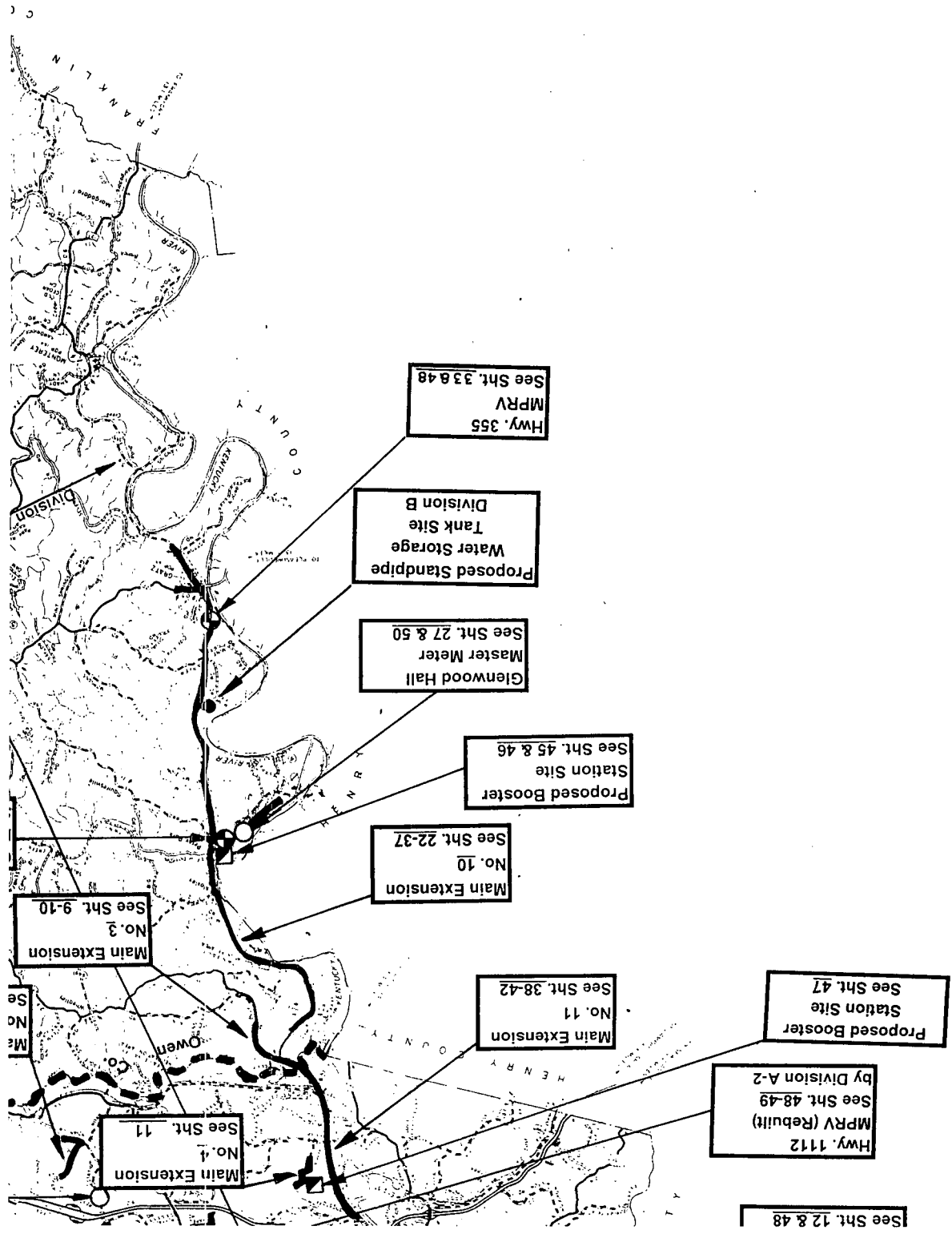


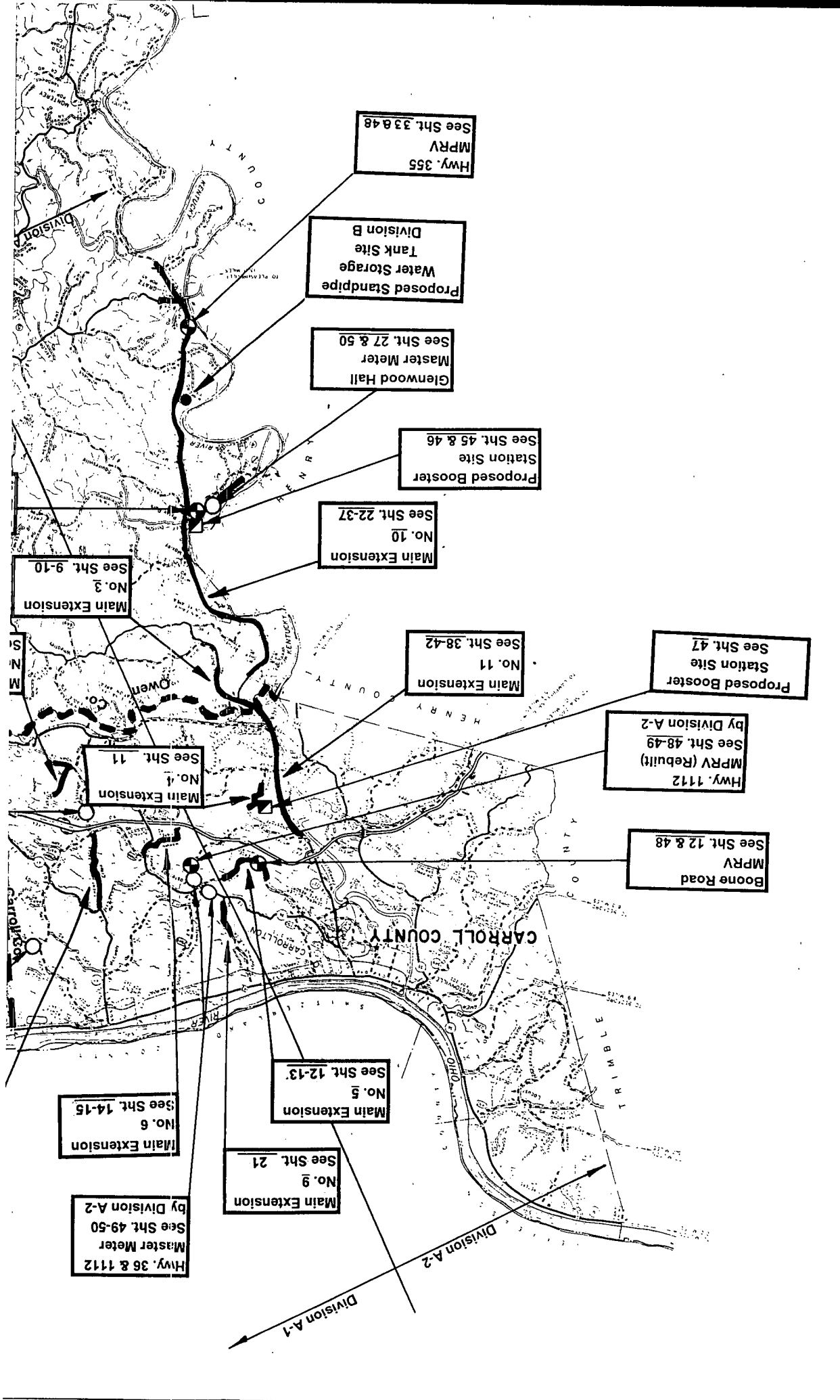
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B
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General Site

SCALE: 1" = 2.15 Miles





Hwy. 355
MPRV
See Sht. 33&48

Proposed Standpipe
Water Storage
Tank Site
Division B

Glenwood Hall
Master Meter
See Sht. 27 & 50

Proposed Booster
Station Site
See Sht. 45 & 46

Main Extension
No. 10
See Sht. 22-37

Main Extension
No. 3
See Sht. 9-10

Main Extension
No. 11
See Sht. 38-42

Proposed Booster
Station Site
See Sht. 47

Hwy. 1112
MPRV (Rebuilt)
See Sht. 48-49
by Division A-2

Main Extension
No. 4
See Sht. 11

Boone Road
MPRV
See Sht. 12 & 48

Main Extension
No. 5
See Sht. 12-13

Main Extension
No. 6
See Sht. 14-15

Main Extension
No. 9
See Sht. 21

Hwy. 36 & 1112
Master Meter
See Sht. 49-50
by Division A-2

Division A-1

Division A-2

09-302

JUL 13 1999
PUBLIC WORKS
COMMISSION

FINAL ENGINEERING REPORT

PROPOSED WATER SYSTEM EXTENSIONS PROJECT OF 1997

WATER MAIN EXTENSIONS, TELEMETRY CONTROL, BOOSTER STATION, WATER STORAGE TANK AND METERED SERVICES

PREPARED FOR


Carroll County Water District No. 1
205 Main Cross Street
P.O. Box 350
Ghent, Kentucky 41045

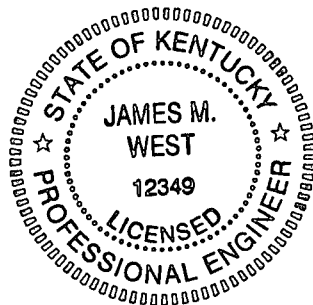
BOARD OF COMMISSIONERS

Dennis Crawford.....	Chairman
Steven D. Terry.....	Secretary-Treasurer
Bennie D. Wilson.....	Commissioner
Robert Dickerson.....	Commissioner
Mona Kindoll.....	Commissioner
Ruth Baxter.....	Attorney
James Smith.....	Manager
Darrell Lykins.....	Superintendent

PREPARED BY

SIECO, Inc.
629 Washington Street
P.O. Box 407
Columbus, Indiana 47202


James M. West, P.E.
Kentucky Licensed No. 12349



April 17, 1999
Date

FINAL ENGINEERING REPORT

CARROLL COUNTY WATER DISTRICT NO. 1 PROPOSED WATER SYSTEM EXTENSIONS PROJECT OF 1997

INTRODUCTION

The Carroll County Water District No. 1 project covered by this report is intended to be revised from the Engineer's Preliminary Report of October 26, 1998.

Proposed monthly water service rates have been revised to generate revenues required to meet debt service and operation and maintenance costs.

1.0 PROJECT CONSTRUCTION COST

Construction bids received March 23, 1999 refer to Engineer's Bid Tabulations of March 30 and April 1, 1999

DIVISION A-1 Low Bid:

Howard Engineering and Construction, London, KY.....\$ 294,185.00

DIVISION A-2 Low Bid:

Kenney, Inc. Mt. Sterling, KY.....\$1,410,211.50

DIVISION B Low Bid:

Welding, Inc., Charleston, WV.....\$ 148,000.00

TOTAL CONSTRUCTION BIDS.....\$1,852,396.50

CONSTRUCTION CONTINGENCIES (5% nearly).....\$ 92,603.50

TOTAL PROJECT DEVELOPMENT COST.....\$1,945,000.00

PROJECT COST AND FUNDING SUMMARYProject Cost

Development (Construction Allowance)	\$1,945,000.
Administrative and Legal	\$34,400.
Preliminary Engineering	\$12,900.
Basic Design Engineering	\$141,800.
Construction Observation and Reporting	\$72,900.
Additional Engineering	\$9,300.
Interest During Construction	\$51,600.
Contingencies (3.4% Nearly of Non-Construction Cost)	<u>\$11,000.</u>

TOTAL ESTIMATED PROJECT COST**\$2,278,900**Project Funding

District's Cash Contribution	\$54,300.
Glenwood Hall Contribution	\$100,000.
USDA, RECD Loan Required	\$1,509,600.
USDA, RECD Grant Requested	\$615,000.

TOTAL PROJECT FUNDING**\$2,278,900.**

3.0 REVENUE REQUIRED FOR DEBT SERVICE

Requirements for first full year operation - 2000:

Scheduled Annual Bond Retirement Requirements,	
1965 Bond Issue	\$25,600.
1994 Bond Issue	\$29,040.
1997 Bond Series A and Series B	\$130,967.
Refinance Loan, Star Bank	\$116,778.
Proposed \$509,600 Bond Issue of 1999, Annual Requirement @ 5% for 38 yrs. Debt service on \$1,509,600 x 0.0592842	\$89,460.
Required Reserve of 20% Annual Debt Service (\$391,845 x 0.20)	<u>\$78,369.</u>
Total Average Revenue Required to meet Bond Principle, Interest and Reserve Requirements	\$470,214.

4.0 REVENUE REQUIREMENTS FOR OPERATION AND MAINTENANCE

Requirements for first full year operation - 2000:

Labor/Pr Tax/Employee Benefits	\$335,000.
Purchased Water	\$25,000.
Pumping Expense	\$64,000.
Insurance Premiums	\$21,000.
Transmission and Distribution Expenses	\$80,000.
Water Treatment	\$16,000.
Administrative and General Expense	<u>\$65,000.</u>
Total Estimated Annual Revenue Required for Operation and Maintenance	\$606,000.

5.0 SUMMARY OF TOTAL ANNUAL REVENUE REQUIREMENTS

Requirements for first full year of operation - 2000:

Bond principle and interest and reserve	\$470,214.
Operation and maintenance expense	<u>\$606,000.</u>
Total Annual Average Revenue Requirement	\$1,076,214.

6.0 PROPOSED MONTHLY WATER SERVICE RATE SCHEDULE

<u>Billing Class</u>	<u>Proposed Rate/1,000 gallons</u>
First 1,000 gallons.....	\$12.50 (minimum bill)
Next 1,000 gallons	\$5.75 per 1,000 gallons
Next 3,000 gallons	\$4.75 per 1,000 gallons
Next 5,000 gallons	\$4.40 per 1,000 gallons
Next 10,000 gallons	\$3.50 per 1,000 gallons
Next 20,000 gallons	\$3.00 per 1,000 gallons
Over 40,000 gallons	\$2.35 per 1,000 gallons

7.0 PROJECTED WATER USAGE AND INCOME

Based on usage study/test period January 1, 1998 thru December 31, 1998, and projected as detailed on revenue charts, pages 6 through 8 of this report.

Existing System at Proposed Rates

22,289 bills, totaling 205,207,000 gallons generating \$928,570.

New Customers at Proposed Rates

**3,912 bills, totaling 24,072,864 gallons, generating \$130,252.

TOTAL REVENUE GENERATED AT PROPOSED RATES \$1,058,822

**Indicates projected billings for 12 separate road extensions, Glenwood Hall, and Town of Gratz in Owen County KY. proposed to serve 326 users.

8.0 PROJECTED OPERATING AND NON-OPERATING INCOME

Existing system water sales	\$928,570.
Projected water sales-new customers	\$130,252.
Disconnect/reconnect/late charge/hydrant fees	\$20,000.
Interest on deposits	<u>\$5,000.</u>
TOTAL PROJECT INCOME	\$1,083,822.

9.0 PROJECTED COVERAGE

By using the proposed rate schedule and applying the rates to the projected consumption data, a total income of \$1,083,822 is anticipated, as shown above. This is an adequate amount to cover the expected annual debt service and operation and maintenance requirements of \$1,076,214 and produces the following coverage:

$$\text{Coverage} = \frac{\text{Revenue} - \text{O \&M}}{\text{Principal \& Interest}} = \frac{\$1,083,822 - 606,000}{\$391,845} = 1.219$$

CARROLL COUNTY WATR DISTRICT #1
PROJECTED REVENUE FROM MULTIFAMILY USERS OF RECORD 12/31/98

Billing Class	% of Bills	Bills	Avg. Bill	Gallons	1st 1000	next 1000	next 3000	next 5000	next 10000	next 20000	over 40000	Total
First 1000	1.6%	4	150	600	600							2,700
Next 1000	0.8%	2	1,350	2,700	2,000	700						221,600
Next 3000	23.1%	58	3,821	221,600	58,000	105,600						494,800
Next 5000	27.9%	70	7,069	494,800	70,000	210,000	144,800					909,400
Next 10000	25.1%	63	14,435	909,400	63,000	189,000	315,000	279,400				1,067,000
Next 20000	15.5%	39	27,359	1,067,000	39,000	117,000	195,000	390,000	287,000			2,228,600
Over 40000	6.0%	15	148,573	2,228,600	15,000	45,000	75,000	150,000	300,000	1,628,600		4,924,700
total	100%	251		4,924,700	247,600	245,700	666,600	729,800	819,400	587,000	1,628,600	4,924,700
Usage Bracket		Bills		Gallons	Rate	Existing Revenue	Proposed rate	Proposed Revenue				
First 1000		251		247,600	\$10.00	\$2,510.00	\$12.50	\$3,138				
Next 1000				245,700	\$4.40	\$1,081.08	\$5.75	\$1,413				
Next 3000				666,600	\$4.30	\$2,866.38	\$4.75	\$3,166				
Next 5000				729,800	\$4.20	\$3,065.16	\$4.50	\$3,284				
Next 10000				819,400	\$3.30	\$2,704.02	\$3.50	\$2,868				
Next 20000				587,000	\$2.50	\$1,467.50	\$3.00	\$1,761				
Over 40000				1,628,600	\$2.35	\$3,827.21	\$2.35	\$3,827				
subtotal						\$17,521.35		\$19,457				
multicharge		168			\$10.00	\$1,680.00	\$12.50	\$2,100				
total						\$19,201.35		\$21,557				

For Period: January 1, 1998-December 31, 1998

CARROLL COUNTY WATER DISTRICT #1
PROJECTED REVENUE FROM EXISTING SINGLE METERS OF RECORD 12/31/98

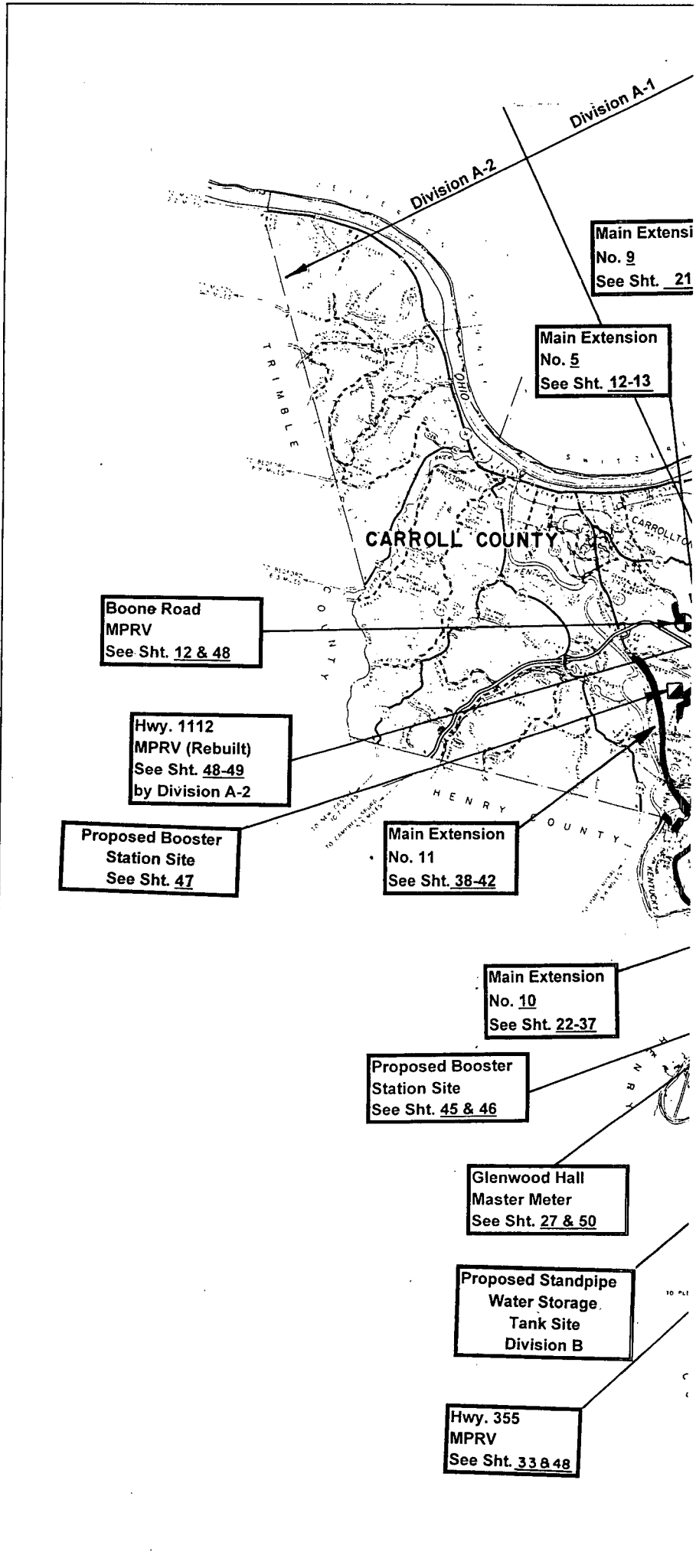
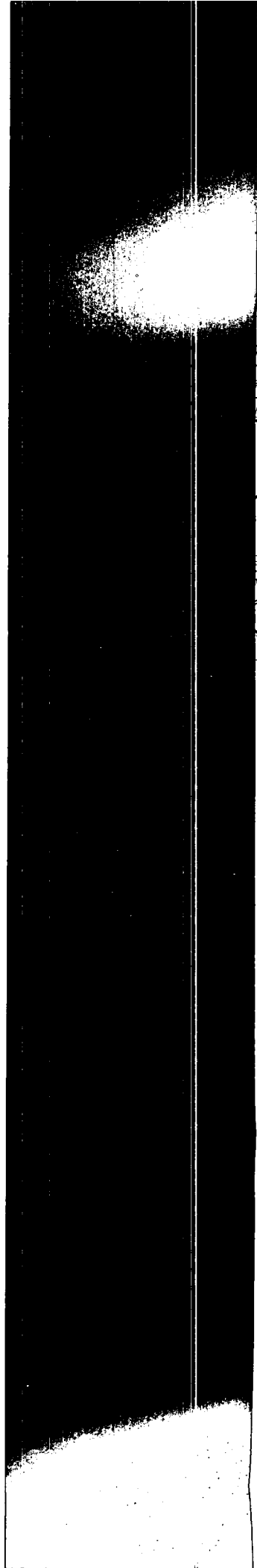
Billing Class	% of Bills	Bills	Avg. Bill	Gallons	1st 1000	next 1000	next 3000	next 5000	next 10000	next 20000	over 40000	Total
First 1000	23.0%	5,077	293	1,485,100	1,485,100							1,485,100
Next 1000	12.2%	2679	1,562	4,185,900	2,679,000	1,506,900						4,185,900
Next 3000	36.5%	8033	3,472	27,893,200	8,033,000	8,033,000	11,827,200					27,893,200
Next 5000	20.4%	4494	6,820	30,650,600	4,494,000	4,494,000	13,482,000	8,180,600				30,650,600
Next 10000	4.7%	1026	13,341	13,687,600	1,026,000	1,026,000	3,078,000	5,130,000	3,427,600			13,687,600
Next 20000	1.5%	320	27,828	8,905,100	320,000	320,000	960,000	1,600,000	3,200,000	2,505,100		8,905,100
Over 40000	1.9%	409	277,444	113,474,800	409,000	409,000	1,227,000	2,045,000	4,090,000	8,180,000	97,114,800	113,474,800
total	100%	22,038		200,282,300	18,446,100	15,788,900	30,574,200	16,955,600	10,717,600	10,685,100	97,114,800	200,282,300
Usage Bracket		Bills		Gallons	Rate	Existing Revenue	Proposed rate	Proposed Revenue				
First 1000		23,753		18,446,100	\$10.00	\$237,530	\$12.50	\$296,913				
Next 1000				15,788,900	\$4.40	\$69,471	\$5.75	\$90,786				
Next 3000				30,574,200	\$4.30	\$131,469	\$4.75	\$145,227				
Next 5000				16,955,600	\$4.20	\$71,214	\$4.50	\$76,300				
Next 10000				10,717,600	\$3.30	\$35,368	\$3.50	\$37,512				
Next 20000				10,685,100	\$2.50	\$26,713	\$3.00	\$32,055				
Over 40000				97,114,800	\$2.35	\$228,220	\$2.35	\$228,220				
total		23,753		200,282,300		\$799,984		\$907,013				

CARROLL COUNTY WATER DISTRICT #1
 PROJECTED REVENUE FROM 326 PROPOSED RESIDENTIAL METERS
 FOR THE 12 WATERMAIN EXTENSIONS PLUS GLENWOOD HALL AND THE TOWN OF GRATZ

Billing Class	% of Bills	Bills	Avg. Bill	Gallons	1st 1000	next 1000	next 3000	next 5000	next 10000	next 20000	over 40000	Total
First 1000	22.5%	880	452	397,518	397,518							397,518
Next 3000	11.7%	457	1,606	734,118	457,000	277,118						734,118
Next 5000	35.4%	1384	3,306	4,574,856	1,384,000	1,806,856	1,806,856					4,574,856
Next 10000	21.1%	824	6,985	5,755,640	824,000	2,472,000	2,472,000	1,635,640				5,755,640
Next 20000	5.8%	227	10,352	2,350,000	227,000	681,000	681,000	1,135,000	80,000			2,350,000
Over 40000	1.5%	59	20,376	1,202,166	59,000	177,000	177,000	295,000	590,000	22,166		1,202,166
	2.1%	81	111,834	9,058,566	81,000	81,000	243,000	405,000	810,000	1,620,000	5,818,566	9,058,566
total	100%	3912		24,072,864	3,429,518	2,852,118	5,379,856	3,470,640	1,480,000	1,642,166	5,818,566	24,072,864
Usage Bracket		Bills		Gallons	Rate	Existing Revenue	Proposed rate	Proposed Revenue				
First 1000		3,912		3,429,518			\$12.50	\$48,900				
Next 1000				2,852,118			\$5.75	\$16,400				
Next 3000				5,379,856			\$4.75	\$25,554				
Next 5000				3,470,640			\$4.50	\$15,618				
Next 10000				1,480,000			\$3.50	\$5,180				
Next 20000				1,642,166			\$3.00	\$4,926				
Over 40000				5,818,566			\$2.35	\$13,674				
total		3,912		24,072,864				\$130,252				

CARROLL COUNTY WATER DISTRICT #1
PROJECTED REVENUE

	Revenue Totals	
Carroll County Water	Existing Revenue	Proposed Revenue
Revenue from single users	\$799,984	\$907,013
Revenue from 21 Multi-family meters	\$19,201	\$21,557
Revenue from new users	\$0	\$130,252
Total	\$819,186	\$1,058,822
Actual 1/1/98-12/31/98 revenue error	\$818,275	0.11%



Hwy. 1112
MPRV (Rebuilt)
See Sht. 48-49
by Division A-2

Proposed Booster
Station Site
See Sht. 47

Main Extension
No. 11
See Sht. 38-42

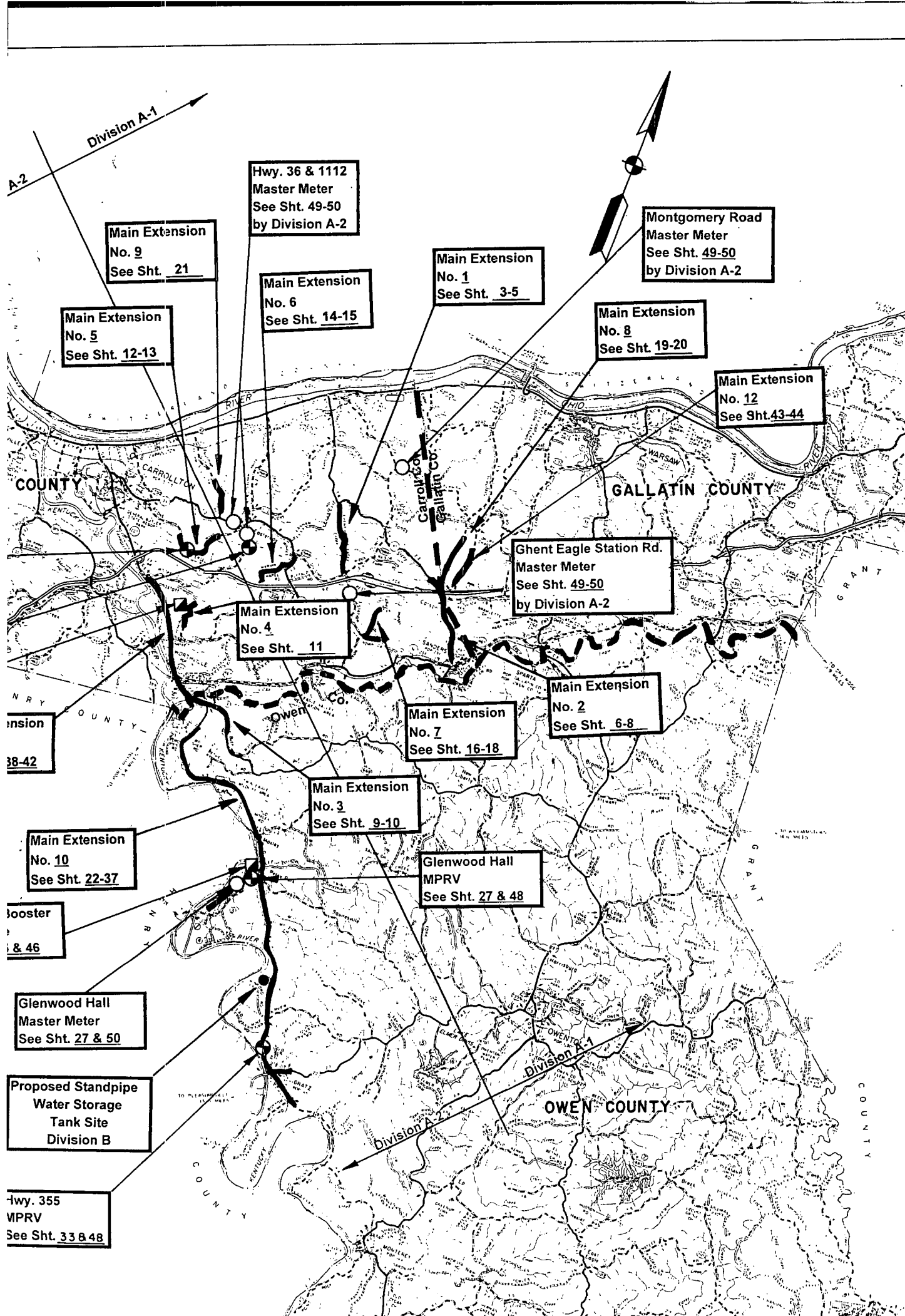
Main Extension
No. 10
See Sht. 22-37

Proposed Booster
Station Site
See Sht. 45 & 46

Glenwood Hall
Master Meter
See Sht. 27 & 50

Proposed Standpipe
Water Storage
Tank Site
Division B

Hwy. 355
MPRV
See Sht. 33 & 48



Division A-1
A-2

Hwy. 36 & 1112
Master Meter
See Sht. 49-50
by Division A-2

Montgomery Road
Master Meter
See Sht. 49-50
by Division A-2

Main Extension
No. 9
See Sht. 21

Main Extension
No. 1
See Sht. 3-5

Main Extension
No. 5
See Sht. 12-13

Main Extension
No. 6
See Sht. 14-15

Main Extension
No. 8
See Sht. 19-20

Main Extension
No. 12
See Sht. 43-44

CARROLLTON
GALLATIN COUNTY
OWEN COUNTY
GALLATIN COUNTY

Ghent Eagle Station Rd.
Master Meter
See Sht. 49-50
by Division A-2

Main Extension
No. 4
See Sht. 11

Division
38-42

Main Extension
No. 7
See Sht. 16-18

Main Extension
No. 2
See Sht. 6-8

Main Extension
No. 10
See Sht. 22-37

Main Extension
No. 3
See Sht. 9-10

Glenwood Hall
MPRV
See Sht. 27 & 48

booster
& 46

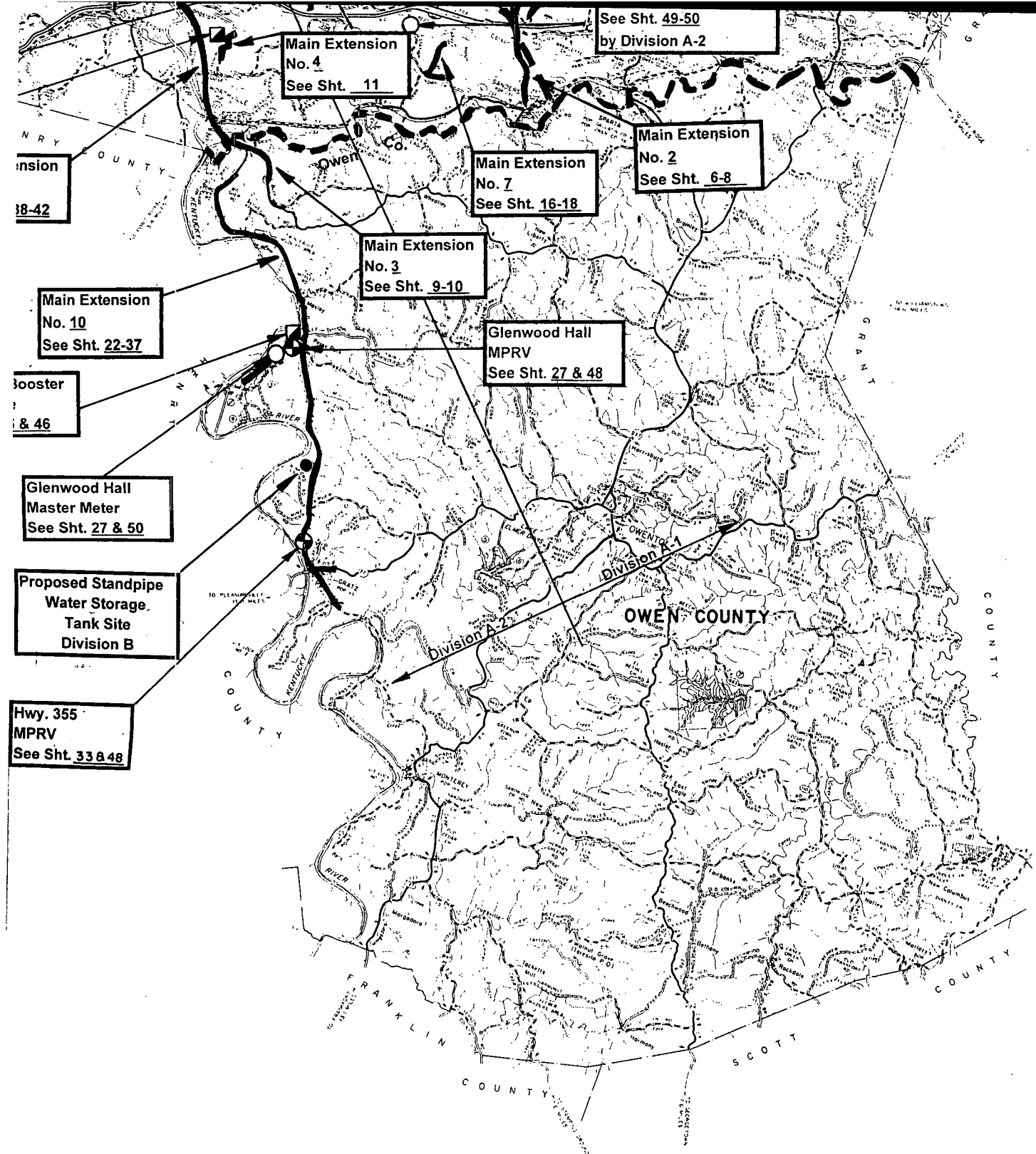
Glenwood Hall
Master Meter
See Sht. 27 & 50

Proposed Standpipe
Water Storage
Tank Site
Division B

Hwy. 355
MPRV
See Sht. 33 & 48

Division A-1
Division A-2

OWEN COUNTY



General Site & Project Location Map

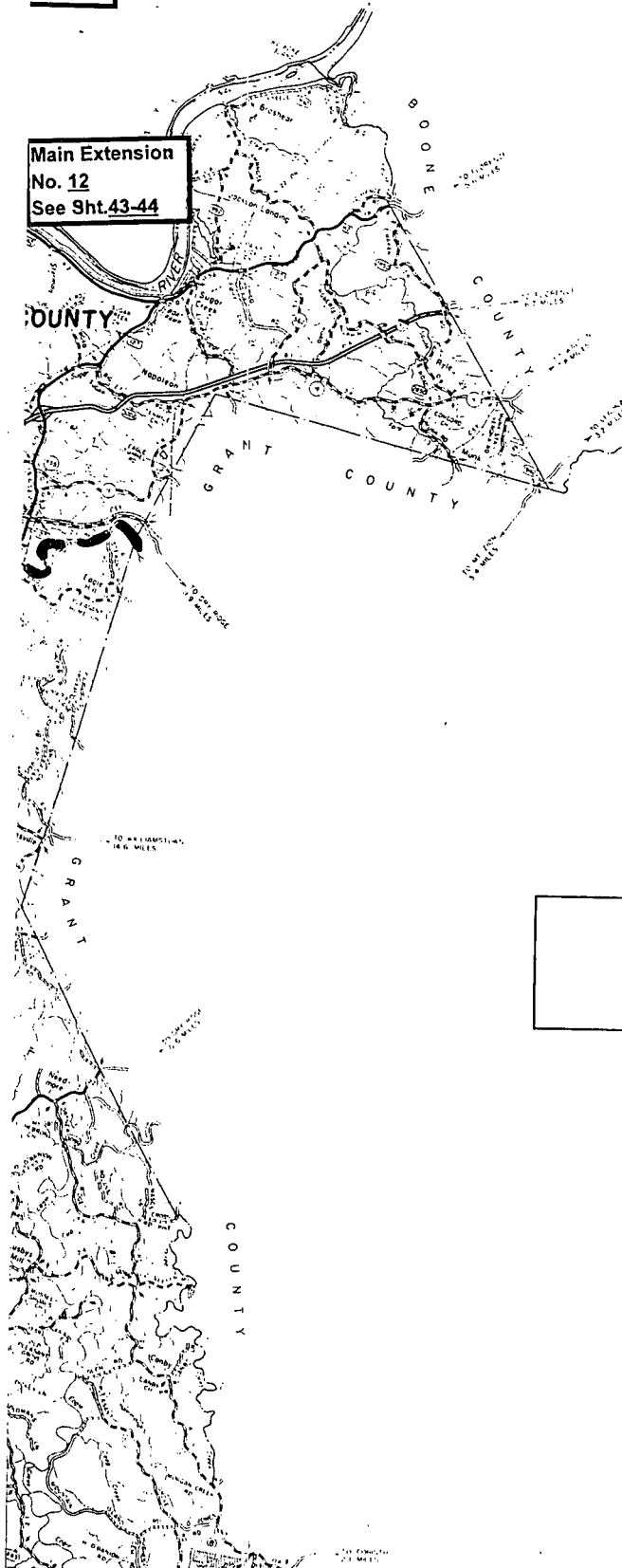
SCALE: 1" = 2.15 Miles

EXISTING UTILITIES AND CONTRACTS

The contractor is advised to contact the following representatives to familiarize himself with the existing local utilities and related requirements involved prior to start of construction.

ry Road
er
-50
A-2

Main Extension
No. 12
See Sht. 43-44



TELEPHONE

American Telephone and Telegraph
308 Cynthiana Street
Williamstown, KY 41097
(800)752-6007 Toll Free B.U.D.

South Central Bell Telephone Company
U.S. Highway No. 227
Carrallton, KY 41008
(502)732-4424
Mr. Mike Cutshaw

South Central Bell Telephone Company
817 Washington Street, P.O. Box 351
Shelbyville, KY 40065
(800)752-6007 Toll Free B.U.D.

GAS

Texas Gas Transmission Corporation
Suite 475, Mall Office Center
400 Sherburn Lane
Louisville, KY 40207
(502)491-0251
Mr. Joe Alsip
Mr. Dan Roe
Mr. Phil Acres

Mid Valley Pipeline Co.
Longview, Texas
1-800-753-5531

ELECTRIC

Kentucky Utilities
11th Street
Carrallton, KY 41008
(502)738-4441
Mr. Gene McCarty

Owen County Rural Electric Cooperative
510 South Main Street
Owenton, KY 40359
(800)372-7612
Mr. Frank Downing

WATER

Carroll County Water D
P.O. Box 333
Carrallton, KY 41008
(502)347-9470
Mr. James Smith, Man
Office: Ernestine Saun
(502)732-4034

HIGHWAYS

Commonwealth of Kent
Transportation Cabinet
P.O. Box 17130
Covington, KY 41017
(606)341-2700
Mr. Kevin Flowers

Carroll Co. Road Depart
Rt. 1 (Prestonville)
Carrallton, KY 41008
(502)732-7039

CONTACTS

Underground Protection
BUD 800-752-6007
All Kentucky

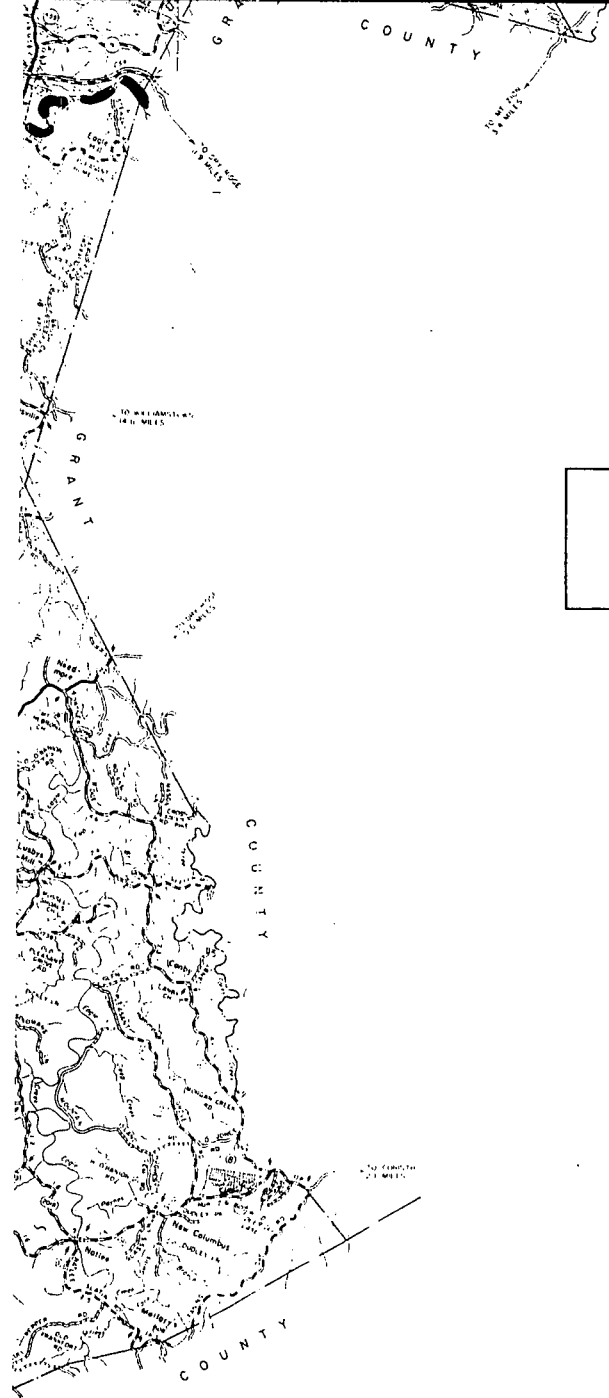
SIECO, INC. (Engineers)
629 Washington Street
P.O. Box 407
Columbus, IN 47202
Mr. James West (812)
Mr. Fred Marsh (812)8

Raisor, Zapp & Woods
P.O. Box 354
Carrallton, KY 41008
Mr. Dennis Raisor

Ms. Ruth Baxter, Attorr
Berry & Floyd
523 Highland Avenue
Carrallton, KY 41008
(502)732-6688

Note:
Extension No. 12 is not a part
of the Div. A-1 Contract.





1-800-753-5531

ELECTRIC

Kentucky Utilities
11th Street
Carrollton, KY 41008
(502)738-4441
Mr. Gene McCarty

Owen County Rural Electric Cooperative
510 South Main Street
Owenton, KY 40359
(800)372-7612
Mr. Frank Downing

629 Washington Street
P.O. Box 407
Columbus, IN 47202
Mr. James West (812)3
Mr. Fred Marsh (812)81

Raisor, Zapp & Woods
P.O. Box 354
Carrollton, KY 41008
Mr. Dennis Raisor

Ms. Ruth Baxter, Attorn
Berry & Floyd
523 Highland Avenue
Carrollton, KY 41008
(502)732-6688

Note:
Extension No. 12 is not a part
of the Div. A-1 Contract.



CONTRACTS

g representatives to familiarize
d requirements involved prior to

WATER

Carroll County Water District No. 1
P.O. Box 333
Carrollton, KY 41008
(502)347-9470
Mr. James Smith, Manager
Office: Ernestine Saunders
(502)732-4034

HIGHWAYS

Commonwealth of Kentucky
Transportation Cabinet
P.O. Box 17130
Covington, KY 41017
(606)341-2700
Mr. Kevin Flowers

Carroll Co. Road Department
Rt. 1 (Prestonville)
Carrollton, KY 41008
(502)732-7039

CONTACTS

Underground Protection Service
BUD 800-752-6007
All Kentucky

SIECO, INC. (Engineers)
629 Washington Street
P.O. Box 407
Columbus, IN 47202
Mr. James West: (812)372-9911
Mr. Fred Marsh (812)866-3410







Raisor, Zapp & Woods (Accountants)
P.O. Box 354
Carrollton, KY 41008
Mr. Dennis Raisor

Ms. Ruth Baxter, Attorney
Berry & Floyd
523 Highland Avenue
Carrollton, KY 41008
(502)732-6688

GENERAL NOTES

1. Existing underground utilities, etc., are generally located where it is known that they exist. The contractor is responsible for the accurate location of all utilities and hazards whether shown or not. The contractor shall include the cost of all fittings that are required to avoid existing utilities structure.
2. The contractor shall be responsible for the repair and/or replacement of all damaged utilities.
3. The contractor shall be responsible for notifying all residents of interruption to their utilities that will be caused by the construction.
4. The owner shall obtain road permits, but the contractor shall be responsible for meeting all requirements of each agency.
5. Meters and service lines shall be installed at locations indicated by the Resident Inspector in accordance with the standard details and the construction specification.
6. U. S. and State Highway crossings shall be bored and encased according to these plans, construction specifications, and Commonwealth of Kentucky Transportation Cabinet. County and Township roads shall be bored and encased unless otherwise noted in accordance with these plans and specifications. Prior to construction in rights-of-way, the contractor shall provide minimum 7 day notice to the proper agency.
7. Where possible, when in road right-of-way, the water line shall be installed between the ditch and the right-of-way line.
8. If a trencher is used, the trench shall be a minimum of two (2) feet off the edge of the pavement.
9. Division A Contractor to furnish and install all materials and labor for installation of radio controlled equipment including electric service.
10. All hydrants to be field located.
11. Pipe utilized on the project shall be NSF and/or AWWA approved pipe.
12. Pressure testing on pipe shall be in accordance with methods outlined in AWWA C600.
13. Disinfection of water lines shall be performed in accordance with AWWA C651.
14. Separation of the proposed water lines and any sewers shall be a minimum of 18" vertical and 10' horizontal.
15. Depth proposed for water line (36" Min.) unless otherwise shown.

LEGEND

-  Existing Water Main
-  Proposed Water Main
-  Stationing
-  Gate Valve
-  Service
-  Stream Crossing and Bores

SIECO, INC.
COLUMBUS, IN. MICHIGAN CITY, IN. LANCASTER, OH.

REVISIONS
DATE
1/99

DESCRIPTION
Added note that Extension No. 12 is not part of Div. A-1

NO.
1




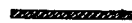





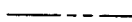

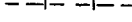





529 Washington Street
 P.O. Box 407
 Columbus, IN 47202
 Mr. James West (812)372-9911
 Mr. Fred Marsh (812)866-3410


Raisor, Zapp & Woods (Accountants)
 P.O. Box 354
 Carrollton, KY 41008
 Mr. Dennis Raisor

Ms. Ruth Baxter, Attorney
 Berry & Floyd
 523 Highland Avenue
 Carrollton, KY 41008
 (502)732-6638

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LEGEND

-  Existing Water Main
-  Proposed Water Main
-  Stationing
-  Gate Valve
-  Service
-  Stream Crossing and Bores
-  Flushing Device w/Valve
-  Property Line and Right-of-Way
-  Gas Line
-  Telephone Line
-  Electrical Line
-  Booster Station
-  Air Release Valve
-  MPRV
-  Master Meter



COLUMBUS

NO.	1	REVISIONS	DESCRIPTION	DATE
			Added note that Extension No. 12 is not part of Div. A-1	1/99



STATE OF KENTUCKY
 JAMES M. WEST
 12340
 REGISTERED PROFESSIONAL ENGINEER

PROJECT NAME
Carroll County Water District No. 1
Water Main Extensions 1997

P. O. Box 333
Carrollton, Kentucky
Project Location Map and General Notes

DRAWN BY: *[Signature]* **DATE:** 9/97
CHECKED BY: *[Signature]* **SCALE:**

JOB NO. 93329.00	
SHEET NUMBER	
2 OF 59	

Sieco, Inc.
Engineers

LETTER OF TRANSMITTAL



629 Washington Street
P.O. Box 407
Columbus, Indiana 47202

RECEIVED

JUL 21 1999

PUBLIC SERVICE
COMMISSION

TO Public Service Commission
730 Schenkel Lane, P.O. Box 615
Frankfort, KY 40602

DATE	JULY 20, 1999	JOB NO.
ATTENTION	Mr. Don Mills, Executive Director	
RE:	Carroll County Water District No. 1	
	Water System Extensions of 1997	
	Carroll County, Kentucky	
	Case No. 99-302	

WE ARE SENDING YOU Attached Under separate cover via _____ the following items:

Shop drawings Prints Plans Samples Specifications

Copy of letter Change order _____

COPIES	DATE	NO.	DESCRIPTION
1 set			Plans & Specifications for the Division A-1, A-2 and B for the above referenced project including Addendums

THESE ARE TRANSMITTED as checked below:

- For approval Approved as submitted Resubmit _____ copies for approval
- For your use Approved as noted Submit _____ copies for distribution
- As requested Returned for corrections Return _____ corrected prints
- For review and comment _____
- FOR BIDS DUE _____ 19 _____ PRINTS RETURNED AFTER LOAN TO US

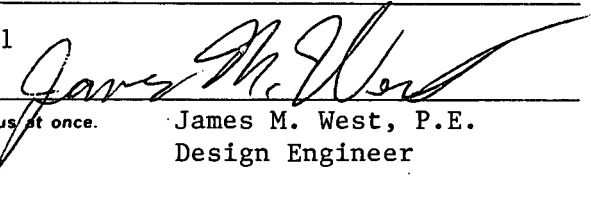
REMARKS _____

NOTE: This is in response to the Application of Carroll County Water District No. 1 for a Certificate of Public Convenience and Necessity to construct and finance an Improvement Project.

If you have any questions or need additional information, please call me at (812)372-9911.

file
 COPY TO Jim Smith, Manager, Carroll Co. Water Dist. No. 1
Randall Jones, Rubin & Hays
C.F. Marsh, Project Manager

SIGNED: _____



James M. West, P.E.
Design Engineer

If enclosures are not as noted, kindly notify us at once.

Phone: 812-372-9911

FAX: 812-372-7190

Contract Documents and Specifications

Sieco, Inc.
Engineers

RECEIVED

JUL 21 1999

PUBLIC SERVICE
COMMISSION

WATER SYSTEM EXTENSIONS PROJECT OF 1997
FOR
CARROLL COUNTY WATER DISTRICT NO. 1
CARROLLTON, KENTUCKY

DIVISION A-1 - Water Main Extensions

DIVISION A-2 - Water Main Extensions, Booster Stations,
Main MPRV's, Master Meters and Telemetry

DIVISION B - Standpipe Water Storage Tank and
Related Work

Sieco

ADDENDUM 4

FOR

**WATER SYSTEM EXTENSIONS PROJECT OF 1997
FOR
CARROLL COUNTY WATER DISTRICT NO. 1
CARROLLTON, KENTUCKY**

DIVISION A-1 - Water Main Extensions

**DIVISION A-2 - Water Main Extensions, Booster Stations,
Main MPRV's, Master Meters and Telemetry**

DIVISION B - Standpipe Water Storage Tank and Related Work

ISSUED BY: SIECO, Inc., Columbus, Indiana

DATE: March 19, 1999

**BID DATE: March 23, 1999 - 1:00 p.m.
Bids Opened at 1:30 p.m.**

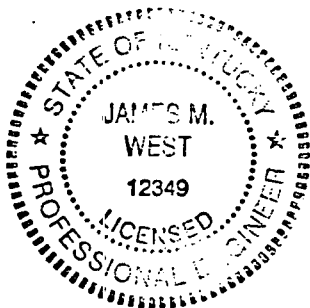
This addendum shall supplement, amend and become a part of the bidding documents, the specifications and drawings. All bids and construction contracts shall be based on these modifications, which follow:

DIVISION A-1

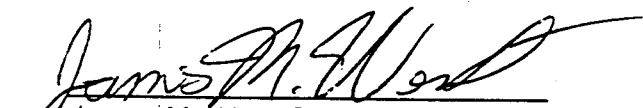
1. Bid Items No. 13 and 14 shall include steel casing pipe per detail on Plan Sheet 54.

DIVISION A-2

2. Bid Items No. 19, 20, 21 and 22 shall include steel casing pipe per detail on Plan Sheet 54.



CERTIFIED BY:


James M. West, P.E.
Kentucky License. No. 12349

ADDENDUM 3

FOR

**WATER SYSTEM EXTENSIONS PROJECT OF 1997
FOR
CARROLL COUNTY WATER DISTRICT NO. 1
CARROLLTON, KENTUCKY**

DIVISION A-1 - Water Main Extensions

**DIVISION A-2 - Water Main Extensions, Booster Stations,
Main MPRV's, Master Meters and Telemetry**

DIVISION B - Standpipe Water Storage Tank and Related Work

ISSUED BY: SIECO, Inc., Columbus, Indiana

DATE: March 18, 1999

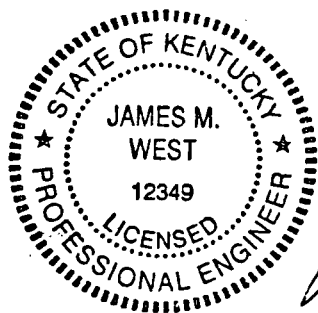
**BID DATE: March 23, 1999 - 1:00 p.m.
Bids Opened at 1:30 p.m.**

This addendum shall supplement, amend and become a part of the bidding documents, the specifications and drawings. All bids and construction contracts shall be based on these modifications, which follow:

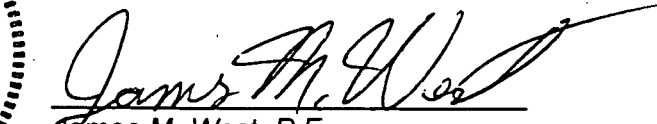
DIVISION A-2

1. Bid Item No. 73 for 1" P.E. Service Pipe has been added to the Bid Schedule.

The enclosed revised Bid Schedule sheets BS-A2-9 and BS-A2-10 shall be used for submitting bids for Division A-2.



CERTIFIED BY:


James M. West, P.E.
Kentucky License No. 12349

BID SCHEDULE - DIVISION A-2
Water System Improvements Project of 1995
Carroll County Water District No. 1
Carrollton, Kentucky

Item	Description	Unit Price	Estimated Quantity	Total Price
70.	Furnish and install Radio Telemetry System at the Montgomery Road Master Meter, lump sum:	\$	1	\$
71.	Furnish and install Radio Telemetry System at the Kentucky Highway #36 and #1112 Master Meter, lump sum:	\$	1	\$
72.	Furnish and install valves and piping to rebuild MPRV on Kentucky Highway #1112 Master Meter, lump sum:	\$	1	\$
73.	Furnish and install 1" P.E. Service Pipe, per foot:	\$	2,800'	\$
TOTAL BASE BID - DIVISION A-2				\$

BID SCHEDULE - DIVISION A-2
Water Main Extensions Project of 1997
Carroll County Water District No. 1
Carrollton, Kentucky

THE CONTRACT PRICE - The Owner shall pay to the Contractor for the performance of this Contract, subject to any additions or deductions provided herein; the sum as follows:

BASE BID TOTAL - (Summation of Items 1 thru 73): \$ _____
_____ Dollars _____ Cents

Bidder agrees to furnish and install, and perform all work necessary to complete the Division A-2 - Water Main Extensions, Booster Stations, Main MPRV's, Master Meters and Telemetry for the Carroll County Water District No. 1, Carroll County, Kentucky, as required by the specifications and indicated on the Drawings.

All work to be completed in 270 calendar days after written authorization to proceed. Liquidated damages of \$350.00 per day shall be paid to the Owner by the Contractor for each calendar day that completion of the construction exceeds the above allowed calendar days.

The Bidder, by submitting this bid, is certifying he has reviewed the plans and specifications and that he intends to complete the project with no deviation from the plans and specifications and that he can complete the project in the time frame indicated.

Respectfully submitted:

_____	_____
Signature	Address
_____	_____
Title	
_____	_____
Date	

SEAL

ATTEST: _____

ADDENDUM 2

FOR

**WATER SYSTEM EXTENSIONS PROJECT OF 1997
FOR
CARROLL COUNTY WATER DISTRICT NO. 1
CARROLLTON, KENTUCKY**

DIVISION A-1 - Water Main Extensions

**DIVISION A-2 - Water Main Extensions, Booster Stations,
Main MPRV's, Master Meters and Telemetry**

DIVISION B - Standpipe Water Storage Tank and Related Work

ISSUED BY: SIECO, Inc., Columbus, Indiana

DATE: March 16, 1999

**BID DATE: March 23, 1999 - 1:00 p.m.
Bids Opened at 1:30 p.m.**

This addendum shall supplement, amend and become a part of the bidding documents, the specifications and drawings. All bids and construction contracts shall be based on these modifications, which follow:

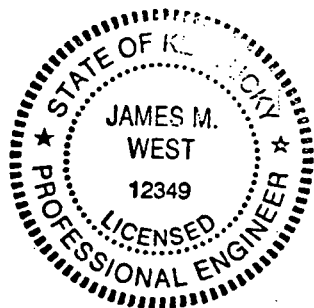
DIVISION A-1 AND A-2

1. Division A-1, Bid Items 35 thru 41, for master meters and radio telemetry systems have been deleted and are included in the Division A-2 Bid Schedule as Bid Items 65 thru 71.

The enclosed revised Bid Schedules shall be used for submitting bids for Divisions A-1 and A-2.

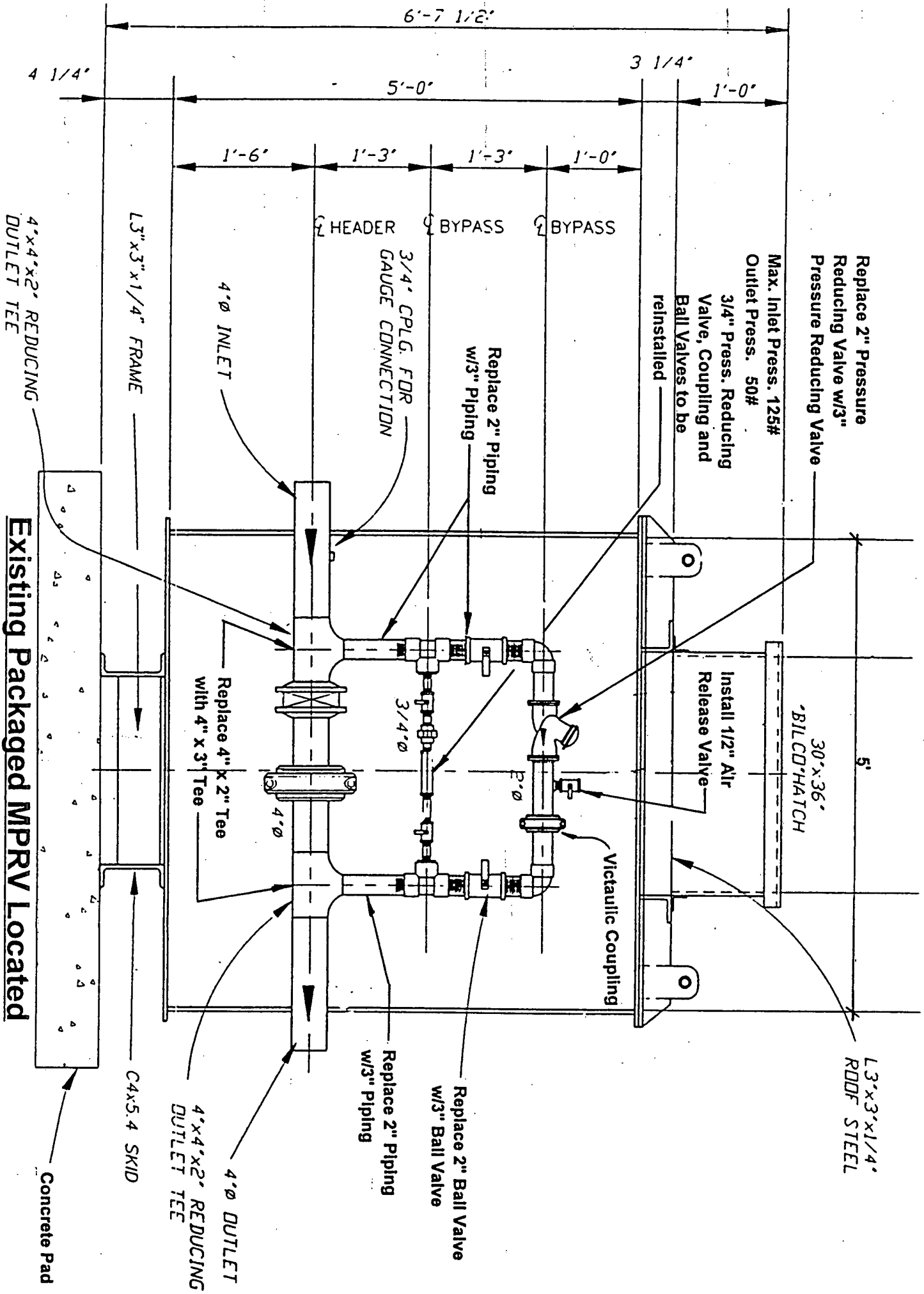
2. Main Pressure Reducing Valve (MPRV) on S.R. 1112, Plan Sheet 2 and 49, shall be rebuilt per the attached drawing. Bid shall be Bid Item #72, Div. A-2 Bid Schedule.

Pressure Reducing Valve shall be Cla-Val Model 90-01 BY.



CERTIFIED BY:

James M. West
James M. West, P.E.
Kentucky License. No. 12349



Existing Packaged MPRV Located

South of S.R. #36 on S.R. 1112 at Easterday

ELIHYA TION WFW

BID

Proposal of _____ (hereinafter called "BIDDER"), organized and existing under the laws of the State of _____ doing business as _____*. To the Carroll County Water District No. 1, (hereinafter called "OWNER").

In compliance with your Advertisement for Bids, BIDDER hereby proposes to perform all WORK for the construction of Division A-1 - Water Main Extensions Project of 1997, in strict accordance with the CONTRACT DOCUMENTS, within the time set forth therein, and at the prices stated below.

By submission of this BID, each BIDDER certifies, and in the case of a joint BID each party thereto certifies as to his own organization, that this BID has been arrived at independently, without consultation, communication, or agreement as to any matter relating to this BID with any other BIDDER or with any competitor.

BIDDER hereby agrees to commence WORK under this contract on or before a date to be specified in the NOTICE TO PROCEED and to fully complete the PROJECT within 270 consecutive calendar days thereafter. BIDDER further agrees to pay as liquidated damages, the sum of \$350.00 for each consecutive calendar day thereafter as provided in Section 15 of the General Conditions.

BIDDER acknowledges receipt of the following ADDENDUM:

Bids shall include sales tax and all other applicable taxes and fees.

*Insert "a corporation", "a partnership", or "an individual" as applicable.

BID SCHEDULE

for the

DIVISION A-1 - Water Mains Extension Project of 1997

for

CARROLL COUNTY WATER DISTRICT NO. 1

CARROLL COUNTY, KENTUCKY

Item	Description	Unit Price	Estimated Quantity	Total Price
Furnish and install, complete, including necessary fittings, and restoration to preconstruction conditions, the following water mains, per foot:				
1.	4" PVC, SDR 21, per foot:	\$	22,300'	\$
2.	3" PVC, SDR 13.5, per foot:	\$	2,600'	\$
3.	3" PVC, SDR 17, per foot:	\$	9,500'	\$
4.	3" PVC, SDR 21, per foot:	\$	21,400'	\$
5.	1" P.E. Service Pipe, per foot:	\$	3,000'	\$
6.	6" Gate Valve and Box, each:	\$	1	\$
7.	4" Gate Valve and Box, each:	\$	6	\$
8.	3" Gate Valve and Box, each:	\$	7	\$
9.	4" Main Air Release Valve, each:	\$	2	\$
10.	3" Main Air Release Valve, each:	\$	1	\$
11.	2" Flush Hydrant including 2" valve and box, and fittings, each:	\$	7	\$
12.	Furnish and install Detectable Flagging, per lineal foot:	\$	55,800'	\$
Bore under asphalt and concrete drives and roads and placing carrier pipe in boring hole, with carrier pipe to be paid for by unit price in trench, per lineal foot, for the following pipe sizes:				
13.	4" Water Main:	\$	330'	\$
14.	3" Water Main:	\$	80'	\$
15.	1" Service Pipe:	\$	500'	\$

BID SCHEDULE - DIVISION A:1
 Water Mains Extension Project of 1997
 Carroll County Water District No. 1
 Carrollton, Kentucky

Item	Description	Unit Price	Estimated Quantity	Total Price
16.	Cut and repair of gravel roads and drives, per lineal foot of trench:	\$	550'	\$
17.	Cut and repair of asphalt roads and drives, per lineal foot of trench:	\$	40'	\$
18.	Furnish and install Type "B" Connection to existing 6" line, Sheet 3, lump sum:	\$	1	\$
19.	Furnish and install Type "B" Connection to existing 6" line, Sheet 8, lump sum:	\$	1	\$
20.	Furnish and install Type "B" Connection to existing 8" line, Sheet 14, lump sum:	\$	1	\$
21.	Furnish and install Type "B" Connection to existing 6" line, Sheet 21, lump sum:	\$	1	\$
22.	Furnish and install Type "C" Connection to existing 4" line, Sheet 6, lump sum:	\$	1	\$
23.	Furnish and install Type "C" Connection to existing 3" line, Sheet 19, lump sum:	\$	1	\$
24.	Furnish and install Class "B" stream crossing for 4" main, per lineal foot:	\$	50'	\$
25.	Furnish and install Class "B" stream crossing for 3" main, per lineal foot:	\$	80'	\$
26.	Furnish and install Class "C" stream crossing for 4" main, per lineal foot:	\$	205'	\$

BID SCHEDULE - DIVISION A-1
 Water Mains Extension Project of 1997
 Carroll County Water District No. 1
 Carrollton, Kentucky

Item	Description	Unit Price	Estimated Quantity	Total Price
27.	Furnish and install Class "C" stream crossing for 3" main, per lineal foot:	\$	225'	\$
28.	Furnish and install Class "C" Stream Crossing for Service Pipe, per lineal foot:	\$	50'	\$
29.	Service Taps to 4" main, each:	\$	20	\$
30.	Service Taps to 3" main, each:	\$	34	\$
31.	Furnish and install 5/8" x 3/4" meter installation, each:	\$	54	\$
32.	Additional cost for including an Individual Pressure Reducing Valve (IPRV) as part of the meter installation, each:	\$	39	\$
33.	Furnish and install 6" PVC, SDR 21 Casing Pipe and install 3" PVC Carrier Pipe, per foot:	\$	50'	\$
34.	Furnish and install 8" PVC, SDR 21 Casing Pipe and install 4" PVC Carrier Pipe, per foot:	\$	200'	\$
TOTAL DIVISION A-1 BASE BID				\$

BID SCHEDULE - DIVISION A-1
Water Mains Extension Project of 1997
Carroll County Water District No. 1
Carrollton, Kentucky

THE CONTRACT PRICE - The Owner shall pay to the Contractor for the performance of this Contract, subject to any additions or deductions provided herein, the sum as follows:

BASE BID TOTAL - (Summation of Items 1 thru 34): \$ _____
_____ Dollars _____ Cents

Bidder agrees to furnish and install, and perform all work necessary to complete the Division A-1 - Water Main Extensions Project of 1997, for the Carroll County Water District No. 1, Carroll County, Kentucky, as required by the specifications and indicated on the Drawings.

All work to be completed in 270 calendar days after written authorization to proceed. Liquidated damages of \$350.00 per day shall be paid to the Owner by the Contractor for each calendar day that completion of the construction exceeds the above allowed calendar days.

The Bidder, by submitting this bid, is certifying he has reviewed the plans and specifications and that he intends to complete the project with no deviation from the plans and specifications and that he can complete the project in the time frame indicated.

Respectfully submitted:

_____	_____
Signature	Address
_____	_____
Title	
_____	_____
Date	

SEAL

ATTEST: _____

BID

Proposal of _____ (hereinafter called "BIDDER"), organized and existing under the laws of the State of _____ doing business as _____*. To the Carroll County Water District No. 1, (hereinafter called "OWNER").

In compliance with your Advertisement for Bids, BIDDER hereby proposes to perform all WORK for the construction of Division A-2 - Water Main Extensions Project of 1997, in strict accordance with the CONTRACT DOCUMENTS, within the time set forth therein, and at the prices stated below.

By submission of this BID, each BIDDER certifies, and in the case of a joint BID each party thereto certifies as to his own organization, that this BID has been arrived at independently, without consultation, communication, or agreement as to any matter relating to this BID with any other BIDDER or with any competitor.

BIDDER hereby agrees to commence WORK under this contract on or before a date to be specified in the NOTICE TO PROCEED and to fully complete the PROJECT within 270 consecutive calendar days thereafter. BIDDER further agrees to pay as liquidated damages, the sum of \$350.00 for each consecutive calendar day thereafter as provided in Section 15 of the General Conditions.

BIDDER acknowledges receipt of the following ADDENDUM:

Bids shall include sales tax and all other applicable taxes and fees.
*Insert "a corporation", "a partnership", or "an individual" as applicable.

BID SCHEDULE
for the
DIVISION A-2 - Water Main Extensions Project of 1997
for
CARROLL COUNTY WATER DISTRICT NO. 1
CARROLL COUNTY, KENTUCKY

Item	Description	Unit Price	Estimated Quantity	Total Price
Furnish and install, complete, including necessary fittings, and restoration to preconstruction conditions, the following water mains, per foot:				
1.	8" PVC, SDR 17, per foot:	\$	22,800'	\$
2.	6" PVC, SDR 17, per foot:	\$	23,600'	\$
3.	6" PVC, SDR 21, per foot:	\$	16,700'	\$
4.	6" Polyethylene (P.E.), Class 160, SDR 11, per foot:	\$	1,000'	\$
5.	4" D.I., CL 350, per foot:	\$	13,950'	\$
6.	4" PVC, SDR 21, per foot:	\$	19,400'	\$
7.	3" PVC, SDR 17, per foot:	\$	4,400'	\$
8.	3" PVC, SDR 21, per foot:	\$	35,000'	\$
9.	8" Gate Valve and Box, each:	\$	5	\$
10.	6" Gate Valve and Box, each:	\$	5	\$
11.	4" Gate Valve and Box, each:	\$	6	\$
12.	3" Gate Valve and Box, each:	\$	13	\$
13.	8" Main Air Release Valve, each:	\$	3	\$
14.	6" Main Air Release Valve, each:	\$	7	\$
15.	3" Main Air Release Valve, each:	\$	1	\$
16.	6" Flush Hydrant including 6" valve and box, and fittings, each:	\$	7	\$
17.	2" Flush Hydrant including 2" valve and box, and fittings, each:	\$	11	\$

BID SCHEDULE - DIVISION A-2
 Water Main Extensions Project of 1997
 Carroll County Water District No. 1
 Carrollton, Kentucky

Item	Description	Unit Price	Estimated Quantity	Total Price
18.	Furnish and install Detectable Flagging, per lineal foot:	\$	136,850'	\$
Bore under asphalt and concrete drives and roads and placing carrier pipe in boring hole, with carrier pipe to be paid for by unit price in trench, per lineal foot, for the following pipe sizes:				
19.	8" Water Main:	\$	150'	\$
20.	6" Water Main:	\$	200'	\$
21.	4" Water Main:	\$	100'	\$
22.	3" Water Main:	\$	90'	\$
23.	1" Service Pipe:	\$	700'	
24.	Cut and repair of gravel roads and drives for 8" main, per lineal foot of trench:	\$	320'	\$
25.	Cut and repair of gravel roads and drives for 6" main, per lineal foot of trench:	\$	320'	\$
26.	Cut and repair of gravel roads and drives for 4" main, per lineal foot of trench:	\$	500'	\$
27.	Cut and repair of gravel roads and drives for 3" main, per lineal foot of trench:	\$	1,080'	\$
28.	Cut and repair of gravel roads and drives for 1" service pipe, per lineal foot of trench:	\$	280'	\$
29.	Cut and repair of asphalt roads and drives for 8" main, per lineal foot of trench:	\$	100'	\$

BID SCHEDULE - DIVISION A-2
 Water Main Extensions Project of 1997
 Carroll County Water District No. 1
 Carrollton, Kentucky

Item	Description	Unit Price	Estimated Quantity	Total Price
30.	Cut and repair of asphalt roads and drives for 6" main, per lineal foot of trench:	\$	20'	\$
31.	Cut and repair of asphalt roads and drives for 4" main, per lineal foot of trench:	\$	40'	\$
32.	Cut and repair of asphalt roads and drives for 3" main, per lineal foot of trench:	\$	1,550'	\$
33.	Cut and repair of asphalt roads and drives for 1" service pipe, per lineal foot of trench:	\$	300'	\$
34.	Furnish and install Type "B" Connection to existing 6" line, Sheet 9, lump sum:	\$	1	\$
35.	Furnish and install Type "B" Connection to existing 6" line, Sheet 22, lump sum:	\$	1	\$
36.	Furnish and install Type "B" Connection to existing 6" line, Sheet 38, lump sum:	\$	1	\$
37.	Furnish and install Type "B" Connection to existing 6" line, Sheet 42, lump sum:	\$	1	\$
38.	Furnish and install Type "C" Connection to existing 3" line, Sheet 11, lump sum:	\$	1	\$
39.	Furnish and install Type "C" Connection to existing 3" line, Sheet 12, lump sum:	\$	1	\$
40.	Furnish and install Type "C" Connection to existing 3" line, Sheet 13, lump sum:	\$	1	\$

BID SCHEDULE - DIVISION A-2
 Water Main Extensions Project of 1997
 Carroll County Water District No. 1
 Carrollton, Kentucky

Item	Description	Unit Price	Estimated Quantity	Total Price
41.	Furnish and install Type "C" Connection to existing 6" line, Sheet 37, lump sum:	\$	1	\$
42.	Furnish and install Class "B" stream crossing for 6" main, per lineal foot:	\$	320'	\$
43.	Furnish and install Class "C" stream crossing for 6" main, per lineal foot:	\$	330'	\$
44.	Furnish and install Class "C" stream crossing for 4" main, per lineal foot:	\$	330'	\$
45.	Furnish and install Class "B" stream crossing for 3" main, per lineal foot:	\$	160'	\$
46.	Furnish and install Class "C" stream crossing for 3" main, per lineal foot:	\$	100'	\$
47.	Service Taps to 6" main, each:	\$	18	\$
48.	Service Taps to 4" main, each:	\$	11	\$
49.	Service Taps to 3" main, each:	\$	31	\$
50.	Furnish and install 5/8" x 3/4" meter installation, each:	\$	56	\$
51.	Furnish and install double 5/8" x 3/4" meter installation, each:	\$	4	\$
52.	Additional cost for including an Individual Pressure Reducing Valve (IPRV) as part of the meter installation, each:	\$	33	\$

BID SCHEDULE - DIVISION A-2
 Water Main Extensions Project of 1997
 Carroll County Water District No. 1
 Carrollton, Kentucky

Item	Description	Unit Price	Estimated Quantity	Total Price
53.	Furnish and install 6" PVC, SDR 21 Casing Pipe, open cut, and install 3" PVC Carrier Pipe, per foot:	\$	35'	\$
54.	Furnish and install 8" Water Main on Bridge, per foot of pipe:	\$	700'	\$
55.	Furnish and install Glenwood Hall Master Meter, excluding cost of Radio Telemetry System, lump sum:	\$	1	\$
56.	Furnish and install Radio Telemetry System at the Perry Park Booster Station, including hardwire to and monitoring of the Glenwood Hall Master Meter and MPRV outlet pressure, lump sum:	\$	1	\$
57.	Furnish and install Radio Telemetry System at the Kendall Road Booster Station, lump sum:	\$	1	\$
58.	Furnish and install Radio Telemetry System at the Central Control Unit, lump sum:	\$	1	\$
59.	Furnish and install Glenwood Hall MPRV as manufactured by EFI, Inc., lump sum	\$	1	\$
*I-59.	Deduct from Item 59 for using MPRV Station as manufactured by Systecon, Inc. or SyncroFlo: Name of Manufacturer _____			

*Informational Bid - cost not to be included in total base bid.

BID SCHEDULE - DIVISION A-2
 Water Main Extensions Project of 1997
 Carroll County Water District No. 1
 Carrollton, Kentucky

Item	Description	Unit Price	Estimated Quantity	Total Price
60.	Furnish and install Gratz MPRV, as manufactured by EFI, lump sum:	\$	1	
*I-60	Deduct from Item 60 for using a MPRV Station manufactured by Systecon, Inc. or SyncroFlo: Name of Manufacturer _____	\$	1	
61.	Furnish and install Boone Road MPRV, manufactured by EFI, lump sum:	\$	1	\$
*I-61	Deduct from Item 61 for using a MPRV manufactured by Systecon, Inc. or SyncroFlo: Name of Manufacturer _____	\$	1	
62.	Furnish and install Perry Park Booster Station, as manufactured by EFI, excluding cost of telemetering, lump sum:	\$	1	\$
*I-62	Deduct from Item 62 for using a booster station manufactured by Systecon, Inc. or SyncroFlo: Name of Manufacturer _____	\$		
63.	Furnish and install Kendall Road Booster Station, as manufactured by EFI, lump sum:	\$	1	\$

*Informational Bid - cost not to be included in total base bid.

BID SCHEDULE - DIVISION A-2
 Water System Improvements Project of 1995
 Carroll County Water District No. 1
 Carrollton, Kentucky

Item	Description	Unit Price	Estimated Quantity	Total Price
*I-63	Deduct from Item 63 for using a Booster Station manufactured by Systecon, Inc. or SyncroFlo: Name of Manufacturer _____	\$	1	
64.	Bore and jack railroad crossing 16" x 0.375" minimum wall thickness, steel casing and furnish and install carrier pipe with spacers per foot of casing length:	\$	1	\$
65.	Furnish and install Eagle Station Road Master Meter, excluding cost of Radio Telemetry System, lump sum:	\$	1	\$
66.	Furnish and install Montgomery Road Master Meter, excluding cost of Radio Telemetry System, lump sum:	\$	1	\$
67.	Furnish and install Kentucky Highway #36 Master Meter, excluding cost of Radio Telemetry System, lump sum:	\$	1	\$
68.	Furnish and install Kentucky Highway #1112 Master Meter, excluding cost of Radio Telemetry System, lump sum:	\$	1	\$
69.	Furnish and install Radio Telemetry System at the Eagle Station Road Master Meter, lump sum:	\$	1	\$

*Informational Bid - cost not to be included in total base bid.

BID SCHEDULE - DIVISION A-2
 Water System Improvements Project of 1995
 Carroll County Water District No. 1
 Carrollton, Kentucky

Item	Description	Unit Price	Estimated Quantity	Total Price
70.	Furnish and install Radio Telemetry System at the Montgomery Road Master Meter, lump sum:	\$	1	\$
71.	Furnish and install Radio Telemetry System at the Kentucky Highway #36 and #1112 Master Meter, lump sum:	\$	1	\$
72.	Furnish and install valves and piping to rebuild MPRV on Kentucky Highway #1112 Master Meter, lump sum:	\$	1	\$
TOTAL BASE BID - DIVISION A-2				\$

BID SCHEDULE - DIVISION A-2
Water Main Extensions Project of 1997
Carroll County Water District No. 1
Carrollton, Kentucky

THE CONTRACT PRICE - The Owner shall pay to the Contractor for the performance of this Contract, subject to any additions or deductions provided herein, the sum as follows:

BASE BID TOTAL - (Summation of Items 1 thru 72): \$ _____
_____ Dollars _____ Cents

Bidder agrees to furnish and install, and perform all work necessary to complete the Division A-2 - Water Main Extensions, Booster Stations, Main MPRV's, Master Meters and Telemetry for the Carroll County Water District No. 1, Carroll County, Kentucky, as required by the specifications and indicated on the Drawings.

All work to be completed in 270 calendar days after written authorization to proceed. Liquidated damages of \$350.00 per day shall be paid to the Owner by the Contractor for each calendar day that completion of the construction exceeds the above allowed calendar days.

The Bidder, by submitting this bid, is certifying he has reviewed the plans and specifications and that he intends to complete the project with no deviation from the plans and specifications and that he can complete the project in the time frame indicated.

Respectfully submitted:

_____	_____
Signature	Address
_____	_____
Title	
_____	_____
Date	

SEAL

ATTEST: _____

ADDENDUM 1

FOR

WATER SYSTEM EXTENSIONS PROJECT OF 1997
FOR
CARROLL COUNTY WATER DISTRICT NO. 1
CARROLLTON, KENTUCKY

DIVISION A-1 - Water Main Extensions

DIVISION A-2 - Water Main Extensions, Booster Stations,
Main MPRV's, Master Meters and Telemetry

DIVISION B - Standpipe Water Storage Tank and Related Work

ISSUED BY: SIECO, Inc., Columbus, Indiana

DATE: March 12, 1999

BID DATE: March 23, 1999 - 1:00 p.m.
Bids Opened at 1:30 p.m.

This addendum shall supplement, amend and become a part of the bidding documents, the specifications and drawings. All bids and construction contracts shall be based on these modifications, which follow:

DIVISION A-1, A-2 and B

1. United States Department of Agriculture Employment of the Handicapped (Form AD-655, Rev. 5-76) is no longer required and is deleted from the contract documents.
2. United States Department of Agriculture Equal Employment Opportunity Contract Compliance Notices are no longer required and are deleted from the contract documents.

DIVISION A-2

3. For Informational Deduct Bid Items I-59, I-60, I-61, I-62 and I-63, the contractor may offer a Deduct Bid for using stations as manufactured by USEMCO as long as they are constructed to meet the specifications. Contractor shall name the manufacturer in the space provided for Informational Deduct.
4. If the contractor offers a deduct for an alternate supplier for Bid Items I-59, I-60, I-61, I-62 and I-63, and the owner accepts the offer, shop drawings shall be submitted within 60 days of the date of the Notice to Proceed or the date of authorization to use an alternate supplier, whichever is later, such that if the supplier can not meet the specification, it will not delay the project.

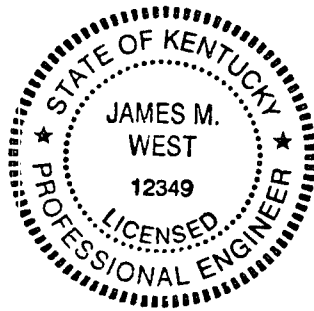
DIVISION B - TANK

5. Contractor may submit a bid for Glass Lined Bolted Steel Tank in place of a welded tank meeting all applicable parts of the plans and specifications and the attached specifications for a Glass Lined Bolted Steel Tank.

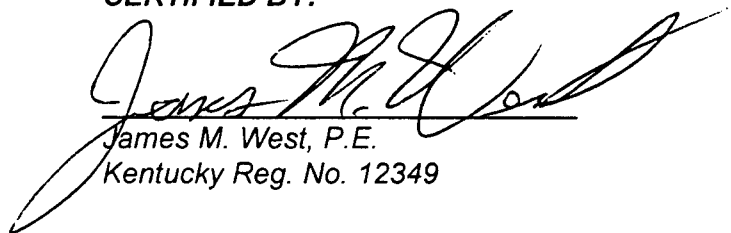
DIVISION A-1 and A-2

The following revisions shall apply to Section 16900, Supervisory Control and Data Acquisition (SCADA) System:

1. Page 16900-1; System to include two (2) Booster Station Remote Units.
2. Page 16900-5; Delete B. Maintenance Stock.
3. Page 16900-20 thru 16900-23; Delete Paragraphs M thru U.
4. Page 16900-25 thru 16900-29; Delete Paragraphs F thru H.
5. Page 16900-41; Paragraphs C and D shall be included as part of the pump station controls from the pump station manufacturer.
6. Page 16900-42 thru 16900-47; Delete Section 2.07.



CERTIFIED BY:


James M. West, P.E.
Kentucky Reg. No. 12349

PART 2 PRODUCTS

2.01 GLASS LINED BOLTED STEEL TANKS

A. Design Criteria:

1. The glass-coated, bolted steel tanks specified herein shall have nominal capacities as specified in the Base Bid Schedule. The tank diameters and heights shall be approximately equal to those indicated on the plans.

B. Materials Specification

Tank Structure:

The materials, design, fabrication and erection of the bolt together steel tank shall conform to the Standards of AWWA D-103 "Factory Coated Bolted Steel Tanks", noted in detail as follows:

1. Materials

a. Plates and Sheets:

Plates and sheets used in the construction of the tank shell, bottom and room shall comply with the minimum standards of AWWA D-103 Section 2.4.

b. Rolled Structural Shapes:

Rolled structural shapes shall conform to the minimum standards of AWWA D-103 Section 2.5.

2. Bolts:

- a. Bolts used in tank joints shall be 1/2 inch diameter and shall meet the minimum requirements of AWWA D-103 Section 2.2. Bolt heads shall be located inside of tank and shall be vinyl covered for complete corrosion protection.

- b. Other bolts shall conform to or at least be equal in strength to the latest revision of ASTM A307.

3. Sealants:

- a. All bolted connections shall incorporate air cured flexible sealant in compliance with AWWA D-103 Section 2.20.2.

4. Coatings:

- a. All metal plates, sheets, members and miscellaneous parts, except bolts, shall be factory coated in accordance with the

provisions of Section "C" of these specifications. Field coating, except for touch-up, will not be permitted.

C. Coating Systems:

Shall be in accordance with Section 10.4 of AWWA Specification D103.

1. Following the decoiling process, the parts shall be steel grit-blasted to the equivalent of SSPC-10. The surface anchor pattern shall be not less than 1.0 mils. These parts shall be oiled to protect from corrosion during fabrication.
2. After fabrication and prior to application of the coating system, all metal plates, members and miscellaneous parts, except bolts, shall be thoroughly cleaned by a hot wash-rinse process followed immediately by hot air drying.
3. Sheet edges of sidewalls and floor plates shall be mechanically removed and coated with a corrosion resistant material prior to glassing so as to insure glass coating of the sheet edges.
4. All steel sheets and plates shall receive one coat of glass precoat and one coat of glass frit on both sides and shall be fired at a minimum temperature of 1500 degrees F in strict accordance with manufacturer's recommendations. Minimum dry mil film thickness shall be 8.0 mils.
5. All coated parts shall be inspected and approved prior to shipment. Factory inspection shall include a mil thickness test (Microtest or equal) and a holiday detection test (Tinker Razor or equivalent). An owner representative may be present during this process.
6. All coated parts shall be protected from damage prior to packing for shipment.
7. All small parts and appurtenances shall be hot dip galvanized in accordance with ASTM A386.

D. Tank Roofs:

The tank roof shall be constructed of the same bolted, glass-fused-to-steel plates as the tank walls, unless the tank diameter is larger than available standard tank roof sizes. In such a case, an aluminum dome roof shall be provided. All tank roofs shall form an airtight connection with the tank walls, to prevent the entrance of dust, smoke and other air-borne pollutants into the tanks.

1. Aluminum Dome Roof:

The aluminum dome shall be a spherical structure conforming to the specified tank diameter. The dome structure shall be a fully triangulated space truss complete with non-corrugated closure panels. The dome shall be clear-span and designed to be self-supporting from the peripheral structure with primary horizontal thrust contained by an integral tension ring. Full provisions shall be made to allow for thermal expansion. The dome dead weight shall not exceed 3 pounds per square foot of surface area.

The aluminum dome surface paneling shall be designed as a watertight system under all design load conditions. All raw edges of the aluminum panels shall be covered, sealed and firmly clamped in an interlocking manner to prevent slipping or disengagement under all load and temperature changes. The dome material list shall equal or exceed:

- a. Triangulated space truss: 60601-T6 aluminum struts and gussets.
- b. Triangular closure panels: 16 gauge 3003-H16 aluminum sheet.
- c. Tension ring: 6061-T6 Aluminum.
- d. Fasteners: 7075-T73 aluminum or series 300 stainless steel.
- e. Sealant: Dow 790 silicone, or approved equal.
- f. Support bearing pads: Teflon faced neoprene, or approved equal.
- g. Expansion anchor bolts: 300 series stainless steel.
- h. Vents and hatches: 6061-T6 or 3003-H16 aluminum.

The aluminum dome frame and skin shall be designed in accordance with the "Specifications for Aluminum Structures" as published by the "Aluminum Association" and designed for full dead load plus the following live load conditions:

- a. Dome Frame Design Load:
 1. Symmetrical Loading - 15 lb/sq ft, minimum, or 25 lb/sq ft on the horizontal protection of the tank, for surfaces having a slope of 30 degrees or less with the horizontal.

2. Unbalanced Loading - reduce the live load by 50% over one half of the dome.
 3. Wind Loading - Velocity pressure 30 lb/sq ft on vertical plane surfaces, 18 lb/sq ft on projected areas of cylindrical surfaces and 15 lb/sq ft on projected areas of conical and double-curved plate surfaces, all based on wind velocities of 100 miles per hour.
- b. Panel Design Load:
1. 250 lb. load concentrated on one square foot at any time.
 2. Plus or minus 60 lb/sq ft distribution over the total panel area.

1 and 2 above are not to be considered as acting simultaneously.

The aluminum dome shall be field-erected by personnel who are adequately experienced in the fabrication and erection of aluminum. Before performing any of the aluminum dome work just outlined, complete details and drawings of the dome shall be submitted to the Engineer for approval. These submittals shall show dimensions, sizes, thicknesses, gauges, materials, finishes and joint attachment and erection procedures. A complete set of design calculations for the aluminum dome shall be submitted also.

E. Appurtenances:

1. The Bidder shall furnish and install the appurtenances included on the Division B plans and specifications, or an approved equal, modified as required.
2. Unless otherwise noted, all specified appurtenances shall be according to AWWA D-103 Section 5, specifically:
 - a. *Hatch.* The tank roof shall have curbed, upward openings with a minimum dimension of 24 inches. The curb shall extend at least 4 inches above the tank. The hatch cover lip shall be hinged and provisions made for locking. The hatch cover lip should extend for a distance of two inches down on the outside of the curb.
 - b. *Inlet and Outlet Connections.* Inlet and outlet connections shall conform to the sizes and locations specified on the

plan sheets for welded steel tanks. These connections shall be field located and installed with double flange bolting. The tank shall be equipped with an overflow of the type and size specified on the plans for welded steel tanks.

- c. *Vent.* A suitable vent shall be furnished above the maximum water level of sufficient capacity to pass air so that at the maximum possible rate of the water either entering or leaving the tank, pressure will not be developed which will exceed the roof design loads. The overflow pipe shall not be considered to be a tank vent. The vent shall be so designed and constructed as to prevent the entrance of birds or animals.
- d. *Outside Tank Ladder.* A tank ladder shall be provided in accordance with the plans and specifications included in the welded tank specifications.

F. Shipping:

- 1. All plates, members and miscellaneous parts shall be packaged for shipment in such a fashion to prevent abrasion or scratching of finished coating system.

G. Erection:

- 1. Field erection of glass coated, bolt together steel tanks shall be in strict accordance with the manufacturer's recommendations. Particular care shall be exercised in handling and bolting of the tank plates and members to avoid abrasion or scratching of the coating system. Prior to liquid test, all surface areas shall be inspected by the Engineer; touch-up coating shall be done in accordance with manufacturer's recommendations where and as directed.
- 2. Leveling of base ring shall be required and the differential elevation shall not exceed one-eighth (1/8") inch for entire ring.
- 3. Placing of sealant on each connection may be inspected prior to the placement of adjacent member. However, the Engineer's inspection shall not relieve the Bidder of his responsibility for liquid-tightness.

H. Testing:

- 1. Following completion of erection and cleaning of the tank, the structure shall be tested for liquid-tightness by filling the tank to its overflow elevation.

2. Any leaks disclosed by this test shall be corrected by the Contractor in accordance with the manufacturer's recommendations.
3. Labor and equipment necessary for tank testing shall be included in the price of the tank.

I. Warranty:

1. Structure:

The tank contractor shall warrant the glass-coated, bolted steel tanks against any defects in workmanship and materials for a period of one (1) year from the date of substantial completion in accordance with paragraph 29.1 of General Conditions.

2. Glass Coating System:

If within a period of five (5) years from date of completion of the tank (but not more than 62 months from date of delivery of the product to the erection site) the coating on the tank chips, cracks, spalls, or under-cuts during normal water service, the manufacturer shall (after examination by the manufacturer) supply an identical or substantially similar replacement part(s) f.o.b. the manufacturer's factory, or, at the manufacturer's option, repair or allow credit for such part.

J. Disinfection of Bolted Steel Water Storage Tank:

1. Standards

- a. The tank structure shall be disinfected at the time of testing by chlorination in accordance with AWWA Specification C-652, Method 2, "Disinfection of Water Storage Facilities".
- b. Disinfection shall not take place until tank sealant is fully cured (5 to 8 days at 73 degrees F/50% RH).

WATER SYSTEM EXTENSIONS PROJECT OF 1997
FOR
CARROLL COUNTY WATER DISTRICT NO. 1
CARROLLTON, KENTUCKY

DIVISION A-1 - Water Main Extensions

DIVISION A-2 - Water Main Extensions, Booster Stations,
Main MPRV's, Master Meters and Telemetry

DIVISION B - Standpipe Water Storage Tank and
Related Work

CONTRACT DOCUMENTS
AND SPECIFICATIONS

for

WATER SYSTEM EXTENSIONS PROJECT OF 1997
FOR
CARROLL COUNTY WATER DISTRICT NO. 1
CARROLLTON, KENTUCKY

- DIVISION A-1 - Water Main Extensions
DIVISION A-2 - Water Main Extensions, Booster Stations,
Main MPRV's, Master Meters and Telemetry
DIVISION B - Standpipe Water Storage Tank and
Related Work

BOARD OF DIRECTORS

Dennis Crawford	Chairman
Stephen D. Terry	Secretary/Treasurer
Bennie D. Wilson	Commissioner
Robert Dickerson	Commissioner
Mona Kindoll	Commissioner
Ruth Baxter	Attorney-at-Law
Darrell Lykins	Superintendent
James Smith	Manager

PREPARED BY:

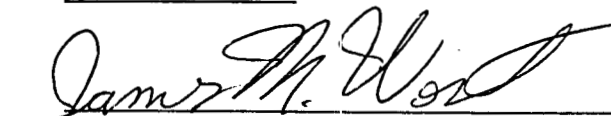
SIECO, Inc.
Consulting Engineers

629 Washington Street
P.O. Box 407
Columbus, IN 47202

450 St. John Road, Suite 790
P.O. Box 420
Michigan City, IN 46360

134 W. Main Street
P.O. Box 907
Lancaster, OH 43130

CERTIFIED BY:


James M. West, P.E.
Kentucky Reg. No. 12349



Nov. 20, 1997
Date

CONTRACT DOCUMENTS
AND SPECIFICATIONS

for

WATER SYSTEM EXTENSIONS PROJECT OF 1997
FOR
CARROLL COUNTY WATER DISTRICT NO. 1
CARROLLTON, KENTUCKY

DIVISION A-1 - Water Main Extensions
DIVISION A-2 - Water Main Extensions, Booster Stations,
Main MPRV's, Master Meters and Telemetry
DIVISION B - Standpipe Water Storage Tank and Related Work

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ADVERTISEMENT FOR BIDS

Sealed separate bids for the construction of:

WATER SYSTEM EXTENSIONS PROJECT OF 1997

DIVISION A-1 - Water Main Extensions

DIVISION A-2 - Water Main Extensions, Booster Stations,
Main MPRV's, Master Meters and Telemetry

DIVISION B - Standpipe Water Storage Tank and
Related Work

will be received by the Carroll County Water District No. 1, until 1:00 P.M., Local Time, March 23, 1999, then publicly opened and read aloud. Proposals received after said hour may be returned unopened. Bids to be opened at 1:30 P.M., Local Time, on March 23, 1999 at the Carroll County Courthouse, Courtroom, Highland Avenue, Carrollton, Kentucky 41008.

Proposals may be forwarded by registered mail and addressed to: Mr. James Smith, Manager, Carroll County Water District No. 1 Office, 205 Main Cross Street, P.O. Box 350, Ghent, KY 41045 and plainly labeled "*Sealed Proposal for Division ___*".

The Information for Bidders, Bid Forms, Contract Forms, Plans, Construction Specifications and forms of Bid Bond, Payment Bond, Performance Bond and other Contract Documents may be examined at the following:

SIECO, Inc., 629 Washington St., Columbus, IN 47201
Builders Exchange of Louisville, 2300 Meadow Dr., Louisville, KY 40218
F.W. Dodge Reports, 6666 E. 75th St., Suite 199, Indianapolis, IN 46250
F.W. Dodge Reports, 1812 Taylor Avenue, Louisville, KY 40213
F.W. Dodge Reports, 2525 Harrodsburg Road, Lexington, KY 40504
Carroll County Water District No. 1, 205 Main Cross Street, Ghent, KY 41045
Ruth Baxter, Attorney at Law, 523 Highland Avenue, Carrollton, KY 41008

Separate copies of the complete bidding documents and plans for each division of work may be obtained at the office of the Engineer, SIECO, Inc., Consulting Engineers, 629 Washington Street, P.O. Box 407, Columbus, Indiana 47202, for the prices specified as follows:

Divisions A-1 and A-2 Combined - Plans, Specifications and Bid Documents	\$125.00
Division B - Plans, Specifications and Bid Documents	\$ 75.00

Any Bidder, upon returning said drawings and specifications, in good condition, along with Bid or promptly after bid opening, will be refunded his payment. Any non-bidder, (i.e., not submitting prime bid on the prescribed form) upon so returning said bidding documents, drawings and specifications will be refunded \$0.00.

All Bidders must comply with the President's Executive Order No. 11246 as amended, which prohibits discrimination in employment regarding race, creed, color, sex, or national origin.

All Bidders must comply with Title VI of the Civil Rights Act of 1964, the Davis-Bacon Act, the Anti-Kickback Act, the Contract Work Hours Standard Act, and 40 CFR 33.1016.

Federal law prohibits discrimination on the grounds of race, color, national origin, religion, age, handicap and sex on this project.

Each bidder must deposit with his bid, security in the amount of 5% of the highest aggregate proposal in the form of a certified check or bid bond made payable to the Carroll County Water District No. 1.

No bidder may withdraw his proposal within 90 days after the actual date of the opening thereof.

Each sealed proposal envelope must indicate the title of the project, the bidder's name and address and the division(s) being bid.

Proposals for Bidders shall be executed on the forms provided by the Engineer.

The Owner reserves the right to waive any informality or reject any or all bids.

The estimated cost of construction for each division is as follows:

Division A-1	\$ 492,000
Division A-2	\$1,430,000
Division B	\$ 127,000

BOARD OF COMMISSIONERS
CARROLL COUNTY WATER DISTRICT NO. 1

Dennis Crawford, Chairman

Date: _____

INFORMATION FOR BIDDERS

BIDS will be received by Carroll County Water District No. 1 (herein called the "OWNER"), at 205 Main Cross Street, P.O. Box 350, Ghent, Kentucky 41045 until 1:00 P.M., Local Time, March 23, 1999 and then at the Carroll County Courthouse, Courtroom, Highland Avenue, Carrollton, Kentucky, publicly opened and read aloud.

Each BID must be submitted in a sealed envelope, addressed to Carroll County Water District No. 1 at 205 Main Cross Street, P.O. Box 350, Ghent, Kentucky 41045. Each sealed envelope containing a BID must be plainly marked on the outside as BID for Water System Extensions Project of 1997, Division A-1 - Water Main Extensions; or Division A-2 - Water Main Extensions, Booster Stations, Main MPRV's, Master Meters and Telemetry; and Division B - Water Storage Tank and the envelope should bear on the outside the BIDDER'S name, address and license number if applicable, and the name of the project for which the BID is submitted. If forwarded by mail, the sealed envelope containing the BID must be enclosed in another envelope addressed to the OWNER at 205 Main Cross Street, P.O. Box 350, Ghent, Kentucky 41045.

All BIDS must be made on the required BID form. All blank spaces for BID prices must be filled in, in ink or typewritten, and the BID form must be fully completed and executed when submitted. Only one copy of the BID form is required.

The OWNER may waive any informalities or minor defects or reject any and all BIDS. Any BID may be withdrawn prior to the above scheduled time for the opening of BIDS or authorized postponement thereof. Any BID received after the time and date specified shall not be considered. No BIDDER may withdraw a BID within 90 days after the actual date of the opening thereof. Should there be reasons why the contract cannot be awarded within the specified period, the time may be extended by mutual agreement between the OWNER and the BIDDER.

BIDDERS must satisfy themselves of the accuracy of the estimated quantities in the BID Schedule by examination of the site and a review of the drawings and specifications including ADDENDA. After BIDS have been submitted, the BIDDER shall not assert that there was a misunderstanding concerning the quantities of WORK or of the nature of the WORK to be done.

The OWNER shall provide to BIDDERS prior to BIDDING, all information which is pertinent to, and delineates and describes, the land owned and rights-of-way acquired or to be acquired.

The CONTRACT DOCUMENTS contain the provisions required for the construction of the PROJECT. Information obtained from an officer, agent, or employee of the OWNER or any other person shall not affect the risks or obligations assumed by the CONTRACTOR or relieve the contractor from fulfilling any of the conditions of the contract.

Each BID must be accompanied by a BID bond payable to the OWNER for five percent of the total amount of the BID. As soon as the BID prices have been compared, the OWNER will return the BONDS of all except the three lowest responsible BIDDERS. When the Agreement is executed the bonds of

the two remaining unsuccessful BIDDERS will be returned. The BID BOND of the successful BIDDER will be retained until the payment BOND and performance BOND have been executed and approved, after which it will be returned. A certified check may be used in lieu of a BID BOND.

A performance BOND and a payment BOND, each in the amount of 100 percent of the CONTRACT PRICE, with a corporate surety approved by the OWNER, will be required for the faithful performance of the contract.

Attorneys-in-fact who sign BID BONDS or payment BONDS and performance BONDS must file with each BOND a certified and effective dated copy of their power of attorney.

The party to whom the contract is awarded will be required to execute the Agreement and obtain the performance BOND and payment BOND within ten (10) calendar days from the date when NOTICE OF AWARD is delivered to the BIDDER. The NOTICE OF AWARD shall be accompanied by the necessary Agreement and BOND forms. In case of failure of the BIDDER to execute the Agreement, the OWNER may at his option consider the BIDDER in default, in which case the BID BOND accompanying the proposal shall become the property of the OWNER.

The OWNER within ten (10) days of receipt of acceptable performance BOND, payment BOND and Agreement signed by the party to whom the Agreement was awarded shall sign the Agreement and return to such party an executed duplicate of the Agreement. Should the OWNER not execute the Agreement within such period, the BIDDER may by WRITTEN NOTICE withdraw his signed Agreement. Such notice of withdrawal shall be effective upon receipt of the notice by the OWNER.

The NOTICE TO PROCEED shall be issued within ten (10) days of the execution of the Agreement by the OWNER. Should there be reasons why the NOTICE TO PROCEED cannot be issued within such period, the time may be extended by mutual agreement between the OWNER and CONTRACTOR. If the NOTICE TO PROCEED has not been issued within the ten (10) day period or within the period mutually agreed upon, the CONTRACTOR may terminate the Agreement without further liability on the part of either party.

The OWNER may make such investigations as deemed necessary to determine the ability of the BIDDER to perform the WORK, and the BIDDER shall furnish to the OWNER all such information and data for this purpose as the OWNER may request. The OWNER reserves the right to reject any BID if the evidence submitted by, or investigation of, such BIDDER fails to satisfy the OWNER that such BIDDER is properly qualified to carry out the obligations of the Agreement and to complete the WORK contemplated herein.

A conditional or qualified BID will not be accepted.

Award will be made to the lowest responsive, responsible Base or Combination BIDDER.

All applicable laws, ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the PROJECT shall apply to the contract throughout.

Each BIDDER is responsible for inspecting the site and for reading and being thoroughly familiar with the CONTRACT DOCUMENTS. The failure or omission of any BIDDER to do any of the foregoing shall in no way relieve any BIDDER from any obligation in respect to its BID.

Further, the BIDDER agrees to abide by the requirements under Executive Order No. 11246, as amended, including specifically the provisions of the equal opportunity clause set forth in the SUPPLEMENTAL GENERAL CONDITIONS.

The low BIDDER shall supply the names and addresses of major material SUPPLIERS and SUBCONTRACTORS when requested to do so by the OWNER.

Inspection trips for prospective BIDDERS will leave from the office of the _____ at _____

The ENGINEER is SIECO, Inc. His address is 629 Washington Street, P.O. Box 407, Columbus, Indiana 47202

SUPPLEMENTARY INFORMATION FOR BIDDERS

1. Application

The purpose of these Supplementary Information for Bidders is to amplify the foregoing Information for Bidders and it is not intended that they shall supersede any of the requirements therein except as specifically hereinafter stated.

2. Interpretations

Wherever in these contract documents and specifications the words "provide", "provided" or "providing" are written, they shall be interpreted to read "furnish and install", "furnished and installed" and "furnishing and installing", respectively.

3. Completeness of Specifications and Plans

Upon issue to prospective bidders, the physical make-up and content of the plans, specifications, and extra proposal forms are intended to be complete for preparing and submitting of proposals. However, the bidder shall verify his own satisfaction that all material issued him is complete.

Should he discover that a page, sheet, etc., is missing, he shall notify the Engineer in writing and it will be forwarded to him. After bids have been submitted, no claims of ignorance of the requirements of bidding or of construction due to such missing material will be recognized.

4. Insurance

The Contractor shall include in his bid price, or prices, the cost of all insurance set forth in the "General Conditions" and the "Supplemental General Conditions".

Contractor shall provide insurance such that specified aggregate amounts for General Liability and Property Damage are available for this specific project.

Contractor shall require Sub-contractors, if any, not protected under Contractor's insurance policies to take out and maintain insurance in the same amounts as required of the Contractor. It is the intent of this action that the Contractor completely protect the Owner from damage suits resulting from Contractor's negligence.

5. Examination Of Bidders

Bidders shall carefully examine the entire site of the work and adjacent premises and the various means of approach to the site(s) and shall make all necessary investigations to inform themselves thoroughly as to the facilities for delivering, placing, and operating the necessary construction plant, and the facilities for delivering, placing and

operating the necessary construction system, and the facilities for delivering and installing the equipment specified and for handling materials at the site, and to inform themselves thoroughly as to all the difficulties that may be encountered in the complete execution of all work under the attached contracts, in accordance with the specifications and drawings.

Bidders are also required to examine the Contract Documents, Specifications, and Plans and any other data which may be on file in the office of the Engineer, for examination of bidders. No plea of ignorance of conditions that exist, or of conditions or difficulties that may be encountered in the execution of the work under this contract, as a result of failure to make the necessary examinations and investigations, will be accepted as an excuse for any failure or omission on the part of the Contractor to fulfill in every detail the requirements of said contract, specifications and drawings or will be accepted as basis for any claim whatsoever for extra compensation.

Upon application, all available information in the possession of the Engineer will be shown to the bidders, but the correctness of any such information is not guaranteed.

6. Local Features

The character and location of existing structures above and underground are not necessarily, entirely, or accurately shown on the plans, but are a matter of investigation by the Contractor, and such as are shown are merely indicative or typical of the nature of some of the existing structures which the Contractor may expect to observe or encounter.

It is expressly understood that no attempt has been made to show all underground objects on the plans, and that, if any such objects are indicated, their location and character are not necessarily known to be even approximately correct.

In case the subsurface conditions or objects encountered necessitate a change in the alignment which shall serve to delay work, the time allowed for completion of the Contract will be extended to the extent to which the delay shall have operated, the decision of the Engineer upon this point being final.

7. Excavation Classifications

Pipeline trench excavation is unclassified as set forth in Section 02222 of the Construction Specifications.

8. Pipe Bury Depth

The minimum bury depth for pipelines of the project is 36 inches. Refer to Section 13300, Part 3 of the construction specifications for additional requirements.

SPECIAL CONDITIONS

1. Existing Underground Utilities

Existing underground utilities may consist of gas lines, water lines, sewer lines and buried telephone cables. These utilities are not be completely located on the plans. The Contractor shall be responsible for determining the location of all underground utilities.

2. Local Electric Power

Electric power is available at the various sites shown on the plans, however, in order to insure that phase and voltage are correct, the Contractor is instructed to contact the local power company serving the specified area and re-check the power supply before submission of shop drawings for equipment requiring electric power.

3. Contract Descriptions, Completion Time and Liquidated Damages

The project contemplated by the Engineer's plans and these specifications consist of three (3) separate contract divisions of work to be completed on a furnish-and-install basis. Nothing within these contract documents shall be interpreted to relieve the Contractor from any responsibility for the storage, handling and protection of any and all materials and equipment, etc., which is required by the Bid Documents to be performed under the contract including furnishing and installing, but not limited to the following:

Division A-1 Contract

This Contract consists generally of furnishing and installing 3" and 4" water mains and related appurtenances, including, but not limited to: providing all mains, trenching, valves, stream and highway crossings, fittings, flushing hydrants, also installing thrust blocking, anchoring, connections to existing mains, rock removal, seeding, site clearing, special bedding, backfill, repairs to private property, service lines, pressure reducing units, service meters, encasement pipes, drive repairs, disinfection, flushing, system start-up and appurtenances, complete, all in accordance with the Engineer's plans, specifications and Bid Forms.

Division A-2 Contract

This Contract consists generally of furnishing and installing package water pumping stations, package pressure reducing stations, master meters, telemetry controls and central control units, 3", 4", 6" and 8" water mains and related appurtenances, including, but not limited to: providing all mains, trenching, valves, stream and highway crossings, fittings, flushing hydrants, also installing thrust blocking, anchoring, connections to existing mains, rock removal, seeding, site clearing, special bedding, backfill, repairs to private

property, railroad crossing, service lines, service meters, pressure reducing units, telemetry system, electric services and systems, pump tests, painting, concrete foundations, encasement pipes, drive repairs, disinfection, flushing, system start-up and appurtenances, complete, all in accordance with the Engineer's plans, specifications and Bid Forms.

Division B Contract

This Contract consists generally of furnishing and installing a standpipe water storage tank and appurtenances, including, but not limited to: concrete foundations, shop steel fabrication, piping, steel erection, painting, site work, chain link fence, disinfection, flushing and etc., complete, all in accordance with the Engineer's plans, specifications and Bid Forms.

Each separate division of work shall be completed within 270 calendar days, in accordance with, and as set forth in the notice to proceed issued for each contract division.

The amount of liquidated damages to be imposed on the separate division contract is as follows:

Division A-1 - Three Hundred Fifty Dollars (\$350.00)
Division A-2 - Three Hundred Fifty Dollars (\$350.00)
Division B - Three Hundred Fifty Dollars (\$350.00)

4. Special Requirements

Contractor shall conform to applicable Kentucky State Highway Commission Department of Transportation requirements, construction and material specifications, all applicable Carroll County Board of Health requirements and all applicable County Highway Department requirements.

5. Water For Testing

The Contractor requiring water to flush, test and sterilize shall coordinate their requirements with the Carroll County Water District No. 1, when using them as a source of water. All contractors shall be financially responsible to the supplier for the cost of providing the water. Cost of water shall be included in Contractor's total project cost. The Contractors' cost of water for flushing, testing and disinfection operations shall be \$1.50/1,000 gallons.

6. Project Signs

When construction begins, the General Contractor for Division A-1 and A-2 shall provide and erect two (2) project signs and the Division B Contractor shall provide and erect one (1) project sign at locations chosen by the Owner and shall include in general, the following:

- (a) The signs shall be constructed of 3/4 inch marine plywood, painted as indicated on the sign detail and maintained in good condition until completion of the project. The outside dimensions of the sign shall be 4'-0" vertical by 8'-0" horizontal, and be supported by and bolted to two 4" x 4" posts with the bottom of the sign at a point about four feet above the ground line.
- (b) The cost of providing the signs shall be included in the Contractor's total project cost.
- (c) The following information shall appear on the sign:

OWNER: CARROLL COUNTY WATER DISTRICT NO. 1
CARROLLTON, KENTUCKY 41008

PROJECT: WATER SYSTEM EXTENSION PROJECT OF 1997

FINANCED BY: RURAL ECONOMIC AND COMMUNITY DEVELOPMENT/RUS
UNITED STATES DEPARTMENT OF AGRICULTURE

ENGINEER: SIECO, INC., CONSULTING ENGINEERS
COLUMBUS, INDIANA
MICHIGAN CITY, INDIANA
LANCASTER, OHIO

CONTRACTORS: (as applicable)

- (d) Actual sign layout sketch specifying the size and spacing for lettering and symbols shall be submitted to the Engineer for approval prior to finish lettering and erection.
- (e) Sign layout to be in accordance with the detail - PROJECT SIGN, as per Supplemental General Conditions.

7. Stakes and Instructions

The Contractor shall provide personnel to assist the Engineer's representative in stake-out and locating any and all mains, tanks, equipment, meters, valves and in making measurements of completed work required for this project. All measured quantities shall be agreed to in writing by both parties prior to submittal for payment. The Contractor shall also furnish all hubs, nails, flags, and all appurtenances necessary to make all stakeouts and measurements required. The Engineer will provide a bench mark circuit and base line for vertical and horizontal control where required.

8. As-Built Information

It shall be the responsibility of the Resident Inspector, whether employed by the Engineer or the Owner, to submit to the Engineer a monthly list of as-built information. The list shall be compiled by

the Resident Inspector with the aid of the Contractor and shall be submitted with the Contractor's monthly Partial Payment Estimate.

9. Construction Within State, County or Township Road Rights-of-Way

The Owner shall provide all special drawings for permit applications and approvals for construction within State, County, or Township Road Rights-of-way.

It shall be the Contractor's responsibility, prior to construction and installation of water mains, within any State, County or Township Road Rights-of-Way, to verify that the governing agency has issued to the Owner necessary permits and approval for construction within the road rights-of-way. The Contractor shall also comply with all requirements and specifications of such governing agencies.

The Contractor shall have in his possession or have access to, at all times, a copy of the necessary permit(s), approval(s), and drawing(s) when working within the State, County, or Township Road Rights-of-Way.

All work performed and material and equipment furnished to complete the construction required within State Highway right-of-way as indicated on the Engineer's plans shall comply with the requirements of Kentucky Division of Transportation, Bureau of Highways. When the Contractor cuts or damage the existing State road surface, surface restoration shall be in accordance with Kentucky Department of Transportation, Bureau of Highways TD 99-13, Rev. 10-76. Drawing TD 99-13 included hereinafter as page SC-7.

When working in the highway rights-of-way, the Contractor shall include in his price for crossing and/or paralleling said highways, all work necessary in the right-of-way including grading and seeding as outlined in the specifications and the bid proposal.

10. Historical Preservation

If any archaeological material (skeletal, ceramic or lithic) features or sites are encountered during construction activities, the project engineer or his representative shall immediately notify the Kentucky Historic Preservation office at (502/564-7005).

It shall be the responsibility of each resident inspector whether employed by the Owner or Engineer to observe the excavation and construction and notify the project engineer of any suspected historic feature.

The cooperation of the General Contractor (and any subcontractor) is requested by Carroll County Water District No. 1, to fulfill their commitment in this regard.

Any delay or additional work caused or created due to the stopping of construction for Historical Investigation shall be reviewed and

considered in accordance with the General Conditions; specifically Sections 13 and 14 covering changes in work.

11. Construction Procedure and Priority

The Contractor shall submit a schedule for installation of all equipment and completion of all work included in the various trades, to the Engineer, for review and acceptance by the Owner prior to commencing work.

12. Basis of Award

The Contracts will be awarded to the lowest responsive, responsible bidder.

The lowest bidder will be determined by the lowest Total Base Bid, or Combination Bid if a Combination Bid is offered that is lower than the lowest Base Bids added together.

13. Bid Proposal Forms

The bid proposal must be properly and completely executed and submitted on the separate forms furnished by the Engineer.

Bids which are not signed by the individuals making the bid must have power of attorney attached.

The Owner reserves the right to adjust any and all quantities or delete any item set out in the Bid Proposal forms prior to awarding a contract. The Contractor shall make no claim to extra compensation for the reduction in contract amount necessitated by the reduction in quantities.

14. Environmental Impact Mitigation Measures

Normal construction shall be limited to daylight hours to minimize disturbance from noise and lights.

Contractor shall control all unnecessary noise.

Contractor shall control dust by wetting down or use of chemicals when necessary or requested by the Engineer.

Contractor shall provide temporary siltation control by minimizing disturbed areas and providing prompt temporary seeding, temporary sediment basin, straw bale barrier and silt fence where needed or requested by the Engineer.

Contractor shall provide permanent erosion control through suitable site drainage and finish grading, seeding, sodding and other structural erosion control measures as shown on the plans, specified herein or as necessary.

All disturbed areas including pipeline construction areas shall be restored to preconstruction conditions.

Contractor shall comply with all applicable OSHA and KDOT safety standards and regulations.

Contractor shall provide temporary sanitary facilities as specified and/or as required.

Contractor shall be in compliance with all Kentucky EPA and health department requirements.

Any wetlands that are crossed during construction shall have the existing surface elevations restored and existing surface material, including topsoil, plant roots, seeds, etc., shall be placed on top of the trench to promote regrowth of aquatic vegetation. No granular material shall be used in the pipe trench.

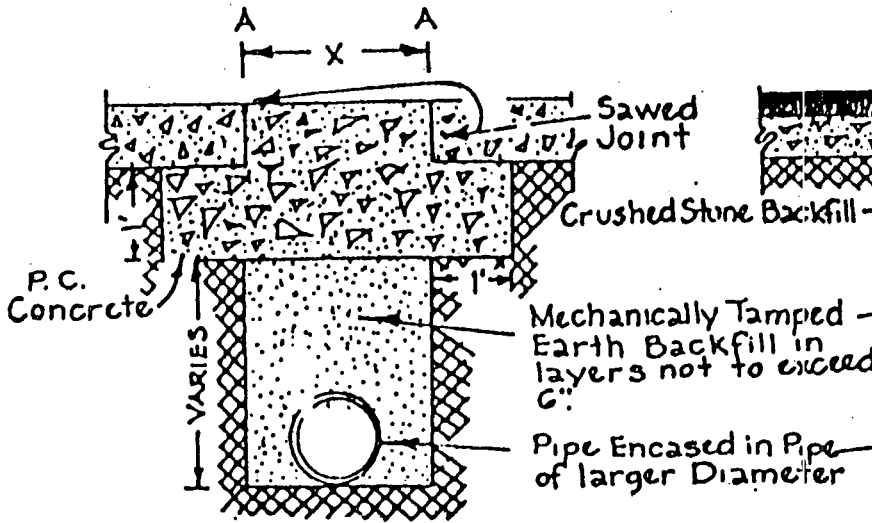
15. Fittings

All fittings used in this project shall be Class 350 ductile iron compact fittings (AWWA C153) with mechanical joint ends.

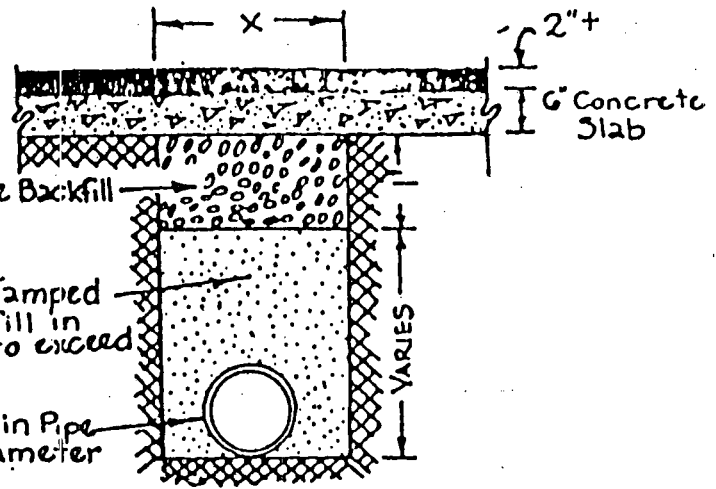
16. Federal Aviation Administration

The FAA has determined that the proposed construction of the structure of the water storage tank does not require notice to FAA. However, the determination does not include temporary construction equipment such as cranes, derricks, etc., which may be used during the actual construction of the project. Such equipment which has a height greater than the proposed structure and a height which would exceed the notice standards of Part 77 of the Federal Aviation Regulations requires separate notices. The Contractor shall be solely responsible for compliance with FAA regulations for construction equipment.

CONCRETE PAVEMENT



BITUMINOUS SURFACING 2" +

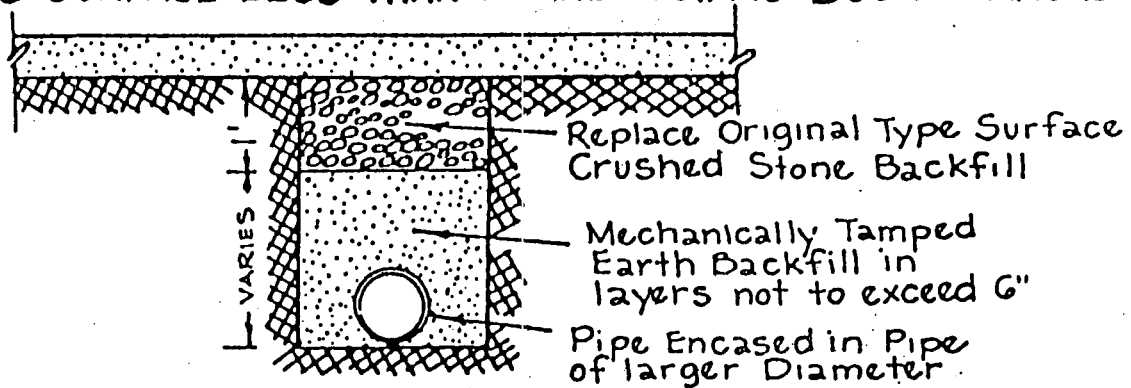


X = Width of Excavation

Replace Concrete Pavement with new pavement same thickness of existing pavement.

Replace Bituminous Pavement with same type and depth as existing pavement.

BITUMINOUS SURFACE LESS THAN 2" AND TRAFFIC BOUND MACADAM



NOTE:

From points "A" (Concrete Pavement) to distance to nearest joint or break in pavement must be six (6) feet, or more. If less than (6) feet, remove pavement to joint or break and replace entire slab.

Concrete slab under Bituminous Surface to extend 12 inches on each side, to trench.

KENTUCKY DEPT. OF TRANSPORTATION
BUREAU OF HIGHWAYS
DIVISION OF MAINTENANCE

Approved Methods of Surface Restoration or account of open trench pipe installation

RECOMMENDED BY W. W. Labury
DIRECTOR OF DIVISION OF MAINT.

APPROVED BY Geo. F. Kaysan
STATE HIGHWAY ENGINEER



500 Water Street, SC J180
Jacksonville, FL 32202-4467
(904) 359-1167
FAX (904) 359-3665

Kevin P. Foy
Manager
Contract Administration

June 15, 1998

Agreement No. CSX-032253

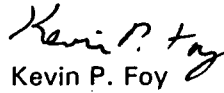
Mr. James L. Smith
Manager
Carroll County Water District No. 1
P. O. Box 350
Ghent, KY 41045

Dear Mr. Smith:

Attached is fully-executed original of Agreement No. CSX-032253 dated April 29, 1998, between CSX Transportation, Inc. and Carroll County Water District No. 1.

It is your responsibility to schedule the installation with CSXT Roadmaster, Telephone: (502) 732-5251 (ideally between the hours of 6:30 AM and 8:30 AM), FAX: (502) 732-8720, at least seven (7) days in advance of the date you desire to commence the project. No work is to be performed on Railroad property without Roadmaster's authorization.

Very truly yours,


Kevin P. Foy

PIPELINE CROSSING AGREEMENT

THIS AGREEMENT, Made as of April 29, 1998, by and between CSX TRANSPORTATION, INC., a Virginia corporation, whose mailing address is 500 Water Street, Jacksonville, Florida 32202, hereinafter called "Licensor" and CARROLL COUNTY WATER DISTRICT NO. 1, a corporation of the State of Kentucky, whose mailing address is P.O. Box 350, Ghent, KY 41045, hereinafter called "Licensee", WITNESSETH:

WHEREAS, Licensee desires to maintain a certain pipeline or duct work, solely for the transmission of potable water, hereinafter called "Pipeline" under or across the track(s) and property owned or controlled by Licensor at or near Worthville, County of Carroll, State of Kentucky, located at Valuation Station 3024+80, Milepost 00T-54.07, Louisville Cincinnati Subdivision, hereinafter called the "Crossing"; as shown on print of Licensee's Drawing KF032253, dated April 22, 1998, attached hereto and made a part hereof; other details and data pertaining to said Pipeline being as indicated on Licensee's Application Form, dated April 22, 1998, also attached hereto and made a part hereof:

NOW, THEREFORE, in consideration of the mutual covenants, conditions, terms and agreements herein contained, the parties hereto agree and covenant as follows:

1. LICENSE:

1.1 Licensor, insofar as it has the legal right, power and authority to do so, and its present title permits, and subject to:

(A) Licensor's present and future right to occupy, possess and use its property within the area of the Crossing for any and all purposes;

(B) All encumbrances, conditions, covenants, easements, and limitations applicable to Licensor's title to or rights in the subject property; and

(C) Compliance by Licensee with the terms and conditions herein contained;

does hereby license and permit Licensee to maintain, repair, renew, operate, use, alter or change said Pipeline at the Crossing above for the term herein stated, and to remove same upon termination.

1.2 The term Pipeline, as used herein, shall include only the pipes, ducts, casing, vents, manholes, connectors, fixtures, appliances and ancillary facilities devoted exclusively to the transmission usage above within the Crossing, and as shown on attached Application Form.

1.3 No additional Pipeline or Wireline or other facilities shall be placed, allowed or maintained by Licensee in, upon or on the Crossing except upon prior separate written consent of Licensor.

2. LICENSE FEE; TERM:

2.1 In lieu of annual payments and in consideration of Licensor's waiver of future fee increases, Licensee shall pay Licensor a one-time nonrefundable License Fee of ONE THOUSAND FIVE HUNDRED AND 00/100 U.S. DOLLARS (\$1,500.00) upon execution of this Agreement.

2.2 However, Licensee assumes sole responsibility for, and shall pay directly (or reimburse Licensor), any additional annual taxes and/or periodic assessments levied against Licensor or Licensor's property solely on account of said Pipeline or Crossing.

2.3 Effective Date of this Agreement shall be the date first written above. License shall be revocable only in the event of Licensee's default, as herein provided, but shall also terminate upon (a) Licensee's cessation of use of the Pipeline or Crossing for the purpose(s) above, (b) removal of the Pipeline, and/or (c) subsequent mutual consent.

3. MAINTENANCE AND REPAIRS:

3.1 Licensee shall maintain, relocate, repair, renew, alter, and/or remove said Pipeline, in a prudent, workmanlike manner, using quality materials and complying with any applicable standard(s) or regulation(s) of Licensor (A.R.E.A. Specifications), Licensee's particular industry, and/or any governmental or regulatory body having jurisdiction over the Crossing or Pipeline.

3.2 Location and construction of Pipeline shall be made strictly in accordance with design(s) and specifications furnished to, and approved by, Licensor and of the material(s) and size(s) appropriate for the purpose(s) above recited.

3.3 All Licensee's work and exercise of rights hereunder shall be undertaken at time(s) satisfactory to Licensor and so as to eliminate or minimize any impact on, or interference with, the safe use and operation of Licensor's track(s).

3.4 In the installation and/or maintenance of said Pipeline, Licensee shall not use explosives of any type or perform or cause any blasting without the separate express written consent of Licensor. As a condition to such consent, a representative will be assigned by Licensor to monitor blasting, and Licensee shall reimburse Licensor for the entire cost and/or expense of furnishing said monitor.

3.5 Any repairs or maintenance to Pipeline, whether resulting from acts of Licensee, or natural or weather events, which are necessary to protect or facilitate Licensor's use of its property, shall be made by Licensee promptly, but in no event later than thirty (30) days after Licensee has notice as to the need for such repairs or maintenance.

3.6 Licensor, in order to protect or safeguard its property, rail operations, equipment and/or employees from damage or injury, may request

immediate repair or renewal of the Pipeline, and if the same is not performed, may make or contract to make such repairs or renewals, at the sole risk, cost and expense of Licensee.

3.7 Neither the failure of Licensor to object to any work done, material used, or method of construction or maintenance of said Crossing, nor any approval given or supervision exercised by Licensor, shall be construed as an admission of liability or responsibility by Licensor, or as a waiver by Licensor of any of the obligations, liability and/or responsibility of Licensee under this Agreement.

3.8 Licensee hereby agrees to reimburse Licensor any loss, cost or expense (including losses resulting from train delays and/or inability to meet train schedules) arising from any failure of Licensee to make or from improper or incomplete repairs or maintenance to Pipeline or Crossing.

4. PERMITS, LICENSES:

4.1 Before any work hereunder is performed, or before use of the Crossing for the contracted purpose, Licensee, at its sole cost and expense, shall obtain all necessary permit(s) (including but not limited to zoning, building, construction, health, safety or environmental matters), letter(s) or certificate(s) of approval. Licensee expressly agrees and warrants that it shall conform and limit its activities to the terms of such permit(s), approval(s) and authorization(s), and shall comply with all applicable ordinances, rules, regulations, requirements and laws of any governmental authority (state, federal or local) having jurisdiction over Licensee's activities, including the location, contact, excavation and protection regulations of the Occupational Safety and Health Act (OSHA) (20 CFR 1926.651(b), et al.), and State "One Call" - "Call Before You Dig" requirements.

4.2 Licensee assumes sole responsibility for failure to obtain such permit(s) and approval(s), for any violations thereof, or for costs or expenses of compliance or remedy.

5. MARKING AND SUPPORT:

5.1 With respect to any subsurface installation upon Licensor's property, Licensee, at its sole cost and expense, shall:

(A) Support track(s) and roadbed of Licensor, in a manner satisfactory to Licensor;

(B) Backfill with satisfactory material and thoroughly tamp all trenches to prevent settling of surface of land and roadbed of Licensor; and

(C) Either remove any surplus earth or material from Licensor's property or cause said surplus earth or material to be placed and distributed at location(s) and in such manner as Licensor may approve.

5.2 After construction of Pipeline, Licensee shall:

(A) Restore said track(s), roadbed and other disturbed property of Licensor to a condition satisfactory to Licensor; and

(B) Erect, maintain and periodically verify the accuracy of aboveground markers, in a form approved by Licensor, indicating the location, depth and ownership of Pipeline or related facilities.

5.3 Licensee shall be solely responsible for any subsidence or failure of lateral or subjacent support in the Crossing area for a period of three (3) years after completion of installation.

6. TRACK CHANGES:

6.1 In the event that Licensor's rail operations and/or track maintenance result in changes in grade or alignment of, additions to, or relocation of Licensor's track(s) or other facilities, or in the event future use by Licensor of right-of-way and property necessitate any change of location, height or depth of Pipeline or Crossing, Licensee, at its sole cost and expense and within thirty (30) days after notice in writing from Licensor, shall make changes in Pipeline or Crossing to accommodate Licensor's track(s) or operations.

6.2 If Licensee fails to do so, Licensor may make such changes at Licensee's cost.

7. PIPE CHANGES:

7.1 Licensee shall periodically monitor and verify the depth or height of Pipeline and Crossing in relation to Licensor's tracks and facilities, and shall relocate Pipeline or change Crossing, at Licensee's expense, should such relocation or change be necessary to comply with the minimum clearance requirements of this Agreement or any public authority.

7.2 If Licensee undertakes to revise, renew, relocate or change in any manner whatsoever all or any part of Pipeline (including any change in circumference, diameter or radius of pipe or change in materials transmitted in and through said pipe), or is required by any public agency or court order to do so, plans therefor shall be submitted to Licensor for approval before any such change is made. After approval the terms and conditions of this Agreement shall apply thereto.

8. INTERFERENCE WITH RAIL FACILITIES:

8.1 Although the Pipeline/Crossing herein permitted may not presently interfere with Licensor's railroad operations or facilities, in the event that the operation, existence or maintenance of said Pipeline, in the sole judgment of Licensor, causes: (a) interference (physical, magnetic or otherwise) with Licensor's communication, signal or other wires, powerlines, train control system, or other facilities; or (b) interference in any manner with the operation, maintenance or use by Licensor of its right-of-way, track(s), structures, pole lines, devices, other property, or any appurtenances thereto;

then, and in either event, Licensee, upon receipt of written notice from Licensor of any such interference, and at Licensee's sole risk, cost and expense, shall promptly make such changes in its Pipeline as may be required in the judgment of Licensor to eliminate all such interference. Upon Licensee's failure to remedy or change, Licensor may do so or contract to do so, at Licensee's sole cost.

8.2 Without assuming any duty hereunder to inspect Licensee's Pipeline, Licensor hereby reserves the right to inspect same and to require Licensee to undertake necessary repairs, maintenance or adjustments to Pipeline, which Licensee hereby agrees to make promptly, at Licensee's sole cost and expense.

9. RISK; LIABILITY, INDEMNITY:

With respect to the relative risk and liabilities of the parties, it is hereby agreed that:

9.1 Licensee hereby assumes, and shall at all times hereafter release, indemnify, defend and save Licensor harmless from and against any and all liability, loss, claim, suit, damage, charge or expense which Licensor may suffer, sustain, incur or in any way be subjected to, on account of death of or injury to any person whomsoever (including officers, agents, employees or invitees of Licensor), and for damage to or loss of or destruction of any property whatsoever within or adjacent to the Crossing, arising out of, resulting from, or in any way connected with the presence, existence, operations or use of Pipeline or any structure in connection therewith, or restoration of premises of Licensor to good order or condition after removal, EXCEPT when proven to have been caused solely by the fault or negligence of Licensor. HOWEVER, during any period of actual repair, maintenance, replacement or removal of the Pipeline, when equipment, agents or personnel of Licensee are on the railroad right-of-way, Licensee's liability hereunder shall be absolute, irrespective of any joint, sole or contributory fault or negligence of Licensor.

9.2 Use of Licensor's right-of-way involves certain risks of loss or damage as a result of Licensor's rail operations. Notwithstanding Section 9.1, Licensee expressly assumes all risk of loss and damage to Licensee's Property and Pipeline on the Crossing, including loss of or any interference with use or service thereof, regardless of cause, including electrical field creation, fire or derailment arising out of Licensor's rail operations. For this Section, the term "Licensee's Property" shall include contents of Pipeline as well as property of third parties situated or placed upon Licensor's right-of-way by Licensee or by such third parties at request of or for benefit of Licensee.

9.3 Notwithstanding Section 9.1, Licensee also expressly assumes all risk of loss which may result from Licensee's failure to maintain either the required clearances for any overhead Pipeline or the required depth and encasement for any underground Pipeline, regardless of any contributory negligence or joint fault of Licensor.

9.4 Notwithstanding Section 9.1 or any other provision herein, Licensee assumes all responsibility for, and agrees to defend, indemnify and hold Licensor harmless from: (a) all claims, costs and expenses, including reasonable attorneys' fees, as a consequence of any sudden or nonsudden pollution of air,

water, land and/or ground water on or off the Crossing area, arising from or in connection with the use of this Crossing or resulting from leaking, bursting, spilling, or any escape of the material transmitted in or through said Pipeline; (b) any claim or liability arising under federal or state law dealing with either such sudden or nonsudden pollution of air, water, land and/or ground water arising therefrom or the remedy thereof; and (c) any subsidence or failure of subjacent or lateral support of Licensor's tracks arising from such Pipeline leakage, etc.

9.5 Obligations of Licensee hereunder to release, indemnify and hold Licensor harmless shall also extend to officers, agents and employees of Licensor, and to companies and other legal entities that control or are controlled by or subsidiaries of or are affiliated with Licensor, and their respective officers, agents and employees.

9.6 If a claim is made or action is brought against Licensor, for which Licensee may be responsible hereunder in whole or in part, Licensee shall be notified to assume the handling or defense of such claim or action; but Licensor may participate in such handling or defense.

10. INSURANCE:

10.1 Prior to commencement of surveys, installation or occupation of Premises pursuant to this Agreement, Licensee shall procure and shall maintain during the continuance of this Agreement, at its sole cost and expense, a policy of Commercial General Liability Insurance (CGL), naming Licensor as additional insured and covering liability assumed by Licensee under this Agreement. A coverage limit of not less than THREE MILLION DOLLARS (\$3,000,000) Combined Single Limit per occurrence for bodily injury liability and property damage liability is currently recommended as a prudent limit to protect Licensee's assumed obligations. The evidence of insurance coverage shall be endorsed to provide for thirty (30) days' notice to RAILROAD prior to cancellation or modification of any policy.

10.2 If said CGL insurance policy(ies) do(es) not automatically cover Licensee's contractual liability during periods of survey, installation, maintenance and continued occupation, a specific endorsement adding such coverage shall be purchased by Licensee. If said CGL policy is written on a "claims made" basis instead of a "per occurrence" basis, Licensee shall arrange for adequate time for reporting losses. Failure to do so shall be at Licensee's sole risk.

10.3 Securing such insurance shall not limit Licensee's liability under this Agreement, but shall be security therefor.

10.4 Licensor may at any time request evidence of insurance purchased by Licensee to comply with this Agreement. Failure of Licensee to comply with Licensor's request shall be considered a default by Licensee.

10.5 Notwithstanding Sections 10.1 through 10.4, specifically to cover construction and/or demolition activities within fifty (50) feet of any operated railroad track(s) or affecting any railroad bridge, trestle, tunnel, track(s), roadbed, overpass or underpass, Licensee shall pay to Licensor the sum of TWO

HUNDRED FIFTY AND 00/100 U.S. DOLLARS (\$250.00) to cover the cost of adding this Crossing to Licensor's Railroad Protective Liability (RPL) Policy for the period of actual construction.

11. GRADE CROSSINGS; FLAGGING:

11.1 Nothing herein contained shall be construed to permit Licensee or Licensee's contractor(s) to move any vehicles or equipment over track(s) of Licensor, except at public road crossing(s), without separate written consent of Licensor (CSXT Form 7422).

11.2 If Licensor deems it advisable, during the maintenance, repair, renewal, alteration, change or removal of said Pipeline, to place watchmen, flagmen, inspectors or supervisors for protection of operations of Licensor or others on Licensor's property at the Crossing, and to keep persons, equipment and materials away from Licensor's track(s), Licensor shall have the right to do so at the expense of Licensee, but Licensor shall not be liable for failure to do so.

11.3 Subject to Licensor's consent and to Licensor's Railroad Operating Rules and existing labor agreements, Licensee may provide flagmen, watchmen, inspectors or supervisors, during all times of construction, at Licensee's sole risk and expense; and in such event, Licensor shall not be liable for the failure or neglect of such watchmen, flagmen, inspectors or supervisors.

12. LICENSOR'S COSTS:

12.1 Any additional or alternative costs or expenses incurred by Licensor to accommodate Licensee's continued use of Licensor's property as a result of Track Changes or Pipe Changes shall also be paid by Licensee.

12.2 Licensor's expense for wages ("force account" charges) and materials for any work performed at the expense of Licensee pursuant hereto shall be paid by Licensee within thirty (30) days after receipt of Licensor's bill therefor.

12.3 Such expense shall include, but not be limited to, cost of railroad labor and supervision under "force account" rules, plus current applicable overhead percentages, the actual cost of materials, and insurance, freight and handling charges on all materials used. Equipment rentals shall be in accordance with Licensor's applicable fixed rate(s).

12.4 All undisputed bills or portions of bills not paid within said thirty (30) days shall thereafter accrue interest at twelve percent (12%) per annum, unless limited by local law, and then at the highest rate so permitted. Unless Licensee shall have furnished detailed objections to such bills within said thirty (30) days, bills shall be presumed undisputed.

13. DEFAULT, BREACH, WAIVER:

13.1 The proper and complete performance of each covenant of this Agreement shall be deemed of the essence thereof, and in the event Licensee fails or refuses to fully and completely perform any of said covenants or remedy any

breach within thirty (30) days after receiving a written notice from Licensor to do so (or within forty-eight (48) hours in the event of notice of a railroad emergency), Licensor shall have the option of immediately revoking this Agreement and privileges and powers hereby conferred, regardless of license fee(s) having been paid in advance for any annual or other period. Upon such revocation, Licensee shall make removal in accordance with Article 14.

13.2 No waiver by Licensor of its rights as to any breach of covenant or condition herein contained shall be construed as a permanent waiver of such covenant or condition, or any subsequent breach thereof, unless such covenant or condition is permanently waived in writing by Licensor.

14. TERMINATION, REMOVAL:

14.1 All rights which Licensee may have hereunder shall cease upon the date of (a) termination, (b) revocation, (c) subsequent agreement, or (d) Licensee's removal of Pipeline from the Crossing. However, neither termination nor revocation of this Agreement shall affect any claims and liabilities which have arisen or accrued hereunder, and which at the time of termination or revocation have not been satisfied; neither party, however, waiving any third party defenses or actions.

14.2 Within thirty (30) days after revocation or termination, Licensee at its sole risk and expense, shall (a) remove Pipeline from the right-of-way of Licensor, unless the parties hereto agree otherwise, (b) restore property of Licensor in a manner satisfactory to Licensor, and (c) reimburse Licensor any loss, cost or expense of Licensor resulting from such removal.

15. NOTICE:

15.1 Licensee shall give Licensor's Division Engineer (1701 East Market Street - Box 610, Jeffersonville, IN 47130-0610) at least five (5) days' written notice before doing any work of any character on Licensor's right-of-way, except that in cases of emergency shorter notice may be given to said Division Engineer.

15.2 All other notices and communications concerning this Agreement shall be addressed to Licensee at the address above, and to Licensor at the address above, c/o CSXT Contract Administration, J180; or at such other address as either party may designate in writing to the other.

15.3 Unless otherwise expressly stated herein, all such notices shall be in writing and sent via Certified or Registered Mail, Return Receipt Requested, or by Courier, and shall be effective upon: (a) actual receipt, or (b) date of refusal of such delivery.

16. ASSIGNMENT:

16.1 The rights herein conferred are the privilege of Licensee only, and Licensee shall obtain Licensor's prior written consent to any assignment of Licensee's interest herein; said consent shall not be unreasonably withheld.

16.2 Subject to Sections 2.2 and 16.1, this Agreement shall be binding upon and inure to the benefit of the parties hereto and their respective successors or assigns.

16.3 Licensee shall give Licensor notice of any legal succession (by merger, consolidation, reorganization, etc.) or other change of legal existence or status of Licensee, with a copy of documents attesting to such change or legal succession, within thirty (30) days thereof.

16.4 Licensor expressly reserves the right to assign this Agreement, in whole or in part, to any grantee or vendee of Licensor's underlying property interests in the Crossing, upon notice thereof to Licensee.

16.5 In the event of any unauthorized sale, transfer, assignment, sublicense or encumbrance of this Agreement, or any of the rights and privileges hereunder, Licensor, at its option, may immediately revoke this Agreement, by giving Licensee or any such assignee written notice of such revocation; and Licensee shall reimburse Licensor for any loss, cost or expense Licensor may incur as a result of Licensee's failure to obtain said consent.

16.6 In the event of sale or other conveyance by Licensor of its Right-of-Way, across, under or over, which the Crossing(s) is constructed, Licensor's conveyance shall be made subject to the right of Licensee to continue to occupy the Crossing on the specific segment of Right-of-Way, and to operate, maintain, repair, renew thereon and to remove therefrom the facilities of Licensee, subject to all other terms of this Agreement.

17. TITLE; LIENS, ENCUMBRANCES:

17.1 Licensee shall not at any time own or claim any right, title or interest in or to Licensor's property occupied by Licensee's Pipeline, nor shall the exercise of this Agreement for any length of time give rise to any right, title or interest in Licensee to said property other than the license herein created.

17.2 Nothing herein shall be deemed to act as any warranty, guarantee, or representation of the quality of title of the Rail Right-of-Way or Corridor occupied or used under this Agreement. Further, Licensee shall not have or make any claims against Licensor for damages on account of any failure or insufficiency or deficiencies in title to such Rail Right-of-Way or Corridor or any portion thereof covered by this Agreement.

17.3 Nothing in this Agreement shall be deemed to give, and Licensor hereby expressly waives, any claim of ownership in and to any part of Licensee's Pipeline.

17.4 Licensee shall not create or permit any mortgage, pledge, security, interest, lien or encumbrances, including without limitation, tax liens and liens or encumbrances with respect to work performed or equipment furnished in connection with the construction, installation, repair, maintenance or operation of Licensee's pipeline in or on any portion of the Crossing (collectively, "Liens

or Encumbrances"), to be established or remain against the Crossing or any portion thereof or any other Licensor property.

17.5 In the event that any property of Licensor becomes subject to such Liens or Encumbrances, Licensee agrees to pay, discharge or remove the same promptly upon Licensee's receipt of notice that such Lien or Encumbrances has been filed or docketed against the Crossing or any other property of Licensor; however, Licensee reserves the right to challenge, at its sole expense, the validity and/or enforceability of any such Liens or Encumbrances.

18. GENERAL PROVISIONS:

18.1 This Agreement, and the attached specifications, contains the entire understanding between the parties hereto.

18.2 Neither this Agreement, any provision hereof, nor any agreement or provision included herein by reference, shall operate or be construed as being for the benefit of any third person.

18.3 Neither the form of this Agreement, nor any language herein, shall be interpreted or construed in favor of or against either party hereto as the sole drafter thereof.

18.4 This Agreement is executed under current interpretation of applicable federal, state, county, municipal or other local statute, ordinance or law(s). However, each separate division (paragraph, clause, item, term, condition, covenant or agreement) hereof shall have independent and severable status for the determination of legality, so that if any separate division is determined to be void or unenforceable for any reason, such determination shall have no effect upon the validity or enforceability of each other separate division, or any combination thereof.

18.5 This Agreement shall be construed and governed by the laws of the state in which the Pipeline and Crossing is located.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement in duplicate (each of which shall constitute an original) as of the date and year first above written.

Witness for Licensor:

Kevin P. Toy

CSX TRANSPORTATION, INC.

By: Sheila W. Bazar

Print/Type Name: Sheila W. Bazar

Print/Type Title: Director Property Services

Witness for Licensee:

Stephen D. Terry
STEPHEN D. TERRY, SEC'Y

CARROLL COUNTY WATER DISTRICT NO. 1

By: Dennis N. Crawford

Who, by the execution hereof, affirms that he/she has the authority to do so and to bind the Licensee to the terms and conditions of this Agreement.

Print/Type Name: DENNIS N. CRAWFORD

Print/Type Title: CHAIRMAN

Social Security Number or Tax

Identification Number: 610658004

APPLICATION FOR PIPELINE CROSSING UNDER/OVER PROPERTIES AND TRACK

(For RR Use) Division LOUISVILLE Subdivision LOUISVILLE - CINCINNATI Val Sec. (Map) V23295

Location: Val. Sta. 3024 + 79.8 Milepost DOT 54 .07

Application and plans must be approved and written authority received from the Railroad Company before construction is begun. Original and one copy of both application and drawing, along with a nonrefundable Application Fee in the amount of \$300.00 should be submitted to: CSX Transportation, Property Services J180, 500 Water Street, Jacksonville, FL 32202.

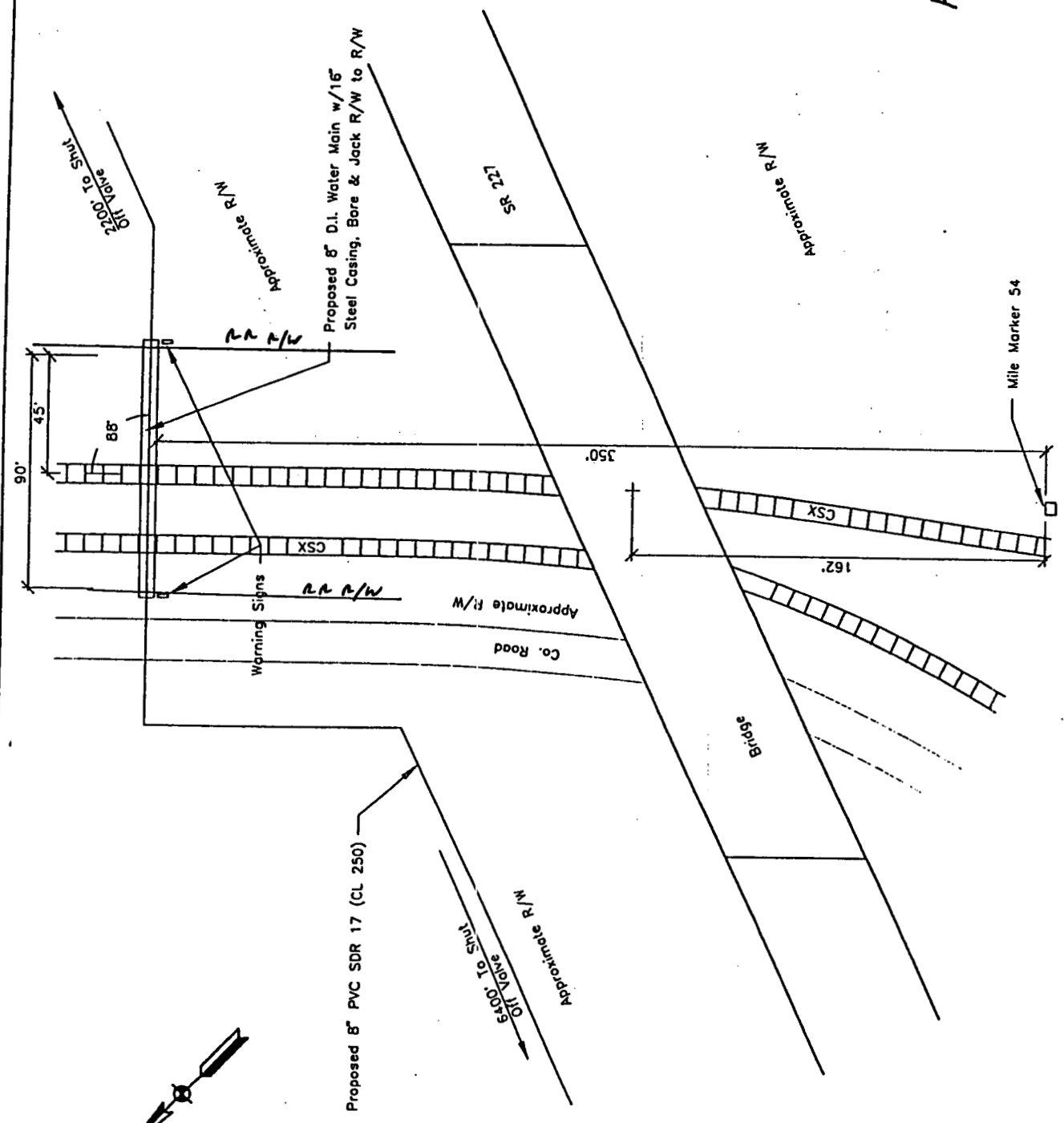
- 1 Reference/File Number: _____
 - 2 Complete Legal Name of applicant: CARROLL COUNTY WATER DISTRICT #1
 Company Contact Name: JAMES L. SMITH Title: MANAGER
 Telephone: (502) 347-9470 Fax: (502) 347-9333
 3. Address: P.O. Box 350 City: Ghent State: KY Zip: 41045
 4. Type of business: _____ Individual, _____ Developer, _____ Municipality, NON-PROFIT Corporation, (State in which incorporated: KY), _____ Partnership, (type and state of Partnership _____)
 5. Location: 350 feet NE (direction) from Railroad Milepost NO. 54
MILEMARKER LOCATED 162 FEET SW OF HWY 227 AT WORTHVILLE
 - Valuation Station of Crossing if known: _____ Val. Map No. _____
 6. Town: Worthville County: CARROLL State: KY
 7. Angle of crossing: 88°
 8. Temporary track support or rripping required? Yes _____ No X (Describe and Detail on Drawing)
 9. Wires, poles, obstructions to be relocated? Yes _____ No X (Describe and Detail on Drawing)
 10. Product to be conveyed POTABLE WATER Flammable? Yes _____ No X Temperature 55°-60 DEG.
 11. Max. Working Pressure 143 PSI. Field Test Pressure 300 PSI. Type Test HYDRO - Pass.
 12. Location of shut-off valves 6400' NW & 2200' SE OF R/W LINE DISPLACEMENT PUMP
 13. Number of manholes located on Railroad Right-of-Way: _____
 14. PIPE SPECIFICATIONS:
- | | CARRIER PIPE: | CASING PIPE: |
|--|-----------------------------------|--------------------------|
| Material | <u>CAST DUCTILE IRON (CL51)</u> | <u>STEEL (SCH 20)</u> |
| Material Specifications & Grade | <u>AWWA C-150 & C-151</u> | <u>GRADE B - CARBON</u> |
| Minimum Yield Strength of Material PSI | <u>42,000</u> | <u>35,000</u> |
| Inside Diameter | <u>8.55"</u> | <u>15.5</u> |
| Wall Thickness | <u>0.25"</u> | <u>0.25</u> |
| Outside Diameter | <u>9.05"</u> | <u>16</u> |
| Type of Seam | <u>NONE</u> | <u>SPIRAL WELD</u> |
| Kind of Joints | <u>PUSH ON, BELL & SPIGOT</u> | <u>ASTM A139, WELDED</u> |
| Total Length Within Railroad Right-of-Way | <u>90'</u> | <u>90'</u> |
| Vents: Number <u>ONE</u> Size <u>4"</u> Height above ground <u>48"</u> | | |
| Seals: Both ends <u>YES</u> One end _____ | | |
| Bury: Base of rail to top of casing <u>6'</u> feet, <u>0"</u> inches, Bury (Not beneath tracks) _____ feet, _____ inches | | |
| Bury: (Below ditches) <u>3</u> feet, <u>0</u> inches | | |
| CATHODIC PROTECTION: Yes _____ No <u>X</u> | | |
| PROTECTIVE COATING: Yes <u>X</u> No _____ Kind <u>BITUMASTIC</u> | | |

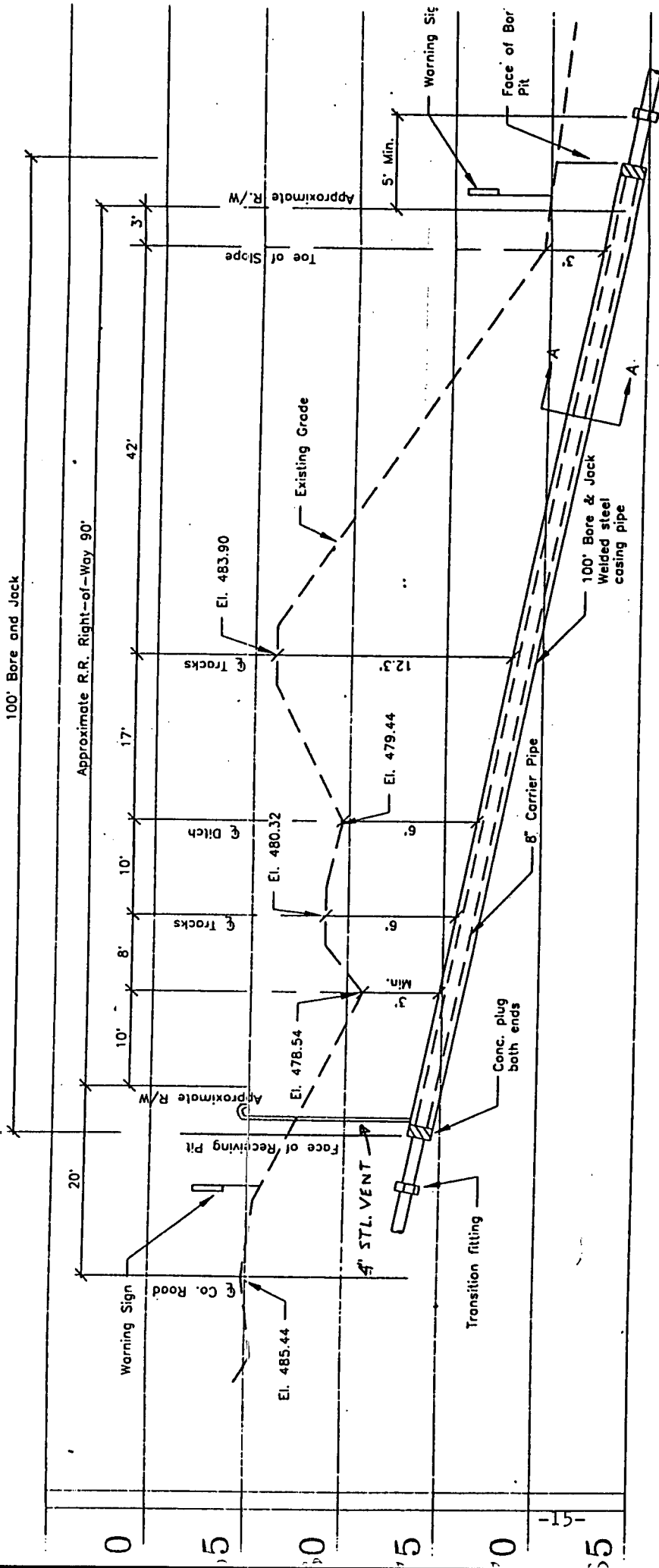
Proposal and construction must be in accordance with CSXT's Specifications, The American Railway Engineering Association, and any governing laws or regulations. Please note that although the specifications furnished in the Pipeline Application Package are to be used as a guideline only, CSXT reserves the right to approve or decline an application.

Date APR 22, 1998 Signature & Title of Officer Making Application Dennis Crawford, Chairman

Please Type or Print: DENNIS CRAWFORD CHAIRMAN (502) 347-9500
 Name Title Telephone Number

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PAGE 1 OF 5





Railroad Crossing - Water Main

Scale: 1" Vert. = 5' 1" Horz. = 10'

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 4-22-1998
 PAGE 2 OF 5

PIPE DATA		
	CARRIER PIPE	CASING PIPE
Contents to be handled	Potable water	8"
Normal Operating Pressure	Nor. 91# Max. 143#	N/A
Nominal Size of Pipe	8"	16"
Outside Diameter	9.05"	16"
Inside Diameter	8.55"	15.5"
Wall Thickness	0.25"	0.25"
Weight per Foot	22.1 lbs.	42.05 lbs
Material	D.I.	Steel
Process of Manufacture	Centrifugally cast in metal molds	Spiral Weld
Specification	AWWA C-151 and C-150	AWWA C-200 ASTM A135
Grade or Class	Class 51	Grade B
Test Pressure	350 psi	N/A
Type of Joint	Push-on joint	Welded
Type of Coating	Bitumastic	Bitumastic
Details of Cathodic Protection	None	None
Details of Seal or Protection at ends of casing	N/A	Concrete Copped
Method of installation	Push in on skids	Bore and Jack
Character of Subsurface Material at the Crossing Location		
Approximate Ground Water Level		
Source of Information on Subsurface conditions (Borings, Test Pits or Other)		

NOTE:

1. Steel casing pipe shall be made of smooth wall steel with a minimum yield strength of 35,000 psi with a 0.375" wall thickness, then exterior

KF 32253

4-22-1998

PAGE 3 OF 5

NOTE:

1. Steel casing pipe shall be made of smooth wall steel with a minimum yield strength of 35,000 psi with a 0.375" wall thickness, then exterior surfaces shall have a bituminous protective coating.
2. Push-on joint pipe and fittings to be used inside each casing pipe and to a point 5' out from the end of the casing.
3. Warning sign(s) both sides of railroad right-of-way to be a durable, weatherproof sign located over centerline of water main and showing the following information:
 1. Name and address of owner
 2. Contents of pipe
 3. Pressure in pipe
 4. Depth below grade at point of sign
 5. Emergency telephone number in case of pipe rupture.
4. Carrier pipe as shown shall be furnished and installed and cost included in unit price for the casing length.
5. Pipe line and crossing to be installed and maintained in accordance with latest approved AMERICAN RAILWAY ENGINEERING ASSOCIATION'S "Specifications for pipelines for Conveying Flammable and Non-Flammable Substances".

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000 psi with a
then exterior
bituminous

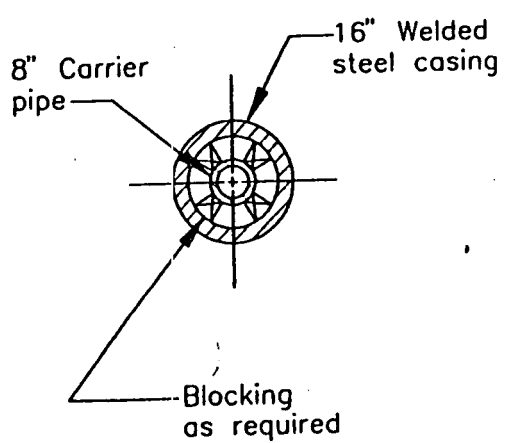
and fittings
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sides of railroad right-of-way to be
of sign located over centerline of
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Section A-A

KF032253
4-22-1998
PAGE 5 OF 5

CHECKLIST FOR SUBMITTING BID

Project: CARROLL COUNTY WATER DISTRICT NO. 1
WATER SYSTEM EXTENSIONS PROJECT OF 1997

Bid Date: March 23, 1999 - 1:00 P.M.

- _____ 1. Division Bid Form and Schedule
- _____ 2. A properly executed and notarized Non-Collusion Affidavit included as part of your bid.
- _____ 3. A Bid Bond, properly signed by the bidder, and its surety, or cashier's check or certified check in the sum of at least 5% of amount bid included as part of your bid.
- _____ 4. Preliminary tank and foundation design submittal required for Division B only.

BID

Proposal of _____ (hereinafter called "BIDDER"), organized and existing under the laws of the State of _____ doing business as _____*. To the Carroll County Water District No. 1, (hereinafter called "OWNER").

In compliance with your Advertisement for Bids, BIDDER hereby proposes to perform all WORK for the construction of Division A-1 - Water Main Extensions Project of 1997, in strict accordance with the CONTRACT DOCUMENTS, within the time set forth therein, and at the prices stated below.

By submission of this BID, each BIDDER certifies, and in the case of a joint BID each party thereto certifies as to his own organization, that this BID has been arrived at independently, without consultation, communication, or agreement as to any matter relating to this BID with any other BIDDER or with any competitor.

BIDDER hereby agrees to commence WORK under this contract on or before a date to be specified in the NOTICE TO PROCEED and to fully complete the PROJECT within 270 consecutive calendar days thereafter. BIDDER further agrees to pay as liquidated damages, the sum of \$350.00 for each consecutive calendar day thereafter as provided in Section 15 of the General Conditions.

BIDDER acknowledges receipt of the following ADDENDUM:

Bids shall include sales tax and all other applicable taxes and fees.

**Insert "a corporation", "a partnership", or "an individual" as applicable.*

BID SCHEDULE
for the
DIVISION A-1 - Water Mains Extension Project of 1997
for
CARROLL COUNTY WATER DISTRICT NO. 1
CARROLL COUNTY, KENTUCKY

Item	Description	Unit Price	Estimated Quantity	Total Price
Furnish and install, complete, including necessary fittings, and restoration to preconstruction conditions, the following water mains, per foot:				
1.	4" PVC, SDR 21, per foot:	\$	22,300'	\$
2.	3" PVC, SDR 13.5, per foot:	\$	2,600'	\$
3.	3" PVC, SDR 17, per foot:	\$	9,500'	\$
4.	3" PVC, SDR 21, per foot:	\$	21,400'	\$
5.	1" P.E. Service Pipe, per foot:	\$	3,000'	\$
6.	6" Gate Valve and Box, each:	\$	1	\$
7.	4" Gate Valve and Box, each:	\$	6	\$
8.	3" Gate Valve and Box, each:	\$	7	\$
9.	4" Main Air Release Valve, each:	\$	2	\$
10.	3" Main Air Release Valve, each:	\$	1	\$
11.	2" Flush Hydrant including 2" valve and box, and fittings, each:	\$	7	\$
12.	Furnish and install Detectable Flagging, per lineal foot:	\$	55,800'	\$
Bore under asphalt and concrete drives and roads and placing carrier pipe in boring hole, with carrier pipe to be paid for by unit price in trench, per lineal foot, for the following pipe sizes:				
13.	4" Water Main:	\$	330'	\$
14.	3" Water Main:	\$	80'	\$
15.	1" Service Pipe:	\$	500'	\$

BID SCHEDULE - DIVISION A-1
Water Mains Extension Project of 1997
Carroll County Water District No. 1
Carrollton, Kentucky

Item	Description	Unit Price	Estimated Quantity	Total Price
16.	Cut and repair of gravel roads and drives, per lineal foot of trench:	\$	550'	\$
17.	Cut and repair of asphalt roads and drives, per lineal foot of trench:	\$	40'	\$
18.	Furnish and install Type "B" Connection to existing 6" line, Sheet 3, lump sum:	\$	1	\$
19.	Furnish and install Type "B" Connection to existing 6" line, Sheet 8, lump sum:	\$	1	\$
20.	Furnish and install Type "B" Connection to existing 8" line, Sheet 14, lump sum:	\$	1	\$
21.	Furnish and install Type "B" Connection to existing 6" line, Sheet 21, lump sum:	\$	1	\$
22.	Furnish and install Type "C" Connection to existing 4" line, Sheet 6, lump sum:	\$	1	\$
23.	Furnish and install Type "C" Connection to existing 3" line, Sheet 19, lump sum:	\$	1	\$
24.	Furnish and install Class "B" stream crossing for 4" main, per lineal foot:	\$	50'	\$
25.	Furnish and install Class "B" stream crossing for 3" main, per lineal foot:	\$	80'	\$
26.	Furnish and install Class "C" stream crossing for 4" main, per lineal foot:	\$	205'	\$

BID SCHEDULE - DIVISION A-1
Water Mains Extension Project of 1997
Carroll County Water District No. 1
Carrollton, Kentucky

Item	Description	Unit Price	Estimated Quantity	Total Price
27.	Furnish and install Class "C" stream crossing for 3" main, per lineal foot:	\$	225'	\$
28.	Furnish and install Class "C" Stream Crossing for Service Pipe, per lineal foot:	\$	50'	\$
29.	Service Taps to 4" main, each:	\$	20	\$
30.	Service Taps to 3" main, each:	\$	34	\$
31.	Furnish and install 5/8" x 3/4" meter installation, each:	\$	54	\$
32.	Additional cost for including an Individual Pressure Reducing Valve (IPRV) as part of the meter installation, each:	\$	39	\$
33.	Furnish and install 6" PVC, SDR 21 Casing Pipe and install 3" PVC Carrier Pipe, per foot:	\$	50'	\$
34.	Furnish and install 8" PVC, SDR 21 Casing Pipe and install 4" PVC Carrier Pipe, per foot:	\$	200'	\$
35.	Furnish and install Eagle Station Road Master Meter, excluding cost of Radio Telemetry System, lump sum:	\$	1	\$
36.	Furnish and install Montgomery Road Master Meter, excluding cost of Radio Telemetry System, lump sum:	\$	1	\$

BID SCHEDULE - DIVISION A-1
Water Mains Extension Project of 1997
Carroll County Water District No. 1
Carrollton, Kentucky

Item	Description	Unit Price	Estimated Quantity	Total Price
37.	Furnish and install Kentucky Highway #36 Master Meter, excluding cost of Radio Telemetry System, lump sum:	\$	1	\$
38.	Furnish and install Kentucky Highway #1112 Master Meter, excluding cost of Radio Telemetry System, lump sum:	\$	1	\$
39.	Furnish and install Radio Telemetry System at the Eagle Station Road Master Meter, lump sum:	\$	1	\$
40.	Furnish and install Radio Telemetry System at the Montgomery Road Master Meter, lump sum:	\$	1	\$
41.	Furnish and install Radio Telemetry System at the Kentucky Highway #36 and #1112 Master Meter, lump sum:	\$	1	\$
TOTAL DIVISION A-1 BASE BID				\$

BID SCHEDULE - DIVISION A-1
Water Mains Extension Project of 1997
Carroll County Water District No. 1
Carrollton, Kentucky

THE CONTRACT PRICE - The Owner shall pay to the Contractor for the performance of this Contract, subject to any additions or deductions provided herein, the sum as follows:

BASE BID TOTAL - (Summation of Items 1 thru 41): \$ _____
_____ Dollars _____ Cents

Bidder agrees to furnish and install, and perform all work necessary to complete the *Division A-1 - Water Main Extensions Project of 1997*, for the Carroll County Water District No. 1, Carroll County, Kentucky, as required by the specifications and indicated on the Drawings.

All work to be completed in 270 calendar days after written authorization to proceed. Liquidated damages of \$350.00 per day shall be paid to the Owner by the Contractor for each calendar day that completion of the construction exceeds the above allowed calendar days.

The Bidder, by submitting this bid, is certifying he has reviewed the plans and specifications and that he intends to complete the project with no deviation from the plans and specifications and that he can complete the project in the time frame indicated.

Respectfully submitted:

_____	_____
Signature	Address
_____	_____
Title	
_____	_____
Date	

SEAL

ATTEST: _____

BID BOND

Know all men by these presents, that we, the undersigned, _____
_____ as Surety, are hereby held firmly bound
unto _____ as Owner in the penal sum of

_____ for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, successors and assigns.

Signed this _____ day of _____, 19__.

The Condition of the above obligation is such that whereas the Principal has submitted to _____ a certain Bid, attached hereto and hereby made a part hereof to enter into a contract in writing, for the _____

Now, Therefore,

- (a) If said Bid shall be rejected, or
- (b) If said Bid shall be accepted and the Principal shall execute and deliver a contract in the form of Contract attachment hereto (properly completed in accordance with said Bid) and shall furnish a Bond for faithful performance of said contract, and for the payment of all persons performing labor furnishing materials in connection therewith and shall in all other respects perform the agreement created by the acceptance of said Bid, then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for the value received, hereby stipulates and agrees that the obligations of said Surety and its Bond shall be in no way impaired or affected by any extension of the time within which the Owner may accept such Bid; and said Surety does hereby waive notice of any extension.

In Witness Whereof, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

Principal

Surety

By: _____

IMPORTANT - Surety companies executing Bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the project is located. In addition the Surety may not exceed the bonding limits set forth in the circular.

BID

Proposal of _____ (hereinafter called "BIDDER"), organized and existing under the laws of the State of _____ doing business as _____*. To the Carroll County Water District No. 1, (hereinafter called "OWNER").

In compliance with your Advertisement for Bids, BIDDER hereby proposes to perform all WORK for the construction of Division A-2 - Water Main Extensions Project of 1997, in strict accordance with the CONTRACT DOCUMENTS, within the time set forth therein, and at the prices stated below.

By submission of this BID, each BIDDER certifies, and in the case of a joint BID each party thereto certifies as to his own organization, that this BID has been arrived at independently, without consultation, communication, or agreement as to any matter relating to this BID with any other BIDDER or with any competitor.

BIDDER hereby agrees to commence WORK under this contract on or before a date to be specified in the NOTICE TO PROCEED and to fully complete the PROJECT within 270 consecutive calendar days thereafter. BIDDER further agrees to pay as liquidated damages, the sum of \$350.00 for each consecutive calendar day thereafter as provided in Section 15 of the General Conditions.

BIDDER acknowledges receipt of the following ADDENDUM:

Bids shall include sales tax and all other applicable taxes and fees.

*Insert "a corporation", "a partnership", or "an individual" as applicable.

BID SCHEDULE
for the
DIVISION A-2 - Water Main Extensions Project of 1997
for
CARROLL COUNTY WATER DISTRICT NO. 1
CARROLL COUNTY, KENTUCKY

Item	Description	Unit Price	Estimated Quantity	Total Price
Furnish and install, complete, including necessary fittings, and restoration to preconstruction conditions, the following water mains, per foot:				
1.	8" PVC, SDR 17, per foot:	\$	22,800'	\$
2.	6" PVC, SDR 17, per foot:	\$	23,600'	\$
3.	6" PVC, SDR 21, per foot:	\$	16,700'	\$
4.	6" Polyethylene (P.E.), Class 160, SDR 11, per foot:	\$	1,000'	\$
5.	4" D.I., CL 350, per foot:	\$	13,950'	\$
6.	4" PVC, SDR 21, per foot:	\$	19,400'	\$
7.	3" PVC, SDR 17, per foot:	\$	4,400'	\$
8.	3" PVC, SDR 21, per foot:	\$	35,000'	\$
9.	8" Gate Valve and Box, each:	\$	5	\$
10.	6" Gate Valve and Box, each:	\$	5	\$
11.	4" Gate Valve and Box, each:	\$	6	\$
12.	3" Gate Valve and Box, each:	\$	13	\$
13.	8" Main Air Release Valve, each:	\$	3	\$
14.	6" Main Air Release Valve, each:	\$	7	\$
15.	3" Main Air Release Valve, each:	\$	1	\$
16.	6" Flush Hydrant including 6" valve and box, and fittings, each:	\$	7	\$
17.	2" Flush Hydrant including 2" valve and box, and fittings, each:	\$	11	\$

BID SCHEDULE - DIVISION A-2
 Water Main Extensions Project of 1997
 Carroll County Water District No. 1
 Carrollton, Kentucky

Item	Description	Unit Price	Estimated Quantity	Total Price
18.	Furnish and install Detectable Flagging, per lineal foot:	\$	136,850'	\$
Bore under asphalt and concrete drives and roads and placing carrier pipe in boring hole, with carrier pipe to be paid for by unit price in trench, per lineal foot, for the following pipe sizes:				
19.	8" Water Main:	\$	150'	\$
20.	6" Water Main:	\$	200'	\$
21.	4" Water Main:	\$	100'	\$
22.	3" Water Main:	\$	90'	\$
23.	1" Service Pipe:	\$	700'	\$
24.	Cut and repair of gravel roads and drives for 8" main, per lineal foot of trench:	\$	320'	\$
25.	Cut and repair of gravel roads and drives for 6" main, per lineal foot of trench:	\$	320'	\$
26.	Cut and repair of gravel roads and drives for 4" main, per lineal foot of trench:	\$	500'	\$
27.	Cut and repair of gravel roads and drives for 3" main, per lineal foot of trench:	\$	1,080'	\$
28.	Cut and repair of gravel roads and drives for 1" service pipe, per lineal foot of trench:	\$	280'	\$
29.	Cut and repair of asphalt roads and drives for 8" main, per lineal foot of trench:	\$	100'	\$

BID SCHEDULE - DIVISION A-2
Water Main Extensions Project of 1997
Carroll County Water District No. 1
Carrollton, Kentucky

Item	Description	Unit Price	Estimated Quantity	Total Price
30.	Cut and repair of asphalt roads and drives for 6" main, per lineal foot of trench:	\$	20'	\$
31.	Cut and repair of asphalt roads and drives for 4" main, per lineal foot of trench:	\$	40'	\$
32.	Cut and repair of asphalt roads and drives for 3" main, per lineal foot of trench:	\$	1,550'	\$
33.	Cut and repair of asphalt roads and drives for 1" service pipe, per lineal foot of trench:	\$	300'	\$
34.	Furnish and install Type "B" Connection to existing 6" line, Sheet 9, lump sum:	\$	1	\$
35.	Furnish and install Type "B" Connection to existing 6" line, Sheet 22, lump sum:	\$	1	\$
36.	Furnish and install Type "B" Connection to existing 6" line, Sheet 38, lump sum:	\$	1	\$
37.	Furnish and install Type "B" Connection to existing 6" line, Sheet 42, lump sum:	\$	1	\$
38.	Furnish and install Type "C" Connection to existing 3" line, Sheet 11, lump sum:	\$	1	\$
39.	Furnish and install Type "C" Connection to existing 3" line, Sheet 12, lump sum:	\$	1	\$
40.	Furnish and install Type "C" Connection to existing 3" line, Sheet 13, lump sum:	\$	1	\$

BID SCHEDULE - DIVISION A-2
Water Main Extensions Project of 1997
Carroll County Water District No. 1
Carrollton, Kentucky

Item	Description	Unit Price	Estimated Quantity	Total Price
41.	Furnish and install Type "C" Connection to existing 6" line, Sheet 37, lump sum:	\$	1	\$
42.	Furnish and install Class "B" stream crossing for 6" main, per lineal foot:	\$	320'	\$
43.	Furnish and install Class "C" stream crossing for 6" main, per lineal foot:	\$	330'	\$
44.	Furnish and install Class "C" stream crossing for 4" main, per lineal foot:	\$	330'	\$
45.	Furnish and install Class "B" stream crossing for 3" main, per lineal foot:	\$	160'	\$
46.	Furnish and install Class "C" stream crossing for 3" main, per lineal foot:	\$	100'	\$
47.	Service Taps to 6" main, each:	\$	18	\$
48.	Service Taps to 4" main, each:	\$	11	\$
49.	Service Taps to 3" main, each:	\$	31	\$
50.	Furnish and install 5/8" x 3/4" meter installation, each:	\$	56	\$
51.	Furnish and install double 5/8" x 3/4" meter installation, each:	\$	4	\$
52.	Additional cost for including an Individual Pressure Reducing Valve (IPRV) as part of the meter installation, each:	\$	33	\$

BID SCHEDULE - DIVISION A-2
Water Main Extensions Project of 1997
Carroll County Water District No. 1
Carrollton, Kentucky

Item	Description	Unit Price	Estimated Quantity	Total Price
53.	Furnish and install 6" PVC, SDR 21 Casing Pipe, open cut, and install 3" PVC Carrier Pipe, per foot:	\$	35'	\$
54.	Furnish and install 8" Water Main on Bridge, per foot of pipe:	\$	700'	\$
55.	Furnish and install Glenwood Hall Master Meter, excluding cost of Radio Telemetry System, lump sum:	\$	1	\$
56.	Furnish and install Radio Telemetry System at the Perry Park Booster Station, including hardwire to and monitoring of the Glenwood Hall Master Meter and MPRV outlet pressure, lump sum:	\$	1	\$
57.	Furnish and install Radio Telemetry System at the Kendall Road Booster Station, lump sum:	\$	1	\$
58.	Furnish and install Radio Telemetry System at the Central Control Unit, lump sum:	\$	1	\$
59.	Furnish and install Glenwood Hall MPRV as manufactured by EFI, Inc., lump sum	\$	1	
*I-59.	Deduct from Item 59 for using MPRV Station as manufactured by Systecon, Inc. or SyncroFlo: Name of Manufacturer _____			

**Informational Bid - cost not to be included in total base bid.*

BID SCHEDULE - DIVISION A-2
Water Main Extensions Project of 1997
Carroll County Water District No. 1
Carrollton, Kentucky

Item	Description	Unit Price	Estimated Quantity	Total Price
60.	Furnish and install Gratz MPRV, as manufactured by EFI, lump sum:	\$	1	
*I-60	Deduct from Item 60 for using a MPRV Station manufactured by Systecon, Inc. or SyncroFlo: Name of Manufacturer _____	\$	1	
61.	Furnish and install Boone Road MPRV, manufactured by EFI, lump sum:	\$	1	\$
*I-61	Deduct from Item 61 for using a MPRV manufactured by Systecon, Inc. or SyncroFlo: Name of Manufacturer _____	\$	1	
62.	Furnish and install Perry Park Booster Station, as manufactured by EFI, excluding cost of telemetering, lump sum:	\$	1	\$
*I-62	Deduct from Item 62 for using a booster station manufactured by Systecon, Inc. or SyncroFlo: Name of Manufacturer _____	\$		
63.	Furnish and install Kendall Road Booster Station, as manufactured by EFI, lump sum:	\$	1	\$

***Informational Bid - cost not to be included in total base bid.**

BID SCHEDULE - DIVISION A-2
Water System Improvements Project of 1995
Carroll County Water District No. 1
Carrollton, Kentucky

Item	Description	Unit Price	Estimated Quantity	Total Price
*I-63	Deduct from Item 63 for using a Booster Station manufactured by Systecon, Inc. or SyncroFlo: Name of Manufacturer _____	\$	1	
64.	Bore and jack railroad crossing 16" x 0.375" minimum wall thickness, steel casing and furnish and install carrier pipe with spacers per foot of casing length:	\$	1	\$
TOTAL BASE BID - DIVISION A-2				\$

**Informational Bid - cost not to be included in total base bid.*

BID SCHEDULE - DIVISION A-2
Water Main Extensions Project of 1997
Carroll County Water District No. 1
Carrollton, Kentucky

THE CONTRACT PRICE - The Owner shall pay to the Contractor for the performance of this Contract, subject to any additions or deductions provided herein, the sum as follows:

BASE BID TOTAL - (Summation of Items 1 thru 64): \$ _____
_____ Dollars _____ Cents

Bidder agrees to furnish and install, and perform all work necessary to complete the *Division A-2 - Water Main Extensions, Booster Stations, Main MPRV's, Master Meters and Telemetry* for the Carroll County Water District No. 1, Carroll County, Kentucky, as required by the specifications and indicated on the Drawings.

All work to be completed in 270 calendar days after written authorization to proceed. Liquidated damages of \$350.00 per day shall be paid to the Owner by the Contractor for each calendar day that completion of the construction exceeds the above allowed calendar days.

The Bidder, by submitting this bid, is certifying he has reviewed the plans and specifications and that he intends to complete the project with no deviation from the plans and specifications and that he can complete the project in the time frame indicated.

Respectfully submitted:

Signature

Title

Date

Address

SEAL

ATTEST: _____

BID BOND

Know all men by these presents, that we, the undersigned, _____
_____ as Surety, are hereby held firmly bound
unto _____ as Owner in the penal sum of

_____ for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, successors and assigns.

Signed this _____ day of _____, 19__.

The Condition of the above obligation is such that whereas the Principal has submitted to _____ a certain Bid, attached hereto and hereby made a part hereof to enter into a contract in writing, for the _____

Now, Therefore,

- (a) If said Bid shall be rejected, or
- (b) If said Bid shall be accepted and the Principal shall execute and deliver a contract in the form of Contract attachment hereto (properly completed in accordance with said Bid) and shall furnish a Bond for faithful performance of said contract, and for the payment of all persons performing labor furnishing materials in connection therewith and shall in all other respects perform the agreement created by the acceptance of said Bid, then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for the value received, hereby stipulates and agrees that the obligations of said Surety and its Bond shall be in no way impaired or affected by any extension of the time within which the Owner may accept such Bid; and said Surety does hereby waive notice of any extension.

In Witness Whereof, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

Principal

Surety

By: _____

IMPORTANT - Surety companies executing Bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the project is located. In addition the Surety may not exceed the bonding limits set forth in the circular.

WATER SYSTEM EXTENSIONS PROJECT OF 1997

FOR

CARROLL COUNTY WATER DISTRICT NO. 1
CARROLLTON, KENTUCKY

DIVISION A-1 - Water Main Extensions

DIVISION A-2 - Water Main Extensions, Booster Stations,
Main MPRV's, Master Meters and Telemetry

VOLUNTARY COMBINATION BID SCHEDULE FOR DIVISIONS "A-1" AND "A-2"

Combination Bid for Division "A-1" and "A-2".

Deduct \$	_____	Percent	_____	from the combined
	(Dollar Amount)	(Percentage)	(Words)	
	Base Bids of Division "A-1" and "A-2".			
	TOTAL COMBINATION BID - DIVISIONS "A-1" AND "A-2":			
	_____ Dollars	_____ Cents	\$	_____ (Bid Total)

By submission of this proposal, the Bidder agrees to the contractual conditions as set down in the contract documents. The Bidder has included all applicable taxes and fees.

(Bidder's Name) _____ (Address) _____ (Date)

Submitted by: _____
Attest (if Corporation): _____
License Number (If Applicable): _____

BID

Proposal of _____ (hereinafter called "BIDDER"), organized and existing under the laws of the State of _____ doing business as _____*. To the Carroll County Water District No. 1, (hereinafter called "OWNER").

In compliance with your Advertisement for Bids, BIDDER hereby proposes to perform all WORK for the construction of Division B - Standpipe Water Storage Tank in strict accordance with the CONTRACT DOCUMENTS, within the time set forth therein, and at the prices stated below.

By submission of this BID, each BIDDER certifies, and in the case of a joint BID each party thereto certifies as to his own organization, that this BID has been arrived at independently, without consultation, communication, or agreement as to any matter relating to this BID with any other BIDDER or with any competitor.

BIDDER hereby agrees to commence WORK under this contract on or before a date to be specified in the NOTICE TO PROCEED and to fully complete the PROJECT within 270 consecutive calendar days thereafter. BIDDER further agrees to pay as liquidated damages, the sum of \$350.00 for each consecutive calendar day thereafter as provided in Section 15 of the General Conditions.

BIDDER acknowledges receipt of the following ADDENDUM:

BIDS SHALL INCLUDE SALES TAX AND ALL OTHER APPLICABLE TAXES AND FEES.

**Insert "a corporation", "a partnership", or "an individual" as applicable.*

DIVISION B

Standpipe Water Storage Tank
for the
Carroll County Water District No. 1
Carroll County, Kentucky

BID SCHEDULE

Item	Description	Total Price
BASE BID Furnish and Install a 170,000 Gallon, 18' diameter x 89' high Standpipe Water Storage Tank in accordance with Plans and Specifications.		
1.	Foundation and tank design and shop drawings:	\$
2.	Tank foundation:	\$
3.	Tank fabrication:	\$
4.	Tank erection:	\$
5.	Tank painting:	\$
6.	Site work, excluding drive and fence:	\$
7.	Tank disinfection:	\$
8.	Chain link fence and gate:	\$
9.	Access Drive:	\$
TOTAL DIVISION B BASE BID PRICE		\$

BID SCHEDULE

**Division B - Standpipe Water Storage Tank And Related Work
Carroll County Water District No. 1
Carroll County, Kentucky**

THE CONTRACT PRICE - The Owner shall pay to the Contractor for the performance of this Contract, subject to any additions or deductions provided herein, the sum as follows:

BASE BID TOTAL - (Summation of Items 1 thru 9): \$ _____
_____ Dollars _____ Cents

Bidder agrees to furnish and install, and perform all work necessary to complete the *Division B - Standpipe Water Storage Tank* for the Carroll County Water District No. 1, Carroll County, Kentucky, as required by the specifications and indicated on the Drawings.

All work to be completed in 270 calendar days after written authorization to proceed. Liquidated damages of \$350.00 per day shall be paid to the Owner by the Contractor for each calendar day that completion of the construction exceeds the above allowed calendar days.

The Bidder, by submitting this bid, is certifying he has reviewed the plans and specifications and that he intends to complete the project with no deviation from the plans and specifications and that he can complete the project in the time frame indicated.

Respectfully submitted:

Signature

Title

Date

Address

ATTEST:

SEAL

BID BOND

Know all men by these presents, that we, the undersigned, _____
_____ as Surety, are hereby held firmly bound
unto _____ as Owner in the penal sum of

_____ for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, successors and assigns.

Signed this _____ day of _____, 19__.

The Condition of the above obligation is such that whereas the Principal has submitted to _____ a certain Bid, attached hereto and hereby made a part hereof to enter into a contract in writing, for the _____

Now, Therefore,

- (a) If said Bid shall be rejected, or
- (b) If said Bid shall be accepted and the Principal shall execute and deliver a contract in the form of Contract attachment hereto (properly completed in accordance with said Bid) and shall furnish a Bond for faithful performance of said contract, and for the payment of all persons performing labor furnishing materials in connection therewith and shall in all other respects perform the agreement created by the acceptance of said Bid, then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for the value received, hereby stipulates and agrees that the obligations of said Surety and its Bond shall be in no way impaired or affected by any extension of the time within which the Owner may accept such Bid; and said Surety does hereby waive notice of any extension.

In Witness Whereof, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

Principal

Surety

By: _____

IMPORTANT - Surety companies executing Bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the project is located. In addition the Surety may not exceed the bonding limits set forth in the circular.

**CONTRACTOR'S
NON-COLLUSION AFFIDAVIT**

The Bidder, by its officers and _____
Agents, representatives present at the time of filing this Bid, being duly
sworn, on their oaths say that neither they nor any of them have in any
way, directly or indirectly entered into any agreement or agreements with
any other bidder, or with any public official. Whereby such affiants or
either of them, has paid or is to pay to such bidder or public official,
any sum of money, or has given or is to give to such other bidder or public
official anything of value whatever, or such affiant or affiants or either
of them has not directly or indirectly entered into any agreement or
agreements or arrangements with any other bidder or bidders which tends to
or does lessen or destroy free competition in the letting of the Contract
sought for by the attached bids; that no inducement of any form or
character other than that which appears upon the face of the bids will be
suggested, offered, paid or delivered to any person whomsoever to influence
the acceptance of said bid or awarding of the Contract; nor has this bidder
any agreement or understanding of any kind whatsoever, with any other
person whomsoever to pay, deliver to, or share with any other person in any
way or manner, any of the proceeds of the contract sought by this bid.

(SEAL)

(Bidder)

By _____

(Title)

Subscribed and sworn to before me by _____

this _____ day of _____, 19____. My commission

expires _____, _____, Notary Public

(SEAL)

In and for _____ County

State of _____

COMPLIANCE STATEMENT

This statement relates to a proposed contract with _____

(Name of Borrower or Guarantee)

who expects to finance the contract with assistance from the United States Department of Agriculture (whether by a loan, grant loan insurance, guarantee, or other form of financial assistance). I am the undersigned or prospective contractor. I represent that:

1. I ___ have, ___ have not, participated in a previous contract or subcontract subject to Executive Order 11246 (regarding equal employment opportunity) or a preceding similar Executive Order.
2. If I have participated in such a contract or subcontract, I ___ have, ___ have not, filed all compliance reports that I have been required to file in connection with the contract or subcontract.

If the proposed contract is for \$50,000 or more and I have 50 or more employees, I also represent that:

3. I ___ have ___ have not previously had contracts subject to the written affirmation action program requirements of the Secretary of Labor.
4. If I have participated in such a contract or subcontract, I ___ have, ___ have not, developed and placed on file at each establishment affirmative action programs as required by the rules and regulations of the Secretary of Labor.

I understand that if I have failed to file any compliance reports that have been required of me, I am not eligible and will not be eligible to have my bid considered or to enter into the proposed contract unless and until I make arrangement regarding such reports that is satisfactory to the United States Department of Agriculture or to the office where the reports are required to be filed.

I also certify that I do not maintain or provide for my employees any segregated facilities at any of my establishments, and that I do not permit my employees to perform their services at any location, under my control, where segregated facilities are maintained. I certify further that I will not maintain or provide for my employees any segregated facilities at any of my establishments, and that I will not permit my employees to perform their services at any location, under my control, where segregated facilities are maintained. I agree that a breach of this certification is a violation of the Equal Opportunity clause in my contract. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage and dressing areas, parking lots drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, creed, color, or national origin, because of habit, local custom or otherwise. I further agree that (except where I have obtained identical certifications for proposed subcontractors for specific time periods) I will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding \$10,000

which are not exempt from the provisions of the Equal Opportunity clause; that I will retain such certifications in my files; and that I will forward the following notice to such proposed subcontractors (except where the proposed subcontractors have submitted identical certifications for specific time periods):

**NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENTS FOR
CERTIFICATIONS OF NON-SEGREGATED FACILITIES**

A certification of Non-Segregated Facilities, as required by the May 9, 1967, order (32F.R. 7439, May 9, 1967) on Elimination of Segregated Facilities, by the Secretary of Labor, must be submitted prior to the award of a subcontract exceeding \$10,000 which is not exempt from the Equal Opportunity clause. The certification may be submitted for each subcontract or for all subcontracts during a period (i. e., quarterly, semiannually, or annually).

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

(Signature of Bidder or Prospective Contractor)

Date

(Address including Zip Code)

UNITED STATES DEPARTMENT OF AGRICULTURE

EMPLOYMENT OF THE HANDICAPPED

(The following clause is applicable to all contracts or purchase orders of \$2,500 or more, as required by the regulations of the Secretary of Labor.)

(a) The contractor will not discriminate against any employee or applicant for employment because of physical or mental handicap in regard to any position for which the employee or applicant for employment is qualified. The contractor agrees to take affirmative action to employ, advance in employment and otherwise treat qualified handicapped individuals without discrimination based upon their physical or mental handicap in all employment practices such as the following: employment, upgrading, demotion or transfer, recruitment, advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship.

(b) The contractor agrees to comply with the rules, regulations, and relevant orders of the Secretary of Labor issued pursuant to the Rehabilitation Act of 1973, as amended.

(c) In the event of the contractor's noncompliance with the requirements of this clause, actions for noncompliance may be taken in accordance with the rules, regulations and relevant orders of the Secretary of Labor issued pursuant to the Act.

(d) The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices in a form to be prescribed by the Director, Office of Federal Contract Compliance Programs, Department of Labor, provided by or through the contracting officer. Such notices shall state the contractor's obligation under the law to take affirmative action to employ and advance in employment qualified handicapped employees and applicants for employment, and the rights of applicants and employees.

(e) The contractor will notify each labor union or representative of workers with which it has a collective bargaining agreement or other contract understanding, that the contractor is bound by the terms of section 503 of the Act and is committed to take affirmative action to employ and advance in employment physically and mentally handicapped individuals.

(f) The contractor will include the provisions of this clause in every subcontract or purchase order of \$2,500 or more unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 503 of the Act, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as the Director, Office of Federal Contract Compliance Programs, may direct to enforce such provisions, including action for noncompliance.

town Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or Subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or Subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.

4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7a through p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. The Contractor is expected to make substantially uniform progress toward its goals in each craft during the period specified.

5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.

6. In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:

a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.

b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.

c. Maintain a current file of the names,

addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefor, along with whatever additional actions the Contractor may have taken.

d. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.

e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under 7b above.

f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with onsite supervisory personnel such as Superintendents, General Foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.

i. Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than

UNITED STATES DEPARTMENT OF AGRICULTURE

EQUAL EMPLOYMENT OPPORTUNITY
CONTRACT COMPLIANCE NOTICES

(1). The following notices shall be included in all solicitations for offers and bids on all Federal and federally assisted construction contracts or subcontracts in excess of \$10,000 pursuant to Department of Labor (OFCCP) regulations 41 CFR, Part 60-4.

NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY (EXECUTIVE ORDER 11246)

1. The Offeror's or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth herein.

2. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

Timetables	Goals for minority participation for each trade.	Goals for female participation in each trade
	Insert goals for each year.	Insert goals for each year.

These goals are applicable to all the Contractor's construction work (whether or not it is Federal or federally assisted) performed in the covered area.

The Contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a), and its efforts to meet the goals established for the geographical area where the contract resulting from this solicitation is to be performed. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within 10 working days of award of any construction subcontract in excess of \$10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address and telephone number of the subcontractor; employer identification number; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the contract is to be performed.

4. As used in this Notice, and in the contract resulting from this solicitation, the "covered area" is (insert description of the geographical areas where the contract is to be performed giving the state, county and city, if any)

STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY CONSTRUCTION CONTRACT SPECIFICATIONS (EXECUTIVE ORDER 11246)

1. As used in these specifications:

a. "Covered area" means the geographical area described in the solicitation from which this contract resulted;

b. "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;

c. "Employer identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.

d. "Minority" includes:

(i) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);

(ii) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);

(iii) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and

(iv) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

2. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of \$10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.

3. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Home-

one month prior to the date for the acceptance of applications for apprenticeship or

other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's work force.

k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.

l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.

m. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.

n. Ensure that all facilities and company activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.

p. Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7a through p). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 7a through p of these Specifications provided that the contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female workforce participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.

9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required

to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).

10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.

11. The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.

12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.

13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.

14. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.

15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

the 1970 Census data that provides counts of minority and other persons in the experienced civilian labor force.

A single minority goal is established for each SMSA and EA without a timetable. Timetables for the achievement of minority goals are not provided because it is assumed that after 10 years of Executive Order and other equal employment opportunity efforts to increase the minority participation in the labor force, these levels should be at least at the 1970 minority force figures. The minority utilization goals adopted today were calculated using the 1970 Census tabulation mentioned above, and are set at the 1970 minority representation in the experienced civilian labor force.

Separate goals are established for each of the SMSA's and for each of the EA's. When a covered construction contract or subcontract is for a project located in an SMSA, the goals for that SMSA apply. When a covered construction contract or subcontract is for a project located in an area outside of an SMSA, the EA goals for that area apply.

The minority (male and female) goals apply to Federal and federally assisted construction contractors and subcontractors which have covered contracts. The goals are expressed as a percentage of the total hours worked by such a covered contractor's or subcontractor's entire onsite construction workforce which is working on any construction site within a relevant area. The goal applies to each construction craft and trade in the contractor's entire workforce in the relevant area including those employees working on private nonfederally involved projects.

The applicable goals for the contractor or subcontractors are the goals for the geographical area where the contract is being performed, and all the work of a Federal or federally assisted construction contractor or subcontractor is covered regardless of whether the work is being performed on a covered contract. Therefore, a contractor with a covered contract in SMSA X would apply the goals for SMSA X for that contract. The same contractor, however, would apply the SMSA Y goals to all its construction work in SMSA Y even though that contractor's contracts in SMSA Y were neither Federal nor federally assisted.

Finally, this notice and Appendix B-80 do not affect contractors which are participating under Hometown Plans approved by OFCCP with respect to contracts being performed in the geographical area covered by the Hometown Plan.

Each contracting agency, each applicant, and each contractor is required to include the appropriate goal set forth below in all invitations for bids or other solicitations for Federal or federally assisted construction contracts of subcontracts in excess of \$10,000.

Accordingly, Appendix B of the Notice issued on April 7, 1978, (43 FR 14899) and corrected on May 5, 1978, (43 FR 19473) and Appendix B-1 of the notice issued on March 20, 1979, (44 FR 17116) which established goals for minority utilization in the construction industry are hereby superseded.

A new Appendix B-80 is hereby issued as set forth below which shall become effective on November 3, 1980.

Dated: September 30, 1980.

Ray Marshall,
Secretary of Labor.

John N. Gentry,
Under Secretary.

Donald E. Elisburg,
Assistant Secretary, Employment Standards Administration.

Weldon Rougeau,
Director, Office of Federal Contract Compliance Programs.

Appendix B-80

Until further notice, the following goals for minority utilization in each construction craft and trade shall be included in all Federal or federally assisted construction contracts and subcontracts in excess of \$10,000 to be performed in the respective geographical areas. The goals are applicable to each nonexempt contractor's total onsite construction workforce, regardless of whether or not part of that workforce is performing work on a Federal, federally assisted or nonfederally related project, contract or subcontract.

Construction contractors which are participating in an approved Hometown Plan (see 41 CFR 60-4.5) are required to comply with the goals of the Hometown Plan with regard to construction work they perform in the area covered by the Hometown Plan. With regard to all their other covered construction work, such contractors are required to comply with the applicable SMSA or EA goal contained in this appendix B-80.

Economic Areas

State	Goal (percent)
Maine:	
001 Bangor, ME: Non-SMSA Counties.....	0.8
ME Aroostook; ME Hancock; ME Penobscot; ME Piscataquis; ME Waldo; ME Wash- ington.	
002 Portland-Lewiston, ME: SMSA Counties:	
4243 Lewiston-Auburn, ME.....	0.6
ME Androscoggin.	
6403 Portland, ME.....	0.6
ME Cumberland; ME Sagadahoc.	
Non-SMSA Counties.....	0.5

Economic Areas—Continued

State	Goal (percent)
ME Franklin; ME Kennebec; ME Knox; ME Lincoln; ME Oxford; ME Somerset; ME York.	
Vermont:	
003 Burlington, VT: Non-SMSA Counties.....	0.8
NH Coos; NH Grafton; NH Sullivan; VT Addison; VT Caledonia; VT Chittenden; VT Essex; VT Franklin; VT Grand Isle; VT Lamoille; VT Orange; VT Orleans; VT Rutland; VT Washington; VT Windsor.	
Massachusetts:	
004 Boston, MA: SMSA Counties:	
1123 Boston - Lowell - Brockton - Lawrence - Haverhill, MA-NH.....	4.0
MA Essex; MA Middlesex; MA Norfolk; MA Plymouth; MA Suffolk; NH Rockingham.	
4763 Manchester-Nashua, NH.....	0.7
NH Hillsborough	
5403 Fall River-New Bedford, MA.....	1.6
MA Bristol.	
9243 Worcester - Fitchburg - Leominster, MA.....	1.6
MA Worcester.	
Non-SMSA Counties.....	3.6
MA Barnstable; MA Dukes; MA Nantucket; NH Belknap; NH Carroll; NH Merrimack; NH Stratford.	
Rhode Island:	
005 Providence - Warwick - Pawtucket, RI: SMSA Counties:	
6483 Providence - Warwick - Pawtucket, RI.....	3.0
RI Bristol; RI Kent; RI Providence; RI Washington.	
Non-SMSA Counties.....	3.1
RI Newport.	
Connecticut (Mass):	
006 Hartford - New Haven - Springfield, CT-MA: SMSA Counties:	
3283 Hartford - New Britain - Bristol, CT.....	6.9
CT Hartford; CT Middlesex; CT Tolland.	
5483 New Haven - Waterbury - Meriden, CT.....	9.0
CT New Haven.	
5523 New London - Norwich, CT.....	4.5
CT New London.	
6223 Pittsfield, MA.....	1.6
MA Berkshire.	
8463 Springfield - Chicopee - Holyoke, MA-CT.....	4.8
MA Hampden; MA Hampshire.	
Non-SMSA Counties.....	5.9
CT Litchfield; CT Windham; MA Franklin; NH Cheshire; VT Windham.	
New York:	
007 Albany - Schenectady - Troy, NY: SMSA Counties:	
0160 Albany - Schenectady - Troy, NY.....	3.2
NY Albany; NY Montgomery; NY Rensselaer; NY Saratoga; NY Schenectady.	
Non-SMSA Counties.....	2.6
NY Clinton; NY Columbia; NY Essex; NY Fulton; NY Greene; NY Hamilton; NY Schoharie; NY Warren; NY Washington; VT Bennington.	
008 Syracuse - Utica, NY: SMSA Counties:	
8160 Syracuse, NY.....	2.8
NY Madison; NY Onondaga; NY Oswego.	
8680 Utica - Rome, NY.....	2.1
NY Herkimer; NY Oneida.	
Non-SMSA Counties.....	2.5
NY Cayuga; NY Cortland; NY Franklin; NY Jefferson; NY Lewis; NY St. Lawrence.	
009 Rochester, NY: SMSA Counties:	
6440 Rochester, NY.....	5.3
NY Livingston; NY Monroe; NY Ontario; NY Orleans; NY Wayne.	
Non-SMSA Counties.....	5.9
NY Genesee; NY Seneca; NY Yates.	
010 Buffalo, NY: SMSA Counties:	
1280 Buffalo, NY.....	7.7
NY Erie; NY Niagara.	
Non-SMSA Counties.....	6.3
NY Allegany; NY Cattaraugus; NY Chautauque; NY Wyoming; PA McKean; PA Potter.	
011 Binghamton-Elmira, NY: SMSA Counties:	
0960 Binghamton, NY-PA.....	1.1

Economic Areas—Continued

State	Goal (percent)
NY Broome; NY Tioga; PA Susquehanna	2.2
2335 Elmira, NY	
NY Chemung	1.2
Non-SMSA Counties	
NY Chenango; NY Delaware; NY Otsego; NY Schuyler; NY Steuben; NY Tompkins; PA Bradford; PA Tioga	
012 New York, NY:	
SMSA Counties:	
1163 Bridgeport - Stamford - Norwalk - Danbury, CT	10.2
CT Fairfield	
3640 Jersey City, NJ	12.8
NJ Hudson	
4410 Long Branch - Asbury Park, NJ	9.5
NJ Monmouth	
5380 Haverhill - Suffolk, NY	5.8
NY Nassau; NY Suffolk	
5460 New Brunswick - Perth Amboy - Sayreville, NJ	
NJ Middlesex	
5800 New York, NY, NJ	
NJ Bergen; NY Putnam; NY Rockland; NY Westchester; NY New York City	

(The following goal ranges are applicable to the indicated trades in the Counties of Bronx, Kings, New York, Queens and Richmond.)

Electricians	9.0 to 10.2
Carpenters	27.6 to 32.0
Steam fitters	12.2 to 13.5
Metal fitters	24.6 to 25.8
Painters	28.6 to 28.0
Operating engineers	25.6 to 28.0
Plumbers	12.0 to 14.5
Iron workers (struct)	25.9 to 32.0
Elevator constructors	5.5 to 8.5
Bricklayers	13.4 to 15.5
Asbestos workers	22.8 to 28.0
Roofers	8.3 to 7.5
Iron workers (ornamental)	22.4 to 23.0
Cement masons	23.0 to 27.0
Glaziers	16.0 to 20.0
Plasterers	15.8 to 18.0
Teamsters	22.0 to 22.5
Boiler makers	13.0 to 15.5
All others	16.4 to 17.5

5640 Newark, NJ	17.3
NJ Essex; NJ Morris; NJ Somerset; NJ Union	
6040 Paterson - Clifton - Passaic, NJ	12.9
NJ Passaic	
6460 Poughkeepsie, NY	6.4
NY Dutchess	
Non-SMSA Counties	17.0
NJ Hunterdon; NJ Ocean; NJ Sussex; NY Orange; NY Sullivan; NY Ulster; PA Pike	

PENNSYLVANIA:

013 Scranton—Wilkes - Barre, PA:	
SMSA Counties:	
5745 Northeast Pennsylvania	0.6
PA Lackawanna; PA Luzerne; PA Monroe	
Non-SMSA Counties	0.5
PA Columbia; PA Wayne; PA Wyoming	

014 Williamsport, PA:	
SMSA Counties	
9140 Williamsport, PA	1.0
PA Lycoming	
Non-SMSA Counties	0.7
PA Cameron; PA Centre; PA Clearfield; PA Clinton; PA Elk; PA Jefferson; PA Montour; PA Northumberland; PA Snyder; PA Sullivan; PA Union	

015 Erie, PA:	
SMSA Counties:	
2380 Erie, PA	2.8
PA Erie	
Non-SMSA Counties	1.8
PA Clarion; PA Crawford; PA Forest; PA Venango; PA Warren	

016 Pittsburgh, PA:	
SMSA Counties	
0280 Altoona, PA	1.0
PA Blair	
3680 Johnson, PA	1.3
PA Cambria; PA Somerset	
6280 Pittsburgh, PA	6.3
PA Allegheny; PA Beaver; PA Washington; PA Westmoreland	
Non-SMSA Counties	4.8
MD Allegany; MD Garrett; PA Armstrong; PA Bedford; PA Butler; PA Fayette; PA Greene; PA Indiana; WV Mineral	

Economic Areas—Continued

State	Goal (percent)
017 Harrisburg - York - Lancaster, PA:	
SMSA Counties	
3240 Harrisburg, PA	6.2
PA Cumberland; PA Dauphin; PA Perry	
4000 Lancaster, PA	2.0
PA Lancaster	
9290 York, PA	2.2
PA Adams; PA York	
Non-SMSA Counties	3.1
PA Franklin; PA Fulton; PA Huntingdon; PA Juniata; PA Lebanon; PA Mifflin	
018 Philadelphia, PA:	
SMSA Counties	
0240 Allentown - Bethlehem - Easton, PA-NJ	1.8
NJ Warren; PA Carbon; PA Lehigh; PA Northampton	
0560 Atlantic City, NJ	18.2
NJ Atlantic	
6160/ Philadelphia, PA-NJ	17.3
NJ Burlington; NJ Camden; NJ Gloucester; PA Bucks; PA Chester; PA Delaware; PA Montgomery; PA Philadelphia	
6680 Reading, PA	2.5
PA Berks	
8480 Trenton, NJ	16.4
NJ Mercer	
8760 Vineland - Millsboro - Bridgeton, NJ	18.0
NJ Cumberland	
9160 Wilmington, DE-NJ-MD	12.3
DE New Castle; MD Cecil; NJ Salem	
Non-SMSA Counties	14.5
DE Kent; DE Sussex; NJ Cape May; PA Schuylkill	

Maryland:

019 Baltimore, MD:	
SMSA Counties:	
0720 Baltimore, MD	23.0
MD Anne Arundel; MD Baltimore, MD Carroll; MD Harford; MD Howard; MD Baltimore City	
Non-SMSA Counties	23.6
MD Caroline; MD Dorchester; MD Kent; MD Queen Annes; MD Somerset; MD Talbot; MD Worcester; MD Worcester; VA Accomack; VA Northampton	

Washington, DC:

020 Washington, DC:	
SMSA Counties:	
8840 Washington, DC-MD-VA	28.0
DC District of Columbia; MD Charles; Montgomery; MD Prince Georges; VA Arlington; VA Fairfax; VA Loudoun; VA Prince William; VA Alexandria; VA Fairfax City; VA Falls Church	

NON-SMSA Counties

MD Calvert; MD Frederick; MD St. Marys; MD Washington; VA Clarke; VA Culpeper; VA Fauquier; VA Frederick; VA King George; VA Page; VA Rappahannock; VA Shenandoah; VA Spotsylvania; VA Stafford; VA Warren; VA Westmoreland; VA Fredericksburg; VA Winchester; WV Berkeley; WV Grant; WV Hampshire; WV Hardy; WV Jefferson; WV Morgan	25.2
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Virginia:

021 Roanoke-Lynchburg, VA:	
SMSA Counties:	
4640 Lynchburg, VA	19.3
VA Amherst; VA Appomattox; VA Campbell; VA Lynchburg	
6800 Roanoke, VA	10.2
VA Botetourt; VA Craig; VA Roanoke; VA Roanoke City; VA Salem	
Non-SMSA Counties	12.0
VA Alleghany; VA Augusta; VA Bath; VA Bedford; VA Bland; VA Carroll; VA Floyd; VA Franklin; VA Giles; VA Grayson; VA Henry; VA Highland; VA Montgomery; VA Nelson; VA Patrick; VA Pittsylvania; VA Pulaski; VA Rockbridge; VA Rockingham; VA Wythe; VA Bedford City; VA Buena Vista; VA Clifton Forge; VA Covington; VA Danville; VA Galax; VA Harrisonburg; VA Leesington; VA Martinsville; VA Radford; VA Staunton; VA Waynesboro; WV Pendleton	

022 Richmond, VA:	
SMSA Counties:	
8140 Petersburg - Colonial Heights - Hopewell, VA	30.8
VA Dinwiddie; VA Prince George; VA Colonial Heights; VA Hopewell; VA Petersburg	
6760 Richmond, VA	24.9
VA Charles City; VA Chesterfield; VA	

Economic Areas—Continued

State	Goal (percent)
Goochland; VA Hanover; VA Henrico; VA New Kent; VA Powhatan; VA Richmond	27.8
Non-SMSA Counties	
VA Albemarle; VA Amelia; VA Brunswick; VA Buckingham; VA Caroline; VA Charlotte; VA Cumberland; VA Essex; VA Fluvanna; VA Greene; VA Greensville; VA Halifax; VA King And Queen; VA King William; VA Lancaster; VA Louisa; VA Lunenburg; VA Madison; VA Mecklenburg; VA Northumberland; VA Nottoway; VA Orange; VA Prince Edward; VA Richmond; VA Sussex; VA Charlottesville; VA Emmons; VA South Boston	
023 Norfolk - Virginia Beach - Newport News, VA:	
SMSA Counties:	
5680 Newport News-Hampton, VA	27.1
VA Gloucester; VA James City; VA York; VA Hampton; VA Newport News; VA Williamsburg	
5720 Norfolk - Virginia Beach - Portsmouth, VA-NC	26.8
NC Currituck; VA Chesapeake; VA Norfolk; VA Portsmouth; VA Suffolk; VA Virginia Beach	
Non-SMSA Counties	29.7
NC Bertie; NC Camden; NC Chowan; NC Gates; NC Hertford; NC Pasquotank; NC Perquimans; VA Isle of Wight; VA Matthews; VA Middlesex; VA Southampton; VA Surry; VA Franklin	

North Carolina:

024 Rocky Mount - Wilson - Greenville, NC:	
Non-SMSA Counties	31.7
NC Beaufort; NC Carteret; NC Craven; NC Dare; NC Edgecombe; NC Greene; NC Halifax; NC Hyde; NC Jones; NC Lenox; NC Martin; NC Nash; NC Northampton; NC Pamlico; NC Pitt; NC Tyrrell; NC Washington; NC Wayne; NC Wilson	

025 Wilmington, NC:	
SMSA Counties:	
9200 Wilmington, NC	20.7
NC Brunswick; NC New Hanover	
Non-SMSA Counties	23.5
NC Columbus; NC Duplin; NC Onslow; NC Pender	

026 Fayetteville, NC:	
SMSA Counties:	
2560 Fayetteville, NC	26.2
NC Cumberland	
Non-SMSA Counties	33.5
NC Bladen; NC Hoke; NC Richmond; NC Robeson; NC Sampson; NC Scotland	

027 Raleigh - Durham, NC:	
SMSA Counties:	
6640 Raleigh - Durham, NC	22.8
NC Durham; NC Orange; NC Wake	
Non-SMSA Counties	24.7
NC Chatham; NC Franklin; NC Granville; NC Harnett; NC Johnston; NC Lee; NC Person; NC Vance; NC Warren	

028 Greensboro - Winston Salem - High Point, NC:	
SMSA Counties:	
1300 Burlington, NC	16.2
NC Alamance	
3120 Greensboro - Winston Salem - High Point, NC	16.4
NC Davidson; NC Forsyth; NC Guilford; NC Randolph; NC Stokes; NC Yadkin	
Non-SMSA Counties	15.5
NC Alleghany; NC Ashe; NC Caswell; NC Davne; NC Montgomery; NC Moore; NC Rockingham; NC Surry; NC Watauga; NC Wikes	

029 Charlotte, NC:	
SMSA Counties:	
1520 Charlotte - Gastonia, NC	18.5
NC Gaston; NC Mecklenburg; NC Union	
Non-SMSA Counties	15.7
NC Alexander; NC Anson; NC Burke; NC Cabarrus; NC Caldwell; NC Catawba; NC Cleveland; NC Iredell; NC Lincoln; NC Rowan; NC Rutherford; NC Stanley; SC Chester; SC Lancaster; SC York	

030 Asheville, NC:	
Non-SMSA Counties:	
0480 Asheville, NC	8.5
NC Buncombe; NC Madison	
Non-SMSA Counties	8.3

Economic Areas—Continued

State	Goal (per-cent)
NC Avery; NC Cherokee; NC Clay; NC Graham; NC Haywood; NC Henderson; NC Jackson; NC McDowell; NC Macon; NC Mitchell; NC Swain; NC Transylvania; NC Yancey.	
South Carolina:	
031 Greenville - Spartanburg, SC:	
SMSA Counties:	
3180 Greenville - Spartanburg, SC	18.0
SC Greenville; SC Pickens; SC Spartanburg.	
Non-SMSA Counties:	
SC Polk; SC Abbeville; SC Anderson; SC Cherokee; SC Greenwood; SC Laurens; SC Oconee; SC Union.	17.8
032 Columbia, SC:	
SMSA Counties:	
1780 Columbia, SC	23.4
SC Lexington; SC Richland.	
Non-SMSA Counties:	
SC Calhoun; SC Clarendon; SC Fairfield; SC Kershaw; SC Lee; SC Newberry; SC Orangeburg; SC Saluda; SC Sumter.	32.0
033 Florence, SC:	
Non-SMSA Counties:	
SC Chesterfield; SC Darlington; SC Dillon; SC Florence; SC Georgetown; SC Horry; SC Marion; SC Marlboro; SC Williamsburg.	33.0
034 Charleston-North Charleston, SC:	
SMSA Counties:	
1440 Charleston - North Charleston, SC	30.0
SC Berkeley; SC Charleston; SC Dorchester.	
Non-SMSA Counties:	
SC Colleton.	30.7
Georgia:	
035 Augusta, GA:	
SMSA Counties:	
0600 Augusta, GA-SC	27.2
GA Columbia; GA Richmond; SC Aiken.	
Non-SMSA Counties:	
GA Burke; GA Emanuel; GA Glascock; GA Jefferson; GA Jenkins; GA Lincoln; GA McDuffie; GA Talbot; GA Warren; GA Wilkes; SC Allendale; SC Bamberg; SC Barnwell; SC Edgefield; SC McCormick.	32.8
036 Atlanta, GA:	
SMSA Counties:	
0520 Atlanta, GA	21.2
GA Butts; GA Cherokee; GA Clayton; GA Cobb; GA DeKalb; GA Douglas; GA Fayette; GA Forsyth; GA Fulton; GA Gwinnett; GA Henry; GA Newton; GA Paulding; GA Rockdale; GA Walton.	
Non-SMSA Counties:	
GA Banks; GA Barrow; GA Bartow; GA Citron; GA Clarke; GA Coweta; GA Dawson; GA Elbert; GA Fannin; GA Floyd; GA Franklin; GA Gilmer; GA Gordon; GA Greene; GA Habersham; GA Hall; GA Haralson; GA Hart; GA Heard; GA Jackson; GA Jasper; GA Lamar; GA Lumpkin; GA Madison; GA Morgan; GA Oconee; GA Oglethorpe; GA Pickens; GA Pike; GA Polk; GA Rabun; GA Spalding; GA Stephens; GA Towns; GA Union; GA Upson; GA Wilkes.	18.6
037 Columbia, GA:	
SMSA Counties:	
1800 Columbia, GA-AL	29.8
AL Russell; GA Chattahoochee; GA Columbus.	
Non-SMSA Counties:	
AL Chambers; AL Lee; GA Harris; GA Macon; GA Milledgeville; GA Quitman; GA Schley; GA Stewart; GA Sumter; GA Talbot; GA Troup; GA Webster.	31.8
038 Macon, GA:	
SMSA Counties:	
4680 Macon, GA	27.5
GA Bobb; GA Houston; GA Jones; GA Twiggs.	
Non-SMSA Counties:	
GA Baldwin; GA Blackley; GA Crawford; GA Crisp; GA Dodge; GA Dooly; GA Hancock; GA Johnson; GA Laurens; GA Macon; GA Monroe; GA Peach; GA Pulaski; GA Putnam; GA Taylor; GA Telfair; GA Treutlen; GA Washington; GA Wheeler; GA Wilcox; GA Wilkinson.	31.7
039 Savannah, GA:	
SMSA Counties:	
7520 Savannah, GA	30.6
GA Bryan; GA Chatham; GA Effingham.	
Non-SMSA Counties:	
	28.8

Economic Areas—Continued

State	Goal (per-cent)
GA Appling; GA Atkinson; GA Bacon; GA Bulloch; GA Camden; GA Coffee; GA Evans; GA Jeff Davis; GA Liberty; GA Long; GA McIntosh; GA Montgomery; GA Screven; GA Talbot; GA Toombs; GA Wayne; SC Beaufort; SC Hampton; SC Jasper.	
040 Albany, GA:	
SMSA Counties:	
0120 Albany, GA	32.1
GA Dougherty; GA Lee.	
Non-SMSA Counties:	
GA Baker; GA Ben Hill; GA Berrien; GA Brooks; GA Calhoun; GA Clay; GA Clinch; GA Colquitt; GA Cook; GA Decatur; GA Early; GA Echols; GA Grady; GA Irwin; GA Lanier; GA Lowndes; GA Miller; GA Mitchell; GA Randolph; GA Seminole; GA Terrell; GA Thomas; GA Tift; GA Turner; GA Worth.	31.1
Florida:	
041 Jacksonville, FL:	
SMSA Counties:	
2900 Gainesville, FL	20.6
FL Alachua.	
3600 Jacksonville, FL	21.8
FL Baker; FL Clay; FL Duval; FL Nassau; FL St. Johns.	
Non-SMSA Counties:	
FL Bradford; FL Columbia; FL Dixie; FL Gilchrist; FL Hamilton; FL LaFayette; FL Levy; FL Marion; FL Putnam; FL Suwannee; FL Union; GA Branley; GA Camden; GA Charlton; GA Glynn; GA Pierce; GA Ware.	22.2
042 Orlando - Melbourne - Daytona Beach, FL:	
SMSA Counties:	
2020 Daytona Beach, FL	15.7
FL Volusia.	
4900 Melbourne - Titusville - Cocoa, FL	10.7
FL Brevard.	
5960 Orlando, FL	15.5
FL Orange; FL Osceola; FL Seminole.	
Non-SMSA Counties:	
FL Flagler; FL Lake; FL Sumter.	14.9
043 Miami - Fort Lauderdale, FL:	
SMSA Counties:	
2640 Fort Lauderdale - Hollywood, FL	15.5
FL Broward.	
5000 Miami, FL	39.5
FL Dade.	
6960 West Palm Beach - Boca Raton, FL	22.4
FL Palm Beach.	
Non-SMSA Counties:	
FL Glades; FL Hendry; FL Indian River; FL Marion; FL Monroe; FL Okeechobee; FL St. Lucie.	30.4
044 Tampa - St Petersburg, FL:	
SMSA Counties:	
1140 Bradenton, FL	15.9
FL Manatee.	
2700 Fort Myers, FL	15.3
FL Lee.	
3980 Lakeland - Winter Haven, FL	18.0
FL Polk.	
7510 Sarasota, FL	10.5
FL Sarasota.	
8280 Tampa - St Petersburg, FL	17.9
FL Hillsborough; FL Pasco; FL Pinellas.	
Non-SMSA Counties:	
FL Charlotte; FL Citrus; FL Collier; FL DeSoto; FL Hardee; FL Hernando; FL Highlands.	17.1
045 Tallahassee, FL:	
SMSA Counties:	
8240 Tallahassee, FL	24.3
FL Leon; FL Wakulla.	
Non-SMSA Counties:	
FL Calhoun; FL Franklin; FL Gadsden; FL Jackson; FL Jefferson; FL Liberty; FL Madison; FL Taylor.	29.5
046 Pensacola - Panama City, FL:	
SMSA Counties:	
6015 Panama City, FL	14.1
FL Bay.	
6080 Pensacola, FL	18.3
FL Escambia; FL Santa Rosa.	
Non-SMSA Counties:	
FL Gulf; FL Holmes; FL Okaloosa; FL Walton; FL Washington.	15.4
Alabama:	
047 Mobile, AL:	
SMSA Counties:	
5160 Mobile, AL	25.9
AL Baldwin; AL Mobile.	
6025 Pascagoula-Moss Point, MS	16.9
MS Jackson.	
Non-SMSA Counties:	
	26.4

Economic Areas—Continued

State	Goal (per-cent)
AL Choctaw; AL Clarke; AL Conecuh; AL Escambia; AL Monroe; AL Washington; AL Wilcox; MS George; MS Greene.	
048 Montgomery, AL:	
SMSA Counties:	
6240 Montgomery, AL	29.9
AL Autauga; AL Elmore; AL Montgomery.	
Non-SMSA Counties:	
AL Barbour; AL Bullock; AL Butler; AL Coffee; AL Coosa; AL Covington; AL Crenshaw; AL Dale; AL Dallas; AL Geneva; AL Henry; AL Houston; AL Lowndes; AL Macon; AL Perry; AL Pike; AL Tallapoosa.	29.9
049 Birmingham, AL:	
SMSA Counties:	
0450 Anniston, AL	14.3
AL Calhoun.	
1000 Birmingham, AL	24.9
AL Jefferson; AL St. Clair; AL Shelby; AL Walker; AL Wetlow.	
6600 Tuscaloosa, AL	20.6
AL Tuscaloosa.	
Non-SMSA Counties:	
AL Bibb; AL Blount; AL Cherokee; AL Chilton; AL Clay; AL Cullman; AL Cullman; AL Fayette; AL Greene; AL Hale; AL Lamar; AL Marion; AL Pickens; AL Randolph; AL Sumter; AL Talladega; AL Winston.	20.7
050 Huntsville - Florence, AL:	
SMSA Counties:	
2650 Florence, AL	11.9
AL Colbert; AL Lauderdale.	
3440 Huntsville, AL	12.0
AL Limestone; AL Madison; AL Marshall.	
Non-SMSA Counties:	
AL Franklin; AL Lawrence; AL Morgan; TN Lincoln.	11.2
TENNESSEE:	
051 Chattanooga, TN:	
SMSA Counties:	
1560 Chattanooga, TN-GA	12.5
GA Chattooga; GA Dade; GA Walker; TN Hamilton; TN Marion; TN Sequatchie.	
Non-SMSA Counties:	
AL De Kalb; AL Jackson; GA Chattooga; GA Murray; GA Whitfield; TN Blount; TN Bradley; TN Grundy; TN McMinn; TN Meigs; TN Monroe; TN Polk; TN Rhea.	8.6
052 Johnson City - Kingsport - Bristol, TN-VA:	
SMSA Counties:	
3660 Johnson City - Kingsport - Bristol, TN-VA	2.6
TN Carter; TN Hawkins; TN Sullivan; TN Unicoi; TN Washington; VA Scott; VA Washington; VA Bristol.	
Non-SMSA Counties:	
TN Greene; TN Hancock; TN Johnson; VA Buchanan; VA Dickson; VA Lee; VA Russell; VA Smyth; VA Tazewell; VA Wise; VA Norton; WV McDowell; WV Mercer.	3.2
053 Knoxville, TN:	
SMSA Counties:	
3840 Knoxville, TN	6.6
TN Anderson; TN Blount; TN Knox; TN Union.	
Non-SMSA Counties:	
KY Bell; KY Harlan; KY Knox; KY Laurel; KY McCreary; KY Wayne; KY Whitley; TN Campbell; TN Claiborne; TN Cocke; TN Cumberland; TN Fentress; TN Grainger; TN Hamilton; TN Jefferson; TN Loudon; TN Morgan; TN Roane; TN Scott; TN Sevier.	4.5
054 Nashville, TN:	
SMSA Counties:	
1660 Clarksville - Hopkinsville, TN-KY	18.2
KY Christian; TN Montgomery.	
5360 Nashville - Davidson, TN	15.8
TN Cheatham; TN Davidson; TN Dickson; TN Robertson; TN Rutherford; TN Sumner; TN Williamson; TN Wilson.	
Non-SMSA Counties:	
KY Adair; KY Barren; KY Butler; KY Clinton; KY Cumberland; KY Edmonson; KY Logan; KY Metcalfe; KY Monroe; KY Simpson; KY Todd; KY Trigg; KY Warren; TN Bedford; TN Cannon; TN Clay; TN Coffee; TN DeKalb; TN Franklin; TN Giles; TN Hickman; TN Houston; TN Humphreys; TN Jackson; TN Lawrence; TN Lewis; TN Macon; TN Marshall; TN Maury; TN Moore; TN Overton; TN Perry; TN Pickett; TN Putnam; TN Smith; TN Stewart; TN Trousdale; TN Van Buren; TN Warren; TN Wayne; TN White.	12.0
055 Memphis, TN:	
SMSA Counties:	
4920 Memphis, TN-AR-MS	32.3

Economic Areas—Continued

State	Goal (per-cent)
AR Crittenden; MS De Soto; TN Shelby; TN Tipton.	
Non-SMSA Counties.....	26.5
AR Clay; AR Craighead; AR Cross; AR Greene; AR Lawrence; AR Lee; AR Mississippi; AR Phillips; AR Poinsett; AR Randolph; AR St. Francis; MS Alcorn; MS Benton; MS Bolivar; MS Calhoun; MS Carroll; MS Chickasaw; MS Clay; MS Coahoma; MS Grenada; MS Itawamba; MS Lafayette; MS Lee; MS LeFlore; MS Marshall; MS Monroe; MS Montgomery; MS Neshoba; MS Pontotoc; MS Prentiss; MS Quitman; MS Sunflower; MS Tallahatchie; MS Tate; MS Tippah; MS Tishomingo; MS Union; MS Washington; MS Webster; MS Yalobusha; MO Dunklin; MO New Madrid; MO Pemscot; TN Benton; TN Carroll; TN Chester; TN Crockett; TN Decatur; TN Dyer; TN Fayette; TN Gibson; TN Hardeman; TN Hardin; TN Haywood; TN Henderson; TN Henry; TN Lake; TN Lauderdale; TN McNairy; TN Madison; TN Obion; TN Weakley.	
Kentucky:	
056 Paducah, KY:	
Non-SMSA Counties.....	5.2
IL Hardin; IL Massac; IL Pope; KY Ballard; KY Caldwell; KY Calloway; KY Carlisle; KY Crittenden; KY Fulton; KY Graves; KY Hickman; KY Livingston; KY Lyon; KY McCracken; KY Marshall.	
057 Louisville, KY:	
SMSA Counties:	
4520 Louisville, KY-IN.....	11.2
IN Clark; IN Floyd; KY Bullitt; KY Jefferson; KY Oldham.	
Non-SMSA Counties.....	9.6
IN Crawford; IN Harrison; IN Jefferson; IN Orange; IN Scott; IN Washington; KY Breckinridge; KY Grayson; KY Harlan; KY Hart; KY Henry; KY Letcher; KY Menifee; KY Meade; KY Nelson; KY Shelby; KY Spencer; KY Trimble; KY Washington.	
058 Lexington, KY:	
SMSA Counties:	
4280 Lexington-Fayette, KY.....	10.8
KY Bourbon; KY Clark; KY Fayette; KY Jessamine; KY Scott; KY Woodford.	
Non-SMSA Counties.....	7.0
KY Adair; KY Anderson; KY Bath; KY Boyle; KY Breathitt; KY Casey; KY Clay; KY Estill; KY Franklin; KY Garrard; KY Green; KY Hamson; KY Jackson; KY Knott; KY Lee; KY Leslie; KY Letcher; KY Lincoln; KY Madison; KY Magoffin; KY Menifee; KY Mercer; KY Montgomery; KY Morgan; KY Nicholas; KY Owsley; KY Perry; KY Powell; KY Pulaski; KY Rockcastle; KY Russell; KY Taylor; KY Wolfe.	
West Virginia:	
059 Huntington, WV:	
SMSA Counties:	
3400 Huntington-Ashland, WV-KY-OH.....	2.9
KY Boyd; KY Greenup; OH Lawrence; WV Cabell; WV Wayne.	
Non-SMSA Counties.....	2.5
KY Carter; KY Elliott; KY Floyd; KY Johnson; KY Lawrence; KY Martin; KY Pike; KY Rowan; OH Galia; WV Lincoln; WV Logan; WV Mason; WV Mingo.	
060 Charleston, WV:	
SMSA Counties:	
1480 Charleston, WV.....	4.9
WV Kanawha; WV Putnam.	
Non-SMSA Counties.....	4.2
WV Boone; WV Braxton; WV Calhoun; WV Clay; WV Fayette; WV Gilmer; WV Greenbrier; WV Jackson; WV Monroe; WV Nicholas; WV Pocahontas; WV Raleigh; WV Roane; WV Summers; WV Webster; WV Wyoming.	
061 Morgantown-Farmont, WV:	
Non-SMSA Counties.....	2.1
WV Barbour; WV Doddridge; WV Harrison; WV Lincoln; WV Marion; WV Monongalia; WV Preston; WV Randolph; WV Taylor; WV Tucker; WV Upshur.	
062 Parkersburg, WV:	
SMSA Counties:	
6020 Parkersburg-Marietta, WV-OH.....	1.1
OH Washington; WV Wirt; WV Wood.	
Non-SMSA Counties.....	1.2
WV Pleasants; WV Ritchie.	
063 Wheeling - Steubenville - Wirton, WV-OH.	
SMSA Counties:	
8080 Steubenville-Wirton, OH-WV.....	4.3

Economic Areas—Continued

State	Goal (per-cent)
OH Jefferson; WV Brooke; WV Hancock.	
9000 Wheeling, WV-OH.....	2.4
OH Belmont; WV Marshall; WV Ohio.	
Non-SMSA Counties.....	3.0
OH Harrison; OH Monroe; WV Tyler; WV Wetzel.	
Ohio:	
064 Youngstown-Warren, OH:	
SMSA Counties:	
9320 Youngstown-Warren, OH.....	9.4
OH Mahoning; OH Trumbull.	
Non-SMSA Counties.....	6.7
OH Columbus; PA Lawrence; PA Mercer.	
065 Cleveland, OH:	
SMSA Counties:	
0080 Akron, OH.....	7.8
OH Portage; OH Summit.	
1320 Canton, OH.....	6.1
OH Carroll; OH Stark.	
1680 Cleveland, OH.....	16.1
OH Cuyahoga; OH Geauga; OH Lake; OH Medina.	
4440 Lorain-Elyria, OH.....	9.3
OH Lorain.	
4800 Mansfield, OH.....	6.3
OH Richland.	
Non-SMSA Counties.....	11.3
OH Ashland; OH Ashtabula; OH Coahuon; OH Crawford; OH Erie; OH Holmes; OH Huron; OH Tuscarawas; OH Wayne.	
066 Columbus, OH:	
SMSA Counties:	
1840 Columbus, OH.....	10.6
OH Delaware; OH Fairheld; OH Franklin; OH Madison; OH Pickaway.	
Non-SMSA Counties.....	7.3
OH Athens; OH Fayette; OH Guernsey; OH Hocking; OH Jackson; OH Knox; OH Licking; OH Marion; OH Merger; OH Morgan; OH Morrow; OH Muskingum; OH Noble; OH Perry; OH Pike; OH Ross; OH Scioto; OH Union; OH Vinton.	
067 Cincinnati, OH:	
SMSA Counties:	
1640 Cincinnati, OH - KY - IN.....	11.0
IN Dearborn; KY Boone; KY Campbell; KY Kenton; OH Clermont; OH Hamilton; OH Warren.	
3200 Hamilton-Middletown, OH.....	5.0
OH Butler.	
Non-SMSA Counties.....	9.2
IN Franklin; IN Ohio; IN Ripley; IN Switzerland; KY Bracken; KY Carroll; KY Fleming; KY Gallatin; KY Grant; KY Lewis; KY Mason; KY Owen; KY Pendleton; KY Robertson; OH Adams; OH Brown; OH Clinton; OH Highland.	
068 Dayton, OH:	
SMSA Counties:	
2000 Dayton, OH.....	11.5
OH Greene; OH Miami; OH Montgomery; OH Preble.	
7960 Springfield, OH.....	7.8
OH Champaign; OH Clark.	
Non-SMSA Counties.....	9.9
OH Darke; OH Logan; OH Shelby.	
069 Lima, OH:	
SMSA Counties:	
4320 Lima, OH.....	4.4
OH Allen; OH Auglaize; OH Putnam; OH Van Wert.	
Non-SMSA Counties.....	3.5
OH Hardin; OH Mercer.	
070 Toledo, OH:	
SMSA Counties:	
8400 Toledo, OH-MI.....	8.8
MI Monroe; OH Fulton; OH Lucas; OH Ottawa; OH Wood.	
Non-SMSA Counties.....	7.3
MI Lenawee; OH Hancock; OH Henry; OH Sandusky; OH Seneca; OH Wyandot.	
Michigan:	
071 Detroit, MI:	
SMSA Counties:	
0440 Ann Arbor, MI.....	8.5
MI Washtenaw.	
2160 Detroit, MI.....	17.7
MI Lapeer; MI Livingston; MI Macomb; MI Oakland; MI St. Clair; MI Wayne.	
2640 Flint, MI.....	12.6
MI Genesee; MI Shiawassee.	
Non-SMSA Counties.....	16.7
MI Sanilac.	
072 Saginaw, MI:	
SMSA Counties:	
0800 Bay City, MI.....	2.2
MI Bay.	
6960 Saginaw, MI.....	14.3

Economic Areas—Continued

State	Goal (per-cent)
MI Saginaw	
Non-SMSA Counties.....	5.2
MI Alcona; MI Alpena; MI Arenac; MI Cheboygan; MI Chippewa; MI Clare; MI Crawford; MI Gladwin; MI Gratiot; MI Huron; MI Iosco; MI Isabella; MI Leelanau; MI Mackinac; MI Midland; MI Montmorency; MI Ogemaw; MI Oscoda; MI Otsego; MI Presque Isle; MI Roscommon; MI Tuscola.	
073 Grand Rapids, MI:	
SMSA Counties:	
3000 Grand Rapids, MI.....	5.2
MI Kent; MI Ottawa.	
5320 Muskegon - Norton Shores - Muskegon Heights, MI.....	9.7
MI Muskegon; MI Oceana.	
Non-SMSA Counties.....	4.9
MI Allegan; MI Antrim; MI Benzie; MI Charlevoix; MI Emmet; MI Grand Traverse; MI Kalamazoo; MI Lake; MI Leelanau; MI Manistee; MI Mason; MI Mecosta; MI Missaukee; MI Montcalm; MI Newaygo; MI Oshtemo; MI Westland.	
074 Lansing - Kalamazoo, MI:	
SMSA Counties:	
0760 Battle Creek, MI.....	7.2
MI Barry; MI Calhoun.	
3520 Jackson, MI.....	6.1
MI Jackson.	
3720 Kalamazoo-Portage, MI.....	5.9
MI Kalamazoo; MI Van Buren.	
4040 Lansing-East Lansing, MI.....	5.5
MI Clinton; MI Easton; MI Ingham; MI Ionia.	
Non-SMSA Counties.....	5.5
MI Branch; MI Halesdale.	
Indiana:	
075 South Bend, IN:	
SMSA Counties:	
7800 South Bend, IN.....	7.1
IN Marshall; IN St. Joseph.	
2300 Elkhart, IN.....	4.0
IN Elkhart.	
Non-SMSA Counties.....	6.2
IN Fulton; IN Kosciusko; IN Lagrange; MI Bernon; MI Cass; MI St. Joseph.	
076 Fort Wayne, IN:	
Non-SMSA Counties.....	4.4
IN Allen; IN DeKalb; IN Wells; IN Huntington; IN Noble; IN Steuben; IN Whitley; OH DeFence; OH Paulding; OH Williams.	
077 Kokomo-Marion, IN:	
SMSA Counties:	
3850 Kokomo, IN.....	4.4
IN Howard; IN Tipton.	
Non-SMSA Counties.....	3.7
IN Cass; IN Grant; IN Miami; IN Wabash.	
078 Anderson-Muncie, IN:	
SMSA Counties:	
0400 Anderson, IN.....	4.9
IN Madison.	
5280 Muncie, IN.....	5.3
IN Delaware.	
Non-SMSA Counties.....	3.9
IN Blackford; IN Fayette; IN Henry; IN Jay; IN Randolph; IN Union; IN Wayne.	
079 Indianapolis, IN:	
SMSA Counties:	
1020 Bloomington, IN.....	3.1
IN Monroe.	
3480 Indianapolis, IN.....	12.5
IN Boone; IN Hamilton; IN Hendricks; IN Johnson; IN Marion; IN Morgan; IN Shelby.	
Non-SMSA Counties.....	9.7
IN Bartholomew; IN Brown; IN Davess; IN Decatur; IN Greene; IN Jackson; IN Jennings; IN Lawrence; IN Martin; IN Owen; IN Putnam; IN Rush.	
080 Evansville, IN:	
SMSA Counties:	
2440 Evansville, IN-KY.....	4.8
IN Gibson; IN Posey; IN Vanderburgh; IN Warrick; KY Henderson.	
5990 Owensboro, KY.....	4.7
KY Davess.	
Non-SMSA Counties.....	3.5
IL Edwards; IL Gallatin; IL Hamilton; IL Lawrence; IL Saline; IL Wabash; IL White; IN Dubois; IN Knox; IN Perry; IN Pike; IN Spencer; KY Hancock; KY Hopkins; KY McLean; KY Muhlenberg; KY Ohio; KY Union; KY Webster.	
081 Terre Haute, IN:	
SMSA Counties:	
8320 Terre Haute, IN.....	3.1
IN Clay; IN Sullivan; IN Vermilion; IN Vigo.	
Non-SMSA Counties.....	2.5

NOTICE OF AWARD

TO: _____

PROJECT DESCRIPTION: _____

The Owner has considered the Bid submitted by you for the above described Work in response to its Advertisement for Bids dated _____, 19____ and Information for Bidders.

You are hereby notified that your Bid has been accepted for items in the amount of \$ _____.

You are required by the Information to Bidders to execute the Agreement and furnish the required Contractor's Performance Bond, Payment Bond and Certificates of Insurance within ten (10) calendar days from the date of this notice to you.

If you fail to execute said Agreement and to furnish said Bonds within ten (10) days from the date of this Notice, the Owner will be entitled to consider all your rights arising out of the Owner's acceptance of your Bid as abandoned and as a forfeiture of your Bid Bond. The Owner will be entitled to such other rights as may be granted by law.

You are required to return an acknowledge copy of this Notice of Award to the Owner.

Dated this _____ day of _____, 19____.

Owner

By

Title

ACCEPTANCE OF NOTICE:

Receipt of the above Notice of Award is hereby acknowledged by

Signature

Date

Title

AGREEMENT

This Agreement, made this _____ day of _____, 19____, by and between _____ hereinafter called the Owner and _____ doing business as (an individual,) or (a partnership,) or (a corporation) hereinafter called "Contractor".

WITNESSETH: That for and in consideration of the payments and agreements herein after mentioned:

1. The Contractor will commence and complete the construction of _____.
2. The Contractor will furnish all of the materials, supplies, tools, equipment, labor and other services necessary for the construction and the completion of the Project described herein.
3. The Contractor will commence the Work required by the Contract Documents within _____ consecutive calendar days after the date of the Notice to Proceed and will complete the same within _____ consecutive calendar days unless the period for completion is extended otherwise by the Contract Documents.
4. The Contractor agrees to perform all of the Work described in the Contract Documents and comply with the terms therein for the sum of \$ _____ or as shown by the Bid schedule.
5. The term "Contract Documents" means and includes the following:
 - (A) Advertisement for Bids
 - (B) Information for Bidders
 - (C) Bid
 - (D) Bid Bond
 - (E) Agreement
 - (F) General Conditions
 - (G) Supplemental General Conditions

(H) Payment Bond

(I) Performance Bond

(J) Notice of Award

(K) Notice to Proceed

(L) Change Order

(M) Drawings prepared by _____
numbered _____ through _____, and dated _____, 19__

(N) Specifications prepared or issued by _____
_____, and dated _____, 19__

(O) Addenda:

No. _____, dated _____, 19__

No. _____, dated _____, 19__

No. _____, dated _____, 19__

No. _____, dated _____, 19__

No. _____, dated _____, 19__

No. _____, dated _____, 19__

6. The Owner will pay to the Contractor in the manner and at such times as set forth in the General Conditions such amounts as required by the Contract Documents.

7. This Agreement shall be binding upon all parties hereto and their respective heirs, executors, administrators, successors and assigns.

IN WITNESS WHEREOF, the parties hereto have executed or caused to be executed by there duly authorized official, this Agreement in _____ (number) copies each of which shall be deemed an original on the date first above written.

OWNER:

Owner

By

Title

(Seal)
Attest:

Signature

Name (Please Type)

Title

CONTRACTOR:

Contractor

By

Title

Address

Employee Identification Number

(Seal)
Attest:

Signature

Name (Please Type)

Title

CERTIFICATION FOR CONTRACTS, GRANTS and LOANS

The undersigned certifies, to the best of his or her knowledge and belief, that:

1. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant or Federal loan, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant or loan.

2. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant or loan, the undersigned shall complete and submit Standard Form - LLL, "Disclosure of Lobbying Activities," in accordance with its instructions.

3. The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including contracts, subcontracts, and subgrants under grants and loans) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

(name)

(date)

(title)

PERFORMANCE BOND

Know All Persons By These Presents: that

(Name of Contractor)

(Address of Contractor)

a _____, herein after called the Principal, and

(Name of Surety)

(Address of Surety)

hereinafter called Surety, are held and firmly bound unto _____

(Name of Owner)

(Address of Owner)

hereinafter called Owner, and the United States of America acting through the Rural Utilities Service hereinafter referred to as the Government: in the total aggregate penal sum of

_____ Dollars (\$ _____)

in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

The Condition Of This Obligation is such that whereas, the Principal entered into a certain contract with the Owner, dated the _____ day of _____ 19____, a copy of which is hereto attached and made a part hereof for the construction of:

Now, Therefore, if the Principal shall well, truly and faithfully perform its duties, all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term thereof, and any extensions thereof which may be granted by the Owner, or Government, with or without notice to the Surety and during the one year guaranty period and of the Principal shall satisfy all claims and demands incurred under such contract, and shall fully

indemnify and save harmless the Owner and Government from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the Owner and Government all outlay and expense which the Owner and Government may incur in making good any default, then this obligation shall be void, otherwise to remain on full force and effect.

Provided, Further, that the liability of the Principal And Surety hereunder to the Government shall be subject to the same limitations and defenses as may be available to them against a claim hereunder by the Owner, provided, however, that the Government may, at its option, perform any obligations of the Owner required by the contract.

Provided, Further, that the said Surety, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to Work to be performed thereunder or the Specifications accompanying same shall in any way affect its obligation on this Bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the Work or to the Specifications.

Provided, Further, that it is expressly agreed that the Bond shall be deemed amended automatically and immediately, without formal and separate amendments hereto, upon amendment to the Contract not increasing the contract price more than 20 percent, so as to bind the Principal and the Surety to the full and faithful performance of the contract as so amended. The term "Amendment", wherever used in this Bond, and whether referring to this Bond, the Contract or the Loan Documents shall include any alteration, addition, extension, or modification of any character whatsoever.

Provided, Further, that no final settlement between the Owner or Government and the Principal shall abridge the right of the other beneficiary hereunder, whose claim may be unsatisfied. The Owner and Government are only beneficiaries hereunder.

In Witness whereof, this instrument is executed in _____ counterparts, each
(Number)
one of which shall be deemed an original, this the _____ day of
_____ 19 _____.

Attest:

Principal

(Principal) Secretary

(Seal)

By _____ (s)

(Address)

Witness to the Principal

(Address)

Surety

Attest:

Witness to Surety

(Address)

(Address)

NOTE: Date of Bond must not be prior to date of Contract.

If the Contractor is a partnership, all partners should execute the Bond.

IMPORTANT: Surety companies executing Bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and must be authorized to transact business in the State where the Project is located. In addition the Surety must not exceed the bonding limits set forth in the circular.

PAYMENT BOND

Know All Persons By These Presents: that

(Name of Contractor)

(Address of Contractor)

a _____, herein after called the Principal, and

(Name of Surety)

(Address of Surety)

hereinafter called Surety, are held and firmly bound unto _____

(Name of Owner)

(Address of Owner)

hereafter called Owner and the United States of America acting through the Rural Utilities Service hereinafter referred to as Government, and unto all persons, firms, and corporations who or which may furnish labor, or who furnish materials to perform as described under the Contract and to their successors and assigns in the total aggregate penal sum of _____ Dollars

(\$ _____) in lawful money of the United States, for payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

The Condition Of This Obligation is such that whereas, the Principal entered into a separate contract with the Owner, dated the _____ day of _____ 19____, a copy of which is hereto attached and made a part hereof for the construction of:

Now, Therefore, if the Principal shall promptly make payment to all persons, firms, and corporations furnishing materials or performing labor in the prosecution of the Work provided for in such Contract, and any authorized extensions or modifications thereof, including all amounts due for materials, lubricants, oil, gasoline, coal and coke, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such Work, and

for all labor cost incurred in such Work including that by a Subcontractor, and to any mechanic or materialman lienholder whether it acquires its lien by operation of State or Federal law; then this obligation shall be void, otherwise to remain in full force and effect.

Provided, that beneficiaries or claimants hereunder shall be limited to the Subcontractors, and persons, firms, and corporations having a direct contract with the Principal or its Subcontractors.

Provided, Further, that the said Surety for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to the Work to be performed thereunder or the Specifications accompanying the same shall in any way affect its obligation on this Bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract or to the Work or to the Specifications.

Provided, Further, that no suit or action shall be commenced hereunder by any claimant: (a) Unless claimant, other than one having a direct contract with the Principal (or with the Government in the event the Government is performing the obligations of the Owner), shall have given written notice to any two of the following: The Principal, the Owner or the Surety above named within ninety (90) days after such claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same by registered mail or certified mail, postage prepaid, in an envelope address to the Principal, Owner or Surety, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the state in which the aforesaid project is located, save that such service need not be made by a public officer. (b) After the expiration of one (1) year following the date of which Principal ceased work on said Contract, is being understood, however, that if any limitation embodied in the Bond is prohibited by law controlling the construction hereof, such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.

Provided, Further, that it is expressly agreed that this Bond shall be deemed amended automatically and immediately, without formal and separate amendments hereto, upon amendment to the Contract not increasing the contract more than twenty (20) percent,

so as to bind the Principal and the Surety to the full and faithful performance of the Contract as so amended. The term "Amendment", wherever used in this Bond and whether referring to this Bond, the contract or the loan Documents shall include any alteration, addition, extension or modification of any character whatsoever.

Provided, Further, that no final settlement between the Owner or Government and the Contractor shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

In Witness whereof, this instrument is executed in _____ counterparts, each
(Number)
one of which shall be deemed an original, this the _____ day of
_____ 19 _____.

Attest:

Principal

(Principal) Secretary

(Seal)

By _____ (s)

(Address)

Witness to the Principal

(Address)

Surety

Attest:

Witness to Surety

By _____

(Address)

(Address)

NOTE: Date of Bond must not be prior to date of Contract.

If the Contractor is a partnership, all partners should execute the Bond.

IMPORTANT: Surety companies executing Bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and must be authorized to transact business in the State where the Project is located. In addition the Surety must not exceed the bonding limits set forth in the circular.

NOTICE TO PROCEED

TO: _____ DATE: _____
_____ PROJECT: _____

You are hereby notified to commence Work in accordance with the Agreement dated _____, 19____, on or before _____, 19____ and you are to complete the Work within _____consecutive calendar days thereafter. The date of completion of all Work is therefore _____ 19____.

Owner

By

Title

ACCEPTANCE OF NOTICE:
Receipt of the above Notice to Proceed is hereby acknowledge by

Signature _____ Date _____

Title

PARTIAL PAY ESTIMATE

No. _____ & - Pay Period _____

Contractor: _____ Project - Owner: _____

Address: _____

Date of Completion: _____ Amount of Contract: _____

Original _____ Original _____

Revised _____ Revised _____
(Col. 1 + C0)

ANALYSIS OF WORK PERFORMED

Completed to Date (Col. 4) _____

Less Amount Retained _____ %

Net Amount Earned _____

Plus Material Stored,
Less 10% * _____

Total Earned & Amount Stored _____

Less Previous Payments _____

Due This Estimate _____

* Attach Separate Schedule.

CHANGE ORDERS APPROVED (Number) _____

NET CHANGE ORDER AMOUNT: _____

Contracting Firm _____

By _____ Date _____

I hereby certify that I have carefully inspected the work and as a result of my inspection and to the best of my knowledge and belief, the quantities and amounts shown as due are correct, and the work has been performed in accordance with contract documents.

Engineering Firm _____

By _____ Date _____

Owner _____

By _____ Date _____

Accepted by FmHA Representative:

The review and acceptance of partial pay estimates by FmHA does not attest to the correctness of the quantities shown or that the work has been performed in accordance with the plans and specifications.

FmHA Signature _____

Date _____

Project - Owner _____ Estimate No. _____

Item No.	Description	ORIGINAL CONTRACT			REVISED CONTRACT (ORIGINAL+C.O.)			COMPLETED TO DATE	
		Quantity	Unit Cost	Total Cost (1)	C.O. No.	Quantity	Total Cost (2)	Quantity	Total Cost (4)

GENERAL CONDITIONS

- | | |
|--|---|
| 1. Definitions | 17. Subsurface Conditions |
| 2. Additional Instructions and Detail Drawings | 18. Suspension of Work, Termination and Delay |
| 3. Schedules, Reports and Records | 19. Payments to Contractors |
| 4. Drawings and Specifications | 20. Acceptance of Final Payment as Release |
| 5. Shop Drawings | 21. Insurance |
| 6. Materials, Services and Facilities | 22. Contract Security |
| 7. Inspection and Testing | 23. Assignments |
| 8. Substitutions | 24. Indemnification |
| 9. Patents | 25. Separate Contracts |
| 10. Surveys, Permits and Regulations | 26. Subcontracting |
| 11. Protection of Work, Property and Persons | 27. Engineer's Authority |
| 12. Supervision by Contractor | 28. Land and Rights-of-Way |
| 13. Changes in the Work | 29. Guaranty |
| 14. Changes in Contract Price | 30. Arbitration |
| 15. Time for Completion and Liquidated Damages | 31. Taxes |
| 16. Correction of Work | 32. Environmental Requirements |

1. DEFINITIONS

1.1 Wherever used in the CONTRACT DOCUMENTS, the following terms shall have the meanings indicated and shall be applicable to both the singular and plural thereof:

1.2 ADDENDA - Written or graphic instruments issued prior to the execution of the Agreement which modify or interpret the CONTRACT DOCUMENTS, DRAWINGS and SPECIFICATIONS, by additions, deletions, clarifications or corrections.

1.3 BID - The offer or proposal of the BIDDER submitted on the prescribed form setting forth the prices for the WORK to be performed.

1.4 BIDDER - Any person, firm or corporation submitting a BID for the WORK.

1.5 BONDS - Bid, Performance and Payment Bonds and other instruments of surety, furnished by the CONTRACTOR and the CONTRACTOR'S surety in accordance with the CONTRACT DOCUMENTS.

1.6 CHANGE ORDER - A written order to the CONTRACTOR authorizing an addition, deletion or revision in the WORK within the general scope of the CONTRACT DOCUMENTS, or authorizing an adjustment in the CONTRACT PRICE or CONTRACT TIME.

1.7 CONTRACT DOCUMENTS - The contract, including Advertisement for BIDS, Information for Bidders, BID, BID BOND, Agreement, PAYMENT BOND, PERFORMANCE BOND, NOTICE OF AWARD, NOTICE TO PROCEED, CHANGE ORDER, DRAWINGS, SPECIFICATIONS and ADDENDA.

- 1.8 CONTRACT PRICE - The total monies payable to the CONTRACTOR under the terms and conditions of the CONTRACT DOCUMENTS.
- 1.9 CONTRACT TIME - The number of calendar days stated in the CONTRACT DOCUMENTS for the completion of the work.
- 1.10 CONTRACTOR - The person, firm or corporation with whom the OWNER has executed the Agreement.
- 1.11 DRAWINGS - The parts of the CONTRACT DOCUMENTS which show the characteristics and scope of the WORK to be performed and which have been prepared or approved by the ENGINEER.
- 1.12 ENGINEER - The person, firm or corporation named as such in the CONTRACT DOCUMENTS.
- 1.13 FIELD ORDER - A written order effecting a change in the WORK not involving an adjustment in the CONTRACT PRICE or an extension of the CONTRACT TIME, issued by the ENGINEER to the CONTRACTOR during construction.
- 1.14 NOTICE OF AWARD - The written notice of the acceptance of the BID from the OWNER to the successful BIDDER.
- 1.15 NOTICE TO PROCEED - Written communication issued by the OWNER to the CONTRACTOR authorizing him/her to proceed with the WORK and establishing the date for commencement of the WORK.
- 1.16 OWNER - A public or quasi-public body or authority, corporation, association, partnership or an individual for whom the WORK is to be performed.
- 1.17 PROJECT - The undertaking to be performed as provided in the CONTRACT DOCUMENTS.
- 1.18 RESIDENT PROJECT REPRESENTATIVE - The authorized representative of the OWNER who is assigned to the PROJECT site or any part thereof.
- 1.19 SHOP DRAWINGS - All drawings, diagrams, illustrations, brochures, schedules and other data which are prepared by the CONTRACTOR, a SUBCONTRACTOR, manufacturer, SUPPLIER or distributor, which illustrates how specific portions of the WORK shall be fabricated or installed.
- 1.20 SPECIFICATIONS - A part of the CONTRACT DOCUMENTS consisting of written descriptions of a technical nature of materials, equipment, construction systems, standards and workmanship.
- 1.21 SUBCONTRACTOR - An individual, firm or corporation having a direct contract with CONTRACTOR or with any other SUBCONTRACTOR for the performance of a part of the WORK at the site.
- 1.22 SUBSTANTIAL COMPLETION - That date certified by the ENGINEER when the construction of the PROJECT or a specified part thereof is sufficiently completed, in accordance with the CONTRACT DOCUMENTS, so that the PROJECT or specified part can be utilized for the purposes for which it is intended.

1.23 SUPPLEMENTAL GENERAL CONDITIONS - Modifications to General Conditions required by a Federal agency for participation in the PROJECT and approved by the agency in writing prior to inclusion in the CONTRACT DOCUMENTS, or such requirements that may be imposed by applicable state laws.

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

1.25 WORK - All labor necessary to produce the construction required by the CONTRACT DOCUMENTS and all materials and equipment incorporated or to be incorporated in the PROJECT.

1.26 WRITTEN NOTICE -- Any notice to any party of the Agreement relative to any part of this Agreement in writing and considered delivered and the service thereof completed, when posted by certified or registered mail to the said party at their last given address, or delivered in person to said party or their authorized representative on the WORK.

2. ADDITIONAL INSTRUCTIONS AND DETAIL DRAWINGS

2.1 The CONTRACTOR may be furnished additional instructions and detail drawings, by the ENGINEER, as necessary to carry out the WORK required by the CONTRACT DOCUMENTS.

2.2 The additional drawings and instructions thus supplied will become a part of the CONTRACT DOCUMENTS. The CONTRACTOR shall carry out the WORK in accordance with the additional detail drawings and instructions.

3. SCHEDULES, REPORTS AND RECORDS

3.1 The CONTRACTOR shall submit to the OWNER such schedule of quantities and costs, progress schedules, payrolls, reports, estimates, records and other data where applicable as are required by the CONTRACT DOCUMENTS for the WORK to be performed.

3.2 Prior to the first partial payment estimate the CONTRACTOR shall submit construction progress schedules showing the order in which the CONTRACTOR proposes to carry on the WORK, including dates at which the various parts of the WORK will be started, estimated date of completion of each part and, as applicable:

3.2.1 The dates at which special detail drawings will be required; and

3.2.2 Respective dates for submission of SHOP DRAWINGS, the beginning of manufacture, the testing and the installation of materials, supplies and equipment.

3.3 The CONTRACTOR shall also submit a schedule of payments that the CONTRACTOR anticipates will be earned during the course of the WORK.

4. DRAWINGS AND SPECIFICATIONS

4.1 The intent of the DRAWINGS and SPECIFICATIONS is that the CONTRACTOR shall furnish all labor, materials, tools, equipment and transportation necessary for the proper execution of the WORK in accordance with the CONTRACT DOCUMENTS and all incidental work necessary to complete the PROJECT in an acceptable manner, ready for use, occupancy or operation by the OWNER.

4.2 In case of conflict between the DRAWINGS and SPECIFICATIONS, the SPECIFICATIONS shall govern. Figure dimensions on DRAWINGS shall govern over general DRAWINGS.

4.3 Any discrepancies found between the DRAWINGS and SPECIFICATIONS and site conditions or any inconsistencies or ambiguities in the DRAWINGS or SPECIFICATIONS shall be immediately reported to the ENGINEER, in writing, who shall promptly correct such inconsistencies or ambiguities in writing. WORK done by the CONTRACTOR after discovery of such discrepancies, inconsistencies or ambiguities shall be done at the CONTRACTOR'S risk.

5. SHOP DRAWINGS

5.1 The CONTRACTOR shall provide SHOP DRAWINGS as may be necessary for the prosecution of the WORK as required by the CONTRACT DOCUMENTS. The ENGINEER shall promptly review all SHOP DRAWINGS. The ENGINEER'S approval of any SHOP DRAWING shall not release the CONTRACTOR from responsibility for deviations from the CONTRACT DOCUMENTS. The approval of any SHOP DRAWING which substantially deviates from the requirement of the CONTRACT DOCUMENTS shall be evidenced by a CHANGE ORDER.

5.2 When submitted for the ENGINEER'S review, SHOP DRAWINGS shall bear the CONTRACTOR'S certification that he has reviewed, checked and approved the SHOP DRAWINGS and that they are in conformance with the requirements of the CONTRACT DOCUMENTS.

5.3 Portions of the WORK requiring a SHOP DRAWING or sample submission shall not begin until the SHOP DRAWING or submission has been approved by the ENGINEER. A copy of each approved SHOP DRAWING and each approved sample shall be kept in good order by the CONTRACTOR at the site and shall be available to the ENGINEER.

6. MATERIALS, SERVICES AND FACILITIES

6.1 It is understood that, except as otherwise specifically stated in the CONTRACT DOCUMENTS, the CONTRACTOR shall provide and pay for all materials, labor, tools, equipment, water, light, power, transportation, supervision, temporary construction of any nature, and all other services and facilities of any nature whatsoever necessary to execute, complete, and deliver the WORK within the specified time.

6.2 Materials and equipment shall be so stored as to insure the preservation of their quality and fitness for the WORK. Stored materials and equipment to be incorporated in the WORK shall be located so as to facilitate prompt inspection.

6.3 Manufactured articles, materials, and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned as directed by the manufacturer.

6.4 Materials, supplies and equipment shall be in accordance with samples submitted by the CONTRACTOR and approved by the ENGINEER.

6.5 Materials, supplies or equipment to be incorporated into the WORK shall not be purchased by the CONTRACTOR or the SUBCONTRACTOR subject to a chattel mortgage or under a conditional sale contract or other agreement by which an interest is retained by the seller.

7. INSPECTION AND TESTING

7.1 All materials and equipment used in the construction of the PROJECT shall be subject to adequate inspection and testing in accordance with generally accepted standards, as required and defined in the CONTRACT DOCUMENTS.

7.2 The OWNER shall provide all inspection and testing services not required by the CONTRACT DOCUMENTS.

7.3 The CONTRACTOR shall provide at the CONTRACTOR'S expense the testing and inspection services required by the CONTRACT DOCUMENTS.

7.4 If the CONTRACT DOCUMENTS, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction require any WORK to specifically be inspected, tested or approved by someone other than the CONTRACTOR, the CONTRACTOR will give the ENGINEER timely notice of readiness. The CONTRACTOR will then furnish the ENGINEER the required certificates of inspection, testing or approval.

7.5 Inspections, tests or approvals by the ENGINEER or others shall not relieve the CONTRACTOR from the obligations to perform the WORK in accordance with the requirements of the CONTRACT DOCUMENTS.

7.6 The ENGINEER and the ENGINEER'S representatives will at all times have access to the WORK. In addition, authorized representatives and agents of any participating Federal or State agency shall be permitted to inspect all work, materials, payrolls, records or personnel, invoices of materials and other relevant data and records. The CONTRACTOR will provide proper facilities for such access and observation of the WORK and also for any inspection or testing thereof.

7.7 If any WORK is covered contrary to the written instructions of the ENGINEER, it must, if requested by the ENGINEER, be uncovered for the ENGINEER'S observation and replaced at the CONTRACTOR'S expense.

7.8 If the ENGINEER considers it necessary or advisable that covered WORK be inspected or tested by others, in the CONTRACTOR, at the ENGINEER'S request, will uncover, expose or otherwise make available for observation, inspection or testing as the ENGINEER may require, that portion of the WORK in question, furnishing all necessary labor, materials, tools and equipment. If it is found that such WORK is defective, the CONTRACTOR will bear all the expenses of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction, if, however, such WORK is not found to be defective, the CONTRACTOR will 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 and an appropriate CHANGE ORDER shall be issued.

8. SUBSTITUTIONS

8.1 Whenever a material, article, or piece of equipment is identified on the DRAWINGS or SPECIFICATIONS by reference to brand name or catalogue numbers, it shall be understood that this is referenced for the purpose of defining the performance or other salient requirements and that other products of equal capacities, quality and function shall be considered. The CONTRACTOR may recommend the substitution of a material, article or piece of equipment of equal substance and function for those referred to in the CONTRACT DOCUMENTS by reference to brand name or catalogue number, and if, in the opinion of the ENGINEER, such material, article, or piece of equipment is of equal substance

and function to that specified, the ENGINEER may approve its substitution and use by the CONTRACTOR. Any cost differential shall be deductible from the CONTRACT PRICE and the CONTRACT DOCUMENTS shall be appropriately modified by CHANGE ORDER. The CONTRACTOR warrants that if substitutes are approved, no major changes in the function or general design of the PROJECT will result. Incidental changes or extra component parts required to accommodate the substitute will be made by the CONTRACTOR without a change in the CONTRACT PRICE or CONTRACT TIME.

9. PATENTS

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

10. SURVEYS, PERMITS AND REGULATIONS

10.1 The OWNER shall furnish all boundary surveys and establish all base lines for locating the principal component parts of the WORK together with a suitable number of bench marks adjacent to the WORK as shown in the CONTRACT DOCUMENTS. From the information provided by the OWNER, unless otherwise specified in the CONTRACT DOCUMENTS, the CONTRACTOR shall develop and make all detail surveys needed for construction such as slope stakes, batter boards, stakes for pipe locations and other working points, lines, elevations and cut sheets.

10.2 The CONTRACTOR shall carefully preserve bench marks, reference points and stakes and, in case of willful or careless destruction, shall be charged with the resulting expense and shall be responsible for any mistake that may be caused by their unnecessary loss or disturbance.

10.3 Permits and licenses of a temporary nature necessary for the prosecution of the WORK shall be secured and paid for by the CONTRACTOR unless otherwise stated in the SUPPLEMENTAL GENERAL CONDITIONS. Permits, licenses and easements for permanent structures or permanent changes in existing facilities shall be secured and paid for by the OWNER, unless otherwise specified. The CONTRACTOR shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the WORK as drawn and specified. If the CONTRACTOR observes that the CONTRACT DOCUMENTS are at variance therewith, the CONTRACTOR shall promptly notify the ENGINEER in writing, and any necessary changes shall be adjusted as provided in Section 13, CHANGES IN THE WORK.

11. PROTECTION OF WORK, PROPERTY AND PERSONS

11.1 The CONTRACTOR will be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the WORK. The CONTRACTOR will take all necessary precautions for the safety of, will provide the necessary precautions for the safety of, and will provide the necessary protection to prevent damage, injury or loss to all employees on the WORK and other persons who may be affected thereby, all the WORK and all materials or equipment to be incorporated therein, whether in storage on or off the site, and 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.

11.2 The CONTRACTOR will comply with all applicable laws, ordinances, rules, regulations and orders of any public body having jurisdiction. The CONTRACTOR will erect and maintain, as required by the conditions and progress of the WORK, all necessary safeguards for safety and protection. The CONTRACTOR will notify owners of adjacent utilities when prosecution of the WORK may affect them. The CONTRACTOR will remedy all damage, injury or loss to any property caused, directly or indirectly, in whole or part, by the CONTRACTOR, any SUBCONTRACTOR or anyone directly or indirectly employed by any of them or anyone of whose acts any of them be liable, except damage or loss attributable to the fault of the CONTRACT DOCUMENTS or to the acts or omissions of the OWNER, of the ENGINEER or anyone employed by either of them or anyone for whose acts either of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of the CONTRACTOR.

11.3 In emergencies affecting the safety of persons or the WORK or property at the site or adjacent thereto, the CONTRACTOR, without special instructions or authorization from the ENGINEER or OWNER, shall act to prevent threatened damage, injury or loss. The CONTRACTOR will give the ENGINEER prompt WRITTEN NOTICE of any significant changes in the WORK or deviations from the CONTRACT DOCUMENTS caused thereby, and a CHANGE ORDER shall thereupon be issued covering the changes and deviations involved.

12. SUPERVISION BY CONTRACTOR

12.1 The CONTRACTOR will supervise and direct the WORK. He will be solely responsible for the means, methods, techniques, sequences and procedures of construction. The CONTRACTOR will employ and maintain on the WORK a qualified supervisor or superintendent who shall have been designated in writing by the CONTRACTOR as the CONTRACTOR'S REPRESENTATIVE at the site. The supervisor shall have full authority to act on behalf of the CONTRACTOR and all communications given to the supervisor shall be as binding as if given to the CONTRACTOR. The supervisor shall be present on the site at all times as required to perform adequate supervision and coordination of the WORK.

13. CHANGES IN THE WORK

13.1 The OWNER may at any time, as the need arises, order changes within the scope of the WORK without invalidating the Agreement. If such changes increase or decrease the amount due under the CONTRACT DOCUMENTS, or in the time required for performance of the WORK, an equitable adjustment shall be authorized by CHANGE ORDER.

13.2 The ENGINEER, also, may at any time, by issuing a FIELD ORDER, make changes in the details of the WORK. The CONTRACTOR shall proceed with the performance of any changes in the WORK so ordered by the ENGINEER unless the CONTRACTOR believes that such FIELD ORDER entitles the CONTRACTOR to a change in CONTRACT PRICE OR TIME, or both, in which event the CONTRACTOR shall give the ENGINEER WRITTEN NOTICE thereof within seven (7) days after the receipt of the ordered change. Thereafter the CONTRACTOR shall document that basis for the change in CONTRACT PRICE or TIME within thirty (30) days. The CONTRACTOR shall not execute such changes pending the receipt of an executed CHANGE ORDER or further instruction from the OWNER.

14. CHANGES IN CONTRACT PRICE

14.1 The CONTRACT PRICE may be changed only by a CHANGE ORDER. The value of any WORK covered by a CHANGE ORDER or of any claim for increase or decrease in the CONTRACT PRICE shall be determined by one or more of the following methods in the order of precedence listed below:

- a. Unit prices previously approved.
- b. An agreed sum.

15. TIME FOR COMPLETION AND LIQUIDATED DAMAGES

15.1 The date of beginning and the time for completion of the WORK are essential conditions of the CONTRACT DOCUMENTS and the WORK embraced shall be commenced on a date specified in the NOTICE TO PROCEED.

15.2 The CONTRACTOR will proceed with the WORK at such rate of progress to insure full completion within the CONTRACT TIME. It is expressly understood and agreed, by and between the CONTRACTOR and the OWNER, that the CONTRACT TIME for the completion of the WORK described herein is a reasonable time taking into consideration the average climatic and economic conditions and other factors prevailing in the locality of the WORK.

15.3 If the CONTRACTOR shall fail to complete the WORK within the CONTRACT TIME, or extension of time granted by the OWNER, then the CONTRACTOR will pay to the OWNER the amount for liquidated damages as specified in the BID for each calendar day that the CONTRACTOR shall be in default after the time stipulated in the CONTRACT DOCUMENTS.

15.4 The CONTRACTOR shall not be charged with liquidated damages or any excess cost when the delay in completion of the WORK is due to the following and the CONTRACTOR has promptly given WRITTEN NOTICE of such delay to the OWNER or ENGINEER.

15.4.1 To any preference, priority or allocation order duly issued by the OWNER.

15.4.2 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 OWNER, acts of another CONTRACTOR in the performance of a contract with the OWNER, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes and abnormal and unforeseeable weather; and

15.4.3 To any delays of SUBCONTRACTORS occasioned by any of the causes specified in paragraphs 15.4.1 and 15.4.2 of this Article.

16. CORRECTION OF WORK

16.1 The CONTRACTOR shall promptly remove from the premises all WORK rejected by the ENGINEER for failure to comply with the CONTRACT DOCUMENTS, whether incorporated in the construction or not, and the CONTRACTOR shall promptly replace and re-execute the WORK in accordance with the CONTRACT DOCUMENTS and without expense to the OWNER and shall bear the expense of making good all WORK of other CONTRACTORS destroyed or damaged by such removal or replacement.

16.2 All removal and replacement WORK shall be done at the CONTRACTOR'S expense. If the CONTRACTOR does not take action to remove such rejected WORK within ten (10) days after receipt of WRITTEN NOTICE, the OWNER may remove such WORK and store the materials at the expense of the CONTRACTOR.

17. SUBSURFACE CONDITIONS

17.1 The CONTRACTOR shall promptly, and before such conditions are disturbed, except in the event of an emergency, notify the OWNER, by WRITTEN NOTICE of:

17.1.1 Subsurface or latent physical conditions at the site differing materially from those indicated in the CONTRACT DOCUMENTS; or

17.1.2 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 the CONTRACT DOCUMENTS.

17.2 The OWNER shall promptly investigate the conditions, and if it is found that such conditions do so materially differ and cause an increase or decrease in the cost of, or in the time required for, performance of the WORK, an equitable adjustment shall be made and the CONTRACT DOCUMENTS shall be modified by a Change Order. Any claim of the CONTRACTOR for adjustment hereunder shall not be allowed unless the required WRITTEN NOTICE has been given; provided that the OWNER may, if the OWNER determines the facts so justify, consider and adjust any such claims asserted before the date of final payment.

18. SUSPENSION OF WORK, TERMINATION AND DELAY

18.1 The OWNER may suspend the WORK or any portion thereof for a period of not more than ninety (90) days or such further time as agreed upon by the CONTRACTOR, by WRITTEN NOTICE to the CONTRACTOR and the ENGINEER which shall fix the date on which WORK shall be resumed. The CONTRACTOR will resume that 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.

18.2 If the CONTRACTOR is adjudged a bankrupt or insolvent, or makes a general assignment for the benefit of its creditors, or is a trustee or receiver is appointed for the CONTRACTOR or for any of its property, or if CONTRACTOR files a petition to take advantage of any debtor's act, or to reorganize under the bankruptcy or applicable laws, or repeatedly fails to supply sufficient skilled workmen or suitable materials or equipment, or repeatedly fails to make prompt payments to SUBCONTRACTORS or for labor, materials or equipment or disregards laws, ordinances, rules, regulations or orders of any public body having jurisdiction of the WORK or disregards the authority of the ENGINEER or otherwise violates any provision of the CONTRACT DOCUMENTS, then the OWNER may, without prejudice to any other right or remedy and after giving the CONTRACTOR and its surety a minimum of ten (10) days from delivery of a WRITTEN NOTICE, terminate the services of the CONTRACTOR and take possession of the PROJECT and of all materials, equipment, tools, construction equipment and machinery thereon owned by the CONTRACTOR, and finish the WORK by whatever method 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 PROJECT, including compensation for additional professional services, such excess SHALL BE PAID TO THE CONTRACTOR. If such costs exceed such unpaid balance, the CONTRACTOR will pay the difference to the OWNER. Such costs incurred by the OWNER will be determined by the ENGINEER and incorporated in a CHANGE ORDER.

18.3 Where the CONTRACTOR'S services have been so terminated by the OWNER, said termination shall not affect any right of the OWNER against the CONTRACTOR then existing or which may thereafter accrue. Any retention or payment of monies by the OWNER due the CONTRACTOR will not release the CONTRACTOR from compliance with the CONTRACT DOCUMENTS.

18.4 After ten (10) days from delivery of a WRITTEN NOTICE to the CONTRACTOR and the ENGINEER, the OWNER may, without cause and without prejudice to any other right or remedy, elect to abandon the PROJECT and terminate the CONTRACT. In such case the CONTRACTOR shall be paid for all WORK executed and any expense sustained plus reasonable profit.

18.5 If, through no act of 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 the court or other public authority, or the ENGINEER fails to act on any request for payment within thirty (30) days after it is submitted, or the OWNER fails to pay the CONTRACTOR substantially the sum approved by the ENGINEER or awarded by arbitrators within thirty (30) days of its approval and presentation, then the CONTRACTOR may, after ten (10) days from delivery of a WRITTEN NOTICE to the OWNER and the ENGINEER terminate the CONTRACT and recover from the OWNER payment for all WORK executed and all expenses sustained. In addition and in lieu of terminating the CONTRACT, if the ENGINEER has failed to act on a request for payment or if the OWNER has failed to make any payment as aforesaid, the CONTRACTOR may upon ten (10) days WRITTEN NOTICE to the OWNER and the ENGINEER stop the WORK until paid all amounts then due, in which event and upon resumption of the WORK CHANGE ORDERS shall be issued for adjusting the CONTRACT PRICE or extending the CONTRACT TIME or both to compensate for the costs and delays attributable to the stoppage of the WORK.

18.6 If the performance of all or any portion of the WORK is suspended, delayed or interrupted as a result of a failure of the OWNER or ENGINEER to act within the time specified in the CONTRACT DOCUMENTS, or if no time is specified, within a reasonable time, an adjustment in the CONTRACT PRICE or an extension of the CONTRACT TIME, or both, shall be made by CHANGE ORDER to compensate the CONTRACTOR for the costs and delays necessarily caused by the failure of the OWNER or ENGINEER.

19. PAYMENT TO CONTRACTOR

19.1 At least ten (10) days before each progress payment falls due (but not more often than once a month), the CONTRACTOR will submit to the ENGINEER a partial payment estimate filled out and signed by the CONTRACTOR covering the WORK performed during the period covered by the partial payment estimate and supported by such data as the ENGINEER may reasonably require. If payment is requested on the basis of materials and equipment not incorporated in the WORK but delivered and suitably stored at or near the site, the partial payment estimate shall also be accompanied by such supporting data, satisfactory to the OWNER, as will establish the OWNER'S title to the material and equipment and protect the OWNER'S interest therein, including applicable insurance. The ENGINEER will, within ten (10) days after receipt of each partial payment estimate, either indicate in writing approval of payment, and present the partial payment estimate to the OWNER, or return the partial payment estimate to the CONTRACTOR indicating in writing the reasons for refusing to approve payment. In the

latter case, the CONTRACTOR may make the necessary corrections and resubmit the partial payment estimate. The OWNER will, within ten (10) days of presentation of an approved partial payment estimate, pay the CONTRACTOR a progress payment on the basis of the approved partial payment estimate, less the retainage. The retainage shall be an amount equal to ten (10%) percent of said estimate until fifty (50%) percent of the work has been completed. At fifty (50%) percent completion, further partial payments shall be made in full to the CONTRACTOR and no additional amounts may be retained unless the ENGINEER certifies that the job is not proceeding satisfactorily, but amounts previously retained shall not be paid to the CONTRACTOR. At fifty (50%) percent completion or any time thereafter when the progress of the WORK is not satisfactory, additional amounts may be retained but in no event shall the total retainage be more than ten (10%) percent of the value of the work completed. Upon substantial completion of the work, any amount retained may be paid to the CONTRACTOR. When the WORK has been substantially completed except for WORK which cannot be completed because of weather conditions, lack of materials or other reasons which in the judgement of the OWNER are valid reasons for noncompletion, the OWNER may make additional payments, retaining at all times an amount sufficient to cover the estimated cost of the WORK still to be completed. **NOTE** - No project progress payments will be made that place in escrow any funds that are required for retainage, nor invest the retainage for the benefit of the Contractor. In addition, all project funds, regardless of other local, state or federal participation, or private funding of the project will be subject to retainage in the amounts indicated above.

19.2 The request for payment may also include an allowance for the cost of such major materials and equipment which are suitably stored either at or near the site.

19.3 Prior to SUBSTANTIAL COMPLETION, the OWNER, with the approval of the ENGINEER and with the concurrence of the CONTRACTOR, may use any completed or substantially completed portions of the WORK. Such use shall not constitute an acceptance of such portions of the work.

19.4 The OWNER shall have the right to enter the premises for the purpose of doing work not covered by the CONTRACT DOCUMENTS. This provision shall not be construed as relieving the CONTRACTOR of the sole responsibility for the care and protection of the WORK, or the restoration of any damaged WORK except such as may be caused by agents or employees of the OWNER.

19.5 Upon completion and acceptance of the WORK, the ENGINEER shall issue a certificate attached to the final payment request that the WORK has been accepted under the conditions of the CONTRACT DOCUMENTS. The entire balance found to be due the CONTRACTOR, including the retained percentages, but except such sums as may be lawfully retained by the OWNER, shall be paid to the CONTRACTOR within thirty (30) days of completion and acceptance of the WORK.

19.6 The CONTRACTOR will indemnify and save the OWNER or the OWNER'S agents harmless from all claims growing out of the lawful demand of SUBCONTRACTORS, laborers, workmen, mechanics, materialmen and furnishers of machinery and parts thereof, equipment, tools and all supplies, incurred in the furtherance of the performance of the WORK. The CONTRACTOR shall, at the OWNER'S request furnish satisfactory evidence that all obligations of the nature designated above have been paid, discharged or waived. If the CONTRACTOR fails to do so the OWNER may, after having notified the CONTRACTOR, either pay unpaid bills or withhold from the CONTRACTOR'S unpaid compensation a sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged whereupon payment to the CONTRACTOR shall be resumed in accordance with the terms of the CONTRACT DOCUMENTS, but in no event shall the provisions of this sentence be construed to impose any obligations upon the OWNER to either the CONTRACTOR, the CONTRACTOR'S Surety, or any third party. In paying any unpaid bills

of the CONTRACTOR, any payment so made by the OWNER shall be considered as payment made under the CONTRACT DOCUMENTS by the OWNER to the CONTRACTOR and the OWNER shall not be liable to the CONTRACTOR for any such payments made in good faith.

19.7 If the OWNER fails to make payment thirty (30) days after approval by the ENGINEER, in addition to other remedies available to the CONTRACTOR, there shall be added to each such payment interest at the maximum legal rate commencing on the first day after said payment is due and continuing until the payment is received by the CONTRACTOR.

20. ACCEPTANCE OF FINAL PAYMENT AS RELEASE

20.1 The acceptance by the CONTRACTOR of final payment shall be and shall operate as a release to the OWNER of all claims and all liability to the CONTRACTOR other than claims in stated amounts as may be specifically excepted by the CONTRACTOR for all things done or furnished in connection with this WORK and for every act and neglect of the OWNER and others relating to or arising out of this WORK. Any payment, however, final or otherwise, shall not release the CONTRACTOR or its sureties from any obligations under the CONTRACT DOCUMENTS or the PERFORMANCE and PAYMENT BONDS.

21. INSURANCE

21.1 The CONTRACTOR shall purchase and maintain such insurance as will protect it from claims as set forth below which may arise out of, or result from, the CONTRACTOR'S execution of the WORK, whether such execution be by the CONTRACTOR, any SUBCONTRACTOR, or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

21.1.1 Claims under workmen's compensation, disability benefit and other similar employee benefit acts;

21.1.2 Claims for damages because of bodily injury, occupational sickness or disease, or death of employees;

21.1.3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than employees;

21.1.4 Claims for damages insured by usual personal injury liability coverage which are sustained (1) by any person as a result of an offense directly or indirectly related to the employment of such person by the CONTRACTOR; or (2) by any other person; and

21.1.5 Claims for damages because of injury to or destruction of tangible property, including loss of use resulting therefrom.

21.2 Certificates of Insurance acceptable to the OWNER shall be filed with the OWNER prior to commencement of the WORK. These Certificates shall contain a provision that coverages afforded under the policies will not be cancelled unless at least fifteen (15) days prior WRITTEN NOTICE has been given to the OWNER.

21.3 The CONTRACTOR shall procure and maintain, at the CONTRACTOR'S own expense, during the CONTRACT TIME, Liability Insurance as hereinafter specified:

21.3.1 CONTRACTOR'S General Public Liability and Property Damage Insurance including vehicle coverage issued to the CONTRACTOR and protecting the CONTRACTOR from all claims for personal injury, including death, and all claims for destruction of or damage to property, arising out of or in connection with any operations under the CONTRACT DOCUMENTS, whether such operations be by the CONTRACTOR or by any SUBCONTRACTOR employed by the CONTRACTOR or anyone directly or indirectly employed by the CONTRACTOR or by a SUBCONTRACTOR employed by the CONTRACTOR. Insurance shall be written with a limit of liability of not less than \$500,000 for all damages arising out of bodily injury, including death, at any time resulting therefrom, sustained by any one person in any one accident; and a limit of liability of not less than \$500,000 aggregate for any such damages sustained by two or more person in any one accident. Insurance shall be written with a limit of liability of not less than \$200,000 for all property damage sustained by any one person in any one accident; and a limit of liability of not less than \$200,000 aggregate for any such damage sustained by two or more persons in any one accident.

21.3.2 The CONTRACTOR shall acquire and maintain, if applicable, Fire and Extended Coverage insurance upon the PROJECT to the full insurable value thereof for the benefit of the OWNER, the CONTRACTOR and SUBCONTRACTORS as their interest may appear. This provision shall in no way release the CONTRACTOR or CONTRACTOR'S Surety from obligations under the CONTRACT DOCUMENTS to fully complete the PROJECT.

21.4 The CONTRACTOR shall procure and maintain, at the CONTRACTOR'S own expense, during the CONTRACT TIME, in accordance with the provisions of the laws of the state in which the WORK is performed, Workmen's Compensation Insurance, including occupational disease provision, for all of the CONTRACTOR'S employees at the site of the PROJECT and in case any WORK is sublet, the CONTRACTOR shall require such SUBCONTRACTOR similarly to provide Workmen's Compensation Insurance, including occupational disease provisions for all of the latter's employees unless such employees are covered by the protection afforded by the CONTRACTOR. In case any class of employees engaged in hazardous work under this contract at the site of the PROJECT is not protected under Workmen's Compensation statute, the CONTRACTOR shall provide, and shall cause each SUBCONTRACTOR to provide, adequate and suitable insurance for the protection of its employees not otherwise protected.

21.5 The CONTRACTOR shall secure, if applicable, "ALL RISK" type Builder's Risk Insurance for WORK to be performed. Unless specifically authorized by the OWNER, the amount of such insurance shall not be less than the CONTRACT PRICE totaled in the BID. The policy shall cover not less than the losses due to fire, explosion, hail, lightning, vandalism, malicious mischief, wind, collapse, riot, aircraft and smoke during the CONTRACT TIME, and until the WORK is accepted by the OWNER. The policy shall name as the insured the CONTRACTOR, and the OWNER.

22. CONTRACT SECURITY

22.1 The CONTRACTOR shall within ten (10) days after the receipt of the NOTICE OF AWARD furnish the OWNER with a PERFORMANCE BOND and a PAYMENT BOND in penal sums equal to the amount of the CONTRACT PRICE, conditioned upon the performance by the CONTRACTOR of all undertakings, covenants, terms, conditions and agreements of the CONTRACT DOCUMENTS, and upon the prompt payment by the CONTRACTOR to all persons supplying labor and materials in the prosecution of the WORK provided by the CONTRACT DOCUMENTS. Such BONDS shall be executed by the CONTRACTOR and a corporated bonding company licensed to transact such business in the state in which the WORK is to be performed and named on the current list of "Surety Companies Acceptable on Federal

Bonds" as published in the Treasury Department, Circular Number 570. The expense of these BONDS shall be borne by the CONTRACTOR. If at any time a surety on any such BOND is declared bankrupt or loses its right to do business in the state in which the WORK is to be performed or is removed from the list of Surety Companies accepted on Federal Bonds, CONTRACTOR shall within ten (10) days after notice from the OWNER to do so, substitute an acceptable BOND (or BONDS) in such form and sum and signed by such other surety or sureties as may be satisfactory to the OWNER. The premiums on such BOND shall be paid by the CONTRACTOR. No further payment shall be deemed due nor shall be made until the new surety or sureties shall have furnished an acceptable BOND to the OWNER.

23. ASSIGNMENTS

23.1 Neither the CONTRACTOR nor the OWNER shall sell, transfer, assign, or otherwise dispose of the Contract or any portion thereof, or of any right, title or interest therein, or any obligations thereunder, without written consent of the other party.

24. INDEMNIFICATION

24.1 The CONTRACTOR will indemnify and hold harmless the OWNER and the ENGINEER and their agents and employees from and against all claims, damages, losses and expenses including attorney's fees arising out of or resulting from the performance of the WORK, provided that any such claims, damage, loss or expense is attributable to bodily injury, sickness, disease or death or to injury to or destruction of tangible property including the loss of use resulting therefrom; and is caused in whole or in part by a negligent or willful act or omission of the CONTRACTOR, and SUBCONTRACTOR, anyone directly or indirectly employed by any of them or anyone from whose acts any of them may be liable.

24.2 In any and all claims against the OWNER or the ENGINEER, or any of their agents or employees, by any employee 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, the indemnification obligation 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 workmen's compensation acts, disability benefit acts or other employee benefits acts.

24.3 The obligation of the CONTRACTOR under this paragraph shall not extend to the liability of the ENGINEER, its agents or employees arising out of the preparation or approval of maps, DRAWINGS, opinions, reports, surveys, CHANGE ORDERS, designs or SPECIFICATIONS.

25. SEPARATE CONTRACTS

25.1 The OWNER reserves the right to let other contracts in connection with this PROJECT. The CONTRACTOR shall afford other CONTRACTORS reasonable opportunity for the introduction and storage of their materials and the execution of their WORK, and shall properly connect and coordinate the WORK with theirs. If the proper execution or results of any part of the CONTRACTOR'S WORK depends upon the WORK of any other CONTRACTOR, the CONTRACTOR shall inspect and promptly report to the ENGINEER any defects in such WORK that render it unsuitable for such proper execution and results.

25.2 The OWNER may perform additional WORK related to the PROJECT or the OWNER may let other contracts containing provisions similar to these. The CONTRACTOR will afford the other CONTRACTORS who are parties to such Contracts (or the OWNER, if the OWNER is performing the

additional WORK) reasonable opportunity for the introduction and storage of materials and equipment and the execution of WORK, and shall properly connect and coordinate the WORK with theirs.

25.3 If the performance of additional WORK by other CONTRACTORS or the OWNER is not noted in the CONTRACT DOCUMENTS prior to the execution of the CONTRACT, 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 it in additional expense or entitles it to an extension of the CONTRACT TIME, the CONTRACTOR may make a claim thereof as provided in Sections 14 and 15.

26. SUBCONTRACTING

26.1 The Contractor may utilize the services of specialty SUBCONTRACTORS on those parts of the WORK which, under normal contracting practices, are performed by specialty SUBCONTRACTORS.

26.2 The CONTRACTOR shall not award WORK to SUBCONTRACTOR(S), in excess of fifty (50%) percent of the CONTRACT PRICE, without prior written approval of the OWNER.

26.3 The CONTRACTOR shall be fully responsible to the OWNER for the acts and omissions of its SUBCONTRACTORS, and of persons either directly or indirectly employed by them, as the CONTRACTOR is for the acts and omissions of persons directly employed by the CONTRACTOR.

26.4 The CONTRACTOR shall cause appropriate provisions to be inserted in all subcontracts relative to the WORK to bind SUBCONTRACTORS to the CONTRACTOR by the terms of the CONTRACT DOCUMENTS insofar as applicable to the WORK of SUBCONTRACTORS and to give the CONTRACTOR the same power as regards terminating any subcontract that the OWNER may exercise over the CONTRACTOR under any provision of the CONTRACT DOCUMENTS.

26.5 Nothing contained in this CONTRACT shall create any contractual relationship between any SUBCONTRACTOR and the OWNER. (Revised 2-16-83, PN 869.)

27. ENGINEER'S AUTHORITY

27.1 The ENGINEER shall act as the OWNER'S representative during the construction period, shall decide questions which may arise as to quality and acceptability of materials furnished and WORK performed, and shall interpret the intent of the CONTRACT DOCUMENTS in a fair and unbiased manner. The ENGINEER will make visits to the site and determine if the WORK is proceeding in accordance with the CONTRACT DOCUMENTS.

27.2 The CONTRACTOR will be held strictly to the intent of the CONTRACT DOCUMENTS in regard to the quality of materials, workmanship and execution of the WORK. Inspections may be made at the factory or fabrication plant of the source of material supply.

27.3 The ENGINEER will not be responsible for the construction means, controls, techniques, sequences, procedures or construction safety.

27.4 The ENGINEER shall promptly make decisions relative to interpretation of the CONTRACT DOCUMENTS.

28. LAND AND RIGHTS-OF-WAY

28.1 Prior to issuance of NOTICE TO PROCEED, the OWNER shall obtain all land and rights-of-way necessary for carrying out and for the completion of the WORK to be performed pursuant to the CONTRACT DOCUMENTS, unless otherwise mutually agreed.

28.2 The OWNER shall provide to the CONTRACTOR information which delineates and describes the lands owned and rights-of-way acquired.

28.3 The CONTRACTOR shall provide at its own expense and without liability to the OWNER any additional land and access thereto that the CONTRACTOR may desire for temporary construction facilities, or for storage of materials.

29. GUARANTEE

29.1 The CONTRACTOR shall guarantee all materials and equipment furnished and WORK performed for a period of one (1) year from the date of SUBSTANTIAL COMPLETION. The CONTRACTOR warrants and guarantees for a period of one (1) year from the date of SUBSTANTIAL COMPLETION of the system that the completed system is free from all defects due to faulty materials or workmanship and the CONTRACTOR shall promptly make such corrections as may be necessary by reason of such defects including the repairs of any damage to other parts of the system resulting from such defects. The OWNER will give notice of observed defects with reasonable promptness. In the event that the CONTRACTOR should fail to make such repairs, adjustments, or other WORK that may be made necessary by such defects, the OWNER may do so and charge the CONTRACTOR the cost thereby incurred. The PERFORMANCE BOND shall remain in full force and effect through the guarantee period.

30. ARBITRATION BY MUTUAL AGREEMENT
(Revised 2-16-83, PN 869.)

30.1 All claims, disputes and other matters in question arising out of, or relating to the CONTRACT DOCUMENTS or the breach thereof, except for claims which have been waived by making an acceptance of final payment as provided by Section 20, may be decided by arbitration if the parties mutually agree. Any agreement to arbitrate shall be specifically enforceable under the prevailing arbitration law. The award rendered by the arbitrators shall be final, and judgment may be entered upon it in any court having jurisdiction thereof. (Revised 2-16-83, PN 869.)

30.2 Notice of the request for arbitration shall be filed in writing with the other party to the CONTRACT DOCUMENTS and a copy shall be filed with the ENGINEER. Request for arbitration shall in no event be made on any claim, dispute or other matter in question which would be barred by the applicable statute of limitations. (Revised 2-16-83, PN 869.)

30.3 The CONTRACTOR will carry on the WORK and maintain the progress schedule during any arbitration proceedings, unless otherwise mutually agreed in writing.

31. TAXES

31.1 The CONTRACTOR will pay all sales, consumer, use and other similar taxes required by the laws of the place where the WORK is performed.

32. ENVIRONMENTAL REQUIREMENTS
(Added 09-16-92, PN 191.)

32.1 The CONTRACTOR, when constructing a project involving trenching and/or other related earth excavation, shall comply with the following environmental constraints.

32.2 WETLANDS: The CONTRACTORS, when disposing of excess, spoils or other construction materials on public or private property WILL NOT FILL IN or otherwise CONVERT WETLANDS.

32.3 FLOODPLAINS: The CONTRACTOR, when disposing of excess, spoil or other construction materials on public or private property WILL NOT FILL IN or otherwise CONVERT 100 YEAR FLOODPLAIN areas delineated on the latest FEMA Floodplain Maps.

32.4 HISTORIC PRESERVATION: Any excavation by the Contractor that uncovers an historical or archaeological artifact shall be immediately reported to the PROJECT ENGINEER and a representative of FmHA. Construction shall be temporarily halted pending the notification process and further directions issued by FmHA after consultation with the State Historic Preservation Officer (SHPO).

32.5 ENDANGERED SPECIES: The CONTRACTOR shall comply with the Endangered Species Act, which provides for the protection of endangered and/or threatened species and critical habitat. Should any evidence of the presence of endangered and/or threatened species or their critical habitat be brought to the attention of the CONTRACTOR, the CONTRACTOR will immediately report this evidence to the PROJECT ENGINEER and a representative of FmHA. Construction shall be temporarily halted pending the notification process and further directions issued by FmHA after consultation with the U.S. Fish and Wildlife Service.

END OF SECTION

FmHA SUPPLEMENTAL GENERAL CONDITIONS

The provisions of the Farmers Home Administration (FmHA) Supplemental General Conditions as described herein change, amend, or supplement the General Conditions and shall supersede any conflicting provisions of this Contract. All provisions of the General Conditions which are not changed, amended or supplemented, remain in full force.

- | | | | |
|----|--------------------------------|-----|---|
| 1. | Contract Approval | 9. | Small, Minority and Women's
Businesses |
| 2. | Contract Change Orders | 10. | Anti-Kickback |
| 3. | Partial Payment Estimate | 11. | Violating Facilities |
| 4. | Conflict of Interest | 12. | State Energy Policy |
| 5. | Protection of Lives & Property | 13. | Equal Opportunity Requirements |
| 6. | Remedies | 14. | Certificate of Owner's Attorney |
| 7. | Gratuities | 15. | FmHA Concurrence |
| 8. | Audit and Access Records | | |

1. Contract Approval.

1.1 The OWNER and the CONTRACTOR will furnish the OWNER'S Attorney such evidence as required so that the OWNER'S Attorney can complete and execute "Certificate of Owner's Attorney" (Section 14) before the OWNER submits the executed Contract Documents to FmHA for approval.

1.2 Concurrence by the FmHA State Director or designee in the award of the CONTRACT is required before it is effective and the "FmHA Concurrence" (Section 15), shall be attached and made a part of the Agreement.

1.3 When a PERFORMANCE BOND and PAYMENT BOND are provided, the United States acting through the Farmers Home Administration will be named as co-obligee in these BONDS unless prohibited by State law. Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State where the project is located.

1.4 This CONTRACT is expected to be funded in part with funds from the FmHA. Neither the United States nor any of its departments, agencies or employees is or will be a party to this CONTRACT or any SUBCONTRACT.

2. Contract Change Orders.

2.1 All changes affecting the project's construction cost or modifications of the terms or conditions of the contract must be authorized by means of a written contract change order which is mutually agreed to by the OWNER and CONTRACTOR and is approved by FmHA. The contract change order will include extra work, work for which quantities have been altered from those shown in the bidding schedule, as well as decreases or increases in the quantities of installed units which are different than those shown in the bidding schedule because of final measurements. All changes must be recorded on a contract change order before they can be included in a partial payment estimate.

2.2 FORM FmHA 1924-7, "Contract Change Order" or similar forms approved by

2.3 When the CONTRACT sum is, in whole or in part, based on unit prices, the OWNER reserves the right to increase or decrease a unit price quantity, as may be deemed reasonable or necessary, in order to complete the work contemplated by this CONTRACT.

3. Partial Payment Estimates.

3.1 FORM FmHA 1924-18, "Partial Payment Estimate," or similar forms approved by FmHA shall be used when estimating periodic payments due the CONTRACTOR. (Revised 5-12-87, SPECIAL PN.)

3.2 The OWNER may after consultation with the ARCHITECT/ENGINEER withhold or, on account of subsequently discovered evidence, nullify the whole or part of any approved partial payment estimate to such extent as may be necessary to protect the OWNER from loss on account of:

3.2.1 Defective work not remedied.

3.2.2 Claims filed.

3.2.3 Failure of CONTRACTOR to make payments properly to subcontractors or suppliers.

3.2.4 A reasonable doubt that the WORK can be completed for the balance then unpaid.

3.2.5 Damage to another CONTRACTOR.

3.2.6 Performance of WORK in violation of the terms of the CONTRACT DOCUMENTS.

3.3 Where WORK on unit price items is substantially complete but lacks testing, clean-up and/or corrections, amounts shall be deducted from unit prices in partial payment estimates to amply cover such testing, clean-up and/or corrections.

3.4 When the items in 3.2 and 3.3 are cured, payment shall be made for amounts withheld because of them.

3.5 Payments will not be made that would deplete the retainage nor place in escrow any funds that are required for retainage nor invest the retainage for the benefit of the CONTRACTOR.

4. Conflict of Interest.

4.1 Unacceptable bidders. An ENGINEER or ARCHITECT (individual or firm including persons they employ) who has prepared plans and specifications will not be considered an acceptable bidder. Any firm or corporation in which such ENGINEER or ARCHITECT (including persons they employ) is an officer, employee or holds or controls a substantial interest will not be considered an acceptable bidder. Contracts or purchases by the CONTRACTOR shall not be awarded or made to a supplier or manufacturer if the ENGINEER or ARCHITECT (firm or

individual) who prepared the plans and specifications has a corporate or financial affiliation with the supplier or manufacturer. Bids will not be awarded to firms or corporations which are owned or controlled wholly or in part by a member of the governing body of the OWNER or to an individual who is such a member.

4.2 The OWNER's officers, employees or agents shall not engage in the award or administration of this CONTRACT if a conflict of interest, real or apparent, would be involved. Such a conflict would arise when: (a) the employee, officer or agent; (b) any member of their immediate family; (c) their partner; or (d) an organization which employs, or is about to employ, any of the above has financial or interest in the CONTRACTOR. The OWNER'S officers, employees, or agents shall neither solicit nor accept gratuities, favors or anything of monetary value from the CONTRACTOR or SUBCONTRACTOR.

5. Protection of Lives and Property.

5.1 In order to protect the lives and health of its employees under the CONTRACT, the CONTRACTOR shall comply with all pertinent provisions of the Occupational Safety and Health Administration (OSHA) and any State Safety and Health agency requirements.

5.2 The CONTRACTOR alone shall be responsible for the safety, efficiency, and adequacy of its plant, appliances and methods, and for any damage which may result from their failure or their improper construction, maintenance or operation.

6. Remedies. Unless otherwise provided in this CONTRACT, all claims, counterclaims, disputes and other matters in question between the OWNER and the CONTRACTOR arising out of or relating to this CONTRACT or the breach thereof will be decided by arbitration if the parties mutually agree, or in a court of competent jurisdiction within the State in which the OWNER is located.

6.1 The arbitration provisions of this section may be initiated by either party to this CONTRACT by filing with the other party and the ENGINEER/ARCHITECT a WRITTEN REQUEST for arbitration.

6.2 Each party to this CONTRACT will appoint one arbitrator; the two arbitrators will select a third arbitrator.

6.3 The arbitrators will select a hearing location as close to the OWNER'S locale as possible.

6.4 The procedure for conducting the hearings will follow the Construction Industry Arbitration Rules of the American Arbitration Association.

7. Gratuities.

7.1 If the OWNER finds after a notice and hearing that the CONTRACTOR, or any of the CONTRACTOR'S agents or representatives, offered or gave gratuities (in the form of entertainment, gifts or otherwise) to any official, employee or agent of the OWNER, the State, or FmHA officials in an attempt to secure this CONTRACT or favorable treatment in awarding, amending or making any determinations related to the performance of this CONTRACT, the OWNER may, by written notice to the CONTRACTOR, terminate this CONTRACT. The

OWNER may also pursue other rights and remedies that the law or this CONTRACT provides. However, the existence of the facts on which the OWNER bases such findings shall be an issue and may be reviewed in proceedings under the Remedies clause of this CONTRACT.

7.2 In the event this CONTRACT is terminated as provided in paragraph 7.1, the OWNER may pursue the same remedies against the CONTRACTOR as it could pursue in the event of a breach of the CONTRACT by the CONTRACTOR. As a penalty, in addition to any other damages to which it may be entitled by law, the OWNER may pursue exemplary damages in an amount (as determined by the OWNER) which shall be not be less than three (3) nor more than ten (10) times the costs the CONTRACTOR incurs in providing any such gratuities to any such officer or employee.

8. Audit and Access to Records: For all negotiated contracts (except those of \$10,000 or less) the FmHA, the Comptroller General, the OWNER or any of their duly authorized representatives, shall have access to any books, documents, papers and records of the CONTRACTOR, which are pertinent to the CONTRACT, for the purpose of making audits, examinations, excerpts and transcriptions. The CONTRACTOR shall maintain all required records for three (3) years after final payment is made and all other pending matters are closed.
9. Small, Minorities and Women's Businesses: If the CONTRACTOR intends to let any subcontracts for a portion of the work, the CONTRACTOR shall take affirmative steps to assure that small, minority and women's businesses are used when possible as sources of supplies, equipment, construction and services. Affirmative steps shall consist of: (1) including qualified small, minority and women's businesses on solicitation lists; (2) assuring that small, minority and women's businesses are solicited whenever they are potential sources; (3) dividing total requirements when economically feasible, into small tasks or quantities to permit maximum participation of small, minority and women's businesses; (4) establishing delivery schedules, where the requirements of the work permit, which will encourage participation by small, minority and women's businesses; (5) using the services and assistance of the Small Business Administration, and the Minority Business Development Agency of the U.S. Department of Commerce; (6) requiring each party to a subcontract to take the affirmative steps of this section; and (7) CONTRACTORS are encouraged to procure goods and services from labor surplus area firms.
10. Anti-Kickback: The CONTRACTOR shall comply with the Copeland Anti-Kickback Act (18 USC 874) as supplemented in Department of Labor regulations (29 CFR, Part 3). This Act provides that each CONTRACTOR shall be prohibited from inducing, by any means, any person employed in the construction, completion or repair of public facilities, to give up any part of the compensation to which they are otherwise entitled. The OWNER shall report all suspected or reported violations to FmHA.
11. Violating Facilities: Where this CONTRACT exceeds \$100,000 the CONTRACTOR shall comply with all applicable standards, orders or requirements issued under Section 306 of the Clean Air Act (42 U.S.C. 1857(h)), Section 508 of the Clean Water Act (33 U.S.C. 1368), Executive Order 11738 and Environmental Protection Agency regulations 40 CFR Part 15 which prohibits the awarding of non-exempt federal contracts, grants or loans to facilities included on EPA's list of violating facilities. The CONTRACTOR will report violations to the EPA.

12. State Energy Policy. The CONTRACTOR shall comply with the Energy Policy and Conservation Act (P.L. 94-163). Mandatory standards and policies relating to energy efficiency, contained in the State Energy Conservation Plan, shall be utilized.

13. Equal Opportunity Policy. For all contracts in excess of \$10,000, the Contractor shall comply with Executive order 11246, entitled "Equal Employment Opportunity," as amended by Executive Order 11375, and as supplemented in Department of Labor regulations (41 CFR Part 60).

13.1 If the CONTRACT exceeds \$10,000, the CONTRACTOR will execute Form FmHA 400 6, "Compliance Statement."

13.2 The CONTRACTOR'S compliance with Executive Order 11246 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the Standard Federal Equal Employment Opportunity Construction Contract Specifications, as set forth in 41 CFR Part 60-4 and its efforts to meet the goals established for the geographical area where the CONTRACT is to be performed. The hours of minority and female employment and training must be substantially uniform throughout the length of the CONTRACT and in each trade, and the CONTRACTOR shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from contractor to contractor or from project to project for the sole purpose of meeting the CONTRACTOR'S goals shall be a violation of the CONTRACT, the Executive Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

13.3 The CONTRACTOR shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within ten (10) working days of award of any construction subcontract in excess of \$10,000 at any tier for construction work under the CONTRACT resulting from this solicitation. The notification shall list the name, address and telephone number of the subcontractor; employer identification number; estimated dollar amount of subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the CONTRACT is to be performed.

14. Certificate of Owner's Attorney.

I, the undersigned, _____, the duly authorized and
acting legal representative of

_____,

do hereby certify as follows:

I have examined the attached contract(s) and performance and payment bond(s) and the manner of execution thereof, and I am of the opinion that each of the aforesaid agreements are adequate and have has been duly executed by the proper parties thereto acting through their duly authorized representatives; that said representatives have full power and authority to execute said agreements on behalf of the respective parties named thereon; and that the foregoing agreements constitute valid and legally binding obligations upon the parties executing the same in accordance with terms, conditions and provisions thereof.

Date: _____

NOTE: Delete phrase "performance and payment bonds" when not applicable.

15. FmHA Concurrence.

As lender or insurer of funds to defray the costs of this contract, and without liability for any payments thereunder, the Farmers Home Administration (FmHA) hereby concurs in the award of this CONTRACT to

U.S. Department of Agriculture
Farmers Home Administration

By: _____ Title: _____

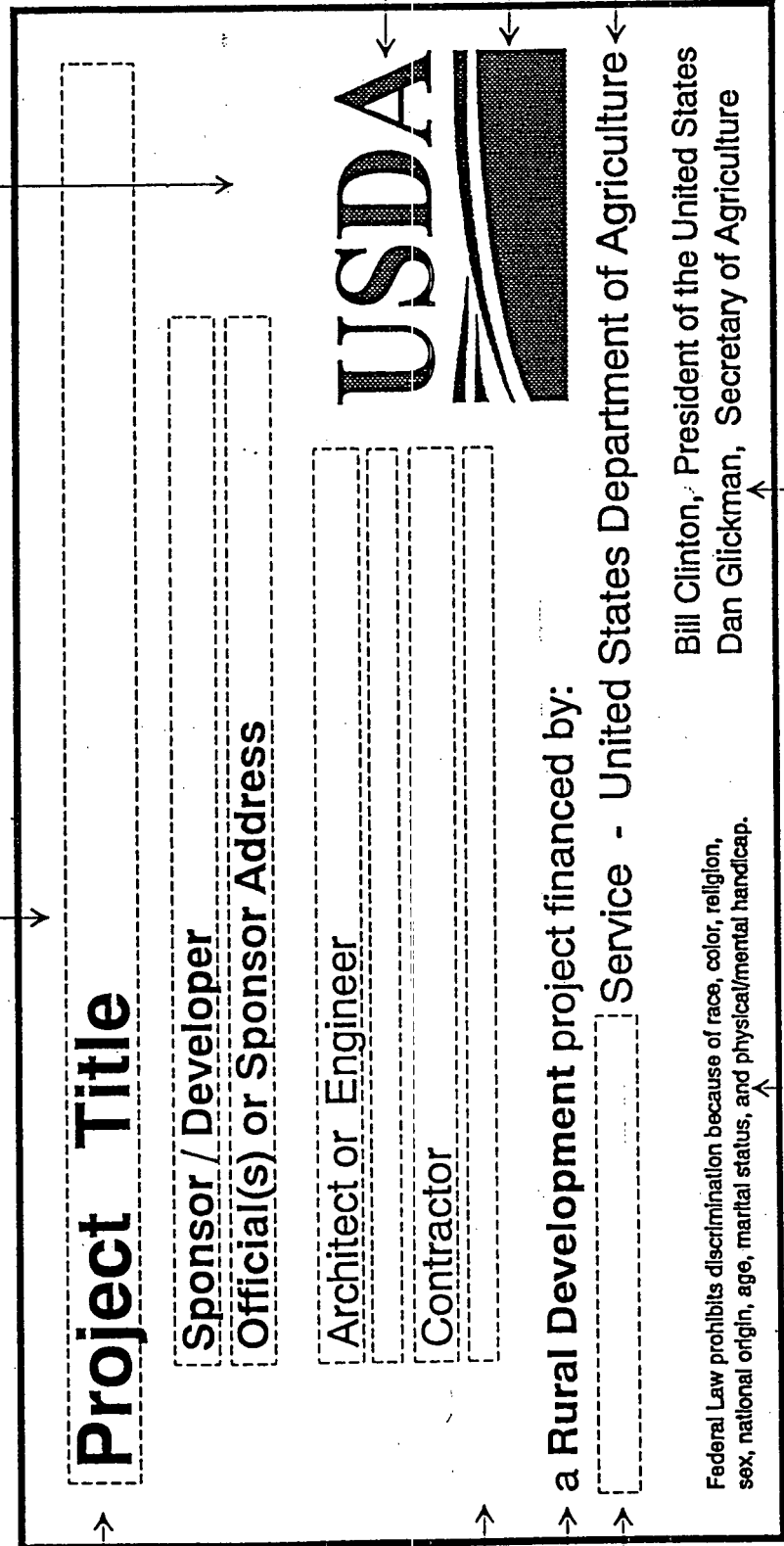
Date: _____

This CONTRACT shall not be effective unless and until concurred in by the State Director of the Farmers Home Administration, U.S. Department of Agriculture or a delegated representative.

END OF SECTION

construction sign for RURAL DEVELOPMENT projects:

WHITE BACKGROUND



BLACK LETTERING

PMS 287 BLUE LETTERING

BLACK LETTERING

PMS 287 BLUE LETTERING

PMS 343 GREEN FORMS

PMS 343 GREEN LETTERING

INSERT
 "Rural Housing",
 "Rural Utilities", or
 "Rural Business-Cooperative"
 (PMS 343 GREEN)

SIGN DIMENSIONS: 1200mm x 2400mm x 19mm (approx. 4' x 8' x 3/4")
 PLYWOOD PANEL (APA RATED A-B GRADE - EXTERIOR)

PAUL E. PATTON
GOVERNOR



DIVISION OF EMPLOYMENT STANDARDS,
APPRENTICESHIP AND TRAINING

JOE NORSWORTHY
SECRETARY

LABOR CABINET
1047 U.S. HIGHWAY 127 SOUTH, STE. 4
FRANKFORT, KY 40601

DENNIS J. LANGFORD
DIRECTOR

January 13, 1998

Mr. James L. Smith
Carroll County Water District #1
P. O. Box 350
Ghent, Kentucky 41045

Re: Carroll County Water District #1
Extension Project of 1997

Advertising Date as Shown on Notification: January 23, 1999

Dear Mr. Smith:

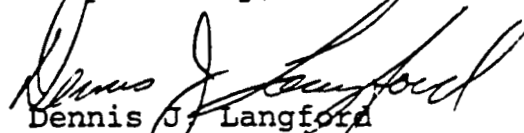
This office is in receipt of your written notification on the above project as required by KRS 337.510(1).

I am enclosing a copy of the current prevailing wage determination number CR-3-041 & CR-3-077, dated February 17, 1998, for Carroll & Gallatin County. This schedule of wages shall be attached to and made a part of the specifications for the work, printed on the bidding blanks, and made a part of the contract for the construction of the public works between the public authority and the successful bidder or bidders.

The determination number assigned to this project is based on the date contained in your notification as the date the project is advertised for bids. The commissioner has chosen to adopt the prevailing wages as determined by the United States Department of Labor for the aforementioned county. There may be modifications to this rate determination prior to your advertising date. It is the responsibility of the public authority to contact this office a few days before advertising to be certain the correct schedule of the prevailing rates of wages are included in the project.

Your project number is as follows: 041-2-0012-98-3

Respectfully,


Dennis J. Langford
Director

lprh

Enclosure

PHONE: (502) 564-2784

An Equal Opportunity Employer M/F/D

FAX: (502) 564-2248



COMMISSIONER'S CURRENT REVISION
KENTUCKY PREVAILING WAGE DETERMINATION
GALLATIN COUNTY

Determination No. CR-3-077

Date of Determination: February 17, 1998

This schedule of the prevailing rate of wages for Gallatin County has been determined in accordance with the provisions of KRS 337.505 to 337.550. The commissioner has chosen to adopt the prevailing wages as determined by the United States Department of Labor for this county. This determination shall be referred to as Prevailing Wage Determination No. CR-3-077, which includes General Decision Nos. KY980029 for Building Construction and KY980027 for Heavy/Highway Construction. This will also include any modifications since the original publication date of this determination.

Apprentices or trainees shall be permitted to work as such subject to Administrative Regulations adopted by the Commissioner of Workplace Standards. Copies of these regulations will be furnished upon request to any interested person.

Overtime is to be computed at not less than one and one-half (1 1/2) times the indicated BASE RATE for all hours worked in excess of eight (8) per day, or in excess of forty (40) per week. However, KRS 337.540 permits an employee and employer to agree, in writing, that the employee will be compensated at a straight time base rate for hours worked in excess of eight (8) hours in any one workday, but not more than ten (10) hours worked in any one workday, if such written agreement is prior to the over eight (8) hours in a workday actually being worked, or where provided for in a collective bargaining agreement. The fringe benefit rate is to be paid for each hour worked at a straight time rate for all hours worked.

No laborer, workman or mechanic shall be paid at a rate less than that of the General Laborer except those classified as bona fide apprentices registered with the Kentucky State Apprenticeship Supervisor unless otherwise specified in this schedule of wage rates.

Fringe benefit amounts are applicable for all hours worked except when otherwise noted.

NOTE: The type of construction shall be determined by applying the following definitions.

BUILDING CONSTRUCTION


Building construction is the construction of sheltered enclosures with walk-in access for the purpose of housing persons, machinery, equipment, or supplies. It includes all construction of such structures, the installation of utilities and the installation of equipment, both above and below grade level, as well as incidental grading, utilities and paving.

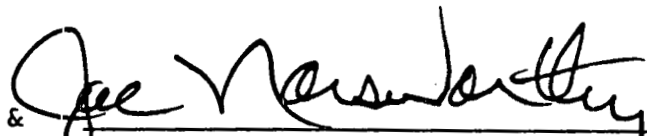
HIGHWAY CONSTRUCTION

Highway construction includes the construction, alteration or repair of roads, streets, highways, runways, taxiways, alleys, trails, paths, parking areas, and other similar projects not incidental to building or heavy construction. It includes all incidental construction in conjunction with the highway construction project.

HEAVY CONSTRUCTION

Heavy projects are those projects that are not properly classified as either "building" or "highway". For example, dredging projects, water and sewer line projects, dams, flood control projects, sewage treatment plants and facilities, and water treatment plants and facilities are considered heavy.


Dennis J. Langford, Director
Employment Standards,
Apprenticeship & Training
Kentucky Labor Cabinet


Joe Norsworthy, Secretary
Kentucky Labor Cabinet
Frankfort, Kentucky 40601

This 17th day of February, 1998.

NOTICE

THIS DETERMINATION APPLIES TO

PROJECT NO. 041-2-0012-98-3

COMMISSIONER'S CURRENT REVISION
KENTUCKY PREVAILING WAGE DETERMINATION
CARROLL COUNTY

Determination No. CR-3-041

Date of Determination: February 17, 1998

This schedule of the prevailing rate of wages for Carroll County has been determined in accordance with the provisions of KRS 337.505 to 337.550. The commissioner has chosen to adopt the prevailing wages as determined by the United States Department of Labor for this county. This determination shall be referred to as Prevailing Wage Determination No. CR-3-041, which includes General Decision Nos. KY980029 for Building Construction and KY980027 for Heavy/Highway Construction. This will also include any modifications since the original publication date of this determination.

Apprentices or trainees shall be permitted to work as such subject to Administrative Regulations adopted by the Commissioner of Workplace Standards. Copies of these regulations will be furnished upon request to any interested person.

Overtime is to be computed at not less than one and one-half (1 1/2) times the indicated BASE RATE for all hours worked in excess of eight (8) per day, or in excess of forty (40) per week. However, KRS 337.540 permits an employee and employer to agree, in writing, that the employee will be compensated at a straight time base rate for hours worked in excess of eight (8) hours in any one workday, but not more than ten (10) hours worked in any one workday, if such written agreement is prior to the over eight (8) hours in a workday actually being worked, or where provided for in a collective bargaining agreement. The fringe benefit rate is to be paid for each hour worked at a straight time rate for all hours worked.

No laborer, workman or mechanic shall be paid at a rate less than that of the General Laborer except those classified as bona fide apprentices registered with the Kentucky State Apprenticeship Supervisor unless otherwise specified in this schedule of wage rates.

Fringe benefit amounts are applicable for all hours worked except when otherwise noted.

NOTE: The type of construction shall be determined by applying the following definitions.

BUILDING CONSTRUCTION

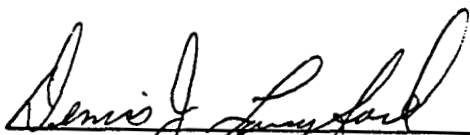
Building construction is the construction of sheltered enclosures with walk-in access for the purpose of housing persons, machinery, equipment, or supplies. It includes all construction of such structures, the installation of utilities and the installation of equipment, both above and below grade level, as well as incidental grading, utilities and paving.

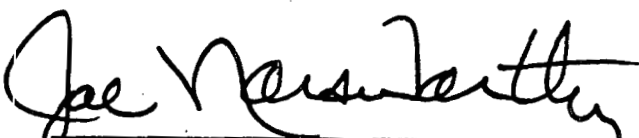
HIGHWAY CONSTRUCTION

Highway construction includes the construction, alteration or repair of roads, streets, highways, runways, taxiways, alleys, trails, paths, parking areas, and other similar projects not incidental to building or heavy construction. It includes all incidental construction in conjunction with the highway construction project.

HEAVY CONSTRUCTION

Heavy projects are those projects that are not properly classified as either "building" or "highway". For example, dredging projects, water and sewer line projects, dams, flood control projects, sewage treatment plants and facilities, and water treatment plants and facilities are considered heavy.


Dennis J. Langford, Director
Employment Standards,
Apprenticeship & Training
Kentucky Labor Cabinet

& 
Joe Norsworthy, Secretary
Kentucky Labor Cabinet
Frankfort, Kentucky 40601

This 17th day of February, 1998.

GENERAL DECISION KY980027 12/28/98 KY27
General Decision Number KY980027

Superseded General Decision No. KY970027

State: Kentucky

Construction Type:
HEAVY
HIGHWAY

County(ies):

ANDERSON	GALLATIN	MERCER
BATH	GRANT	MONTGOMERY
BOURBON	GRAYSON	NELSON
BOYD	GREENUP	NICHOLAS
BOYLE	HARDIN	OLDHAM
BRACKEN	HARRISON	OWEN
BRECKINRIDGE	HENRY	ROBERTSON
BULLITT	JEFFERSON	ROWAN
CARROLL	JESSAMINE	SCOTT
CARTER	LARUE	SHELBY
CLARK	LEWIS	SPENCER
ELLIOTT	MADISON	TRIMBLE
FAYETTE	MARION	WASHINGTON
FLEMING	MASON	WOODFORD
FRANKLIN	MEADE	

Heavy and Highway Construction Projects

Modification Number	Publication Date
0	02/13/1998
1	02/20/1998
2	03/13/1998
3	04/03/1998
4	05/22/1998
5	06/05/1998
6	06/19/1998
7	07/06/1998
8	07/24/1998
9	08/14/1998
10	09/04/1998
11	11/13/1998
12	12/28/1998

COUNTY(ies):

ANDERSON	GALLATIN	MERCER
BATH	GRANT	MONTGOMERY
BOURBON	GRAYSON	NELSON
BOYD	GREENUP	NICHOLAS
BOYLE	HARDIN	OLDHAM
BRACKEN	HARRISON	OWEN
BRECKINRIDGE	HENRY	ROBERTSON
BULLITT	JEFFERSON	ROWAN

CARROLL	JESSAMINE	SCOTT
CARTER	LARUE	SHELBY
CLARK	LEWIS	SPENCER
ELLIOTT	MADISON	TRIMBLE
FAYETTE	MARION	WASHINGTON
FLEMING	MASON	WOODFORD
FRANKLIN	MEADE	

BRIN0004D 04/01/1998

	Rates	Fringes
BRECKINRIDGE COUNTY:		
BRICKLAYERS	21.61	5.15

BRKY0001G 06/01/1998

	Rates	Fringes
BULLITT, CARROLL, GRAYSON, HARDIN, HENRY, JEFFERSON, LARUE, MARION, MEADE, NELSON, OLDHAM, SHELBY, SPENCER & TRIMBLE COUNTIES:		

BRICKLAYERS	18.28	4.28
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BRKY0002F 06/01/1997

	Rates	Fringes
BRACKEN, GALLATIN, GRANT, MASON & ROBERTSON COUNTIES:		

BRICKLAYERS	20.01	4.79
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BRKY0007D 06/01/1997

	Rates	Fringes
BOYD, CARTER, ELLIOTT, FLEMING, GREENUP, LEWIS & ROWAN COUNTIES:		

BRICKLAYERS	21.18	6.20
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BRKY0017D 06/01/1996

	Rates	Fringes
ANDERSON, BATH, BOURBON, BOYLE, CLARK, FAYETTE, FRANKLIN, HARRISON, JESSAMINE, MADISON, MERCER, MONTGOMERY, NICHOLAS,		

OWEN, SCOTT, WASHINGTON & WOODFORD COUNTIES:

BRICKLAYERS	15.50	2.55
LAYOUT MEN	15.75	2.55

CARP0064A 07/01/1998

	Rates	Fringes
CARPENTERS	18.45	4.93
PILEDRIVERMEN	18.70	4.93
DIVERS	28.05	4.93

CARP1031P 06/01/1998

ANDERSON, BATH, BOURBON, BOYLE, CLARK, FAYETTE, FRANKLIN,
HARRISON, JESSAMINE, MADISON, MERCER, MONTGOMERY, NICHOLAS,
OWEN, SCOTT & WOODFORD COUNTIES:

	Rates	Fringes
MILLWRIGHTS	18.04	6.69

CARP1031Q 06/01/1998

BOYD, CARTER, ELLIOTT, FLEMING, GREENUP, LEWIS, MASON, ROBERTSON
& ROWAN COUNTIES:

	Rates	Fringes
MILLWRIGHTS	19.40	11.24

CARP1031R 06/01/1998

BRECKINRIDGE, BULLITT, CARROLL, GALLATIN, GRAYSON, HARDIN, HENRY,
JEFFERSON, LARUE, MARION, MEADE, NELSON, OLDHAM, SHELBY,
SPENCER, TRIMBLE & WASHINGTON COUNTIES:

	Rates	Fringes
MILLWRIGHTS	20.20	7.95

CARP1066D 09/01/1998

BRACKEN & GRANT COUNTIES:

	Rates	Fringes
MILLWRIGHTS	21.30	7.25

ELEC0183C 06/01/1997

ANDERSON, BATH, BOURBON, BOYLE, CLARK, FAYETTE, FRANKLIN,
HARRISON, JESSAMINE, MADISON, MERCER, MONTGOMERY, NICHOLAS,
OWEN, ROBERTSON, SCOTT & WOODFORD COUNTIES:

	Rates	Fringes
ELECTRICIANS	19.70	6.24

ELEC0212Q 06/01/1997

BRACKEN, GALLATIN & GRANT COUNTIES:

	Rates	Fringes
ELECTRICIANS	20.30	6.61

ELEC0317L 06/01/1998

BOYD, CARTER, ELLIOTT & ROWAN COUNTIES:

	Rates	Fringes
ELECTRICIANS: Electricians	19.90	10.81

Cable Splicers	20.895	10.84
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ELEC0369J 06/01/1998

	Rates	Fringes
BRECKINRIDGE, BULLITT, CARROLL, GRAYSON, HARDIN, HENRY, JEFFERSON, LARUE, MARION, MEADE, NELSON, OLDHAM, SHELBY, SPENCER, TRIMBLE & WASHINGTON COUNTIES:		

ELECTRICIANS	22.25	6.34
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ELEC0575B 06/01/1998

	Rates	Fringes
FLEMING, GREENUP, LEWIS & MASON COUNTIES:		

ELECTRICIANS	23.80	6.63
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ENGI0181Y 01/01/1998

	Rates	Fringes
POWER EQUIPMENT OPERATORS:		
GROUP 1	19.55	5.90
GROUP 2	17.13	5.90
GROUP 3	17.51	5.90
GROUP 4	16.87	5.90

POWER EQUIPMENT OPERATOR CLASSIFICATIONS

GROUP 1 - A-Frame Winch Truck; Auto Patrol; Backfiller; Batcher Plant; Bituminous Paver; Boom Cat; Bulldozer; Mechanic; Cableway; Carry-All Scoop; Central Compressor Plant Operator; Clamshell; Concrete Mixer (21 cu. ft. or over); Concrete Paver; Truck-Mounted Concrete Pump; Core Drill; Crane; Crusher Plant; Derrick; Derrick Boat; Ditching & Trenching Machine; Dragline; Elevating Grader & Loader; Gradeall; Gurry; High Lift; Hoe-Type Machine; Hoist (2 or more drums); Hoisting Engine (2 or more drums); Hydrocrane; Hyster; KeCal Loader; LeTourneau; Locomotive; Mechanic Welder; Mucking Machine; Motor Scraper; Orangepeel Bucket; Piledriver; Power Blade; Pumpcrete; Push Dozer; Rock Spreader, attached to equipment; Rotary Drill; Roller (Bituminous); Scarifier; Scoopmobile; Shovel; Side Boom; Subgrader; Tailboom; Tow or

Push Boat; Tower Crane (French, German & other types); Tractor Shovel; & Truck Crane

GROUP 2 - Air Compressor (over 900 cu. ft. per min.); Bituminous Mixer; Boom Type Tamping Machine; Bull Float; Concrete Mixer (Under 21 cu. ft.); Dredge Engineer; Electric Vibrator Compactor; Self-propelled Compactor; Elevator (One Drum or Buck Hoist); Elevator (When used to hoist building materials); Finish Machine; Fireperson; Hoist (1 drum); Flexplane; Forklift; Form Grader; Joint Sealing Machine; Outboard Motor Boat; Power Sweeper (Riding Type); Roller (Rock); Ross Carrier; Skid Mounted or Trailer Mounted Concrete Pump; Switchman or Brakeman; Throttle Valve Man;

Tractair & Road Widening Trencher; Tractor (50 H.P. or Over); Truck Crane Oiler; Tugger; Welding Machine; Well Points; & Whirley Oiler

GROUP 3 - Greaser on Grease Facilities Servicing Heavy Equipment

GROUP 4 - Bituminous Distributor; Burlap & Curing Machine; Cement Gun; Concrete Saw; Conveyor; Deckhand Oiler; Grout Pump; Hydraulic Post Driver; Hydro Seeder; Mud Jack; Oiler; Paving Joint Machine; Power Form Handling Equipment; Pump; Roller (Earth); Steerman; Tamping Machine; Tractor (Under 50 H.P.); & Vibrator

CRANES WITH BOOMS 150 FEET & OVER (INCLUDING JIB) SHALL RECEIVE \$.50 ABOVE BASE RATE.

EMPLOYEES ASSIGNED TO WORK BELOW GROUND LEVEL ARE TO BE PAID 10% ABOVE BASIC WAGE RATE. THIS DOES NOT APPLY TO OPEN CUT WORK.

* IRON0044I 12/01/1998

	Rates	Fringes
BOURBON (Northern third, including Townships of Jackson, Millersburg, Ruddel Mills & Shawhan);		
CARROLL (Eastern third, including the Township of Ghent);		
FLEMING (Western part, excluding Townships of Beechburg, Colfax, Elizaville, Flemingsburg, Flemingsburg Junction, Foxport, Grange City, Hillsboro, Hilltop, Mount Carmel, Muses Mills, Nepton, Pecksville, Plummers Landing, Plummers Mill, Poplar Plains, Ringos Mills, Tilton & Wallingford);		
MASON (Western two-thirds, including Townships of Dover, Lewisburg, Mays Lick, Maysville, Minerva, Moranburg, Murphysville, Ripley, Sardis, Shannon, South Ripley & Washington);		
NICHOLAS (Townships of Barefoot, Barterville, Carlisle, Ellisville, Headquarters, Henryville, Morningglory, Myers & Oakland Mills);		
OWEN (Townships of Beechwood, Bromley, Fairbanks, Holbrook, Jonesville, Long Ridge, Lusby's Mill, New, New Columbus, New Liberty, Owenton, Poplar Grove, Rockdale, Sanders, Teresita & Wheatley);		
SCOTT (Northern two-thirds, including Townships of Biddle, Davis, Delaplain, Elmville, Longlick, Muddy Ford, Oxford, Rogers Gap, Sadieville, Skinnersburg & Stonewall) &		
BRACKEN, GALLATIN, GRANT, HARRISON & ROBERTSON COUNTIES:		

IRONWORKERS:

Structural	20.20	9.24
Fence Erector	18.18	9.24

IRON0070J 06/01/1998

	Rates	Fringes
BOURBON (Southern two-thirds, including Townships of Austerlity, Centerville, Clintonville, Elizabeth, Hutchison, Littlerock, North Middletown & Paris);		
CARROLL (Western two-thirds, including Townships of Carrollton, Easterday, English, Locust, Louis, Prestonville & Worthville);		
CLARK (Western two-thirds, including Townships of Becknerville, Flanagan, Ford, Pine Grove, Winchester & Wyandotte);		
OWEN (Eastern eighth, including Townships of Glenmary, Gratz, Monterey, Perry Park & Tacketts Mill);		
SCOTT (Southern third, including Townships of Georgetown, Great Crossing, Newtown, Stamping Ground & Woodlake);		
ANDERSON, BOYLE, BRECKINRIDGE, BULLITT, FAYETTE, FRANKLIN, GRAYSON, HARDIN, HENRY, JEFFERSON, JESSAMINE, LARUE, MADISON, MARION, MEADE, MERCER, NELSON, OLDHAM, SHELBY, SPENCER, TRIMBLE, WASHINGTON & WOODFORD COUNTIES:		

IRONWORKERS	20.26	9.32
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* IRON0372F 06/01/1998

	Rates	Fringes
BOURBON (Northern third, including Townships of Jackson, Millersburg, Ruddel Mills & Shawhan);		
CARROLL (Eastern third, including the Township of Ghent);		
FLEMING (Western part, Excluding Townships of Beechburg, Colfax, Elizaville, Flemingsburg, Flemingsburg Junction, Foxport, Grange City, Hillsboro, Hilltop, Mount Carmel, Mises Mills, Nepton, Peckridge, Plummers Landing, Plummers Mill, Poplar Plains, Ringos Mills, Tilton & Wallingford);		
MASON (Western two-thirds, including Townships of Dover, Lewisburg, Mays Lick, Maysville, Minerva, Moranburg, Murphysville, Ripley, Sardis, Shannon, South Ripley & Washington);		
NICHOLAS (Townships of Barefoot, Barterville, Carlisle, Ellisville, Headquarters, Henryville, Morningglory, Myers & Oakland Mills);		
OWEN (Townships of Beechwood, Bromley, Fairbanks, Holbrook, Jonesville, Long Ridge, Lusby's Mill, New, New Columbus, New Liberty, Owenton, Poplar Grove, Rockdale, Sanders, Teresita & Wheatley);		
SCOTT (Northern two-thirds, including Townships of Biddle, Davis,		

Delaplain, Elmville, Longlick, Muddy Ford, Oxford, Rogers Gap, Sadieville, Skinnersburg & Stonewall);

BRACKEN, GALLATIN, GRANT, HARRISON & ROBERTSON COUNTIES:

IRONWORKERS, Reinforcing:

Up to & including 25-mile radius of Hamilton County, Ohio		
Courthouse	20.72	7.95
Beyond 25-mile radius of Hamilton County, Ohio Courthouse	21.02	7.95

IRON0769G 06/01/1998

	Rates	Fringes
CLARK (Eastern third, including Townships of Bloomingdale, Hunt, Indian Fields, Kiddville, Loglick, Rightangele & Thomson);		

FLEMING (Townships of Beechburg, Colfax, Elizaville, Flemingsburg, Flemingsburg Junction, Foxport, Grange City, Hillsboro, Hilltop, Mount Carmel, Muses Mills, Nepton, Pecksridge, Plummers Landing, Plummers Mill, Poplar Plains, Ringos Mills, Tilton & Wallingford);

MASON (Eastern third, including Townships of Helena, Marshall, Orangeburg, Plumville & Springdale);

NICHOLAS (Eastern eighth, including the Township of Moorefield Sprout);

BATH, BOYD, CARTER, ELLIOTT, GREENUP, LEWIS, MONTGOMERY & ROWAN COUNTIES:

IRONWORKERS:

ZONE 1	21.85	9.67
ZONE 2	22.25	9.67
ZONE 3	24.25	9.67

ZONE 1 - Up to 10 mi. radius of union hall, Ashland, Ky., 1643 Greenup Avenue

ZONE 2 - 10 to 50 mi. radius of union hall;

ZONE 3 - 50 mi. radius and beyond

LABO0189C 07/01/1998

	Rates	Fringes
LABORERS:		
GROUP 1	14.97	4.53
GROUP 2	15.22	4.53
GROUP 3	15.27	4.53
GROUP 4	15.87	4.53

LABORERS CLASSIFICATIONS

GROUP 1 - Aging & Curing of Concrete; Asbestos Abatement Worker; Asphalt Plant; Asphalt; Batch Truck Dump; Carpenter Tender;

Cement Mason Tender; Cleaning of Machines; Concrete; Demolition; Dredging; Drill Tender; Environmental - Nuclear, Radiation, Toxic & Hazardous Waste - Level D; Flagperson; Grade Checker; Hand Digging & Hand Back Filling; Highway Marker Placer; Landscaping, Mesh Handler & Placer; Puddler; Railroad; Rip-rap & Grouter; Right-of-Way; Sign, Guard Rail & Fence Installer; Signal Person; Sound Barrier Installer; Storm & Sanitary Sewer; Swamper; Truck Spotter & Dumper; & Wrecking of Concrete Form

GROUP 2 - Batter Board Man (Sanitary & Storm Sewer); Brickmason Tender; Mortar Mixer Operator; Burner & Welder; Bushhammer; Chain Saw Operator; Concrete Saw Operator; Deckhand Scow Man; Dry Cement Handler; Environmental - Nuclear, Radiation, Toxic & Hazardous Waste - Level C; Forklift Operator for Masonary; Form Setter; Green Concrete Cutting; Hand Operated Grouter & Grinder Machine Operator; Jackhammer; Pavement Breaker; Paving Joint Machine; Pipelayer; Plastic Pipe Fusion; Power Driven Georgia Buggy & Wheel Barrow; Power Post Hole Digger; Precast Manhole Setter; Walk-Behind Tamper; Walk-Behind Trencher; Sand Blaster; Concrete Chipper; Surface Grinder; Vibrator Operator; & Wagon Driller

GROUP 3 - Air Track Driller; Asphalt Luteman & Raker; Gunnite Nozzleman; Gunnite Operator & Mixer; Grout Pump Operator; Powderman & Blaster; Side Rail Setter; Rail Paved Ditch; Screw Operator; Tunnel (Free Air); & Water Blaster

GROUP 4 - Caisson Worker (Free Air); Cement Finisher; Environmental - Nuclear, Radiation, Toxic & Hazardous Waste - Levels A & B; Miner & Driller (Free Air); Tunnel Blaster; & Tunnel Mucker (Free Air)

PAIN0012M 06/15/1996

BRACKEN, GALLATIN, GRANT, MASON & OWEN COUNTIES:

	Rates	Fringes
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PAINTERS:

GROUP 1	18.25	3.85
GROUP '2	18.75	3.85
GROUP 3	19.00	3.85
GROUP 4	19.25	3.85
GROUP 5	20.00	3.85

PAINTER CLASSIFICATIONS

GROUP 1 - Brush; Roller; & Tanks

GROUP 2 - Spray

GROUP 3 - Sandblasting; Hopper Tender; & Water Blasting

GROUP 4 - Bridges when highest point of clearance is 60 feet or more; Lead Paint Abatement; Elevated Tanks 40 feet or over; Radio Towers, Stacks, Light Towers, Water Towers, Steeples,

Skeleton Steel; Sandblasting, Hopper Tender & Waterblasting under Hazardous Conditions; & Work over 60 feet in height

GROUP 5 - Sandblasting, Hopper Tender, Waterblasting on Bridges when highest point of clearance is 60 feet or more

PAIN0118D 05/01/1998

	Rates	Fringes
ANDERSON, BRECKINRIDGE, BULLITT, CARROLL, GRAYSON, HARDIN, HENRY, JEFFERSON, LARUE, MARION, MEADE, NELSON, OLDHAM, SHELBY, SPENCER, TRIMBLE & WASHINGTON COUNTIES:		

PAINTERS:

Brush	15.57	4.00
Abrasive Blaster; Fireproofing; Lead Abatement; Spray; & Waterblasting 4000 PSI and Above	16.07	4.00

PAIN1072D 06/01/1998

	Rates	Fringes
BOYD, CARTER, ELLIOTT, FLEMING, GREENUP, LEWIS & ROWAN COUNTIES:		

PAINTERS:

Bridges	22.02	5.30
All Other Work	18.68	5.30

PAIN1072F 09/30/1997

	Rates	Fringes
BATH, BOURBON, BOYLE, CLARK, FAYETTE, FRANKLIN, HARRISON, JESSAMINE, MADISON, MERCER, MONTGOMERY, NICHOLAS, ROBERTSON, SCOTT & WOODFORD COUNTIES:		

PAINTERS:

Bridges	21.88	5.03
All Other Work	14.70	3.06

PLUM0059I 06/01/1998

	Rates	Fringes
BRACKEN, CARROLL (Eastern Half), GALLATIN, GRANT, MASON, OWEN & ROBERTSON COUNTIES:		

PLUMBERS	22.78	7.74
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PLUM0107F 08/01/1998

	Rates	Fringes
BRECKINRIDGE, BULLITT, CARROLL (Western Half), FRANKLIN (Western three-fourths), GRAYSON, HARDIN, HENRY, JEFFERSON, LARUE, MARION, MEADE, NELSON, OLDHAM, SHELBY, SPENCER, TRIMBLE & WASHINGTON COUNTIES:		

PLUMBERS; GAS FITTERS:

Plumbing contracts less than \$150,000.00	17.24	5.17
All Other Plumbing contracts	22.16	5.17

* PLUM0248C 06/01/1998

	Rates	Fringes
BOYD, CARTER, ELLIOTT, GREENUP, LEWIS & ROWAN COUNTIES:		
PLUMBERS & STEAMFITTERS	21.56	9.57

PLUM0392H 06/01/1998

	Rates	Fringes
BRACKEN, CARROLL (Eastern Half), GALLATIN, GRANT, MASON, OWEN & ROBERTSON COUNTIES:		
PIPEFITTERS & STEAMFITTERS	23.50	6.22

PLUM0452C 11/01/1998

	Rates	Fringes
ANDERSON, BATH, BOURBON, BOYLE, CLARK, FAYETTE, FLEMING, FRANKLIN (Eastern one-fourth), HARRISON, JESSAMINE, MADISON, MERCER, MONTGOMERY, NICHOLAS, SCOTT & WOODFORD COUNTIES:		

PIPEFITTERS & PLUMBERS:

Projects over 1 1/2 million dollars in piping contracts:

ZONE 1	21.50	4.82
ZONE 2	22.50	4.82

Projects under 1 1/2 million dollars in piping contracts:

ZONE 1	18.12	4.82
ZONE 2	19.12	4.82

ZONE 1 - Within 25 mile radius of Fayette County Courthouse

ZONE 2 - Beyond 25 mile radius of Fayette County Courthouse

PLUM0522D 08/01/1998

	Rates	Fringes
BRECKINRIDGE, BULLITT, CARROLL (Western Half), FRANKLIN (Western three-fourths), GRAYSON, HARDIN, HENRY, JEFFERSON, LARUE, MARION, MEADE, NELSON, OLDHAM, SHELBY, SPENCER, TRIMBLE & WASHINGTON COUNTIES:		

PIPEFITTERS & STEAMFITTERS	23.40	6.45
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SUKY2003A 02/05/1996

	Rates	Fringes
TRUCK DRIVERS:		
GROUP 1	14.62	5.92
GROUP 2	14.73	5.92
GROUP 3	14.91	5.92
GROUP 4	14.94	5.92

GROUP 5

15.01

5.92

TRUCK DRIVER CLASSIFICATIONS

GROUP 1 - Mobile Batch Truck Tender

GROUP 2 - Greaser; Tire Changer; & Mechanic Tender

GROUP 3 - Single Axle Dump; Flatbed; Semi-trailer or Pole
Trailer when used to pull building materials and equipment;
Tandem Axle Dump; Distributor; & Truck Mechanic

GROUP 4 - Mixer

GROUP 5 - Euclid & Other Heavy Earthmoving Equipment & Lowboy;
Articulator Cat; 5-Axle Vehicle; Winch & A-Frame when used in
transporting materials; Ross Carrier; Forklift when used to
transport building materials; & Pavement Breaker

WELDERS - Receive rate prescribed for craft performing operation
to which welding is incidental.
=====

Unlisted classifications needed for work not included within
the scope of the classifications listed may be added after
award only as provided in the labor standards contract clauses
(29 CFR 5.5(a)(1)(v)).

In the listing above, the "SU" designation means that rates
listed under that identifier do not reflect collectively
bargained wage and fringe benefit rates. Other designations
indicate unions whose rates have been determined to be
prevailing.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can
be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a
position on a wage determination matter
- * a conformance (additional classification and rate)
ruling

On survey related matters, initial contact, including requests
for summaries of surveys, should be with the Wage and Hour
Regional Office for the area in which the survey was conducted
because those Regional Offices have responsibility for the
Davis-Bacon survey program. If the response from this initial
contact is not satisfactory, then the process described in 2.)
and 3.) should be followed.

With regard to any other matter not yet ripe for the formal
process described here, initial contact should be with the Branch

of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U. S. Department of Labor
200 Constitution Avenue, N. W.
Washington, D. C. 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N. W.
Washington, D. C. 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U. S. Department of Labor
200 Constitution Avenue, N. W.
Washington, D. C. 20210

4.) All decisions by the Administrative Review Board are final.
END OF GENERAL DECISION

PAUL E. PATTON
GOVERNOR



DIVISION OF EMPLOYMENT STANDARDS,
APPRENTICESHIP AND TRAINING

JOE NORSWORTHY
SECRETARY

LABOR CABINET
1047 U S HWY 127 S STE 4
FRANKFORT KY 40601-4381

DENNIS J. LANGFORD
DIRECTOR

January 13, 1999

Mr. James L. Smith
Carroll County Water District #1
P. O. Box 350
Ghent, Kentucky 41045

Re: Carroll County Water District #1
Extension Project of 1997

Advertising Date as Shown on Notification: January 23, 1999

Dear Mr. Smith:

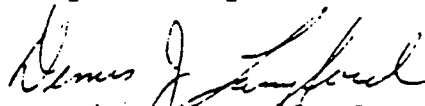
This office is in receipt of your written notification on the above project as required by KRS 337.510(1).

I am enclosing a copy of the current prevailing wage determination number CR-1-279, dated November 6, 1998, for Owen County. This schedule of wages shall be attached to and made a part of the specifications for the work, printed on the bidding blanks, and made a part of the contract for the construction of the public works between the public authority and the successful bidder or bidders.

The determination number assigned to this project is based on the date contained in your notification as the date the project is advertised for bids. If this is changed in any way, it will be the responsibility of the public authority to contact this office and reascertain the correct schedule of the prevailing rates of wages.

Your project number is as follows: 041-2-0012-98-3

Respectfully,


Dennis J. Langford
Director

lprh

Enclosure

TELEPHONE: (502) 564-2784

An Equal Opportunity Employer M/F/D



COMMISSIONER'S CURRENT REVISION
 KENTUCKY PREVAILING WAGE DETERMINATION
 SENATORIAL DISTRICT NO. 020

Determination No. CR-1-279

Date of Determination: November 6, 1998

NOTICE
 THIS DETERMINATION APPLIES TO
 PROJECT NO. 041-2-0012-98-3

This schedule of the prevailing rate of wages for Senatorial District No. 020, which includes the counties of Franklin, Henry, Owen and Shelby, has been determined in accordance with the provisions of KRS 337.505 to 337.550. This determination shall be referred to as Prevailing Wage Determination No. CR-1-279.

Apprentices or trainees shall be permitted to work as such subject to Administrative Regulations adopted by the Commissioner of Workplace Standards. Copies of these regulations will be furnished upon request to any interested person.

Overtime is to be computed at not less than one and one-half (1 1/2) times the indicated BASE RATE for all hours worked in excess of eight (8) per day, or in excess of forty (40) per week. However, KRS 337.540 permits an employee and employer to agree, in writing, that the employee will be compensated at a straight time base rate for hours worked in excess of eight (8) hours in any one workday, but not more than ten (10) hours worked in any one workday, if such written agreement is prior to the over eight (8) hours in a workday actually being worked, or where provided for in a collective bargaining agreement. The fringe benefit rate is to be paid for each hour worked at a straight time rate for all hours worked.

No laborer, workman or mechanic shall be paid at a rate less than that of the General Laborer except those classified as bona fide apprentices registered with the Kentucky State Apprenticeship Supervisor unless otherwise specified in this schedule of wage rates.

Fringe benefit amounts are applicable for all hours worked except when otherwise noted.

<u>CLASSIFICATIONS</u>	<u>RATE AND FRINGE BENEFITS</u>	
ASBESTOS/INSULATION WORKERS	BASE RATE	\$19.48
	FRINGE BENEFITS	5.55
BOILERMAKERS	BASE RATE	\$21.75
	FRINGE BENEFITS	9.76
BRICKLAYERS	BASE RATE	\$16.00
	FRINGE BENEFITS	.59
CARPENTERS:		
Carpenters	BUILDING	BASE RATE \$15.32
		FRINGE BENEFITS 4.59
	HEAVY & HIGHWAY	BASE RATE \$18.45
		FRINGE BENEFITS 4.93

CLASSIFICATIONS RATE AND FRINGE BENEFITS

CARPENTERS: (Continued)

Piledrivers	BUILDING	BASE RATE	\$15.82
		FRINGE BENEFITS	4.59

HEAVY & HIGHWAY	BASE RATE	\$18.70
	FRINGE BENEFITS	4.93

Divers	HEAVY & HIGHWAY	BASE RATE	\$28.05
		FRINGE BENEFITS	4.93

CEMENT MASONS	BASE RATE	\$14.10
	FRINGE BENEFITS	4.65

ELECTRICIANS	*BASE RATE	\$22.25
	FRINGE BENEFITS	5.51 + 3 3/4% gross wages

*When electricians are required to work from Bosum chairs, trusses, stacks, tanks, scaffolds, catwalks, radio and TV towers, structural steel-open, unprotected, unfloored raw steel, bridges, or similar hazardous locations where workman are subject to a direct fall (except for work performed using JLG's and bucket trucks up to 75 ft.): 50' to 75' - add 25% above workman's straight time rate; over 75' - add 50% above workman's straight time rate.

ELEVATOR CONSTRUCTORS	BASE RATE	\$18.47
	FRINGE BENEFITS	1.86

ELEVATOR CONSTRUCTOR HELPERS	BASE RATE	\$12.00
	FRINGE BENEFITS	1.86

GLAZIERS	BASE RATE	\$18.01
	FRINGE BENEFITS	3.88

IRONWORKERS	BASE RATE	\$20.26
	FRINGE BENEFITS	9.32

CLASSIFICATIONS

RATE AND FRINGE BENEFITS

LABORERS:

General laborers, asbestos abatement laborer, toxic waste removal laborer, water boys, tool room checker, carpenter tenders, civil engineer helpers, rodman, grade checkers, concrete pouring and curing, concrete forms stripping and wrecking, hand digging and backfilling of ditches, clearing of right of ways and building sites, wood sheeting and shoring, signalman for concrete bucket and general cleaning, and environmental laborer - nuclear, radiation, toxic and hazardous waste - Level D.

BUILDING	*BASE RATE	\$13.07
	FRINGE BENEFITS	3.63

All air tool operators, air track drills, asphalt rakers, tampers, batchers plant and scale man, chain saw, concrete saw, electric hand grinder, all electric bush and chipping hammers, flagmen, forklift operators, form setter (street or highway), metal form setters, heaters, mesh handlers on walkways, streets and roadways outside building, gunnite laborers, hand spiker, introflax burning rod, joint makers, mason tenders, multi-trade tender, pipe layers, plaster tenders, powderman helpers, power driven Georgia buggies, power posthole diggers, railroad laborers, sandblaster laborers, scow man and deck hand, signal man, sweeper and cleaner machines, vibrator operators, walk behind trenching machines, mortar mixer machines, water pumpmen, and environmental laborers - nuclear, radiation, toxic and hazardous waste - Level C.

BUILDING	*BASE RATE	\$13.47
	FRINGE BENEFITS	3.63

Gunnite nozzleman and gunnite nozzle machine operator, sand blaster nozzleman, concrete or grout pumpman, plaster pumpman.

BUILDING	*BASE RATE	\$13.67
	FRINGE BENEFITS	3.63

Powderman and blaster, and environmental laborer - nuclear, radiation, toxic and hazardous waste - Level B.

BUILDING	*BASE RATE	\$13.77
	FRINGE BENEFITS	3.63

Caisson holes (6 ft. and over) pressure and free air including tools, construction specialist, and environmental laborer-nuclear, radiation, toxic and hazardous waste - Level A.

BUILDING	*BASE RATE	\$14.27
	FRINGE BENEFITS	3.63

CLASSIFICATIONS

RATE AND FRINGE BENEFITS

LABORERS: (Continued)

Tunnel man and tunnel sand miner, cofferdam (pressure and free air), sand hog or mucker (pressure or free air).

BUILDING	*BASE RATE	\$14.57
	FRINGE BENEFITS	3.63

*Employees handling chemically treated materials which are harmful to the skin shall receive an additional \$.25 above base rate. Any employee working on high work such as towers or smoke stacks or any type of work putting the employee 50 feet above the ground or a solid floor shall receive an additional \$.50 per hour above the base rate. Any employee working on boilers, kilns, melting tanks, furnaces, or when refractory is done using live fire, drying fires, heatups or any hot work shall receive an additional 25% premium above the base rate.

Aging and curing of concrete (any mode or method), asbestos abatement worker, asphalt plant laborers, asphalt laborers, batch truck dumpers, carpenter tenders, cement mason tenders, cleaning of machines, concrete laborers, demolition laborers, dredging laborers, drill helper, environmental laborer - nuclear, radiation, toxic and hazardous waste - Level Director, flagmen, grade checkers, all hand digging and hand back filling, highway marker placers, landscaping laborers, mesh handlers and placers, puddler, railroad laborers, rip-rap and grouters, right of way laborers, sign, guard rail and fence installers (all types), signal men, sound barrier installer, storm and sanitary sewer laborers, swampers, truck spotters and dumpers, and wrecking of concrete forms.

HEAVY & HIGHWAY	BASE RATE	\$14.97
	FRINGE BENEFITS	4.53

Batter board men (sanitary and storm sewer), brick mason tenders, mortar mixer operator, burner and welder, bushammers, chain saw operator, concrete saw operators, deckhand scow man, dry cement handlers, environmental laborers - nuclear, radiation, toxic and hazardous waste - Level C forklift operators for masonry, form setters, green concrete cutting, hand operated grouter and grinder machine operator, jack hammers, lead paint abatement, pavement breakers, paving joint machine, pipe layers-laser operators (non-metallic), plastic pipe fusion, power driven georgia buggy or wheelbarrow, power post hole diggers, precast manhole setters, walk-behind tampers, walk-behind trenchers, sand blasters, concrete chippers, surface grinders, vibrator operators, wagon drillers.

HEAVY & HIGHWAY	BASE RATE	\$15.22
	FRINGE BENEFITS	4.53

CLASSIFICATIONS

RATE AND FRINGE BENEFITS

Air track driller (all types), asphalt lute-man and rakers, gunnite nozzle-man, gunnite operators and mixers, grout pump operator, powderman and blaster, side rail setters, rail paved ditches, screw operators, tunnel laborers (free air), and water blasters.

HEAVY & HIGHWAY	BASE RATE	\$15.27
	FRINGE BENEFITS	4.53

Caisson workers (free air), cement finishers, environmental laborer - nuclear, radiation, toxic and hazardous waste - Levels A and B, miners and drillers (free air), tunnel blasters, and tunnel muckers (free air).

HEAVY & HIGHWAY	BASE RATE	\$15.87
	FRINGE BENEFITS	4.53

MARBLE, TILE & TERRAZZO WORKERS	BASE RATE	\$15.00
	FRINGE BENEFITS	2.69

MARBLE, TILE & TERRAZZO FINISHERS	BASE RATE	\$ 9.90
	FRINGE BENEFITS	2.69

MILLWRIGHTS	BASE RATE	\$18.04
	FRINGE BENEFITS	6.69

PAINTERS:

Brush & Roller	BUILDING	BASE RATE	\$14.35
		FRINGE BENEFITS	3.87

Spray & Sandblast	BUILDING	BASE RATE	\$14.85
		FRINGE BENEFITS	3.87

Brush & Roller	HEAVY & HIGHWAY	BASE RATE	\$18.20
		FRINGE BENEFITS	5.08

Drywall finishers and Plasterers

HEAVY & HIGHWAY	BASE RATE	\$18.45
	FRINGE BENEFITS	5.08

CLASSIFICATIONS

RATE AND FRINGE BENEFITS

TEAMSTERS: (Continued)

Driver, over 3 tons, semi-trailer or pole trailer, dump trucks, tandem axle, farm tractor when used to pull building material or equipment.

BUILDING	*BASE RATE	\$15.83
	**FRINGE BENEFITS	6.23

Driver, concrete mixer trucks (all types, hauling only on job sites), truck mechanics.

BUILDING	*BASE RATE	\$15.90
	**FRINGE BENEFITS	6.23

Driver, Euclid and other heavy earth moving equipment and low boy, winch truck and A-Frame and monorail truck when used to transport building materials, fork lift truck when used inside warehouse or storage area.

BUILDING	*BASE RATE	\$16.00
	**FRINGE BENEFITS	6.23

*Employees who perform work either on or hauling to or from any hazardous or toxic waste site will receive \$4.00 in addition to their base rate of pay.

Truckhelper and warehouseman, mobile batch truck helper.

HEAVY & HIGHWAY	BASE RATE	\$14.62
	**FRINGE BENEFITS	5.92

Greaser, tire changer and mechanic helper.

HEAVY & HIGHWAY	BASE RATE	\$14.73
	**FRINGE BENEFITS	5.92

Driver - single axle dump and flatbed trucks, semi-trailer or pole trailer when used to pull building materials and equipment, tandem axle dump truck, driver of distributors, truck mechanic.

HEAVY & HIGHWAY	BASE RATE	\$14.91
	**FRINGE BENEFITS	5.92

CLASSIFICATIONS RATE AND FRINGE BENEFITS

TEAMSTERS: (Continued)

Driver on mixer trucks (all types).

HEAVY & HIGHWAY	BASE RATE	\$14.94
	**FRINGE BENEFITS	5.92

Driver - Euclid and other heavy earthmoving equipment and lowboy, articulator cat truck, 5-axle vehicle, winch truck and A-Frame truck when used in transporting materials, Ross Carrier, forklift truck when used to transport building materials, driver on pavement breakers.

HEAVY & HIGHWAY	BASE RATE	\$15.01
	**FRINGE BENEFITS	5.92

**FRINGE BENEFITS apply to employees who have been employed a minimum of twenty (20) workdays within any ninety (90) consecutive day period for that employer.

OPERATING ENGINEERS:

Auto patrol, batcher plant, bituminous paver, cableway, central com-pressor plant, clamshell, concrete mixer (21 cu. ft. or over), concrete pump, crane, crusher plant, derrick, derrick boat, ditching and trenching machine, dragline, dredge operator, dredge engineer, elevating grader and all types of loaders, hoe-type machine, hoist (1 drum when used for stack or chimney construction or repair), hoisting engineer (2 or more drums), locomotive, motor scraper, carry-all scoop, bulldozer, heavy duty welder, mechanic, orangepeel bucket, piledriver, power blade, motor grader, roller (bituminous), scarifier, shovel, tractor shovel, truck crane, winch truck, push dozer, highlift, all types of boom cats, core drill, hopto, tow or push boat, A-frame winch truck, concrete paver, gradeall, hoist, hyster, pumpcrete, Ross carrier, boom, tail boom, rotary drill, hydro hammer, mucking machine, rock spreader attached to equipment, scoopmobile, KeCal loader, tower cranes (French, German and other types), hydrocrane, backfiller, gurries, sub-grader, tunnel mining machines including moles, shields, or similar types of tunnel mining equipment.

BUILDING	*BASE RATE	\$18.75
	FRINGE BENEFITS	5.90

All air compressors (over 900 CFM), bituminous mixer, joint sealing machine, concrete mixer (under 21 cu. ft.), form grader, roller (rock), tractor (50 HP and over), bull float, finish machine, outboard motor boat, flexplane, fireman, boom type tamping machine, forklift (regard-less of lift height), greaser on

CLASSIFICATIONS

RATE AND FRINGE BENEFITS

OPERATING ENGINEERS: (Continued)

grease facilities servicing heavy equipment, switchman or brakeman, mechanic helper, whirley oiler, self-propelled compactor, tractair and road widening trencher and farm tractor with attachments (except backhoe, highlift and endloader), elevator (regardless of ownership when used for hoisting any building material), hoisting engineer (1-drum or buck hoist), Firebrick masonry excluded), well points, grout pump, throttle-valve man, tugger, electric vibrator compactor, and caisson drill helper.

BUILDING	BASE RATE	\$16.01
	FRINGE BENEFITS	5.90

Bituminous distributor, cement gun, conveyor, mud jack, paving joint machine, roller (earth), tamping machine, tractors (under 50 HP), vibrator, oiler, concrete saw, burlap and curing machine, truck crane oiler, hydro-seeder, power form handling equipment, deckhand steersman, hydraulic post driver, and drill helper.

BUILDING	BASE RATE	\$15.24
	FRINGE BENEFITS	5.90

A-Frame winch truck, auto patrol, backfiller, batcher plant, bituminous paver, all types of boom cats, bulldozer, cableway, carry-all scoop, central compressor plant operator, clamshell, concrete mixer (21 cu. ft. or over), concrete paver, truck-mounted concrete pump, core drills, crane, crusher plant, derrick, derrick boat, ditching and trenching machine, dragline, elevating grader and all types of loaders, grade-all, guries, high lift, hoe-type machine, hoist (two or more drums), hoisting engine (two or more drums), hydrocrane, hyster, KeCal loader, Letourneau, locomotive, mechanic, mechanic welder, mucking machine, motor scraper, orangepeel bucket, piledriver, power blade, pumpcrete, push dozer, rock spreader attached to equipment, all rotary drills, roller (bituminous), scarifier, scoopmobile, shovel, side boom, sub-grader, tailboom, tow or push boat, tower cranes (French, German and other types), tractor shovel and truck crane.

HEAVY & HIGHWAY	**BASE RATE	\$19.55
	FRINGE BENEFITS	5.90

All air compressors (over 900 cu. ft. per min.), bituminous mixer, boom type tamping machine, bull float, concrete mixer (under 21 cu. ft.), dredge engineer, electric vibrator compactor/self-propelled compactor, elevator (one drum or buck hoist), elevator (regardless of ownership when used to hoist building material), finish machine, firemen, flex-plane, forklift (regardless of lift height), form grader, hoist (one drum), joint sealing machine, mechanic helper, outboard motor boat, power sweeper (riding type), roller (rock), ross carrier, skid mounted or trailer mounted concrete pumps, switchman or brakeman, throttle valve man, tractair and road widening trencher, tractor (50 HP and over), truck crane oiler, tugger, welding machine, well points, and whirley oiler.

HEAVY & HIGHWAY	BASE RATE	\$17.13
	FRINGE BENEFITS	5.90

CLASSIFICATIONS RATE AND FRINGE BENEFITS

OPERATING ENGINEERS: (Continued)

Greaser on grease facilities servicing heavy equipment.

HEAVY & HIGHWAY	BASE RATE	\$17.51
	FRINGE BENEFITS	5.90

Bituminous distributor, burlap and curing machine, caisson drill and core drill helper (track or skid mounted), cement gun, concrete saw, conveyor, core drill, deckhand oiler, grout pump, hydraulic post driver, hydro seeder, mud jack, oiler, paving joint machine, power form handling equipment, pump, roller (earth), steermen, tamping machine, tractors (under 50 H.P.) and vibrator.

HEAVY & HIGHWAY	BASE RATE	\$16.87
	FRINGE BENEFITS	5.90

*Operators on cranes with boom one-hundred fifty feet (150') and over, including jib, shall receive seventy-five cents (\$.75) above base rate. All cranes with piling leads shall receive fifty cents (\$.50) above base rate regardless of boom length.

**Operators on cranes with boom one-hundred fifty feet (150') and over, including jib, shall receive fifty cents (\$.50) above base rate.

Employees assigned to work below ground level are to be paid 10% above base rate. This does not apply to open cut work.

WELDERS - Receive rate for craft in which welding is incidental.

NOTE: The type of construction shall be determined by applying the following definitions.

BUILDING CONSTRUCTION

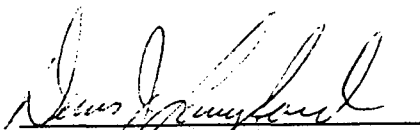
Building construction is the construction of sheltered enclosures with walk-in access for the purpose of housing persons, machinery, equipment, or supplies. It includes all construction of such structures, the installation of utilities and the installation of equipment, both above and below grade level, as well as incidental grading, utilities and paving.

HIGHWAY CONSTRUCTION

Highway construction includes the construction, alteration or repair of roads, streets, highways, runways, taxiways, alleys, trails, paths, parking areas, and other similar projects not incidental to building or heavy construction. It includes all incidental construction in conjunction with the highway construction project.

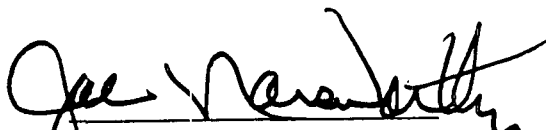
HEAVY CONSTRUCTION

Heavy projects are those projects that are not properly classified as either "building" or "highway". For example, dredging projects, water and sewer line projects, dams, flood control projects, sewage treatment plants and facilities, and water treatment plants and facilities are considered heavy.



Dennis J. Langford, Director
Employment Standards,
Apprenticeship and Training
Kentucky Labor Cabinet

&



Joe Norsworthy, Secretary
Kentucky Labor Cabinet
Frankfort, Kentucky 40601

This 6th day of November, 1998

WATER SYSTEM EXTENSIONS PROJECT OF 1997
FOR
CARROLL COUNTY WATER DISTRICT NO. 1
CARROLLTON, KENTUCKY

- DIVISION A-1 - Water Main Extensions
DIVISION A-2 - Water Main Extensions, Booster Stations,
Main MPRV's, Master Meters and Telemetry
DIVISION B - Standpipe Water Storage Tank and
Related Work

CONSTRUCTION SPECIFICATIONS

I N D E X

SECTION

DIVISION 1 - GENERAL REQUIREMENTS

- 01010 Summary of Work
- 01039 Coordination and Meetings
- 01340 Shop Drawings, Product Data and Samples
- 01400 Quality Controls
- 01410 Testing Laboratory Services
- 01500 Construction Facilities and Temporary Controls
- 01510 Temporary Utilities
- 01530 Barriers
- 01535 Protection and Repair of Private Property
- 01540 Security
- 01560 Temporary Controls
- 01570 Traffic Regulations
- 01600 Material and Equipment
- 01610 Storage and Protection
- 01620 Product Handling
- 01700 Project Closeout

DIVISION 2 - SITEWORK

- 02110 Clearing
- 02210 Site Grading
- 02215 Excavation
- 02220 Backfilling
- 02221 Trenching
- 02485a Seeding
- 02511 Crushed Stone Paving (Repair of)
- 02513 Asphaltic Concrete Paving (Repair of)
- 02831 Chain Link Fences and Gates

INDEX (CONT'D)

DIVISION 3 - CONCRETE

03100 Concrete Formwork
03200 Concrete Reinforcement
03300 Cast-In-Place Concrete

DIVISION 4 - MASONRY (Not Used)

DIVISION 5 - METALS (Not Used)

DIVISION 6 - WOOD AND PLASTIC (Not Used)

DIVISION 7 - THERMAL AND MOISTURE PROTECTION (Not Used)

DIVISION 8 - DOORS AND WINDOWS (Not Used)

DIVISION 9 - FINISHES

09901 Tank Painting

DIVISION 10 - SPECIALTIES (Not Used)

DIVISION 11 - EQUIPMENT (Not Used)

DIVISION 12 - FURNISHINGS (Not Used)

DIVISION 13 - SPECIAL CONSTRUCTION

13300 Water Distribution System
13310 Utility Location Markers
13311 Utility Location Detectable Flagging

DIVISION 14 - CONVEYING SYSTEMS (Not Used)

DIVISION 15 - MECHANICAL

15110 Valves and Appurtenances
15145 Underground Packaged Booster Pumping Station
15146 Above Ground Packaged Water Booster Station
15150 Underground Packaged Pressure Reducing Station
15176 Water Storage Tanks

INDEX (CONT'D)

DIVISION 16 - ELECTRICAL

- 16010 Electrical Special Conditions
- 16025 Codes, Permits, Inspections, Fees
- 16100 Basic Scheduled Materials
- 16111 Conduit
- 16120 Conductors, 600 volt or less
- 16131 Boxes
- 16140 Wiring Devices
- 16180 Overcurrent Protective Devices
- 16190 Supporting Devices
- 16421 Utility Service Entrance
- 16450 Grounding
- 16900 Supervisory Control and Data Acquisition (SCADA) System

WATER SYSTEM EXTENSIONS PROJECT OF 1997
FOR
CARROLL COUNTY WATER DISTRICT NO. 1
CARROLLTON, KENTUCKY

- DIVISION A-1 - Water Main Extensions
DIVISION A-2 - Water Main Extensions, Booster Stations,
Main MPRV's, Master Meters and Telemetry
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- 01610 Storage and Protection
- 01620 Product Handling
- 01700 Project Closeout

SECTION 01010

SUMMARY OF WORK

PART 1 GENERAL

1.01 WORK COVERED BY CONTRACT DOCUMENTS/REQUIREMENTS INCLUDED

- A. The work of this contract comprises the general construction for the installation of water facilities for the Carroll County Water District No. 1, Carroll County, Kentucky, in accordance with the plans, specifications and bid proposal forms.
- B. Contractor shall furnish and install, test and place into operation the improvements and related appurtenances necessary to provide a complete and operational system in accordance with the design indicated by the plans, specifications and contract documents.
- C. The project contemplated by these plans and specifications is composed of three (3) contract division of work to be completed on a furnish-and-install basis, as follows:
 - 1. Division A-1 - Water Main Extensions
 - 2. Division A-2 - Water Main Extensions, Booster Stations, Main MPRV's, Master Meters, and Telemetry
 - 3. Division B - Elevated Water Storage Tank
- D. The work in general to be carried out under the separate contract divisions is as described above and set forth in the "Special Conditions".
- E. Project Descriptions:

Division A-1 Contract

This Contract consists generally of furnishing and installing 3" and 4" water mains and related appurtenances, including, but not limited to: providing all mains, trenching, valves, stream and highway crossings, fittings, flushing hydrants, also installing thrust blocking, anchoring, connections to existing mains, rock removal, seeding, site clearing, special bedding, backfill, repairs to private property, service lines, pressure reducing units, service meters, encasement pipes, drive repairs, disinfection, flushing, system start-up and appurtenances, complete, all in accordance with the Engineer's plans, specifications and Bid Forms.

Division A-2 Contract

This Contract consists generally of furnishing and installing package water pumping stations, package pressure reducing stations, master meters,

telemetry controls and central control units, 3", 4" , 6" and 8" water mains and related appurtenances, including, but not limited to: providing all mains, trenching, valves, stream and highway crossings, fittings, flushing hydrants, also installing thrust blocking, anchoring, connections to existing mains, rock removal, seeding, site clearing, special bedding, backfill, repairs to private property, railroad crossing, service lines, service meters, pressure reducing units, telemetry system, electric services and systems, pump tests, painting, concrete foundations, encasement pipes, drive repairs, disinfection, flushing, system start-up and appurtenances, complete, all in accordance with the Engineer's plans, specifications and Bid Forms.

Division B Contract

This Contract consists generally of furnishing and installing a standpipe water storage tank and appurtenances, including, but not limited to: concrete foundations, shop steel fabrication, piping, steel erection, painting, site work, chain link fence, disinfection, flushing and etc., complete, all in accordance with the Engineer's plans, specifications and Bid Forms.

1.02 WORK SEQUENCE

- A. The Contractor shall start work and carry it on at such point or points and in such order of precedence and at times and seasons as may be deemed necessary by the Owner and as directed by the Engineer and shall complete the various parts of the work in accordance with the progress schedule approved by the Engineer.

1.03 COMMUNICATIONS

- A. No construction shall be commenced without approval of the Engineer and the Owner. When such approval is requested, the Contractor shall advise as to method of operations, materials and equipment on hand to do the work, and estimate completion time to allow proper scheduling of system operations.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01039

COORDINATION AND MEETINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Coordination.
- B. Field engineering.
- C. Preconstruction meeting.

1.02 COORDINATION

- A. Coordinate scheduling, submittals, and Work of the various sections of the Project Manual to assure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- C. Coordinate space requirements and installation of mechanical and electrical work which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- D. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- E. Coordinate completion and clean up of Work of separate sections in preparation for Substantial Completion.
- F. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

1.03 FIELD ENGINEERING

- A. Contractor to locate and protect survey control and reference points.

- B. Control datum for survey is that established by Owner provided survey or as shown on Drawings.
- C. Verify set-backs and easements, confirm drawing dimensions and elevations.

1.04 PRECONSTRUCTION MEETING

- A. Architect/Engineer will schedule a meeting after Notice of Award.
- B. Attendance Required: Owner, Architect/Engineer, and Contractor.
- C. Agenda:
 - 1. Execution of Owner-Contractor Agreement.
 - 2. Submission of executed bonds and insurance certificates.
 - 3. Distribution of Contract Documents.
 - 4. Submission of list of Subcontractors, list of Products, schedule of values, and progress schedule.
 - 5. Designation of personnel representing the parties in Contract, and the Architect/Engineer.
 - 6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
 - 7. Scheduling.
 - 8. Scheduling activities of a Geotechnical Engineer.
- D. Engineer shall record minutes and distribute copies after meeting to participants, with copies to participants, and those affected by decisions made.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

SECTION 01340

SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Submit Shop Drawings, Product Data and Samples required by Contract Documents.

1.02 RELATED REQUIREMENTS

- A. Definitions, and Additional Responsibilities of Parties: Conditions of the Contract.
- B. Section 01720: Record Documents
- C. Designate in a separate coordinated schedule, the dates for submission and the dates that reviewed Shop Drawings, Product Data and Samples will be needed.

1.03 SHOP DRAWINGS

- A. Drawings shall be presented in a clear and thorough manner.
 - 1. Details shall be identified by reference to sheet and detail, schedule or item numbers shown on Contract Drawings.

1.04 PRODUCT DATA

- A. Preparation:
 - 1. Clearly mark each copy to identify pertinent products or models.
 - 2. Show performance characteristics and capacities.
 - 3. Show dimensions and clearances required.
 - 4. Show wiring or piping diagrams and controls.
- B. Manufacturer's standard schematic drawings and diagrams:
 - 1. Modify drawings and diagrams to delete information which is not applicable to the Work.
 - 2. Supplement standard information to provide information specifically applicable to the Work.

1.05 SAMPLES

- A. Office samples shall be of sufficient size and quantity to clearly illustrate:
 - 1. Functional characteristics of the product, with integrally related parts and attachment devices.
 - 2. Full range of color, texture and pattern.

1.06 CONTRACTOR RESPONSIBILITIES

- A. Review Shop Drawings, Product Data and Samples prior to submission.
- B. Determine and verify:
 - 1. Field measurements.
 - 2. Field construction criteria.
 - 3. Catalog numbers and similar data.
 - 4. Conformance with specifications.
- C. Coordinate each submittal with requirements of the Work and of the Contract Documents.
- D. Notify the Architect/Engineer in writing, at time of submission, of any deviations in the submittals from requirements of the Contract Documents.
- E. Begin no fabrication or work which requires submittals until return of submittals with Architect/Engineer approval.

1.07 SUBMISSION REQUIREMENTS

- A. Make submittals promptly in accordance with approved schedule, and in such sequence as to cause no delay in the Work or in the work of any other contractor.
- B. Number of submittals required:
 - 1. Shop Drawings: Submit a minimum of 5 copies of all submittals for use as follows:
 - a) Owner's file
 - b) Inspector's field copy
 - c) Engineer's file
 - d) Contractor's office copy
 - e) Contractor's field copy
 - 2. Additional copies may be submitted if required by sub-contractors, fabricators or suppliers.
- C. Submittals shall contain:
 - 1. The date of submission and the dates of any previous submissions.
 - 2. The Project title and number.
 - 3. Contract identification.
 - 4. The names of:
 - a. Contractor
 - b. Supplier
 - c. Manufacturer
 - 5. Identification of the product, with the specification section number.
 - 6. Field dimensions, clearly identified as such.

7. Relation to adjacent or critical features of the Work or materials.
8. Applicable standards, such as ASTM, or Federal Specification numbers.
9. Identification of deviations from Contract Documents.
10. Identification of revisions on resubmittals.
11. A 5 in. x 3 in. blank space for Contractor and Architect/Engineer stamps.
12. Contractor's stamp, initialed or signed, certifying to review of submittal, verification of products, field measurements and field construction criteria, and coordination of the information within the submittal with requirements of the Work and of Contract Documents.

1.08 RESUBMISSION REQUIREMENTS

- A. Make any corrections or changes in the submittals required by the Architect/Engineer and resubmit until approved.
- B. Shop Drawings and Product Data:
 1. Revise initial drawings or data, and resubmit as specified for the initial submittal.
 2. Indicate any changes which have been made other than those requested by the Architect/Engineer.
- C. Samples: Submit new sample as required for initial submittal.

1.09 ARCHITECT/ENGINEER DUTIES

- A. Review submittals within two weeks after receiving them.
- B. Affix stamp and initials or signature, and indicate requirements for resubmittal, or approval of submittal.
- C. Return submittals to Contractor for distribution, or for resubmission.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

SECTION 01400

QUALITY CONTROL

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Quality assurance - control of installation.
- B. Tolerances
- C. References.
- D. Mockup.
- E. Inspecting and testing laboratory services.
- F. Manufacturers' field services and reports.

1.02 RELATED SECTIONS

- A. Section 01340 - Shop Drawings, Product Data and Samples
- B. Section 01400 - Testing Laboratory Services
- C. Section 01600 - Material and Equipment: Requirements for material and product quality.

1.03 QUALITY ASSURANCE - CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, Products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.
- D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Perform work by persons qualified to produce workmanship of specified quality.

- F. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1.04 TOLERANCES

- A. Monitor tolerance control of installed Products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.
- C. Adjust Products to appropriate dimensions; position before securing Products in place.

1.05 REFERENCES

- A. For Products or workmanship specified by association, trade, or other consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Conform to reference standard by date of issue current on date for receiving bids, date of Owner-Contractor Agreement when there are no Bids, except where a specific date is established by code.
- C. Obtain copies of standards where required by product specification sections.
- D. The contractual relationship, duties, and responsibilities of the parties in Contract nor those of the Architect/Engineer shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.06 MOCK-UP

- A. Tests will be performed under provisions identified in this section and identified in the respective product specification sections.
- B. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
- C. Accepted mock-ups are representative of the quality required for the Work.
- D. Where mock-up has been accepted by Architect/Engineer and is specified in product specification sections to be removed; remove mock-up and clear area when directed to do so.

1.07 INSPECTING AND TESTING LABORATORY SERVICES

- A. Contractor will appoint, employ, and pay for specified services of an independent firm to perform inspecting and testing.
- B. The independent firm will perform inspections, tests, and other services specified in individual specification sections and as required by the Architect/Engineer or the Owner.
- C. Inspecting, testing, and source quality control may occur on or off the project site. Perform off-site inspecting or testing as required by the Architect/Engineer or the Owner.
- D. Reports will be submitted by the independent firm to the Architect/Engineer and Contractor, in duplicate, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.
- E. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.
 - 1. Notify Architect/Engineer and independent firm 24 hours prior to expected time for operations requiring services.
 - 2. Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.
- F. Testing or inspecting does not relieve Contractor to perform Work to contract requirements.
- G. Retesting required because of non-conformance to specified requirements shall be performed after corrections have been made or for additional testing of the non-conformance for quality control at the cost to the Contractor.

1.08 MANUFACTURERS' FIELD SERVICES AND REPORTS

- A. When specified in individual specification sections, require material or Product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment applicable, and to initiate instructions when necessary.
- B. Submit qualifications of observer, to Architect/Engineer 30 days in advance of required observations. Observer subject to approval of Architect/Engineer.
- C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

D. Submit report in duplicate within 30 days of observation to Architect/Engineer for information.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01410

TESTING LABORATORY SERVICES

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Contractor shall employ and pay for the services of an Independent Testing Laboratory to perform specified services and testing.

1.02 RELATED REQUIREMENTS

- A. Conditions of the Contract: Inspections and testing required by laws, ordinances, rules, regulations, orders or approvals of public authorities.
- B. Related Requirements Specified in Other Sections:
- C. Respective sections of specifications: Certification of products.
- D. Each specification section listed: Laboratory tests required, and standards for testing.

1.03 QUALIFICATION OF LABORATORY

- A. Meet "Recommended Requirements for Independent Laboratory Qualification", published by American Council of Independent Laboratories.
- B. Meet basic requirements of ASTM E329, "Standards of Recommended Practice for Inspection and Testing Agencies for Concrete and Steel as Used in Construction".
- C. Authorized to operate in the State in which the Project is located.
- D. Submit copy of report of inspection of facilities made by Materials Reference Laboratory of National Bureau of Standards during the most recent tour of inspection, with memorandum of remedies of any deficiencies reported by the inspection.
- E. Testing Equipment:
 - 1. Calibrated at reasonable intervals by devices of accuracy traceable to either:
 - a. National Bureau of Standards
 - b. Accepted values of natural physical constants.

1.04 LABORATORY DUTIES

- A. Cooperate with Architect/Engineer and Contractor; provide qualified personnel after due notice.
- B. Perform specified inspections, sampling and testing of materials and methods of construction:
 - 1. Comply with specified standards.
 - 2. Ascertain compliance of materials with requirements of Contract Documents.
- C. Promptly notify Architect/Engineer and Contractor of observed irregularities or deficiencies of work or products.
- D. Promptly submit written report of each test and inspection; one copy each to Architect/Engineer, Owner, Contractor, and one copy to Record Documents File. Each report shall include:
 - 1. Date issued.
 - 2. Project title and number.
 - 3. Testing laboratory name, address and telephone number.
 - 4. Name and signature of laboratory inspector.
 - 5. Date and time of sampling or inspection.
 - 6. Record of temperature and weather conditions.
 - 7. Date of test.
 - 8. Identification of product and specification section.
 - 9. Location of sample or test in the Project.
 - 10. Type of inspection or test.
 - 11. Results of tests and compliance with Contract Documents.
 - 12. Interpretation of test results, when requested by Architect/Engineer.
- F. Perform additional tests as required by Architect/Engineer or the Owner.

1.05 LIMITATIONS OF AUTHORITY OF TESTING LABORATORY

- A. Laboratory is not authorized to:
 - 1. Release, revoke, alter or enlarge on requirements of Contract Documents.
 - 2. Approve or accept any portion of the work.
 - 3. Perform any duties of the Contractor.

1.06 CONTRACTOR'S RESPONSIBILITIES

- A. Cooperate with laboratory personnel, provide access to work, to manufacturer's operations.
- B. Secure and deliver to the laboratory adequate quantities of representational samples of materials proposed to be used and which require testing.

- C. Provide to the laboratory the preliminary design mix proposed to be used for concrete, and other materials mixes which require control by the testing laboratory.
- D. Furnish copies of products test reports as required.
- E. Furnish incidental labor and facilities:
 - 1. To provide access to work to be tested.
 - 2. To obtain and handle samples at the Project site or at the source of the product to be tested.
 - 3. To facilitate inspections and tests.
 - 4. For storage and curing of test samples.
- F. Notify laboratory sufficiently in advance of operations to allow for laboratory assignment of personnel and scheduling of tests.
 - 1. When tests or inspections cannot be performed after such notice, reimburse Owner for laboratory personnel and travel expenses incurred due to Contractor's negligence.
- G. Employ and pay for the services of a separate, equally qualified independent testing laboratory to perform additional inspections, sampling and testing required:
 - 1. For the Contractor's convenience.
 - 2. When initial tests indicate Work does not comply with Contract Documents.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

WATER SYSTEM EXTENSIONS PROJECT OF 1997

SECTION 01500

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

DIVISION "A-2" CONTRACTOR

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Telephone Service
- B. Water
- C. Sanitary Facilities
- D. Construction Aids
- E. Barriers
- F. Cleaning During Construction
- G. Project Identification (Division "A-1" , "A-2" and "B")
- H. Field Offices and Sheds

1.02 RELATED SECTIONS

- A. Section 01010 - Summary of Work
- B. Section 01510 - Temporary Utilities

1.03 TELEPHONE SERVICE

- A. Provide telephone service to field office.

1.04 WATER

- A. Connect to existing facilities; extend branch piping with outlets located so that water is available by use of hoses. Contractor shall pay for water used.

1.05 SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures.

1.06 CONSTRUCTION AIDS

- A. Provide and operate drainage and pumping equipment; maintain excavations and site free of standing water.

1.07 BARRIERS

- A. Provide as required to prevent public entry to construction areas to provide for Owner's use of site, and to protect existing facilities and adjacent properties from damage from construction operations.
- B. Provide barriers around trees and plants designed to remain. Protect against vehicular traffic, stored materials, dumping, chemically injurious materials, and puddling or continuous running water.

1.08 CLEANING DURING CONSTRUCTION

- A. Control accumulation of waste materials and rubbish; periodically dispose of off-site.

1.09 PROJECT IDENTIFICATION

- A. Provide 8 x 4 foot Project identification signs, in accordance with detailed drawing of wood frame and exterior grade plywood construction, painted, with exhibit lettering by professional sign painter, to Engineer's design and colors. List title of Project, names of Owner, Engineer, financing agency, professional consultants, Contractor and major subcontractors.
- B. Erect on site at location(s) established by Engineer.
- C. Allow no other signs to be displayed.

1.10 FIELD OFFICES AND SHEDS

- A. Office for Owner or his representative's use: Weather-tight, with lighting, electrical outlets, heating, and ventilating equipment, equipped with furniture.
- B. Storage Sheds for Trailers for Tools, Materials and Equipment: Weather-tight, with head and ventilation for products requiring controlled conditions, with adequate space for organized storage and access, and lighting for inspection of stored materials.

1.11 REMOVAL

- A. Remove temporary materials, equipment, services, and construction prior to Substantial Completion inspection.
- B. Clean and repair damage caused by installation or use of temporary facilities. Remove underground installations to a depth of 2 feet; grade site to original contours or as indicated on the Engineer's drawings.

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PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01510

TEMPORARY UTILITIES

DIVISION "A-2" CONTRACTOR

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Furnish, install and maintain temporary utilities required for construction, remove on completion of Work.

1.02 RELATED REQUIREMENTS

- A. Section 01010 - Summary of Work
- B. Section 01500 - Construction Facilities and Temporary Controls

1.03 REQUIREMENTS OF REGULATORY AGENCIES

- A. Comply with National Electric Code.
- B. Comply with Federal, State and Local codes and regulations and with utility company requirements.

PART 2 PRODUCTS

2.01 MATERIALS, GENERAL

- A. Materials may be new or used, but must be adequate in capacity for the required usage, must not create unsafe conditions, and must not violate requirements of applicable codes and standards.

2.02 TEMPORARY ELECTRICITY AND LIGHTING

- A. Arrange with utility company, provide service required for power and lighting, and pay all costs for service and for power used.

2.03 TEMPORARY TELEPHONE SERVICE

- A. Arrange with local telephone service company, provide direct line telephone service at the combination construction site and project representative office site for the use by personnel and employees. Service required:

- 1. One direct line instrument in Field Office.

WATER SYSTEM EXTENSIONS PROJECT OF 1997

- B. Pay all costs for installation, maintenance and removal, and service charges for local calls. Toll charges shall be paid by the party who places the call.

2.04 TEMPORARY WATER

- A. Make connections to existing facilities, provide water for general construction, testing and flushing purposes.
- B. Install temporary piping with taps located as required to permit pressure testing of system. Protect piping and fittings against freezing.

2.05 TEMPORARY SANITARY FACILITIES

- A. Provide sanitary facilities in compliance with laws and regulations.
- B. Service, clean and maintain facilities and enclosures.

PART 3 EXECUTION

3.01 GENERAL

- A. Maintain and operate systems to assure continuous service.
- B. Modify and extend systems as work progress requires.

3.02 REMOVAL

- A. Completely remove temporary materials and equipment when their use is no longer required.
- B. Clean and repair damage caused by temporary installations or use of temporary facilities.
- C. Restore existing facilities used for temporary services to specified, or to original, condition.

END OF SECTION

SECTION 01530

BARRIERS

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Furnish, install and maintain suitable barriers as required to prevent public entry, and to protect the Work, existing facilities, trees and plants from construction operations; remove when no longer needed, or at completion of Work.

1.02 RELATED REQUIREMENTS

- A. Section 01010: Summary of Work

PART 2 PRODUCTS

2.01 MATERIALS, GENERAL

- A. Materials may be new or used, suitable for the intended purpose, but must not violate requirements of applicable codes and standards.

2.02 FENCING

- A. Materials to Contractor's option, minimum fence height 6 feet.

2.03 BARRIERS

- A. Materials to Contractor's option, as appropriate to serve required purpose.

PART 3 EXECUTION

3.01 GENERAL

- A. Install facilities of a neat and reasonable uniform appearance, structurally adequate for required purposes.
- B. Maintain barriers during entire construction period.
- C. Relocate barriers as required by progress of construction.

3.02 TREE AND PLANT PROTECTION

- A. Preserve and protect existing trees and plants at site which are designated to remain, and those adjacent to site.

- B. Consult with Architect/Engineer, and remove agreed-on roots and branches which interfere with construction.
 - 1. Employ qualified tree surgeon to remove, and to treat cuts.
- C. Protect root zones of trees and plants:
 - 1. Do not allow vehicular traffic or parking.
 - 2. Do not store materials or products.
 - 3. Prevent dumping of refuse or chemically injurious materials or liquids.
 - 4. Prevent puddling or continuous running water.
- D. Carefully supervise excavating, grading and filling, and subsequent construction operations, to prevent damage.
- E. Replace, or suitably repair, trees and plants designated to remain which are damaged or destroyed due to construction operations.

3.03 REMOVAL

- A. Completely remove barricades, including foundations, when construction has progressed to the point that they are no longer needed, and when approved by the Architect/Engineer.
- B. Clean, repair damage caused by installation, fill and grade areas of the site to required elevations and slopes, and clean the area.

END OF SECTION

SECTION 01535

PROTECTION AND REPAIR OF PRIVATE PROPERTY

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Furnish, install all material and labor required to protect and/or repair all damaged private property.

1.02 RELATED REQUIREMENTS

- A. Section 01530: Barriers

PART 2 PRODUCTS

2.01 MATERIALS, GENERAL

- A. Materials shall be new, suitable for the intended purpose.

2.02 FENCING

- A. New fence materials shall be used that match the type of fence being repaired.

2.03 TILE

- A. New tile of the same size and quality of the existing cut tile shall be used.

PART 3 EXECUTION

3.01 GENERAL

- A. Install repairs in neat appearance and with good workmanship.
- B. No additional compensation shall be made to the Contractor for this work.
- C. The Contractor shall conduct the construction within the acquired easements. At no time shall Contractor's equipment be outside the temporary construction easement, unless written permission is received from the property owner.

3.02 FENCES

- A. All cutting of fence shall be avoided if possible.

- B. Fences shall be let down from existing splices or corner post if possible.
- C. The repairs to the fence shall be installed to match the existing fence and to the satisfaction of the property owner, Owner and Engineer.

3.03 DRAINAGE TILE

- A. Drainage tile which is broken or damaged in any way during the construction of the water mains shall be replaced for a distance of 2 feet each side of trench with a section of solid PVC SDR 26 pipe of the same diameter, with each end connected using a repair clamp. When the length of repair pipe is seven (7) feet or longer, the replacement pipe shall be installed with pea gravel backfill from bottom of trench to 6" above top of replacement pipe and 1 foot each way from the centerline of replacement pipe along the trench. In all cases, the repair of drainage tile shall be to the satisfaction of the Engineer.

END OF SECTION

SECTION 01540

SECURITY

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Provide a project security program, to:
 - 1. Protect Work, stored products and construction equipment from theft and vandalism.
 - 2. Protect premises from entry by unauthorized persons.

1.02 RELATED REQUIREMENTS

- A. Section 01530 - Barriers
- B. Section 01610 - Product Handling
- C. Section 01620 - Storage and Handling

1.03 MAINTENANCE OF SECURITY

- A. Initiate security program promptly after job mobilization.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01560

TEMPORARY CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Water control
- B. Dust control
- C. Erosion and sediment control
- D. Noise control
- E. Pollution control
- F. Rodent control

1.02 RELATED SECTIONS

- A. Section 01010 - Summary of Work
- B. Section 01039 - Coordination and Meetings

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.01 WATER CONTROL

- A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
- B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

3.02 DUST CONTROL

- A. Execute Work by methods to minimize raising dust from construction operations.
- B. Provide positive means to prevent air-borne dust from dispersing into atmosphere.

3.03 EROSION AND SEDIMENT CONTROL

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- A. Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
- B. Minimize amount of bare soil exposed at one time.
- C. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.
- D. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
- E. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.
- F. Erosion and sedimentation controls shall be in accordance with the applicable requirements of "Water Management and Sediment Control for Urbanizing Areas".

3.04 NOISE CONTROL

- A. Provide methods, means, and facilities to minimize noise from construction and noise produced by construction operations.

3.05 POLLUTION CONTROL

- A. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations.

3.06 RODENT CONTROL

- A. Provide methods, means, and facilities to prevent rodents from accessing or invading premises.

END OF SECTION

SECTION 01570

TRAFFIC REGULATION

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Provide, operate and maintain equipment, services and personnel, with traffic control and protective devices, as required to expedite vehicular traffic flow on haul routes, at site entrances, on-site access roads, and parking areas.
- B. Remove temporary equipment and facilities when no longer required, restore grounds to original, or to specified conditions.

1.02 TRAFFIC SIGNALS AND SIGNS

- A. Provide and operate traffic control and directional signals required to direct and maintain an orderly flow of traffic in all areas under Contractor's control, or affected by Contractor's operations.
- B. Provide traffic control and directional signs, mounted on barricades or standard posts.
 - 1. At each change of direction of a roadway and at each crossroads.
 - 2. At detours.
 - 3. At parking areas.

1.03 FLAGMEN

- A. Provide qualified and suitably equipped flagmen when construction operations encroach on traffic lanes, as required for regulation of traffic.

1.04 FLARES AND LIGHTS

- A. Provide flares and lights during periods of low visibility.
 - 1. To clearly delineate traffic lanes and to guide traffic.
 - 2. For use by flagmen in directing traffic.
- B. Provide illumination of critical traffic and parking areas.

1.05 CONSTRUCTION PARKING CONTROL

- A. Control vehicular parking to preclude interference with public traffic or parking, access by emergency vehicles, Owner's operations, or construction operations.
- B. Monitor parking of construction personnel's private vehicles:
 - 1. Maintain free vehicular access to and through parking areas.

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2. Prohibit parking on or adjacent to access roads, or in non-designated areas.

1.06 HAUL ROUTES

- A. Consult with governing authorities, establish public thoroughfares which will be used as haul routes and site access.
- B. Confine construction traffic to designated haul routes.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

SECTION 01600

MATERIAL AND EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Products.
- B. Transportation and handling.
- C. Storage and protection.
- D. Product options.
- E. Substitutions.

1.02 RELATED SECTIONS

- A. Instructions to Bidders
- B. Section 01400 - Quality Control

1.03 PRODUCTS

- A. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.
- B. Provide interchangeable components of the same manufacture, for components being replaced.

1.04 TRANSPORTATION AND HANDLING

- A. Transport and handle Products in accordance with manufacturer's instructions.
- B. Promptly inspect shipments to ensure that Products comply with requirements, quantities are correct, and Products are undamaged.
- C. Provide equipment and personnel to handle Products by methods to prevent soiling, disfigurement, or damage.

1.05 STORAGE AND PROTECTION

- A. Store and protect Products in accordance with manufacturers' instructions, with seals and labels intact and legible.
- B. Store sensitive Products in weather tight, climate controlled enclosures.

- C. For exterior storage of fabricated Products, place on sloped supports, above ground.
- D. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.
- E. Cover Products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation or potential degradation of Product.
- F. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- G. Provide equipment and personnel to store Products by methods to prevent soiling, disfigurement, or damage.
- H. Arrange storage of Products to permit access for inspection. Periodically inspect to verify Products are undamaged and are maintained in acceptable condition.

1.06 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Any Product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Products of manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named in accordance with the following article.

1.07 SUBSTITUTIONS

- A. Architect/Engineer will consider requests for Substitutions only within 15 days after date established in Notice to Proceed.
- B. Substitutions may be considered when a Product becomes unavailable through no fault of the Contractor.
- C. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.
- D. A request constitutes a representation that the Contractor:
 - 1. Has investigated proposed Product and determined that it meets or exceeds the quality level of the specified Product.
 - 2. Will provide the same warranty for the Substitution as for the specified Product.

3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.
4. Waives claims for additional costs or time extension which may subsequently become apparent.
5. Will reimburse Owner and Architect/Engineer for review or redesign services associated with re-approval by authorities.

E. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

F. Substitution Submittal Procedure:

1. Submit three copies of request for Substitution for consideration. Limit each request to one proposed Substitution.
2. Submit shop drawings, product data, and certified test results attesting to the proposed Product equivalence. Burden of proof is on proposer.
3. The Architect/Engineer will notify Contractor in writing of decision to accept or reject request.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01610

STORAGE AND PROTECTION

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Provide secure storage and protection for products to be incorporated into the Work, and maintenance and protection for Products after installation and until completion of the Work.

1.02 STORAGE

- A. Store products immediately on delivery, and protect until installed in the Work.
 - 1. Store in accordance with manufacturer's instructions, with seals and labels intact and legible.
- B. Store Products subject to damage by elements in substantial weathertight enclosures.
 - 1. Maintain temperatures within ranges required by manufacturer's instructions.
 - 2. Provide humidity control for sensitive products, as required by manufacturer's instructions.
 - 3. Store unpacked products on shelves, in bins or in neat piles, accessible for inspection.
- C. Exterior Storage:
 - 1. Provide substantial platforms, blocking or skids to support fabricated products above ground, prevent soiling or staining.
 - a. Cover products, subject to discoloration or deterioration from exposure to the elements, with impervious sheet coverings. Provide adequate ventilation to avoid condensation.
 - 2. Store loose granular materials on solid surfaces such as paved areas, or provide plywood or sheet materials to prevent mixing with foreign matter.
 - a. Provide surface drainage to prevent flow or ponding of rainwater.
 - b. Prevent mixing of refuse or chemically injurious materials or liquids.
- D. Arrange storage in manner to provide easy access for inspection.

1.03 MAINTENANCE OF STORAGE

- A. Maintain periodic system of inspection of stored products on scheduled basis to assure that:

1. State of storage facilities is adequate to provide required conditions.
2. Required environmental conditions are maintained on continuing basis.
3. Surfaces of products exposed to elements are not adversely affected.
 - a. Any weathering of products, coatings and finishes is acceptably under requirements of Contract Documents.

B. Mechanical and electrical equipment which requires servicing during long term storage shall have complete manufacturer's instructions for servicing accompanying each item, with notice of enclosed instructions shown on exterior of package.

1. Comply with manufacturer's instructions on scheduled basis.
2. Space heaters which are part of electrical equipment shall be connected and operated continuously until equipment is placed in service.

1.05. PROTECTION AFTER INSTALLATION

A. Provide protection of installed products to prevent damage from subsequent operations. Remove when no longer needed, prior to completion of work.

B. Control traffic to prevent damage to equipment and surfaces.

C. Provide coverings to protect finished surfaces from damage.

1. Cover projections, wall corners, and jambs, sills and soffits of openings, in areas used for traffic and for passage of products in subsequent work.
2. Protect finished floors and stairs from dirt and damage:
 - a. In areas subject to foot traffic, secure heavy paper, sheet goods, or other materials in place.
 - b. For movement of heavy products, lay planking or similar materials in place.
 - c. For storage of products, lay tight wood sheathing in place.
 - d. Cover walls and floor of elevated cars, and surfaces of elevator car doors, used by construction personnel.

D. Waterproofed and roofing surfaces:

1. Prohibit use of surfaces for traffic of any kind, and for storage of any products.
2. When some activity must take place in order to carry out the Contract, obtain recommendations of installer for protection of surface.
 - a. Install recommended protection, remove on completion of that activity.
 - b. Redistrict use of adjacent unprotected areas.

E. Lawns and Landscaping:

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1. Prohibit traffic of any kind across planted lawn and landscaped areas.

PART 2 PRODUCTS - Not used.

PART 3 EXECUTION - Not used.

END OF SECTION

SECTION 01620

PRODUCT HANDLING

PART 1 GENERAL

1.01 DESCRIPTION

- A. Transportation and Handling: Material shipments to job site.
- B. Remove temporary equipment and facilities when no longer required, restore grounds to original, or to specified conditions.

1.02 DELIVERY

- A. Deliver materials, supplies or equipment to project site during working hours. Working hours will be considered as 8:00 a.m. to 4:30 p.m., week days only.
- B. Deliveries made during other than normal working hours must be received by an authorized agent of Contractor involved or be received by other means which shall be the sole responsibility of that Contractor.
- C. No employee of the Owner is authorized to receive any shipment designated for this Project.
- D. The Owner assumes no responsibility for receiving any shipments designated for this Project.
- E. Any materials delivered in the presence of Owner's representative shall be accounted for by the respective contractor.
- F. Under no circumstances may shipments be directed to or in care of the Owner.

1.03 HANDLING

- A. General Contractor, Subcontractor, Manufacturer or Supplier furnishing materials under this Contract shall identify, ship, address, consign, etc., all such materials to the Contractor who may be charged therewith by giving the name of the Contractor, the name of the Project, the street or post office address and the city.

PART 2 PRODUCTS - Not used.

PART 3 EXECUTION - Not used.

END OF SECTION

SECTION 01700

PROJECT CLOSEOUT

PART 1 GENERAL

1.01 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Time of Final Payment: Standard Agreement for Construction Projects.
- B. Completion; Waiver of Claims: General Conditions.

1.02 SUBSTANTIAL COMPLETION

- A. Submit written certification to Engineer that project or designated portion of project is substantially complete.
- B. The Engineer, Contractor, and Owner will make an inspection within seven days after receipt of certification.
- C. Should Engineer consider that work is substantially complete:

- 1. Contractor shall prepare and submit to Engineer a list of items to be completed or corrected as determined by the inspection.
- 2. Engineer will prepare and issue a Certificate of Substantial Completion, complete with signatures of Engineer, Owner and Contractor, accompanied by Contractor's list of items to be completed or corrected as verified and amended by the Engineer.
- 3. Owner occupancy of project or designated portion of project:
 - a. Owner will occupy project under provisions stated in Certificate of Substantial Completion.
- 4. Contractor: Complete work listed for completion or correction within designed time stated on Certificate of Substantial Completion.

D. Should Engineer consider that work is not substantially complete:

- 1. He shall immediately notify Contractor, in writing, stating reasons.
- 2. Contractor: Complete work and send second written notice to Engineer certifying that project or designated portion of project is substantially complete.
- 3. Engineer will reinspect work.

1.03 FINAL INSPECTION

- A. A prefinal inspection will be held to determine the final punch list.
- B. Contractor shall submit written certification that:
 - 1. Contract Documents have been reviewed.
 - 2. Work has been completed and inspected in accordance with Contract Documents.
 - 3. Equipment and systems have been tested in presence of Owner's representative and are operational.
 - 4. Project is completed and ready for final inspection.
- C. Engineer will make final inspection within seven (7) days after receipt of certification.
- D. Should Engineer consider that work is finally complete in accordance with requirements of Contract Documents, he shall request Contractor to make project closeout submittals.
- E. Should Engineer consider that work is not finally complete:
 - 1. He shall notify contractor, in writing, stating reasons.
 - 2. Contractor shall take immediate steps to remedy the stated deficiencies and send second written notice to Engineer certifying that work is complete.
 - 3. Engineer will reinspect work.

1.04 SUBMITTALS

- A. Record Drawings:
 - 1. Contractor shall: Keep up to date one (1) set of prints on the project at all time with all changes, errors, deviations, omissions and all corrections noted plainly therein.
 - 2. After acceptance of the project by Owner, certify on title sheet that the information contained is true and accurate.
 - 3. Submit "Record Drawings" on one (1) complete set of prints to Engineer prior to certification of final payment.

PART 2 PRODUCTS - Not Used.

PART 3 EXECUTION - Not Used.

END OF SECTION

WATER SYSTEM EXTENSIONS PROJECT OF 1997
FOR
CARROLL COUNTY WATER DISTRICT NO. 1
CARROLLTON, KENTUCKY

- DIVISION A-1 - Water Main Extensions
DIVISION A-2 - Water Main Extensions, Booster Stations,
Main MPRV's, Master Meters and Telemetry
DIVISION B - Standpipe Water Storage Tank and
Related Work

CONSTRUCTION SPECIFICATIONS

I N D E X

SECTION

DIVISION 2 - SITEWORK

- 02110 Clearing
02210 Site Grading
02215 Excavation
02220 Backfilling
02221 Trenching
02485a Seeding
02511 Crushed Stone Paving (Repair of)
02513 Asphaltic Concrete Paving (Repair of)
02831 Chain Link Fences and Gates

SECTION 02110

CLEARING

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Clear required sites of plant life and grass.
- B. Remove root system of trees and shrubs.
- C. Remove surface debris.

1.02 RELATED WORK

- A. Section 02210 - Site Grading.
- B. Section 02215 - Excavation.

1.03 REGULATORY REQUIREMENTS

- A. Conform to applicable State and Local codes for disposal of debris.

PART 2 PRODUCTS - Not used.

PART 3 EXECUTION

3.01 CLEARING

- A. Clear areas required for access to site and execution of Work.
- B. Remove trees and shrubs within designated areas. Grub out stumps, roots, and surface rock.
- C. Clear undergrowth and deadwood.

3.02 PROTECTION

- A. Protect existing plant growth and features to remain upon completion of construction.
- B. Protect bench marks and existing work from damage or displacement.
- C. Maintain designated site access for vehicle and pedestrian traffic.

3.03 REMOVAL

- A. Remove debris from site.

END OF SECTION

SECTION 02210

SITE GRADING

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Remove topsoil and stockpile for later reuse.
- B. Excavate subsoil and stockpile for later reuse.
- C. Grade and rough contour site.

1.02 RELATED WORK

- A. Section 02110 - Clearing
- B. Section 02215 - Excavation
- C. Section 02220 - Backfilling
- D. Section 02221 - Trenching

1.03 PROJECT RECORD DOCUMENTS

- A. Accurately record location of utilities remaining, rerouted utilities, new utilities by horizontal dimensions, elevations or inverts, and slope gradients.

1.04 PROTECTION

- A. Protect trees, shrubs, lawns, rock outcropping, and other features remaining as portion of final landscaping.
- B. Protect bench marks, existing structures, roads.
- C. Protect above or below grade utilities which are to remain.
- D. Repair damage.

1.05 TIME CONSTRAINTS

- A. Contractor shall complete site, grading within 90 days after installation of facilities.

PART 2 PRODUCTS

2.01 MATERIALS

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- A. Topsoil: Excavated material, graded free of roots, rocks larger than one inch subsoil, debris, and large weeds. See also Section 02485a - Seeding.
- B. Subsoil: Excavated material, graded free of lumps larger than 6 inches, rocks larger than 3 inches and debris.

PART 3 EXECUTION

3.01 PREPARATION

- A. Maintain and protect existing utilities remaining which pass through work area.
- B. Upon discovery of unknown utility or concealed conditions, discontinue affected work; notify Engineer's representative and Owner in writing.

3.02 TOPSOIL EXCAVATION

- A. Excavate topsoil from areas to be further excavated, relandscaped, or regraded and stockpile in area designated on site.
- B. Do not excavate wet topsoil.
- C. Stockpile topsoil to depth not exceeding 8 feet. Cover to protect from erosion.

3.03 SUBSOIL EXCAVATION

- A. Excavate subsoil from areas to be relandscaped or regraded and stockpile in area designated on site.
- B. Do not excavate wet subsoil.
- C. Stockpile subsoil to depth not exceeding 8 feet.

END OF SECTION

SECTION 02215

EXCAVATION

PART 1 GENERAL

1.01 WORK INCLUDED

- A. General excavation
- B. Dewatering
- C. Shoring excavations

1.02 RELATED WORK

- A. Section 01400 - Quality Control
- B. Section 02210 - Site Grading
- C. Section 02220 - Backfilling
- D. Section 02221 - Trenching
- E. Section 03300 - Cast-in-Place Concrete

1.03 PROTECTION

- A. Protect excavations by shoring, bracing, sheet piling, underpinning, or other methods required to prevent cave-in or loose soil from falling into excavation.
- B. Underpin adjacent structures which may be damaged by excavation work.
- C. Notify Engineer of unexpected subsurface conditions and discontinue affected work in area until notified to resume work.
- D. Grade excavation top perimeter to prevent surface water run-off into excavation.

1.04 CLASSIFICATION

- A. The excavation on this project is considered to be unclassified. The Contractor shall remove all unacceptable materials encountered.

1.05 QUALITY ASSURANCE

WATER SYSTEM EXTENSIONS PROJECT OF 1997

- A. The Contractor shall employ the services of a qualified soils engineer to conduct in place testing and make recommendations for over excavation, backfill and dewatering.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Subsoil: Excavated material, graded free of lumps larger than 6 inches, rocks larger than 3 inches and debris.
- B. Pea Gravel: Mineral aggregate graded 1/4 inch (6 mm) to 5/8 inch (16 mm); free of soil, subsoil, clay, shale, or foreign matter.

PART 3 EXECUTION

3.01 PREPARATION

- A. Identify required lines, levels, contours, and datum.

3.02 EXCAVATION

- A. Excavate subsoil required for structure slabs, construction operations, and other work.
- B. All excavated material shall be piled in a manner that will not hamper the work and that will avoid obstructing sidewalks and driveways. Hydrants under pressure, valve pit covers, valve boxes, or other utility controls shall be left unobstructed and accessible until the work is completed. Ditches shall be kept clear or other satisfactory provisions made for road drainage, and natural watercourses shall not be obstructed.
- C. Correct unauthorized excavation at no cost to Owner.
- D. Fill over-excavated areas under structure bearing surfaces as directed by the Engineer.

3.03 DEWATERING

- A. Where required, dewatering will be performed, as directed by the Contractor's Soils Engineer and approved by the Engineer. Cost shall be included in the applicable unit price of the base bid.

3.04 FIELD QUALITY CONTROL

- A. Provide for visual inspection of bearing surfaces.

END OF SECTION

SECTION 02220

BACKFILLING

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Compaction requirements

1.02 RELATED WORK

- A. Section 02215 - Excavation
- B. Section 02221 - Trenching

1.03 REFERENCES

- A. ANSI/ASTM C136 - Sieve Analysis of Fine and Coarse Aggregates.

PART 2 PRODUCTS

2.01 SELECT FILL MATERIALS

- A. Type A - Coarse Stone: Gravel: Pit run, angular, crushed, washed natural stone; free of shale, clay, friable materials and debris; graded in accordance with ANSI/ASTM C136 within the following limits:

<u>Sieve Size</u>	<u>Percent Passing</u>
2 inches (50 mm)	100
1 inch (25 mm)	95
3/4 inch (19 mm)	95 to 100
5/8 inch (16 mm)	75 to 100
3/8 inch (9 mm)	55 to 85
No. 4	35 to 60
No. 16	15 to 35
No. 40	10 to 25
No. 200	5 to 10

- B. Type B - Pea Gravel: Natural stone; washed, free of clay, shale, organic matter; 1/4 inch minimum to 5/8 inch maximum size; graded in accordance with ANSI/ASTM C136.

- C. Type C - Sand: Natural river or bank sand; washed, free of clay, shale, organic matter; graded in accordance with ANSI/ASTM C136 within the following limits:

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<u>Sieve Size</u>	<u>Percent Passing</u>
No. 4	100
No. 14	10 to 100
No. 50	5 to 90
No. 100	4 to 30
No. 200	0

2.02 COMMON BACKFILL

- A. When the type of backfill material is not indicated on the drawings or specified, the Contractor may backfill with the excavated material, provided that such material consists of loam, clay, sand, gravel or other materials that, in the opinion of the Engineer, are suitable for backfilling. If excavated material is indicated on the drawings or specified for backfill, and there is a deficiency due to a rejection or part thereof, the Contractor shall furnish the required amount of sand, gravel, or other approval material.
- B. All backfill material, unless otherwise specified, shall be free from cinders, ashes, refuse, vegetable and organic material, boulders, rocks or stone or other material that in the opinion of the Engineer is unsuitable.

PART 3 EXECUTION

3.01 INSPECTION

- A. Verify stockpiled fill to be reused is approved.
- B. Verify areas to be backfilled are free of debris, snow, ice, or water, and ground surfaces are not frozen.
- C. All disturbed areas shall be restored to at least preconstruction conditions.
- D. Verify underground tanks, booster stations, MPRV, etc., anchoring to foundation slabs to avoid flotation after backfilling.

3.02 PREPARATION

- A. When necessary, compact subgrade surfaces to density requirements for backfill materials.
- B. Cut out soft areas of subgrade not readily capable of insitu compaction. Backfill with Type A and compact to density equal to requirements for subsequent backfill material.

3.03 BACKFILLING AROUND STRUCTURES

- A. Backfill areas to contours and elevations. Use unfrozen materials.

- B. Backfill systematically, as early as possible, to allow maximum time for natural settlement. Do not backfill over porous, wet, or spongy subgrade surfaces.
- C. Place and compact select fill materials in continuous layers not exceeding 8 inches loose depth.
- D. Place and compact common fill material in continuous layers not exceeding 12 inches loose depth.
- E. Maintain optimum moisture content of backfill materials to attain required compaction density.
- F. Remove surplus backfill materials from site.
- G. Leave stockpile areas completely free of excess fill materials.

3.04 BACKFILLING TRENCHES

- A. All trenches shall be backfilled from the bottom of the trench to the centerline of the pipe with Common Backfill or Select Fill Material, Type B or C, placed in layers of three inches and compacted by tamping. Backfilling material shall be deposited in the trench for its full width on each side of the pipe, fittings, and appurtenances simultaneously. The Contractor shall place the backfill around the pipe in such a manner as to confirm there are no void spaces and subsequently compact the fill by flooding if necessary.
- B. From the centerline of the pipe, fittings and appurtenances to a depth of one foot above the top of the pipe, the trench shall be backfilled and compacted in layers. The Contractor shall use special care in placing this portion of the backfill so as to avoid damaging or moving the pipe. Backfill material shall be free from cinders, ashes, refuse, vegetable and organic material, boulders, rocks or stone or other material that in the opinion of the Engineer is unsuitable. From one foot above the top of the pipe to the existing grade, however, material containing stones up to four inches in their greatest dimension may be used, unless otherwise specified.
- C. When the trench crosses a driveway or other access, the Contractor shall backfill the trench immediately to restore access. He shall check all such areas every day to see if any settlement has occurred and if so, shall backfill again to maintain a smooth surface.
- D. All concrete or asphaltic driveways and entrances shall be bored, but not cased. Bore shall be a maximum of 4" larger in diameter than the carrier pipe outside diameter. Where boring is not

possible and is directed by the Owner, those driveways and entrances, as well as driveways, entrances, and parking areas, consisting of crushed stone, gravel, concrete, or asphaltic surfaces, including those in public rights-of-way, damaged by the construction shall be repaired and replaced with like material to the original grade. All damaged curbs and sidewalks shall also be re-replaced with like material to the original grade. All trench backfilling, replacements and repairs shall be included in the unit price of the pipe unless pay items are provided in the Bid Schedule.

- E. All areas disturbed by construction shall be restored to at least the original preconstruction conditions, and to the satisfaction of the Engineer.
- F. One year from substantial completion of the project the Contractor shall return to the site and backfill or smooth out any settlement that has occurred in the entire length of the pipeline. Any areas repaired shall be seeded and fertilized.

END OF SECTION

SECTION 02221

TRENCHING

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Excavate trenches for utilities as detailed on the plans.
- B. Compacted bed and compacted fill over utilities.
- C. Compaction requirements

1.02 RELATED WORK

- A. Section 02215 - Excavation
- B. Section 02220 - Backfilling: General backfilling

1.03 PROTECTION

- A. Protect excavations by shoring, bracing, sheet piling, underpinning, or other methods required to prevent cave-in or loose soil from falling into excavation.
- B. Underpin adjacent structures which may be damaged by excavation work.
- C. Notify Owner and Engineer's representative, in writing, of unexpected subsurface conditions and discontinue work in affected area until notification to resume work.
- D. Protect bottom of excavations and soil adjacent to and beneath foundations from frost.
- E. Grade excavation top perimeter to prevent surface water run-off into excavation.
- F. Protect from erosion.

PART 2 PRODUCTS

2.01 SELECT BED AND FILL MATERIALS

- A. Type A, B and C - As detailed in Backfilling Section 02220.

2.02 COMMON FILL MATERIALS

- A. Subsoil: Reused; free of gravel larger than 3 inch (75 mm) size, and debris.

PART 3 EXECUTION

3.01 INSPECTION

- A. Verify stockpiled fill to be reused is approved.
- B. Verify areas to be backfilled are free of debris, snow, ice, or water, and ground surfaces are not frozen.

3.02 PREPARATION

- A. Identify required lines, levels, contours, and datum.
- B. Maintain and protect existing utilities remaining which pass through work area.
- C. Upon discovery of unknown utility or concealed conditions, discontinue affected work; notify Owner and Engineer's representative in writing.

3.03 TRENCH EXCAVATION

- A. The trench shall be dug so that the pipe can be laid to the alignment and depth required, and it shall be excavated only so far in advance of pipe laying to prevent unusual lengths of trench standing open over nights and weekends. The width of the trench shall be ample to permit the pipe to be laid and joined properly and the backfill to be placed and compacted. Trenches shall be of such extra width, when required as will permit the convenient placing of timber supports, sheeting and bracing, and handling of valves and fittings.
- B. In the course of excavation, the Contractor may encounter stones or boulders. These large stones or boulders shall be stockpiled and disposed of in an acceptable manner. Boulders and large stones shall be removed to provide a clearance of at least 6 inches below and on each side of all pipe, valves and fittings.
- C. The specified minimum clearances are the minimum clear distances that will be permitted between any part of the pipe and appurtenances being laid and any part, projection, or point of such rock, boulder or stone.
- D. Where the bottom of the trench at subgrade is found to be unstable or to include ashes, cinders, refuse, vegetable or other organic material, or large pieces of fragments of inorganic material that in the judgment of the Engineer should be removed, the Contractor shall

excavate and remove such unsuitable material to the width and depth ordered by the Engineer. This depth shall be 24" below the pipe unless instructed otherwise. Before the pipe is laid, the subgrade shall be relaid with thoroughly compacted suitable material.

- E. The Contractor shall proceed with caution in the excavation and preparation of the trench so that the exact location of underground structures or utilities both known and unknown, may be determined and he shall be held responsible for the repair of such structures if broken or otherwise damaged. Whenever it is necessary to excavate to determine the location of existing underground structures, the Contractor shall make exploration and excavation for such purposes.
- F. When rock is encountered and the Contractor determines that blasting will be required, he shall contact the Owner and the Engineer prior to any blasting. A conference will be held to discuss the blasting operation which will include a review of safety and other procedures. All blasting will be conducted in strictest conformance to any and all Municipal, State or Federal laws and regulations covering these operations. If blasting is not conducted in an expert manner at all times, the Engineer reserves the right to suspend blasting and require the work to proceed without it. The Contractor shall obtain all necessary permits required for blasting of rock.

3.04 RESTORATION

- A. All disturbed areas shall be restored to at least original preconstruction conditions.

END OF SECTION

SECTION 02485a

SEEDING

PART 1 GENERAL

1.01 WORK INCLUDED

- A. All disturbed vegetated areas except cultivated cropland shall be seeded.
- B. Preparation of subgrade to receive topsoil.
- C. Spreading topsoil.
- D. Seeding and fertilizing.
- E. Seed protection on slopes.
- F. Hydroseeding.
- G. Maintaining seeded areas until acceptance.
- H. Temporary seeding.

1.02 QUALITY ASSURANCE

- A. Supply written analysis stating organic matter content, and pH value of soil.

1.03 DELIVERY, STORAGE AND HANDLING

- A. Deliver grass seed in original containers showing analysis of seed mixture, percentage of pure seed, seed percentage germination, year of production, net weight, date of packaging and location of packaging. Damaged packages are not acceptable.
- B. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

1.04 TEMPORARY SEEDING

- A. Temporary seeding is to be applied to areas during construction to reduce damages from sediment and runoff.

PART 2 PRODUCTS

2.01 GROWING MEDIA

- A. Existing Topsoil: Natural, fertile agricultural soil capable of sustaining vigorous plant growth, not in frozen or muddy condition, containing not less than 6% organic matter, and corrected to pH value of 5.9 to 7.0. Free from subsoil, slag, clay, stones, lumps, live plants, roots, sticks, crabgrass, coughgrass, noxious weeds, and foreign matter.
- B. Fertilizer: 10-6-4 commercial type with 50% of the elements derived from organic sources.
- C. Fertilizer for temporary seeding: 12-12-12.

2.02 SEED

- A. Seed Mixture: 50 percent Kentucky Bluegrass, 40 percent Creeping Red Fescue, and 10 percent Norlea Perennial Rye.
- B. Seed for temporary seeding shall be selected from Table 1.

TABLE 1
TEMPORARY SEEDINGS AND SEEDING DATES

Kind of Seed ¹⁾	Seeding Dates ²⁾	Per 1,000 Sq. Ft.	Per Acre
Oats	March 1- June 15	3 pounds	4 bushel
Oats and Sudangrass	June 16-August 15	2 pounds 2 pounds	2 bushel 2 bushel
Rye or Wheat	August 16-November 1	3 pounds	2 bushel
Crown Vetch	March 1-June 15	2 pounds	2 bushel

After November 1, use Mulch only.

- 1) Other seed species may be substituted for the above, check with the local SCS office for recommendations.
- 2) These seeding dates are ideal. With the use of mulch and irrigation, seedings could be made any time from March to September.

2.03 ACCESSORIES

- A. Mulching Material: Oat or wheat straw, reasonably free from weeds, foreign matter detrimental to plant life, and in dry condition. Mulching shall also be applied to temporary seeding.
- B. Mulching Material: Wood or wood cellulose fiber free of growth or germination inhibiting ingredients.

PART 3 EXECUTION

3.01 PREPARATION

- A. Protect existing underground improvements from damage.
- B. Remove foreign materials, plants, roots, stones and debris from site. Do not bury foreign material.
- C. Remove contaminated subsoil.
- D. Cultivate to depth of 3 inches (975 mm), area to receive topsoil. Repeat cultivation areas where equipment has compacted subgrade.
- E. Apply temporary seeding the same day the operations are completed that produce the disturbed area. If no additional work is not scheduled for a period of three weeks, seed immediately.

3.02 SPREADING TOPSOIL

- A. Remove from site, foreign materials collected during cultivation.
- B. Grade to eliminate rough spots and low area where ponding may occur. Maintain smooth, uniform grade.
- C. Assure positive drainage away from building.
- D. Finish ground level firm and sufficient to prevent sinkage pockets when irrigation is applied.

3.03 FERTILIZING

- A. Apply fertilizer at a rate of 10 pounds per 1,000 sq. ft.
- B. Do not apply grass seed and fertilizer at same time, in same machine.
- C. Lightly water to aid breakdown of fertilizer and to provide moist soil for seed.

3.04 SEEDING

- A. For final seeding, apply seed at a uniform rate of 5 lbs. per 1,000 sq. ft. Rake in lightly.
- B. Do not sow immediately following rain, when ground is too dry, or during windy periods, as determined by the Owner.
- C. Roll seeded area with roller not exceeding 112 lbs.

D. Apply water with fine spray immediately after each area has been sown.

E. Mulch at a rate which will allow a coverage at least 1/2" thick.

3.05 SEED PROTECTION ON SLOPES

A. Cover seeded slopes where grade is 3:1 or greater with jute matting. Roll matting down over slopes without stretching or pulling. This includes areas that receive temporary seeding.

B. Lay matting smoothly on soil surface, burying top end of each section in narrow 6 inches trench. Leave 12 inches overlap from top roll over bottom roll. Leave 4 inches overlap over adjacent section.

C. Staple outside edges and overlaps at 36 inches intervals.

D. Lightly dress slopes with topsoil to ensure close contact between matting and soil.

E. In ditches, unroll matting in direction of flow. Overlap ends of strips 6 inches (150 mm) with upstream section on top.

3.06 MAINTENANCE PERIOD

A. Maintenance Period: Until final acceptance.

3.07 MAINTENANCE

A. Maintain surfaces and supply additional topsoil where necessary, including areas affected by erosion.

B. Water to ensure uniform seed germination and to keep surface of soil damp.

C. Apply water slowly so that surface of soil will not puddle and crust.

D. After first mowing, water grass sufficient to moisten soil from 3 inches to 5 inches deep.

E. Apply weed killer when weeds start developing, during calm weather when air temperature is above 50 degrees F.

F. Replant damaged grass areas showing root growth failure, deterioration, bar or thin spots, and eroded areas.

G. Irrigation: If soil moisture is deficient, supply new seedings with adequate water for plant growth until they are firmly established.

This is especially true when seeding is done late in planting season, in abnormally dry or hot season, or on adverse sites.

3.08 RESTORATION

- A. Restore pavement, concrete, grassed areas, planted areas damaged during execution of work, of this section.

3.09 ACCEPTANCE

- A. Seeded areas will be accepted at end of maintenance period when seeded areas are properly established and otherwise acceptable.

END OF SECTION

SECTION 02511

CRUSHED STONE PAVING
(REPAIR OF)

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Prepare sub-grade.
- B. Place, distribute and level base course and topping course.
- C. Compact as required.

1.02 RELATED WORK

- A. Section 02513 - Asphaltic Concrete Paving.

1.03 REFERENCE STANDARDS

- A. Section 02220: Backfilling
- B. Section 02221: Trenching
- C. Section 02513: Asphaltic Concrete Paving
- D. Kentucky Department of Transportation specifications, latest edition.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Products to conform to Kentucky Department of Transportation specifications.

PART 3 EXECUTION

3.01 PREPARATION

- A. As per Kentucky Department of Transportation specifications.
- B. All trench cuts made in the existing pavement for the purpose of installing water mains shall be filled and compacted within 12 inches of the existing surface with a suitable approved granular material. The backfill material shall then be flooded (jetted) in to reduce the possibility of future settlement. The remaining depth shall be filled with aggregate meeting requirements of the Kentucky

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Department of Transportation specifications and future settlement maintained until that section of main and appurtenances are installed, tested, and approved by A/E. The cuts in the pavement shall be neat and straight. The pavement shall be cut to insure a clean break in pavement.

- C. Excavated material may be used for backfill if it is approved as suitable granular material by the A/E. All unsuitable material shall be hauled from the site and disposed of at the Contractor cost.
- D. The Contractor shall be required to maintain the excavated areas to existing grade on a daily basis until the excavated area is resurfaced.
- E. The Contractor shall prevent dust nuisance from all temporary surfaces by applying calcium chloride, or bituminous material, or other suitable dust preventative as may be required.
- F. All repair work shall be done to the satisfaction of the governing agency having authority.
- G. Should the Contractor fail or refuse to maintain any streets or roads in a satisfactory manner as herein specified within twenty four (24) hours after having been notified to do so, the Owner may directly, or by contract, proceed to make the necessary repairs and retain the cost of repair out of funds due on contract.
- H. The Contractor shall be paid for street repair per lineal foot or main installed under the road, street, or alley surface, as allowed for in the proposal forms.

END OF SECTION

SECTION 02513

ASPHALTIC CONCRETE PAVING
(REPAIR OF)

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Prepare sub-grade to receive base course.
- B. Place stabilizing base courses, work and compact.
- C. Prime base course, place asphalt pavement.

1.02 RELATED WORK

- A. Section 02511 - Crushed Stone Paving
- B. Section 02220 - Backfilling
- C. Section 02221 - Trenching

1.03 REFERENCE STANDARDS

- A. Kentucky Department of Transportation specifications, latest edition.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Products to conform to Kentucky Department of Transportation specifications, latest edition.
- B. Granular Sub-base: Crushed rock screenings; free from shale, clay, organic matter and debris, graded as shown on plan sheets. See Section 02511 of these specifications.
- C. Primer: Homogeneous medium curing liquid asphalt; of type recommended for asphaltic paving; of grade to suit job conditions.

2.02 ASPHALT PAVEMENT MATERIALS

- A. Surface and binder course shall be supplied by local asphalt producer whose design mix has been accepted as per Kentucky Department of Transportation specifications.

PART 3 EXECUTION

3.01 PREPARATION

- A. All trench cuts made in the existing pavement for the purpose of installing mains shall be filled and compacted within 12 inches of the existing surface with a suitable approved granular material. The backfill material shall then be flooded (jetted) in to reduce the possibility of future settlement. The remaining depth shall be filled with aggregate meeting requirements of Kentucky Department of Transportation specifications and future settlement maintained until that section of main and appurtenances are installed, tested, and approved by A/E. The cuts in the pavement shall be neat and straight. The pavement shall be cut to insure a clean break in pavement.
- B. Excavated material may be used for backfill if it is approved as suitable granular material by the A/E. All unsuitable material shall be hauled from the site and disposed of at the Contractor's expense.
- C. The Contractor shall be required to maintain the excavated areas to existing grade on a daily basis until the excavated area is resurfaced.
- D. The Contractor shall prevent dust nuisance from all temporary surfaces by applying calcium chloride, or bituminous material, or other suitable dust preventative as may be required.
- E. Street and road repair shall be as follows:
 - 1. All repair shall be done in accordance with Kentucky Department of Transportation Specifications, as it applies to the following specifications.
 - 2. As soon as possible after the installation of the facilities, the trench shall be cleaned out a minimum of 3" below the existing pavement. A minimum of 7" of aggregate shall be remaining.
 - 3. Aggregate shall be compacted and primed with bituminous material as per Kentucky Department of Transportation Specifications, at a rate of 0.3 to 0.35 gallon per square yard.
 - 4. The edge of the existing pavement shall have a tack coat of bituminous material as per Kentucky Department of Transportation Specifications, applied.
 - 5. A minimum of 2" of base coat hot asphaltic concrete shall be installed and compacted.

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6. A 1" minimum top coat of hot asphaltic concrete shall be installed and compacted with surface to be flush with the existing pavement.
 7. Where the berm of the parking area or road is damaged, a minimum of 7" deep by 12" wide from the edge of pavement shall be filled with compacted aggregate. Cost shall be included in the unit cost of the main.
- F. All repair work shall be done to the satisfaction of the governmental office having jurisdiction.
- G. Should the Contractor fail or refuse to maintain any streets or roads in a satisfactory manner as herein specified within twenty four (24) hours after having been notified to do so, the Owner may directly, or by contract, proceed to make the necessary repairs and retain the cost of repair out of funds due on contract.
- H. The Contractor shall be paid for road repair per lineal foot of main installed under the road surface, as allowed for in the proposal forms.

END OF SECTION

SECTION 02831

CHAIN LINK FENCES AND GATES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fence framework, fabric, and accessories.
- B. Excavation for post bases; concrete foundation for posts, and center drop for gates.
- C. Manual gates and related hardware.

1.02 REFERENCES

- A. ASTM A116 - Zinc-Coated (Galvanized) Steel Woven Wire Fence Fabric.
- B. ASTM A121 - Zinc-Coated (Galvanized) Steel Barbed Wire.
- C. ASTM A123 - Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products.
- D. ASTM A153 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- E. ASTM A392 - Zinc-Coated Steel Chain-Link Fence Fabric.
- F. ASTM A428 - Weight of Coating on Aluminum-Coated Iron or Steel Articles.
- G. ASTM A446 - Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality.
- H. ASTM A491 - Aluminum-Coated Steel Chain Link Fence Fabric.
- I. ASTM A569 - Steel, Carbon (0.15 Maximum Percent), Hot-Rolled Sheet and Strip Commercial Quality.
- J. ASTM A585 - Aluminum Coated Steel Barbed Wire.
- K. ASTM C94 - Ready-mixed Concrete.
- L. ASTM F567 - Installation of Chain-Link Fence.
- M. ASTM F573 - Residential Zinc-Coated Steel Chain Link Fence Fabric.
- N. ASTM F668 - Poly (Vinyl Chloride) (PVC) Coated Steel Chain Link Fence Fabric.

- O. ASTM F669 - Strength Requirements of Metal Posts and Rails for Industrial Chain Link Fence.
- P. ASTM F1083 - Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures.
- Q. ASTM F1234 - Protective Coatings on Steel Framework for Fences.
- R. Chain Link Fence Manufacturers Institute (CLFMI) - Product Manual.

1.03 SYSTEM DESCRIPTION

- A. Fence Height: As indicated on Drawings.
- B. Line Post Spacing: At intervals not exceeding 10 feet.

1.04 SUBMITTALS FOR REVIEW

- A. Section 01300 - Submittals: Procedures for submittals.
- B. Product Data: Provide data on fabric, posts, accessories, fittings and hardware.
- C. Shop Drawings: Indicate plan layout, spacing of components, post foundation dimensions, hardware anchorage, and schedule of components.

1.05 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Framing (Steel): ASTM F1083 Schedule 40 galvanized steel pipe, welded construction, coating conforming to ASTM F1234 Type A on pipe exterior and interior.
- B. Fabric Wire (Steel): ASTM A116 galvanized wire.
- C. Barbed Wire: ASTM A121 galvanized steel 12 gage thick wire, 3 strands, 4 points at 3 inch oc.
- D. Concrete: Type specified in Section 03300.

2.02 COMPONENTS

- A. Line Posts: 2.38 inch diameter.
- B. Corner and Terminal Posts: 2.88 inch.
- C. Gate Posts: 4.5 inch diameter.
- D. Top and Brace Rail: 1.66 inch diameter, plain end, sleeve coupled.
- E. Gate Frame: 1.66 inch diameter for welded fabrication.
- F. Fabric: 2 inch diamond mesh interwoven wire, 9 gage thick, top salvage twisted tight, bottom selvage twisted tight.
- G. Tension Wire: 6 gage thick steel, single strand.
- H. Tie Wire: Aluminum alloy steel wire.

2.03 ACCESSORIES

- A. Caps: Cast steel galvanized; sized to post diameter, set screw retainer.
- B. Fittings: Sleeves, bands, clips, rail ends, tension bars, fasteners and fittings; steel.
- C. Extension Arms: Cast steel galvanized to accommodate 3 strands of barbed wire, single arm, sloped to 45 degrees.
- D. Gate Hardware: Fork latch with gravity drop; two 180 degree gate hinges per leaf and hardware for padlock.

2.04 FINISHES

- A. Components and Fabric: Galvanized to ASTM A123; 1.8 oz/sq ft coating.
- B. Hardware: Galvanized to ASTM A153, 1.8 oz/sq ft coating.
- C. Accessories: Same finish as framing.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install framework, fabric, accessories and gates in accordance with manufacturer's instructions.
- B. Place fabric on outside of posts and rails.

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- C. Set intermediate, terminal, and gate posts plumb, in concrete footings with top of footing 2 inches below finish grade. Slope top of concrete for water runoff.
- D. Line Post Footing Depth Below Finish Grade: ASTM F567 or as shown on plans.
- E. Corner, Gate and Terminal Post Footing Depth Below Finish Grade: ASTM F567 or as shown on plans.
- F. Brace each gate and corner post to adjacent line post with horizontal center brace rail and diagonal truss rods. Install brace rail one bay from end and gate posts.
- G. Provide top rail through line post tops and splice with 6 inch long rail sleeves.
- H. Install center and bottom brace rail on corner gate leaves.
- I. Do not stretch fabric until concrete foundation has cured 7 days.
- J. Stretch fabric between terminal posts or at intervals of 100 feet maximum, whichever is less.
- K. Position bottom of fabric 2 inches above finished grade.
- L. Fasten fabric to top rail, line posts, braces, and bottom tension wire with tie wire at maximum 15 inches on centers.
- M. Attach fabric to end, corner, and gate posts with tension bars and tension bar clips.
- N. Install bottom tension wire stretched taut between terminal posts.
- O. Install support arms sloped inward and attach barbed wire; tension and secure.
- P. Do not attach the hinged side of gate from building wall; provide gate posts.
- Q. Install gate with fabric and barbed wire overhang to match fence. Install three hinges per leaf, latch, catches, drop bolt.
- R. Provide concrete center drop to footing depth and drop rod retainers at center of double gate openings.

3.02 ERECTION TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch.

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- B. Maximum Offset From True Position: 1 inch.
- C. Components shall not infringe adjacent property lines.

END OF SECTION

WATER SYSTEM EXTENSIONS PROJECT OF 1997
FOR
CARROLL COUNTY WATER DISTRICT NO. 1
CARROLLTON, KENTUCKY

- DIVISION A-1 - Water Main Extensions
DIVISION A-2 - Water Main Extensions, Booster Stations,
Main MPRV's, Master Meters and Telemetry
DIVISION B - Standpipe Water Storage Tank and
Related Work

CONSTRUCTION SPECIFICATIONS

I N D E X

SECTION

DIVISION 3 - CONCRETE

- 03100 Concrete Formwork
03200 Concrete Reinforcement
03300 Cast-In-Place Concrete

SECTION 03100

CONCRETE FORMWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Formwork for cast-in place concrete, with shoring, bracing and anchorage.
- B. Openings for other work.
- C. Form accessories.
- D. Form stripping.

1.02 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

- A. Section 03300 - Cast-In-Place Concrete: Supply of concrete accessories for placement by this section.
- B. Section 16190 - Supporting Devices: Supply of electrical items for placement by this section.

1.03 RELATED SECTIONS

- A. Section 02215 - Excavation.
- B. Section 03200 - Concrete Reinforcement.
- C. Section 03300 - Cast-in-Place Concrete.

1.04 REFERENCES

- A. ACI 301 - Structural Concrete for Buildings.
- B. ACI 318 - Building Code Requirements for Reinforced Concrete.
- C. ANSI/ASME A17.1 - Safety Code for Elevators, Dumbwaiters, Escalators, and Moving Walks
- D. PS 1 - Construction and Industrial Plywood.

1.05 DESIGN REQUIREMENTS

- A. Design, engineer and construct formwork, shoring and bracing to conform to design and code requirements; resultant concrete to conform to required shape, line and dimension.

1.06 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 301.
- B. Maintain one copy of each document on site.

1.07 REGULATORY REQUIREMENTS

- A. Conform to applicable code for design, fabrication, erection and removal of formwork.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and handle products to site under provisions of Section 01600.
- B. Deliver void forms and installation instructions in manufacturer's packaging.
- C. Store off ground in ventilated and protected manner to prevent deterioration from moisture and/or soil.

1.09 COORDINATION

- A. Coordinate work under provisions of Section 01039.
- B. Coordinate this Section with other Sections of work which require attachment of components to formwork.
- C. If formwork is placed after reinforcement resulting in insufficient concrete cover over reinforcement before proceeding, request instructions from Architect/Engineer.

PART 2 PRODUCTS

2.01 WOOD FORM MATERIALS

- A. Plywood: Douglas Fir or spruce species; solid one side, select sheathing, tight face, medium density overlaid one side grade; sound undamaged sheets with clean, true edges.
- B. Lumber: #2 grade; with grade stamp clearly visible.

2.02 PREFABRICATED FORMS

- A. Preformed Steel Forms: Minimum 16 gage (1.5 mm), matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.

- B. Glass Fiber Fabric Reinforced Plastic Forms: Matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished concrete surfaces.
- C. Pan Type: Steel or Glass fiber of size and profile required.
- D. Tubular Column Type: Round, spirally wound laminated fiber or glass fiber material, surface treated with release agent, non-reusable, of sizes required.
- E. Void Forms: Moisture resistant treated paper faces, biodegradable, structurally sufficient to support weight of wet concrete mix until initial set; 2 inches (50 mm) thick.

2.03 FORMWORK ACCESSORIES

- A. Form Ties: Removable or snap-off type, galvanized metal, adjustable length, free of defects that could leave holes larger than 1 inch (25 mm) in concrete surface.
- B. Form Release Agent: Colorless mineral oil which will not stain concrete, or absorb moisture, or impair natural bonding, or color characteristics of coating intended for use on concrete.
- C. Corners: Chamfer wood strip type; 1" x 1" (25 x 25 mm) size; maximum possible lengths.
- D. Dovetail Anchor Slot: Galvanized steel, 22 gage (0.8 mm) thick, foam filled, release tape sealed slots, anchors for securing to concrete formwork.
- E. Flashing Reglets: Galvanized steel, 22 gage (0.8 mm) thick, longest possible lengths, with alignment splines for joints, non-filled, release tape sealed slots, anchors for securing to concrete formwork.
- F. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.
- G. Waterstops: Polyvinyl chloride, minimum 1,800 psi (12 MPa) tensile strength, minimum 50 degrees F (46 degrees C) to plus 175 degrees F (79 degrees C) working temperature range, width as shown on plans, maximum possible lengths, ribbed profile, preformed corner sections, heat welded jointing.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.02 EARTH FORMS

- A. Earth forms are not permitted.

3.03 ERECTION - FORMWORK

- A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.
- B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to over stressing by construction loads.
- C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.
- D. Align joints and make watertight. Keep form joints to a minimum.
- E. Obtain approval before framing openings in structural members which are not indicated on Drawings.
- F. Provide fillet and chamfer strips on external corners of beams, joists and columns.
- G. Install void forms in accordance with manufacturer's recommendations. Protect forms from moisture or crushing.

3.04 APPLICATION - FORM RELEASE AGENT

- A. Apply form release agent on formwork in accordance with manufacturer's recommendations.
- B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.
- C. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings which are effected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.05 INSERTS, EMBEDDED PARTS, AND OPENINGS

- A. Provide formed openings where required for items to be embedded in passing through concrete work.

- B. Locate and set in place items which will be cast directly into concrete.
- C. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other Work.
- D. Position recessed reglets for brick veneer masonry anchors to spacing and intervals specified in Section 04300.
- E. Install accessories in accordance with manufacturer's instructions, straight, level, and plumb. Ensure items are not disturbed during concrete placement.
- F. Install waterstops continuous without displacing reinforcement. Heat seal joints watertight.
- G. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.
- H. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

3.06 FORM CLEANING

- A. Clean forms as erection proceeds, to remove foreign matter within forms.
- B. Clean formed cavities of debris prior to placing concrete.
- C. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.
- D. During cold weather, remove ice and snow from within forms. Do not use de-icing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.

3.07 FORMWORK TOLERANCES

- A. Construct formwork to maintain tolerances required by ACI 301.
- B. Camber slabs and beams in accordance with ACI 301.

3.08 FIELD QUALITY CONTROL

- A. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and that supports, fastenings, wedges, ties, and items are secure.
- B. Do not reuse wood formwork more than 3 times for concrete surfaces to be exposed to view. Do not patch formwork.

3.09 FORM REMOVAL

- A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.
- B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.
- C. Store removed forms in manner that surfaces to be in contact with fresh concrete will not be damaged. Discard damaged forms.

END OF SECTION

SECTION 03200

CONCRETE REINFORCEMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Reinforcing steel bars, wire fabric and accessories for cast-in-place concrete.

1.02 RELATED SECTIONS

- A. Section 03100 - Concrete Formwork.
- B. Section 03300 - Cast-in-Place Concrete.

1.03 REFERENCES

- A. ACI 301 - Structural Concrete for Buildings.
- B. ACI 318 - Building Code Requirements For Reinforced Concrete.
- C. ACI SP-66 - American Concrete Institute - Detailing Manual.
- D. ANSI/ASTM A82 - Cold Drawn Steel Wire for Concrete Reinforcement.
- E. ANSI/ASTM A184 - Fabricated Deformed Steel Bar Mats for Concrete Reinforcement.
- F. ANSI/ASTM A185 - Welded Steel Wire Fabric for Concrete Reinforcement.
- G. ANSI/ASTM A496 - Deformed Steel Wire Fabric for Concrete Reinforcement.
- H. ANSI/ASTM A497 - Welded Deformed Steel Wire Fabric for Concrete Reinforcement.
- I. ANSI/AWS D1.4 - Structural Welding Code for Reinforcing Steel.
- J. ASTM A615 - Deformed and Plain Billet Steel Bars for Concrete Reinforcement.
- K. ASTM A616 - Rail Steel Deformed and Plain Bars for Concrete Reinforcement.
- L. ASTM A767 - Zinc-Coated (Galvanized) Bars for Concrete Reinforcement.
- M. ASTM A775 - Epoxy-Coated Reinforcing Steel Bars.

- N. ASTM D3963 - Epoxy-Coated Reinforcing Steel.
- O. AWS D12.1 - Welding Reinforcement Steel, Metal Inserts and Connections in Reinforced Concrete Construction.
- P. CRSI - Concrete Reinforcing Steel Institute - Manual of Practice.
- Q. CRSI - Placing Reinforcing Bars.
- R. ASTM A884 - Epoxy-Coated Steel Wire and Welded Wire Fabric for Reinforcement.

1.04 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Shop Drawings: Indicate bar sizes, spacings, locations, and quantities of reinforcing steel and wire fabric, bending and cutting schedules, and supporting and spacing devices.
- C. Manufacturer's Certificate: Certify that materials meet or exceed specified requirements.

1.05 QUALITY ASSURANCE

- A. Perform Work in accordance with CRSI - Manual of Standard Practice, ACI 301.
- B. Maintain one (1) copy of each document on site.
- C. Submit certified copies of mill test report of reinforcement materials analysis.

1.06 QUALIFICATIONS

- A. Design reinforcement under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State of Ohio.
- B. Welders' Certificates: Submit under provisions of Section 01400 Manufacturer's Certificates, certifying welders employed on the Work, verifying AWS qualification within the previous 12 months.

1.07 COORDINATION

- A. Coordinate work under provisions of Section 01039.
- B. Coordinate with placement of formwork, formed openings and other Work.

PART 2 PRODUCTS

2.01 REINFORCEMENT

- A. Reinforcing Steel: ASTM A615, 60 ksi (414) MPa yield grade; deformed billet steel bars.
- B. Reinforcing Steel Plain Bar and Rod Mats: ASTM A704, ASTM A615, Grade 40 steel bars or rods, unfinished.
- C. Stirrup Steel: ANSI/ASTM A82.
- D. Welded Steel Wire Fabric: ASTM A497 Deformed Type.

2.02 ACCESSORY MATERIALS

- A. Tie Wire: Minimum 16 gage annealed type.
- B. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions including load bearing pad on bottom to prevent vapor barrier puncture.
- C. Special Chairs, Bolsters, Bar Supports, Spacers Adjacent to Weather Exposed Concrete Surfaces: Plastic coated steel type; size and shape as required.

2.03 FABRICATION

- A. Fabricate concrete reinforcing in accordance with ACI 318, ANSI/ASTM A184.
- B. Locate reinforcing splices not indicated on drawings, at point of minimum stress.

PART 3 EXECUTION

3.01 PLACEMENT

- A. Place, support and secure reinforcement against displacement. Do not deviate from required position.
- B. Do not displace or damage vapor barrier.
- C. Accommodate placement of formed openings.
- D. Maintain concrete cover around reinforcing as follows:

<u>Item</u>	<u>Coverage</u>
Beams	3 inch
Supported Slabs and Joists	2 inch

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Column Ties	3 inch
Walls (exposed to weather or backfill)	2 inch
Slabs on Fill	3 inch

F. Bond and ground all reinforcement to requirements of Section 16170.

3.02 FIELD QUALITY CONTROL

A. Field inspection will be performed under provisions of Section 01400.

END OF SECTION

SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Cast-in-place concrete for structures.
- B. Floors and slabs on grade.
- C. Control, expansion and contraction joint devices associated with concrete work, including joint sealants.
- D. Equipment pads, thrust blocks and manholes.
- E. Encasement for stream crossing.

1.02 PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION

- A. Section 03100 - Concrete Formwork: Placement of joint device in formwork.

1.03 RELATED SECTIONS

- A. Section 03100 - Concrete Formwork.
- B. Section 03200 - Concrete Reinforcement.

1.04 REFERENCES

- A. ACI 301 - Structural Concrete for Buildings.
- B. ACI 302 - Guide for Concrete Floor and Slab Construction.
- C. ACI 304 - Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete.
- D. ACI 305R - Hot Weather Concreting.
- E. ACI 306R - Cold Weather Concreting.
- F. ACI 308 - Standard Practice for Curing Concrete.
- G. ACI 318 - Building Code Requirements for Reinforced Concrete.
- H. ANSI/ASTM D994 - Preformed Expansion Joint Filler for Concrete (Bituminous Type).

- I. ANSI/ASTM D1190 - Concrete Joint Sealer, Hot-Poured Elastic Type.
 - J. ANSI/ASTM D1751 - Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).
 - K. ANSI/ASTM D1752 - Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.
 - L. ASTM B221 - Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.
 - M. ASTM C33 - Concrete Aggregates.
 - N. ASTM C94 - Ready-Mixed Concrete.
 - O. ASTM C150 - Portland Cement.
 - P. ASTM C260 - Air Entraining Admixtures for Concrete.
 - Q. ASTM C330 - Light Weight Aggregates For Structural Concrete.
 - R. ASTM C494 - Chemicals Admixtures for Concrete.
 - S. ASTM C618 - Fly Ash and Raw or Calcinated Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete.
- 1.05 SUBMITTALS
- A. Submit under provisions of Section 01300.
 - B. Product Data: Provide data on joint devices, attachment accessories and admixtures.
 - C. Submit proposed mix design for each class of concrete.
- 1.06 PROJECT RECORD DOCUMENTS
- A. Submit under provisions of Section 01700.
 - B. Accurately record actual locations of embedded utilities and components which are concealed from view.
- 1.07 QUALITY ASSURANCE
- A. Perform Work in accordance with ACI 301.
 - B. Maintain one (1) copy of each document on site.
 - C. Acquire cement and aggregate from same source for all work.

- D. Conform to ACI 305R when concreting during hot weather.
- E. Conform to ACI 306R when concreting during cold weather.

1.08 COORDINATION

- A. Coordinate work under provisions of Section 01039.
- B. Coordinate the placement of joint devices with erection of concrete formwork and placement of form accessories.

PART 2 PRODUCTS

2.01 CONCRETE MATERIALS

- A. Cement: ASTM C150, Type I - Normal, Portland type.
- B. Fine and Coarse Aggregates: Coarse aggregate shall be .75-1.00 inch maximum.
- C. Water: Clean and not detrimental to concrete.
- D. Glass Fiber Reinforcement: ASTM C948.

2.02 ADMIXTURES

- A. Air Entrainment: ASTM C260.

2.03 ACCESSORIES

- A. Bonding Agent: Polymer resin emulsion.
- B. Vapor Barrier: 6 mil (0.5 mm) thick clear polyethylene film type recommended for below grade application.
- C. Non-Shrink Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; capable of developing minimum compressive strength of 2,400 psi (17 MPa) in 48 hours and 7,000 psi (48 MPa) in 28 days.

2.04 JOINT DEVICES AND FILLER MATERIALS

- A. Joint Filler Type A: ASTM D1751; Asphalt impregnated fiberboard or felt, 1/4 inch (6 mm) thick; tongue and groove profile.
- B. Construction Joint Devices: Integral extruded plastic; .25 inch (.25 mm) thick, formed to tongue and groove profile.
- C. Expansion and Contraction Joint Devices: ASTM B221 alloy, extruded aluminum; resilient elastomeric filler strip with a Shore A hardness

of 35 to permit plus or minus 25 percent joint movement with full recovery; extruded aluminum cover plate, of longest manufactured length at each location, flush mounted; color as selected.

2.05 CONCRETE MIX

- A. Mix and deliver concrete in accordance with ASTM C94, Alternative No. 2.
- B. Select proportions for normal weight concrete in accordance with ACI 301 Method 1.
- C. Provide concrete to the following criteria:

<u>Unit</u>	<u>Measurement</u>
Compressive Strength (7 day)	3000 psi
Compressive Strength (28 day)	4000 psi
Coarse Aggregate	±45 percent
Fine Aggregate	No less than 35 percent
Water/Cement Ratio (maximum)	.50
Air Entrained	6 percent
Admixture	1 type
Cement Content:	Minimum 564 pounds per cu yd
Slump - Plus or minus 1 inch (50 mm)	4 inches maximum

- D. Use accelerating admixtures in cold weather only when approved by Architect/Engineer. Use of admixtures will not relax cold weather placement requirements.
- E. Use of calcium chloride is prohibited.
- F. Use set retarding admixtures during hot weather only when approved by Architect/Engineer.
- G. Add air entraining agent to normal weight concrete mix for work exposed to exterior.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify site conditions under provisions of Section 01039.
- B. Verify requirements for concrete cover over reinforcement.
- C. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not cause hardship in placing concrete.

3.02 PREPARATION

- A. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.
- B. In locations where new concrete is dowelled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.

3.03 PLACING CONCRETE

- A. Place concrete in accordance with ACI 304, ACI 301, ACI 318.
- B. Notify Architect/Engineer minimum 48 hours prior to commencement of operations.
- C. Ensure reinforcement, inserts, embedded parts, formed expansion and contraction joints are not disturbed during concrete placement.
- D. Install vapor barrier under interior slabs on grade. Lap joints minimum 6 inches (150 mm) and seal watertight by sealant applied between overlapping edges and ends.
- E. Repair vapor barrier damaged during placement of concrete reinforcing. Repair with vapor barrier material; lap over damaged areas minimum 6 inches (150 mm) and seal watertight.
- F. Install joint devices in accordance with manufacturer's instructions.
- G. Install construction joint devices in coordination with floor slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.
- H. Install joint device anchors. Maintain correct position to allow joint cover to be flush with floor finish.
- I. Install joint covers in longest practical length, when adjacent construction activity is complete.
- J. Apply sealants in joint devices in accordance with Section 07900.
- K. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.
- L. Place concrete continuously between predetermined expansion, control, and construction joints.
- M. Do not interrupt successive placement; do not permit cold joints to occur.

- N. Place floor slabs in saw cut pattern.
- O. Saw cut joints within 24 hours after placing. Use 3/16 inch thick blade, cut into 1/4 depth of slab thickness.
- P. Screed floors and slabs on grade level, maintaining surface flatness of maximum 1/4 inch in 10 ft (6 mm/3m).

3.04 SEPARATE FLOOR TOPPINGS

- A. Prior to placing floor topping, roughen substrate concrete surface and remove deleterious material. Broom and vacuum clean.
- B. Place required dividers and other items to be cast in.
- C. Apply bonding agent to substrate in accordance with manufacturer's instructions.

3.05 CONCRETE FINISHING

- A. Provide formed concrete surfaces to be left exposed, concrete walls, columns, beams and joists with smooth hand rubbed finish.
- B. Finish concrete floor surfaces in accordance with ACI 301.
- C. Steel trowel surfaces which are scheduled to be exposed.
- D. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains 1/4 inch per foot (10 mm per m) nominal as indicated on drawings.

3.06 CURING AND PROTECTION

- A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
- C. Cure floor surfaces in accordance with ACI 308.
- D. Ponding: Maintain 100 percent coverage of water over floor slab areas continuously for 4 days.
- E. Spraying: Spray water over floor slab areas and maintain wet for 7 days.

3.07 FIELD QUALITY CONTROL

- A. Field inspection and testing shall be performed in accordance with ACI 301 and under provisions of Section 01400.
- B. Provide free access to Work and cooperate with appointed firm.
- C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of Work.
- D. Tests of cement and aggregates may be performed to ensure conformance with specified requirements.
- E. Three concrete test cylinders shall be taken for each day's pour and for each structure at each pour of 50 cu yds.
- F. One additional test cylinder shall be taken during cold weather concreting, cured on job site under same conditions as concrete it represents.
- G. One slump test shall be taken for each truckload of concrete.

3.08 PATCHING

- A. Allow Architect/Engineer to inspect concrete surfaces immediately upon removal of forms.
- B. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Architect/Engineer upon discovery.
- C. Patch imperfections as directed.

3.09 DEFECTIVE CONCRETE

- A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.
- B. Repair or replacement of defective concrete shall be determined by the Architect/Engineer.
- C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect/Engineer for each individual area.

END OF SECTION

WATER SYSTEM EXTENSIONS PROJECT OF 1997
FOR
CARROLL COUNTY WATER DISTRICT NO. 1
CARROLLTON, KENTUCKY

- DIVISION A-1 - Water Main Extensions
DIVISION A-2 - Water Main Extensions, Booster Stations,
Main MPRV's, Master Meters and Telemetry
DIVISION B - Standpipe Water Storage Tank and
Related Work

CONSTRUCTION SPECIFICATIONS

I N D E X

SECTION

DIVISION 9 - FINISHES

09901 Tank Painting

SECTION 09901

PAINTING
WATER STORAGE TANK

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Prepare surfaces which are to receive finish.
- B. Finish surfaces as indicated in this section.

1.02 RELATED SECTIONS

- A. Provide shop drawings in accordance with Section 01300.
- B. The paint supplier shall submit a certification stating that the paint system to be used is acceptable for use on a portable water storage tank.

1.03 REFERENCE STANDARDS

- A. American Water Works Association (AWWA).
- B. Surface Preparation Specification (SSPC).

1.04 SAMPLES

- A. Colors to be selected by Architect/Engineer prior to commencement of work.

1.05 MAINTENANCE MANUALS

- A. Leave on premises, where directed by Architect/Engineer prior to commencement of work.
- B. Containers to be tightly sealed and clearly labeled for identification.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Deliver paint materials in sealed original labeled containers, bearing manufacturer's name, type of paint, brand name, color designation and instructions for mixing and/or reducing.
- B. Provide adequate storage facilities. Store paint materials at minimum ambient temperature of 45 degrees F and maximum 100 degrees F in well ventilated area.
- C. Take precautionary measures to prevent fire hazards and spontaneous combustions.

1.07 ENVIRONMENTAL CONDITIONS

- A. Paint shall not be applied to wet or damp surfaces and shall not be applied in the rain, snow, fog or mist or when the relative humidity is in excess of 85%.
- B. Ensure surface temperatures or the surrounding air temperature is above 60 degrees F before applying paint. No paint shall be applied when it is expected that the ambient temperature will drop below 60 degrees F within 6 hours after the application of the paint. Dew or moisture condensation should be anticipated, and if such conditions are prevalent, painting shall be delayed until midmorning to be certain that the surfaces are dry. Further, the day's painting shall be completed well in advance of the probable time of day when condensation will occur, in order to permit the film an appreciable drying time prior to the formation of moisture.

1.08 GUARANTEE

- A. The Contractor shall furnish a guarantee on the tank painting period of one (1) year from the date of substantial completion stating that he will repair any defects due to faulty workmanship or materials which may appear during that period.

The tank(s) will be drained and inspected before the one (1) year expires and the Contractor will be notified of any detectable paint failures.

PART 2 PRODUCTS

2.01 GENERAL OBJECTIVE

- A. The paint and paint products of TNEMEC Company, Kansas City, Missouri, mentioned in the following specifications are set up as standards of quality. The usual "or equal" clause shall apply. The products of other manufacturers comparable in quality and type to those specified will be acceptable if data on past performance on water storage tanks, composition, directions for use, and other information required, is presented to and approved by the Engineer. No request for substitution shall be considered unless received, in writing, within fifteen (15) days following the date of Notice to Proceed.

PART 3 EXECUTION

3.01 GENERAL OBJECTIVE

- A. The object of these specifications is to provide the material and workmanship necessary to produce a first-class job.

Painting shall be done at such times as approved by the Engineer. All painting shall be done strictly in accordance with the manufacturer's instructions and shall be performed in a manner satisfactory to the Engineer.

3.02 SURFACE PREPARATION

- A. Prior to priming in the shop, all surfaces shall be cleaned of all rust, mill scale, rust, as well as other interference materials. For interior wet area surfaces, the removal of these items shall be accomplished by sandblasting in accordance with SSPC Surface Preparation Specification No. 10 or pickling in accordance with SSPC Surface Preparation Specification No. 8. Exterior surfaces and interior dry areas shall be sandblasted in accordance with SSPC Surface Preparation Specification No. 6 or pickling in accordance with SSPC Surface Preparation Specification No. 8. In the field, following erection and welding, the weld which the shop paint has been damaged shall be sandblasted in accordance with SSPC Surface Specification No. 10. All surfaces so cleaned shall be painted the same day that the cleaning operation is carried out, and the Architect/Engineer shall be given 48 hour notice after all surfaces have been cleaned and primed "prior" to painting, in order to inspect the tank welds and cleanness.

3.03 APPLICATION OF PAINT

- A. The painter shall apply each coating at the rate and in the manner specified by the manufacturer. If material has thickened or must be diluted for application by spray gun, the coating shall be built up to the same film thickness achieved with undiluted material. Deficiencies in film thickness shall be corrected by the application of additional coat(s) of paint.

3.04 INTERIOR PAINTING SYSTEM

- A. In the shop, all interior surfaces shall receive one coat of TNEMEC Series 20-1255 Potapox Primer (Epoxy) Beige to a dry film thickness of 3.0 - 5.0 mils.
- B. In the field, following erection, welding and necessary surface preparation, all welds and other areas which have been cleaned down to bare metal shall receive one coat of TNEMEC Series 20-1255 Potapox Primer (Epoxy) Beige to a dry film thickness of 3.0 - 5.0 mils.
- C. The finish coats shall consist of two (2) coats of two component, high build epoxy similar to TNEMEC Series 140-WH01 intermediate and 140-WH02 top coat, with a dry film thickness of 4.0 to 6.0 mils per coat.

- D. The total dry film thickness shall be 11.0 - 17.0 mils.
- E. Coating shall have (NSF) approval.

3.05 EXTERIOR PAINTING SYSTEM

- A. In the shop, all exterior surfaces shall receive one coat of TNEMEC Series 90-97 zinc rich urethane primer to a dry film thickness of 2.5 to 3.5 mils.
- B. In the field, following erection, welding and necessary surface preparation, all welds and other areas which have been cleaned down to bare metal shall receive one coat of TNEMEC Series 90-97 zinc rich urethane primer applied to a dry film thickness of 2.5 to 3.5 mils.
- C. An intermediate coat shall consist of TNEMEC Series 74 Enduroshield Polyurethane Enamel, same as finish color, to a dry film thickness of 2.0 to 3.0 mils.
- D. The finish coat shall consist of TNEMEC Series 74, gloss, color, (Polyurethane Enamel) to a dry film thickness of 2.0 to 3.0 mils.
- E. The total dry film thickness shall be 6.5 - 9.5 mils.
- F. For lettering, apply one coat of polyurethane enamel similar to Tnemec Series 74 Enduroshield at a dry film thickness of 2.0 to 3.0 mils. Color to be as selected by Owner.
- G. All portions of any tank, reservoir, standpipe, etc. that will be below finished grade after completion of installation, and all surfaces of any steel inlet pipe, shall be painted in accordance with Interior Painting System.

3.06 TEST

- A. After the final coat has been applied and allowed to cure for a minimum of seven (7) days, the Engineer will check the paint thickness with an Elcometer and check paint appearance. Deficiencies in paint thickness will be corrected by applying additional finish coats, at the expense of the Contractor.
- B. The finish coating on all surfaces shall be completely without defects permitting moisture penetration when testing according to the low-voltage, wet-sponge method. Deficiencies in the continuity of the coating shall be corrected by applying additional finish coats, at the expense of the Contractor.

3.07 VENTILATION AND DRYING TIME

- A. Adequate ventilation which will effectively remove solvents shall be provided for proper drying of paints on interior tank surfaces. A minimum of seven days following the application of the final coat on the interior surfaces shall be allowed before the tank is sterilized or filled with water.

3.08 LETTERING

- A. The Contractor shall include in his bid price the cost for painting the name of the Water Company on the tank at two (2) locations. Shop drawings for A/E approval shall be submitted indicating the height, width, spacing, and width of the stripes for the lettering. Height of letters shall not be less than four (4) feet.

3.09 CLEANUP

- A. Upon completion of all work, the coating applicator shall remove all surplus materials and rubbish. He shall repair all damage caused by his workers and shall leave the premises in a clean and orderly condition.

END OF SECTION

WATER SYSTEM EXTENSIONS PROJECT OF 1997
FOR
CARROLL COUNTY WATER DISTRICT NO. 1
CARROLLTON, KENTUCKY

DIVISION A-1 - Water Main Extensions

DIVISION A-2 - Water Main Extensions, Booster Stations,
Main MPRV's, Master Meters and Telemetry

DIVISION B - Standpipe Water Storage Tank and
Related Work

CONSTRUCTION SPECIFICATIONS

I N D E X

SECTION

DIVISION 13 - SPECIAL CONSTRUCTION

13300 Water Distribution System
13310 Utility Location Markers
13311 Utility Location Detectable Flagging

SECTION 13300

WATER DISTRIBUTION SYSTEM

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Under this section of the specifications all water distribution piping and appurtenances shall be furnished and installed.
- B. The work covered by this section of the specifications shall include, in general, installation of all distribution piping, fittings, valves, valve vaults, O & M hydrants, pumping units, road, railroad and stream crossings, metered services, service lines, connections to existing mains, pressure testing, disinfection and etc.

1.02 RELATED SECTIONS

- A. All applicable sections of these specifications and the plans.

1.03 QUALITY ASSURANCE

- A. Products/materials - AWWA Standards.
- B. Installation - AWWA Standards.
- C. All products, devices, materials, and accessories shall be new and never before used. They shall be clean and/or restored to like new condition prior to approval of submittal by the Engineer.
- D. The front end of each load of pipe shall be completely tarped to prevent fumes from entering pipe.

PART 2 PRODUCTS

2.01 POLYVINYL CHLORIDE (PVC) PIPE

- A. Polyvinyl chloride (PVC) pipe for water distribution and transmission mains shall be pressure rated pipe with push-on gasketed joints as manufactured by Certain-Teed Products Corp., Valley Forge, Penn.; Johns-Manville, New York, N.Y.; Anesite Division, Clow Corp., Chicago, Illinois; or an Engineer approved equal product.
- B. Rigid PVC (polyvinyl chloride) pressure pipe described herein shall be designed to carry portable water at pressures (including surge) up to the maximum class rating.

- C. Material used to produce the pipe shall conform to ASTM D1784, Type 1, Grade 1, 2000 psi design stress.
- D. The standard dimensional ratio for the pipe shall be SDR 26 through 13.5 as called for in the contract documents and as indicated on the Engineer's drawings (plans).
- E. All PVC pipe shall conform to the latest revisions of ASTM Specification D2241 (SDR-PR) for pressure rated pipe.
- F. Pipe identification code marking shall include the following data, and shall be marked continuously down each pipe length.

1. Nominal size	4. Manufacturer's name
2. Type of material	5. NFS (National Sanitation
3. SDR, Class Pressure Rating	Foundation Seal of Approval)
- G. Markings of pipe-printing shall be color coded for pressure class identification. Pipe shall be furnished with a minimum of one (1) contrasting color circumferential stripe painted on the plain end or uncoupled end of each length to allow field checking of pipe construction joints, said stripes shall indicate manufacturer's recommended F-stop mark.
- H. Each lot shipment of pipe and related materials shall include a shipment itemized check list for recording damages and/or deficiencies.
- I. Plastic pipe shall be installed in accordance with the manufacturer's published instructions, modified only as may be directed herein or by the Engineer. PVC pipe installation shall comply with applicable paragraphs of "Pipe Installation and Jointing" section of these construction specifications.
- J. The pipe supplier shall be capable of supplying fittings with combinations of spigot (plain) ends and bell ends, designed and manufactured to withstand the same pressures specified for the pipe.
- K. All PVC material for pipe shall be light gray, light blue or white in color to minimize material heat gain. The use of white pipe is encouraged.
- L. The PVC pipe joints shall be designed and manufactured so that the pipe and fittings may be connected on the job without the use of solvent cement or any special equipment. The push-on joint (single rubber gasket joint) shall be assembled by positioning a continuous, molded, rubber ring gasket in an annular recess in the pipe bell end socket and the forcing of the plain end of the entering pipe into the socket, thereby compressing that gasket radially to the pipe to form a positive seal. The gasket and the annular recess shall be so designed and shaped that the gasket is locked in place against

displacement as the joint is assembled. Details of the joint design and assembly shall be in accordance with the manufacturer's standard practice. The joints shall be so designed so as to provide for the thermal expansion or contraction experienced with a total temperature change of at least 75° in each joint per length of pipe.

- M. All rubber gaskets incorporated in the assembled push-on joints of PVC pipe shall meet the requirements of ASTM F477 on elastomeric seals, conform to the standard ASTM E-1869 and applicable requirements of ASA Standard A21.11.

Random bell sections shall be destructively tested by the Engineer.

- N. All fittings shall be Mechanical Joint Ductile Iron.

2.02 AWWA C-900 POLYVINYL CHLORIDE (PVC) PIPE

- A. AWWA C-900 polyvinyl chloride (PVC) pipe shall meet all requirements of AWWA C-900, latest edition, and shall be of the following diameter ratio and pressure class as indicated in the Bid Schedule: DR25, 100 psi, DR18, 150 psi, DR14, 200 psi. Fittings shall be Mechanical Joint Ductile Iron.

2.03 AWWA C-905 POLYVINYL CHLORIDE (PVC) PIPE (14" THRU 36")

- A. AWWA C-905 polyvinyl chloride (PVC) pipe shall meet all requirements of AWWA C-905, latest edition, shall be CI outside diameter, and shall be of the following diameter ratio and pressure class as indicated in the Bid Schedule: DR 41, 100 psi; DR 32.5, 125 psi; DR 25, 165 psi; DR 21 200 psi; DR 18, 235 psi. Fitting shall be Mechanical Joint Ductile Iron.

2.04 PVC RIVER CROSSING PIPE

- A. Polyvinyl chloride (PVC) pipe for river crossing shall meet all requirements as specified for polyvinyl chloride (PVC) pipe for water distribution as specified in paragraph 2.01.
- B. Lock joints shall meet ASTM D3139, Joints for Plastic Pressure Pipe Using Flexible Elastomeric Seals.
- C. Pipe shall be Yelomine Class 250 as manufactured by Certain Teed or equal.

2.05 DUCTILE IRON (DI) PIPE

- A. Ductile iron pipe shall conform in all respects to ANSI A21.51 (AWWA C-151) and ANSI A21.50 (AWWA C-150) latest revisions, except as modified herein. D.I. pipe shall be minimum Class 350 for 4" thru 12", Class 250 for 14" thru 20", Class 200 for all larger sizes

unless indicated otherwise on the plans and/or in the Bid Schedule. All interior surfaces of the pipe and fittings shall have a factory applied bituminous coated cement mortar lining per ANSI A-21-4. The standard coating for buried piping and fitting shall be a bituminous coating and shall conform to ANSI Specification A21-10 (AWWA C-110), Section 10-8 and ANSI Specification A21.51 (AWWA C-151).

- B. Five percent of the pipe furnished shall be manufactured and inspected so as to insure that whenever a cut is made at any point along the pipe barrel, the cut end will socket properly into a push-on joint bell. This pipe shall be identified by a painted green stripe along the length of the pipe barrel.
- C. Ductile iron non-restrained joint pipe shall be of the push-on joint type meeting the requirements of AWWA C-151/ANSI A21.51 and AWWA C-111/ANSI A21.11. The pipe shall be "Tyton Joint" pipe - U.S. Pipe and Foundry, "Super Bell Tite" - Clow Corp. or "American Fastite Joint" pipe - American Cast Iron Pipe Company or equal.
- D. Push-on type joints shall have an annular recess in the pipe socket to accommodate a single rubber gasket. Plain ends shall be suitably beveled to permit easy entry into the bell. The gasket and annular recess of the socket shall be so designed and shaped that the gasket is locked in place against displacement as the joint is assembled.
- E. Mechanical joints shall be bolted and of the stuffing box type and shall consist of a bell, with exterior flange and interior recess for the sealing gasket, a pipe or fitting plain end, a sealing gasket, a follower gland, tee-head bolts and hexagon nuts.
- F. Restrained joints shall be of the flexible, positive locking type. The thickness of the pipe barrel remaining at grooves cut for restraint shall not be less than the nominal wall thickness of the class specified. Follower glands held in place with set screws will not be acceptable.
- G. Ductile iron restrained joint pipe shall be "Lok-Tyton" joint type - U.S. Pipe and Foundry Co., "Lok-Fast" joint pipe - American Cast Iron Pipe Co., or "Super-Lock" joint pipe - Clow Corp. or Engineer approved equal.
- H. Each piece of pipe shall bear the manufacturer's name or trademark, the year in which it was produced, the letters "DI" or words "DUCTILE" and the standard thickness class designation.

2.06 POLYETHYLENE (PE) PIPE

- A. The pipe shall be high performance, high molecular weight, high density polyethylene pipe equal to Driscopipe 5,100 for water service pipe and Driscopipe 1000 for water mains as manufactured by

Phillips Driscopipe, Inc., Dallas, Texas, or equal, and shall conform to ASTM D 1248 (Type III, Class C, Category 5, P34). Minimum cell classification values shall be 3 5 5 4 3 4 C as referenced in ASTM D 3350.

B. Typical Properties of Pipe Compound:

Density - The density shall be no less than 0.957 gms/cm³ as referenced in ASTM D 1505.

Melt Flow - Melt flow shall be no greater than 1.5 gms/10 min. when tested in accordance with ASTM D 1238 - Condition F.

Flex Modulus - Flexural modulus shall be 125,000 psi as referenced in ASTM D 3350.

Tensile Strength at Yield - Tensile strength shall be 3,500 psi as referenced in ASTM D 638.

ESCR - Environmental Stress Crack Resistance shall be in excess of 1,000 hours with zero failures when tested in accordance with ASTM D 1693 - Condition C.

Hydrostatic Design Basis shall be 1,600 psi at 23°C when tested in accordance with ASTM D 2837.

- C. The Owner or the specifying Engineer may request certified lab data to verify the physical properties of the materials supplied under this specification or may take random samples and have them tested by an independent laboratory.
- D. The P.E. pipe supplied under this specification shall be copper tube size (C.T.S.), 200 psi, unless otherwise specified.
- E. The P.E. pipe shall meet all applicable requirements of AWWA C-901 for water service pipe and AWWA C-906 for water mains.

2.07 PVC FITTINGS AND ACCESSORIES

- A. All couplings, fittings and gaskets shall be furnished by the pipe manufacturer, shall be same material as pipe, and shall accommodate the pipe for which they are to be used. Insertion depth of the pipe in the couplings and fittings shall be controlled by an internal PVC mechanical stop in the couplings and fittings which will allow for a thermal expansion and contraction. Jointing method shall allow for half of the expansion or contraction of each pipe section to be taken up at each end of the pipe without any evidence of infiltration, exfiltration, cracking or breaking.

- B. Couplings and fittings shall be of the molded type or machined from extruded stock.
- C. Fittings shall have joints as specified for the pipe and shall be designed to withstand the same pressures as required for the pipe.
- D. The supplier shall be capable of supplying fittings with combinations of spigot (plain) end and bell.
- E. Gaskets shall be vulcanized natural or vulcanized synthetic rubber. No reclaimed rubber shall be used. When two hardnesses of rubber are included in a gasket, the hard and soft portions shall be integrally molded and joined in a strong vulcanized bond. They shall be free of porous areas, foreign material, and visible defects.
- F. Gasket dimensions shall be in accordance with the manufacturer's standard design dimensions and tolerances. The gasket shall be of such size and shape as to provide an adequate compressive force against the spigot and socket after assembly to effect a positive seal under all combinations of joint and gasket tolerances. Rubber gaskets shall be color coded imprinted with joint type, pipe size, I.P.S. SDR rating, trade name or trademark, size, mold number, gasket manufacturer's mark, and year of manufacture shall be molded in the rubber on the back of the gaskets.
- G. Lubrication shall be water soluble, non-toxic, be non-objectionable in taste and odor imparted to the fluid, be non-supporting of bacteria growth, and have no deteriorating effect on the PVC or rubber gaskets. It shall be as supplied by the pipe manufacturer and labeled with the manufacturer's name and instructions.
- H. Restrained joints shall be provided for all joints of fitting and pipe in road or railroad bores.

2.08 D.I. FITTINGS AND ACCESSORIES

- A. Ductile iron fittings shall be Class 350 ductile iron compact fittings conforming to ANSI Specification A21.53 (AWWA C153). All lining and coating for fittings shall be as specified for pipe. The fittings shall be designed to withstand the same pressures as required for the adjoining pipe and shall have the same type of joints.
- B. Fittings shall be coated outside with a standard bituminous material equal to that specified for ductile-iron pipe under ASA Specification A21.51 (AWWA C 151).
- C. Fittings shall be as manufactured by U.S. Pipe and Foundry Co., American Cast Iron Pipe Co., Clow Corp. or Engineer approved equal.

- D. Push-on (slip) joint fittings shall conform to ANSI 21.11 (AWWA C 111).
- E. Mechanical joint fittings including accessories shall conform to ANSI 21.11 (AWWA C 111).
- F. Flanged joint fittings shall conform to ANSI A21.10 (AWWA C 110) or ANSI B16.1.
- G. All flanged joints shall be furnished with 1/8 inch thick red rubber gaskets. The bolts shall have American Standard heavy unfinished hexagonal head and nut dimensions all as specified in Americana Standard for Wrench head Bolt and Nuts and Wrench Openings (ANSI B18.2). Material for bolts and nuts shall conform to ASTM A-307 Grade B.

2.09 METER SETTERS

- A. Meter setters for single or double metered service installations shall be copper type for 5/8" x 3/4" meter with brass 90° self-stabilizing inverted-key angle type meter valve with "O" ring stem seal, locking wing, and smooth contour unobstructed water way, 3/4" flare inlet and 3/4" flare outlet fittings for 3/4" P.E. service tubing, (double purpose X double purpose) bracing eye for 1/2" P.E., outlet angle check valve, catalog #VBH-72-7W, as manufactured by the Ford Meter Box Co., Inc., Wabash, Indiana, or an Engineer approved alternate.
- B. Where combinations individual pressure reducing valve and single metered service installations (IPRV's) are required and/or shown on the Engineer's plans a tandem setter shall be installed in accordance with the Detail in the plans. IPRV setters shall be valved type-tandem copper setters with double purpose X double purpose connections, Catalog No. TVBH-72-7W, for 5/8" x 3/4" meters as manufactured by the Ford Meter Box Co., Inc., Wabash, Indiana, or an Engineer approved alternate.
- C. All setters shall be shipped complete with neoprene or approved alternate meter gaskets.
- D. Insert stiffeners are required for use with P.E. pipe service line sizes 3/4" thru 2" at pack joint connections. Insert stiffeners shall be formed of quality stainless steel and shall be as manufactured by the Ford Meter Box Co., Inc. or an Engineer approved alternate.

2.10 METER ENCLOSURES

- A. Round Tube with Separate Lids

Tube shall be 18" nominal inside diameter by 24" long. Tube shall be constructed from extruded rigid polyvinyl chloride (PVC), cell classification 12344, in accordance with ASTM D-1784.

Meter enclosures shall be "Sono-Loc" Meter Box as manufactured by Sonoco Products Company, Hartsville, South Carolina, or an Engineer approved alternate.

Lids shall be cast iron, two (2) piece, flat, as manufactured by Bell, or an Engineer approved alternate.

- B. A unit price bid is required for furnishing and installing the previous specified meter enclosure with lid, meter setter, and gravel base as a unit.
- C. Base for meter enclosure shall be clean, washed gravel a minimum of 2' deep and extended beyond outside of enclosure 6 inches on all sides.
- D. The backfill around enclosures shall be tamped in 6" layers to prevent settlement and present a finished installation to maintain good public relations with the water consumers.

2.11 SERVICE CLAMPS AND CORPORATION STOPS

- A. Service clamps shall be double strap type, of bronze with bronze screws, confined "O" ring seal and AWWA thread outlet. Service clamps shall be of a design with will accurately fit plastic pipe (O.D.) to provide a positive seal between plastic main and clamp at a minimum water working pressure of 200 psi.
- B. The service clamp shall be marked to indicate size of plastic main (O.D.) and outlet size on body and strap. Service clamps shall be as manufactured by Fort Meter Box Company, Inc., or an Engineer approved alternate.
- C. Corporation stops shall be brass, designed and manufactured in accordance with AWWA Standard Specification C800, latest edition, and shall be individually inspected and tested for leaks at the factory prior to shipment. Corporation stops shall be of a design which will permit use with drilling machines of current design.
- D. Corporation stop shall be plug type furnished with AWWA inlet thread and pack joint outlet for P.E. pipe as manufactured by Ford Meter Box Co., Inc., or an Engineer approved alternate.

2.12 INDIVIDUAL PRESSURE REDUCING VALVE (IPRV)

- A. Individual Pressure Reducing Valves shall conform to the standard requirements of the American Society of Sanitary Engineers, Standard 1003. Valve shall have an integral stainless steel or Monel strainer and be Watts Series U5-Z3, Wilkins 600 SC or Engineer approved equal. The pressure reducing valve shall be rated for 300 psi inlet and reduced pressure adjustable from 25 to 75 psi with factory setting at 50 psi.

2.13 METERS

- A. Meters shall be furnished by the Owner and installed by the Contractor.

PART 3 EXECUTION

3.01 INSTALLATION OF PIPE

- A. All pipe shall be installed in accordance with the manufacturer's published instructions, modified only as may be directed herein or by the Engineer. All piping locations shall be as shown on the plans and staked out prior to installation. The Contractor and Resident Inspector shall agree on the staked location of the water main prior to installation. No installation shall be made without documentation of easement or permit. Construction outside of easement or permit area shall be at the Contractor's expense.

All pipe installations shall comply with applicable paragraphs contained as part of these construction specifications.

- B. Pipe Bury Depth - normal laying depth shall be 36" of cover depth minimum regardless of pipe diameter. Where rock is encountered, the minimum cover over top of the pipe shall be 30" Where rock is excavated, 5 inches of sand bedding shall be required. Where rock is encountered on the trench bottom at the normal laying depth, 5 inches of sand bedding shall be required.
- C. All piping shall be assembled in accordance with the layout shown on the plans with only such modifications as may be necessary to conform to the final detail dimensions or location of existing water mains, hydrants, existing utilities, tanks, valve vaults, booster stations, valves, county roads, highway and stream crossings, etc. In crossing under ditches and streams the standard depth of trench required under the Construction Specifications for the job shall be maintained. Standard fittings shall be used if required to depress the pipe but in no case shall the approach to the crossing be laid at a steeper angle than forty-five degrees (45°) with the horizontal.
- D. All pipe installed under this contract shall be installed in accordance with the applicable sections of AWWA Specification C 600.

Class B laying conditions shall be maintained. Trench width at the top of the pipe shall not exceed the pipe diameter plus 1-1/2 feet unless approved by the Engineer. Pipe shall be laid directly on a trench bottom containing coupling or bell joint holes with trench shaped to provide continuous contact with the pipe between coupling or bell joint holes as recommended by the pipe manufacturer or as directed by the Engineer.

- E. If, in the course of construction, ground water is encountered, the Contractor shall, by means of well points or other acceptable methods reduce the water level to the invert of the main or bottom of the structure. The Contractor shall maintain this dewatered condition until the area around the structure has been backfilled to existing grade. No pipe shall be laid in water, or when the trench conditions or the weather is unsuitable for such work, except by permission of the Engineer. At times when pipe laying is not in progress, the open ends of the pipe shall be closed by approved means and no trench water shall be permitted to enter the pipe. It shall be borne in mind that precautions must be taken to prevent empty pipe from floating, should the trench become flooded before backfilling has been completed.
- F. Each piece of pipe shall be lowered into trench and installed separately. All pipe shall be laid in the trench so that it is firmly supported on the bedding material throughout its length.
- G. As shown on the plans, or as directed by the Engineer, the Contractor shall provide concrete anchors or thrust blocks (against undisturbed earth), joint harness, and concrete encasement where required. This work shall be included in the unit prices bid for installing pipe, fittings and appurtenances.
- H. Pieces of pipe or fitting which are known to be defective shall not be laid or placed. Any defective piece of pipe or fitting discovered after the piping is laid shall be removed and replaced with satisfactory pipe or fitting. In case a length of pipe is cut to fit in a line, it shall be so cut as to leave a smooth end at right angles to the longitudinal axis of the pipe. Cuts shall be made with proper tools for cutting the pipe. In the event the pipe is damaged as a result of the pipe being cut, the affected joint shall be rejected.
- I. Sand bedding as specified in Paragraph B above shall be required where rock, either loose or solid, is exposed at trench bottom at the required bury depth. It is intended that the pipe at all times is protected against damage from protruding objects and rests on a smooth and continuous bedding earth or sand.
- J. The Contractor shall include in the unit prices for furnishing and installing mains, all rock excavation and sand bedding required.

3.02 INSTALLATION OF METERED SERVICES

- A. The location of metered water services for consumers along the mains as indicated on the Engineer's drawings is as accurate as could reasonably be determined. The Contractor, however, shall verify all meter installation locations with the Owner or an authorized representative of the Owner whether they are shown or may be required at the time of construction. It is anticipated that some may be deleted and others added.
- B. The Contractor and/or Resident Inspector shall contact the individual property owner (water consumer) to establish the exact location of the metered service, only if said water consumer has signed an easement or other written form authorizing the Owner the right to install said services.
- C. The Contractor and/or Resident Inspector shall notify Owner of any and all easements required for metered service installations a minimum of five (5) days in advance of actual service installation.
- D. When metered services are installed on property adjoining the water main, the maximum service line length shall not exceed 4'-0", unless authorized by the Owner in writing.
- E. When metered services are installed on property which does not adjoin the water main, said service shall not exceed a 2'-0" maximum limit beyond the property line parallel to the main without written authorization of the Owner.
- F. If upon final measurements it is determined that meters have extended beyond the above 2'-0" and 4'-0" limitations and no written approval is presented, then such extension(s) shall have been made at the Contractor's expense.

3.03 INSTALLATION OF SERVICE LINE AND TAPS TO MAIN

- A. Service line extended from the main service tap to the inlet of the meter setter shall be polyethylene plastic pipe and on the customer's side of the meter setter outlet the service line shall be polyethylene plastic pipe which shall terminate five (5) feet (field conditions permitting) beyond the customer side of the meter enclosure at a depth of 24" below grade, capped to permit pressure testing.
- B. Service line taps to the mains shall be made to the pipe manufacturer's standard tapped coupling or by drilling and tapping through service clamps.

- C. Tapping methods used shall not allow plastic shavings to enter mains. The method and equipment shall be approved by the Engineer.
- D. Type K copper shall be used for service lines when main pressure exceeds 140 psi.
- E. The service installation shall exclude the meter. The setter openings and fittings shall be protected from foreign matter. Individual pressure reducing valves shall be installed where indicated on the drawings.

3.04 PRESSURE TESTING

- A. After the pipe has been laid and partially backfilled all newly laid pipe, or any valved section of it, including hydrants, service taps, service line and meter setters shall unless otherwise specified, be subjected to hydrostatic testing in accordance with AWWA Specification - "Pipe Laying", where applicable. The pipe section tested shall be tested to the shut-off valve of each meter setter. No meters shall be installed during testing. The test pressure shall be at least 50% above normal working pressure, or the rating of the pipe, whichever is greater. Tests on pipe with joints unbackfilled shall be for a duration of four (4) hours. Tests on pipe completely backfilled shall be for a duration of 24 hours. The Contractor shall furnish all labor, materials, and equipment necessary to test the system as described herein.
- B. Allowable leakage shall not exceed 10 gal./in.dia.mile/24 hours, or the limits established in AWWA Specification C-600 latest revision, as measured in a manner approved by the Engineer, whichever is less for the type of pipe being tested.
- C. Leakage is defined as the quantity of water to be supplied into the newly laid pipe, or any valved section of it, necessary to maintain the specified test pressure after the pipe has been filled with water and the air expelled.
- D. Any defects, cracks or leakage that may develop, or that may be discovered either in the joints or in the body of the castings, shall be promptly made good by the Contractor, at his own expense, and to the satisfaction of the Engineer.
- E. If directed by the Engineer or required by the specifications, further leakage tests shall be run upon combined lengths of the newly laid mains.
- F. Should any tests of combined sections of pipe laid disclose leakage per mile of pipe greater than that specified or if individual sections show leakage greater than the specified limit, the Contractor shall, at his own expense, locate and repair the

defective joints and/or pipe until the leakage is within the specified allowance.

- G. Before applying the specified test pressure, all air should be expelled from the pipe. To accomplish this, valved taps shall be made at points of highest elevation along the water main as required for installation of manual air release valve pits. These air vent installations are necessary for the Contractor to satisfactorily pressure test, flush and sterilize the water mains.
- H. The air release valve and combination air/vacuum release valve installations shall be in accordance with the Water Facility Details contained in the plans.
- I. All exposed pipes, fittings, valves, hydrants and joints shall be carefully examined during the open trench test. Any cracked or defective pipes, fittings, valves or hydrants discovered in consequence of this pressure test shall be removed and replaced with sound material at the Contractor's expense, and the test shall be repeated until satisfactory to the Engineer.
- J. Any valved pipe section may be subjected to hydrostatic pressure, inspected, and tested for leakage at any convenient time after partial completion of backfill, or as directed by the Engineer or his authorized representative.

In general, the Contractor shall provide system pressure testings as follows:

1. Fill pipe with water until all air is exhausted.
 2. Raise pressure to manufacturer's rated working strength of pipe or design pressure plus 50%, whichever is less by means of pumping from a container.
 3. Refill container and maintain pressure for a minimum of four (4) hours.
 4. Measure water required to refill container to pre-test level.
- K. The Engineer and/or his authorized representative shall supervise the testing specified herein and complete test results in report form shall be submitted to or filed by the Engineer. The test shall be conducted using pressure gauges furnished by the Owner.

3.05 CONNECTIONS

- A. Type A Connection (Pressure Tap):

The Contractor shall furnish and install complete where indicated on the plans or indicated in the proposal forms pressure taps. These taps shall include a mechanical joint tapping sleeve with flanged mechanical joint tapping valve. The installation shall also include a valve box as a part of the installation. A lump sum price for each tap shall be submitted in the proposal forms for all labor, material, and equipment necessary to provide a complete tap as set out above and hereinafter.

The outlet tapping sleeves shall be designed for a water working pressure of the main being tapped. The valve and sleeve shall be provided with the necessary test plugs for pressure testing. Dimensions shall be such that the tapping sleeves can be installed on the Class of pipe being tapped. All material shall be in accordance with AWWA Specifications.

The Contractor shall provide competent personnel to make all pressure taps.

The Contractor shall, after the tapping sleeve and valve are installed and properly supported on concrete pads, pressure test the installation at 150 pounds in the presence of the Inspector to prove no leakage is present. After this test and before the tap is made, the Contractor shall provide a poured concrete thrust block behind the tapping sleeve providing a bearing area of not less than 15 square feet against undisturbed soil.

B. Connections to Existing Mains (Type A, B & C):

All connections to existing mains shall be provided as indicated on the plans and proposal forms. The Contractor shall provide 7-day written notice to the Owner prior to the connection or line outage.

C. Type A Connections:

A separate lump sum bid item has been established for each Type A, Hot Tap, or Pressure connection as described above.

D. Type B Connections:

A separate lump sum bid item has been established for each Type B connection which includes cutting into an existing main and installing the tee, concrete blocking, etc., to provide a complete connection at each location. The branch valve shall be anchored to the tee.

When connection is to an existing cement asbestos (CA) pipe, a complete section of existing CA pipe shall be broken out such that no sawing of the pipe is required. Pipe shall be replaced with pipe matching pressure rating of the proposed main at the location of the

connection with the minimum requirement being PVC, SDR 21, Class 200. Connection cost shall include all couplings and fittings required. Contractor is responsible for properly disposing of broken out CA pipe.

E. Type C Connections:

A separate lump sum bid item has been established for each Type C connection which includes all connections to the end of existing main. A gate valve and box shall be provided at all type "C" connections.

The Contractor shall include in the lump sum price for each Type B and Type C connection the cost of valving off the existing main, flushing and bleeding air from the existing line once the connection is made. The existing line shall not be valved off until the Contractor has all necessary equipment and materials at the site to make the proper connection.

All gate valves shall be paid for under the unit price for furnishing and installing gate valves and boxes, except for tapping sleeves.

3.06 RAILROAD CROSSINGS

- A. As shown on the plans and as required by the proposal forms, the pipe division Contractors shall install welded standard steel casings under the railroads and install mains by sliding into the steel casing. The Owner shall obtain the necessary permit(s) from the railroad prior to the authorization of the project. The Contractor shall have at the site, during construction of each crossing, a copy of the approved railroad permit. Contractor shall also provide railroad liability insurance, as required by each railroad company.

3.07 DISINFECTION

- A. No water distribution piping installed shall be placed in service until it has been pressure tested and disinfected. Disinfection procedures shall be as follows, unless more stringent procedures are required by AWWA Specifications C-651.
- B. After testing, a solution of hypochlorite, using HTH or approved equal, shall be introduced, sufficient to insure a chlorine dosage of at least 50 ppm in the pipe. While the solution is being applied, the water should be allowed to escape to the ends of the section until tests indicate that a dosage of at least 50 ppm has been obtained throughout. The lines shall be kept full of the chlorinated solution for a period of 24 hours, and sufficient hypochlorite added, if necessary, to insure a residual at the end of

this period of at least 10 ppm. The mains shall then be thoroughly flushed with potable water.

- C. Samples shall not be taken from flushing hydrants or any unsterilized equipment. Samples may be taken through sampling yokes at individual meter installations or rise pipe from corporation cocks installed in the water main. All sampling locations shall be approved either by the Engineer or the Public Health Agency having jurisdiction.
- D. All water required for the filling, hydrostatic testing, disinfection and flushing of water mains shall be obtained from the Owner. Cost of the water shall be at the Owner's lowest wholesale rate.
- E. After disinfection and flushing, the Contractor must secure and obtain satisfactory bacteriological samples and results of the finished water from the Public Health Agency having jurisdiction. The satisfactory report must be submitted to the Owner and Engineer before authorizing domestic consumption of the water. Disinfection procedures shall be continued until approved samples have been obtained.

3.08 VIDEO TAPING

- A. Prior to construction of water main, the Contractor shall conduct video taping of the "preconstruction conditions". Site conditions recorded on the videotape shall include sufficient area to include the easement or right-of-way and identifiable references to clearly identify the location. The taping shall be conducted no greater than 30 calendar days prior to construction or disturbance occurring in the area. Should site conditions change after taping and prior to construction, then the area shall be re-taped to indicate the changes.
- B. The date and time shall be recorded and imprinted for identification during playback. Audio or visual descriptions shall be utilized to identify the location being viewed. Information shall include line number, road name, and approximate stationing. Stationing shall be indicated at intervals no greater than 1,000 feet in distance. The direction of the location shall be identified either with the direction of stationing or reversed stationing.
- C. Two copies of the recording shall be provided to the Engineer on VHS format. One copy shall be retained by the Engineer until the completion of the project and one copy shall be presented to the Owner. The tapes shall be available to the Owner and Engineer prior to construction proceeding in the area.

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- D. The tapes shall be labeled and indexed. Indexing shall include line number and stationing covered.

END OF SECTION

SECTION 13310

UTILITY LOCATION MARKER

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This section covers utility location markers.
- B. Markers are to be installed at all valves each side of road at road crossings, each side of stream at stream crossings and at other locations that the Owner selects.

Contractor to be paid per marker installed.

PART 2 PRODUCTS

2.01 MARKER

- A. Utility markers shall be light weight, impact resistant, highly visible composite valve and main marker with decal indicating use; CAUTION: WATER PIPELINE, or CAUTION: WATER VALVE.
- B. The markers shall be white with blue decal and be 62" long and 3-3/4" wide.
- C. The markers shall be Carsonite Utility Markers as manufactured by Carsonite International Corporation, 2900 Lockheed Way, Carson City, Nevada 89701, 1-800/648-7974 or equal.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Markers shall be installed using a pilot hole driver to make the initial hole and then a post driver to insert the marker into the ground.
- B. After installation, the top of the marker shall be 42" above grade.

END OF SECTION

SECTION 13311

UTILITY LOCATION DETECTABLE FLAGGING

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This section covers utility location flagging.
- B. Detectable flagging shall be installed over all water mains.
- C. Contractor to be paid per lineal foot of trench.

PART 2 PRODUCTS

2.01 DETECTABLE FLAGGING

- A. The detectable flagging shall be an inert, bonded layer plastic with a metallized foil core and shall be highly resistant to alkalis, acids or other destructive chemical components likely to be encountered in soils.
- B. Flagging shall be blue in color, minimum 2" wide, and be imprinted with "CAUTION: BURIED WATER MAIN BELOW".

PART 3 EXECUTION

3.01 INSTALLATION

- A. The detectable flagging shall be installed 18" below finish grade.

END OF SECTION

WATER SYSTEM EXTENSIONS PROJECT OF 1997
FOR
CARROLL COUNTY WATER DISTRICT NO. 1
CARROLLTON, KENTUCKY

- DIVISION A-1 - Water Main Extensions
DIVISION A-2 - Water Main Extensions, Booster Stations,
Main MPRV's, Master Meters and Telemetry
DIVISION B - Standpipe Water Storage Tank and
Related Work

CONSTRUCTION SPECIFICATIONS

I N D E X

SECTION

DIVISION 15 - MECHANICAL

- 15110 Valves and Appurtenances
15145 Underground Packaged Booster Pumping Station
15146 Above Ground Packaged Water Booster Station
15150 Underground Packaged Pressure Reducing Station
15176 Water Storage Tanks

SECTION 15110

VALVES AND APPURTENANCES

PART 1 GENERAL

1.01 WORK INCLUDED

- A. The Contractor shall provide all labor, materials and equipment necessary to furnish and install all valves and appurtenances which are not included as an integral part of other equipment under other items, of the type shown on the drawings or required for proper process operations.
- B. This specification is intended to be general in nature. All of the valves described herein are not necessarily included in this contract. Bidders shall verify from the drawings the specific valves required for this work.

1.02 SUBMITTALS

- A. Provide shop drawings in accordance with Section 01340.

PART 2 PRODUCTS

2.01 GATE VALVES

- A. All hand-operated gate valves, three inches (3") and larger shall conform to the latest standard specifications of the American Water Works Association (AWWA) Section C-509 for resilient seated valves. All gate valves installed under this contract shall be of the same class as the pipe on which they are installed. Valves shall have joint ends compatible with type of pipe used, non-rising stems, 2" square operating nut and shall open "left".
- B. All gate valves, 2-1/2" and smaller, shall be of an Engineer approved manufacture and suitable for the service required. All valves shall have openings through the body of the same circular area as that of the pipe to which they are attached. All valves shall be designed to take the full unbalanced pressure upon either face.
- C. Except as otherwise stated or indicated upon the plans, underground valves shall be fitted with standard, two inch square operating nut. All valves in interior or above ground piping shall be fitted with hand wheels and shall have flanged or screwed ends depending upon the size of pipe with which they are being used, or as shown on the plans. Underground valves will be provided with boxes, covers and operating nuts extended to just below grade.

- D. All hand-operated gate valves shall open by turning counter-clockwise. The direction of opening shall be indicated by an arrow on handwheels and on operating nuts.
- E. All submerged valves shall be furnished with "O" ring packing.
- F. All gate valves shall be designed for a minimum working pressure of 150 lbs. per square inch, unless noted otherwise on the plans or in the Bid Schedule.

2.02 VALVE BOXES

- A. All buried outside valves shall be provided with valve boxes and covers. Valve boxes shall be of standard, adjustable, heavy pattern, cast iron extension type, of the various lengths required. The valve boxes shall be installed such that they are not supported in any way by the buried valve.

2.03 OPERATING NUTS

- A. All valve operating nuts shall be 2" square.

2.04 STANDARD CHECK VALVES

- A. Check valves conforming to the American Water Works Association C508 standard shall be of the non-slamming externally balanced type. The seat ring shall be of bronze and backfaced. The gate shall be mounted in a bronze gate ring and shall be hung from a solid bronze or malleable iron hinge with a stainless steel pin, connected in such a manner as to prevent gate rotation. The gate and all internal working parts shall be removable through a top cover. Valves shall be manufactured by Pratt, DeZurik, M. & H., American-Darling, Dresser, or an Engineer approved equal. The sizes and number of valves required for the project to be determined from the plans.

2.05 BUTTERFLY VALVES

- A. All butterfly valves shall conform to the dimensions set forth in this specification, and shall be rated not less than 150 psi CWP, or as indicated on the plans.
- B. Butterfly valves 3" through 24" shall conform to the latest revision of AWWA Specification C-504 for Class 150B. Butterfly valves 30" through 120" shall conform to the latest revision of AWWA Specification C-504, complying with the requirements of the AWWA class needed to meet the most severe actual operating conditions.
- C. Valve bodies shall be of cast iron per ASTM A126, Class B. Flanged valves shall be of the short body design with 125 pound flanged ends faced and drilled per ANSI B16.1 standard for cast iron flanges.

Mechanical joint ends shall meet the requirements of AWWA C110/ANSI A21.11.

- D. Discs shall be offset to provide an uninterrupted 360 degree seating edge and shall be cast iron per ASTM A-48, Class 40 or ductile iron per ASTM A-536. The disc seating edge shall be 316 stainless steel. The disc shall be securely attached to the valve shaft using 304 stainless steel pins.
- E. The valve shaft shall be of type 304 stainless steel.
- F. The seat shall be of Acrylonitrile Butadiene for water and shall be vulcanized or recess mounted and mechanically retained in the valve body. Compression between the seat and disc edge shall be adjustable and the seat shall be replaceable without disassembly of the disc and shaft.
- G. Valve shaft bearings shall be of non-cold-flowing, metal backed, PTFE.
- H. Valve shaft seals for valves shall be of self-compensating V-type packing.
- I. Unless otherwise specified, exterior cast iron or steel surfaces of each valve shall be shop painted per the latest revision of AWWA C-504. Interior of the body shall be lined with the same material as the seat.
- J. Butterfly valves shall be DeZurik BAW, or equal.
- K. Ten position levers shall be furnished for 3" - 6" valves. Provision must be made for locking in any position.
- L. Valves 8" and larger shall have handwheel actuators in complete conformance with AWWA C-504 and AWWA C-540. Housings shall be of cast iron, in both weatherproof and buriable constructions, with optional chainwheel or 2" square nut inputs. All units shall have adjustable open and closed position stops. Buried valve shall be provided with box, cover, and operating nut extended to just below grade. Valves greater than 6 feet above floor shall be furnished with chain operator.
- M. Pneumatic and hydraulic cylinder actuators shall be double acting, stationary mounted, with all working parts totally protected within weatherproof enclosures per the latest version of AWWA C-540.
- N. Cylinder tubes shall be fiberglass reinforced epoxy resin having a 16 micro inch or smoother internal finish. Piston seals shall be TFE or PTFE with elastomeric backup.

- O. Cylinder actuators shall be available with pneumatic or electronic positioners and position transmitters, pilot valves, position indicating switches, and extended mounting provisions.

2.06 ECCENTRIC PLUG VALVES

- A. Valves shall be of the non-lubricated, eccentric type with resilient faced plugs and screwed, flanged, or mechanical joint ends as shown on the plans. Port areas of 4" - 20" valves shall be at least 80% of full pipe area. Port areas of 24" and larger valves shall be at 100% of full pipe area. Bodies shall be cast iron with raised seats. Seats in 3" and larger valves shall have a welded-in overlay of high nickel content on all surfaces contacting the plug face. Valves through 20" shall have permanently lubricated, stainless steel bearings in the upper and lower plug stem journals. Valves 24" and larger shall have bronze bearings and stainless steel sleeves in the upper and lower plug stem journals. All valves shall be of the bolted bonnet design. All 4" and larger valves shall be designed so that they can be repacked without removing the bonnet and the packing shall be adjustable. All exposed nuts, bolts, springs and washers shall be zinc plated. Flanged valves shall be faced and drilled to ANSI 125/150 pound standard. Flanges of valves through 12" shall have face-to-face dimensions of standard gate valves.
- B. Resilient plug facings shall be of neoprene, suitable for use with water or wastewater.
- C. Valves will be equipped with an adjustable packing gland.
- D. Manual valves shall have lever or gear actuators and tee wrenches, extension stems, floor stands, etc., as indicated on the plans. All valves 6" and larger shall be equipped with gear actuators. All gearing shall be enclosed in a semi-steel housing and be suitable for running in a lubricant with seals provided on all shafts to prevent entry of dirt and water into the actuator. The actuator shaft and the quadrant shall be supported on permanently lubricated bronze bearings. Actuators shall clearly indicate valve position and an adjustable stop shall be provided to set closing torque. All exposed nuts, bolts and washers shall be zinc plated.
- E. Valves and gear actuators for buried or submerged service shall have seals on all shafts and gaskets on the valve and actuator covers to prevent the entry of water. Actuator mounting brackets for buried or submerged service shall be totally enclosed and shall have gasket seals. All exposed nuts, bolts, springs and washers shall be stainless steel.
- F. Power actuated valves shall be furnished with cylinder or electric motor 120V, 1 phase, with positioning requiring 4-20 ma input.

- G. Cylinder actuators shall be rack and gear type and shall be enclosed in a semi-steel housing. Actuators shall be sealed and shall be suitable for running in a lubricant. The actuator shall clearly indicate valve position and an adjustable stop shall be provided to set closing torque. Cylinder controls shall include 4-way solenoid valve, speed control valves, pneumatic positioner, mounted on the valve as required. All exposed nuts, bolts and washers shall be zinc plated. Actuators shall be equipped with an operating nut to allow manual valve operation in case of supply failure.

All valves and actuators shall be as manufactured by DeZurik, or equal.

PART 3 EXECUTION

3.01 TESTING

- A. The Contractor shall make all valves tight under their working pressure after they have been installed and before they are placed in operation. Any defective parts shall be replaced at the Contractor's expense.
- B. All valves shall be pressure tested and sterilized in conjunction with their adjoining piping.

3.02 INSTALLATION AND STORAGE

- A. The valves and appurtenances shall be installed in accordance with the installation manual furnished by the valve manufacturer. Extreme care shall be used in the handling, storage and installation of these valves to prevent damage or distortion of the equipment and to insure proper performance.

3.03 SPARE PARTS AND TOOLS

- A. Repair or service parts of each type and size of valve supplied shall be furnished and stored as directed by Engineer, for each Division of work for the Water Distribution Facilities.
- B. The equipment shall include, in general, the following items:

Special tools required for maintenance or operation of valves.

Gaskets, rings, seals, lubricants, bolts, washers, operation manuals, drawings and etc., required to maintain valves in proper operating service.

END OF SECTION

*

SECTION 15145

UNDERGROUND PACKAGED BOOSTER PUMPING STATION

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The contractor shall furnish and install one (1) factory built, underground booster pumping station, with all the necessary piping, controls and appurtenances as shown on the plans and as specified herein.

1.02 QUALIFIED MANUFACTURERS

- A. The booster pumping station general design as specified and as shown on the drawings is based on equipment manufactured and supplied by Engineered Fluid, Inc. of Centralia, Illinois and as such this manufacturer is to be listed and costed into each responding contractors bid as the BASE BID ITEM. Alternate manufacturers to Engineered Fluid, Inc. are allowed as DEDUCTIVE ALTERNATES on the bid and are listed below following Engineered Fluid, Inc. All manufacturers are required to strictly adhere to the plans and specifications.

- B. The three (3) listed manufacturers are deemed to have sufficient facilities, personnel, technical expertise and a record of high quality product installations such that the selection of qualified manufacturers has been limited to these three (3).

1. Engineered Fluid, Inc., Centralia, Illinois as Base Bid, and only
2. Systecon, Inc., Cincinnati, Ohio, or
3. SyncroFlo, Inc. of Norcross, Georgia, as deductive alternates.

1.03 QUALITY ASSURANCE

- A. The equipment and materials covered by these specifications are intended to be standard equipment of proven reliability and as manufactured by reputable manufacturers having experience in the production of such equipment. The equipment furnished shall be designed, constructed, and installed in accordance with the best practices and methods and shall operate satisfactorily when installed as shown on the contract drawings and operated per manufacturer's recommendations.

- B. It is intended that the manufacturer of the specified equipment shall be a business regularly engaged in the manufacture, assembly, construction, start-up and maintenance of water distribution equipment of the type required for this project. The manufacturer shall have at least ten (10) years of successful experience in providing stations of

the type, design, function and quality as required for this project. Equipment manufactured by an outside source or "brokered equipment" defined as systems not assembled on the premises of the named manufacturer by that company's employees WILL NOT be allowed.

1.04 SUBMITTAL

- A. Equipment submittals shall be bound and in a minimum of six (6) copies. The submittals shall contain a minimum of two (2) full size drawings, size 24" x 36"; one (1) each covering the booster pump station and the electrical control schematic. The booster pump station drawing shall be specific to this project, in at least three (3) different views, be to scale and illustrate the National Electrical Code (NEC) clearances per Section 110-16 of the Code. The submittal booklets will be complete with data sheets covering all individual components that make up the booster pump station and the UL file number under which the manufacturer is listed, service department personnel statement as detailed in the specifications and be complete with the manufacturer's formal warranty policy.
- B. Two (2) submittal reviews of this item will be accomplished at no cost to the submitting contractor. However, all subsequent reviews will be charged to the submitting contractor at the design engineer's standard hourly billing rate.

PART 2 PRODUCTS

2.01 EQUIPMENT CAPSULE

- A. The equipment capsule size as shown on the drawings for this project is appropriate for National Standard mandated clearances and for proper clearances above, below and around equipment to provide for safe servicing, removal and reinstallation of that equipment.
- B. Likewise, the entrance manway and/or equipment hatches shall be sized to provide eventual removal and replacement of any component within the station without altering the station to accomplish that task.
- C. The drawing for this equipment illustrates centerline and clearance/maintenance dimensions about major equipment items. These dimensions are minimum. Dimensions less than those shown will not be accepted.

2.02 EQUIPMENT CAPSULE - CONSTRUCTION

- A. The plate steel employed throughout the capsule shall be 1/4" minimum thickness and meet or exceed the requirements for ASTM A-36. The structural shapes employed shall meet or exceed the requirements for ASTM A-36. Field welding to complete the capsule or attach the entrance hatch will not be allowed.

- B. The plate forming the top and bottom of the capsule shall be cold formed prior to assembly so as to form a lap joint with the side wall. The lap joint shall be continuously welded on the interior by hand and the exterior by machine to form an airtight seal. The lower side wall continuous weld shall be an average 1½ inches above the capsule floor, which removes the lower weld from incidental water impingement. Capsules without lap joints will not be accepted.
- C. The lap joint shall be in full conformance with Steel Tank Institute (STI) P-3 specifications Section 4.2.6 and Underwriters Laboratories (UL) 58 specifications for steel vessels in buried service, and the American Welding Society (AWS) Structural Welding Code, Section 9.10, for dynamically loaded structures.
- D. Any ferrous metal device passing through the capsule wall will be welded fully along its circumference or length on both sides of the capsule wall.
- E. Non-ferrous, PVC, or ductile iron piping passing through the capsule wall will be housed in a suitable ferrous metal wall sleeve. Each wall sleeve will be complete with two (2) link seal type compression joints; each segment of each joint shall be individually adjustable from within the capsule when in place.
- F. The capsule shall be a rolled, vertical cylinder and have an outside diameter of 11 feet 0 inches and an inside clear height of 7 feet 3 inches.
- G. The bottom of the capsule shall be reinforced by two (2) C8x11.5 channels in parallel, and one (1) 8 x 4 x 3/16 inch structural tubing down the center parallel to the C8x11.5 channels. There shall also be ten (10) C6x8.2 channels in parallel, placed perpendicularly to the C8x11.5 channels. The top of the capsule shall be reinforced by 4 inch x 4 inch x 1/4 inch angles, as shown on the plans for this item.
- H. Four (4) lifting plates of 3/8 inch minimum thickness shall be placed about the perimeter of the capsule to facilitate the lifting and handling of the station. Interior lifting eyes shall be placed over each piece of equipment in excess of 60 pounds in weight.
- I. The entrance manway shall be Bilco Model MNB-50 roof scuttle, with a minimum clear inside opening of thirty (30) inches x fifty-four (54) inches. The scuttle cover shall be made of 11 gauge aluminum on the exterior. The scuttle cover shall be insulated with a minimum of one (1) inch of fiberglass insulation, covered and protected by an 18 gauge aluminum liner.
- J. The entry lock shall be flush mounted, in the scuttle riser, in position to be protected from the elements by the cover skirt as detailed on Bilco Drawing 6184. The lock will be of the pin tumbler

type, dead bolt, with an inside safety release. Two (2) keys will be provided, on a key ring complete with the manufacturer's identification. No locking devices or other penetrations of the cover shall be allowed.

- K. An all aluminum access ladder will be provided. The ladder shall meet UL approval and OSHA qualifications under the Type I, Heavy Duty Specifications. The ladder will have 1-1/4" diameter, tempered, serrated rungs with 3" x 1-1/8" full I-Beam side rails. The uppermost ends of the side rails will be protected by plastic caps bolted into place. The complete access ladder will be bolted into place, at a minimum of two (2) points both top and bottom, so as to be easily removable to facilitate equipment maintenance.
- L. The capsule will be complete with a sump. The sump shall be a minimum of eighteen (18) inches in diameter x eight (8) inches deep; the sump shall be provided with a four (4) inch plugged outlet for gravity outflow as required.
- M. The capsule walkway areas (that space from the entrance ladder to the control panel and the entire NEC clearance area) shall be covered with a Nyracord industrial safety matting. The mat shall be a heavy duty, 1/2 inch minimum thickness Nyracord compound (rubber blend with fiber reinforcement) of open slot design with a ribbed safety pattern (ribbed in two directions) to promote sure footing. The underside of the safety mat shall also be ribbed (in one direction only) to permit aeration and drainage. The safety mat shall not be glued to the floor surface.

2.03 CORROSION PROTECTION

- A. All surfaces of the entire structure shall be gritblasted equal to commercial blast cleaning (SSPC-SP6).
- B. The protective coating shall take place immediately after surface preparation. The protective coating shall be Tnemec Series 66 Hi-Build Epoxoline consisting of a two-component, high solids, amide-cured epoxy system formulated for high build application having excellent chemical and corrosion resistant properties. The epoxy system shall be self-priming and require no intermediate coatings. The protective coating shall provide in two (2) applications a total dry mil thickness of 8.0 mils.
- C. The station manufacturer shall furnish two (2) seventeen pound packaged magnesium anodes for cathodic protection. The anodes shall be buried equally spaced around the station and connected by heavy copper wire to lugs on the station provided for that purpose.

2.04 OPERATING CONDITIONS

- A. The pump station shall be capable of delivering the fluid medium at the following capacities and heads when operating at 0 feet minimum suction pressure.

PUMPS #1 & #2

Design GPM 100 @ 435 feet TDH;
Maximum GPM 110 @ 360 feet TDH;
Efficiency at design GPM 65%.

- B. The pump driver shall be a standard, A.C. induction motor, open drip-proof construction, of the vertical extended shaft, normal thrust type and shall be 15 h.p., 3500 rpm and suitable for 3 phase, 60 cycle, 230 volt electrical service.

2.05 BOOSTER PUMPS - CENTRIFUGAL DIFFUSER TYPE, MULTI-STAGE - VERTICAL

- A. The booster pumps employed within the booster pump station shall be of the vertical centrifugal diffuser type, multi-stage, designed specifically for low flow - high head operation. The pumps shall conform to the detailed specifications as set forth below and shall be G&L Model 4SVC/8 stage.

- B. PUMP - The pump suction/discharge chamber, motor stool and pump shaft coupling shall be constructed of cast iron. The impellers, pump shaft, diffuser chambers, outer discharge sleeve and impeller seal rings or seal ring retainers shall be constructed of stainless steel. The impellers shall be secured directly to the pump shaft by means of a stainless steel tapered split cone and locking nut or by a splined shaft arrangement. Intermediate and lower shaft bearings shall be bronze or tungsten carbide and ceramic. Pumps shall be equipped with a high temperature mechanical seal assembly with tungsten carbide seal faces mounted in stainless steel seal components.

- C. MOTOR - The pump motor shall be sized to insure the pump is non-overloading when operating on the specified pump curve. The motor shall be of the horsepower, voltage, phase and cycle as shown on the drawings. Motor design shall be of the open drip proof with a Nema C face design operating at a nominal 3450 rpm with a minimum service factor of 1.15. Lower motor bearings shall be adequately sized to insure long motor life.

2.06 PUMP/MOTOR VIBRATION ISOLATION PADS

- A. The pump/motor assembly shall be mounted to a fabricated steel base built specifically for the pump/motor to be mounted. Each mounting or attachment point shall be complete with a vibration isolation pad. The pad will be in two (2) parts, a 1/4" base layer followed by a 5/8" upper layer and be a nominal 2" x 2" square size for pump/motor combinations weighing up to 1500 pounds. The mounting or hold down bolts at each base attachment point shall be complete with washer of

appropriate size made of the same material and thickness as the 5/8" upper layer pad.

2.07 ELASTOMER PIPE CONNECTOR

- A. The inlet side of each booster pump shall include an elastomer connector to help isolate vibration and noise in the piping system. The elastomer connector shall be of single sphere design, constructed of neoprene and nylon with bias-ply tire reinforcing cord to provide a 225 psi working pressure rating to a minimum of 120°F. The elastomer connector shall pass through the plate steel flanges designed to grip the connector so the connector seals without gaskets when the flange bolts are drawn up.
- B. A control joint limiting pipe connector movement shall be supplied with each pipe connector.

2.08 PIPING

- A. All internal transmission piping shall be steel and conform to ASTM A-53(CW) for nominal pipe size 4 inch and smaller and ASTM A-53(ERW) Grade B for nominal pipe size 5 inch and larger. Butt welded fittings shall conform to ASTM A-106. Forged steel flanges shall conform to ASTM A-181, Grade 1 and ASA B16.5.

The piping sizes shall be as shown on the drawing.

Size 10 inch and below - Schedule 40

Size 12 inch and above - Standard weight (.375" wall)

- B. All pipe welds shall be performed by certified welders employed by the pump station manufacturer. As part of the equipment submittal, the pump station manufacturer shall provide copies of the welding certificates of the employees who are to perform the pipe welds.
- C. All piping surfaces shall be prepared by sandblasting, or other abrasive blasting, prior to any welds taking place. Piping of 5" diameter and smaller may be cut by saw. Piping of 6" diameter and larger shall be bevel cut, and Oxyfuel or Plasma-arc cutting techniques shall be used to assure and facilitate bevel pipe cuts. No saw cuts or other form of abrasive cut-offs are allowed on 6" and larger diameter pipe.
- D. In all cases, short circuit transfer, spray transfer or pulse-arc transfer modes of the gas metal arc welding process shall be applied semi-automatically. When utilizing the short circuit mode, shielding gas consisting of 50% carbon dioxide and 50% argon gas shall be used. When utilizing the spray or pulse-arc transfer modes, a shielding gas consisting of 5% carbon dioxide and 95% argon shall be used. In all cases, welding wire with a minimum tensile strength of 70,000 psi shall be employed. All flange welds and butt welds of equal size pipe shall

be a single continuous nonstop weld around the complete circumference of the pipe. Whenever possible, vertical up weld passes will be applied to all pipe welds. No vertical down weld passes will be allowed. Completed welding assemblies shall create no internal obstruction, restriction or create any unintended sources of water deflection.

- E. Piping of six (6) inch diameter and larger shall require a minimum of two (2) weld passes to complete each weld. The first pass, or root pass, shall be applied at the bottom of the bevel cut using the short circuit transfer welding mode, and the second pass, or cap pass, shall be applied over the root pass using the spray or pulse arc transfer welding modes to insure that at a minimum the total weld thickness shall be equal to thinnest of the two pieces being welded together.

2.09 PIPE SUPPORTS

- A. Pipe supports by minimum sizing for:

- 4" and smaller piping shall be 2" x 2" x 3/16" wall rectangular tubing;
- 6" through 12" piping shall be 3" x 3" x 1/4" wall rectangular tubing;
- 14" through 24" piping shall be 4" x 4" x 1/4" wall rectangular tubing and, also;
- 6" and larger piping shall be provided with "kick" bracing projecting fully from the underside of the pipe to the floor at an angle of no less than 15° from vertical out at a right angle to the run of the pipe being supported. These "kick" braces shall be in addition to the vertical pipe supports called out above.

- B. Pipe supports are to be fully welded at both end points to the pipe and steel floor where required.

Simple pipe stands made of pipe welded only at the floor and upholding a yoke or bracket with or without a threaded jack bolt or a U-bolt are not acceptable, as no lateral or transverse support is provided.

2.10 SERVICE CONNECTIONS ON INTERNAL PIPING

- A. All plumbed devices within the station eventually requiring service, such as meters, control valves, pumps and like equipment, shall be easily removed from the piping by the presence of appropriately placed and sufficient quantity of adapters and couplings as shown on the drawings; no less than the quantity of couplings and adapters shown shall be allowed.

2.11 RESTRAINING POINTS

- A. The main inlet and outlet piping to the station shall each be provided with two (2) or four (4) restraining points as welded on "eyes" or similar device welded to the capsule or framing to facilitate the attachment of joint restraint tie rods or other device to be used in retarding any pipe movement at the connections.

2.12 COMPRESSION COUPLINGS

- A. The booster station piping shall include a compression type, flexible coupling to prevent binding and facilitate removal of associated equipment where shown on the plans for this item. In lieu of a compression coupling, a Uni-Flange or a flanged coupling adapter (FCA) may be used.
- B. All compression couplings, Uni-Flanges, flanged coupling adapters (FCA), and flexible connectors/expansion joints shall include a minimum of two (2) control joint rods with gusset plates.

2.13 COMBINATION PRESSURE GAUGES

- A. Combination pressure gauges shall be glycerine filled with a built-in pressure snubber and have 4-1/2 inch minimum diameter faces and be turret style, black phenolic case with clear glass face. The movement shall be rotary, of 400 Series stainless steel with Teflon coated pinion gear and segment. The gauge shall be bottom connected and accept a 1/4" NPT female thread. Combination pressure gauge range and scale graduations shall be in psi and feet of water as follows:
 - B. INLET PRESSURE - 0 to 100 psi, 10 psi figure intervals, with graduating marks every 1 psi (0-230 feet).
 - C. OUTLET PRESSURE - 0 to 400 psi, 20 psi figure intervals, with graduating marks every 2 psi (0-460 feet).
- D. All gauges will be panel mounted off the pipeline and be flexible connected to their respective sensing point. The gauge trim tubing shall be complete with both isolating and vent valves and the tubing shall be so arranged as to easily vent air and facilitate gauge removal. Gauges mounted directly to the pipeline or at the sensing point will not be accepted.
- E. MANUFACTURER - Ashcroft Model 1279ASL.

2.14 SAMPLE TAP

- A. A single, right angle outlet, smooth nose, brass sample tap shall be affixed to the manual vent ball valve for the low suction lockout and suction pressure gauge assembly.

2.15 BUTTERFLY VALVES

- A. The isolating valves used throughout the equipment capsule will be of the wafer design. The body of each isolating valve will be constructed of carbon steel and be equipped with a minimum of four (4) alignment holes with which to pass mating flange studs so as to assure proper butterfly alignment within the piping system. The valve disc will be constructed of 316 stainless steel and be machined to close tolerances on both the flats and O.D. to assure drop tight shut off and reduce operating torque. The valve stems will be constructed of 17-4 PH stainless steel and the bearing material shall be glass backed TFE. The disc will be affixed to the shaft by a pair of wedge pins. The valve seat will be TFE designed to be easily field replaceable. The valve shall be 150 ANSI Class rated at 285 psi working pressure.
- B. Valve sized six (6) inches and smaller shall be equipped with lever operator and 10 degree increment throttling plate. Valve sized eight (8) inches and larger shall be equipped with a weatherproof, heavy duty, gear operator complete with a position indicator.
- C. THE BUTTERFLY VALVES SHALL BE FLO-SEAL MODEL 1WA, or equal.

2.16 NON-SLAM CHECK VALVES

- A. Each pump discharge pipe run shall include a wafer-type, non-slam check valve. The body of the check valve shall be cast iron. The plug and seat shall be bronze and conform to ASTM Designation B-584. The guide bushings shall be bronze copper alloy and conform to ASTM Designation B-584. The valve spring and seat retainers shall be stainless steel and conform to ASTM Designation A-313. The valve plug shall be guided at both ends by a center shaft integral with the valve plug. Alignment of the center shaft shall be provided by guide bushings.

2.17 GATE VALVES (RELIEF VALVE)

- A. Isolating valves where shown and as sized on the plan sheet covering this item shall be gate valves meeting or exceeding ASTM Spec B283 No. C37700. The gate valves will be forged brass body, integral seat, NRS (non-rising stem) solid wedge disc. The valves will be NPT threaded pattern complete with handwheel operators (counter-clockwise). Maximum working pressure shall be 200 psi.

2.18 GATE VALVE

- A. The meter inlet isolating valve where shown and as sized on the plan sheet covering this item shall be a gate valve meeting or exceeding AWWA Standard C-500. The gate valve will be cast iron body, bronze mounted, resilient seat, NRS (non-rising stem). The valve will be flanged pattern with flange and drilling complying to ANSI B16.1, Class 125. The valve will be complete with handwheel operator and shall be

constructed so as to open left (counter-clockwise). Maximum working pressure shall be 200 psi.

2.19 RELIEF VALVE

- A. The relief valve shall be diaphragm actuated, direct acting, spring loaded, adjustable, normally closed, angle style valve designed to permit flow when pressure exceeds the spring setting. It shall have a separate pressure sensing chamber under the diaphragm. Pressure from a remote point directed to this chamber shall provide the signal source to which the valve responds. The valve shall be equipped with a single removable stainless steel seat and a resilient sealing disc molded into a replaceable metal retainer. The adjusting spring shall be positioned top and bottom by self centering retainers. Seals shall be of BUNA-N. The diaphragm shall be BUNA-N elastomer bound to a close woven nylon fabric reinforcement. External packing glands are not permitted. A threaded cap shall protect the adjusting screw and jam nut.
- B. The relief valve shall be ANSI Class 125/250, NPT threaded, angle pattern.
- C. THE RELIEF VALVE SHALL BE CLA-VAL MODEL 50A-01B, or equal.

2.20 WATER METER & STRAINER

- A. The booster pump station shall include a turbine type meter, size three (3) inch. The turbine meter shall be flanged and shall conform to ANSI Class 125. The maincase and cover shall be cast of water works bronze containing not less than 75% copper. The size, model, arrows indicating direction of flow, and AWWA Class II shall be cast in raised characters on the maincase or cover. The cover shall contain a stainless steel calibration vane for the purpose of calibrating the turbine measuring element while in-line and under pressure. The calibration vane shall contain no gear reduction and shall be covered by a protective cap that is attached in a tamper-resistant manner. The external casing bolts shall be made of type 316 stainless steel. The register shall be permanently roll-sealed, straight reading, indicating in gallons. The register shall include a center-sweep test hand, a low flow indicator, and a glass lens. The register shall be serviceable without interruption of the meter's operation. Register boxes and covers shall be of bronze composition. No plastic retainer rings will be acceptable. The name of the manufacturer and the meter serial number shall be clearly identifiable and located on the register box cover. The register box shall be affixed to the top cover by means of a plastic tamperproof seal pin that must be destroyed in order to remove the register. The meter serial number shall be imprinted on the meter maincase as well as the register box cover. The turbine measuring chamber shall be a self-contained unit attached to the cover for easy removal. The turbine rotor spindle shall be stainless steel. The bearings shall be graphite or ryton-coated graphite. The

intermediate gear train shall be directly-coupled to the turbine rotor spindle and magnetically coupled to the register through the meter cover. The gear train shall be enclosed in the turbine rotor outlet and shall be capillary sealed. All moving parts of the gear train shall be made of a self-lubricating polymer or stainless steel for operation in water. Registration accuracy over the normal operating range shall be 98.5% to 101.5%. The meter shall have normal operating range of 5 gpm to 450 gpm with a maximum intermittent flow of 560 gpm. Maximum head loss at maximum flow shall not exceed 5 psi. The turbine meter assembly shall be complete with a like size, plastic type, top clean-out strainer immediately upstream and flanged to the inlet of the turbine meter.

- B. The meter/strainer assembly shall be a Neptune HP Turbine as manufactured by Schlumberger Industries, or equal.

2.21 METER TEST STATION

- A. The meter installation shall be complete with a meter test station of a size as shown on the plans for this item. The test station shall be installed a minimum of two (2) pipe diameters downstream of the meter. The test station shall include an all bronze gate valve, minimum 2½" size, 200 psi WOG rating, with outlet side bronze adapter to change NPT to fire hose thread. The fire hose thread adapter shall be complete with a bronze hydrant cap and chain.

2.22 PRESSURE TESTING

- A. When the station plumbing is completed, the pressure piping within the station, including valves, pumps, control valves, fittings, connections as make up the entire system shall be hydrostatically tested at a pressure of 100 psi or a pressure equal to the lowest test pressure rating of the equipment within the tested system, whichever is greater pressure. The test pressure shall be applied for a minimum of 20 minutes, during which time all joints, connections and seams shall be checked for leaking. Any deficiencies found shall be repaired and the system shall be retested.
- B. The results of this testing shall be transmitted in writing to the Engineer prior to shipment of the station and shall note test pressure, time at full pressure and be signed by the Quality Control Manager or test technician.

2.23 ELECTRICAL APPARATUS - DESIGN, ASSEMBLY & TEST

- A. The electrical apparatus and control panel design, assembly, and installation, and the integration of component parts will be the responsibility of the manufacturer of record for this booster pumping equipment. That manufacturer shall maintain at his regular place of business a complete electrical design, assembly and test facility to

assure continuity of electrical design with equipment application. Control panels designed, assembled or tested at other than the regular production facilities or by other than the regular production employees of the manufacturer of record for this booster pumping equipment will not be approved.

2.24 CONFORMANCE TO BASIC ELECTRICAL STANDARDS

- B. The manufacturer of electrical control panels and their mounting and installation shall be done in strict accordance with the requirements of UL Standard 508 and the National Electrical Code (NEC) latest revision so as to afford a measure of security as to the ability of the eventual owner to safely operate the equipment. No exceptions to the requirements of these codes and standards will be allowed; failure to meet these requirements will be cause to remove the equipment and correct the violation.

2.25 U.L. LISTING

- A. All service entrance, power distribution, control and starting equipment panels shall be constructed and installed in strict accordance with Underwriter's Laboratories (UL) Standard 508 "Industrial Control Equipment." The UL label shall also include an SE "Service Entrance" rating stating that the main distribution panel is suitable for use as service entrance equipment. The panels shall be shop inspected by UL, or constructed in a UL recognized facility. All panels shall bear a serialized UL label indicating acceptance under Standard 508 and under Enclosed Industrial Control Panel or Service Equipment Panel. In addition, a photocopy of the UL labels for this specific project shall be transmitted to both the project engineer and the contractor for installation within their permanent project files, prior to shipment of the equipment covered under these specifications.

2.26 EQUIPMENT GROUNDING

- A. Each electrical equipment item in the station shall be properly grounded per Section 250 of the National Electrical Code. Items to be grounded include, but are not limited to, pump motor frames, control panel, transformer, convenience receptacles, dedicated receptacle for sump pump/dehumidifier, heater, lights, light switch, exhaust fans and pressure switches.
- B. All ground wires from installed equipment shall be in conduit and shall lead back to the control panel to a copper ground buss specific for grounding purposes and so labeled. The ground buss shall be complete with a lug large enough to accept the installing electrician's bare copper earth ground wire. The bus shall serve as a bond between the earth ground and the equipment ground wires.

2.27 ELECTRICAL APPARATUS - CONTROL PANEL

- A. All circuit breakers, motor starters, time delay relays and control relays shall be incorporated into one (1) NEMA I control panel. The electrical service provided for this station shall be 240 volt, 1 phase, 60 cycle, 3 wire.
- B. There shall be provided, thermal-magnetic trip circuit breakers as follows:
 - One (1) Main Breaker, 250 amps;
 - Two (2) Branch Breakers, one each per pump, 45 amps;
 - One (1) Phase Converter Breaker, 75 amps;
 - Eight (8) Auxiliary Circuit Breakers, as follows:

1. Controls	5. Sump Pump/Dehumidifier
2. Lights	6. Spare
3. Heater	7. Convenience Outlets
4. Exhaust Fan	8. Telemetry
- C. Pump starting equipment shall be three (3) phase, full voltage magnetic starters connecting the pump motor directly across the line, complete with overload relay with correctly sized heater elements on each line.
- D. Automatic pump alternation shall be provided through a solid state sequence relay. The relay shall be enclosed in a plastic cover and shall plug into a eight (8) terminal socket. Control wiring for the sequence relay shall terminate at the socket. Replacement of the alternator shall not disturb control wiring. Automatic start of the backup pump upon lead pump failure shall be provided.

2.28 ROTARY PHASE CONVERTER

- A. The booster station manufacturer shall supply and start-up a phase converter, rotary type, of a size sufficient to carry the imposed three-phase load of fifteen (15) h.p. booster pump motors, as detailed under the "Operating Conditions" of these specifications. The phase converter will convert existing 230 volt single phase power service power to 230 volt, 3 phase. The rotary phase converter will be supplied complete with a single phase A.C. contactor for starting.
- B. The three-phase motors shall be supplied with power by a rotary phase converter employing rotary transformer taps for motor current balancing. Type 2CSP, 30KVA, 230 volts, as manufactured by RONK Electrical Industries, Inc., or equivalent. The rotary phase converter to be capable of operating the three-phase motors at 100% rated load on the single-phase line.
- C. Starting and stopping of the phase converter shall work in conjunction with the run requirements of the pumps. When a pump is called to run, the A.C. contactor for the phase converter shall be energized first - thus energizing the converter system. This same signal shall energize

a time delay relay which shall prevent the pumps from starting until the end of the time delay period. The time delay period shall be of sufficient time to allow the phase converter to be up to speed before energizing a motor starter.

- D. Contactor interlock and a voltage sensitive relay shall also be provided to prevent pump starting until phase converter output has been proven.
- E. Capacitor banks supplied with the converter shall be of the split panel type such that each motor has its own dedicated capacitor panel.
- F. Start-up and phase adjustment of the rotary phase converter will be the responsibility of the booster station manufacturer.

2.29 ELECTRICAL APPARATUS - SUCTION PRESSURE CONTROL

- A. Suction control of the pumping operation shall be provided by a bellows type, adjustable differential pressure switch. The switch shall be complete with a single pole, double throw contact block with 5 amp non-inductive rated contacts at 240 volts AC. The set points of the on/off cycle shall be independently adjustable through the full range of the switch rating.

- 1. Low Suction Cut-out, 4-150 psi.
- 1A. Adjustable Differential, 2-25 psi.

- B. A pressure gauge shall be sub-panel mounted adjacent to the low suction pressure switch. The gauge and switch shall be so plumbed with the suction header sensing line that a common blow-off valve can relieve pressure in both simultaneously for purposes of checking and calibrating the low suction lock-out.
- C. A pressure gauge shall be sub-panel mounted adjacent to the discharge header. The gauge shall be so plumbed with the discharge header sensing line that a common blow-off valve can relieve pressure for purposes of checking the gauge.

2.30 PANEL MOUNTING HARDWARE

- A. Metal framing channel shall be used exclusively for mounting of all electrical panels and electrical components except for those specifically designated otherwise.

2.31 ELECTRICAL APPARATUS - TELEMETRY CONTROL - INTERFACE PANEL

- A. It will be the responsibility of the booster station manufacturer to provide the following as an adjunct to the supplied telemetry equipment.

1. 3/4" telemetry entrance conduit complete to telemetry interface panel.
2. Size 12" x 12" NEMA 1 telemetry interface panel.
3. Separate 120 volt single phase power circuit in conduit to the telemetry interface panel.
4. Telemetry control circuits made up and in conduit from main control panel to telemetry interface panel terminal strip.
5. Brackets to mount telemetry equipment.

2.32 ELECTRICAL APPARATUS - DEVICES

- A. One (1) solid state time delay relays shall be provided to perform the following functions:
 1. Low Suction Timer
- B. The solid state time delay relay shall have an adjustable time range of 10 seconds to 10 minutes. The relays shall be constructed to use a DIN rail mount socket so that the relays can be replaced without disturbing the wiring. The relay shall be complete with LED indicators for output and power.
- C. Hand-Off-Automatic switches shall be oil tight, 3-position maintained and be located on the main control panel door.
 1. Pump #1
 2. Pump #2
 3. Exhaust Fan (2-position) Run-Auto
 4. Telemetry Test
- D. Indicating lights shall be oil tight, with a full voltage pilot light and be provided:
 1. Red - Low Suction Pressure
 2. Green - Pump #1 in Operation
 3. Green - Pump #2 in Operation
- E. Nameplates shall be furnished on all panel front mounted switches and lights.
- F. The control panel door shall be complete on the interior with a stick-on transparency containing an "as-built" reproduction of the electrical control panel schematic. The wiring diagram shall be a corrected "as-built" copy and contain individual wire numbers, circuit breaker numbers, switch designations and control function explanations.

2.33 CONDUIT, WIRING, RECEPTACLES AND LIGHTING

- A. The service entrance conduits shall be rigid steel conduit, individually sized to accept the inbound service conductors and

telemetry/telephone/radio cables, and shall be installed from the main power or control panel through the equipment capsule side sheet and terminate exterior to the equipment capsule. The service entrance exterior conduit connection points shall be capped or plugged for shipment.

- B. All wiring within the equipment capsule and outside of the control panel or panels shall be run in conduit except for the watertight flexible conduit and fittings used to connect pump drivers, fan motors, solenoid valves, limit switches, etc., where flexible connections are best utilized, in accordance with the National Electrical Code. Only the sump pump and dehumidifier, where furnished by the original manufacturer with a UL approved rubber cord and plug, may be plugged into a receptacle.
- C. EQUIPMENT CAPSULE CONDUIT - Rigid, heavy wall, Schedule 40 PVC with solvent weld moisture-proof connections adequately sized to handle the type, number and size of equipment conductors to be carried - in compliance with Article 347 of the National Electrical Code and NEMA TC-2, Federal WC-1094A and UL-651 Underwriters Laboratory Specifications.
- D. FLEXIBLE CONNECTIONS - Where flexible conduit connections are necessary, the conduit used shall be liquid-tight, flexible, totally nonmetallic, corrosion resistant, nonconductive, U.L. listed conduit sized to handle the type, number and size of equipment conductors to be carried - in compliance with Article 351 of the National Electrical Code.
- E. MOTOR CIRCUIT CONDUCTORS - Sized for load. All branch circuit conductors supplying a single motor of one (1) horsepower or more shall have an ampacity of not less than 125 percent of the motor full load current rating, dual rated type THHN/THWN, as set forth in Article 310 and 430-B of the National Electrical Code (NEC), Schedule 310-13 for flame retardant, heat resistant thermoplastic, copper conductors in a nylon or equivalent outer covering.
- F. CONTROL AND ACCESSORY WIRING - Sized for load, type MTW/AWM (Machine tool wire/appliance wiring material) as set forth in Article 310 and 670 of the National Electrical Code, Schedule 310-13 and NFPA Standard 79 for flame retardant, moisture, heat and oil resistant thermoplastic, copper conductors in compliance with NMTBA and as listed by Underwriters' Laboratories (AWM), except where accessories are furnished with a manufacturer supplied UL approved rubber cord and plug.
- G. RECEPTACLES - Two (2) duplex, ground fault circuit interrupter type receptacles shall be furnished about the periphery of the equipment capsule, with one (1) receptacle adjacent to the main control panel.

One (1) additional receptacle, three-wire grounded type, shall be installed and dedicated solely to sump pump/dehumidifier service only.

- H. LIGHTING - There shall be one or more two-tube, 40 watt per tube, rapid start, enclosed and gasketed, forty-eight (48) inch minimum length fluorescent light fixtures installed within the equipment capsule, as shown on the plan for this item. One (1) light fixture shall be located directly over the main control panel. The light switch shall be of the night glow type and be located within the hatch periphery. The light switch shall be wired to operate the exhaust fan equipment whenever the equipment capsule lights are on. Open fluorescent or incandescent fixtures will not be accepted.

2.34 HEATER

- A. One (1) each wall mounted as shown.
- B. Rating - 10,239 BTU/HR - 3000 watts, 240 volt.
- C. Enclosed resistance wire within steel finned element.
- D. Control - off/heat/constant.
- E. UL listed.
- F. Vane axial fan - floor flow discharge.
- G. Hard wired in conduit per UL 400-1.

2.35 EXHAUST FAN

- A. One (1) each installed as shown.
- B. Capacity each 232 cfm at .2 inch static pressure.
- C. Shaded pole motor - squirrel cage blower.
- D. Hard wired in conduit to conduit box on motor per UL 400-1.
- E. 120 volt A.C. operation from wall mount thermostat and HOA switch on main control panel.
- F. Hatch installed limit switch to activate exhaust fan whenever the entrance hatch is open.
- G. Exhaust air piping - 3 inch minimum.
- H. Air return piping - 3 inch minimum.

- I. Exhaust and return piping protected by 180° PVC return bend with removable insect screen.
- J. When exhaust fans and an air conditioner or fan coil cooling unit are both used, the exhaust fans' control wiring shall contain relay contacts (normally closed) that open the exhaust fans' circuit whenever an air conditioner or fan coil cooling unit is in operation.
- K. The automatic exhaust fan system specified herein should exempt this station from the limitations of permit-required confined space as detailed in the Code of Federal Regulations 1910.146(C)(5)(i)(B).

2.36 SUMP PUMP

- A. One (1) each installed as shown.
- B. Capacity 18 gpm at 15 feet TDH.
- C. Impeller - glass filled valor.
- D. Cast iron motor shell, switch cap and pump housing.
- E. UL listed submersible oil filled motor - UL listed rubber power cord - 120 volt AC operation.
- F. Float operated, submersible (NEMA 6) mechanical switch.
- G. Completely submersible, hermetically sealed.
- H. Auto reset thermal overload protection.
- I. PVC pump discharge piping 1½" x 1½" with single check valve - union both sides.
- J. Provision for dewatering drain system for freeze protection.

2.37 DEHUMIDIFIER

- A. One (1) each installed as shown.
- B. Capacity 25 pints per 24 hours (AHAM Standard DH-1).
- C. Refrigerant type, with environmentally safe refrigerant.
- D. Compressor rated 1/5 HP, 4.1 amps, 400 watts.
- E. Condensate piped direct to sump.
- F. 120 volt AC operation by dial-controlled adjustable humidistat.

G. UL listed rubber cord.

2.38 FACTORY START-UP SERVICE

A. Start-up service technician shall be a regular employee of booster station manufacturer.

B. As part of the submittal covering this equipment, list the factory service manager, his employee number, his telephone number with extension and his number of years with the company. List also each start-up service technician, his employee number and years of service with the company.

C. Verify that one (1) or more of the service technicians listed above will perform the required start-up service on the equipment covered in the submittal.

D. One (1) full day at job site for start-up and training.

E. Start-up service to include two (2) bound O&M manuals.

F. Start-up service report attested to by start-up technician and representative of owner or engineer.

G. Service report distributed to:

1. Manufacturer's File
2. Engineer's File
3. Contractor's File
4. Owner's File

2.39 CONCRETE BASE

A. The booster station base shall be constructed of 4,000 psi reinforced concrete as shown on the plans. It shall be poured on pea gravel or crushed stone fill, eight (8) inches minimum compacted depth.

PART 3 EXECUTION

3.01 GENERAL

A. Verify electrical service available and coordinate service with local power company.

B. Submit and receive approval of shop drawings.

C. Shop fabricate and have unit delivered to site.

D. Excavate opening, install concrete base on 8" of crushed stone and install package unit.

- E. Connect water mains, electrical service and controls.
- F. Backfill.
- G. Factory representative start-up.
- H. Finish site work.

3.02 WARRANTY

- A. The warranty is the responsibility of the station manufacturer and that warranty shall be provided in written form to the contractor for inclusion with the submittal and said warranty shall at a minimum cover:
 - 1. A period of one (1) year commencing upon station acceptance by the Owner and Engineer.
 - 2. The one (1) year period shall be inviolate regardless of any component manufacturer's warranty for equipment and components within the station.
 - 3. The warranty shall cover all equipment, components and systems provided in or with the station.
 - 4. The warranty shall provide for replacement and/or repair of faulty or defective components at no cost to the owner during the warranty period.
 - 5. Where deemed necessary, the manufacturer will be responsible for the labor of removal and reinstalling the defective or faulty components without cost to the owner.
 - 6. No assumption of contingent liabilities for any component failure during warranty is made.

3.03 GENERAL LIABILITY INSURANCE

- A. The booster pump station manufacturer shall furnish premises/operations and products/completed operations general liability insurance from an insurance company with a rating of A-V according to the most recent Best's Key Rating Guide, in an amount equal to \$10,000,000 per occurrence. The insurance certificate must be included with the manufacturer's submittal. The coverage must be provided by an insurance carrier licensed and admitted in the state of manufacture.

END OF SECTION

SECTION 15146

ABOVE GROUND PACKAGED WATER BOOSTER PUMPING STATION

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The contractor shall furnish and install one (1) factory built, above ground packaged water booster pumping station, with all the necessary piping, controls and appurtenances as shown on the plans and as specified herein.

1.02 QUALIFIED MANUFACTURERS

- A. The above ground packaged water booster pumping station general design as specified and as shown on the drawings is based on equipment manufactured and supplied by Engineered Fluid, Inc. of Centralia, Illinois and as such this manufacturer is to be listed and costed into each responding contractors bid as the BASE BID ITEM. Alternate manufacturers to Engineered Fluid, Inc. are allowed as DEDUCTIVE ALTERNATES on the bid and are listed below following Engineered Fluid, Inc. All manufacturers are required to strictly adhere to the plans and specifications.

- B. The three (3) listed manufacturers are deemed to have sufficient facilities, personnel, technical expertise and a record of high quality product installations such that the selection of qualified manufacturers has been limited to these three (3).

1. Engineered Fluid, Inc., Centralia, Illinois as Base Bid, and only
2. Systecon, Inc., Cincinnati, Ohio, or
3. SyncroFlo, Inc. of Norcross, Georgia, as deductive alternates.

1.03 QUALITY ASSURANCE

- A. The equipment and materials covered by these specifications are intended to be standard equipment of proven reliability and as manufactured by reputable manufacturers having experience in the production of such equipment. The equipment furnished shall be designed, constructed, and installed in accordance with the best practices and methods and shall operate satisfactorily when installed as shown on the contract drawings and operated per manufacturer's recommendations.

- B. It is intended that the manufacturer of the specified equipment shall be a business regularly engaged in the manufacture, assembly, construction, start-up and maintenance of water distribution equipment

of the type required for this project. The manufacturer shall have at least ten (10) years of successful experience in providing stations of the type, design, function and quality as required for this project. Equipment manufactured by an outside source or "brokered equipment" defined as systems not assembled on the premises of the named manufacturer by that company's employees WILL NOT be allowed.

1.04 SUBMITTAL

- A. Equipment submittals shall be bound and in a minimum of six (6) copies. The submittals shall contain a minimum of two (2) full size drawings, size 24" x 36"; one (1) each covering the booster pump station and the electrical control schematic. The booster pump station drawing shall be specific to this project, in at least three (3) different views, be to scale and illustrate the National Electrical Code (NEC) clearances per Section 110-16 of the Code. The submittal booklets will be complete with data sheets covering all individual components that make up the booster pump station and the UL file number under which the manufacturer is listed, service department personnel statement as detailed in the specifications and be complete with the manufacturer's formal warranty policy.
- B. Two (2) submittal reviews of this item will be accomplished at no cost to the submitting contractor. However, all subsequent reviews will be charged to the submitting contractor at the design engineer's standard hourly billing rate.

PART 2 PRODUCTS

2.01 EQUIPMENT BASE

- A. The plate steel employed throughout the equipment base shall meet or exceed the requirements for ASTM A-36. The structurals shall meet or exceed the requirements for ASTM A-36. The design of all members shall be in accordance with the recommended practice for design as specified in the MANUAL OF STEEL CONSTRUCTION, published by the American Institute of Steel Construction, Inc.
- B. The equipment base shall be one completed unit when delivered. Field welding to complete the structure or attach the internal piping system will not be accepted. The steel plate and structural shapes used must be adequate to meet the purpose for which they are intended plus the additional stresses from the lifting and setting of the equipment. The equipment base design shall accommodate both lifting from above the unit by a hoist or crane and lifting from below by a fork lift.

2.02 EQUIPMENT ENCLOSURE

- A. The equipment enclosure shall be a hand layup, molded fiberglass cover containing but not be limited to the following raw material:

1. Resins - Resins shall be thermosetting, medium reactivity, rigid fire resistant polyester containing maximum monomer content of 42% and a maximum of 11% Thixotropic additive.
 2. Glass Fiber - Glass Fiber reinforcement shall be K filament type E Borosilicate glass having high performance chrome-complex or silane finish compatible with polyester resins.
 3. Gelcoat - Exterior surface coating shall be ultraviolet light stabilized, weather resistant, polyester base containing fade resistant color pigments, and such inert extenders as are appropriate to maintain total pigment volume concentration less than 20%.
 4. Interior Coating - Interior laminate coating when required shall be a pigmented heat resistant high gloss polyester base surfacing sealer.
 5. Other Materials - Organic peroxide catalysts and promoters appropriate to the resin-type shall be used as necessary to provide thorough cure.
- B. The equipment enclosure when installed shall be hinged at one end. A minimum of three (3) butt type hinges will be used and each hinge will have a removable hinge pin. The hinges shall be affixed to the cover by bolting and be complete with a full span aluminum backing bar. Bolts and nuts of the hinging system shall not directly bear on the fiberglass cover, but bear only on each hinge and the backing bar. The hinges shall allow the cover to open fully to expose all interior equipment.
- C. Two (2) pneu-spring inert gas over oil spring-loaded opening assist automatic cylinders shall be supplied to counterbalance the weight of the fiberglass cover to ease the opening and closing function. The cylinders shall be complete with internal orifice-type valve that dampens the extension motion, but permits undampened compression. A safety chain shall also be provided with spring adjustment to prevent over travel of the cover in the open position.
- D. The equipment enclosure shall be secured from unauthorized entry by a simplex, weather resistant padlock system. Where more than one (1) cover is used or more than one (1) booster station is supplied, the padlocks shall be keyed alike. Five (5) keys shall be provided for each padlock, with each set of keys on a key ring complete with the manufacturer's identification and service telephone number. The equipment enclosure cover shall have affixed in a prominent location the logo of the manufacture.

- E. The equipment enclosure shall be insulated with a isocyanurate (flame retardant urethane) foam insulating material. The insulation shall be applied to the interior of the cover by spray and other approved methods. The insulation shall have a minimum density (compressibility) of 2.25 lbs/cu. ft. nominal and shall be applied to the thickness required to provide a minimum R value of 21.
- F. The equipment enclosure cover shall be complete with a minimum of one (1) galvanized lifting handle. The handle will be affixed to the long side of the cover. The handle shall be so located as to allow the equipment enclosure cover to be easily tilted to expose completely the mechanical/electrical equipment contained therein. The handle shall be bolted through the cover and through an aluminum backing bar. Handles screwed directly to the cover will not be acceptable.

2.03 CORROSION PROTECTION - BASE ONLY

- A. All surfaces of the entire structure shall be sandblasted equal to commercial blast cleaning (SSPC-SP6).
- B. The protective coating shall take place immediately after surface preparation. The protective coating shall be Tnemec Series 66 Hi-Build Epoxoline consisting of a two-component, high solids, amide-cured epoxy system formulated for high build application having excellent chemical and corrosion resistant properties. The epoxy system shall be self-priming and require no intermediate coatings. The protective coating shall provide in two (2) applications a total dry mil thickness of 8.0 mils.

2.04 OPERATING CONDITIONS

- A. The pump station shall be capable of delivering the fluid medium at the following capacities and heads when operating at 0 feet minimum suction pressure.

PUMPS #1 & #2

Design GPM 33 @ 95 feet TDH;
Maximum GPM 40 @ 60 feet TDH;
Efficiency at design GPM 56%.

- B. The pump driver shall be a standard, A.C. induction motor, open drip-proof construction, of the vertical extended shaft, high thrust type and shall be 1½ h.p., 3500 rpm and suitable for single phase, 60 cycle, 240 volt electrical service.

2.05 BOOSTER PUMPS - CENTRIFUGAL DIFFUSER TYPE, MULTI-STAGE - VERTICAL

- A. The booster pumps employed within the booster pump station shall be of the vertical centrifugal diffuser type, multi-stage, designed

specifically for low flow - high head operation. The pumps shall conform to the detailed specifications set forth below and shall be G&L Model 2SVB.

- B. PUMP - The pump suction/discharge chamber, motor stool and pump shaft coupling shall be constructed of cast iron. The impellers, pump shaft, diffuser chambers, outer discharge sleeve and impeller seal rings or seal ring retainers shall be constructed of stainless steel. The impellers shall be secured directly to the pump shaft by means of a stainless steel tapered split cone and locking nut or by a splined shaft arrangement. Intermediate and lower shaft bearings shall be bronze or tungsten carbide and ceramic. Pumps shall be equipped with a high temperature mechanical seal assembly with tungsten carbide seal faces mounted in stainless steel seal components.
- C. MOTOR - The pump motor shall be sized to insure the pump is non-overloading when operating on the specified pump curve. The motor shall be of the horsepower, voltage, phase and cycle as shown on the drawings. Motor design shall be of the open drip proof with a Nema C face design operating at a nominal 3450 rpm with a minimum service factor of 1.15. Lower motor bearings shall be adequately sized to insure long motor life.

2.06 HYDRO-PNEUMATIC STORAGE

- A. The equipment capsule shall be complete with two (2) diaphragm type hydro-pneumatic storage tanks. Each storage tank volume will be a minimum of 86 gallons with a maximum working pressure of 125 psi.
- B. The hydro-pneumatic storage tank shall feature deep drawn steel upper and lower domes with side shell construction specifically designed for diaphragm type storage tanks. Storage tank welding shall be carefully done to eliminate rough spots and sharp edges. The storage tank base shall be designed so as to permit free airflow to prevent moisture from accumulating beneath the storage tank.
- C. The hydro-pneumatic storage tank internals shall include two (2) separate pieces. The first piece shall be a heavy-duty butyl diaphragm that effectively separates the air chamber from the water chamber. The shape of the diaphragm shall conform exactly to the shell configuration and shall be of seamless construction meeting FDA requirements for potable water.
- D. The second piece shall be a polypropylene liner that conforms exactly to the lower dome and acts as the water receptacle. Water shall never touch steel.
- E. The polypropylene liner shall be 100% non-corrosive and will not be bonded to the steel shell wall or lower dome. A mechanical clamping ring shall permanently affix the diaphragm and the liner to the shell.

groove. The polypropylene liner shall be tested and accepted by the National Sanitation Foundation.

- F. The Hydro-Pneumatic Storage Vessel shall be as manufactured by Amtrol, Inc., Well-X-Trol Model WX-302. Storage tanks without either or both diaphragm and liner and will not be accepted.

2.07 PIPING

- A. All internal transmission piping shall be steel and conform to ASTM A-53(CW) for nominal pipe size 4 inch and smaller and ASTM A-53(ERW) Grade B for nominal pipe size 5 inch and larger. Butt welded fittings shall conform to ASTM A-106. Forged steel flanges shall conform to ASTM A-181, Grade 1 and ASA B16.5.

The piping sizes shall be as shown on the drawing.

Size 10 inch and below - Schedule 40

Size 12 inch and above - Standard weight (.375" wall)

- B. All pipe welds shall be performed by certified welders employed by the station manufacturer. As part of the equipment submittal, the pump station manufacturer shall provide copies of the welding certificates of the employees who are to perform the pipe welds.
- C. All piping surfaces shall be prepared by sandblasting, or other abrasive blasting, prior to any welds taking place. Piping of 5" diameter and smaller may be cut by saw. Piping of 6" diameter and larger shall be bevel cut, and Oxyfuel or Plasma-arc cutting techniques shall be used to assure and facilitate bevel pipe cuts. No saw cuts or other form of abrasive cut-offs are allowed on 6" and larger diameter pipe.
- D. In all cases, short circuit transfer, spray transfer or pulse-arc transfer modes of the gas metal arc welding process shall be applied semi-automatically. When utilizing the short circuit mode, shielding gas consisting of 50% carbon dioxide and 50% argon gas shall be used. When utilizing the spray or pulse-arc transfer modes, a shielding gas consisting of 5% carbon dioxide and 95% argon shall be used. In all cases, welding wire with a minimum tensile strength of 70,000 psi shall be employed. All flange welds and butt welds of equal size pipe shall be a single continuous nonstop weld around the complete circumference of the pipe. Whenever possible, vertical up weld passes will be applied to all pipe welds. No vertical down weld passes will be allowed. Completed welding assemblies shall create no internal obstruction, restriction or create any unintended sources of water deflection.
- E. Piping of six (6) inch diameter and larger shall require a minimum of two (2) weld passes to complete each weld. The first pass, or root pass, shall be applied at the bottom of the bevel cut using the short

circuit transfer welding mode, and the second pass, or cap pass, shall be applied over the root pass using the spray or pulse arc transfer welding modes to insure that at a minimum the total weld thickness shall be equal to thinnest of the two pieces being welded together.

2.08 PIPE SUPPORTS

A. Pipe supports by minimum sizing for:

- 4" and smaller piping shall be 2" x 2" x 3/16" wall rectangular tubing;
- 6" through 12" piping shall be 3" x 3" x 1/4" wall rectangular tubing;
- 14" through 24" piping shall be 4" x 4" x 1/4" wall rectangular tubing and, also;
- 6" and larger piping shall be provided with "kick" bracing projecting fully from the underside of the pipe to the floor at an angle of no less than 15° from vertical out at a right angle to the run of the pipe being supported. These "kick" braces shall be in addition to the vertical pipe supports called out above.

B. Pipe supports are to be fully welded at both end points to the pipe and steel floor where required.

C. Simple pipe stands made of pipe welded only at the floor and upholding a yoke or bracket with or without a threaded jack bolt or a U-bolt are not acceptable, as no lateral or transverse support is provided.

2.09 SERVICE CONNECTIONS ON INTERNAL PIPING

A. All plumbed devices within the station eventually requiring service, such as meters, control valves, pumps and like equipment, shall be easily removed from the piping by the presence of appropriately placed and sufficient quantity of adapters and couplings as shown on the drawings; no less than the quantity of couplings and adapters shown shall be allowed.

2.10 COMPRESSION COUPLINGS

A. The booster station piping shall include a compression type, flexible coupling to prevent binding and facilitate removal of associated equipment where shown on the plans for this item. In lieu of a compression coupling, a Uni-Flange or a flanged coupling adapter (FCA) may be used.

- B. All compression couplings, Uni-Flanges, flanged coupling adapters (FCA), and flexible connectors/expansion joints shall include a minimum of two (2) control joint rods with gusset plates.

2.11 COMBINATION PRESSURE GAUGES

- A. Combination pressure gauges shall be glycerine filled with a built-in pressure snubber and have 4-1/2 inch minimum diameter faces and be turret style, black phenolic case with clear glass face. The movement shall be rotary, of 400 Series stainless steel with Teflon coated pinion gear and segment. The gauge shall be bottom connected and accept a 1/4" NPT female thread. Combination pressure gauge range and scale graduations shall be in psi and feet of water as follows:

INLET PRESSURE - 0 to 100 psi, 10 psi figure intervals, with graduating marks every 1 psi (0-230 feet).

OUTLET PRESSURE - 0 to 200 psi, 20 psi figure intervals, with graduating marks every 2 psi (0-460 feet).

- B. All gauges shall be panel mounted off the pipeline and be flexible connected to their respective sensing point. The gauge trim tubing shall be complete with both isolating and vent valves and the tubing shall be so arranged as to easily vent air and facilitate gauge removal. Gauges mounted directly to the pipeline or at the sensing point will not be accepted.

MANUFACTURER - Ashcroft Model 1279ASL, or equal.

2.12 SAMPLE TAP

- A. A single, right angle outlet, smooth nose, brass sample tap shall be affixed to the manual vent ball valve for the low suction lockout and suction pressure gauge assembly.

2.13 GATE VALVE

- A. Isolating valves where shown and as sized on the plan sheet covering this item shall be gate valves meeting or exceeding ASTM Spec B283 No. C37700. The gate valves will be forged brass body, integral seat, NRS (non-rising stem) solid wedge disc. The valves will be NPT threaded pattern complete with handwheel operators (counter-clockwise). Maximum working pressure shall be 200 psi.

2.14 NON-SLAM CHECK VALVES

- A. Each pump suction header shall include a "Y" type strainer of a size as shown on the plans for this item. The strainer body and cover material shall be high grade cast iron equal to ASTM specification A126 Class B. The machined seal shall be self-aligning and at the

same time hold the screen securing in place by a straight threaded and gasketed cap. The screen shall be 20 mesh stainless steel screens.

2.16 PRESSURE TESTING

- A. When the station plumbing is completed, the pressure piping within the station, including valves, pumps, control valves, fittings, connections as make up the entire system shall be hydrostatically tested at a pressure of 100 psi or a pressure equal to the lowest test pressure rating of the equipment within the tested system, whichever is greater pressure. The test pressure shall be applied for a minimum of 20 minutes, during which time all joints, connections and seams shall be checked for leaking. Any deficiencies found shall be repaired and the system shall be retested.
- B. The results of this testing shall be transmitted in writing to the Engineer prior to shipment of the station and shall note test pressure, time at full pressure and be signed by the Quality Control Manager or test technician.

2.17 ELECTRICAL APPARATUS - DESIGN, ASSEMBLY & TEST

- A. The electrical apparatus and control panel design, assembly, and installation, and the integration of component parts shall be the responsibility of the manufacturer of record for this booster pumping equipment. That manufacturer shall maintain at his regular place of business a complete electrical design, assembly and test facility to assure continuity of electrical design with equipment application. Control panels designed, assembled or tested at other than the regular production facilities or by other than the regular production employees of the manufacturer of record for this booster pumping equipment will not be approved.

2.18 CONFORMANCE TO BASIC ELECTRICAL STANDARDS

- A. The manufacturer of electrical control panels and their mounting and installation shall be done in strict accordance with the requirements of UL Standard 508 and the National Electrical Code (NEC) latest revision so as to afford a measure of security as to the ability of the eventual owner to safely operate the equipment. No exceptions to the requirements of these codes and standards will be allowed; failure to meet these requirements will be cause to remove the equipment and correct the violation.

2.19 U.L. LISTING

- A. All service entrance, power distribution, control and starting equipment panels shall be constructed and installed in strict accordance with Underwriter's Laboratories (UL) Standard 508 "Industrial Control Equipment." The UL label shall also include an SE

"Service Entrance" rating stating that the main distribution panel is suitable for use as service entrance equipment. The panels shall be shop inspected by UL, or constructed in a UL recognized facility. All panels shall bear a serialized UL label indicating acceptance under Standard 508 and under Enclosed Industrial Control Panel or Service Equipment Panel. In addition, a photocopy of the UL labels for this specific project shall be transmitted to both the project engineer and the contractor for installation within their permanent project files, prior to shipment of the equipment covered under these specifications.

2.20 EQUIPMENT GROUNDING

- A. Each electrical equipment item in the station shall be properly grounded per Section 250 of the National Electrical Code. Items to be grounded include, but are not limited to, pump motor frames, control panel, transformer, convenience receptacles, heater, exhaust fans and pressure switches.
- B. All ground wires from installed equipment shall be in conduit and shall lead back to the control panel to a copper ground buss specific for grounding purposes and so labeled. The ground buss shall be complete with a lug large enough to accept the installing electrician's bare copper earth ground wire. The bus shall serve as a bond between the earth ground and the equipment ground wires.

2.21 PANEL MOUNTING HARDWARE

- A. Metal framing channel shall be used exclusively for mounting of all electrical panels and electrical components except for those specifically designated otherwise.

2.22 ELECTRICAL APPARATUS - CONTROL PANEL

- A. All circuit breakers, motor starters, time delay relays and control relays shall be incorporated into one (1) NEMA I control panel. The electrical service provided for this station will be 240 volt, single phase, 60 cycle, 3 wire.
- B. There shall be provided, thermal-magnetic trip circuit breakers as follows:

- One (1) Main Breaker, 50 amps;
- Two (2) Branch Breakers, one each per pump, 15 amps;
- Six (6) Auxiliary Circuit Breakers, as follows:
 - 1. Controls
 - 2. Heater
 - 3. Heater
 - 4. Exhaust Fan
 - 5. Exhaust Fan
 - 6. Convenience Outlet

- C. Pump starting equipment shall be single (1) phase, full voltage magnetic starters connecting the pump motor directly across the line, complete with overload relay with correctly sized heater elements on each line.
- D. Automatic pump alternation shall be provided through a solid state sequence relay. The relay shall be enclosed in a plastic cover and shall plug into an 8 terminal socket. Control wiring for the sequence relay shall terminate at the socket. Replacement of the alternator shall not disturb control wiring. Automatic start of the backup pump upon lead pump failure shall be provided.
- E. A solid state, phase sequence/failure and under voltage release relay shall be supplied. The relay shall be complete with an LED to indicate proper phase sequence, all phases in operation and voltage within limits. The relay shall also include an adjustable voltage monitor, be UL and CSA certified and be complete with an automatic reset feature.

2.23 ELECTRICAL APPARATUS - SUCTION PRESSURE CONTROL

- A. Suction control of the pumping operation shall be provided by a bellows type, adjustable differential pressure switch. The switch shall be complete with a single pole, double throw contact block with 5 amp non-inductive rated contacts at 240 volts AC. The set points of the on/off cycle shall be independently adjustable through the full range of the switch rating.

- 1. Low Suction Cut-out, 4-150 psi.
- 1A. Adjustable Differential, 2-25 psi.

- B. A pressure gauge shall be sub-panel mounted adjacent to the low suction pressure switch. The gauge and switch shall be so plumbed with the suction header sensing line that a common blow-off valve can relieve pressure in both simultaneously for purposes of checking and calibrating the low suction lock-out.

2.24 ELECTRICAL APPARATUS - LOCAL PRESSURE CONTROL

- A. Control of the pumps shall be provided by bellows type, adjustable differential pressure switches. Each switch assembly shall be complete with a single pole, double through contact block with 5 amp non-inductive rated contacts at 240, volts AC. The set points of the on/off cycle shall be independently adjustable through the full range of the switch rating.

- 1. Start Lead Pump, 4-150 psi control range.
- 1A. Adjustable Differential, 2-25 psi.

2. Start Back-up Pump, 4-150 psi control range.

2A. Adjustable Differential, 2-25 psi.

B. A pressure gauge shall be sub-panel mounted adjacent to the discharge pressure switches. The gauge and switches shall be so plumbed with the discharge header sensing line that a common blow-off valve can relieve pressure in all simultaneously for purposes of checking and calibrating the start-stop functions of the pumps.

2.25. ELECTRICAL APPARATUS - DEVICES

A. Five (5) solid state time delay relays shall be provided to perform the following functions:

1. Low Suction Timer
2. Start Control Timer Pump #1
3. Stop Control Timer Pump #1
4. Start Control Timer Pump #2
5. Stop Control Timer Pump #2

B. The solid state time delay relay shall have an adjustable time range of 10 seconds to 10 minutes. The relays shall be constructed to use a DIN rail mount socket so that the relays can be replaced without disturbing the wiring. The relay shall be complete with LED indicators for output and power.

C. Hand-Off-Automatic switches shall be oil tight, 3-position maintained and be located on the main control panel door, and control the following circuits:

1. Pump #1
2. Pump #2
3. Exhaust Fan (2-position) Run-Auto

D. Indicating lights shall be oil tight, with a full voltage pilot light and be provided:

1. Red - Low Suction Pressure
2. Green - Pump #1 in Operation
3. Green - Pump #2 in Operation

- E. Nameplates shall be furnished on all panel front mounted switches and lights.
- F. The control panel door shall include a plastic pocket on the interior to hold one (1) copy of the panel wiring diagram. The wiring diagram shall be corrected "as-built" copy and contain individual wire numbers, circuit breaker numbers, switch designations and control function explanations.
- G. One (1) duplex receptacle shall be adjacent to the main control panel. The equipment ground wire from each equipment ground post of the polarized receptacle shall be affixed at the main control panel terminal board solely designated for that purpose and separate from the neutral buss.

2.26 WIRING

- A. Rigid conduit, sized to adequately accept the inbound service conductors, and/or telemetry or telephone cables, shall be installed from the main power or control panel through the equipment enclosure and terminate in a threaded coupling exterior to the equipment enclosure. The service entrance conduit connection shall be plugged for shipment.
- B. All wiring within the equipment enclosure and outside of the control panel or panels shall be run in conduit except for the watertight flexible conduit and fittings properly used to connect pump drivers, fan motors, solenoid valves, limit switches, etc., where flexible connections are best utilized. All internal equipment conduit and wire will meet or exceed the conduit, wiring schedule and electrical codes set forth as follows:
- C. EQUIPMENT ENCLOSURE CONDUIT - Rigid, heavy wall, Schedule 40 PVC with solvent weld moisture-proof connections adequately sized to handle the type, number and size of equipment conductors to be carried - in compliance with Article 347 of the National Electrical Code and NEMA TC-2, Federal WC-1094A and UL-651 Underwriters' Laboratory Specifications.
- D. FLEXIBLE CONNECTIONS - Where flexible conduit connections are necessary the conduit used shall be liquid-tight flexible totally nonmetallic, corrosion resistant, nonconductive, U.L. listed conduit with a sunlight resistant jacket over an inner flexible core, sized to handle the type, number and size of equipment conductors to be carried - in compliance with Article 351 of the National Electrical Code.
- E. MOTOR CIRCUIT CONDUCTORS - Sized for load. All branch circuit conductors supplying a single motor of one (1) horsepower or more shall have an ampacity of not less than 125 percent of the motor full

load current rating, dual rated type THHN/THWN, as set forth in Article 310 and 430-B of the National Electrical Code, Schedule 310-13 for flame retardant, heat resistant thermoplastic, copper conductors in a nylon or equivalent outer covering.

- F. CONTROL AND ACCESSORY WIRING - Sized for load, type MTW/AWM (Machine tool wire/appliance wiring material) as set forth in Article 310 and 670 of the National Electrical Code, Schedule 310-13 and NFPA Standard 79 for flame retardant, moisture, heat and oil resistant thermoplastic, copper conductors in compliance with NMTBA and as listed by Underwriters' Laboratories (AWM), except where accessories are furnished with a manufacturer supplied UL approved rubber cord and plug.

2.27 HEATER

- A. Two (2) each.
- B. Rating - 10,239 BTU/HR - 3000 watts, 240 volt.
- C. Enclosed resistance wire within steel finned element.
- D. Control - off/heat/constant.
- E. UL listed.
- F. Vane axial fan - floor flow discharge.
- G. Hard wired in conduit per UL 400-1.

2.28 EXHAUST FAN

- A. Two (2) each installed as shown.
- B. Capacity each 232 cfm at .2 inch static pressure.
- C. Shaded pole motor - squirrel cage blower.
- D. Hard wired in conduit to conduit box on motor per UL 400-1.
- E. 120 VAC operation from HOA switch on main control panel.
- F. Exhaust fan attachment to fiberglass cover complete with rain hooded air exhaust gravity damper.
- G. Enclosure complete with louvered air, intake port located opposite and on an elevation lower than exhaust fan.
- H. Lever operated, manual shutter to be screened.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install concrete structure, piping, etc., not supplied by booster pump station supplier.
- B. Install the packaged pumping system in accordance with manufacturer's instructions.

3.02 GENERAL

- A. Verify electrical service available and coordinate service with local power company.
- B. Verify water main, inlet and outlet location.
- C. Submit and receive approval of shop drawings.
- D. Shop fabricate and have unit delivered to site.
- E. Factory representative start-up.
- F. Finish site work.

3.03 FACTORY START-UP SERVICE

- A. Start-up service technician shall be a regular employee of booster station manufacturer.
- B. As part of the submittal covering this equipment, list the factory service manager, his employee number, his telephone number with extension and his number of years with the company. List also each start-up service technician, his employee number and years of service with the company.
- C. Verify that one (1) or more of the service technicians listed above will perform the required start-up service on the equipment covered in the submittal.
- D. One (1) full day at job site for start-up and training.
- E. Start-up service to include two (2) bound O&M manuals.
- F. Start-up service report attested to by start-up technician and representative of owner or engineer.
- G. Service report distributed to:
 - 1. Manufacturer's File
 - 2. Engineer's File

- 3. Contractor's File
- 4. Owner's File

3.04 WARRANTY

- A. The warranty is the responsibility of the station manufacturer and that warranty shall be provided in written form to the contractor for inclusion with the submittal and said warranty shall at a minimum cover:
 - 1. A period of one (1) year commencing upon station acceptance by the Owner and Engineer.
 - 2. The one (1) year period shall be inviolate regardless of any component manufacturer's warranty for equipment and components within the station.
 - 3. The warranty shall cover all equipment, components and systems provided in or with the station.
 - 4. The warranty shall provide for replacement and/or repair of faulty or defective components at no cost to the owner during the warranty period.
 - 5. Where deemed necessary, the manufacturer will be responsible for the labor of removal and reinstalling the defective or faulty components without cost to the owner.
 - 6. No assumption of contingent liabilities for any component failure during warranty is made.

3.05 GENERAL LIABILITY INSURANCE

- A. The booster pump station manufacturer shall furnish premises/operations and products/completed operations general liability insurance from an insurance company with a rating of A-V according to the most recent Best's Key Rating Guide, in an amount equal to \$10,000,000 per occurrence. The insurance certificate must be included with the manufacturer's submittal. The coverage must be provided by an insurance carrier licensed and admitted in the state of manufacture.

END OF SECTION

SECTION 15150

UNDERGROUND PACKAGED PRESSURE REDUCING STATION

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The contractor shall furnish and install one (1) factory built, underground pressure reducing station, with all the necessary piping, controls and appurtenances as shown on the plans and as specified herein.

1.02 QUALIFIED MANUFACTURERS

- A. The underground pressure reducing station general design as specified and as shown on the drawings is based on equipment manufactured and supplied by Engineered Fluid, Inc. of Centralia, Illinois and as such this manufacturer is to be listed and costed into each responding contractors bid as the BASE BID ITEM. Alternate manufacturers to Engineered Fluid, Inc. are allowed as DEDUCTIVE ALTERNATES on the bid and are listed below following Engineered Fluid, Inc. All manufacturers are required to strictly adhere to the plans and specifications.

- B. The three (3) listed manufacturers are deemed to have sufficient facilities, personnel, technical expertise and a record of high quality product installations such that the selection of qualified manufacturers has been limited to these three (3).

1. Engineered Fluid, Inc., Centralia, Illinois as Base Bid, and only
2. Systecon, Inc., Cincinnati, Ohio, or
3. SyncroFlo, Inc. of Norcross, Georgia, as deductive alternates.

1.03 QUALITY ASSURANCE

- A. The equipment and materials covered by these specifications are intended to be standard equipment of proven reliability and as manufactured by reputable manufacturers having experience in the production of such equipment. The equipment furnished shall be designed, constructed, and installed in accordance with the best practices and methods and shall operate satisfactorily when installed as shown on the contract drawings and operated per manufacturer's recommendations.

- B. It is intended that the manufacturer of the specified equipment shall be a business regularly engaged in the manufacture, assembly, construction, start-up and maintenance of water distribution equipment

of the type required for this project. The manufacturer shall have at least ten (10) years of successful experience in providing stations of the type, design, function and quality as required for this project. Equipment manufactured by an outside source or "brokered equipment" defined as systems not assembled on the premises of the named manufacturer by that company's employees WILL NOT be allowed.

1.04 SUBMITTAL

- A. Equipment submittals shall be bound and in a minimum of six (6) copies. The submittals shall contain a minimum of two (2) full size drawings, size 24" x 36"; one (1) each covering the booster pump station and the electrical control schematic. The booster pump station drawing shall be specific to this project, in at least three (3) different views, be to scale and illustrate the National Electrical Code (NEC) clearances per Section 110-16 of the Code. The submittal booklets will be complete with data sheets covering all individual components that make up the booster pump station and the UL file number under which the manufacturer is listed, service department personnel statement as detailed in the specifications and be complete with the manufacturer's formal warranty policy.
- B. Two (2) submittal reviews of this item will be accomplished at no cost to the submitting contractor. However, all subsequent reviews will be charged to the submitting contractor at the design engineer's standard hourly billing rate.

PART 2 PRODUCTS

2.01 EQUIPMENT CAPSULE

- A. The plate steel employed throughout the capsule shall be 1/4" minimum thickness and meet or exceed the requirements for ASTM - 283, Grade D. The structurals shall meet or exceed the requirements for A-36. Field welding to complete the capsule or attach the entrance hatch will not be allowed.
- B. The plate forming the top and bottom of the capsule shall be cold formed prior to assembly so as to form a lap joint with the side wall. The lap joint shall be continuously welded on the interior by hand and the exterior by machine to form an airtight seal. The lower side wall continuous weld shall be an average 1 1/2 inches above the capsule floor, which removes the lower weld from incidental water impingement. Capsules without lap joints will not be accepted.
- C. The lap joint shall be in full conformance with Steel Tank Institute (STI) P-3 specifications Section 4.2.6 and Underwriters Laboratories (UL) 58 specifications for steel vessels in buried service, and the American Welding Society (AWS) Structural Welding Code, Section 9.10, for dynamically loaded structures.

- D. Any ferrous metal device passing through the capsule wall shall be welded fully along its circumference or length on both sides of the capsule wall.
- E. Non-ferrous, PVC, fusion bonded, or ductile iron piping passing through the capsule wall shall be housed in a suitable ferrous metal wall sleeve. Each wall sleeve shall be complete with two (2) each link seal type compression joints, each segment of each joint shall be individually adjustable from within the capsule when in place.
- F. The capsule shall be a rolled, vertical cylinder and have an outside diameter of 5 feet 6 inches and an inside clear height of 5 feet 1 inches.
- G. The bottom of the capsule shall be reinforced by two (2) C3x4.1 channels in parallel. There shall also be two (2) C3x4.1 channels in parallel, placed perpendicularly to the C3x4.1 channels. The top of the capsule shall be reinforced by 4 inch by 4 inch by 1/4 inch angles.
- H. Four (4) lifting plates of 3/8 inch minimum thickness shall be placed about the perimeter of the capsule to facilitate the lifting and handling of the station. Interior lifting eyes shall be placed over each piece of equipment in excess of 60 pounds in weight.
- I. The entrance manway shall be Bilco Model MS-50, or equal, roof scuttle, with a minimum clear inside opening of thirty (30) inches by thirty-six (36) inches. The scuttle cover shall be made of 11 gauge aluminum on the exterior. The scuttle cover shall be insulated with a minimum of one (1) inch of fiberglass insulation, covered and protected by an 18 gauge aluminum liner.
- J. The entry lock shall be flush mounted, in the scuttle riser, in position to be protected from the elements by the cover skirt as detailed on Bilco Drawing 6184. The lock shall be of the pin tumbler type, dead bolt, with an inside safety release. Two (2) keys shall be provided, on a key ring complete with the manufacturer's identification. No locking devices or other penetrations of the cover shall be allowed. Locks for all packaged units shall be masterkeyed such that one (1) key will fit all units.
- K. An all aluminum access ladder shall be provided. The ladder shall meet UL approval and OSHA qualifications under the Type I, Heavy Duty Specifications. The ladder shall have 1-1/4" diameter, tempered, serrated rungs with 3" by 1-1/8" full I-Beam side rails. The uppermost ends of the side rails shall be protected by plastic caps bolted into place. The complete access ladder shall be bolted into place, at a minimum of two (2) points both top and bottom, so as to be easily removable to facilitate equipment maintenance.

- L. The capsule shall be complete with a sump. The sump shall be a minimum of eighteen (18) inches diameter by eight (8) inches deep. The sump shall be provided with a four (4) inch plugged outlet for gravity outflow as required.
- M. The capsule walkway areas (that space from the entrance ladder to the control panel and the entire NEC clearance area) shall be covered with a Nyracord industrial safety matting. The mat shall be a heavy duty, ½ inch minimum thickness Nyracord compound (rubber blend with fiber reinforcement) of open slot design with a ribbed safety pattern (ribbed in two directions) to promote sure footing. The underside of the safety mat shall also be ribbed (in one direction only) to permit aeration and drainage. The safety mat shall not be glued to the floor surface.

2.02 CORROSION PROTECTION

- A. All surfaces of the entire structure shall be sandblasted equal to commercial blast cleaning (SSPC-SP6).
- B. The protective coating shall take place immediately after surface preparation. The protective coating shall be Tnemec Series 66 Hi-Build Epoxoline two (2) component, high solids, amide-cured epoxy system formulated for high build application having excellent chemical and corrosion resistant properties. The epoxy system shall be self priming and require no intermediate coatings. The protective coating shall provide in two (2) applications a total dry mil thickness of 8.0 mils.
- C. The station manufacturer shall furnish two (2) seventeen pound packaged magnesium anodes for cathodic protection. The anodes shall be buried equally spaced around the station and connected by heavy copper wire to lugs on the station provided for that purpose.

2.03 PIPING

- A. All internal transmission piping shall be steel and conform to ASTM A-53(CW) for nominal pipe size 4 inch and smaller and ASTM A-53(ERW) Grade B for nominal pipe size 5 inch and larger. Butt welded fittings shall conform to ASTM A-106. Forged steel flanges shall conform to ASTM A-181, Grade 1 and ASA B16.5.
- B. The piping sizes shall be as shown on the drawing.

Size 10 inch and below - Schedule 40
Size 12 inch and above - Standard weight (.375" wall)
- C. All pipe welds shall be performed by certified welders employed by the station manufacturer. As part of the equipment submittal, the pump

station manufacturer shall provide copies of the welding certificates of the employees who are to perform the pipe welds.

- D. All piping surfaces shall be prepared by sandblasting, or other abrasive blasting, prior to any welds taking place. Piping of 5" diameter and smaller may be cut by saw. Piping of 6" diameter and larger shall be bevel cut, and Oxyfuel or Plasma-arc cutting techniques shall be used to assure and facilitate bevel pipe cuts. No saw cuts or other form of abrasive cut-offs are allowed on 6" and larger diameter pipe.
- E. In all cases, short circuit transfer, spray transfer or pulse-arc transfer modes of the gas metal arc welding process shall be applied semi-automatically. When utilizing the short circuit mode, shielding gas consisting of 50% carbon dioxide and 50% argon gas shall be used. When utilizing the spray or pulse-arc transfer modes, a shielding gas consisting of 5% carbon dioxide and 95% argon shall be used. In all cases, welding wire with a minimum tensile strength of 70,000 psi shall be employed. All flange welds and butt welds of equal size pipe shall be a single continuous nonstop weld around the complete circumference of the pipe. Whenever possible, vertical up weld passes will be applied to all pipe welds. No vertical down weld passes will be allowed. Completed welding assemblies shall create no internal obstruction, restriction or create any unintended sources of water deflection.
- F. Piping of six (6) inch diameter and larger shall require a minimum of two (2) weld passes to complete each weld. The first pass, or root pass, shall be applied at the bottom of the bevel cut using the short circuit transfer welding mode, and the second pass, or cap pass, shall be applied over the root pass using the spray or pulse arc transfer welding modes to insure that at a minimum the total weld thickness shall be equal to thinnest of the two pieces being welded together.

2.04 PIPE SUPPORTS

A. Pipe supports by minimum sizing for:

- 4" and smaller piping shall be 2" x 2" x 3/16" wall rectangular tubing;
- 6" through 12" piping shall be 3" x 3" x 1/4" wall rectangular tubing;
- 14" through 24" piping shall be 4" x 4" x 1/4" wall rectangular tubing and, also;
- 6" and larger piping shall be provided with "kick" bracing projecting fully from the underside of the pipe to the floor at an angle of no less than 15° from vertical out at a right angle to the

run of the pipe being supported. These "kick" braces shall be in addition to the vertical pipe supports called out above.

- B. Pipe supports are to be fully welded at both end points to the pipe and steel floor where required.
- C. Simple pipe stands made of pipe welded only at the floor and upholding a yoke or bracket with or without a threaded jack bolt or a U-bolt are not acceptable, as no lateral or transverse support is provided.

2.05 SERVICE CONNECTIONS ON INTERNAL PIPING

- A. All plumbed devices within the station eventually requiring service, such as meters, control valves, pumps and like equipment, shall be easily removed from the piping by the presence of appropriately placed and sufficient quantity of adapters and couplings as shown on the drawings; no less than the quantity of couplings and adapters shown shall be allowed.

2.06 RESTRAINING POINTS

- A. The main inlet and outlet piping to the station shall each be provided with two (2) or four (4) restraining points as welded on "eyes" or similar device welded to the capsule or framing to facilitate the attachment of joint restraint tie rods or other device to be used in retarding any pipe movement at the connections.

2.07 COMPRESSION COUPLINGS

- A. The pressure reducing station piping shall include a compression type, flexible coupling to prevent binding and facilitate removal of associated equipment where shown on the plans for this item. In lieu of a compression coupling, a Uni-Flange or a flanged coupling adapter (FCA) may be used.
- B. All compression couplings, Uni-Flanges, flanged coupling adapters (FCA), and flexible connectors/expansion joints shall include a minimum of two (2) control joint rods with gusset plates.

2.08 COMBINATION PRESSURE GAUGES

- A. Combination pressure gauges shall be glycerine filled with a built-in pressure snubber and have 4-1/2 inch minimum diameter faces and be turret style, black phenolic case with clear glass face. The movement shall be rotary, of 400 Series stainless steel with Teflon coated pinion gear and segment. The gauge shall be bottom connected and accept a 1/4" NPT female thread. Combination pressure gauge range and scale graduations shall be in psi and feet of water as follows:

INLET PRESSURE - 0 to 400 psi, 50 psi figure intervals, with graduating marks every 5 psi (0-920 feet).

INTERMEDIATE PRESSURE - 0 to 200 psi, 20 psi figure intervals, with graduating marks every 2 psi (0-460 feet).

OUTLET PRESSURE - 0 to 100 psi, 10 psi figure intervals, with graduating marks every 1 psi (0-230 feet).

- B. Lower pressure gauges may be used when plans indicate a lower maximum pressure.
- C. All gauges shall be panel mounted off the pipeline and be flexible connected to their respective sensing point. The gauge trim tubing shall be complete with both isolating and vent valves and the tubing shall be so arranged as to easily vent air and facilitate gauge removal. Gauges mounted directly to the pipeline or at the sensing point will not be accepted.

MANUFACTURER - Ashcroft Model 1279ASL, or equal.

2.09 SAMPLE TAP

- A. A single, right angle outlet, smooth nose, brass sample tap shall be affixed to the manual vent ball valve for the low suction lockout and suction pressure gauge assembly.

2.10 BALL VALVES

- A. Isolating valves where shown and as sized on the plan sheet covering this item shall be ball valves meeting or exceeding ASTM Spec B124 No. C37700. The ball valves will be 2-piece forged brass body, blow out proof stem, TFE seats, TFE packing with adjustable stem packing gland. The valves will be NPT threaded pattern complete with lever operators. Maximum working pressure shall be 600 psi.

2.11 BUTTERFLY VALVES

- A. The isolating valve on the outlet side of the 3" pressure reducing valve shall be wafer style and meet ANSI Class 125/150 flange standards. Metal reinforced dovetail seat shall ensure drop tight, bi-directional shutoff and shall be field replaceable. The stem shall be one piece. The disc and stem shall provide positive engagement. The valve shall have upper and lower RTFE inboard stem bearings, isolated from the line media, and a heavy-duty upper stem bushing.
- B. The valve body shall be cast iron; aluminum bronze disc; stainless steel stem; EPDM seat; acetal upper stem bushing; BUNA-N V-cup stem seal.

- C. Valve sized six (6) inches and smaller shall be equipped with lever operator and 10 degree increment throttling plate. Valve sized eight (8) inches and larger shall be equipped with a weather-proof, heavy-duty, gear operator complete with a position indicator.

2.12 BUTTERFLY VALVE

- A. The isolating valve shown on the inlet side of the 3" pressure reducing valve shall be of the wafer design. The body of the isolating valve shall be constructed of carbon steel and be equipped with a minimum of four (4) alignment holes with which to pass mating flange studs so as to assure proper butterfly alignment within the piping system. The valve disc will be constructed of 316 stainless steel and be machined to close tolerances on both the flats and O.D. to assure drop tight shut off and reduce operating torque. The valve stems will be constructed of 17-4 PH stainless steel and the bearing material shall be glass backed TFE. The disc will be affixed to the shaft by a pair of wedge pins. The valve seat will be TFE designed to be easily field replaceable. The valve shall be 150 ANSI Class, rated at 285 psi working pressure.
- B. Valve sized six (6) inches and smaller shall be equipped with lever operator and 10 degree increment throttling plate. Valve sized eight (8) inches and larger shall be equipped with a weather-proof, heavy duty, gear operator complete with a position indicator.

The valve shall be a Flowseal Model 1WA, or equal.

2.13 PRIMARY PRESSURE REDUCING VALVES

- A. The water pressure reducing valve shall be a pilot controlled, hydraulically operated, diaphragm actuated, globe pattern valve. The valve in operation shall function to maintain a constant downstream pressure regardless of varying inlet head. The main valve shall be single seated and have a removable seat insert. The disc shall contain a replaceable, resilient rubber seat that will guarantee drop tight shut off when closed against the seat insert. The main valve shall be cast iron with bronze trim, faced, flanged and drilled to conform to 125 ANSI standards. Where maximum inlet pressure exceeds 150 pounds, the valve shall be flanged to meet ANSI Class 250 and have a maximum pressure rating of 400 psi.
- B. The control pilot shall be a direct acting, adjustable, spring-loaded normally open diaphragm valve designed to permit main valve opening when the reduced outlet pressure is less than the pilot set point. The control pilot shall be bronze with stainless steel trim. At a 50 psi set point, the control pilot shall be easily adjustable 25 psi above or below the set point. The control pilot piping shall contain a closing speed control.

THE CONTROL VALVE SHALL BE A CLA-VAL MODEL 90G-01ABCS, OR EQUAL.

2.14 SECONDARY PRESSURE REDUCING VALVES

- A. The water pressure reducing valve shall be a direct acting, hydraulically operated, diaphragm actuated, valve with threaded connections. The valve in operation shall function to maintain a constant downstream pressure regardless of varying inlet head. The valve shall be bronze body construction with renewable stainless steel seat. Disc holder shall be removable for replacement of disc without dismantling the valve - no special tools required.
- B. Valve shall be manufactured by Cla-Valve Model 990.
- C. Two (2) pressure reducing valves shall be provided in series to prevent cavitation when indicated on the plans.

2.15 PRESSURE TESTING

- A. When the station plumbing is completed, the pressure piping within the station, including valves, pumps, control valves, fittings, connections as make up the entire system shall be hydrostatically tested at a pressure of 100 psi or a pressure equal to the lowest test pressure rating of the equipment within the tested system, whichever is greater pressure. The test pressure shall be applied for a minimum of 20 minutes, during which time all joints, connections and seams shall be checked for leaking. Any deficiencies found shall be repaired and the system shall be retested.
- B. The results of this testing shall be transmitted in writing to the Engineer prior to shipment of the station and shall note test pressure, time at full pressure and be signed by the Quality Control Manager or test technician.

2.16 FACTORY START-UP SERVICE

- A. Start-up service technician shall be a regular employee of booster station manufacturer.
- B. As part of the submittal covering this equipment, list the 2 factory service manager, his employee number, his telephone number with extension and his number of years with the company. List also each start-up service technician, his employee number and years of service with the company.
- C. Verify that one (1) or more of the service technicians listed above will perform the required start-up service on the equipment covered in the submittal.

- D. One (1) full day at job site for start-up and training.
- E. Start-up service to include two (2) bound O&M manuals.
- F. Start-up service report attested to by start-up technician and representative of owner or engineer.
- G. Service report distributed to:
 - 1. Manufacturer's File
 - 2. Engineer's File
 - 3. Contractor's File
 - 4. Owner's File

2.17 WARRANTY

- A. The warranty is the responsibility of the station manufacturer and that warranty shall be provided in written form to the contractor for inclusion with the submittal and said warranty shall at a minimum cover:
 - 1. A period of one (1) year commencing upon station acceptance by the Owner and Engineer.
 - 2. The one (1) year period shall be inviolate regardless of any component manufacturer's warranty for equipment and components within the station.
 - 3. The warranty shall cover all equipment, components and systems provided in or with the station.
 - 4. The warranty shall provide for replacement and/or repair of faulty or defective components at no cost to the owner during the warranty period.
 - 5. Where deemed necessary, the manufacturer will be responsible for the labor of removal and reinstalling the defective or faulty components without cost to the owner.
 - 6. No assumption of contingent liabilities for any component failure during warranty is made.

PART 3 EXECUTION

3.01 GENERAL

- A. Submit and receive approval of shop drawings.
- B. Shop fabricate and have unit delivered to site.
- C. Excavate opening, install concrete base.

- D. Connect water mains.
- E. Connect electrical.
- F. Backfill.
- G. Factory representative start-up.
- H. Finish site work.

END OF SECTION

SECTION 15176

WATER STORAGE TANKS

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Work under this Division includes furnishing and installing, on concrete foundations, any and all metal water storage tanks complete with all appurtenances, ready for service, as set out in the proposal and contract forms and as indicated herein.
- B. Bids shall be taken on steel water storage tank(s) meeting these specifications and in accordance with AWWA D100 for welded steel tanks for water storage.
- C. The structures are to be constructed to withstand safely the following loads and forces acting separately or in combinations:
 - 1. Weight of the structure.
 - 2. Weight of the water in the tank.
 - 3. Wind stresses incurred by a hurricane blowing at a rate of one hundred (100) miles per hour from any direction.
 - 4. Anchor bolts shall be designed to resist the uplift caused by 150 mph winds.
 - 5. The members shall be capable of transmitting safely loads for which said members are proportioned. The design shall conform to the standard specifications of the American Water Works Association covering steel water tanks.

1.02 SUBMITTALS

- A. Provide shop drawings in accordance with Section 01340.

1.03 RELATED WORK

- A. Division 1 - General Requirements
- B. Division 2 - Site Work
- C. Division 3 - Concrete
- D. Division 15 - Mechanical

E. Division 16 - Electrical

1.04 QUALITY OF WORKMANSHIP

- A. Shop and erection workmanship will conform to the standards of the American Water Works Association.
- B. All shop fabrication shall be accurate as to the forming of members and shop assembled items also as to joint preparation to assure proper field assembly.
- C. Welding procedures and welding operators shall conform to the American Welding Society's Standards.

1.05 FOUNDATION FOR TANKS

- A. General Requirements: In order that the tank and foundations be completely coordinated, and to provide for undivided responsibility of the entire installation, the foundations for the tanks shall be provided as a part of the tank contract.
- B. Foundation Analysis: Before proceeding with the design and construction of the concrete foundations, the Contractor shall have a foundation engineering analysis made by an independent qualified soils testing laboratory to determine the safe maximum bearing capacity of the soil at the site of the proposed tank(s). A copy of the engineering analysis shall be furnished to the Architect/Engineer.

The lump sum price for each proposal item shall be based upon the number of yards of concrete necessary to support the Contractor's tank based on a maximum soil bearing value of 4,000 pounds per square foot at a depth of 4'-6" . Should the bearing value be less than 4,000 pounds per square foot, the Contractor shall submit such evidence to the Engineer and Owner and request a change in the foundations based upon the allowable bearing value.

- C. Concrete Foundations: Within thirty (30) days after the notice to proceed, the Contractor shall furnish to the Engineer, six (6) copies of certified detail dimension drawings of the footings and center pier required to safely and adequately support the tanks, based on the soil conditions encountered. Two (2) sets of the design calculations shall be submitted to the Architect/Engineer.

Anchor bolts shall be of adequate size and weight to serve the purpose intended and shall be provided with generous hooks or other suitable anchorage at the lower end in accordance with the design and shown on the plans.

The concrete foundations shall be adequate and satisfactory to serve the purpose intended. The work includes all excavations, sheeting and shoring, dewatering, removal and disposal of excess excavated materials, backfill, compaction, clearing of site, the providing of concrete, reinforcing steel, forms, setting of anchor bolts, grouting, rough grading area around foundations and clean up.

Excavation and backfill shall conform to the applicable requirements for excavation and backfill as set out in the specifications.

The bottoms of the excavations shall be trimmed by hand and special care taken to avoid cutting below grade. Any unauthorized excavation below grade shall be refilled with concrete.

1.06 PAINTING

- A. Upon completion of erection, the tank(s) shall be painted in accordance with Section 09901 of these Construction Specifications.

1.07 DISINFECTION AND TESTING

- A. After painting has been completed and approved, the interior of the tank shall be disinfected in accordance with Method 2 or Method 3 of the AWWA Specifications C652. Interior paint must be properly cured such that the coating does not transfer substances which are toxic.
- B. After the tank is filled, any leaks or other defects which may appear shall be repaired so as to have the tank in absolute first class condition.
- C. Before the storage facility is placed in service, water from the full facility shall be sampled and tested for coliform organisms in accordance with the latest edition of Standard Methods for the Examination of Water and Wastewater. The testing shall be either the multiple tube fermentation techniques or the membrane filter technique.

If the above sample is negative, then the storage facility may be placed in service. If the above sample shows the presence of coliform bacteria, then repeat samples shall be taken until two (2) consecutive samples are negative or the storage facility shall again be subjected to disinfection.

The above disinfection and testing shall be at the expense of the Contractor.

The Owner will supply water to initially fill the water storage facility. If additional water is required, the Owner will charge the Contractor for such water at the present lowest wholesale rate.

1.08 SITE WORK AND ACCESS ROADS

- A. In general, site work is defined as clearing, providing access to, rough and finish grading to provide proper drainage to areas for the installation of a storage tank.

Site work for the storage installations shall be provided as defined above and as indicated on the drawings at the site location. Rough grading and access roads shall be sufficient to provide ample room for moving in equipment and a level area around the tank foundations to permit construction work. (See drawings for required ground elevations at these sites.)

The Owner shall be responsible for obtaining any additional access road easements necessary for access to the tanks.

The Contractor shall clean up and remove from site all debris, excavated materials, waste, etc., perform finish grading, seed and protect all disturbed areas after tank completion and shall assure surface water drainage will flow away from tank and foundation.

PART 2 PRODUCTS

2.01 STEEL TANK(S)

- A. Except as noted herein, all materials in the structure shall be in accordance with the current A7 specifications of the American Society of Testing Materials except for minor parts.

Modifications as allowed in the above specifications will be permitted.

The tanks shall be of welded construction with all water bearing members having plate thicknesses not less than 1/4", and shall rest on concrete foundations as detailed by the manufacturer and approved by the Architect/Engineer.

A steel ladder shall extend from the roof entrance manhole down the tank to within 10 feet of the ground. All interior ladders shall extend to grade.

A roof hatch or manhole shall be provided near the ladder to permit easy access to the inside of the tanks. The roof hatch or manway cover shall be provided with heavy duty locking device and duplicate keys.

Suitable overflow shall be as indicated on the drawings and 4 mesh stainless steel screen shall be provided.

An additional hatch or flanged vent, having a minimum opening dimension or diameter of 24 inches and a neck of 4 inches minimum height, shall be provided at, or near, the center of the tank. The vent shall contain a four mesh stainless steel screen. The additional opening shall be so constructed that an exhaust fan may be bolted to the hatch if required for ventilation during painting. The flange shall be drilled with at least four 13/16 inch diameter holes on a 30-1/4 inch diameter bolt circle. This flange may also be used for the attachment of exterior painting scaffolding.

All riser pipes in elevated tanks over 8 inches in diameter shall have protective bars over the inlet for personnel safety protection. Railings or hand holds shall be provided in elevated tanks where personnel must transfer from the access tube to the water compartment. The riser and/or discharge pipe shall be constructed to prevent the flow of sediment into the distribution system. Constructed silt stops shall be removable.

Appropriate sampling taps shall be provided to permit collection of water samples for bacteriological and chemical analysis.

- B. Ladder and safety device shall conform with the Williams and Steiger Occupational Safety Act. Safety device shall be similar to Saf-T-Rail or Engineer approved alternate. (Two (2) Body Harnesses required.) Cable type safety device will not be considered as an equal.
- C. Where required as indicated on plans, the outside ladder on all tanks shall be closed with a steel safety cage from the bottom of the ladder to above the balcony railing and allow easy access onto the balcony. This shall be constructed of steel strapping not less than 3/16" thick.
- D. All welded joints on the tank interior including the underside of roof lap joints and structural framing shall be seal welded.

2.02 CONCRETE FOUNDATIONS

- A. As per Division 3 - Concrete.

PART 3 EXECUTION

3.01 GENERAL

- A. Design foundation and tank.
- B. Submit and receive approval of design and shop drawings.
- C. Shop fabricate steel.

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- D. Excavate for and construct concrete foundations.
- E. Erect steel structure.
- F. Clean and paint tank.
- G. Disinfect, fill and receive satisfactory bacteriological test.
- H. Place tank in service.
- I. Finish site work.

END OF SECTION

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FOR
CARROLL COUNTY WATER DISTRICT NO. 1
CARROLLTON, KENTUCKY

- DIVISION A-1 - Water Main Extensions
- DIVISION A-2 - Water Main Extensions, Booster Stations,
Main MPRV's, Master Meters and Telemetry
- DIVISION B - Standpipe Water Storage Tank and
Related Work

CONSTRUCTION SPECIFICATIONS

I N D E X

SECTION

DIVISION 16 - ELECTRICAL

- 16010 Electrical Special Conditions
- 16025 Codes, Permits, Inspections, Fees
- 16100 Basic Scheduled Materials
- 16111 Conduit
- 16120 Conductors, 600 volt or less
- 16131 Boxes
- 16140 Wiring Devices
- 16180 Overcurrent Protective Devices
- 16190 Supporting Devices
- 16421 Utility Service Entrance
- 16450 Grounding
- 16900 Supervisory Control and Data Acquisition (SCADA) System

SECTION 16010.

ELECTRICAL SPECIAL CONDITIONS

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

- A. General Conditions
- B. General Requirements - Division 1
- C. Electrical Specifications - Division 16

1.02 DESCRIPTION

- A. The Electrical Special Conditions are in addition to the General Conditions and General Requirement, and shall be an extension of these sections of the Specifications.
- B. The Electrical Special Conditions apply to all electrical materials, equipment, installations and services supplied under any portion of the Work.
- C. The Contractor shall coordinate the Electrical Special Conditions as applicable to any equipment, installations, and services of an electrical nature.

1.03 GENERAL REQUIREMENTS

- A. It is the intent of these Specifications and Drawings to provide an electrical installation of consistent quality, of uniform standards of installation and to have various portions of the Project compatible in design and execution to all other portions of the Work.

1.04 ELECTRIC SERVICES

- A. The Contractor shall coordinate with the electric utility for the electrical service to the facilities.

1.05 CODES AND STANDARDS

- A. All materials and workmanship shall comply with all applicable codes, specifications, local ordinances, industry standards and utility company regulations.
- B. These code requirements are to be considered minimum and are to be exceeded when so indicated on the Drawings and the Specifications.

- C. In case of difference between building codes, specifications, state laws and federal laws, local ordinances, industry standards and utility company regulations and the Drawings and Specifications, the most stringent shall govern. The Contractor shall promptly make required modifications.
- D. Non-Compliance: Should the Contractor perform any work that does not comply with the requirements of the applicable building codes, state and federal laws, local ordinances, industry standards, plans and specifications, and utility company regulations, he shall bear all costs in correcting all deficiencies.
- E. Applicable Codes and Standards shall include all the state laws, local ordinances, utility company regulations and the applicable requirements of the following nationally accepted codes and standards.
- F. Building Codes: Indiana Building Code, National Electric Code, National Electrical Safety Code.
- G. Industry Standards, Codes and Specifications:
 - 1. IEE - Institute of Electric and Electronic Engineers
 - 2. ASA - American Standards Association
 - 3. ASTM - American Society of Testing Materials
 - 4. ICEA - Insulated Cable Engineers Association
 - 5. NBS - National Bureau of Standards
 - 6. NEMA - National Electrical Manufacturers Association
 - 7. NFPA - National Fire Protection Association
 - 8. UL - Underwriters Laboratories
 - 9. NECA - Standard of Installation

1.06 SUBMITTALS

- A. Submit shop drawings for all equipment specified in conformance with Section 01340. The submittal must include a written statement of exceptions and deviations from these specifications.
- B. Shop drawings shall include complete data including physical dimensions and other information required for installation, performance capabilities and limitations, equipment wiring diagrams complete with sequence of operation, and schedules indicating locations when more than one type of an item is to be used. All shop drawings must be certified as being correct for the proposed work.
- C. Shop drawings, brochures or catalog cuts showing more than one size or model shall be marked to indicate the size or model proposed for the particular application.

- D. Prior to submittal, shop drawings shall be coordinated with the work of all other trades.
- E. Shop drawings shall be identified as to the specific equipment for which the shop drawing relates. Identification shall be by reference to the appropriate Article of the Specifications in which the equipment is specified.

1.07 INSTRUCTION MANUALS

- A. Two sets of Instruction Manuals shall be furnished to the Engineer prior to acceptance with each set to include the following:
 - 1. Manufacturer's parts list identified with the make, model and serial number of the equipment furnished.
 - 2. Schematic control, and wiring diagrams identifying the location and function of all system components and controls.
 - 3. Installation, operation, lubrication and maintenance instructions.
 - 4. Manufacturer's recommended spare parts list.
 - 5. Test data and performance curves where applicable.
- B. Instruction manuals shall be loose leaf binders.
- C. All materials larger than 8-1/2 inches by 11 inches shall be neatly folded to the specified size in a manner which will permit easy unfolding without removal from the binder.
- D. All materials shall be neatly punched before insertion into the binder and all binding holes shall be reinforced.
- E. Use dividers between each category of equipment.
- F. Provide a typewritten Table of Contents for each binder.

1.08 WORK VERIFICATION AND FIELD MEASUREMENTS

- A. All dimensions and clearances affecting the installation of work shall be verified in the field in relation to established datum, to building openings and to the work of other trades.
- B. Location of all equipment and systems shall be coordinated to preclude interferences with other construction.
- C. Should interferences occur which will necessitate deviations from layout or dimensions shown on the Drawings, the Engineer shall be notified and any changes approved before proceeding with the work.

1.09 RECORD DRAWINGS

- A. A record shall be kept of all deviations in location or elevation of any underground or concealed installation from that shown on the Contract Drawings. Records shall consist of marked shop or Contract Drawings and shall be submitted to the Engineer at any time upon request during or after completion of construction. No such deviations from the Contract Drawings or approved shop drawings shall be made without prior approval by the Engineer.

1.10 ACCESSIBILITY

- A. A record shall be kept of all deviations in location or elevation of any underground or concealed installation from that shown on the Contract Drawings. Records shall consist of marked shop drawings or Contract Drawings and shall be submitted to the Engineer at any time upon request during or after completion of construction. No such deviations from the Contract Drawings or approved shop drawings shall be made without prior approval by the Engineer.

1.11 WARRANTIES AND GUARANTEES

- A. All warranties and guarantees shall be as specified in Division 1 except as modified by more stringent requirements in the individual specification sections.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.01 FASTENING TO BUILDING STRUCTURES

- A. The methods of attaching or fastening equipment or equipment supports or hangers to the building structure shall be subject to approval by the Engineer at all times. Submit shop drawings or samples for approval before proceeding with the work.
- B. Cutting, burning, drilling, welding or the use of explosive driven fasteners on building structures shall require prior approval by the Engineer for each type of application unless specifically shown on the Drawings.

3.02 MISCELLANEOUS WORK

- A. Excavation and backfilling for electrical work shall be the responsibility of the Contractor and shall meet the requirements of Division 2: Sitework.
- B. Contractor shall provide all roof openings and flashing required by the electrical work.

1. Unless otherwise detailed on the Drawings, all conduits through roofs shall be installed using pitch pockets and counterflashing.
- C. The Contractor shall provide all pads, bases and anchors required to complete the electrical work. The General Contractor will provide concrete bases as shown on the drawings.
- D. The Contractor shall provide all platforms and supporting stands for electrical equipment required to complete his work.
 1. Each piece of equipment or apparatus suspended from ceiling or mounted above floor level shall be provided with suitable structural support, platform or carrier in accordance with the best recognized practice.
 2. The Contractor shall exercise extreme care that structural members of the building are not overloaded by such equipment. In all cases, details of such hangers, platforms and supports, together with the total weights of mounted equipment shall be reviewed by the Engineer.
- E. Cutting and patching of new structures required for electrical work shall be provided as required. Such work shall be the responsibility of the Contractor, however, the work must be performed by workmen skilled in the appropriate trade.
- F. Ceiling and wall access panels for electrical equipment shall be provided by the Contractor where shown or required for access to the electrical equipment.
- G. Holes Thru Structural Members, Slabs and Walls: Holes required for conduit of size 5" or smaller shall be sleeved. The Engineer shall be notified prior to any cutting.

3.03 SERVICE TIE CONNECTIONS

- A. Contractor shall check and verify all voltage and phasing of service tie connections at switchboards.
- B. Phasing to be maintained shall be A.B.C. top to bottom, east to west and north to south in all cases.

3.04 ELECTRICAL CONNECTIONS TO EQUIPMENT

- A. Contractor shall provide all connections to mechanical equipment supplied under various sections of these Specifications and shown in Drawings.
- B. All equipment shall be wired complete in each detail, including all interlocks, safety switches, control devices, starters and

disconnects. Control wiring for equipment and interfacing may not be shown on drawings. Control wiring and conduits shall be furnished as required by equipment and control manufacturers to provide an operating system.

- C. Drawings include equipment as anticipated to be furnished; however, in case other makes, etc., are furnished than shown, the furnished equipment shall be wired completely as required at no additional cost to the Owner. Any additional cost shall be borne by the Contractor furnishing the equipment.
- D. All connections and wiring diagrams where shown on the Drawings are for bidding purposes only and the Contractor shall obtain final wiring diagrams from the Contractor furnishing the equipment. Diagrams as supplied shall be specifically for this Project and connected as shown on final diagrams at no additional cost.
- E. Motor sizes where shown on the Drawings are for bidding purposes only and the Contractor shall verify all motor sizes prior to wiring. Contractor furnishing the equipment shall furnish proper starters for the equipment as furnished at no additional cost to the Owner.
- F. Conduits and wires where shown on the Drawings are for bidding purposes. Contractor shall verify all wire sizes, number of wires required and supply the proper number to each piece of equipment before installation. Current carrying conductors are shown on drawings. Contractor to provide neutral and grounding conductors as required by code.

3.05 NAMEPLATES

- A. All equipment shall have factory applied permanent nameplates indicating the manufacturer's name model and serial numbers, voltage, current, phase and any other data necessary to conform with specified requirements.
- B. In addition to the factory applied nameplate, the Contractor shall furnish and install identification plates on the exterior of all panels, motor starters, push-button stations, etc.. to identify use, i.e., "Panel A", EF #4, etc. Identification plates shall be laminated phenolic engraving stock a minimum of 1/16 inch thick, white background black letters. Letters shall be no smaller than 1/4 inch high. Identification plates shall be attached with drive pins or rivets.

3.06 PAINTING AND FINISHING

- A. All purchased equipment shall have a factory applied standard finish of the manufacturer's standard color unless otherwise specified.

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- B. Equipment which will be subject to abnormal conditions of high temperature, corrosive environment, etc., shall have finishes and/or protective coatings suitable for the service as noted on the Drawings and/or in the Specifications.
- C. Finishes which are marred during shipping, handling, or installation shall be touched up to match original finish. Satisfactory to the Engineer or the unit shall be completely repainted.
- D. Field fabricated bare iron or steel items required in installation of this work under this Division shall have rough or shape edge removed, be thoroughly cleaned of dirt, rust, weld slag, grease or oil and be painted.

END OF SECTION

SECTION 16025

CODES, PERMITS, INSPECTIONS, FEES

PART 1 GENERAL

1.01 CODES

- A. All work shall be installed in strict accordance with the latest edition and supplements of the National Electrical Code, as a minimum requirement, increased as noted in the Contract Documents, and as adopted by the State of Kentucky.
- B. In instances where government bodies or Utility Companies have jurisdiction, all work shall be installed in approved manner at no additional cost to the Owner.

Governing regulations shall include applicable portions of the Occupational Safety and Health Act.

1.02 PERMITS

- A. Obtain and pay for all necessary permits of governing bodies.

1.03 UNDERWRITERS LABEL

- A. All materials provided under this contract shall bear the U.L. label where available to the specific items.
- B. Where modifications to equipment prevent the inclusion of the U.L. label at the factory, the Designer shall be notified in writing before fabrication and such equipment shall be provided with labeled components and furnished in separate enclosure connected to the labeled device in order to provide the label.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

SECTION 16100

BASIC SCHEDULED MATERIALS

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

- A. Electrical Special Conditions: Division 16
- B. The Contractor shall examine all sections of these Specifications for work relating to this Section.

1.02 DESCRIPTION

- A. The work required under this Section includes basic electrical materials common to all electrical systems in the Work.

1.03 CONTRACT DOCUMENTS

- A. All basic scheduled electrical materials shall be new, in original cartons or bundles and shall have UL label whenever applicable.
- B. The Contractor shall provide proper storage facilities to protect all materials in order that all materials be in new, unused condition when finally installed. Electric heater shall be provided in all cases where recommended by the manufacturer or by the Engineer. Weather protective covers or enclosures shall be provided by good practice or as requested by the Engineer.
- C. Installation shall be in accordance with NECA Installation Standards, and the Contract Documents.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

SECTION 16111

CONDUIT

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 16010: Electrical Special Conditions
- B. Section 16100: Basic Scheduled Materials

1.02 DESCRIPTION

- A. The work required under this Section includes, but is not limited to, the provision, fabrication and installation of all conduit required for this work.
- B. This Section covers all conduit to be used on the various portions of the Work and the Electrical Contractor shall meet the requirements of these Specifications where ever possible.

1.03 CONTRACT REQUIREMENTS

- A. All electrical work for all voltages, communications, instrumentation and controls shall be installed in a continuous conduit system unless specifically indicated otherwise on the Contract Documents.
- B. All conduits not used by this Contract shall have a #12 TW aluminum pull wire installed and securely tied off at each end for future pull wire.

1.04 REFERENCES

- A. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated.
- B. ANSI C80.3 - Electrical Metallic Tubing, Zinc Coated.
- C. ANSI C80.5 - Rigid Aluminum Conduit.
- D. ANSI/NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
- E. ANSI/NFPA 70 - National Electrical Code.
- F. NECA "Standard of Installation."

- G. NEMA RN 1 - Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.
- H. NEMA TC 2 - Electrical Plastic Tubing (EPT) and Conduit (EPC-40 and EPC-80).
- I. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing.

1.05 DESIGN REQUIREMENTS

- A. Conduit Size: ANSI/NFPA 70.

PART 2 PRODUCTS

2.01 RIGID GALVANIZED CONDUIT

- A. The conduit shall be rigid heavy wall full weight mild steel and shall have uniform sherardized coating or hot dipped galvanized on the outside and on the inside of the conduit including threads. The exterior surface shall be of standard weight and quality to afford maximum protection against corrosion.
- B. Elbows, bends and similar offsets shall be made of full weight materials and shall be treated, coated and threaded the same as conduit. All threads on conduit couplings and fittings shall be full depth and clean cut.
- C. All conduit shall be 3/4" trade size or larger and shall be one of the following makes:
 - 1. National Electric Products Company
 - 2. Youngstown Sheet and Tube Company
 - 3. Republic Steel
 - 4. Approved Equal

2.02 RIGID NONMETALLIC POLYVINYLCHLORIDE TYPE (P.V.C.)

- A. P.V.C. conduit of standard pipe dimensions U.L. approved for use with P.V.C. boxes and fittings.
- B. Minimum size shall be 3/4" nominal conduit size.

2.03 FLEXIBLE CONDUIT - LIQUIDTIGHT

- A. Conduit shall be galvanized flexible steel in standard conduit sizes, three-quarter (3/4) inch or larger with heavy wall neoprene jacket.

- B. Fittings shall be of special design to be used with flexible liquidtight conduit and shall insure continuity of ground throughout the fittings and prevent entrance of moisture.

2.04 FLEXIBLE STEEL CONDUIT

- A. Conduit shall be standard weight flexible steel galvanized conduit.
- B. Fittings shall be designed for use with flexible steel conduit and shall maintain electrical continuity throughout fittings and conduit.
- C. Minimum size shall be 3/4" nominal conduit size.

2.05 ELECTRICAL METALLIC TUBING

- A. Conduit shall be galvanized or sherardized electrical metallic tubing (E.M.T.).
- B. Electrical metallic tubing fittings shall be gland compression or indenter type. Set screw type shall not be used.

PART 3 EXECUTION

3.01 CONDUIT USAGE

- A. Rigid galvanized conduit shall be used for general wiring throughout Contract, unless specifically indicated otherwise on the Drawings.
- B. P.V.C. conduit shall be used in exterior areas in contact with earth unless otherwise indicated on drawings.
- C. P.V.C. conduit shall be used in high moisture and corrosive atmospheres.
- D. Liquidtight flexible steel conduit shall be used in lengths of 24" or less or connections to motors and/or equipment subject to vibration.
- E. Flexible steel conduit may be used in lengths of six feet (6'-0") or less for connection to recessed light fixture.
- F. Electrical metallic conduit (E.M.T.) is not to be used within this Work unless specifically indicated otherwise in the Drawings.

3.02 INSTALLATION - GENERAL

- A. Install conduit in accordance with NECA "Standard of Installation".

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- B. Install nonmetallic conduit in accordance with manufacturer's instructions.
- C. Arrange supports to prevent misalignment during wiring installation.
- D. Support conduit using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.
- E. Fasten conduit supports to building structure and surfaces under provisions of Section 16190.
- F. Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports.
- G. Do not attach conduit to ceiling support wires.
- H. Arrange conduit to maintain headroom and present neat appearance.
- I. Route exposed conduit parallel and perpendicular to walls.
- J. Route conduit installed above accessible ceilings parallel and perpendicular to walls.
- K. Route conduit in and under slab from point-to-point.
- L. Maintain adequate clearance
- M. Maintain 12 inch (300 mm) clearance between conduit and surfaces with temperatures exceeding 104 degrees F (40 degrees C).
- N. Bring conduit to shoulder of fittings, fasten securely.
- O. Join nonmetallic conduit using cement as recommended manufacturer. Wipe nonmetallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for 20 minutes, minimum.
- P. Use conduit hubs to fasten conduit to sheet metal boxes in damp and wet locations and to cast boxes.
- Q. Install no more than equivalent of three 90-degree bends between boxes. Use conduit bodies to make sharp changes in direction, as around beams. use hydraulic one-shot bender to fabricate or factory elbows for bends in metal conduit larger than 2 inch (50 mm size).
- R. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.

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- S. Provide suitable fittings to accommodate expansion and deflection where conduit crosses, control and expansion joints.
- T. Provide suitable pull string in each empty conduit except sleeves and nipples.
- U. Use suitable caps to protect installed conduit against entrance of dirt and moisture.
- V. Ground and bond conduit under provisions of Section 16170.
- W. Identify conduit under provisions of Section 16195.
- X. Installation of all electrical work shall be exposed except as follows:
 - 1. In finished areas where conduit shall be recessed in walls.
- Y. Exposed conduits shall be grouped and run adjacent to beams and girders and held as tight to the bottoms of beams as possible.
- Z. All conduit field joints shall be cut square, reamed smooth, threads shall be cleanly cut and full depth and joint drawn up tight. No running threads will be permitted.
- AA. All runs shall be completed and clean and free from foreign matter inside before the conductors are drawn in. During the installation, conduit ends are to be plugged or capped to prevent the entrance of foreign materials.
- BB. All runs shall be grounded in an effective and approved manner at point of origin and shall be continuous and maintain a continuous electrical ground throughout the runs, cabinets, pull boxes and fittings from point of service to all outlets.
- CC. Offsets and bends shall be carefully made without reducing cross sectional area and shall not be less than radius of standard elbows.
- DD. Conduits 1-1/4" shall be equipped with bushings and shall have locknuts inside and outside of enclosure.
- EE. Conduits shall be supported by wall brackets, pipe straps or trapeze hangers spaced not more than 8'-0" on center. Secure supports by means of toggle bolts, inserts, or expansion bolts in masonry surfaces.
- FF. Convenience outlets, switches or other devices located on walls shall be serviced from the ceiling unless shown otherwise on the drawings.

- GG. Support single conduits 1-1/4" and larger by means of rod and cast ring hangers. Support multiple runs in similar manner or use common trapeze hanger as required for span and loading. Provide end caps for trapeze type hangers except where such hangers are above ceilings. Conduits trapeze hangers shall be supported by rods.
- HH. Surface mounted conduit supports on walls shall be two hole galvanized malleable pipe straps.
- II. Conduit fittings similar to conduit type shall be used as required to keep conduits close to the building surfaces.
- JJ. No pinch type conduit clamps (Mineralac or similar) shall be used for any work less than 8'0" A.F.F.

3.03 POLYVINYLCHLORIDE CONDUIT INSTALLATION

- A. Install PVC conduit in strict accordance with manufacturer's recommendations. Make all bends by means of electrical heating unit approved by conduit manufacturer where standard elbows and fittings cannot be used.

3.04 UNDERGROUND CONDUIT INSTALLATION

- A. Where PVC conduit is used, convert to rigid galvanized conduit by means of adapters when entering building or raising up poles.
- B. Install all underground conduits on undisturbed or fully compacted earth.
- C. As completed conduit runs are installed, rod and draw through test mandrel. Plug conduit after testing to prevent entry of foreign material.

3.05 COLOR CODING

- A. Provide color bands one inch wide for all conduits, applied at panel and pullbox. Locations within each room and 50 feet on centers within an area.
- B. Color Banding:
 - 1. 120/208 volt: Gray
 - 2. 460 volt: Sand
 - 3. Telephone: Blue
 - 4. Low Voltage: Black
 - 5. Control: Yellow

3.06 CONDUIT INSTALLATION HAZARDOUS AREAS

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- A. Conduit installation shall comply in all respects with the requirements of NEC for respective Class, Division, Group installation. Conduit shall be threaded rigid type. Where flexible connections are necessary such as connections to motors, light fixtures, etc., flexible connections shall be explosion-proof.
- B. All boxes, fittings and joints shall be threaded for connection to the conduit.
- C. Threaded joints shall be made up of at least five threads fully engaged as described by NEC.
- D. Seals shall be provided as required by NEC in each conduit entering an arcing device within 18" of device, in conduits entering an enclosure, and in conduit runs leaving a hazardous area. Seals shall be fitted with the proper compound approved for the purpose and as recommended by the manufacturer.
- E. Run conduits vertically wherever possible to avoid use of horizontal seals. Where conduit is to be run horizontally, provide junction boxes in horizontal run and sealed risers to devices, rather than connecting directly between the devices.
- F. Conduits in concrete slab shall be considered within the hazardous area.

END OF SECTION

SECTION 16120

CONDUCTORS
600 VOLT OR LESS

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 01300: Shop Drawings
- B. Section 16010: Electrical Special Conditions
- C. Section 16100: Basic Scheduled Materials
- D. Section 16111: Conduit

1.02 DESCRIPTION

- A. The work required under this Section includes, but is not limited to, the provision and installation of all wire and cable 600 volt and under required for the Work.
- B. This Section covers all wire and cable 600 volt and under to be used on the various portions of the Work and the Electrical Contractor shall meet the requirements of these specifications wherever applicable.

1.03 SUBMITTALS

- A. Submit shop drawings for all products to be used on project.
- B. Samples:
 - 1. Submit, in compliance with Division 1, a minimum of 1-foot length of each type of wire proposed for use on the Project. Samples shall show all markings, including names of manufacturer, wire size, insulation type, and insulation rating.

PART 2 PRODUCTS

2.01 WIRE AND CABLE - 600 VOLT OR LESS

- A. The circular mill area and insulating walls for all wires and cable shall conform in thickness and size to latest requirements of National Electrical Code or 600 volt operation. No wires smaller than No. 12 shall be installed unless specifically designated.

- B. Conductors shall be soft drawn Lake Copper. Conductivity of wire shall not be less than 98%.
- C. Types of insulation and use shall be as follows, unless specifically indicated otherwise on the Drawings or in the Specifications.
 - 1. Power and control wires No. 10 AWG and smaller shall be Type THHN/THWN or XHHW rated at 90°C for dry locations and 75°C for wet locations.
 - 2. Power and control wires No. 8 AWG and larger shall be Type THHN/THWN or XHHW, both rated at 90°C for dry locations and 75° for wet locations.
 - 3. Wire and cable shall be as manufactured by General Electric, General Cable, Okonite, Equal offered mfg.
 - 4. Pull wire in conduits: TW.
 - 5. Wiring for direct burial shall be Type UF.
- D. Conductors size No. 8 and larger shall be stranded; smaller than No. 8 shall be solid.

2.02 WIRE TAGS

- A. Main and feeder cables shall be tagged in all pull boxes, wireways and wiring gutters of the panels. Tags shall identify wire or cable number and/or equipment served as shown on the drawings. Tags shall be metal or of flame resistive adhesive material.

2.03 CABLE LUGS AND TAPS

- A. For conductor sizes No. 8 or smaller: Compression type. Thomas & Betts Stakon; Burndy Hydent; Buchanan Pressure; or approved equal.
- B. For conductors larger than No. 8: Compression type. Thomas & Betts Lugit; Burndy Quicklug; Penn Union Ez; or approved equal.
- C. Connectors to all motors shall be compression indent type suitable for feeder and motor conductors.

2.04 CABLE SUPPORTS IN RISERS

- A. Provide clamping devices employing insulating wedges at code required locations or as indicated on the Drawings or in the Specifications.

2.05 WIRE CONNECTORS

- A. Connectors used to connect fixtures to circuits shall be screw-on spring type connectors with flexible plastic jacket. Scotchlok, Ideal Wing-Nut; Equal offered Mfg.; wire No. 10 AWG and smaller.
- B. All other wiring connectors shall be compression type couplings.

2.06 PULLING CABLES

- A. Steel conduit: nylon or steel
- B. PVC conduit: nylon

PART 3 EXECUTION

3.01 INSTALLATION

- A. Run all wire in conduit, unless otherwise indicated on the Drawings, or directed by the Engineer.
- B. Run all wires of the same circuit in the same conduit.
- C. No wire shall be pulled until conduit installation is complete, clean and dry.
- D. Do not pull thermoplastic wire at temperatures lower than 33 degrees F.
- E. Use pull-in compound (Wire-Lube, Y-Er-Ease, or approved equal) to facilitate pulling of wire. Grease or oil not permitted.
- F. Splice and connect wires only in readily accessible boxes.
- G. Outdoor conduit runs shall be at least 36" below finished grade.
- H. Train and lace wiring inside equipment and panelboard with plastic wrap for a neat appearance.
- I. Make all spare wires in cabinets or panelboards of adequate length for connections. Terminate with insulating tape and tag.

3.02 WIRES AND CABLES IDENTIFICATION

- A. Color code wires size No. 10 and smaller, as follows:

208/120V

- | | |
|------------|-------|
| 1. Phase A | Red |
| 2. Phase B | Black |
| 3. Phase C | Blue |
| 4. Neutral | White |

5. Ground Green

- B. Cables larger than No. 6 shall have each phase labeled using Brady labels.
- C. Identify control wires at terminations.
- D. Interlocks installed in one device with power from another device shall be special color coding of yellow tracer on black wire.
- E. Instrumentation wires shall be identified with their tag number.
- F. Tag each spare wire.

3.03 WIRE CONNECTIONS AND DEVICES

- A. Thoroughly clean wires before installing lugs and connectors so that joint will carry full capacity of conductors without perceptible temperature rise. Use lugs or connectors of sufficient size to enclose all strands of the conductors.

3.04 PULLING CABLES

- A. Insert nylon pulling cables with carbon dioxide, compressed air or vacuum. Use inert pulling compounds free of ingredients harmful to insulation. Do not use grease or oil.

3.05 INSULATION TESTS

- A. Test and record insulation resistance of all motors and circuits except lighting branches. Megger readings must be taken before energizing a circuit or motor. When the insulation resistance tests less than 5,000,000 ohm, the Contractor shall investigate causes and take remedial action to prevent damage to circuits and/or motors. The megger test set shall have voltage rating as indicated below.

- | | |
|-----------------------------|----------------|
| 1. 125 to 1000V insulation | 500V test set |
| 2. 1001 to 7500V insulation | 1000V test set |
| 3. Above 7500V insulation | 2500V test set |

- B. All reports shall be certified and submitted to the Engineer as shop drawings.

END OF SECTION

SECTION 16131

BOXES

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 16010: Electrical Special Conditions
- B. Section 16100: Basic Scheduled Material
- C. Section 16140: Wiring Devices

1.02 DESCRIPTION

- A. The work required under this Section includes, but is not limited to, the furnishing and installing of all outlet and junction boxes required for the Work.
- B. This Section covers all outlet and junction boxes to be used on the various portions of the Work, and the Electrical Contractor shall meet the requirements of these Specifications wherever applicable.

1.03 REFERENCES

- A. NECA - Standard of Installation.
- B. NEMA FB 1 - Fittings and Supports for Conduit and Cable Assemblies.
- C. NEMA OS 1 - Sheet-steel Outlet Boxes, Device Boxes, Covers, and Box Supports.
- D. NEMA OS 2 - Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports.
- E. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
- F. NFPA 70 - National Electrical Code.

1.04 REGULATORY REQUIREMENTS

- A. Conform to requirements of NFPA 70.
- B. Provide products listed and classified by Underwriters Laboratories, Inc., as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.01 OUTLET BOXES - FOR OFFICES OR SIMILAR FINISHED AREAS

- A. General: stamped steel, code gauge, galvanized.
- B. In Masonry or Tile Walls: rectangular boxes without external ears and with square corners or 4" outlet boxes with raised covers having square corners.
- C. Wall Brackets: with fixture stud, except where box accommodates lampholder only.

2.02 OUTLET BOXES - GENERAL USE

- A. General: cast conduit type outlet boxes shall be used in all areas except as permitted in 2.01 above.
- B. Boxes shall be surface mounted single or multiple ganged, as required.
- C. Outdoor areas and room areas subject to washdown shall be weather-proof with dust covers and spring lids.
- D. Outlet boxes shall be F.S. or F.D. as manufactured by Crouse-Hinds, Appleton, Killark; or approved equal.
- E. Special purpose outlets shall be furnished where standard outlets are not applicable.

2.03 JUNCTION AND PULL BOXES

- A. General:
 - 1. Provide junction and pull boxes where required by the NEC whether or not indicated on the Drawings.
 - 2. Locate in accessible locations.
 - 3. Verify locations in field with the Engineer to avoid interferences.
 - 4. Size in accordance with the NEC.
- B. Type: shall be code gauge galvanized sheet steel or heavy gauge sheet aluminum.
- C. Outdoor type and areas subject to washdown to be NEMA 4 cast aluminum or stainless steel and shall be gasketed. To be provided at 150' intervals on all conduit runs.
- D. Covers: shall be screw attached type.

2.04 COVERS - ALL BOXES

- A. Covers on all boxes, junction boxes, condulets, (any removable cover in a wireway system) shall be stainless steel or cast aluminum and shall be gasketed.
- B. All screws for covers shall be stainless steel and captive.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install boxes in accordance with NECA "Standard of Installation".
- B. Install in locations as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections and compliance with regulatory requirements.
- C. Set wall mounted boxes at elevations to accommodate mounting heights indicated.
- D. Electrical boxes are shown on Drawings in approximate locations unless dimensioned. Adjust box location up to 10 feet if required to accommodate intended purpose.
- E. Orient boxes to accommodate wiring devices oriented as specified in Section 16140.
- F. Maintain headroom and present neat mechanical appearance.
- G. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.
- H. Inaccessible Ceiling Areas: Install outlet and junction boxes no more than 6 inches from ceiling access panel or from removable recessed luminaire.
- I. Install boxes to preserve fire resistance rating of partitions and other elements, using approved materials and methods.
- J. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.
- K. Locate outlet boxes to allow luminaires positioned as shown on reflected ceiling plan.
- L. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.

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- M. Use flush mounting outlet box in finished areas.
- N. Locate flush mounting box in masonry wall to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening.
- O. Do not install flush mounting box back-to-back in walls; provide minimum 6 inches separation. Provide minimum 24 inches separation in acoustic rated walls.
- P. Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness.
- Q. Use stamped steel bridges to fasten flush mounting outlet box between studs.
- R. Install flush mounting box without damaging wall insulation or reducing its effectiveness.
- S. Use adjustable steel channel fasteners for hung ceiling outlet box.
- T. Do not fasten boxes to ceiling support wires.
- U. Support boxes independently of conduit.
- V. Use gang box where more than one device is mounted together. Do not use sectional box.
- W. Use gang box with plaster ring for single device outlets.
- X. Maintain symmetry of all outlets as closely as possible within the Architectural Section contained. For example, center a light fixture over a doorway, or a receptacle in a section of masonry wall, if shown in that approximate position. If the receptacle is shown in the same location as counter or bench, determine the counter's top height and set the receptacle to clear the top and trim of the counter and render the outlet easily accessible.
- Y. Locate light switches on the latch side of the door. Verify door hinge location in the field prior to the switch outlet installation.
- Z. Protect devices on outlets in locations where outlets are subject to injury, by means of wire guards or other approved means of protection.
- AA. Cap all outlets not used under this contract with blank outlet covers.
- BB. Install weatherproof outlet boxes, covers and trim as designated on the Drawings or specified.

CC. Large Pull Boxes: Use hinged enclosure in interior dry locations, surface-mounted cast metal box in other locations.

3.02 INTERFACE WITH OTHER PRODUCTS

A. Coordinate installation of outlet box for equipment connected under Section 1.6180.

3.03 HEIGHTS OF OUTLETS (Heights given are to center of outlet).

A. Generally as follows:

1. Receptacles over workbenches, tables, etc., except as indicated: 4'-2".
2. Receptacles, general: 1'-6".
3. Telephone outlets over workbenches, tables, etc., except as indicated: 4'-2".
4. Telephone outlets, offices: 1'-6".
5. Telephone outlets, general: 1'-6".
6. Wall switches, general: 4'-2".
7. Wall pushbuttons: 4'-2".
8. Motor controllers, 4'-2".
9. Clocks: 7'-0".

B. Exceptions:

1. At junction of different materials in wall finishes.
2. Where outlets would occur in moldings, break in wall surface or unsuitable location in tile, wood, or similar finish.
3. Where outlets would conflict with locations of wall mounted equipment, such as radiators, convectors, unit heaters and the like.

3.04 JUNCTION AND PULL BOX INSTALLATION

A. Provide pull boxes wherever necessary to facilitate pulling of wire and as indicated.

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- B. Locate junction and pull boxes as approved, generally not exposed in finished space, unless otherwise indicated. Where necessary, reroute conduit or make other arrangements for concealments as approved.
- C. Covers shall be accessible.
- D. Splicing boxes for fixtures, recessed in hung ceilings to be accessible through opening created by the removal of fixtures.

END OF SECTION

SECTION 16140

WIRING DEVICES

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 16010: Electrical Special Conditions
- B. Section 16100: Basic Scheduled Materials

1.02 DESCRIPTION

- A. The work required under this Section includes, but is not limited to, the furnishing and installation of all wiring devices required for the work.
- B. This section covers all wiring devices to be used for the various portions of the work and the Electrical Contractor shall meet the requirements of these specifications wherever applicable.

1.03 REFERENCES

- A. NECA - Standard of Installation
- B. NEMA WD 1 - General Requirements for Wiring Devices.
- C. NEMA WD 6 - Wiring Device - Dimensional Requirements.
- D. NFPA 70 - National Electrical Code.

1.04 SUBMITTALS FOR REVIEW

- A. Do not request submittals if drawings sufficiently describe the products of this section if proprietary specifying techniques are used. The review of submittals increases the possibility of unintended variations to drawings, thereby increasing the Specifier's liability.

The following submittals are intended for review and responsive action by the Architect/Engineer.

- B. Section 01340 - Shop Drawings, Product Data and Samples.
- C. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.

PART 2 PRODUCTS

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2.01 TOGGLE SWITCHES

A. 120-277 Volt AC 15 and 20 amp

1. Arrow Hart	1891	1991
2. Bryant	4801	4901
3. Hubbell	1201	1221
4. Pass & Seymour	15AC1	20AC1

2.02 RECEPTACLES, PLUGS AND CONNECTORS

A. 125 Volt, 20 Amp, 2 Pole, 3 Wire Grounding

NEMA Config.	5-20R	5-20P	5-20R
Manufacturer	Receptacle		Plug
1. Arrow Hart	5735S	6766	6769
2. Bryant	5362	5366M	5369N
3. Hubbell	5362	5366C	5369C
4. Pass & Seymour	5352	SS9806	SS9805

B. 125 Volt, 30 Amp, 2 pole, 3 Wire Grounding

NEMA Config.	5-30R	5-30R	5-30R
Manufacturer	Receptacle		Plug
1. Arrow Hart	5716	5717	6716
2. Bryant	9530FR	9530RP	
3. Hubbell	9308	9309	
4. Pass & Seymour	5920	5921	

C. 125 Volt, 50 Amp, 3 Pole, 3 Wire Grounding

1. NEMA Config.	5-5-R	5-50P	
Manufacturer	Receptacle		Plug
1. Arrow Hart	5711		5712
2. Bryant	9550FR		9550
3. Hubbell	9360		9361
4. Pass & Seymour	5940		5951

D. 250 Volt, 20 Amp, 2 Pole, 3 Wire Grounding

NEMA CONFIG.	10-30r	
Manufacturer	Receptacle	
1. Arrow Hart	9344	

- 2. Hubbell 9350
- 3 Pass & Seymour 3853

2.03 WEATHERPROOF RECEPTACLES

- A. Receptacles for weatherproof type outlets to be equipped with gasket, die-cast hinged lid and corrosion resistant type plate or PVC as called for. Hubbell 5210; Arrow Hart 5769; or approved equal.

2.04 COLOR OF WIRING DEVICES

- A. All wiring devices in finished areas shall be ivory plastic, and ivory finished devices corresponding to the catalog numbers shown on the Contract Documents.

2.05 DEVICE PLATES

- A. Finished Areas: Heavy duty brushed stainless steel, type 302 Brushed finish shall extend to edges of plat including beveled surfaces.
- B. Rest Rooms and Locker Rooms: Chromium plated over brass.
- C. High Moisture and Corrosive Areas: Non-metallic nylon type.
- D. Provide weather tight PVC lever operated covers where called for and in outside locations.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that outlet boxes are installed at proper height.
- B. Verify that wall openings are neatly cut and will be completely covered by wall plates.
- C. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

3.02 PREPARATION

- A. Provide extension rings to bring outlet boxes flush with finished surface.
- B. Clean debris from outlet boxes.

3.03 INSTALLATION

- A. Install in accordance with NECA "Standard of Installation."
- B. Install devices plumb and level.
- C. Install switches with OFF position down..
- D. Install wall dimmers to achieve full rating specified and indicated after derating for ganging as instructed by manufacturer.
- E. Do not share neutral conductor on load side of dimmers.
- F. Install receptacles with grounding pole on bottom.
- G. Connect wiring device grounding terminal to outlet box with bonding jumper or branch circuit equipment grounding conductor.
- H. Install decorative plates on switch, receptacle, and blank outlets in finished areas.
- I. Connect wiring devices by wrapping conductor around screw terminal.
- J. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.

3.04 INTERFACE WITH OTHER PRODUCTS

- A. Coordinate locations of outlet boxes provided under Section 16130 to obtain mounting heights shown or specified are compatible with the Americans with Disabilities Act (ADA) and other regulations.

3.05 FIELD QUALITY CONTROL

- A. Inspect each wiring device for defects.
- B. Operate each wall switch with circuit energized and verify proper operation.
- C. Verify that each receptacle device is energized.
- D. Test each receptacle device for proper polarity.
- E. Test each GFCI receptacle device for proper operation.

3.06 ADJUSTING

- A. Section 01700 - Contract Closeout, 01650 - Starting of Systems: Adjusting installed work
- B. Adjust devices and wall plates to be flush and level.

3.07 CLEANING

- A. Section 01700 - Contract Closeout: Cleaning installed work.
- B. Clean exposed surfaces to remove splatters and restore finish.

END OF SECTION

SECTION 16180

OVERCURRENT PROTECTIVE DEVICES

PART 1 GENERAL

1.01 DESCRIPTION

A. Work Specified Herein and Elsewhere

- 1. Circuit breakers
- 2. Fuses

1.02 RELATED WORK

A. Shop Drawings and Product Data

- 1. Submit shop drawings and product data for the products of this Section in compliance with Section 01300.
- 2. Submit fuse and circuit breaker time/current characteristic curves, on standard size sheets, for each type and size of overcurrent protective device proposed for use on the Project.

PART 2 PRODUCTS

2.01 CIRCUIT BREAKERS

A. General Requirements:

- 1. All Circuit Breakers shall be UL. Listed.
- 2. Circuit Breakers shall be as manufactured by Square D, General Electric, or approved equal.

B. Unless otherwise indicated elsewhere in the Specifications or on the Drawings, the following shall govern:

- 1. Circuit breakers up to 500A shall be molded case thermal magnetic type.
- 2. Circuit breakers greater than 500A shall be molded case solid state trip type. Square D Micrologic with ground fault.
- 3. Interrupting current ratings shall be as indicated in the following table:

<u>Type of Service</u>	<u>Frame Size (Amps)</u>	<u>Interrupting Ratings*</u>
------------------------	--------------------------	------------------------------

a.	120/208 Vac	Thru 100	10,000 AIC**
b.	120/208 Vac	225	22,000 AIC
c.	120/208 Vac	400	42,000 AIC
d.	120/208 Vac	600	42,000 AIC
e.	480 Vac		65,000 AIC

*Values shown are at rated supply voltage.

**AIC - Amperes Interrupting Capacity

C. Molded Case Thermal Magnetic Circuit Breaker

1. Breakers covered under this specification include those applied in switchboards, panelboards, motor control centers, combination motor starters, busway plug-in units and individual enclosures.
2. Molded case circuit breakers shall have overcenter, trip-free, toggle-type operating mechanisms with quick-make, quick-break action and positive handle indication. Two and three-pole breakers shall be common trip. Each circuit breaker shall have a permanent trip unit containing individual thermal and magnetic trip elements in each pole. The circuit breaker shall be constructed to accommodate the supply connections at either end. Circuit breaker operating handles shall assume a center position when tripped. All breakers shall be calibrated for operation in an ambient temperature of 40°C. Circuit breakers shall be suitable for mounting and operating in any position.
3. Breakers shall have removable lugs. Lugs shall be UL Listed for copper only conductors. Breakers shall be UL Listed for installation of crimp lugs.

D. Solid State Trip Circuit Breakers

1. General: This specification covers Solid State Trip Circuit Breakers rated 225 through 2000 amperes, 480 volt, AC. All circuit breakers shall be UL Listed and meet NEMA Standard No. AB1-1975 and Federal Specification No. W-C-375B-GEN when applicable. Breakers covered under this specification may be installed in panelboards, switchboards or individual enclosures.
2. Construction: Solid State Trip Circuit Breakers shall be quick-make and quick-break type. They shall have wiping type contacts and be provided with arc chutes. Two and three-pole breakers shall be designed for operation in an ambient temperature of 40° C. Each Solid State Trip Circuit Breaker shall have trip indication by handle position and shall be trip free. The ampere rating of the Solid State Trip Circuit Breaker shall be determined by the rating plug. Solid State Trip Circuit Breakers shall have highly reliable electronic components to measure and time the output from internal current monitors and initiate

automatic tripping action. The Solid State Trip Circuit Breakers shall be constructed to accommodate the supply connections at either end of the circuit breaker. A button shall be provided on the cover for mechanically tripping the circuit breaker. Circuit breakers shall be suitable for mounting and operating in any position.

3. Adjustments: Solid State Trip Circuit Breakers shall have separate adjustments for the ampere setting 70%, 80%, 90%, or 100% of the rating plug and short time pickup trip setting 200%, 400%, 500%, or 600% of the ampere setting. Instantaneous operation shall occur on overcurrents greater than 900% of the ampere setting.
4. Equipment Ground Fault Protection as Called for on Plans: Solid State Trip Circuit Breakers shall have integral 3-phase, 3-wire equipment ground fault protection. An external neutral CT shall be provided for 3-phase, 4-wire systems. The ground fault current trip point shall be 40% of the rating plug with time delay selections at .1, .2, .3, and .5 seconds for system coordination. Each Solid State Trip Circuit Breaker with ground fault protection shall include ground fault trip indication.
5. Testing: A battery powered test kit to simulate overcurrent and ground fault conditions shall be provided by the Contractor.
6. Terminations: Solid State Trip Circuit Breakers shall have removable lugs. Lugs shall be UL Listed for copper and aluminum conductors. Breakers shall be UL Listed for installation of mechanical screw type lugs.
7. Solid State Trip Circuit Breakers shall be Square D ME or PE circuit breakers as indicated on the drawings.

2.02 FUSES

- A. Fuses for above 600 amps shall be UL Class L current limiting type with 200,000 amp interrupting capacity and for second time delay at 500% rating. Fuses above 600 amp rating shall be Buss HiCap KRP-C; Gould-Shawmut Amptrap Form 480; Reliance LCL; or approved equal.
- B. Fuses for above 150 amps up through 600 amps shall be UL Class RK-5 dual element current limiting type with 200,000 amp interrupting capacity and 10 second delay at 500% rating. Fuses rated above 150 through 600 amps shall be Buss Low Peak; Gould-Shawmut Tri-Onic; Reliance ECNR; or approved equal.
- C. Fuses for 150 amps and below shall be UL Class RK-1 current limiting silver link type with minimum time delay and 200,000 amp

interrupting capacity. Fuses 150 amps and below shall be Buss Limitron; Gould-Shawmut Amptrap; Reliance NCLR; approved equal.

- D. Fuses for motor circuits shall be dual element type with 200,000 amp interrupting capacity. Fuses for motor circuits shall be Buss Fusetron; Gould-Shawmut Dual Element; approved equal.

2.03 PANELBOARD OVERCURRENT PROTECTIVE DEVICE

- A. The MAIN Overcurrent Protective Device in or ahead of the Panelboard shall have current limiting capabilities to limit the Short Circuit in the panelboard to less than 10,000 amperes.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install overcurrent protective devices in compliance with the manufacturer's instructions.
- B. Circuit Breakers:
 - 1. Do not install 2 poles in a single module.
 - 2. Install multi-pole breakers with a single handle. Do not install external mechanical ties between single pole breakers.

END OF SECTION

SECTION 16190

SUPPORTING DEVICES

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 16010: Electrical Special Conditions
- B. Section 16450: Grounding

1.02 DESCRIPTION

- A. The work under this Section includes, but is not limited to, the furnishing and installing of all racks and supports for the mounting of electrical equipment required for the Work.

1.03 CONTRACT DOCUMENTS

- A. The Electrical Contractor shall furnish and install proper racks and supports as required to mount all starters, motor control devices, push buttons, convenience outlets and other miscellaneous electrical components.
- B. The Electrical Contractor shall mount all electrical components in a uniform method, as specified under all of the various portions of the Work.

1.04 REFERENCES

- A. NECA - National Electrical Contractors Association
- B. ANSI/NFPA 70 - National Electrical Code

1.05 SUBMITTALS

- A. Submit under provisions of Section 01340.
- B. Product Data: Provide manufacturer's catalog data for fastening systems.

PART 2 PRODUCTS

2.01 MATERIAL

- A. The Electrical Contractor shall use steel rolled structural shapes, flat plate 1/8" thick, and steel rods for all racks and supports

unless shown otherwise on the Contract Documents. All materials shall be hot dipped galvanized.

2.02 ATTACHMENTS

- A. Racks shall not be attached to equipment, equipment bases, or housekeeping pads. Racks shall be free standing from such equipment.
- B. Racks shall have supports of rolled channel sections and where subject to moisture shall be isolated from concrete floors or walls by neoprene pad.
- C. Attachment to structural members or floors shall be by expansion shields.

2.03 SUPPORTING STRUCTURES

- A. Racks shall be supported from floor using channel sections with a minimum size of 3" x 1-1/2".
- B. Adequate feet shall be provided to allow secure mounting.
- C. All sections shall be welded.

2.04 MOUNTING PANELS

- A. Mounting panels shall be sized to adequately mount all necessary equipment, shall be not less than 1/8" steel plate.
- B. Mounting panels shall not exceed sixty (60) inches to top from floor.
- C. Mounting panels shall be uniform sizes as far as practical. Preferred sizes being 12" x 18", 18" x 24", 18" x 30", and 24" x 30.

2.05 CONDUIT SUPPORTS

- A. Conduit supports shall be provided, as required, using structural rolled sections or continuous slot channels.

2.06 PLATFORMS

- A. Platforms for heavy electrical equipment shall be constructed of structural rolled steel shapes and with checkered steel plates.

PART 3 EXECUTION

3.01 INSTALLATION

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- A. All items shall be installed in best field practice in general conformance to NECA installation standards and these Specifications.
- B. Any field cuts or abrasions of the galvanized surfaces shall be primed with at least 2 coats of zinc primer containing a high percentage of zinc dust.

END OF SECTION

SECTION 16421

UTILITY SERVICE ENTRANCE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Arrangement with Utility Company for permanent electric service, including payment of Utility Company charges for service.
- B. Underground service entrance.
- C. Metering equipment.

1.02 RELATED SECTIONS

- A. Section 02215 - Excavating
- B. Section 02220 - Backfilling
- C. Section 02221 - Trenching
- D. Section 03300 - Cast-in-Place Concrete
- E. Section 16111 - Conduit
- F. Section 16450 - Grounding

1.03 REFERENCES

- A. ANSI/NFPA 70 - National Electrical Code.

1.04 SYSTEM DESCRIPTION

- A. System Characteristics: As shown on the plans.
- B. Service Entrance: Service entrance shall run from utility transformer to service meter and shall include all metering requirements, conduits, wires, mounting, etc. of the power company.

1.05 SUBMITTALS

- A. Submit under provisions of Section 01300.

1.06 QUALITY ASSURANCE

- A. Perform Work in accordance with Utility Company written requirements.

- B. Maintain one copy of each document on site.

1.07 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc.

1.08 PRE-INSTALLATION CONFERENCE

- A. Convene three (3) weeks prior to commencing work of this Section.

1.09 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated and correct as needed.

PART 2 PRODUCTS

2.01 UTILITY METERS

- A. Meters will be furnished by Utility Company.

2.02 COMPONENTS

- A. Conduit: See Section 16111.
- B. Concrete: 3,000 psi (20.7 MPa) with additive to give permanent red color, 3/4 inch (19.0 mm) maximum aggregate size. See Section 03300.
- C. Markers: Square with 12-14 in. letters reading DANGER HIGH VOLTAGE MAIN ENTRANCE.
- D. Conductors: See Section 16120.
- E. Cable Lugs: Suitable for the application.
- F. Drainage Assembly: Provide 1/2 in. (12.7 mm) drain assembly. Drain for each conduit.

2.03 METER CABINET

- A. Provide C.T. and P.T. cabinet as required by power company.
- B. Provide conduit for meter conducting from C.T. and P.T. cabinet as required by power company to meter setter.

- C. Mount meter setter and C.T. and P.T. cabinet as required by power company.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Terminate service conduit in main panel with grounding bushing. Make #3/0 AWG ground connection from bushing to distribution center ground bus.

END OF SECTION

SECTION 16450

GROUNDING

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 01340: Shop Drawings
- B. Section 16010: Electrical Special Conditions
- C. Section 16100: Basic Scheduled Materials

1.02 DESCRIPTION

- A. The work under this Section includes, but is not limited to, furnishing and installing all grounding required for the Work.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Ground Rod: 3/4" x 10'-0" copperweld ground rod.
- B. Ground Conductor: bare copper conductor as required by the NEC. Minimum size to be #4/0 in ground network, or as indicated on the Drawings.

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

- A. Entire installation to be grounded in accordance with the requirements of the NEC, and as indicated on the Drawings or specified.
- B. Resistance to ground at any point shall not measure more than 5.0 ohms.
- C. Ground system tests shall be performed and test reports shall be certified. Furnish Test Reports to the Engineer as Shop Drawings.
- D. Connection of cables to rods or cable to cable shall be thermite reaction welding system employing copper oxide and aluminum power reaction to melt and fuse copper conductors into welded connections.
- E. No connections shall be covered before inspection by the Engineer.

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- F. Frames of all motors shall be properly grounded using grounding conductor installed inside of, or grounding jumpers installed around, final flexible conduit connections.
- G. Ground system meter testing shall be completed prior to the connection to the Grounding System to its associated Electrical Equipment.
- H. No Electrical Equipment shall be energized prior to the testing of its associated Grounding System.

END OF SECTION

SECTION 16900

SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA) SYSTEM

PART 1 GENERAL

1.01 DESCRIPTION

A. Description of Work:

The work to be accomplished under this section shall consist of furnishing and installing the equipment necessary for a complete control system to function as specified herein and as shown on the drawings. The manufacturer shall furnish and install a completely integrated all solid-state Radio Telemetry Supervisory Control and Data Acquisition (SCADA) system. It shall be the system manufacture's responsibility to supply a system that is compatible with existing equipment. The complete system shall be supplied, installed, and warranted by the telemetry system manufacture to insure a single source of responsibility.

B. Scope of Project:

This section covers a Radio Telemetry SCADA and Instrumentation System to include a Central Control Unit that shall be located at the Water Office in Ghent and will be the basis of control. It shall interrogate the remote units to send control data and receive level, pressure, flow, status and alarm data as required from each remote unit.

The system to include the following:

- (1) Booster Station Remote Unit
- (1) Water Tower Remote Unit
- (2) Master Meter Remote Units

Modifications shall be made to the following remote units to make the existing facilities compatible with the proposed facilities:

- (2) Water Treatment Plant Remote Units
- (1) Control Valve Station Remote Units
- (1) Portable Monitor
- (3) Tank Level Remote Units
- (1) Booster Station Remote Unit

C. Contractor shall supply:

- 1 - Shop drawings prior to installation.
- 1 - All the paper work and fees necessary to obtain a license for

the Owner.

- 1 - All equipment required by schedule
- 1 - All wiring and ancillary equipment, hardware, software, and appurtenances needed for proper installation and operation of equipment.
- 1 All labor for installation and start-up of the system.
- 1 Provide spare parts and maintenance tools as described below.
- 1 Operations and maintenance manuals as detailed below.

D. Owner shall supply:

- 1 Access and easements as needed for all sites.
- 1 120VAC power at all sites.

1.02 QUALITY ASSURANCE

A. Manufacturer's Qualifications:

The system specified herein shall be the product of a manufacturer who can demonstrate at least five (5) years of satisfactory experience in furnishing and installing comparable radio telemetry and control systems for water and wastewater installations.

The manufacturer of this system shall maintain a 24 hour available inventory of all replaceable modules to assure the Owner of prompt maintenance service and a single source of responsibility. The manufacture shall certify availability to the Engineer in writing at the time of bidder pre-qualification.

B. Evaluation Submittal Required with Bid:

All bidders shall submit an electrical and dimensional submittal, a list of comparable installations, and a radio path study with their bid. Bids that fail to include a complete submittal will be deemed unresponsive. The Consulting Engineer and the Owner shall be the sole judge as to whether the alternate equipment is considered an approved equal. Approval of an alternate system by the Engineer will not relieve the alternate system of strict adherence to these specifications.

The electrical and dimensional submittal shall include block diagrams for the various sites in the proposed system and sample electrical drawings for typical sites. A product performance data sheet shall be included for each proposed component in the system (i.e. antennas, radios, coaxial cables & arrestors, remote and central terminal equipment, power supplies, time delays and relays, and the various sensors required). The installation list shall include the names and phone numbers of both the Owner and Consulting Engineer for projects of similar size and complexity. The bidder shall include a "statement of compliance" detailing paragraph by paragraph his compliance or exceptions to these specifications.

Each bidder shall satisfy himself that the necessary radio frequency can be obtained. The radio path study shall utilize either computer generated techniques or actual field measurements to determine the necessary antenna heights, transmitter power, and antenna gains necessary to insure a 20db fade margin as detailed in Section 2.02 of these specifications.

The computer study shall use USGS terrain information to plot the path profiles for each radio path with elevation samples taken at not more than 2000 foot increments. The bidder shall employ a computer analysis of the path profile and include this data in his bid.

The physical path analysis shall use temporary equipment installations and an IFR 1000 or equal equipment to measure actual path margins. The bidder shall include all the calculations in his bid, used to extrapolate the measured data to the expected system performance. The bidder shall obtain the necessary temporary FCC license for the study.

C. Codes & Standards:

The control system and its components shall comply with all applicable requirements of the following:

Electrical Code Compliance (National & Local)

NEMA Compliance
IEEE Compliance
EIA Compliance
FCC Compliance

D. Approved Manufactures:

- 1 Micro-Comm, Inc. Overland Park, Kansas
- 1 Approved Equal

1.03 SUBMITTALS

A complete electrical and dimensional drawings shall be provided for approval by the consulting Engineer prior to equipment fabrication. The submittal data shall include the following:

A. Product Data:

Provide product data sheets for each instrument and component supplied in the system. The data sheets shall show the component name as used on reference drawings, manufacturer's model number or other product designator, input and output characteristics, scale or

ranges selected, electrical or mechanical requirements, and materials compatibility.

B. Shop Drawings:

Provide drawings for each panel showing the wiring diagrams for control circuits and interconnections of all components. The drawings shall include wiring diagrams for all remote devices connected to the panel.

C. Panel Layout Drawings:

A front panel and sub-panel layout shall be included as part of each control panel drawing. Components shall be clearly labeled on the drawing.

D. Installation Drawings:

Typical installation drawings applicable to each site in the system shall be included.

E. Operator Interface Software:

The submittal shall include a generic but detailed technical description of the Operator's Interface Software as proposed for this system including:

- 1 Sample text screens and menus
- 1 Sample graphics screens

1.04 DELIVERY, STORAGE, & HANDLING

- A. All items shall be stored in a dry sheltered place, not exposed to the outside elements, until ready for installation. All items shall be handled with appropriate care to avoid damage during transport and installation.

1.05 SEQUENCING & SCHEDULING

A. Coordinate:

Coordinate with other electrical and mechanical work including wires/cables, raceways, electrical boxes and fittings, controls supplied by others, and existing controls, to properly interface installation of the control system with other work.

B. Sequence:

Sequence installation and start-up work with other trades to minimize downtime and to minimize the possibility of damage and soiling during the remainder of the construction period.

1.06 MAINTENANCE

A. Maintenance Data:

Submit maintenance manuals and "as built" drawings on all items supplied with the system. The manuals and drawings are to be bound into one or more books as needed. In addition to "as built" engineering submittal data and drawings, the manual shall include:

- 1 Trouble Shooting Guides.
- 1 Maintenance and calibration data for all adjustable items.
- 1 Specific tuning instructions for Radio Transceivers as per FCC frequency restrictions.

B. Maintenance Stock:

The contractor shall provide one years supply of charts for each recorder and a 2500 sheet supply of fanfold tractor feed paper for each printer. The contractor shall also provide 10% spare fuses and lamps for each type used in the system. Provide one each spare parts to include:

- (1) Each type of Radio Transceiver
- (1) Each type of Remote Unit Power Supply
- (1) Each type of Remote Terminal Unit (RTU) card
- (1) Each type of Time Delay Relay
- (1) Each type of Output Relay
- (1) Each type of Water Tower Level Transducer
- (1) Each type of Backplane or Motherboard type circuit boards that contains active circuitry.

Systems that require the zero or span adjustments of level transducers be adjusted to specific site conditions shall require a spare adjusted transducer for each different site location.

No spare parts will be required for the Operator Display Console Computer, CRT display, printer, passive backplanes, or wiring harnesses.

C. Maintenance Tools:

Provide the following maintenance tools to the Owner for use in start-up and trouble shooting of equipment:

- (1) Fluke Model 77 Digital Multi-meter with necessary test leads and carrying case.

1.07 JOB CONDITIONS

All instruments and equipment shall be designed to operate under the environmental conditions where they are to perform their service.

The equipment shall be designed to handle lightning and transient voltages as normal environmental hazards. The environmental conditions are as follows:

A. Outdoor

The equipment will be exposed to direct sunlight, dust, rain, snow, ambient temperatures from -20 to +120 degrees F, relative humidity of 10 to 100 percent, and other natural outdoor conditions. The installations shall be hardened to withstand normal vandalism.

B. Indoor

The equipment will be capable of operating in ambient temperatures of +32 to +130 degrees F and relative humidity of 20 to 100 percent.

PART 2 PRODUCTS

2.01 DISTRIBUTED CONTROL OPERATION

A. General:

The control system shall use "smart" Remote Terminal Units (RTUs) with micro-processors at all locations to provide a "distributed intelligence" type control system. The software programs used at all locations shall be stored in non-volatile "burned-in" type ROM memories. The system shall be "self-initializing" and not require operator intervention after power interruptions, transients from lightning storms, or component changes. All microprocessors in the system shall include "watch-dog" circuitry to insure automatic restarts of the system. Each remote site in the system shall be assigned a unique digital address.

The system shall support both Programmed "Single Board Computer" RTUs (SBC-RTUs) and "Programmable Logic Controller" RTUs (PLC-RTUs). The SBC-RTUs shall use Single Board RTU type construction and be provided with software that is identical for all sites in the system. The SBC-RTUs shall "automatically" configure themselves, without operator intervention, from the site wiring and from commands down-loaded from the Central Unit. The SBC-RTUs shall be interchangeable without regard to station type (i.e. Water Towers, Booster Pump Stations, Sewage Lift Stations, etc.).

The PLC-RTUs shall use a "Card Cage" type construction with identical and interchangeable circuit cards. The PLC-RTUs shall be fully programmable and capable of providing integrated RTU and PLC functions.

The term "Central Unit" shall refer to the combination of computers and display devices used at a central control location. The "Central Unit" shall be composed of two separate computers

communicating over a high speed serial data link. The first computer (called the Operator Display Console or ODC) shall be responsible for the operator interface to the system and provide display, alarm, and logging of all data. The second computer (called the Central Terminal Unit or CTU) shall provide all communications with remote units, local inputs and outputs, and local hardware display devices.

The "Central Terminal Unit" (CTU) shall provide the primary control of the system with operator input from the Operator Display Console (ODC) and/or the hardware operator interface as detailed later in these specifications. The CTU shall address each remote site in sequence, to send command data and receive status, alarm, flow, pressure, and level data as required from each site. The Central Unit shall indicate, display, alarm, and record (by CTU hardware and/or ODC software as detailed in the Central Unit section of this specification) all information received. Data received shall be compared to setpoints, hand-off-auto control selections, and pump enable logic to generate control outputs.

The control system shall support peer-to-peer (i.e. RTU to RTU) communications to provide completely automatic control should the Central Unit fail. Each Water Tower remote shall be able to automatically interrogate its respective Pump Station or Control Valve Station remotes with level data. Each pump station remote shall generate its own pump stop/start commands to maintain its water tower's level. Each control valve station remote shall generate its own valve operation commands to maintain its water tower's level. Should a station RTU fail to be interrogated or experience an internal failure, it shall turn off its "Telemetry Control" output relay, causing the station controls to automatically shift control to any existing back-up controls. All sites in the system shall have a "Telemetry Control" lamp to indicate that the site is functioning normally and in communication with the Central Unit or its respective water tower. Each station shall also have a "Central Control" lamp to indicate that the station is being controlled by the "central" unit.

The system shall be capable of supporting multiple Central Units with mixed and overriding control responsibilities. Each Central Unit shall be responsible for polling and controlling the operation of its assigned RTUs. Each Central Unit shall pass information on its RTUs to the Main Central Unit and receive information on RTUs assigned to other Central Units as needed for alarm, display, and control. Each Central Unit shall be capable (as manually initiated by that Central Unit's operator) of interrogating and/or overriding control of the other Central Units' RTUs. The "control overridden" RTU shall indicate this condition to its associated Central Unit.

B. The Central Unit & Programmable Remote Unit Control Software:

The Central Unit control algorithms shall have the ability to integrate both hardware and software operator inputs at the Central Unit along hardware inputs at the remote sites in to a cohesive automatic operating control system. As data is received, changes, or lost (i.e. a loss of signal from a RTU or CTU), the software shall automatically adjust the controlling algorithm to the new situation. At a minimum the control logic shall provide the following features:

- 1) Fully automatic control of up to 8 pumps (at up to 8 separate locations) from up to 8 different levels. The Central Unit shall be able to automatically shift control from one level to another or one pump to another in the event of RTU failure.
- 2) Monitor input conditions at RTUs to determine the validity of the controlling input signals (i.e. altitude valves must be open before controlling pumps from that level) and to determine the correctness of generating pump call commands (i.e. monitoring high discharge and low suction cut-off controls at booster pump stations) before starting pumps.
- 3) Automatic pump staging operation of pump stations with pumps of different capacities. Integrating different combinations of pumps in to the operation of each stage and automatically choosing alternate combinations of pumps for each stage should a pump fail or otherwise not be available (i.e. HOA is off). Automatic alternation of like sized pumps and automatic transfer to the next available pumping stage in the event of pump failure.
- 4) Automatic pump staging operation of pumps of different sizes from local discharge pressure and discharge flow inputs in a closed-loop system. The pumps shall be up-staged on decreasing discharge pressure and down-staged on decreasing flow rate. The control shall include PID (Proportional Integral Derivative) loop control of variable speed pumps mixed with constant speed pumps for the various stages required.
- 5) Automatic transfer of pump call to the next available pump on pump failure with out waiting for the controlling level to degrade to the next start level.
- 6) Automatic alternation of pumps after each cycle of operation.
- 7) Integrated Pump HAND/OFF/AUTO (HOA) selector switch operation with CALL/RUN/FAIL indication for each pump. The Central Unit shall be capable of integrating software and hardware HOA selections at the Central Unit with the existing control panel HOA selector switches at remote units (if specifically listed in the RTU input/output requirements).

- 8) Providing peak power load management by comparing current tank levels and tank fill rates for all tanks in the system to operator inputs for peak period inhibit/restore times and generating pump start commands to top-off tank levels prior to the beginning of the peak demand period.
- 9) Automatic staging of in-line pumping station operation including: starting of downstream pump stations on confirmation of upstream pumps running, implementing alternate course of action during pump failure, and monitoring station pressures to enable pump calls.
- 10) Provide "complementary" type control logic for pump stations with existing local pressure/flow control systems. The telemetry system shall monitor the pump run operation of the existing controls and utilize running pumps as its automatic lead and lag pump call functions.

C. Multiple Levels of Back-up Control:

The control system shall have four (4) levels of Back-up Control operation. The "Telemetry Control" and "Central Control" lamps at the booster pump stations will indicate which level the pump stations are operating in.

The primary level of operation shall be under the guidance of the (future) Operator's Display Console (ODC) computer at the "central" unit. This computer will provide the operator interface to the control system. Analysis of incoming data will determine the outgoing control signals. The remote sites will be monitored and/or controlled through the "central" unit per the designed mode of operation. Hand-Off-Auto and stop/start setpoint control of all remote devices will be accomplished by the "central" unit. In the event of a fault or an interruption of operation of the ODC, the operation of the system shall automatically revert to a next level of back-up control.

The secondary level of control shall be by the (future) Central Terminal Unit computer (CTU) at the "central" unit in the event of a failure of the ODC. In this level the Central Terminal Unit shall continue automatic control the system from hardware operator inputs (i.e. physical HOA switches and Thumbwheel setpoints) or on the last known parameters from the Operator Display Console (if present). In this level of control, booster pump station remotes have both the "Telemetry Control" and "Central Control" lamps turned on. Complete failure of the "central" unit (either the radio, CTU, or both CTU and ODC) shall cause the system to shift automatically to the next level of back-up control.

The third level of control will employ peer-to-peer data transmission between specific RTUs (i.e. "water tower" remotes and

their respective "booster pump stations"). At this level of control the booster pump stations will act as individual "central" units and generate their own pump commands based on predetermined levels to maintain their respective water tower levels. In this level of control booster pump station remotes will have only the "Telemetry Control" lamp turned on.

In the event of failure in the peer-to-peer level of control, the system shall automatically revert to the last level of control on a station by station basis. That is, if the system is operating in this level of control and a "water tower" fails to transmit its level or a "pump station" fails to respond to transmissions, only the failed tower/pump combinations will revert to the last level of control, while the remainder of the system continues to function in the peer-to-peer level.

The fourth level of control shall utilize any existing local back-up pressure controls. In this level of control neither the "Telemetry Control" or "Central Control" lamps will be turned on. The back-up pressure controls will be inhibited in the above levels of control. The Central Unit may automatically elect to shift a booster pump station RTU to the this last level of control in the event of communication failure of the controlling water tower.

At all times the system shall attempt to operate in the highest level of control (lowest number) available. Whenever a failure is corrected, the system shall automatically transfer to the highest available level of control, always trying to reach primary control. Protective overriding controls (such as high discharge and low suction cut-off controls at booster pump stations) will be operative in all four levels.

D. Multiple Modes of Control:

The system supplied shall be a "distributed intelligence" type control system capable of supporting multiple "modes" of RTU control in addition to the levels of back-up control described above. The multiple modes shall be available with one or more Central Units. A failure at one or more sites (including one or all of the "central units") in the system shall not prohibit automatic control of the system. The system shall support the following modes of operation:

- Mode 1 - Monitoring only of an RTU's inputs from one or more Central Units.
 - 1 - Systems with multiple Central Units shall provide for Central Unit exchange of RTU information and/or
 - 1 - Provide direct polling of RTUs by each Central Unit (should one Central fail).

- Mode 2 - Monitoring only of an RTU's inputs from one or more Central Units with direct control of the RTU's outputs from a normally controlling Central Unit.
- 1 - The non-controlling Central units shall be able to pole an RTU to request data without disturbing the controlling Central's operation.
 - 1 - The monitoring only Central Unit(s) shall have the ability to manually initiate a Control Override of the RTUs outputs.
- Mode 3 - Direct RTU to RTU communication and control as a normal method of operation instead of as back-up control as described above.
- 1 - The non-controlling Central Unit(s) shall be able to pole RTU inputs without disturbing the RTU to RTU control.
 - 1 - The Central Unit(s) shall be able to manually initiate Control Override of RTU to RTU control loops.
- Mode 4 - Self directed control of "PLC-RTUs" from either local or remote data.
- 1 - The non-controlling Central Unit(s) shall be able to pole PLC-RTUs for information without disturbing the local PLC-RTU control.
 - 1 - The Central Unit(s) shall be able to manually initiate Control Override of all or portions of local PLC-RTU controls.
 - 1 - PLC-RTUs shall be able act as mini-Central Units and receive data exchanges from Central Units and/or pole RTUs for data directly using modes 1, 2, and/or 3 as described above.

The RTUs shall be able to operate in one or more of the above modes as detailed for specific RTUs at the end of these specifications. The Control Override operation shall provide for both manual and automatic override control.

E. Specific RTU Control Operations:

- 1. Existing Dividing Ridge Tank (Existing Unit)
 - a. Sense water level
 - b. Control Ghent Water Treatment Plant
 - c. Control Montgomery Road Control Valve Station
- 2. Montgomery Road Control Valve Station (Existing Unit)
 - a. Monitor water level of existing Dividing Ridge Tank
 - b. Open/close control valve
 - c. Sense water level of Sharon Black Rock Road Elevated Water Storage Tank
 - d. Control Gallatin Water Treatment Plant
 - e. Flow monitoring from Master Meter to be added
- 3. Gallatin Water Treatment Plant (Existing Unit)
 - a. Monitor water level of proposed Sharon Black Rock Road Tank
 - b. Control Wells #7 and 8

- c. Control chemical feed
- 4. Ghent Water Treatment Plant (Existing Unit)
 - a. Monitor existing Dividing Ridge Tank
 - b. Control high service pumps
 - c. Monitor clear wells
 - d. Control Wells #1 thru 5
 - e. Control chemical feed equipment
- 5. Existing Jackson Ridge Tank (Existing Unit)
 - a. Sense water level
 - b. Control existing Buffalo Road Booster (Existing Unit)
- 6. Existing Buffalo Road Booster (Existing Unit)
 - a. Monitor water level of existing Jackson Ridge Tank
 - b. Start/Stop pumps
 - c. Flow monitoring
- 7. Proposed State Road #355 Tank
 - a. Sense water level
 - b. Control Glenwood Hall Booster Station
- 8. Proposed Glenwood Hall Booster Station
 - a. Monitor water level S.R. #355 Tank
 - b. Start/Stop pumps
 - c. Flow monitoring of two (2) meters
 - d. Pressure monitoring for MPRV discharge
- 9. Proposed Master Meters KY S.R. #36 and KY S.R. #1112
 - a. Flow monitoring of two (2) master meters
- 10. Proposed Master Meter Ghent Eagle Sta. Road
 - a. Flow monitoring of master meter

2.02 . VHF (154 - 173 MHz) RADIO CHANNEL DATA OPERATION

A. General:

The control system shall be specifically designed for radio channel data communications. In addition to radio communications, the system shall be capable of simultaneous operation over hardwire, dedicated phone line, and radio communication channels. All of the equipment required for operation of the system shall be directly owned by the Owner and included as part of this contract. Systems using third party repeaters, trunking masters, or leased equipment will not be allowed.

B. Communications:

The control system shall operate in a half-duplex mode over a single VHF (154 - 173MHz) radio frequency using "point-to-point"

communication techniques. The control system shall monitor for a clear channel to allow co-channel operation with other radio systems.

All data transmitted shall be in digital word form using FSK (frequency shift keying) transmission and the standard ASCII data format. All transmissions shall include the address of the sender and the receiver, and be subject to check sum, parity, and framing error checks, to insure a minimum data reliability of 1 error in 1,000,000,000 bits. Any transmissions that fail the data checking will be retried until correct. No data correction methods will be allowed. A plug-in RS232C data port shall be provided at all locations in the system to allow the use of a standard data terminal to view data exchanges between the remote sites and the central and to provide a means of extensive de-debugging.

The system shall provide a complete data update at least once every (3) minutes with some functions updating faster as required by local system conditions.

C. Radio Channel Operation:

The system shall be capable of operation on the narrow band splinter frequencies of the Private Land Mobile Radio Services within the FCC's (Federal Communications Commission) rules and regulations regarding these telemetry channels. The manufacture shall guarantee operation under co-channel conditions with other radio systems without interference to this system. FSK tones, data baud rates, transmitter output power, transmitter deviation, antenna gain, and antenna height shall be chosen to comply with the FCC requirements Part 90 - Subpart B (90.17) for Local Government or Part 90 - Subpart D (90.63) for Power Radio Service. The radio system shall specifically meet the operating requirement that the sum of the highest FSK frequency and the amount of deviation shall not exceed 1.7 kHz for 3F2 emission (or 2.3 kHz for 6F2 emission) as detailed by the FCC for the specific frequency assigned.

The overall system design and operation shall provide a 20db pad over the minimum required for operation on all primary data paths (primary paths may include data relays) to insure a 98% reliability of communications. Remote sites required to support peer-to-peer back-up control shall provide 30db of pad to insure operation under all weather conditions and provide a 99.9% communications reliability. The 20db and 30db pad requirements and FCC rule compliance shall be demonstrated (at no additional cost) to the Engineer at his request. The testing shall be accomplished using an IFR AM/FM 1000S communications analyzer or equal equipment.

D. Central Unit Automatic Antenna Switching:

The central shall use directional antennas as specified below with automatic antenna switching. The use of Omni-directional antennas will not be allowed.

E. Remote Unit Data-Relay Operation:

To facilitate system layout and future expansion all RTUs shall (under the direction of the CTU or CTUs) be able to relay data and commands to and from other RTUs as required to establish the desired path. Should the assigned relay site for a distant remote be inoperative, the Future Central Unit shall automatically choose another remote site to access the distant remote. All RTUs shall be able to include automatic antenna switching as part of their relaying operations.

F. FCC Licensing:

The system supplier shall be responsible for collecting all information, generating all paper work, and paying all fees required to obtain a license on behalf of the Owner.

2.03 RADIO TRANSCEIVERS & ACCESSORIES (154 or 173 MHz)

A. General:

The Radio Transceivers shall be standard business band units that can be tuned, aligned, and repaired at any two-way radio shop. The units shall be tuned to FCC specifications for the specific frequency assigned. The radio equipment shall be FCC type approved and the system capable of operation on the narrow band splinter frequencies (154 or 173 MHz) in the Power Radio or Local Government service.

B. Radio Transceiver:

The system manufacturer shall supply a 25 watt VHF radio transceiver to insure a high level of quality and reliability. The radios shall be adjustable to 4 watts output power as may be required for the FCC requirement of 20 Watts ERP (Effective Radiated Power). Radio transceivers without a 25 watt maximum output power will not be accepted. All connections to the radio shall be plug-in. The VHF radio transceiver shall have the following specifications:

<u>Transmitter:</u>	
RF output power	25 watts (adjustable to 10)
Spurious & Harmonics	-57db below carrier
Frequency Stability	±0.0005% (-30 to +60 degrees C)
Emission (VHF)	6F2 (with 1.2khz deviation max) or 3F2 (with 1.2khz deviation max)
FM hum and noise	-60db

Receiver:

Sensitivity	.30 microvolt (.5uV @ 20db quieting)
Selectivity	-75 db
Spurious image rejection	-75 db
Intermodulation	-75 db
Frequency stability	±0.0005% (-30 to +60 degrees C)
Receive bandwidth	*6kHz (or 3kHz) as required to match the transmitter

The receiver bandwidth shall be reduced to match the transmit bandwidth of the transmitter and provide a minimum adjacent channel rejection of -50db. The radio transceivers shall be Motorola Radius M100 or approved equal.

C. Antenna & Coaxial Cable:

The radio antennas at all locations shall be a five element Yagi, constructed with 3/8" diameter aluminum rod elements and 1-1/16" diameter aluminum pipe element support. The antenna shall have 8.0db forward gain with a 20.0db front-to-back ratio. The antenna shall be wind rated for a 100 MPH wind speed. The antennas shall be MC-Yagi, Decibel Products DB292, or Celwave PD390.

Antennas shall be cabled to the transmitter enclosure connection by a RG/8U low loss (less than 1.8db per 100ft @ 100MHz) coaxial cable with cellular polyethylene (foam) dielectric. The coaxial cable shall have a braided copper shield coverage of 97% and a long life weather resistant polyvinyl chloride jacket. The antenna coaxial cable connection shall be a constant impedance weatherproof Type N connector, taped with a weather resistant electrical tape, and coated with Scotchcote to insure a lifetime water tight assembly. The coaxial cable shall be Beldon 8214 type RG-8/U.

D. Antenna Lightning Protection:

Coaxial connection to remote and central unit enclosures shall be by means of a coaxial type bulk-head lightning arrester. The units shall be rated at 1 kilowatt with a minimum 500V and maximum 2000V breakdown voltage. Coaxial lightning arrestors shall be a PD-593 or PolyPhaser IS-B50LU-CO.

E. Antenna Mounting Systems:

Antennas shall be mounted at a height above ground that is consistent with FCC rules and regulations and provides adequate signal fade margin as described earlier. Antennas must be a minimum of 15 feet above ground and mounted as follows:

- 1) Water Towers: The antenna shall be mounted on the ladder or the water tower catwalk railing at a height consistent with FCC requirements. The coaxial cable shall be secured to the ladder

or obstruction lighting conduit. A 3/4" rigid conduit with a weatherhead shall be provided from the transmitter to the ladder on the tower.

- 2) Above Ground Structures: The antenna shall be mounted on a 10' long X 1-1/2" diameter galvanized mast with top mounted weatherhead. The mast assembly shall be secured to the side of the structure with Uni-strut clamps. The coaxial cable shall feed through the mast assembly to the interior of the building.
- 3) Below Ground Structures and When Cannot Be Mounted on Above Ground Structure: The antenna shall be mounted on a 20' high Class II power pole with a 10' long X 1-1/2" galvanized mast secured to the side of the pole and extending 5' above the pole. A 3/4" rigid conduit with a weatherhead shall be provided from the below ground vault to a location 10 feet up the power pole for the coaxial cable.
- 4) Antenna Towers: A bracketed antenna tower shall be supplied where specifically noted on the plans or in the RTU & CTU site descriptions. The tower shall be assembled from 10 sections built on a 12-1/2" (or 18" for ROHN 45G) equilateral triangle design. Tower sections shall be constructed of 1-1/4" steel tubing with continuous solid steel rod "zig-zag" cross-bracing electrically welded to the tubing. The entire 10' sections shall be Hot-Dip Galvanized after fabrication for long life. The antenna towers shall be ROHN Model 25G (for unsupported heights of up to 33 feet) or ROHN Model 45G (for unsupported heights less than 45 feet).

2.04 INSTRUMENTATION & ACCESSORIES

A. General:

All items in the control system (electronic cards, power supplies, radios, time delays, relays, etc.) shall be of plug-in construction or make use of a plug-in wiring harness and be interchangeable without recalibration. To insure field repair-ability by non-technical personnel, equipment that must be un-wired for replacement will not be accepted.

The following instrumentation devices and techniques shall be used as specifically called for in the RTU and CTU input/output sections of this specification.

B. Power Supplies:

The common 12 VDC power supply shall provide $\pm 0.1\%$ line and load regulation with $\pm 10\%$ input variations. It shall have a temperature coefficient of $\pm 0.02\%$ per degree C. The input/output isolation shall be 100 Mohms DC (900Volts AC) with output transient response

of 50 microseconds maximum. The power supply shall be sized to operate the remote unit equipment with or without the back-up battery in place. Power Supplies shall be an ELPAC Series OLV, Sola SLS, or approved equal.

C. Battery Back-up Operation:

The remote units indicated shall be supplied with battery back-up operation. The rechargeable batteries shall be the sealed solid gelled electrolyte type, designed for float or standby service. Unless noted otherwise in the RTU descriptions, batteries shall be sized to maintain 24 hour service at water tower remotes and 3 hour service at booster pump stations and other remotes. The remote shall include a plug-in charging module to recharge the battery when power is resumed, maintain the charge between outages, and provide a low voltage cut-off to protect the battery from excessive discharge during prolonged outages. Pressure, level, and flow rate inputs shall continue to function on battery back-up. Batteries shall be Globe Gel/Cell or approved equal.

D. Single Phase 120VAC Power Line Lightning Protection:

Every site in the system shall be equipped with a combination AC line filter and lightning arrester. The unit shall provide 3 stage lightning/transient protection including inductive and capacitive filtering, MOV overvoltage protection, and three terminal gas discharge tube lightning protection. The unit shall be a TT-LPU, TrippLite ISOBAR IB-2-0, or StediWatt Model 1120-3.

E. SBC-RTU, PLC-RTU, and Future Central Terminal Unit Inputs & Outputs:

The RTU and CTU inputs and outputs shall share a common type of architecture and interface as follows:

- 1) Discrete Inputs - The RTU and CTU discrete inputs shall be 110 VAC with optically isolated couplers providing 1500 volts of isolation.
- 2) Discrete Outputs - The RTU and CTU discrete outputs shall be 400 VAC rated triac outputs providing 1500 volts of isolation. The output connections to other panels shall be further isolated by wiring to Time Delays or Relays as specified below.
- 3) Analog Inputs - Analog inputs shall be capable of processing a wide range of instrumentation signals (i.e. 4-20mA, 1-5VDC, 0-100mV, etc) from the various sensors required. The inputs shall have suppressed zero capability sufficient to suppress 85% of the incoming signal and transmit the remaining signal with a combined $\pm 0.5\%$ accuracy and resolution. The inputs must be implemented so that zero and span adjustments are a part of the

remote site enclosure allowing the RTU & CTU cards, signal convertors, and transducers to be changed without recalibration.

- 4) Analog Outputs - The analog outputs shall be 0-5 volt DC with $\pm 0.3\%$ accuracy. Analog signals that are provided to other control panels shall be optically isolated from the RTU/CTU signal with a universal wide-ranging signal convertor. The isolated signal convertor shall be capable of providing voltage or current signals with $\pm 0.25\%$ accuracy and 1000V of isolation. The signal isolator shall be Action Instruments model AP4380 or equal.
- 5) Pulse Rate & Accumulator Inputs - The pulse rate inputs shall be high speed TTL inputs capable of up to 50Hz signals. The flow rate signals shall be a dry switch closure (or open collector transistor) output from a meter transmitter head. The pulse outputs shall be received directly by the remote unit and stored in a RAM memory register for report back to the Central Unit. The register shall be sized large enough to prohibit undetected register roll-over or over-flow. The remote unit shall provide the proper excitation voltage required by the meter head transmitter.

The flow pulse data sent from remote units shall be analyzed and totalized by the central unit in 1000 gallon units. Pulse data shall be stored in non-volatile memory so that it is not lost during power outages or resets. Pulse rate and total data shall be displayed at the Central Unit in standard engineering units (i.e. gpm, cfm, gallons, cubic feet, etc).

Flow rate signals that originate as analog (i.e. 4-20mA) signals shall be converted to pulse frequency signals for presentation to the RTU and CTU inputs.

- 6) Digital Displays - Digital displays of data shall be by means of a 1/2" high LCD or LED readout. Data shall be displayed in standard engineering units (i.e. psi, gpm, ft, etc).
- 7) Digital Setpoint Assemblies - Digital Setpoints shall be by 1/8" high thumbwheel setpoint assemblies providing settings of 000 through 999 directly in standard engineering units (i.e. psi, gpm, ft, etc). The thumbwheel assemblies shall have gold plated circuit board contacts and gold flashed wipers.

F. Time Delays & Relays:

All control outputs from the telemetry system shall be via adjustable 0-5 minute electronic time delays with $\pm 0.2\%$ repeat accuracy. The time delays shall have both "timing" and "timed" LED indicators. All time delays and relays used in the system shall be of plug-in construction with rail or board mounted sockets and have

pilot duty contacts rated for 3 amps resistive @ 240VAC (or 0.8 amps inductive) loads. Time delays and relays shall be IDEC series RTY-D, RY4S or approved equal.

G. Level Transducers (and submersible pressure transducers):

Level transducers shall be of the all solid-state two-wire transmitter type and be powered from the common 12VDC power supply with a 4-20mA output. The transducers shall have a combined error (linearity and hysteresis) of $\pm 0.2\%$ full scale and be temperature compensated to $\pm 2.5\%$ per 100 degrees Fahrenheit. RFI (Radio Frequency Interference) effects shall be less than 1.0% from 27 to 500MHz for 5 V/m field intensity 1 meter from the device. Zero and span adjustments shall be standardized so that transducers are interchangeable without recalibration.

The transducers shall be mounted at the sensing point and wired to the enclosure. Transducers for above ground mounting shall have a 1/2" conduit connection for cable entry. Transducers at water towers (and other outside locations) shall be mounted below grade. Below grade mounted units shall have cabling connections and suitable for a minimum of 100' submerged duty. All exposed parts shall be series 304 stainless steel and wetted parts shall be 316 stainless steel. The units shall be capable of two times full scale over pressure with out damage or change of calibration. Pressure/Level transducers shall be Foxboro Model 1125 or approved equal.

H. Suction & Discharge Pressure Transducers (panel mounted):

Suction & Discharge pressure transducers shall be combination Bourdon tube and Linear Differential Transformer (LVDT) type solid-state transmitters. The units be powered from the common 12VDC power supply and provide a 1-5VDC output. The transducers shall have a combined error (linearity and hysteresis) of $\pm 1.0\%$ full scale. The units shall be constructed of a beryllium-copper Bourdon tube with a 1/4" NPT brass pressure inlet. Zero and span adjustments shall be standardized so that transducers are interchangeable without recalibration.

The transducers shall be mounted on brass bulkhead connections that extend through the bottom of the enclosure. No tubing connections shall be allowed inside the RTU enclosure.

I. Direct Submergence Type Level Transducers:

Level transducers for clearwells and wetwells shall be of the all solid-state two-wire transmitter type and be powered from the common 12VDC power supply with a 4-20mA output. The transducers shall have a combined error (linearity and hysteresis) of $\pm 0.2\%$ full scale and be temperature compensated to $\pm 2.5\%$ per 100 degrees Fahrenheit.

Zero and span adjustments shall be standardized so that transducers are interchangeable without recalibration. The transducers shall be suspended in the clearwell or wetwell and supplied with sufficient cable to access the junction box. All exposed and wetted parts shall be series 300 stainless steel. Direct Submergence Type Level transducers shall be Ametek Model 57 SN or approved equal.

J. Pressure Switches:

Pressure switches shall be of compact design with visual adjustment scales, a die cast aluminum frame, and Brass & Buna N wetted parts. The units shall have a repeatability of 1% of range, an adjustable deadband with 10-100% full scale adjustment, and withstand two times range over pressure without damage. Units mounted in control panels may be of open frame design. Units mounted at the sensing point shall have a Nema 4 watertight enclosure. The pressure switches shall be ASCO Tri-Point Series PA or approved equal.

K. Station Flooding Float Switches:

The station flooding sensors shall be wall bracket mounted float switches capable of sensing less than 1-1/2" of water on the floor. The units shall be constructed with a Buna N float, 304 stainless steel float guide, a clear plastic protective shield, and a sealed neoprene cable connection. The float switch shall be Omega LV-70 or approved equal.

L. Entry Alarm:

Unauthorized entry alarms at remote sites shall be accomplished through a perimeter alarm system powered from the common 12VDC power supply. The system shall include the necessary structure entrance magnetic switches and a key type acknowledge switch on the remote unit enclosure door. Should an intruder enter the structure without acknowledging his presence, an entry alarm will be sent to the Central Unit. The entry alarm shall have an adjustable time delay (0-60 seconds) to allow authorized personnel time to acknowledge their presence when entering the structure and provide a re-arming delay when leaving the structure. The key switch shall be constructed so that the key can only be removed in the "armed" position. The alarm system shall be TT-EAS, Tandy Safe House 49-450, or equal.

M. Three-Phase Power Monitor:

The 3-phase power monitor shall continuously monitor the 3-phase power lines for abnormal conditions. The unit shall monitor for loss of any phase, low voltage on any or all phases, and phase reversal to inhibit pump operation and provide an alarm. The unit shall include an internal 5 minute short cycle delay. The unit shall be Time-Mark Model 158R or approved equal.

N. High/Low Wetwell Floats:

The high/low wetwell alarm floats shall be direct acting float switches. The floats shall have a polypropylene case containing a hermetically sealed mercury switch and be supplied with 40' of PVC type STO cable. The float switches shall be Anchor Scientific Roto-Float or approved equal.

O. Circular Chart Recorders:

The circular chart recorder(s) shall be one or two pen, servo driven, 10" circular chart recorders with 0.50% accuracy and provide for a field configurable chart range and speed. Chart paper shall be provided to match the range (in engineering units) and chart speed of the recorder operation. The chart recorders shall be Honeywell Model DR 4200 GP or approved equal.

P. Strip Chart Recorders:

The strip chart recorder(s) shall be a single pen, linear servomotor driven, 4" strip chart recorders with 0.50% accuracy and with either roll or Z fold chart paper. The recorder shall be provided with an integral display scale (in engineering units) to match recorded range. The chart recorders shall be Kent Clearspan P100S or approved equal.

Q. PID (Proportional Integral Derivative) Loop Control Module:

The PID loop control module shall be a DC input/DC output, optimizing, 3-mode controller. The unit shall provide "adjustable" proportional band action (0.1-999.9%), reset action (0.02-50.00 repeats/minute or minutes/repeat), and rate action (0.08-10.00 minutes) operation with $\pm 0.25\%$ accuracy. Separate digital displays of process variable and setpoint shall be provided. The unit shall also provide a $\pm 10\%$ analog bar graph for deviation. The unit shall operate independently of the RTU's operation. The unit shall normally accept a setpoint control signal from the RTU or CTU, however in the event of RTU/CENTRAL failure the unit shall switch to a local manual setpoint. The control output shall be an isolated 4-20mA signal. The PID controller shall be a Honeywell UDC 3000 or approved equal.

R. Two-Wire Low Voltage DC Controllers:

The pumps indicated shall be controlled by a two-wire low voltage DC controller consisting of a 120VDC power supply, a sender unit, and a receiver unit. The controller shall provide remote CALL of pumps with RUN report back and LINE FAIL indication over a single pair of 22 gauge wires. The controller shall operate from a 120VDC power source and be self adjusting for line resistances up to 10Kohms.

Each pair of modules shall be provided with a Line Protection Unit consisting of a gas tube line protector and 1/4 amp fuses. The units shall be a TT-TWC or Healy-Ruff TSC.

S. Back-up Pressure Controls:

The control panels at RTU sites where noted shall include back-up pressure controls. The pressure sensor shall be a mechanical device providing independent start and stop switches operated from a single bellows sensor assembly. The pressure sensor shall be rated for water service and have a brass bellows and pressure connection. The unit shall have a repeat accuracy of $\pm 1.0\%$ of range. The start/stop settings shall be clearly visible on a calibrated scale on the front of the assembly. The start/stop switches shall be wired to electronic time delays and relays to provide "electronic" surge suppression. The action shall cause the controls to not change state unless the pressure is at or past the desired pressure setting for an adjustable time as set on the time delay. The pressure controls shall ignore momentary fluctuations in pressure that exceed the stop/start pressure settings for time periods less than the time delay setting, without the use of pressure snubbers. The pressure switch sensor shall be United Electric Series 300 or approved equal.

T. Differential Pressure Type Flow Transmitters:

The differential pressure transmitters for flow rate measurement shall be of the all solid-state two-wire transmitter type and be powered from the common 12VDC power supply with a 4-20mA output. The transducers shall have an accuracy of $\pm 0.25\%$ of span (including linearity, hysteresis, and repeatability) and be temperature compensated to $\pm 1.5\%$ of span per 100 degrees Fahrenheit. RFI (Radio Frequency Interference) effects shall be less than 0.1% from 27 to 500MHz for 10 V/m field intensity 1 meter from the device. The unit shall be capable of field calibration for inputs from 75 to 300" H₂O.

The transducers shall be mounted on the wall or a pipe stand below the sensing points and wired to the enclosure. The transducers shall have a low copper diecast aluminum alloy housing with epoxy finish, threaded covers, and Buna-N O-rings and be rated NEMA 4X. The housing shall have 1/2" conduit connections for cable entry. The sensor shall be Cobalt-Nickel-Chromium alloy with silicone oil fluid fill. The process connections and covers shall be 316 SS and equipped with an integral Bypass Manifold connection. The units shall have a maximum over range and working pressure of 2000 psi. Differential Pressure type flow transmitters shall be Foxboro Model 843 d/p Cell Transmitter or approved equal.

U. Temperature Switches:

Temperature switches for low (or high) building temperature shall have an NEMA 1 rated enclosure with an exposed helical element and be mounted on the outside of the RTU enclosure. The unit(s) shall have an adjustable range of 30-110 degrees F.

2.05 CENTRAL UNIT EQUIPMENT

- A. The "Central Unit" shall be composed of two separate computers communicating over a high speed serial link. The first computer (called the Operator Display Console or ODC) shall be responsible for the operator interface to the system and provide display, alarm, and logging of all data. The second computer (called the Central Terminal Unit or CTU) shall provide all communications with remote units, local inputs and outputs, and local hardware display devices.

2.05.1 MAIN CENTRAL TERMINAL UNIT

A. General:

The Main Central Terminal Unit (CTU) located at Ghent will be the center of control for the system. This unit shall control the system by interrogating remote units for status/alarm and level/pressure data, comparing this information to operator setpoints and command inputs, and generate pump commands to be sent to the remote units.

The CTU and the Operator Display Console (ODC) shall communicate with serial ASCII data communications at switch selectable baud rates up to 9600 baud. The CTU will provide to the ODC computer "on demand" all "real" status, analog, and pulse information from the remote units and "virtual" data points generated by the CTU. The CTU will receive operator input from the ODC computer and generate commands sent to the remote units.

The CTU shall be capable of supporting simultaneous access from multiple ODC computers. These ODC computers may access the CTU both locally over a plug-in RS-232 port or remotely over a Bell 212 "auto-answer" phone modem.

B. Construction:

The control panel shall have all electronic components (except radio, radio power supply, time delays, and relays) housed in a card rack. The card rack components shall be plug-in and interchangeable without calibration and be mounted for easy operator access.

The card rack shall be designed for standard 19" EIA mounting. Each card rack assembly shall contain its own plug-in power supply. Card edge connectors and their mating edgeboard connectors shall be gold plated or gold flashed. Card edge connectors shall be keyed to prevent accidentally inserting the wrong card into the wrong

connector. Card types shall be designed and arranged by function as follows:

- 1) CPU - The Central Processing Unit (CPU) shall be a plug-in card providing all control processing and short term data storage for the system. The CPU card shall include a combination of RAM, PROM, and EEPROM memory. The EEPROM will be used to store the current operating data base and maintain this data base without the use of batteries.
- 2) MODEM - The modem card(s) shall provide a switch selectable baud rate interface to the RTUs, CTUs, and ODCs in the system. The modem card shall include both RS232 data and Radio modem interfaces.
- 3) DISCRETE INPUT/OUTPUT - The discrete input/output cards shall provide a 110VAC interface to front panel lights and switches as well time delay and relay outputs. The inputs and outputs shall be optically isolated to 1000V as described previously.
- 4) ANALOG/PULSE INPUT - The analog/pulse input cards shall provide analog to digital conversion as well as signal conditioning of high and low level analog process signals. The pulse rate inputs shall be high speed TTL inputs capable of up to 50Hz pulse rate signals. The analog input cards shall be interchangeable with out recalibration and constructed so that zero and span adjustments remain a part of the CTU enclosure.
- 5) ANALOG OUTPUT - The analog input cards shall provide a 0-5VDC signal to CTU recorders or to signal isolators if sent to other panels as specified previously.
- 6) THUMBWHEEL & DISPLAY - The Thumbwheel and Display interface card shall provide direct BCD communication between the card rack CPU and front panel thumbwheel (TW) setpoint and LCD display assemblies.
- 7) POWER SUPPLY - Each card cage assembly shall include a plug-in power supply.

C. Enclosures

All of the Central Terminal Unit equipment (including CTU card cage, radio, power supplies, automatic antenna switching, and local inputs & outputs) at the central shall be housed in a 30"W x 20"D x 36"H wall mounted NEMA 12 enclosure.

D. Phone-Line Debug:

The Central Terminal Unit shall be equipped with a Bell 103/212 direct connect phone modem to provide long distance factory

debugging over dial-up phone lines. This de-bug system shall allow the factory technician to monitor data transmissions to and from all sites and to manually send interrogations and receive data from the remote sites. The debug system shall allow testing all inputs and outputs (analog and discrete), digital displays, and thumbwheel assemblies at the "Central". The de-bug service shall provide sufficient detail to pinpoint the defective module for operator replacement. The 103 Modem shall be "plug-in" connected to the Central Unit or be equipped with a on/off switch. De-bug entry shall require a 4 digit access code to prohibit unauthorized access.

E. Remote Control Access Port:

The Central Unit shall include an additional serial (RS232) data port for remote access by a second ODC computer. This port shall use the phone-line debug modem specified above in an auto-answer mode to allow remote access to the control system over dial-up phone lines. The port shall be optionally configured as monitor only or full control access.

F. Front Panel Hardware Displays for Remote Units:

The Central Unit shall include separate front panel displays of the specified remote unit data for each remote unit. Each remote unit shall have its own display devices. Single unit display devices that provide scanning displays of information or that require operator intervention to display the desired data will not be allowed.

Front panel displays of levels and pressures shall be .5" high 3 digit LCD displays. Pump Stop/Start thumbwheel assemblies shall have two 3 digit setpoints each for high/low alarm or stop/start control. LCD displays and TW setpoint switches shall be mounted on engraved aluminum plates and grouped in a logical manner.

Front panel displays of pump controls shall include HAND/OFF/AUTO (HOA) selector switches and CALL/RUN/FAIL (CRF) indicator lamps for each controlled pump. An Alternator Control selector switch shall be included for each set of pumps. HOA switches, CRF lamps, alternator selector switches, and associated alarm/status lamps shall be mounted on engraved aluminum plates and grouped in a logical manner.

The Central Unit shall include front panel mounted hardware display and control input devices for each of the following remote units:

- 1) Each Water Tower Remote Unit:
 - LCD Display (3 digit) of Tank Level (to read in feet)
 - High/Low level alarm thumbwheel setpoint assembly
 - High/Low level alarm lamps
 - Power Failure alarm lamp

- Loss of Signal alarm lamp
 10" Circular Chart Recorder for Tank Level
- 2) Each Booster Pump Station Remote Unit:
 LCD Display (3 digit) of Discharge Press (to read in psi)
 LCD Display (3 digit) of Suction Pressure (to read in psi)
 LCD Display (3 digit) of Flow Rate (to read in gpm)
 Flow Totalizer (6 digit) (to totalize in 1000 gallons)
 Pump #1 HAND/OFF/AUTO selector switch assembly
 " " CALL/RUN/FAIL lamps
 Pump #2 HAND/OFF/AUTO selector switch assembly
 " " CALL/RUN/FAIL lamps
 Pump Alternator Selector Switch (Pump1/Auto/Pump2)
 Lead & Lag Pump Stop/Start thumbwheel setpoint assemblies
 High Discharge Pressure alarm lamp
 Low Suction Pressure alarm lamp
 Power Failure alarm lamp
 Loss of Signal alarm lamp
- 3) Each Well Pump Remote Unit:
 LCD Display (3 digit) of Flow Rate (to read in gpm)
 Flow Totalizer (6 digit) (to totalize in 1000 gallons)
 Well #1 HAND/OFF/AUTO selector switch assembly
 " " CALL/RUN/FAIL lamps
 Well Pump Stop/Start thumbwheel setpoint assemblies
 Power Failure alarm lamp
 Loss of Signal alarm lamp
- 4) Each Master Meter Remote Unit:
 LCD Display (3 digit) of System Pressure (to read in psi)
 LCD Display (3 digit) of Flow Rate (to read in gpm)
 Flow Totalizer (6 digit) (to totalize in 1000 gallons)
 Power Failure alarm lamp
 Loss of Signal alarm lamp
- 5) Common Controls & Displays:
 CTU System Normal lamp & output relay
 CTU Power ON lamp
 Lamp Test Pushbutton (common to all lamps)
 Alarm Acknowledge Pushbutton (common to all alarms)
 Alarm Horn (common to all alarms)

The common Lamp Test pushbutton shall light all lamps on the front of the panel when pressed. On the occurrence of any displayed alarm, the common Alarm Horn shall sound and the specific alarm lamps shall flash. Pressing the common Alarm Acknowledge Pushbutton shall cause the alarm horn to silence and the specific alarm lamp to go steady on. The Alarm Lamps shall remain on until the alarm has cleared. Acknowledging an alarm shall not prevent the alarm horn from resounding on the occurrence of a new alarm.

G. Local CTU Control Input and Output Functions:

The central controls shall include discrete inputs, discrete outputs, analog inputs, pulse inputs, and the associated instrumentation for controlling local devices listed below. The controls shall include two wire pressure transducers for sensing of local pressures, flows, and the clearwell level. The local inputs and outputs shall be as follows:

1) HIGH SERVICE PUMPS:

DISCRETE INPUTS: DISCRETE OUTPUTS:

DI-1)	Pump #1 RUNNING	DO-1)	High Serv #1 CALL
2)	Pump #2 RUNNING	2)	High Serv #2 CALL
3)	Power Failure	3)	Telemetry Control
4)	High Discharge Cut-off		
5)	Low Clearwell Cut-off		

ANALOG INPUTS:

AI-1)	Discharge Pressure 0-250psi
2)	(spare)

PULSE INPUT:

PI-1)	Effluent Flow Rate 0-500gpm
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DISCRETE INPUT EXPANSION MODULE:

DI-7)	HS Pump #1 HAND	15)
8)	HS Pump #1 AUTO	16)
9)	HS Pump #2 HAND	17)
10)	HS Pump #2 AUTO	18)
11)	19)	
12)	20)	
13)	21)	
14)	22)	

2) RAW WATER PUMPS:

DISCRETE INPUTS: DISCRETE OUTPUTS:

DI-1)	Pump #1 RUNNING	DO-1)	Pump #1 CALL
2)	Pump #2 RUNNING	2)	" #2 "
3)	Pump #3 RUNNING	3)	" #3 "
4)	Pump #4 RUNNING	4)	" #4 "
5)	Power Failure	5)	
6)	Phase Failure	6)	Telemetry Control

ANALOG INPUTS:

AI-1)	Discharge Pressure 0-250psi
2)	(spare)

PULSE INPUT:

PI-1)	Effluent Flow Rate 0-500gpm
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DISCRETE INPUT EXPANSION MODULE:

- DI-7) Pump #1 HAD 15)
- 8) Pump #1 AUTO 16)
- 9) Pump #2 HAND 17)
- 10) Pump #2 AUTO 18)
- 11) Pump #3 HAND 19)
- 12) Pump #3 AUTO 20)
- 13) Pump #4 HAND 21)
- 14) Pump #4 AUTO 22)

H. Front Panel Hardware Displays for Local Control Functions:

The Central Unit shall include front panel mounted hardware display and control input devices for local inputs devices. The HAND control for HAND/OFF/AUTO devices shall provide direct manual control of the local devices without any interposing micro-processor logic. Local display and control inputs shall be as follows:

- 1) Clearwell Level:
 - LCD Display (3 digit) of Tank Level (to read in feet)
 - High/Low level alarm thumbwheel setpoint assembly
 - High/Low level alarm lamps

- 2) High Service Pumps:
 - LCD Display (3 digit) of Discharge Press (to read in psi)
 - LCD Display (3 digit) of Flow Rate (to read in gpm)
 - Flow Totalizer (6 digit) (to totalize in 1000 gallons)
 - Pump #1 HAND/OFF/AUTO selector switch assembly
 - " " CALL/RUN/FAIL lamps
 - Pump #2 HAND/OFF/AUTO selector switch assembly
 - " " CALL/RUN/FAIL lamps
 - Pump Alternator Control Selector Switch (Pump1/Auto/Pump2)
 - Lead & Lag Pump Stop/Start thumbwheel setpoint assemblies
 - High Discharge Pressure alarm lamp
 - Low Clearwell Cut-Off " "
 - Power Failure alarm lamp

- 3) Well Pumps:
 - LCD Display (3 digit) of Flow Rate (to read in gpm)
 - Flow Totalizer (6 digit) (to totalize in 1000 gallons)
 - Well #1 HAND/OFF/AUTO selector switch assembly
 - " " CALL/RUN/FAIL lamps
 - Well #2 HAND/OFF/AUTO selector switch assembly
 - " " CALL/RUN/FAIL lamps
 - Well #3 HAND/OFF/AUTO selector switch assembly
 - " " CALL/RUN/FAIL lamps
 - Well #4 HAND/OFF/AUTO selector switch assembly
 - " " CALL/RUN/FAIL lamps
 - Well Alternator Control Selector Switch (Pump1/Auto/Pump2)
 - Lead & Lag Pump Stop/Start thumbwheel setpoint assemblies

- 4) Chemical Feeder Controls:
- Chemical Feeder #1 HAND/OFF/AUTO selector switch assembly
 - " " " RUN lamp
 - Chemical Feeder #2 HAND/OFF/AUTO selector switch assembly
 - " " " RUN lamp
 - Chemical Feeder #3 HAND/OFF/AUTO selector switch assembly
 - " " " RUN lamp
 - Chemical Feeder #4 HAND/OFF/AUTO selector switch assembly
 - " " " RUN lamp

2.05.2 OPERATOR DISPLAY CONSOLE

A. General:

As described previously the Central Unit shall have two micro-processors tied together with separate operating responsibilities. The first processor (Central Terminal Unit or CTU) shall handle all the telemetry, setpoint comparison and command duties. The second processor (Operator Display Console or ODC) shall handle the CRT display, operator keyboard, alarm/log printer, and data storage duties.

B. System Unit:

The Operator Display Console (ODC) computer shall be a 32 bit micro-processor operating at a minimum of 200MHz. It shall include a 1.4MB floppy disk drive, a 2.5GB (minimum) hard disk drive, and 64MB of RAM memory. The ODC shall use the standard MS-DOS Windows 95 operating system that allows the operation of word processor, spread sheet, and data base application programs with out modification. The CTU shall store all command inputs and setpoints as down-loaded from the ODC. The hard drive in the ODC shall be used for program and data storage. The floppy disc shall be used for archive data storage and back-up protection of the operating program.

The separately mounted keyboard shall have a standard typewriter format with tactile feedback, twelve special function keys, and a separate numeric keypad for entering setpoint data and cursor control. The 256 character symbol set shall include 96 ASCII characters and the IBM (International Business Machine) graphic symbols. The ODC shall be an Compaq Deskpro 5200/2500, or equal.

C. CRT Video Display:

The CRT display shall be a 17" (diagonal) high resolution (1024 x 768) 80 column x 25 line color display terminal with IBM SVGA compatibility. The CRT shall be utilized for display of station and system graphics and real-time data display. It shall provide for operator input and output data, report generation, and access to

system utilities. The CRT display shall be of the same manufacture as the System Unit above.

D. Printer:

The system shall include a "graphic" printer with a 9x9 dot matrix print head. The printer shall provide printing of alarms and data logs. The graphic capability will be required to draw pressure, level, and flow rate graphs for each remote on command. The printer shall be interfaced to the processor via a parallel port and provide 160 characters per second output. The printer shall accept edge-punched fanfold paper forms from 2.5" to 9.5" wide. The printer shall be an Epson FX850, Panasonic or equal.

E. Enclosures:

The Operator Display Console unit (including CRT display, Keyboard, and System Unit) and the graphic printer shall be located on top of a desk supplied by the Owner. All interconnecting cabling shall be plug-in and supplied by the contractor.

F. Multitasking Operating System:

The ODC unit shall be provided with a multitasking operating system that allows running multiple DOS compatible programs simultaneously. The operating system shall include a Program Manager, File Manager, Task List, Control Panel, and limited word processor as standard features. The multitasking operating system shall be Microsoft Windows 95 or equal.

G. Battery Back-up Operation:

The central unit shall be equipped with a battery back-up. The CTU shall include 8 hours of battery back-up for all radio operations. The rechargeable batteries shall be the sealed solid gelled electrolyte type for float or standby service. The central shall include a plug-in charging module to recharge the battery when power is resumed, maintain the charge between outages, and have a low voltage cut-off to protect the battery from excessive discharge during prolonged outages.

The ODC shall include 15 minutes of back-up. The ODC back-up unit shall be an Standby Power Supply (SPS) system that is on-line at all times and provides power line filtering and transient protection. The unit shall automatically take over when the power line fails without interrupting or restarting the system. The SPS shall be located at the desk location of the ODC and shall power the System Unit, CRT display, and printer. The UPS shall be a BEST Patriot Model SPS600, or equal.

2.05.3 OPERATOR DISPLAY CONSOLE SOFTWARE

A. General:

The software shall be capable of operating in the ODC hardware described above as well as in customer supplied IBM/MS-DOS compatible hardware with SVGA display, 2.5GB hard drive of hard drive space and 1MB of RAM memory. The contractor shall supply separate fully functional "engineering level" copies of the SCADA software (including any required software protection keys) for each installed ODC as well as a separate configured copy for installation and use in a customer supplied computer. The software may be modular, however the operator interface shall provide an integrated interface to all areas of the program.

The software shall operate in the Windows 95 environments and shall have available an optional multi-tasking shell that allows simultaneous operation of MS-DOS compatible programs (i.e. Lotus 123, etc.).

The ODC software shall be MC-SCADAview, Wonderware's InTouch, Intellution's FIX DMACS, or approved equal.

B. System Back-Up & Installation:

The contractor shall provide a back-up copy of the installed software, including any setup or graphic files on 1.4MB floppy disks. The copy shall be kept by the Owner for emergency reloading in the event of a catastrophic drive failure. The contractor shall provide an easy to use installation (or re-installation) program that will automatically setup the hard drive operating system and automatically load (or reload) the software.

C. System Restart:

The software shall automatically restart in the event of a power failure. All data necessary for the operation of the system shall be reloaded from mass memory (hard drive). To minimize the restart procedure, a copy of the current state of the following data shall be stored in mass memory:

1. Status Points
2. Measurement Points
3. Calculated Points
4. Pseudo points
5. Accumulator points
6. Date and Time
7. Current limits

D. System Capacity:

At a minimum, the operating software shall be capable of accommodating the following:

1. 3000 discrete status & alarm points
2. 500 measured variables
3. 200 accumulated variables
4. 5000 calculated status & alarm points
5. 500 calculated control points
6. 1-3 operator consoles
7. 1 Remote Operator Console
8. 1 printer for each console

E. Operator's Console:

In general, the operating software shall display all received data in engineering units with operator generated labels, generate and print alarms, print logs, store manually entered data, update CRT displays, and perform operator commanded functions as required by the database. The system shall automatically generate the following system displays:

1. Main Menu page (with direct access to all screens and other program modules)
2. System Summary page (or pages)
3. RTU specific display pages

Beyond the basic operating software required for SCADA operations, the software package shall accommodate the following:

1) Analog Data:

- a. Display value directly in engineering units
- b. Accept High & Low alarm limits and generate alarms
- c. Accept rate of change alarm limit and generate alarm
- d. Store data for trending displays

2) Flow Rate Data:

- a. Display value directly in engineering units
- b. Accept High & Low rate alarm limits and generate alarms
- c. Totalize flow and display in engineering units
- d. Totalize flow as above for 24 hours with reset
- e. Accept High/Low 24 hour total limits and alarms
- f. Store data for trending displays

3) Pump Control Operations:

- a. Display ODC, CTU, and RTU HAND/OFF/AUTO functions
- b. Display Pump CALL/RUN/FAIL status for each pump
- c. Input/Display control database

F. Database Editor:

The Database Editor shall be an on-line operating software system for the generation and modification of the ODC display database for the system. The Contractor shall generate the initial database for the SCADA System, including the graphics displays. It shall be possible to perform the editing function while the system continues to poll remotes for data and performs its normal SCADA control functions. The editor shall operate in an English language type conversational mode and shall not require an understanding of programming as a prerequisite for its use or modification. At a minimum, the following editors shall be available to create or modify the database:

1) RTU and Station Editor

- a. Add, delete, or modify RTU displays.
- b. Modify individual Stations. Stations are defined as collections of individual points from one or more RTUs. Thus, an individual RTU may contain multiple Stations and a Station may contain points from several RTUs.

2) Status Point Definition Editor

Add, delete or modify individual points including the following specific characteristics:

- a. Status points logic
- b. Point and Station name
- c. Alarm conditions
- d. Normal state
- e. Designation of multiple status points associated with a single control point to allow for verification of proper operation

3) Measurement points

- a. Point and Station name
- b. Scaling factors
- c. Rate of change limit
- d. High/Low alarm limits
- e. Normal Condition

All data displays of the measurement point shall be color designated based on which limit has been violated (e.g., green-normal, red-emergency, etc.). The editor shall allow for the creation and modification of text and graphic displays pages. The editor will allow for the entry of the following type of information:

1) Text Display Pages:

- a. Alphanumeric, line and special functional characters for Text Displays
- b. Status/Control points (On/off/alarm display)
- c. Foreground/Background color selection

2) Custom Pixel Level Graphic Displays

- a. Symbols - The status of the equipment shall be indicated by the color of the symbol shown on the display. The following colors shall be used consistently in all displays to indicate the status of equipment:

Pumps:	Called For	- Yellow
	Running	- Green
	Off	- Black
	Failed	- Red
	Signal Loss	- Gray (out of service)
Alarms:	High Level	- Red
	Low Level	- Blue
	Signal Loss	- Gray (out of service)

- b. Digital Display Windows with control of:
 - Numerical format
 - Special display scaling

- c. Analog Bar graph Display Windows with control of:
 - Width
 - Height
 - Display range

- d. Text strings

- 3) As a consequence of the database entry and normal system operation, the system software shall generate the following CRT pages:

- a. Active alarm summary page
- b. Individual RTU page summaries

- 4) The contractor shall generate a custom graphic display for each control grouping in the system.

The system shall provide for password protection to any desired area of the system. Each operator shall be assigned a unique password to control his access. At a minimum, the system shall be capable of limiting access to certain user designated areas:

- a. System Setup
- b. Pump HAND/OFF/AUTO control and High/Low Alarm limits
- c. Pump Stop/Start Control Settings

G. Real-Time Graphic Displays:

The system shall include real-time custom graphic displays. The graphic displays shall be pixel level graphics with full control of the 640x400 pixel resolution of the CRT display. The graphics shall support full 16 color control.

H. Data Archiving:

The program shall track all of the activity in the system. The program shall take a snap-shot of all of the active data in the system every 6 minutes and store this data to the hard drive. The archive data shall be organized by in to monthly files for each RTU. At the end of the month, the operator shall be prompted to move the archived data from the hard drive to floppy disks. The data archiving procedure shall be automatic and employ data compression to allow 1 month of stored data for up to 6 RTUs to be stored on a floppy disk. The data shall be directly usable by the system in its compressed form from either the hard disk or floppy disk storage media.

I. Automatic Logging:

The system shall automatically log all alarm and event activities (ie occurrence, acknowledgement, and clearing) and operator changes to the system. This logging shall be to both the printer and to a monthly file on the hard drive. In addition to the event and alarm log the system shall provide operator selected data logs as follows:

- a. Hourly Logs
- b. Daily Logs

J. Historical Data Trending Module:

The Central Unit shall generate historical data files, stored in available space in the system mass memory. All data is to be accumulated on the hard disk until moved by operator command to the floppy disk storage (ASCII format). Data stored on the floppies shall be capable of being reread directly from the floppies into the system for report generation with out disturbing the current database.

1. Trend Graph Module

This module shall allow the user to output data stored in historical files in trend graph form on the CRT and/or to the printer. These graphs shall be generated by the entry of the following information:

- a. Graph type selection
- b. Historical data set to be used
- c. Names of points to be displayed (up to two different points)
- d. Start date selection
- e. Duration of the trend (24 /48 hour or 7/30 day)

K. Operator Notes Module:

The Operator Notes module shall allow the operator to enter typed data into the system for each of the RTUs. The notes module shall allow operators to pass important information from one operating shift to another. The note module shall also provide for operator input to describe specific circumstances of the operation or maintain a log of operator activities.

L. Pump Maintenance Module:

The Pump Maintenance module shall automatically track the accumulated runtimes and number of starts for each pump in the system. The module shall provide up to 3 operator settable runtime alarms that will alarm when specific maintenance items are required based on accumulated runtime. The runtime alarm counters shall each be resettable by the operator when the service is complete. The module shall also track the number of pump starts and alarm when the number of start exceeds and operator entered setpoint.

M. Historical Report Generator Module:

The system shall include a Historical Report Generator module that allows for operator selected data to be pulled from the archived database and converted to an ASCII, comma delimited file format. The format shall allow for data import into other software packages for data review by the Owner or his engineer. The data search shall allow for 1 to 365 days of accumulated data.

2.05.4 MAPBOARD GRAPHIC DISPLAY PANEL

A. General:

The Central Unit shall include a hardware Graphic Display Panel as described below and shown on the plans.

B. Construction:

This panel shall include a plastic silk screen overlay showing the system layout. This silk screen shall be prepared from originals supplied by the Owner or the Engineer. The Graphic display shall include LED level, pressure, and flow displays and associated alarm/status lamps as detailed below. The mapboard shall communicate with the CTU panel over a multi-conductor cable.

The panel shall include separate display modules for each remote unit. The display modules shall display the following items:

1) Each Water Tower Remote Unit:

- LCD Display (3 digit) of Tank Level (to read in feet)
- High/Low level alarm lamps
- Power Failure alarm lamp
- Loss of Signal alarm lamp

2) Each Booster Pump Station Remote Unit:

LCD Display (3 digit) of Discharge Press. (to read in psi)
LCD Display (3 digit) of Suction Press. (to read in psi)
Pump #1 Running lamp
Pump #2 Running lamp
High Discharge Pressure alarm lamp
Low Suction Pressure alarm lamp
Power Failure alarm lamp
Loss of Signal alarm lamp

3) Each Master Meter Remote Unit:

LCD Display (3 digit) of System Pressure (to read in psi)
Power Failure alarm lamp
Loss of Signal alarm lamp

4) Common Controls:

Common Lamp Test Pushbutton

C. Enclosures:

The Mapboard display shall be provided in a 4' high x 6' wide x 4" deep shadow box, mounted on the wall. The unit shall be aluminum in construction with a wood frame to match the existing office decor. The unit shall be hung on the wall at a location directed by the Owner.

2.06 SINGLE BOARD COMPUTER REMOTE TERMINAL UNITS (SBC-RTUs)

A. General:

The Single Board Computer Remote Terminal Units (SBC-RTU) shall use micro-processors at all locations. The software programs used at all locations shall be stored in non-volatile "burned-in" type ROM memories. The system shall be "self-initializing" and include "watch-dog" circuitry. The software used shall be identical for all sites and interchangeable without regard to station type (i.e. Water Towers, Booster Pump Stations, Sewage Lift Stations, etc.). The SBC-RTUs shall support Mode 1, 2, and 3 type distributed control operations as described previously.

B. Construction:

The remote units shall contain three major components: a Radio Transceiver, a SBC-RTU, and a single (common) 12VDC power supply. Each SBC-RTU shall be capable of controlling a local LCD display, reading BCD thumbwheel assemblies, inputting and outputting analog data (with zero and span adjustments to be part of the remote unit enclosure), and have 110 VAC inputs and outputs with 1000 volts of optical isolation. The SBC-RTU module shall have a plastic shroud to provide complete protection of all components and internal

adjustments during handling. All connections to the SBC-RTU module shall be via gold flashed plug-in connectors. The remote station addressing shall be accomplished via this end mounted connector and not be affected by changing of SBC-RTU modules. LCD displays and thumbwheel assemblies shall be identical to those used at the Central Unit.

The SBC-RTU shall plug to a "passive" wiring interface board. The wiring interface board shall have plug-in connectors for the radio and power supply. All external input and output wiring connections to the RTU panel shall be by barrier type terminal strips. LED lamps shall indicated the status of all discrete inputs and outputs.

C. Enclosures:

The remote unit enclosures for indoor mounting shall meet all the requirements for NEMA Type 12 enclosures. The enclosures shall be made of a minimum 14 gauge steel with continuously welded seems, have a 14 gauge steel hinge, and be furnished with external mounting feet. Subpanels shall be 14 gauge steel for 16x14 enclosures and 12 gauge for larger enclosures. Enclosures larger than 16x14 shall have a rolled lip on 3 sides of the door for added strength. The door opening shall have a rolled edge on 4 sides to protect the door gasket. The gasket shall be heavy neoprene attached to the door with oil resistant adhesive. The enclosure and subpanel finish shall be gray polyester powder coating inside and out over phosphatized surfaces. Nema 12 enclosures shall be Hoffman Bulletin A-51 or A-12.

Remote site installations requiring equipment to be mounted outside shall have the remote unit NEMA 12 enclosure described above mounted inside a vented (and screened), lockable NEMA 3R enclosure. The double enclosure shall be required to control vandalism, provide complete weather protection, reduce the heating effects of the sun, and prolong the life of the equipment. The NEMA 3R enclosure shall be constructed of 14 gauge galvanized steel, with a drip shield top and seem free sides front and back. The NEMA 3R enclosures shall be finished with a dark gray enamel inside and out. The NEMA 3R enclosure shall be Hoffman Bulletin A-3.

2.06.1 WATER TOWER REMOTE UNITS

A. General:

The Water Tower Remote Units shall use a Single Board Computer RTU. The water tower remotes shall transmit a suppressed head type signal representing only the upper usable range of the storage tank. The remote shall include a battery for 24 hour back-up operation as specified.

B. Construction:

The tower transceiver NEMA 12 enclosure shall be mounted inside a vented, lockable, NEMA 3R enclosure as specified. The tower remote equipment shall include an internal power switch, bulk-head coaxial cable lightning arrester, and a power line lightning arrester as specified earlier.

The level transducer shall be a two-wire transmitter suitable for below ground mounting as specified earlier.

C. Installation:

The level transducer shall be installed at a point below freezing in the altitude vault (if available) or in a 24" fiber meter vault with a freeze proof lid. The pressure connection shall be equipped with a corporation stop providing a 1/4" NPT female connection for the transducer. The contractor shall run 3/4" rigid conduit from the vault or meter box to the transceiver enclosure for the transducer signal cable.

The antenna shall be as specified and mounted on the water tower at a height consistent with FCC requirements. The contractor shall provide a 3/4" rigid conduit with a weatherhead from the transmitter to the ladder on the tower.

D. Water Tower Remote Unit Input/Output Requirements:

The Water Tower remotes shall send and receive the following information:

- 1) STANDPIPE:
 - DISCRETE INPUTS:
 - DI- 1) Power Failure
 - DISCRETE OUTPUTS:
 - DO- 1) Telemetry Control Active
 - ANALOG INPUTS:
 - AI- 1) Water Level 0-50.0ft (upper usable range)

2.06.2 BOOSTER PUMP STATION REMOTE UNITS

A. General:

The Booster Pump Station Remote Units shall use a Single Board Computer RTU module. The booster pump station remotes shall receive Pump stop/start commands from the Central Unit (or its respective tower in back-up control). When the pump station is not being controlled by another site or its respective water tower, it shall turn off its "Telemetry Control" output causing pump control to revert to any existing back-up controls. The remote shall include a battery for 3 hour back-up operation as specified above.

B. Construction:

Telemetry Control and Pump Command outputs to other panels shall be dry isolated contacts on plug-in 0-3 minute delays as specified. Indicating lamps shall display the status of these outputs on the front of the enclosure.

Local pressure inputs shall be by two-wire transducers as specified with the transducer located at the sensing point. Flow rate and totalizing shall be as specified above.

The booster pump station equipment shall be housed in a NEMA 12 enclosure. The booster station equipment shall include an internal power switch, bulk-head coaxial cable lightning arrester, and a power line lightning arrester as specified earlier.

C. Installation:

The pressure sensors shall be mounted at the sensing point with 1/2" conduit run to the remote unit enclosure.

The antenna shall be mounted on a 10' long X 1-1/2" diameter mast secured to the side of the structure for an above ground pump stations or on a 20' power pole with 3/4" rigid conduit and a weatherhead run to the station for a below ground pump stations as previously specified.

2.06.3 BOOSTER PUMP STATION COMBINED CONTROL/REMOTE UNIT PANELS

A. General:

The Booster Pump Station Control Panels shall combine the functions of basic pump control and monitoring along with the functions of radio telemetry RTU control into a single integrated control panel. The panel shall include all selector switches (HAND/OFF/AUTO, etc), pressure switches, and logic controls for both manual and automatic operation of the station (including pump control valves). The panel shall include the required contacts and connections for wiring directly to motor starters (coils and auxiliary contacts), solenoid valves, limit switches, and other devices supplied with the pump station. The remote shall include a battery for 3 hour back-up operation as specified above.

The panel shall use a Single Board Computer RTU module. The booster pump station remotes shall receive Pump stop/start commands from the Central Unit (or its respective tower in back-up). When the pump station is not being controlled by another site, it shall turn off its "Telemetry Control" output, causing pump control to revert to any available back-up controls.

B. Protective Pressure Controls:

The control panel shall include protective pressure controls for High Discharge and Low Suction pressure cut-off. These controls shall inhibit the operation of the pumps in "automatic" control only. Pump HAND selection shall override the pressure cut-off controls. Indicating lamps shall display the status of these switches on the front of the enclosure.

C. Back-up Pressure Controls:

The control panel shall include back-up pressure controls as specified. The back-up pressure controls shall include a front panel mounted PRESSURE/AUTO/TELEMETRY selector switch to select the pump control operation as follows:

Pressure - Pressure selection shall cause the pump controls to operate strictly from the discharge pressure using the back-up pressure controls and not radio telemetry.

Auto - Auto selection shall cause the pump controls to operate from radio telemetry and to automatically switch to discharge pressure control in the event of telemetry failure (i.e. loss to Telemetry Control output).

Telemetry - Telemetry selection shall cause the pump controls to operate strictly from radio telemetry and not switch to pressure control on telemetry failure.

D. Automatic Pump Control Valve Operation:

The control panel shall provide for synchronized operation of the pumps, motor starters, and pump control valves. In both manual and automatic operation, the pump will be required to stop and start against a closed Pump Control Valve (PCV). The PCV will be equipped with a Normal Control Solenoid (NCS), a valve position limit switch, and an optional Emergency Control Solenoid (ECS).

Pump Start: When a pump is called, the controls shall start the pump against a closed PCV and energize both the NCS and ECS causing the valve to open slowly. Verification of pump run shall be required for PCV opening.

Pump Stop: When the pump call is canceled, the controls shall de-energize the NCS (the ECS will remain energized), causing the valve to close slowly. The pump shall continue to run until the valve is 95% closed as detected by the PCV limit switch.

Emergency Stop: In the event of pump or power failure the controls shall de-energize both the NCS and ECS to cause the valve to close quickly.

Valve Fail: The controls shall provide an adjustable time delay to monitor the time of valve opening or closing. Should these operations exceed the set time, the controls shall turn-off the pump and display this condition on the front of the panel. Manual reset will be required.

In pump stations equipped with two or more pumps and a single PCV, the controls shall allow for stopping or starting one pump directly with an open PCV valve if two pumps are running. The last pump selected to stop shall be required to do so against a closed PCV.

E. Construction:

Telemetry Control and Pump Command outputs to other panels shall be dry isolated contacts on plug-in 0-3 minute time delays. Indicating lamps shall display the status of these outputs on the front of the enclosure.

All indicating lamps and selector switches shall be NEMA Oiltight rated.

Local pressure inputs shall be by a two-wire transducer as specified earlier with the transducer located at the sensing point. Flow rate and totalizing shall be as specified.

The booster pump station equipment shall be housed in a NEMA 12 enclosure and shall include an internal power switch, bulk-head coaxial cable lightning arrester, and a power line lightning arrester as specified earlier.

F. Installation:

The antenna shall be mounted on a 10' long X 1-1/2" diameter mast secured to the side of the structure for an above ground pump stations or on a 20' power pole with 3/4" rigid conduit and a weatherhead run to the station for a below ground pump stations as previously specified.

The booster pump station RTU/control panel shall be shipped to the pump station manufacture for installation in the prefabricated booster stations. The RTU panel pilot duty contacts shall be wired to the motor starter coils, auxiliary contacts, and other devices in the pump station by the pump station manufacture. The RTU panel pressure connections shall be piped to sensing points by the pump station manufacture.

2.07 PROGRAMMABLE LOGIC CONTROLLER REMOTE TERMINAL UNITS (PLC-RTUs)

A. General:

The "Programmable Logic Controller - Remote Terminal Units (PLC-RTU) shall use micro-processors at all locations. The software programs used at all locations shall be stored in non-volatile "burned-in" type ROM memories. Operating setpoints/parameters shall be entered from an optional local Operator Display Console, a Portable Computer/Terminal, and/or front panel hardware display thumbwheel setpoints and Hand/Off/Auto switches as detailed below. These setpoints shall be stored in non-volatile memory and not be disturbed by power outages or resets. The system shall be "self-initializing" and include "watch-dog" circuitry.

The PLC-RTU shall be capable of supporting an IBM computer based ODC as specified earlier. With the presence of an ODC, the PLC-RTU shall be capable of performing all the functions of a Central Unit and provide "operator initiated" back-up control to the Main Central Unit.

The PLC-RTU shall be capable of operating in all four modes of distributed control as described previously.

B. Construction:

The PLC-RTU construction shall be as described for the Central Unit CTU panel above. Each panel shall contain hardware displays (i.e. LCD displays, HOA switches, Call/Run/Fail lamps, etc) as detailed for each remote unit below.

C. Enclosures:

PLC-RTUs shall use enclosure systems as described for the Single Board Computer RTU above.

2.07.1 WATER TREATMENT PLANT REMOTE UNIT (AND AUXILIARY CENTRAL UNIT)
(Existing)

A. General:

The Water Treatment Plant Remote Unit shall use a Programmable Logic Controller Remote Unit (PLC-RTU) as described previously. The unit shall use plug-in cards (interchangeable with the cards at the Central Unit) with card cage type construction.

The Water Treatment Plant remote unit shall include an IBM Operator Display Console (ODC) computer, printer, and software as described for the Main Central Unit previously. This unit shall monitor and control the local inputs & outputs and remote units listed below. It shall receive data from the Main Central Unit on the other RTUs in the system and provide manually initiated Override Control of the other RTUs.

B. Operation:

The High Service Pumps shall operate in both mode 1 and mode 3 distributed control. In mode 1 the High Service Pumps shall receive Pump stop/start commands from the Main Central Unit. In mode 3 control the High Service pumps shall be controlled locally with level information from the associated tower level RTU (and/or the Main Central Unit). When the High Service pumps are not being controlled by another site, they shall turn off their "Telemetry Control" output causing pump control to revert to any existing back-up controls.

The Well Pumps shall operate from local control logic as part of this PLC-RTU. The Water Treatment Plant RTU shall provide direct control of the Well Pumps from the Clearwell Level and provide a data exchange with the Main Central Unit in Mode 4 type distributed control. The RTU shall also accept overriding control commands of the Well Pumps from the Central Unit.

C. Construction:

The Water Treatment Plant equipment shall be housed in a NEMA 12 enclosure and shall include an internal power switch, bulk-head coaxial cable lightning arrester, and a power line lightning arrester as specified earlier. The remote shall include a battery for 3 hour back-up operation as specified above.

Command outputs to other panels shall be dry isolated contacts on plug-in 0-3 minute delays. Indicating lamps shall display the status of these outputs on the front of the enclosure.

Local pressure inputs shall be by a two-wire transducer as specified earlier with the transducer located at the sensing point. Flow rate and totalizing shall be as specified above.

D. Installation:

The antenna shall be mounted on a 10' long X 1-1/2" diameter mast secured to the side of the building or on a bracketed ROHN 40' antenna tower.

E. Water Treatment Plant Remote Unit Input/Output Requirements:

The Water Treatment Plant send, receive, and or control the following information:

1) HIGH SERVICE PUMPS:

DISCRETE INPUTS: DISCRETE OUTPUTS:

DI- 1) HS Pump #1 RUNNING	DO- 1) High Service Pump #1 CALL
2) HS Pump #2 RUNNING	2) High Service Pump #1 CALL
3) Power Failure	3) Telemetry Control Active

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- 4) Entry Alarm
- 5) High Discharge Cut-off
- 6) Low Clearwell Cut-off

ANALOG INPUTS:

- AI- 1) Discharge Pressure 0-250psi
2) (spare)

PULSE INPUT:

- I- 1) Effluent Flow Rate 0-500gpm

INPUT EXPANSION MODULE INPUTS:

- DI- 1) High Serv Pump #1 HAND 09)
2) High Serv Pump #1 AUTO 10)
3) High Serv Pump #2 HAND 11
4) High Serv Pump #2 AUTO 12)
5) 13)
6) 14)
7) 15)
8) 16)

2) WELL PUMPS:

DISCRETE INPUTS: DISCRETE OUTPUTS:

- | | |
|------------------------|--------------------------|
| DI- 1) Well #1 RUNNING | DO- 1) Well Pump #1 CALL |
| 2) " #2 " | 2) " " #2 " |
| 3) " #3 " | 3) " " #3 " |
| 4) " #4 " | 4) " " #4 " |
| 5) Power Failure | 5) Telemetry Control |

ANALOG INPUTS:

- AI- 1) Clearwell Level 0-25.0feet
2) (spare)

PULSE INPUT:

- PI- 1) Influent Flow Rate 0-500gpm

INPUT EXPANSION MODULE INPUTS:

- | | |
|---------------------|----------------------------|
| DI- 1) Well #1 HAND | 09) Chemical Feeder #1 RUN |
| 2) Well #1 AUTO | 10) Chemical Feeder #2 RUN |
| 3) Well #2 HAND | 11) Chemical Feeder #3 RUN |
| 4) Well #3 AUTO | 12) Chemical Feeder #4 RUN |
| 5) Well #3 HAND | 13) Chlorine Leak Alarm |
| 6) Well #3 AUTO | 14) |
| 7) Well #4 HAND | 15) |
| 8) Well #4 AUTO | 16) |

F. Front Panel Hardware Displays for Remote Units:

The Water Treatment Plant Unit shall include separate front panel displays for specific remote unit data. Each displayed remote shall

have its own display device. Single unit display devices that provide scanning displays of information or that require operator intervention to display the desired data will not be allowed.

The Water Treatment Unit shall include front panel mounted hardware display and control input devices for each of the following:

- 1) Each Water Tower Remote Unit:
 - LCD Display (3 digit) of Tank Level (to read in feet)
 - High/Low level alarm thumbwheel setpoint assembly
 - High/Low level alarm lamps

10" Circular Chart level recorder (to read in feet)

G. Front Panel Hardware Displays for Local Control Functions:

The Water Treatment Plant Unit shall include front panel mounted hardware display and control input devices for locally controlled devices. The HAND selection of HAND/OFF/AUTO switches shall provide direct manual control of the local devices without any interposing micro-processor logic. Local display and control inputs shall be as follows:

- 1) Clearwell Level:
 - LCD Display (3 digit) of Tank Level (to read in feet)
 - High/Low level alarm thumbwheel setpoint assembly
 - High/Low level alarm lamps

- 2) High Service Pumps:
 - LCD Display (3 digit) of Discharge Press (to read in psi)
 - LCD Display (3 digit) of Flow Rate (to read in gpm)
 - Flow Totalizer (6 digit) (to totalize in 1000 gallons)
 - Pump #1 HAND/OFF/AUTO selector switch assembly
 - " " CALL/RUN/FAIL lamps
 - Pump #2 HAND/OFF/AUTO selector switch assembly
 - " " CALL/RUN/FAIL lamps
 - Pump Alternator Selector Switch (Pump1/Auto/Pump2)
 - Lead & Lag Pump Stop/Start thumbwheel setpoint assemblies
 - High Discharge Pressure alarm lamp
 - Low Clearwell Cut-off " "
 - Power Failure alarm lamp

- 3) Well Pumps:
 - LCD Display (3 digit) of Flow Rate (to read in gpm)
 - Flow Totalizer (6 digit) (to totalize in 1000 gallons)
 - Well #1 HAND/OFF/AUTO selector switch assembly
 - " " CALL/RUN/FAIL lamps
 - Well #2 HAND/OFF/AUTO selector switch assembly
 - " " CALL/RUN/FAIL lamps
 - Well #3 HAND/OFF/AUTO selector switch assembly
 - " " CALL/RUN/FAIL lamps

Well #4 HAND/OFF/AUTO selector switch assembly
 " " CALL/RUN/FAIL lamps
 Well Alternator PUMP1/AUTO/PUMP4 Selector Switch
 Lead & Lag Well Stop/Start thumbwheel setpoint assemblies

4) Chemical Feeder Controls:

Chemical Feeder #1 HAND/OFF/AUTO selector switch assembly
 " " " CALL/RUN/FAIL lamps
 Chemical Feeder #2 HAND/OFF/AUTO selector switch assembly
 " " " CALL/RUN/FAIL lamps
 Chemical Feeder #3 HAND/OFF/AUTO selector switch assembly
 " " " " " CALL/RUN/FAIL lamps
 Chemical Feeder #4 HAND/OFF/AUTO selector switch assembly
 " " " CALL/RUN/FAIL lamps

5) Common Controls & Displays:

CTU System Normal lamp & output relay
 CTU Power ON lamp
 Lamp Test Pushbutton (common to all lamps)
 Alarm Acknowledge Pushbutton (common to all alarms)
 Alarm Horn (common to all alarms)

2.08 PORTABLE DATA UNIT (Existing)

A. General:

The Portable Data Unit (PDU) shall be a fully integrated device incorporating radio receiver, battery, and sub-notebook computer into a compact integrated package. The unit shall be a passive (receive only) device that receives alarm and status information from both the Central Unit and directly from the remote sites.

B. Construction:

The unit shall include a CGA compatible LCD display to display levels, pressures, flows, status points, and alarm points. The unit shall store the last 24hrs of analog data for display on the LCD display as a trend graph. The trend graph shall contain a movable Time and Value Read Line; indicating the analog value at a specific time. The unit shall have a QWERTY keypad with dedicated function keys for data entry to include: alarm acknowledgment, data access, high/low alarm setpoints, and display scan control. The PDU shall be software intensive so that expansions and changes to the telemetry system shall require only software modifications. The PDU shall have an internal battery for 4 hours battery operation and include external cigarette lighter and wall plug type chargers capable of charging the unit while operating.

Each PDU shall be supplied with a fixed base antenna system to be installed by the Owner. The antenna system (as specified earlier) shall include antenna, coaxial cable, connectors, lightning

arrester, and ground rod. The system layout and data relay points shall insure 100% coverage at the fixed location(s) selected by the Owner when the CTU is operating. A magnetic base mobile antenna with coaxial cable and connector shall also be included. The system shall provide a minimum 50% area coverage while in mobile operation. The hardware shall be housed in a rugged molded plastic enclosure. To insure portability the monitor shall be sized so that the sum of the height, width, and depth dimensions shall not exceed 21" and the weight shall be less than 6 pounds.

C. Operation:

The monitor shall indicate the levels, pressures, alarms, and status points from all stations by use of a scanning display. The LCD shall display each remote station's name and number in sequence and the alarm/status points, levels, pressures, flow rates, high/low alarms, call/run/fail status for each pump, and loss of signal status for each station. Occurrence of an alarm shall cause the display scan to stop and the LCD display to indicate the time, the station number, and the specific alarm. The internal horn shall annunciate the alarm occurrence until acknowledged. Operator acknowledgment shall cause the display to shift to the next station with an active alarm, or to resume scanning if no new alarms are present. The monitor shall store the last 100 existing alarms and their time of occurrence. The operator may prompt the monitor to draw a trend chart covering the previous 24 hours for any selected analog (Tank level, PSI, Flow rate, etc.).

PART 3 EXECUTION

3.01 EXAMINATION

The control system shall be completely tested prior to shipment. The entire control system shall be "Burned In" at the factory for a period of at least 20 days. The component equipment shall be computer tested and temperature cycled at zero degrees and at fifty degrees centigrade.

3.02 FCC LICENSING

The system manufacturer/supplier shall be responsible for collecting all information, generating all paper work, and paying all fees required to obtain a license on behalf of the Owner.

If the system supplier can demonstrate to the satisfaction of the Engineer that no VHF (154-173 MHz) frequency can be obtained, he may apply for a UHF (450-470 MHz) frequency for operation under Part 90.267 for 12.5 kHz offset channels or Part 90.261 for secondary basis channels. The system will still be required to operate with point-to-point operation within the FCC rules and regulations and provide the same rf path margins as detailed the specifications.

The UHF radios must meet or exceed the requirements set forth in these specifications for VHF radios, except that the radio output power may be 10 watts adjustable to 2 watts to meet FCC requirements. Antennas shall be constructed as previously specified and provide 10db of gain. No changes to the contract amount will be made for a change to UHF operation.

3.03 START-UP

The manufacturer shall supply "Factory" personnel for start-up service as needed to insure satisfactory operation. Subsequent trips to the job site to correct defects shall be made at no charge to the Owner during the warranty period.

3.04 TRAINING

The system manufacturer shall supply "factory" personnel to conduct two separate on-site training sessions.

The initial training session shall be conducted during start-up as needed until the Owner and Engineer are satisfied that the operators are comfortable with the operation and maintenance of the system. Training shall be done on site with the owner's personnel.

Six months after the Owner commencing system operation, the system manufacturer shall supply "factory" personnel to conduct follow-up training of the Owner's personnel. The follow-up training shall be conducted on-site and consist a three day training session reviewing the operation and maintenance of the system. The Owner shall be contacted a minimum of two weeks in advance, prior to scheduling the training session to allow proper coordination.

3.05 SUBSTANTIAL COMPLETION

Substantial completion will be granted by the Engineer only after completion of the start-up and initial training phase of the project. The Engineer shall make an inspection of the system to determine the status of completion. Substantial completion will be awarded only when the system is providing usable service to the Owner. If the system is commissioned in phases, the Contractor may request substantial completion for the completed phases.

3.06 ACCEPTANCE TEST

After start-up and debugging of the entire system has been completed, the system manufacturer shall notify the Engineer that he is ready to begin the 60-day acceptance test. The system must run continuously for 60 consecutive calendar days. During this period, all system functions shall be exercised in automatic control, including all levels of back-up control. Any system interruption

and accompanying component, subsystem, or program failure shall be logged for cause of failure, as well as the time of occurrence and the duration of each failure.

Failures shall be classified as either major or minor by the Owner's representative. A minor failure would be a small, noncritical component failure which is corrected by the operators. This occurrence shall be logged but shall not be grounds for non-acceptance unless the same or similar failure occurs repeatedly (more than two such failures of similar components). A major failure shall be considered to have occurred when a component, subsystem, or program fault causes a halt in the operation of the system and/or when a "factory" technician's work is required to make a repair or to reinitiate operation of the system.

A major failure shall cause termination of the 60 day acceptance test. When the causes of a major failure have been corrected, a new 60 day acceptance test shall be started. Final Acceptance of the control system shall not occur until satisfactory completion of this 60 day test.

The manufacturer shall provide "factory" personnel who shall be on site and conduct the initial system exercise portion of the testing. The manufacturer shall be responsible for maintaining a checklist type test report wherein each function is checked-off and initialed by the Owner's representative as it is demonstrated. During the remainder of the 60-day acceptance test, the manufacturer shall provide 24 hour response to calls from the owner in order to correct any failure.

3.07 WARRANTY

The control system manufacturer shall supply a five (5) year parts and labor warranty for all items supplied under this section (except as noted below). Power surges and lightning damage shall be included as part of the warranty.

The warranty shall begin from the time of "substantial completion" as issued by the engineer. The manufacturer shall provide a 24 hour response to calls from the Owner. The manufacturer, at his discretion, may dispatch replacement parts to the Owner by next-day delivery service for field replacement by the Owner. Any damage to the control system caused by the actions of the Owner in attempting these field replacements shall be the sole responsibility of the manufacturer. If, during the warranty period, satisfactory field repair can not be attained by field replacement of parts by the Owner, the manufacturer shall dispatch "factory" personnel to the job site to complete repairs at no cost to the Owner.

The IBM Computer System Unit, keyboard, CRT display, printer, and associated UPS (and Portable Operator Display Console if specified

in this contract) shall be covered by a one (1) year warranty beginning with "substantial completion". Lightning damage shall be included as part of the warranty on these components.

Flow meters and control valves supplied as part of this contract shall be covered by a one (1) year warranty beginning with "substantial completion".

3.08 INSTALLATION

- A. Contractor shall install all instrumentation equipment as shown on plans and/or called for in specifications.
- B. Contractor shall install all necessary cables and sensor wires. These cables and sensor wires shall be enclosed in conduit, except where direct bury cable is shown on the plans.
- C. All analog signals shall be carried on 18 AWG shielded cable in separate conduit.
- D. The Contractor is responsible for bringing all power needed by the equipment to such equipment. He shall provide all wiring, conduit and all other items needed to install these power sources.

END OF SECTION