GERAGHTY & MILLER, INC.

SCOPE OF WORK
FOR INSTALLATION OF AN INTERCEPTOR/EXTRACTION WELL AND CONSTRUCTION OF A WATER MAIN ACROSS THE WISCONSIN RIVER

CITY OF WAUSAU
WAUSAU, WISCONSIN

Date:

MARCH 4, 1988

Prepared by:

GERAGHTY & MILLER, INC.
GROUND WATER CONSULTANTS
322 E. MICHIGAN STREET, SUITE 600
MILWAUKEE, WI 53202

and

CONESTOGA-ROVERS & ASSOCIATES
CONSULTING ENGINEERS
651 COLBY DRIVE
WATERLOO, ONTARIO, CANADA

SCOPE OF WORK
FOR INSTALLATION OF AN INTERCEPTOR/EXTRACTION WELL AND CONSTRUCTION OF A WATER MAIN ACROSS THE WISCONSIN RIVER

CITY OF WAUSAU
WAUSAU, WISCONSIN

The Environmental Protection Agency has discovered a plume of high concentrations of tetrachloroethylene (PCE) in the immediate vicinity of City Well 3. The ground water supply for the City of Wausau is provided by City Wells 3, 4, 7, and 9; at the present time, City Well 3 provides more than 40% of the water supply to the City. However, due to increasing VOC concentrations, it is necessary to provide alternative sources for the City's water needs. In addition, ground water south of City Well 6 on the west side wellfield has been found to contain excess levels of trichloroethylene (TCE).

A scope of work for remedial activities to be conducted on the City of Wausau wellfield has been prepared by Geraghty & Miller, Inc., Ground Water Consultants, and Conestoga-Rovers Associates, Consulting Engineers.

The proposed activities include:

- The removal of contaminated ground water on the west side wellfield through the use of a high capacity well, and treatment of the water using aeration; and,

- The installation of a watermain across the Wisconsin River, which will provide transport for water from City Well 6 to the treatment systems on the east side, in replacement of City Well 3.

This scope of work provides a description of the work tasks to be completed and the expected schedules.

3/4/88
SCOPE OF WORK
CITY OF WAUSAU

TASK 1.
INSTALLATION OF INTERCEPTOR/EXTRACTION WELL
BETWEEN MARATHON ELECTRIC AND CITY WELL 6

no comment

The installation of an interceptor/extraction well is proposed on the west side wellfield in the City of Wausau. The well will be located north of the contamination detected on the Marathon Electric/Old City Landfill property (Randolph Street) and south of City Well 6. The proposed location of the well is shown on Figure 1.

The installation of an interceptor/extraction system is part of a remedial program which has been designed to protect the flow of contaminants to City Well 6.

The design of this system has been prepared by Conestoga-Rovers Associates, has been reviewed by both the State of Wisconsin and the City of Wausau, and has received State approval. This proposal, in addition to the State Approval for the Plan of Remedial Work, is provided:

CONESTOGA-ROVERS ASSOCIATES
PLAN OF REMEDIAL WORK SUMMARY
MARATHON ELECTRIC MANUFACTURING COMPANY
WAUSAU, WISCONSIN

Marathon Electric and the City of Wausau recently completed a joint study of ground water conditions on the west side of Wausau near City Well No. 6. That study indicated that ground water south of City Well 6 contained excess levels of trichloroethylene (TCE), an industrial solvent. Upon finding TCE, Marathon Electric undertook additional tests to identify the source of the TCE. This effort was unsuccessful. However, as the TCE was present on and near its property, Marathon Electric commissioned an expeditious program to remove the TCE from the ground water.

(Why put in an extraction well if M.E. is not the source)

In essence, this remedial work will involve:

(1) The removal of the contaminated ground water through the use of a high capacity well; and

(2) Treatment of the water using aeration technology and discharge of the treated ground water to the Wisconsin River.

Permit Requirements

The design of this system has been reviewed by both the State and the City and has received State approval (see Attachment 1).

I don't think they have the discharge permit yet.

Plan of Work

The proposed ground water containment system is comprised of the following components:

- large diameter extraction well that fully penetrates the ground water flow regime on the north side of Marathon Electric's property;
- above ground secure pumphouse that provides protection for a flow metering system and allows for monitoring of extracted ground water as well as preventing the potential for public contact with the system;
- below ground discharge pipe to an existing storm sewer system;
- storm sewer discharge to the Wisconsin River designed to treat extracted ground water prior to mixing with the Wisconsin River;
- network of new and existing monitoring wells designed to monitor the effectiveness of operating the extraction well; and
- provisions for supplementing the ground water extraction system, if required.

Figure 1, attached, locates the Marathon Electric property, the location of the proposed extraction well (on City of Wausau property), City Well No. 6 and all existing and proposed monitoring wells. Figures A-1 through A-8 details the extraction well and discharge system.

While the location of the extraction well is shown to be at the corner of Randolph and Burek Streets, the location may be changed based on an evaluation of test data recently received from the Environmental Protection Agency.

Schedule

Contract documents and specifications have been prepared for the above work. Including the bid and award period, the work is scheduled for completion in 3 months.

TASK 2.
INSTALLATION OF WATER MAIN FROM CITY WELL 6 ACROSS WISCONSIN RIVER TO WATER TREATMENT PLANT

The installation of a water main extending from the New City Well on the west side wellfield, across the Wisconsin River, to the Water Treatment Plant on the east side is proposed.

Present Water Supply

City Wells 3 and 4 are located on the east side wellfield. Water supply from these wells is transported to the Water Treatment Plant by separate pipelines. Due to undesirable levels of VOCs, the water supply from the east side is treated at the air strippers located at the treatment plant. At the present time, Well 3 provides more than 40% of the water supply to the City. However, due to increasing VOC concentrations, it is necessary to provide alternative sources for the City's water needs. Upon installation of the new City Well and watermain, wells 3 and 4 will be used as backup wells, during periods of seasonal demand and maintenance.

Water supply from the west side (City Wells 7 and 9) crosses the Wisconsin River to the Water Treatment Plant through an 18-inch diameter water main. Presently, City Well 6 is not used for water supply, and is pumped to waste into Bos Creek. The new City Well is scheduled to be installed this summer; upon installation of the new City Well, the present water main will not be sufficient to transport the water supply from the west side wellfield to the treatment plant on the east side.

The installation of the proposed watermain across the Wisconsin River will allow the continued supply of clean water to the City of Wausau's residents. Water supply from Well 6 will replace the water supply from Well 3. This replacement will not require increased treatment capacity at the Water Treatment Plant.

Installation

The installation of a water main across the Wisconsin River for the City of Wausau was proposed by Conestoga-Rovers & Associates in 1986 ("Proposed New City Well and Watermain"). As in the Conestoga-Rovers plan, the proposed watermain route initiates at the new city well location on the west side wellfield (intersection of Bugbee Avenue and Tierney Road), extends south along city right-of-way, across the Wisconsin River, and south along railroad right-of-way to the Water Treatment Plant (Figure 2).

Upon installation of an additional water main, Wells 7, 9, and the new City Well will be the primary supply of water for the City. The supply from these wells will cross the river to the Water Treatment Plant through the proposed 20-inch water main.

Presently, City Well 6 is pumping to waste into Bos Creek due to undesirable levels of volatile organics. Upon installation of the proposed water main, contaminated water from City Well 6 can be transported across the river in the existing 18-inch diameter watermain to treatment systems on the east side to be used as a backup well. Well 6 will be used during periods of high demand, during maintenance of wells, or as an alternate well. The use of water supply from City Well 6 will require treatment by air stripping on the east side.

Construction Details

The watermain will be constructed of 20-inch diameter, ductile iron pipe. Along the west side, it will extend along city property and right-of-ways. Upon crossing the river, the main will extend parallel to the present water main, south to the Water Treatment Plant, along the railroad right-of-way. Approximately 700 feet of the pipeline will consist of the river crossing; this portion of the watermain will be constructed of ball and joint ductile iron pipe. The pipeline will be placed underground along the land areas, and will cross under the Wisconsin River.

3/4/88
SCOPE OF WORK
CITY OF WAUSAU

Permit Requirements

Permits for pipeline construction will be required from the Army Corps of Engineers, the Department of Natural Resources, and the Soo Line Railroad (for permission to install the pipeline along the railroad right-of-way).

Schedule

Upon approval and receipt of permits, the actual construction of a 20-inch pipeline from the New City Well, across the Wisconsin River, and south to the Water Treatment Plant is anticipated to take approximately 4 weeks.

This Scope of Work has been prepared based on the available information; schedules are preliminary, and will be finalized at a later date.

If you have any questions or comments, please feel free to contact us.

Sincerely,

GERAGHTY & MILLER, INC.

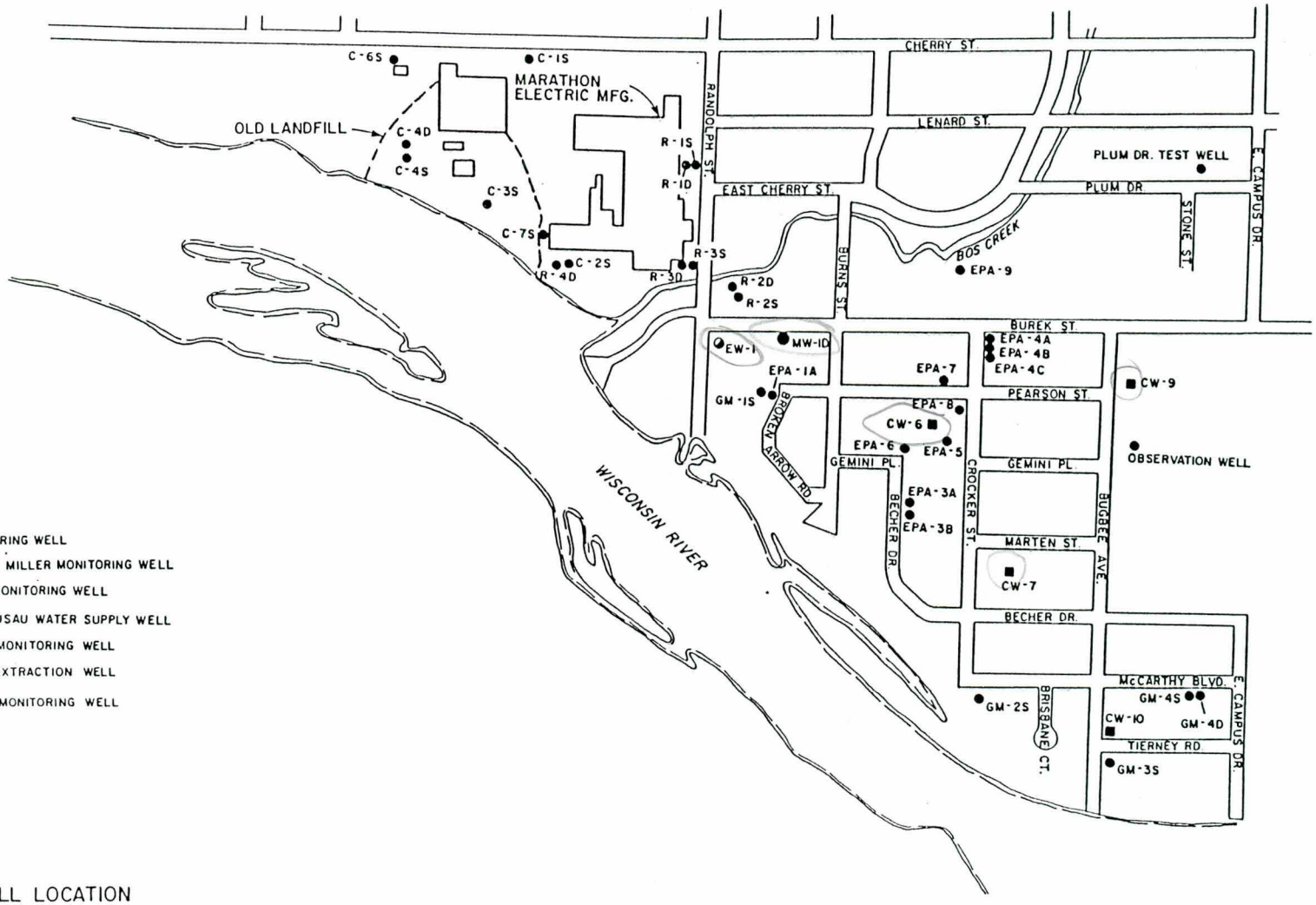
Lori Huntoon Pencak
Project Scientist

Bruce L. Cutright
Vice President

COW/LHPwkdsk:workplan

FIGURES

SOURCE: RMT INC FIGURE 1, 5/14/87



LEGEND

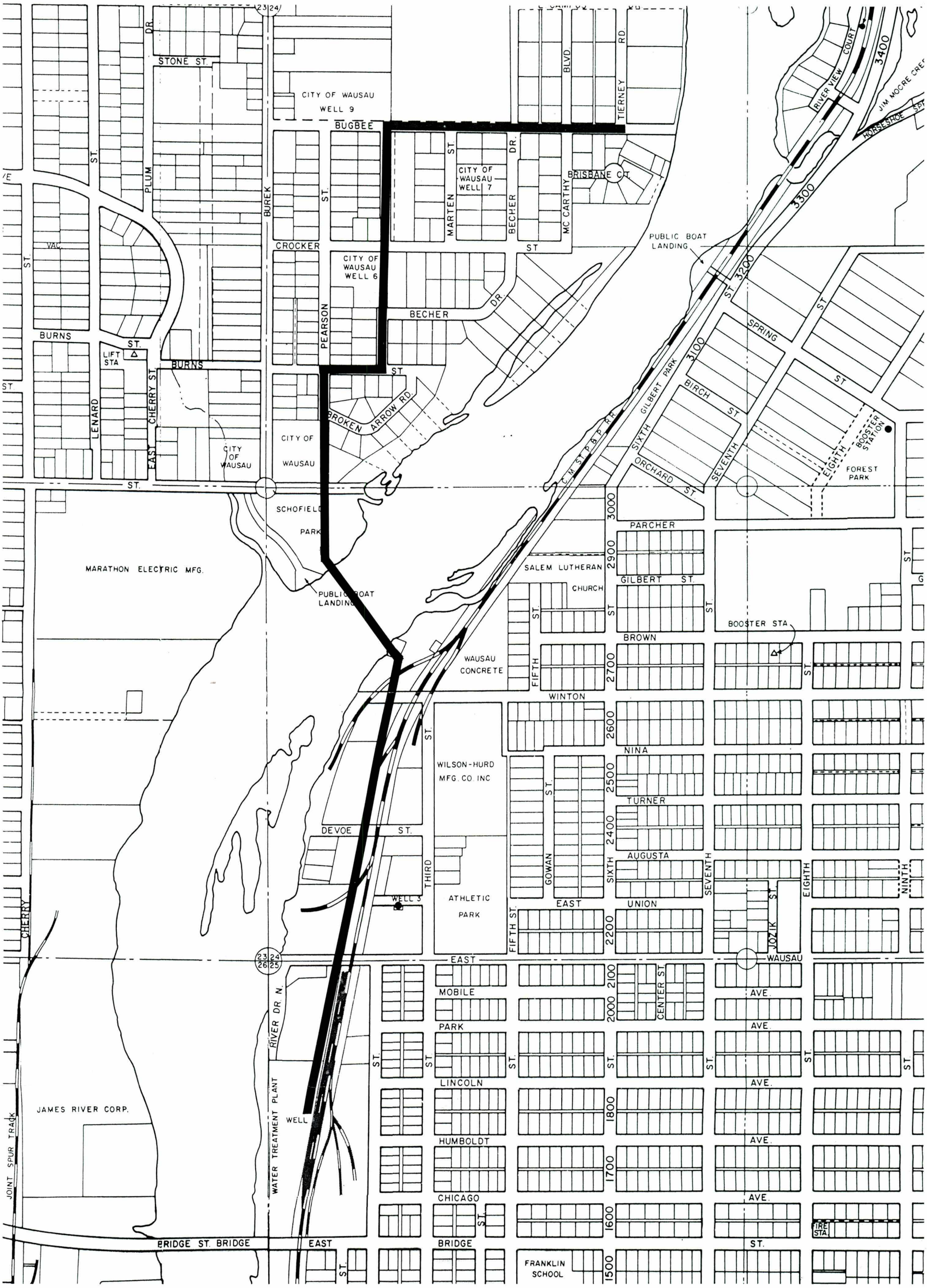
- EPA-1A ● — EPA MONITORING WELL
- GM-1S ● — GERAGHTY & MILLER MONITORING WELL
- R-1S ● — RMT, INC. MONITORING WELL
- CW-6 ■ — CITY OF WAUSAU WATER SUPPLY WELL
- C-4S ● — CH_2M HILL MONITORING WELL
- EW-1 ◪ — PROPOSED EXTRACTION WELL
- MW-1D ● — PROPOSED MONITORING WELL

figure 1

EXTRACTION WELL LOCATION
Marathon Electric Manufacturing Co.

CRA

2115-2/07/87-L-0



GERAGHTY & MILLER, INC.
Ground-Water Consultants

FIGURE 2
WATERMAIN INSTALLATION
CITY WELL 6 TO WATER TREATMENT PLANT
CITY OF WAUSAU WELLFIELD
WAUSAU, WISCONSIN

ATTACHMENT 1

STATE APPROVAL FOR

PLAN OF REMEDIAL WORK

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Carroll D. Besadny
Secretary

PLEASE READ CAREFULLY
AND COMPLY WITH
THE CONDITIONS OF APPROVAL

BOX 7921
MADISON, WISCONSIN 53707

NOV 2 5 1987

IN REPLY REFER TO: 3320

Mr. David Eisenreich - Vice President
Marathon Electric Manufacturing Corp.
100 E. Randolph St.
Wausau, Wisconsin 54401

File: Wausau
County: Marathon

Dear Mr. Eisenreich:

The Division of Environmental Standards, Bureau of Water Supply, has received an application submitted by yourself requesting approval for proposed construction of one high capacity groundwater contamination extraction well.

GENERAL INFORMATION

Operator: Marathon Electric Manufacturing Corp.
100 E. Randolph St.
Wausau, WI 54401

Officials: David Eisenreich - Vice President

Property Owner: City of Wausau
City Hall
Wausau, Wisconsin 54401

Officials: Utilities Director - Joseph Gehin
City Engineer - David Koch

Property Location: The property is located along the west side of the Wisconsin River in the NE 1/4, SE 1/4, S23, T29N, R7E, City of Wausau, Marathon County.

Existing Water Supply

There is no existing water supply.

Proposed Water Supply

Well #	DNR Permanent Well #	Location	Civil Town
1	81819	NE 1/4, SE 1/4, S23, T29N, R7E	City of Wausau

Proposed Construction of Well(s): The well will be constructed the entire depth of the unconsolidated formation to the top of the granite bedrock formation.

Well #	Well Depth (ft)	Geologic Formation(s)	Depth(s) From (ft)	To (ft)	Drillhole Diameters	Drillhole Depth(s) From (ft)	To (ft)
1	140'	Unconsolidated	0'	140'	16"	0'	140'

Casing Material	Casing Diameters (in)	Casing Thickness (in)	Casing Method of Assembly
Steel	12"	Sch. 40	Welded or T & C

Casing Depth(s) From (ft)	To (ft)	Screen Material	Screen Diameter (in)	Screen Length (ft)	Screen Attachment to Casing
0'	70'	Stainless Steel	12"	70'	Welded or T & C Joint

Annular Space Material(s)	Annular Space Material Depths From (ft)	To (ft)	Method of Constructing Well(s)
Collapsed Native Material or Sand Pack	70'	140'	Rotary - Mud
Neat Cement with 2% Bentonite Grout	0'	70'	

Proposed Installation of Pump(s):

Well #	Pump Capacity	Pump Type	Installation Sketch #	Water Level Measurement
1	500 GPM	Submersible	Modified Figure A-4	Air Line & Guage

Pumpage Measurement	Well Pump Control	Pressure Tank Size(s) and Location
Flow Meter	Manual	N/A

The extracted groundwater will be discharged through a 6 inch discharge pipe to a manhole and an existing 18-inch diameter storm sewer. The discharge

point into the manhole will allow for a free fall of water allowing for volatilization of contaminants. The storm sewer will discharge onto riprap into the Wisconsin River. The riprap will cause additional volatilization.

Any monitoring requirements or discharge permits that may be required shall be obtained from the DNR North Central District Office.

Water Usage

Well #	Normal Water Use Per Day	Maximum Water Use Per Day	Period of Operation	Principal Water Usage
1	500 GPM	500 GPM	Continuously	Contamination Removal

Proximal Public Utility Well: Wausau, 1375 feet, Northeast

CONCLUSIONS AND RECOMMENDATIONS

Because the operation of the high capacity water supply should not cause a reduction in groundwater availability to the nearest public utility well, the proposed construction and operation of the high capacity high capacity groundwater contamination extraction well is hereby approved subject to the following conditions:

1. That the construction, location, installation and operation of the water supply be completed as described in this approval.

2. That all sampling, reporting and other applicable requirements shall be complied with including any special monitoring requirements and discharge permits that may be required by the DNR North Central District Office.

3. The water extraction rate shall not exceed that stipulated in this report.

4. That a sign(s) stating that "WATER FROM THIS WELL SHALL NOT BE USED FOR HUMAN CONSUMPTION," shall be posted at the site of the well(s) and thereafter maintained in a legible condition.

5. That the well driller shall collect drill cuttings at 5-foot intervals and at each change in formation and send the samples to the State Geological Survey for examination and preparation of an accurate geological log of the well.

6. That the well driller shall submit a construction report of the well(s) to the Department within 20 days after completion of the well(s).

7. That the property owner and well operator understand that approval by the Department does not relieve the property owner and well operator of any liability which may result from injury or damage suffered by any person upon operation of the well(s).

8. That prior Departmental approval shall be obtained for any future well construction, reconstruction, or increase in pumpage capacity.

9. That a pump operation timing device shall be installed for well(s) #1 and an air line with gauge shall be installed for well(s) #1 and maintained in good operating condition.

10. That reports of static well water levels and that reports of pumping well water levels for well(s) # 1 and total pumpage for well(s) # 1 shall be made to the Department on the first of each month on the forms provided by the Department).

11. That there shall be a free air-break of at least two pipe diameters between the discharge pipe and the high water level of the manhole

12. Upon completion of the project, the well shall be permanently abandoned in accordance with s. NR 112.21, Wis. Adm. Code, and well abandonment report form or forms shall be completed and submitted to the Department.

13. The Department reserves the right to limit pumpage from the well(s) in an amount necessary to eliminate excessive drawdown in the nearby public utility well.

This application has been reviewed in accordance with s. 144.025(2)(e), Stats., for compliance with ch. NR 112, Wis. Adm. Code (or any other applicable section of the Wisconsin Administrative Code or Statutes which may be specifically referenced in the conditions above). This letter should not be construed as an approval for activities requiring approval under other statutes or by other federal, state, or local agencies.

If you desire a hearing on this decision, you must file with the Department a verified petition for a hearing to contest the issuance of this decision, or any of its terms, within 60 days after the date this decision is mailed. All petitions shall set forth specifically the modification or change desired in this decision. All petitions shall be filed either by delivery to the Office of the Secretary of the Department at 101 South Webster Street, Madison, Wisconsin, or by certified mail addressed to the Office of the Secretary, Department of Natural Resources, P.O. Box 7921, Madison, Wisconsin 53707. This notice is provided pursuant to section 227.48(2), Stats.

In granting this approval, the Division of Environmental Standards of the Department of Natural Resources reserves the right to order changes or additions in construction and operation, should conditions arise making this necessary.

Construction or operation not conforming to the terms of this approval voids the approval.

If construction has not commenced within two years from the date of this letter, this approval shall become void. After two years, therefore, new application must be made for approval of these or other plans and specifications before any construction work is undertaken.

As authorized by L. F. Wible, P.E., Administrator, Division of Environmental Standards.

Sincerely,

Eric Imhof

Eric Imhof
Private Water Supply Section

Approved: on Nov 23, 1987

William T. Rock, P.E., Chief
Private Water Supply Section
Bureau of Water Supply

WTR:db/0902E

Enc.

cc: Operator - (3) (1 for Well Driller) (1 for Pump Installer)
Property Owner - City of Wausau
North Central District - Chuck Fitzgerald
Engineer - Conestoga - Rovers and Assoc. - Frank Rovers and Ed Roberts
Dennis Kugle - SW/3
North Central District - Gary Kulibert

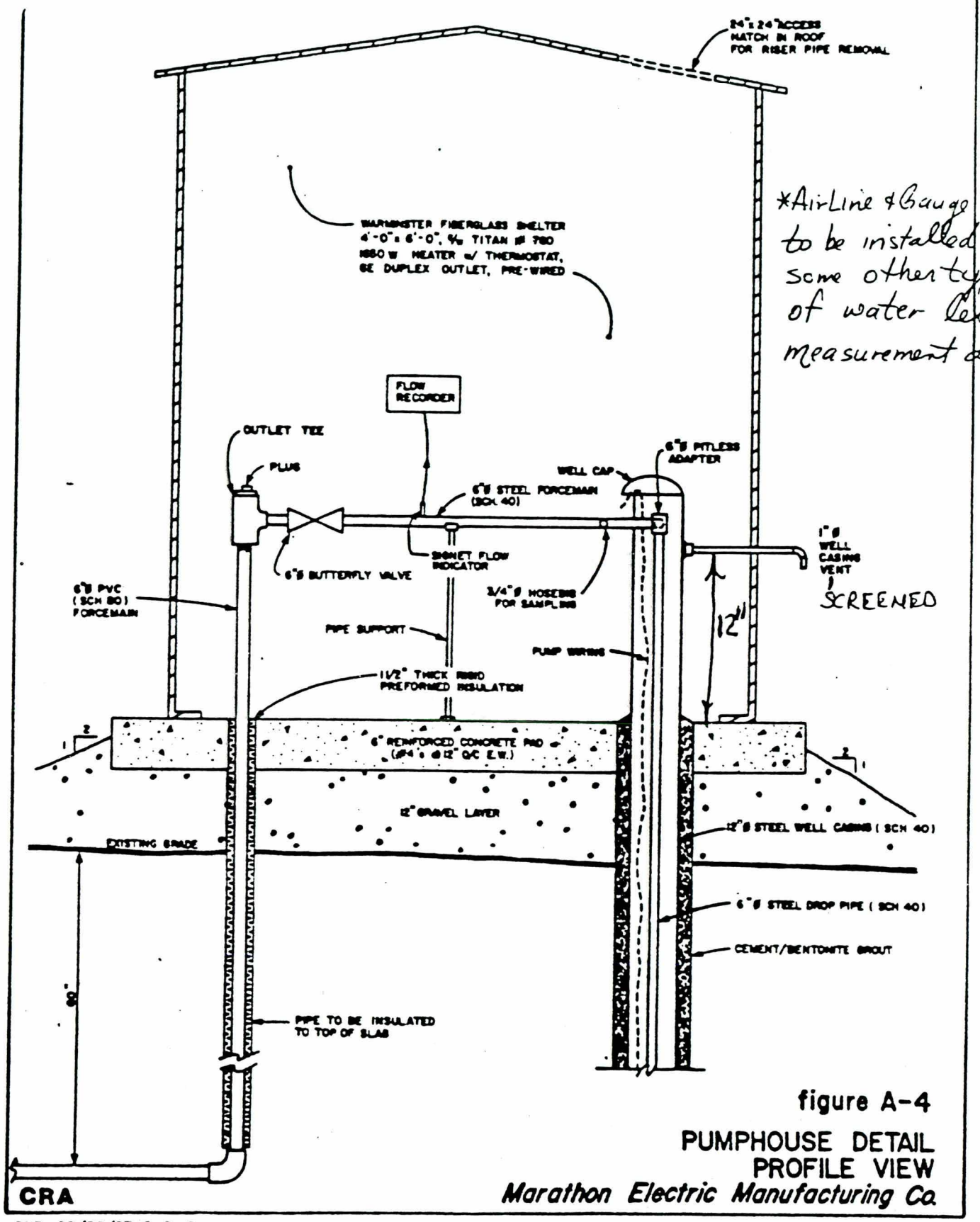
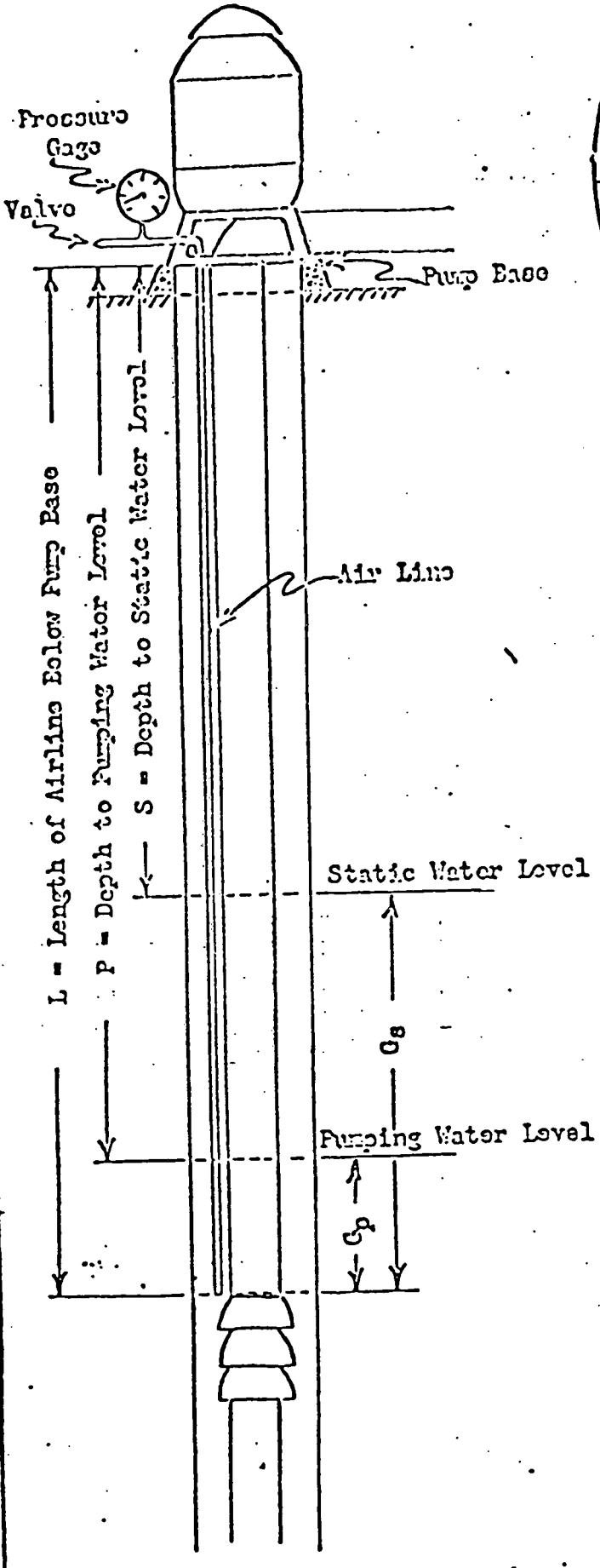


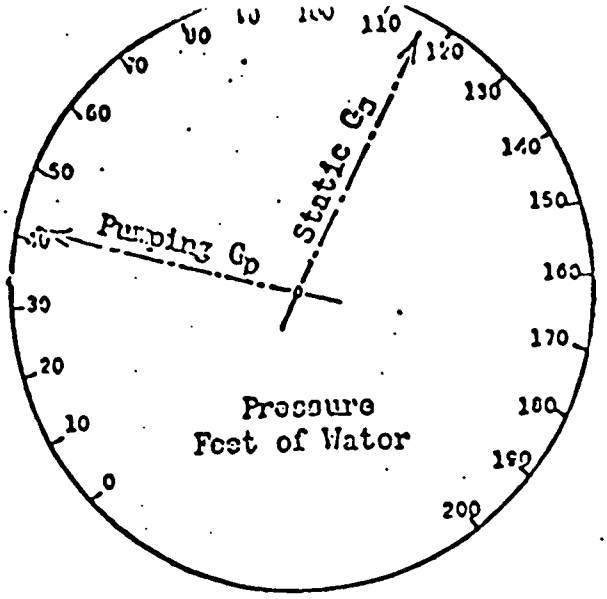
figure A-4

PUMPHOUSE DETAIL
PROFILE VIEW
Marathon Electric Manufacturing Co.

CRA

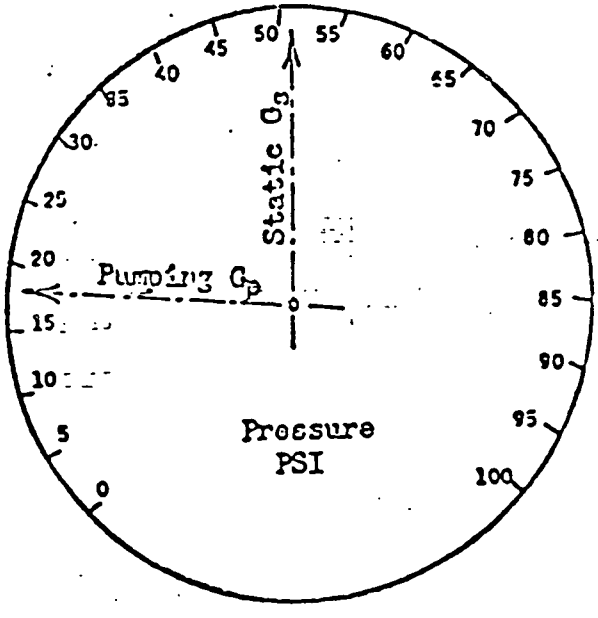
• 2115-28/09/87-2-D-0





L = 300 Ft.

$S = L - C_s$
$S = 300 - 117 = 183$ Ft.
$P = L - C_p$
$P = 300 - 41 = 259$ Ft.



L = 300 Feet

$S = L - (2.3 \times C_s)$
$S = 300 - (2.3 \times 51) = 300 - 117 = 183'$
$P = L - (2.3 \times C_p)$
$P = 300 - (2.3 \times 18) = 300 - 41 = 259$ Ft.

FIGURE 1 DETERMINATION OF WATER LEVELS USING AN AIR LINE

INSTRUCTIONS FOR USE OF

AIR LINES IN DETERMINING WATER LEVELS IN WELLS

CASE I - LENGTH OF AIR LINE KNOWN

1. Using a hand tire air pump or portable air compressor, pump air into tire-type valve (schroeder valve) near altitude gauge until dial hand on gauge stops rising.
2. Read dial on altitude gauge in feet or psi (lbs. per square inch). (If gauge is calibrated in psi convert to feet by multiplying psi times 2.3, for example, 10 psi = 23 feet). This reading, in feet, gives the number of feet of water forced out of the air line by the air pressure.
3. Subtract the reading in feet, obtained in 2 from the total length of air line. This will give the depth to water in the well.

CASE II - LENGTH OF AIR LINE UNKNOWN

1. Measure the depth to the water in the well with a tape or weighted string. (This is not possible if there is not an opening in the pump base.)
2. Pump air into air line as in 1 of Case
3. Read dial as in 2 of Case I.
4. Add reading obtained in 3 to depth to water obtained in 1. (This will give total length of air line.)
5. Proceed as in Case I.

NOTE: Some altitude gauges are pre-set to read the depth to water directly (without subtracting total length of air line.)

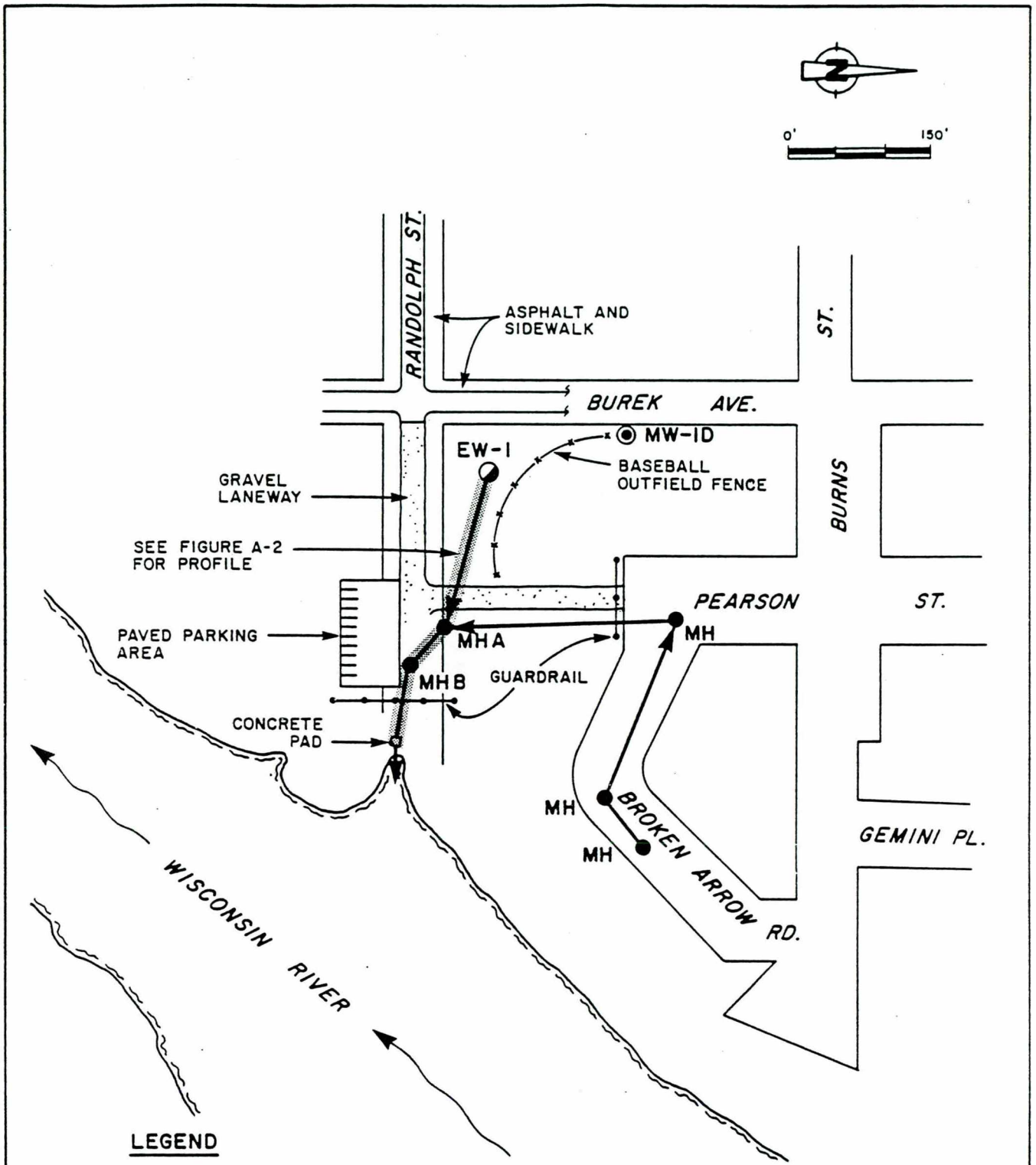


figure A-1

EXTRACTION WELL AND DISCHARGE SYSTEM PLAN

Marathon Electric Manufacturing Co.

CRA

2115-11/09/87-2-D-1

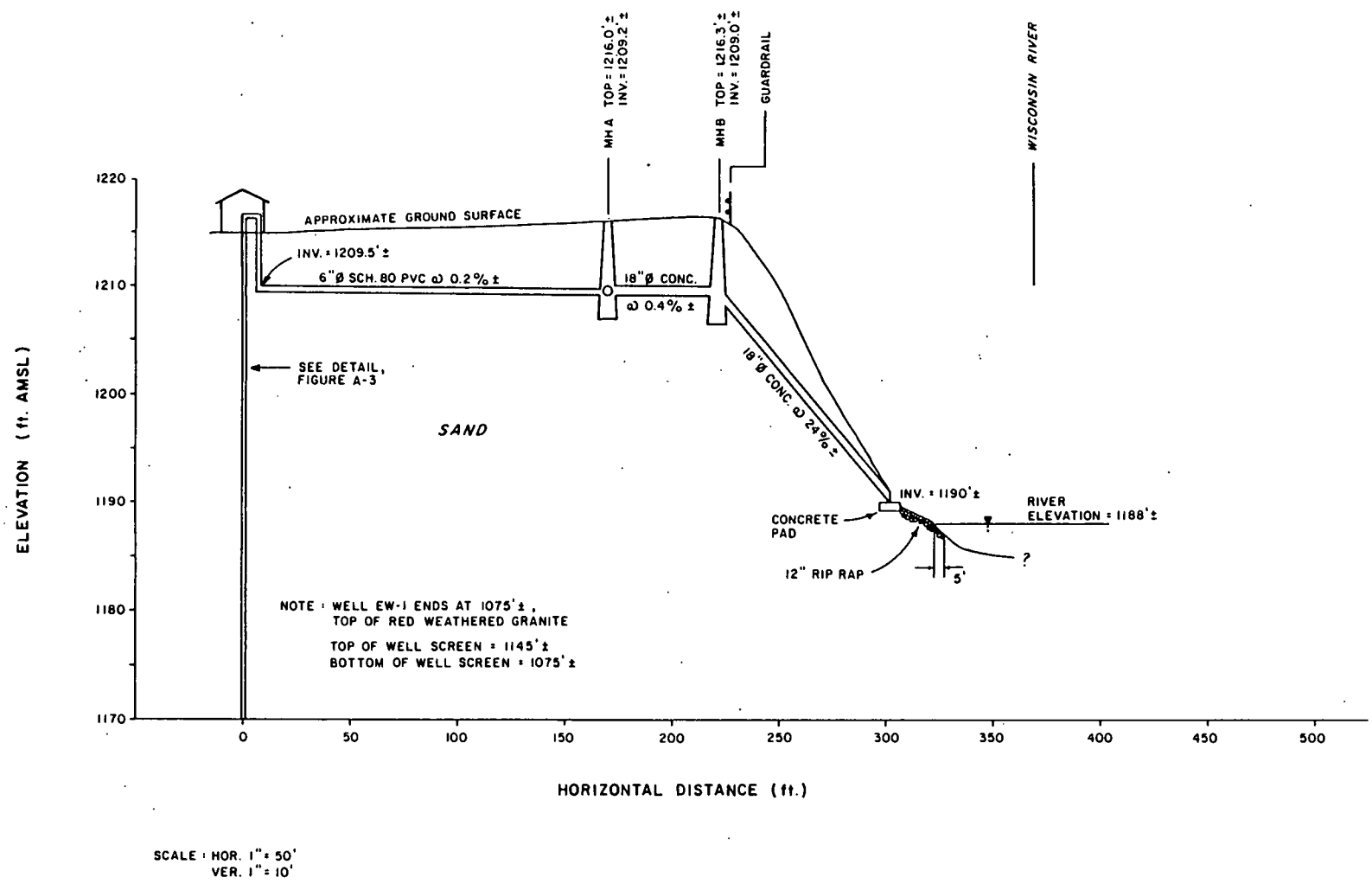


figure A-2

EXTRACTION WELL AND DISCHARGE SYSTEM PROFILE

Marathon Electric Manufacturing Co.

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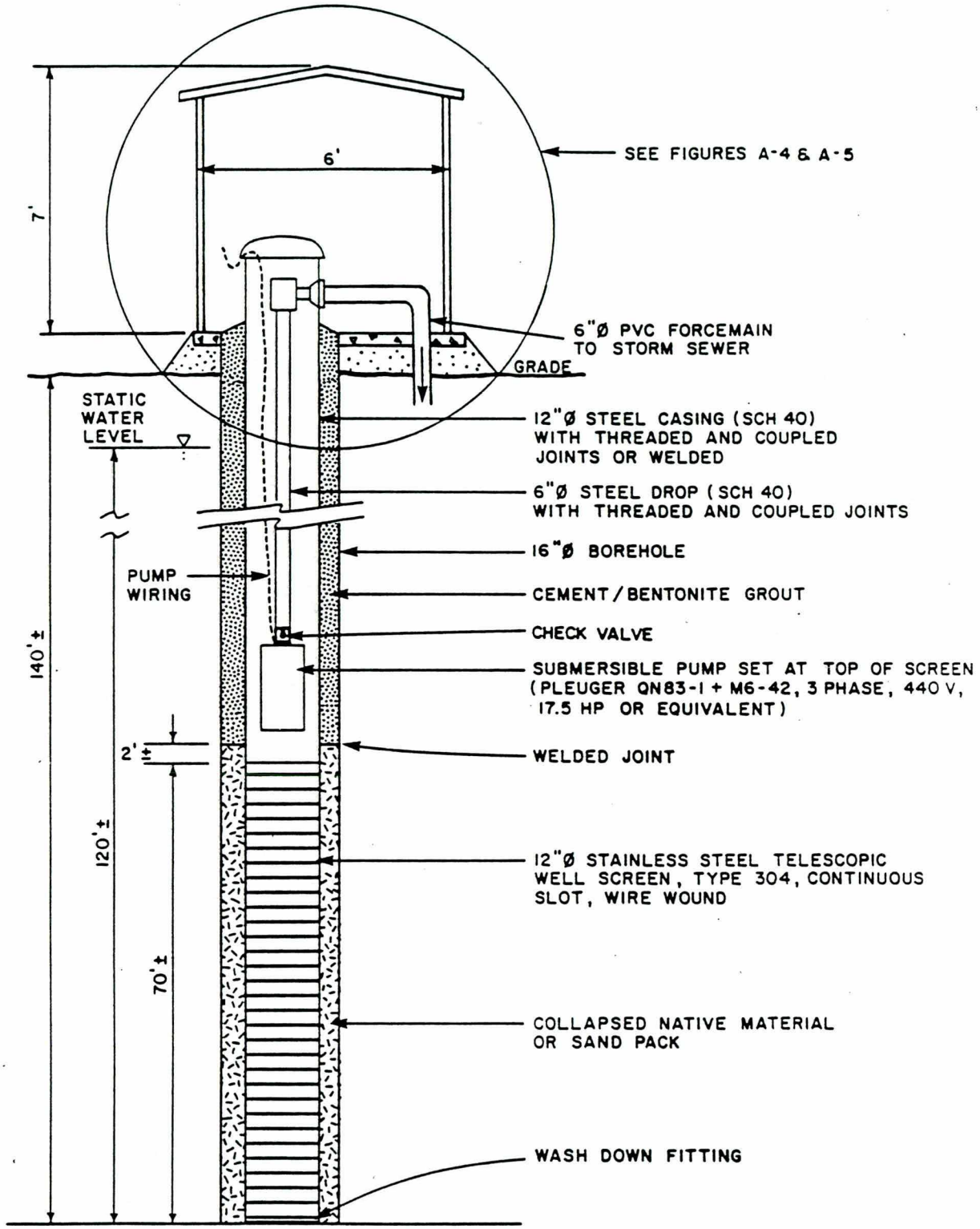
2115-11/09/87-2-D-1



N.T.S.

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figure A-3

TYPICAL EXTRACTION WELL DETAIL

Marathon Electric Manufacturing Co.

2115-14/09/87-2-D-1

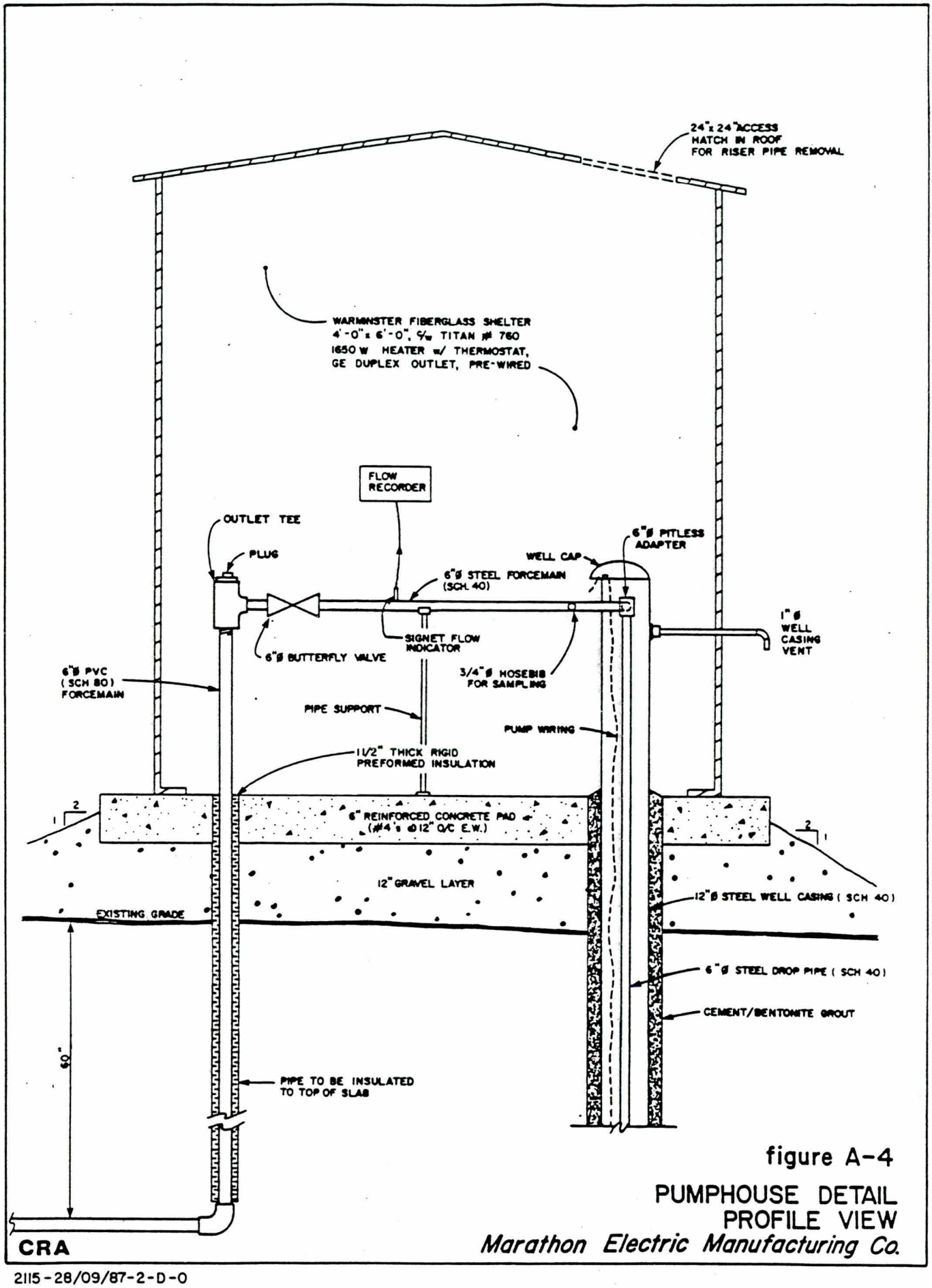

figure A-4

PUMPHOUSE DETAIL
PROFILE VIEW
Marathon Electric Manufacturing Co.

CRA

2115-28/09/87-2-D-0

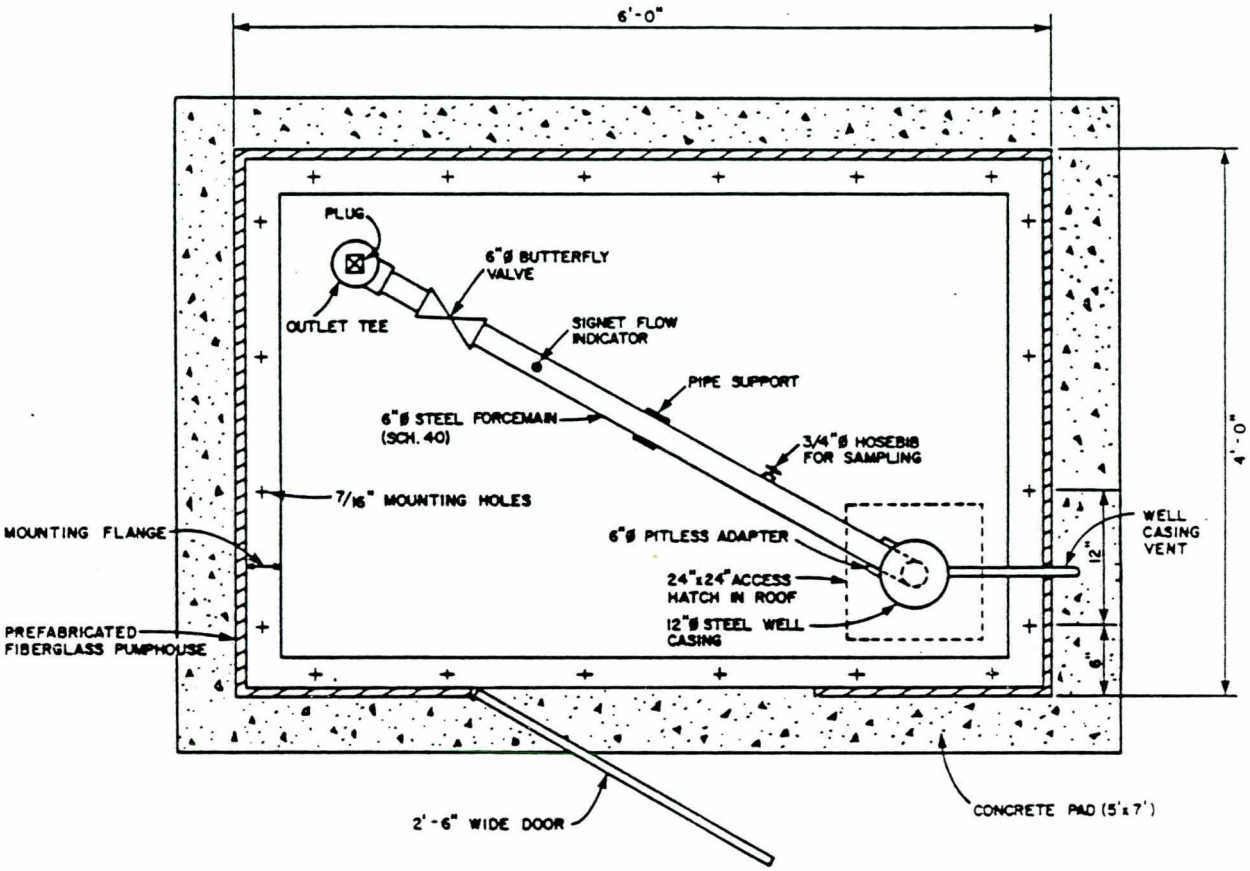

figure A-5

PUMPHOUSE DETAIL
PLAN VIEW
Marathon Electric Manufacturing Co.

CRA

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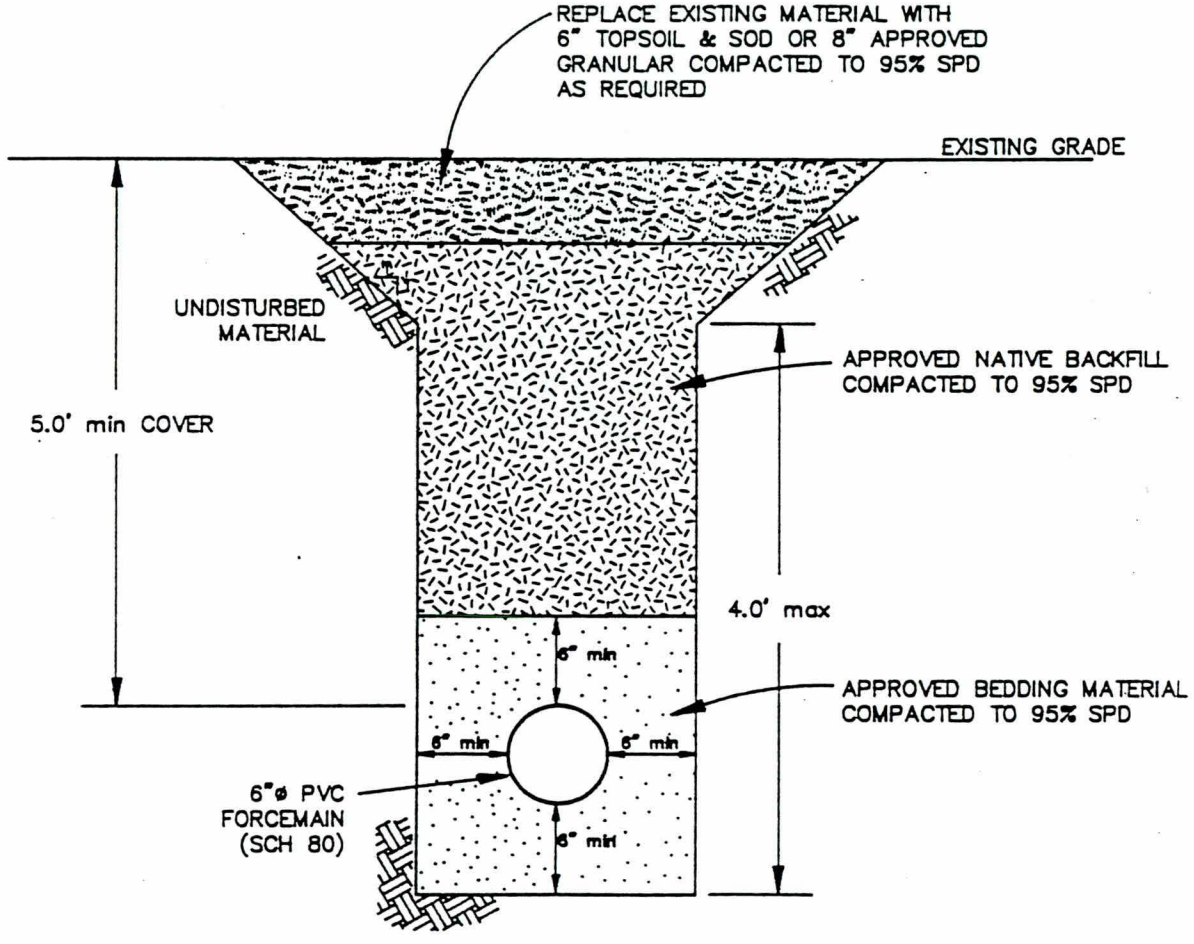

figure A-6

FORCEMAIN TRENCH CROSS-SECTION
Marathon Electric Manufacturing Co.

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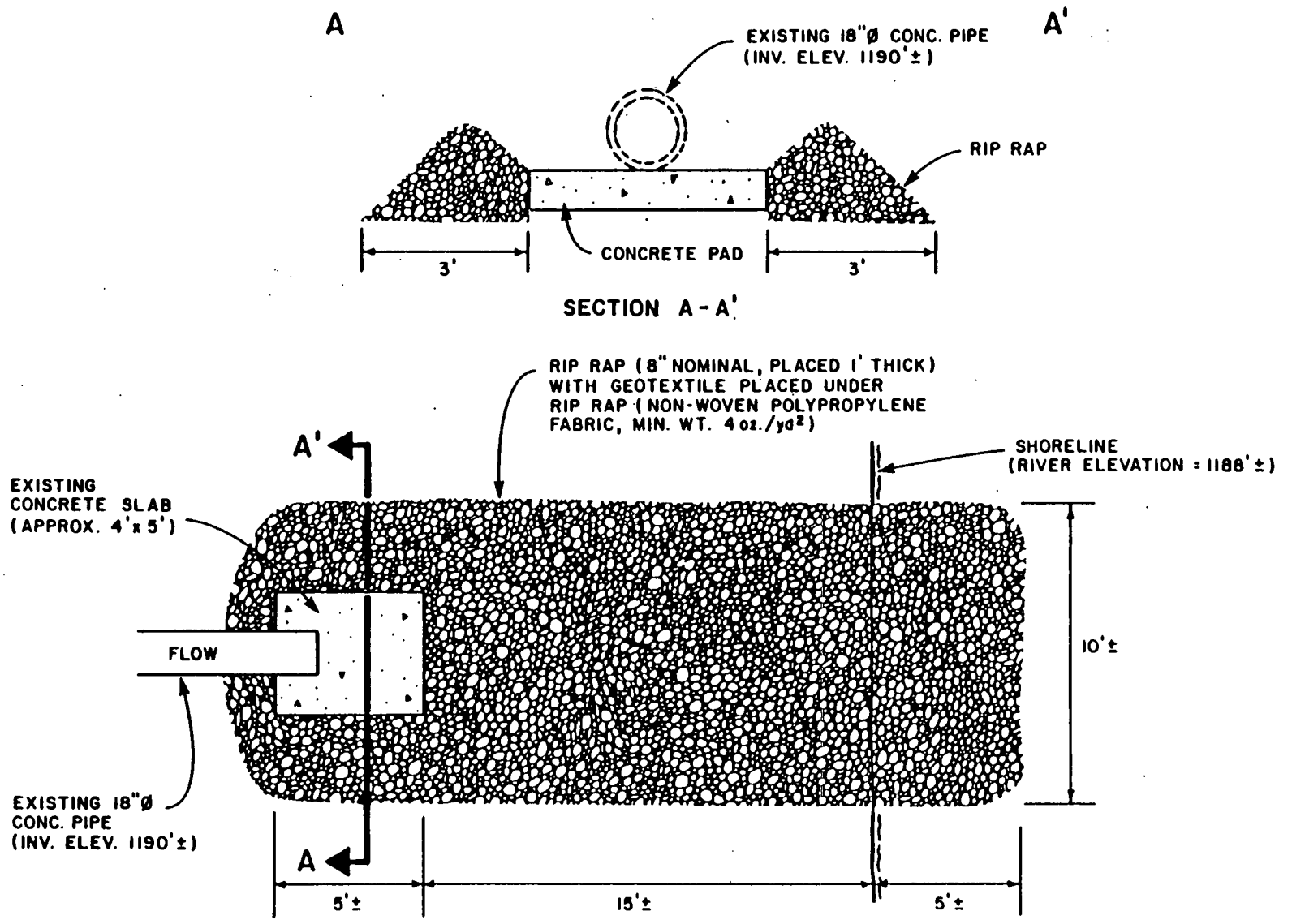

figure A-7

OUTLET PIPE RIP RAP DETAIL

Marathon Electric Manufacturing Co.

CRA

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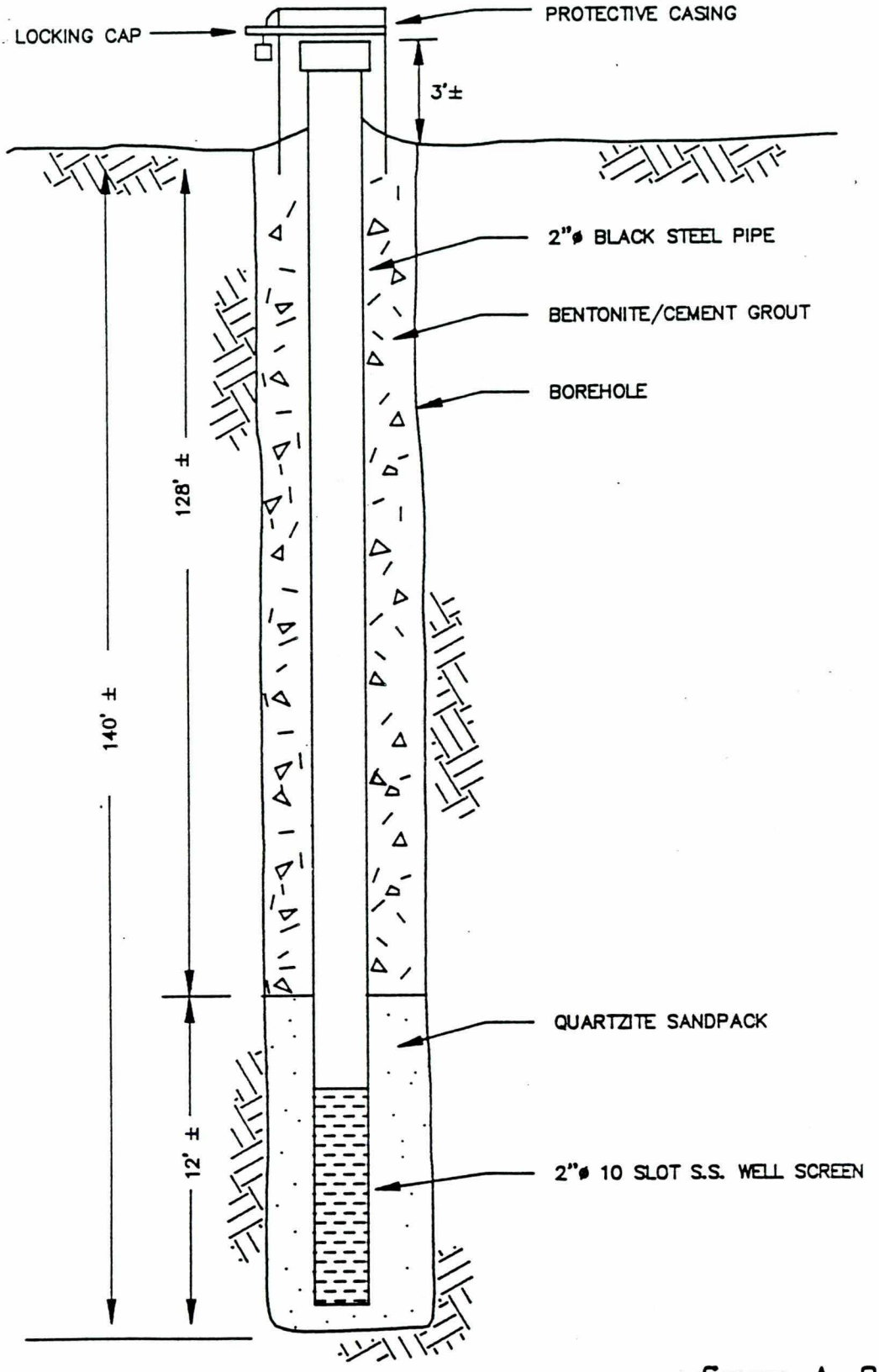

figure A–8

TYPICAL MONITORING WELL DETAIL

Marathon Electric Manufacturing Co.

2115–21/09/87–2–D–0