SPECIFICATIONS

NORTHERN KENTUCKY WATER DISTRICT

Dudley Discharge 36-inch Redundancy Project Crestview Hills, Kenton County, Kentucky

2010-00351

August 2010

COMPILED BY:
Northern Kentucky Water District (Owner)
2835 Crescent Springs Road
Erlanger, Kentucky 41018

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COMMISSION

SPECIFICATIONS

FOR

NORTHERN KENTUCKY WATER DISTRICT

Dudley Discharge 36-inch Redundancy Project
Crestview Hills, Kenton County, Kentucky

August 2010

GOVERNING BODY

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COMPILED BY:
Northern Kentucky Water District (Owner)
2835 Crescent Springs Road
Erlanger, Kentucky 41018

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ONE MOOCK ROAD WILDER, KENTUCKY 41071
PHONE: (859) 581-9600 FAX: (859) 581-9636
www.cardinalengineering.net

DUDLEY DISCHARGE
36-INCH REDUNDANCY PROJECT
CLARIFICATION

TO: ALL BIDDERS
OWNER: NORTHERN KENTUCKY WATER DISTRICT
DATE: August 17, 2010
BID DATE: August 24, 2010

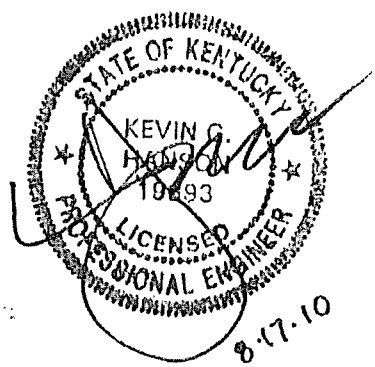
A. At **Station 54+76 on Sheet C-3.8,** there is a discrepancy between the plan and profile views for the 22-1/2 degree horizontal bend. The text shall read "**22-1/2 Horizontal Bend w/ Thrust Blocking.**" **No additional restraints are required.**

B. At **Station 63+76 on Sheet C-3.10,** there is a discrepancy between the plan and profile views for the 22-1/2 degree horizontal bend. The text shall read "**22-1/2 Horizontal Bend w/ Thrust Blocking.**" **No additional restraints are required.**

If you have any questions, please contact me at (859) 581-9600. This notice is being faxed to you.

Respectfully Submitted,

Kevin Hanson, P.E.



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DUDLEY DISCHARGE
36-INCH REDUNDANCY PROJECT
CLARIFICATION

TO: ALL BIDDERS
OWNER: NORTHERN KENTUCKY WATER DISTRICT
DATE: August 17, 2010
BID DATE: August 24, 2010

A. At **Station 54+76 on Sheet C-3.8**, there is a discrepancy between the plan and profile views for the 22-1/2 degree horizontal bend. The text shall read "**22-1/2 Horizontal Bend w/ Thrust Blocking.**" **No additional restraints are required**.

B. At **Station 63+76 on Sheet C-3.10**, there is a discrepancy between the plan and profile views for the 22-1/2 degree horizontal bend. The text shall read "**22-1/2 Horizontal Bend w/ Thrust Blocking.**" **No additional restraints are required**.

If you have any questions, please contact me at (859) 581-9600. This notice is being faxed to you.

Respectfully Submitted,

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DUDLEY DISCHARGE
36-INCH REDUNDANCY PROJECT
ADDENDUM NO. 1

TO: ALL BIDDERS
OWNER: NORTHERN KENTUCKY WATER DISTRICT
DATE: August 19, 2010
BID DATE: August 24, 2010

1. At **Stations 10+80, 11+49, 11+66, 11+90, and 12+08 on Sheet C-3.0**, there are discrepancies between the plan and profile views for the horizontal and vertical bends. The bends are to be **internal restrained** as mentioned in Thelen's report.
2. At **Stations 48+75 and 48+91 on Sheet C-3.7**, the bends are inadvertently called out as restrained. The bends are to be **internal restrained** as mentioned in Thelen's report.
3. At **Station 48+91 on Sheet C-3.7**, the internal restrained pipe length indicated is incorrect. It should be read "PER THELEN'S REPORT, INSTALL 36' **(54' EA SIDE OF THE 11-1/4 BEND)** OF 36" CLASS 250 (INTERNAL RESTRAINED JOINT) D.I.P. W/ POLYETHYLENE WRAP (42" MIN. COVER)."
4. At **Station 63+86 on Sheet C-3.10**, there is a discrepancy between the plan and profile views for the 22-1/2 degree horizontal bend. The text shall read "**22-1/2 Horizontal Bend w/ Thrust Blocking.**" **No additional restraints are required**.
5. At **Stations 66+56, 68+36, 68+65, and 68+80 on Sheet C-3.10**, there are discrepancies between the plan and profile views for the horizontal and vertical bends. The bends are to be **internal restrained** as mentioned in Thelen's report.
6. At **Station 68+80 on Sheet C-3.10**, the internal restrained pipe length indicated is incorrect. It should be read "PER THELEN'S REPORT, INSTALL 36' **(147 L.F. MIN.)** OF 36" CLASS 250 (INTERNAL RESTRAINED JOINT) D.I.P. W/ POLYETHYLENE WRAP (42" MIN. COVER)."

7. Due to the clarifications in Item nos. 1-6 above, the quantity of "internal restrained" is anticipated to be **885 LF for Bid Item No. 2**. Hence, **Bid Item No. 1 is to be 5,197 LF**.

1	6.01 CLASS 250 DUCTILE IRON PIPE *(36-inch)* WITH BONDED JOINTS. (Detail 103, 103a, 104, 104a, 110)	LF	5197		
2	6.02 CLASS 250 DUCTILE IRON PIPE INTERNAL RESTRAINED JOINT.*(36-inch)* WITH BONDED JOINTS. (Detail 103, 103a, 104, 104a, 110, Thelen Details x & x)	LF	885		

8. At Station 41+62 on Sheet C-3.11, there is a discrepancy between the plan and profile notes regarding the connection required. The plan view note is correct. The profile view shall read the same as follows: **"CONNECT TO EXIST. 36" RESILENT SEATED GATE VALVEAS SET BY THE NKWD. CONNECTION TO THE EXIST. WATER MAIN TO BE PERFORMED BY THE NKWD."**
9. Section 01025 Measurement and Payment was inadvertently left out of the specification book. A copy of said section is attached to this addendum.

Attached are new bid sheets for your use. If you have any questions, please contact me at (859) 581-9600. This notice is being faxed to you.

Respectfully Submitted,

Kevin Hanson, P.E.

Note: Bidder agrees to perform all the following work described in the specifications and shown on the plans, for the following unit prices:

Item No.	Description	Unit of Measure	Estimated Quantity	Unit Cost Total	Total Cost
1	6.01 CLASS 250 DUCTILE IRON PIPE *(36-inch)* WITH BONDED JOINTS. (Detail 103, 103a, 104, 104a, 110)	LF	**5197** ~~5053~~		
2	6.02 CLASS 250 DUCTILE IRON PIPE INTERNAL RESTRAINED JOINT.*(36-inch)* WITH BONDED JOINTS. (Detail 103, 103a, 104, 104a, 110, Thelen Details x & x)	LF	**885** ~~1029~~		
3	7.01 CONNECT TO EXISTING 36-INCH MAIN	EA	4		
4	8.01 INSTALL HIGH PRESSURE FIRE HYDRANT ASSEMBLY WITH VERTICAL CONNECTION	EA	5		
5	9.02 RESILIENT SEATED GATE VALVE *(36-inch)*	EA	2		
6	11.01 CONCRETE ENCASEMENT	LF	112		
7	11.02 4-INCH UNDERDRAIN	LF	357		
8	11.05 AIR RELEASE VALVE (*2-inch ARV and service line materials provided by NKWD*)	EA	1		
9	11.06 ANCHORING TEE AND BLOCK *(36-inch x 36-inch x 6-inch)*	EA	5		
10	11.07 TEE AND BLOCK *(36-inch x 36-inch x 24-inch)*	EA	1		
11	11.07 TEE AND BLOCK *(36-inch x 36-inch x 36-inch)*	EA	1		
12	11.12 36-INCH DUCTILE IRON BEND *(11-1/4 Degree)*	EA	8		
13	11.12 36-INCH DUCTILE IRON BEND *(22-1/2 Degree)*	EA	2		

14	11.12 36-INCH DUCTILE IRON RESTRAINED BEND *(11-1/4 Degree)*	EA	6		
15	11.12 36-INCH DUCTILE IRON RESTRAINED BEND *(22-1/2 Degree)*	EA	7		
16	11.12 36-INCH DUCTILE IRON RESTRAINED BEND *(45 Degree)*	EA	2		
17	11.12 CORROSION TEST STATION	EA	9		
18	11.13 CORROSION PROTECTION SYSTEM - 48# MAGNESIUM ANODE	EA	61		
19	12.04 ASPHALTIC CONCRETE MILLING AND PAVING	SY	110		
20	12.10 CONCRETE CURBING	LF	30		
21	12.11 CONCRETE SIDEWALK	SY	5		
22	12.14 BEST MANAGEMENT PRACTICES	LS	1		
23	12.15 REMOVE EXISTING TREES (2)	LS	1		
24	12.18 CONCRETE BANK RESTORATION IN CREEK	SY	14		
25	12.17 TEMPORARY CHAIN LINK FENCE	LF	20		
26	12.19 REMOVE AND REINSTALL EXISTING CHAIN LINK FENCE	LF	95		
27	12.20 REMOVE AND REPLACE EX. 15" CULVERT AND HEADWALLS	LF	22		
28	12.20 REMOVE AND REPLACE EX. 18" CULVERT AND HEADWALLS	LF	35		
29	12.21 REMOVE AND REPLACE EX. CONCRETE WALL	LF	10		
30	12.17 REMOVE AND REINSTALL GUARDRAIL	LF	50		
	TOTAL BID				

Section 01025

MEASUREMENT AND PAYMENT

1. SCOPE. This section covers methods of measurement and payment for items of Work under this Contract.

2. GENERAL. The total Contract Price shall cover all Work required by the Contract Documents. All costs in connection with the proper and successful completion of the Work, including furnishing all materials, equipment, supplies, and appurtenances; providing all construction plant, equipment, and tools; and performing all necessary labor and supervision to fully complete the Work, shall be included in the unit and lump sum prices bid. All Work not specifically set forth as a pay item in the Bid Form shall be considered a subsidiary obligation of Contractor and all costs in connection therewith shall be included in the prices bid. The Contractor shall be responsible for supplying all project materials, except for items supplied by the Owner as indicated in the Bid Item Descriptions below and on the bid form.

3. ESTIMATED QUANTITIES. All estimated quantities stipulated in the Bid Form or other Contract Documents are approximate and are to be used only (a) as a basis for estimating the probable cost of the Work and (b) for the purpose of comparing the bids submitted for the Work. The actual amounts of work done and materials furnished under unit price items may differ from the estimated quantities. The basis of payment for work and materials will be the actual amount of work done and materials furnished. Contractor agrees that it will make no claim for damages, anticipated profits, or otherwise on account of any difference between the amounts of work actually performed and materials actually furnished and the estimated amounts therefor.

4. EXCAVATION AND TRENCHING. Except where otherwise specified, the unit or lump sum price bid for each item of Work, which involves excavation, or trenching shall include all costs for such Work. No direct payment shall be made for excavation or trenching. All excavation and trenching shall be unclassified as to materials, which may be encountered; in addition, trenches shall be unclassified as to depth.

5. BID PRICES TO INCLUDE INCIDENTAL WORK. The bid prices will cover and include the cost and expense of all contingents, accessories and incidental work and material required to complete the improvement. This includes replacement of services, pavement, fences and any other objects which are affected in the process of construction on this work. It shall also include where necessary, watchmen, flagmen, barricades, red lights, all backfill material such as gravel, flowable fill and any temporary restoration, construction joints, finishing and curing concrete, dust control, maintenance of traffic, maintenance of existing sewage flow, provision for access to property, and many other incidents which occur on a normal construction job.

DESCRIPTION OF BID ITEMS

NOTE: Descriptions of each material can be found in Section 01600 Technical Provisions

6. PIPELINES. Pipelines which are to be paid for on a unit price basis shall be measured for payment on a horizontal plane after installation of the pipe. Where lines are laid to conform

to stationed profiles, payment shall be made on linear quantities based on the pipeline stationing as determined by surveys made after installation.

The measurement of the length of each line or run of pipe of each size will begin and end at:

a. The end of the pipe where connected to an existing pipe, fitting, or valve; or at the end of a dead-end run.

b. The center lines intersection of the run and branch on tees, crosses, or laterals where a branch line connecting therewith is constructed under this Contract. Where a branch fitting is installed under this Contract, and the branch or connecting line is to be constructed by others at some future date or under another contract, the pay measurement will include the entire laying length of the branch or branches of such fitting.

c. The measurement of each line of pipe of each size which is to be paid for on a unit price basis will be continuous through, and shall include the full laying lengths of, all fittings and valves installed between the ends of each line; except that the laying lengths of reducers and increasers will be divided equally between the connected pipe sizes. Connecting piping for fire hydrants will be paid under the unit price for fire hydrants.

6.01 PRESSURE CLASS 250 DUCTILE IRON PIPE (ALL SIZES). (Detail 103, 103a, 104, 104a, 110). Includes the specified pipe, polyethylene wrap, fittings, bends, tracing wire, excavation, labor, equipment, bedding, backfill, restoration of non-paved areas, etc. required to install the specified pipe at the location shown on the plans, or as directed, in accordance with the specifications and standard drawings complete and ready for use. Paid LINEAR FEET (LF).

6.02 PRESSURE CLASS 250 DUCTILE IRON PIPE (ALL SIZES) – INTERNAL RESTRAINED JOINT. (Detail 103, 103a, 110). Includes the specified pipe, polyethylene wrap, bonded joints, excavation, labor, equipment, bedding, backfill, restoration of non-paved areas, etc. required to install the specified pipe at the location shown on the plans, or as directed, in accordance with the specifications, plans, and standard drawings complete and ready for use. Paid LINEAR FEET (LF).

6.03 C-900, C-909 Poly Vinyl Chloride (PVC) (ALL SIZES). (Detail 103, 103a, 104, 104a, 111). Includes the specified pipe, polyethylene wrap, fittings, bends, excavation, labor, equipment, bedding, backfill, disinfection, pressure testing, restoration of non-paved areas, tracing wire etc. required to install the specified pipe at the location shown on the plans, or as directed, in accordance with the specifications and standard drawings complete and ready for use. Paid LINEAR FEET (LF).

6.04 CASING PIPE. Includes the casing pipe (K.D.O.T. or Railroad Spec.), labor, equipment, excavation, backfill, restoration, etc. required to install the casing pipe at the location shown on the plans, or as directed, in accordance with the specifications and standard drawings complete and ready for use. Paid LINEAR FEET (LF).

a. Crossings. Where tunneling is required in connection with railroad, highway, or primary road crossings, each crossing shall be measured for payment horizontally along the longitudinal center line of the enclosing conduit or pipe installed therein, from end to end of the enclosing conduit, or from end to end of the tunnel

excavation where an enclosing conduit is not required. Each designated type of crossing shall include the following:

b. Crossings in Earth Backfill Tunnel. The unit price bid for each crossing in earth backfill tunnel shall include all costs in connection with excavation and backfilling, the excess cost of installing pipe in tunnel above the amount bid for the pipe laid in open trench, all skids, jointing materials, stabilized sand backfill, and all other work for and in connection with the crossing, not paid for separately. Separate payment shall not be made for tunnel liner or supports which may be needed for Contractor's convenience; all such items shall be considered a subsidiary obligation of Contractor.

c. Crossings in Conduit. The unit price bid for each crossing in pipe conduit or tunnel liner shall include all costs in connection with excavation and backfilling, pipe conduit or tunnel liner, the excess cost of installing pipe in pipe conduit or tunnel liner above the amount bid for the pipe laid in open trench, all skids, jointing materials, jacking pipe, jacking pits, sand backfill, end closures, and all other work for and in connection with the crossing, not paid for separately.

6.05 WATER MAIN DISINFECTION AND DE-CHLORINATION (ALL SIZES). Includes all labor, equipment, fittings, chemicals, materials to disinfect the new water main(s) and properly de-chlorinate the disinfection water required to put to water mains in service in accordance with the specifications and District's Standard Drawings and Specification. Temporary piping connections for disinfection and de-chlorination shall be included with this work. If additional disinfection and de-chlorination procedures are needed beyond the first test, the contractor shall be responsible for all extra cost. Paid LUMP SUM (LS).

6.06 WATER MAIN PRESSURE TEST (ALL SIZES). Includes all labor, equipment, excavation, backfill, fittings, materials, temporary connections, restoration of non-paved areas, etc. to pressure test the new water main(s) in accordance with the project specifications and District's Standard Drawings and Specification. . If additional water main pressure tests are needed beyond the first test, the contractor shall be responsible for all extra cost. Paid LUMP SUM (LS).

7. Connections to Existing Water Mains. Connections to existing water mains will be paid for at the lump sum prices bid. Each lump sum price named for a connection shall include all costs incurred for making the connection over and above the price of the connecting piping in place. Each lump sum price shall include furnishing and installing the tapping sleeve and valve, fittings; all excavation, blocking and backfilling work; tapping of existing main; and all other costs not included under other bid items.

7.01 CONNECT TO EXISTING MAIN/TIE-IN (ALL SIZES). Includes all labor, equipment, excavation, fittings, sleeves, couplings, blocking, anchoring, polyethylene wrap, disinfection, pressure testing, backfill and restoration, required to make the connection as shown on the plans, and in accordance with the specifications. If necessary, this work shall also include the materials needed to make the connection/transition into another restrained pipe system. Pipe for connection shall be paid under pipe bid item and shall be measured thru connection fittings. Paid EACH (EA).

7.02 TAPPING SLEEVE & VALVE (ALL SIZES) Includes the District approved tapping sleeve and valve, polyethylene wrap, labor, equipment, excavation, blocking, anchoring, disinfection, backfill, restoration, etc. to install the specified fitting at the locations shown on the plans in accordance with the specifications and standard drawing complete and ready for use. Paid EACH (EA) when complete.

7.03 REMOVE EXISTING PLUG AND BLOCK AND CONNECT INTO EXISTING WATER MAIN (ALL SIZES) Includes all labor, equipment, excavation, fittings, sleeves, couplings, blocking, anchoring, polyethylene wrap, disinfection, pressure testing, backfill and restoration, required to remove the existing plug & block and make the needed connection as shown on the plans, and in accordance with the specifications. If necessary, this work shall also include the materials needed to make the connection/transition into another restrained pipe system. Pipe for connection shall be paid under pipe bid item and shall be measured thru connection fittings. Paid EACH (EA).

8. Fire Hydrants. Fire hydrants will be paid for at the unit price bid. The unit price named for each fire hydrant installation shall include all costs incurred in furnishing and installing the fire hydrant; auxiliary gate valve, all connecting piping to the adjacent water main, accessories, and appurtenances, concrete blocking behind and under the fire hydrant, drainage facilities, yard restoration and all other costs not included under other bid items.

8.01 INSTALL FIRE HYDRANT ASSEMBLY. (Detail 109). Includes all labor, equipment, excavation, concrete blocking, 6" Ductile Iron Resilient Seated Gate Valve, Valve box, 6" Ductile Iron Anchor Coupling, Fire Hydrant, extensions, granular drainage material, backfill and yard restoration to install fire hydrant complete and in accordance with the specifications and standard drawings. Paid EACH (EA).

8.02 INSTALL FUTURE FIRE HYDRANT VALVE. (Detail 109). Includes all labor, equipment, excavation, 6" Ductile Iron Resilient Seated Gate Valve, Valve box, Plug, backfill and yard restoration to install future fire hydrant assembly complete and in accordance with the specifications and standard drawings. Paid EACH (EA).

8.03 REMOVE FIRE HYDRANT. Includes all labor, equipment, excavation, backfill and yard restoration to remove an existing fire hydrant, cap hydrant lead if necessary and return to the Northern Kentucky Water District warehouse. Paid EACH (EA).

8.04 RELOCATE FIRE HYDRANT. Includes allowing for Northern Kentucky Water District's Inspector to inspect the existing fire hydrant prior to reuse, returning unusable fire hydrants to the Northern Kentucky Water District Warehouse and picking up a replacement hydrant for use. Includes the labor, equipment, excavation, bedding, backfill, testing, disinfection, and yard restoration to relocate existing fire hydrant to valve, pipe, and anchoring tee as indicated on plans and on standard drawings contained in the plans. The pipe, valve and anchoring tee shall be paid under separate bid items when required. The Contractor to supply and install all anchoring couplings, fire hydrant extensions, concrete blocking, yard restoration, granular drainage material, etc, needed to install the fire hydrant complete and ready for use as shown on the plans, and in accordance with the specifications and standard drawings. Paid EACH (EA).

8.05 ADJUST FIRE HYDRANT TO GRADE. Includes the labor, equipment, excavation, bedding, backfill, testing, disinfection, and yard restoration to adjust the existing fire

hydrant using the fire hydrant manufacturer's extension kit for adjustments of 18" or less. Adjustments greater than 18" require anchoring couplings and vertical bends to adjust to grade. The Contractor will supply and install all anchor couplings, bends, fire hydrant extension, concrete blocking, yard restoration, granular drainage material, etc, needed to adjust the fire hydrant complete and ready for use as shown on the plans, and in accordance with the specifications and standard drawings. Paid EACH (EA).

9. Valves. Sectionalizing valves in water mains will be paid for at the unit price bid for each size. The unit price shall include all costs incurred in completing the sectionalizing valve installation over and above the amount paid for piping in place. The unit price shall include furnishing and installing the sectionalizing valve, valve box, and appurtenances; excavation and backfill not included under piping; and all other costs not included under other bid items.

No separate payment will be made for fire hydrant auxiliary gate valves or tapping valves.

9.01 DUCTILE IRON RESILIENT SEATED GATE VALVE (ALL SIZES) (Detail 105). Includes the specified valve, labor, equipment, excavation, polyethylene wrap, bedding, backfill, disinfection, pressure testing, restoration, etc. (contractor must supply mechanical joint restraints on restrained joint applications), required to install the specified valve at the location shown on the plans, or as directed, in accordance with the specifications and standard drawings complete and ready for use. All External Dome and Packing Bolts Shall be Stainless Steel. Paid EACH (EA).

10. SERVICES

10.01 REPLACE and RECONNECT SERVICE LINE (3/4" THRU 2"). Includes the labor, equipment, excavation, bedding, backfill, and asphalt, concrete and yard restoration to install the service line at the locations shown on the plans or as directed, in accordance with the specifications and standard drawings, complete and ready for use. Lead service lines encountered by the excavation shall be replaced from the main to and including the meter vault and meter setting. All service line material will be supplied by NKWD. Paid EACH (EA).

10.02 REPLACE SERVICE LINE AND INSTALL WATER METER SETTING (3/4" THRU 2"). Includes the labor, equipment, excavation, bedding, backfill, and asphalt, concrete and yard restoration to install the service line, new meter vault and yoke setting at the locations shown on the plans or as directed, in accordance with the specifications and standard drawings, complete and ready for use. All service line material will be supplied by NKWD. Paid EACH (EA).

10.03 RECONNECT COPPER SERVICE (3/4" THRU 2"). Includes the labor, equipment, excavation, bedding, backfill and asphalt, concrete and yard restoration to reconnect the service line at the locations shown on the plans or as directed, in accordance with the specifications and standard drawings, complete and ready for use. Lead service lines encountered by the excavation shall be replaced from the main to and including the meter vault and meter setting. All service line material will be supplied by NKWD. Paid EACH (EA).

10.04 RELOCATE WATER METER SETTING. Includes the labor, equipment, excavation, bedding, backfill and asphalt, concrete and yard restoration to install a new

meter vault and yoke setting to the location shown on the plans or as directed, in accordance with the specifications and standard drawings complete and ready for use. All service line material will be supplied by NKWD. Paid EACH (EA).

10.05 INSTALL WATER METER SETTING. Includes the labor, equipment, excavation, bedding, backfill, testing, disinfection and asphalt, concrete and yard restoration to install a new meter vault and yoke setting to the location shown on the plans or as directed, in accordance with the specifications and standard drawings complete and ready for use. All service line material will be supplied by NKWD. Paid EACH (EA).

10.06 ADJUST EXISTING WATER VALVE BOX TO GRADE. Includes all labor, equipment, excavation, bedding, 2'x2'x4" concrete pad, backfill, testing, disinfection, and asphalt, concrete and yard restoration to install the valve box and valve toggle extensions (if required) and adjust the top of the box to finished grade complete and ready for use. Valve toggle extensions will be supplied by NKWD. Paid EACH (EA).

10.07 ADJUST WATER METER TO GRADE. Includes all labor, equipment, excavation, bedding, backfill, testing, disinfection, and asphalt, concrete and yard restoration to adjust the top of the box to finished grade complete and ready for use. Paid EACH (EA).

10.08 REMOVE EXISTING CURB STOP/METER CROCK. Includes the labor, equipment, excavation, backfill and asphalt, concrete or yard restoration to remove the existing curb stop or meter crock at the location shown on the plans or as directed, in accordance with the specifications and standard drawings. Paid EACH (EA).

11. MISCELLANEOUS

11.01 CONCRETE ENCASEMENT. Includes the labor, equipment, excavation, backfill, concrete, restoration, etc. to construct the concrete encasement of the water main stream crossing as shown on the plans, and in accordance with the specifications and standard drawings. Paid SQUARE FEET (SF).

11.02 4" RIGID PREFORATED & NON-PERFORED PVC DRAIN PIPE. Includes the labor, equipment, excavation, bedding, materials, backfill, and restoration, etc. required to install the PVC drain piping at the location shown on the plans in accordance with the specifications and standard drawings complete and ready for use. Paid LINEAR FEET (LF).

11.03 PRESSURE REDUCING VALVE PIT. Includes the labor, equipment, excavation, concrete pit construction, materials, pipe work, electrical work, backfill, restoration, etc. required to install the specified pressure reducing valve pit at the location shown on the plans in accordance with the plans, specifications and standard drawings complete and ready for use. Paid EACH (EA).

11.04 PLUG AND BLOCK (ALL SIZES). This item shall include the specified plug, polyethylene wrap, labor, equipment, excavation, concrete, backfill and restoration required to install the plug and blocking at the location shown on the plans or as directed in accordance with the specifications. Paid EACH (EA).

11.05 AIR RELEASE VALVE. (Detail 106). This item shall include labor, equipment, excavation, polyethylene wrap, bedding, backfill, disinfection, pressure testing, restoration, etc. required to install the air release valve at the location shown on the plans or as directed in accordance with the specifications. All materials will be supplied by NKWD. Paid EACH (EA).

11.06 ANCHORING TEE AND BLOCK (ALL SIZES). Includes the specified anchoring tee, labor, equipment, excavation, polyethylene wrap, bedding, backfill, disinfection, pressure testing, restoration, etc. required to install the specified anchoring tee at the location shown on the plans, or as directed, in accordance with the specifications and standard drawings complete and ready for use. Paid EACH (EA).

11.07 DUCTILE IRON TEE AND BLOCK (ALL SIZES). Includes the specified ductile iron tee, labor, equipment, excavation, polyethylene wrap, bedding, backfill, disinfection, pressure testing, restoration, etc. required to install the specified tee at the location shown on the plans, or as directed, in accordance with the specifications and standard drawings complete and ready for use. Paid EACH (EA).

11.08 DUCTILE IRON CROSS (ALL SIZES). Includes the specified ductile iron cross, labor, equipment, excavation, polyethylene wrap, bedding, backfill, disinfection, pressure testing, restoration, etc. required to install the specified ductile iron cross at the location shown on the plans, or as directed, in accordance with the specifications and standard drawings complete and ready for use. Paid EACH (EA).

11.09 REDUCER (ALL SIZES). Includes the reducer, labor, equipment, excavation, polyethylene wrap, bedding, backfill, disinfection, pressure testing, restoration, etc. required to install the specified reducer at the location shown on the plans, or as directed, in accordance with the specifications and standard drawings complete and ready for use. Paid EACH (EA).

11.10 FLUSHING DEVICE. (Detail 113) Includes the labor, equipment, excavation, polyethylene wrap, bedding, backfill, disinfection, pressure testing, restoration, etc. required to install the specified flushing device at the location shown on the plans in accordance with the specifications and standard drawings complete and ready for use. Flushing device materials will be supplied by NKWD. Paid EACH (EA).

11.11 TEST TAP. Includes the labor, equipment, excavation, polyethylene wrap, bedding, backfill, disinfection, pressure testing, restoration, etc. required to install the specified test tap at the location shown on the plans in accordance with the specifications and standard drawings complete and ready for use. Test Tap materials will be supplied by NKWD. Paid EACH (EA).

11.12 DUCTILE BENDS (ALL SIZES). Includes the specified internally restrained joint ductile iron bend, labor, equipment, excavation, polyethylene wrap, bedding, backfill, disinfection, pressure testing, restoration, etc. required to install the specified ductile iron bends at the location shown on the plans, or as directed, in accordance with the specifications and standard drawings complete and ready for use. Paid EACH (EA).

11.13 CORROSION MONITORING TEST STATIONS. Includes all materials, labor, equipment, excavation, bedding, backfill, restoration, etc. required to install the specified corrosion monitoring test stations at the location shown on the plans, or as directed, in

accordance with the project technical specifications and drawings complete and ready for use. Paid EACH (EA).

11.14 CORROSION PROTECTION SYSTEM Includes all materials, labor, equipment, excavation, bedding, backfill, restoration, etc. required to install the specified corrosion protection system (anode bags) at the location shown on the plans, or as directed, in accordance with the project technical specifications and drawings complete and ready for use. Paid EACH (EA).

12. RESTORATION

12.01. Pavement Removal and Replacement. The unit prices per square yard for pavement removal and replacement shall be measured for (length x width) payment horizontally along the center line of the pipe, through manholes, and to the edge of the existing pavement; or, where the edge of the existing pavement is not clearly defined, to the edge of the pavement replacement. The unit prices bid for pavement removal and replacement shall include all costs in connection therewith, including cutting, removal, and disposal of old pavement; construction of new pavement; and all extra compaction effort required for backfill beneath pavement.

12.02 Miscellaneous Asphaltic Concrete Paving. Existing valve boxes shall be abandoned by removal or filling with concrete at the discretion of the District. This cost shall be incidental to any bid item associated with asphaltic concrete paving.

12.03. Sidewalk or Driveway Removal and Replacement. The unit prices per square yard bid for sidewalk or driveway removal and replacement shall include all costs involved in cutting and removing sidewalk or driveway, and all labor and materials required to replace the sidewalks.

Measurement for payment for sidewalk or driveway removal and replacement shall be on a square yard basis and shall include only the area actually removed and replaced, between joints, over the pipeline trench.

All costs involved in repairing or removal and replacement of existing sidewalk or driveway outside the specified pay limits, where damaged during the construction operations, shall be considered a subsidiary obligation of Contractor and shall be borne by Contractor.

12.04. MISCELLANEOUS CONCRETE. Concrete for encasement or blocking of pipe and fittings not included as parts of pipelines will be measured for payment as the actual volume of concrete placed within the limits as indicated or specified.

Concrete for total encasement shall be computed using the maximum allowable trench width (or pipe OD plus 24 inches where no maximum is specified), the minimum clear depth below the pipe, and the minimum cover over the pipe, less the volume occupied by the pipe itself.

Unless otherwise authorized by Owner, all additional concrete for encasement or blocking required outside the specified pay limits will be considered a subsidiary obligation of Contractor and no direct payment shall be made therefore.

All concrete which is required in connection with manholes or structures, pavement or sidewalk replacement, and other pay items shall be included in the lump sum or unit price bid for the pay item.

The unit price bid for miscellaneous concrete shall include concrete, reinforcing steel, forms, finishing, curing, and all other work or materials required to complete the concrete work.

Existing valve boxes shall be abandoned by removal or filling with concrete at the discretion of the District. This cost shall be incidental to any bid item associated with concrete paving or other concrete work.

12.05 ASPHALTIC CONCRETE MILLING AND PAVING. Includes the labor, equipment and materials required to perform any necessary milling, placing of asphalt to a depth of 1.5 inches in accordance with specifications and standard drawing #103A. Paid SQUARE YARD (SY).

12.06 ASPHALTIC CONCRETE. Includes the labor, equipment and materials required to perform any necessary removal and replacement of asphalt to a minimum depth of 6 inches or match existing and abandoning of valve boxes in accordance with specifications and standard drawing #103A. Paid SQUARE YARD (SY).

12.07 ASPHALTIC CONCRETE - DRIVEWAY. Includes the labor, equipment and materials required to perform any necessary removal and replacement of asphalt to match existing depth in accordance with specifications and standard drawing #103A. Culvert repair or replacement shall be considered incidental to driveway restoration. Paid SQUARE YARD (SY).

12.08 ASPHALTIC CONCRETE. – WINTER CHARGE In effect when a sole asphalt plant is operating within a 50 mile radius of the project. Includes the labor, equipment and materials required to perform any necessary removal and replacement of asphalt to a minimum depth of 6 inches and abandoning of valve boxes in accordance with specifications and standard drawing #103A. Paid SQUARE YARD (SY).

12.09 CONCRETE PAVEMENT. Includes the labor, equipment and materials required to remove and replace a minimum of 8" KDOT class A Concrete or to match existing, whichever is greater and abandoning of valve boxes in accordance with specifications and standard drawing #103A. Paid SQUARE YARD (SY).

12.10 CONCRETE DRIVEWAY. Includes the labor, equipment and materials required to remove and replace the driveway concrete to match existing depth. Culvert repair or replacement shall be considered incidental to driveway restoration. Paid SQUARE YARD (SY).

12.11 CONCRETE CURBING. Includes the labor, equipment and materials required to place KDOT class A Concrete to match existing in accordance with specifications and standard drawings. Paid LINEAR FEET (LF).

12.12 CONCRETE SIDEWALK. Includes the labor, equipment and materials required to remove and replace the sidewalk concrete to match existing depth. This item also includes any requirements to install sidewalk ramps per ADA standards. Paid SQUARE YARD (SY).

12.13 GRAVEL DRIVEWAY/PARKING AREA. Includes the labor, equipment and materials required to replace and grade gravel driveway to match existing depth. Paid SQUARE YARD (SY).

12.14 BEST MANAGEMENT PRACTICE. Includes the labor, equipment and materials required to conform and comply with the best management practices to control soil erosion as shown on the plans and specifications. Paid LUMP SUM (LS).

12.15 REMOVE EXISTING TREES Includes the labor, equipment, grading, and materials, required to remove and haul away existing trees, including stumps, at the location shown on the plans in accordance with the specifications. Paid LUMP SUM (LS).

12.16 GUARD RAIL RESTORATION Includes the labor, equipment and materials required to replace guard rail in accordance with KDOT specifications and standard drawings. Paid LINEAR FEET (LF).

12.17 TEMPORARY CHAIN LINK FENCE Includes the labor, equipment and materials required to remove the existing security fence; install a temporary security fence (same height & construction as existing) at the construction limits during construction operation, (fencing plans will need to be approved by the District); as directed by the District. Paid LINEAR FEET (LF).

12.18 CONCRETE BANK RESTORATION IN CREEK. Includes the labor, equipment and materials required to remove and replace the bank concrete to match existing depth. Paid SQUARE YARD (SY).

12.19 REMOVE AND REINSTALL EXISTING CHAIN LINK FENCE. Includes the labor, equipment and materials required to remove the existing security fence and when project is complete, replace the fences to match existing fences (including razor wire) in the same location as directed by the District. Paid LINEAR FEET (LF).

12.20 REMOVE AND REPLACE EXISTING CULVERT AND HEADWALLS (All Sizes). Includes the labor, equipment and materials required to remove and replace (when construction is completed in the vicinity) existing culvert and headwalls. Paid LINEAL FOOT (LF).

12.21 REMOVE AND REPLACE EXISTING CONCRETE WALL. Includes the labor, equipment and materials required to: demolish and remove sections of an existing, concrete retaining wall that are in conflict with the new utility installation, to protect and maintain the existing slope while the retaining wall is removed, and to reconstruct the demolished portion of the concrete retaining wall with similar construction, connecting the reconstructed sections of wall with steel dowel rods epoxied into the existing wall, or with similar approved construction. Paid LINEAL FOOT (LF).

End of Section

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DUDLEY DISCHARGE
36-INCH REDUNDANCY PROJECT
ADDENDUM NO. 2

TO: ALL BIDDERS
OWNER: NORTHERN KENTUCKY WATER DISTRICT
DATE: August 20, 2010
BID DATE: August 24, 2010

1. At **Station 66+56 on Sheet C-3.10**, the 11-1/4 degree horizontal bend is not required to be restrained. The text shall read "**11-1/4 Horizontal Bend w/ Thrust Blocking.**"
2. At **Stations 53+96 and 54+16 on Sheet C-3.8**, the 45 degree horizontal bends are not required to be restrained. The text for both shall read "**45 Horizontal Bend w/ Thrust Blocking.**".
3. Due to the changes mentioned above in Item nos. 1 and 2 above and to clarify what is required for Bid Item nos. 15 and 16, the quantity and/or text for the following bid items are amended as follows:

INTERNAL

14	11.12 36-INCH DUCTILE IRON RESTRAINED V BEND *(11-1/4 Degree)* INTERNAL	EA	7 ~~6~~		
15	11.12 36-INCH DUCTILE IRON RESTRAINED V BEND *(22-1/2 Degree)*	EA	7		
16	11.12 36-INCH DUCTILE IRON ~~RESTRAINED~~ BEND *(45 Degree)*	EA	2		

CLARIFICATION

1. At **Stations 10+15, 68+40, and 40+24 on Sheets C-3.0, C-3.10, and C-3.11 respectively**, the 36" x 6" Anchoring Tees **are assumed to be internal restrained** since they are in areas where Thelen has indicated the pipeline needs to be internal restrained.

Attached are new bid sheets for your use. If you have any questions, please contact me at (859) 581-9600. This notice is being faxed to you.

Respectfully Submitted,

Kevin Hanson, P.E.

Note: Bidder agrees to perform all the following work described in the specifications and shown on the plans, for the following unit prices:

Item No.	Description	Unit of Measure	Estimated Quantity	Unit Cost Total	Total Cost
1	6.01 CLASS 250 DUCTILE IRON PIPE *(36-inch)* WITH BONDED JOINTS. (Detail 103, 103a, 104, 104a, 110)	LF	**5197** ~~5053~~		
2	6.02 CLASS 250 DUCTILE IRON PIPE INTERNAL RESTRAINED JOINT.*(36-inch)* WITH BONDED JOINTS. (Detail 103, 103a, 104, 104a, 110, Thelen Details x & x)	LF	**885** ~~1029~~		
3	7.01 CONNECT TO EXISTING 36-INCH MAIN	EA	4		
4	8.01 INSTALL HIGH PRESSURE FIRE HYDRANT ASSEMBLY WITH VERTICAL CONNECTION	EA	5		
5	9.02 RESILIENT SEATED GATE VALVE *(36-inch)*	EA	2		
6	11.01 CONCRETE ENCASEMENT	LF	112		
7	11.02 4-INCH UNDERDRAIN	LF	357		
8	11.05 AIR RELEASE VALVE (*2-inch ARV and service line materials provided by NKWD*)	EA	1		
9	11.06 ANCHORING TEE AND BLOCK *(36-inch x 36-inch x 6-inch)*	EA	5		
10	11.07 TEE AND BLOCK *(36-inch x 36-inch x 24-inch)*	EA	1		
11	11.07 TEE AND BLOCK *(36-inch x 36-inch x 36-inch)*	EA	1		
12	11.12 36-INCH DUCTILE IRON BEND *(11-1/4 Degree)*	EA	8		
13	11.12 36-INCH DUCTILE IRON BEND *(22-1/2 Degree)*	EA	2		

INTERNAL

14	11.12 36-INCH DUCTILE IRON RESTRAINED BEND *(11-1/4 Degree)* INTERNAL	EA	7 ~~6~~		
15	11.12 36-INCH DUCTILE IRON RESTRAINED BEND *(22-1/2 Degree)*	EA	7		
16	11.12 36-INCH DUCTILE IRON ~~RESTRAINED~~ BEND *(45 Degree)*	EA	2		
17	11.12 CORROSION TEST STATION	EA	9		
18	11.13 CORROSION PROTECTION SYSTEM - 48# MAGNESIUM ANODE	EA	61		
19	12.04 ASPHALTIC CONCRETE MILLING AND PAVING	SY	110		
20	12.10 CONCRETE CURBING	LF	30		
21	12.11 CONCRETE SIDEWALK	SY	5		
22	12.14 BEST MANAGEMENT PRACTICES	LS	1		
23	12.15 REMOVE EXISTING TREES (2)	LS	1		
24	12.18 CONCRETE BANK RESTORATION IN CREEK	SY	14		
25	12.17 TEMPORARY CHAIN LINK FENCE	LF	20		
26	12.19 REMOVE AND REINSTALL EXISTING CHAIN LINK FENCE	LF	95		
27	12.20 REMOVE AND REPLACE EX. 15" CULVERT AND HEADWALLS	LF	22		
28	12.20 REMOVE AND REPLACE EX. 18" CULVERT AND HEADWALLS	LF	35		
29	12.21 REMOVE AND REPLACE EX. CONCRETE WALL	LF	10		
30	12.17 REMOVE AND REINSTALL GUARDRAIL	LF	50		
	TOTAL BID				

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DUDLEY DISCHARGE
36-INCH REDUNDANCY PROJECT
ADDENDUM NO. 3

TO: ALL BIDDERS
OWNER: NORTHERN KENTUCKY WATER DISTRICT
DATE: August 20, 2010
BID DATE: August 24, 2010

1. At **Station 10+00 on Sheet C-3.0**, there needs to bid item no. for the 45 degree (internal restrained) horizontal bend. Bid Item No. 31 is hereby added as follows:

31	11.12 24-INCH DUCTILE IRON INTERNAL RESTRAINED BEND *(45 Degree)*	EA	1		

2. At **Station 48+91 on Sheet C-3.7**, the internal restrained pipe length indicated is incorrect. It should be read "PER THELEN'S REPORT, INSTALL **108' (54' EA SIDE OF THE 11-1/4 BEND)** OF 36" CLASS 250 (INTERNAL RESTRAINED JOINT) D.I.P. W/ POLYETHYLENE WRAP (42" MIN. COVER)."
3. At **Station 68+80 on Sheet C-3.10**, the internal restrained pipe length indicated is incorrect. It should be read "PER THELEN'S REPORT, INSTALL **147' MIN. (108' EA. SIDE)** OF 36" CLASS 250 (INTERNAL RESTRAINED JOINT) D.I.P. W/ POLYETHYLENE WRAP (42" MIN. COVER)." Note that **only 39' is possible from Stations 68+80 to 69+19** as this is the point of connection to the existing main.

Attached are final bid sheets for your use. If you have any questions, please contact me at (859) 581-9600. This notice is being faxed to you.

Respectfully Submitted,

Kevin Hanson, P.E.

Note: The bidder agrees to performa all the following work described in the specifications and shown on the plans, for the following prices:

Item No.	Description	Unit of Measure	Estimated Quantity	Unit Cost Total	Total Cost
1	6.01 CLASS 250 DUCTILE IRON PIPE *(36-inch)* WITH BONDED JOINTS. (Detail 103, 103a, 104, 104a, 110)	LF	5197		
2	6.02 CLASS 250 DUCTILE IRON PIPE INTERNAL RESTRAINED JOINT.*(36-inch)* WITH BONDED JOINTS. (Detail 103, 103a, 104, 104a, 110, Thelen Details x & x)	LF	885		
3	7.01 CONNECT TO EXISTING 36-INCH MAIN	EA	4		
4	8.01 INSTALL HIGH PRESSURE FIRE HYDRANT ASSEMBLY WITH VERTICAL CONNECTION	EA	5		
5	9.02 RESILIENT SEATED GATE VALVE *(36-inch)*	EA	2		
6	11.01 CONCRETE ENCASEMENT	LF	112		
7	11.02 4-INCH RIGID PERFORATED PVC UNDERDRAIN	LF	357		
8	11.05 AIR RELEASE VALVE (*2-inch ARV and service line materials provided by NKWD*)	EA	1		
9	11.06 ANCHORING TEE AND BLOCK *(36-inch x 36-inch x 6-inch)*	EA	5		
10	11.07 DUCTILE IRON TEE AND BLOCK *(36-inch x 36-inch x 24-inch)*	EA	1		
11	11.07 DUCTILE IRON TEE AND BLOCK *(36-inch x 36-inch x 36-inch)*	EA	1		
12	11.12 36-INCH DUCTILE IRON BEND *(11-1/4 Degree)*	EA	8		
13	11.12 36-INCH DUCTILE IRON BEND *(22-1/2 Degree)*	EA	2		
14	11.12 36-INCH DUCTILE IRON INTERNAL RESTRAINED BEND *(11-1/4 Degree)*	EA	7		
15	11.12 36-INCH DUCTILE IRON INTERNAL RESTRAINED BEND *(22-1/2 Degree)*	EA	7		
16	11.12 24-INCH DUCTILE IRON BEND *(45 Degree)*	EA	2		
17	11.13 CORROSION TEST STATION	EA	9		
18	11.14 CORROSION PROTECTION SYSTEM – 48# MAGNESIUM ANODE	EA	61		
19	12.04 ASPHALTIC CONCRETE MILLING AND PAVING	SY	110		
20	12.10 CONCRETE CURBING	LF	30		

Note: The bidder agrees to performa all the following work described in the specifications and shown on the plans, for the following prices:

Item No.	Description	Unit of Measure	Estimated Quantity	Unit Cost Total	Total Cost
21	12.11 CONCRETE SIDEWALK	SY	5		
22	12.14 BEST MANAGEMENT PRACTICES	LS	1		
23	12.15 REMOVE EXISTING TREES (2)	LS	1		
24	12.18 CONCRETE BANK RESTORATION IN CREEK	SY	14		
25	12.17 TEMPORARY CHAIN LINK FENCE	LF	20		
26	12.19 REMOVE AND REINSTALL EXISTING CHAIN LINK FENCE	LF	95		
27	12.20 REMOVE AND REPLACE EX. 15" CULVERT AND HEADWALLS	LF	22		
28	12.20 REMOVE AND REPLACE EX. 18" CULVERT AND HEADWALLS	LF	35		
29	12.21 REMOVE AND REPLACE EX. CONCRETE WALL	LF	10		
30	12.16 REMOVE AND REINSTALL GUARDRAIL	LF	50		
31	11.12 24-INCH DUCTILE IRON INTERNAL RESTRAINED BEND *(45 Degree)*	EA	1		
	TOTAL BID				

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DUDLEY DISCHARGE
36-INCH REDUNDANCY PROJECT
CLARIFICATION NO. 2

TO: ALL BIDDERS
OWNER: NORTHERN KENTUCKY WATER DISTRICT
DATE: August 23, 2010
BID DATE: August 24, 2010

A typo was noted on the bid sheets sent on Friday, August 20, 2010

1. At **Station 10+00 on Sheet C-3.0**, there is a **36-inch** ductile iron internal restrained bend (45 degree). The bid item shall read as follows:

31	11.12 36-INCH DUCTILE IRON INTERNAL RESTRAINED BEND *(45 Degree)*	EA	1		

2. At **Stations 53+96 and 54+16 on Sheet C-3.7**, there is a **36-inch** ductile iron restrained bend (45 degree). The bid item shall read as follows:

16	11.12 36-INCH DUCTILE IRON BEND *(45 Degree)*	EA	2		

No more bid sheets will be issued. Utilize the sheets faxed late on 8/20/10 and revise the pipe size for bid item nos. 16 and 30. If you have any questions, please contact me at (859) 581-9600. This notice is being faxed to you.

Respectfully Submitted,

Kevin Hanson, P.E.

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Section 00020

INVITATION TO BID

Date: August 5, 2010

PROJECT: **Dudley Discharge 36-inch Redundancy Project, Crestview Hills, Kenton County, Kentucky**

SEALED BIDS WILL BE RECEIVED AT:

Northern Kentucky Water District (Owner)
2835 Crescent Springs Road
P.O. Box 18640
Erlanger, Kentucky 41018

UNTIL: Date: August 24, 2010
Time: 9:00 AM (local time)

At said place and time, and promptly thereafter, all Bids that have been duly received will be publicly opened and read aloud.

The proposed Work is generally described as follows: Construction/installation of approximately 6,100 linear feet of 36-inch restrained joint and non-restrained joint ductile iron pipe along Horsebranch Road from Right Fork Road to Rhine Valley and along Rhine Valley from Horsebranch Road to Centre View Blvd. Crestview Hills, Kentucky.

All Bids must be in accordance with the Instructions to Bidders and Contract Documents on file, and available for examination at:

Northern Kentucky Water District (Owner)
2835 Crescent Springs Road
Erlanger, Kentucky 41018

Or

Cardinal Engineering Corp.
1 Moock Road
Wilder, Kentucky 41071

Copies of the Bidding Documents may be obtained from the office of Cardinal Engineering. at the address indicated herein. Charges for all documents obtained will be made on the following basis:

	Charge
Complete set of Bidding Documents	$ 60.00
Mailing and Handling (U.S. Mail) (if requested)	$ 15.00

Charges for Bidding Documents and mailing and handling, if applicable, will not be refunded.

Bids will be received on a unit price and/or lump sum basis as described in the Contract Documents.

Bid security, in the form of a certified check or a Bid Bond in the amount of ten percent (10%) of the maximum total bid price, must accompany each Bid.

The Successful Bidder will be required to furnish a Construction Payment Bond and a Construction Performance Bond as security for the faithful performance of the contract and the payment of all bills and obligations arising from the performance of the Contract.

Contractor and all Subcontractors will be required to conform to the labor standards set forth in the Contract Documents. This project falls under the provisions of KRS 337.505 to 337.550 for prevailing wage rates.

Owner reserves the right to reject any or all Bids, including without limitation the right to reject any or all nonconforming, non-responsive, incomplete, unbalanced, or conditional Bids, to waive informalities, and to reject the Bid of any Bidder if Owner believes that it would not be in the best interest of Owner to make an award to that Bidder. Owner also reserves the right to negotiate with the apparent qualified Bidder to such an extent as may be determined by Owner.

Minority Bidders are encouraged to bid.

Bids shall remain subject to acceptance for 90 days after the day of bid opening or for such longer period of time to which a Bidder may agree in writing upon request of the Owner. If a Contract is to be awarded, the Owner will give the successful Bidder a Notice of Award during the period of time during which the successful Bidder's bid remains subject to acceptance.

Richard Harrison, Vice President of Engineering and Distribution
Northern Kentucky Water District

End of Section

Section 00100

INSTRUCTIONS TO BIDDERS

1. DEFINED TERMS. Terms used in these Instructions to Bidders will have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below which are applicable to both the singular and plural thereof:

A. *Bidder* - The individual or entity who submits a Bid directly to Owner.

B. *Successful Bidder* - The lowest responsible Bidder submitting a responsive Bid to whom Owner (on the basis of Owner's evaluation as hereinafter provided) makes an award.

2. COPIES OF CONTRACT DOCUMENTS. Complete sets of Contract Documents must be used in preparing Bids; Bidder shall have sole responsibility for errors or misrepresentations resulting from the use of incomplete sets of Bidding Documents.

Owner and Engineer, in making copies of Bidding Documents available on the above terms, do so only for the purpose of obtaining Bids for the Work and do not confer a license or grant for any other use.

3. QUALIFICATIONS OF BIDDERS. To demonstrate Bidder's qualifications to perform the Work, within five days of Owner's request Bidder shall submit written evidence such as financial data, previous experience, present commitments, and such other data as may be requested by Owner. Bidders who have not, in the Owner's opinion, had sufficient experience in the size and type of work involved may not be considered.

Each Bid must contain evidence of Bidder's qualifications to do business in the State of Kentucky or covenant to obtain such qualifications prior to award of the Contract. The Contractor's state license number must be included where applicable. Each Bidder must be registered as a plan holder with the Issuing Office or Engineer on record in the advertised "Invitation to Bid".

4. EXAMINATION OF CONTRACT DOCUMENTS AND SITE. It is the responsibility of each Bidder, before submitting a Bid, to:

a. thoroughly examine and study the Instructions to Bidders and the Contract Documents, including any Addenda;

b. visit the Site, at the arrange time with District escort, and become familiar with and satisfy Bidder as to the general, local, and site conditions that may affect cost, progress, performance, or furnishing of the Work (site visit ;

c. become familiar with and satisfy Bidder as to all federal, state, and local Laws and Regulations that may affect cost, progress, performance, or furnishing of the Work;

d. agree at the time of submitting its Bid that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of its Bid for

performance of the Work at the price bid and within the times and in accordance with the other terms and conditions of the Contract Documents;

e. correlate the information known to Bidder, information and observations obtained from visits to the Site, and all additional examinations, investigations, explorations, tests, studies, and data with the Contract Documents;

f. promptly give Owner written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder discovers in the Contract Documents and confirm that the written resolution thereof by Owner is acceptable to Bidder; and

g. determine that the Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work.

4.01. Underground Facilities. Information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based upon information and data furnished to Owner and Engineer by owners of such Underground Facilities, including Owner or others, and Owner and Engineer disclaim responsibility for the accuracy or completeness thereof, unless it is expressly provided otherwise in the Supplementary Conditions.

4.02. Additional Information. Before submitting a Bid, each Bidder may, at Bidder's own expense, make or obtain any additional examinations, investigations, explorations, tests, and studies and obtain any additional information and data which pertain to subsurface or physical conditions at or contiguous to the Site or otherwise, which may affect cost, progress, performance, or furnishing of the Work and which Bidder deems necessary to determine its Bid for performing and furnishing the Work in accordance with the time, price, and other terms and conditions of the Contract Documents. Each Bidder shall be responsible for any claims for personal injury, death or damage to property caused by Bidder's entry on public or private property and shall defend and indemnify Owner and all other parties against any such claims.

4.03. Bidder's Representation. The submission of a Bid will constitute an incontrovertible representation and covenant by Bidder that Bidder has complied with every requirement of this Article 4, that without exception the Bid is premised upon performing and furnishing the Work required by the Contract Documents and applying any specific means, methods, techniques, sequences, and procedures of construction that may be shown or indicated or expressly required by the Contract Documents, that Bidder has given Owner written notice of all conflicts, errors, ambiguities, and discrepancies that Bidder has discovered in the Contract Documents and the written resolutions thereof are acceptable to Bidder, and that the Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work.

5. SITE AND OTHER AREAS. The Site is identified in the Contract Documents. All additional lands and access thereto required for temporary construction facilities, construction equipment, or storage of materials and equipment to be incorporated in the Work are to be obtained and paid for by Contractor. Easements for permanent structures or permanent changes in existing facilities are to be obtained and paid for by Owner unless otherwise provided in the Contract Documents.

6. INTERPRETATIONS AND ADDENDA. All questions about the meaning or intent of the Bidding Documents are to be submitted to Owner in writing. Any interpretations or clarifications that are considered necessary by Owner in response to such questions will be issued by Addenda mailed or delivered to all parties recorded by Owner as having received the Bidding Documents. Questions received less than seven days prior to the date for opening of Bids may not be answered. The person submitting questions shall be responsible for their prompt delivery. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

Addenda may be issued to clarify, correct, or change the Bidding Documents as deemed advisable by Owner or Engineer.

Owner will not be responsible for explanations or interpretations of the Bidding Documents or Contract Documents except as issued in accordance herewith.

7. BID SECURITY. Each Bid must be accompanied by Bid security made payable to Owner in an amount of 10 percent of Bidder's maximum Bid price and in the form of a Bid Bond (on the form attached) issued by a surety meeting the requirements of paragraphs 5.01 and 5.02 of the General Conditions.

Bid security of the Successful Bidder will be retained until such Bidder has executed the Contract Documents, furnished the required contract security, and met the other conditions of the Notice of Award, whereupon the Bid security will be returned. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within 15 days after the Notice of Award, Owner may annul the Notice of Award and Bid security of that Bidder will be forfeited. Bid security of other Bidders whom Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of seven days after the Effective Date of the Agreement or one day after the last day the Bids remain subject to acceptance, whereupon Bid security furnished by such Bidders will be returned.

8. CONTRACT TIMES. The numbers of days within which, or the dates by which, the Work is to be (a) Substantially Completed and (b) also completed and ready for final payment are set forth in the Agreement.

9. LIQUIDATED DAMAGES. Provisions for liquidated damages, if any, are set forth in the Agreement.

10. SUBSTITUTE OR "OR-EQUAL" ITEMS. The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents without consideration of possible substitute or "or-equal" items. Whenever it is specified or described in the Bidding Documents that a substitute or "or-equal" item of material or equipment may be furnished or used by Contractor if acceptable to Owner, application for such acceptance will not be considered by Owner until after the Effective Date of the Agreement. The procedure for submission of any such application by Contractor and consideration by Owner is set forth in the General Conditions and may be supplemented in the General Requirements.

11. PREPARATION OF BID. The Bid form is included with the Bidding Documents. Additional copies may be obtained from Owner.

All blanks on the Bid form shall be completed by printing in ink or by typewriter and the Bid signed. A Bid price shall be indicated for each lump sum bid item and/or unit price item listed therein, or the words "No Bid", "No Change", or "Not Applicable" entered.

A Bid by a corporation shall be executed in the corporate name by the president or a vice-president or other corporate officer accompanied by evidence of authority to sign. The corporate seal shall be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation shall be shown below the signature.

A Bid by a partnership shall be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The official address of the partnership shall be shown below the signature.

A Bid by a limited liability company shall be executed in the name of the firm by a member and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm must be shown below the signature.

A Bid by an individual shall show the Bidder's name and official address.

A Bid by a joint venture shall be executed by each joint venturer in the manner indicated on the Bid form. The official address of the joint venture must be shown below the signature.

All names shall be typed or printed in ink below the signatures.

The Bid shall contain an acknowledgment of receipt of all Addenda, the numbers of which shall be filled in on the Bid form.

The address and telephone number for communications regarding the Bid shall be shown.

12. BASIS OF BID; EVALUATION OF BIDS. Bidders shall submit a Bid on a unit price basis for each item of Work listed in the Bid schedule. The total of all estimated prices will be determined as the sum of the products of the estimated quantity of each item and the unit price Bid for the item. The final quantities and Contract Price will be determined in accordance with paragraph 11.03 of the General Conditions and as amended in the Supplemental Conditions.

Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. Discrepancies between words and figures will be resolved in favor of the words.

13. SUBMITTAL OF BID. A Bid shall be submitted no later than the date and time prescribed and at the place indicated in the advertisement or invitation to Bid and shall be enclosed in an opaque sealed envelope plainly marked with the Project title, the name and address of Bidder, and shall be accompanied by the Bid security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate envelope plainly marked on the outside with the notation "Bid Enclosed".

Bids shall be addressed to Owner at:

Northern Kentucky Water District (Owner)
2835 Crescent Springs Road
P.O. Box 18640
Erlanger, Kentucky 41018

Two complete and executed Bid Form along with "Non-Collusion Affidavit" and Bid Bond shall be submitted. Bids shall be typed or in ink. Bidder shall assume full responsibility for timely delivery at the location designated for receipt of Bids. Bids received after the time and date for receipt of Bids may be returned unopened. Oral, telephone, facsimile, or telegraph Bids are invalid and will not receive consideration.

14. MODIFICATION AND WITHDRAWAL OF BIDS. A Bid may be modified or withdrawn by an appropriate document duly executed in the manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids. For a period ending 72 hours after Bids are opened, any Bidder may request the withdrawal of its Bid by filing with Owner a duly signed written notice and otherwise demonstrating by clear and convincing evidence to the reasonable satisfaction of Owner that the Bid was submitted in good faith but there was a material and/or substantial mistake in the preparation of its Bid. If the withdrawal of the Bid is approved by the Owner in its sole discretion, the Bid security will be returned. Without the advanced full disclosure by the withdrawing Bidder to and written consent of the Owner, (i) no Bid shall be withdrawn under this section when the result would be the awarding of the contract on another Bid of the same Bidder or of another Bidder in which the withdrawing Bidder has a direct or indirect equitable interest and (ii) no Bidder who is permitted to withdraw a Bid shall, for compensation, supply any material or labor to or perform any subcontract or other work agreement for the Bidder to whom the contract is awarded or otherwise benefit, directly or indirectly, from the performance of the Project.

15. OPENING OF BIDS. Bids will be opened at the time and place indicated in the advertisement or invitation to Bid and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the base Bids and major alternates, if any, will be made available to Bidders after the opening of Bids.

16. BIDS TO REMAIN SUBJECT TO ACCEPTANCE. All Bids will remain subject to acceptance for the period of time stated in the Bid form, but Owner may, in its sole discretion, release any Bid and return the Bid security prior to the end of this period.

17. AWARD OF CONTRACT. Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, non-responsive, incomplete, unbalanced, or conditional Bids. Owner further reserves the right to reject the Bid of any Bidder which it finds, after reasonable inquiry and evaluation, to be non-responsive. Owner may also reject the Bid of any Bidder if Owner believes that it would not be in the best interest of the Project to make an award to that Bidder. Owner also reserves the right to waive all informalities not involving price, time, or changes in the Work and to negotiate with the apparent Successful Bidder to such an extent as may be determined by Owner. The Owner also reserves the right to increase or decrease the quantities of work per the General Conditions.

In the case of Bids for equipment and materials only, Owner may award the Contract to a responsible Bidder other than the lowest in the interest of standardization or ultimate economy, as determined by Owner.

In evaluating Bids, Owner will consider the following:

1. Whether or not the Bid complies with the prescribed requirements, and provides such alternates, unit prices and other information or data as may be requested in the Bid form or prior to the Notice of Award.

2. The qualifications of the Bidder.

3. If the Bidder maintains a permanent place of business.

4. If the Bidder has adequate personnel, plant and equipment to perform the Work properly and expeditiously.

5. Bidder's financial status to meet all obligations and incidentals to the Work.

6. Whether the Bidder has appropriate technical expertise and experience.

7. Bidder's performance record.

8. The amount of the TOTAL BASE BID, exclusive of any additive alternates, if applicable. Any additive alternates will be considered after selection of the lowest Total Base Bid. Each additive alternate will be considered and selected or not selected individually, at Owner's discretion, for inclusion in the work.

Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders to perform the Work in accordance with the Contract Documents.

18. CONTRACT SECURITY AND INSURANCE. Article 5 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth Owner's requirements as to performance and payment Bonds and insurance. When the Successful Bidder delivers the executed Agreement to Owner, it must be accompanied by such Bonds.

19. SIGNING OF AGREEMENT. When Owner gives a Notice of Award to the Successful Bidder, it will be accompanied by the required number of unsigned counterparts of the Agreement with the other Contract Documents identified in the Agreement as attached thereto. Within 15 days thereafter, the Successful Bidder shall sign, leaving the dates blank, and deliver the required number of counterparts of the Agreement and attached documents to Owner. Within 15 days thereafter, Owner shall deliver one fully signed counterpart to Successful Bidder with a complete set of the Drawings with appropriate identification.

20. RETAINAGE. Provisions concerning retainage are set forth on the Agreement.

End of Section

Section 00300

BID FORM

PROJECT IDENTIFICATION: Dudley Discharge 36-inch Redundancy Project, Crestview Hills, Kenton County, Kentucky

THIS BID IS SUBMITTED TO:

Northern Kentucky Water District (Owner)
P.O. Box 18640
2835 Crescent Springs Road
Erlanger, Kentucky 41018

THIS BID IS SUBMITTED BY: _____
(Bidder's Company Name)

1. The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Contract Documents to perform all Work as specified or indicated in the Contract Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Contract Documents.

2. Bidder accepts all of the terms and conditions of the Invitation to Bid and the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for 90 days after the Bid opening, or for such longer period of time to which the Bidder may agree in writing upon request of Owner. Bidder understands that certain extensions to the time for acceptance of this Bid may require the consent of the surety for the Bid Bond.

3. In submitting this Bid, Bidder represents and covenants, as set forth in the Agreement, that:

   a. Bidder has examined and carefully studied the Contract Documents, the other related data identified in the Contract Documents, and the following Addenda, receipt of all of which is hereby acknowledged:

      No. _____ Dated _____

      No. _____ Dated _____

      No. _____ Dated _____

   b. Bidder has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

   c. Bidder is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.

   d. Bidder has obtained and carefully studied (or assumes responsibility for having done so) all additional or supplementary explorations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface, and Underground

Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying the specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents to be employed by Bidder, and safety precautions and programs incident thereto.

e. Bidder does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price(s) bid and within the times and in accordance with the other terms and conditions of the Bidding Documents.

f. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.

g. Bidder has correlated the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents.

h. Bidder has given Owner written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and the written resolution thereof by Owner is acceptable to Bidder.

i. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work for which this Bid is submitted.

4. Bidder further represents that this Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any agreement or rules of any group, association, organization, or corporation; Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; Bidder has not solicited or induced any individual or entity to refrain from bidding; and Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over Owner.

5. The Bidder understands and agrees that during the performance of the Contract, it shall maintain a presence within such proximity of the Work Site which will allow it to respond to an emergency at the Work Site within one hour of receiving notice of an emergency, including emergencies occurring during non-working hours. The Bidder shall provide a list of emergency phone numbers for such purposes. If the Bidder does not have such a presence, it may satisfy this requirement by sub-contracting with a sub-contractor that does have such a presence, provided that any such sub-contractor must be approved by the Owner, in its sole discretion, prior to the project pre-construction meeting.

6. Bidder will complete the Work for the following unit prices, computed in accordance with paragraph 11.03.B of the General Conditions. Bidder acknowledges that estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all Unit Price Bid items will be based on actual quantities provided, determined as provided in the Contract Documents.

Note: Bidder agrees to perform all the following work described in the specifications and shown on the plans, for the following unit prices:

Item No.	Description	Unit of Measure	Estimated Quantity	Unit Cost Total	Total Cost
1	6.01 CLASS 250 DUCTILE IRON PIPE *(36-inch)* WITH BONDED JOINTS. (Detail 103, 103a, 104, 104a, 110)	LF	5053		
2	6.02 CLASS 250 DUCTILE IRON PIPE INTERNAL RESTRAINED JOINT.*(36-inch)* WITH BONDED JOINTS. (Detail 103, 103a, 104, 104a, 110, Thelen Details x & x)	LF	1029		
3	7.01 CONNECT TO EXISTING 36-INCH MAIN	EA	4		
4	8.01 INSTALL HIGH PRESSURE FIRE HYDRANT ASSEMBLY WITH VERTICAL CONNECTION	EA	5		
5	9.02 RESILIENT SEATED GATE VALVE *(36-inch)*	EA	2		
6	11.01 CONCRETE ENCASEMENT	LF	112		
7	11.02 4-INCH UNDERDRAIN	LF	357		
8	11.05 AIR RELEASE VALVE (*2-inch ARV and service line materials provided by NKWD*)	EA	1		
9	11.06 ANCHORING TEE AND BLOCK *(36-inch x 36-inch x 6-inch)*	EA	5		
10	11.07 TEE AND BLOCK *(36-inch x 36-inch x 24-inch)*	EA	1		
11	11.07 TEE AND BLOCK *(36-inch x 36-inch x 36-inch)*	EA	1		
12	11.12 36-INCH DUCTILE IRON BEND *(11-1/4 Degree)*	EA	8		
13	11.12 36-INCH DUCTILE IRON BEND *(22-1/2 Degree)*	EA	2		

14	11.12 36-INCH DUCTILE IRON RESTRAINED BEND *(11-1/4 Degree)*	EA	6		
15	11.12 36-INCH DUCTILE IRON RESTRAINED BEND *(22-1/2 Degree)*	EA	7		
16	11.12 36-INCH DUCTILE IRON RESTRAINED BEND *(45 Degree)*	EA	2		
17	11.12 CORROSION TEST STATION	EA	9		
18	11.13 CORROSION PROTECTION SYSTEM - 48# MAGNESIUM ANODE	EA	61		
19	12.04 ASPHALTIC CONCRETE MILLING AND PAVING	SY	110		
20	12.10 CONCRETE CURBING	LF	30		
21	12.11 CONCRETE SIDEWALK	SY	5		
22	12.14 BEST MANAGEMENT PRACTICES	LS	1		
23	12.15 REMOVE EXISTING TREES (2)	LS	1		
24	12.18 CONCRETE BANK RESTORATION IN CREEK	SY	14		
25	12.17 TEMPORARY CHAIN LINK FENCE	LF	20		
26	12.19 REMOVE AND REINSTALL EXISTING CHAIN LINK FENCE	LF	95		
27	12.20 REMOVE AND REPLACE EX. 15" CULVERT AND HEADWALLS	LF	22		
28	12.20 REMOVE AND REPLACE EX. 18" CULVERT AND HEADWALLS	LF	35		
29	12.21 REMOVE AND REPLACE EX. CONCRETE WALL	LF	10		
30	12.17 REMOVE AND REINSTALL GUARDRAIL	LF	50		
	TOTAL BID				

TOTAL BID IN WORDS

Note: See section 01025 Measurement and Payment for bid form definitions
Bidder selection will be based upon the lowest "TOTAL BASE BID"

7. Bidder agrees that the Work will be substantially complete within 90 calendar days after the date when the Contract Times commence to run as provided in paragraph 14.07.B of the General Conditions, and completed and ready for final payment in accordance with paragraph 14.07.B of the General Conditions within 120 calendar days after the date when the Contract Times commence to run.

The terms used in this Bid with initial capital letters have the meanings indicated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.

8. References

Contact Person	Company Name	Phone No.	Project Name
1.			
2.			
3.			
4.			

SUBMITTED on _____, 2010.

9. Communications concerning this Bid shall be sent to Bidder at the following address:

_____

_____

_____

_____

10. The terms in this Bid, which are defined in the General Conditions included as part of the Contract Documents, have the meanings assigned to them in the General Conditions.

11. Bidder's State of Kentucky "Contractor's State License Number" - _____
(Each Bid must contain evidence of Bidder's qualifications to do business in the State of Kentucky or covenant to obtain such qualifications prior to award of the Contract.)

SIGNATURE OF BIDDER

If an Individual

Name (typed or printed): _____

By_____ (SEAL)
(Individual's signature)

doing business as _____

Business address _____

_____

Phone No.: _____ Fax No.: _____

If a Partnership

Partnership Name: _____ (SEAL)

By_____
(Signature of general partner - attach evidence of authority to sign)

Name (typed or printed): _____

Business address _____

_____

Phone No. _____ Fax No.: _____

If a Corporation

Corporation Name: _____ (SEAL)

State of Incorporation: _____

Type (General, Professional, Service, Limited Liability): _____

By_____
(Signature - attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

(CORPORATE SEAL)

Attest _____

Business address _____

_____

Phone No. _____ Fax No.: _____

If a Joint Venture

(Each joint venturer must sign. The manner for signing for each individual, partnership, and corporation that is party to the joint venture should be in the manner indicated above.)

Joint Venturer Name: _____ (SEAL)

By: _____
(Signature - attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

Business address: _____

_____

Phone No.: _____ Fax No.: _____

Joint Venturer Name: _____ (SEAL)

By: _____
(Signature - attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

Business address: _____

_____

Phone No.: _____ Fax No.:_____

BID BOND

BIDDER (Name and Address):

_____
_____
_____

SURETY (Name and Address of Principal Place of Business):

_____
_____
_____

OWNER (Name and Address):

_____
_____
_____

BID

BID DUE DATE: _____

PROJECT (Brief Description Including Location):

_____
_____
_____

BOND

BOND NUMBER: _____

DATE (Not later than Bid due date): _____

PENAL SUM: _____ _____
(Words) (Figures)

IN WITNESS WHEREOF, Surety and Bidder, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Bid Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

BIDDER	SURETY
_____(Seal)	_____(Seal)
Bidder's Name and Corporate Seal	Surety's Name and Corporate Seal
By: _____	By: _____
Signature and Title	Signature and Title (Attach Power of Attorney)
Attest: _____	Attest: _____
Signature and Title	Signature and Title

Note: (1) Above addresses are to be used for giving required notice.
(2) Any singular reference to Bidder, Surety, OWNER or other party shall be considered plural where applicable.

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to pay to OWNER upon default of Bidder the penal sum set forth on the face of this Bond.

2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by OWNER) the executed Agreement required by the Bidding Documents and any performance and payment Bonds required by the Bidding Documents.

3. This obligation shall be null and void if:
   3.1. OWNER accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by OWNER) the executed Agreement required by the Bidding Documents and any performance and payment Bonds required by the Bidding Documents, or
   3.2. All Bids are rejected by OWNER, or
   3.3. OWNER fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by paragraph 5 hereof).

4. Payment under this Bond will be due and payable upon default by Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from OWNER, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.

5. Surety waives notice of and any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by OWNER and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from Bid due date without Surety's written consent.

6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in paragraph 4 above is received by Bidder and Surety and in no case later than one year after Bid due date.

7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.

8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.

9. Surety shall cause to be attached to this Bond a current and effective Power or Attorney evidencing the authority of the officer, agent or representative who executed this Bond on behalf of Surety to execute, seal and deliver such Bond and bind the Surety thereby.

10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.

11. The term "Bid" as used herein includes a Bid, offer or proposal as applicable.

Section 00460

NON-COLLUSION AFFIDAVIT

STATE OF: _____)

COUNTY OF: _____) SS

_____, being first duly sworn, deposes

and says that he/she is the _____ of
(sole owner, a partner, president, secretary, etc.)

_____, the party making the foregoing bid; that such bid is genuine and not collusive or sham; that said bidder is not financially interested in, or otherwise affiliated in a business way with any other bidder on the same contract; that said bidder has not colluded, conspired, connived, or agreed, directly or indirectly, with any bidder or person, to put in a sham bid, or that such other person shall refrain from bidding, and has not in any manner directly or indirectly sought by agreement or collusion, or communication or conference, with any person, to fix the price or affidavit of any other bidder, or that of any other bidder, or to secure any advantage against Owner, or any person or persons interested in the proposed Contract; and that all statements contained in said bid are true; and further, that such bidder has not, directly or indirectly submitted this bid, or the contents thereof, or divulged information of data relative thereto to any association or to any member or agent thereof.

_____
AFFIANT

Sworn to and subscribed before me, a Notary Public in and for the above named

State and County, this _____ day of _____, 20 _____.

_____
NOTARY PUBLIC

End of Section

Section 00500

AGREEMENT
Dudley Discharge 36-inch Redundancy Project
Crestview Hills, Kenton County, Kentucky

THIS AGREEMENT is by and between the Northern Kentucky Water District (herein called Owner) and_____(herein called Contractor).

Owner and Contractor, in consideration of the mutual covenants herein set forth, agree as follows:

Article 1. WORK.

Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows: Construction/installation of approximately 6,100 linear feet of 36-inch restrained joint and non-restrained joint ductile iron pipe along Horsebranch Road from Right Fork Road to Rhine Valley and along Rhine Valley from Horsebranch Road to Centre View Blvd. Crestview Hills, Kentucky.

Article 2. ENGINEER.

The Project has been designed by **Cardinal Engineer Corp.**, who is referred to in the Contract Documents as Engineer.

Article 3. CONTRACT TIMES, LIQUIDATED DAMAGES, DELAYS, AND DAMAGES.

All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

3.1. Contract Times. The Work will be substantially completed within **90** days after the date when the Contract Times commence to run as provided in paragraph 2.03 of the General Conditions, and completed and ready for final payment in accordance with paragraph 14.07 of the General Conditions within **120** days after the date when the Contract Times commence to run.

3.2. Liquidated Damages. Owner and Contractor recognize that time is of the essence of this Agreement and that Owner will suffer financial loss if the Work is not completed within the times specified in paragraph 3.1 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. The parties also recognize the delays, expenses, and difficulties involved in proving in a legal proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty), Contractor shall pay Owner $ 500.00 for each day that expires after the time specified in paragraph 3.1 for Substantial Completion until the Work is substantially complete. After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Times or any proper extension thereof granted by Owner, Contractor shall pay Owner as liquidated damages (but not as a

penalty) $ 500.00 for each day that expires after the time specified in paragraph 3.1 for completion and readiness for final payment until the Work is completed and ready for final payment.

Owner shall have the right to deduct the liquidated damages from any money in its hands, otherwise due, or to become due, to Contractor, or to initiate action to recover liquidated damages for nonperformance of this Contract within the time stipulated.

3.3. Delays and Damages. In the event Contractor is delayed in the prosecution and completion of the Work because of any delays caused by Owner or Engineer, Contractor shall have no claim against Owner or Engineer for damages (including but not limited to acceleration costs or damages) or contract adjustment other than an extension of the Contract Times and the waiving of liquidated damages during the period occasioned by the delay.

Contractor shall provide advance written notice to Owner and Engineer of Contractor's intention to accelerate the Work prior to commencing any acceleration. Such written notice shall include a detailed explanation of the nature and scope of the acceleration, the reason for the acceleration, the anticipated duration of the acceleration, and the estimated additional costs to Contractor, if any, related to the acceleration. This requirement shall not in any way affect or alter the agreement of Owner and Contractor with respect to delays and damages as set forth above and in Article 7 of the General Conditions.

Article 4. CONTRACT PRICE.

Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents an amount in current funds equal to the sum of the established unit price for each separately identified item of Unit Price Work times the estimated quantity of that item as indicated in the Contractor's Bid, attached hereto as an exhibit, for the total amount of:

(words)	**(figures)**

As provided in paragraph 11.03 of the General Conditions, estimated quantities are not guaranteed, and determinations of actual quantities and classifications are to be made as provided in paragraph 9.08 of the General Conditions and as modified by the Supplementary Conditions. Unit Prices have been computed as provided in paragraph 11.03 of the General Conditions.

Article 5. PAYMENT PROCEDURES.

Contractor shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by Owner as provided in the General Conditions and as modified by the Supplementary Conditions.

5.1. Progress Payments. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment on or about the 25th day of each month

during performance of the Work. All such payments will be measured by the schedule of values established in paragraph 2.07.A of the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no schedule of values, as provided in the General Requirements.

5.2. Retainage. In addition to any amounts withheld from payment in accordance with Paragraph 14.02 of the General Conditions, Owner shall retain from progress payments amounts equal to the following percentages:

a. Ten percent (10%) of the amount of the Work completed. This amount may be reduced by the Owner in its sole and absolute discretion, if the project is substantially completed; and

b. Ten percent (10%) of the value of materials and equipment that are not incorporated in the Work but are delivered, suitably stored, and accompanied by documentation satisfactory to Owner as provided in paragraph 14.02 of the General Conditions. Retainage for stored materials and equipment will be released when the materials and equipment are incorporated in the Work.

All retainage will be paid to Contractor when the Work is completed and ready for final payment in accordance with paragraph 14.07 of the General Conditions. Consent of the Surety shall be obtained before retainage is paid by Owner. Consent of the Surety, signed by an agent, must be accompanied by a certified copy of such agent's authority to act for the Surety.

5.3. Final Payment. Upon final completion and acceptance of the Work in accordance with paragraphs 14.07 of the General Conditions, Owner shall pay the remainder of the Contract Price as provided in said paragraph 14.07.

Article 6. CONTRACTOR'S REPRESENTATION

In order to induce Owner to enter into this Agreement Contractor makes the following representations:

a. Contractor has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents

b. Contractor has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

c. Contractor is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.

d. Contractor has obtained and carefully studied (or assumes responsibility for having done so) all additional or supplementary explorations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or

performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, including applying the specific means, methods, techniques, sequences, and procedures of construction, if any, expressly required by the Contract Documents to be employed by Contractor, and safety precautions and programs incident thereto.

e. Contractor does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract Documents.

f. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.

g. Contractor has correlated the information known to Contractor, information and observations obtained from visits to the Site, reports and drawings identified in the Contract Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Contract Documents.

h. Contractor has given Owner written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Owner is acceptable to Contractor.

i. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

Article 7. CONTRACT DOCUMENTS.

The Contract Documents, which are incorporated as part of the Agreement, consist of the following:

A. This Agreement;
B. Performance Bond;
C. Payment Bond;
D. General Conditions;
E. Supplementary Conditions;
F. Specifications as listed in the table of contents of the Project Manual;
G. Drawings consisting of a cover sheet and sheets numbered 1 through ____ inclusive, with each sheet bearing the following general title;
Dudley Discharge 36" Redundancy Project Part 2
H. Addenda (numbers ___ to ___, inclusive);
I. Exhibits to this Agreement (enumerated as follows):
1. Notice to Proceed;
2. Contractor's Bid;
3. Documentation submitted by Contractor prior to Notice of Award;
J. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:

1. Written Amendments;
2. Work Change Directives;
3. Change Orders.

There are no Contract Documents other than those listed above in this Article 7. The Contract Documents may only be amended, modified, or supplemented as provided in paragraphs 3.05 of the General Conditions.

Article 8. CONTRACT CORRECTION PERIOD

Notwithstanding the reference to "one year after the date of Substantial Completion" at the beginning of paragraph 13.07.A of the General Conditions, the Contractor's Correction Period with respect to the obligations set forth in paragraph 13.07.A of the General Conditions shall be twenty-four (24) months after the issuance of "Certificate of Substantial Completion" for all machinery, piping, materials, equipment, fittings, roadway pavement work, general restoration, shoulder & ditch restoration furnished under the Contract Documents. The correction period referenced in paragraph 13.07.C of the General Conditions shall be twenty-four (24) months for all machinery, piping, materials, equipment, fittings and all roadway pavement work.

Article 9. COMPLIANCE WITH KENTUCKY LAW

Contractor represents and warrants that it has revealed to Owner any and all final determinations of a violation of KRS Chapters 136, 139, 141, 337, 338, 341, and 342 by Contractor or any subcontractor within the past five years. Contractor further represents and warrants that it and each of its subcontractors will remain in continuous compliance with the provisions of KRS Chapters 136, 139, 141, 337, 338, 341 and 342 for the duration of this Agreement. Contractor understands that its failure to reveal a final determination of a violation or to comply with the above statutory requirements constitutes grounds for cancellation of the Agreement and for disqualification of Contractor from eligibility for any contracts for a period of two years.

Article 10. EQUAL OPPORTUNITY

Unless exempted under KRS 45.590, during the performance of the Agreement, the Contractor agrees as follows:

a. Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, age forty (40) and over, disability, veteran status, or national origin;

b. Contractor will take affirmative action in regard to employment, upgrading, demotion, transfer, recruitment, recruitment advertising, layoff, termination, rates of pay or other forms of compensation, and selection for training, so as to ensure that applicants are employed and that employees during employment are treated without regard to their race, color, religion, sex, age forty (40) and over, disability, veteran status, or national origin;

c. Contractor will state in all solicitations or advertisements for employees placed by or on behalf of Contractor that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, age forty (40) or over, disability, veteran status, or national origin;

d. Contractor will post notices in conspicuous places, available to employees and applicants for employment, setting forth the provisions of the nondiscrimination clauses required by this section; and

e. Contractor will send a notice to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding advising the labor union or workers' representative of Contractor's commitments under the nondiscrimination clauses.

f.

Article 11. MISCELLANEOUS.

a. Terms used in this Agreement will have the meanings indicated in the General Conditions.

b. No assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

c. Owner and Contractor each binds itself, its partners, successors, assigns, and legal representatives to the other party hereto, its partners, successors, assigns, and legal representatives in respect of all covenants, agreements, and obligations contained in the Contract Documents.

d. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Owner and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement. One counterpart each has been delivered to Owner, Contractor, Surety, and Engineer.

This Agreement will be effective on _____ (which is the Effective Date of the Agreement).

OWNER: Northern Kentucky Water District

_____

By:_____

Address for giving notices

2835 Crescent Springs Road
PO Box 18640
Erlanger, Kentucky 41018

CONTRACTOR:_____

By:_____

(Corporate Seal)

Address
Address
Address

Joint Venture

CONTRACTOR:_____

By:_____

(Corporate Seal)

Address for giving notices

_____

_____

Performance Bond

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address):

SURETY (Name and Address of Principal Place of Business):

OWNER (Name and Address):

CONTRACT
Date:
Amount:
Description (Name and Location):

BOND
Date (Not earlier than Contract Date):
Amount:
Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Performance Bond to be duly executed on its behalf by its authorized officer, agent or representative.

CONTRACTOR AS PRINCIPAL
Company: (Corp. Seal)

Signature: _____
Name and Title:

SURETY
Company: (Corp. Seal)

Signature: _____
Name and Title:
(Attach Power of Attorney)

(Space is provided below for signatures of additional parties, if required.)

CONTRACTOR AS PRINCIPAL
Company: (Corp. Seal)

Signature: _____
Name and Title:

SURETY
Company: (Corp. Seal)

Signature: _____
Name and Title:

EJCDC No. 1910-28-A (1996 Edition)
Originally prepared through the joint efforts of the Surety Association of America, Engineers Joint Contract Documents Committee, the Associated General Contractors of America, and the American Institute of Architects.

1. The CONTRACTOR and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner for the performance of the Contract, which is incorporated herein by reference.

2. If the CONTRACTOR performs the Contract, the Surety and the CONTRACTOR have no obligation under this Bond, except to participate in conferences as provided in paragraph 3.1.

3. If there is no OWNER Default, the Surety's obligation under this Bond shall arise after:

3.1. The OWNER has notified the CONTRACTOR and the Surety at the addresses described in paragraph 10 below, that the OWNER is considering declaring a CONTRACTOR Default and has requested and attempted to arrange a conference with the CONTRACTOR and the Surety to be held not later than fifteen days after receipt of such notice to discuss methods of performing the Contract. If the OWNER, the CONTRACTOR and the Surety agree, the CONTRACTOR shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive the OWNER's right, if any, subsequently to declare a CONTRACTOR Default; and

3.2. The OWNER has declared a CONTRACTOR Default and formally terminated the CONTRACTOR's right to complete the Contract. Such CONTRACTOR Default shall not be declared earlier than twenty days after the CONTRACTOR and the Surety have received notice as provided in paragraph 3.1; and

3.3. The OWNER has agreed to pay the Balance of the Contract Price to:

3.3.1. The Surety in accordance with the terms of the Contract;

3.3.2 Another contractor selected pursuant to paragraph 4.3 to perform the Contract.

4. When the OWNER has satisfied the conditions of paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

4.1. Arrange for the CONTRACTOR, with consent of the OWNER, to perform and complete the Contract; or

4.2. Undertake to perform and complete the Contract itself, through its agents or through independent contractors; or

4.3. Obtain bids or negotiated proposals from qualified contractors acceptable to the OWNER for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by the OWNER and the contractor selected with the OWNER's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the Bonds issued on the Contract, and pay to the OWNER the amount of damages as described in paragraph 6 in excess of the Balance of the Contract Price incurred by the OWNER resulting from the CONTRACTOR Default; or

4.4. Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances;

4.4.1 After investigation, determine the amount for which it may be liable to the OWNER and, as soon as practicable after the amount is determined, tender payment therefor to the OWNER; or

4.4.2 Deny liability in whole or in part and notify the OWNER citing reasons therefor.

5. If the Surety does not proceed as provided in paragraph 4 with reasonable promptness, the Surety shall be deemed to be in default on this Bond fifteen days after receipt of an additional written notice from the OWNER to the Surety demanding that the Surety perform its obligations under this Bond, and the OWNER shall be entitled to enforce any remedy available to the OWNER. If the Surety proceeds as provided in paragraph 4.4, and the OWNER refuses the payment tendered or the Surety has denied liability, in whole or in part, without further notice the OWNER shall be entitled to enforce any remedy available to the OWNER.

6. After the OWNER has terminated the CONTRACTOR's right to complete the Contract, and if the Surety elects to act under paragraph 4.1, 4.2, or 4.3 above, then the responsibilities of the Surety to the OWNER shall not be greater than those of the CONTRACTOR under the Contract, and the responsibilities of the OWNER to the Surety shall not be greater than those of the OWNER under the Contract. To a limit of the amount of this Bond, but subject to commitment by the OWNER of the Balance of the Contract Price to mitigation of costs and damages on the Contract, the Surety is obligated without duplication for:

6.1. The responsibilities of the CONTRACTOR for correction of defective Work and completion of the Contract;

6.2. Additional legal, design professional and delay costs resulting from the CONTRACTOR's Default, and resulting from the actions or failure to act of the Surety under paragraph 4; and

6.3. Liquidated damages, or if no liquidated damages are specified in the Contract, actual damages caused by delayed performance or non-performance of the CONTRACTOR.

7. The Surety shall not be liable to the OWNER or others for obligations of the CONTRACTOR that are unrelated to the Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the OWNER or its heirs, executors, administrators, or successors.

8. The Surety hereby waives notice of any change, including changes of time, to the Contract or to related subcontracts, purchase orders and other obligations.

9. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the Work or part of the Work is located and shall be instituted within two years after CONTRACTOR Default or within two years after the CONTRACTOR ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

10. Notice to the Surety, the OWNER or the CONTRACTOR shall be mailed or delivered to the address shown on the signature page.

11. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted here from and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

12. Definitions.

12.1 Balance of the Contract Price: The total amount payable by the OWNER to the CONTRACTOR under the Contract after all proper adjustments have been made, including allowance to the CONTRACTOR of any amounts received or to be received by the OWNER in settlement of insurance or other Claims for damages to which the CONTRACTOR is entitled, reduced by all valid and proper payments made to or on behalf of the CONTRACTOR under the Contract.

12.2. Contract: The agreement between the OWNER and the CONTRACTOR identified on the signature page, including all Contract Documents and changes thereto.

12.3. CONTRACTOR Default: Failure of the CONTRACTOR, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Contract.

12.4. OWNER Default: Failure of the OWNER, which has neither been remedied nor waived, to pay the CONTRACTOR as required by the Contract or to perform and complete or comply with the other terms thereof.

(FOR INFORMATION ONLY--Name, Address and Telephone)
AGENT or BROKER: OWNER'S REPRESENTATIVE (Engineer or other party):

Payment Bond

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address):

SURETY (Name and Address of Principal Place of Business):

OWNER (Name and Address):

CONTRACT
Date:
Amount:
Description (Name and Location):

BOND
Date (Not earlier than Contract Date):
Amount:
Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Payment Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL
Company: (Corp. Seal)

Signature: _____
Name and Title:

SURETY
Company: (Corp. Seal)

Signature: _____
Name and Title:
(Attach Power of Attorney)

(Space is provided below for signatures of additional parties, if required.)

CONTRACTOR AS PRINCIPAL
Company: (Corp. Seal)

Signature: _____
Name and Title:

SURETY
Company: (Corp. Seal)

Signature: _____
Name and Title:

EJCDC No. 1910-28-B (1996 Edition)
Originally prepared through the joint efforts of the Surety Association of America, Engineers Joint Contract Documents Committee, the Associated General Contractors of America, the American Institute of Architects, the American Subcontractors Association, and the Associated Specialty Contractors.

1. The CONTRACTOR and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the OWNER to pay for labor, materials and equipment furnished for use in the performance of the Contract, which is incorporated herein by reference.

2. With respect to the OWNER, this obligation shall be null and void if the CONTRACTOR:

2.1. Promptly makes payment, directly or indirectly, for all sums due Claimants, and

2.2. Defends, indemnifies and holds harmless the OWNER from all claims, demands, liens or suits by any person or entity who furnished labor, materials or equipment for use in the performance of the Contract, provided the OWNER has promptly notified the CONTRACTOR and the Surety (at the addresses described in paragraph 12) of any claims, demands, liens or suits and tendered defense of such claims, demands, liens or suits to the CONTRACTOR and the Surety, and provided there is no OWNER Default.

3. With respect to Claimants, this obligation shall be null and void if the CONTRACTOR promptly makes payment, directly or indirectly, for all sums due.

4. The Surety shall have no obligation to Claimants under this Bond until:

4.1. Claimants who are employed by or have a direct contract with the CONTRACTOR have given notice to the Surety (at the addresses described in paragraph 12) and sent a copy, or notice thereof, to the OWNER, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.

4.2. Claimants who do not have a direct contract with the CONTRACTOR:

1. Have furnished written notice to the CONTRACTOR and sent a copy, or notice thereof, to the OWNER, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials were furnished or supplied or for whom the labor was done or performed; and

2. Have either received a rejection in whole or in part from the CONTRACTOR, or not received within 30 days of furnishing the above notice any communication from the CONTRACTOR by which the CONTRACTOR had indicated the claim will be paid directly or indirectly; and

3. Not having been paid within the above 30 days, have sent a written notice to the Surety and sent a copy, or notice thereof, to the OWNER, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to the CONTRACTOR.

5. If a notice required by paragraph 4 is given by the OWNER to the CONTRACTOR or to the Surety, that is sufficient compliance.

6. When the Claimant has satisfied the conditions of paragraph 4, the Surety shall promptly and at the Surety's expense take the following actions:

6.1. Send an answer to the Claimant, with a copy to the OWNER, within 45 days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.

6.2. Pay or arrange for payment of any undisputed amounts.

7. The Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

8. Amounts owed by the OWNER to the CONTRACTOR under the Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any Performance Bond. By the CONTRACTOR furnishing and the OWNER accepting this Bond, they agree that all funds earned by the CONTRACTOR in the performance of the Contract are dedicated to satisfy obligations of the CONTRACTOR and the Surety under this Bond, subject to the OWNER's priority to use the funds for the completion of the Work.

9. The Surety shall not be liable to the OWNER, Claimants or others for obligations of the CONTRACTOR that are unrelated to the Contract. The OWNER shall not be liable for payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.

10. The Surety hereby waives notice of any change, including changes of time, to the Contract or to related Subcontracts, purchase orders and other obligations.

11. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the Work or part of the Work is located or after the expiration of one year from the date (1) on which the Claimant gave the notice required by paragraph 4.1 or paragraph 4.2.3, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to the Surety, the OWNER or the CONTRACTOR shall be mailed or delivered to the addresses shown on the signature page. Actual receipt of notice by Surety, the OWNER or the CONTRACTOR, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.

13. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted therefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. The intent is, that this Bond shall be construed as a statutory Bond and not as a common law bond.

14. Upon request of any person or entity appearing to be a potential beneficiary of this Bond, the CONTRACTOR shall promptly furnish a copy of this Bond or shall permit a copy to be made.

15. DEFINITIONS

15.1. Claimant: An individual or entity having a direct contract with the CONTRACTOR or with a Subcontractor of the CONTRACTOR to furnish labor, materials or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Contract, architectural and engineering services required for performance of the Work of the CONTRACTOR and the CONTRACTOR's Subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

15.2. Contract: The agreement between the OWNER and the CONTRACTOR identified on the signature page, including all Contract Documents and changes pthereto.

15.3. OWNER Default: Failure of the OWNER, which has neither been remedied nor waived, to pay the CONTRACTOR as required by the Contract or to perform and complete or comply with the other terms thereof.

(FOR INFORMATION ONLY--Name, Address and Telephone)
AGENCY or BROKER: OWNER'S REPRESENTATIVE (Engineer or other party):

CERTIFICATE OF INSURANCE

Issue Date:

PRODUCER:

Code Sub-Code

INSURED:

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.

COMPANIES AFFORDING COVERAGE

COMPANY LETTER A	
COMPANY LETTER B	
COMPANY LETTER C	
COMPANY LETTER D	
COMPANY LETTER E	

COVERAGES

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES.

CO LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE	POLICY EXPIRATION DATE	ALL LIMITS IN THOUSANDS	
	GENERAL LIABILITY				GENERAL AGGREGATE	$1,000,
	[X] COMMERCIAL GENERAL LIABILITY [X] OCCURRENCE [X] BLANKET CONTRACTUAL [ ] _____	(Completed Operations & Products Liability remains in force for 2 years after final payment)			PRODUCTS-COMP/OPS AGGREGATE	$1,000,
					PERSONAL & ADVERTISING INJURY	$1,000,
					EACH OCCURRENCE	$1,000,
	AUTOMOBILE LIABILITY [X] ANY AUTO [X] HIRED AUTOS [X] NON-OWNED AUTOS				COMBINED SINGLE LIMIT EACH OCCURRENCE Bodily Injury & Property Damage	$1,000,
	EXCESS LIABILITY				EACH OCCURRENCE	$4,000,
	[X] UMBRELLA FORM	(Follows Form of the Primary)			AGGREGATE	$4,000,
	WORKERS' COMPENSATION AND EMPLOYERS' LIABILITY	(Includes US Longshoremen and Harbor Workers Act and Maritime Coverage Where Applicable and All States Endorsement)			STATUTORY	
					EACH ACCIDENT	$1,000,
					DISEASE-POLICY LIMIT	$1,000,
					DISEASE-EACH EMPLOYEE	$1,000,
	OTHER [ ] _____				EACH OCCURRENCE	
					AGGREGATE	

DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/SPECIAL ITEMS:

1. Certificate Holder(s) & their Officers, Directors, Partners, Employees, & Agents Named as Additional Insured (all policies except WC). The coverage afforded the Additional Insured under these policies shall be primary insurance. If the Additional Insured has other insurance which is applicable to the loss, such other insurance shall be on an excess or contingent basis. (Copy of Additional Insured Endorsement attached.)
2. Blanket Coverage for XCU Hazards (General Liability & Excess Liability).
3. Waiver of Subrogation Against Certificate Holder(s), Their Officers, Directors, Partners, Employees, & Agents (all policies).
4. Contractual Coverage covers liability assumed in the Indemnification Clause of the Contract between Certificate Holder and Insured (General Liability & Excess Liability).
5. General and Products/Completed Operations aggregates apply for each Certificate Holder contract(s) or amendments (General Liability & Excess Liability).
6. Contractual Liability Limitation Endorsement CG2139 or its equivalent is not included in either General or Excess Liability policies.
7. Severability of Interest or Cross Liability clause or endorsement included (General Liability & Excess Liability).

CERTIFICATE HOLDERS	CANCELLATION
1.	SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELED, TERMINATED, OR MATERIALLY CHANGED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING COMPANY WILL MAIL 30 DAYS' WRITTEN NOTICE TO THE CERTIFICATE HOLDERS NAMED TO THE LEFT. ANY IMPAIRMENT OR EXHAUSTION OF AGGREGATES WILL BE THE SUBJECT OF IMMEDIATE NOTICE TO THE CERTIFICATE HOLDERS.
2.	AUTHORIZED REPRESENTATIVE

CERTIFICATE OF PROPERTY INSURANCE

ISSUE DATE _____ (mm/dd/yy)

THIS IS EVIDENCE THAT INSURANCE AS IDENTIFIED BELOW HAS BEEN ISSUED, IS IN FORCE, AND CONVEYS ALL THE RIGHTS AND PRIVILEGES AFFORDED UNDER THE POLICY.

PRODUCER	COMPANY
Code Sub-Code	
INSURED	POLICY NUMBER
	EFFECTIVE DATE (mm/dd/yy) EXPIRATION DATE (mm/dd/yy)

PROPERTY INFORMATION

LOCATION/DESCRIPTION

COVERAGE INFORMATION

COVERAGES/PERILS/FORMS	AMOUNT OF INSURANCE	DEDUCTIBLE
BUILDERS RISK/INSTALLATION FLOATER All Risk of Physical Damage or Loss to Equipment and Materials at or incidental to the Jobsite, on Completed Value Form.	Insurable value of completed work.	

REMARKS (including Special Conditions)

1. Certificate Holder and others identified in the property insurance paragraph of the Contract Documents are Named Insureds.
2. Waiver of Subrogation against Named Insureds.
3. Any similar insurance carried by Named Insureds is excess of coverage described hereon.
4. Losses are payable to Owner as fiduciary for the Named Insureds.

CANCELLATION

THIS POLICY IS SUBJECT TO THE PREMIUMS, FORMS, AND RULES IN EFFECT FOR EACH POLICY PERIOD. SHOULD THE POLICY BE TERMINATED OR MATERIALLY CHANGED, THE COMPANY WILL GIVE THE CERTIFICATE HOLDERS IDENTIFIED BELOW 30 DAYS' WRITTEN NOTICE, AND WILL SEND NOTIFICATION OF ANY CHANGES TO THE POLICY THAT WOULD AFFECT THAT INTEREST, IN ACCORDANCE WITH THE POLICY PROVISIONS OR AS REQUIRED BY LAW.

CERTIFICATE HOLDERS

Name and Address	Nature of Interest
1.	X Additional Named Insured
2.	SIGNATURE OF AUTHORIZED AGENT OF THE COMPANY

This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the Controlling Law.

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

Issued and Published Jointly By

AMERICAN CONSULTING ENGINEERS COUNCIL

National Society of Professional Engineers
Professional Engineers in Private Practice

AMERICAN SOCIETY OF CIVIL ENGINEERS

PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE
a practice division of the
NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

AMERICAN CONSULTING ENGINEERS COUNCIL

AMERICAN SOCIETY OF CIVIL ENGINEERS

This document has been approved and endorsed by

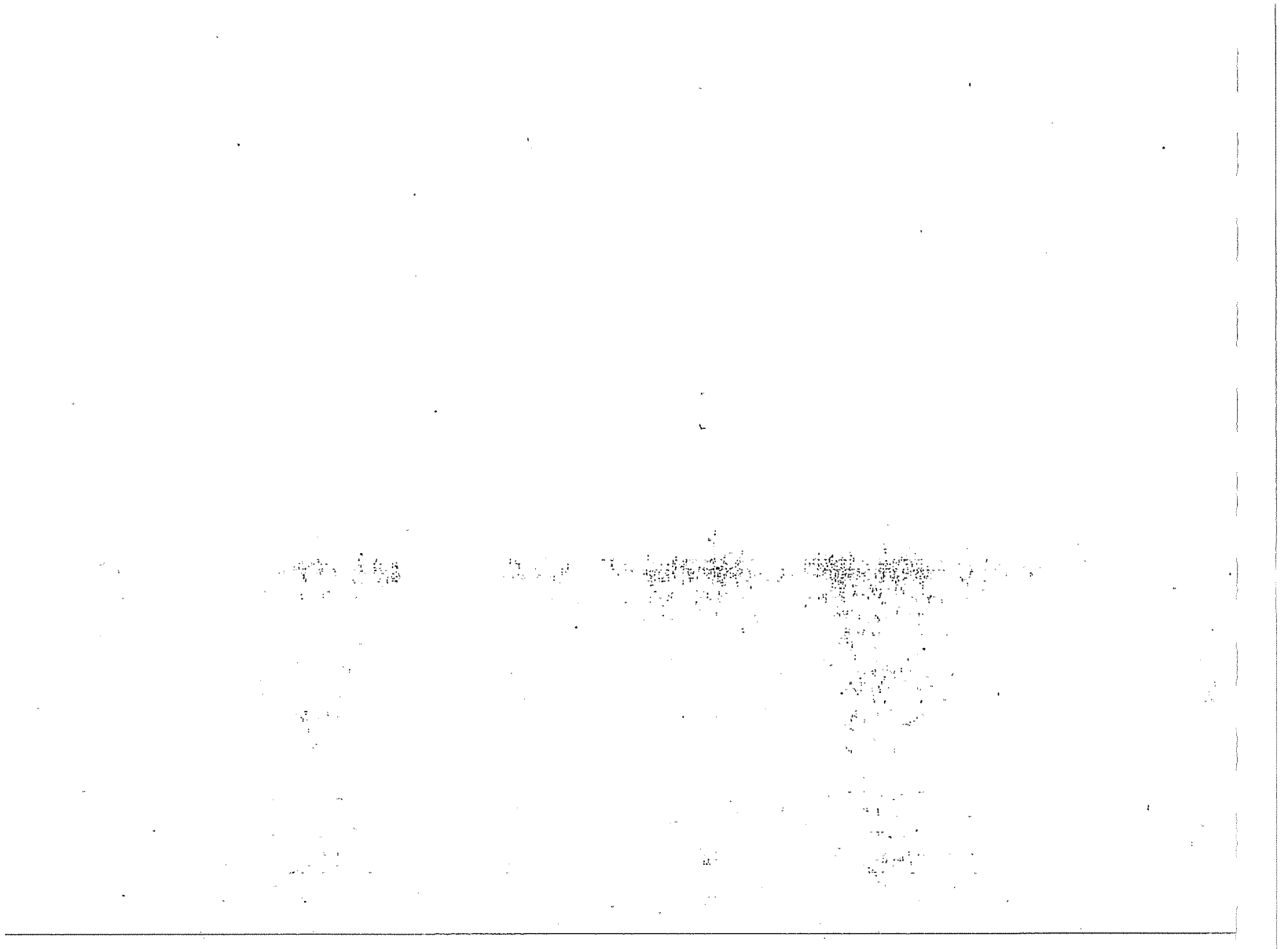
The Associated General Contractors of America

Construction Specifications Institute

Advancement of Construction Technology

These General Conditions have been prepared for use with the Owner-Contractor Agreements (No. 1910-8-A-1 or 1910-8-A-2) (1996 Editions). Their provisions are interrelated and a change in one may necessitate a change in the other. Comments concerning their usage are contained in the EJCDC User's Guide (No. 1910-50). For guidance in the preparation of Supplementary Conditions, see Guide to the Preparation of Supplementary Conditions (No. 1910-17) (1996 Edition).

EJCDC No. 1910-8 (1996 Edition)



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GENERAL CONDITIONS

ARTICLE 1 - DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

A. Wherever used in the Contract Documents and printed with initial or all capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof.

1. *Addenda*--Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the Contract Documents.

2. *Agreement*--The written instrument which is evidence of the agreement between OWNER and CONTRACTOR covering the Work.

3. *Application for Payment*--The form acceptable to ENGINEER which is to be used by CONTRACTOR during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

4. *Asbestos*--Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.

5. *Bid*--The offer or proposal of a bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

6. *Bidding Documents*--The Bidding Requirements and the proposed Contract Documents (including all Addenda issued prior to receipt of Bids).

7. *Bidding Requirements*--The Advertisement or Invitation to Bid, Instructions to Bidders, Bid security form, if any, and the Bid form with any supplements.

8. *Bonds*--Performance and payment bonds and other instruments of security.

9. *Change Order*--A document recommended by ENGINEER which is signed by CONTRACTOR and OWNER and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.

10. *Claim*--A demand or assertion by OWNER or CONTRACTOR seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.

11. *Contract*--The entire and integrated written agreement between the OWNER and CONTRACTOR concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.

12. *Contract Documents*--The Contract Documents establish the rights and obligations of the parties and include the Agreement, Addenda (which pertain to the Contract Documents), CONTRACTOR's Bid (including documentation accompanying the Bid and any post Bid documentation submitted prior to the Notice of Award) when attached as an exhibit to the Agreement, the Notice to Proceed, the Bonds, these General Conditions, the Supplementary Conditions, the Specifications and the Drawings as the same are more specifically identified in the Agreement, together with all Written Amendments, Change Orders, Work Change Directives, Field Orders, and ENGINEER's written interpretations and clarifications issued on or after the Effective Date of the Agreement. Approved Shop Drawings and the reports and drawings of subsurface and physical conditions are not Contract Documents. Only printed or hard copies of the items listed in this paragraph are Contract Documents. Files in electronic media format of text, data, graphics, and the like that may be furnished by OWNER to CONTRACTOR are not Contract Documents.

13. *Contract Price*--The moneys payable by OWNER to CONTRACTOR for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of paragraph 11.03 in the case of Unit Price Work).

14. *Contract Times*--The number of days or the dates stated in the Agreement to: (i) achieve Substantial Completion; and (ii) complete the Work so that it is ready for final payment as evidenced by ENGINEER's written recommendation of final payment.

15. *CONTRACTOR*--The individual or entity with whom OWNER has entered into the Agreement.

16. *Cost of the Work*--See paragraph 11.01.A for definition.

17. *Drawings*--That part of the Contract Documents prepared or approved by ENGINEER which graphically shows the scope, extent, and character of the Work to be performed by CONTRACTOR. Shop Drawings and other CONTRACTOR submittals are not Drawings as so defined.

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

19. *ENGINEER*--The individual or entity named as such in the Agreement.

20. *ENGINEER's Consultant*--An individual or entity having a contract with ENGINEER to furnish services as ENGINEER's independent professional associate or consultant with respect to the Project and who is identified as such in the Supplementary Conditions.

21. *Field Order*--A written order issued by ENGINEER which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.

22. *General Requirements*--Sections of Division 1 of the Specifications. The General Requirements pertain to all sections of the Specifications.

23. *Hazardous Environmental Condition*--The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto in connection with the Work.

24. *Hazardous Waste*--The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.

25. *Laws and Regulations; Laws or Regulations*--Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

26. *Liens*--Charges, security interests, or encumbrances upon Project funds, real property, or personal property.

27. *Milestone*--A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

28. *Notice of Award*--The written notice by OWNER to the apparent successful bidder stating that upon timely compliance by the apparent successful bidder with the conditions precedent listed therein, OWNER will sign and deliver the Agreement.

29. *Notice to Proceed*--A written notice given by OWNER to CONTRACTOR fixing the date on which the Contract Times will commence to run and on which CONTRACTOR shall start to perform the Work under the Contract Documents.

30. *OWNER*--The individual, entity, public body, or authority with whom CONTRACTOR has entered into the Agreement and for whom the Work is to be performed.

31. *Partial Utilization*--Use by OWNER of a substantially completed part of the Work for the purpose for which it is intended (or a related purpose) prior to Substantial Completion of all the Work.

32. *PCBs*--Polychlorinated biphenyls.

33. *Petroleum*--Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.

34. *Project*--The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part as may be indicated elsewhere in the Contract Documents.

35. *Project Manual*--The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.

36. *Radioactive Material*--Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.

37. *Resident Project Representative*--The authorized representative of ENGINEER who may be assigned to the Site or any part thereof.

38. *Samples*--Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.

39. *Shop Drawings*--All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for CONTRACTOR and submitted by CONTRACTOR to illustrate some portion of the Work.

40. *Site*--Lands or areas indicated in the Contract Documents as being furnished by OWNER upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by OWNER which are designated for the use of CONTRACTOR.

41. *Specifications*--That part of the Contract Documents consisting of written technical descriptions of materials, equipment, systems, standards, and workmanship as applied to the Work and certain administrative details applicable thereto.

42. *Subcontractor*--An individual or entity having a direct contract with CONTRACTOR or with any other Subcontractor for the performance of a part of the Work at the Site.

43. *Substantial Completion*--The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of ENGINEER, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.

44. *Supplementary Conditions*--That part of the Contract Documents which amends or supplements these General Conditions.

45. *Supplier*--A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with CONTRACTOR or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by CONTRACTOR or any Subcontractor.

46. *Underground Facilities*--All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

47. *Unit Price Work*--Work to be paid for on the basis of unit prices.

48. *Work*--The entire completed construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.

49. *Work Change Directive*--A written statement to CONTRACTOR issued on or after the Effective Date of the Agreement and signed by OWNER and recommended by ENGINEER ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

50. *Written Amendment*--A written statement modifying the Contract Documents, signed by OWNER and CONTRACTOR on or after the Effective Date of the Agreement and normally dealing with the nonengineering or nontechnical rather than strictly construction-related aspects of the Contract Documents.

1.02 *Terminology*

A. *Intent of Certain Terms or Adjectives*

1. Whenever in the Contract Documents the terms "as allowed," "as approved," or terms of like effect or import are used, or the adjectives "reasonable," "suitable," "acceptable," "proper," "satisfactory," or adjectives of like effect or import are used to describe an action or determination of ENGINEER as to the Work, it is intended that such action or determination will be solely to evaluate, in general, the completed Work for compliance with the requirements of and information in the Contract Documents and conformance with the design concept of the completed Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The

use of any such term or adjective shall not be effective to assign to ENGINEER any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of paragraph 9.10 or any other provision of the Contract Documents.

B. *Day*

1. The word "day" shall constitute a calendar day of 24 hours measured from midnight to the next midnight.

C. *Defective*

1. The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it does not conform to the Contract Documents or does not meet the requirements of any inspection, reference standard, test, or approval referred to in the Contract Documents, or has been damaged prior to ENGINEER's recommendation of final payment (unless responsibility for the protection thereof has been assumed by OWNER at Substantial Completion in accordance with paragraph 14.04 or 14.05).

D. *Furnish, Install, Perform, Provide*

1. The word "furnish," when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.

2. The word "install," when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

3. The words "perform" or "provide," when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.

4. When "furnish," "install," "perform," or "provide" is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of CONTRACTOR, "provide" is implied.

E. Unless stated otherwise in the Contract Documents, words or phrases which have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 - PRELIMINARY MATTERS

2.01 *Delivery of Bonds*

A. When CONTRACTOR delivers the executed Agreements to OWNER, CONTRACTOR shall also deliver to OWNER such Bonds as CONTRACTOR may be required to furnish.

2.02 *Copies of Documents*

A. OWNER shall furnish to CONTRACTOR up to ten copies of the Contract Documents. Additional copies will be furnished upon request at the cost of reproduction.

2.03 *Commencement of Contract Times; Notice to Proceed*

A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Agreement or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Agreement. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Agreement, whichever date is earlier.

2.04 *Starting the Work*

A. CONTRACTOR shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to the date on which the Contract Times commence to run.

2.05 *Before Starting Construction*

A. *CONTRACTOR's Review of Contract Documents:* Before undertaking each part of the Work, CONTRACTOR shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. CONTRACTOR shall promptly report in writing to ENGINEER any conflict, error, ambiguity, or discrepancy which CONTRACTOR may discover and shall obtain a written interpretation or clarification from ENGINEER before proceeding with any Work affected thereby; however, CONTRACTOR shall not be liable to OWNER or ENGINEER for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless CONTRACTOR knew or reasonably should have known thereof.

B. *Preliminary Schedules:* Within ten days after the Effective Date of the Agreement (unless otherwise specified

in the General Requirements), CONTRACTOR shall submit to ENGINEER for its timely review:

1. a preliminary progress schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;

2. a preliminary schedule of Shop Drawing and Sample submittals which will list each required submittal and the times for submitting, reviewing, and processing such submittal; and

3. a preliminary schedule of values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

C. *Evidence of Insurance:* Before any Work at the Site is started, CONTRACTOR and OWNER shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which is called for by one is as binding as if called for by all. CONTRACTOR and OWNER respectively are required to purchase and maintain in accordance with Article 5.

2.06 *Preconstruction Conference*

A. Within 20 days after the Contract Times start to run, but before any Work at the Site is started, a conference attended by CONTRACTOR, ENGINEER, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in paragraph 2.05.B, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.

2.07 *Initial Acceptance of Schedules*

A. Unless otherwise provided in the Contract Documents, at least ten days before submission of the first Application for Payment a conference attended by CONTRACTOR, ENGINEER, and others as appropriate will be held to review for acceptability to ENGINEER as provided below the schedules submitted in accordance with paragraph 2.05.B. CONTRACTOR shall have an additional ten days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to CONTRACTOR until acceptable schedules are submitted to ENGINEER.

1. The progress schedule will be acceptable to ENGINEER if it provides an orderly progression of the Work to completion within any specified Milestones and the Contract Times. Such acceptance will not impose on ENGINEER responsibility for the progress schedule, for sequencing, scheduling, or progress of the Work nor interfere with or relieve CONTRACTOR from CONTRACTOR's full responsibility therefor.

2. CONTRACTOR's schedule of Shop Drawing and Sample submittals will be acceptable to ENGINEER if it provides a workable arrangement for reviewing and processing the required submittals.

3. CONTRACTOR's schedule of values will be acceptable to ENGINEER as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

ARTICLE 3 - CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 *Intent*

A. The Contract Documents are complementary; what is called for by one is as binding as if called for by all.

B. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result will be provided whether or not specifically called for at no additional cost to OWNER.

C. Clarifications and interpretations of the Contract Documents shall be issued by ENGINEER as provided in Article 9.

3.02 *Reference Standards*

A. *Standards, Specifications, Codes, Laws, and Regulations*

1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids),

except as may be otherwise specifically stated in the Contract Documents.

2. No provision of any such standard, specification, manual or code, or any instruction of a Supplier shall be effective to change the duties or responsibilities of OWNER, CONTRACTOR, or ENGINEER, or any of their subcontractors, consultants, agents, or employees from those set forth in the Contract Documents, nor shall any such provision or instruction be effective to assign to OWNER, ENGINEER, or any of ENGINEER's Consultants, agents, or employees any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies*

1. If, during the performance of the Work, CONTRACTOR discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents or between the Contract Documents and any provision of any Law or Regulation applicable to the performance of the Work or of any standard, specification, manual or code, or of any instruction of any Supplier, CONTRACTOR shall report it to ENGINEER in writing at once. CONTRACTOR shall not proceed with the Work affected thereby (except in an emergency as required by paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in paragraph 3.04; provided, however, that CONTRACTOR shall not be liable to OWNER or ENGINEER for failure to report any such conflict, error, ambiguity, or discrepancy unless CONTRACTOR knew or reasonably should have known thereof.

B. *Resolving Discrepancies*

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:

a. the provisions of any standard, specification, manual, code, or instruction (whether or not specifically incorporated by reference in the Contract Documents); or

b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Amending and Supplementing Contract Documents*

A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof in one or more of the following ways: (i) a Written Amendment; (ii) a Change Order; or (iii) a Work Change Directive.

B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways: (i) a Field Order; (ii) ENGINEER's approval of a Shop Drawing or Sample; or (iii) ENGINEER's written interpretation or clarification.

3.05 *Reuse of Documents*

A. CONTRACTOR and any Subcontractor or Supplier or other individual or entity performing or furnishing any of the Work under a direct or indirect contract with OWNER: (i) shall not have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of ENGINEER or ENGINEER's Consultant, including electronic media editions; and (ii) shall not reuse any of such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of OWNER and ENGINEER and specific written verification or adaption by ENGINEER. This prohibition will survive final payment, completion, and acceptance of the Work, or termination or completion of the Contract. Nothing herein shall preclude CONTRACTOR from retaining copies of the Contract Documents for record purposes.

ARTICLE 4 - AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; REFERENCE POINTS

4.01 *Availability of Lands*

A. OWNER shall furnish the Site. OWNER shall notify CONTRACTOR of any encumbrances or restrictions not of general application but specifically related to use of the Site with which CONTRACTOR must comply in performing the Work. OWNER will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If CONTRACTOR and OWNER are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in OWNER's furnishing the Site, CONTRACTOR may make a Claim therefor as provided in paragraph 10.05.

B. Upon reasonable written request, OWNER shall furnish CONTRACTOR with a current statement of record legal title and legal description of the lands upon which the Work is to be performed and OWNER's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.

C. CONTRACTOR shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.02 *Subsurface and Physical Conditions*

A. *Reports and Drawings:* The Supplementary Conditions identify:

1. those reports of explorations and tests of subsurface conditions at or contiguous to the Site that ENGINEER has used in preparing the Contract Documents; and

2. those drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) that ENGINEER has used in preparing the Contract Documents.

B. *Limited Reliance by CONTRACTOR on Technical Data Authorized:* CONTRACTOR may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," CONTRACTOR may not rely upon or make any Claim against OWNER, ENGINEER, or any of ENGINEER's Consultants with respect to:

1. the completeness of such reports and drawings for CONTRACTOR's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by CONTRACTOR, and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or

3. any CONTRACTOR interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions, or information.

4.03 *Differing Subsurface or Physical Conditions*

A. *Notice:* If CONTRACTOR believes that any subsurface or physical condition at or contiguous to the Site that is uncovered or revealed either:

1. is of such a nature as to establish that any "technical data" on which CONTRACTOR is entitled to rely as provided in paragraph 4.02 is materially inaccurate; or

2. is of such a nature as to require a change in the Contract Documents; or

3. differs materially from that shown or indicated in the Contract Documents; or

4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then CONTRACTOR shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by paragraph 6.16.A), notify OWNER and ENGINEER in writing about such condition. CONTRACTOR shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

B. *ENGINEER's Review:* After receipt of written notice as required by paragraph 4.03.A, ENGINEER will promptly review the pertinent condition, determine the necessity of OWNER's obtaining additional exploration or tests with respect thereto, and advise OWNER in writing (with a copy to CONTRACTOR) of ENGINEER's findings and conclusions.

C. *Possible Price and Times Adjustments*

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in CONTRACTOR's cost of, or time required for, performance of the Work; subject, however, to the following:

a. such condition must meet any one or more of the categories described in paragraph 4.03.A; and

b. with respect to Work that is paid for on a Unit Price Basis, any adjustment in Contract Price will be subject to the provisions of paragraphs 9.08 and 11.03.

2. CONTRACTOR shall not be entitled to any adjustment in the Contract Price or Contract Times if:

a. CONTRACTOR knew of the existence of such conditions at the time CONTRACTOR made a final commitment to OWNER in respect of Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or

b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for CONTRACTOR prior to CONTRACTOR's making such final commitment; or

c. CONTRACTOR failed to give the written notice within the time and as required by paragraph 4.03.A.

3. If OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in paragraph 10.05. However, OWNER, ENGINEER, and ENGINEER's Consultants shall not be liable to CONTRACTOR for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by CONTRACTOR on or in connection with any other project or anticipated project.

4.04 *Underground Facilities*

A. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to OWNER or ENGINEER by the owners of such Underground Facilities, including OWNER, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

1. OWNER and ENGINEER shall not be responsible for the accuracy or completeness of any such information or data; and

2. the cost of all of the following will be included in the Contract Price, and CONTRACTOR shall have full responsibility for:

a. reviewing and checking all such information and data,

b. locating all Underground Facilities shown or indicated in the Contract Documents,

c. coordination of the Work with the owners of such Underground Facilities, including OWNER, during construction, and

d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

B. *Not Shown or Indicated*

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, CONTRACTOR shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by paragraph 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to OWNER and ENGINEER. ENGINEER will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, CONTRACTOR shall be responsible for the safety and protection of such Underground Facility.

2. If ENGINEER concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price of Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that CONTRACTOR did not know of and could not reasonably have been expected to be aware of or to have anticipated. If OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price or Contract Times, OWNER or CONTRACTOR may make a Claim therefor as provided in paragraph 10.05.

4.05 *Reference Points*

A. OWNER shall provide engineering surveys to establish reference points for construction which in ENGINEER's judgment are necessary to enable CONTRACTOR to proceed with the Work. CONTRACTOR shall be responsible for laying out the Work, shall protect and preserve the established reference points and property

monuments, and shall make no changes or relocations without the prior written approval of OWNER. CONTRACTOR shall report to ENGINEER whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.06 *Hazardous Environmental Condition at Site*

A. *Reports and Drawings:* Reference is made to the Supplementary Conditions for the identification of those reports and drawings relating to a Hazardous Environmental Condition identified at the Site, if any, that have been utilized by the ENGINEER in the preparation of the Contract Documents.

B. *Limited Reliance by CONTRACTOR on Technical Data Authorized:* CONTRACTOR may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," CONTRACTOR may not rely upon or make any Claim against OWNER, ENGINEER or any of ENGINEER's Consultants with respect to:

1. the completeness of such reports and drawings for CONTRACTOR's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by CONTRACTOR and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or

3. any CONTRACTOR interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions or information.

C. CONTRACTOR shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. CONTRACTOR shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by CONTRACTOR, Subcontractors, Suppliers, or anyone else for whom CONTRACTOR is responsible.

D. If CONTRACTOR encounters a Hazardous Environmental Condition or if CONTRACTOR or anyone for whom CONTRACTOR is responsible creates a Hazardous Environmental Condition, CONTRACTOR shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by paragraph 6.16); and (iii) notify OWNER and ENGINEER (and promptly thereafter confirm such notice in writing). OWNER shall promptly consult with ENGINEER concerning the necessity for OWNER to retain a qualified expert to evaluate such condition or take corrective action, if any.

E. CONTRACTOR shall not be required to resume Work in connection with such condition or in any affected area until after OWNER has obtained any required permits related thereto and delivered to CONTRACTOR written notice: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If OWNER and CONTRACTOR cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by CONTRACTOR, either party may make a Claim therefor as provided in paragraph 10.05.

F. If after receipt of such written notice CONTRACTOR does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then OWNER may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If OWNER and CONTRACTOR cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in paragraph 10.05. OWNER may have such deleted portion of the Work performed by OWNER's own forces or others in accordance with Article 7.

G. To the fullest extent permitted by Laws and Regulations, OWNER shall indemnify and hold harmless CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants and the officers, directors, partners, employees, agents, other consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by CONTRACTOR or by anyone for whom CONTRACTOR is responsible. Nothing

in this paragraph 4.06.E shall obligate OWNER to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

H. To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, ENGINEER's Consultants, and the officers, directors, partners, employees, agents, other consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by CONTRACTOR or by anyone for whom CONTRACTOR is responsible. Nothing in this paragraph 4.06.F shall obligate CONTRACTOR to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

I. The provisions of paragraphs 4.02, 4.03, and 4.04 are not intended to apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 5 - BONDS AND INSURANCE

5.01 *Performance, Payment, and Other Bonds*

A. CONTRACTOR shall furnish performance and payment Bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all CONTRACTOR's obligations under the Contract Documents. These Bonds shall remain in effect at least until one year after the date when final payment becomes due, except as provided otherwise by Laws or Regulations or by the Contract Documents. CONTRACTOR shall also furnish such other Bonds as are required by the Contract Documents.

B. All Bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All Bonds signed by an agent must be accompanied by a certified copy of such agent's authority to act.

C. If the surety on any Bond furnished by CONTRACTOR is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of paragraph 5.01.B, CONTRACTOR shall within 20 days thereafter substitute another Bond and surety, both of which shall comply with the requirements of paragraphs 5.01.B and 5.02.

5.02 *Licensed Sureties and Insurers*

A. All Bonds and insurance required by the Contract Documents to be purchased and maintained by OWNER or CONTRACTOR shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue Bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

5.03 *Certificates of Insurance*

A. CONTRACTOR shall deliver to OWNER, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by OWNER or any other additional insured) which CONTRACTOR is required to purchase and maintain. OWNER shall deliver to CONTRACTOR, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by CONTRACTOR or any other additional insured) which OWNER is required to purchase and maintain.

5.04 *CONTRACTOR's Liability Insurance*

A. CONTRACTOR shall purchase and maintain such liability and other insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which may arise out of or result from CONTRACTOR's performance of the Work and CONTRACTOR's other obligations under the Contract Documents, whether it is to be performed by CONTRACTOR, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:

1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;

2. claims for damages because of bodily injury, occupational sickness or disease, or death of CONTRACTOR's employees;

3. claims for damages because of bodily injury, sickness or disease, or death of any person other than CONTRACTOR's employees;

4. claims for damages insured by reasonably available personal injury liability coverage which are sustained: (i) by any person as a result of an offense directly or indirectly related to the employment of such person by CONTRACTOR, or (ii) by any other person for any other reason;

5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and

6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.

B. The policies of insurance so required by this paragraph 5.04 to be purchased and maintained shall:

1. with respect to insurance required by paragraphs 5.04.A.3 through 5.04.A.6 inclusive, include as additional insureds (subject to any customary exclusion in respect of professional liability) OWNER, ENGINEER, ENGINEER's Consultants, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;

2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;

3. include completed operations insurance;

4. include contractual liability insurance covering CONTRACTOR's indemnity obligations under paragraphs 6.07, 6.11, and 6.20;

5. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least thirty days prior written notice has been given to OWNER and CONTRACTOR and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the CONTRACTOR pursuant to paragraph 5.03 will so provide);

6. remain in effect at least until final payment and at all times thereafter when CONTRACTOR may be correcting, removing, or replacing defective Work in accordance with paragraph 13.07; and

7. with respect to completed operations insurance, and any insurance coverage written on a claims-made basis, remain in effect for at least two years after final payment (and CONTRACTOR shall furnish OWNER and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to OWNER and any such additional insured of continuation of such insurance at final payment and one year thereafter).

5.05 *OWNER's Liability Insurance*

A. In addition to the insurance required to be provided by CONTRACTOR under paragraph 5.04, OWNER, at OWNER's option, may purchase and maintain at OWNER's expense OWNER's own liability insurance as will protect OWNER against claims which may arise from operations under the Contract Documents.

5.06 *Property Insurance*

A. Unless otherwise provided in the Supplementary Conditions, OWNER shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:

1. include the interests of OWNER, CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as an additional insured;

2. be written on a Builder's Risk "all-risk" or open peril or special causes of loss policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, false work, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage, and such other perils or causes of loss as may be specifically required by the Supplementary Conditions;

3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);

4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by OWNER prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by ENGINEER;

5. allow for partial utilization of the Work by OWNER;

6. include testing and startup; and

7. be maintained in effect until final payment is made unless otherwise agreed to in writing by OWNER, CONTRACTOR, and ENGINEER with 30 days written notice to each other additional insured to whom a certificate of insurance has been issued.

B. OWNER shall purchase and maintain such boiler and machinery insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of OWNER, CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants, and any other individuals or entities identified in the Supplementary Conditions, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured.

C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to OWNER and CONTRACTOR and to each other additional insured to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with paragraph 5.07.

D. OWNER shall not be responsible for purchasing and maintaining any property insurance specified in this paragraph 5.06 to protect the interests of CONTRACTOR, Subcontractors, or others in the Work to the extent of any deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount will be borne by CONTRACTOR, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

E. If CONTRACTOR requests in writing that other special insurance be included in the property insurance policies provided under paragraph 5.06, OWNER shall, if possible, include such insurance, and the cost thereof will be charged to CONTRACTOR by appropriate Change Order or Written Amendment. Prior to commencement of the Work at the Site, OWNER shall in writing advise CONTRACTOR whether or not such other insurance has been procured by OWNER.

5.07 *Waiver of Rights*

A. OWNER and CONTRACTOR intend that all policies purchased in accordance with paragraph 5.06 will protect OWNER, CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or additional insureds thereunder. OWNER and CONTRACTOR waive all rights against each other and their respective officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors, ENGINEER, ENGINEER's Consultants, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by OWNER as trustee or otherwise payable under any policy so issued.

B. OWNER waives all rights against CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants, and the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them for:

1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to OWNER's property or the Work caused by, arising out of, or resulting from fire or other peril whether or not insured by OWNER; and

2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by OWNER during partial utilization pursuant to paragraph 14.05, after Substantial Completion

pursuant to paragraph 14.04, or after final payment pursuant to paragraph 14.07.

C. Any insurance policy maintained by OWNER covering any loss, damage or consequential loss referred to in paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against CONTRACTOR, Subcontractors, ENGINEER, or ENGINEER's Consultants and the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them.

5.08 *Receipt and Application of Insurance Proceeds*

A. Any insured loss under the policies of insurance required by paragraph 5.06 will be adjusted with OWNER and made payable to OWNER as fiduciary for the insureds, as their interests may appear, subject to the requirements of any applicable mortgage clause and of paragraph 5.08.B. OWNER shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order or Written Amendment.

B. OWNER as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to OWNER's exercise of this power. If such objection be made, OWNER as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, OWNER as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, OWNER as fiduciary shall give bond for the proper performance of such duties.

5.09 *Acceptance of Bonds and Insurance; Option to Replace*

A. If either OWNER or CONTRACTOR has any objection to the coverage afforded by or other provisions of the Bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the objecting party shall so notify the other party in writing within 10 days after receipt of the certificates (or other evidence requested) required by paragraph 2.05.C. OWNER and CONTRACTOR shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the Bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent Bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

A. If OWNER finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to paragraph 5.06 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

ARTICLE 6 - CONTRACTOR'S RESPONSIBILITIES

6.01 *Supervision and Superintendence*

A. CONTRACTOR shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction, but CONTRACTOR shall not be responsible for the negligence of OWNER or ENGINEER in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents. CONTRACTOR shall be responsible to see that the completed Work complies accurately with the Contract Documents.

B. At all times during the progress of the Work, CONTRACTOR shall assign a competent resident superintendent thereto who shall not be replaced without written notice to OWNER and ENGINEER except under extraordinary circumstances. The superintendent will be CONTRACTOR's representative at the Site and shall have authority to act on behalf of CONTRACTOR. All communications given to or received from the superintendent shall be binding on CONTRACTOR.

6.02 *Labor; Working Hours*

A. CONTRACTOR shall provide competent, suitably qualified personnel to survey, lay out, and construct the Work as required by the Contract Documents. CONTRACTOR shall at all times maintain good discipline and order at the Site.

B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours, and CONTRACTOR will not permit overtime work or the performance of Work on Saturday, Sunday, or any legal holiday without OWNER's written consent (which will not be unreasonably withheld) given after prior written notice to ENGINEER.

6.03 *Services, Materials, and Equipment*

A. Unless otherwise specified in the General Requirements, CONTRACTOR shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start-up, and completion of the Work.

B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All warranties and guarantees specifically called for by the Specifications shall expressly run to the benefit of OWNER. If required by ENGINEER, CONTRACTOR shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

6.04 *Progress Schedule*

A. CONTRACTOR shall adhere to the progress schedule established in accordance with paragraph 2.07 as it may be adjusted from time to time as provided below.

1. CONTRACTOR shall submit to ENGINEER for acceptance (to the extent indicated in paragraph 2.07) proposed adjustments in the progress schedule that will not result in changing the Contract Times (or Milestones). Such adjustments will conform generally to the progress schedule then in effect and additionally will comply with any provisions of the General Requirements applicable thereto.

2. Proposed adjustments in the progress schedule that will change the Contract Times (or Milestones) shall be submitted in accordance with the requirements of Article 12. Such adjustments may only be made by a Change Order or Written Amendment in accordance with Article 12.

6.05 *Substitutes and "Or-Equals"*

A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to ENGINEER for review under the circumstances described below.

1. *"Or-Equal" Items:* If in ENGINEER's sole discretion an item of material or equipment proposed by CONTRACTOR is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by ENGINEER as an "or-equal" item, in which case review and approval of the proposed item may, in ENGINEER's sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:

a. in the exercise of reasonable judgment ENGINEER determines that: (i) it is at least equal in quality, durability, appearance, strength, and design characteristics; (ii) it will reliably perform at least equally well the function imposed by the design concept of the completed Project as a functioning whole, and;

b. CONTRACTOR certifies that: (i) there is no increase in cost to the OWNER; and (ii) it will conform substantially, even with deviations, to the detailed requirements of the item named in the Contract Documents.

2. *Substitute Items*

a. If in ENGINEER's sole discretion an item of material or equipment proposed by CONTRACTOR does not qualify as an "or-equal" item under

paragraph 6.05.A.1, it will be considered a proposed substitute item.

b. CONTRACTOR shall submit sufficient information as provided below to allow ENGINEER to determine that the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by ENGINEER from anyone other than CONTRACTOR.

c. The procedure for review by ENGINEER will be as set forth in paragraph 6.05.A.2.d, as supplemented in the General Requirements and as ENGINEER may decide is appropriate under the circumstances.

d. CONTRACTOR shall first make written application to ENGINEER for review of a proposed substitute item of material or equipment that CONTRACTOR seeks to furnish or use. The application shall certify that the proposed substitute item will perform adequately the functions and achieve the results called for by the general design, be similar in substance to that specified, and be suited to the same use as that specified. The application will state the extent, if any, to which the use of the proposed substitute item will prejudice CONTRACTOR's achievement of Substantial Completion on time, whether or not use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with OWNER for work on the Project) to adapt the design to the proposed substitute item and whether or not incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty. All variations of the proposed substitute item from that specified will be identified in the application, and available engineering, sales, maintenance, repair, and replacement services will be indicated. The application will also contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change, all of which will be considered by ENGINEER in evaluating the proposed substitute item. ENGINEER may require CONTRACTOR to furnish additional data about the proposed substitute item.

B. *Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence, or procedure of construction is shown or indicated in and expressly required by the Contract Documents, CONTRACTOR may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by ENGINEER. CONTRACTOR shall submit sufficient information to allow ENGINEER, in ENGINEER's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The procedure for review by ENGINEER will be similar to that provided in subparagraph 6.05.A.2.

C. *Engineer's Evaluation:* ENGINEER will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to paragraphs 6.05.A and 6.05.B. ENGINEER will be the sole judge of acceptability. No "or-equal" or substitute will be ordered, installed or utilized until ENGINEER's review is complete, which will be evidenced by either a Change Order for a substitute or an approved Shop Drawing for an "or equal." ENGINEER will advise CONTRACTOR in writing of any negative determination.

D. *Special Guarantee:* OWNER may require CONTRACTOR to furnish at CONTRACTOR's expense a special performance guarantee or other surety with respect to any substitute.

E. *ENGINEER's Cost Reimbursement:* ENGINEER will record time required by ENGINEER and ENGINEER's Consultants in evaluating substitute proposed or submitted by CONTRACTOR pursuant to paragraphs 6.05.A.2 and 6.05.B and in making changes in the Contract Documents (or in the provisions of any other direct contract with OWNER for work on the Project) occasioned thereby. Whether or not ENGINEER approves a substitute item so proposed or submitted by CONTRACTOR, CONTRACTOR shall reimburse OWNER for the charges of ENGINEER and ENGINEER's Consultants for evaluating each such proposed substitute.

F. *CONTRACTOR's Expense:* CONTRACTOR shall provide all data in support of any proposed substitute or "or-equal" at CONTRACTOR's expense.

6.06 *Concerning Subcontractors, Suppliers, and Others*

A. CONTRACTOR shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to OWNER as indicated in paragraph 6.06.B), whether initially or as a replacement, against whom OWNER may have reasonable objection. CONTRACTOR shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom CONTRACTOR has reasonable objection.

B. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or

entities to be submitted to OWNER in advance for acceptance by OWNER by a specified date prior to the Effective Date of the Agreement, and if CONTRACTOR has submitted a list thereof in accordance with the Supplementary Conditions, OWNER's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. CONTRACTOR shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued or Written Amendment signed. No acceptance by OWNER of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of any right of OWNER or ENGINEER to reject defective Work.

C. CONTRACTOR shall be fully responsible to OWNER and ENGINEER for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as CONTRACTOR is responsible for CONTRACTOR's own acts and omissions. Nothing in the Contract Documents shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between OWNER or ENGINEER and any such Subcontractor, Supplier or other individual or entity, nor shall it create any obligation on the part of OWNER or ENGINEER to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

D. CONTRACTOR shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with CONTRACTOR.

E. CONTRACTOR shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with ENGINEER through CONTRACTOR.

F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control CONTRACTOR in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

G. All Work performed for CONTRACTOR by a Subcontractor or Supplier will be pursuant to an appropriate agreement between CONTRACTOR and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of OWNER and ENGINEER. Whenever any such agreement is with a Subcontractor or Supplier who is listed as an additional insured on the property insurance provided in paragraph 5.06, the agreement between the CONTRACTOR and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against OWNER, CONTRACTOR, ENGINEER, ENGINEER's Consultants, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, CONTRACTOR will obtain the same.

6.07 *Patent Fees and Royalties*

A. CONTRACTOR shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if to the actual knowledge of OWNER or ENGINEER its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by OWNER in the Contract Documents. To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, ENGINEER's Consultants, and the officers, directors, partners, employees or agents, and other consultants of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

6.08 *Permits*

A. Unless otherwise provided in the Supplementary Conditions, CONTRACTOR shall obtain and pay for all construction permits and licenses. OWNER shall assist CONTRACTOR, when necessary, in obtaining such permits

and licenses. CONTRACTOR shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. CONTRACTOR shall pay all charges of utility owners for connections to the Work, and OWNER shall pay all charges of such utility owners for capital costs related thereto, such as plant investment fees.

6.09 *Laws and Regulations*

A. CONTRACTOR shall give all notices and comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither OWNER nor ENGINEER shall be responsible for monitoring CONTRACTOR's compliance with any Laws or Regulations.

B. If CONTRACTOR performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, CONTRACTOR shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work; however, it shall not be CONTRACTOR's primary responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve CONTRACTOR of CONTRACTOR's obligations under paragraph 3.03.

C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work may be the subject of an adjustment in Contract Price or Contract Times. If OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in paragraph 10.05.

6.10 *Taxes*

A. CONTRACTOR shall pay all sales, consumer, use, and other similar taxes required to be paid by CONTRACTOR in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

6.11 *Use of Site and Other Areas*

A. *Limitation on Use of Site and Other Areas*

1. CONTRACTOR shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. CONTRACTOR shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.

2. Should any claim be made by any such owner or occupant because of the performance of the Work, CONTRACTOR shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.

3. To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, ENGINEER's Consultant, and the officers, directors, partners, employees, agents, and other consultants of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against OWNER, ENGINEER, or any other party indemnified hereunder to the extent caused by or based upon CONTRACTOR's performance of the Work.

B. *Removal of Debris During Performance of the Work:* During the progress of the Work CONTRACTOR shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.

C. *Cleaning:* Prior to Substantial Completion of the Work CONTRACTOR shall clean the Site and make it ready for utilization by OWNER. At the completion of the Work CONTRACTOR shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

D. *Loading Structures:* CONTRACTOR shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall CONTRACTOR subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

6.12 *Record Documents*

A. CONTRACTOR shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Written Amendments, Change Orders, Work

Change Directives, Field Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to ENGINEER for reference. Upon completion of the Work, these record documents, Samples, and Shop Drawings will be delivered to ENGINEER for OWNER.

6.13 *Safety and Protection*

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

1. all persons on the Site or who may be affected by the Work;

2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and

3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

B. CONTRACTOR shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. CONTRACTOR shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property. All damage, injury, or loss to any property referred to in paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by CONTRACTOR, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by CONTRACTOR (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of OWNER or ENGINEER or ENGINEER's Consultant, or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of CONTRACTOR or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them). CONTRACTOR's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and ENGINEER has issued a notice to OWNER and CONTRACTOR in accordance with paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.14 *Safety Representative*

A. CONTRACTOR shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

6.15 *Hazard Communication Programs*

A. CONTRACTOR shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

6.16 *Emergencies*

A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, CONTRACTOR is obligated to act to prevent threatened damage, injury, or loss. CONTRACTOR shall give ENGINEER prompt written notice if CONTRACTOR believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If ENGINEER determines that a change in the Contract Documents is required because of the action taken by CONTRACTOR in response to such an emergency, a Work Change Directive or Change Order will be issued.

6.17 *Shop Drawings and Samples*

A. CONTRACTOR shall submit Shop Drawings to ENGINEER for review and approval in accordance with the acceptable schedule of Shop Drawings and Sample submittals. All submittals will be identified as ENGINEER may require and in the number of copies specified in the General Requirements. The data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show ENGINEER the services, materials, and equipment CONTRACTOR proposes to provide and to enable ENGINEER to review the information for the limited purposes required by paragraph 6.17.E.

B. CONTRACTOR shall also submit Samples to ENGINEER for review and approval in accordance with the acceptable schedule of Shop Drawings and Sample

submittals. Each Sample will be identified clearly as to material, Supplier, pertinent data such as catalog numbers, and the use for which intended and otherwise as ENGINEER may require to enable ENGINEER to review the submittal for the limited purposes required by paragraph 6.17.E. The numbers of each Sample to be submitted will be as specified in the Specifications.

C. Where a Shop Drawing or Sample is required by the Contract Documents or the schedule of Shop Drawings and Sample submittals acceptable to ENGINEER as required by paragraph 2.07, any related Work performed prior to ENGINEER's review and approval of the pertinent submittal will be at the sole expense and responsibility of CONTRACTOR.

D. *Submittal Procedures*

1. Before submitting each Shop Drawing or Sample, CONTRACTOR shall have determined and verified:

a. all field measurements, quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;

b. all materials with respect to intended use, fabrication, shipping, handling, storage, assembly and installation pertaining to the performance of the Work;

c. all information relative to means, methods, techniques, sequences, and procedures of construction and safety precautions and programs incident thereto; and

d. CONTRACTOR shall also have reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents.

2. Each submittal shall bear a stamp or specific written indication that CONTRACTOR has satisfied CONTRACTOR's obligations under the Contract Documents with respect to CONTRACTOR's review and approval of that submittal.

3. At the time of each submittal, CONTRACTOR shall give ENGINEER specific written notice of such variations, if any, that the Shop Drawing or Sample submitted may have from the requirements of the Contract Documents, such notice to be in a written communication separate from the submittal; and, in addition, shall cause a specific notation to be made on each Shop Drawing and Sample submitted to ENGINEER for review and approval of each such variation.

E. *ENGINEER's Review*

1. ENGINEER will timely review and approve Shop Drawings and Samples in accordance with the schedule of Shop Drawings and Sample submittals acceptable to ENGINEER. ENGINEER's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

2. ENGINEER's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

3. ENGINEER's review and approval of Shop Drawings or Samples shall not relieve CONTRACTOR from responsibility for any variation from the requirements of the Contract Documents unless CONTRACTOR has in writing called ENGINEER's attention to each such variation at the time of each submittal as required by paragraph 6.17.D.3 and ENGINEER has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample approval; nor will any approval by ENGINEER relieve CONTRACTOR from responsibility for complying with the requirements of paragraph 6.17.D.1.

F. *Resubmittal Procedures*

1. CONTRACTOR shall make corrections required by ENGINEER and shall return the required number of corrected copies of Shop Drawings and submit as required new Samples for review and approval. CONTRACTOR shall direct specific attention in writing to revisions other than the corrections called for by ENGINEER on previous submittals.

6.18 *Continuing the Work*

A. CONTRACTOR shall carry on the Work and adhere to the progress schedule during all disputes or disagreements with OWNER. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except

as permitted by paragraph 15.04 or as OWNER and CONTRACTOR may otherwise agree in writing.

6.19 *CONTRACTOR's General Warranty and Guarantee*

A. CONTRACTOR warrants and guarantees to OWNER, ENGINEER, and ENGINEER's Consultants that all Work will be in accordance with the Contract Documents and will not be defective. CONTRACTOR's warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, modification, or improper maintenance or operation by persons other than CONTRACTOR, Subcontractors, Suppliers, or any other individual or entity for whom CONTRACTOR is responsible; or

2. normal wear and tear under normal usage.

B. CONTRACTOR's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of CONTRACTOR's obligation to perform the Work in accordance with the Contract Documents:

1. observations by ENGINEER;

2. recommendation by ENGINEER or payment by OWNER of any progress or final payment;

3. the issuance of a certificate of Substantial Completion by ENGINEER or any payment related thereto by OWNER;

4. use or occupancy of the Work or any part thereof by OWNER;

5. any acceptance by OWNER or any failure to do so;

6. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by ENGINEER;

7. any inspection, test, or approval by others; or

8. any correction of defective Work by OWNER.

6.20 *Indemnification*

A. To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, ENGINEER's Consultants, and the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage:

1. is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom; and

2. is caused in whole or in part by any negligent act or omission of CONTRACTOR, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable, regardless of whether or not caused in part by any negligence or omission of an individual or entity indemnified hereunder or whether liability is imposed upon such indemnified party by Laws and Regulations regardless of the negligence of any such individual or entity.

B. In any and all claims against OWNER or ENGINEER or any of their respective consultants, agents, officers, directors, partners, or employees by any employee (or the survivor or personal representative of such employee) of CONTRACTOR, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for CONTRACTOR or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

C. The indemnification obligations of CONTRACTOR under paragraph 6.20.A shall not extend to the liability of ENGINEER and ENGINEER's Consultants or to the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them arising out of:

1. the preparation or approval of, or the failure to prepare or approve, maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or

2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

ARTICLE 7 - OTHER WORK

7.01 *Related Work at Site*

A. OWNER may perform other work related to the Project at the Site by OWNER's employees, or let other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:

1. written notice thereof will be given to CONTRACTOR prior to starting any such other work; and

2. if OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in paragraph 10.05.

B. CONTRACTOR shall afford each other contractor who is a party to such a direct contract and each utility owner (and OWNER, if OWNER is performing the other work with OWNER's employees) proper and safe access to the Site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work and shall properly coordinate the Work with theirs. Unless otherwise provided in the Contract Documents, CONTRACTOR shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. CONTRACTOR shall not endanger any work of others by cutting, excavating, or otherwise altering their work and will only cut or alter their work with the written consent of ENGINEER and the others whose work will be affected. The duties and responsibilities of CONTRACTOR under this paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of CONTRACTOR in said direct contracts between OWNER and such utility owners and other contractors.

C. If the proper execution or results of any part of CONTRACTOR's Work depends upon work performed by others under this Article 7, CONTRACTOR shall inspect such other work and promptly report to ENGINEER in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of CONTRACTOR's Work. CONTRACTOR's failure to so report will constitute an acceptance of such other work as fit and proper for integration with CONTRACTOR's Work except for latent defects and deficiencies in such other work.

7.02 *Coordination*

A. If OWNER intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth in Supplementary Conditions:

1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;

2. the specific matters to be covered by such authority and responsibility will be itemized; and

3. the extent of such authority and responsibilities will be provided.

B. Unless otherwise provided in the Supplementary Conditions, OWNER shall have sole authority and responsibility for such coordination.

ARTICLE 8 - OWNER'S RESPONSIBILITIES

8.01 *Communications to Contractor*

A. Except as otherwise provided in these General Conditions, OWNER shall issue all communications to CONTRACTOR through ENGINEER.

8.02 *Replacement of ENGINEER*

A. In case of termination of the employment of ENGINEER, OWNER shall appoint an engineer to whom CONTRACTOR makes no reasonable objection, whose status under the Contract Documents shall be that of the former ENGINEER.

8.03 *Furnish Data*

A. OWNER shall promptly furnish the data required of OWNER under the Contract Documents.

8.04 *Pay Promptly When Due*

A. OWNER shall make payments to CONTRACTOR promptly when they are due as provided in paragraphs 14.02.C and 14.07.C.

8.05 *Lands and Easements; Reports and Tests*

A. OWNER's duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in paragraphs 4.01 and 4.05. Paragraph 4.02 refers to OWNER's identifying and making available to CONTRACTOR copies of reports of explorations

and tests of subsurface conditions and drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site that have been utilized by ENGINEER in preparing the Contract Documents.

8.06 *Insurance*

A. OWNER's responsibilities, if any, in respect to purchasing and maintaining liability and property insurance are set forth in Article 5.

8.07 *Change Orders*

A. OWNER is obligated to execute Change Orders as indicated in paragraph 10.03.

8.08 *Inspections, Tests, and Approvals*

A. OWNER's responsibility in respect to certain inspections, tests, and approvals is set forth in paragraph 13.03.B.

8.09 *Limitations on OWNER's Responsibilities*

A. The OWNER shall not supervise, direct, or have control or authority over, nor be responsible for, CONTRACTOR's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of CONTRACTOR to comply with Laws and Regulations applicable to the performance of the Work. OWNER will not be responsible for CONTRACTOR's failure to perform the Work in accordance with the Contract Documents.

8.10 *Undisclosed Hazardous Environmental Condition*

A. OWNER's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in paragraph 4.06.

8.11 *Evidence of Financial Arrangements*

A. If and to the extent OWNER has agreed to furnish CONTRACTOR reasonable evidence that financial arrangements have been made to satisfy OWNER's obligations under the Contract Documents, OWNER's responsibility in respect thereof will be as set forth in the Supplementary Conditions.

ARTICLE 9 - ENGINEER'S STATUS DURING CONSTRUCTION

9.01 *OWNER'S Representative*

A. ENGINEER will be OWNER's representative during the construction period. The duties and responsibilities and the limitations of authority of ENGINEER as OWNER's representative during construction are set forth in the Contract Documents and will not be changed without written consent of OWNER and ENGINEER.

9.02 *Visits to Site*

A. ENGINEER will make visits to the Site at intervals appropriate to the various stages of construction as ENGINEER deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of CONTRACTOR's executed Work. Based on information obtained during such visits and observations, ENGINEER, for the benefit of OWNER, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. ENGINEER will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. ENGINEER's efforts will be directed toward providing for OWNER a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, ENGINEER will keep OWNER informed of the progress of the Work and will endeavor to guard OWNER against defective Work.

B. ENGINEER's visits and observations are subject to all the limitations on ENGINEER's authority and responsibility set forth in paragraph 9.10, and particularly, but without limitation, during or as a result of ENGINEER's visits or observations of CONTRACTOR's Work ENGINEER will not supervise, direct, control, or have authority over or be responsible for CONTRACTOR's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of CONTRACTOR to comply with Laws and Regulations applicable to the performance of the Work.

9.03 *Project Representative*

A. If OWNER and ENGINEER agree, ENGINEER will furnish a Resident Project Representative to assist ENGINEER in providing more extensive observation of the Work. The responsibilities and authority and limitations thereon of any such Resident Project Representative and assistants will be as provided in paragraph 9.10 and in the Supplementary Conditions. If OWNER designates another

representative or agent to represent OWNER at the Site who is not ENGINEER's Consultant, agent or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

9.04 *Clarifications and Interpretations*

A. ENGINEER will issue with reasonable promptness such written clarifications or interpretations of the requirements of the Contract Documents as ENGINEER may determine necessary, which shall be consistent with the intent of and reasonably inferable from the Contract Documents. Such written clarifications and interpretations will be binding on OWNER and CONTRACTOR. If OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a written clarification or interpretation, a Claim may be made therefor as provided in paragraph 10.05.

9.05 *Authorized Variations in Work*

A. ENGINEER may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on OWNER and also on CONTRACTOR, who shall perform the Work involved promptly. If OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of a Field Order, a Claim may be made therefor as provided in paragraph 10.05.

9.06 *Rejecting Defective Work*

A. ENGINEER will have authority to disapprove or reject Work which ENGINEER believes to be defective, or that ENGINEER believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. ENGINEER will also have authority to require special inspection or testing of the Work as provided in paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

9.07 *Shop Drawings, Change Orders and Payments*

A. In connection with ENGINEER's authority as to Shop Drawings and Samples, see paragraph 6.17.

B. In connection with ENGINEER's authority as to Change Orders, see Articles 10, 11, and 12.

C. In connection with ENGINEER's authority as to Applications for Payment, see Article 14.

9.08 *Determinations for Unit Price Work*

A. ENGINEER will determine the actual quantities and classifications of Unit Price Work performed by CONTRACTOR. ENGINEER will review with CONTRACTOR the ENGINEER's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). ENGINEER's written decision thereon will be final and binding (except as modified by ENGINEER to reflect changed factual conditions or more accurate data) upon OWNER and CONTRACTOR, subject to the provisions of paragraph 10.05.

9.09 *Decisions on Requirements of Contract Documents and Acceptability of Work*

A. ENGINEER will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. Claims, disputes and other matters relating to the acceptability of the Work, the quantities and classifications of Unit Price Work, the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, and Claims seeking changes in the Contract Price or Contract Times will be referred initially to ENGINEER in writing, in accordance with the provisions of paragraph 10.05, with a request for a formal decision.

B. When functioning as interpreter and judge under this paragraph 9.09, ENGINEER will not show partiality to OWNER or CONTRACTOR and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity. The rendering of a decision by ENGINEER pursuant to this paragraph 9.09 with respect to any such Claim, dispute, or other matter (except any which have been waived by the making or acceptance of final payment as provided in paragraph 14.07) will be a condition precedent to any exercise by OWNER or CONTRACTOR of such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any such Claim, dispute, or other matter.

9.10 *Limitations on ENGINEER's Authority and Responsibilities*

A. Neither ENGINEER's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by ENGINEER in good faith either to exercise or not exercise such authority

or responsibility or the undertaking, exercise, or performance of any authority or responsibility by ENGINEER shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by ENGINEER to CONTRACTOR, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

B. ENGINEER will not supervise, direct, control, or have authority over or be responsible for CONTRACTOR's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of CONTRACTOR to comply with Laws and Regulations applicable to the performance of the Work. ENGINEER will not be responsible for CONTRACTOR's failure to perform the Work in accordance with the Contract Documents.

C. ENGINEER will not be responsible for the acts or omissions of CONTRACTOR or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

D. ENGINEER's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, Bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests and approvals that the results certified indicate compliance with, the Contract Documents.

E. The limitations upon authority and responsibility set forth in this paragraph 9.10 shall also apply to ENGINEER's Consultants, Resident Project Representative, and assistants.

ARTICLE 10 - CHANGES IN THE WORK; CLAIMS

10.01 *Authorized Changes in the Work*

A. Without invalidating the Agreement and without notice to any surety, OWNER may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Written Amendment, a Change Order, or a Work Change Directive. Upon receipt of any such document, CONTRACTOR shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

B. If OWNER and CONTRACTOR are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in paragraph 10.05.

10.02 *Unauthorized Changes in the Work*

A. CONTRACTOR shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in paragraph 3.04, except in the case of an emergency as provided in paragraph 6.16 or in the case of uncovering Work as provided in paragraph 13.04.B.

10.03 *Execution of Change Orders*

A. OWNER and CONTRACTOR shall execute appropriate Change Orders recommended by ENGINEER (or Written Amendments) covering:

1. changes in the Work which are: (i) ordered by OWNER pursuant to paragraph 10.01.A, (ii) required because of acceptance of defective Work under paragraph 13.08.A or OWNER's correction of defective Work under paragraph 13.09, or (iii) agreed to by the parties;

2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and

3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by ENGINEER pursuant to paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, CONTRACTOR shall carry on the Work and adhere to the progress schedule as provided in paragraph 6.18.A.

10.04 *Notification to Surety*

A. If notice of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times) is required by the provisions of any Bond to be given to a surety, the giving of any such notice will be CONTRACTOR's responsibility. The amount of each applicable Bond will be adjusted to reflect the effect of any such change.

10.05 *Claims and Disputes*

A. *Notice:* Written notice stating the general nature of each Claim, dispute, or other matter shall be delivered by the claimant to ENGINEER and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. Notice of the amount or extent of the Claim, dispute, or other matter with supporting data shall be delivered to the ENGINEER and the other party to the Contract within 60 days after the start of such event (unless ENGINEER allows additional time for claimant to submit additional or more accurate data in support of such Claim, dispute, or other matter). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of paragraph 12.01.B. A Claim for an adjustment in Contract Time shall be prepared in accordance with the provisions of paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to ENGINEER and the claimant within 30 days after receipt of the claimant's last submittal (unless ENGINEER allows additional time).

B. *ENGINEER's Decision:* ENGINEER will render a formal decision in writing within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any. ENGINEER's written decision on such Claim, dispute, or other matter will be final and binding upon OWNER and CONTRACTOR unless:

1. an appeal from ENGINEER's decision is taken within the time limits and in accordance with the dispute resolution procedures set forth in Article 16; or

2. if no such dispute resolution procedures have been set forth in Article 16, a written notice of intention to appeal from ENGINEER's written decision is delivered by OWNER or CONTRACTOR to the other and to ENGINEER within 30 days after the date of such decision, and a formal proceeding is instituted by the appealing party in a forum of competent jurisdiction within 60 days after the date of such decision or within 60 days after Substantial Completion, whichever is later (unless otherwise agreed in writing by OWNER and CONTRACTOR), to exercise such rights or remedies as the appealing party may have with respect to such Claim, dispute, or other matter in accordance with applicable Laws and Regulations.

C. If ENGINEER does not render a formal decision in writing within the time stated in paragraph 10.05.B, a decision denying the Claim in its entirety shall be deemed to have been issued 31 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any.

D. No Claim for an adjustment in Contract Price or Contract Times (or Milestones) will be valid if not submitted in accordance with this paragraph 10.05.

ARTICLE 11 - COST OF THE WORK; CASH ALLOWANCES; UNIT PRICE WORK

11.01 *Cost of the Work*

A. *Costs Included:* The term Cost of the Work means the sum of all costs necessarily incurred and paid by CONTRACTOR in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to CONTRACTOR will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by OWNER, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall include only the following items, and shall not include any of the costs itemized in paragraph 11.01.B.

1. Payroll costs for employees in the direct employ of CONTRACTOR in the performance of the Work under schedules of job classifications agreed upon by OWNER and CONTRACTOR. Such employees shall include without limitation superintendents, foremen, and other personnel employed full time at the Site. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by OWNER.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to CONTRACTOR unless OWNER deposits funds with CONTRACTOR with which to make payments, in which case the cash discounts shall accrue to OWNER. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to OWNER, and CONTRACTOR shall make provisions so that they may be obtained.

3. Payments made by CONTRACTOR to Subcontractors for Work performed by Subcontractors. If required by OWNER, CONTRACTOR shall obtain competitive bids from subcontractors acceptable to OWNER and CONTRACTOR and shall deliver such bids to OWNER, who will then determine, with the advice of ENGINEER, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as CONTRACTOR's Cost of the Work and fee as provided in this paragraph 11.01.

4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.

5. Supplemental costs including the following:

a. The proportion of necessary transportation, travel, and subsistence expenses of CONTRACTOR's employees incurred in discharge of duties connected with the Work.

b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of CONTRACTOR.

c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from CONTRACTOR or others in accordance with rental agreements approved by OWNER with the advice of ENGINEER, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

d. Sales, consumer, use, and other similar taxes related to the Work, and for which CONTRACTOR is liable, imposed by Laws and Regulations.

e. Deposits lost for causes other than negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by CONTRACTOR in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with paragraph 5.06.D), provided such losses and damages have resulted from causes other than the negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of OWNER. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining CONTRACTOR's fee.

g. The cost of utilities, fuel, and sanitary facilities at the Site.

h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, expressage, and similar petty cash items in connection with the Work.

i. When the Cost of the Work is used to determine the value of a Change Order or of a Claim, the cost of premiums for additional Bonds and insurance required because of the changes in the Work or caused by the event giving rise to the Claim.

j. When all the Work is performed on the basis of cost-plus, the costs of premiums for all Bonds and insurance CONTRACTOR is required by the Contract Documents to purchase and maintain.

B. *Costs Excluded:* The term Cost of the Work shall not include any of the following items:

1. Payroll costs and other compensation of CONTRACTOR's officers, executives, principals (of partnerships and sole proprietorships), general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks, and other personnel employed by CONTRACTOR, whether at the Site or in CONTRACTOR's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in paragraph 11.01.A.1 or specifically covered by paragraph 11.01.A.4, all of which are to be

considered administrative costs covered by the CONTRACTOR's fee.

2. Expenses of CONTRACTOR's principal and branch offices other than CONTRACTOR's office at the Site.

3. Any part of CONTRACTOR's capital expenses, including interest on CONTRACTOR's capital employed for the Work and charges against CONTRACTOR for delinquent payments.

4. Costs due to the negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in paragraphs 11.01.A and 11.01.B.

C. *CONTRACTOR's Fee:* When all the Work is performed on the basis of cost-plus, CONTRACTOR's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, CONTRACTOR's fee shall be determined as set forth in paragraph 12.01.C.

D. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to paragraphs 11.01.A and 11.01.B, CONTRACTOR will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to ENGINEER an itemized cost breakdown together with supporting data.

11.02 *Cash Allowances*

A. It is understood that CONTRACTOR has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums as may be acceptable to OWNER and ENGINEER. CONTRACTOR agrees that:

1. the allowances include the cost to CONTRACTOR (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and

2. CONTRACTOR's costs for unloading and handling on the Site, labor, installation costs, overhead, profit, and other expenses contemplated for the allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

B. Prior to final payment, an appropriate Change Order will be issued as recommended by ENGINEER to reflect actual amounts due CONTRACTOR on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

11.03 *Unit Price Work*

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by CONTRACTOR will be made by ENGINEER subject to the provisions of paragraph 9.08.

B. Each unit price will be deemed to include an amount considered by CONTRACTOR to be adequate to cover CONTRACTOR's overhead and profit for each separately identified item.

C. OWNER or CONTRACTOR may make a Claim for an adjustment in the Contract Price in accordance with paragraph 10.05 if:

1. the quantity of any item of Unit Price Work performed by CONTRACTOR differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and

2. there is no corresponding adjustment with respect any other item of Work; and

3. if CONTRACTOR believes that CONTRACTOR is entitled to an increase in Contract Price as a result of having incurred additional expense or OWNER believes that OWNER is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 12 - CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

12.01 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order or by a Written Amendment. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the ENGINEER and the other party to the Contract in accordance with the provisions of paragraph 10.05.

B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:

1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of paragraph 11.03); or

2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with paragraph 12.01.C.2); or

3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in paragraph 11.01) plus a CONTRACTOR's fee for overhead and profit (determined as provided in paragraph 12.01.C).

C. *CONTRACTOR's Fee:* The CONTRACTOR's fee for overhead and profit shall be determined as follows:

1. a mutually acceptable fixed fee; or

2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

a. for costs incurred under paragraphs 11.01.A.1 and 11.01.A.2, the CONTRACTOR's fee shall be 15 percent;

b. for costs incurred under paragraph 11.01.A.3, the CONTRACTOR's fee shall be five percent;

c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of paragraph 12.01.C.2.a is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and CONTRACTOR will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;

d. no fee shall be payable on the basis of costs itemized under paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;

e. the amount of credit to be allowed by CONTRACTOR to OWNER for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in CONTRACTOR's fee by an amount equal to five percent of such net decrease; and

f. when both additions and credits are involved in any one change, the adjustment in CONTRACTOR's fee shall be computed on the basis of the net change in accordance with paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.

12.02 *Change of Contract Times*

A. The Contract Times (or Milestones) may only be changed by a Change Order or by a Written Amendment. Any Claim for an adjustment in the Contract Times (or Milestones) shall be based on written notice submitted by the party making the claim to the ENGINEER and the other party to the Contract in accordance with the provisions of paragraph 10.05.

B. Any adjustment of the Contract Times (or Milestones) covered by a Change Order or of any Claim for an adjustment in the Contract Times (or Milestones) will be determined in accordance with the provisions of this Article 12.

12.03 *Delays Beyond CONTRACTOR's Control*

A. Where CONTRACTOR is prevented from completing any part of the Work within the Contract Times (or Milestones) due to delay beyond the control of CONTRACTOR, the Contract Times (or Milestones) will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in paragraph 12.02.A. Delays beyond the control of CONTRACTOR shall include, but not be limited to, acts or neglect by OWNER, acts or neglect of utility owners or other contractors performing other work as contemplated by

Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.

12.04 *Delays Within CONTRACTOR's Control*

A. The Contract Times (or Milestones) will not be extended due to delays within the control of CONTRACTOR. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of CONTRACTOR.

12.05 *Delays Beyond OWNER's and CONTRACTOR's Control*

A. Where CONTRACTOR is prevented from completing any part of the Work within the Contract Times (or Milestones) due to delay beyond the control of both OWNER and CONTRACTOR, an extension of the Contract Times (or Milestones) in an amount equal to the time lost due to such delay shall be CONTRACTOR's sole and exclusive remedy for such delay.

12.06 *Delay Damages*

A. In no event shall OWNER or ENGINEER be liable to CONTRACTOR, any Subcontractor, any Supplier, or any other person or organization, or to any surety for or employee or agent of any of them, for damages arising out of or resulting from:

1. delays caused by or within the control of CONTRACTOR; or

2. delays beyond the control of both OWNER and CONTRACTOR including but not limited to fires, floods, epidemics, abnormal weather conditions, acts of God, or acts or neglect by utility owners or other contractors performing other work as contemplated by Article 7.

B. Nothing in this paragraph 12.06 bars a change in Contract Price pursuant to this Article 12 to compensate CONTRACTOR due to delay, interference, or disruption directly attributable to actions or inactions of OWNER or anyone for whom OWNER is responsible.

ARTICLE 13 - TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

13.01 *Notice of Defects*

A. Prompt notice of all defective Work of which OWNER or ENGINEER has actual knowledge will be given to CONTRACTOR. All defective Work may be rejected, corrected, or accepted as provided in this Article 13.

13.02 *Access to Work*

A. OWNER, ENGINEER, ENGINEER's Consultants, other representatives and personnel of OWNER, independent testing laboratories, and governmental agencies with jurisdictional interests will have access to the Site and the Work at reasonable times for their observation, inspecting, and testing. CONTRACTOR shall provide them proper and safe conditions for such access and advise them of CONTRACTOR's Site safety procedures and programs so that they may comply therewith as applicable.

13.03 *Tests and Inspections*

A. CONTRACTOR shall give ENGINEER timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.

B. OWNER shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:

1. for inspections, tests, or approvals covered by paragraphs 13.03.C and 13.03.D below;

2. that costs incurred in connection with tests or inspections conducted pursuant to paragraph 13.04.B shall be paid as provided in said paragraph 13.04.B; and

3. as otherwise specifically provided in the Contract Documents.

C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, CONTRACTOR shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish ENGINEER the required certificates of inspection or approval.

D. CONTRACTOR shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for OWNER's and ENGINEER's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to CONTRACTOR's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to OWNER and ENGINEER.

E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by CONTRACTOR without written concurrence of ENGINEER, it must, if requested by ENGINEER, be uncovered for observation.

F. Uncovering Work as provided in paragraph 13.03.E shall be at CONTRACTOR's expense unless CONTRACTOR has given ENGINEER timely notice of CONTRACTOR's intention to cover the same and ENGINEER has not acted with reasonable promptness in response to such notice.

13.04 *Uncovering Work*

A. If any Work is covered contrary to the written request of ENGINEER, it must, if requested by ENGINEER, be uncovered for ENGINEER's observation and replaced at CONTRACTOR's expense.

B. If ENGINEER considers it necessary or advisable that covered Work be observed by ENGINEER or inspected or tested by others, CONTRACTOR, at ENGINEER's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as ENGINEER may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment. If it is found that such Work is defective, CONTRACTOR shall pay all Claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and OWNER shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, OWNER may make a Claim therefor as provided in paragraph 10.05. If, however, such Work is not found to be defective, CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Times (or Milestones), or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, CONTRACTOR may make a Claim therefor as provided in paragraph 10.05.

13.05 *OWNER May Stop the Work*

A. If the Work is defective, or CONTRACTOR fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, OWNER may order CONTRACTOR to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of OWNER to stop the Work shall not give rise to any duty on the part of OWNER to exercise this right for the benefit of CONTRACTOR, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

13.06 *Correction or Removal of Defective Work*

A. CONTRACTOR shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by ENGINEER, remove it from the Project and replace it with Work that is not defective. CONTRACTOR shall pay all Claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).

13.07 *Correction Period*

A. If within one year after the date of Substantial Completion or such longer period of time as may be prescribed by Laws or Regulations or by the terms of any applicable special guarantee required by the Contract Documents or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for CONTRACTOR's use by OWNER or permitted by Laws and Regulations as contemplated in paragraph 6.11.A is found to be defective, CONTRACTOR shall promptly, without cost to OWNER and in accordance with OWNER's written instructions: (i) repair such defective land or areas; or (ii) correct such defective Work or, if the defective Work has been rejected by OWNER, remove it from the Project and replace it with Work that is not defective, and (iii) satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom. If CONTRACTOR does not promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, OWNER may have the defective Work corrected or repaired or may have the rejected Work removed and replaced, and all Claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by CONTRACTOR.

B. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that

item may start to run from an earlier date if so provided in the Specifications or by Written Amendment.

C. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

D. CONTRACTOR's obligations under this paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this paragraph 13.07 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitation or repose.

13.08 *Acceptance of Defective Work*

A. If, instead of requiring correction or removal and replacement of defective Work, OWNER (and, prior to ENGINEER's recommendation of final payment, ENGINEER) prefers to accept it, OWNER may do so. CONTRACTOR shall pay all Claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to OWNER's evaluation of and determination to accept such defective Work (such costs to be approved by ENGINEER as to reasonableness) and the diminished value of the Work to the extent not otherwise paid by CONTRACTOR pursuant to this sentence. If any such acceptance occurs prior to ENGINEER's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and OWNER shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, OWNER may make a Claim therefor as provided in paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by CONTRACTOR to OWNER.

13.09 *OWNER May Correct Defective Work*

A. If CONTRACTOR fails within a reasonable time after written notice from ENGINEER to correct defective Work or to remove and replace rejected Work as required by ENGINEER in accordance with paragraph 13.06.A, or if CONTRACTOR fails to perform the Work in accordance with the Contract Documents, or if CONTRACTOR fails to comply with any other provision of the Contract Documents, OWNER may, after seven days written notice to CONTRACTOR, correct and remedy any such deficiency.

B. In exercising the rights and remedies under this paragraph, OWNER shall proceed expeditiously. In connection with such corrective and remedial action, OWNER may exclude CONTRACTOR from all or part of the Site, take possession of all or part of the Work and suspend CONTRACTOR's services related thereto, take possession of CONTRACTOR's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and equipment stored at the Site or for which OWNER has paid CONTRACTOR but which are stored elsewhere. CONTRACTOR shall allow OWNER, OWNER's representatives, agents and employees, OWNER's other contractors, and ENGINEER and ENGINEER's Consultants access to the Site to enable OWNER to exercise the rights and remedies under this paragraph.

C. All Claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by OWNER in exercising the rights and remedies under this paragraph 13.09 will be charged against CONTRACTOR, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and OWNER shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, OWNER may make a Claim therefor as provided in paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of CONTRACTOR's defective Work.

D. CONTRACTOR shall not be allowed an extension of the Contract Times (or Milestones) because of any delay in the performance of the Work attributable to the exercise by OWNER of OWNER's rights and remedies under this paragraph 13.09.

ARTICLE 14 - PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 *Schedule of Values*

A. The schedule of values established as provided in paragraph 2.07.A will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to ENGINEER. Progress payments on account of Unit Price Work will be based on the number of units completed.

14.02 *Progress Payments*

A. *Applications for Payments*

1. At least 20 days before the date established for each progress payment (but not more often than once a month), CONTRACTOR shall submit to ENGINEER for review an Application for Payment filled out and signed by CONTRACTOR covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that OWNER has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect OWNER's interest therein, all of which must be satisfactory to OWNER.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of CONTRACTOR stating that all previous progress payments received on account of the Work have been applied on account to discharge CONTRACTOR's legitimate obligations associated with prior Applications for Payment.

3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

B. *Review of Applications*

1. ENGINEER will, within 10 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to OWNER or return the Application to CONTRACTOR indicating in writing ENGINEER's reasons for refusing to recommend payment. In the latter case, CONTRACTOR may make the necessary corrections and resubmit the Application.

2. ENGINEER's recommendation of any payment requested in an Application for Payment will constitute a representation by ENGINEER to OWNER, based on ENGINEER's observations on the Site of the executed Work as an experienced and qualified design professional and on ENGINEER's review of the Application for Payment and the accompanying data and schedules, that to the best of ENGINEER's knowledge, information and belief:

a. the Work has progressed to the point indicated;

b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work under paragraph 9.08, and to any other qualifications stated in the recommendation); and

c. the conditions precedent to CONTRACTOR's being entitled to such payment appear to have been fulfilled in so far as it is ENGINEER's responsibility to observe the Work.

3. By recommending any such payment ENGINEER will not thereby be deemed to have represented that: (i) inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to ENGINEER in the Contract Documents; or (ii) that there may not be other matters or issues between the parties that might entitle CONTRACTOR to be paid additionally by OWNER or entitle OWNER to withhold payment to CONTRACTOR.

4. Neither ENGINEER's review of CONTRACTOR's Work for the purposes of recommending payments nor ENGINEER's recommendation of any payment, including final payment, will impose responsibility on ENGINEER to supervise, direct, or control the Work or for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for CONTRACTOR's failure to comply with Laws and Regulations applicable to CONTRACTOR's performance of the Work. Additionally, said review or recommendation will not impose responsibility on ENGINEER to make any examination to ascertain how or for what purposes CONTRACTOR has used the moneys paid on account of the Contract Price, or to determine that title to any of the Work, materials, or equipment has passed to OWNER free and clear of any Liens.

5. ENGINEER may refuse to recommend the whole or any part of any payment if, in ENGINEER's opinion, it would be incorrect to make the representations to OWNER referred to in paragraph 14.02.B.2. ENGINEER may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests,

revise or revoke any such payment recommendation previously made, to such extent as may be necessary in ENGINEER's opinion to protect OWNER from loss because:

a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;

b. the Contract Price has been reduced by Written Amendment or Change Orders;

c. OWNER has been required to correct defective Work or complete Work in accordance with paragraph 13.09; or

d. ENGINEER has actual knowledge of the occurrence of any of the events enumerated in paragraph 15.02.A.

C. *Payment Becomes Due*

1. Ten days after presentation of the Application for Payment to OWNER with ENGINEER's recommendation, the amount recommended will (subject to the provisions of paragraph 14.02.D) become due, and when due will be paid by OWNER to CONTRACTOR.

D. *Reduction in Payment*

1. OWNER may refuse to make payment of the full amount recommended by ENGINEER because:

a. claims have been made against OWNER on account of CONTRACTOR's performance or furnishing of the Work;

b. Liens have been filed in connection with the Work, except where CONTRACTOR has delivered a specific Bond satisfactory to OWNER to secure the satisfaction and discharge of such Liens;

c. there are other items entitling OWNER to a set-off against the amount recommended; or

d. OWNER has actual knowledge of the occurrence of any of the events enumerated in paragraphs 14.02.B.5.a through 14.02.B.5.c or paragraph 15.02.A.

2. If OWNER refuses to make payment of the full amount recommended by ENGINEER, OWNER must give CONTRACTOR immediate written notice (with a copy to ENGINEER) stating the reasons for such action and promptly pay CONTRACTOR any amount remaining after deduction of the amount so withheld. OWNER shall promptly pay CONTRACTOR the amount so withheld, or any adjustment thereto agreed to by OWNER and CONTRACTOR, when CONTRACTOR corrects to OWNER's satisfaction the reasons for such action.

3. If it is subsequently determined that OWNER's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by paragraph 14.02.C.1.

14.03 *CONTRACTOR's Warranty of Title*

A. CONTRACTOR warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to OWNER no later than the time of payment free and clear of all Liens.

14.04 *Substantial Completion*

A. When CONTRACTOR considers the entire Work ready for its intended use CONTRACTOR shall notify OWNER and ENGINEER in writing that the entire Work is substantially complete (except for items specifically listed by CONTRACTOR as incomplete) and request that ENGINEER issue a certificate of Substantial Completion. Promptly thereafter, OWNER, CONTRACTOR, and ENGINEER shall make an inspection of the Work to determine the status of completion. If ENGINEER does not consider the Work substantially complete, ENGINEER will notify CONTRACTOR in writing giving the reasons therefor. If ENGINEER considers the Work substantially complete, ENGINEER will prepare and deliver to OWNER a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. OWNER shall have seven days after receipt of the tentative certificate during which to make written objection to ENGINEER as to any provisions of the certificate or attached list. If, after considering such objections, ENGINEER concludes that the Work is not substantially complete, ENGINEER will within 14 days after submission of the tentative certificate to OWNER notify CONTRACTOR in writing, stating the reasons therefor. If, after consideration of OWNER's objections, ENGINEER considers the Work substantially complete, ENGINEER will within said 14 days execute and deliver to OWNER and CONTRACTOR a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as ENGINEER believes justified after consideration of any objections from OWNER. At the time of delivery of the tentative certificate of Substantial Completion ENGINEER will deliver to OWNER and CONTRACTOR a written recommendation as to division of responsibili-

ties pending final payment between OWNER and CONTRACTOR with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless OWNER and CONTRACTOR agree otherwise in writing and so inform ENGINEER in writing prior to ENGINEER's issuing the definitive certificate of Substantial Completion, ENGINEER's aforesaid recommendation will be binding on OWNER and CONTRACTOR until final payment.

B. OWNER shall have the right to exclude CONTRACTOR from the Site after the date of Substantial Completion, but OWNER shall allow CONTRACTOR reasonable access to complete or correct items on the tentative list.

14.05 *Partial Utilization*

A. Use by OWNER at OWNER's option of any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which OWNER, ENGINEER, and CONTRACTOR agree constitutes a separately functioning and usable part of the Work that can be used by OWNER for its intended purpose without significant interference with CONTRACTOR's performance of the remainder of the Work, may be accomplished prior to Substantial Completion of all the Work subject to the following conditions:

1. OWNER at any time may request CONTRACTOR in writing to permit OWNER to use any such part of the Work which OWNER believes to be ready for its intended use and substantially complete. If CONTRACTOR agrees that such part of the Work is substantially complete, CONTRACTOR will certify to OWNER and ENGINEER that such part of the Work is substantially complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work. CONTRACTOR at any time may notify OWNER and ENGINEER in writing that CONTRACTOR considers any such part of the Work ready for its intended use and substantially complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work. Within a reasonable time after either such request, OWNER, CONTRACTOR, and ENGINEER shall make an inspection of that part of the Work to determine its status of completion. If ENGINEER does not consider that part of the Work to be substantially complete, ENGINEER will notify OWNER and CONTRACTOR in writing giving the reasons therefor. If ENGINEER considers that part of the Work to be substantially complete, the provisions of paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

2. No occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of paragraph 5.10 regarding property insurance.

14.06 *Final Inspection*

A. Upon written notice from CONTRACTOR that the entire Work or an agreed portion thereof is complete, ENGINEER will promptly make a final inspection with OWNER and CONTRACTOR and will notify CONTRACTOR in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. CONTRACTOR shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

14.07 *Final Payment*

A. *Application for Payment*

1. After CONTRACTOR has, in the opinion of ENGINEER, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, Bonds, certificates or other evidence of insurance certificates of inspection, marked-up record documents (as provided in paragraph 6.12), and other documents, CONTRACTOR may make application for final payment following the procedure for progress payments.

2. The final Application for Payment shall be accompanied (except as previously delivered) by: (i) all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by subparagraph 5.04.B.7; (ii) consent of the surety, if any, to final payment; and (iii) complete and legally effective releases or waivers (satisfactory to OWNER) of all Lien rights arising out of or Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in paragraph 14.07.A.2 and as approved by OWNER, CONTRACTOR may furnish receipts or releases in full and an affidavit of CONTRACTOR that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which OWNER or OWNER's property might in any way be responsible have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, CONTRACTOR may furnish a Bond or other collateral satisfactory to OWNER to indemnify OWNER against any Lien.

B. *Review of Application and Acceptance*

1. If, on the basis of ENGINEER's observation of the Work during construction and final inspection, and ENGINEER's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, ENGINEER is satisfied that the Work has been completed and CONTRACTOR's other obligations under the Contract Documents have been fulfilled, ENGINEER will, within ten days after receipt of the final Application for Payment, indicate in writing ENGINEER's recommendation of payment and present the Application for Payment to OWNER for payment. At the same time ENGINEER will also give written notice to OWNER and CONTRACTOR that the Work is acceptable subject to the provisions of paragraph 14.09. Otherwise, ENGINEER will return the Application for Payment to CONTRACTOR, indicating in writing the reasons for refusing to recommend final payment, in which case CONTRACTOR shall make the necessary corrections and resubmit the Application for Payment.

C. *Payment Becomes Due*

1. Thirty days after the presentation to OWNER of the Application for Payment and accompanying documentation, the amount recommended by ENGINEER will become due and, when due, will be paid by OWNER to CONTRACTOR.

14.08 *Final Completion Delayed*

A. If, through no fault of CONTRACTOR, final completion of the Work is significantly delayed, and if ENGINEER so confirms, OWNER shall, upon receipt of CONTRACTOR's final Application for Payment and recommendation of ENGINEER, and without terminating the Agreement, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by OWNER for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if Bonds have been furnished as required in paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by CONTRACTOR to ENGINEER with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

14.09 *Waiver of Claims*

A. The making and acceptance of final payment will constitute:

1. a waiver of all Claims by OWNER against CONTRACTOR, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from CONTRACTOR's continuing obligations under the Contract Documents; and

2. a waiver of all Claims by CONTRACTOR against OWNER other than those previously made in writing which are still unsettled.

ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION

15.01 *OWNER May Suspend Work*

A. At any time and without cause, OWNER may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by notice in writing to CONTRACTOR and ENGINEER which will fix the date on which Work will be resumed. CONTRACTOR shall resume the Work on the date so fixed. CONTRACTOR shall be allowed an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if CONTRACTOR makes a Claim therefor as provided in paragraph 10.05.

15.02 *OWNER May Terminate for Cause*

A. The occurrence of any one or more of the following events will justify termination for cause:

1. CONTRACTOR's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the progress schedule established under paragraph 2.07 as adjusted from time to time pursuant to paragraph 6.04);

2. CONTRACTOR's disregard of Laws or Regulations of any public body having jurisdiction;

3. CONTRACTOR's disregard of the authority of ENGINEER; or

4. CONTRACTOR's violation in any substantial way of any provisions of the Contract Documents.

B. If one or more of the events identified in paragraph 15.02.A occur, OWNER may, after giving CONTRACTOR (and the surety, if any) seven days written notice, terminate

the services of CONTRACTOR, exclude CONTRACTOR from the Site, and take possession of the Work and of all CONTRACTOR's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by CONTRACTOR (without liability to CONTRACTOR for trespass or conversion), incorporate in the Work all materials and equipment stored at the Site or for which OWNER has paid CONTRACTOR but which are stored elsewhere, and finish the Work as OWNER may deem expedient. In such case, CONTRACTOR shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by OWNER arising out of or relating to completing the Work, such excess will be paid to CONTRACTOR. If such claims, costs, losses, and damages exceed such unpaid balance, CONTRACTOR shall pay the difference to OWNER. Such claims, costs, losses, and damages incurred by OWNER will be reviewed by ENGINEER as to their reasonableness and, when so approved by ENGINEER, incorporated in a Change Order. When exercising any rights or remedies under this paragraph OWNER shall not be required to obtain the lowest price for the Work performed.

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

15.03 *OWNER May Terminate For Convenience*

A. Upon seven days written notice to CONTRACTOR and ENGINEER, OWNER may, without cause and without prejudice to any other right or remedy of OWNER, elect to terminate the Contract. In such case, CONTRACTOR shall be paid (without duplication of any items):

1. for completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. for expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;

3. for all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and

4. for reasonable expenses directly attributable to termination.

B. CONTRACTOR shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

15.04 *CONTRACTOR May Stop Work or Terminate*

A. If, through no act or fault of CONTRACTOR, the Work is suspended for more than 90 consecutive days by OWNER or under an order of court or other public authority, or ENGINEER fails to act on any Application for Payment within 30 days after it is submitted, or OWNER fails for 30 days to pay CONTRACTOR any sum finally determined to be due, then CONTRACTOR may, upon seven days written notice to OWNER and ENGINEER, and provided OWNER or ENGINEER do not remedy such suspension or failure within that time, terminate the Contract and recover from OWNER payment on the same terms as provided in paragraph 15.03. In lieu of terminating the Contract and without prejudice to any other right or remedy, if ENGINEER has failed to act on an Application for Payment within 30 days after it is submitted, or OWNER has failed for 30 days to pay CONTRACTOR any sum finally determined to be due, CONTRACTOR may, seven days after written notice to OWNER and ENGINEER, stop the Work until payment is made of all such amounts due CONTRACTOR, including interest thereon. The provisions of this paragraph 15.04 are not intended to preclude CONTRACTOR from making a Claim under paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to CONTRACTOR's stopping the Work as permitted by this paragraph.

ARTICLE 16 - DISPUTE RESOLUTION

16.01 *Methods and Procedures*

A. Dispute resolution methods and procedures, if any, shall be as set forth in the Supplementary Conditions. If no method and procedure has been set forth, and subject to the provisions of paragraphs 9.09 and 10.05, OWNER and CONTRACTOR may exercise such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any dispute.

ARTICLE 17 - MISCELLANEOUS

17.01 *Giving Notice*

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

17.02 *Computation of Times*

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

17.03 *Cumulative Remedies*

A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents, and the provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

17.04 *Survival of Obligations*

A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion, and acceptance of the Work or termination or completion of the Agreement.

17.05 *Controlling Law*

A. This Contract is to be governed by the law of the state in which the Project is located.

Section 00800

SUPPLEMENTARY CONDITIONS

SCOPE. These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract (No. 1910-8, 1996 Edition) and other provisions of the Contract Documents as indicated herein. All provisions which are not so amended or supplemented remain in full force and effect.

The terms used in these Supplementary Conditions will have the meanings indicated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings indicted herein, which are applicable to both the singular and plural thereof.

SC-1. DEFINITIONS AND TERMINOLOGY. Amend the following defined terms as indicated:

3. Application for Payment: Strike out the word "Engineer" and insert the word "Owner" in its place.

9. Change Order: Strike out the words "recommended by Engineer".

12. Contract Documents: In the first sentence, strike out the word "Engineer's" and insert the word "Owner's" in its place.

14. Contract Times: Strike out the words "as evidenced by Engineer's written recommendation of final payment".

21. Field Order: Add the words "or Owner" following the word "Engineer".

43. Substantial Completion: Strike out the word "Engineer" and insert the word "Owner" in its place.

49. Work Change Directive: In the first sentence strike out the words "and recommended by Engineer".

Add the following new definitions to paragraph 1.01:

51. Bidder - The one who submits a Bid directly to Owner, as distinct from a sub-bidder who submits a bid directly to a Bidder.

52. Without exception – The term "without exception", when used in the Contract Documents following the name of a Supplier or a proprietary item of equipment, product, or material, shall mean that the sources of the product are limited to the listed Suppliers or products and that no like, equivalent, or "or-equal" item and no substitution will be considered.

SC-2. PRELIMINARY MATTERS.

SC-2.02. Copies of Documents. Delete the second sentence of paragraph 2.02.A and insert the following new sentence in its place:

Two (2) sets of contract drawings and specifications will be furnished the Contractor without charge. Additional sets will be furnished upon request at the cost of reproduction. The Contractor shall keep one (1) set of approved plans and specifications on the site of the work. This set shall be kept current by addition of all approved changes, addenda and amendments thereto. One set of as-built plans shall be returned to the District after the project is complete.

The plans and specifications are intended to be complementary; but should any discrepancy appear or any misunderstanding arise as to the import of anything contained in either, the decision of the District shall be final and binding on the Contractor. The District may make any corrections of errors or omissions in the drawings and specifications when such corrections are necessary for the proper fulfillment of their intention as construed by the District.

All work or materials shown on the plans and not mentioned in the specifications or any work specified and not shown on the plans, shall be furnished, performed and done by the Contractor as if the same were both mentioned in the specifications and shown on the plans.

Should the Contractor in preparing its bid find anything necessary for the construction of the project that is not mentioned in the specifications or shown on the plans, or any discrepancy, it shall notify the District so that such items may be included. Should the Contractor fail to notify the District of such items, it will be assumed that its bid included everything necessary for the complete construction in the spirit and intent of the designs shown.

In case of discrepancy, figure dimensions shall govern over scale dimensions, large-scale details shall govern over small-scale drawings, plans shall govern over specifications, detailed technical specifications shall govern over general specifications, and the more restrictive specifications shall prevail.

SC-2.03. Commencement of Contract Times; Notice to Proceed. Delete the last sentence of paragraph 2.03.A.

SC-2.05. Before Starting Construction. Amend paragraphs 2.05.A and 2.05.B by striking out the word "Engineer" in all locations where it appears in the paragraphs and inserting the word "Owner" in its place.

SC-2.06. Preconstruction Conference. Delete paragraph 2.06.A in its entirety and insert the following new paragraph in its place:

> If requested by Owner, within 20 days after the Contract Times start to run, but before any work at the Site is started, a conference attended by Contractor, Owner, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in paragraph 2.05.B, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.

SC-2.07. Initial Acceptance of Schedules. Amend paragraph 2.07.A, including paragraphs 2.07.A.1, 2.07.A.2, and 2.07.A.3, by striking out the word "Engineer" in all locations where it appears in the paragraph and inserting the word "Owner" in its place.

SC-3. CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE.

SC-3.01. Intent. Amend paragraph 3.01.C by striking out the word "Engineer" and inserting the word "Owner" in its place.

SC-3.03. Reporting and Resolving Discrepancies. Amend paragraph 3.03.A by striking out the word "Engineer" and inserting the word "Owner" in its place.

SC-3.04. Amending and Supplementing Contract Documents. Amend paragraph 3.04.B by striking out the word "Engineer" and inserting the word "Owner" in its place.

SC-4. AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; REFERENCE POINTS.

SC-4.02. Subsurface and Physical Conditions. Add the following new paragraph**(s)** immediately after paragraph 4.02.B:

C. In the preparation of Drawings and Specifications, Engineer or Engineer's Consultants relied upon the following reports of explorations and tests of subsurface conditions at the Site:

a. Report prepared by Thelen Associates Inc. This report shall be considered technical data upon which Contractor may rely on and shall be consider part of these project specifications.

Test holes have been made on the site of the Work. The locations of test holes are indicated on the Drawings.

SC-4.03. Differing Subsurface or Physical Conditions. Delete paragraph 4.03.B in its entirety and insert the following new paragraph in its place:

B. *Owner's Review.* After receipt of written notice as required by paragraph 4.03.A, Owner will promptly review the pertinent condition, determine the necessity if obtaining additional explorations or tests with respect thereto, and advise Contractor in writing of Owner's findings and conclusions.

SC-4.03. Underground Facilities. Amend the first sentence of paragraph 4.04.B.1 by striking out the words "and Engineer".

Amend the second sentence of paragraph 4.04.B.2 by striking out the word "Engineer" and inserting the word "Owner" in its place.

Amend the first sentence of paragraph 4.04.B.2 by striking out the word "Engineer" and inserting the word "Owner" in its place.

Add the following new paragraph immediately after paragraph 4.04.B:

Generally, service connections are not indicated on the Drawings. Contractor shall be responsible for discovery of existing underground installations, in advance of excavating or trenching, by contacting all local utilities and by prospecting.

SC-5. BONDS AND INSURANCE.

SC-5.03. Certificates of Insurance. Add the following new sentence at the end of paragraph 5.03.A:

Contractor shall deliver to Owner properly completed certificates of insurance prior to the start of any Work at the Site, on the forms included in the Contract Documents.

SC-5.04. Contractor's Liability Insurance.

Add the following new paragraphs immediately after paragraph 5.04.A.6:

7. Claims arising out of pollution and excluded from the Contractor's general liability and comprehensive automobile liability policies. This insurance shall be coordinated with the Contractor's general liability policy and provide bodily injury and property damage coverage similar to the Contractor's general liability policy. Coverage shall include contractual liability.

Add the following new paragraphs immediately after paragraph 5.04.B.7:

8. contain a cross liability or severability of interest clause or endorsement. Insurance covering the specified additional insured's shall be primary insurance, and all other insurance carried by the additional insured's shall be excess insurance;

9. with respect to worker's compensation and employer's liability, comprehensive automobile liability, commercial general liability, and umbrella liability insurance, Contractor shall require its insurance carriers to waive all rights of subrogation against Owner, Engineer, and their respective officers, directors, partners, employees, and agents.

Add the following new paragraphs immediately after paragraph 5.04.B:

C. The insurance required by paragraph 5.04 shall include coverage as necessary for the benefits provided under the United States Longshoremen's and Harbor Workers' Act and the Jones Act. This policy shall include an "all states" endorsement.

D. The limits of liability for the insurance required by paragraph 5.04 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

1. Workers' Compensation, and related coverage under paragraphs 5.04.A.1 and 5.04.A.2 of the General Conditions:

a. State Statutory

b. Employer's Liability — $1,000,000 each occurrence

2. Contractor's General Liability under paragraphs 5.04.A.3 through 5.04.A.6 of the General Conditions, which shall include completed operations and product liability coverage and eliminate the exclusion with respect to property under the acre, custody, and control of Contractor:

   a. General Aggregate — $1,000,000

   b. Products – Completed Operations Aggregate — $1,000,000

   c. Personal and Advertising Injury — $1,000,000

   d. Each Occurrence (Bodily Injury and Property Damage) — $1,000,000

   e. Property Damage liability insurance will provide Explosion, Collapse and Underground coverage's where applicable.

   f. Excess or Umbrella Liability
      1) General Aggregate — $4,000,000
      2) Each Occurrence — $4,000,000

3. Automobile Liability under paragraph 5.04.A.6 of the General Conditions:

   a. Bodily Injury
      Each Person — $1,000,000
      Each Accident — $1,000,000

   b. Property Damage
      Each Accident — $1,000,000

   c. Combined Single Limit — $1,000,000

4. The Contractual Liability coverage required by paragraph 5.04.B.4 of the General Conditions shall provide coverage for not less than the following amounts:

   a. Bodily Injury
      Each Accident — $1,000,000
      Annual Aggregate — $1,000,000

b. Property Damage

Each Accident	$1,000,000
Annual Aggregate	$1,000,000

5. The Railroad Protective Liability coverage required by paragraph 5.04.A.8 shall provide coverage for not less than the following amounts:

a. Bodily Injury

Each Occurrence	$3,000,000
General Aggregate	$3,000,000

b. Property Damage

Each Occurrence	$3,000,000
General Aggregate	$3,000,000

SC-5.05. Owner's Liability Insurance. Delete paragraph 5.05 in its entirety and insert the following new paragraph in its place:

5.05. *Owner's Liability Insurance*. This insurance shall be obtained by Contractor and issued in the name of Owner, and shall protect and defend Owner against claims arising as a result of the operations of Contractor or Contractor's Subcontractors. The liability limits shall be not less than:

a. Bodily Injury

Each Occurrence	$1,000,000
General Aggregate	$1,000,000

b. Property Damage

Each Occurrence	$1,000,000
General Aggregate	$1,000,000

SC-5.06. Property Insurance. Delete paragraph 5.06 in its entirety, including paragraphs 5.06.A, 5.06.A.1, 5.06.A.2, 5.06.A.3, 5.06.A.4, 5.06.A.5, 5.06.A.6, 5.06.A.7, 5.06.B, 5.06.C, 5.06.D, and 5.06.E and insert the following new paragraphs in their place:

5.06. *Property Insurance*

A. Contractor shall purchase and maintain property insurance coverage upon the Work at the Site in the amount of the full replacement cost thereof. This insurance shall:

1. include the interests of Owner, Contractor, Subcontractors, Engineer, Engineer's Consultants, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as an additional insured;

2. be written on a Builder's Risk "all-risk" or open peril or special causes of loss policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, false work, and materials and equipment, and

shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage, flood, damage caused by frost and freezing, and such other perils or causes of loss as may be specifically required by the Supplementary Conditions;

3. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment accepted by Owner;

4. include expenses incurred in the repair or replacement of any insured property (including, but not limited to, fees and charges of engineers and architects);

5. allow for partial utilization of the Work by Owner;

6. include testing and startup; and

7. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner and Contractor, with 30 days written notice to each other additional insured to whom a certificate of insurance has been issued.

B. Contractor shall be responsible for any deductible or self-insured retention.

C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with paragraph 5.06 shall contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with paragraph 5.07.

D. If Owner requests in writing that other special insurance be included in the property insurance policies provided under paragraph 5.06, Contractor shall, if possible, include such insurance, and the cost thereof will be charged to Owner by appropriate Change Order or Written Amendment. Prior to commencement of the Work at the Site, Contractor shall in writing advise Owner whether or not Contractor has procured such other special insurance.

SC-5.07. Waiver of Rights. Delete paragraph 5.07 in its entirety.

SC-5.08. Receipt and Application of Insurance Proceeds. Delete paragraph 5.08 in its entirety.

SC-6. CONTRACTOR'S RESPONSIBILITIES.

SC-6.02. Labor; Working Hours. Amend the last sentence of paragraph 6.02.B by striking out the word "Engineer" and inserting the word "Owner" in its place.

Add the following new paragraphs immediately after paragraph 6.02.B:

C. No Work shall be done between 6:00 p.m. and 7:00 a.m. without permission of Owner. However, emergency work may be done without prior permission.

D. Night Work may be undertaken as a regular procedure with the permission of Owner; such permission, however, may be revoked at any time by Owner if Contractor fails to maintain adequate equipment and supervision for the proper prosecution and control of the Work at night.

SC-6.03. Services, Materials, and Equipment. Amend the second sentence of paragraph 6.03.B by striking out the word "Engineer" and inserting the word "Owner" in its place.

SC-6.04. Progress Schedule. Amend the first sentence of paragraph 6.04.A.1 by striking out the word "Engineer" and inserting the word "Owner" in its place.

SC-6.05. Substitutes and "or-Equals". Amend paragraph 6.05, including paragraphs 6.05.A, 6.05.A.1, 6.05.A.1.a, 6.05.A.1.b, 6.05.A.2, 6.05.A.2.a, 6.05.A.2.b, 6.05.A.2.c, 6.05.A.2.d, 6.05.B, 6.05.C, 6.05.D, and 6.05.E by striking out the words "Engineer" and "Engineer's" in all locations where they appear in the paragraph and inserting the words "Owner" and "Owner's", respectively, in their place.

SC-6.06. Concerning Subcontractors, Suppliers, and Others. Delete paragraph 6.06.B in its entirety and insert the following new paragraph in its place:

B. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to Owner in advance for acceptance by Owner by a specified date prior to the Effective Date of the Agreement, and if Contractor has submitted a list thereof in accordance with the Supplementary Conditions, Owner's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity without an increase in the Contract Price. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of any right of Owner or Engineer to reject defective Work.

SC-6.08. Permits. Add the following new paragraph immediately after paragraph 6.08:

A. Owner will obtain and pay for the following permits: Road & Highway Encroachment Permits, Kentucky Division of Water, & Stream Crossing Permits.

SC-6.09. Laws and Regulations. Add the following new paragraph immediately after paragraph 6.09.C:

D. Employment requirements shall be as specified herein and in the attachments at the end of the Supplementary Conditions.

SC-6.12. Record Documents. Amend the second sentence of paragraph 6.12.A by striking out the word "Engineer" and inserting the word "Owner" in its place.

Amend the third sentence of paragraph 6.12.A by striking out the words "Engineer for".

SC-6.16. Emergencies. Amend paragraph 6.16 by striking out the word "Engineer" in all locations where it appears in the paragraph and inserting the word "Owner" in its place.

Add the following new paragraph immediately after paragraph 6.16.A:

B. The Contractor understands and agrees that during the performance of the Contract, it shall maintain a presence within such proximity of the Work Site which will allow it to respond to an emergency at the Work Site within one hour of receiving notice of an emergency, including emergencies occurring during non-working hours. The Contractor shall provide a list of emergency phone numbers for such purposes. If the Contractor does not have such a presence, it may satisfy this requirement by sub-contracting with a sub-contractor that does have such a presence, provided that any such sub-contractor must be approved by the Owner, in tits sole discretion, prior to the project pre-construction meeting.

SC-6.17. Shop Drawings and Samples. Amend paragraph 6.17, including paragraphs 6.17.A, 6.17.B, 6.17.C, 6.17.D, 6.17.D.1, 6.17.D.1.a, 6.17.D.1.b, 6.17.D.1.c, 6.17.D.1.d, 6.17.D.2, 6.17.D.3, 6.17.E.1, 6.17.E.2, 6.17.E.3, and 6.17.F.1 by striking out the words "Engineer" and "Engineer's" in all locations where they appear in the paragraph and inserting the words "Owner" and "Owner's", respectively, in their place.

SC-6.19. Contractor's General Warranty and Guarantee. Amend paragraph 6.19.B.1 by adding the words "or Owner" at the end of the paragraph.

Amend paragraph 6.19.B.2 by striking out the words "recommendation by Engineer or".

Amend paragraph 6.19.B.3 by striking out the words "by Engineer".

Amend paragraph 6.19.B.6 by striking out the word "Engineer" and inserting the word "Owner" in its place.

Delete paragraph 6.19.B.8 and insert the following new paragraph in its place:

8. any correction of defective Work by Owner; or

Add the following new paragraph immediately after paragraph 6.19.B.8:

9. any expiration of a correction period.

SC-7. OTHER WORK.

SC-7.01. Related Work at Site. Amend paragraphs 7.01.B and 7.01.C by striking out the word "Engineer" in all locations where it appears in the paragraphs and inserting the word "Owner" in its place.

SC-8. OWNER'S RESPONSIBILITIES.

SC-8.01. Communications to Contractor. Amend paragraph A by striking out "through Engineer".

SC-8.02. Replacement of Engineer. Delete paragraph 8.02 in its entirety.

SC-9. ENGINEER'S STATUS DURING CONSTRUCTION.

SC-9.01. Owner's Representative. Delete paragraph 9.01 in its entirety.

SC-9.02. Visits to Site. Amend paragraphs 9.02.A and 9.02.B by striking out the words "Engineer" and "Engineer's" in all locations where they appear in the paragraph and inserting the words "Owner" and "Owners", respectively, in their place. Add following new paragraph:

> B. Engineer may make visits to the Site as Owner deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, at the request and benefit of Owner, may determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will advise Owner of the progress of the Work and will endeavor to guard Owner against defective Work.

SC-9.04. Clarifications and Interpretations. Amend paragraph 9.04 by striking out the word "Engineer" in all locations where it appears in the paragraph and inserting the word "Owner" in its place.

SC-9.05. Authorizing Variations in Work. Amend paragraph 9.05 by striking out the word "Engineer" in all locations where it appears in the paragraph and inserting the word "Owner" in its place.

SC-9.06. Rejecting Defective Work. Amend paragraph 9.06 by striking out the word "Engineer" in all locations where it appears in the paragraph and inserting the word "Owner" in its place.

SC-9.07. Shop Drawings, Change Orders and Payments. Delete paragraph 9.07 in its entirety.

SC-9.08. Determinations for Unit Price Work. Delete paragraph 9.08 in its entirety.

SC-9.09. Decisions on Requirements of Contract Documents and Acceptability of Work. Delete paragraph 9.09 in its entirety.

SC-9.10. Limitations on Engineer's Authority and Responsibilities. Delete paragraph 9.10.D in its entirety.

SC-10. CHANGES IN THE WORK.

SC-10.03. Execution of Change Orders. Amend paragraph 10.03.A by striking out the words "recommended by Engineer".

Amend paragraph 10.03.A.3 by striking out the word "Engineer" and inserting the word "Owner" in its place.

SC-10.05. Claims and Disputes. Amend paragraph 10.05 by deleting paragraphs 10.05.A, 10.05.B, 10.05.B.1, 10.05.B.2, and 10.05.C in their entirety and inserting the following new paragraphs in their place:

A. *Notice.* Written notice stating the general nature of each Claim, dispute, or other matter shall be delivered by Contractor to Owner no later than 30 days after the start of the event giving rise thereto. Notice of the amount of extent of the Claim, dispute, or other matter with supporting data shall be delivered to Owner within 60 days after the start of such event, unless the Owner allows, in writing, additional time for Contractor to submit additional or more accurate data in support of such Claim, dispute, or other matter. A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of paragraph 12.01.B. A Claim for an adjustment in Contract Time shall be prepared in accordance with the provisions of paragraph 12.02.B. Each Claim shall be accompanied by Contractor's written statement that the adjustment claimed is the entire adjustment to which Contractor believes it is entitled as a result of said event.

B. *Owner's Decisions.* Owner will render a formal decision in writing within 30 days after receipt of the last submittal of Contractor.

C. If Owner does not render a formal decision in writing within the time stated in paragraph 10.05.B, a decision denying the Claim in its entirety shall be deemed to have been issued 31 days after receipt of the last submittal of Contractor, unless Owner notifies Contractor in writing that a formal decision is pending and will be rendered within a specified number of days or by a specified date.

SC-11. COST OF THE WORK; CASH ALLOWANCES; UNIT PRICE WORK.

SC-11.01. Cost of the Work. Amend the second sentence of paragraph 11.01.A.3 by striking out the words "with the advice of Engineer".

Amend paragraph 11.01.D by striking out the word "Engineer" and inserting the word "Owner" in its place.

SC-11.02. Cash Allowances. Amend paragraph 11.02.A by striking out the words "and Engineer".

B. Authorized representatives of the U.S. Environmental Protection Agency and the Kentucky Division of Water shall have access to the Work wherever it is in preparation or progress. Contractor shall provide proper facilities for such access and inspection.

SC-13.03. Tests and Inspections. Amend paragraph 13.03.A by striking out the word "Engineer" and inserting the word "Owner" in its place.

Amend paragraph 13.03.C by striking out the word "Engineer" and inserting the word "Owner" in its place.

Amend paragraph 13.03.E by striking out the word "Engineer" in both locations where it appears in the paragraph and inserting the word "Owner" in its place.

Amend paragraph 13.03.F by striking out the word "Engineer" in both locations where it appears in the paragraph and inserting the word "Owner" in its place.

SC-13.04. Uncovering Work. Amend paragraph 13.04.A by striking out the words "Engineer" and "Engineer's" in all locations where they appear in the paragraph and inserting the words "Owner" and "Owner's", respectively, in their place.

Delete paragraph 13.04.B in its entirety and insert the following new paragraph in its place:

B. If Owner considers it necessary or advisable that covered Work be observed by Engineer or Owner's representatives, or inspected or tested by others, Contractor, at Owner's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Owner may require, that portion of the Work in question, furnishing all necessary labor, material and equipment. If it is found that such Work is defective, Contractor shall pay all Claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and Owner shall be entitled to an appropriate decrease in the Contract Price. If, however, such Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times (or Milestones), or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, Contractor may make a Claim therefor as provided in paragraph 10.05.

SC-13.06. Correction or Removal of Defective Work. Amend paragraph 13.06.A by inserting the words "or Owner" following the word "Engineer".

SC-13.07. Correction Period. Add the following new paragraphs immediately after paragraph 13.07.A:

Nothing in Article 13 concerning the correction period shall establish a period of limitation with respect to any other obligation which Contractor has under the Contract Documents. The establishment of time periods relates only to the specific obligations of Contractor to correct the Work, and has no relationship to the time within which

Contractor's obligations under the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish Contractor's liability with respect to Contractor's obligations other than to specifically correct the Work.

All machinery, piping, materials, equipment, fittings, and restoration of every kind furnished under this Contract by the Contractor shall be free from defects of manufacture and/or, workmanship. The Contractor agrees to replace materials, workmanship and restoration, which includes all roadway pavement work, shoulder and ditch restoration and repairs, found defective within twenty four (24) months after issuance of the "Certificate of Substantial Completion." In cases where such defects shall be caused by forces beyond the Contractor's control, as judged by the District, the replacements will not have to be made by the Contractor.

SC-13.07.C. Amend paragraph 13.07.C by striking out the words "one year" where they appear in the paragraph and inserting the words "twenty four (24) months", respectively, in their place.

SC-13.08. Acceptance of Defective Work. Delete paragraph 13.08.A in its entirety and insert the following new paragraph in its place:

A. If, instead of requiring correction or removal and replacement of defective Work, Owner, prior to making final payment, prefers to accept it, Owner may do so. Contractor shall pay all Claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to Owner's evaluation of and determination to accept such defective Work and the diminished value of the Work to the extent not other wise paid by Contractor pursuant to this sentence. If any such acceptance occurs prior to Owner making final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of the Work so accepted. If the acceptance occurs after making final payment, an appropriate amount will be paid by Contractor to Owner.

SC-13.09. Owner May Correct Defective Work. Amend paragraph 13.09.A by striking out the word "Engineer" in all locations where it appears in the paragraph and inserting the word "Owner" in its place.

SC-14. PAYMENTS TO CONTRACTOR AND COMPLETION.

SC-14.01. Schedule of Values. Amend paragraph 14.01.A by striking out the word "Engineer" and inserting the word "Owner" in its place.

SC-14.02. Applications for Payments. Amend paragraph 14.02.A by striking out the word "Engineer" and inserting the word "Owner" in its place.

Add the following new paragraphs immediately after paragraph 14.02.A.3:

4. Contractor's Applications for Payment shall be accompanied by the documentation specified herein.

5. Payments for stored materials and equipment shall be based only upon the actual cost to Contractor of the materials and equipment and shall not include any overhead or profit to Contractor. Partial payments will not be made for undelivered materials or equipment.

6. During the progress of the Work, each Application for Payment shall be accompanied by Contractor's updated schedule of operations, or progress report, with such shop drawings schedules, procurement schedules, value of material on hand included in application, and other data specified in Division 1 or reasonably required by Owner.

Delete paragraphs 14.02.B.1, 14.02.B.2, 14.02.B.2.a, 14.02.B.2.b, 14.02.B.2.c, 14.02.B.3, 14.02.B.4, 14.02.B.5, 14.02.B.5.a, 14.02.B.5.b, 14.02.B.5.c, 14.02.B.5.d, and 14.02.C in their entirety and insert the following new paragraphs in their place:

B. *Review of Applications*

1. Owner will, within 10 days after receipt of each Application for Payment, either begin processing the Application for Payment to Contractor or return the Application to Contractor indicating in writing Owner's reasons for refusing payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.

2. Owner's review of Contractor's Application for Payment will consider whether the following have been achieved:

a. the Work has progressed to the point indicated;

b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work under paragraph 9.08, and to any other qualifications as reasonably applied by Owner); and

c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as Owner or Engineer has observed the Work.

3. By processing and making such payment Owner will not thereby be deemed to have represented that: (i) inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work; or (ii) that there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Owner's review of Contractor's Work for the purposes of processing payments nor Owner's making any such payments, including final payment, will impose responsibility on Owner to supervise, direct, or control the Work or for the means, methods, techniques, sequences, or procedures of construction, or the safety

precautions and programs incident thereto, or for Contractor's performance of the Work. Additionally, said payment will not impose responsibility on Owner to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.

5. Owner may refuse to process or make the whole or any part of any payment if, in Owner's opinion, the criteria referred to in paragraph 14.02.B.2 has not been met. Owner may also refuse to process or make any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment previously made, to such extent as may be necessary in Owner's opinion to protect Owner from loss because:

a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;

b. the Contract Price has been reduced by Written Amendment or Change Orders;

c. Owner has been required to correct defective Work or complete Work in accordance with paragraph 13.09; or

d. Owner has actual knowledge of the occurrence of any of the events enumerated in paragraph 15.02.A.

C. *Payment Becomes Due*

1. 25 days after presentation of the Application for Payment to Owner, the amount requested will (subject to the provisions of paragraph 14.02.D) become due, and when due will be paid by Owner to Contractor.

Amend paragraph 14.02.D.1 by striking out the words "recommended by Engineer" and inserting the words "requested by Contractor" in their place.

Delete paragraph 14.02.D.2 in its entirety and insert the following new paragraph in its place:

2. If Owner refuses to make payment of the full amount requested by Contractor, Owner must give Contractor immediate written notice stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, when Contractor corrects to Owner's satisfaction the reasons for such action.

SC-14.04. Substantial Completion. Delete paragraph 14.04.A in its entirety and insert the following new paragraph in its place:

A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that Owner issue a certificate of Substantial Completion. Promptly thereafter, Owner and Contractor shall

make an inspection of the Work to determine the status of completion. If Owner does not consider the Work substantially complete, Owner will notify Contractor in writing giving the reasons therefor. If Owner considers the Work substantially complete, Owner will within 14 days after the inspection of the Work execute and deliver to Contractor a statement of Substantial Completion. At the time of delivery of the certificate of Substantial Completion, Owner will deliver to Contractor a statement as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor subsequently agree otherwise in writing, Owner's aforesaid statement will be binding on Owner and Contractor until final payment.

Add the following new paragraphs following paragraph 14.04.B:

C. To be considered substantially complete, the following portions of the Work must be operational and ready for Owner's continuous use as intended: Water main has been placed in-service, services are switch over if part of project and rough restoration is complete.

SC-14.05. Partial Utilization. Amend paragraph 14.05.A by striking out the word "Engineer".

Delete paragraph 14.05.A.1 in its entirety and insert the following new paragraph in its place:

1. Owner may at any time request Contractor in writing to permit Owner to use any such part of the Work which Owner believes to be ready for its intended use and substantially complete. If Contractor agrees that such part of the Work is substantially complete, Contractor will certify to Owner that such part of the Work is substantially complete and request Owner to issue a certificate of Substantial Completion for that part of the Work. Contractor at any time may notify Owner in writing that Contractor considers any such part of the Work ready for its intended use and substantially complete and request Owner to issue a certificate of Substantial Completion for that part of the Work. Within a reasonable time after either such request, Owner and Contractor shall make an inspection of that part of the Work to determine its status of completion. If the parties are in agreement that the applicable part of the Work is substantially complete, the provisions of paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

SC-14.06. Final Inspection. Delete paragraph 14.06.A in its entirety and insert the following new paragraph in its place:

A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Owner and Contractor shall promptly make a final inspection of the Work. Owner will notify Contractor in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

SC-14.07. Final Application for Payment. Amend paragraph 14.07.A.1 by striking out the word "Engineer" and inserting the word "Owner" in its place.

Add the following new sentence immediately after the last sentence of paragraph 14.07.A.2:

> Consent of the surety, signed by an agent, must be accompanied by a certified copy of such agent's authority to act for the surety. The Contractor shall be responsible for providing all of the documents identified in this paragraph.

Delete paragraph 14.07.B in its entirety and insert the following new paragraph in its place:

> B. *Review of Application and Acceptance.* If, on the basis of Owner's observation of the Work during construction and final inspection, and Owner's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Owner is satisfied that the Work has been completed and Contractor's other obligations under the Contract Documents have been fulfilled, Owner will process the final Application for Payment. Otherwise, Owner will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to process final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

Amend paragraph 14.07.C by striking out the words "recommended by Engineer" and inserting the words "requested by Contractor" in their place.

SC-14.08. Final Completion Delayed. Delete paragraph 14.08.A in its entirety and insert the following new paragraph in its place:

> A. If, through no fault of Contractor, final completion of the Work is significantly delayed, Owner shall, upon receipt of Contractor's final Application for Payment, and without terminating the Agreement, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if Bonds have been furnished as required in paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by Contractor to Owner with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

SC-15. SUSPENSION OF WORK AND TERMINATION.

SC-15.01. Owner May Suspend Work. Amend paragraph 15.01.A by striking out the words "and Engineer".

SC-15.02. Owner May Terminate for Cause. Amend paragraph 15.02.B by deleting the fifth sentence of the paragraph, in its entirety, which begins: "Such Claims, costs, losses, and damages incurred...".

SC-15.04. Contractor May Stop Work or Terminate. Delete paragraph 15.04.A in its entirety and insert the following new paragraph in its place:

> A. If, through no act or fault of Contractor, the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or Owner fails to act on any Application for Payment within 30 days after it is submitted, or

Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner, and provided Owner does not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in paragraph 15.03. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner, stop the Work until payment is made of all such amounts dues Contractor, including interest thereon. The provisions of this paragraph 15.04 are not intended to preclude Contractor from making a Claim under paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this paragraph.

SC-16. DISPUTE RESOLUTION.

Delete Article 16 in its entirety and insert the following new article in its place:

ARTICLE 16 - DISPUTES.

Arbitration will not be acceptable as a means for settling claims, disputes, and other matters.

SC-17. MISCELLANEOUS.

SC-17.04. Survival of Obligations. Add the following new paragraph immediately after paragraph 17.04.A:

B. Contractor shall obtain from all Suppliers and manufacturers any and all warranties and guarantees of such Suppliers and manufacturers, whether or not specifically require by the Specifications, and shall assign such warranties and guarantees to Owner. With respect thereto, Contractor shall render reasonable assistance to Owner when requested, in order to enable Owner to enforce such warranties and guarantees. The assignment of any warranties or guarantees shall not affect the Correction Period or any other provisions of these Contract Documents.

End of Section

EMPLOYMENT REQUIREMENTS AND WAGE RATES

R-1. GENERAL. This Contract shall be based upon payment by the Contractor and his Subcontractors of wage rates not less than the prevailing hourly wage rate for each craft or type of workman engaged on the Work as determined by the Department of Labor of the Commonwealth of Kentucky.

The Contractor shall comply with the prevailing wage law of Kentucky, Kentucky Revised Statutes 337.510 to 337.550, including latest amendments thereto.

The Contractor and each Subcontractor shall keep accurate records indicating the hours worked each day by each employee in each classification of work and the amount paid each employee for his work in each classification. Such records shall be open to the inspection and transcript of the Commissioner of Labor or his duly authorized representatives at any reasonable time. These payroll records shall not be destroyed or removed from the state for one year following completion of the improvement.

The Contractor and each Subcontractor shall post and keep posted in a conspicuous place or places at the construction site a copy or copies of prevailing rates of wages and working hours as prescribed in these Contract Documents.

If, during the life of this Contract, the prevailing hourly rate of wages is changed by the Department of Labor, such change shall not be the basis of any claim by the Contractor against the Owner, nor will deductions be made by the Owner against sums due the Contractor by reason of any such change.

The prevailing wage law does not prohibit payment of more than the prevailing rate of wages.

Pursuant to Kentucky Revised Statute 337.540, no laborer, workman, mechanic, helper, assistant, or apprentice shall be permitted to work more than 8 hours in one calendar day, nor more than 40 hours in one week, except in cases of emergency caused by fire, flood, or damage to life or property. Whenever work in excess of 8 hours per day or 40 hours per week is required, payment for overtime shall be at not less than one and one-half times the prevailing rate of wages.

R-2. PREVAILING WAGES. The following wage rate schedule is the prevailing wage rate determination made by the Department of Labor of the Commonwealth of Kentucky on the designated date, and shall be a part of the Contract.

Steven L. Beshear
Governor

Daniel Mongiardo
Lieutenant Governor

KENTUCKY LABOR CABINET
DEPARTMENT OF WORKPLACE STANDARDS
1047 US Highway 127 S - Suite 4
Frankfort, Kentucky 40601
Phone: (502) 564-0977
Fax: (502) 696-1984
www.labor.ky.gov

J. R. Gray
Secretary

Mark S. Brown
Deputy Secretary

Michael L. Dixon
Commissioner

July 23, 2010

JOHN SCHEBEN
NORTHERN KY WATER DIST
2835 CRESCENT SPRINGS RD
ERLANGER KY 41018

Re: NORTHERN KY WATER DIST, DUDLEY DISCHARGE REDUNDANCY PROJ

Advertising Date as Shown on Notification: August 5, 2010

Dear JOHN SCHEBEN:

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 3-015, dated July 9, 2010 for KENTON 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 upon the advertising date contained in your notification. There may be modifications to this wage determination prior to the advertising date indicated. In addition, if the contract is not awarded within 90 days of this advertising date or if the advertising date is modified, a different set of prevailing rates of wages may be applicable. It will be the responsibility of the public authority to contact this office and verify the correct schedule of the prevailing rates of wages for use on the project. Your project number is as follows: 059-H-00468-10-3, Heavy/Highway

Sincerely,

Michael L. Dixon

Michael L. Dixon
Commissioner

KENTUCKY LABOR CABINET
PREVAILING WAGE DETERMINATION
CURRENT REVISION
LOCALITY NO. 15

KENTON COUNTY

Determination No. CR-3-015 2010

Date of Determination: July 9, 2010

PROJECT 059-H-00468-10-3 HEAVY/HIGHWAY

NORTHERN KY WATER DISTRICT
DUDLEY DISCHARGE REDUNDANCY PROJECT

This schedule of the prevailing rate of wages for Kenton County 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-3-015 2010.

Apprentices 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, and/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 calendar day, but not more than ten (10) hours worked in any one calendar day, if such written agreement is prior to the over eight (8) hours in a calendar day 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.

Fringe benefit amounts are applicable for all hours worked except when otherwise noted. Welders will 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.

Michael L. Dixon, Commissioner
Department of Workplace Standards
Kentucky Labor Cabinet

Determination No. CR-3-015 2010
July 9, 2010

ASBESTOS/INSULATION WORKERS:

Asbestos/Insulation Workers: (Includes application of all insulating materials, protective coverings, coatings and finishings to al types of mechanical systems):		BASE RATE	$28.03
		FRINGE BENEFITS	12.35
Hazardous Material Handlers: (Includes preparation, wetting, stripping, removal, scrapping, vacuuming, bagging & disposing of all insulation materials, whether they contain asbestos or nor, from mechanical systems):		BASE RATE	$23.60
		FRINGE BENEFITS	9.80
BOILERMAKERS:		BASE RATE	$35.79
		FRINGE BENEFITS	16.71
BRICKLAYERS:			
Bricklayers, Caulkers, Cleaners, Pointers & Stone Masons:		BASE RATE	$26.12
		FRINGE BENEFITS	9.73
Refractory:	BUILDING	BASE RATE	$26.62
		FRINGE BENEFITS	9.73
Marble Setters, Terrazzo Workers, & Tile Setters:	BUILDING	BASE RATE	$26.39
		FRINGE BENEFITS	9.62
Marble, Terrazzo & Tile Finishers:			
Finishers:	BUILDING	BASE RATE	$21.95
		FRINGE BENEFITS	9.62
Marble Sanders, Polishers, Waxers, & Sawyers:	BUILDING	BASE RATE	$22.02
		FRINGE BENEFITS	9.62
Terrazzo Base Grinders (While operating base grinding machine):	BUILDING	BASE RATE	$22.37
		FRINGE BENEFITS	9.62

CLASSIFICATIONS		RATE AND FRINGE BENEFITS	
CARPENTERS:			
Carpenters, Piledrivermen, & Lathers:	BUILDING	BASE RATE	$21.47
		FRINGE BENEFITS	10.67
	HEAVY & HIGHWAY	BASE RATE	$27.05
		FRINGE BENEFITS	9.69
Divers:	HEAVY & HIGHWAY	BASE RATE	$40.58
		FRINGE BENEFITS	9.69
CEMENT MASON/CONCRETE FINISHERS:	BUILDING	BASE RATE	$22.50
		FRINGE BENEFITS	10.40
	HEAVY & HIGHWAY	BASE RATE	$25.75
		FRINGE BENEFITS	8.60
ELECTRICIANS:			
Electricians:		BASE RATE	$26.11
		FRINGE BENEFITS	13.72
ELECTRICIAN/LINE CONSTRUCTION:			
Linemen:	BUILDING	BASE RATE	$30.50
		FRINGE BENEFITS	11.15
Equipment Operator:	BUILDING	BASE RATE	$27.45
		FRINGE BENEFITS	10.51
Groundmen:	BUILDING	BASE RATE	$19.83
		FRINGE BENEFITS	8.92
SOUND & COMMUNICATION TECHNICIAN:		BASE RATE	$20.45
		FRINGE BENEFITS	6.95
ELEVATOR MECHANICS:		BASE RATE	$37.47
		FRINGE BENEFITS	20.035
GLAZIERS:		BASE RATE	$23.70
		FRINGE BENEFITS	11.40

IRONWORKERS:

Structural & Ornamental:		BASE RATE	$26.17
		FRINGE BENEFITS	16.72
Fence Erector:		BASE RATE	$23.55
		FRINGE BENEFITS	16.72
REINFORCING:			
Beyond 30-mile radius of Hamilton County, OH Courthouse		BASE RATE	$26.45
		FRINGE BENEFITS	16.70
Up to and including 30-mile radius of Hamilton County, OH Courthouse		BASE RATE	$26.20
		FRINGE BENEFITS	16.70

LABORERS/BUILDING:

Building & Common Laborer, Asbestos Removal, Cement Mason Tender, Hand Operated Mechanical Mule, Mechanical Sweeper, Signaler, Flagger & Wrecking Laborer:			
	BUILDING	BASE RATE	$23.15
		FRINGE BENEFITS	7.50
Bottom Man & Pipe Layer:	BUILDING	BASE RATE	23.25
		FRING BENEFITS	7.50
Skid Steer, Burning Torch Operator, Jackhammer, Air Spade, Chipping Hammer, Mechanical & Air Tamper Operator, Mechanical Concrete Buggy, Power Operated Mechanical Mule, Concrete Pump Hose Man, Vibrator Man, CERCLA Trained Hazardous Material Removal – Levels A, B, C:			
	BUILDING	BASE RATE	$23.30
		FRINGE BENEFITS	7.50
Bottom Jackhammer Man:	BUILDING	BASE RATE	$23.35
		FRINGE BENEFITS	7.50
Tunnel Laborer:	BUILDING	BASE RATE	$23.65
		FRINGE BENEFITS	7.50
Gunnite Nozzle Operator:	BUILDING	BASE RATE	$23.90
		FRINGE BENEFITS	7.50

LABORER/BUILDING: Continued

Brick Mason Tender:	BUILDING	BASE RATE	$23.10
		FRINGE BENEFITS	7.50
PLASTERER TENDER:			
Mixer Pump Operator:	BUILDING	BASE RATE	$23.30
		FRINGE BENFITS	7.50
Tender:	BUILDING	BASE RATE	$23.15
		FRINGE BENEFITS	7.50

LABORER/HEAVY HIGHWAY:

GROUP 1:
Asphalt Laborer, Carpenter Tender, Concrete Curing applicator, Dump Man (Batch Truck), Guardrail and Fence Installer, Joint Setter, Laborer (Construction), Landscape Laborer, Mesh Handlers & Placer, Right-of-way Laborer, Riprap Laborer & Grouter, Scaffold Erector, Seal Coating, Surface Treatment or Road Mix Laborer, Sign Installer, Slurry Seal, Utility Man, Bridge Man, Handyman, waterproofing Laborer, Flagperson, Hazardous Waste (Level D), Diver Tender, Zone Person & Traffic Control:

	HEAVY & HIGHWAY	BASE RATE	$25.27
		FRINGE BENEFITS	7.50

GROUP 2:
Skid Steer, Asphalt Raker, Concrete Puddler, Kettle Man (Pipeline), Machine Driven Tools (Gas, Electric, Air), Mason Tender, Brick Paver, Mortar Mixer, Power Buggy or Power Wheelbarrow, Sheeting & Shoring Man, Surface Grinder Man, Plastic Fusing Machine Operator, Pug Mill Operator, & Vacuum Devices (wet or dry), Rodding Machine Operator, Diver, Screwman or Paver, Screed Person, Water Blast, Hand Held Wand, Pumps 4" & Under (Gas, Air or Electric) & Hazardous Waste (Level C), Air Track and Wagon Drill, Bottom Person, Cofferdam (below 25 ft. deep), Concrete Saw Person, Cutting with Burning Torch, Form Setter, Hand Spiker (Railroad), Pipelayer, tunnel Laborer (without air) & Caisson, Underground Person (working in Sewer and Waterline, Cleaning, Repairing & Reconditioning), Sandblaster Nozzle Person, & Hazardous Waste (Level B):

	HEAVY & HIGHWAY	BASE RATE	$25.44
		FRINGE BENEFITS	7.50

GROUP 3:
Blaster, Mucker, Powder Person, Top Lander, Wrencher (Mechanical Joints & Utility Pipeline), Yarner, Hazardous Waste (Level A), Concrete Specialist, Concrete Crew in Tunnels (With Air-pressurized - $1.00 premium), Curb Setter & Cutter, Grade Checker, Utility Pipeline Tapper, Waterline, and Caulker:

	HEAVY & HIGHWAY	BASE RATE	$25.77
		FRINGE BENEFITS	7.50

GROUP 4:
Miner (With Air-pressurized - $1.00 premium), & Gunnite Nozzle Person:

	HEAVY & HIGHWAY	BASE RATE	$26.22
		FRINGE BENEFITS	7.50

Signal Person will receive the rate equal to the rate paid the laborer classification for which he or she is signaling

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MILLWRIGHTS:		BASE RATE	$27.55
		FRINGE BENEFITS	15.39

OPERATING ENGINEERS/BUILDING:

GROUP 1			
Boom & Jib 250' over:	BUILDING	BASE RATE	$30.74
		FRINGE BENEFITS	11.16
GROUP 2			
Boom & Jib Over 180' through 249:			
	BUILDING	BASE RATE	$30.49
		FRINGE BENEFITS	11.16
GROUP 3			
Boom & Jib 150' through 180':	BUILDING	BASE RATE	$29.99
		FRINGE BENEFITS	11.16
GROUP 4			
Master Mechanic:	BUILDING	BASE RATE	$29.74
		FRINGE BENEFITS	11.16

GROUP 5
Barrier Moving Machine; Boiler or Compressor Mounted on Crane (Piggy-Back Operation); Boom Truck (All Types); Cableway; Cherry Picker; Combination Concrete Mixer & Tower; All Concrete Pumps with Booms; Crane (All Types); Crane-Compact, Track or Rubber Over 4,000 lbs Capacity; Crane-Self Erecting, Stationary, Track or Truck (All Configurations); Derrick (All Types); Dragline; Dredge (Dipper, Clam or Suction) 3 Man Crew; Elevating Grader or Euclid Loader; Floating Equipment; Forklift(rough terrain with winch/hoist) Gradual; Helicopter Operator & Helicopter Winch Operator (Hoisting Builders Materials); Hoe (All Types); Hoist (Two or More Drums); Horizontal Directional Drill; Hydraulic Gantry (Lift System); Laser Finishing Machine; Laser Screed and Like Equipment; Lift Slab or Panel Jack; Locomotive (All Types); Maintenance Engineer (Mechanic and/or Welder); Mixer, Paving (Multiple Drum); Mobile Concrete Pump With Boom; Panelboard (All Types on Site); Pile Driver; Power Shovel; Prentice Loader; Rail Tamper (with Automatic Lifting & Aligning device); Rotary Drill (All) used on Caisson Work for Foundations & Substructure work; Side Boom; Slip Form Paver; Straddle Carrier (Building Construction on Site); Trench Machine (Over 24" Wide); & Tug Boat:

	BUILDING	BASE RATE	$29.49
		FRINGE BENEFITS	11.16

GROUP 6
Asphalt Paver; Bobcat-type and/or Skid Steer Loader with Hoe Attachment Greater than 7,000 lbs.; Bulldozer; C.M.I. Type Equipment; Endloader; Hydro Milling Machine; Kolman Type Loader (Dirt Loading); Lead Greaseman; Mucking Machine; Pettibone-Rail Equipment; Power Grader; Power Scoop; Power Scraper; Push Cat; Rotomill (All), Grinders & Planers of All Types & Vermeer Type Concrete Saw:

	BUILDING	BASE RATE	$29.37
		FRINGE BENEFITS	11.16

OPERATING ENGINEERS/ BUILDING: Continued

GROUP 7
A-Frame; Air Compressor Pressurizing Shafts or Tunnels; Asphalt Roller (All); Bobcat-type and/or Skid Steer Loader with or without Attachments; Boiler (15 lbs. pressure & over); All Concrete Pumps without Booms & with 5" System; Forklift (Except Masonry); Highway Drills-All Types (with Integral Power); Hoist (One Drum); House Elevator (except those automatic call button controlled); Man Lift; Material Hoist/Elevator; Mud Jack; Pressure Grouting; Pump (Installing or Operating Well Points or other Type of Dewatering Systems); Pump (4" and over Discharge); Railroad Tie Inserter/Remover; Rotovator (Lime soil Stabilizer); Submersible Pump (4" and over Discharge); Switch & Tie Tamper (w/o lifting & aligning device); Trench Machine (24" & under); & Utility:

	BUILDING	BASE RATE	$28.33
		FRINGE BENEFITS	11.16

GROUP 8
Ballast Relocator; Backfiller & Tamper; Batch Plant; Bar & Joint Installing Machine; Bull Floats; Burlap & Curing Machines; Clefplanes; Compressor on Building Construction; Concrete Mixer, Capacity more than one bag; Concrete Mixer, one bag capacity (side loader); All Concrete Pumps without Booms with 4" or Smaller System; Concrete Spreading Machine; Conveyor, used for handling building materials; Crusher; Deckhand; Drum Fireman in Asphalt Plant; Farm Type Tractor, Pulling Attachments; Finishing Machines; Form Trencher; Generator; Gunnite Machine; Hydro-Seeder; Pavement Breaker (Hydraulic or Cable); Post Driver; Post Hole Digger; Pressure Pump (over 1/2" discharge); Road Widening Trencher; Roller (except Asphalt); Self-propelled Power Spreader; Self-propelled Sub-Grader; Shotcrete Machine; Tire Repairman; Tractor (Pulling Sheep Foot Roller or Grader); VAC/ALL; Vibratory Compactor (with Integral Power) & Welder:

	BUILDING	BASE RATE	$27.15
		FRINGE BENEFITS	11.16

GROUP 9
Allen Screed Paver(concrete); Boiler (Less than 15 lbs. pressure); Crane-Compact, Track or Rubber under 4,000 lbs.; Directional Drill "Locator"; Inboard & Outboard Motor Boat Launch; Light Plant; Masonry Forklift; Oiler; Power Driven Heater (Oil Fired); Power Scrubber; Power Sweeper; Pump (Under 4" discharge); & Submersible Pump (Under 4" discharge):

	BUILDING	BASE RATE	$21.69
		FRINGE BENEFITS	11.16

OPERATING ENGINEERS/HEAVY HIGHWAY:

Master Mechanic & Boom from 150-180:

	HEAVY & HIGHWAY	BASE RATE	$29.74
		FRINGE BENEFITS	11.16

Boom from 180 and over:	HEAVY & HIGHWAY	BASE RATE	$29.99
		FRINGE BENEFITS	11.16

OPERATING ENGINEERS: HEAVY & HIGHWAY: Continued

GROUP 1
Air Compressor on Steel Erection; Barrier Moving Machine; Boiler Operator on Compressor or Generator when mounted on a Rig; Cableway; Combination Concrete Mixer & Tower; Concrete Plant (over 4 yd. Capacity); Concrete Pump; Crane (All Types, Including Boom Truck, Cherry Picker); Crane-Compact, Track or Rubber over 4,000 lbs. capacity; Cranes-Self Erecting, Stationary, Track or Truck (All Configurations); Derrick; Dragline; Dredge (Dipper, Clam or Suction); Elevating Grader or Euclid Loader; Floating Equipment (All Types); Gradual; Helicopter Crew (Operator-Hoist or Winch); Hoe (all types); Hoisting Engine on Shaft or Tunnel Work; Horizontal Directional Drill (over 500,000 ft. lbs. thrust); Hydraulic Gantry (Lifting System); Industrial-Type Tractor; Jet Engine Dryer (D8 or D9) Diesel Tractor; Locomotive (Standard Gauge); Maintenance Operator Class A; Mixer, Paving (Single or Double Drum); Mucking Machine; Multiple Scraper; Piledriving Machine (All Types); Power Shovel; Prentice Loader; Quad 9 (Double Pusher); Rail Tamper (with auto lifting & aligning device); Refrigerating Machine (Freezer Operation); Rotary Drill, on Caisson work; Rough Terrain Fork Lift with Winch/Hoist; Side-Boom; Slip-Form Paver; Tower Derrick; Tree Shredder; Trench Machine (Over 24" wide); Truck Mounted Concrete Pump; Tug Boat; Tunnel Machine and/or Mining Machine; & Wheel Excavator:

HEAVY & HIGHWAY	BASE RATE	$29.49
	FRINGE BENEFITS	11.16

GROUP 2
Asphalt Paver; Automatic Subgrader Machine, Self-Propelled (CMI Type); Bobcat Type and/or Skid Steer Loader with Hoe Attachment Greater than 7,000 lbs.; Boring Machine More than 48"; Bulldozer; Endloader; Hydro Milling Machine; Kolman-type Loader (production type-Dirt); Lead Greaseman; Lighting & Traffic Signal Installation Equipment (includes all groups or classifications); Material Transfer Equipment (Shuttle Buggy) Asphalt; Pettibone-Rail Equipment; Power Grader; Power Scraper; Push Cat; Rotomill (all), Grinders & Planers of All types; Trench Machine (24" wide & under); & Vermeer type Concrete Saw:

HEAVY & HIGHWAY	BASE RATE	$29.37
	FRINGE BENEFITS	11.16

GROUP 3
A-Frame; Air Compressor on Tunnel Work (low pressure); Asphalt Plant Engineer; Bobcat-type and/or Skid Steer Loader with or without Attachments; Highway Drills (all types); Locomotive (narrow gauge); Material Hoist/Elevator; Mixer, Concrete (more than one bag capacity); Mixer, one bag capacity (Side Loader); Power Boiler (Over 15 lbs. Pressure) Pump Operator installing & operating Well Points; Pump (4" & over discharge); Roller, Asphalt; Rotovator (lime soil stabilizer); Switch & Tie Tampers (without lifting & aligning device); Utility Operator (Small equipment); & Welding Machines:

HEAVY & HIGHWAY	BASE RATE	$28.33
	FRINGE BENEFITS	11.16

GROUP 4
Backfiller; Ballast Re-locator; Bars, Joint & Mesh Installing Machine; Batch Plant; Boring Machine Operator (48" or less); Bull Floats; Burlap & Curing Machine; Concrete Plant (capacity 4 yd. & under); Concrete Saw (Multiple); Conveyor (Highway); Crusher; Deckhand; Farm-type Tractor with attachments (highway) except Masonry); Finishing Machine; Fireperson, Floating Equipment (all types); Fork Lift (highway); Form Trencher; Hydro Hammer; Hydro Seeder; Pavement Breaker; Plant Mixer; Post Driver; Post Hole Digger (Power Auger); Power Brush Burner; Power Form Handling Equipment; Road Widening Trencher; Roller (Brick, Grade & Macadam); Self-Propelled Power Spreader; Self-Propelled Power Subgrader; Steam Fireperson; Tractor (Pulling Sheepfoot, Roller or Grader); & Vibratory Compactor with Integral Power:

HEAVY & HIGHWAY	BASE RATE	$27.15
	FRINGE BENEFITS	11.16

OPERATING ENGINEERS: HEAVY & HIGHWAY: Continued

GROUP 5
Compressor (Portable, Sewer, Heavy & Highway); Drum Fireperson (Asphalt); Generator; Inboard-Outboard Motor Boat Launch; Masonry Fork Lift; Oil Heater (asphalt plant); Oiler; Power Driven Heater; Power Sweeper & Scrubber; Pump (under 4" discharge); Signalperson; Tire Repairperson; & VAC/ALLS:

	HEAVY & HIGHWAY	BASE RATE	$21.69
		FRINGE BENEFITS	11.16

PAINTERS/ BUILDING

Brush, Roller, Paper Hanging & Drywall Taping:	BUILDING	BASE RATE	$23.10
		FRINGE BENEFITS	6.83
Spray:	BUILDING	BASE RATE	$23.60
		FRINGE BENEFITS	6.83
Sandblasting, Waterblasting:	BUILDING	BASE RATE	$23.85
		FRINGE BENEFITS	6.83
Lead Abatement:	BUILDING	BASE RATE	$24.10
		FRINGE BENEFITS	6.83
Sign Painter & Erector:	BUILDING	BASE RATE	$20.23
		FRINGE BENEFITS	3.25

PAINTERS/ HEAVY & HIGHWAY

Bridge/Equipment Tender and/or Containment Builder:	HEAVY & HIGHWAY	BASE RATE	$20.49
		FRINGE BENEFITS	6.83
Brush & Roller:	HEAVY & HIGHWAY	BASE RATE	$23.10
		FRINGE BENEFITS	6.83
Spray:	HEAVY & HIGHWAY	BASE RATE	$23.60
		FRINGE BENEFITS	6.83
Sandblasting & Water Blasting:	HEAVY & HIGHWAY	BASE RATE	$23.85
		FRINGE BENEFITS	6.83

PAINTERS/ HEAVY & HIGHWAY: Continued

Elevated Tanks; Steeplejack Work; Bridge & Led Abatement:			
	HEAVY & HIGHWAY	BASE RATE	$24.10
		FRINGE BENEFITS	6.83
PIPEFITTERS & PLUMBERS:		BASE RATE	$28.39
		FRINGE BENEFITS	14.30
PLASTERERS:	BUILDING	BASE RATE	$22.00
		FRINGE BENEFITS	10.10
ROOFERS (excluding metal roofs):			
Roofers:		BASE RATE	$26.31
		FRINGE BENEFITS	11.07
Pitch:		BASE RATE	$27.31
		FRINGE BENEFITS	11.07
SHEETMETAL WORKERS (including metal roofs):		BASE RATE	$27.33
		FRINGE BENEFITS	14.66
SPRINKLER FITTERS:		BASE RATE	$29.50
		FRINGE BENEFITS	15.85
TRUCK DRIVERS/BUILDING:			
3 Tons & Under, Greaser, Tire Changer, & Mechanic Tender:			
	BUILDING	*BASE RATE	$19.57
		FRINGE BENEFITS	12.17
Over 3 Tons, Semi-Trailer or Pole Trailer, Dump Tandem Axles, Farm Tractor (When used to pull building material & equipment):			
	BUILDING	*BASE RATE	$19.68
		FRINGE BENEFITS	12.17
Concrete Mixer (Hauling on jobsites), & Truck Mechanic:			
	BUILDING	*BASE RATE	$19.75
		FRINGE BENEFITS	12.17

TRUCK DRIVERS/BUILDING: Continued

Euclids & Other Heavy Moving Equipment, Lowboy, Winch, A-Frame & Monorail Truck (To transport building materials):	BUILDING	*BASE RATE	$19.85
		FRINGE BENEFITS	12.17

***Work on Hazardous or Toxic Waste Site - $4.00 Premium**

TRUCK DRIVER/HEAVY HIGHWAY:

Driver:	HEAVY & HIGHWAY	BASE RATE	$15.85
		FRINGE BENEFITS	4.60

Euclid Wagon, End Dump, Lowboy, Heavy Duty Equipment, Tractor-Trailer Combination, & Drag:			
	HEAVY & HIGHWAY	BASE RATE	$16.29
		FRINGE BENEFITS	4.60

End of Document
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Section 01015

PROJECT REQUIREMENTS

1. GENERAL DESCRIPTION OF WORK. The Work to be performed under these Contract Documents is generally described as follows: Furnishing all plant, materials, equipment, supplies, labor and transportation, including fuel, power, water, (except any materials, equipment, utility, or service, if any, specified herein to be furnished by the District), and performing all work required in the scope of work in the Contract, in strict accordance with the specifications, schedules, and drawings, all of which are made a part hereof and including such detail drawings as may be furnished by the District from time to time during the prosecution of the work in explanation of said drawings.

2. COORDINATION. Contractor shall plan, schedule, and coordinate its operations in a manner which will facilitate the simultaneous progress of the work included under other contracts outside the scope of these Contract Documents if applicable.

3. MATERIALS TO BE FURNISHED BY OWNER. If the Owner is supplying some of the materials for this project (eg. air release valves, meter materials) it shall be indicated on the bid item unit price sheet and Measurement and Payment Section1025. Items will be available at the Owner's storage yard unless other provisions have been made.

4. RESPONSIBILITY FOR MATERIALS AND EQUIPMENT.

4.01. Items Furnished by Owner. Contractor's responsibility for materials and equipment furnished by Owner shall begin at the point of delivery on acceptance by Contractor. Contractor shall carefully examine each shipment prior to acceptance and shall reject all defective items. Owner reserves the right, however, to accept items rejected by Contractor and to authorize their installation in the Work.

Defective materials and equipment discovered after installation and prior to final acceptance of the Work, where the defect is of a nature not detectable by visual examination and other appropriate field inspection methods, shall be replaced by Owner, together with such additional materials and supplies as may be necessary for their replacement. Contractor shall furnish all necessary tools, equipment, and appliances, and perform all necessary labor, for the removal and replacement of such defective items in a manner acceptable to Owner; adjustment to the Contract Price for the costs of the removal and replacement shall be made in accordance with Article 11 of the General Conditions.

All materials and equipment furnished by Owner which disappear or are damaged after their acceptance by Contractor shall be replaced by and at the expense of Contractor. Replacements shall conform to the original procurement specifications.

Contractor shall be responsible for all unloading, reloading, transporting to the site, storage if necessary, re-handling, and installation.

All items shall be unloaded promptly after arrival. All charges for demurrage due to negligence or delay by Contractor shall be paid by Contractor. Equipment and materials shall be handled by methods which will prevent damage.

Equipment and materials shall be protected from exposure to the elements. All equipment shall be stored in accordance with the General Equipment Stipulations.

Contractor shall accept the risk of any delay in delivery of equipment or materials furnished by Owner, and if the Work is delayed, Contractor shall have no claim for damages or contract adjustment other than an extension of time and the waiving of liquidated damages occasioned by the delay.

All equipment shall be arranged and installed as indicated on the Drawings, and in conformity with installation drawings and instructions furnished to Owner by the manufacturer of the equipment.

4.02. Items Furnished by Contractor. Contractor shall be fully responsible for all materials and equipment which it has furnished.

5. OFFSITE STORAGE. Offsite storage arrangement shall be approved by Owner for all materials and equipment not incorporated into the Work but included in Applications for Payment. Such offsite storage arrangement shall be presented in writing and shall afford adequate and satisfactory security and protection. Offsite storage facilities shall be accessible to Owner.

6. SUBSTITUTES AND "OR-EQUAL" ITEMS. Provisions for evaluation of substitutes and "or-equal" items of materials and equipment are covered in Paragraph 6.05 of the General Conditions. Requests for review of equivalency will not be accepted by Owner from anyone except Contractor, and such requests will not be considered until after the Contract has been awarded.

7. PREPARATION FOR SHIPMENT. All materials shall be suitably packaged to facilitate handling and protect against damage during transit and storage. Painted surfaces shall be protected against impact, abrasion, discoloration, and other damage. All painted surfaces which are damaged prior to acceptance of equipment shall be repainted to the satisfaction of Owner.

Each item, package, or bundle of material shall be tagged or marked as identified in the delivery schedule or on the Shop Drawings. Complete packing lists and bills of material shall be included with each shipment.

8. SALVAGE OF MATERIALS AND EQUIPMENT. Existing materials and equipment removed, and not reused as a part of the Work, shall become Contractor's property, except the following items which shall remain Owner's property: Fire Hydrants, temporary plugs, and any unused materials supplied by the Owner.

Contractor shall carefully remove, in a manner to prevent damage, all materials and equipment specified or indicated to be salvaged and reused or to remain the property of Owner. Contractor shall store and protect salvaged items specified or indicated to be reused in the Work.

Salvaged items not to be reused in the Work, but to remain Owner's property, shall be delivered by Contractor in good condition to Owner's storage yard.

Any items damaged in removal, storage, or handling through carelessness or improper procedures shall be replaced by Contractor in kind or with new items.

Contractor may furnish and install new items instead of those specified or indicated to be salvaged and reused, in which case such removed items will become Contractor's property.

Existing materials and equipment removed by Contractor shall not be reused in the Work except where so specified or indicated.

9. EASEMENTS AND RIGHTS-OF-WAY. The easements and rights-of-way for the pipelines will be provided by Owner. Contractor shall confine its construction operations within the limits indicated on the Drawings. Contractor shall use due care in placing construction tools, equipment, excavated materials, and pipeline materials and supplies in order to avoid damage to property and interference with traffic.

9.01. On Private Property. Easements across private property are indicated on the Drawings. Contractor shall set stakes to mark the boundaries of construction easements across private property. The stakes shall be protected and maintained until completion of construction and cleanup.

Contractor shall not enter any private property outside the designated construction easement boundaries without written permission from the owner of the property.

Whenever the easement is occupied by crops which will be damaged by construction operations, Contractor shall notify the owner sufficiently in advance so that the crops may be removed before excavation or trenching is started. Contractor shall be responsible for all damage to crops outside the easement and shall make satisfactory settlement for the damage directly with the owner.

Where the line crosses fields which are leveled for irrigation or terraced, Contractor shall relevel irrigated fields and replace all terraces to their original or better condition, and to the satisfaction of the owner.

9.02. Work Within Highway and Railroad Rights-of-Way. Permits shall be obtained by Owner. All Work performed and all operations of Contractor, its employees, or Subcontractors within the limits of railroad and highway rights-of-way shall be in conformity with the requirements and be under the control (through Owner) of the railroad or highway authority owning, or having jurisdiction over and control of, the right-of-way in each case.

10. OPERATION OF EXISTING FACILITIES. The existing water transmission and distribution system must be kept in continuous operation throughout the construction period. No interruption will be permitted which adversely affects the degree of service provided. Provided permission is obtained from Owner in advance, portions of the existing facilities may be taken out of service for short periods corresponding with

periods of minimum service demands. This may facilitate work at night or weekends which is considered incidental to the project.

Contractor shall provide temporary facilities and make temporary modifications as necessary to keep the existing facilities in operation during the construction period.

11. NOTICES TO OWNERS AND AUTHORITIES. Contractor shall, as provided in the General Conditions, notify owners of adjacent property and utilities when prosecution of the Work may affect them.

When it is necessary to temporarily deny access to property, or when any utility service connection must be interrupted, Contractor shall give notices sufficiently in advance to enable the affected persons to provide for their needs. Notices shall conform to any applicable local ordinance and, whether delivered orally or in writing, shall include appropriate information concerning the interruption and instructions on how to limit inconvenience caused thereby.

Utilities and other concerned agencies shall be notified at least 24 hours prior to cutting or closing streets or other traffic areas or excavating near underground utilities or pole lines.

12. LINES AND GRADES. All Work shall be done to the lines, grades, and elevations indicated on the Drawings.

Basic horizontal and vertical control points will be established or designated by Owner to be used as datums for the Work. All additional survey, layout, and measurement work shall be performed by Contractor as a part of the Work.

Contractor shall provide an experienced instrument person, competent assistants, and such instruments, tools, stakes, and other materials required to complete the survey, layout, and measurement work. In addition, Contractor shall furnish, without charge, competent persons and such tools, stakes, and other materials as Owner may require in establishing or designating control points, or in checking survey, layout, and measurement work performed by Contractor.

Contractor shall keep Owner informed, a reasonable time in advance, of the times and places at which it wishes to do Work, so that horizontal and vertical control points may be established and any checking deemed necessary by Owner may be done with minimum inconvenience to Owner and minimum delay to Contractor.

Contractor shall remove and reconstruct work which is improperly located.

13. CONNECTIONS TO EXISTING FACILITIES. Unless otherwise specified or indicated, Contractor shall make all necessary connections to existing facilities, including structures, drain lines, and utilities such as water, sewer, gas, telephone, and electric. In each case, Contractor shall receive permission from Owner or the owning utility prior to undertaking connections. Contractor shall protect facilities against deleterious substances and damage.

Connections to existing facilities which are in service shall be thoroughly planned in advance, and all required equipment, materials, and labor shall be on hand at the time of undertaking the connections. Work shall proceed continuously (around the clock) if necessary to complete connections in the minimum time. Operation of valves or other appurtenances on existing utilities, when required, shall be by or under the direct supervision of the owning utility.

14. UNFAVORABLE CONSTRUCTION CONDITIONS. During unfavorable weather, wet ground, or other unsuitable construction conditions, Contractor shall confine its operations to work which will not be affected adversely by such conditions. No portion of the Work shall be constructed under conditions which would affect adversely the quality or efficiency thereof, unless special means or precautions are taken by Contractor to perform the Work in a proper and satisfactory manner.

15. CUTTING AND PATCHING. As provided in General Conditions, Contractor shall perform all cutting and patching required for the Work and as may be necessary in connection with uncovering Work for inspection or for the correction of defective Work.

Contractor shall perform all cutting and patching required for and in connection with the Work, including but not limited to the following:

Removal of improperly timed Work.
Removal of samples of installed materials for testing.
Alteration of existing facilities.
Installation of new Work in existing facilities.

Contractor shall provide all shoring, bracing, supports, and protective devices necessary to safeguard all Work and existing facilities during cutting and patching operations. Contractor shall not undertake any cutting or demolition which may affect the structural stability of the Work or existing facilities without Owner's concurrence.

Materials shall be cut and removed to the extent indicated on the Drawings or as required to complete the Work. Materials shall be removed in a careful manner, with no damage to adjacent facilities or materials. Materials which are not salvable shall be removed from the site by Contractor.

All Work and existing facilities affected by cutting operations shall be restored with new materials, or with salvaged materials acceptable to Owner, to obtain a finished installation with the strength, appearance, and functional capacity required. If necessary, entire surfaces shall be patched and refinished.

16. ASBESTOS REMOVAL. If, during the progress of the Work, suspected asbestos-containing products are identified, Contractor shall stop work in the affected area and engage an asbestos removal Subcontractor to verify the materials and, if necessary, encapsulate, enclose, or remove and dispose of all asbestos in accordance with current regulations of the Environmental Protection Agency and the U. S. Department of Labor - Occupational Safety and Health Administration, the state asbestos regulating agency, and any local government agency. Payment for such work will be made by Change Order.

16.01. Subcontractor's Qualifications. The Subcontractor for asbestos removal shall be regularly engaged in this type of activity and shall be familiar with the regulations which govern this work. The Subcontractor shall demonstrate to the satisfaction of Owner that it has successfully completed at least three asbestos removal projects, that it has the necessary staff and equipment to perform the work, and that it has an approved site for disposal of the asbestos. The Subcontractor shall carry insurance as specified in the Supplementary Conditions.

16.02. Removal Methods. The asbestos removal Subcontractor shall submit a work plan of its proposed removal procedure to Owner before beginning work and shall certify that the methods are in full compliance with the governing regulations. The work plan shall cover all aspects of the removal, including health and safety of employees and building occupants, hygiene facilities, employee certification, clearance criteria, transportation and disposal, enclosure techniques, and other techniques appropriate for the proposed work.

17. CLEANING UP. Contractor shall keep the premises free at all times from accumulations of waste materials and rubbish. Contractor shall provide adequate trash receptacles about the site and shall promptly empty the containers when filled.

Construction materials, such as concrete forms and scaffolding, shall be neatly stacked by Contractor when not in use. Contractor shall promptly remove splattered concrete, asphalt, oil, paint, corrosive liquids, and cleaning solutions from surfaces to prevent marring or other damage.

Volatile wastes shall be properly stored in covered metal containers and removed daily.

Wastes shall not be buried or burned on the site or disposed of into storm drains, sanitary sewers, streams, or waterways. All wastes shall be removed from the site and disposed of in a manner complying with local ordinances and anti-pollution laws.

Adequate cleanup will be a condition for processing of progress payment applications.

18. APPLICABLE CODES. References in the Contract Documents to local codes mean the following:

Kentucky Building Code
Kentucky Plumbing Code
National Electric Code
BOCA Mechanical Code

Other standard codes which apply to the Work are designated in the Specifications.

19. PRECONSTRUCTION CONFERENCE. Prior to the commencement of Work at the site, a pre-construction conference will be held at a mutually agreed time and place. The conference shall be attended by:

Contractor and its superintendent.
Principal Subcontractors.
Representatives of principal Suppliers and manufacturers as appropriate.
Representatives of Owner.

Government representatives as appropriate.
Others as requested by Contractor or Owner.

Unless previously submitted to Owner, Contractor shall bring to the conference a preliminary schedule for each of the following:

Progress.
Procurement.
Values for progress payment purposes.
Shop Drawings and other submittals.

The purpose of the conference is to designate responsible personnel and establish a working relationship. Matters requiring coordination will be discussed and procedures for handling such matters established. The agenda will include:

Contractor's preliminary schedules.
Transmittal, review, and distribution of Contractor's submittals.
Processing Applications for Payment.
Maintaining record documents.
Critical Work sequencing.
Field decisions and Change Orders.
Use of premises, office and storage areas, security, housekeeping, and Owner's needs.
Contractor's assignments for safety and first aid.

Owner will preside at the conference and will arrange for keeping the minutes and distributing the minutes to all persons in attendance.

20. PROGRESS MEETINGS. Contractor shall schedule and hold regular progress meetings at least monthly and at other times as requested by Owner or required by progress of the Work. Contractor, Owner, and all Subcontractors active on the site shall be represented at each meeting. Contractor may at its discretion request attendance by representatives of its Suppliers, manufacturers, and other Subcontractors.

Contractor shall preside at the meetings. Meeting minutes will be prepared and distributed by Contractor. The purpose of the meetings will be to review the progress of the Work, maintain coordination of efforts, discuss changes in scheduling, and resolve other problems which may develop.

End of Section

SECTION 01070

ABBREVIATIONS OF TERMS AND ORGANIZATIONS

1. LIST OF ABBREVIATIONS. Reference to standards and organizations in the Specifications shall be by the following abbreviated letter designations:

AA	Aluminum Association
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
ACPA	American Concrete Pipe Association
AFBMA	Antifriction Bearing Manufacturers Association
AGA	American Gas Association
AGMA	American Gear Manufacturers Association
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
ANSI	American National Standards Institute
APA	American Plywood Association
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASSE	American Society of Sanitary Engineers
ASTM	American Society for Testing and Materials
AWG	American Wire Gage
AWPA	American Wood-Preservers' Association
AWPB	American Wood Preservers Bureau
AWS	American Welding Society
AWWA	American Water Works Association
BHMA	Builders Hardware Manufacturers Association
CDA	Copper Development Association
CISPI	Cast Iron Soil Pipe Institute
CRSI	Concrete Reinforcing Steel Institute
CS	Commercial Standard (U.S. Department of Commerce)
DIPRA	Ductile Iron Pipe Research Association
EEI	Edison Electric Institute
EJCDC	Engineers' Joint Contract Documents Committee
EPA	Environmental Protection Agency
Fed Spec	Federal Specification
FHWA	Federal Highway Administration

FIA	Factory Insurance Association
FM	Factory Mutual
IEEE	Institute of Electrical and Electronics Engineers
IFI	Industrial Fasteners Institute
IRI	Industrial Risk Insurers
MIL	Military Specification
MSS	Manufacturers Standardization Society of Valve and Fitting Industry
NBS	National Bureau of Standards
NCSPA	National Corrugated Steel Pipe Association
NEC	National Electrical Code
NECA	National Electrical Contractors Association
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NIST	National Institute of Standards and Technology
NPC	National Plumbing Code
NPT	National Pipe Thread
NRMCA	National Ready Mixed Concrete Association
NSC	National Safety Council
NSF	National Sanitation Foundation
OSHA	Occupational Safety and Health Administration
PCA	Portland Cement Association
PCI	Prestressed Concrete Institute
PS	Product Standard
SAE	Society of Automotive Engineers
SI	Système International des Unitès (International System of Units)
SPFA	Steel Plate Fabricators Association
SSI	Scaffolding and Shoring Institute
SSPC	Steel Structures Painting Council
UL	Underwriters' Laboratories

End of Section

Section 01300

SUBMITTALS

1. PROGRESS SCHEDULE. After the preconstruction conference and before Work is started, Contractor shall submit to Owner for review a schedule of the proposed construction operations. Owner shall cooperate with Contractor in arrangements for continuity of service and operation of valves and other control facilities. The progress schedule shall indicate the sequence of the Work, the time of starting and completion of each part, and the time for making connections to existing piping, structures, or facilities.

2. PROGRESS REPORTS. A progress report shall be furnished to Owner with each Application for Payment. If the Work falls behind schedule, Contractor shall submit additional progress reports at such intervals as Owner may request.

Each progress report shall include sufficient narrative to describe current and anticipated delaying factors, their effect on the progress schedule, and proposed corrective actions. Any Work reported complete, but which is not readily apparent to Owner, must be substantiated with satisfactory evidence.

3. SURVEY DATA. All field books, notes, and other data developed by Contractor in performing surveys required as part of the Work shall be available to Owner for examination throughout the construction period. All such data shall be submitted to Owner with the other documentation required for final acceptance of the Work.

4. SHOP DRAWINGS AND ENGINEERING DATA.

4.01. General. Shop Drawings and engineering data (submittals) covering all equipment and fabricated and building materials which will become a permanent part of the Work under this Contract shall be submitted to Owner for review, at the Owner's address given in the Agreement. Submittals shall verify compliance with the Contract Documents, and shall include drawings and descriptive information in sufficient detail to show the kind, size, arrangement, and operation of component materials and devices; the external connections, anchorages, and supports required; performance characteristics; and dimensions needed for installation and correlation with other materials and equipment. When an item consists of components from several sources, Contractor shall submit a complete initial submittal including all components.

All submittals, regardless of origin, shall be stamped with the approval of Contractor and identified with the name and number of this Contract, Contractor's name, and references to applicable specification paragraphs and Contract Drawings. Each submittal shall indicate the intended use of the item in the Work. When catalog pages are submitted, applicable items shall be clearly identified and inapplicable data crossed out. The current revision, issue number, and date shall be indicated on all drawings and other descriptive data.

Contractor shall be solely responsible for the completeness of each submission. Contractor's stamp of approval is a representation to Owner that Contractor accepts sole responsibility for determining and verifying all quantities, dimensions, field

construction criteria, materials, catalog numbers, and similar data, and that Contractor has reviewed and coordinated each submittal with the requirements of the Work and the Contract Documents.

All deviations from the Contract Documents shall be identified as deviations on each submittal and shall be tabulated in Contractor's letter of transmittal. Such submittals shall, as pertinent to the deviation, indicate essential details of all changes proposed by Contractor (including modifications to other facilities that may be a result of the deviation) and all required piping and wiring diagrams.

Five copies (or one reproducible copy) of each drawing and necessary data shall be submitted to Owner. Owner will return two marked copies (or one marked reproducible copy) to Contractor. Facsimile (fax) copies will not be acceptable. Owner will not accept submittals from anyone but Contractor. Submittals shall be consecutively numbered in direct sequence of submittal and without division by subcontracts or trades.

4.02. Owner's Review of Submittals. Owner's review of submittals will cover only general conformity to the Drawings and Specifications, external connections, and dimensions which affect the layout. Owner's review does not indicate a thorough review of all dimensions, quantities, and details of the material, equipment, device, or item shown. Owner's review shall not relieve Contractor of Contractor's sole responsibility for errors, omissions, or deviations in the drawings and data, nor of Contractor's sole responsibility for compliance with the Contract Documents.

Owner's submittal review period shall be 21 consecutive calendar days in length and shall commence on the first calendar day immediately following the date of arrival of the submittal or resubmittal in Owner's office. The time required to mail the submittal or resubmittal back to Contractor shall not be considered a part of the submittal review period.

When the drawings and data are returned marked "NOT ACCEPTABLE" or "RETURNED FOR CORRECTION", the corrections shall be made as noted thereon and as instructed by Owner and five corrected copies (or one corrected reproducible copy) resubmitted. Facsimile (fax) copies will not be acceptable.

When the drawings and data are returned marked "EXCEPTIONS NOTED", "NO EXCEPTIONS NOTED", or "RECORD COPY", no additional copies need be furnished unless requested by Owner at time of review.

4.03. Resubmittal of Drawings and Data. Contractor shall accept full responsibility for the completeness of each resubmittal. Contractor shall verify that all corrected data and additional information previously requested by Owner are provided on the resubmittal.

When corrected copies are resubmitted, Contractor shall in writing direct specific attention to all revisions and shall list separately any revisions made other than those called for by Owner on previous submissions.

Requirements specified for initial submittals shall also apply to resubmittals. Resubmittals shall bear the number of the first submittal followed by a letter (A, B, etc.) to indicate the sequence of the resubmittal.

Re-submittals shall be made within 30 days of the date of the letter returning the material to be modified or corrected, unless within 14 days Contractor submits an acceptable request for an extension of the stipulated time period, listing the reasons the resubmittal cannot be completed within that time.

Any need for more than one resubmission, or any other delay in obtaining Owner's review of submittals, will not entitle Contractor to extension of the Contract Times unless delay of the Work is directly caused by a change in the Work authorized by a Change Order or by failure of Owner to review any submittal within the submittal review period specified herein and to return the submittal to Contractor.

End of Section

Section 01400

QUALITY CONTROL

1. TESTING SERVICES. All tests to determine compliance with the Contract Documents shall be performed by an independent commercial testing firm acceptable to Owner. The testing firm's laboratory shall be staffed with experienced technicians, properly equipped and fully qualified to perform the tests in accordance with the specified standards.

Testing services provided by Owner are for the sole benefit of Owner; however, test results shall be available to Contractor. Testing necessary to satisfy Contractor's internal quality control procedures shall be the sole responsibility of Contractor.

1.01. Testing Services Furnished by Contractor. Unless otherwise specified, Contractor shall provide all testing services in connection with the following:

Concrete materials and mix designs.
Asphaltic concrete materials and mix designs.
Embedment, fill and backfill materials.
All other tests and engineering data required for Owner's review of materials and equipment proposed to be used in the Work.

Contractor shall obtain Owner's acceptance of the testing firm before having services performed, and shall pay all costs for these testing services.

1.02. Testing Services Furnished by Owner. Unless otherwise specified, Owner shall provide for tests made on the following materials and equipment:

Concrete.
Asphaltic concrete.
Moisture-density and relative density tests on embedment, fill, and backfill materials.
In-place field density tests on embedments, fills, and backfill.
Other materials and equipment at the discretion of Owner.

Testing, including sampling, will be performed by Owner or the testing firm's laboratory personnel, in the general manner indicated in the Specifications. Owner shall determine the exact time, location, and number of tests, including samples.

Arrangements for delivery of samples and test specimens to the testing firm's laboratory will be made by Owner. The testing firm's laboratory shall perform all laboratory tests within a reasonable time consistent with the specified standards and shall furnish a written report of each test.

Contractor shall furnish all sample materials and cooperate in the testing activities, including sampling. Contractor shall interrupt the Work when necessary to allow testing, including sampling, to be performed. Contractor shall have no claim for an increase in Contract Price or Contract Times due to such interruption. When testing activities,

including sampling, are performed in the field by Owner or the testing firm's laboratory personnel, Contractor shall furnish personnel and facilities to assist in the activities.

If testing shows workmanship and/or materials does not meet established requirements, the Contractor shall be responsible for all additional testing cost to ensure compliance.

1.03. Transmittal of Test Reports. Written reports of tests and engineering data furnished by Contractor for Owner's review of materials and equipment proposed to be used in the Work shall be submitted as specified for Shop Drawings.

End of Section

Section 01500

TEMPORARY FACILITIES

1. PRESENCE IN THE AREA. The Contractor understands and agrees that during the performance of the Contract, it shall maintain a presence within such proximity of the Work Site which will allow it to respond to an emergency at the Work Site within one hour of receiving notice of an emergency, including emergencies occurring during non-working hours. The Contractor shall provide a list of emergency phone numbers for such purposes. If the Contractor does not have such a presence, it may satisfy this requirement by sub-contracting with a sub-contractor that does have such a presence, provided that any such sub-contractor must be approved by the Owner, in its sole discretion, prior to the project pre-construction meeting.

2. WATER. Water in reasonable amounts required for and in connection with the Work to be performed will be furnished at existing fire hydrants by Owner without charge to Contractor. All water used in testing and disinfection of mains will be furnished by the Owner for the first test only. Contractor shall furnish necessary pipe, hose, nozzles, and tools and shall perform all necessary labor. Contractor shall make arrangements with Owner (who will fix the time, rate, and duration of each withdrawal from the distribution system) as to the amount of water required and the time when the water will be needed. Unnecessary waste of water will not be tolerated. Special hydrant wrenches shall be used for opening and closing fire hydrants. In no case shall pipe wrenches be used for this purpose.

3. POWER. Contractor shall provide all power for heating, lighting, operation of Contractor's plant or equipment, or for any other use by Contractor.

4. TELEPHONE SERVICE. Contractor shall make all necessary arrangements and pay all installation charges for telephone lines in its offices at the Site and shall provide all telephone instruments.

5. SANITARY FACILITIES. Contractor shall furnish temporary sanitary facilities at the Site, as provided herein, for the needs of all construction workers and others performing work or furnishing services on the Project.

Sanitary facilities shall be of reasonable capacity, properly maintained throughout the construction period, and obscured from public view to the greatest practical extent. If toilets of the chemically treated type are used, at least one toilet will be furnished for each 20 persons. Contractor shall enforce the use of such sanitary facilities by all personnel at the Site.

6. MAINTENANCE OF TRAFFIC. Contractor shall conduct his work to interfere as little as possible with public travel, whether vehicular or pedestrian. Whenever it is necessary to cross, obstruct, or close roads, driveways, and walks, whether public or private, Contractor shall provide and maintain suitable and safe bridges, detours, or other temporary expedients for the accommodation of public and private travel, and shall give reasonable notice to owners of private drives before interfering with them. Such maintenance of traffic will not be required when Contractor has obtained permission from the owner and tenant of

private property, or from the authority having jurisdiction over public property involved, to obstruct traffic at the designated point.

In making open cut street crossings, Contractor shall not block more than one-half of the street at a time. Whenever possible, Contractor shall widen the shoulder on the opposite side to facilitate traffic flow. Temporary surfacing shall be provided as necessary on shoulders.

The Contractor shall wherever necessary or as required by the Owner or the authority having jurisdiction provide, erect and maintain proper lights, signs, barricades, temporary guardrail, other traffic control devices, and furnish watchmen and flagmen as may be necessary to maintain safe traffic conditions in accordance with the Manual of Uniform Traffic Control Devices.

The Contractor shall be liable for and hold the Owner free and harmless from all damages occasioned in any way by its actions or neglect or those of its agents, employees, or workmen.

Work that requires the Contractor to shut down the road on weekends or at nights is considered an incidental to the project.

The Contractor at all times shall conduct the work in such manner as to cause as little interference as possible with private business or with private and public travel on the public highway. All damage (other than that resulting from normal wear and tear) to existing roads or pavements shall be repaired to withstand traffic in a safe condition.

Where the Contractor finds it necessary to remove excavated material to some other location, care should be taken not to overload trucks, which would in turn spill material out upon highways. Any such material spilled upon highways shall be immediately cleaned up from the location and properly disposed of per applicable regulation.

Where it is necessary and is agreeable with public and private property owners, excavated materials may be temporarily piled in the streets or roadways, however, one lane of traffic must be maintained at all times.

After excavated materials have been removed, all hard surface streets or roadways shall be thoroughly cleaned and left free of dirt, gravel and dust. Streets or roadways, which do not have hard surfaces, must be restored to their original condition at the expense of the Contractor. Streets and roadways shall be kept in a safe and passable condition at all times.

6.01. Temporary Bridges. Contractor shall construct substantial bridges at all points where it is necessary to maintain traffic across pipeline construction. Bridges in public streets, roads, and highways shall be acceptable to the authority having jurisdiction thereover. Bridges erected in private roads and driveways shall be adequate for the service to which they will be subjected. Bridges shall be provided with substantial guardrails and with suitably protected approaches. Footbridges shall be at least 4 feet wide, provided with handrails and uprights of dressed lumber. Bridges shall be maintained in place as long as the conditions of the Work require their use for safety of the public.

When necessary for the proper prosecution of the Work in the immediate vicinity of a bridge, the bridge may be relocated or temporarily removed for such period as Owner may permit.

6.02. Detours. Where required by the authority having jurisdiction thereover that traffic be maintained over any construction work in a public street, road, or highway, and the traffic cannot be maintained on the alignment of the original roadbed or pavement, Contractor shall, at its own expense, construct and maintain a detour around the construction work. Each detour shall include a bridge across the pipe trench and all necessary barricades, guardrails, approaches, lights, signals, signs, and other devices and precautions necessary for protection of the Work and safety of the public.

7. BARRICADES AND LIGHTS. All streets, roads, highways, and other public thoroughfares, which are closed to traffic, shall be protected by effective barricades on which shall be placed acceptable warning signs. Barricades shall be located at the nearest intersecting public highway or street on each side of the blocked section.

All open trenches and other excavations shall have suitable barricades, signs, and lights to provide adequate protection to the public. Obstructions, such as material piles and equipment, shall be provided with similar warning signs and lights.

All barricades and obstructions shall be illuminated with warning lights from sunset to sunrise. Material storage and conduct of the Work on or alongside public streets and highways shall cause the minimum obstruction and inconvenience to the traveling public.

All barricades, signs, lights, and other protective devices shall be installed and maintained in conformity with applicable statutory requirements and, where within railroad and highway rights-of-way, as required by the authority having jurisdiction thereover.

8. TRAFFIC CONTROL. In addition to the requirements of the maintenance of traffic and barricades and lights paragraphs in this section, traffic control shall be as set forth herein.

During periods of inclement weather, rush-hour traffic, or during periods of unusually heavy traffic, the Owner may require the Contractor to cease operations in order to adequately handle the traffic. The Owner reserves the right to require the suspension or delay of certain operations, or the expediting of other operations, at no additional cost to the Owner, to provide a proper sequence of operations which will promote the satisfactory movement of traffic. The Owner may require additional barricades, lights, or flagmen at any time or at any place necessary for proper protection of traffic, but approval by the Owner of the Contractor's method of operation shall not relieve the Contractor of his responsibility to protect traffic.

The use and duration of using heavy steel plates to convey traffic across open excavations shall be kept to a minimum. Steel plates shall be secured in an appropriate manner to prevent them from moving. The purpose of this requirement is to minimize the sound to the residents, institutions, commercial establishments, etc. The Owner reserves the right, at no additional cost to the Owner, to require the Contractor to complete certain operations and street re-paving so steel plates are not required.

Contractor shall take extra precautions to provide and maintain emergency access on all streets and roads and to all residential, commercial, and other properties for police and fire departments and emergency medical service throughout the construction operations.

Contractor shall maintain the use of existing walks for pedestrians at all times. Additional requirements are specified in the temporary bridge subparagraph in this section.

9. TRAFFIC CONTROL PLAN. To obtain a permit to work within public rights-of-way, Contractor may be required to prepare and submit to the appropriate agencies, a traffic control plan in conformance with the requirements of the authority having jurisdiction thereover.

10. FENCES. All existing fences affected by the Work shall be maintained by Contractor until completion of the Work. Fences which interfere with construction operations shall not be relocated or dismantled until written permission is obtained from the owner of the fence, and the period the fence may be left relocated or dismantled has been agreed upon. A copy of all written permissions shall be submitted to Owner. Where fences must be maintained across the construction easement, adequate gates shall be installed. Gates shall be kept closed and locked at all times when not in use.

On completion of the Work across any tract of land, Contractor shall restore all fences to their original or to a better condition and to their original location.

11. PROTECTION OF PUBLIC AND PRIVATE PROPERTY, DAMAGE TO EXISTING PROPERTY. Contractor shall protect, shore, brace, support, and maintain all underground pipes, conduits, drains, and other underground construction uncovered or otherwise affected by his construction operations. All pavement, surfacing, driveways, curbs, walks, buildings, utility poles, guy wires, fences, and other surface structures affected by construction operations, together with all sod, shrubs, trees in yards, parkways, and medians shall be restored to their original or better condition, whether within or outside the easement. Unless otherwise specified, all replacements shall be made with new materials.

Sodded and landscaped areas on improved property (yards) shall be disturbed only to the extent required to permit construction. Such areas shall not be used as storage sites for construction supplies and, insofar as practicable, shall be kept free from stockpiles or excavated materials.

No trees shall be removed outside the permanent easement, except where authorized by Owner. Hand excavation shall be employed as necessary to prevent injury to trees. Trees left standing shall be adequately protected against damage from construction operations.

Contractor shall be responsible for all damage to streets, curbs/gutters, roads, sidewalks, shoulders, ditches, embankments, culverts, bridges, traffic loops and other public or private property, regardless of location or character, which may be caused by transporting equipment, materials, or workers to or from the Work or any part or site thereof, whether by him or his Subcontractors. Contractor shall make satisfactory and acceptable arrangements with the owner of, or the agency or authority having jurisdiction over, the damaged property concerning its repair or replacement or payment of costs incurred in connection with the damage and shall furnish a written verification of all agreements.

Should the Contractor's operations damage any existing underground or aboveground utility, installation, structure, or other construction, Contractor shall immediately notify the authority owning or having jurisdiction over and control of the utility, installation, structure, or other construction, and make a report of such damage. A copy of the report shall be submitted to the Owner. The damaged item shall be repaired immediately by and at the expense of the Contractor unless otherwise specified or acceptable to the authority or owner having jurisdiction over, or to the Owner.

The utility, installation, structure, or other structures damaged by Contractor's operations shall be repaired, replaced, or otherwise restored in accordance with the local ordinances, standards, and requirements of the applicable authority or owner having jurisdiction thereover and shall be subject to acceptance by the Owner.
Special precaution shall be taken by the Contractor to avoid damage to existing overhead and underground utilities owned and operated by the Owner or other public or private utility companies.

With particular respect to existing underground utilities, all available information concerning their location has been shown on the drawings. While it is believed that the locations shown are reasonably correct, the Owner cannot guarantee the accuracy or adequacy of this information.

Before proceeding with the work, the Contractor shall confer with all public or private companies, agencies, property owners, or departments that own and operate utilities in the vicinity of the construction work. The purpose of this conference or conferences shall be to notify said companies, agencies or departments of the proposed construction schedule, verify the location of and possible interference with the existing utilities, fire protection systems, lawn irrigation systems, etc., that are shown on the plans, arrange for necessary suspensions of service, and make arrangements to locate and avoid interference with all other utilities (including house connections) that are not shown on the plans. The Owner has no objection to the Contractor arranging for said utility companies, agencies, or departments to locate and uncover their own utilities, however, insofar as the Owner is concerned, the Contractor shall bear entire responsibility for locating and avoiding or repairing damage to said existing utilities.

Where existing utilities or other underground structures are encountered, they shall not be displaced or molested unless necessary, and in such case they shall be replaced in as good or better condition than found as quickly as possible. All such utilities that are so damaged or molested shall be replaced at the Contractor's expense unless in the opinion of the Owner such damage was caused through no fault or action of the Contractor.

It is expected that the Contractor will be diligent in its efforts and use every possible means to locate existing utilities. Any claims for unavoidable damage based on improper or unknown locations will be thoroughly examined in the light of the Contractor's efforts to locate the said utilities or obstructions prior to beginning.

When construction is completed, the private property owner's facilities and grounds shall be restored to as good or better condition than found and as quickly as possible at the Contractor's expense.

All water mains and water service connections damaged by Contract's operations will be repaired by the Owner at the expense of the Contractor unless other arrangements are made. Customer irrigation piping damaged by Contractor's operations shall be repaired by and at the cost of the Contractor.

All fire hydrants and water control valves shall be kept free from obstruction and available for use at all times.

12. TREE AND PLANT PROTECTION. Tree and plant protection is of prime importance. Except where otherwise authorized, indicated, or specified, no trees or plants shall be removed. Activities near trees that are to be protected shall be kept to a minimum. Tree protection shall also include trimming, when necessary, to prevent damage by construction equipment.

Trees and plants to be removed shall be removed in such a manner as to avoid injury to surrounding trees and plants. Contractor shall be responsible for disposal of all trees and plants removed or damaged.

13. HAUL ROUTES. Contractor shall obtain and pay for all necessary permits from the applicable authority having jurisdiction thereover to allow use of public streets to transport equipment and material to and from the Site. At such time the Contractor shall request the agency having jurisdiction to establish the haul routes. A copy of the permit and designated haul routes shall be provided to the Owner prior to commencement of Work in that area.

14. PARKING. Contractor shall provide and maintain suitable parking areas for the use of all construction workers and others performing work or furnishing services in connection with the Project, as required to avoid any need for parking personal vehicles where they may interfere with public traffic, Owner's operations, or construction activities.

Contractor shall clean up all parking areas used and return them to their original state.

The location of the Contractor's parking areas shall be acceptable to Owner, and the owner and tenant of private property or to the authority having jurisdiction over public property upon which the parking area will be located.

15. RESIDENTIAL PARKING. Contractor shall provide appropriate areas for residents to park their vehicles during the construction operations adjacent to their properties, if required. This shall include making the appropriate areas available to the residents by not storing construction materials or equipment in these areas and providing signs and other notification methods acceptable to the Owner for instructing the residents on the location of the temporary parking and its intended use.

Additional requirements for notifying property owners and tenants of available temporary parking are covered in the project requirements section.

16. ACCESS ROADS. Contractor shall establish and maintain temporary access roads to various parts of the Site as required to complete the Project. Such roads shall be available for the use of all others performing work or furnishing services in connection with the Project.

17. NOISE CONTROL. Contractor shall take reasonable measures to avoid unnecessary noise. Such measures shall be appropriate for the normal ambient sound levels in the area during working hours. All construction machinery and vehicles shall be equipped with practical sound-muffling devices, and operated in a manner to cause the least noise consistent with efficient performance of the Work.

During construction activities on or adjacent to occupied buildings, and when appropriate, Contractor shall erect screens or barriers effective in reducing noise in the building and shall conduct his operations to avoid unnecessary noise which might interfere with the activities of building occupants.

18. DUST CONTROL. Contractor shall take reasonable measures to prevent unnecessary dust. Earth surfaces subject to dusting shall be kept moist with water or by application of a chemical dust suppressant. When practicable, dusty materials in piles or in transit shall be covered to prevent blowing dust.

Buildings or operating facilities, which may be affected adversely by dust, shall be adequately protected from dust. Existing or new machinery, motors, instrument panels, or similar equipment shall be protected by suitable dust screens. Proper ventilation shall be included with dust screens.

19. STORM WATER EROSION AND PREVENTION. The following is to be used as a guideline in conjunction with the plans for temporary drainage provisions, erosion control and pollution control as required by a Sanitation District #1 Permit and Kentucky Pollution Discharge Elimination System (KPDES). Reference "Kentucky Best Management Practices for Controlling Erosion, Sediment, and Pollutant Runoff from Construction Sites" and the "Northern Kentucky Sanitation District No. 1 Storm Water Permitting Guide".

19.01. GRADING PERMIT, NOTICE of INTENT and NOTICE of TERMINATION. The owner will be responsible for acquiring a Grading Permit from Sanitation District #1 and filing a Notice of Intent/Notice of Termination with the KPDES. A Grading Permit is necessary when the square footage of the pervious and impervious areas are equal to or greater than one acre.

A. Projects less than one acre:
   - Best Management Practices that are shown on the plans and specifications are a minimum. Contractors are responsible for providing the minimum, and, if necessary will provide additional BMP's to satisfy the situation and the regulating authority.

B. Projects greater than one acre:
   - Best Management Practices that are shown on the plans and specifications are a minimum. Contractors are responsible for providing the minimum, and, if necessary will provide additional BMP's to satisfy the situation and the regulating authority.
   - Sanitation District #1 must be contacted at least 72 hours prior to any construction activity. (Andy Amen @ 859-578-6880)

- Site stabilization shall begin within 14 days where construction activity has permanently ceased.
- Site stabilization shall begin within 21 days where construction activity has temporarily ceased.
- BMP'S shall be checked a minimum of every 7 days and within 24 hours after a 0.5" rainfall. Contractor shall keep a maintenance log book that records the date, weather event, reason for inspection and signature. The maintenance log book shall be turned over to the Owner at the end of the project.

19.02. TEMPORARY DRAINAGE PROVISIONS. Contractor shall provide for the drainage of storm water and such water as may be applied or discharged on the Site in performance of the Work. Drainage facilities shall be adequate to prevent damage to the Work, the Site, and adjacent property.

Existing drainage channels and conduits shall be cleaned, enlarged, or supplemented as necessary to carry all increased runoff attributable to Contractor's operations. Dikes shall be constructed as necessary to divert increased runoff from entering adjacent property (except in natural channels), to protect Owner's facilities and the Work, and to direct water to drainage channels or conduits. Ponding shall be provided as necessary to prevent downstream flooding.

19.03. EROSION CONTROL. Contractor shall prevent erosion of soil on the Site and adjacent property resulting from it's construction activities. Effective measures shall be initiated prior to the commencement of clearing, grading, excavation, or other operation that will disturb the natural protection.

Work shall be scheduled to expose areas subject to erosion for the shortest possible time, and natural vegetation shall be preserved to the greatest extent practicable. Temporary storage and construction buildings shall be located, and construction traffic routed, to minimize erosion. Temporary fast-growing vegetation or other suitable ground cover shall be provided as necessary to control runoff.

20. POLLUTION CONTROL. Contractor shall prevent the pollution of drains and watercourses by sanitary wastes, sediment, debris, and other substances resulting from construction activities. No sanitary wastes will be permitted to enter any drain or watercourse other than sanitary sewers. No sediment, debris, or other substance will be permitted to enter sanitary sewers, and reasonable measures shall be taken to prevent such materials from entering any drain or watercourse.

21. CUSTOMER NOTIFICATION. The Contractor after approval by the Owner's representative shall notify all affected Owner customers a minimum of 48 hours prior to interrupting water service. Notification shall be made by the Contractor using the Northern Kentucky Water District "Interruption of Service Notice". All Owner customers shall be notified prior to having their water turned-off to have ample time to draw water for use until service is restored. Under no circumstance shall a customer of the Owner be without water service overnight. If water service or existing water system cannot be interrupt during normal daytime hours due to

water needs or high demands, the contractor may be required to conduct the work at night or on the weekend. This work is considered an incidental to the project.

It is the Contractor's responsibility to post "No Parking" signs twenty-four (24) hours in advance of starting work in designated parking zones. Said signs shall be removed upon completion of work. Signs shall not be left posted over weekends or holidays.

22. UNSAFE CONDITIONS. The Owner reserves the right to take whatever action necessary to correct an unsafe condition created by the Contractor at the Contractor's expense.

23. SECURITY. CONTRACTOR shall be responsible for protection of the Site, and all the Work, materials, equipment, and existing facilities thereon, against vandals and other unauthorized persons.

No Claim shall be made against OWNER by reason of any act of an employee or trespasser, and CONTRACTOR shall make good all damage to OWNER's property resulting from CONTRACTOR's failure to provide security measures as specified. Security measures shall be at least equal to those usually provided by OWNER to protect OWNER's existing facilities during normal operation, but shall also include such additional security fencing, barricades, lighting, and other measures as required to protect the Site.

24. STREAM CROSSINGS. The following is reprint of the requirements and conditions for blue line stream crossings which shall be followed:

SECTION 401 WATER QUALITY CERTIFICATION
CONDITIONS FOR NATIONWIDE PERMIT NO. 12
WITHIN THE COMMONWEALTH OF KENTUCKY

General Certification -Nationwide Permit #12 - Utility Line Backfill and Bedding

This General Certification is issued March 19, 2007, in conformity with the requirements of Section 401 of the Clean Water Act of 1977, as amended (33USC 1314), as well as Kentucky Statute KRS 224.16-070.

The Commonwealth of Kentucky hereby certifies under Section 401 of the Clean Water Act (CWA) that it has reasonable assurances that applicable water quality standards under Kentucky Administrative Regulations Title 401, Chapter 5, established pursuant to Sections 301, 302, 304, 306 and 307 of the CWA, will not be violated for the activity covered under 33 CFR Part 330 Appendix A(B) (12), namely utility line backfill and bedding provided that the following conditions are met:

1. This general Water Quality Certification is limited to the crossing of streams by utility lines. The length of a single utility crossing shall not exceed twice the width of the stream. This document does not authorize the installation of utility lines in a linear manner within the stream channel or below the top of the stream bank.

2. The provisions of 401 KAR 5:005 Section 8 are hereby incorporated into this General Water Quality Certification. Namely, "Sewer lines shall be located at least 50 feet away from a stream which appears as a blue line on a USGS 7 ½ minute topographic map except where the sewer alignment crosses the stream. The distance shall be measured from the top of the stream bank. The cabinet may allow construction within the 50' buffer if adequate methods are used to prevent soil from entering the stream.

   Gravity sewer lines and force mains that cross streams shall be constructed by methods that maintain normal stream flow and allow for a dry excavation. Water pumped from the excavation shall be contained and allowed to settle prior to re-entering the stream. Excavation equipment and vehicles shall operate outside of the flowing portion of the stream. Spoil material from the sewer line excavation shall not be allowed to enter the flowing portion of the stream." The provisions of this condition shall apply to all types of utility line stream crossings.

3. Removal of riparian vegetation in the utility line right-of-way shall be limited to that necessary for equipment access. Effective erosion and sedimentation control measures must be employed at all times during the project to prevent degradation of waters of the Commonwealth. Site regarding and reseeding will be accomplished within 14 days after disturbance.

4. Utility line construction projects through jurisdictional wetlands shall not result in conversion of the area to non-wetland status.

5. This General Certification shall not apply to those waters of the Commonwealth identified as Outstanding Resource Waters, Exceptional Waters or Cold Water Aquatic Habitat Waters, as designated by the Division of Water. An individual Water Quality Certification will be required for projects in these waters.

Non-compliance with the conditions of this general certification or violation of Kentucky state water quality standards may result in civil penalties.

This General Certification is issued March 19, 2007, (expires 5 years from this date) in conformity with the requirements of Section 401 of the Clean Water Act of 1977, as amended (33USC 1314), as well as Kentucky Statute KRS 224.16-070.

For additional information contact: Kentucky Division of Water, Water Quality Branch, 14 Reilly Road, Frankfort, Ky 40601 Phone (502)564-3410 Fax (502)564-4245

NATIONWIDE PERMIT CONDITIONS

GENERAL CONDITIONS: The Following general conditions must be followed in order for any authorization by a NWP to be valid:

1. **Navigation**. No activity may cause more than a minimal adverse effect on navigation.

2. Proper maintenance. Any structure of fill authorized shall be properly maintained, including maintenance to ensure public safety.

3. Erosion and siltation controls. Appropriate erosion and siltation controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date.

4. Aquatic life movements. No activity may substantially disrupt the movement of those species of aquatic life indigenous to the water body, including those species which normally migrate through the area, unless the activity s primary purpose is to impound water.

5. Equipment. Heavy equipment working in wetlands must be placed on mats, or other measures must be taken to minimize soil disturbance.

6. Regional and case-by-case conditions. The activity must comply with any regional conditions which may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state or tribe in its section 401 water quality certification.

7. Wild and Scenic rivers. No activity may occur in a component of the National Wild and Scenic River System; or in a river officially designed by Congress as a "study river" for possible inclusion in the system, while the river is in an official study status; unless the appropriate Federal agency, with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely effect the Wild and Scenic River designation, or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency in the area (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service.)

8. Tribal rights. No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.

9. Water quality certification. In certain states, an individual Section 401 water quality certification must be obtained or waived (see CFR 330.4(c)).

10. Endangered Species.

a. No activity is authorized under any NWP which is likely to jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act, or which is likely to destroy or adversely modify the critical habitat of such species. Non-federal permittees shall notify the District Engineer if any listed species or critical habitat might be affected or is in the vicinity of the project, and shall not begin work on the activity until notified by the District Engineer that the requirements of the Endangered Species Act have been satisfied and that the activity is authorized.

b. Authorization of an activity by a nationwide permit does not authorize the take of a threatened or endangered species as defined under the Federal Endangered Species

Act. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with incidental take provisions, etc.) from the U.S. Fish and Wildlife Service or the National Marine Fisheries Service, both lethal and non-lethal takes of protected species are in violation of the Endangered Species Act. Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the U.S. Fish and Wildlife Service and National Marine Fisheries Service or their world web pages at http://www.fws.gov/~r9endspp/html and http://kingfish.spp.mnfs.gov/tmccintyr/prot_res.html#ES and Recovery, respectively.

11. Historic properties. No activity which may affect historic properties listed, or eligible for listing, in the National Register of Historic Places in authorized, until the DE has complied with the provisions of 33 CFR Part 325, Appendix C. The prospective permittee must notify the District Engineer if the authorized activity may affect historic properties listed, determined to be eligible, or which the prospective permittee has reason to believe may be eligible for listing on the National Register of Historic Places, and shall not begin the activity until notified by the District Engineer that the requirements of the National Historic Preservation Act have been satisfied and that the activity is authorized. Information on the location and existence of historic resources can be obtained from the State Historic Preservation Office and the National Register of Historic Places (see 33 CFR 330.4(g)).

12. Compliance certification. Every permittee who has received a Nationwide permit verification from the Corps will submit a signed certification regarding the completed work and any required mitigation. The certification will be forwarded by the Corps with the authorization letter and will include: a.) A statement that the authorized work was done in accordance with the Corps authorization, including any general or specific conditions; b.) A statement that any required mitigation was completed in accordance with the permit conditions; c.) The signature of the permittee certifying the completion of the work and mitigation.

13. Multiple use of Nationwide permits. In any case where any NWP number 12 through 40 is combined with any other NWP number 12 through 40, as part of a single and complete project, the permittee must notify the District Engineer in accordance with paragraphs a, b, and c on the Notification General Condition number 13. Any NWP number 1 through 11 may be combined with any other NWP without notification to the Corps, unless notification is otherwise required by the terms of the NWPs. As provided at 33 CFR 330.6 © two or more different NWPs can be combined to authorize a single and complete project. However, the same NWP cannot be used more than once for a single and complete project.

SECTION 404 ONLY CONDITIONS:

In addition to the General Conditions, the following conditions apply only to activities that involve the discharge of dredged or fill material into waters of the U.S., and must be followed in order for authorization by the NWPs to be valid:

1. Water supply intakes. No discharge of dredged or fill material may occur in the proximity of a public water supply intake except where the discharge is for repair of the public water supply intake structures or adjacent bank stabilization.

2. Shellfish production. No discharge or dredged or fill material may occur in areas of concentrated shellfish production shellfish production, unless the discharge is directly related to a shellfish harvesting activity authorized by NWP 4.

3. Suitable material. No discharge of dredged or fill material may consist of unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.,) and material discharged must be free from toxic pollutants in toxic amounts (see Section 307 of the Clean Water Act).

4. Mitigation. Discharges of dredged or fill material into waters of the United States must be minimized or avoided to the maximum extent practicable at the project site (i.e., on-site), unless the District Engineer approves a compensation plan that the District Engineer determines is more beneficial to the environment than on-site minimization or avoidance measures.

5. Spawning areas. Discharge in spawning areas during spawning seasons must be avoided to the maximum extent practicable.

6. Obstruction of high flows. To the maximum extent practicable, discharges must not permanently restrict or impede the passage of normal or expected high flows or cause the relocation of the water (unless the primary purpose of the fill is to Impound waters).

7. Adverse effects from impoundments. If the discharge creates an impoundment of water, adverse effects on the aquatic system caused by the accelerated passage of water and /or the restriction of its flow shall be minimized to the maximum extent practicable.

8. Waterfowl breeding areas. Discharges into breeding areas for migratory waterfowl must be avoided to the maximum extent practicable.

9. Removal of temporary fills. Any temporary fills must be removed in their entirety and the affected areas returned to their preexisting elevation.

TERMS FOR NATIONWIDE PERMIT NO. 12

Utility Line Discharges. Discharges of dredged or fill material associated with excavation, backfill or bedding for utility lines, including outfall and intake structures, provided there is no change in pre-construction contours. A "utility line" is defined as any pipe or pipeline for the transportation of any gaseous, liquid, liquefiable, or slurry substance, for any purpose, and any cable, line, or wire for the transmission for any purpose of electrical energy, telephone and telegraph messages, and rapid and television communication. The term "utility line" does not include activities which drain water of the United States, such as drainage tile, however, it does apply to pipes conveying drainage from another area. This NWP authorizes mechanized landclearing necessary for the installation of utility lines, including overhead utility lines, provided the cleared area is kept to the minimum necessary and pre-construction contours are maintained. However, access roads, temporary or permanent, or foundations associated with overhead utility lines are not authorized by this

NWP. Material resulting from trench excavation may be temporarily sidecast (up to three months) into waters of the United States, provided that the material is not placed in such a manner that it is dispersed by currents or other forces. The DE may extend the period of temporary side-casting not to exceed a total of 180 days, where appropriate. The area of waters of the United States that is disturbed must be limited to the minimum necessary to construct the utility line. In wetlands, the top 6" to 12" of the trench should generally be backfilled with topsoil from the trench. Excess material must be removed to upland areas immediately upon completion of construction. Any exposed slopes and stream banks must be stabilized immediately upon completion of the utility line. (See 33 CFR Part 322).

Notification: The permittee must notify the district engineer in accordance with the "Notification" general condition, if any of the following criteria are met:

a. Mechanized land clearing in a forested wetland;
b. A Section 10 permit is required for the utility line;
c. The utility line in waters of the United States exceeds 500 feet; or,
d. The utility line is placed within a jurisdictional area (i.e., a water of the United States), and it runs parallel to a streambed that is within that jurisdictional area. (Sections 10 and 404)

End of Section

Section 01600

TECHNICAL PROVISIONS

1. WATER LINES

A. General

The Contractor shall furnish all labor, materials, and equipment to install the water lines and appurtenances as shown on the plans and specifications.

The Contractor shall be responsible for videotaping the entire project prior to the start of construction. The video shall show driveway crossings, drainage ditches, problem areas, lay of the land, etc. One copy shall be forwarded to the District. Pictures of specific areas are recommended.

All private residents shall be notified no less than 48 hours and all businesses, industrial and commercial customers shall be notified no less that 1 week prior to the interruption of service. All shutdowns shall be coordinated with the effected residents, with priority given to any special needs customers such as hospitals, schools, and customers with special medical needs

The water lines shall be Pressure Class 250 Ductile Iron Pipe. Pipe as specified on the Bid Sheet.

The District will secure right-of-way permits for this project.

Unless otherwise specified all pipe fittings, valves, fire hydrants and accessories shall be rated for a minimum of 250 psi working pressure and material as specified herein or shown on the proposal. The pipe and accessories shall be new and unused. The interior of the pipe shall be thoroughly cleaned of foreign matter before being lowered into the trench and shall be kept clean during laying operations by plugging. The full length of each section of pipe shall rest upon the pipe bed with recessed excavation to accommodate bells and joints. Any pipe that has the grade or joint disturbed after laying, shall be taken up and re-laid.

Trench backfill shall be rough graded with ditch lines established and maintained within 500 feet for rural areas and 250 feet for urban areas for actual installation of main unless otherwise directed by the District. Individual roadways shall be completed (final grade established, preparation of the seed bed, and all concrete and asphalt restoration completed) prior to the start of additional roadways unless otherwise approved by the District. Temporary roadway and driveway access shall be maintained during construction.

Pipe shall not be laid in water or when trench or weather conditions are unsuitable for the work, except by permission from the District. When work is not in progress, open ends of pipe and fittings shall be plugged with a watertight plug. Any section of pipe found to be

defective before and after laying shall be replaced with sound pipe without additional expense to the District. Fittings at bends in the pipe shall be firmly wedged with concrete block as indicated on the plans against the vertical face of the trench to prevent the fittings from being blown off the lines when under pressure.

SEWER MAIN SEPARATION. A 10' minimum lateral separation between water mains and sewers (defined as any sanitary/combined sewer, septic tank or subsoil treatment system) and sewer manholes, measured from the outside diameter to outside diameter, must be maintained. When a 10' separation is not practical then a variance may be obtained from DOW to maintain an 18" vertical and 18" lateral separation. No variances will be permitted for force mains.

SEWER MAIN CROSSING. Waterlines crossing under or over sewers lines (defined as any sanitary/combined sewer, septic tank or subsoil treatment system) must maintain a minimum vertical clearance of 18" and one full length of pipe shall be located so both joints are as far from the sewer as possible. Special Structural support for the water and sewer pipes may be required.

ORGANIC CONTAMINATION. Mains installed within 200 feet of petroleum tanks and other areas of organic contamination must be ductile iron pipe.

B. **Hauling and Storage**

The Contractor shall notify the District when pipe will be received on the job so that proper arrangements may be made for inspecting the unloading and stringing, as well as inspecting and examining the pipe materials.

The Contractor shall be required to deliver all equipment and other materials and place same as and where required for installation. Care must be exercised in the handling of all materials and equipment. The Contractor will be held responsible for all breakage or damage to same caused by his workman, agents, or appliances for handling and moving. Pipes and other castings shall in no case be thrown or dropped from cars, trucks, or wagons to the ground, but same shall be lowered gently and not allowed to roll against or strike other castings and unyielding objects violently. Pipe and other castings may be unloaded, yarded, and distributed at places that will not interfere with other building operations as the Contractor may elect.

Valves, castings, and other materials shall be yarded or housed in same convenient location by the Contractor. The cost of all hauling, handling, and storage shall be included in the bid prices for this project. The District takes no risk or responsibility for fire, flood, theft, or damage until after final acceptance of work.

2. **WATER MAIN PIPE**

A. **DUCTILE IRON PIPE**. Ductile iron pipe shall meet the requirements of ANSI A21.51 (AWWA C151)

1. Material. The chemical constituents shall meet the physical property

recommendations of ASTM A536 to ensure that the iron is suitable for satisfactory drilling and cutting.

2. Minimum Thickness. Unless otherwise shown on the plans, the minimum thickness of the barrel of the pipe shall be Pressure Class 250. All pipe shall be clearly marked as to class by the manufacturer.

3. Coating and Lining. The pipe shall be coated outside with a bituminous coating in accordance with ANSI A 21.51 (AWWA C151) and lined inside with cement mortar and seal coated in accordance with ANSI A21.4 (AWWA- C104).

4. Fittings & Glands. Fittings and glands shall be ductile iron as specified in Section 3A, "Ductile Iron Fittings".

5. Polyethylene Encasement. Ductile Iron Pipe shall be encased with Polyethylene film conforming to ANSI A21.5 (AWWA C105)

6. Tracing Wire - All pipe shall be installed with a 12 gauge solid copper (P.V.C coated) tracing wire taped to the top of the pipe every 5'. Maximum tracing wire length shall be 500' without terminating in a curb stop box. Water main installations that stop short of the permanent fire hydrant tee, the tracing wire shall be terminated in a curb stop box. Splices in the tracing wire shall be kept to minimum and approved by the District. If splices are required, they shall be made with copper split bolt (Ilsco #IK-8 or approved equal) and taped with electrical tape. Should the new pipe be fitted to an existing pipe without a tracing wire, the tracing wire shall be terminated in a curb stop box at the point where the transition is made. Curb stop boxes shall not be located in pavement.

7. Cathodic Protection. Ductile Iron Pipe shall be installed with cathodic protection as described in Section 2660 of these Specifications.

B. **PIPE JOINTS**

1. Push on and Mechanical. - Push-on and mechanical joints including accessories shall conform to ANSI A21.11 (AWWA-C111). Bolts shall be high strength COR-10 tee head with hex nuts. The maximum deflection at push-on joints and/or mechanical joints shall be 5 degrees or as recommended by the Manufacturer.

2. Flanged. - Flanged joints shall meet the requirements of ANSI A21.15 (AWWA C115) or ANSI B16.1

   a. Gaskets. All flanged joints shall be furnished with 1/16 inch thick full face red rubber.

   b. Bolts. Bolts shall have American Standard heavy unfinished hexagonal head and nut dimensions all a specified in ANSI B18.2. For bolts of 1-3/4 inches in diameter and larger, bolt studs with a nut on each end are recommended. Material for bolts and nuts shall conform to ASTM A307, Grade B.

3. Restrained. - If restrained joint system is required on the plans, all pipes, bends, tees, etc. shall be restrained push-on joint pipe and fittings utilizing ductile iron components. Restrained joint pipe shall be ductile iron manufactured in accordance with the requirements of ANSI/AWWA C151/A21.51. Push-on joints for pipe shall be in accordance with ANSI/AWWA C111/A21.11 "Rubber-Gasket Joints for Ductile-Iron Pipe and Fittings." Pipe thickness shall be designed in accordance with ANSI/AWWA C150/A21.50 "Thickness Design of Ductile-Iron Pressure Pipe," and shall be based on laying conditions and internal pressures as stated in the project plans and specifications. All restrained joint pipe and fittings shall be boltless, flexible and capable of deflection after installation. Restrained joint pipe and fittings shall be U.S. Pipe's TR FLEX restrained joint system, American's Flex-Ring or approved equal. Restraint of field cut pipe shall be provided with U.S. Pipe's TR FLEX GRIPPER® Ring, TR FLEX Pipe field weldments or approved equal. Method of restraining and laying schedule shall be approved by the District prior to the start of the project. Manufacturer installation instructions shall be followed. Restrained joints shall be capable of withstanding a maximum joint pressure of 250 psi. unless otherwise noted. **Mechanical joints with retainer gland and Field Lok® gaskets are not acceptable unless otherwise specified (note: exception for valves).**

   Exception to Restraint Specifications: Valves shall be restrained using mechanical joint restraint devices consisting of multiple gripping wedges incorporated into a follower gland compatible with all mechanical joints or MJ Field Lok conforming to the requirements of ANSI/AWWA C111/A21.11. Gland body, wedges and wedge actuating components shall be cast from 65-45-12 ductile iron and shall have a working pressure of 250 psi. Megalug Series 1100, MJ Field Lok® or approved equal.

   a. Bell and Spigot Bell and spigot joints shall conform to current AWWA Standards.

4. Bonded Joints – Ductile Iron Joints and pipe fittings joints shall be electrically bonded to provide electrical continuity except where "insulated" flange joints are required or ordered. Bonding shall be as described in Section 2660 of these Specifications.

C. **FITTINGS**

1. DUCTILE IRON FITTINGS. Ductile Iron Compact Fittings and accessories shall conform to AWWA C153 and Full Body Fittings - and accessories to AWWA C110. Bolts and nuts shall be high strength, corrosion resistant alloy, such as "Cor-Ten" or approved equal.

   a. Working Pressures. All fittings and accessories shall be Ductile Iron, rated for a minimum of 250 psi working pressure or as specified herein. The fittings and accessories shall be new and unused. (NOTE: Certain areas of the District's service area require materials used, to be of a higher working pressure than 250 psi.)

   b. Coating and Lining. The fittings shall be coated outside with a bituminous coating in accordance with ANSI A21.10 (AWWA C110) and lined inside with cement

mortar and seal coated in accordance with ANSI A21.4 (AWWA C104).

c. Fittings and Glands. All pipe fittings shall be mechanical joint fittings unless specified elsewhere. Mechanical joints shall conform to AWWA C111.

d. Polyethylene Encasement. Ductile Iron Fittings shall be encased with polyethylene film conforming to ANSI A21.5 (AWWA C105)

2. JOINTS

a. Mechanical. Mechanical joints including accessories shall conform to ANSI A21.11 (AWWA C111). Glands shall be ductile iron. Bolts shall be high strength COR-10 tee head with hex nuts.

D. **POLYETHYLENE WRAP**

All ductile iron pipe, fittings, valves, and fire hydrant leads shall be polyethylene wrapped, installed according to the current edition of AWWA C105.

1. Material. Polyethylene wrap shall be 8-mil thickness low-density film or 4-mil thickness high-density cross-laminated polyethylene tube per AWWA C105.

2. Installation. The contractor shall cut the roll in tubes 2 feet longer than a standard length of pipe. Each tube shall be slipped over the length of pipe, centering to allow a one foot overlap on each adjacent pipe section. The polyethylene encasement shall prevent contact between the pipe and bedding material. Gather and lap polyethylene encasement to provide a snug fit. Secure lap at quarter points with polyethylene tape. Secure each end of polyethylene encasement with a complete wrap of polyethylene tape. Repair all damaged polyethylene encasement using polyethylene tape or replace the damaged section entirely. Pick and move polyethylene-encased pipe with nylon slings; wire rope or chains are not permitted.

Pipe shall not be wrapped and stored on site for any period of time, but wrapped and immediately placed in the trench, fittings shall be wrapped prior to installing blocking or pads. (see Standard Drawing #104) Polyvinyl chloride pipe requires no wrap. Odd shaped appurtenances such as valves, tees, fittings, and other ferrous metal pipeline appurtenances shall be wrapped by using a flat sheet of polyethylene. Wrapping shall be done by placing the sheet under the appliances and bringing the edges together, folding twice, and taping down.

4. **FIRE HYDRANTS**

A. DESCRIPTION. The Contractor shall provide all labor, materials, tools, and equipment required to furnish and install in good workmanlike manner all fire hydrants complete and ready for service where shown on the plans or where directed by the District and as specified herein.

B. FIRE HYDRANTS. Fire hydrants shall conform to AWWA C502. Hydrants shall conform to the standards of the Northern Kentucky Water Service District and as shown on the plans. All fire hydrants shall have auxiliary valves for isolating water flow to the hydrant. All fire hydrants and auxiliary valves shall be positively locked to the water main by restrained joints, hydrant adapters, or other approved method.

Hydrants shall be designed to 200 psi working pressure and shall be shop tested to 300 psi hydrostatic pressure with the main valve both open and closed. The barrel shall have a breakable safety section and/or base bolts just above the ground line. Hydrants shall have a main valve opening of 5 1/4 inches, a 6 inch mechanical joint inlet to be suitable for setting in a trench 3' 6" deep minimum, and shall be the traffic style hydrant so that the main valve remains closed when the barrel is broken off. Hydrants shall have a dry top and shall be self draining, when the main valve is closed. Self draining hydrants shall drain to dry wells provided exclusively for that purpose. Hydrant drains shall not be connected to storm or sanitary sewers. Hydrants located generally in the Covington System and other areas determined by the District (flood zones) shall have all drain holes plugged prior to installation. Hydrants shall be rotatable in a minimum of eight (8) position in 360 degrees. All hydrants shall have two (2)- two and one half (2 1/2) inch hose nozzles and one (1) steamer or pumper connection threaded to conform to Northern Kentucky Water Service District Standards: steamer nozzle shall be National Standard Thread and 2 1/2" outlets shall be Northern Kentucky Water Service District Standard Thread (Old Cincinnati Thread). The operating nut and the nuts of the nozzle caps shall be square in shape, measuring one (1) inch from side to side. Hydrant body shall be painted yellow for areas designed for 150 psi working pressure and red for areas in excess of 150 psi. Hydrants used in areas in excess of 150 psi working pressure shall be designed to operate at the higher pressures and shall have independent operating valves on each 2 1/2" outlet.

All hydrants shall be right hand open, clockwise, except in certain areas of Campbell Co. as specified in Standard Drawings and shall have a direction arrow of operation cast into the dome of the hydrant. Installation per Standard Drawing #109.

C. INSTALLATION. The installation of fire hydrants shall be in conformance with "Mains Installation" section, paragraph "Setting Hydrants".

D. Polyethylene Encasement Fire hydrant tee, anchoring pipe and part of the fire hydrant shoe shall be encased with Polyethylene film conforming to ANSI A21.5 (AWWA C105). (See Standard Drawing #109)

5. VALVES

A. DESCRIPTION. The Contractor shall provide all labor, materials, tools, and equipment required to furnish and install in good workmanlike manner all valves and accessories complete and ready for service where shown on the plans or where directed by the District and as specified herein. .

B. GATE VALVES. Gate valves shall conform to AWWA C509 and shall be ductile body, resilient wedge, non-rising stem with rubber "O" ring packing seals. All external dome and

packing bolts shall be stainless steel. The valves shall open by turning counter-clockwise. All valves shall have openings through the body of the same circular area as that of the pipe to which they are attached. Valves shall have mechanical joint ends unless otherwise shown on the plans or directed by the District. For valves 20-inch and larger the Ductile Iron Resilient Wedge Gate Valve shall have Bevel Gearing. All valves shall be designed for a working pressure of 250 pounds per square inch (PSI) unless otherwise noted on the plans or in the "Supplemental Specifications". An extension stem shall be furnished if required, to bring the operating nut within 3-1/2 feet of finished grade. Extension stems shall be securely fastened to the valve stem. The Contractor shall make all valves tight under their working pressures after they have been placed and before the main is placed in operation.

C. TAPPING SLEEVES AND VALVES. Tapping sleeves and valves shall be designed for a working pressure of 250 psi. The tapping sleeve together with the tapping valve shall be tested at 250 psi for visible leakage and pressure drop before the main is tapped. Tapping sleeve and valve used in high pressure areas shall be tested at 350 psi.

1. Tapping Sleeves Tapping sleeves shall be two piece with mechanical joint type ends, and be so designed as to assure uniform gasket pressure and permit centering of the sleeve on the pipe.

2. Tapping Valves Tapping valves shall have a flange on one end for bolting to the tapping sleeve and a mechanical joint type end connection on the outlet with slotted standard flange or other adapters for connection to the tapping machine. All external dome, flange and packing bolts shall be stainless steel. The valves shall open by turning counterclockwise. Tapping valves shall conform to AWWA C509.

D. VALVE BOXES All valves shall be provided with valve boxes. Valve boxes shall be of standard, adjustable, heavy duty cast iron extension type, two piece, 5 1/4 inch shaft, screw type, and of such length as necessary to extend from valve to finished grade, Tyler #562-S, Tyler #564-S or approved equal. Valve box cover shall be stamped "Water". Tops shall be set at final established grade.

E. BUTTERFLY VALVES. Unless otherwise specified on the bid sheets, valves 16 inches and larger shall be butterfly valves rated at 250 psi working pressure and conform to the applicable portions of AWWA Standard C504, latest edition.

1. Body - The valves shall be AWWA Class 250B designed for tight shut-off against a differential pressure of 250 psi. Valve bodies shall be constructed of ductile iron. Two trunnions for shaft bearing shall be integral with the valve body. The valves and appurtenances shall be suitable for buried service.

2. Ends - Valves shall have mechanical joint ends and shall be furnished with high strength COR-10 tee head with hex nuts, ductile iron glands, and rubber gaskets for each mechanical joint end.

3. Discs - Valve discs of cast steel, fabricated steel, or cast bronze are not acceptable.

4. Seats - Seats bonded on the discs are not acceptable.

5. Shaft Seals - If stuffing boxes are utilized for shaft seals they shall be constructed of cast iron, ASTM A126. Gland assemblies shall be of cast bronze, ASTM B132. The packing gland shall be housed in a solid walled cast iron, ASTM A48, Class 40 one piece structure or equal.

6. Operators - The valve operating mechanism shall be for counterclockwise opening. There shall be no external moving parts on valve or operator except the operator input shaft. Input shaft is to be operated by a 2 inch square operating nut. Maximum required input force on the operator shaft to open and close the valve shall be 40 pounds. The total number of turns applied to the operating nut required to completely open the valve from a completely closed position shall not be less than twice the normal valve diameter. An extension stem shall be furnished to bring the operating nut within 3 1/2 feet of the finished grade. Extension stems shall be securely fastened to the valve stem.

F. AIR RELEASE AND VACUUM VALVES. Air release valves shall be constructed at high points in the water line as indicated on the plans. These valves shall permit the air in the pipeline to escape as the pipeline fills and allows the air to re-enter as the line empties. The air relief vent of automatic air release valves, where practical, may be extended to a distance of at least 1 foot above the grade and installed with a screened, downward facing elbow. Manually operated air release valves shall include a camlock-type coupling and waste valve. These valves shall be APCO Air Release Valves Model #200-A or approved equal, 250 psi working pressure. 8" and smaller water mains, tap size and piping shall be ¾", 12" water main - 1", & 16" and larger water main - 2". Temporary taps of suitable size may be required at certain points on the water main for the release of air for filling and/or flushing purposes. Temporary taps will be removed and plugged after use. Refer to Standard Drawing #106 for reference. Materials for air release valves will be supplied by the District.

6. STEEL CASING PIPE

Casing pipe shall be steel pipe with a minimum yield strength of 35,000 psi with a minimum wall thickness as listed below:

Nominal Diameter Casing Pipe	Normal Wall Thickness	Nominal Diameter Casing Pipe	Normal Wall Thickness
Under 14"	0.251"	26"	0.438"
14" & 16"	0.282"	28" & 30"	0.469"
18"	0.313"	32"	0.501"
20"	0.344"	34" & 36"	0.532"
22"	0.375"	38", 40", & 42"	0.563"
24"	0.407"	48"	0.626"

The inside diameter of the casing pipe shall be at least four (4) inches greater than the outside diameter of the carrier pipe joints. Steel casing sections shall be connected by welding, conforming to AWWA C206.

Adequate manufactured pipe spacers shall be installed to ensure that the carrier pipe is adequately supported in the center of the casing pipe throughout it's length, particularly at the ends. There shall not be any metallic contact between the casing and carrier pipe. Manufactured pipe spacers shall be installed per manufacture's installation requirements. Casings shall have both ends sealed up in such a way as to prevent the entrance of foreign material. See Standard Drawing #114 for installation details.

7. **PIPE, VALVE, HYDRANT PRESSURE REGULATOR PIT AND METER SETTING INSTALLATION**

A. Pipe Laying. Pipe shall be laid with bell ends facing in the direction of laying, unless otherwise directed by the District. After placing a length of pipe in the trench the spigot end shall be centered in the bell and the pipe forced home. All pipe shall be laid with ends abutting and true to line and grade. Deflection of pipe joints in excess of the manufacturer's recommendations will not be permitted. A watertight pipe plug or bulkhead shall be provided and used to prevent the entrance of foreign material whenever pipe laying operations are not in progress.

B. Pipe Cutting. The cutting of pipe for installing valves, fittings, or hydrants shall be done in a neat and workmanlike manner without damage to the pipe or lining. The end shall be smooth and at right angles to the axis of the pipe. Flame cutting of metal pipe by means of an oxyacetylene torch shall not be permitted. All pipe cutting shall be at the Contractor's expense.

C. Push-On Joints. The surfaces with which the rubber gasket comes in contact shall be thoroughly cleaned just prior to assembly. The gasket shall then be inserted into the groove in the bell. Before starting joint assembly, a liberal coating of special lubricant shall be applied to the spigot end. (Special lubricant shall be suitable for use in potable water) With the spigot end centered in the bell, the spigot end is pushed home. Insertion of spigot into PCV type pipe bell should be inserted until the reference mark is flush with the end of the bell. Over insertion of the pipe is not recommended per the manufacturer.

D. Mechanical Joints. Mechanical joints for pipe require that the spigot be centrally located in the bell. The surfaces with which the rubber gasket comes in contact shall be thoroughly cleaned just prior to assembly. The clean surfaces shall be brushed with a special lubricant just prior to slipping the gasket over the spigot end and into the bell. (Special lubricant shall be suitable for use in potable water) The lubricant shall also be brushed over the gasket prior to installation to remove the loose dirt and lubricate the gasket as it is forced into its retaining space.

1. Bolt Torque The normal range of bolt torque to be applied to standard cast iron bolts in a joint are:

Size	Range of Torque in foot-pounds
5/8"	40 - 60
3/4"	60 - 90
1"	70 - 100
1-1/4"	90 - 120

E. Setting Valves. Valves shall be set on a firm solid concrete block foundation so that no load will be transferred to the connecting pipe. Valves in water mains shall, where possible, be located on the street property lines extended, unless otherwise shown on the plans. A valve box shall be provided for every valve. The valve box shall not transmit shock or stress to the valve and shall be centered and plumb over the operating nut of the valve. The box cover shall be set flush with the surface of the finished pavement unless otherwise shown. All valves boxes with the exception of isolating valves for fire hydrants that are located in non-paved areas shall have a minimum of 2' by 2' by 4" concrete pad as shown in Standard Drawing No. 105, unless a smaller pad is approved by the District.

F. Setting Hydrants. Hydrants shall be located as shown on the plans or as directed by the District. The location shall provide complete accessibility and minimize the possibility of damage from vehicles or injury to pedestrians. All hydrants shall stand plumb with the pumper nozzle facing the curb. Hydrant shall be set to the established grade, with the traffic flange within 4" above final grade in accordance to Standard Drawing No. 109. Each hydrant shall be controlled by an independent gate valve with valve box. All valves used for hydrant control shall be anchored to the branch tee.

G. Thrust Blocking. All bends over five (5) degrees, plugs, caps, and tees shall be securely blocked against movement with concrete thrust blocks placed against undisturbed earth in accordance with Standard Drawing No. 104. All thrust blocks shall be inspected and approved by the District prior to backfilling. Water mains shall have concrete thrust block at all pipe intersections and changes of direction to resist forces acting on the pipeline. All concrete thrust blocks shall be poured in such a manner that the bolts can be replaced without disturbing the blocking.

All caps or plugs used in mains to undergo hydrostatic test shall be properly installed and blocked in advance of testing mains. All caps or plug installations shall be approved by the District representative before the main is subjected to the pressure test.

1. Concrete Blocking. Concrete blocking shall be K.D.O.T. Class A concrete as specified in Section "Concrete". Blocking shall be placed between undisturbed ground and the fitting to be anchored. The area of bearing on the fitting and on the ground in each instance shall be that shown herein. The blocking shall, unless otherwise shown, be so placed that the pipe and fitting joints will be accessible for repair.

2. Tie Rods. If shown or specified, movement shall be prevented by attaching suitable metal rods, clamps or restrained fittings. Steel tie rods or clamps, where permitted, shall be of adequate strength to prevent movement. Steel tie rods or clamps shall be painted with three coats of approved bituminous paint or coal tar enamel. A minimum of 3/4" welded eyebolts @ a 90 degree bend and 3/4" threaded rods may only be used with the approval of the District for temporary restraint only. Duc-Lucs are prohibited for use.

    1. Restrained Fittings. Restrained fittings, where permitted, shall be subject to the approval of the District.

H. Meter Setting Installation

The Contractor shall furnish all labor, equipment, excavation, backfill, testing, disinfection, and restoration to install the pipe at the locations shown on the plans or as directed, in accordance with the specifications and standard drawings, complete and ready for use. No additional payment will be made for rock excavation or for bedding required in rock excavation. It will be the Contractors responsibility to remove and reset the service at his own expense if he fails to notify and receive the approval from the District. Contractors work shall be warranted for a period of one year of the date of activation of each service (meter set date).

1. Inspection & Notification. The Contractor shall notify all affected District customers prior to interrupting water service. The Contractor shall make 48 hours notification. Routine service inspection and final inspections will be made by the District upon request by the Contractor and in a timely manner. The Contractor shall provide the District 24 hours notification for inspection by the District. It is the Contractors responsibility to post "No Parking" signs and safety devices.

2. Materials. The District shall furnish to the Contractor the materials necessary to install the meter setting and water service lines. This shall include: Lid & ring, meter vault, piping, yoke bar, double yoke bar, angle valve, yoke ell, couplings, corporation, tapping saddle, extension ring.

   The Contractor shall be responsible for pickup of materials at the District's designated location. The Contractor will be responsible to the District for materials lost, stolen, or damaged while in his possession. The Contractor shall return all unused materials, which includes scrap copper and fittings to the District. Salvaged materials are the property of the District and shall be returned to the District. The materials necessary to do restoration will not be provided under this contract item but shall be obtained from a pre-approved source.

3. Installation of Service Lines The Contractor shall be familiar with copper piping, fittings and connections, and have available equipment to work with said materials. No sweat type fittings shall be permitted. Service line shall be installed as shown on the plans or as directed by the District. The Contractor shall excavate whatever material encountered. The service lines shall be installed using boring and jacking or open cut (as specified on the plans) at the depth required to clear existing and proposed sewers, but in no case shall the line be installed with less than 36 inches cover from final grade. The trench width shall be as excavated to a maximum of 2 feet. The line shall be laid on firm soil. In rock, sufficient extra depth shall be excavated and refilled with acceptable compacted soil or bedding sand to provide a cushion for the elimination of the possibility of crushing or perforating the pipe. Connections shall be made using normal practices for water line installation and in accordance with the standards in the plans or contained herein.

   a. Water Service Taps. The Contractor shall maintain a minimum of 36" cover over any tap. The corporation installed into the main shall have no more the 4 threads showing between the top of the water main and the bottom of the corporation unless a tapping saddle is used.

b. Service Line. The Contractor shall maintain a constant cover of 36"over any water line. Methods of pushing or jacking under the existing street must avoid bending or kinking the pipe. No open cuts of the pavement will be permitted unless pre-approved by the District. All copper shall be cut using a copper-tubing cutter. All connections shall be flared connections. No oil base or other contaminating materials will be used in lubricants, caulking and sealers. The Contractor shall be responsible for making all joints watertight.

c. Meter Vault. All meter vaults shall be located inside existing right-of-ways or water main easements of record or as directed by the District. Typically the meter vault shall sit 5' behind the back edge of curb or edge of pavement. The Contractor shall contact the customer and determine a suitable location of the setting within the above guidelines. It is the Contractors responsibility to notify the District's Inspector if these conditions cannot be met. The District's Inspector will inspect any questionable meter setting location prior to the Contractor installing.

Meter vaults shall be set to allow the meter cover to be level with the back edge of the existing curb or the back edge of paving along roadways without curbs. It is the Contractor's responsibility to ensure that the meter vault does not settle due to poor compaction or any other reason within the Contractor's control. The Contractor at no additional expense to the District shall adjust any meter vault that sinks below grade due to poor workmanship by the Contractor to grade.

8. TRENCH BACKFILL

All trench backfill shall be free from cinders, refuse, organic material, boulders, rocks or other material which in the opinion of the District is unsuitable. No backfill shall be made with frozen material.

A. BACKFILL IN NON-PAVEMENT AREAS. Trench backfill in areas not directly beneath or near pavements and driveways shall be as specified in this section unless the local authority having jurisdiction or the District stipulates additional requirements.

1. Trench Bottom Preparation. The pipe shall be bedded on sand to achieve full pipe barrel support. In any event not less than 3" of sand bedding shall be used.

2. Backfill to 12" Over Pipe Barrel. All trench excavations shall be backfilled immediately after pipe is laid with the exception of thrust blocks. Compacted sand or bankrun material shall be used to backfill the trench from the bottom of the pipe barrel to the 12" over the pipe barrel. Backfill material shall be free from cinders, refuse, organic material, boulders, top soil, frozen material, material with a high void content, rocks **1 1/2"** or larger measured in any direction, sharp stones and crushed rocks larger than **3/4"**, or other materials which in the opinion of the District is unsuitable. No flushing of backfill shall be permitted to achieve compaction. Clay bulkheads shall be installed as specified in Section B-5 of Trench Backfill.

3. Remaining Trench Backfill. From 12" above the pipe barrel to the surface, excavated trench material may be used as backfill material or as required by local or county

authorities. No material shall be used for backfill that contains frozen earth, vegetable or organic material, debris, rocks **8"** or larger measured in any direction, or earth with an exceptionally high void content.

4. Compaction. All backfill shall be placed in uniform loose layers, not to exceed 12" layers, and each layer shall be compacted to a density not less than 95 percent of the standard Proctor maximum dry density (ASTM D698) unless additional requirements are required by the local authority having jurisdiction. The backfill shall be compacted in such a manner and with appropriate equipment so that there is no pipe damage, pipe misalignment or damage to joints. No flushing of backfill shall be permitted to achieve compaction.

B. BACKFILL BENEATH DRIVEWAYS. Trench backfill beneath and within five (5) feet of driveways shall be as specified in this section.

1. Trench Bottom Preparation. The pipe shall be bedded on sand to achieve full pipe barrel support. In any event not less than 3" of sand bedding shall be used.

2. Backfill to 12" Over Pipe Barrel. All trench excavations shall be backfilled immediately after pipe is laid with the exception of thrust blocks. Compacted sand or bankrun material shall be used to backfill the trench from the bottom of the pipe barrel to the 12" over the pipe barrel. Backfill material shall be free from cinders, refuse, organic material, boulders, top soil, frozen material, material with a high void content, rocks **1 1/2"** or larger measured in any direction, sharp stones and crushed rocks larger than **3/4"**, or other materials which in the opinion of the District is unsuitable. No flushing of backfill shall be permitted to achieve compaction. Clay bulkheads shall be installed as specified in Section B-5 of Trench Backfill.

3. Granular Backfill. When backfilling under pavements, driveways, or as directed by the District, granular material as specified shall be used in place of the excavated material. The granular backfill shall be placed from 12 inches from the top of pipe to 6 inches below pavement subgrade level in uniform 6 inch loose layers and each layer shall be compacted to a density not less than 95 percent of the standard Proctor maximum dry density (ASTM D698). The backfill shall be compacted in such a manner and with appropriate equipment so that there is no pipe damage, pipe misalignment or damage to joints. No flushing of backfill shall be permitted to achieve compaction.

4. Trench Backfill to Subgrade. The top 6 inches of the trench backfill, immediately below pavement subgrade level, shall be crushed limestone or dense grade aggregate compacted in the same manner and to the same density at the granular backfill.

5. Remaining Trench Backfill to Final Grade. From subgrade to final grade, asphalt, concrete or other paving/surface shall be placed to match the existing pavement/surface conditions.

6. Bulkheads. When a granular bedding is provided in rock or when granular backfill is required, the Contractor shall place bulkheads of clay soil across the trench at 100 foot intervals to resist the movement of groundwater through the granular material. Such

bulkheads shall be carefully compacted and shall extend approximately 3 feet in a direction parallel to the pipe and shall extend from the bottom of the trench to a point 4" below final grade level.

7. Surface Conditions. The trench surface shall be periodically attended to during the course of the contract. The trench surface shall be maintained in a safe condition and shall not interfere with natural drainage.

C. BACKFILL BENEATH PAVEMENT. Trench backfill beneath roadway pavements, or as directed by the District shall include flowable fill as specified in this section.

1. Backfill to 12 Inches Over pipe Barrel. The pipe shall be bedded on sand so that the pipe barrel has full and continuous support. All trench excavations shall be backfilled immediately after pipe is laid. Compacted sand or bankrun shall be used to backfill the trench from the bottom of the pipe barrel to 12 inches above the top of the pipe barrel. The sand or bankrun shall be placed in uniform 6 inch loose layers and each layer compacted to a density not less than 95 percent of the standard Proctor maximum dry density (ASTM D698) in such a manner and with appropriate equipment so that there is no pipe damage, pipe misalignment or damage to joints so as to eliminate the possibility of settlement, pipe misalignment, or damage to joints. The sand or bankrun shall be free from cinders, refuse, organic material, boulders, rocks, or other material which in the opinion of the District is unsuitable. No backfill shall be made with frozen material.

2. Trench Backfill to Subgrade. From 12 inches above the pipe barrel to subgrade, **"Low Strength Mortar Backfill Material"** (Flowable Fill, K-Crete) shall be used as backfill material. The Low Strength Mortar Mix shall meet the current Ky. Dept. of Highways's "Standard Specifications for Road & Bridge Construction". The Low Strength Mortar Mix shall have sufficient drying time (per manufacturer's recommendation) before the final layer of backfill is applied.

3. Remaining Trench Backfill to Final Grade. From subgrade to final grade, asphalt, concrete or other paving/surface shall be placed to match the existing pavement/surface conditions. All joints shall be properly seal with an approved material.

4. Testing of Trench Backfill Testing of backfill shall be at the request of the District and to the specifications of the District and at the cost of the Contractor.

11. TEMPORARY STREET & ROADWAY RESTORATION

A. Traffic-Bound Base Course. For all trenches where replacing streets and/or driveways is required, the Contractor shall maintain at his own expense a traffic- bound course of a minimum of 6" traffic-bound gravel and 4" of temporary hot asphalt or cold patch asphalt when hot mix is not available in a safe and passable condition until the trenches are ready for final resurfacing. The traffic-bound base course shall be compacted to a density not less than 95 percent of the standard Proctor maximum dry density (ASTM D698).

B. Maintenance of Temporary Street Restoration Temporary street restoration areas shall be maintained in a safe condition at all times. There shall be no loose materials, depressions,

drop-offs or any other deficiencies in the temporary pavement. If said deficiencies exist they shall be immediately corrected by the Contractor.

12. FINAL RESTORATION OF STREET & ROADWAYS

A. SCOPE. This section covers the restoration of concrete and asphaltic concrete pavement, driveways, sidewalks and other surface construction removed or damaged during the progress of the work.

B. GENERAL. Except as otherwise specified, indicated on the drawings, or covered with other surface treatments, all pavement, driveways, curbs/gutters, and sidewalks which are removed or damaged during the progress of the work shall be restored to its original or better condition by the Contractor. All restoration work shall be subject to acceptance by the property owner, agency having jurisdiction thereof, and the District. Unless otherwise specified, all material used for restoration work shall be new.

At least five days in advance of pavement and curbs/gutter replacement, the Contractor shall notify the District and the authority having jurisdiction thereof of the proposed work. All street work shall be subject to acceptance by the authority having jurisdiction thereof.

Crushed limestone, bituminous materials or other materials used in the resurfacing of streets, shall meet the current requirements of the Standard Specifications of the Kentucky Department of Highways.

Sub-grades shall be thoroughly compacted to at least 95 percent of maximum density at optimum moisture content as determined by ASTM D698. In addition, the stability of sub-grades shall be such that when materials for construction are deposited on the sub-grade no rutting or displacement of the subgrade by material hauling vehicles will occur.

Governing Standards. Except as otherwise specified or indicated, materials, equipment, details, and construction methods shall comply with the applicable provisions of the local, county and state ordinances and regulations. Requirements for surface restoration and materials specified herein are the minimum requirements for compliance with the Contract Documents. If requirements of the authority having jurisdiction over surface restoration are greater than those presented herein, Contractor shall comply with those requirements at no additional cost to the District.

Weather Limitations. Minimum temperature under which asphaltic concrete pavements may be constructed shall be as stipulated in the governing standards.

If weather conditions do not permit replacement of permanent surfacing, a temporary cold mix asphaltic concrete surfacing shall be provided and maintained in a smooth and driveable condition. Cold mix material shall be replaced with the specified hot mix asphaltic concrete when weather conditions permit. No materials shall be placed when the underlying surface is muddy, frozen, or has frost or water thereon.

Equipment and facilities for measuring, mixing, heating, transporting, spreading, compacting, and other operations shall be in accordance with the applicable requirements of the governing

standards. Improved or modernized equipment which will produce results equal in quality to those which would result from the specified equipment will be considered for use. All equipment and facilities shall be acceptable to the District.

C. MATERIALS. The sources of materials shall be submitted for review by the District. Except as modified herein, materials shall conform to the requirements of the Kentucky Department of Transportation standards.

Contractor shall submit to District for approval documentation certifying materials to be used for surface restoration are in compliance with the requirements herein.

D. ASPHALTIC CONCRETE PAVEMENT. Except as modified herein, existing asphaltic concrete pavement which is removed or damaged during the progress of the work shall be replaced with new pavement to match, as closely as possible, the adjacent existing pavement.

Asphaltic concrete pavements shall be constructed as specified, and in accordance with the Kentucky Department of Transportation standards.

Finished surfaces shall match existing surfaces as appropriate.

Bituminous mixtures shall be spread and finished by hand methods only where machine methods are impractical as determined by the District. Hand placed mixtures shall not be cast or otherwise manipulated in such manner that segregation occurs.

Each lift of the base course shall be uniformly compacted to a density of not less than 94 percent as determined by ASTM D2950. The surface course shall be uniformly compacted to a density of not less than 96 percent as determined by ASTM D2950.

Where asphaltic concrete pavement is to be replaced, the subgrade shall be prepared as herein before specified and this subgrade shall comprise the base course upon which the concrete sub-slab and/or bituminous pavement shall be laid.

Where no concrete sub-slab is required, the subgrade or base shall be thoroughly cleaned and broomed and a prime coat of medium tar (RC-3) shall be uniformly applied at a rate of .20 to .25 gallons per square yard. Where Portland cement concrete sub-slab is required the prime shall be applied at the rate of approximately .05 gallons per square yard. The prime shall be applied by a pressure distributor or other approved pressure spray method.

When the prime coat has become tacky but not dry and hard, a bituminous surfacing consisting of class "I" asphaltic concrete shall be placed, spread, finished and compacted in accordance with the current Standard Specifications of the Kentucky Department of Highways. Compacted thickness of asphaltic concrete pavement shall be as directed or as shown on the plans. All asphaltic concrete joints shall be properly seal with an approved material in accordance with the current Standard Specifications of the Kentucky Department of Highways (hot-poured elastic joint sealer).

E. CONCRETE PAVEMENT. Existing concrete pavements which are removed or damaged during the progress of the work shall be replaced to match, as closely as possible, the

adjacent existing concrete pavement. Concrete, materials, and workmanship shall conform to the applicable requirements of the concrete section.

Where concrete pavement is to be replaced or is required under bituminous pavement replacement, it shall conform to the existing pavement and/or the District's instructions, (not less than 6" (six inches) thick) and accomplished with K.D.O.T. Class "A" concrete. Concrete curbs shall conform to existing concrete curbs. All joints shall be properly seal with an approved material.

If concrete is removed to within 2 feet or less of an existing construction joint, the additional pavement to the joint shall be removed and replaced with new concrete.

F. AGGREGATE BASE COURSE. Aggregate base course shall be used as a base, where required by the governing regulations. The base course shall be constructed in accordance with the governing standards. Mixing of the base course shall be by the central plant method or the road mix method.

G. PROTECTION. The Contractor shall protect all adjacent concrete and masonry so that no damage will occur as the result of subsequent construction operations. All damage or discoloration shall be repaired to the satisfaction of the District.

Special care shall be taken to prevent bituminous materials from spraying or splashing. Adjacent construction shall be protected by covering with suitable fabric or paper.

H. MISCELLANEOUS REPAIR WORK. All existing items and construction, whether or not indicated by the drawings but which are removed or damaged as a result of construction operations under this contract, whether within or outside of public right-of-way, shall be repaired or replaced unless otherwise required by the drawings.

Repair or replacement shall be with material similar to those existing and shall, in each case, restore the item to its original or better condition as acceptable to the District and the District thereof.

I. UNTREATED SURFACE. Where the existing surface is untreated gravel or stone, the Contractor shall replace the surfacing that is disturbed or removed with crushed limestone to at least the thickness of the existing pavement. The crushed limestone shall be placed and compacted in the same manner as traffic-bound base course. Prior to the final acceptance the Contractor shall fill all depressions with compacted crushed limestone, and shall thoroughly compacted and graded to match the existing surface.

13. CLEAN UP

After a section of main is tested and accepted, the ground surface shall be cleaned of all surplus material including stone, broken pipe, construction material, and all other debris, to the satisfaction of the District.

Disposal of excess excavated material from trench excavations or site restoration shall be disposed from the sit at the Contractor's expense. Broken concrete and other debris resulting from pavement or sidewalk removal, excavated rock in excess of the amount permitted to be installed in trench backfill, debris encountered in excavation work, and other similar waste materials shall be disposed from the site at the Contractor's expense. The Contractor shall be responsible for procurement of its own dump sites, and maintaining that site at its own expense.

14. TRENCH MAINTENANCE

The Contractor shall be responsible for the condition of the trenches for a period of two years from the date of the "Certificate of Substantial Completion" issuance.

15. RESTORATION, GRADING AND SEEDING

The Contractor shall provide all labor, materials, tools, and equipment required to grade, fertilize, seed, and mulch in good, workmanlike manner the areas where shown on the plans or where directed by the District and as specified herein.

A. Materials

1. Topsoil - Topsoil shall not contain more than 40% clay in that portion passing a No.10 sieve and shall contain not less than 5% or more than 20% organic matter as determined by loss on ignition of samples oven dried to constant weight at 212 degrees Fahrenheit.

2. Fertilizer - Fertilizer shall be lawn or turf grade 12-12-12.

3. Seed

a. Urban Areas - All areas to be seeded which are considered to be urban in character, and any area in front of a residence, business or commercial, shall be seeded with the following mixture: (% are by weight)

40% Fine Lawn Turf-Type Fescue
40% Creeping Red Fescue (Festuca rubra)
20% Annual Ryegrass (Lolium multifiorm)

b. Right-of-way and Easements - All areas in right-of way or in easements adjacent to right-of-away other than urban areas, shall be seeded with the following mixture: (% are by weight)

30% Fine Lawn Turf-Type Fescue
50% Kentucky 31 Fescue (Festuca arundinaces Var. Ky.31.)
20% Annual Ryegrass (Lolium multiflorum)

c. All Other Areas - All other areas shall be seeded with the following mixture: (% are by weight)

90% Perennial Ryegrass (Lolium perenne)
10% Alsike Clover (Trifolium hybridum)

4. Mulch - Mulch shall be straw reasonably free of weed seed and any foreign materials which may affect plant growth. Other materials may be used if approved by the District.

5. Asphalt Emulsion - Emulsion shall be nontoxic to plants and shall conform to AASHTO M140 or AASHTO M208.

C. Installation

1. Preparation of Seed Bed

a. Topsoil - If suitable topsoil is available as part of the excavated material it shall be removed, stored and used to backfill the top 4 inches of the excavation. All grass, weeds, roots, sticks, stones, and other debris are to be removed and the topsoil carefully brought to the finish grade by **hand raking.**

b. Non-topsoil - If there is no suitable topsoil available on any part of the work or if there is a deficiency of suitable topsoil, the trench backfill, except in urban areas shall be used as a seed bed. After the backfill has been given a reasonable time to settle, it shall be graded off to the finish grade and harrowed to a depth of 3 inches. All grass, weeds, roots, sticks, stones, and other debris are to be removed and the soil carefully brought to the finish grade by **hand raking.**

c. Urban Areas - If there is no topsoil available on any part of the work or is there is a deficiency of suitable topsoil, the Contractor shall furnish 4 inches of topsoil to be used as a seed bed in all urban areas and any area in front of a residence.

2. Fertilizing - Fertilizing shall be uniformly applied to all areas to be seeded at the rate of 1 pound per 100 square feet in topsoil or 2 pounds per 100 square feet in non-topsoil. The fertilizer shall be thoroughly disked, harrowed or raked into the soil to a depth of not less than 2 inches. Immediately before sowing the seed, the Contractor shall rework the surface until it is a fine, pulverized, smooth seed bed, varying not more than 1 inch in 10 feet.

3. Seeding - Immediately after the preparation and fertilization of the seed bed the District shall inspect and approve the site prior to seeding. The seed shall be thoroughly mixed and then evenly sown over the prepared areas at the rate of 3 pounds per 1000 square feet for urban, right-of-way and easement areas and a rate of 2 pounds per 1000 square feet for all other areas. Seed shall be sown dry or hydraulically. After sowing, the area shall be raked, dragged, or otherwise treated to cover the seed to a depth of approximately 1/4 inch.

4. Mulching - Within 48 hours after any given area is seeded, mulching material shall be evenly placed over all seeded areas at the rate of approximately 2 tons per acre, when seeding is performed between the dates of March 15 and October 15, and at the approximate rate of 3 tons per acre when seeding is performed between the dates of October 15 and March 15 of the succeeding year.

a. Emulsion - Mulching materials shall be kept in place with asphalt emulsion applied at

a minimum rate of 60 gallons per ton of mulch or by methods as approved or may be otherwise required to prevent displacement of material. Mulching which is displaced shall be replaced at once but only after the seeding or other work which preceded the mulching and which work was damaged as a result of displacement of mulching material has been acceptably repaired.

5. Maintenance - All seeded areas shall be carefully maintained and tended by the Contractor, watering as necessary to secure a good turf. Settled areas shall be filled, graded, and re-seeded. Seeded areas shall be free of weeds and other debris. The Contractor shall be responsible for the condition of the seeded areas for a period of 1 year from the date of "Final Certificate" issuance.

D. Payment - Seeding is not a pay item and all cost related thereto shall be included in the unit price of the applicable bid item.

16. **DISINFECTION AND LEAKAGE TEST**

A. SCOPE. This section covers the disinfection of the new water mains, fittings, temporary services and associated appurtenances. The Contractor shall provide all labor, materials, tools, equipment, and incidentals required to test the mains for watertightness and disinfect the mains as directed by the District and as specified herein. Gauges for the test shall be furnished by the Contractor.

B. TEST SECTION. After the main has been installed and backfilled all newly installed pipe or any valved section thereof shall be considered a test section.

C. WITNESS. All tests performed for each test section shall be witnessed and approved by the District before acceptance. In the event the Contractor performs any test without witness by the District, the Contractor will be required to test the section again in conformance with this specification at no cost to the District.

D. GENERAL. All disinfection work shall conform to the requirements of the latest revision of ANSI/AWWA C651 and the requirements of the Kentucky Division of Water. If any State requirements conflict with the provisions of this section, the State requirements shall govern.

Water required for flushing and disinfection work will be provided as stipulated in the temporary facilities.
When it is necessary to interrupt service to water customers, each customer affected shall be notified in advance of the proposed service interruption and its probable duration in accordance with the project requirements.

E. DISINFECTION PROCEDURE. During construction or after the installation of the pipe and fittings is complete, an approved disinfection method, according to governing standards, shall be used. The disinfection solution shall be allowed to stand in the main and associated appurtenances for a period of at least twenty-four (24) hours.

During disinfection, all valves, hydrants, and service line connections shall be operated to ensure that all appurtenances are disinfected. Valves shall be manipulated in such a manner that the strong disinfection solution in the main from flowing back into the supply line. Check valves shall be used if required.

All non-disinfected fittings used for tie-ins or repairs shall be cleaned and swabbed with a liquid sodium hypochlorite disinfecting solution prior to installation.

F. FINAL FLUSHING. Upon completion of chlorination but before sampling and bacteriological testing, Contractor shall remove all heavily chlorinated water from the main and temporary services by flushing with potable water at the maximum velocity which can be developed under the direction and control of the District.

The Contractor shall properly neutralize and dispose of the chlorinated water and flushing water in accordance with all applicable regulations. Contractor shall obtain all special waste disposal permits necessary.

G. DISPOSAL OF HEAVILY CHLORINATED WATER. Disposal of chlorinated water will be in accordance with 401 KAR5:031. Coliform samples must be taken at connection points to existing mains, 1 mile intervals along new mains, and at all dead ends. Contractor shall apply a de-chlorinating agent to the water to be wasted to neutralize thoroughly the chlorine residual remaining in the water. (See the following table for neutralizing chemicals.) Federal, state, and local regulatory agencies should be contacted to determine special provisions for disposal of heavily chlorinated water.

Chlorine residual of water being disposed of shall be de-chlorinated by treating with one of the chemicals listed in the following table:

Pounds of Chemicals Required to De-chlorinate Various Residual Chlorine Concentrations in 100,000 Gallons of Water*

Residual Chlorine Concentration *mg/L*	Sulfur Dioxide (SO_2)	Sodium Bisulfate (NaHSO3)	Sodium Sulfite (Na_2SO_3)	Sodium Thiosulfate ($Na_2S_2O_3@5H_2O$)
1	0.8	1.2	1.4	1.2
2	1.7	2.5	2.9	2.4
10	8.3	12.5	14.6	12.0
50	41.7	62.6	73.0	60.0

* Except for residual chlorine concentration, all amounts are in pounds.

The Contractor shall provide all necessary materials, equipment and labor for applying the de-chlorinating chemical in a manner such that proper mixing and contact time of the chemical and the heavily chlorinated water is obtained for complete removal of chlorine

being flushed. The Contractor shall periodically test the flush water to verify that the chlorine residual is zero.

H. CHLORINE RESIDUAL TESTS. Upon completion of final flushing, the District will perform chlorine residual tests to ensure the chlorine residual in the main and temporary services is not higher than that generally prevailing in the remainder of the water distribution system and is acceptable to the District.

I. BACTERIOLOGICAL TESTS. Sampling and testing of water in the main and temporary services will be performed by the District after final flushing. A standard plate count will be made by the District for each sample.

J. REDISINFECTION. Should the bacteriological tests indicate the presence of coliform organisms at any sampling point, the main and temporary services shall be re-flushed, re-sampled, and re-tested. If check samples show the presence of coliform organisms, the main and temporary services shall be re-chlorinated at no additional cost to the District until results acceptable to the District are obtained.

Re-disinfection shall be completed by the continuous feed or by the slug method. Unless otherwise permitted, the chlorination agent shall be injected into the main and temporary services at the supply end through a corporation cock installed in the top of the pipe. All materials, equipment and labor necessary for the re-disinfection shall be supplied by Contractor at no additional cost to the District.

K. HYDROSTATIC TESTING. Hydrostatic Testing will be in accordance with AWWA C600. The water main being tested shall have all air expelled by additional flushing or installation of taps on high points in the line. The pressure of the water main shall be gradually increased to obtain a minimum pressure of 100 psi over the design pressure (250 psi minimum) at the lowest elevation point of the water main or as directed by the District. The test will be for a two (2) hour duration and will not vary by more than 5 psi. All tests performed for each test section shall be witnessed and approved by a representative of the District, in the event any test is performed without a representative of the District, the Contractor shall be required to test the section again. Leakage is defined as the amount of water used to maintain the test pressure.

17. APPLICABLE SPECIFICATIONS & STANDARDS

The following current specifications and standards form a part of these Specification:

A. **American Water Works Association** (AWWA) Standards
B. **Northern Kentucky Water District** Standards Drawing & Specifications
C. "Manual of Accident Prevention in Construction" published by the **Associated General contractors of America**
D. **Kentucky Occupational Safety and Health Administration's** "Kentucky Occupational Safety and Health Standards for General Industry" current edition.
E. **American National Standards Institute** (ANSI)
F. **American Society for Testing & Materials** (ASTM)
G. **Kentucky Division of Water Quality**

H. **"Recommended Standards for Water Works"** current edition

Section 02660

Bonding & Corrosion Components

GENERAL

A. This specification shall include all construction labor, equipment, supervision and engineering to ensure the bonding and corrosion monitoring components are installed properly and in accordance with these specifications and associated detail drawings. The contractor shall be completely responsible for workmanship and the satisfactory performance of the components furnished.

B. The contractor may propose modifications upon review of the project specifications and site verifications. These changes shall be limited to component installation locations and will only be considered if documented that they will result in benefits. Any proposed modification must be fully described arid submitted by the contractor and approved by the District. Modifications or additional materials shall be at no additional cost. Any modifications shall incorporate all requirements of this specification.

1. Verification of Site Conditions: The contractor shall coordinate and properly relate this work to the site and to the work of all trades. The general location of the pipeline is shown on the drawings. However, the contractor shall visit the premises and thoroughly familiarize himself with all details of the work and working conditions, verify existing conditions in the field, detem1ine the exact locations of existing lines and structures, and advise the authority engineer of any discrepancy that may prevent or hinder the specified work from being completed. The contractor shall be solely responsible for locating and marking underground structures so as to avoid their damage during construction.

2. System Arrangement: The drawings indicate the locations of the corrosion control system components to be installed which are generally near fire hydrants and air release valves.

3. Materials Storage: The contractor shall be solely responsible for securing stored on-site materials.

4 Submittals

A. The contractor shall furnish two (2) copies of the following information for approval:

1. Bill of Materials: Prepare a bill of materials indicating quantities, detailed description and manufacturer.

2. Manufacturer's data for all related equipment. The data shall include, at a minimum, descriptions of the follow equipment, and wiring diagrams where applicable:

a. Test Leads
b. Test Station

c. Exothermic Weld Materials
d. Backfill Shield
e. Bond Cable

CORROSION MONITORING MATERIALS

1. Test stations shall be installed at predetermined intervals along the pipe route for monitoring purposes.

2. Test stations shall be placed as shown on the plans.

3. Permanent reference electrodes are required at all test station locations. Permanent reference electrodes shall be used for soil environments to provide a stable electrical benchmark. A combination Cu/CuSO4 - Zinc reference electrode is used for longer life designs.

CATHODIC PROTECTION

1. Sacrificial Anodes and Accessories
   A. Magnesium Anodes shall be capable of delivering a minimum efficiency of 500 amp-hours per pound of magnesium and shall have the following metallurgical analysis and physical properties:
      (1) Aluminum: 0.01% (max.)
      (2) Manganese: 0.50% - 1.3%
      (3) Copper: 0.02% (max.)
      (4) Nickel: 0.001% (max.)
      (5) Iron: 0.03% (max.)
      (6) Other (each): 0.05% (max.)
      (7) Other (total): 0.30% (max.)
      (8) Magnesium: Balance
   B. Packaged Magnesium Anode and Backfill
      Magnesium anodes shall be packaged within a cotton sack in a special chemical backfill. Backfill shall have a grain size such that 100% is capable of passing a 20-mesh screen and a 100-mesh screen shall retain 50 %. Backfill shall completely surround the anode ingot without voids.
   C. Anode Lead Wire - The standard lead wire for a magnesium anode shall be a minimum 10' length of No. 12 AWG solid copper wire with Type TW (red) thermoplastic insulation

DUCTILE IRON PIPE

A. PIPELINE FABRICATION REQUIREMENTS

1. Ductile Iron Pipe, fittings and specials shall have asphaltic shop applied exterior coating.

   a. The coating system for ductile iron pipe shall be in accordance with ANSJ/AWWA Standard C-151/A21.51. The system shall consist of a nominal thickness of I-mill thick asphaltic coating.

B. BONDED JOINTS

1. Ductile Iron Joints and pipe fitting joints shall have approved type bonded joints. All joints shall be electrically bonded to provide electrical continuity across all joints. The bonded type joints shall be of a type that can be used in conjunction with the impressed current cathodic protection system that is furnished under this specification. The bonds - shall be of a type that provides positive electrical continuity across all joints of the pipe: all fittings and specials, except where "insulated"- flange joints are required or ordered.

   a. On pipe sizes up to and including 24-inch in diameter, one (1) "set" of bonding connectors shall be installed at the top of each pipe/fitting joint. On pipe sizes 30-inch and larger, two (2) "sets" of bonding connectors shall be installed, one (1) set each at twelve (12) inches clockwise and counterclockwise from the top of each - pipe/fitting joint. A "set" includes one bonding wire along with two exothemic welds – one on each side of the joint.

CORROSION MONITORING MATERIALS

A. Test Stations

1. Flush-to-grade test stations shall be used and installed in no-pavement areas. Test stations shall consist of a lockable cast iron head, with "Test Station" cast in lid with an 18" long high impact strength molded plastic conduit. The testing wires shall extend a minimum of 12-inchs slack.

2. Test Lead Wire:

   a. Water Main - No. 8 AWG stranded copper wire with THWM insulation, black in color.

3. Solderless pressure-type ring tongue wire terminal connectors shall be used for each individual lead cable (test leads, reference electrodes).

B. Permanent Reference Electrodes

1. Copper Sulfate Reference Cell shall be located 6-inches below the bottom of the trench excavation at the center line of the pipe in native soil.
   a. Lead Wire: No. 14 AWG stranded copper RHW wire. Lead wire shall be sufficiently long to reach its termination point without splicing. Yellow in color.

BOND CABLES

A. Electrical Continuity Bond Cables: High molecular weight polyethylene - insulated stranded copper cable shall be used for continuity bond cables installed across pipe joints of mechanically coupled pipe. Insulation shall conform to ASTM D1248 - Specification for Plastic Molding and Extrusion - Materials, Type 1, Class C, Grade 5.

B. Pipe Joint Continuity Bond Cables.

1. Shall be sized as follows:

   a. Wire Gauge: No.4
   b. Number of Strands: 7
   c. Outer Jacket: 0.11" thickness
   d. Length: 18"
   e. Number of Bonds (24" and below): 1across each pipe joint
   f. Number of Bonds (30" and above): 2 across each pipe joint

PIPELINE CABLE CONNECTIONS

A. Pipeline Cable Connection: Exothermic type welds suitable for attaching - copper wire to "steel" or "ductile/cast iron" pipelines shall be used. The proper size welders, metal charges, and wire sleeves shall be used in accordance with the manufacturer's recommendations. Pipe preparation for - the exothemic welds shall be in accordance with manufacturer's recommendations.

B. Exothermic Weld connection Sealer: Non-metallic, protective coating (bitumastic) filled shields are to be used over all exothermic welds.

BONDING

A. Provide appropriate number of #4 AWG/HMWPE bonding cables across each slip or mechanical joint on the new water main. Bond all fittings including elbows, tee's reducers and valves.

B. Make the bond wire attachment directly to the pipe (Ductile iron pipe) using an exothermic weld connection. Clean the surfaces with a ceramic grinding wheel, rasp or coarse file prior to welding the bond cable in place. "The use of resin impregnated wheels or discs will not be permitted". The cable shall be welded to the brackets or fitting with only sufficient insulation removed from the cable to - allow placement into the weld mold. After the weld has cooled, all slag shall be removed, and the weld shall be tested with a sharp hammer blow to assure a proper metallurgical bond. All defective welds shall be removed and replaced. All exposed surfaces of the copper bond cable and steel or iron shall be covered with a bitumastic filled plastic shield encapsulating the connection.

C. Repeat the weld procedure on both sides of each joint.

D. After Joint bonding, test lead and anode lead connections have been - completed, the contractor shall complete the exterior joint wrapping as per the pipe installation specifications.

E. The importance of properly bonding the pipeline joints cannot be over emphasized. Take care to ensure each weld is in place and not darilaged when covered/back-filled. Any missing or loose bonds will be excavated and repaired as a part of this project.

TEST LEADS

A. The steel surface of the ductile iron pipe - shall be cleaned to white metal with a ceramic grinding wheel, rasp, or coarse file prior to welding the conductor. "Use of resin impregnated wheels or discs will not be permitted". The conductor shall be welded to the bracket by the - exothermic process with only sufficient insulation removed from the conductor to allow placement in the welding mold. After the weld has cooled, all slag shall be removed, and the weld shall be tested with a sharp hammer - blow to assure a proper metallurgical bond. All defective welds shall be removed and replaced. All exposed surfaces of copper and steel shall be covered with a bitumastic filled shield encapsulating the connection.

B. After Joint bonding and test lead connections have been completed, the contractor shall complete the exterior joint wrapping as per the pipe installation specifications.

REFERENCE ELECTRODE INSTALLATION

A. Install reference electrodes within 6" of the water main at the test location(s) shown on the Drawings.

B. Route the reference electrode lead wire to the test station enclosure. All reference electrode lead wires shall be of sufficient length to extend to their termination point without splicing.

C. If the water main backfill is extremely dry, soak the electrode's cloth sack - with a minimum of 5 gallons of clean water prior to backfilling.

TEST STATIONS

A. Install test stations directly over the pipe unless the main is in pavement. Route the test leads to the terminal board allowing a minimum of 12" of slack.

B. Exercise extreme care in backfilling the structure to avoid damaging lead wires or connections.

C. Set flush type test station enclosure level with final grade in an 18" square (or diameter) by 4" thick concrete pad.

D. Terminate test leads as indicated. Install test station labels where indicated.

INSTALLATION OF GALVANIC ANODES

A. General:
   1. Install the required number of anodes at the locations shown on the plans or as directed by the District.
   2. Install additional anodes at the locations determined by District after pipe installation is completed and District has conducted field-electrical tests on pipeline.

B. Method:
   1. Remove plastic or paper shipping bags from around prepackaged anodes prior to installation.

2. Install in the manner and at the dimensions from the water main as shown on the Details. Field modifications shall be made only with the approval of the District.
3. Handle galvanic anodes in such a manner to avoid damaging anode materials and wire connections.
4. Attach anode lead wire to pipe or directly to test station as required. Splices are not permitted within the lead wire of an anode except to repair damaged lead wires.
5. Install prepackaged anodes with compacted backfill material, such that no voids exist between the anode material and the backfill.
6. In very dry or coarse soils, pour 5 gallons of water over the anode after backfilling and tamping have been completed to a point about 6 inches above the anode. After the water has been absorbed by the earth, backfilling shall be completed to the ground surface level.

TESTS AND SUBMITTALS

A. The District's inspector shall witness all field tests. Advise the District at least 5 days prior to conducting final test.

B. CORROSION SYSTEM TESTING

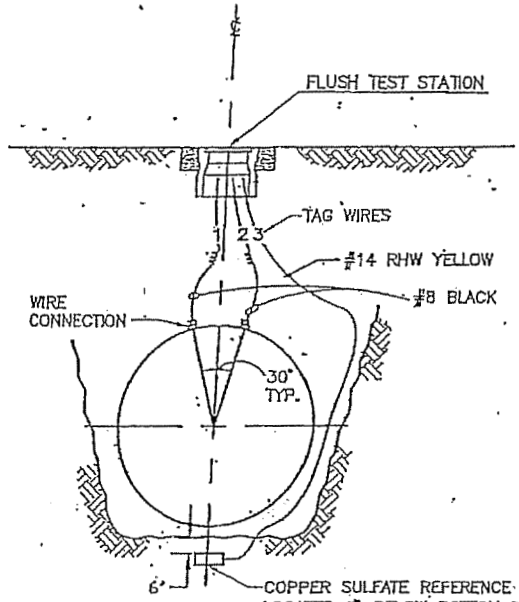
1. The tester shall obtain baseline A.C. and D.C. potentials at each test station.

2. The tester shall be NACE certified with at least 3 years performing baseline potential testing. The tester's credentials and firms experience shall be submitted to District for review and approval for use.

3. If any point on the water pipe fails to satisfy the NACE criteria, the tester shall conduct further testing to determine the reason for the inadequacies. If the problem is related to workmanship or material quality, the contractor shall immediately correct it. The contractor will incur all costs associated with retesting.

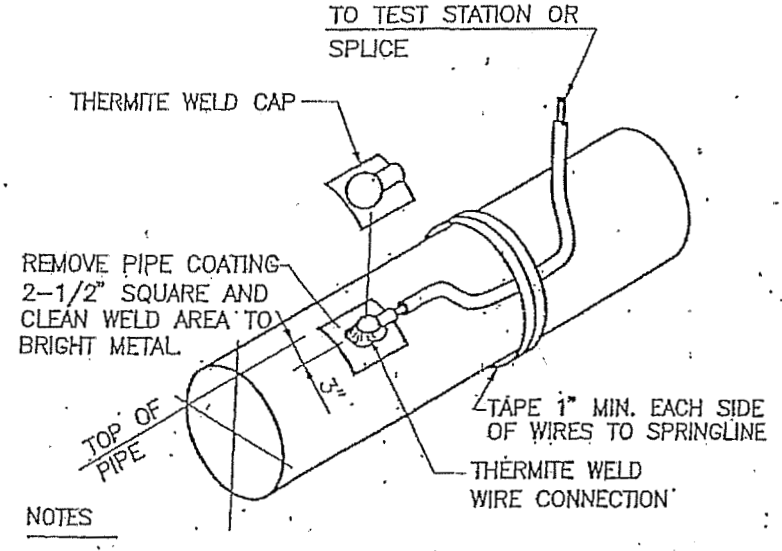
4. The tester will determine if additional AC interference mitigation is required and provide recommendations to District, as required.

5. All of the field data shall be tabulated and presented in a typed report. The report must include an evaluation of the field data, analysis of data, recommendations for system monitoring and operation and maintenance instructions.



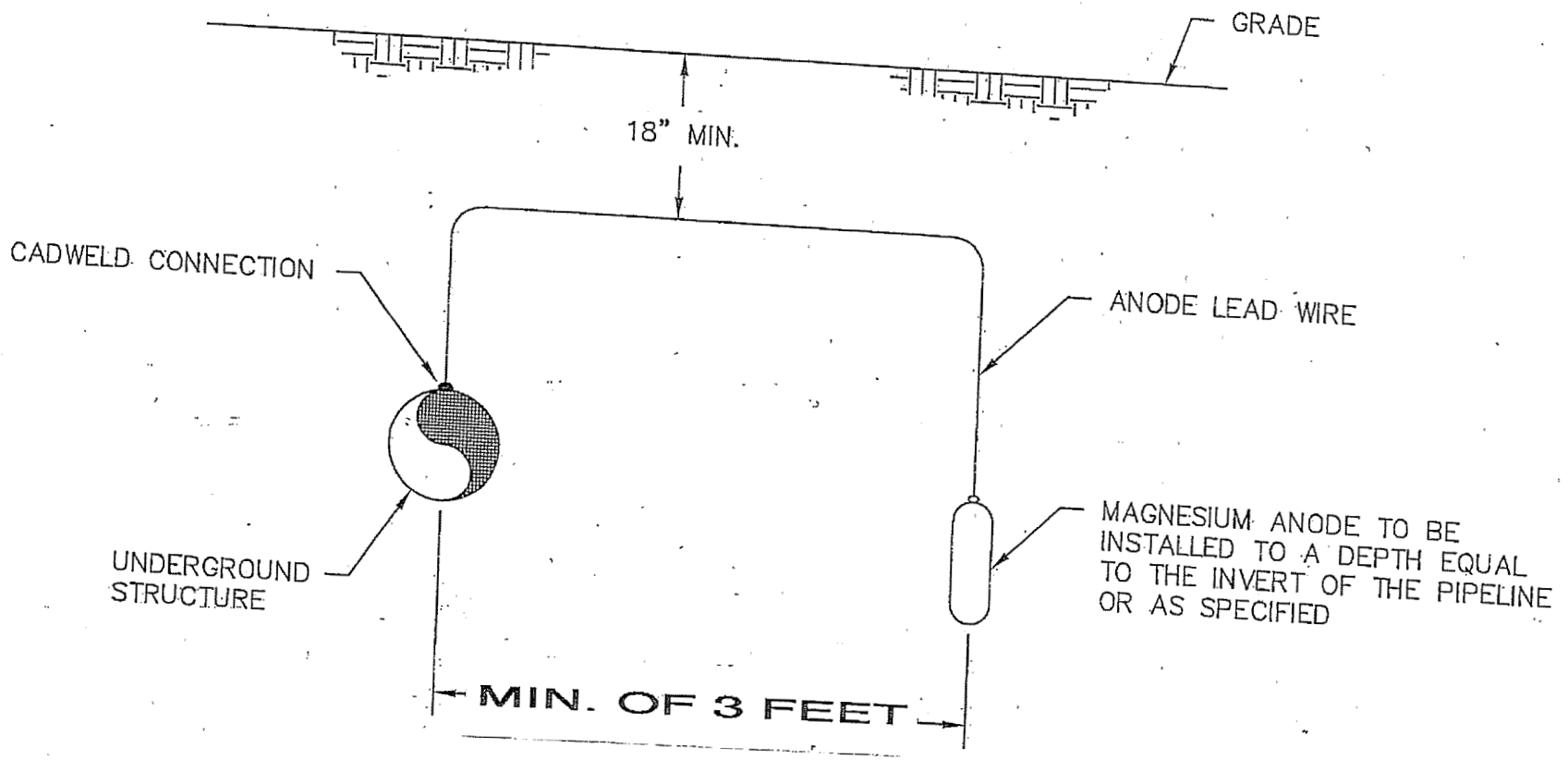
NOTES:

1) WIRE CONNECTIONS AND REFERENCE CELL SHALL BE LOCATED AT THE NEAREST PIPE JOINT.
2) LEAVE SUFFICIENT SLACK IN LEAD WIRES TO ALLOW COMPLETE REMOVAL OF TERMINAL BLOCK.
3) ALL TEST WIRES SHALL BE STRANDED COPPER WIRE OF SIZE INDICATED WITH THWN INSULATION.



NOTES

1) USE CHARGE AND SIZE AS RECOMMENDED BY THERMITE WELD MANUFACTURER.
2) SECURE WIRE TO PIPE WITH TAPE OR OTHER ACCEPTABLE METHOD WITHOUT DAMAGING PIPE COATING.
3) COAT BARE WELD AREA AND APPLY CAP TO WELD PER MANUFACTURER'S RECOMMENDATIONS.
4) WRAP PIPE WITH 8-MIL THICK POLYETHYLENE ENCASEMENT PER AWWA C105.


GRADE
18" MIN.
CADWELD CONNECTION
ANODE LEAD WIRE
UNDERGROUND STRUCTURE
MAGNESIUM ANODE TO BE INSTALLED TO A DEPTH EQUAL TO THE INVERT OF THE PIPELINE OR AS SPECIFIED
MIN. OF 3 FEET

CONSULTING SERVICES – FINAL REPORT

36" REDUNDANCY PROJECT, PART 2

HORSEBRANCH ROAD

EDGEWOOD, KENTUCKY

Prepared for: **Northern Kentucky Water District**

Thelen Project No.: **090212E**

THELEN ASSOCIATES, INC.

Geotechnical • Testing Engineers

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September 28, 2009

Northern Kentucky Water District
2835 Crescent Springs Road
P. O. Box 18640
Erlanger, Kentucky 41018-0640

Attn: Mr. John Scheben

Re: Consulting Services – Final Report
36" Redundancy Project, Part 2
Horsebranch Road
Edgewood, Kentucky

Ladies and Gentlemen:

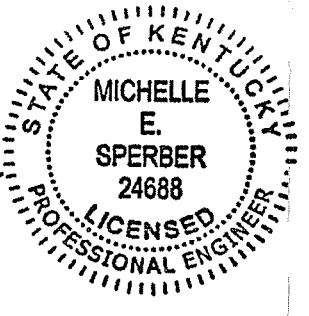
Summarized in this final report are our recommendations for Part 2 of the Dudley Discharge 36" Redundancy Project along Horsebranch Road in Edgewood, Kentucky. These recommendations are based on our engineering reconnaissance, a records review of projects previously performed by us in the vicinity of the alignments (Thelen Project Nos. 92034E, 92437T and 87323E), and a review of the updated Project Plans prepared by Cardinal Engineering Corporation (CEC), drawings dated June 3, 2009

Our services were authorized through Work Order No. 12 of the Geotechnical Engineering 2007 Contingency Services Agreement between the Northern Kentucky Water District (NKWD) and Thelen Associates, Inc. (Thelen). Work Order No. 12 had an effective date of March 11, 2009 and we received it on March 24, 2009. Our consulting services are outlined in our Proposal-Agreement No. K29048, dated February 25, 2009.

We have included in the Appendix to this report a reprint of "Important Information About Your Geotechnical Engineering Report" published by ASFE, Professional Firms Practicing in the Geosciences, which our firm would like to introduce to you at this time.

We appreciate the opportunity to provide our consulting services for Part 2 of the Dudley Discharge 36" Redundancy Project along Horsebranch Road in Edgewood, Kentucky. Should you have any questions concerning the information, conclusions or recommendations contained in this report, please do not hesitate to contact us.

Respectfully submitted,
THELEN ASSOCIATES, INC.



Michelle E. Sperber, P.E.
Staff Geotechnical Engineer

Theodore W. Vogelpohl, P.E.
Principal Geotechnical Engineer

MES/TWV:mes
090212E

Copies submitted: 2 – Client
2 – Cardinal Engineering Corporation (one unbound copy)

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September 28, 2009

CONSULTING SERVICES – FINAL REPORT
36" REDUNDANCY PROJECT, PART 2
HORSEBRANCH ROAD
EDGEWOOD, KENTUCKY

1.0 INTRODUCTION

Summarized in this report are our recommendations for Part 2 of the Dudley Discharge 36" Redundancy Project along Horsebranch Road in Edgewood, Kentucky. The scope of our geotechnical services included an engineering reconnaissance of the proposed alignments, a records review of projects previously performed by us in the vicinity of the proposed alignments (Thelen Project Nos. 92034E, 92437T and 87323E) and a review of the Project Plans prepared by Cardinal Engineering Corporation (CEC). The CEC Project Plans were originally dated January 7, 2008 with a latest revision date of June 3, 2009. The CEC Project Plans are titled "Dudley Discharge 36" Redundancy Project, Part 2, Edgewood, Kentucky".

Test borings were not performed as part of our consulting services on this project due to the fact that we have previously performed numerous test borings in the area of the proposed alignments for past projects. More specifically, we performed a geotechnical exploration and construction review services before and during the construction of Horsebranch Road, as well as exploration for the Dudley Pump Station. The conclusions and recommendations contained in this report regarding the water main alignments and depths are based on our engineering reconnaissance, a review of the previously drilled test borings and cross-section drawings and a review of the CEC Project Plans.

2.0 PROJECT CHARACTERISTICS

The proposed alignments are shown on the previously mentioned CEC Project Plans. Part 2 of this project will include approximately 1,883 linear feet of water main along Horsebranch Road and 162 linear feet of water main at the top of the hill at the Dudley Road Pump Station. The portion of the proposed main along Horsebranch Road will begin south of the intersection with Horsebranch Road and Orphanage Road where Part 1 of the project including another 36-inch diameter main is currently under design coming down the hillside below the Dudley Road Pump Station, crossing Horsebranch Creek to the west side of Horsebranch Road.

It is our understanding that all of the pipe will be 36-inch diameter, Class 51, ductile iron pipe with polywrap encasement and at least 42 inches of soil cover. The depths of the proposed water main are expected to vary along the alignment due to constraints caused by local geology, existing utilities and other construction-related features. Throughout this report, "normal depth" refers to at least 3.5 feet of soil cover above the top of the pipe.

Specific descriptions of the proposed water main installation and our recommendations are provided on a station-to-station basis in the Conclusions and Recommendations Section of this report. This report only addresses the geotechnical issues for the water main project.

3.0 ENGINEERING RECONNAISSANCE

Our Mrs. Michelle E. Sperber, P.E. performed a reconnaissance of the proposed alignments in order to note any areas of existing or potential instability, and soil and/or bedrock outcrops along the alignment. Mrs. Sperber used the January 14, 2009 CEC Project Plans during the engineering reconnaissance. During the reconnaissance, Mrs. Sperber noted soil and bedrock exposures, steep existing slopes, evidence of ground movement and the general terrain. Specific details of the engineering reconnaissance are described on a station-to-station basis in the Conclusions and Recommendations

Section of this report, which refers to the stationing system shown on the updated June 3, 2009 CEC Project Plans.

4.0 SUBSURFACE EXPLORATION

No new test borings were made specifically for this water main alignment. Rather, test borings made near the alignment for several previous projects were adopted for this project. These include Test Borings 28 through 38, including Test Boring 28A, which were performed along the originally proposed extension and re-alignment of Horsebranch Road in March of 1992 as part of Thelen Project No. 92034E. In addition, test borings were also previously performed at the top of the hill by the existing water tanks and pump station. Test Borings 1 through 4 were drilled here as part of Thelen Project No. 87323E for a proposed storage tank addition and Test Boring 3 was drilled as part of Thelen Project No. 030875E for Part 1 of the redundancy project where three (3) parallel mains will extend from the Dudley Tanks down the hillside toward Horsebranch Creek. The reader is cautioned that these test borings were made from ground levels that existed before the project improvements were made, that grade changes were made as part of the project improvements, and that these grade changes need to be taken into account when estimating from the boring logs the ground conditions that will be encountered for this water main project.

A station and offset has been assigned to each test boring based on the CEC Project Plans. The locations are summarized on the following page in Table 1 - Test Boring Locations.

The test borings were made with a truck-mounted or track-mounted drill rig advancing continuous flight augers. Standard split spoon and Shelby tube sampling was accomplished ahead of the augers in accordance with the procedures outlined in ASTM D1586 and D1587.

Concurrent with the drilling operation, the Drilling Technician prepared the field test boring logs of the subsurface profile noting soil and bedrock types and depths,

penetration test resistances (N-values), soil and bedrock stratifications and ground water levels or the lack thereof.

TABLE 1

Test Boring Locations

Test Boring No.	Street	Station	Offset
28-92034E	Horsebranch Road	26+54	18' Left
28A-92034E	"	26+57	36' Right
29-92034E	"	23+18	7' Right
30-92034E	"	23+31	50' Right
31-92034E	"	23+16	44' Left
32-92034E	"	18+45	11' Right
33-92034E	"	18+45	45' Right
34-92034E	"	18+47	42' Left
35-92034E	"	16+00	15' Left
36-92034E	"	12+92	25' Left
37-92034E	"	11+80	60' Left
38-92034E	"	11+30	52' Left
1-87323E	Top of Hill	40+31	25' Left
2-87323E	"	40+09	94' Left
3-87323E	"	40+94	138' Left
4-87323E	"	41+45	62' Left
3-030875E	"	39+42	26' Left

Following the completion of the test borings, the samples were returned to our Soil Mechanics Laboratory where they were reviewed and visually classified by the Project Geotechnical Engineer. Final test boring logs were prepared based on the Drilling Technician's field logs and the Engineer's visual classification of the samples. Copies of these logs can be found in the Appendix along with a Soil Classification Sheet describing the terms and symbols used in their preparation.

The dashed lines on the test boring logs identify the changes between the soil and bedrock types, which were determined by interpolation between samples and should be considered approximate. Only changes that occur within samples can be precisely

determined and are indicated by solid lines on the logs. The transition between soil and bedrock types may be abrupt or gradual.

5.0 SUBSURFACE CONDITIONS

Specific subsurface conditions were identified only in limited areas along the alignments. The following is a general discussion of the subsurface profiles encountered in the test borings.

5.1 General Subsurface Profiles

5.1.1 Horsebranch Road

The test borings originally performed along Horsebranch Road encountered a general subsurface profile consisting of 0 to 5 inches of topsoil; over 0 to 10 feet of undocumented fill including silty clays and clays with limestone floaters, shale fragments, pieces of wood and asphalt, topsoil and crushed stone; followed by 0 to 10 feet of native overburden clay or silty clay, followed by the interbedded shale and limestone bedrock. It should be recognized that these test borings were drilled prior to the construction of, and regrading for, Horsebranch Road; therefore, the depths and thicknesses of soil and bedrock types shown on the attached test boring logs do not necessarily reflect depths and thicknesses from the existing ground surface. Currently, the subsurface conditions include variable thicknesses of compacted and tested fill consisting of silty clay, plastic clay and/or brown or gray shale with some limestone floaters placed during construction of Horsebranch Road, and areas of very shallow bedrock where cuts were made during the re-construction of Horsebranch Road. The test boring logs must be adjusted for the difference between existing ground elevations and the elevations at the time the test borings were made in order to assess the subsurface conditions along the alignment.

5.1.2 Top of Hill At Storage Tanks

The test borings performed at the top of the hill encountered a general subsurface profile consisting of 0 to 5 inches of topsoil, over 0 to 2 feet of artificial fill, followed by 0 to 2 feet of native residual clay and finally by the interbedded shale and limestone

bedrock. Currently, the subsurface conditions include variable thickness of fill consisting of silty clay, plastic clay and/or brown or gray shale with some limestone floaters placed during construction of the storage tanks, and areas of shallow bedrock where cuts were made during the construction of the storage tanks. The test boring logs must be adjusted for the difference between existing ground elevations and the elevations at the time the test borings were made in order to assess the subsurface conditions along the alignment.

5.2 Artificial and Undocumented Fill

Two (2) types of fill may be encountered during trench excavations for the proposed water main. Type I consists of artificial fill that was placed as compacted and tested, controlled fill. Type I fill consists of the native overburden silty clay and clay, along with shale from all three (3) zones of the bedrock and possible limestone floaters that was placed during the re-construction of Horsebranch Road. The Type I fill has consistencies that are stiff or very stiff. The Type I fill was not sampled with test borings as the test borings were performed prior to re-construction of Horsebranch Road.

Type II fill consists of undocumented fill that was in-place beneath old Horesebranch Road, prior to the re-construction of Horsebranch Road. This fill is comprised of mixed dark brown and/or brown, silty clay and/or shale with and without topsoil, roots, asphalt fragments and limestone floaters. The Standard Penetration Resistances (N-values) encountered within the test borings widely ranged from 7 to greater than 50 blows per foot (bpf). It is our opinion that the higher N-values were elevated due to encountering limestone floaters larger than the size of the sampler opening. It should also be noted that some of this material may have been undercut from below the new roadway area as part of the earthwork operations of the Horsebranch Road construction.

5.3 Native Alluvial Terrace Deposits

Alluvial terrace deposits are soils that have been laid down by meandering stream flow in the valley bottom. These soils primarily consist of silty clay with iron oxide stains and variable concentrations of limestone fragments and floaters. These terrace deposits are

medium stiff to stiff with N-values ranging from a low of 18 bpf to more than 50 blows for less than 6 inches of sampler penetration because of the presence of the limestone floaters.

5.4 Native Colluvial and Residual Soils

Colluvium is a transported soil that has been deposited on the slopes of hillsides from weathering and degradation of the shale and limestone bedrock and movement down the slopes to form talus deposits on the hillsides. These soils are recognized by the random orientation of the shale fragments and limestone floaters included in a relatively dense clay matrix. Residuum is a soil that has weathered from the underlying shale and limestone bedrock and can be recognized by traces of horizontal bedding planes.

The native overburden clay and silty clay was primarily brown in color, with occasional traces of gray and with and without iron oxide stains, shale fragments and limestone fragments and floaters. The N-values for the medium stiff soil ranged from 3 to 9 bpf and 17 to greater than 50 bpf for the stiff to very stiff soil. The higher N-values were due to encountering limestone floaters larger than the size of the sampler opening.

5.5 Bedrock

The bedrock beneath the fill and the native overburden soil is a system of Ordovician Aged shale and limestone. This type of bedrock is typically classified into three distinct zones separated by the extent of weathering of the shale portion of the bedrock. The uppermost zone is termed highly weathered interbedded shale and limestone, where the shale portion has virtually weathered to a brown silty clay or clay, yet possesses horizontally aligned bedding characteristics of the bedrock system. Occasional clay seams were also observed in the highly weathered zone of bedrock. The intermediate zone is described as an olive brown weathered bedrock and is characterized by a shale component which is tougher, and generally at a lower moisture content, than the highly weathered zone. The upper and intermediate zones have weathered from the third commonly accepted zone, the unweathered, gray, parent interbedded shale and limestone. Highly weathered and weathered zones, locally, may or may not be present

above the unweathered bedrock zone because of variable weathering and erosion conditions. The limestone layers within all three (3) zones of the bedrock are relatively unweathered and hard in comparison to the shale portion of the bedrock.

According to the USGS Quadrangle Map in the vicinity of the alignment, the bedrock type near the ground surface along Horsebranch Road is of the Kope Formation. The Kope Formation is described as approximately 85 percent shale and 15 percent limestone. The shale is described as laminated and locally cross-laminated, commonly fissile, in beds less than 1 inches thick to sets as thick as 8 feet with abundant fossils. The limestone is described as 3 to 6 inches thick, uneven tabular beds. The bedrock type near the ground surface on the top of the hill is mapped as the Fairview Formation. The Fairview Formation is described as interbedded shale and limestone in beds generally less than 6 inches thick and rarely thicker than 15 inches with shale being 45 to 60 percent of the formation and limestone comprising 40 to 55 percent of the formation.

5.6 Groundwater

All of the test borings were noted to be dry during drilling, upon completion of drilling and up to 75 hours after the completion of drilling in the holes that were not immediately backfilled. Individual groundwater measurements can be found at the bottom of each test boring log. Based on our local experience, groundwater can be encountered at various times of the year as perched water within the fill, at the fill soil/native soil interface, at the native soil/bedrock interface and along limestone layers within the bedrock.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 General

Based upon our engineering reconnaissance of the proposed water main alignments, a review of the previously performed test borings, our understanding of the proposed construction, and our experience as Consulting Soil and Foundation Engineers in the

Northern Kentucky Area, we have reached the conclusions and make the recommendations in this report.

The conclusions and recommendations of this report have been derived by relating the general principles of the discipline of Geotechnical Engineering to the proposed construction outlined by the Project Characteristics section of this report. Because changes in surface, subsurface, climatic, and economic conditions can occur with time and location, we recommend for our mutual interest that the use of this report be restricted to this specific project.

Our understanding of the proposed design and construction is based on the documents provided to us at the time this report was prepared and which are referenced in the Project Characteristics section of this report. We recommend that our office be retained to review the final design documents, plans, and specifications to assess any impact changes, additions or revisions in these documents may have on the conclusions and recommendations of this Geotechnical Report. Any changes or modifications which are made in the field during the construction phase which alter the water main alignment or depths or other related site work should also be reviewed by our office prior to their implementation.

If conditions are encountered in the field during construction which vary from the facts of this report, we recommend that our office be contacted immediately to review the changed conditions in the field and make appropriate recommendations.

The scope of our services did not include any environmental assessment or investigation for the presence or absence of wetlands or hazardous or toxic materials in the soil, bedrock, surface water, groundwater or air, on or below or around this site.

We have reviewed the previously performed test borings for our evaluation of the site conditions and for the formulation of the conclusions and recommendations of this

report. We assume no responsibility for the interpretation or extrapolation of the data by others.

The earthwork recommendations of this report presume that the earthwork will be monitored by an Engineering Technician under the direction of a Registered Professional Geotechnical Engineer. We recommend that the Owner contract these services directly with Thelen Associates, Inc.

The proposed water main installation and the terrain that exists along the proposed alignments were reviewed on a station-by-station basis and are discussed individually in Sections 6.2 through 6.7 of this report. Section 6.8 contains general recommendations for placement and compaction of trench backfill. Section 6.9 contains recommendations regarding thrust restraint.

6.2 Station 10+00 (Beginning of Alignment) to Station 11+00

The Project Plans indicate that the water main will be located about 5 to 27 feet off the west side of the road throughout this section. The ground surface along the west side of the road is a moderate cut slope down to a drainage ditch along the road. Hillside creep movement was observed on the cut slope during our reconnaissance, as evidence by a leaning power pole. The Horsebranch Creek is located along the east side of the road throughout this section.

The alignment profile on the Project Plans indicates that the water main trench excavations will be as deep as 10 to 13 feet in this section. Based on the closest test boring, Test Boring 38, we anticipate that the bottoms of the excavations may be into the interbedded shale and limestone bedrock or in stiff native silty clays with limestone floaters.

Based on the hillside creep movement and the Project Plans showing the water main along the toe of the slope, we recommend that the open, unbackfilled trench length be

limited as necessary to prevent movement of or damage to the slope above the trench and the nearby pavement and utilities.

6.3 Station 11+00 to Station 12+00

The Project Plans indicate that the water main will remain on the west side of the road and will cross a tributary of the Horsebranch Creek in this section. The ground surface is relatively flat along the alignment in the beginning of this section until about Station 11+30, where the northern bank of the creek crossing begins. The northern bank of the creek was observed to have a concrete cover. The southern bank of the creek crossing ends at about Station 11+90. The Horsebranch Creek is located along the east side of the road throughout this section. The proposed alignment crosses Right Fork Road between Stations 11+90 and 12+13.

The alignment profile on the Project Plans indicates that the water main trench excavations will be as deep as 6.5 feet below the creek bottom and as deep as 7 to 10 feet on the banks. Test Borings 37 and 38 encountered the top of the interbedded shale and limestone bedrock at Elevations 558.5 and 556.0 feet, respectively.

It is our opinion that the water main in this section can be installed at the location and depth shown on the Project Plans. We also recommend that a concrete encasement be installed at the creek crossing and that a note should be added to the Final Project Plans.

6.4 Station 12+00 to Station 16+00

The Project Plans indicate that the water main will be located about 27 feet off the west side of the road at Station 12+00 and will transition to about 6.5 feet west of the west edge of Horsebranch Road by Station 12+70. The water main will remain about 5 to 10 feet west of the west edge of Horsebranch Road throughout this section.

A drainage ditch is located along the west edge of the road throughout this section and the ground surface is relatively flat or very gently sloping upward away from the road on

the west side of the road. The Horsebranch Creek remains along the east side of the road throughout this section. The proposed alignment will primarily be installed between the drainage ditch and the edge of the road.

Based on the profile, the water main trench excavations will be as deep as 7 to 8 feet in this section. Based on the closest test borings in this section, Test Borings 35 and 36, and the proposed invert levels shown on the profile alignment of the Project Plans, it is anticipated that the water main trench excavations will be into the interbedded weathered to unweathered shale and limestone bedrock.

It is our opinion that the water main can be installed at the location and depth shown on the Project Plans.

6.5 Station 16+00 to Station 28+00

The Project Plans indicate that the proposed alignment will remain 0 to 18 feet off the west side of the road between the edge of the road and the drainage ditch throughout this section. The ground surface along the west side of the road is very gently sloping downward toward the drainage ditch and then a steep cut slope upward away from the ditch throughout this entire section.

Shallow ground surface slumps were observed near the top of the cut slope where the overburden is sliding off the top of the bedrock. Small areas of toe bulge were observed where the overburden soil meets the exposed bedrock on the cut slope. Leaning, swept and bowed trees were also observed on the upper portion of the slope. Several drainage paths where erosion slots have been cut into the overburden soil were observed. The bottom portion of the cut slope, above the drainage ditch, exposed the interbedded unweathered gray shale and limestone bedrock until about Station 20+00. From this point, the interbedded brown highly weathered to weathered shale and limestone bedrock was exposed in the bottom portion of the slope until the end of this section.

A review of the cross sections from the re-construction of Horsebranch Road indicates that this section of the road was built by making a cut across the entire road, or by making a cut on the west side of the road and a fill on the east side of the road. The profile alignment on the Project Plans indicates that the water main trench excavations will extend as deep as 7 to 11 feet. The previously performed test borings in this section, Test Borings 28 through 35, including Test Boring 28A, indicate that the water main excavations throughout this section will primarily expose the interbedded shale and limestone bedrock, with the majority of the excavations extending into the interbedded unweathered gray shale and limestone bedrock.

It is our opinion that the water main can be installed at the location and depth shown on the Project Plans.

6.6 Station 28+00 to Station 28+83 (End of Alignment on Horsebranch Road)

The Project Plans show that the water main will be installed about 5 to 7 feet off the west edge of the road throughout this section. The ground surface along the west side of the road is a broad drainage swale with a headwall where a drainage culvert crosses the road and then a moderate cut slope above the broader drainage swale. Limestone rip rap was observed on the north bank of the culvert crossing and both banks of the culvert crossing were gentle. The writer did not observe good exposure of the bedrock on the cut slope in this section.

The profile alignment on the Project Plans indicates that the water main excavations will extend as deep as 7 to 15 feet in this section, with a difficult section near Station 28+58 where the proposed water main will cross underneath an existing 36-inch diameter water main.

No test borings were previously performed in this section, but it is anticipated that the water main trench excavations will penetrate the stiff native soil and extend into the interbedded shale and limestone bedrock.

The water main trench excavations throughout the project, including this section, must be made in a manner that provides for the safety of workers in the excavations and protects existing ground, pavement, structures and infrastructure adjacent to the excavations from damage, including but not limited to the nearby headwall, culvert and existing 36-inch storm sewer and the existing 36-inich diameter water main. The excavations should be braced, shored, sloped or otherwise stabilized in a manner that satisfies all safety concerns and all federal, state and local regulations. The responsibility of maintaining safe working conditions in the excavations and for protecting ground, structures and infrastructure adjacent to the excavations should be the Contractor's. The Contractor should be responsible for maintaining the stability of the existing water main during the proposed water main installation process. The existing 36-inch diameter storm sewer and water main must be protected, braced, supported and maintained in-service during construction of the water main, and must be resupported with compacted bedding and backfill as the water main work is completed.

6.7 Station 40+00 to Station 41+62 (Top of Hill Alignment)

The Project Plans indicate that another section of the proposed 36-inch diameter water main will connect to the Part 1 Section of this project at the top of the hill near the Dudley Tanks. This portion of the Part 2 project will begin at Station 40+00 by connecting to the end of the 36-inch diameter water main as proposed in Part 1 of the project at the top of the hill by the Dudley Tanks. The proposed alignment will continue to the east between the fence around the southernmost tank and the fence around the existing cell tower to the south of the tanks. The alignment will end near the access road by teeing into the existing 36-inch diameter concrete main. A short concrete retaining wall is located along the outer security fence for the water tank.

Three (3) test borings were previously performed in the vicinity of this alignment, Test Boring 3 (030875E) and Test Borings 1 and 4 (87323E). These test borings indicate that the top of the bedrock ranges from about 2 to 4 feet below the existing grades at the time of the boring. The Project Plans indicate that the water main trench excavations will be as deep as about 7 feet in this section.

It is our opinion that the water main can be installed in either the stiff native soils or the bedrock, whichever is encountered at the location and depth shown on the Project Plans. It should be noted that the existing concrete retaining wall may have to be removed for construction of the water main. The Contract Documents should address the removal and replacement of this wall as part of this project.

The water main trench excavations throughout the project, including this section at the top of the hill, must be made in a manner that provides for the safety of workers in the excavations and protects existing ground, pavement, structures and infrastructure adjacent to the excavations from damage, including but not limited to the existing concrete retaining wall, the water tank, the fences and associated cell tower structure foundations. The excavations should be braced, shored, sloped or otherwise stabilized in a manner that satisfies all safety concerns and all federal, state and local regulations. The responsibility of maintaining safe working conditions in the excavations and for protecting ground, structures and infrastructure adjacent to the excavations should be the Contractor's.

6.8 General Excavating and Backfilling Recommendations

The excavations throughout this project will encounter a variety of materials. Those materials will include artificial fill (comprised primarily of silty clay, clay and shale), native silty clay and clay soils, and interbedded shale and limestone bedrock. Limestone floaters were also encountered within the fill and within some of the native soils. Experience indicates that the difficulty of completing the excavations in the bedrock usually far exceeds the difficulty of excavating in the fill materials and the native silty clays. The difficulty of making bedrock excavations is primarily related to the amount and thickness of the limestone layers in the bedrock as well as the degree of weathering. The Contractor should be aware of the presence of the bedrock and should be prepared for the difficulty that the bedrock may present in the excavations.

The scope of this project involved a review of subsurface explorations that were performed to define specific subsurface conditions in widely spaced areas along

Horsebranch Road or at the top of the hill, which represent a limited percentage of the total project length. Therefore, we recommend that the specifications for this project be based on unclassified excavation, not on separate cost items for soil excavation and bedrock excavation. The base bid for the project should include the cost of excavating the materials encountered within the specified water main depths, regardless of soil or bedrock characteristics.

It is difficult to shear limestone layers neatly in the sides of trench excavations. Frequently, when limestone layers are encountered at relatively shallow depths in trench excavations, the tendency is for the layers not to break even with the sides of the excavations, but rather to be pulled up in large chunks, which tend to heave and ravel the soils outside the limits of the intended trench. Where trench excavations will be made immediately adjacent to or near the edge of the existing pavement with the intention of not disturbing the existing pavement beyond the trench limits, it should be anticipated that there will be some areas where there is heave and raveling due to removal of limestone layers that could damage pavement adjacent to the trench, and said pavement will have to be restored.

We expect that the excavated materials, exclusive of the thick limestone layers, can be used as backfill after the appropriate granular pipe bedding and backfill is installed. Fill materials should not include asphalt, concrete, trash, construction or demolition debris, topsoil or frozen material. Large pieces of limestone, which tend to nest or retard compaction, should be excluded from the backfill. Smaller pieces of limestone that can be broken up and dispersed so that they do not nest or retard compaction can be incorporated in the backfill provided that proper protection of the pipe from these pieces of limestone is provided.

The trench excavations for the project will extend a minimum of about 7.0 feet deep. There are areas where the water main will be lowered for bedrock embedment requirements and conflicts with other utilities or infrastructure as shown on the Final CEC Project Plans and as discussed in this report. The Contractor should be

responsible for the stability and safety of all excavations and should exercise all necessary precautions to shore, slope or otherwise maintain stable trench excavations to protect workers, slopes above and below the trenches, adjacent pavement and structures, and infrastructure. These trenches should be made and maintained in accordance with all Federal, State and Local regulations.

Normal and recommended utility construction practice is to bed and backfill pipes with granular fill to a specified height above the crown of the pipe. Compaction of trench backfill to a moist, firm, dense condition is important throughout the alignments. If clayey backfill can be used within or adjacent to the pavement, we recommend that all clayey soil backfill for this project be placed in shallow level layers, 6 to 8 inches in thickness, and be compacted to densities not less than 95 percent of the standard Proctor maximum dry density, ASTM D698. The clayey backfill soils should be moisture-conditioned to within the range of 2 percent below to 3 percent above the optimum moisture at the time of compaction. All shale should be pulverized to a soil-like consistency and moisture conditioned the same as a soil. Where granular fill is used, it should be compacted to at least 75 percent relative density using ASTM D4253 and D4254 test methods. Density tests should be made in the backfill to document that the recommended degree of compaction is being achieved.

6.9 Thrust Restraint

Thrust restraint is required at all horizontal and vertical bends, tees, dead end plugs, fire hydrants and other fittings for this entire pipeline project. Thrust restraint can be provided at horizontal and vertical bends by full-sized concrete thrust blocks or by a combination of restrained joint pipe and modified thrust blocks of reduced size. For vertical bends that will have thrust forces acting out of the ground throughout the project, we recommend that restrained joint pipe and modified blocks be implemented.

It is our understanding that NKWD and CEC are still deciding which specific bends will be restrained. If restrained joint pipe is going to be installed and the reduced blocks are going to be implemented, the required length of restrained joint pipe needs to be

calculated based on the working pressure of the system. The following Table 2 is a list of the horizontal and vertical bends that need to be restrained due to thrust forces acting toward existing utilities or upward out of the ground. We also recommend that the 45-degree bend at the beginning of the alignment be restrained due to the fact that the standard thrust block size is very large for this pressure system and pipe size.

TABLE 2

Bends Requiring Restrained Joint Pipe

Station	Diameter of Bend (inches)	Type of Bend	Degree of Bend
10+00	36	Horizontal	45
12+08	36	Vertical	11.25
12+70	36	Horizontal	22.5
21+96	36	Horizontal	11.25
28+83	36	Vertical	22.5

Based on a working pressure of 225 pounds per square inch (psi) and a maximum test pressure of 325 psi, we have calculated the required length for restrained joint pipe for both horizontal and vertical bends specific to this project. It is noted that the 45-degree bend at the beginning of the alignment at Station 10+00 will require restrained joint pipe on the other (east) side of the bend before the beginning of this project for a distance of at least 72 feet. In addition, the 11.25-degree vertical bend at Station 12+08 will require 54 feet of restrained joint pipe on either side of this vertical bend. This will mean that restrained joint pipe will have to be installed between Stations 9+28 and 10+72 and again between Stations 11+54 and 12+62, leaving an 82-foot section of pipe that could potentially be standard pipe. The 22.5-degree horizontal bend at Station 12+70 will require 36 feet of restrained joint pipe on either side of the bend; however, this will overlap with the previous restrained section. Therefore, restrained joint pipe will need to be installed between Stations 12+62 and 13+34. To summarize, restrained joint pipe will be required between Stations 9+28 and 10+72 and again between Stations 11+54 and 13+34.

It is also noted that the thrust force generated by the bends at Station 10+80 and 11+90 are not accounted for in the restrained joint sections described above, therefore, standard blocks will be required at these bends. Alternatively, the pipe could be fully restrained from Stations 9+28 to 13+96, and the reduced thrust blocks could then be used at Stations 10+80 and 11+90.

It is noted that the Project Plans show an existing sanitary sewer easement where the thrust forces for the 11.25-degree bend at Station 21+96 will be acting. The Project Plans also show that a sanitary sewer is located on the east side of the road. If it is determined that there is an existing sanitary sewer within that easement, 18 feet of restrained joint pipe will need to be added to both sides of the bend at Station 21+96, and a reduced thrust block may be used.

Restrained joint pipe will also need to be installed between Stations 28+17 and 30+73, in order to handle the thrust forces of the 22.5-degree vertical bend at Station 28+83, taking into account the vertical offset configuration. Figure 3 can be used for the vertical concrete thrust blocks.

Figure 1 is provided in the Appendix to this report, which details the required reduced thrust block sizes **to be used only in conjunction with the restrained joint pipe**. The standard NKWD block details for horizontal bends do not include the 36-inch pipe size. Figure 2 is provided in the Appendix to this report, which details the required thrust block sizes to be used in conjunction with standard push-on joint pipe. Figure 3 is provided in the Appendix to this report as well, which details the required volumes for vertical blocks **when used in conjunction with restrained joint pipe**. Figure 4 is provided in the Appendix to this report, which details volumes for vertical blocks when used in conjunction with standard push-on joint pipe.

If it is desired to use reduced size blocks anywhere else on this project, we recommend that the required restrained joint lengths be calculated for each specific bend.

APPENDIX

ASFE Report Information

Test Boring Logs 28 through 38 – 92034E

Test Boring Logs 1 through 4 – 87323E

Test Boring Log 3 – 030875E

Soil Classification Sheet

Figures 1 through 4

Important Information about Your

Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you* — should apply the report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual

Station 26+54, Offset 18' Left

CIVIL ENGINEERS

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LOG OF TEST BORING

CLIENT James W. Berling Engineering Company BORING # 28
PROJECT Geotechnical Exploration, Horsebranch Road Extension to Medical Village JOB # 92034E
LOCATION OF BORING Station 47+00 Offset: Centerline Drive, Kenton County, Kentucky

ELEV	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRA. DEPTH	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec.
616.0	SURFACE	0.4						
	Mixed dark brown moist soft FILL, silty clay and topsoil, trace roots and pieces of asphalt.			I	3/5/10	1A 1B	DS	12"
615.6				I	9/6/8	2	DS	18"
	Mixed brown and dark brown moist stiff to medium stiff FILL, silty clay, trace limestone and shale fragments.		5	I	6/7/7	3	DS	16"
609.0		7.0						
	Mixed dark brown, trace brown moist stiff FILL, silty clay, trace shale fragments, tree trunk at 9.0 to 10.0 feet.			I	7/8/41	4	DS	18"
606.0		10.0	10	I	50/2"	5	DS	2"
	Gray moist soft SHALE and thinly bedded LIMESTONE (bedrock).							
603.0		13.0		D	50/6"	6	DS	6"
	Refusal and bottom of test boring at 13.0 feet.		15					
			20					
			25					

Datum USGS
Surf. Elev. 616.0± Ft.
Date Started 3/5/92

Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Pipe Size O.D.2 In.

Hole Diameter 5"
Rock Core Dia.
Boring Method CFA

Foreman DFH
Engineer TWV
Date Completed 3/5/92

SAMPLE CONDITIONS
D – DISINTEGRATED
I – INTACT
U – UNDISTURBED
L – LOST

SAMPLER TYPE
DS – DRIVEN SPLIT SPOON
PT – PRESSED SHELBY TUBE
CA – CONTINUOUS FLIGHT AUGER
RC – ROCK CORE

GROUND WATER DEPTH
FIRST NOTED None FT.
AT COMPLETION Dry FT.
AFTER HRS. FT.
BACKFILLED Immed. HRS.

BORING METHOD
HSA – Hollow Stem Augers
CFA – Continous Flight Augers
DC – Driving Casing
MD – Mud Drilling

CIVIL ENGINEERS

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Station 26+57, Offset 36' Right

LOG OF TEST BORING

CLIENT James W. Berling Engineering Company BORING # 28A
PROJECT Geotechnical Exploration, Horsebranch Road Extension to Medical Village JOB # 92034E
LOCATION OF BORING Station 47+00 Offset: 55' Left Drive, Kenton County, Kentucky

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRA. DEPTH	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec.
626.6	SURFACE							
	Brown moist medium stiff CLAY, trace roots, shale fragments and limestone floaters	2.0		I	2/3/5	1	DS	10"
624.6	(colluvium).							
	Brown moist very stiff SILTY CLAY with	4.5		U		2	PT	11"
622.1	shale fragments, blocky structure (colluvium).		5					
	Brown to olive brown moist soft weathered SHALE and thinly bedded LIMESTONE (bedrock).			I	12/27/24	3	DS	16"
617.6		9.0		I	18/21/27	4	DS	17"
	Bottom of test boring at 9.0 feet.		10					
			15					
			20					
			25					

Datum USGS
Surf. Elev. 626.6± Ft.
Date Started 3/12/92

Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Pipe Size O.D.2 In.

Hole Diameter 5"
Rock Core Dia.
Boring Method CFA

Foreman KN
Engineer TWV
Date Completed 3/12/92

SAMPLE CONDITIONS
D – DISINTEGRATED
I – INTACT
U – UNDISTURBED
L – LOST

SAMPLER TYPE
DS – DRIVEN SPLIT SPOON
PT – PRESSED SHELBY TUBE
CA – CONTINUOUS FLIGHT AUGER
RC – ROCK CORE

GROUND WATER DEPTH
FIRST NOTED None FT.
AT COMPLETION Dry FT.
AFTER 24 HRS. Dry FT.
BACKFILLED 24 HRS.

BORING METHOD
HSA – Hollow Stem Augers
CFA – Continous Flight Augers
DC – Driving Casing
MD – Mud Drilling

BLOW COUNT MADE AT 6" INTERVALS

Station 23+18, Offset 7' Right

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LOG OF TEST BORING

CLIENT James W. Berling Engineering Company BORING # 29
PROJECT Geotechnical Exploration, Horsebranch Road Extension to Medical Village JOB # 92034E
LOCATION OF BORING Station 50+50 Offset: 26' Left Drive, Kenton County, Kentucky

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRA. DEPTH	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec.
618.9	SURFACE							
	Dark brown, moist medium stiff to stiff FILL, silty clay, trace charred wood.			I	3/4/6	1	DS	13"
				I	4/5/6	2	DS	16"
614.4		4.5						
	Brown moist very soft highly weathered SHALE and thinly bedded LIMESTONE (bedrock).		5	I	21/14/16	3	DS	13"
611.9		7.0						
	Gray moist soft SHALE and thinly bedded LIMESTONE (bedrock).	8.5		I	39/50/6"	4	DS	11"
			10					
	Refusal and bottom of test boring at 8.5 feet.							
			15					
	Note: A Shelby tube sample (PT-5) was obtained in an offset hole from 2' to 4'. Recovery was 11 inches.							
			20					
			25					

Datum USGS
Surf. Elev. 618.9± Ft.
Date Started 3/13/92

Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Pipe Size O.D.2 In.

Hole Diameter 5"
Rock Core Dia.
Boring Method CFA

Foreman KN
Engineer TWV
Date Completed 3/13/92

SAMPLE CONDITIONS
D – DISINTEGRATED
I – INTACT
U – UNDISTURBED
L – LOST

SAMPLER TYPE
DS – DRIVEN SPLIT SPOON
PT – PRESSED SHELBY TUBE
CA – CONTINUOUS FLIGHT AUGER
RC – ROCK CORE

GROUND WATER DEPTH
FIRST NOTED None FT.
AT COMPLETION Dry FT.
AFTER 31 HRS. Dry FT.
BACKFILLED 31 HRS.

BORING METHOD
HSA – Hollow Stem Augers
CFA – Continous Flight Augers
DC – Driving Casing
MD – Mud Drilling

BLOW COUNT MADE AT 6" INTERVALS

Station 23+31, Offset 50' Right

CIVIL ENGINEERS

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LOG OF TEST BORING

CLIENT James W. Berling Engineering Company BORING # 30
PROJECT Geotechnical Exploration, Horsebranch Road Extension to Medical Village JOB # 92034E
LOCATION OF BORING Station: 50+50 Offset: 70' Left Drive, Kenton County, Kentucky

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRA. DEPTH	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec.
623.0	SURFACE							
	Dark brown moist medium stiff to stiff SILTY CLAY, trace hairlike roots.	1.5		I	1/3/6	1	DS	16"
621.5				U		2	PT	10"
	Brown moist stiff CLAY, trace limestone fragments. (CH)	4.5	5	I	5/12/19	3	DS	16"
	Brown moist very soft highly weathered SHALE and thinly bedded LIMESTONE (bedrock).			I	12/21/37	4	DS	17"
613.5		9.5						
	Olive brown moist soft weathered SHALE and thinly bedded LIMESTONE (bedrock).	11.0	10	I	47/50/6"	5	DS	9"
612.0								
	Bottom of test boring at 11.0 feet.		15					
			20					
			25					

Datum USGS
Surf. Elev. 623.0± Ft.
Date Started 3/12/92

Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Pipe Size O.D.2 In.

Hole Diameter 5"
Rock Core Dia.
Boring Method CFA

Foreman KN
Engineer TWV
Date Completed 3/12/92

SAMPLE CONDITIONS
D – DISINTEGRATED
I – INTACT
U – UNDISTURBED
L – LOST

SAMPLER TYPE
DS – DRIVEN SPLIT SPOON
PT – PRESSED SHELBY TUBE
CA – CONTINUOUS FLIGHT AUGER
RC – ROCK CORE

GROUND WATER DEPTH
FIRST NOTED None FT.
AT COMPLETION Dry FT.
AFTER 29 HRS. Dry FT.
BACKFILLED 29 HRS.

BORING METHOD
HSA – Hollow Stem Augers
CFA – Continous Flight Augers
DC – Driving Casing
MD – Mud Drilling

Station 23+16, Offset 44' Left

CIVIL ENGINEERS

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LOG OF TEST BORING

CLIENT James W. Berling Engineering Company BORING # 31
PROJECT Geotechnical Exploration, Horsebranch Road Extension to Medical Village JOB # 92034E
LOCATION OF BORING Station 50+50 Offset 25' Right Drive, Kenton County, Kentucky

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRA. DEPTH	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec.
598.1	SURFACE							
	Mixed brown and black moist dense FILL, gravel, pieces of asphalt, shale fragments	2.0		D	50/5"	1	DS	5"
596.1	and limestone pieces.			D	17/30/52 /3"	2	DS	12"
	Brown moist stiff SILTY CLAY with limestone	5.0	5					
593.1	fragments and floaters and iron oxide stains.	6.5		I	18/30/50 /6"	3	DS	18"
591.6	Gray and olive brown moist soft weathered SHALE and thinly bedded LIMESTONE (bedrock).							
	Bottom of test boring at 6.5 feet.		10					
			15					
			20					
			25					

Datum USGS | Hammer Wt. 140 Lbs. | Hole Diameter 5" | Foreman DEH
Surf. Elev. 598.1 Ft. | Hammer Drop 30 In. | Rock Core Dia. | Engineer TWV
Date Started 3/4/92 | Pipe Size O.D.2 In. | Boring Method CFA | Date Completed 3/4/92

SAMPLE CONDITIONS
D – DISINTEGRATED
I – INTACT
U – UNDISTURBED
L – LOST

SAMPLER TYPE
DS – DRIVEN SPLIT SPOON
PT – PRESSED SHELBY TUBE
CA – CONTINUOUS FLIGHT AUGER
RC – ROCK CORE

GROUND WATER DEPTH
FIRST NOTED None FT.
AT COMPLETION Dry FT.
AFTER ____ HRS. ____ FT.
BACKFILLED Immed. HRS.

BORING METHOD
HSA – Hollow Stem Augers
CFA – Continous Flight Augers
DC – Driving Casing
MD – Mud Drilling

Station 18+45, Offset 11' Right

CIVIL ENGINEERS

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LOG OF TEST BORING

CLIENT James W. Berling Engineering Company BORING # 32
PROJECT Geotechnical Exploration, Horsebranch Road Extension to Medical Village JOB # 92034E
LOCATION OF BORING Station 55+50 Offset: 26' Left Drive, Kenton County, Kentucky

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRA. DEPTH	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec.
597.0	SURFACE	0.2						
596.8	TOPSOIL.	2.0		I	2/3/3	1A 1B	DS	16"
595.0	Brown, moist medium stiff to stiff SILTY CLAY, trace bedding planes and limestone floaters.		5	I	11/19/19	2	DS	17"
590.0	Brown moist very soft highly weathered SHALE and thinly bedded LIMESTONE (bedrock).	7.0		I	12/14/11	3	DS	16"
	Olive brown, some gray moist soft weathered SHALE and thinly bedded LIMESTONE (bedrock).		10	I	15/13/29	4	DS	15"
585.0		12.0		I	27/39/44	5	DS	17"
583.5	Gray moist soft to moderately tough SHALE and thinly bedded LIMESTONE (bedrock).	13.5	15	I	40/50/6"	6	DS	10"
	Refusal and bottom of test boring at 13.5 feet.		20					
			25					

Datum USGS
Surf. Elev. 597.0± Ft.
Date Started 3/17/92

Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Pipe Size O.D.2 In.

Hole Diameter 5"
Rock Core Dia.
Boring Method CFA

Foreman KN
Engineer TWV
Date Completed 3/17/92

SAMPLE CONDITIONS
D – DISINTEGRATED
I – INTACT
U – UNDISTURBED
L – LOST

SAMPLER TYPE
DS – DRIVEN SPLIT SPOON
PT – PRESSED SHELBY TUBE
CA – CONTINUOUS FLIGHT AUGER
RC – ROCK CORE

GROUND WATER DEPTH
FIRST NOTED None FT.
AT COMPLETION Dry FT.
AFTER 75 HRS. Dry FT.
BACKFILLED 75 HRS.

BORING METHOD
HSA – Hollow Stem Augers
CFA – Continous Flight Augers
DC – Driving Casing
MD – Mud Drilling

Station 18+45, Offset 45' Right

CIVIL ENGINEERS

G. J. Thelen & Associates, Inc.

☑ 516 Enterprise Drive/Covington, Kentucky 41017-1595/606-341-1322/Fax 606-341-0832
☐ 10265 Spartan Drive/Cincinnati, Ohio 45215/513-771-5005/Fax 513-771-6669
☐ 3337 Milverton Court/Cincinnati, Ohio 45248-2865/513-574-7137

LOG OF TEST BORING

CLIENT James W. Berling Engineering Company BORING # 33
PROJECT Geotechnical Exploration, Horsebranch Road Extension to Medical Village JOB # 92034E
LOCATION OF BORING Station: 55+50 Offset: 110' Left Drive, Kenton County, Kentucky

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRA. DEPTH	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec.
633.0	SURFACE	0.2						
632.8	TOPSOIL.	2.0		I	1/1/2	1A 1B	DS	12"
631.0	Brown moist medium stiff CLAY, trace roots and shale fragments.	4.5		I	7/13/10	2	DS	16"
628.5	Brown moist very stiff to hard SILTY CLAY, blocky structure.	7.0	5	I	14/19/26	3	DS	18"
626.0	Brown moist very soft highly weathered SHALE and thinly bedded LIMESTONE (bedrock).	9.0		I	21/31/30	4	DS	13"
624.0	Olive brown, some brown moist soft weathered SHALE and thinly bedded LIMESTONE (bedrock).		10					
	Bottom of test boring at 9.0 feet.		15					
			20					
			25					

Datum USGS
Surf. Elev. 633.0± Ft.
Date Started 3/17/92

Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Pipe Size O.D.2 In.

Hole Diameter 5"
Rock Core Dia.
Boring Method CFA

Foreman KN
Engineer TWV
Date Completed 3/17/92

SAMPLE CONDITIONS
D – DISINTEGRATED
I – INTACT
U – UNDISTURBED
L – LOST

SAMPLER TYPE
DS – DRIVEN SPLIT SPOON
PT – PRESSED SHELBY TUBE
CA – CONTINUOUS FLIGHT AUGER
RC – ROCK CORE

GROUND WATER DEPTH
FIRST NOTED None FT.
AT COMPLETION Dry FT.
AFTER 72 HRS. Dry FT.
BACKFILLED 72 HRS.

BORING METHOD
HSA – Hollow Stem Augers
CFA – Continous Flight Augers
DC – Driving Casing
MD – Mud Drilling

Station 18+47, Offset 42' Left

CIVIL ENGINEERS

G. J. Thelen & Associates, Inc.

☑ 516 Enterprise Drive/Covington, Kentucky 41017-1595/606-341-1322/Fax 606-341-0832
☐ 10265 Spartan Drive/Cincinnati, Ohio 45215/513-771-5005/Fax 513-771-6669
☐ 3337 Milverton Court/Cincinnati, Ohio 45248-2865/513-574-7137

LOG OF TEST BORING

CLIENT James W. Berling Engineering Company BORING # 34
PROJECT Geotechnical Exploration, Horsebranch Road Extension to Medical Village JOB # 92034E
LOCATION OF BORING Station: 55+25 Offset: 29' Right Drive, Kenton County, Kentucky

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRA. DEPTH	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec.
582.7	SURFACE							
	Mixed dark brown moist dense FILL, crushed stone and silty clay.	2.0		I	11/15/14	1	DS	7"
580.7	Mixed dark brown and brown moist stiff SILTY CLAY with limestone fragments and floaters and iron oxide stains.			I	10/26/46	2A 2B	DS	14"
			5	D	16/50/4"	3	DS	3"
575.7		7.0						
	Gray moist soft to moderately tough SHALE and thinly bedded LIMESTONE (bedrock).	7.9		D	100/5"	4	DS	4"
574.8			10					
	Refusal and bottom of test boring at 7.9 feet.		15					
			20					
			25					

Datum USGS
Surf. Elev. 582.7 Ft.
Date Started 3/4/92

Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Pipe Size O.D.2 In.

Hole Diameter 5"
Rock Core Dia.
Boring Method CFA

Foreman DEH
Engineer TWV
Date Completed 3/4/92

SAMPLE CONDITIONS
D – DISINTEGRATED
I – INTACT
U – UNDISTURBED

SAMPLER TYPE
DS – DRIVEN SPLIT SPOON
PT – PRESSED SHELBY TUBE
CA – CONTINUOUS FLIGHT AUGER

GROUND WATER DEPTH
FIRST NOTED None FT.
AT COMPLETION Dry FT.
AFTER HRS. FT.
Immed.

BORING METHOD
HSA – Hollow Stem Augers
CFA – Continous Flight Augers
DC – Driving Casing
MD – Mud Drilling

Station 16+00, Offset 15' Left

CIVIL ENGINEERS

G. J. Thelen & Associates, Inc.

☑ 516 Enterprise Drive/Covington, Kentucky 41017-1595/606-341-1322/Fax 606-341-0832
☐ 10265 Spartan Drive/Cincinnati, Ohio 45215/513-771-5005/Fax 513-771-6669
☐ 3337 Milverton Court/Cincinnati, Ohio 45248-2865/513-574-7137

LOG OF TEST BORING

CLIENT James W. Berling Engineering Company BORING # 35
PROJECT Geotechnical Exploration, Horsebranch Road Extension to Medical Village JOB # 92034E
LOCATION OF BORING Station: 57+25 Offset: 4' Left Drive, Kenton County, Kentucky

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRA. DEPTH	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec.
583.9	SURFACE							
581.9	Gray and brown moist FILL, dense graded aggregate and silty clay.	2.0		D	17/18/21	1	DS	11"
	Mixed brown moist stiff CLAY with limestone fragments and floaters and iron oxide stains. (CH)		5	I	12/27/32	2	DS	18"
				D	11/17/22	3	DS	12"
576.9		7.0						
575.5	Gray moist soft SHALE and thinly bedded LIMESTONE (bedrock).	8.4		D	43/50/5"	4	DS	10"
			10					
	Refusal and bottom of test boring at 8.4 feet.		15					
			20					
			25					

Datum USGS
Surf. Elev. 583.9± Ft.
Date Started 3/4/92

Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Pipe Size O.D.2 In.

Hole Diameter 5"
Rock Core Dia.
Boring Method CFA

Foreman DEH
Engineer TWV
Date Completed 3/4/92

SAMPLE CONDITIONS
D – DISINTEGRATED
I – INTACT
U – UNDISTURBED
L – LOST

SAMPLER TYPE
DS – DRIVEN SPLIT SPOON
PT – PRESSED SHELBY TUBE
CA – CONTINUOUS FLIGHT AUGER
RC – ROCK CORE

GROUND WATER DEPTH
FIRST NOTED None FT.
AT COMPLETION Dry FT.
AFTER HRS. FT.
BACKFILLED Immed. HRS.

BORING METHOD
HSA – Hollow Stem Augers
CFA – Continous Flight Augers
DC – Driving Casing
MD – Mud Drilling

Station 12+92, Offset 25' Left

CIVIL ENGINEERS

G. J. Thelen & Associates, Inc.

☑ 516 Enterprise Drive/Covington, Kentucky 41017-1595/606-341-1322/Fax 606-341-0832
☐ 10265 Spartan Drive/Cincinnati, Ohio 45215/513-771-5005/Fax 513-771-6669
☐ 3337 Milverton Court/Cincinnati, Ohio 45248-2865/513-574-7137

LOG OF TEST BORING

CLIENT James W. Berling Engineering Company BORING # 36
PROJECT Geotechnical Exploration, Horsebranch Road Extension to Medical Village JOB # 92034E
LOCATION OF BORING Station: 60+50 Offset: Centerline Drive, Kenton County, Kentucky

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRA. DEPTH	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec.
570.6	SURFACE	0.4						
570.2	TOPSOIL.	2.0		I	7/18/50/ /4"	1A 1B	DS	16"
568.6	Dark brown moist stiff SILTY CLAY, trace roots and limestone fragments and floaters.	4.5		D	21/40/50 /4"	2	DS	10"
566.1	Brown moist stiff SILTY CLAY with limestone fragments and floaters.	7.0	5	I	8/10/13	3	DS	12"
563.6	Brown, trace gray moist soft to medium stiff SILTY CLAY with limestone fragments and floaters.	9.5		I	21/38/50 /5"	4	DS	17"
561.1	Gray and olive brown moist soft highly weathered SHALE and thinly bedded LIMESTONE (bedrock).	10.4	10	I	50/4"	5	DS	4"
560.2	Gray moist soft SHALE and thinly bedded LIMESTONE (bedrock).							
	Refusal and bottom of test boring at 10.4 feet.		15					
			20					
			25					

Datum USGS
Surf. Elev. 570.6± Ft.
Date Started 3/4/92

Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Pipe Size O.D.2 In.

Hole Diameter 5"
Rock Core Dia.
Boring Method CFA

Foreman DEH
Engineer TWV
Date Completed 3/4/92

SAMPLE CONDITIONS
D – DISINTEGRATED
I – INTACT
U – UNDISTURBED
L – LOST

SAMPLER TYPE
DS – DRIVEN SPLIT SPOON
PT – PRESSED SHELBY TUBE
CA – CONTINUOUS FLIGHT AUGER
RC – ROCK CORE

GROUND WATER DEPTH
FIRST NOTED None FT.
AT COMPLETION Dry FT.
AFTER HRS. FT.
BACKFILLED Immed. HRS.

BORING METHOD
HSA – Hollow Stem Augers
CFA – Continous Flight Augers
DC – Driving Casing
MD – Mud Drilling

Station 11+80, Offset 60' Left

CIVIL ENGINEERS

G. J. Thelen & Associates, Inc.

☑ 516 Enterprise Drive/Covington, Kentucky 41017-1595/606-341-1322/Fax 606-341-0832
☐ 10265 Spartan Drive/Cincinnati, Ohio 45215/513-771-5005/Fax 513-771-6669
☐ 3337 Milverton Court/Cincinnati, Ohio 45248-2865/513-574-7137

LOG OF TEST BORING

CLIENT James W. Berling Engineering Company BORING # 37
PROJECT Geotechnical Exploration, Horsebranch Road Extension to Medical Village JOB # 92034E
LOCATION OF BORING Station 61+00 Offset: 11' Right Drive, Kenton County, Kentucky

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRA. DEPTH	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec.
569.0	SURFACE							
	Mixed brown moist stiff FILL, silty clay with limestone pieces, trace pieces of asphalt.			D	27/32/10	1	DS	14"
564.5		4.5		D	12/50/3"	2	DS	7"
	Brown moist stiff SILTY CLAY with limestone fragments and floaters.		5	D	20/31/17	3	DS	12"
				D	12/20/17	4	DS	14"
558.5		10.5	10	I	40/27/37	5A 5B	DS	18"
	Olive brown moist soft weathered SHALE and thinly bedded LIMESTONE (bedrock).	11.0 11.5						
557.5	Gray moist moderately tough SHALE and thinly bedded LIMESTONE (bedrock).		15					
	Refusal and bottom of test boring at 11.5 feet.		20					
			25					

Datum USGS
Surf. Elev. 569.0± Ft.
Date Started 3/4/92

Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Pipe Size O.D.2 In.

Hole Diameter 5"
Rock Core Dia.
Boring Method CFA

Foreman DEH
Engineer TWV
Date Completed 3/4/92

SAMPLE CONDITIONS
D – DISINTEGRATED
I – INTACT
U – UNDISTURBED
L – LOST

SAMPLER TYPE
DS – DRIVEN SPLIT SPOON
PT – PRESSED SHELBY TUBE
CA – CONTINUOUS FLIGHT AUGER
RC – ROCK CORE

GROUND WATER DEPTH
FIRST NOTED None FT.
AT COMPLETION Dry FT.
AFTER 2.0 HRS. Dry FT.
BACKFILLED 2.0 HRS.

BORING METHOD
HSA – Hollow Stem Augers
CFA – Continous Flight Augers
DC – Driving Casing
MD – Mud Drilling

Station 11+30, Offset 52' Left

CIVIL ENGINEERS

G. J. Thelen & Associates, Inc.

☑ 516 Enterprise Drive/Covington, Kentucky 41017-1595/606-341-1322/Fax 606-341-0832
☐ 10265 Spartan Drive/Cincinnati, Ohio 45215/513-771-5005/Fax 513-771-6669
☐ 3337 Milverton Court/Cincinnati, Ohio 45248-2865/513-574-7137

LOG OF TEST BORING

CLIENT James W. Berling Engineering Company BORING # 38
PROJECT Geotechnical Exploration, Horsebranch Road Extension to Medical Village JOB # 92034E
LOCATION OF BORING Station: 62+08 Offset: 7' Right Drive, Kenton County, Kentucky

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRA. DEPTH	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec.
568.0	SURFACE	0.3						
567.7	TOPSOIL.	2.0		I	3/7/13	1A 1B	DS	18"
566.0	Dark brown moist stiff FILL, silty clay, trace roots and bits of charred wood.	4.5		I	6/12/18	2	DS	12"
563.5	Mixed brown to dark brown moist stiff SILTY CLAY with shale fragments, limestone fragments and floaters.		5	I	18/25/33	3	DS	12"
558.5	Mixed brown moist stiff to medium stiff SILTY CLAY with shale fragments, limestone fragments and floaters.	9.5		I	17/32/37	4	DS	14"
556.0	Mixed brown and olive brown moist very stiff SILTY CLAY with shale fragments, limestone fragments and floaters.	12.0	10	I	7/25/23	5	DS	18"
554.5	Gray moist soft SHALE and thinly bedded LIMESTONE (bedrock).	13.5		I	21/50/6"	6	DS	12"
	Refusal and bottom of test boring at 13.5 feet.		15					
			20					
			25					

Datum USGS
Surf. Elev. 568.0± Ft.
Date Started 3/4/92

Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Pipe Size O.D.2 In.

Hole Diameter 5"
Rock Core Dia.
Boring Method CFA

Foreman DFH
Engineer TWV
Date Completed 3/4/92

SAMPLE CONDITIONS
D – DISINTEGRATED
I – INTACT
U – UNDISTURBED
L – LOST

SAMPLER TYPE
DS – DRIVEN SPLIT SPOON
PT – PRESSED SHELBY TUBE
CA – CONTINUOUS FLIGHT AUGER
RC – ROCK CORE

GROUND WATER DEPTH
FIRST NOTED None FT.
AT COMPLETION Dry FT.
AFTER 2.0 HRS. Dry FT.
BACKFILLED 2.0 HRS.

BORING METHOD
HSA – Hollow Stem Augers
CFA – Continous Flight Augers
DC – Driving Casing
MD – Mud Drilling

Station 40+31, Offset 25' Left

CIVIL ENGINEERS

G. J. Thelen & Associates, Inc.
516 Enterprise Drive/Covington, Kentucky 41017/606-341-1322

LOG OF TEST BORING

CLIENT Kenton County Water District No. 1 BORING # 1
PROJECT Geotechnical Exploration, Proposed Storage Tank Addition, Dudley Road, JOB # 87323E
LOCATION OF BORING As shown on Boring Plan 87323E-1 /Kenton County, Ky.

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRA. DEPTH	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec.
833.7	SURFACE	0.2						
833.5	TOPSOIL.	2.0		I	10/11/16	1A 1B	DS	5"
831.7	Mixed brown and tan moist stiff FILL, highly weathered shale with limestone floaters.	3.8		I	6/7/10	2A 2B	DS	16"
829.9	Mottled brown and gray moist very stiff CLAY, trace bedding planes with iron oxide stains. (CH)	4.5	5	I	50/5"	3	DS	3"
829.2	Brown, tan and gray moist very soft highly weathered SHALE and thinly bedded LIMESTONE (bedrock).			I	50/2"	4	DS	2"
821.2	Olive brown moist soft weathered SHALE and thinly bedded LIMESTONE (bedrock).	12.5	10	I	50/2"	5	DS	2"
820.0	Gray moist soft SHALE and thinly bedded LIMESTONE (bedrock).	13.7	15	I	50/2"	6	DS	2"
	Refusal and bottom of test boring at 13.7 feet.							

Datum USGS | Hammer Wt. 140 Lbs. | Hole Diameter 5" | Foreman MW
Surf. Elev. 833.7 Ft. | Hammer Drop 30 In. | Rock Core Dia. | Engineer DBT
Date Started 7/21/87 | Pipe Size O.D.2 In. | Boring Method CFA | Date Completed 7/21/87

SAMPLE CONDITIONS
D – DISINTEGRATED
I – INTACT
U – UNDISTURBED
L – LOST

SAMPLER TYPE
DS – DRIVEN SPLIT SPOON
PT – PRESSED SHELBY TUBE
CA – CONTINUOUS FLIGHT AUGER
RC – ROCK CORE

GROUND WATER DEPTH
FIRST NOTED None FT.
AT COMPLETION Dry FT.
AFTER 4.75 HRS. Dry FT.
BACKFILLED 4.75 HRS.

BORING METHOD
HSA – Hollow Stem Augers
CFA – Continous Flight Augers
DC – Driving Casing
MD – Mud Drilling

Station 40+09, Offset 94' Left

CIVIL ENGINEERS

G. J. Thelen & Associates, Inc.
516 Enterprise Drive/Covington, Kentucky 41017/606-341-1322

LOG OF TEST BORING

CLIENT Kenton County Water District No. 1 BORING # 2
PROJECT Geotechnical Exploration, Proposed Storage Tank Addition, Dudley Road, JOB # 87323E
LOCATION OF BORING As shown on Boring Plan 87323E-1 /Kenton County, Ky.

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRA. DEPTH	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec.
832.6	SURFACE	0.0						
	Brown moist stiff FILL, silty clay, trace topsoil with limestone floaters and hairlike	1.2		I	5/18/30	1A 1B	DS	10"
831.4	roots.	2.0		I	9/8/22	2	DS	14"
	Brown moist very stiff CLAY, trace bedding	4.5	5	I	40/20/0"	3	DS	6"
830.6	planes.							
	Brown, trace gray moist very soft highly weathered SHALE and thinly bedded LIMESTONE			I	50/4"	4	DS	3"
828.1	(bedrock).							
	Olive brown moist soft weathered SHALE and thinly bedded LIMESTONE (bedrock).		10	I	50/5"	5	DS	5"
820.1		12.5						
	Gray moist soft SHALE and thinly bedded	13.7		L/D	50/6"	6	DS CA	0"
818.9	LIMESTONE (bedrock).		15					
	Refusal and bottom of test boring at 13.7 feet.							

Datum USGS
Surf. Elev. 832.6 Ft.
Date Started 7/21/87

Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Pipe Size O.D.2 In.

Hole Diameter 5"
Rock Core Dia.
Boring Method CFA

Foreman MW
Engineer DBT
Date Completed 7/21/87

SAMPLE CONDITIONS
D – DISINTEGRATED
I – INTACT
U – UNDISTURBED
L – LOST

SAMPLER TYPE
DS – DRIVEN SPLIT SPOON
PT – PRESSED SHELBY TUBE
CA – CONTINUOUS FLIGHT AUGER
RC – ROCK CORE

GROUND WATER DEPTH
FIRST NOTED None FT.
AT COMPLETION Dry FT.
AFTER 3.5 HRS. Dry FT.
BACKFILLED 3.5 HRS.

BORING METHOD
HSA – Hollow Stem Augers
CFA – Continous Flight Augers
DC – Driving Casing
MD – Mud Drilling

Station 40+94, Offset 138' Left

CIVIL ENGINEERS

G. J. Thelen & Associates, Inc.
516 Enterprise Drive/Covington, Kentucky 41017/606-341-1322

LOG OF TEST BORING

CLIENT Kenton County Water District No. 1 BORING # 3
PROJECT Geotechnical Exploration, Proposed Storage Tank Addition, Dudley Road, JOB # 87323E
LOCATION OF BORING As shown on Boring Plan 87323E-1 /Kenton County, Ky.

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRA. DEPTH	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec.
830.8	SURFACE	0.5						
	Mixed brown, dark brown and tan moist stiff FILL, silty clay, highly weathered shale and topsoil with limestone floaters and hairlike roots.	2.0		I	11/10/16	1A 1B	DS	14"
830.3		4.5		I	8/8/7	2	DS	16"
	Brown, tan and gray moist very soft highly weathered SHALE and thinly bedded LIMESTONE (bedrock). (CL)		5	I	27/30/10 /0"	3	DS	12"
828.8								
	Brown and gray moist very soft highly weathered SHALE and thinly bedded LIMESTONE with clay seams (bedrock).			I	24/24/20	4	DS	16"
826.3			10	I	50/3"	5	DS	1"
	Brown and olive brown moist soft weathered SHALE and thinly bedded LIMESTONE with clay seams (bedrock).	12.0						
818.8		13.2		D	50/2"	6	DS	1"
	Gray moist soft SHALE and thinly bedded LIMESTONE (bedrock).		15					
817.6								
	Refusal and bottom of test boring at 13.2 feet.							

Datum USGS | Hammer Wt. 140 Lbs. | Hole Diameter 5" | Foreman MW
Surf. Elev. 830.8 Ft. | Hammer Drop 30 In. | Rock Core Dia. | Engineer DBT
Date Started 7/21/87 | Pipe Size O.D.2 In. | Boring Method CFA | Date Completed 7/21/87

SAMPLE CONDITIONS
D – DISINTEGRATED
I – INTACT
U – UNDISTURBED
L – LOST

SAMPLER TYPE
DS – DRIVEN SPLIT SPOON
PT – PRESSED SHELBY TUBE
CA – CONTINUOUS FLIGHT AUGER
RC – ROCK CORE

GROUND WATER DEPTH
FIRST NOTED None FT.
AT COMPLETION Dry FT.
AFTER 2 0 HRS. Dry FT.
BACKFILLED 2.0 HRS.

BORING METHOD
HSA – Hollow Stem Augers
CFA – Continous Flight Augers
DC – Driving Casing
MD – Mud Drilling

Station 41+45, Offset 62' Left

CIVIL ENGINEERS

G. J. Thelen & Associates, Inc.
516 Enterprise Drive/Covington, Kentucky 41017/606-341-1322

LOG OF TEST BORING

CLIENT Kenton County Water District No. 1 BORING # 4
PROJECT Geotechnical Exploration, Proposed Storage Tank Addition, Dudley Road, JOB # 87323E
LOCATION OF BORING As shown on Boring Plan 87323E-1 /Kenton County, Ky.

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRA. DEPTH	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec.
826.2	SURFACE	0.0						
	Mixed brown and greenish gray moist medium stiff FILL, silty clay, topsoil and clay with limestone floaters and decayed grass.	2.0		I	2/3/4	1	DS	10"
824.2		4.0		I	26/12/20	2	DS	16"
822.2	Mottled brown moist very stiff CLAY, trace bedding planes with limestone floaters.		5	I	20/15/21	3	DS	16"
819.2	Brown moist very soft highly weathered SHALE and thinly bedded LIMESTONE (bedrock).	7.0		I	20/18/50 /5"	4	DS	10"
	Olive brown moist soft weathered SHALE and thinly bedded LIMESTONE (bedrock).		10	I	50/3"	5	DS	3"
812.7		13.5		L	50/1"	6	DS	0"
812.0	Gray moist soft SHALE and thinly bedded LIMESTONE (bedrock).	14.2	15	L/D	80/1"	7	DS CA	0"
	Refusal and bottom of test boring at 13.5 feet.							
	Note: Concentrations of limestone layers from 12.5 feet to 14.0 feet.							

Datum USGS | Hammer Wt. 140 Lbs. | Hole Diameter 5" | Foreman MW
Surf. Elev. 826.2 Ft. | Hammer Drop 30 In. | Rock Core Dia. | Engineer DBT
Date Started 7/21/87 | Pipe Size O.D.2 In. | Boring Method CFA | Date Completed 7/21/87

SAMPLE CONDITIONS
D – DISINTEGRATED
I – INTACT
U – UNDISTURBED
L – LOST

SAMPLER TYPE
DS – DRIVEN SPLIT SPOON
PT – PRESSED SHELBY TUBE
CA – CONTINUOUS FLIGHT AUGER
RC – ROCK CORE

GROUND WATER DEPTH
FIRST NOTED None FT.
AT COMPLETION Dry FT.
AFTER 0.25 HRS. Dry FT.
BACKFILLED 0.25 HRS.

BORING METHOD
HSA – Hollow Stem Augers
CFA – Continous Flight Augers
DC – Driving Casing
MD – Mud Drilling

Station 39+42, Offset 26' Left

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2140 Waycross Road / Cincinnati, Ohio 45240-2719 / 513-825-4350 / Fax 513-825-4756
www.thelenassoc.com

LOG OF TEST BORING

CLIENT: Northern Kentucky Water District BORING # 3

PROJECT: Geotechnical Services, 16, 24 and 36-Inch Diameter Water Mains, Dudley Tanks JOB # 030875E

LOCATION OF BORING: As shown on the Viox Project Plans / to Orphanage Road, Edgewood, Ky.

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRATA DEPTH feet	DEPTH SCALE feet	SAMPLE Cond	Blows/6"	No.	Type	Rec. Inches
817.4	SURFACE	0.4						
817.0	TOPSOIL	2.0		I	2/3/3	1A 1B	DS	16
815.4	Brown moist medium stiff lean CLAY with roots and limestone fragments.	4.5		I	4/8/18	2A 2B	DS	18
812.9	Interbedded brown moist very soft highly weathered SHALE and gray hard LIMESTONE (bedrock).		5	I	75/6"	3	DS	4
	Interbedded brown moist soft weathered SHALE and hard LIMESTONE (bedrock).			I	21/26/37	4	DS	18
			10	I	50/4"	5	DS	4
805.3		12.1		I	10/16/50/1"	6	DS	12
	Bottom of test boring at 12.1 feet.		15					
			20					
			25					

Datum MSL Hammer Wt. 140 lbs. Hole Diameter 6 in. Foreman SW

Surf. Elev. 817.4 ft. Hammer Drop 30 in. Rock Core Dia. in. Engineer TWV

Date Started 3/10/05 Pipe Size O.D. 2 in. Boring Method 2 1/4 HSA Date Completed 3/10/05

SAMPLE CONDITIONS
D – DISINTEGRATED
I – INTACT
U – UNDISTURBED
L – LOST

SAMPLE TYPE
DS – DRIVEN SPLIT SPOON
PT – PRESSED SHELBY TUBE
CA – CONTINUOUS FLIGHT AUGER
RC – ROCK CORE

GROUND WATER DEPTH
FIRST NOTED Dry ft.
AT COMPLETION Dry ft.
AFTER 24.0 hrs. Dry ft.
BACKFILLED 24.0 hrs.

BORING METHOD
HSA– HOLLOW STEM AUGERS
CFA– CONTINUOUS FLIGHT AUGERS
DC – DRIVING CASING
MD – MUD DRILLING

STANDARD PENETRATION TEST – DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

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SOIL CLASSIFICATION SHEET

NON COHESIVE SOILS
(Silt, Sand, Gravel and Combinations)

Density	
Very Loose	- 5 blows/ft. or less
Loose	- 6 to 10 blows/ft.
Medium Dense	- 11 to 30 blows/ft.
Dense	- 31 to 50 blows/ft.
Very Dense	- 51 blows/ft. or more

Relative Properties	
Descriptive Term	Percent
Trace	1 – 10
Little	11 – 20
Some	21 – 35
And	36 – 50

Particle Size Identification		
Boulders	- 8 inch diameter or more	
Cobbles	- 3 to 8 inch diameter	
Gravel	- Coarse	- 3/4 to 3 inches
	- Fine	- 3/16 to 3/4 inches
Sand	- Coarse	- 2mm to 5mm (dia. of pencil lead)
	- Medium	- 0.45mm to 2mm (dia. of broom straw)
	- Fine	- 0.075mm to 0.45mm (dia. of human hair)
Silt		- 0.005mm to 0.075mm (Cannot see particles)

COHESIVE SOILS
(Clay, Silt and Combinations)

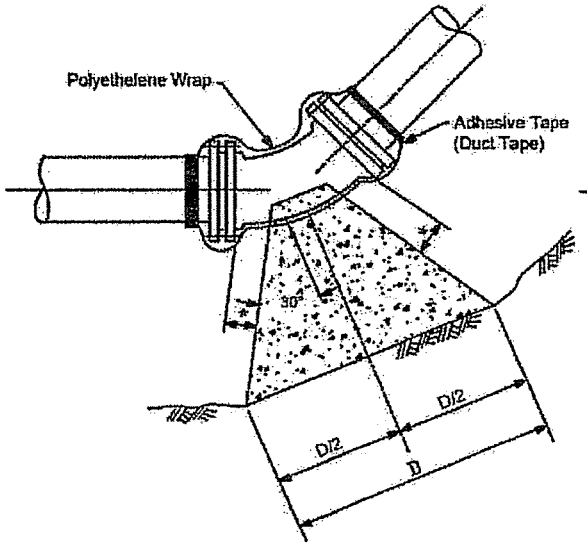
Consistency	Field Identification	Unconfined Compressive Strength (tons/sq. ft.)
Very Soft	Easily penetrated several inches by fist	Less than 0.25
Soft	Easily penetrated several inches by thumb	0.25 – 0.5
Medium Stiff	Can be penetrated several inches by thumb with moderate effort	0.5 – 1.0
Stiff	Readily indented by thumb but penetrated only with great effort	1.0 – 2.0
Very Stiff	Readily indented by thumbnail	2.0 – 4.0
Hard	Indented with difficulty by thumbnail	Over 4.0

Classification on logs are made by visual inspection.

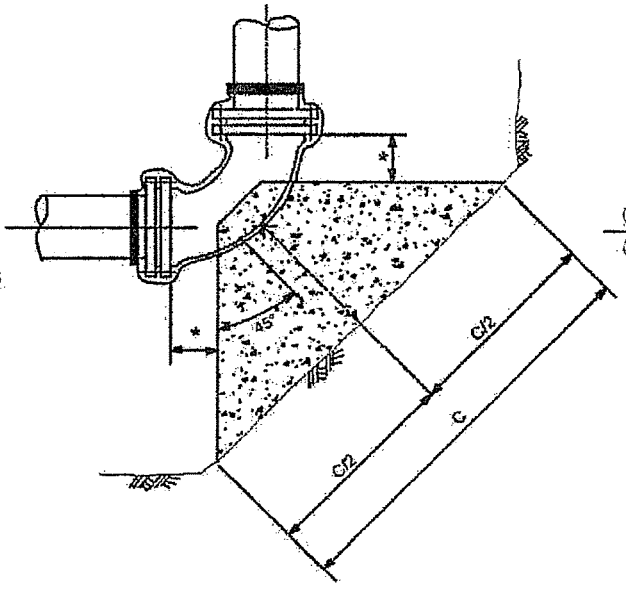
Standard Penetration Test – Driving a 2.0" O.D., 1 3/8" I.D., sampler a distance of 1.0 foot into undisturbed soil with a 140 pound hammer free falling a distance of 30 inches. It is customary to drive the spoon 6 inches to seat into undisturbed soil, then perform the test. The number of hammer blows for seating the spoon and making the tests are recorded for each 6 inches of penetration on the drill log (Example – 6/8/9). The standard penetration test results can be obtained by adding the last two figures (i.e. 8+9=17 blows/ft.). Refusal is defined as greater than 50 blows for 6 inches or less penetration.

Strata Changes – In the column "Soil Descriptions" on the drill log, the horizontal lines represent strata changes. A solid line (————) represents an actually observed change; a dashed line (— — — —) represents an estimated change.

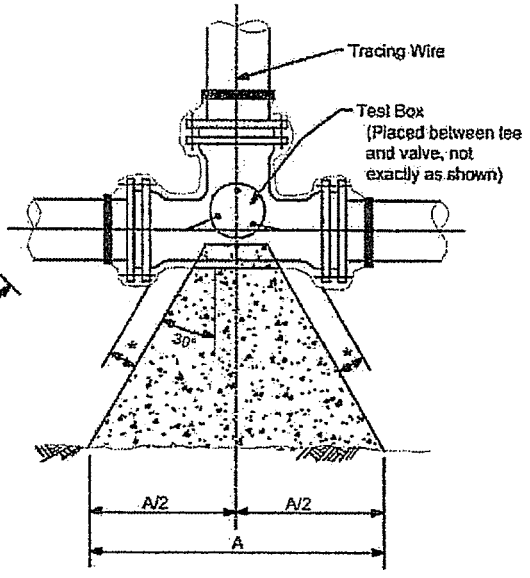
Groundwater observations were made at the times indicated. Porosity of soil strata, weather conditions, site topography, etc., may cause changes in the water levels indicated on the logs.



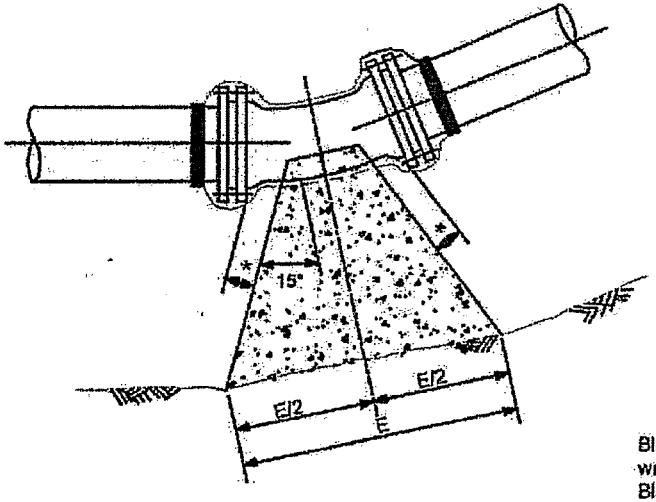
45° BEND



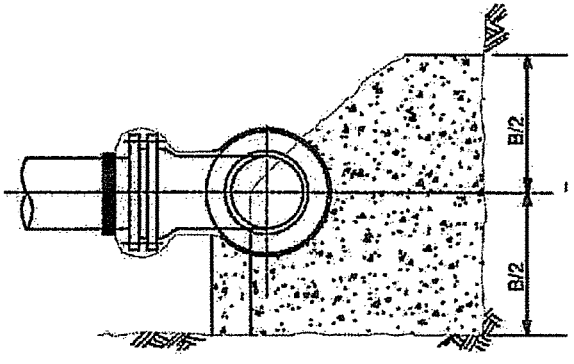
90° BEND



TEE (DEAD END OR FIRE HYDRANT SIMILAP



11 1/4° & 22 1/2° BEND



ELEVATION

Blocking shall be poured after blue polyethelene wrap is in place.
Blocking shall be inspected by the District prior to backfilling.

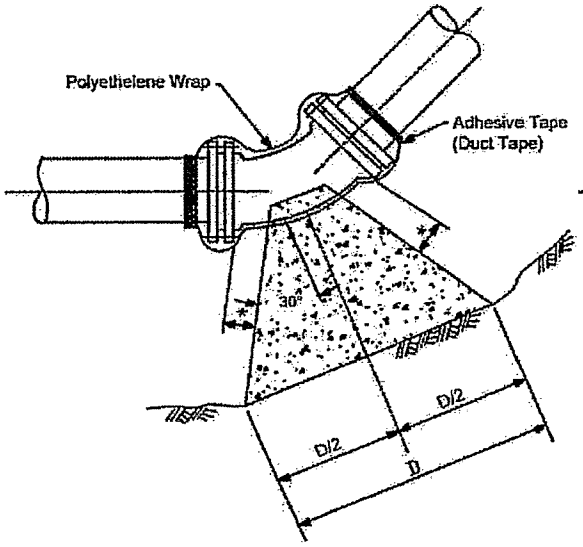
PIPE SIZE	A	B	C	D	E
36"	12'-6"	4'-0"	17'-6"	9'-6"	5'-0"

* Distance to be 1/2" longer than entire length of the bolt used.

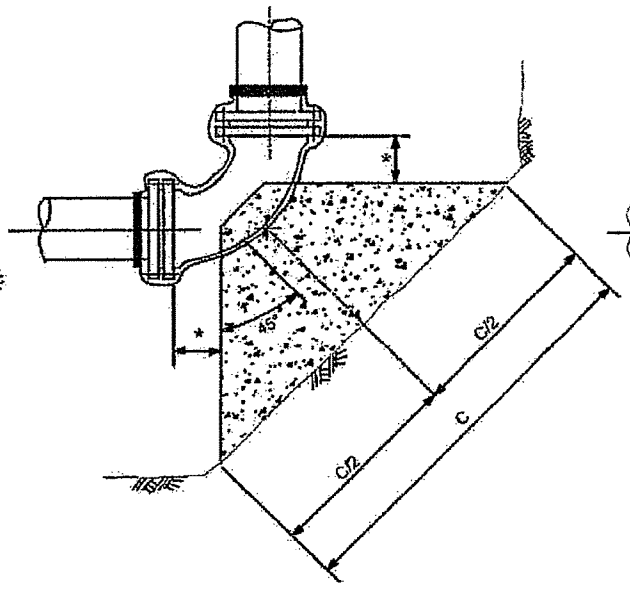
NOTES

1 DIP Fittings shall be per specifications.
2 Concrete to be 3500 psi.
3 All fittings to be Mechanical Joint.
4 Thrust blocks to be placed against undisturbed earth - use additional concrete as required for over excavation.
5 Blocking to be placed in a manner so that bolts can be removed without disturbing the block.
6 Thrust block bearing surface must be suitable for a design bearing pressure of 2,500 psf.

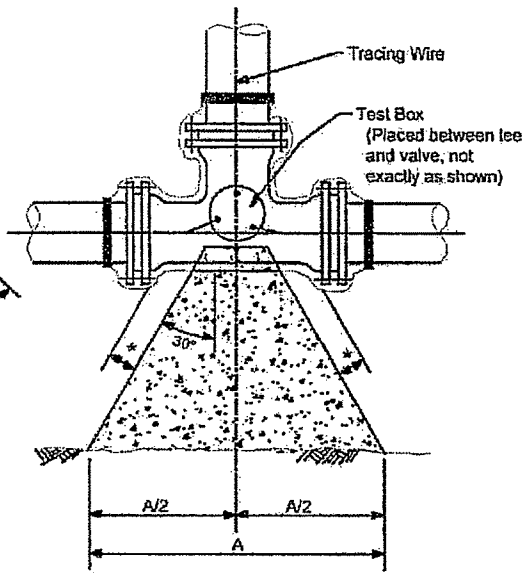
FIGURE 1 - CONCRETE THRUST BLOCK DETAILS FOR RESTRAINED JOINT PIPE



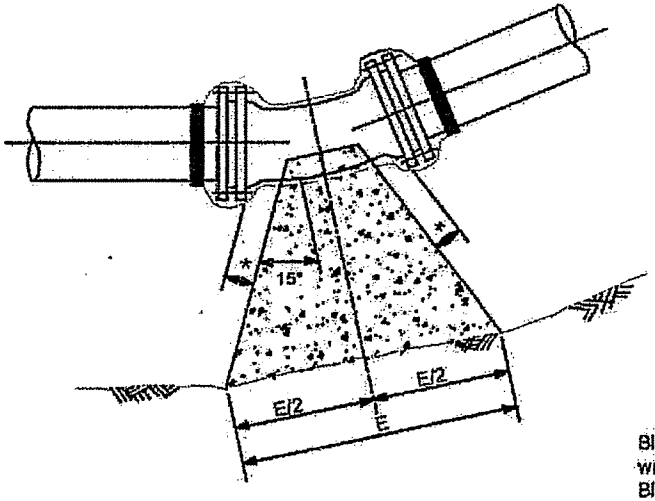
45° BEND



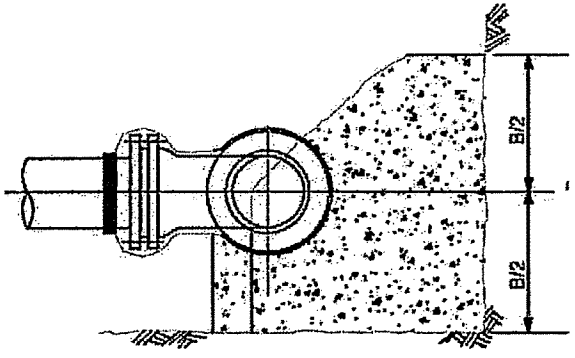
90° BEND



TEE (DEAD END OR FIRE HYDRANT SIMILAP



11 1/4° & 22 1/2° BEND



ELEVATION

Blocking shall be poured after blue polyethelene wrap is in place.
Blocking shall be inspected by the District prior to backfilling.

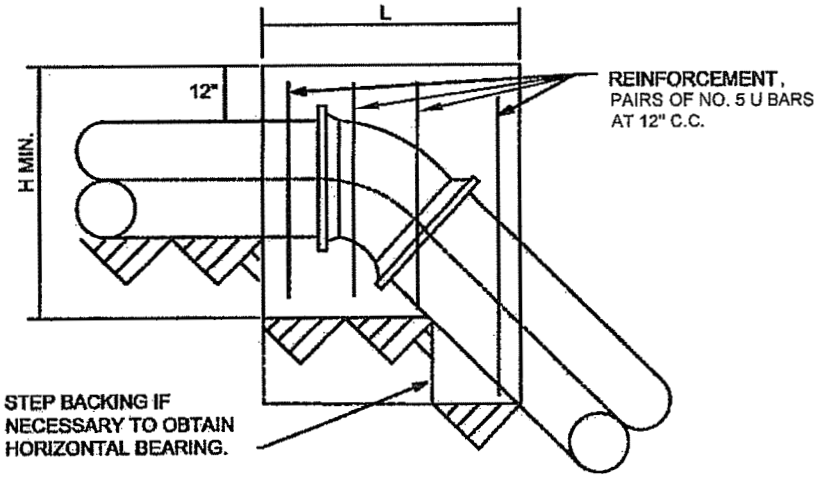
PIPE SIZE	A	B	C	D	E
36"	30'-0"	5'-0"	45'-0"	23'-0"	12'-0"

* Distance to be 1/2" longer than entire length of the bolt used.

NOTES

1 DIP Fittings shall be per specifications.
2 Concrete to be 3500 psi.
3 All fittings to be Mechanical Joint.
4 Thrust blocks to be placed against undisturbed earth - use additional concrete as required for over excavation.
5 Blocking to be placed in a manner so that bolts can be removed without disturbing the block.
6 Thrust block bearing surface must be suitable for a design bearing pressure of 2,500 psf.

FIGURE 2 - CONCRETE THRUST BLOCK DETAILS FOR STANDARD PIPE



SECTION A-A

SIZE OF PIPE	DEGREE OF BEND							
	11.25				22.5			
	L"	W"	H"	VOL.	L"	W"	H"	VOL.
36"	55	78	66	163.9	108	78	66	321.8

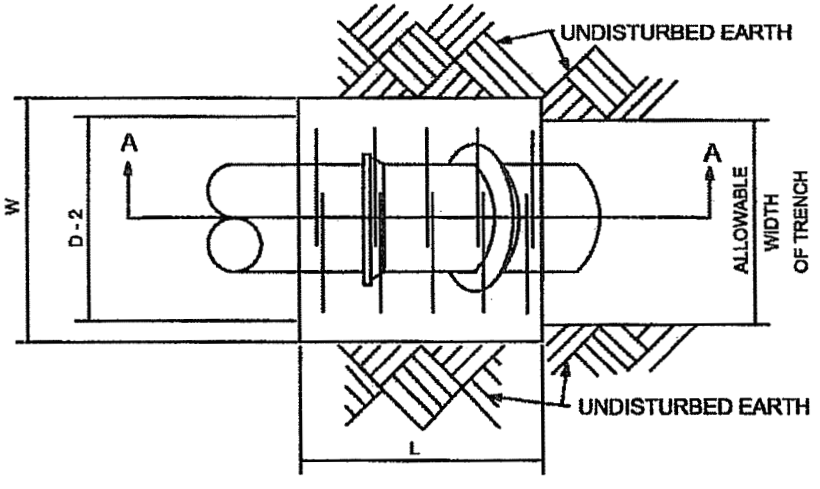
NOTE: VOLUMES GIVEN IN CUBIC FEET

CONCRETE BACKING FOR VERTICAL BENDS

1. BACKING DESIGNED FOR 2500 POUNDS PER SQUARE FOOT SOIL BEARING AND 325 POUNDS PER SQUARE INCH INTERNAL PRESSURE.

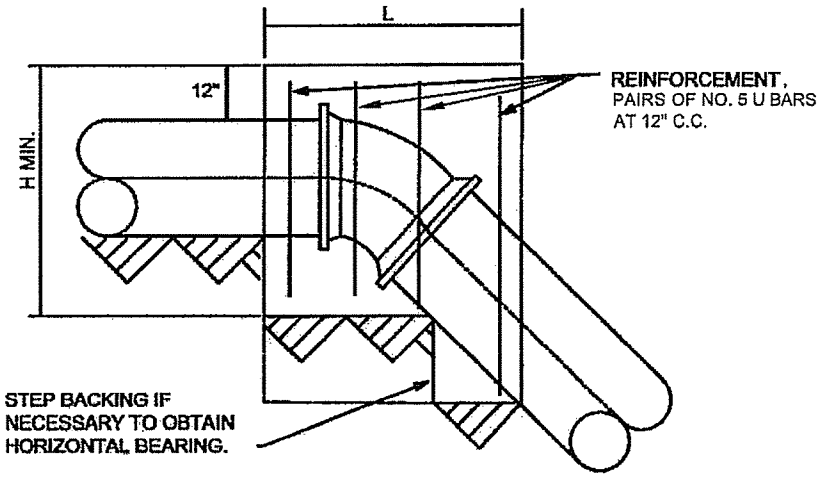
2. PROVIDE MINIMUM CONCRETE REINFORCEMENT OF PAIRS OF TWO (2) NO. 5 "U" BARS AT 12" C.C. AND WITH AT LEAST 3" CONCRETE COVER ON EACH SIDE.

3. CENTER BACKING ON BEND.



PLAN

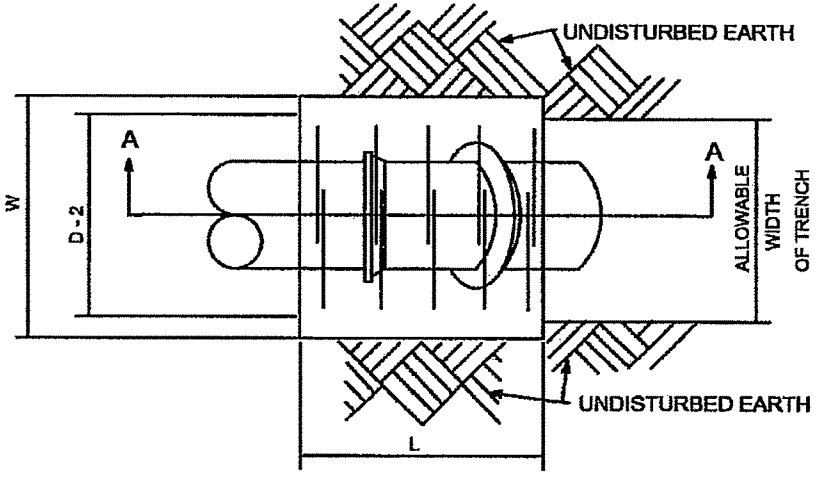
FIGURE 3 - CONCRETE BACKING FOR VERTICAL BENDS WITH RESTRAINED JOINT PIPE



SECTION A-A

SIZE OF PIPE	DEGREE OF BEND			
	11.25			
	L"	W"	H"	VOL.
36"	134	96	66	491.3

NOTE: VOLUMES GIVEN IN CUBIC FEET



PLAN

CONCRETE BACKING FOR VERTICAL BENDS

1. BACKING DESIGNED FOR 2500 POUNDS PER SQUARE FOOT SOIL BEARING AND 325 POUNDS PER SQUARE INCH INTERNAL PRESSURE.

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3. CENTER BACKING ON BEND.

FIGURE 4 - CONCRETE BACKING FOR VERTICAL BENDS WITH STANDARD PIPE

CONSULTING SERVICES

36-INCH REDUNDANCY PROJECT
PART 3

HORSEBRANCH ROAD
TO RHINE VALLEY LANE

EDGEWOOD, KENTUCKY

Prepared for: **Northern Kentucky Water District**

Thelen Project No.: **090495E**

THELEN ASSOCIATES, INC.

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August 18, 2009

Northern Kentucky Water District
2835 Crescent Springs Road
P.O. Box 18640
Erlanger, Kentucky 41018-0640

Attn: Mr. John Scheben

Re: Consulting Services
36-Inch Redundancy Project, Part 3
Horsebranch Road
To Rhine Valley Lane
Edgewood, Kentucky

Ladies and Gentlemen:

Summarized in this report are our recommendations for Part 3 of the 36-Inch Redundancy Project along Horsebranch Road in Edgewood, Kentucky. These recommendations are based on our engineering reconnaissance, a records review of projects previously performed by us in the vicinity of the alignment (Thelen Project Nos. 92034E, 92347T, 95656E, 95845T, 990212E and 050510E), a review of the Project Plans prepared by Cardinal Engineering Corporation (CEC), drawings dated June 3, 2009, and recently performed test borings along Rhine Valley Lane.

Our services were authorized through Work Order No. 1 of the Geotechnical Engineering 2009 Contingency Services Agreement between the Northern Kentucky Water District (NKWD) and Thelen Associates, Inc. (Thelen). Work Order No. 1 had an effective date of June 24, 2009 and we received it on June 29, 2009. Our

consulting services are outlined in Proposal Agreement No. K29097, dated May 8, 2009.

We have included in the Appendix to this report a reprint of "Important Information About Your Geotechnical Engineering Report" published by ASFE, Professional Firms Practicing in the Geosciences, which our firm would like to introduce to you at this time.

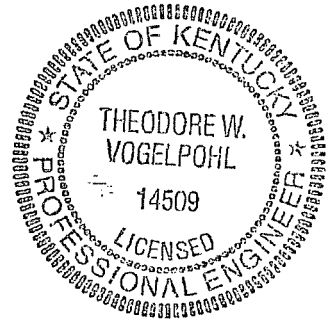
We appreciate the opportunity to provide our consulting services for Part 3 of the 36-Inch Redundancy Project along Horsebranch Road and Rhine Valley Lane in Edgewood, Kentucky. Should you have any questions concerning the information, conclusions or recommendations contained in this report, please do not hesitate to contact us.

Respectfully submitted,
THELEN ASSOCIATES, INC.

Michelle Sperber, P.E.
Staff Geotechnical Engineer

Theodore W. Vogelpohl, P.E.
Principal Geotechnical Engineer

MES/TWV:tmk
090495E



Copies submitted: 2 – Client
2 – Cardinal Engineering Corporation

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CONSULTING SERVICES
36-INCH REDUNDANCY PROJECT, PART 3
HORSEBRANCH ROAD
TO RHINE VALLEY LANE
EDGEWOOD, KENTUCKY

1.0 INTRODUCTION

Summarized in this report are our recommendations for Part 3 of the 36-Inch Redundancy Project along Horsebranch Road and Rhine Valley Lane in Edgewood, Kentucky. The scope of our geotechnical services included an engineering reconnaissance of the proposed alignment, a records review of projects previously performed by us in the vicinity of the alignment (Thelen Project Nos. 92034E, 92347T, 95656E, 95845T, 990212E and 050510E), a review of the Project Plans prepared by Cardinal Engineering Corporation (CEC), and test borings performed as part of this project along Rhine Valley Lane. The CEC Project Plans are dated June 3, 2009 and are titled "Dudley Discharge 36-Inch Redundancy Project Part 2".

A review of our files indicates that instability has existed in the past along the northern portion of Rhine Valley Lane on the east side of the road and that several generations of fill have been placed, but not necessarily monitored, along the west side of the road. Because of the past instability and unknown fill located along the northern portion of Rhine Valley Lane, we performed three (3) test borings in this section to further explore the subsurface conditions. Test borings were not performed as part of this project along the southern portion of Rhine Valley Lane or along Horsebranch Road due to the fact that we have previously performed numerous test borings in these areas for past

projects. In addition, we performed a Geotechnical Exploration and Construction Review Services, before and during the construction of Horsebranch Road. The conclusions and recommendations contained in this report regarding the water main alignment and depths are based on our engineering reconnaissance, a review of the previously drilled test borings and cross section drawings, a review of the CEC Project Plans and the results of the recently performed test borings.

2.0 PROJECT CHARACTERISTICS

The proposed alignment is shown on the previously mentioned CEC Project Plans. Part 3 of this project will include approximately 2,517 linear feet of water main along Horsebranch Road and approximately 1,519 linear feet of water main along Rhine Valley Lane. This part of the Redundancy Project will begin at Station 28+83, at the end of Part 2 along Horsebranch Road. The proposed water main along Horsebranch Road will remain on the north side of the road until its intersection with Rhine Valley Lane. The proposed alignment along Rhine Valley Lane will be located along the east side of the road for the remainder of the alignment and will end at the north edge of Centerview Boulevard.

It is our understanding that all of the pipe will be 36-inch-diameter, Class 51, ductile iron pipe (DIP) with polyethylene wrap and at least 42 inches of soil cover. The depths of the proposed water main are expected to vary along the alignment due to constraints caused by local geology, existing utilities and other construction-related features. Throughout this report, "normal depth" refers to at least 3.5 feet of soil cover above the top of the pipe.

Specific descriptions of the proposed water main installation and our recommendations are provided on a station-to-station basis in the Conclusions and Recommendations Section of this report. This report addresses only the geotechnical issues for the water main project.

3.0 ENGINEERING RECONNAISSANCE

Our Mrs. Michelle E. Sperber, P.E. performed a reconnaissance of the proposed alignment in order to note any areas of existing or potential instability and soil and/or bedrock outcrops along the alignment. The CEC Project Plans were not available during the engineering reconnaissance, therefore the reconnaissance was performed assuming that the alignment would be located along the upslope side of the road. During the reconnaissance, Mrs. Sperber noted that Horsebranch Creek is located parallel with and along the south side of the road throughout the entire portion of the alignment along Horsebranch Road. In addition, Mrs. Sperber noted soil and bedrock exposures, steep existing slopes, evidence of ground movement within the pavement just before the intersection with Rhine Valley Lane in the southern lane of Horsebranch Road, and the general topography. Specific details of the engineering reconnaissance are described on a station-to-station basis in the Conclusions and Recommendations Section of this report, which refer to the stationing system shown on the June 3, 2009 CEC Project Plans.

4.0 SUBSURFACE EXPLORATION

No new test borings were made specifically for the portion of the alignment along Horsebranch Road, or the portion of the alignment between Napa Valley Lane and Horsebranch Road, along Rhine Valley Lane. Rather, test borings previously made near the alignment for several previous projects were adopted for these portions of the proposed alignment. These test borings included Test Borings 11 through 27, including Test Boring 27A and excluding Test Boring 12, which were performed along the originally proposed extension and realignment of Horsebranch Road in March of 1992 as part of Thelen Project No. 92034E. In addition, test borings were also previously performed for a proposed development along the east and west sides of Rhine Valley Lane, south of its intersection with Napa Valley Lane, for Valley View Condominiums and Rhine Valley Lane (Thelen Project No. 95656E). We have also performed construction review testing services for Rhine Valley Lane and for the Valley View Condominiums (Thelen Project Nos. 050510E and 95845T, respectively). Test Borings 2 through 4 from Project No. 95656E will be included in the discussion of the subsurface exploration. **The reader is cautioned that the previously performed test borings**

were made from ground levels that existed before the project improvements were made, that grade changes were made as part of the project improvements, and that these grade changes need to be taken into account when estimating from the boring logs, the ground conditions that will be encountered for this water main project.

A station and offset has been assigned to each test boring based on the CEC Project Plans. The locations are summarized on the following page in Table 1 - Test Boring Locations. The stationing for this project has been added to the tops of the previously performed test boring logs.

The test borings were made with a truck-mounted or track-mounted drill rig advancing continuous flight augers. Standard split spoon and Shelby tube sampling was accomplished ahead of the augers in accordance with the procedures outlined in ASTM D1586 and D1587.

Concurrent with the drilling operation, the Drilling Technician prepared the field test boring logs of the subsurface profile noting soil and bedrock types and depths, penetration test resistances (N-values), soil and bedrock stratifications and ground water levels or the lack thereof.

Following the completion of the test borings, the samples were returned to our Soil Mechanics Laboratory where they were reviewed and visually classified by the Project Geotechnical Engineer. Final test boring logs were prepared based on the Drilling Technician's field logs and the Engineer's visual classification of the samples. Copies of these logs can be found in the Appendix along with a Soil Classification Sheet describing the terms and symbols used in their preparation.

TABLE 1

Test Boring Locations

Test Boring No.	Street	Station	Offset
27-92034E	Horsebranch Road	30+38	15' Right
27A-92034E	"	30+99	58' Left
26-92034E	"	34+22	80' Right
25-92034E	"	34+22	5' Right
24-92034E	"	36+22	51' Left
23-92034E	"	36+22	81' Right
22-92034E	"	36+22	On Alignment
21-92034E	"	41+25	39' Right
20-92034E	"	41+25	5' Right
19-92034E	"	41+25	60' Left
18-92034E	"	46+20	76.5' Right
17-92034E	"	46+20	63' Left
16-92034E	"	46+20	On Alignment
15-92034E	"	49+65	89' Left
14-92034E	"	49+65	6' Right
13-92034E	"	49+65	70.5' Right
11-92034E	"	52+65	53' Left
2-95656E	Rhine Valley Lane	56+45	95' Left
3-95656E	"	58+28	54.5' Left
4-95656E	"	58+95	78.5' Right
1-090495E	"	67+82	10.5' Left
2-090495E	"	66+78	10' Left
3-090495E	"	65+06	13' Left

The dashed lines on the test boring logs identify the changes between the soil and bedrock types, which were determined by interpolation between samples and should be considered approximate. Only changes that occur within samples can be precisely determined and are indicated by solid lines on the logs. The transition between soil and bedrock types may be abrupt or gradual.

5.0 SUBSURFACE CONDITIONS

Specific subsurface conditions were only identified in limited areas along the alignment. The following is a general discussion of the subsurface profile encountered in the test borings.

5.1 General Subsurface Profiles

5.1.1 Horsebranch Road

Test Borings 11 through 27, including Test Boring 27A and excluding Test Boring 12, originally performed along Horsebranch Road encountered a general subsurface profile consisting of 4 to 8 inches of topsoil, where encountered; over 0 to 4.5 feet of undocumented fill including silty clays, clay and topsoil with and without gravel, limestone floaters, pieces of wood and asphalt, and roots; followed by 0 to 15.5 feet of native overburden clay or silty clay; followed by the interbedded shale and limestone bedrock. It should be recognized that these test borings were drilled prior to the construction of, and regrading for, Horsebranch Road; therefore, the depths and thicknesses of soil and bedrock types shown on the attached test boring logs do not necessarily reflect depths and thicknesses from the existing ground surface. Currently, the subsurface conditions include variable thicknesses of compacted and tested fill consisting of silty clay, plastic clay and/or brown or gray shale with some limestone floaters placed during construction of Horsebranch Road, and areas of very shallow bedrock where cuts were made during the re-construction of Horsebranch Road. The test boring logs must be adjusted for the difference between existing ground elevations and the elevations at the time the test borings were made in order to assess the subsurface conditions along the alignment.

5.1.2 Rhine Valley Lane

Test Borings 2, 3 and 4 from Thelen Project No. 95656E performed along Rhine Valley Lane originally encountered a general subsurface profile consisting of 4 to 6 inches of topsoil, over about 3.5 to 9.0 feet of native overburden clay or silty clay, followed by interbedded shale and limestone bedrock. It is again recognized that these test borings were drilled prior to the construction of, and regrading for, Rhine Valley Lane; therefore the depths and thicknesses of soil and bedrock types shown on the attached test boring

logs do not necessarily reflect depths and thicknesses from the existing ground surface. Currently, a compacted and tested fill slope exists along the west side of Rhine Valley Lane and a cut slope is located along the east side of Rhine Valley Lane until the intersection with Napa Valley Lane. The test boring logs must be adjusted for the difference between existing ground elevations and the elevations at the time the test borings were made in order to assess the subsurface conditions along the alignment.

Test Borings 1, 2 and 3, which were performed as part of this exploration, between the intersection of Napa Valley Lane and Center View Boulevard, along Rhine Valley Lane, encountered a general subsurface profile consisting of 10 inches of asphalt, over 0 to at least 14 feet of undocumented fill, including silty clays and clays with and without topsoil, shale fragments, limestone fragments and organics, followed by 1.6 to 6.2 feet of a native overburden clay and finally by the interbedded shale and limestone bedrock.

5.2 Undocumented Fill

Two (2) types of fill may be encountered during trench excavations for the proposed water main. Type I consists of artificial fill that was placed as compacted and tested, controlled fill. Type I fill consists of the native overburden silty clay and clay, along with shale from all three (3) zones of the bedrock, and possible limestone floaters that were placed during the re-construction of Horsebranch Road and Rhine Valley Lane. The Type I fill has consistencies that are stiff or very stiff. The Type I fill was not sampled with test borings as the test borings were performed prior to re-construction of Horsebranch Road and construction of Rhine Valley Lane.

Type II fill consists of undocumented fill that was in-place beneath the old Horesebranch Road, prior to the re-construction of Horsebranch Road and on the hillside where Rhine Valley Lane was constructed. This fill is comprised of mixed dark brown, brown, green, and/or dark gray, silty clay and clay with and without topsoil, asphalt fragments, shale fragments, limestone fragments and limestone floaters. The Standard Penetration Resistances (N-values) encountered within the test borings widely ranged from 7 to greater than 50 blows per foot (bpf). It is our opinion that the higher N-values were due to encountering limestone floaters larger than the size of the sampler opening. It should

also be noted that some of this material may have been undercut from below the new roadway area as part of the earthwork operations of the Horsebranch Road and the Rhine Valley Lane construction.

5.3 Native Alluvial Terrace Deposits

Alluvial terrace deposits are soils that have been laid down by meandering stream flow in the valley bottom. These soils primarily consist of silty clay with iron oxide stains and variable concentrations of limestone fragments and floaters. These terrace deposits are medium stiff to stiff with N-values ranging from a low of 18 bpf to more than 50 blows for less than 6 inches of sampler penetration because of the presence of the limestone floaters.

5.4 Native Colluvial and Residual Soils

Colluvium is a transported soil that has been deposited on the slopes of hillsides from weathering and degradation of the shale and limestone bedrock and movement down the slopes to form talus deposits on the hillsides. These soils are recognized by the random orientation of the shale fragments and limestone floaters included in a relatively dense clay matrix. Residuum is a soil that has weathered from the underlying shale and limestone bedrock and can be recognized by traces of horizontal bedding planes.

The native overburden clay and silty clay was primarily brown in color, with occasional traces of gray and with and without iron oxide stains, shale fragments and limestone fragments and floaters. The N-values for the medium stiff soil ranged from 5 to 10 bpf, and 17 to greater than 50 bpf for the stiff or very stiff soil, with an average value in the low to high 20's. The higher N-values were due to encountering limestone floaters larger than the size of the sampler opening.

5.5 Bedrock

The bedrock beneath the fill and the native overburden soil is a system of Ordovician Aged shale and limestone. This type of bedrock is typically classified into three zones separated by the extent of weathering of the shale portion of the bedrock. The uppermost zone is termed highly weathered interbedded shale and limestone, where

the shale portion has virtually weathered to a brown silty clay or clay, yet possesses horizontally aligned bedding characteristics of the bedrock system. Occasional clay seams and layers were also observed in the highly weathered zone of bedrock. The intermediate zone is described as an olive brown weathered bedrock and is characterized by a shale component which is tougher, and generally drier, than the weathered zone. The upper and intermediate zones have weathered from the third commonly accepted zone, the unweathered, gray, parent interbedded shale and limestone. Highly weathered and weathered zones, locally, may or may not be present above the unweathered bedrock zone because of variable weathering and erosion conditions. The limestone layers within all three (3) zones of the bedrock are relatively unweathered and hard in comparison to the shale portion of the bedrock.

According to the USGS Quadrangle Map in the vicinity of the alignment along Horsebranch Road, the bedrock type near the ground surface transitions between the Kope Formation, the Fairview Formation, the Bellevue Tongue of the Grant Lake Limestone Formation and the Bull Fork Formation. The bedrock type near the ground surface along Horsebranch Road and near the intersection with Rhine Valley Lane is from the Kope Formation. The Kope Formation is described as approximately 85 percent shale and 15 percent limestone. The shale is described as laminated and locally cross-laminated, commonly fissile, in beds less than 1 inch thick to sets as thick as 8 feet, with abundant fossils. The limestone is described as 3 to 6 inches thick, in uneven tabular beds. The bedrock type near the ground surface transitions along Rhine Valley Lane beginning near Horsebranch Road in the Kope Formation, to the Fairview Formation around El. 690 feet, then to the Bellevue Tongue of Grant Lake Limestone near El. 800 to 810 feet, and again to the Bull Fork Formation by El. 820 feet. The Fairview Formation is described as 45 to 60 percent shale and 40 to 55 percent limestone. The shale is described as laminated to thinly bedded, commonly fissile and slightly calcareous. The limestone is described as irregularly to evenly bedded, commonly lenticular, generally less than 4-inch thick beds, but can be as thick as 15 inches. The Bellevue Tongue of the Grant Lake Limestone Formation is described as limestone with rubbly weathering in thin beds that are highly irregular and lenticular and consisting largely of old and broken fossils. The Bull Fork Formation is described as

more than 50 percent limestone, which is irregularly to evenly bedded in beds that are generally between a little less than 1 and 4 inches thick, but locally are as much as 12 inches thick.

5.6 Groundwater

The majority of the test borings were noted to be dry during drilling, upon completion of drilling and up to several hours after the completion of drilling in the holes that were not immediately backfilled. Individual groundwater measurements can be found at the bottom of each test boring log. It is noted that Test Boring 27-92034E encountered groundwater at the ground surface, as this test boring was drilled in the creek bottom. Based on our local experience, groundwater can be encountered at various times of the year as perched water within the fill, at the fill soil/native soil interface, at the native soil/bedrock interface and along limestone layers within the bedrock.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 General

Based upon our engineering reconnaissance of the proposed water main alignment, a review of the previously performed test borings, the recently performed test borings, our understanding of the proposed construction, and our experience as Consulting Soil and Foundation Engineers in the Northern Kentucky Area, we have reached the conclusions and make the recommendations in this report.

The conclusions and recommendations of this report have been derived by relating the general principles of the discipline of Geotechnical Engineering to the proposed construction outlined by the Project Characteristics section of this report. Because changes in surface, subsurface, climatic, and economic conditions can occur with time and location, we recommend for our mutual interest that the use of this report be restricted to this specific project.

Our understanding of the proposed design and construction is based on the documents provided to us at the time this report was prepared and which are referenced in the Project Characteristics section of this report. We recommend that our office be retained

to review the final design documents, plans, and specifications to assess any impact changes, additions or revisions in these documents may have on the conclusions and recommendations of this Geotechnical Report. Any changes or modifications which are made in the field during the construction phase which alter the water main alignment or depths or other related site work should also be reviewed by our office prior to their implementation.

If conditions are encountered in the field during construction which vary from the facts of this report, we recommend that our office be contacted immediately to review the changed conditions in the field and make appropriate recommendations.

The scope of our services did not include any environmental assessment or investigation for the presence or absence of wetlands or hazardous or toxic materials in the soil, bedrock, surface water, groundwater or air, on or below or around this site.

We have reviewed previously performed test borings and performed recent test borings for our evaluation of the site conditions and for the formulation of the conclusions and recommendations of this report. We assume no responsibility for the interpretation or extrapolation of the data by others.

The earthwork recommendations of this report presume that the earthwork will be monitored by an Engineering Technician under the direction of a Registered Professional Geotechnical Engineer. We recommend that the Owner contract these services directly with Thelen Associates, Inc.

The proposed water main installation and the terrain that exists along the proposed alignment were reviewed on a station-by-station basis and are discussed individually in Sections 6.2 through 6.11 of this report. Section 6.12 contains general recommendations for placement and compaction of trench backfill. Section 6.13 contains recommendations for thrust restraint.

6.2 Station 28+83 to Station 31+40

The Project Plans indicate that the water main will be located about 8 to 12 feet off the north, or right side, of the road throughout this section. The ground surface along the north side of the road is relatively flat to sloping moderately upward away from the north side of the road after a drainage ditch. Horsebranch Creek remains along the south side of the road throughout this section.

No new test borings were performed in this section of the alignment; however, based on previously performed Test Borings 27 and 27A from Thelen Project No. 92034E and a review of the cross sections for the reconstruction of Horsebranch Road, it appears that this section of the road was built with a fill embankment on both sides of the road. It is anticipated that the proposed water main will be installed within compacted and tested fill that was placed for the reconstruction of Horsebranch Road.

It is our opinion that the water main can be installed at the location and depth shown on the Project Plans.

6.3 Station 31+40 to Station 39+40

The Project Plans indicate that the proposed alignment will remain approximately 5 to 12 feet off the north side of the road throughout this section of the alignment. The ground surface along this side of the road slopes moderately to steeply upward away from the right side of the road after a drainage ditch. It is noted that a drainage swale is located near Station 39+20, which is lined with limestone rip-rap and an existing concrete headwall is also located at the swale.

Based on previously performed Test Borings 22 through 26 from Thelen Project No. 920234E, and based on cross sections for the reconstruction of Horsebranch Road, it appears that Horsebranch Road was constructed by making a cut into the bedrock along this side of the road. Based on the profile, the water main trench excavations will be into the interbedded weathered to unweathered shale and limestone bedrock.

It is our opinion that the water main can be installed at the location and depth shown on the Project Plans.

6.4 Station 39+40 to Station 44+00

The Project Plans indicate that the water main will be located about 6 to 7 feet off the north side of the road throughout this section of the alignment. The ground surface along this side of the road slopes gently upward away from the right side of the road after a drainage ditch. It is again noted that there is a drainage swale near about Station 43+40 that is lined with limestone rip-rap and has an existing concrete headwall.

No new test borings were performed in this section of the alignment, however, based on previously performed Test Borings 19 through 21 from Thelen Project No. 92034E and cross sections from the Horsebranch Road reconstruction, it is anticipated that the water main trench excavations will extend through the native alluvium and into the unweathered interbedded shale and limestone bedrock.

It is our opinion that the water main can be installed at the location and depth shown on the Project Plans.

6.5 Station 44+00 to Station 51+00

The Project Plans indicate that the water main will be located about 7 to 10 feet off the north side of the road throughout this section. The ground surface along this side of the road consists of a wide relatively flat drainage ditch, then slopes moderately to steeply upward away from the drainage ditch. It is noted that the interbedded shale and limestone bedrock was exposed in the cut slope above the drainage ditch along the north side of the road.

No new test borings were performed in this section of the alignment; however, based on previously performed Test Borings 13 through 16 from Thelen Project No. 92034E, it is anticipated that the water main trench excavations will be in the weathered to unweathered interbedded shale and limestone bedrock.

It is our opinion that the water main can be installed at the location and depth shown on the Project Plans.

6.6 Station 51+00 to Station 54+00

The Project Plans indicate that the proposed alignment will be about 8 feet off the north side of the road throughout this section. The ground surface along this side of the road is relatively flat to sloping moderately upward away from the right side of the road after a drainage ditch along the road. Ground movement was observed within the pavement in the southern lane of Horsebranch Road, as evidenced by edge cracking and cracking near the center of the road near the intersection with Rhine Valley Lane.

No new test borings were performed in this section of the alignment, however, based on cross sections for the Horsebranch Road reconstruction, the road was constructed by placing fill across the entire width of the road. Based on Test Boring 11 from Thelen Project No. 92034E, the water main trench excavations in this section will either encounter the native clay soils or compacted and tested fill placed for the construction of Horsebranch Road.

Provided that the water main alignment remains along the north side of the road in this section, it is our opinion that the water main can be installed at normal minimum depths throughout this section. It is noted that there is an existing brick sign near Station 53+90 and that the water main trench excavations will come in close proximity to this sign. The Contractor should be aware of the location of the sign and should prevent undermining of, or damage to, this sign during installation of the water main.

6.7 Station 54+00 to Station 55+20

The Project Plans indicate that the proposed alignment will be located about 3 to 7 feet off the east side of Rhine Valley Lane throughout this section. The ground surface along this side of the road is relatively flat after a drainage ditch.

No test borings were performed in this section, and based on the cross sections for the reconstruction of Horsebranch Road, it is anticipated that the water main trench

excavations will be in the native clay soils or within the compacted and tested fill placed for the construction of Rhine Valley Lane.

It is our opinion that the water main can be installed at the location and depth shown on the Project Plans.

6.8 Station 55+20 to Station 62+00

The Project Plans indicate that the proposed alignment will remain about 4 to 6 feet from the outside edge of the curb along the east side of Rhine Valley Lane. The ground surface along the east side of the road slopes moderately upward away from the road after a drainage ditch.

A review of a cross section between Test Borings 3 and 4 from Thelen Project No. 95656E indicates that Rhine Valley Lane was constructed by cutting along the east side of the road and filling along the west side of the road. Test Borings 2, 3 and 4 from Thelen Project No. 95656E indicate that the water main trench excavations will most likely be within the interbedded unweathered gray shale and limestone bedrock.

It is our opinion that the water main can be installed at the location and depth shown on the Project Plans.

6.9 Station 62+00 to Station 65+00

The Project Plans indicated that the proposed alignment will remain 5 to 7 feet off the outside edge of the curb along the east side of Rhine Valley Lane. The ground surface along this side of the road is relatively flat throughout this section. The intersection with Napa Valley Lane and Rhine Valley Lane occurs near Station 62+50 and there is a gas main crossing near Station 64+46.

No test borings were performed in this section of the alignment. It is anticipated that the water main trench excavations will encounter either the native clay soils or the compacted and tested fill placed for the road construction.

It is our opinion that the proposed water main can be installed at the location and depth shown on the Project Plans.

6.10 Station 65+00 to Station 66+80

The Project Plans indicate that the proposed alignment will be about 4 to 5 feet off the outside edge of the curb along the east side of Rhine Valley Lane. The ground surface along this side of the road slopes steeply upward away from the east edge of the road. Based on information from previously performed projects within the vicinity of the alignment, this slope has experienced landsliding in the past. The steep slope was built with an undocumented fill in order to create a flat crest on the west side of Top Flight Gymnastics. The landslide has never been repaired, and is still evident on the slope.

Test Borings 2 and 3 were performed in this section as part of this project. These test borings encountered 10 inches of asphalt, over 0 to 1.6 feet of medium stiff undocumented fill, followed by 1.6 to 4.6 feet of stiff or very stiff native alluvium or residual soils, followed by the interbedded shale and limestone bedrock.

Based on our recent and past reconnaissances, it is our opinion that the oversteepened fill slope has not moved much in the past few years. The toe bulge of this slide was evident in the field and noted to be within the proposed alignment location. It is our opinion that installing the water main along the proposed alignment within the toe of the failed slope could reactivate the landslide, which has been at a state of non-noticeable movement in the past few years. Based on the tenuous state of stability of the oversteepened fill slope, it is our opinion that the lowest risk option would be to relocate the proposed alignment into the east lane of the road starting with a 45-degree bend at about Station 65+40 and again at about Station 66+80 in order to transition back to the proposed alignment. If the water main can be relocated within the pavement, it is our opinion that it can be installed at normal minimum depths.

If relocating the water main into the road is not an option, we recommend installing the water main as close as possible to the east edge of the east curb, as far away from the

toe of the slope as possible. In addition, the following paragraph will be very important for the Contractor to follow during installation of the water main.

Due to the past instability within this section of the alignment, we recommend the water main trench excavations be lowered such that top of the main is embedded at least one (1) foot below the surface of the bedrock. Based on a review of the profile and the test borings, it is our opinion that the bedrock embedment can be accomplished at the beginning of this section with at least 8 feet of cover, transitioning to 4.5 feet of cover by the end of this section at Station 66+80. The bedrock embedment should be field verified during construction.

In addition, we recommend that the open, unbackfilled trench lengths be limited as necessary, in order to prevent undermining the over-steepened fill slope and additional mobilization of the landslide. The Contractor should be responsible for the stability and safety of all excavations and should exercise all necessary precautions to shore, slope or otherwise maintain stable trench excavations to protect workers, adjacent ground above and below the trenches, structures and infrastructure. It is our opinion that the Contractor will have to use trench boxes tight against the sides of the short trench lengths to minimize movement of the previous landslide mass into the excavations. Additionally, it is imperative that the trenches be backfilled as soon as possible with compacted and tested clayey fill per the recommendations in Section 6.12 of this report, to restore toe support to the conditions that currently exist. It should be noted that even with these construction practices, there is still a risk that the landslide could be remobilized when the toe is cut out of the slope. Associated with this risk is the possibility that the owner of the property on which the landslide exists may claim that the installation of the water main at the toe of the slope made the landslide conditions on the slope worse than they were before the main was installed.

6.11 Station 66+80 to Station 69+19.21 (End of Alignment)

The Project Plans indicate that the proposed water main will begin at Station 66+80 about 4 feet off the outside edge of the curb along the east side of the Rhine Valley Lane and will cross Centre View Boulevard starting near Station 68+64. The proposed

alignment will terminate at Station 69+19.21 near the north edge of Centre View Boulevard and will connect to an existing 36-inch diameter water main. The ground surface along the proposed alignment slopes gently upward away from the east side of the road, then becomes relatively flat to the end of the alignment.

Test Boring 1 was performed in this section of the alignment and encountered 10 inches of asphalt, over at least 13.2 feet of undocumented fill consisting of clay and silty clay. The consistencies of the fill in the top 3.7 feet ranged from soft to stiff, and stiff to very stiff in the bottom 9.5 feet of fill that was encountered.

It is our opinion that the water main can be installed within the stiff fill at the location and depth shown on the Project Plans throughout this section.

6.12 General Excavating and Backfilling Recommendations

The excavations throughout this project will encounter a variety of materials. Those materials will include artificial fill (comprised primarily of silty clay, clay and shale), native silty clay and clay soils, and interbedded shale and limestone bedrock. Limestone floaters were also encountered within the fill and within some of the native soils. Experience indicates that the difficulty of completing the excavations in the bedrock usually far exceeds the difficulty of excavating in the fill materials and the native silty clays. The difficulty of making bedrock excavations is primarily related to the amount and thickness of the limestone layers in the bedrock as well as the degree of weathering. The Contractor should be aware of the presence of the bedrock and should be prepared for the difficulty that the bedrock may present in the excavations.

The scope of this project involved a review of subsurface explorations that were performed to define specific subsurface conditions in widely spaced areas along Horsebranch Road and Rhine Valley Lane, which represent a limited percentage of the total project length. Therefore, we recommend that the specifications for this project be based on unclassified excavation, not on separate cost items for soil excavation and bedrock excavation. The base bid for the project should include the cost of excavating

the materials encountered within the specified water main depths, regardless of soil or bedrock characteristics.

It is difficult to shear limestone layers neatly in the sides of trench excavations. Frequently, when limestone layers are encountered at relatively shallow depths in trench excavations, the tendency is for the layers not to break even with the sides of the excavations, but rather to be pulled up in large chunks, which tend to heave and ravel the soils outside the limits of the intended trench. Where trench excavations will be made immediately adjacent to or near the edge of the existing pavement with the intention of not disturbing the existing pavement beyond the trench limits, it should be anticipated that there will be some areas where there is heave and raveling due to removal of limestone layers that could damage pavement adjacent to the trench, and said pavement will have to be restored.

We expect that the excavated materials, exclusive of the thick limestone layers, can be used as backfill after the appropriate granular pipe bedding and backfill is installed. Fill materials should not include asphalt, concrete, trash, construction or demolition debris, topsoil or frozen material. Large pieces of limestone, which tend to nest or retard compaction, should be excluded from the backfill. Smaller pieces of limestone that can be broken up and dispersed so that they do not nest or retard compaction can be incorporated in the backfill provided that proper protection of the pipe from these pieces of limestone is provided.

The trench excavations for the project will extend a minimum of about 7.0 feet deep. There are areas where the water main will be deeper for bedrock embedment requirements and conflicts with other utilities or infrastructure as shown on the Final CEC Project Plans and as discussed in this report. The Contractor should be responsible for the stability and safety of all excavations and should exercise all necessary precautions to shore, slope or otherwise maintain stable trench excavations to protect workers, slopes above and below the trenches, adjacent pavement and structures, and infrastructure. These trenches should be made and maintained in accordance with all Federal, State and Local regulations.

Normal and recommended utility construction practice is to bed and backfill pipes with granular fill to a specified height above the crown of the pipe. Compaction of trench backfill to a moist, firm, dense condition is important throughout the alignments. If clayey backfill can be used within or adjacent to the pavement, we recommend that all clayey soil backfill for this project be placed in shallow level layers, 6 to 8 inches in thickness, and be compacted to densities not less than 95 percent of the standard Proctor maximum dry density, ASTM D698. The clayey backfill soils should be moisture-conditioned to within the range of 2 percent below to 3 percent above the optimum moisture at the time of compaction. All shale should be pulverized to a soil-like consistency and moisture conditioned the same as a soil. Where granular fill is used, it should be compacted to at least 75 percent relative density using ASTM D4253 and D4254 test methods. Density tests should be made in the backfill to document that the recommended degree of compaction is being achieved.

6.13 Thrust Restraint

Thrust restraint is required at all horizontal and vertical bends, tees, dead end plugs, fire hydrants and other fittings for this entire pipeline project. Thrust restraint can be provided at horizontal and vertical bends by full-sized concrete thrust blocks or by a combination of restrained joint pipe and modified thrust blocks of reduced size. For vertical bends that will have thrust forces acting out of the ground throughout the project, we recommend that restrained joint pipe and modified blocks be implemented.

It is our understanding that NKWD and CEC are considering installing restrained joint pipe at all horizontal and vertical bends. If restrained joint pipe is going to be installed and the reduced blocks are going to be implemented, the required length of restrained joint pipe needs to be calculated based on the working pressure of the system. The following Table 2 is a list of the horizontal and vertical bends which need to be restrained due to thrust forces acting toward existing utilities or upward out of the ground.

TABLE 2

Bends Requiring Restrained Joint Pipe

Station	Diameter of Bend (inches)	Type of Bend	Degree of Bend
28+83	36	Vertical	22.5
48+91	36	Vertical	11.25
64+76	36	Horizontal	11.25
68+80	36	Vertical	22.5

Based on a working pressure of 200 pounds per square inch (psi) and a maximum test pressure of 300 psi, we have calculated the required length for restrained joint pipe for both horizontal and vertical bends specific to this project. The required lengths are presented in Table 3.

Figure 1 is provided in the Appendix to this report, which details the required reduced thrust block sizes **to be used only in conjunction with the restrained joint pipe**. The standard NKWD block details for horizontal bends should be implemented with the standard push on joint pipe elsewhere throughout the project. Figure 2 is provided in the Appendix to this report as well, which details the required volumes for vertical blocks **when used in conjunction with restrained joint pipe**. The standard NKWD block details for vertical bends should be implemented with the standard push on joint pipe elsewhere throughout the project.

TABLE 3

Calculated Restrained Joint Lengths

Type of Bend	Degree of Bend	Length on Either Side of Bend (feet)	Total Length Required (feet)
Horizontal	11.25	18	36
Horizontal	22.5	36	72
Horizontal	45	54	108
Horizontal	90	126	252
Horizontal	Tee/Dead End	N/A	486
Vertical Down	11.25	54	108
Vertical Down	22.5	108	216

APPENDIX

ASFE Report Information

Test Boring Logs 11 through 27A – 92034E

Test Boring Logs 2 through 4 – 95656E

Test Boring Logs 1 through 3 – 090495E

Soil Classification Sheet

Figure 1

Horizontal Concrete Thrust Block Details for Restrained Joint Pipe

Figure 2

Vertical Concrete Thrust Block Details for Restrained Joint Pipe

Important Information about Your

Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you —* should apply the report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual

CIVIL ENGINEERS

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☐ 3337 Milverton Court/Cincinnati, Ohio 45249-2865/513-574-7137

Station 52+65, Offset 53 Feet Left

LOG OF TEST BORING

CLIENT James W. Berling Engineering Company BORING # 11
PROJECT Geotechnical Exploration, Horsebranch Road Extension to Medical Village JOB # 92034E
LOCATION OF BORING Station: 20+50 Offset: 20' Right Drive, Kenton County, Kentucky

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRA. DEPTH	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec.
695.5	SURFACE							
693.5	Dark brown moist stiff SILTY CLAY.	2.0		I	2/3/3	1	DS	15"
691.0	Brown moist stiff SILTY CLAY. (CL)	4.5		I	5/6/9	2	DS	16"
688.5	Brown moist stiff CLAY with limestone floaters.	7.0	5	I	6/12/10	3	DS	14"
686.0	Brown to olive brown moist very soft highly weathered SHALE and thinly bedded LIMESTONE.	9.5		I	13/21/14	4	DS	12"
684.5	Gray moist soft SHALE and thinly bedded LIMESTONE (bedrock).	11.0	10	I	37/50/6"	5	DS	9"
	Refusal and bottom of test boring at 11.0 feet.		15					
			20					
			25					

Datum USGS
Surf. Elev. 695.5 Ft.
Date Started 3/24/92

Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Pipe Size O.D.2 In.

Hole Diameter 5"
Rock Core Dia.
Boring Method CFA

Foreman KN
Engineer TWV
Date Completed 3/24/92

SAMPLE CONDITIONS
D – DISINTEGRATED
I – INTACT
U – UNDISTURBED
L – LOST

SAMPLER TYPE
DS – DRIVEN SPLIT SPOON
PT – PRESSED SHELBY TUBE
CA – CONTINUOUS FLIGHT AUGER
RC – ROCK CORE

GROUND WATER DEPTH
FIRST NOTED None FT.
AT COMPLETION Dry FT.
AFTER 28 HRS. Dry FT.
BACKFILLED 28 HRS.

BORING METHOD
HSA – Hollow Stem Augers
CFA – Continous Flight Augers
DC – Driving Casing
MD – Mud Drilling

CIVIL ENGINEERS

G. J. Thelen & Associates, Inc.

☑ 516 Enterprise Drive/Covington, Kentucky 41017-1595/606-341-1322/Fax 606-341-0832
☐ 10265 Spartan Drive/Cincinnati, Ohio 45215/513-771-5005/Fax 513-771-6669
☐ 3337 Milverton Court/Cincinnati, Ohio 45248-2865/513-574-7137

Station 49+65, Offset 70.5 Feet Right

LOG OF TEST BORING

CLIENT James W. Berling Engineering Company BORING # 13
PROJECT Geotechnical Exploration, Horsebranch Road Extension to Medical Village JOB # 92034E
LOCATION OF BORING Station: 23+50 Offset: 90' Left Drive, Kenton County, Kentucky

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRA. DEPTH	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec.
728.0	SURFACE	0.5						
727.5	TOPSOIL.	2.0		I	1/3/4	1A 1B	DS	15"
726.0	Brown moist medium stiff to stiff CLAY with roots. (CH)	4.5		I	6/9/9	2	DS	13"
723.5	Brown moist stiff CLAY with limestone floaters and fossils, trace roots.	7.0	5	I	11/19/18	3	DS	16"
721.0	Brown moist very soft highly weathered SHALE and thinly bedded LIMESTONE with clay seams (bedrock).	9.0		I	21/41/32	4	DS	17"
719.0	Brown to olive brown moist soft weathered SHALE and thinly bedded LIMESTONE (bedrock).		10					
	Bottom of test boring at 9.0 feet.		15					
			20					
			25					

Datum USGS
Surf. Elev. 728.0 Ft.
Date Started 3/24/92

Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Pipe Size O.D.2 In.

Hole Diameter 5"
Rock Core Dia.
Boring Method CFA

Foreman KN
Engineer TWV
Date Completed 3/24/92

SAMPLE CONDITIONS
D – DISINTEGRATED
I – INTACT
U – UNDISTURBED
L – LOST

SAMPLER TYPE
DS – DRIVEN SPLIT SPOON
PT – PRESSED SHELBY TUBE
CA – CONTINUOUS FLIGHT AUGER
RC – ROCK CORE

GROUND WATER DEPTH
FIRST NOTED None FT.
AT COMPLETION Dry FT.
AFTER 30 HRS. Dry FT.
BACKFILLED 30 HRS.

BORING METHOD
HSA – Hollow Stem Augers
CFA – Continous Flight Augers
DC – Driving Casing
MD – Mud Drilling

CIVIL ENGINEERS

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☐ 3337 Milverton Court/Cincinnati, Ohio 45248-2865/513-574-7137

Station 49+65, Offset 6 Feet Right

LOG OF TEST BORING

CLIENT James W. Berling Engineering Company BORING # 14
PROJECT Geotechnical Exploration, Horsebranch Road Extension to Medical Village JOB # 92034E
LOCATION OF BORING Station: 23+50 Offset: 26' Left Drive, Kenton County, Kentucky

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRA. DEPTH	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec.
706.6	SURFACE	0.3						
706.3	TOPSOIL.	2.0		I	1/2/3	1A 1B	DS	8"
704.6	Brown moist medium stiff SILTY CLAY, trace roots.	4.5		I	5/11/10	2	DS	10"
702.1	Brown moist stiff SILTY CLAY, trace limestone floaters and bedding planes.	7.0	5	I	21/29/20	3	DS	16"
699.6	Brown moist very soft highly weathered SHALE and thinly bedded LIMESTONE (bedrock).			I	39/41/40	4	DS	14"
	Brown to olive brown, trace gray moist soft weathered SHALE and thinly bedded LIMESTONE (bedrock).		10	I	43/50/5"	5	DS	9"
				I	50/6"	6	DS	6"
690.6		16.0	15	D		7	CA	
	Refusal and bottom of test boring at 16.0 feet.		20					
			25					

Datum USGS
Surf. Elev. 706.6 Ft.
Date Started 3/23/92

Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Pipe Size O.D.2 In.

Hole Diameter 5"
Rock Core Dia.
Boring Method CFA

Foreman KN
Engineer TWV
Date Completed 3/23/92

SAMPLE CONDITIONS
D – DISINTEGRATED
I – INTACT
U – UNDISTURBED
L – LOST

SAMPLER TYPE
DS – DRIVEN SPLIT SPOON
PT – PRESSED SHELBY TUBE
CA – CONTINUOUS FLIGHT AUGER
RC – ROCK CORE

GROUND WATER DEPTH
FIRST NOTED None FT.
AT COMPLETION Dry FT.
AFTER 48 HRS. Dry FT.
BACKFILLED 48 HRS.

BORING METHOD
HSA – Hollow Stem Augers
CFA – Continous Flight Augers
DC – Driving Casing
MD – Mud Drilling

Station 49+65, Offset 89 Feet Left

CIVIL ENGINEERS

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LOG OF TEST BORING

CLIENT James W. Berling Engineering Company BORING # 15
PROJECT Geotechnical Exploration, Horsebranch Road Extension to Medical Village JOB # 92034E
LOCATION OF BORING Station: 23+50 Offset: 70' Right Drive, Kenton County, Kentucky

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRA. DEPTH	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec.
673.9	SURFACE							
	Mixed dark brown, some brown moist medium stiff FILL, topsoil and silty clay, trace roots.	2.0		I	1/3/5	1	DS	16"
671.9	Mixed brown moist medium stiff to stiff SILTY CLAY with limestone fragments and floaters, trace iron oxide stains.	4.5	5	I	11/50/3"	2	DS	8"
669.4	Olive brown, trace gray moist soft weathered SHALE and thinly bedded LIMESTONE (bedrock).	7.0		I	17/20/33	3	DS	13"
666.9	Gray moist soft SHALE and thinly bedded LIMESTONE (bedrock).	8.5		I	39/50/6"	4	DS	10"
665.4	Refusal and bottom of test boring at 8.5 feet.		10					
			15					
			20					
			25					

Datum USGS
Surf. Elev. 673.9 Ft.
Date Started 3/23/92

Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Pipe Size O.D.2 In.

Hole Diameter 5"
Rock Core Dia.
Boring Method CFA

Foreman KN
Engineer TWV
Date Completed 3/23/92

SAMPLE CONDITIONS
D – DISINTEGRATED
I – INTACT
U – UNDISTURBED
L – LOST

SAMPLER TYPE
DS – DRIVEN SPLIT SPOON
PT – PRESSED SHELBY TUBE
CA – CONTINUOUS FLIGHT AUGER
RC – ROCK CORE

GROUND WATER DEPTH
FIRST NOTED None FT.
AT COMPLETION Dry FT.
AFTER 46 HRS. Dry FT.
BACKFILLED 46 HRS.

BORING METHOD
HSA – Hollow Stem Augers
CFA – Continous Flight Augers
DC – Driving Casing
MD – Mud Drilling

CIVIL ENGINEERS

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Station 46+20, On Alignment

LOG OF TEST BORING

CLIENT James W. Berling Engineering Company BORING # 16
PROJECT Geotechnical Exploration, Horsebranch Road Extension to Medical Village JOB # 92034E
LOCATION OF BORING Station: 27+00 Offset: 32' Left Drive, Kenton County, Kentucky

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRA. DEPTH	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec.
683.4	SURFACE	0.3						
683.1	TOPSOIL.	2.0		I	2/4/6	1A 1B	DS	13"
681.4	Brown moist medium stiff to stiff SILTY CLAY, trace roots.	4.5		I	6/7/9	2	DS	17"
678.9	Brown moist stiff SILTY CLAY with shale fragments and limestone floaters (colluvium).	7.0	5	I	7/10/15	3	DS	16"
676.4	Brown moist very stiff to hard SILTY CLAY with shale fragments and limestone floaters (colluvium). (CL)			I	27/31/23	4	DS	15"
	Brown to olive brown moist soft weathered SHALE and thinly bedded LIMESTONE (bedrock).		10	I	50/3"	5	DS	2"
668.9		14.5		I	39/50/4"	6	DS	9"
667.4	Gray moist soft SHALE and thinly bedded LIMESTONE (bedrock).	16.0	15	I	44/50/6"	7	DS	9"
	Refusal and bottom of test boring at 16.0 feet.		20					
	Note: A Shelby tube sample was attempted from 2' to 4'. No recovery. Tube destroyed by limestone floater.		25					

Datum USGS
Surf. Elev. 683.4± Ft.
Date Started 3/16/92

Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Pipe Size O.D.2 In.

Hole Diameter 5"
Rock Core Dia.
Boring Method CFA

Foreman KN
Engineer TWV
Date Completed 3/16/92

SAMPLE CONDITIONS
D – DISINTEGRATED
I – INTACT
U – UNDISTURBED
L – LOST

SAMPLER TYPE
DS – DRIVEN SPLIT SPOON
PT – PRESSED SHELBY TUBE
CA – CONTINUOUS FLIGHT AUGER
RC – ROCK CORE

GROUND WATER DEPTH
FIRST NOTED None FT.
AT COMPLETION Dry FT.
AFTER 24 HRS. Dry FT.
BACKFILLED 24 HRS.

BORING METHOD
HSA – Hollow Stem Augers
CFA – Continous Flight Augers
DC – Driving Casing
MD – Mud Drilling

*STANDARD PENETRATION TEST – DRIVING 2" OD SAMPLER 1' WITH 140 #, HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

CIVIL ENGINEERS

G. J. Thelen & Associates, Inc.

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☐ 10265 Spartan Drive/Cincinnati, Ohio 45215/513-771-5005/Fax 513-771-6669
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Station 46+20, Offset 63 Feet Left

LOG OF TEST BORING

CLIENT James W. Berling Engineering Company BORING # 17
PROJECT Geotechnical Exploration, Horsebranch Road Extension to Medical Village JOB # 92034E
LOCATION OF BORING Station: 27+00 Offset: 40' Right Drive, Kenton County, Kentucky

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRA. DEPTH	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec.
660.0	SURFACE	0.3						
659.7	ASPHALT.	0.6						
		2.5		I	41/21/27	1	DS	8"
659.4	BASE, dense graded aggregate.			I	50/6"	2	DS	6"
	Mixed dark gray and brown moist very stiff FILL, silty clay with pieces	4.0						
657.5	of limestone.	5.2	5	I	50/3"	3	DS	3"
656.0	Olive brown and gray moist soft weathered SHALE and thinly bedded LIMESTONE (bedrock).							
654.8	Gray moist moderately tough to tough SHALE and thinly bedded LIMESTONE (bedrock).		10					
	Refusal and bottom of test boring at 5.2 feet.		15					
			20					
			25					

Datum USGS
Surf. Elev. 660.0± Ft.
Date Started 3/11/92

Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Pipe Size O.D.2 In.

Hole Diameter 5"
Rock Core Dia.
Boring Method CFA

Foreman KN
Engineer TWV
Date Completed 3/11/92

SAMPLE CONDITIONS
D – DISINTEGRATED
I – INTACT
U – UNDISTURBED
L – LOST

SAMPLER TYPE
DS – DRIVEN SPLIT SPOON
PT – PRESSED SHELBY TUBE
CA – CONTINUOUS FLIGHT AUGER
RC – ROCK CORE

GROUND WATER DEPTH
FIRST NOTED None FT.
AT COMPLETION Dry FT.
AFTER HRS. FT.
BACKFILLED Immed. HRS.

BORING METHOD
HSA – Hollow Stem Augers
CFA – Continous Flight Augers
DC – Driving Casing
MD – Mud Drilling

*STANDARD PENETRATION TEST – DRIVING 2" OD SAMPLER 1' WITH 140 #, HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS

Station 46+20, Offset 76.5 Right

CIVIL ENGINEERS

G. J. Thelen & Associates, Inc.

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LOG OF TEST BORING

CLIENT James W. Berling Engineering Company BORING # 18
PROJECT Geotechnical Exploration, Horsebranch Road Extension to Medical Village JOB # 92034E
LOCATION OF BORING Station: 27+00 Offset: 100' Left Drive, Kenton County, Kentucky

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRA. DEPTH	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec.
710.0	SURFACE	0.3						
709.7	TOPSOIL.	2.0		I	2/3/5	1A 1B	DS	16"
708.0	Brown moist medium stiff to stiff SILTY CLAY with shale fragments and limestone floaters (colluvium).	3.0		I	50/4"	2	DS	3"
707.0	Brown moist stiff SILTY CLAY with limestone floaters, trace bedding planes.		5	I	14/30/37	3	DS	16"
701.0	Brown moist soft weathered SHALE and thinly bedded LIMESTONE (bedrock).	9.0		I	22/41/50 /6"	4	DS	15"
	Bottom of test boring at 9.0 feet.		10 15 20 25					

Datum USGS
Surf. Elev. 710.0 Ft.
Date Started 3/23/92

Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Pipe Size O.D.2 In.

Hole Diameter 5"
Rock Core Dia.
Boring Method CFA

Foreman KN
Engineer TWV
Date Completed 3/23/92

SAMPLE CONDITIONS
D – DISINTEGRATED
I – INTACT
U – UNDISTURBED
L – LOST

SAMPLER TYPE
DS – DRIVEN SPLIT SPOON
PT – PRESSED SHELBY TUBE
CA – CONTINUOUS FLIGHT AUGER
RC – ROCK CORE

GROUND WATER DEPTH
FIRST NOTED None FT.
AT COMPLETION Dry FT.
AFTER 29 HRS. Dry FT.
BACKFILLED 29 HRS.

BORING METHOD
HSA – Hollow Stem Augers
CFA – Continous Flight Augers
DC – Driving Casing
MD – Mud Drilling

CIVIL ENGINEERS

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Station 41+25, Offset 60 Feet Left

LOG OF TEST BORING

CLIENT James W. Berling Engineering Company BORING # 19
PROJECT Geotechnical Exploration, Horsebranch Road Extension to Medical Village JOB # 92034E
LOCATION OF BORING Station: 32+00 Offset: 18' Left Drive, Kenton County, Kentucky

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRA. DEPTH	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec.
650.4	**SURFACE**							
	Mixed dark brown moist medium stiff FILL, silty clay, trace bits of charred wood,	2.0		I	3/5/5	1	DS	13"
648.4	trace roots.			I	6/16/10	2	DS	15"
	Mixed brown moist medium stiff to stiff SILTY CLAY with limestone fragments and floaters and iron oxide stains. (CL)		5	I	11/8/10	3	DS	14"
640.9		9.5		I	9/13/7	4	DS	15"
638.9	Gray moist soft SHALE and thinly bedded LIMESTONE (bedrock).	11.5	10	I	27/15/33	5	DS	13"
	Refusal and bottom of test boring at 11.5 feet.		15					
			20					
			25					

Datum USGS
Surf. Elev. 650.4± Ft.
Date Started 3/16/92

Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Pipe Size O.D.2 In.

Hole Diameter 5"
Rock Core Dia.
Boring Method CFA

Foreman KN
Engineer TWV
Date Completed 3/16/92

SAMPLE CONDITIONS
D – DISINTEGRATED
I – INTACT
U – UNDISTURBED
L – LOST

SAMPLER TYPE
DS – DRIVEN SPLIT SPOON
PT – PRESSED SHELBY TUBE
CA – CONTINUOUS FLIGHT AUGER
RC – ROCK CORE

GROUND WATER DEPTH
FIRST NOTED 7.0 FT.
AT COMPLETION Dry FT.
AFTER 26 HRS. Dry FT.
BACKFILLED 26 HRS.

BORING METHOD
HSA – Hollow Stem Augers
CFA – Continous Flight Augers
DC – Driving Casing
MD – Mud Drilling

CIVIL ENGINEERS

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☐ 3337 Milverton Court/Cincinnati, Ohio 45248-2865/513-574-7137

Station 41+25, Offset 5 Feet Right

LOG OF TEST BORING

CLIENT James W. Berling Engineering Company BORING # 20
PROJECT Geotechnical Exploration, Horsebranch Road Extension to Medical Village JOB # 92034E
LOCATION OF BORING Station: 32+00 Offset: 60' Left Drive, Kenton County, Kentucky

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRA. DEPTH	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec.
662.0	SURFACE							
	Mixed brown moist medium stiff FILL, topsoil and silty clay, trace hairlike roots and pieces of limestone.	2.0		I	4/5/9	1	DS	9"
660.0				U		2	PT	8"
657.5	Dark brown to gray moist stiff SILTY CLAY.	4.5	5					
	Brown and gray moist very stiff SILTY CLAY with shale fragments, limestone floaters and fossils (colluvium). (CL)			I	9/11/10	3	DS	14"
				I	5/12/15	4	DS	17"
			10	I	9/16/12	5	DS	15"
				I	9/13/12	6	DS	16"
			15	I	7/12/11	7	DS	15"
644.5		17.5						
642.5	Gray moist soft SHALE and thinly bedded LIMESTONE (bedrock).	19.5		I	41/50/6"	8	DS	11"
			20					
	Refusal and bottom of test boring at 19.5 feet.							
	Note: A Shelby tube sample (PT-9) was obtained in an offset hole from 6.0' to 8.0'. Recovery was 8 inches.		25					

Datum USGS Hammer Wt. 140 Lbs. Hole Diameter 5" Foreman KN
Surf. Elev. 662.0± Ft. Hammer Drop 30 In. Rock Core Dia. Engineer TWV
Date Started 3/13/92 Pipe Size O.D.2 In. Boring Method CFA Date Completed 3/13/92

SAMPLE CONDITIONS
D – DISINTEGRATED
I – INTACT
U – UNDISTURBED
L – LOST

SAMPLER TYPE
DS – DRIVEN SPLIT SPOON
PT – PRESSED SHELBY TUBE
CA – CONTINUOUS FLIGHT AUGER
RC – ROCK CORE

GROUND WATER DEPTH
FIRST NOTED None FT.
AT COMPLETION Dry FT.
AFTER 72 HRS. Dry FT.
BACKFILLED 72 HRS.

BORING METHOD
HSA – Hollow Stem Augers
CFA – Continous Flight Augers
DC – Driving Casing
MD – Mud Drilling

*STANDARD PENETRATION TEST – DRIVING 2" OD SAMPLER 1' WITH 140 #. HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

CIVIL ENGINEERS

G. J. Thelen & Associates, Inc.

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☐ 3337 Milverton Court/Cincinnati, Ohio 45248-2865/513-574-7137

Station 41+25, Offset 39 Feet Right

LOG OF TEST BORING

CLIENT James W. Berling Engineering Company BORING # 21
PROJECT Geotechnical Exploration, Horsebranch Road Extension to Medical Village JOB # 92034E
LOCATION OF BORING Station 32+02 Offset: 43' Right Drive, Kenton County, Kentucky

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRA. DEPTH	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec.
648.2	SURFACE							
645.7	Dark brown moist medium stiff FILL, silty clay with gravel.	2.5		I	4/6/6	1	DS	12"
643.2	Brown, trace gray moist stiff SILTY CLAY with shale fragments (colluvium).	5.0	5	I	11/7/6	2	DS	16"
642.2	Gray moist soft SHALE and thinly bedded LIMESTONE (bedrock).	6.0		I	27/50/5"	3	DS	11"
	Refusal and bottom of test boring at 6.0 feet.		10 15 20 25					

Datum USGS
Surf. Elev. 648.2 Ft.
Date Started 3/5/92

Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Pipe Size O.D.2 In.

Hole Diameter 5"
Rock Core Dia.
Boring Method CFA

Foreman DEH
Engineer TWV
Date Completed 3/5/92

SAMPLE CONDITIONS
D – DISINTEGRATED
I – INTACT
U – UNDISTURBED
L – LOST

SAMPLER TYPE
DS – DRIVEN SPLIT SPOON
PT – PRESSED SHELBY TUBE
CA – CONTINUOUS FLIGHT AUGER
RC – ROCK CORE

GROUND WATER DEPTH
FIRST NOTED None FT.
AT COMPLETION Dry FT.
AFTER HRS. FT.
BACKFILLED Immed. HRS.

BORING METHOD
HSA – Hollow Stem Augers
CFA – Continous Flight Augers
DC – Driving Casing
MD – Mud Drilling

CIVIL ENGINEERS

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Station 36+22, On Alignment

LOG OF TEST BORING

CLIENT James W. Berling Engineering Company BORING # 22
PROJECT Geotechnical Exploration, Horsebranch Road Extension to Medical Village JOB # 92034E
LOCATION OF BORING Station: 37+00 Offset: 26' Left Drive, Kenton County, Kentucky

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRA. DEPTH	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec.
655.5	SURFACE	0.3						
655.2	TOPSOIL.	2.0		I	3/2/4	1A 1B	DS	13"
653.5	Brown moist medium stiff CLAY, trace roots and fossils (colluvium).	4.5		I	3/3/4	2	DS	11"
651.0	Brown moist stiff CLAY with shale fragments (colluvium).	7.0	5	I	16/19/13	3	DS	17"
648.5	Brown, trace gray moist soft weathered SHALE and thinly bedded LIMESTONE (bedrock).	9.5		I	23/21/36	4	DS	15"
646.0	Olive brown moist soft weathered SHALE and thinly bedded LIMESTONE (bedrock).	10.5	10	I	50/6"	5	DS	4"
645.0	Gray moist soft SHALE and thinly bedded LIMESTONE (bedrock).							
	Refusal and bottom of test boring at 10.5 feet.		15					
			20					
			25					

Datum USGS
Surf. Elev. 655.5± Ft.
Date Started 3/20/92

Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Pipe Size O.D.2 In.

Hole Diameter 5"
Rock Core Dia.
Boring Method CFA

Foreman KN
Engineer TWV
Date Completed 3/20/92

SAMPLE CONDITIONS
D – DISINTEGRATED
I – INTACT
U – UNDISTURBED
L – LOST

SAMPLER TYPE
DS – DRIVEN SPLIT SPOON
PT – PRESSED SHELBY TUBE
CA – CONTINUOUS FLIGHT AUGER
RC – ROCK CORE

GROUND WATER DEPTH
FIRST NOTED None FT.
AT COMPLETION Dry FT.
AFTER 75 HRS. Dry FT.
BACKFILLED 75 HRS.

BORING METHOD
HSA – Hollow Stem Augers
CFA – Continous Flight Augers
DC – Driving Casing
MD – Mud Drilling

*STANDARD PENETRATION TEST – DRIVING 2" OD SAMPLER 1' WITH 140 #. HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

CIVIL ENGINEERS

G. J. Thelen & Associates, Inc.

☑ 516 Enterprise Drive/Covington, Kentucky 41017-1595/606-341-1322/Fax 606-341-0832
☐ 10265 Spartan Drive/Cincinnati, Ohio 45215/513-771-5005/Fax 513-771-6669
☐ 3337 Milverton Court/Cincinnati, Ohio 45248-2865/513-574-7137

Station 36+22, Offset 81 Feet Right

LOG OF TEST BORING

CLIENT James W. Berling Engineering Company BORING # 23
PROJECT Geotechnical Exploration, Horsebranch Road Extension to Medical Village JOB # 92034E
LOCATION OF BORING Station: 37+00 Offset: 100' Left Drive, Kenton County, Kentucky

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRA. DEPTH	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec.
681.6	SURFACE	0.3						
681.3	TOPSOIL.	2.0		I	2/3/4	1A 1B	DS	13"
679.6	Dark brown to brown moist medium stiff SILTY CLAY, trace roots.	4.5		I	4/6/6	2	DS	9"
677.1	Brown, trace gray moist medium stiff to stiff SILTY CLAY with limestone floaters, trace bedding planes. (CL)	7.0	5	I	13/19/14	3	DS	11"
674.6	Brown, trace gray moist very soft highly weathered SHALE and thinly bedded LIMESTONE (bedrock).	9.0		I	21/29/33	4	DS	13"
672.6	Olive brown, trace gray moist soft weathered SHALE and thinly bedded LIMESTONE (bedrock).		10					
	Bottom of test boring at 9.0 feet.		15					
			20					
	Note: A Shelby tube sample (PT-5) was obtained in an offset hole from 3.0 to 5.0 feet. Recovery was 11 inches.		25					

Datum USGS | Hammer Wt. 140 Lbs. | Hole Diameter 5" | Foreman KN
Surf. Elev. 681.6± Ft. | Hammer Drop 30 In. | Rock Core Dia. | Engineer TWV
Date Started 3/20/92 | Pipe Size O.D.2 In. | Boring Method CFA | Date Completed 3/20/92

SAMPLE CONDITIONS
D – DISINTEGRATED
I – INTACT
U – UNDISTURBED
L – LOST

SAMPLER TYPE
DS – DRIVEN SPLIT SPOON
PT – PRESSED SHELBY TUBE
CA – CONTINUOUS FLIGHT AUGER
RC – ROCK CORE

GROUND WATER DEPTH
FIRST NOTED None FT.
AT COMPLETION Dry FT.
AFTER 72 HRS. Dry FT.
BACKFILLED 72 HRS.

BORING METHOD
HSA – Hollow Stem Augers
CFA – Continous Flight Augers
DC – Driving Casing
MD – Mud Drilling

*STANDARD PENETRATION TEST – DRIVING 2" OD SAMPLER 1' WITH 140 #. HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS

CIVIL ENGINEERS

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☐ 3337 Milverton Court/Cincinnati, Ohio 45248-2865/513-574-7137

Station 36+22, Offset 51 Feet Left

LOG OF TEST BORING

CLIENT James W. Berling Engineering Company BORING # 24
PROJECT Geotechnical Exploration, Horsebranch Road Extension to Medical Village JOB # 92034E
LOCATION OF BORING Station 37+00 Offset: 33' Right Drive, Kenton County, Kentucky

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRA. DEPTH	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec.
637.2	SURFACE							
635.2	Mixed brown and black moist dense FILL, gravel, pieces of asphalt.	2.0		D	50/6"	1	DS	6"
632.7	Mixed brown moist stiff SILTY CLAY with limestone fragments and floaters.	4.5		D	12/50/5"	2	DS	8"
631.7	Gray moist soft SHALE and thinly bedded LIMESTONE (bedrock).	5.5	5	D	50/6"	3	DS	6"
	Refusal and bottom of test boring at 5.5 feet.		10					
			15					
			20					
			25					

Datum USGS
Surf. Elev. 637.2 Ft.
Date Started 3/5/92

Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Pipe Size O.D.2 In.

Hole Diameter 5"
Rock Core Dia.
Boring Method CFA

Foreman DEH
Engineer TWV
Date Completed 3/5/92

SAMPLE CONDITIONS
D – DISINTEGRATED
I – INTACT
U – UNDISTURBED
L – LOST

SAMPLER TYPE
DS – DRIVEN SPLIT SPOON
PT – PRESSED SHELBY TUBE
CA – CONTINUOUS FLIGHT AUGER
RC – ROCK CORE

GROUND WATER DEPTH
FIRST NOTED None FT.
AT COMPLETION Dry FT.
AFTER HRS. FT.
BACKFILLED Immed. HRS.

BORING METHOD
HSA – Hollow Stem Augers
CFA – Continous Flight Augers
DC – Driving Casing
MD – Mud Drilling

CIVIL ENGINEERS

G. J. Thelen & Associates, Inc.

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☐ 3337 Milverton Court/Cincinnati, Ohio 45248-2865/513-574-7137

Station 34+22, Offset 5 Feet Right

LOG OF TEST BORING

CLIENT James W. Berling Engineering Company BORING # 25
PROJECT Geotechnical Exploration, Horsebranch Road Extension to Medical Village JOB # 92034E
LOCATION OF BORING Station: 39+00 Offset: 25' Left Drive, Kenton County, Kentucky

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRA. DEPTH	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec.
663.0	SURFACE							
661.0	Brown moist stiff SILTY CLAY, trace roots.	2.0		I	2/2/2	1	DS	16"
	Brown moist stiff SILTY CLAY with shale fragments and limestone floaters (colluvium).		5	I	4/4/5	2	DS	15"
656.0		7.0		I	9/19/9	3	DS	14"
653.5	Brown, trace gray moist very stiff SILTY CLAY with shale fragments and limestone floaters (colluvium).	9.5	10	I	39/17/46	4	DS	16"
	Olive brown moist soft weathered SHALE and thinly bedded LIMESTONE (bedrock).			I	37/50/6"	5	DS	10"
648.5		14.5		I	50/6"	6	DS	6"
647.8	Gray moist soft to moderately tough SHALE and thinly bedded LIMESTONE (bedrock).	15.2	15	I	50/3"	7	DS	3"
	Refusal and bottom of test boring at 15.2 feet.		20					
			25					

Datum USGS
Surf. Elev. 663.0± Ft.
Date Started 3/11/92

Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Pipe Size O.D.2 In.

Hole Diameter 5"
Rock Core Dia.
Boring Method CFA

Foreman KN
Engineer TWV
Date Completed 3/11/92

SAMPLE CONDITIONS
D – DISINTEGRATED
I – INTACT
U – UNDISTURBED
L – LOST

SAMPLER TYPE
DS – DRIVEN SPLIT SPOON
PT – PRESSED SHELBY TUBE
CA – CONTINUOUS FLIGHT AUGER
RC – ROCK CORE

GROUND WATER DEPTH
FIRST NOTED None FT.
AT COMPLETION Dry FT.
AFTER 48 HRS. Dry FT.
BACKFILLED 48 HRS.

BORING METHOD
HSA – Hollow Stem Augers
CFA – Continous Flight Augers
DC – Driving Casing
MD – Mud Drilling

*STANDARD PENETRATION TEST – DRIVING 2" OD SAMPLER 1' WITH 140 #. HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

CIVIL ENGINEERS

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Station 34+22, Offset 80 Feet Right

LOG OF TEST BORING

CLIENT James W. Berling Engineering Company BORING # 26
PROJECT Geotechnical Exploration, Horsebranch Road Extension to Medical Village JOB # 92034E
LOCATION OF BORING Station: 39+00 Offset: 105' Left Drive, Kenton County, Kentucky

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRA. DEPTH	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec.
679.0	SURFACE	0.3						
678.7	TOPSOIL.	2.0		I	2/2/3	1A 1B	DS	16"
677.0	Brown moist medium stiff CLAY, trace roots, limestone floaters and fossils (colluvium).	3.9		U		2	PT	13"
675.1	Brown moist very stiff SILTY CLAY with limestone fragments and fossils (colluvium).	7.0	5	I	24/37/42	3	DS	16"
672.0	Brown moist soft weathered SHALE and thinly bedded LIMESTONE (bedrock).			I	37/50/4"	4	DS	10"
668.0	Olive brown moist soft weathered SHALE and thinly bedded LIMESTONE (bedrock).	11.0	10	I	41/50/6"	5	DS	11"
	Bottom of test boring at 11.0 feet.		15					
			20					
			25					

Datum USGS
Surf. Elev. 679.0± Ft.
Date Started 3/12/92

Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Pipe Size O.D.2 In.

Hole Diameter 5"
Rock Core Dia.
Boring Method CFA

Foreman KN
Engineer TWV
Date Completed 3/12/92

SAMPLE CONDITIONS
D – DISINTEGRATED
I – INTACT
U – UNDISTURBED
L – LOST

SAMPLER TYPE
DS – DRIVEN SPLIT SPOON
PT – PRESSED SHELBY TUBE
CA – CONTINUOUS FLIGHT AUGER
RC – ROCK CORE

GROUND WATER DEPTH
FIRST NOTED None FT.
AT COMPLETION Dry FT.
AFTER 29 HRS. Dry FT.
BACKFILLED 29 HRS.

BORING METHOD
HSA – Hollow Stem Augers
CFA – Continous Flight Augers
DC – Driving Casing
MD – Mud Drilling

*STANDARD PENETRATION TEST – DRIVING 2" OD SAMPLER 1' WITH 140 #. HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

CIVIL ENGINEERS

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Station 30+38, Offset 15 Feet Right

LOG OF TEST BORING

CLIENT James W. Berling Engineering Company BORING # 27
PROJECT Geotechnical Exploration, Horsebranch Road Extension to Medical Village JOB # 92034E
LOCATION OF BORING Station: 43+00 Offset: 40' Left Drive, Kenton County, Kentucky

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRA. DEPTH	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec.
611.9	SURFACE							
610.7	Dark brown very moist to wet soft SILTY CLAY, trace roots and limestone fragments.	1.2		I	2/2/50/1"	1	DS	8"
609.0	Gray moist soft SHALE and thinly bedded LIMESTONE (bedrock).	2.9		I	50/5"	2	DS	5"
	Refusal and bottom of test boring at 2.9 feet.		5 10 15 20 25					

Datum USGS Hammer Wt. 140 Lbs. Hole Diameter 5" Foreman KN
Surf. Elev. 611.9 Ft. Hammer Drop 30 In. Rock Core Dia. Engineer TWV
Date Started 3/12/92 Pipe Size O.D.2 In. Boring Method CFA Date Completed 3/12/92

SAMPLE CONDITIONS
D – DISINTEGRATED
I – INTACT
U – UNDISTURBED
L – LOST

SAMPLER TYPE
DS – DRIVEN SPLIT SPOON
PT – PRESSED SHELBY TUBE
CA – CONTINUOUS FLIGHT AUGER
RC – ROCK CORE

GROUND WATER DEPTH
FIRST NOTED 0.0 FT.
AT COMPLETION 0.0 FT.
AFTER 26 HRS. 0.0 FT.
BACKFILLED 26 HRS.

BORING METHOD
HSA – Hollow Stem Augers
CFA – Continous Flight Augers
DC – Driving Casing
MD – Mud Drilling

*STANDARD PENETRATION TEST – DRIVING 2" OD SAMPLER 1' WITH 140 #. HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

CIVIL ENGINEERS

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Station 30+99, Offset 58 Feet Left

LOG OF TEST BORING

CLIENT James W. Berling Engineering Company BORING # 27A
PROJECT Geotechnical Exploration, Horsebranch Road Extension to Medical Village JOB # 92034E
LOCATION OF BORING Station: 43+50 Offset: 40' Right Drive, Kenton County, Kentucky

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRA. DEPTH	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec.
612.0	SURFACE							
610.0	Mixed brown and dark brown moist medium stiff FILL, silty clay, trace gravel and roots.	2.0		I	2/4/3	1	DS	10"
607.5	Mottled brown moist medium stiff SILTY CLAY with iron oxide stains and limestone floaters.	4.5		I	8/14/16	2	DS	13"
606.1	Olive brown and gray moist soft weathered SHALE and thinly bedded LIMESTONE (bedrock).	5.9	5	I	33/31/50/ /4"	3A 3B	DS	14"
605.7	Gray moist soft SHALE and thinly bedded LIMESTONE (bedrock).	6.3						
	Refusal and bottom of test boring at 6.3 feet.		10					
			15					
			20					
			25					

Datum USGS
Surf. Elev. 612.0 Ft.
Date Started 3/12/92

Hammer Wt. 140 Lbs.
Hammer Drop 30 In.
Pipe Size O.D.2 In.

Hole Diameter 5"
Rock Core Dia.
Boring Method CFA

Foreman KN
Engineer TWV
Date Completed 3/12/92

SAMPLE CONDITIONS
D – DISINTEGRATED
I – INTACT
U – UNDISTURBED
L – LOST

SAMPLER TYPE
DS – DRIVEN SPLIT SPOON
PT – PRESSED SHELBY TUBE
CA – CONTINUOUS FLIGHT AUGER
RC – ROCK CORE

GROUND WATER DEPTH
FIRST NOTED None FT.
AT COMPLETION Dry FT.
AFTER 25 HRS. Dry FT.
BACKFILLED 25 HRS.

BORING METHOD
HSA – Hollow Stem Augers
CFA – Continous Flight Augers
DC – Driving Casing
MD – Mud Drilling

*STANDARD PENETRATION TEST – DRIVING 2" OD SAMPLER 1' WITH 140 # HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

CIVIL ENGINEERS

G. J. Thelen & Associates, Inc.

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☐ 1310 Kemper Meadow Drive, Suite 600 / Forest Park, Ohio 45240-1651 / 513-825-4350 / Fax 513-825-4756

Station 56+45, Offset 95 Feet Left

LOG OF TEST BORING

CLIENT The Erpenbeck Company — BORING # 2

PROJECT Geotechnical Exploration, Valley View Ridge Condos, Phase 1, — JOB # 95656E

LOCATION OF BORING As shown on Boring Plan, Drawing 95656E-1 /Crestview Hills, Kentucky

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRA. DEPTH	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec.
718.3	SURFACE	0.5						
717.8	TOPSOIL.	2.5		I	5/7/9	1A 1B	DS	18"
715.8	Brown moist very stiff SILTY CLAY.	4.5		I	8/11/13	2	DS	18"
713.8	Olive brown and brown moist hard CLAY, trace roots.	7.0	5	I	10/15/16	3	DS	18"
711.3	Olive brown, some brown moist hard SILTY CLAY, trace iron oxide stains and shale fragments (colluvium).	9.5		I	17/21/35	4A 4B	DS	18"
708.8	Brown slightly moist to moist very stiff to hard SILTY CLAY with limestone floaters, trace roots and bedding planes.	10.5	10	D	75/6"	5	DS	4"
707.8	Brown to olive brown moist soft weathered SHALE and thinly bedded LIMESTONE (bedrock).							
	Bottom of test boring at 10.5 feet.		15 20 25					

Datum USGS — Hammer Wt. 140 Lbs. — Hole Diameter 5" — Foreman JM

Surf. Elev. 718.3 Ft. — Hammer Drop 30 In. — Rock Core Dia. — Engineer JMK/TWV

Date Started 10/13/95 — Pipe Size O.D.2 In. — Boring Method CFA — Date Completed 10/13/95

SAMPLE CONDITIONS
D – DISINTEGRATED
I – INTACT
U – UNDISTURBED
– LOST

SAMPLER TYPE
DS – DRIVEN SPLIT SPOON
PT – PRESSED SHELBY TUBE
CA – CONTINUOUS FLIGHT AUGER
RC – ROCK CORE

GROUND WATER DEPTH
FIRST NOTED None FT.
AT COMPLETION Dry FT.
AFTER 5 HRS. Dry FT.
BACKFILLED 5 HRS.

BORING METHOD
HSA – Hollow Stem Augers
CFA – Continous Flight Augers
DC – Driving Casing
MD – Mud Drilling

STANDARD PENETRATION TEST – DRIVING 2" OD SAMPLER 1' WITH 140 #, HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

CIVIL ENGINEERS

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Station 58+28, Offset 54.5 Feet Left

LOG OF TEST BORING

CLIENT The Erpenbeck Company — BORING # 3

PROJECT Geotechnical Exploration, Valley View Ridge Condos, Phase 1, — JOB # 95656E

LOCATION OF BORING As shown on Boring Plan, Drawing 95656E-1 /Crestview Hills, Kentucky

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRA. DEPTH	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec.
761.2	SURFACE	0.5						
760.7	TOPSOIL.	2.0		I	3/6/8	1A 1B	DS	18"
759.2	Brown moist very stiff SILTY CLAY with hairlike roots, blocky structure.	4.0		I	18/40/5"	2	DS	9"
757.2	Brown moist hard SILTY CLAY with limestone floaters, trace iron oxide stains and bedding planes.	7.0	5	I	50/6"	3	DS	6"
754.2	Brown and gray moist very soft highly weathered SHALE and thinly bedded LIMESTONE (bedrock).			I	50/3"	4	DS	3"
747.7	Brown to olive brown, trace gray moist soft weathered SHALE and thinly bedded LIMESTONE (bedrock).	13.5	10	I	30/50/4"	5	DS	10"
				I	50/6"	6	DS	6"
	Bottom of test boring at 13.5 feet.		15 20 25					

Datum USGS — Hammer Wt. 140 Lbs. — Hole Diameter 5" — Foreman JM

Surf. Elev. 761.2 Ft. — Hammer Drop 30 In. — Rock Core Dia. — Engineer JMK/TWV

Date Started 10/13/95 — Pipe Size O.D.2 In. — Boring Method CFA — Date Completed 10/13/95

SAMPLE CONDITIONS
D – DISINTEGRATED
I – INTACT
U – UNDISTURBED
L – LOST

SAMPLER TYPE
DS – DRIVEN SPLIT SPOON
PT – PRESSED SHELBY TUBE
CA – CONTINUOUS FLIGHT AUGER
RC – ROCK CORE

GROUND WATER DEPTH
FIRST NOTED None FT.
AT COMPLETION Dry FT.
AFTER 10 HRS. Dry FT.
BACKFILLED 10 HRS.

BORING METHOD
HSA – Hollow Stem Augers
CFA – Continous Flight Augers
DC – Driving Casing
MD – Mud Drilling

*STANDARD PENETRATION TEST – DRIVING 2" OD SAMPLER 1' WITH 140 #. HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

Station 58+95, Offset 78.5 Feet Right

CIVIL ENGINEERS

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LOG OF TEST BORING

CLIENT The Erpenbeck Company — BORING # 4

PROJECT Geotechnical Exploration, Valley View Ridge Condos, Phase 1, — JOB # 95656E

LOCATION OF BORING As shown on Boring Plan, Drawing 95656E-1 /Crestview Hills, Kentucky

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRA. DEPTH	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec.
805.5	SURFACE	0.3						
805.2	TOPSOIL.	2.0		I	2/2/4	1A 1B	DS	7"
803.5	Mottled brown moist stiff SILTY CLAY with hairlike roots and iron oxide stains.	4.5		I	12/25/3"	2	DS	8"
801.0	Brown and gray moist very stiff CLAY with limestone floaters and iron stains, trace bedding planes. (CH)		5	D	50/3"	3	DS	2"
795.0	Brown and olive brown moist soft weathered SHALE and thinly bedded LIMESTONE (bedrock).	10.5		I	65/6"	4	DS	6"
			10	I	50/6"	5	DS	4"
	Bottom of test boring at 10.5 feet.		15					
			20					
			25					

Datum USGS — Hammer Wt. 140 Lbs. — Hole Diameter 5" — Foreman JM

Surf. Elev. 805.5 Ft. — Hammer Drop 30 In. — Rock Core Dia. — Engineer JMK/TWV

Date Started 10/13/95 — Pipe Size O.D.2 In. — Boring Method CFA — Date Completed 10/13/95

SAMPLE CONDITIONS
) – DISINTEGRATED
I – INTACT
U – UNDISTURBED
– LOST

SAMPLER TYPE
DS – DRIVEN SPLIT SPOON
PT – PRESSED SHELBY TUBE
CA – CONTINUOUS FLIGHT AUGER
RC – ROCK CORE

GROUND WATER DEPTH
FIRST NOTED None FT.
AT COMPLETION Dry FT.
AFTER 8½ HRS. Dry FT.
BACKFILLED 8½ HRS.

BORING METHOD
HSA – Hollow Stem Augers
CFA – Continous Flight Augers
DC – Driving Casing
MD – Mud Drilling

STANDARD PENETRATION TEST – DRIVING 2" OD SAMPLER 1' WITH 140 #, HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

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Erlanger, Kentucky
Cincinnati, Ohio
Dayton, Ohio

LOG OF TEST BORING

CLIENT: Northern Kentucky Water District — BORING # 1

PROJECT: Consulting Services, 36" Redundancy Project, Part 3, Edgewood, Kentucky — JOB # 090495E

LOCATION OF BORING: Rhine Valley, Station 67+82, Offset 10.5' Left

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRATA DEPTH feet	DEPTH SCALE feet	SAMPLE Cond	Blows/6"	No.	Type	Rec. Inches
838.0	SURFACE	0.0						
		0.8						
837.2	ASPHALT			I	7/8/5	1	DS	12
		2.4						
835.6	Mixed brown, trace green moist medium stiff to stiff FILL, clay, trace topsoil with limestone fragments.			I	4/5/9	2	DS	8
		4.5						
833.5	Mixed brown moist soft to medium stiff FILL, silty clay with shale and limestone fragments.		5	I	3/7/7	3	DS	8
		7.0						
831.0	Mixed brown, gray and green moist stiff FILL, silty clay, little topsoil with organics and limestone fragments.			I	6/8/8	4	DS	14
		9.5						
828.5	Mixed brown, trace gray moist very stiff FILL, clay with limestone floaters and fragments.	10.8	10	I	13/13/15	5A 5B	DS	18
		12.0						
827.2	Mixed brown, some greenish gray moist very stiff FILL, silty clay, trace topsoil with limestone floaters.			I	28/29/50/6"	6	DS	13
		14.0						
826.0	Mixed brown moist very stiff FILL, clay, trace hairlike roots.		15					
824.0	Mottled brown, trace greenish gray moist very stiff FILL, clay with limestone floaters, organics and wood fragments.							
	Bottom of test boring at 14.0 feet.		20					
			25					

Datum Est. MSL — Hammer Wt. 140 lbs. — Hole Diameter 5 in. — Foreman GB

Surf. Elev. 838.0 ft. — Hammer Drop 30 in. — Rock Core Dia. -- in. — Engineer MES

Date Started 7/15/09 — Pipe Size O.D. 2 in. — Boring Method CFA — Date Completed 7/15/09

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

SAMPLE TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

GROUND WATER DEPTH
FIRST NOTED None ft.
AT COMPLETION Dry ft.
AFTER - hrs. - ft.
BACKFILLED Immed. hrs.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST - DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

THELEN ASSOCIATES, INC.
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LOG OF TEST BORING

CLIENT: Northern Kentucky Water District — BORING # 2

PROJECT: Consulting Services, 36" Redundancy Project, Part 3, Edgewood, Kentucky — JOB # 090495E

LOCATION OF BORING: Rhine Valley, Station 66+78, Offset 10' Left

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRATA DEPTH feet	DEPTH SCALE feet	SAMPLE Cond	Blows/6"	No.	Type	Rec. inches
826.5	SURFACE	0.0						
		0.8		X				
825.7	ASPHALT			I	4/13/16	1	DS	13
		2.4						
	Brown moist very stiff CLAY with limestone floaters, trace bedding planes.			I	24/24/21	2	DS	14
824.1		4.5						
	Interbedded brown moist very soft highly weathered SHALE and gray hard LIMESTONE with clay seams (bedrock).		5	I	34/40/50	3	DS	13
822.0		6.5						
	Interbedded brown moist very stiff highly weathered SHALE and gray hard LIMESTONE (bedrock).							
820.0			10					
	Bottom of test boring at 6.5 feet.		15					
			20					
			25					

Datum	Est. MSL	Hammer Wt.	140 lbs.	Hole Diameter	5 in.	Foreman	GB
Surf. Elev.	826.5 ft.	Hammer Drop	30 in.	Rock Core Dia.	-- in.	Engineer	MES
Date Started	7/15/09	Pipe Size	O.D. 2 in.	Boring Method	CFA	Date Completed	7/15/09

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

SAMPLE TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

GROUND WATER DEPTH
FIRST NOTED None ft.
AT COMPLETION Dry ft.
AFTER - hrs. - ft.
BACKFILLED Immed. hrs.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST - DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

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LOG OF TEST BORING

CLIENT: Northern Kentucky Water District — BORING # 3

PROJECT: Consulting Services, 36" Redundancy Project, Part 3, Edgewood, Kentucky — JOB # 090495E

LOCATION OF BORING: Rhine Valley, Station 65+06, Offset 13' Left

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRATA DEPTH feet	DEPTH SCALE feet	SAMPLE Cond	Blows/6"	No.	Type	Rec. Inches
817.0	SURFACE	0.0						
		0.8						
816.2	ASPHALT			I	2/5/3	1	DS	10
		2.4						
814.6	Mixed greenish gray, trace brown moist medium stiff FILL, silty clay, topsoil with limestone fragments and organics.			I	9/13/12	2	DS	13
		4.5	5					
812.5	Brown, trace gray moist very stiff SILTY CLAY with limestone fragments.			I	11/18/15	3	DS	8
		7.0						
810.0	Brown moist stiff CLAY with limestone floaters.			I	24/50/3"	4	DS	9
		9.5						
807.5	Interbedded brown moist very soft highly weathered SHALE and gray hard LIMESTONE with clay layers (bedrock).	10.8	10	I	15/50/3"	5	DS	9
806.2	Interbedded brown to olive brown moist soft weathered SHALE and gray hard LIMESTONE (bedrock).							
	Bottom of test boring at 10.8 feet.		15					
			20					
			25					

Datum Est. MSL — Hammer Wt. 140 lbs. — Hole Diameter 5 in. — Foreman GB

Surf. Elev. 817.0 ft. — Hammer Drop 30 in. — Rock Core Dia. -- in. — Engineer MES

Date Started 7/15/09 — Pipe Size O.D. 2 in. — Boring Method CFA — Date Completed 7/15/09

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

SAMPLE TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

GROUND WATER DEPTH
FIRST NOTED None ft.
AT COMPLETION Dry ft.
AFTER - hrs. - ft.
BACKFILLED Immed. hrs.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST - DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

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SOIL CLASSIFICATION SHEET

NON COHESIVE SOILS
(Silt, Sand, Gravel and Combinations)

Density	
Very Loose	- 5 blows/ft. or less
Loose	- 6 to 10 blows/ft.
Medium Dense	- 11 to 30 blows/ft.
Dense	- 31 to 50 blows/ft.
Very Dense	- 51 blows/ft. or more

Relative Properties	
Descriptive Term	Percent
Trace	1 – 10
Little	11 – 20
Some	21 – 35
And	36 – 50

Particle Size Identification		
Boulders	- 8 inch diameter or more	
Cobbles	- 3 to 8 inch diameter	
Gravel	- Coarse	- 3/4 to 3 inches
	- Fine	- 3/16 to 3/4 inches
Sand	- Coarse	- 2mm to 5mm (dia. of pencil lead)
	- Medium	- 0.45mm to 2mm (dia. of broom straw)
	- Fine	- 0.075mm to 0.45mm (dia. of human hair)
Silt		- 0.005mm to 0.075mm (Cannot see particles)

COHESIVE SOILS
(Clay, Silt and Combinations)

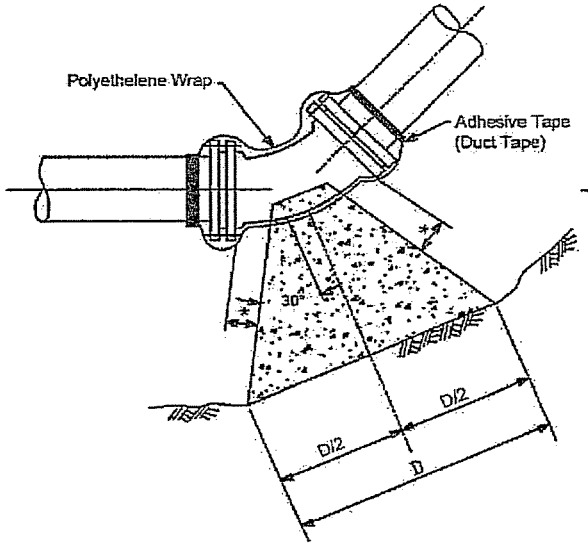
Consistency	Field Identification	Unconfined Compressive Strength (tons/sq. ft.)
Very Soft	Easily penetrated several inches by fist	Less than 0.25
Soft	Easily penetrated several inches by thumb	0.25 – 0.5
Medium Stiff	Can be penetrated several inches by thumb with moderate effort	0.5 – 1.0
Stiff	Readily indented by thumb but penetrated only with great effort	1.0 – 2.0
Very Stiff	Readily indented by thumbnail	2.0 – 4.0
Hard	Indented with difficulty by thumbnail	Over 4.0

Classification on logs are made by visual inspection.

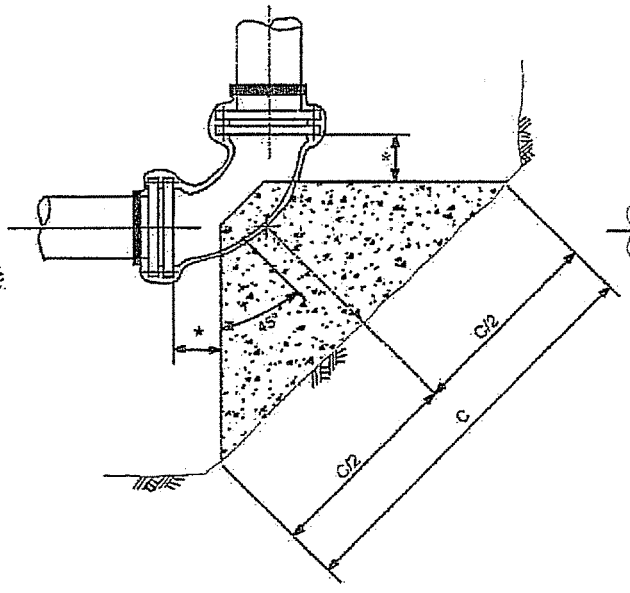
Standard Penetration Test – Driving a 2.0" O.D., 1 3/8" I.D., sampler a distance of 1.0 foot into undisturbed soil with a 140 pound hammer free falling a distance of 30 inches. It is customary to drive the spoon 6 inches to seat into undisturbed soil, then perform the test. The number of hammer blows for seating the spoon and making the tests are recorded for each 6 inches of penetration on the drill log (Example – 6/8/9). The standard penetration test results can be obtained by adding the last two figures (i.e. 8+9=17 blows/ft.). Refusal is defined as greater than 50 blows for 6 inches or less penetration.

Strata Changes – In the column "Soil Descriptions" on the drill log, the horizontal lines represent strata changes. A solid line (————) represents an actually observed change; a dashed line (— — — —) represents an estimated change.

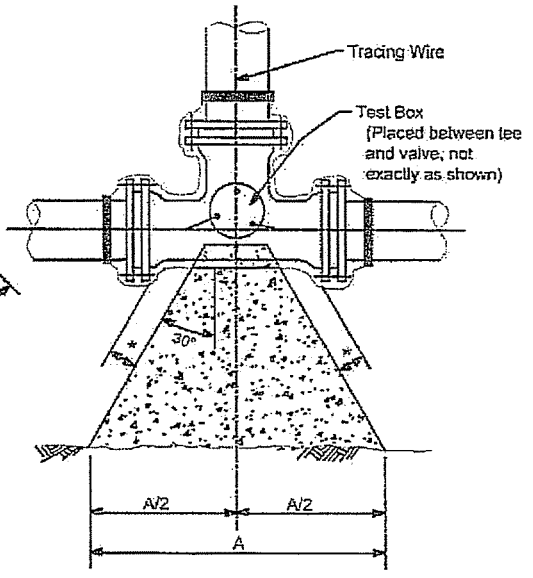
Groundwater observations were made at the times indicated. Porosity of soil strata, weather conditions, site topography, etc., may cause changes in the water levels indicated on the logs.



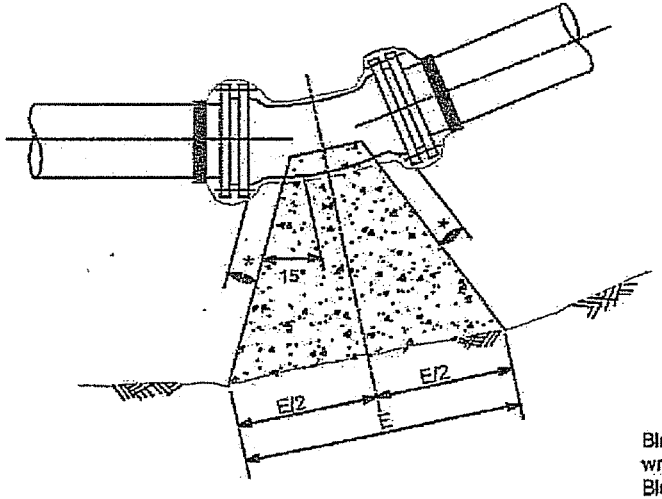
45° BEND



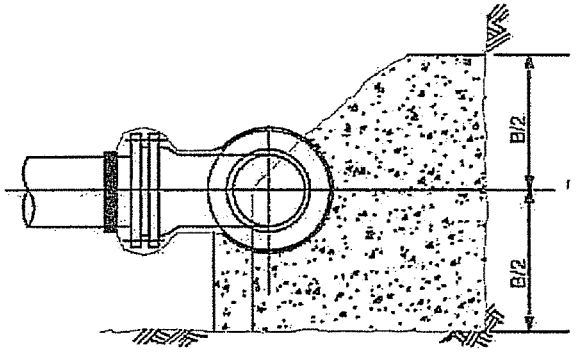
90° BEND



TEE (DEAD END OR FIRE HYDRANT SIMILAR



11 1/4° & 22 1/2° BEND



ELEVATION

Blocking shall be poured after blue polyethelene wrap is in place.
Blocking shall be inspected by the District prior to backfilling.

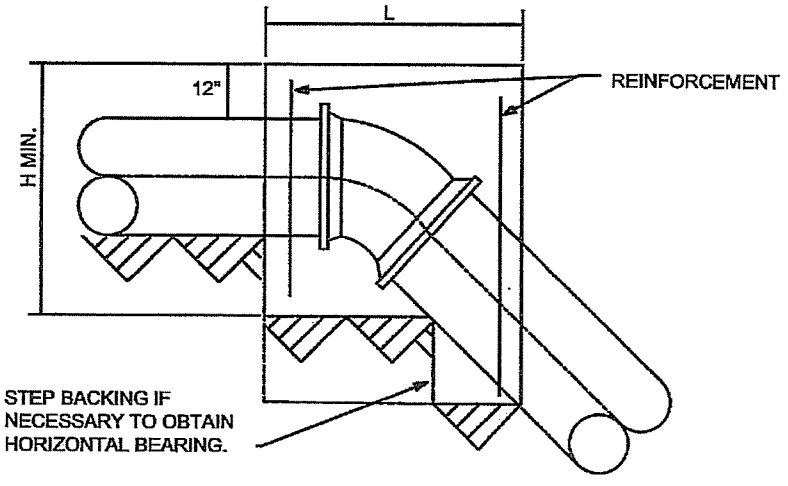
PIPE SIZE	A	B	C	D	E
36"	12'-0"	4'-0"	17'-0"	9'-0"	4'-6"

* Distance to be 1/2" longer than entire length of the bolt used.

NOTES

1 DIP Fittings shall be per specifications.
2 Concrete to be 3500 psi.
3 All fittings to be Mechanical Joint.
4 Thrust blocks to be placed against undisturbed earth - use additional concrete as required for over excavation.
5 Blocking to be placed in a manner so that bolts can be removed without disturbing the block.
6 Thrust block bearing surface must be suitable for a design bearing pressure of 2,500 psf.

FIGURE 1 - CONCRETE THRUST BLOCK DETAILS FOR RESTRAINED JOINT PIPE



SECTION A-A

SIZE OF PIPE	DEGREE OF BEND											
	5.625 and 11.25				22.5				45			
	L"	W"	H"	VOL.	L"	W"	H"	VOL.	L"	W"	H"	VOL.
36"	51	78	66	151.9	100	78	66	297.9	150	102	66	584.4

NOTE: VOLUMES GIVEN IN CUBIC FEET

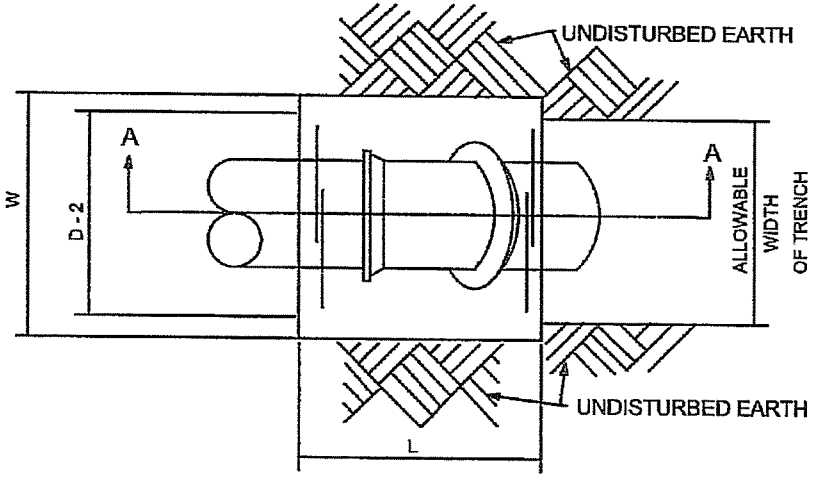
CONCRETE BACKING FOR VERTICAL BENDS

1. BACKING DESIGNED FOR 3000 POUNDS PER SQUARE FOOT SOIL BEARING AND 150 POUNDS PER SQUARE INCH INTERNAL PRESSURE.

2. PROVIDE MINIMUM CONCRETE REINFORCEMENT OF 2 PAIR OF TWO 5" "U" BARS @ 12" C.

3. CENTER BACKING ON BEND.

BLOCKING FOR SIZES NOT SHOWN SHALL USE THE NEXT LARGER SIZE.



PLAN

FIGURE 2