CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION
7725 WEST NORTH AVENUE
WAUWATOSA, WI 53213
Telephone: (414) 479-8927
www.wauwatosa.net

Boris Veleusic, P.E.
City Engineer
bveleusic@wauwatosa.net

PLEASE RETURN THIS FORM VIA EMAIL TO TENGINEERING@WAUWATOSA.NET

Date: _____

To: Boris Veleusic, P.E.
City Engineer
City of Wauwatosa
7725 W. North Avenue
Wauwatosa, WI 53213

RE: Submission of Prequalification Forms for the Year 2026

Submitted herewith please find our statement for your consideration in determining whether our firm is qualified and capable to bid, perform and furnish the necessary labor, materials and skills on the basis of our work record, experience, equipment and staff as required to enter upon and complete those various types of projects indicated below as may be awarded by the Municipality during the current calendar year.

It is understood that the determinations and decisions of the Municipality with regard to qualifications shall be final; and further, that the information herein will be considered confidential. A finding of “qualified” for one project does not bind the Municipality on other projects, and the Municipality expressly reserves the right to review and revise its findings on later projects.

Sincerely,

_____
Signature

_____
Please Print Name

_____
Firm Name

CITY OF WAUWATOSA

PREQUALIFICATION STATEMENT

There is submitted herewith for your consideration, pursuant to Sec. 66.0901 Wisc. Stats., a statement of qualifications of the undersigned to furnish the necessary labor, materials and skills required to enter upon and complete public works contracts to be let by the Municipality through its several departments.

I. IDENTIFICATION

A. Legal firm name: _____

Address: _____

_____

B. Telephone: _____ Fax: _____

Email: _____

C. Number of years in business under present firm name: _____

If less than 5 years, please provide prior company name(s) for that period:

_____

_____

D. Class of work in which firm is seeking qualification: _____

_____

E. Please check and complete No. 1, 2 or 3 below:

1. A Corporation, LLC or S-corporation: _____

   President: _____

   Vice-president: _____

   Secretary: _____

   Treasurer: _____

2. A Partnership: _____

   Name(s) of Partners: _____

   _____

3. Sole Proprietor: _____

F. If a Non-Wisconsin corporation answer below:

1. When incorporated: _____

2. In what state: _____

3. Licensed to do business in Wisconsin (month & year): _____

II. EXPERIENCE

A. Tabulation of major contracts which firm has completed during the past 5 years (use attachments as needed):

Year	Class of Work	Contract Amount	Location of Work	For Whom Performed: (Name, Address & Phone)

B. Tabulation of construction experience of principal individuals in organization (use attachments as needed):

Individual's Name	Present Position or Office	Years of Experience	Class of Work

C. Average number of employees during the last 12 months:

1. Office: _____ 2. Skilled: _____ 3. Unskilled: _____

III. EQUIPMENT:

A. List below major pieces of equipment owned and available when needed for proposed work (use attachments as needed)

Quantity	Item	Description, Size, Capacity, etc.	Condition (Good or Fair)	Years of Service

IV. CONTRACTUAL RESPONSIBILITY

A. Has firm ever failed, in the past ten years, to complete on time, work awarded to it?.....(Yes or No) _____

If you answered yes, complete the following:

1. Date: _____
2. Owner: _____
3. Owner's mailing address: _____

   _____
4. Phone number (at the time or preferably now):

   _____
5. Full particulars in each instance (use attachments as Needed)

   _____

   _____

   _____

B. Has any officer or partner of firm ever failed, in the past ten years, to complete on time, work awarded to it?.....(Yes or No) ____

If you answered yes, complete the following:

1. Date: _____
2. Name of officer or partner: _____

3. Owner's mailing address: _____

_____

4. Phone number (at the time or preferably now):

_____

5. Full particulars in each instance (use attachments as needed)

_____

_____

_____

C. Has any officer or partner of firm ever been an officer or partner of some other organization during the past 10 years that failed to complete on time a construction contract?.....(Yes or No) _____

If you answered yes, complete the following:

1. Date: _____

2. Name of officer or partner: _____

3. Name and mailing address of organization:

_____

_____

_____

4. Name and mailing address of owner:

_____

_____

_____

5. Phone number (at time or preferably now):

_____

6. Full particulars in each instance (use attachments as Needed)

_____

_____

_____

D. Has firm asked to be relieved from a bid submitted by it to a public awarding authority during the past 10 years?.....(Yes or No) _____

If you answered yes, complete the following:

1. Date: _____
2. Owner: _____
3. Owner's mailing address: _____

   _____

4. Phone number (at the time or preferably now):

   _____

5. Full particulars in each instance (use attachments as Needed)

   _____

   _____

   _____

E. Has firm ever been charged with or convicted of a violation of any wage schedule?.....(Yes or No) _____

If you answered yes, complete the following:

1. Date: _____
2. Claimant: _____
3. Claimant's mailing address: _____

   _____

   _____

4. Phone number (at time or preferably now)

   _____

5. Full particulars in each instance (use attachments as Needed)

   _____

V. DEBARMENT

Is the Contractor firm or any owner, partner, director, officer, or principal of the Contractor, or any person in a position with management responsibility or responsibility for the administration of funds:

A. presently debarred, suspended, proposed for debarment, and declared ineligible or voluntarily excluded from covered transactions by any federal or state department/agency?.....(Yes or No) _____

B. within a three-year period preceding this certification been convicted of or had a civil judgment rendered against it for: commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public transaction or contract (federal, state, or local); violation of federal or state antitrust statutes; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property?.....(Yes or No) _____

C. presently indicted for or otherwise criminally or civilly charged by a governmental entity (federal, state, or local) with commission of any of the offenses enumerated in paragraph (b) above?.....(Yes or No) _____

or

D. within a three-year period preceding this certification had one or more public transactions or contracts (federal, state, or local) terminated for cause or default?.....(Yes or No) _____

If the contractor is “Actively” registered with SAMS (Service for Award Management), the UEI (Unique Entity ID) assigned is:
_____

VI. BONDING RESPONSIBILITY

A. Names, addresses and telephone numbers of bonding companies which generally execute bid and surety bonds (use attachments as needed):

_____

_____

_____

B. Names, addresses and telephone numbers of all bonding companies other than those listed above which have written bid and surety bonds during the last 5 years (use attachments as needed):

_____

_____

_____

C. Has any bonding company ever taken over a contract or made any payments, because of firm's failure to carry out a contract?.....(Yes or No) _____

If you answered yes, complete the following:

1. Date: _____
2. Name of bonding company: _____
3. Bonding company's mailing address:

   _____

   _____

4. Bonding company's phone number:

   _____

5. Full particulars in each instance (use attachments as needed)

   _____

   _____

   _____

VII. CONTRACTOR'S FINANCIAL STATEMENT

A. Attach itemized list of your current assets as of latest balance sheet date. (give date)

B. Attach itemized list of your current liabilities as of latest balance sheet date. (give date)

C. Who prepared such balance sheet? _____

D. Are any of your assets assigned?.....(Yes or No) _____

If yes which are assigned? (use attachments as needed):

_____

_____

_____

For what purpose are they assigned? (use attachments as needed):

_____

_____

_____

VIII. DATA

A. Are you familiar with:

1. The provisions of the form of contract used by this Municipality?.....(Yes or No) _____

2. Its terms and conditions?.....(Yes or No) _____

3. Its specifications?.....(Yes or No) _____

4. The regulations of the Municipality relating to bidding and awarding of contracts?.....(Yes or No) _____

IX. AFFIDAVIT

STATE OF _____ _____)
) ss.
COUNTY OF _____)

_____ being duly sworn, deposes and says that s/he is the
Print Name

_____ of the above _____ and that the
Print Title Name of Firm

answers to the foregoing questions and all statements therein contained are true and correct, and that any owner, bonding company, or other agency herein named is hereby authorized to supply the Municipality with any information deemed necessary to verify this statement.

_____
Signature of Authorized Corporate Official, Partner or Owner

_____
Print Name

_____
Title

Subscribed and sworn to before me this _____ day of _____, 20_____

My commission expires _____, 20____ _____

_____
Notary Public

CONTRACT DOCUMENTS
FOR

2026 STREET & UTILITY IMPROVEMENTS
IN THE
CITY OF WAUWATOSA, WISCONSIN

CONTRACT 26-07

PROJECT 1026
QuestCDN No. 10020348

NOT FOR BIDDING PURPOSES

January 21, 2026

Construction & Inspection Coordination:

Nicholas Deming, PE
Construction Manager
(414) 507-7153
ndeming@wauwatosa.net

Paving Plans Prepared By:

Jennifer Schroeder, PE
Senior Civil Engineer
(414) 479-3544
jschroeder@wauwatosa.net

Water Plans Prepared By:

Mike Maki, PE
Senior Civil Engineer
(414) 479-3444
mmaki@wauwatosa.net

Sanitary & Storm Plans Prepared By:

Maggie Anderson, PE
Senior Civil Engineer
(414) 479-3444
manderson@wauwatosa.net

CONTRACT DOCUMENTS
FOR

2026 STREET & UTILITY IMPROVEMENTS

IN THE
CITY OF WAUWATOSA, WISCONSIN

CONTRACT 26-07

PROJECT 1026
QuestCDN No. 10020348

The plans and specifications for this project were prepared by the Engineering Services Division.

Date January 21, 2026

Boris Veleusic
City Engineer

The plans, specifications, form of contracts and other documents contained in and constituting the contract documents for this project were approved by the Board of Public Works of the City of Wauwatosa, at a meeting held January 21, 2026.

Deyanira Nevarez, City Clerk
Wauwatosa, Wisconsin

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SECTION 100 – OFFICIAL NOTICE

OFFICIAL NOTICE TO CONTRACTORS
ADVERTISEMENT FOR BIDS

The City of Wauwatosa will receive proposals for utility improvements until 11:01 A.M. Local Time, February 11th, 2026, at which time all bids will be publicly opened and read virtually via use of the Zoom platform. Access at zoom.us, Meeting ID 858 4894 1097.

CONTRACT 26-07 2026 Street & Utility Improvements

Under this proposal, the Contractor shall furnish all labor, materials, supplies, equipment, tools and other services necessary for water main construction, storm sewer construction, sanitary sewer construction, asphalt repaving and reconstruction including grading, concrete curb and gutter replacement, ADA curb ramps, asphalt pavement, street lighting, and work incidental thereto in portions of:

N Perry Court:	From:	Cul-de-sac bulb
	To:	N 76th Street
Maple Terrace:	From:	N 76th Street
	To:	N 75th Street
Laurel Court:	From:	Cul-de-sac bulb
	To:	Maple Terrace

all in accordance with contract documents.

Interested parties may view and obtain digital copies of the contract documents, including plans and specifications, from Quest Construction Data Network. Access the QuestCDN website at www.questcdn.com. Input QuestCDN eBidDoc No. 10020348 on the website's Project Search page. No password is required. Contact QuestCDN.com at 952-233-1632 or info@questcdn.com for assistance in downloading and working with the digital documents.

There is a nonrefundable charge of $25.00 for the plans and contract documents. Plans are also available for viewing only at the Engineering office at City Hall, 7725 W. North Avenue, Wauwatosa, Wisconsin. Plans will be available on January 21st, 2026.

The City will accept only online electronic bids through QuestCDN. To access the electronic bid form, download the project documents and click the online bidding button at the top of the advertisement.

All proposals must be submitted in electronic format together with a bid bond equal to five (5) percent of the bid payable to the City of Wauwatosa, Wisconsin, as a guarantee that if his bid is accepted, the successful bidder will execute and file the proper contract and bonds within ten (10) days after notification of award of the contract.

Failure on the part of the successful bidder to execute his contract and *performance* and *labor & material payment* bonds within ten (10) days from the date of notice of the award of contract will be considered as just cause for the annulment of the award and the forfeiture of the proposal guarantee to the City not as a penalty but in payment to the City as liquidated damages as a result of such failure.

No bid shall be withdrawn after the opening of bids for a period of sixty (60) days after the scheduled time of closing of bids.

The letting of the work described herein is subject to the provisions of Section 66.09, Wisconsin Statutes, requiring the bidder to furnish proof of responsibility. Bidder prequalification is required on forms furnished by the City of Wauwatosa and submitted to the City Engineer. Prequalification forms that are submitted after 5 days preceding the contract letting date may be cause for the rejecting of bids.

TIME OF SUBSTANTIAL COMPLETION

The substantial completion date for CONTRACT 26-07 2026 Street & Utility Improvements shall be September 25, 2026. See Section 600 for additional completion requirements.

If the contractor does not complete the work on or before the date set forth above for CONTRACT 26-07 2026 Street & Utility Improvements or within the extra time allowed under a City Engineer granted time extension, the City will assess liquidated damages. The City will deduct two thousand one hundred eighty-five dollars ($2,185.00) for every calendar day that the work remains uncompleted from payments due the contractor.

The Contractor will also be charged for each and every day inspection is required after the time of completion has expired. This charge will be based on the actual costs of inspection, construction supervision, clerical and administrative costs, traffic control and overhead charges.

A required "Affidavit of Compliance" is included in Section 300 and must be submitted with the bid.

The right to reject or accept any or all bids and the right to waive any informality in bidding is reserved to the City of Wauwatosa, Wisconsin.

Dated at Wauwatosa, Wisconsin January 21, 2026

Deyanira Nevarez, City Clerk

City of Wauwatosa, Wisconsin

SECTION 200 – INSTRUCTIONS TO BIDDERS

200.01 - DESCRIPTION OF WORK
The work on this contract consists of the following:

CONTRACT 26-07 2026 Street & Utility Improvements

Under this proposal, the Contractor shall furnish all labor, materials, supplies, equipment, tools and other services necessary for water main construction, storm sewer construction, sanitary sewer construction, asphalt repaving and reconstruction including grading, concrete curb and gutter replacement, ADA curb ramps, asphalt pavement, street lighting, and work incidental thereto. The contractor will perform this work at various locations in areas within the City of Wauwatosa, all in accordance with contract documents.

200.02 - RETURN OF PROPOSAL GUARANTY
The bid deposit(s) of all depositors will be returned after the bids have been accepted by the Common Council and the vouchers for the return of the deposit(s) approved by the Common Council.

200.03 - TIME OF SUBSTANTIAL COMPLETION
The substantial completion date for Contract 26-07 2026 Street & Utility Improvements shall be September 25, 2026. See Section 600 for additional completion requirements.

If the contractor does not complete the work on or before the date set forth above for Contract 26-07 2026 Street & Utility Improvements or within the extra time allowed under a City Engineer granted time extension, the City will assess liquidated damages. The City will deduct two thousand one hundred eighty-five dollars ($2,185.00) for every calendar day that the work remains uncompleted from payments due the contractor.

200.04 - BOND REQUIREMENTS
In addition to the standard full penalty for nonperformance of Contract, the Contractor's attention is directed to Section 504.16 that requires a second performance bond guaranteeing labor and material payments.

200.05 - EXAMINATION OF SITE AND CONTRACT DOCUMENTS
The bidder is required to examine carefully the site of the work, the proposal, plans specifications, general conditions, official notice to contractors, contract and bond, all as herein contained and known as the contract documents for the work contemplated; it will be assumed that the bidder has investigated and is satisfied as to the requirements of the contract documents. It is mutually agreed that the submission of a proposal shall be considered as conclusive evidence that the bidder has made such examination and is satisfied as to all the conditions and contingencies.

No pleas of ignorance of conditions that exist or that may hereafter exist, or of conditions or difficulties that may be encountered in the execution of the work under this

Contract, as a result of failure to make the necessary examinations and investigations will be accepted as an excuse for any failure or omission on the part of the Contractor to fulfill, in every detail, all of the requirements of the contract documents, or will be accepted as a basis for any claims whatsoever for extra compensation or for an extension of time.

200.06 - INTERPRETATION OF CONTRACT DOCUMENTS AND ADDENDA
Should any question arise concerning the true meaning of any part of the contract documents, the bidder may submit to the City Engineer a written request for an interpretation thereof. The interpretation of the question so requested will be made as an addendum and either mailed or delivered to all bidders who receive contract documents.

Addenda: Bidders shall acknowledge receipt and incorporation of all addenda at the appropriate location provided in the proposal. Any addenda issued during the time of bidding shall be included with the bid, and in closing a contract they will become a part thereof.

200.07 - PREPARATION OF PROPOSALS
The bidder can ONLY submit his proposal through the QuestCDN electronic bidding format. A nominal fee will be charged to the Bidder for an electronic submission of a proposal through QuestCDN.

Wisconsin Statute 77.54(9m) allows a sales and use tax exemption for certain building materials sold to construction contractors for incorporation into public works projects. To claim the exemption, contractors must prepare Wisconsin Form S-211, Sales and Use Tax Exemption Certificate and provide the form to their supplier in compliance with WI 77.54(9m) when purchasing supplies covered by this statute. All other materials, supplies, and equipment purchased by a contractor, sub contractor, or builder for the construction of the work specified under this contract is subject to all applicable sales tax. Proposals are to include all applicable sales tax.

200.08 - REQUIREMENTS FOR SIGNING BIDS

a) Bids, which are not signed by individuals making them, shall have attached thereto a power of attorney evidencing authority to sign the bid in the name of the person for whom it is signed.

b) Bids, which are signed for a partnership, shall be signed by all of the partners or by an attorney-in-fact. If signed by an attorney-in-fact there shall be attached to the bid a power-of-attorney evidencing authority to sign the bid, executed by the partners.

c) Bids, which are signed for a corporation, shall have the corporate name thereof and the signature of the President or other authorized officers of the Corporation, manually written below the corporate name following the word “By _____.”

200.09 - INTERPRETATION OF ESTIMATES

The estimated quantities of the work, which are the results of calculations as accurate as possible in advance, shall be used as a basis for determining the lowest bidder. After the contract is awarded, the quantity of work listed under any item, or all items, may be increased or decreased a reasonable amount at the discretion of the City Engineer without in any way invalidating the bid price. The quantities on which payment will be made to the contractor will be determined by the City Engineer who shall measure the work actually performed by the contractor as specified in the contract.

Bidders must determine for themselves the quantities of work that will be required, by such means as they may prefer, and shall assume all risks as to variations in the quantities of the different classes of work actually performed under the contract. Bidders shall not at any time after the submission of their proposal dispute or complain of the aforesaid schedule of quantities or assert that there was any misunderstanding in regard to the amount or character of the work to be done, and shall not make any claim for damages or loss of profits because of a difference between the quantities of work assumed for comparison of bids and the quantities of work actually performed.

200.10 - WHEN AWARD EFFECTUAL

The contract shall be deemed as having been awarded when formal notice of award shall have been duly served upon the intended awardee (i.e., the bidder to whom the City contemplates awarding the contract) by some officer or agent of the City duly authorized to give such notice.

200.11 - REQUIRED NUMBER OF EXECUTED CONTRACTS

The successful bidder will be required, after the award of the contract, to furnish four (4) counterparts of the contract and bond, no later than 10 days after notification of the award of the contract.

200.12 - WITHDRAWAL OF BIDS

Any bidder may withdraw his bid at any time prior to the scheduled time for the receipt of bids.

200.13 - DELIVERY OF PROPOSALS

The bidder can ONLY submit his proposal through the QuestCDN electronic bidding format. A nominal fee will be charged to the Bidder for an electronic submission of a proposal through QuestCDN.

Please note that returning the entire Project Manual is not required; the relevant contract forms, proposals, etc. shall be considered sufficiently complete when submitted through the QuestCDN on-line bidding process.

200.14 - REJECTION OF PROPOSALS

Proposals may be rejected, if they show any alterations of form, additions not called for, conditional or alternate bids unless called for, incomplete bids, or irregularities of any kind. Proposals in which the unit prices are obviously unbalanced may be rejected.

200.15 - PROPOSAL GUARANTY
No proposal will be considered unless the bid is accompanied by either of the following proposal guarantees:

a) Bid Bond The bidder may accompany his proposal with a bid bond equal to at least five percent (5%) but not more than ten percent (10%) of his bid, made payable to the City of Wauwatosa, Wisconsin, as a guarantee that if his bid is accepted he will execute and file the proper contract and bond within ten (10) days after notification of the award of the contract.

b) Certified Check The bidder may accompany his proposal with a certified check for at least five percent (5%) of the total amount of his bid, made payable to the City of Wauwatosa, Wisconsin, as a guaranty that if his bid is accepted he will execute and file the proper contract and bond within ten (10) days after notification of the award of the contract.

Failure on the part of the successful bidder to execute his contract and performance bond within ten (10) days from the date of notice of the award of contract will be considered as just cause for the annulment of the award and the forfeiture of the proposal guarantee to the City not as a penalty but in payment to the City as liquidated damages as a result of such failure.

200.16 - CONSIDERATION OF PROPOSALS
The City reserves the right to reject any or all proposals, to waive technicalities, and to advertise for new proposals, or to proceed to do the work otherwise.

Before any contract is awarded, the bidder may be required to furnish a complete statement of the origin, composition and manufacture of any or all materials to be used in the construction of the work, together with samples, which may be subjected to tests provided for in these specifications to determine their quality and fitness for the work.

200.17 – PAYMENT
Payment shall be per Section 500 as supplemented by Section 501.

The City will not accept or respond to payment application requests from subcontractors.

No interest will be paid by the Owner for any delay in making any payment unless the Contractor makes written demand of the Owner for payment of interest for any such delay. In no event, however, will any interest be payable for the 10 day period following the 15th of the calendar month. Interest will be payable at the rate of 5% annually and Wisconsin Statutes Section 66.01335 does not apply.

200.18 - RESPONSIBILITY OF THE CONTRACTOR

The Contractor, under this contract, shall protect the City against any damage to the equipment and material being used or installed. Any damage occurring because of failure on the part of the equipment, employees, or supervisors, shall be repaired or replaced by the contractor without cost to the City.

200.19 - PREQUALIFICATIONS OF BIDDERS

All bidders are to furnish proof of responsibility by completing the prequalification form furnished by the City of Wauwatosa. This form is to be obtained from the City Engineer's office and is to be returned to the City Engineer's office in the City Hall of Wauwatosa, Wisconsin, not less than five (5) days prior to the time set for opening of bids as stated in the Official Notice.

200.20 - SUBSTANCE ABUSE PREVENTION PROGRAM

By signing this Bid, the Bidder certifies to the City of Wauwatosa that it has, or will have prior to Contract award, a substance abuse prevention program which complies with State of Wisconsin Act 181 (Chapter 103.503 of the State Statutes) and the substance abuse prevention program requirements in section 501 of these documents. The program must cover all union and non-union employees who work on the Owner's construction sites. Failure to implement such a program prior to award shall result in the Bidder being held to be non-responsible. Following award of the Contract if the Contractor breaches the District Policy by failing to have or to effectively implement the policy, the Owner shall consider this a breach of the Contract by the Contractor and may terminate the Contract. This requirement shall be applicable to all subcontractors with subcontracts in excess of one percent (1%) of the bid.

200.21 – ELECTRONIC SIGNATURES

By signing this Bid, the Bidder agrees to execute this contract using Digital ("electronic") signatures (e-signature) rather than physical signatures. The parties agree that to the extent they sign electronically, their electronic signature is the legally binding equivalent to their handwritten signature. Failure to execute this contract with an electronic signature shall result in the Bidder being disqualified.

The bidder further agrees to execute any other documents associated with this contract requiring signature with their electronically rather than physically, if so required by the City.

SECTION 300 - PROPOSAL

CONTRACT 26-07 2026 STREET & UTILITY IMPROVEMENTS

Bids to be received until 11:01 A.M. Local Time, February 11, 2026.

TO: CITY OF WAUWATOSA
WAUWATOSA, WISCONSIN

The undersigned, having familiarized oneself with the local conditions affecting the work and with the contract documents including advertisement for bids, instruction to bidders, general conditions, the form of proposal, the form of contract, form of bond, plan, specifications on file in the office of the City Clerk of the City of Wauwatosa, Wisconsin, hereby proposes to perform everything required to be performed and to provide and furnish all labor, materials, supplies, equipment, tools and other services necessary for sanitary and storm sewer construction, water main construction, asphalt repaving and reconstruction including grading, concrete curb and gutter replacement, asphalt pavement, concrete pavement, electrical, street lighting, pavement markings and work incidental thereto all in accordance with the plans and specifications as prepared by the City of Wauwatosa Engineering Services Division, Wauwatosa, Wisconsin, including all addenda issued hereto for the prices as listed below.

Addenda: The bidder hereby acknowledges that they have received Addenda Nos. __, ___, ___, (Bidder shall insert No. of each addendum received) and agrees that all addenda are hereby made part of the Contract Documents, and Bidder further agrees that their bid(s) includes all impact resulting from said addenda.

Contract 26-07

DIVISION A - SANITARY SEWER

NO.	ITEM CODE	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
A1	A1-01	6" PVC ASTM D-3034 SDR35 SANITARY LATERAL (6)	139	LF	$	$
A2	A1-03	8" PVC ASTM D-3034 SDR35 SANITARY SEWER MAIN	86.5	LF	$	$
A3	A1-27	SANITARY SEWER SPOT REPAIR 5-10 LNFT	1	EA	$	$
A4	A1-28	SANITARY SEWER SPOT REPAIR 10-15 LNFT	2	EA	$	$
A5	A2-01	8" SANITARY SEWER LINING	1,496	LF	$	$
A6	A2-02	10" SANITARY SEWER LINING	133	LF	$	$
A7	A2-09	GROUTING 10' LATERAL FROM MAIN	2	EA	$	$
A8	A2-10	GROUTING 15' LATERAL FROM MAIN	15	EA	$	$
A9	A2-18	LATERAL T-LINER AT CONNECTION, 8"x6" (UNDISTRIBUTED)	1	EA	$	$
A10	A2-19	GROUTING ANY LENGTH OF SANITARY LATERAL AT MANHOLE	4	EA	$	$

SAMPLE

A11	A2-24	REMOVAL OF ROOTS IN LATERALS, MEDIUM OR GREATER	7	EA	$	$
A12	A2-25	REMOVAL OF CALCIUM DEPOSITS AT CONNECTION, MEDIUM OR GREATER	11	EA	$	$
A13	A2-26	GROUT LOW PRESSURE 15' LATERAL FROM MAIN	1	EA	$	$
A14	A2-27	GALLONS OF ACRYLAMIDE BASED SANITARY LATERAL GROUT	380	GAL	$	$
A15	A4-02	SANITARY LATERAL RECONNECTION	6	EA	$	$
A16	A5-02	PRO-RING CHIMNEY REBUILD	2.8	VF	$	$
A17	A5-04	REPLACE FRAME AND COVER, EX SAN MH'S, CITY SUPPLIED	9	EA	$	$
A18	A6-04	SANITARY MANHOLE ABANDONMENT AFTER LINING THROUGH	1	EA	$	$

TOTAL FOR DIVISION A - SANITARY SEWER (ITEMS A1 - A18) **$**

DIVISION B - WATER MAIN

NO.	ITEM CODE	ITEM	QUANTITY	UNIT	UNIT PRICE	TOTAL
B1	B1-01	1¼" RELAY ORIGINAL SERVICE (ROS-T), WATER, HDPE, PARTIAL TRENCHLESS (1 Loc.)	55.0	LF	$	$
B2	B1-02	1¼" RELAY ORIGINAL SERVICE (ROS), WATER, HDPE, OPEN CUT (8 loc.)	298.0	LF	$	$
B3	B1-08	6" PVC DR14 C900 WATER MAIN	123.9	LF	$	$
B4	B1-09	8" PVC DR18 C900 WATER MAIN	733.2	LF	$	$
B5	B1-101	ABANDON EX. 6" WATER MAIN	789.7	LF	$	$
B6	B2-03	CONNECT TO EXISTING 6" WATER MAIN	4	EA	$	$
B7	B2-20	6" MJ SLEEVE	4	EA	$	$
B8	B3-08	6" WATER MAIN GATE VALVE	4	EA	$	$
B9	B3-09	8" WATER MAIN GATE VALVE	7	EA	$	$
B10	B3-18	ABANDON EX WATER VALVE & BOX	11	EA	$	$
B11	B5-06	8"x 8" MJ TEE	3	EA	$	$
B12	B5-68	8"x 6" ANCHOR TEE	4	EA	$	$
B13	B6-18	6"-45° BEND	4	EA	$	$
B14	B6-19	8"-45° BEND	1	EA	$	$
B15	B6-34	6"-22½° BEND	2	EA	$	$
B16	B6-35	8"-22½° BEND	2	EA	$	$
B17	B6-51	8"-11¼° BEND	8	EA	$	$

SAMPLE

B18	B6-67	8"-PVC HIGH DEFLECTION COUPLING	2	EA	$	$
B19	B7-03	8"x 6" REDUCER	4	EA	$	$
B20	B8-03	8" PLUG	1	EA	$	$
B21	B9-01	FIRE HYDRANT	4	EA	$	$
B22	B9-02	ABANDON EXISTING HYDRANT	4	EA	$	$

TOTAL FOR DIVISION B - WATER MAIN (ITEMS B1 – B22) **$**

DIVISION C - STORM SEWER

NO.	ITEM CODE	ITEM	QUANTITY	UNIT	UNIT PRICE	TOTAL
C1	C1-02	6" SDR35 PVC STORM SEWER LATERALS	195	LF	$	$
C2	C1-25	30" PVC DR18 C900 STORM SEWER MAIN	101	LF	$	$
C3	C1-31	24" CLASS III REINFORCED CONCRETE STORM SEWER	68	LF	$	$
C4	C1-34	36" CLASS III REINFORCED CONCRETE STORM SEWER	424	LF	$	$
C5	C1-50	18" CLASS IV REINFORCED CONCRETE STORM SEWER	148	LF	$	$
C6	C1-72	29" x 45" CLASS III HE REINFORCED CONCRETE STORM SEWER	364	LF	$	$
C7	C1-123	12" CLASS V REINFORCED CONCRETE STORM SEWER	507	LF	$	$
C8	C1-124	15" CLASS V REINFORCED CONCRETE STORM SEWER	49	LF	$	$
C9	C2-03	12" STORM LINING	261	LF	$	$
C10	C2-05	18" STORM LINING	130	LF	$	$
C11	C3-01	48" DIA. PRECAST STORM MANHOLE	4.5	VF	$	$
C12	C3-02	60" DIA. PRECAST STORM MANHOLE	38	VF	$	$
C13	C3-03	72" DIA. PRECAST STORM MANHOLE	30	VF	$	$
C14	C3-04	84" DIA. PRECAST STORM MANHOLE	19	VF	$	$
C15	C3-42	2.5' x 3' CATCH BASIN W/ 2' SUMP	12	EA	$	$
C16	C3-46	2.5' x 6' CATCH BASIN W/ 2' SUMP	13	EA	$	$
C17	C4-01	CONNECT TO EX STORM STRUCTURE (EXISITING OPENING)	2	EA	$	$
C18	C4-04	CONNECT TO EXISTING STORM SEWER MAIN	1	EA	$	$
C19	C4-08	6-INCH LATERAL, CORE CONNECTION TO PR. STORM SEWER	3	EA	$	$

SAMPLE

C20	C5-06	BULKHEAD AND ABANDON EXISTING STORM SEWER 30" AND SMALLER	278	LF	$	$

TOTAL FOR DIVISION C - STORM SEWER (ITEMS C1 – C20) **$**

DIVISION D - ROADWAY

NO.	ITEM CODE	ITEM	QUANTITY	UNIT	UNIT PRICE	TOTAL
D1	D1-02	COMMON EXCAVATION	1	LS	$	$
D2	D1-04	BASE AGGREGATE DENSE 1¼"	3971	TON	$	$
D3	D1-07	EXCAVATION BELOW SUBGRADE	430	CY	$	$
D4	D1-15	REMOVING CONCRETE PAVEMENT	4294	SY	$	$
D5	D1-16	REMOVING CURB AND GUTTER	2541	LF	$	$
D6	D1-18	REMOVING CONCRETE SIDEWALK AND DRIVE APPROACH	2367	SY	$	$
D7	D1-19	SAWCUTTING	346	LF	$	$
D8	D2-05	31" CONCRETE CURB & GUTTER	2565	LF	$	$
D9	D3-01	5" CONCRETE SIDEWALK AND DRIVEWAY, REMOVE AND REPLACE	1387	SF	$	$
D10	D3-03	5" CONCRETE SIDEWALK AND DRIVEWAY	1026	SF	$	$
D11	D3-07	7" CONCRETE SIDEWALK AND DRIVEWAY	3016	SF	$	$
D12	D3-10	DETECTABLE WARNING FIELD	60	SF	$	$
D13	D4-02	7" CONCRETE PAVEMENT, SHES	19	SY	$	$
D14	D4-20	HMA PAVEMENT 3 LT 58-28 S	828	TON	$	$
D15	D4-24	HMA PAVEMENT 5 LT 58-28 S	488	TON	$	$
D16	D5-01	EROSION CONTROL	1	LS	$	$
D17	D5-02	TOPSOIL AND SOD	5864	SF	$	$
D18	D6-01	TRAFFIC CONTROL	1	LS	$	$
D19	D6-11	NEW SIGN POST	6	EA	$	$
D20	D6-12	SIGN REMOVAL, RELOCATION AND INSTALLATION	5	EA	$	$
D21	D7-01	ADJUSTING WATER VALVE	6	EA	$	$

TOTAL FOR DIVISION D - ROADWAY (ITEMS D1 – D21) **$**

SAMPLE

DIVISION E - STREET LIGHTING AND COMMUNICATIONS

NO.	ITEM CODE	ITEM	QUANTITY	UNIT	UNIT PRICE	TOTAL
E1	E1-01	LOCATE, TEST AND PROTECT EXISTING AND NEW CIRCUITS	1	LS	$	$
E2	E1-04	TEMPORARY LIGHTING	1	LS	$	$
E3	E1-13	GROUND ROD	2	EA	$	$
E4	E1-16	COMPOSITE PULL BOX, 13X24X18	6	EA	$	$
E5	E1-22	REMOVING PULL BOX	1	EA	$	$
E6	E1-23	EXTEND EXISTING CONDUIT	2	EA	$	$
E7	E1-26	1" HDPE DUCT BORED	960	LF	$	$
E8	E1-42	2" DIAMETER SCHEDULE 80 PVC CONDUIT	174	LF	$	$
E9	E2-05	ELECTRICAL WIRE 8 AWG	4250	LF	$	$
E10	E3-02	23-FT STANDARD CONCRETE LIGHT POLES AND ARM	6	EA	$	$
E11	E3-18	REMOVING DIRECT BURIED LIGHTING UNITS	6	EA	$	$
E12	E3-25	LIGHT FIXTURE REMOVE AND REINSTALL	6	EA	$	$

TOTAL FOR DIVISION E - STREET LIGHTING AND COMMUNICATIONS (ITEMS E1 - E12) **$** _____

TOTAL FOR CONTRACT 26-07 – 2026 STREET & UTILITY IMPROVEMENTS (DIVISION A, DIVISION B, DIVISION C, AND DIVISION D, DIVISION E)

$ _____

SAMPLE

PRIME CONTRACTOR

With submission of this proposal, the prime contractor hereby certifies that they are performing a minimum of 1/3 of the value of work within this proposal. The total value of work being performed by the prime contractor is _____ dollars and _____ cents.

SUBCONTRACTOR LIST

The following Subcontractors will be utilized for portions of the Project Work (only list those > $25,000). Changes shall not be made subsequent to the Bid unless the change(s) is approved by the City. The contractor is required to complete and submit this list no later than 24 hours after the bid is due.

Subcontractor	Classification of Work	Estimated Dollar Amount

SAMPLE

AFFIDAVIT OF COMPLIANCE WITH THE STATE OF WISCONSIN ACT 181
(CHAPTER 103.503 OF THE STATE STATUTES)
CONTROLLED SUBSTANCE PREVENTION PROGRAM

State of _____ Project Name _____

_____

_____ County Contract No. _____

I, _____ , being duly sworn, state that:

1. I am the _____ of _____, a_____
(State)
Corporation, partnership, or individual of _____, _____
(City, Village, (State)
and make this affidavit pursuant to the requirements of State of Wisconsin Act 181.

2. I have entered into the City of Wauwatosa's Contract No. _____ and the total cost (including labor, equipment and materials) of completing the contract will exceed $48,000 if a single-trade project or $200,000 if a multiple trade project.

3. The corporation, partnership or individual I represent has in place a Controlled Substance Prevention Program that is consistent with and meets the requirements of the State of Wisconsin Act 181.

4. I have confirmed that the subcontractors I plan to employ on this contract also have in place a Controlled Substance Prevention Program that is consistent with and meets the requirements of the State of Wisconsin Act 181.

Title	Officer Name	Address
President	_____	_____
Vice President	_____	_____
Secretary	_____	_____
Treasurer	_____	_____

Subscribed and sworn to before me this _____

Day of _____, 20_____

_____
(Notary Signature)

_____
(Contractor Signature)

Notary Public, State of _____

My Commission expires: _____

SAMPLE

2. Accompanying this proposal is a _____
(Bond-Certified Check)
in the sum of _____ Dollars

$ _____ as required by the Advertisement for Bids.

3. This bid is based on the following subcontractors:

Name	Address	Class of Work

4. I hereby certify that all statements herein are made on behalf of

_____
(Name of Corporation, partnership or person submitting bid)

a corporation organized and existing under the laws of the State of

_____; a partnership consisting of an individual trading as

_____ of the City of _____

State of _____.

that I have examined and carefully prepared this proposal from the plans and specifications and have checked the same in detail before submitting this proposal; that I have full authority to make such statements and submit this proposal in (its) (their) behalf, and that the said statements are true and correct.

Signature _____

_____
(Title, if any)

Sworn and subscribed before me this
_____ day of _____, 20__.

_____
(Notary or other officer authorized to administer oaths).

My Commission expires _____.

(Bidders should not add any conditions or qualifying statements to this proposal, as otherwise the proposal may be declared irregular as being not responsive to the advertisement. Do not remove Proposal Form from Contract Documents

SAMPLE

SCHEDULE OF FIXED EXTRAS (Apply only if there is no Bid Item for the same work or the work is specified as being included with another item)

CONSTRUCTION:

1.	Water Service alteration or relay 1 ¼" and smaller in diameter	$175.00/Lin. Ft.
2.	Water Service alteration or relay 1 ½" to 2" in diameter	$200.00/Lin. Ft.
3.	Remove & Replace Curb Stop	$1,500.00 Each
4.	Water Service alteration larger than 2"	To be negotiated
5.	Adjust Manhole Frames	$ 500.00 Each
6.	Adjust Catch Basin/Inlet Frames	$ 500.00 Each
7.	Adjust Water Boxes	$250.00 Each
8.	Internal Manhole Seal Removal and/or Installation	$ 325.00 Each
9.	4" Underdrain Pipe (Complete)	$ 15.00/Lin. Ft.
10.	Sawing concrete pavement	$200.00 plus $ 3.00/L.F. for each foot over 50 feet
11.	Sawing asphalt pavement	$200.00 plus $ 2.00/L.F. for each foot over 50 feet
12.	Sawing asphalt over concrete pavement.	$200.00 plus $ 3.50/L.F. for each foot over 50 feet
13.	Relay house sewers and drains (includes reconnect)	$250.00/Lin. Ft.
14.	Reconnect house sewers and drains	$450.00 Each
15.	Steel sheeting and bracing left in place	To be negotiated
16.	Close wood sheeting and bracing left in place	To be negotiated
17.	Spot wood sheeting and bracing left in place	To be negotiated
18.	Concrete Cradle	$ 175.00/Cu. Yd.
19.	Concrete Cap	$ 150.00/Cu. Yd.
20.	Borrow Excavation	$ 20.00/Cu. Yd.

21.	Rock excavation by hand	$ 330.00/Cu. Yd.
22.	Rock excavation by mechanical means	$ 250.00/Cu. Yd.
23.	Buried concrete removal (including concrete encasement)	$ 150.00/Cu. Yd.
24.	Concrete pole base removal & disposal	$ 100.00 Each
25.	Base aggregate dense, 1-1/4 inch, tons in place including disposal of excess excavated materials.	$ 18.00/Ton
26.	Excavated material used for backfill in lieu of gravel backfill – credit.	$ 10.00/Cu. Yd.
27.	Aggregate slurry used for backfill in lieu of granular or crushed concrete backfill or vice versa	$110.00/C.Y. under 5.0 C.Y. $75.00/C.Y. over 5.0 C.Y.
28.	No. 2 stone for ditch bottom stabilization including disposal of excess excavated material	$ 24.20/Ton
29.	Crushed limestone No. 1 or smaller, tons in place	$15.00/Ton
30.	Utility structure masonry repairs	$ 85.00/Vrt. In. or $1020/Vrt. Ft.

RESTORATION: (Prices Include Removal and Disposal)

1.	8” concrete pavement.	$ 70.00/Sq. Yd.
2.	8” concrete base course.	$ 55.00/Sq. Yd.
3.	5” concrete sidewalk	$8.00/Sq. Ft.
4.	7” concrete drive	$ 9.00/Sq. Ft.
5.	Detectible Warning Fields	$40.00/Sq. Ft.
6.	High strength early setting concrete/”9 bag”	125% of bid price for the relevant pavement type
7.	Vertical face concrete curb and gutter	$ 42.00/Lin. Ft.
8.	Mountable concrete curb and gutter	$ 43.00/Lin. Ft.

9.	Concrete Steps	$ 75.00/Lin. Ft.
10.	Pavement Milling (Asphalt)	$ 4.00/Sq. Ft.
11.	Pavement Milling (Concrete)	$ 6.00/Sq. Ft.
12.	Tack Coat	$ 5.00/Gal.
13.	Asphalt pavement	
	Less than 30 tons in place	$ 90.00/Ton
	Greater than 30 tons in place	$ 80.00/Ton
14.	Temporary bituminous cold patch or temporary HMA	$ 120.00/Ton
15.	Topsoil & Sodding	$ 1.50/Sq. Ft.
16.	Topsoil, Seeding & Mulching	$ 0.90/Sq. Ft.
17.	Topsoil, spread	$ 30.00/Cu. Yd.
18.	Concrete pavement dowel bars.	$ 9.50 Each
19.	Concrete pavement tie bars.	$ 7.00 Each

EROSION CONTROLS - ALL ITEMS TO INCLUDE MAINTENANCE: (incidental in this contract)

1.	Silt fence erection and maintenance.	$ 4.00/Lin. Ft.
2.	Hay Bales.	$ 7.00 Each
3.	Ditch protection	$ 6.50/Lin. Ft.
4.	Catch basin and inlet screens.	$ 50.00 Each
5.	Catch basin and inlet baskets.	$ 150.00 Each
6.	Tracking Pad Stone	$ 25.00/Ton

SCHEDULE OF FIXED EXTRAS (CONTINUED)

REPAIR OF WATER MAIN BREAKS DURING CONSTRUCTION

Contractor shall repair all main breaks on existing mains that occur during normal working hours. The Water Works will normally operate the valves for the shutoff.
In emergency situations, the contractor may operate the valves with proper notification and authorization.

Where repairs are made on mains that will be abandoned, the Contractor shall furnish all repair material. The Contractor shall have a minimum of 2 repair clamps, 2 dual purpose sleeves, and 1 length of ductile iron, cast iron or PVC pipe of the existing pipe size on the job before the job starts and at all times thereafter. This repair material need not conform to the standard specifications.

When repairs are required on mains that will remain in service, the contractor shall also furnish all repair materials. The contractor shall have a minimum of 2 repair clamps, 2 dual purpose sleeves, and 1 length of ductile iron, pipe Special Class 54 and of the same size as the existing pipe on the job before the job starts and at all times thereafter. This repair material shall conform to the standard and Wauwatosa's specifications. Where, in unusual circumstances, the City furnishes materials, the cost of such material will be deducted from the amount due the contractor.

All breaks occurring as a result of the negligence of the contractor, whether from actual construction or faulty operation of hydrants and valves, shall be repaired at their own expense. Where the break occurs while exercising normal care, the Contractor will be compensated for the repair of each break as follows:

a. Where the break can be repaired without replacing pipe and no excavation is required, the Contractor will be paid $1,300.00.

b. Where the break can be repaired without replacing pipe, and the Contractor must excavate, the Contractor will be paid $1,900.00.

c. Where a piece of pipe must be removed and replaced, including any excavation required to complete the repair, the Contractor will be paid $2,500.00.

The Contractor, at their own expense, shall repair water services or branches damaged, as a result of the construction.

SECTION 400 – FEDERAL FUNDING REQUIREMENTS AND MINIMUM WAGE SCALE

Additional requirements due to Federal Funding are not applicable to this contract.

Minimum wage scale intentionally omitted pursuant to 2015 Wisconsin Act 55, effective January 1, 2017.

SECTION 500 - STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

ARTICLE 1—DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

A. Wherever used in the Bidding Requirements or Contract Documents, a term printed with initial capital letters, including the term's singular and plural forms, will have the meaning indicated in the definitions below. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.

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

2. *Agreement*—The written instrument, executed by Owner and Contractor, that sets forth the Contract Price and Contract Times, identifies the parties and the Engineer, and designates the specific items that are Contract Documents.

3. *Application for Payment*—The document prepared by Contractor, in a form acceptable to Engineer, to request progress or final payments, and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

4. *Bid*—The offer of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

5. *Bidder*—An individual or entity that submits a Bid to Owner.

6. *Bidding Documents*—The Bidding Requirements, the proposed Contract Documents, and all Addenda.

7. *Bidding Requirements*—The Advertisement or invitation to bid, Instructions to Bidders, Bid Bond or other Bid security, if any, the Bid Form, and the Bid with any attachments.

8. *Change Order*—A document 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, or other revision to the Contract, issued on or after the Effective Date of the Contract.

9. *Change Proposal*—A written request by Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment in Contract Price or Contract Times; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; challenging a set-off against payments due; or seeking other relief with respect to the terms of the Contract.

10. *Claim*

a. A demand or assertion by Owner directly to Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment of Contract Price or Contract Times; contesting an initial decision by Engineer concerning the

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requirements of the Contract Documents or the acceptability of Work under the Contract Documents; contesting Engineer's decision regarding a Change Proposal; seeking resolution of a contractual issue that Engineer has declined to address; or seeking other relief with respect to the terms of the Contract.

b. A demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Engineer's decision regarding a Change Proposal, or seeking resolution of a contractual issue that Engineer has declined to address.

c. A demand or assertion by Owner or Contractor, duly submitted in compliance with the procedural requirements set forth herein, made pursuant to Paragraph 12.01.A.4, concerning disputes arising after Engineer has issued a recommendation of final payment.

d. A demand for money or services by a third party is not a Claim.

11. Constituent of Concern—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), lead-based paint (as defined by the HUD/EPA standard), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to Laws and Regulations regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.

12. *Contract*—The entire and integrated written contract between Owner and Contractor concerning the Work.

13. *Contract Documents*—Those items so designated in the Agreement, and which together comprise the Contract.

14. *Contract Price*—The money that Owner has agreed to pay Contractor for completion of the Work in accordance with the Contract Documents.

15. *Contract Times*—The number of days or the dates by which Contractor shall: (a) achieve Milestones, if any; (b) achieve Substantial Completion; and (c) complete the Work.

16. *Contractor*—The individual or entity with which Owner has contracted for performance of the Work.

17. *Cost of the Work*—See Paragraph 13.01 for definition.

18. *Drawings*—The part of the Contract that graphically shows the scope, extent, and character of the Work to be performed by Contractor.

19. *Effective Date of the Contract*—The date, indicated in the Agreement, on which the Contract becomes effective.

20. *Electronic Document*—Any Project-related correspondence, attachments to correspondence, data, documents, drawings, information, or graphics, including but not limited to Shop Drawings and other Submittals, that are in an electronic or digital format.

21. *Electronic Means*—Electronic mail (email), upload/download from a secure Project website, or other communications methods that allow: (a) the transmission or communication of Electronic Documents; (b) the documentation of transmissions, including sending and receipt; (c) printing of the transmitted Electronic Document by the

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recipient; (d) the storage and archiving of the Electronic Document by sender and recipient; and (e) the use by recipient of the Electronic Document for purposes permitted by this Contract. Electronic Means does not include the use of text messaging, or of Facebook, Twitter, Instagram, or similar social media services for transmission of Electronic Documents.

22. *Engineer*—The individual or entity named as such in the Agreement.

23. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but does not change the Contract Price or the Contract Times.

24. *Hazardous Environmental Condition*—The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto.

    a. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated into the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, is not a Hazardous Environmental Condition.

    b. The presence of Constituents of Concern that are to be removed or remediated as part of the Work is not a Hazardous Environmental Condition.

    c. The presence of Constituents of Concern as part of the routine, anticipated, and obvious working conditions at the Site, is not a Hazardous Environmental Condition.

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

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

27. *Milestone*—A principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date, or by a time prior to Substantial Completion of all the Work.

28. *Notice of Award*—The written notice by Owner to a Bidder of Owner's acceptance of the Bid.

29. *Notice to Proceed*—A written notice 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.

30. *Owner*—The individual or entity with which Contractor has contracted regarding the Work, and which has agreed to pay Contractor for the performance of the Work, pursuant to the terms of the Contract.

31. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising Contractor's plan to accomplish the Work within the Contract Times.

32. *Project*—The total undertaking to be accomplished for Owner by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.

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33. *Resident Project Representative*—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative (RPR) includes any assistants or field staff of Resident Project Representative.

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

35. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer's review of the submittals.

36. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

37. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.

38. *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, and such other lands or areas furnished by Owner which are designated for the use of Contractor.

39. *Specifications*—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.

40. *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.

41. *Submittal*—A written or graphic document, prepared by or for Contractor, which the Contract Documents require Contractor to submit to Engineer, or that is indicated as a Submittal in the Schedule of Submittals accepted by Engineer. Submittals may include Shop Drawings and Samples; schedules; product data; Owner-delegated designs; sustainable design information; information on special procedures; testing plans; results of tests and evaluations, source quality-control testing and inspections, and field or Site quality-control testing and inspections; warranties and certifications; Suppliers' instructions and reports; records of delivery of spare parts and tools; operations and maintenance data; Project photographic documentation; record documents; and other such documents required by the Contract Documents. Submittals, whether or not approved or accepted by Engineer, are not Contract Documents. Change Proposals, Change Orders, Claims, notices, Applications for Payment, and requests for interpretation or clarification are not Submittals.

42. *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 of such Work.

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43. *Successful Bidder*—The Bidder to which the Owner makes an award of contract.

44. *Supplementary Conditions*—The part of the Contract that amends or supplements these General Conditions.

45. *Supplier*—A manufacturer, fabricator, supplier, distributor, 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 a Subcontractor.

46. *Technical Data*

    a. Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (1) existing subsurface conditions at or adjacent to the Site, or existing physical conditions at or adjacent to the Site including existing surface or subsurface structures (except Underground Facilities) or (2) Hazardous Environmental Conditions at the Site.

    b. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then Technical Data is defined, with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06, as the data contained in boring logs, recorded measurements of subsurface water levels, assessments of the condition of subsurface facilities, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical, environmental, or other Site or facilities conditions report prepared for the Project and made available to Contractor.

    c. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data, and instead Underground Facilities are shown or indicated on the Drawings.

47. *Underground Facilities*—All active or not-in-service underground lines, pipelines, conduits, ducts, encasements, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or systems at the Site, including but not limited to those facilities or systems that produce, transmit, distribute, or convey telephone or other communications, cable television, fiber optic transmissions, power, electricity, light, heat, gases, oil, crude oil products, liquid petroleum products, water, steam, waste, wastewater, storm water, other liquids or chemicals, or traffic or other control systems. An abandoned facility or system is not an Underground Facility.

48. *Unit Price Work*—Work to be paid for on the basis of unit prices.

49. *Work*—The entire 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; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.

50. *Work Change Directive*—A written directive to Contractor issued on or after the Effective Date of the Contract, signed by Owner and recommended by Engineer, ordering an addition, deletion, or revision in the Work.

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1.02 *Terminology*

A. The words and terms discussed in Paragraphs 1.02.B, C, D, and E are not defined terms that require initial capital letters, but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.

B. *Intent of Certain Terms or Adjectives*: The Contract Documents include the terms "as allowed," "as approved," "as ordered," "as directed" or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, 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 exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the 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 is not intended to and 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 Article 10 or any other provision of the Contract Documents.

C. *Day*: The word "day" means a calendar day of 24 hours measured from midnight to the next midnight.

D. *Defective*: The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it:

1. does not conform to the Contract Documents;

2. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or

3. 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 15.03 or Paragraph 15.04).

E. *Furnish, Install, Perform, Provide*

1. The word "furnish," when used in connection with services, materials, or equipment, means 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, means 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, means to furnish and install said services, materials, or equipment complete and ready for intended use.

4. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words "furnish," "install," "perform," or "provide," then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.

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F. *Contract Price or Contract Times*: References to a change in "Contract Price or Contract Times" or "Contract Times or Contract Price" or similar, indicate that such change applies to (1) Contract Price, (2) Contract Times, or (3) both Contract Price and Contract Times, as warranted, even if the term "or both" is not expressed.

G. Unless stated otherwise in the Contract Documents, words or phrases that 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 Performance and Payment Bonds; Evidence of Insurance*

A. *Performance and Payment Bonds*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner the performance bond and payment bond (if the Contract requires Contractor to furnish such bonds).

B. *Evidence of Contractor's Insurance*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each additional insured (as identified in the Contract), the certificates, endorsements, and other evidence of insurance required to be provided by Contractor in accordance with Article 6, except to the extent the Supplementary Conditions expressly establish other dates for delivery of specific insurance policies.

C. *Evidence of Owner's Insurance*: After receipt of the signed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor, with copies to each additional insured (as identified in the Contract), the certificates and other evidence of insurance required to be provided by Owner under Article 6.

2.02 *Copies of Documents*

A. Owner shall furnish to Contractor four printed copies of the Contract (including one fully signed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional printed copies will be furnished upon request at the cost of reproduction.

B. Owner shall maintain and safeguard at least one original printed record version of the Contract, including Drawings and Specifications signed and sealed by Engineer and other design professionals. Owner shall make such original printed record version of the Contract available to Contractor for review. Owner may delegate the responsibilities under this provision to Engineer.

2.03 *Before Starting Construction*

A. *Preliminary Schedules*: Within 10 days after the Effective Date of the Contract (or as otherwise required by the Contract Documents), Contractor shall submit to Engineer for 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;

2. a preliminary Schedule of Submittals; 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

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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.

2.04 *Preconstruction Conference; Designation of Authorized Representatives*

A. Before any Work at the Site is started, a conference attended by Owner, 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 2.03.A, procedures for handling Shop Drawings, Samples, and other Submittals, processing Applications for Payment, electronic or digital transmittals, and maintaining required records.

B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit and receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.05 *Acceptance of Schedules*

A. At least 10 days before submission of the first Application for Payment a conference, attended by Contractor, Engineer, and others as appropriate, will be held to review the schedules submitted in accordance with Paragraph 2.03.A. No progress payment will 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 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 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 the component parts of the Work.

4. If a schedule is not acceptable, Contractor will have an additional 10 days to revise and resubmit the schedule.

2.06 *Electronic Transmittals*

A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may send, and shall accept, Electronic Documents transmitted by Electronic Means.

B. If the Contract does not establish protocols for Electronic Means, then Owner, Engineer, and Contractor shall jointly develop such protocols.

C. Subject to any governing protocols for Electronic Means, when transmitting Electronic Documents by Electronic Means, the transmitting party makes no representations as to long-term compatibility, usability, or readability of the Electronic Documents resulting from the recipient's use of software application packages, operating systems, or computer hardware differing from those used in the drafting or transmittal of the Electronic Documents.

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ARTICLE 3—CONTRACT DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 *Intent*

A. The Contract Documents are complementary; what is required by one Contract Document is as binding as if required 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.

C. Unless otherwise stated in the Contract Documents, if there is a discrepancy between the electronic versions of the Contract Documents (including any printed copies derived from such electronic versions) and the printed record version, the printed record version will govern.

D. The Contract supersedes prior negotiations, representations, and agreements, whether written or oral.

E. Engineer will issue clarifications and interpretations of the Contract Documents as provided herein.

F. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation will be deemed stricken, and all remaining provisions will continue to be valid and binding upon Owner and Contractor, which agree that the Contract Documents will 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.

G. Nothing in the Contract Documents creates:

1. any contractual relationship between Owner or Engineer and any Subcontractor, Supplier, or other individual or entity performing or furnishing any of the Work, for the benefit of such Subcontractor, Supplier, or other individual or entity; or

2. any obligation on the part of Owner or Engineer to pay or to see to the payment of any money due any such Subcontractor, Supplier, or other individual or entity, except as may otherwise be required by Laws and Regulations.

3.02 *Reference Standards*

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

1. Reference in the Contract Documents to standard specifications, manuals, reference standards, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, means the standard specification, manual, reference standard, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Contract 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, reference standard, or code, and no instruction of a Supplier, will be effective to change the duties or responsibilities of Owner, Contractor, or Engineer from those set forth in the part of the Contract Documents prepared by or for Engineer. No such provision or instruction shall be effective to assign to Owner or Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility

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inconsistent with the provisions of the part of the Contract Documents prepared by or for Engineer.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies*

1. *Contractor's Verification of Figures and Field Measurements*: Before undertaking each part of the Work, Contractor shall carefully study the Contract Documents, and check and verify pertinent figures and dimensions therein, particularly with respect to applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict, error, ambiguity, or discrepancy is resolved by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract issued pursuant to Paragraph 11.01.

2. *Contractor's Review of Contract Documents*: If, before or during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) actual field conditions, (c) any standard specification, manual, reference standard, or code, or (d) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 7.15) until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract issued pursuant to Paragraph 11.01.

3. 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 had actual knowledge thereof.

B. *Resolving Discrepancies*

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

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

A. During the performance of the Work and until final payment, Contractor and Owner shall submit to the Engineer in writing all matters in question concerning the requirements of the Contract Documents (sometimes referred to as requests for information or interpretation—RFIs), or relating to the acceptability of the Work under the Contract Documents, as soon as possible after such matters arise. Engineer will be the initial interpreter of the requirements of the Contract Documents, and judge of the acceptability of the Work.

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B. Engineer will, with reasonable promptness, render a written clarification, interpretation, or decision on the issue submitted, or initiate an amendment or supplement to the Contract Documents. Engineer's written clarification, interpretation, or decision will be final and binding on Contractor, unless it appeals by submitting a Change Proposal, and on Owner, unless it appeals by filing a Claim.

C. If a submitted matter in question concerns terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work under the Contract Documents, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, then Engineer will promptly notify Owner and Contractor in writing that Engineer is unable to provide a decision or interpretation. If Owner and Contractor are unable to agree on resolution of such a matter in question, either party may pursue resolution as provided in Article 12.

3.05 *Reuse of Documents*

A. Contractor and its Subcontractors and Suppliers shall not:

1. 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 its consultants, including electronic media versions, or reuse any 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 adaptation by Engineer; or

2. have or acquire any title or ownership rights in any other Contract Documents, reuse any such Contract Documents for any purpose without Owner's express written consent, or violate any copyrights pertaining to such Contract Documents.

B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein precludes Contractor from retaining copies of the Contract Documents for record purposes.

ARTICLE 4—COMMENCEMENT AND PROGRESS OF THE WORK

4.01 *Commencement of Contract Times; Notice to Proceed*

A. The Contract Times will commence to run on the 30th day after the Effective Date of the Contract 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 Contract. In no event will the Contract Times commence to run later than the 60th day after the day of Bid opening or the 30th day after the Effective Date of the Contract, whichever date is earlier.

4.02 *Starting the Work*

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

4.03 *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

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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.

4.04 *Progress Schedule*

A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.05 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 2.05) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times.

2. Proposed adjustments in the Progress Schedule that will change the Contract Times must be submitted in accordance with the requirements of Article 11.

B. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work will be delayed or postponed pending resolution of any disputes or disagreements, or during any appeal process, except as permitted by Paragraph 16.04, or as Owner and Contractor may otherwise agree in writing.

4.05 *Delays in Contractor's Progress*

A. If Owner, Engineer, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times.

B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.

C. If Contractor's performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times. Such an adjustment will be Contractor's sole and exclusive remedy for the delays, disruption, and interference described in this paragraph. Causes of delay, disruption, or interference that may give rise to an adjustment in Contract Times under this paragraph include but are not limited to the following:

1. Severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;

2. Abnormal weather conditions;

3. Acts or failures to act of third-party utility owners or other third-party entities (other than those third-party utility owners or other third-party entities performing other work at or adjacent to the Site as arranged by or under contract with Owner, as contemplated in Article 8); and

4. Acts of war or terrorism.

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D. Contractor's entitlement to an adjustment of Contract Times or Contract Price is limited as follows:

1. Contractor's entitlement to an adjustment of the Contract Times is conditioned on the delay, disruption, or interference adversely affecting an activity on the critical path to completion of the Work, as of the time of the delay, disruption, or interference.

2. Contractor shall not be entitled to an adjustment in Contract Price for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor. Such a concurrent delay by Contractor shall not preclude an adjustment of Contract Times to which Contractor is otherwise entitled.

3. Adjustments of Contract Times or Contract Price are subject to the provisions of Article 11.

E. Each Contractor request or Change Proposal seeking an increase in Contract Times or Contract Price must be supplemented by supporting data that sets forth in detail the following:

1. The circumstances that form the basis for the requested adjustment;

2. The date upon which each cause of delay, disruption, or interference began to affect the progress of the Work;

3. The date upon which each cause of delay, disruption, or interference ceased to affect the progress of the Work;

4. The number of days' increase in Contract Times claimed as a consequence of each such cause of delay, disruption, or interference; and

5. The impact on Contract Price, in accordance with the provisions of Paragraph 11.07.

Contractor shall also furnish such additional supporting documentation as Owner or Engineer may require including, where appropriate, a revised progress schedule indicating all the activities affected by the delay, disruption, or interference, and an explanation of the effect of the delay, disruption, or interference on the critical path to completion of the Work.

F. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions, are governed by Article 5, together with the provisions of Paragraphs 4.05.D and 4.05.E.

G. Paragraph 8.03 addresses delays, disruption, and interference to the performance or progress of the Work resulting from the performance of certain other work at or adjacent to the Site.

ARTICLE 5—SITE; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

5.01 *Availability of Lands*

A. Owner shall furnish the Site. Owner shall notify Contractor in writing 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.

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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 permanent improvements are to be made 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.

5.02 *Use of Site and Other Areas*

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

1. Contractor shall confine construction equipment, temporary construction facilities, the storage of materials and equipment, and the operations of workers to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and such other adjacent areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for (a) damage to the Site; (b) damage to any such other adjacent areas used for Contractor's operations; (c) damage to any other adjacent land or areas, or to improvements, structures, utilities, or similar facilities located at such adjacent lands or areas; and (d) for injuries and losses sustained by the owners or occupants of any such land or areas; provided that such damage or injuries result from the performance of the Work or from other actions or conduct of the Contractor or those for which Contractor is responsible.

2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.13, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or in a court of competent jurisdiction; and (c) to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, from and against any such claim, and against all 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 directly or indirectly, in whole or in part by, or based upon, Contractor's performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.

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

C. *Cleaning*: Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site and adjacent areas all tools, appliances, construction equipment

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and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

D. *Loading of 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 structures or land to stresses or pressures that will endanger them.

5.03 *Subsurface and Physical Conditions*

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

1. Those reports of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data;

2. Those drawings of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data; and

3. Technical Data contained in such reports and drawings.

B. *Underground Facilities*: Underground Facilities are shown or indicated on the Drawings, pursuant to Paragraph 5.05, and not in the drawings referred to in Paragraph 5.03.A. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data.

C. *Reliance by Contractor on Technical Data*: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely upon the accuracy of the Technical Data as defined in Paragraph 1.01.A.46.b.

D. *Limitations of Other Data and Documents*: Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, 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;

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

3. the contents of other Site-related documents made available to Contractor, such as record drawings from other projects at or adjacent to the Site, or Owner's archival documents concerning the Site; or

4. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.

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5.04 *Differing Subsurface or Physical Conditions*

A. *Notice by Contractor*: If Contractor believes that any subsurface or physical condition that is uncovered or revealed at the Site:

1. is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraph 5.03 is materially inaccurate;

2. is of such a nature as to require a change in the Drawings or Specifications;

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 7.15), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement permitting Contractor to do so.

B. *Engineer's Review*: After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine whether it is necessary for Owner to obtain additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph 5.04.A; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer's findings, conclusions, and recommendations.

C. *Owner's Statement to Contractor Regarding Site Condition*: After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.

D. *Early Resumption of Work*: If at any time Engineer determines that Work in connection with the subsurface or physical condition in question may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the condition in question has been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.

E. *Possible Price and Times Adjustments*

1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, causes an increase or decrease in

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Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

a. Such condition must fall within any one or more of the categories described in Paragraph 5.04.A;

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 Paragraph 13.03; and,

c. Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraphs 4.05.D and 4.05.E.

2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:

a. Contractor knew of the existence of such condition at the time Contractor made a commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract, or otherwise;

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

c. Contractor failed to give the written notice required by Paragraph 5.04.A.

3. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, then any such adjustment will be set forth in a Change Order.

4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the subsurface or physical condition in question.

F. *Underground Facilities; Hazardous Environmental Conditions*: Paragraph 5.05 governs rights and responsibilities regarding the presence or location of Underground Facilities. Paragraph 5.06 governs rights and responsibilities regarding Hazardous Environmental Conditions. The provisions of Paragraphs 5.03 and 5.04 are not applicable to the presence or location of Underground Facilities, or to Hazardous Environmental Conditions.

5.05 *Underground Facilities*

A. *Contractor's Responsibilities*: Unless it is otherwise expressly provided in the Supplementary Conditions, the cost of all of the following are included in the Contract Price, and Contractor shall have full responsibility for:

1. reviewing and checking all information and data regarding existing Underground Facilities at the Site;

2. complying with applicable state and local utility damage prevention Laws and Regulations;

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3. verifying the actual location of those Underground Facilities shown or indicated in the Contract Documents as being within the area affected by the Work, by exposing such Underground Facilities during the course of construction;

4. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and

5. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.

B. *Notice by Contractor*: If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated on the Drawings, or was not shown or indicated on the Drawings with reasonable accuracy, then 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 7.15), notify Owner and Engineer in writing regarding such Underground Facility.

C. *Engineer's Review*: Engineer will:

1. promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated on the Drawings, or was not shown or indicated with reasonable accuracy;

2. identify and communicate with the owner of the Underground Facility; prepare recommendations to Owner (and if necessary issue any preliminary instructions to Contractor) regarding the Contractor's resumption of Work in connection with the Underground Facility in question;

3. obtain any pertinent cost or schedule information from Contractor; determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and

4. advise Owner in writing of Engineer's findings, conclusions, and recommendations.

During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

D. *Owner's Statement to Contractor Regarding Underground Facility*: After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the Underground Facility in question addressing the resumption of Work in connection with such Underground Facility, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations in whole or in part.

E. *Early Resumption of Work*: If at any time Engineer determines that Work in connection with the Underground Facility may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the Underground Facility in question and conditions affected by its presence have been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.

F. *Possible Price and Times Adjustments*

1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, to the extent that any existing Underground Facility at the Site that was not shown

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or indicated on the Drawings, or was not shown or indicated with reasonable accuracy, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

a. 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 Paragraph 13.03;

b. Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraphs 4.05.D and 4.05.E; and

c. Contractor gave the notice required in Paragraph 5.05.B.

2. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, then any such adjustment will be set forth in a Change Order.

3. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.

4. The information and data shown or indicated on the Drawings with respect to existing Underground Facilities at the Site is based on information and data (a) furnished by the owners of such Underground Facilities, or by others, (b) obtained from available records, or (c) gathered in an investigation conducted in accordance with the current edition of ASCE 38, Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data, by the American Society of Civil Engineers. If such information or data is incorrect or incomplete, Contractor's remedies are limited to those set forth in this Paragraph 5.05.F.

5.06 *Hazardous Environmental Conditions at Site*

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

1. those reports known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site;

2. drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and

3. Technical Data contained in such reports and drawings.

B. *Reliance by Contractor on Technical Data Authorized*: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely on the accuracy of the Technical Data as defined in Paragraph 1.01.A.46.b. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, 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

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of construction to be employed by Contractor, and safety precautions and programs incident thereto;

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 removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work.

D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.

E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 7.15); and (3) 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. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 5.06.F. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then Owner may remove and remediate the Hazardous Environmental Condition, and impose a set-off against payments to account for the associated costs.

F. Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after Owner has obtained any required permits related thereto, and delivered written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.

G. 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, as a result of such Work stoppage, such special conditions under which Work is agreed to be resumed by Contractor, or any costs or expenses incurred in response to the Hazardous Environmental Condition, then within 30 days of Owner's written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off. Entitlement to any such adjustment is subject to the provisions of Paragraphs 4.05.D, 4.05.E, 11.07, and 11.08.

H. 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

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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, following the contractual change procedures in Article 11. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 8.

I. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, 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, arbitration, or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition (1) was not shown or indicated in the Drawings, Specifications, or other Contract Documents, identified as Technical Data entitled to limited reliance pursuant to Paragraph 5.06.B, or identified in the Contract Documents to be included within the scope of the Work, and (2) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.I obligates Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

J. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, 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 failure to control, contain, or remove a Constituent of Concern brought to the Site by Contractor or by anyone for whom Contractor is responsible, or to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.J obligates Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

K. The provisions of Paragraphs 5.03, 5.04, and 5.05 do not apply to the presence of Constituents of Concern or to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 6—BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

A. Contractor shall furnish a performance bond and a payment bond, each in an amount at least equal to the Contract Price, as security for the faithful performance and payment of Contractor's obligations under the Contract. These bonds must remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 15.08, whichever is later, except as provided otherwise by Laws or Regulations, the terms of a prescribed bond form, the Supplementary Conditions, or other provisions of the Contract.

B. Contractor shall also furnish such other bonds (if any) as are required by the Supplementary Conditions or other provisions of the Contract.

C. All bonds must be in the form included in the Bidding Documents or otherwise specified by Owner prior to execution of the Contract, except as provided otherwise by Laws or

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Regulations, and must be issued and signed by a surety named in "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Department Circular 570 (as amended and supplemented) by the Bureau of the Fiscal Service, U.S. Department of the Treasury. A bond signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority must show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.

D. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue bonds in the required amounts.

E. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer in writing and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which must comply with the bond and surety requirements above.

F. If Contractor has failed to obtain a required bond, Owner may exclude the Contractor from the Site and exercise Owner's termination rights under Article 16.

G. Upon request to Owner from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Owner shall provide a copy of the payment bond to such person or entity.

H. Upon request to Contractor from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Contractor shall provide a copy of the payment bond to such person or entity.

6.02 *Insurance—General Provisions*

A. Owner and Contractor shall obtain and maintain insurance as required in this article and in the Supplementary Conditions.

B. All insurance required by the Contract to be purchased and maintained by Owner or Contractor shall be obtained from insurance companies that are duly licensed or authorized in the state or jurisdiction in which the Project is located to issue insurance policies for the required limits and coverages. Unless a different standard is indicated in the Supplementary Conditions, all companies that provide insurance policies required under this Contract shall have an A.M. Best rating of A-VII or better.

C. Alternative forms of insurance coverage, including but not limited to self-insurance and "Occupational Accident and Excess Employer's Indemnity Policies," are not sufficient to meet the insurance requirements of this Contract, unless expressly allowed in the Supplementary Conditions.

D. Contractor shall deliver to Owner, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Contractor has obtained and is maintaining the policies and coverages required by the Contract. Upon request by Owner or any other insured, Contractor shall also furnish other evidence of such required insurance, including but not limited to copies of policies, documentation of applicable self-insured retentions (if allowed) and deductibles, full disclosure of all relevant exclusions, and evidence of insurance required to be purchased and maintained by

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Subcontractors or Suppliers. In any documentation furnished under this provision, Contractor, Subcontractors, and Suppliers may block out (redact) (1) any confidential premium or pricing information and (2) any wording specific to a project or jurisdiction other than those applicable to this Contract.

E. Owner shall deliver to Contractor, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Owner has obtained and is maintaining the policies and coverages required of Owner by the Contract (if any). Upon request by Contractor or any other insured, Owner shall also provide other evidence of such required insurance (if any), including but not limited to copies of policies, documentation of applicable self-insured retentions (if allowed) and deductibles, and full disclosure of all relevant exclusions. In any documentation furnished under this provision, Owner may block out (redact) (1) any confidential premium or pricing information and (2) any wording specific to a project or jurisdiction other than those relevant to this Contract.

F. Failure of Owner or Contractor to demand such certificates or other evidence of the other party's full compliance with these insurance requirements, or failure of Owner or Contractor to identify a deficiency in compliance from the evidence provided, will not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.

G. In addition to the liability insurance required to be provided by Contractor, the Owner, at Owner's option, may purchase and maintain Owner's own liability insurance. Owner's liability policies, if any, operate separately and independently from policies required to be provided by Contractor, and Contractor cannot rely upon Owner's liability policies for any of Contractor's obligations to the Owner, Engineer, or third parties.

H. Contractor shall require:

   1. Subcontractors to purchase and maintain worker's compensation, commercial general liability, and other insurance that is appropriate for their participation in the Project, and to name as additional insureds Owner and Engineer (and any other individuals or entities identified in the Supplementary Conditions as additional insureds on Contractor's liability policies) on each Subcontractor's commercial general liability insurance policy; and

   2. Suppliers to purchase and maintain insurance that is appropriate for their participation in the Project.

I. If either party does not purchase or maintain the insurance required of such party by the Contract, 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.

J. If Contractor has failed to obtain and maintain required insurance, Contractor's entitlement to enter or remain at the Site will end immediately, and Owner may impose an appropriate set-off against payment for any associated costs (including but not limited to the cost of purchasing necessary insurance coverage), and exercise Owner's termination rights under Article 16.

K. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect (but is in no way obligated) to obtain equivalent insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and the Contract Price will be adjusted accordingly.

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L. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests. Contractor is responsible for determining whether such coverage and limits are adequate to protect its interests, and for obtaining and maintaining any additional insurance that Contractor deems necessary.

M. The insurance and insurance limits required herein will not be deemed as a limitation on Contractor's liability, or that of its Subcontractors or Suppliers, under the indemnities granted to Owner and other individuals and entities in the Contract or otherwise.

N. All the policies of insurance required to be purchased and maintained under this Contract will contain a provision or endorsement that the coverage afforded will not be canceled, or renewal refused, until at least 10 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured and Engineer.

6.03 *Contractor's Insurance*

A. *Required Insurance*: Contractor shall purchase and maintain Worker's Compensation, Commercial General Liability, and other insurance pursuant to the specific requirements of the Supplementary Conditions.

B. *General Provisions*: The policies of insurance required by this Paragraph 6.03 as supplemented must:

1. include at least the specific coverages required;

2. be written for not less than the limits provided, or those required by Laws or Regulations, whichever is greater;

3. remain in effect at least until the Work is complete (as set forth in Paragraph 15.06.D), and longer if expressly required elsewhere in this Contract, and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work as a warranty or correction obligation, or otherwise, or returning to the Site to conduct other tasks arising from the Contract;

4. apply with respect to the performance of the Work, whether such performance is 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; and

5. include all necessary endorsements to support the stated requirements.

C. *Additional Insureds*: The Contractor's commercial general liability, automobile liability, employer's liability, umbrella or excess, pollution liability, and unmanned aerial vehicle liability policies, if required by this Contract, must:

1. include and list as additional insureds Owner and Engineer, and any individuals or entities identified as additional insureds in the Supplementary Conditions;

2. include coverage for the respective officers, directors, members, partners, employees, and consultants of all such additional insureds;

3. afford primary coverage to these additional insureds for all claims covered thereby (including as applicable those arising from both ongoing and completed operations);

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4. not seek contribution from insurance maintained by the additional insured; and

5. as to commercial general liability insurance, apply to additional insureds with respect to liability caused in whole or in part by Contractor's acts or omissions, or the acts and omissions of those working on Contractor's behalf, in the performance of Contractor's operations.

6.04 *Builder's Risk and Other Property Insurance*

A. *Builder's Risk*: Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the Work's full insurable replacement cost (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). The specific requirements applicable to the builder's risk insurance are set forth in the Supplementary Conditions.

B. *Property Insurance for Facilities of Owner Where Work Will Occur*: Owner is responsible for obtaining and maintaining property insurance covering each existing structure, building, or facility in which any part of the Work will occur, or to which any part of the Work will attach or be adjoined. Such property insurance will be written on a special perils (all-risk) form, on a replacement cost basis, providing coverage consistent with that required for the builder's risk insurance, and will be maintained until the Work is complete, as set forth in Paragraph 15.06.D.

C. *Property Insurance for Substantially Complete Facilities*: Promptly after Substantial Completion, and before actual occupancy or use of the substantially completed Work, Owner will obtain property insurance for such substantially completed Work, and maintain such property insurance at least until the Work is complete, as set forth in Paragraph 15.06.D. Such property insurance will be written on a special perils (all-risk) form, on a replacement cost basis, and provide coverage consistent with that required for the builder's risk insurance. The builder's risk insurance may terminate upon written confirmation of Owner's procurement of such property insurance.

D. *Partial Occupancy or Use by Owner*: If Owner will occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work, as provided in Paragraph 15.04, then Owner (directly, if it is the purchaser of the builder's risk policy, or through Contractor) will provide advance notice of such occupancy or use to the builder's risk insurer, and obtain an endorsement consenting to the continuation of coverage prior to commencing such partial occupancy or use.

E. *Insurance of Other Property; Additional Insurance*: If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, then the entity or individual owning such property item will be responsible for insuring it. If Contractor elects to obtain other special insurance to be included in or supplement the builder's risk or property insurance policies provided under this Paragraph 6.04, it may do so at Contractor's expense.

6.05 *Property Losses; Subrogation*

A. The builder's risk insurance policy purchased and maintained in accordance with Paragraph 6.04 (or an installation floater policy if authorized by the Supplementary Conditions), will contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights of recovery against any insureds thereunder, or against

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Engineer or its consultants, or their officers, directors, members, partners, employees, agents, consultants, or subcontractors.

1. Owner and Contractor waive all rights against each other and the respective officers, directors, members, partners, employees, agents, 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, risks, 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 Engineer, its consultants, all individuals or entities identified in the Supplementary Conditions as builder's risk or installation floater insureds, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, under such policies for losses and damages so caused.

2. None of the above waivers extends to the rights that any party making such waiver may have to the proceeds of insurance held by Owner or Contractor as trustee or fiduciary, or otherwise payable under any policy so issued.

B. Any property insurance policy maintained by Owner covering any loss, damage, or consequential loss to Owner's existing structures, buildings, or facilities in which any part of the Work will occur, or to which any part of the Work will attach or adjoin; to adjacent structures, buildings, or facilities of Owner; or to part or all of the completed or substantially completed Work, during partial occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to Paragraph 15.06, will contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights of recovery against any insureds thereunder, or against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them, and that the insured is allowed to waive the insurer's rights of subrogation in a written contract executed prior to the loss, damage, or consequential loss.

1. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from fire or any of the perils, risks, or causes of loss covered by such policies.

C. The waivers in this Paragraph 6.05 include the waiver of rights 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 insured peril, risk, or cause of loss.

D. Contractor shall be responsible for assuring that each Subcontract contains provisions whereby the Subcontractor waives all rights against Owner, Contractor, all individuals or entities identified in the Supplementary Conditions as insureds, the Engineer and its consultants, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, relating to, or resulting from fire or other peril, risk, or cause of loss covered by builder's risk insurance, installation floater, and any other property insurance applicable to the Work.

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6.06 *Receipt and Application of Property Insurance Proceeds*

A. Any insured loss under the builder's risk and other policies of property insurance required by Paragraph 6.04 will be adjusted and settled with the named insured that purchased the policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.

B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder's risk and other policies of insurance required by Paragraph 6.04 shall maintain such proceeds in a segregated account, and distribute such proceeds in accordance with such agreement as the parties in interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.

C. If no other special agreement is reached, Contractor shall repair or replace the damaged Work, using allocated insurance proceeds.

ARTICLE 7—CONTRACTOR'S RESPONSIBILITIES

7.01 *Contractor's Means and Methods of Construction*

A. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.

B. If the Contract Documents note, or Contractor determines, that professional engineering or other design services are needed to carry out Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures, or for Site safety, then Contractor shall cause such services to be provided by a properly licensed design professional, at Contractor's expense. Such services are not Owner-delegated professional design services under this Contract, and neither Owner nor Engineer has any responsibility with respect to (1) Contractor's determination of the need for such services, (2) the qualifications or licensing of the design professionals retained or employed by Contractor, (3) the performance of such services, or (4) any errors, omissions, or defects in such services.

7.02 *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.

B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who will not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

7.03 *Labor; Working Hours*

A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall maintain good discipline and order at the Site.

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B. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of Contractor's employees; of Suppliers and Subcontractors, and their employees; and of any other individuals or entities performing or furnishing any of the Work, just as Contractor is responsible for Contractor's own acts and omissions.

C. 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 will be performed during regular working hours, Monday through Friday. Contractor will not perform Work on a Saturday, Sunday, or any legal holiday. Contractor may perform Work outside regular working hours or on Saturdays, Sundays, or legal holidays only with Owner's written consent, which will not be unreasonably withheld.

7.04 *Services, Materials, and Equipment*

A. Unless otherwise specified in the Contract Documents, 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, whether or not such items are specifically called for in the Contract Documents.

B. All materials and equipment incorporated into the Work must be new and of good quality, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications will 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.

C. All materials and equipment must 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.

7.05 *"Or Equals"*

A. *Contractor's Request; Governing Criteria*: Whenever an item of equipment or material is specified or described in the Contract Documents by using the names of one or more proprietary items or specific Suppliers, the Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item 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 is permitted, Contractor may request that Engineer authorize the use of other items of equipment or material, or items from other proposed Suppliers, under the circumstances described below.

1. If Engineer in its sole discretion determines that an item of equipment or material proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Engineer will deem it an "or equal" item. For the purposes of this paragraph, a proposed item of equipment or material will be considered functionally equal to an item so named if:

a. in the exercise of reasonable judgment Engineer determines that the proposed item:

1) is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

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2) will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;

3) has a proven record of performance and availability of responsive service; and

4) is not objectionable to Owner.

b. Contractor certifies that, if the proposed item is approved and incorporated into the Work:

1) there will be no increase in cost to the Owner or increase in Contract Times; and

2) the item will conform substantially to the detailed requirements of the item named in the Contract Documents.

B. *Contractor's Expense*: Contractor shall provide all data in support of any proposed "or equal" item at Contractor's expense.

C. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each "or-equal" request. Engineer may require Contractor to furnish additional data about the proposed "or-equal" item. Engineer will be the sole judge of acceptability. No "or-equal" item will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an "or-equal," which will be evidenced by an approved Shop Drawing or other written communication. Engineer will advise Contractor in writing of any negative determination.

D. *Effect of Engineer's Determination*: Neither approval nor denial of an "or-equal" request will result in any change in Contract Price. The Engineer's denial of an "or-equal" request will be final and binding, and may not be reversed through an appeal under any provision of the Contract.

E. *Treatment as a Substitution Request*: If Engineer determines that an item of equipment or material proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer consider the item a proposed substitute pursuant to Paragraph 7.06.

7.06 *Substitutes*

A. *Contractor's Request; Governing Criteria*: Unless the specification or description of an item of equipment or material required to be furnished under the Contract Documents contains or is followed by words reading that no substitution is permitted, Contractor may request that Engineer authorize the use of other items of equipment or material under the circumstances described below. To the extent possible such requests must be made before commencement of related construction at the Site.

1. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is functionally equivalent to that named and an acceptable substitute therefor. Engineer will not accept requests for review of proposed substitute items of equipment or material from anyone other than Contractor.

2. The requirements for review by Engineer will be as set forth in Paragraph 7.06.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.

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3. Contractor shall make written application to Engineer for review of a proposed substitute item of equipment or material that Contractor seeks to furnish or use. The application:

   a. will certify that the proposed substitute item will:

      1) perform adequately the functions and achieve the results called for by the general design;

      2) be similar in substance to the item specified; and

      3) be suited to the same use as the item specified.

   b. will state:

      1) the extent, if any, to which the use of the proposed substitute item will necessitate a change in Contract Times;

      2) whether 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 other work on the Project) to adapt the design to the proposed substitute item; and

      3) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty.

   c. will identify:

      1) all variations of the proposed substitute item from the item specified; and

      2) available engineering, sales, maintenance, repair, and replacement services.

   d. will contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including but not limited to changes in Contract Price, shared savings, costs of redesign, and claims of other contractors affected by any resulting change.

B. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each substitute request, and to obtain comments and direction from Owner. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No substitute will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an acceptable substitute. Engineer's determination will be evidenced by a Field Order or a proposed Change Order accounting for the substitution itself and all related impacts, including changes in Contract Price or Contract Times. Engineer will advise Contractor in writing of any negative determination.

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

D. *Reimbursement of Engineer's Cost*: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

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E. *Contractor's Expense*: Contractor shall provide all data in support of any proposed substitute at Contractor's expense.

F. *Effect of Engineer's Determination*: If Engineer approves the substitution request, Contractor shall execute the proposed Change Order and proceed with the substitution. The Engineer's denial of a substitution request will be final and binding, and may not be reversed through an appeal under any provision of the Contract. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.06.D, by timely submittal of a Change Proposal.

7.07 *Concerning Subcontractors and Suppliers*

A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner. The Contractor's retention of a Subcontractor or Supplier for the performance of parts of the Work will not relieve Contractor's obligation to Owner to perform and complete the Work in accordance with the Contract Documents.

B. Contractor shall retain specific Subcontractors and Suppliers for the performance of designated parts of the Work if required by the Contract to do so.

C. Subsequent to the submittal of Contractor's Bid or final negotiation of the terms of the Contract, Owner may not require Contractor to retain any Subcontractor or Supplier to furnish or perform any of the Work against which Contractor has reasonable objection.

D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable during the bidding process or otherwise). Such proposed Subcontractor or Supplier shall be deemed acceptable to Owner unless Owner raises a substantive, reasonable objection within 5 days.

E. Owner may require the replacement of any Subcontractor or Supplier. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors or Suppliers for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor or Supplier so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor or Supplier.

F. If Owner requires the replacement of any Subcontractor or Supplier retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, with respect to the replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner's requirement of replacement.

G. No acceptance by Owner of any such Subcontractor or Supplier, whether initially or as a replacement, will constitute a waiver of the right of Owner to the completion of the Work in accordance with the Contract Documents.

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H. On a monthly basis, Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.

I. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors and Suppliers.

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

K. All Work performed for Contractor by a Subcontractor or Supplier must be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract for the benefit of Owner and Engineer.

L. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor for Work performed for Contractor by the Subcontractor or Supplier.

M. Contractor shall restrict all Subcontractors and Suppliers from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed in this Contract.

7.08 *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 an 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 will be disclosed in the Contract Documents.

B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors, 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 specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.

C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, 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 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.

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7.09 *Permits*

A. Unless otherwise provided in the Contract Documents, Contractor shall obtain and pay for all construction permits, licenses, and certificates of occupancy. 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 the submission of Contractor's Bid (or when Contractor became bound under a negotiated contract). Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

7.10 *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.

7.11 *Laws and Regulations*

A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.

B. If Contractor performs any Work or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all resulting costs and losses, and shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, 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 such Work or other action. It is not Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this does not relieve Contractor of its obligations under Paragraph 3.03.

C. Owner or Contractor may give written notice to the other party of any changes after the submission of Contractor's Bid (or after the date when Contractor became bound under a negotiated contract) in Laws or Regulations having an effect on the cost or time of performance of the Work, including but not limited to changes in Laws or Regulations having an effect on procuring permits and on sales, use, value-added, consumption, and other similar taxes. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times resulting from such changes, then within 30 days of such written notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

7.12 *Record Documents*

A. Contractor shall maintain in a safe place at the Site one printed record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, written interpretations and clarifications, and approved Shop Drawings. Contractor shall keep such record documents in good order and annotate them to show changes made during construction. These record documents, together with all approved Samples, will be available to Engineer for reference. Upon completion of the Work, Contractor shall deliver these record documents to Engineer.

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7.13 *Safety and Protection*

A. Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations.

B. Contractor shall designate a qualified and experienced safety representative whose duties and responsibilities are the prevention of Work-related accidents and the maintenance and supervision of safety precautions and programs.

C. 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, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

D. All damage, injury, or loss to any property referred to in Paragraph 7.13.C.2 or 7.13.C.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 at its expense (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer 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).

E. 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.

F. Contractor shall notify Owner; the owners of adjacent property; the owners of Underground Facilities and other utilities (if the identity of such owners is known to Contractor); and other contractors and utility owners performing work at or adjacent to the Site, in writing, when Contractor knows that prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.

G. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. Any Owner's safety programs that are applicable to the Work are identified or included in the Supplementary Conditions or Specifications.

H. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.

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I. Contractor's duties and responsibilities for safety and protection will continue until all the Work is completed, Engineer has issued a written notice to Owner and Contractor in accordance with Paragraph 15.06.C that the Work is acceptable, and Contractor has left the Site (except as otherwise expressly provided in connection with Substantial Completion).

J. Contractor's duties and responsibilities for safety and protection will resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.

7.14 *Hazard Communication Programs*

A. Contractor shall be responsible for coordinating any exchange of safety data sheets (formerly known as 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.

7.15 *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 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 by an emergency, or are required as a result of Contractor's response to an emergency. If Engineer determines that a change in the Contract Documents is required because of an emergency or Contractor's response, a Work Change Directive or Change Order will be issued.

7.16 *Submittals*

A. *Shop Drawing and Sample Requirements*

1. Before submitting a Shop Drawing or Sample, Contractor shall:

a. review and coordinate the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;

b. determine and verify:

1) all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect to the Submittal;

2) the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and

3) all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto;

c. confirm that the Submittal is complete with respect to all related data included in the Submittal.

2. Each Shop Drawing or Sample must bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review of that Submittal, and that Contractor approves the Submittal.

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3. With each Shop Drawing or Sample, Contractor shall give Engineer specific written notice of any variations that the Submittal may have from the requirements of the Contract Documents. This notice must be set forth in a written communication separate from the Submittal; and, in addition, in the case of a Shop Drawing by a specific notation made on the Shop Drawing itself.

B. *Submittal Procedures for Shop Drawings and Samples*: Contractor shall label and submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals.

1. *Shop Drawings*

a. Contractor shall submit the number of copies required in the Specifications.

b. Data shown on the Shop Drawings must 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 7.16.C.

2. *Samples*

a. Contractor shall submit the number of Samples required in the Specifications.

b. Contractor shall clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the Submittal for the limited purposes required by Paragraph 7.16.C.

3. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, 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.

C. *Engineer's Review of Shop Drawings and Samples*

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the accepted Schedule of Submittals. 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, comply with the requirements of 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, or to safety precautions or programs incident thereto.

3. Engineer's review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

4. Engineer's review and approval of a Shop Drawing or Sample will not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 7.16.A.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. Engineer will

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document any such approved variation from the requirements of the Contract Documents in a Field Order or other appropriate Contract modification.

5. Engineer's review and approval of a Shop Drawing or Sample will not relieve Contractor from responsibility for complying with the requirements of Paragraphs 7.16.A and B.

6. Engineer's review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, will not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.

7. Neither Engineer's receipt, review, acceptance, or approval of a Shop Drawing or Sample will result in such item becoming a Contract Document.

8. Contractor shall perform the Work in compliance with the requirements and commitments set forth in approved Shop Drawings and Samples, subject to the provisions of Paragraph 7.16.C.4.

D. *Resubmittal Procedures for Shop Drawings and Samples*

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.

2. Contractor shall furnish required Shop Drawing and Sample submittals with sufficient information and accuracy to obtain required approval of an item with no more than two resubmittals. Engineer will record Engineer's time for reviewing a third or subsequent resubmittal of a Shop Drawing or Sample, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due Contractor to secure reimbursement for such charges.

3. If Contractor requests a change of a previously approved Shop Drawing or Sample, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner may impose a set-off against payments due Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

E. *Submittals Other than Shop Drawings, Samples, and Owner-Delegated Designs*

1. The following provisions apply to all Submittals other than Shop Drawings, Samples, and Owner-delegated designs:

   a. Contractor shall submit all such Submittals to the Engineer in accordance with the Schedule of Submittals and pursuant to the applicable terms of the Contract Documents.

   b. Engineer will provide timely review of all such Submittals in accordance with the Schedule of Submittals and return such Submittals with a notation of either Accepted or Not Accepted. Any such Submittal that is not returned within the time established in the Schedule of Submittals will be deemed accepted.

   c. Engineer's review will be only to determine if the Submittal is acceptable under the requirements of the Contract Documents as to general form and content of the Submittal.

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d. If any such Submittal is not accepted, Contractor shall confer with Engineer regarding the reason for the non-acceptance, and resubmit an acceptable document.

2. Procedures for the submittal and acceptance of the Progress Schedule, the Schedule of Submittals, and the Schedule of Values are set forth in Paragraphs 2.03. 2.04, and 2.05.

F. Owner-delegated Designs: Submittals pursuant to Owner-delegated designs are governed by the provisions of Paragraph 7.19.

7.17 *Contractor's General Warranty and Guarantee*

A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer is entitled to rely on Contractor's warranty and guarantee.

B. Owner's rights under this warranty and guarantee are in addition to, and are not limited by, Owner's rights under the correction period provisions of Paragraph 15.08. The time in which Owner may enforce its warranty and guarantee rights under this Paragraph 7.17 is limited only by applicable Laws and Regulations restricting actions to enforce such rights; provided, however, that after the end of the correction period under Paragraph 15.08:

1. Owner shall give Contractor written notice of any defective Work within 60 days of the discovery that such Work is defective; and

2. Such notice will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the notice.

C. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, or improper modification, 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.

D. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents is absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents, a release of Contractor's obligation to perform the Work in accordance with the Contract Documents, or a release of Owner's warranty and guarantee rights under this Paragraph 7.17:

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 review and approval of a Shop Drawing or Sample submittal;

6. The issuance of a notice of acceptability by Engineer;

7. The end of the correction period established in Paragraph 15.08;

8. Any inspection, test, or approval by others; or

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9. Any correction of defective Work by Owner.

E. If the Contract requires the Contractor to accept the assignment of a contract entered into by Owner, then the specific warranties, guarantees, and correction obligations contained in the assigned contract will govern with respect to Contractor's performance obligations to Owner for the Work described in the assigned contract.

7.18 *Indemnification*

A. To the fullest extent permitted by Laws and Regulations, and in addition to any other obligations of Contractor under the Contract or otherwise, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, from losses, damages, costs, and judgments (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 from third-party claims or actions relating to or resulting from the performance or furnishing of the Work, provided that any such claim, action, loss, cost, judgment or damage is attributable to bodily injury, sickness, disease, or death, or to damage to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom, but only to the extent caused 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.

B. In any and all claims against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, 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 7.18.A will 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.

7.19 *Delegation of Professional Design Services*

A. Owner may require Contractor to provide professional design services for a portion of the Work by express delegation in the Contract Documents. Such delegation will specify the performance and design criteria that such services must satisfy, and the Submittals that Contractor must furnish to Engineer with respect to the Owner-delegated design.

B. Contractor shall cause such Owner-delegated professional design services to be provided pursuant to the professional standard of care by a properly licensed design professional, whose signature and seal must appear on all drawings, calculations, specifications, certifications, and Submittals prepared by such design professional. Such design professional must issue all certifications of design required by Laws and Regulations.

C. If a Shop Drawing or other Submittal related to the Owner-delegated design is prepared by Contractor, a Subcontractor, or others for submittal to Engineer, then such Shop Drawing or other Submittal must bear the written approval of Contractor's design professional when submitted by Contractor to Engineer.

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D. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, and approvals performed or provided by the design professionals retained or employed by Contractor under an Owner-delegated design, subject to the professional standard of care and the performance and design criteria stated in the Contract Documents.

E. Pursuant to this Paragraph 7.19, Engineer's review, approval, and other determinations regarding design drawings, calculations, specifications, certifications, and other Submittals furnished by Contractor pursuant to an Owner-delegated design will be only for the following limited purposes:

1. Checking for conformance with the requirements of this Paragraph 7.19;
2. Confirming that Contractor (through its design professionals) has used the performance and design criteria specified in the Contract Documents; and
3. Establishing that the design furnished by Contractor is consistent with the design concept expressed in the Contract Documents.

F. Contractor shall not be responsible for the adequacy of performance or design criteria specified by Owner or Engineer.

G. Contractor is not required to provide professional services in violation of applicable Laws and Regulations.

ARTICLE 8—OTHER WORK AT THE SITE

8.01 *Other Work*

A. In addition to and apart from the Work under the Contract Documents, the Owner may perform other work at or adjacent to the Site. Such other work may be performed by Owner's employees, or through contracts between the Owner and third parties. Owner may also arrange to have third-party utility owners perform work on their utilities and facilities at or adjacent to the Site.

B. If Owner performs other work at or adjacent to the Site with Owner's employees, or through contracts for such other work, then Owner shall give Contractor written notice thereof prior to starting any such other work. If Owner has advance information regarding the start of any third-party utility work that Owner has arranged to take place at or adjacent to the Site, Owner shall provide such information to Contractor.

C. Contractor shall afford proper and safe access to the Site to each contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work.

D. 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 such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected.

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E. If the proper execution or results of any part of Contractor's Work depends upon work performed by others, 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.

F. The provisions of this article are not applicable to work that is performed by third-party utilities or other third-party entities without a contract with Owner, or that is performed without having been arranged by Owner. If such work occurs, then any related delay, disruption, or interference incurred by Contractor is governed by the provisions of Paragraph 4.05.C.3.

8.02 *Coordination*

A. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, to perform other work at or adjacent to the Site with Owner's employees, or to arrange to have utility owners perform work at or adjacent to the Site, the following will be set forth in the Supplementary Conditions or provided to Contractor prior to the start of any such other work:

1. The identity of the individual or entity that will have authority and responsibility for coordination of the activities among the various contractors;

2. An itemization of the specific matters to be covered by such authority and responsibility; and

3. The extent of such authority and responsibilities.

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

8.03 *Legal Relationships*

A. If, in the course of performing other work for Owner at or adjacent to the Site, the Owner's employees, any other contractor working for Owner, or any utility owner that Owner has arranged to perform work, causes damage to the Work or to the property of Contractor or its Subcontractors, or delays, disrupts, interferes with, or increases the scope or cost of the performance of the Work, through actions or inaction, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times. Contractor must submit any Change Proposal seeking an equitable adjustment in the Contract Price or the Contract Times under this paragraph within 30 days of the damaging, delaying, disrupting, or interfering event. The entitlement to, and extent of, any such equitable adjustment will take into account information (if any) regarding such other work that was provided to Contractor in the Contract Documents prior to the submittal of the Bid or the final negotiation of the terms of the Contract, and any remedies available to Contractor under Laws or Regulations concerning utility action or inaction. When applicable, any such equitable adjustment in Contract Price will be conditioned on Contractor assigning to Owner all Contractor's rights against such other contractor or utility owner with respect to the damage, delay, disruption, or interference that is the subject of the adjustment. Contractor's entitlement to an adjustment of the Contract Times or Contract Price is subject to the provisions of Paragraphs 4.05.D and 4.05.E.

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B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site.

1. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due Contractor, and assign to such other contractor or utility owner the Owner's contractual rights against Contractor with respect to the breach of the obligations set forth in this Paragraph 8.03.B.

2. When Owner is performing other work at or adjacent to the Site with Owner's employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor's failure to take reasonable and customary measures with respect to Owner's other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due Contractor.

C. If Contractor damages, delays, disrupts, or interferes with the work of any other contractor, or any utility owner performing other work at or adjacent to the Site, through Contractor's failure to take reasonable and customary measures to avoid such impacts, or if any claim arising out of Contractor's actions, inactions, or negligence in performance of the Work at or adjacent to the Site is made by any such other contractor or utility owner against Contractor, Owner, or Engineer, then Contractor shall (1) promptly attempt to settle the claim as to all parties through negotiations with such other contractor or utility owner, or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law, and (2) indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claims, and against all 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 damage, delay, disruption, or interference.

ARTICLE 9—OWNER'S RESPONSIBILITIES

9.01 *Communications to Contractor*

A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

9.02 *Replacement of Engineer*

A. Owner may at its discretion appoint an engineer to replace Engineer, provided Contractor makes no reasonable objection to the replacement engineer. The replacement engineer's status under the Contract Documents will be that of the former Engineer.

9.03 *Furnish Data*

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

9.04 *Pay When Due*

A. Owner shall make payments to Contractor when they are due as provided in the Agreement.

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9.05 *Lands and Easements; Reports, Tests, and Drawings*

A. Owner's duties with respect to providing lands and easements are set forth in Paragraph 5.01.

B. Owner's duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.

C. Article 5 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of conditions at the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

9.06 *Insurance*

A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 6.

9.07 *Change Orders*

A. Owner's responsibilities with respect to Change Orders are set forth in Article 11.

9.08 *Inspections, Tests, and Approvals*

A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 14.02.B.

9.09 *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.

9.10 *Undisclosed Hazardous Environmental Condition*

A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 5.06.

9.11 *Evidence of Financial Arrangements*

A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract (including obligations under proposed changes in the Work).

9.12 *Safety Programs*

A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed.

B. Owner shall furnish copies of any applicable Owner safety programs to Contractor.

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ARTICLE 10—ENGINEER'S STATUS DURING CONSTRUCTION

10.01 *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.

10.02 *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 10.07. 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.

10.03 *Resident Project Representative*

A. If Owner and Engineer have agreed that Engineer will furnish a Resident Project Representative to represent Engineer at the Site and assist Engineer in observing the progress and quality of the Work, then the authority and responsibilities of any such Resident Project Representative will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in the Supplementary Conditions and in Paragraph 10.07.

B. If Owner designates an individual or entity who is not Engineer's consultant, agent, or employee to represent Owner at the Site, then the responsibilities and authority of such individual or entity will be as provided in the Supplementary Conditions.

10.04 *Engineer's Authority*

A. Engineer has the authority to reject Work in accordance with Article 14.

B. Engineer's authority as to Submittals is set forth in Paragraph 7.16.

C. Engineer's authority as to design drawings, calculations, specifications, certifications and other Submittals from Contractor in response to Owner's delegation (if any) to Contractor of professional design services, is set forth in Paragraph 7.19.

D. Engineer's authority as to changes in the Work is set forth in Article 11.

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E. Engineer's authority as to Applications for Payment is set forth in Article 15.

10.05 *Determinations for Unit Price Work*

A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor as set forth in Paragraph 13.03.

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

A. Engineer will render decisions regarding the requirements of the Contract Documents, and judge the acceptability of the Work, pursuant to the specific procedures set forth herein for initial interpretations, Change Proposals, and acceptance of the Work. In rendering such decisions and judgments, Engineer will not show partiality to Owner or Contractor, and will not be liable to Owner, Contractor, or others in connection with any proceedings, interpretations, decisions, or judgments conducted or rendered in good faith.

10.07 *Limitations on Engineer's Authority and Responsibilities*

A. Neither Engineer's authority or responsibility under this Article 10 or under any other provision of the Contract, 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, will 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 Contractor under Paragraph 15.06.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 10.07 also apply to the Resident Project Representative, if any.

10.08 *Compliance with Safety Program*

A. While at the Site, Engineer's employees and representatives will comply with the specific applicable requirements of Owner's and Contractor's safety programs of which Engineer has been informed.

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ARTICLE 11—CHANGES TO THE CONTRACT

11.01 *Amending and Supplementing the Contract*

A. The Contract may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.

B. If an amendment or supplement to the Contract includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order.

C. All changes to the Contract that involve (1) the performance or acceptability of the Work, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, must be supported by Engineer's recommendation. Owner and Contractor may amend other terms and conditions of the Contract without the recommendation of the Engineer.

11.02 *Change Orders*

A. Owner and Contractor shall execute appropriate Change Orders covering:

1. Changes in 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;

2. Changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;

3. Changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.05, (b) required because of Owner's acceptance of defective Work under Paragraph 14.04 or Owner's correction of defective Work under Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer's recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise) or other engineering or technical matters; and

4. Changes that embody the substance of any final and binding results under: Paragraph 11.03.B, resolving the impact of a Work Change Directive; Paragraph 11.09, concerning Change Proposals; Article 12, Claims; Paragraph 13.02.D, final adjustments resulting from allowances; Paragraph 13.03.D, final adjustments relating to determination of quantities for Unit Price Work; and similar provisions.

B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of Paragraph 11.02.A, it will be deemed to be of full force and effect, as if fully executed.

11.03 *Work Change Directives*

A. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 11.07 regarding change of Contract Price.

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B. If Owner has issued a Work Change Directive and:

1. Contractor believes that an adjustment in Contract Times or Contract Price is necessary, then Contractor shall submit any Change Proposal seeking such an adjustment no later than 30 days after the completion of the Work set out in the Work Change Directive.

2. Owner believes that an adjustment in Contract Times or Contract Price is necessary, then Owner shall submit any Claim seeking such an adjustment no later than 60 days after issuance of the Work Change Directive.

11.04 *Field Orders*

A. Engineer may authorize minor changes in the Work if the changes 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. Such changes will be accomplished by a Field Order and will be binding on Owner and also on Contractor, which shall perform the Work involved promptly.

B. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

11.05 *Owner-Authorized Changes in the Work*

A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work. Changes involving the design (as set forth in the Drawings, Specifications, or otherwise) or other engineering or technical matters will be supported by Engineer's recommendation.

B. Such changes in the Work may be accomplished by a Change Order, if Owner and Contractor have agreed as to the effect, if any, of the changes on Contract Times or Contract Price; or by a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved; or, in the case of a deletion in the Work, promptly cease construction activities with respect to such deleted Work. Added or revised Work must be performed under the applicable conditions of the Contract Documents.

C. Nothing in this Paragraph 11.05 obligates Contractor to undertake work that Contractor reasonably concludes cannot be performed in a manner consistent with Contractor's safety obligations under the Contract Documents or Laws and Regulations.

11.06 *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, except in the case of an emergency as provided in Paragraph 7.15 or in the case of uncovering Work as provided in Paragraph 14.05.C.2.

11.07 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price must comply with the provisions of Paragraph 11.09. Any Claim for an adjustment of Contract Price must comply with the provisions of Article 12.

B. An adjustment in the Contract Price will be determined as follows:

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1. Where the Work involved is covered by unit prices contained in the Contract Documents, then by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03);
2. Where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.07.C.2); or
3. Where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 11.07.C).

C. *Contractor's Fee*: When applicable, the Contractor's fee for overhead and profit will 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 13.01.B.1 and 13.01.B.2, the Contractor's fee will be 15 percent;
    b. For costs incurred under Paragraph 13.01.B.3, the Contractor's fee will be 5 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 Paragraphs 11.07.C.2.a and 11.07.C.2.b is that the Contractor's fee will be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of 5 percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted Work the maximum total fee to be paid by Owner will be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the Work;
    d. No fee will be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;
    e. The amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in Cost of the Work will be the amount of the actual net decrease in Cost of the Work and a deduction of an additional amount equal to 5 percent of such actual net decrease in Cost of the Work; and
    f. When both additions and credits are involved in any one change or Change Proposal, the adjustment in Contractor's fee will be computed by determining the sum of the costs in each of the cost categories in Paragraph 13.01.B (specifically, payroll costs, Paragraph 13.01.B.1; incorporated materials and equipment costs, Paragraph 13.01.B.2; Subcontract costs, Paragraph 13.01.B.3; special consultants costs, Paragraph 13.01.B.4; and other costs, Paragraph 13.01.B.5) and applying to each such cost category sum the appropriate fee from Paragraphs 11.07.C.2.a through 11.07.C.2.e, inclusive.

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11.08 *Change of Contract Times*

A. The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times must comply with the provisions of Paragraph 11.09. Any Claim for an adjustment in the Contract Times must comply with the provisions of Article 12.

B. Delay, disruption, and interference in the Work, and any related changes in Contract Times, are addressed in and governed by Paragraph 4.05.

11.09 *Change Proposals*

A. *Purpose and Content*: Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; contest an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; challenge a set-off against payment due; or seek other relief under the Contract. The Change Proposal will specify any proposed change in Contract Times or Contract Price, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents. Each Change Proposal will address only one issue, or a set of closely related issues.

B. *Change Proposal Procedures*

1. *Submittal*: Contractor shall submit each Change Proposal to Engineer within 30 days after the start of the event giving rise thereto, or after such initial decision.

2. *Supporting Data*: The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal.

   a. Change Proposals based on or related to delay, interruption, or interference must comply with the provisions of Paragraphs 4.05.D and 4.05.E.

   b. Change proposals related to a change of Contract Price must include full and detailed accounts of materials incorporated into the Work and labor and equipment used for the subject Work.

   The supporting data must be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event.

3. *Engineer's Initial Review*: Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal. If in its discretion Engineer concludes that additional supporting data is needed before conducting a full review and making a decision regarding the Change Proposal, then Engineer may request that Contractor submit such additional supporting data by a date specified by Engineer, prior to Engineer beginning its full review of the Change Proposal.

4. *Engineer's Full Review and Action on the Change Proposal*: Upon receipt of Contractor's supporting data (including any additional data requested by Engineer), Engineer will conduct a full review of each Change Proposal and, within 30 days after such receipt of the Contractor's supporting data, either approve the Change Proposal in whole, deny it in whole, or approve it in part and deny it in part. Such actions must be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change

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Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer's inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.

5. *Binding Decision*: Engineer's decision is final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.

C. *Resolution of Certain Change Proposals*: If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties in writing that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice will be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.

D. *Post-Completion*: Contractor shall not submit any Change Proposals after Engineer issues a written recommendation of final payment pursuant to Paragraph 15.06.B.

11.10 *Notification to Surety*

A. If the provisions of any bond require notice to be given to a surety 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), 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.

ARTICLE 12—CLAIMS

12.01 *Claims*

A. *Claims Process*: The following disputes between Owner and Contractor are subject to the Claims process set forth in this article:

1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals;

2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents;

3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters; and

4. Subject to the waiver provisions of Paragraph 15.07, any dispute arising after Engineer has issued a written recommendation of final payment pursuant to Paragraph 15.06.B.

B. *Submittal of Claim*: The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. The responsibility to substantiate a Claim rests with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor's knowledge

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and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.

C. *Review and Resolution*: The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim will be stated in writing and submitted to the other party, with a copy to Engineer.

D. *Mediation*

1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate will stay the Claim submittal and response process.

2. If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process will resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim submittal and decision process will resume as of the date of the conclusion of the mediation, as determined by the mediator.

3. Owner and Contractor shall each pay one-half of the mediator's fees and costs.

E. *Partial Approval*: If the party receiving a Claim approves the Claim in part and denies it in part, such action will be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.

F. *Denial of Claim*: If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim will be final and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 17 for the final resolution of disputes.

G. *Final and Binding Results*: If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim will be incorporated in a Change Order or other written document to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

ARTICLE 13—COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

13.01 *Cost of the Work*

A. *Purposes for Determination of Cost of the Work*: The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:

1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or

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2. When needed to determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.

B. *Costs Included*: Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work will be in amounts no higher than those commonly incurred in the locality of the Project, will not include any of the costs itemized in Paragraph 13.01.C, and will include only the following items:

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 in advance of the subject Work. Such employees include, without limitation, superintendents, foremen, safety managers, safety representatives, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work will be apportioned on the basis of their time spent on the Work. Payroll costs include, but are not limited to, salaries and wages plus the cost of fringe benefits, which include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, sick leave, and vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, will 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 accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts will accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment will 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, which 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 will be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 13.01.

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

5. Other costs consisting of 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, which are

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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.

1) In establishing included costs for materials such as scaffolding, plating, or sheeting, consideration will be given to the actual or the estimated life of the material for use on other projects; or rental rates may be established on the basis of purchase or salvage value of such items, whichever is less. Contractor will not be eligible for compensation for such items in an amount that exceeds the purchase cost of such item.

c. *Construction Equipment Rental*

1) Rentals of all construction equipment and machinery, and the parts thereof, in accordance with rental agreements approved by Owner as to price (including any surcharge or special rates applicable to overtime use of the construction equipment or machinery), and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs will be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts must cease when the use thereof is no longer necessary for the Work.

2) Costs for equipment and machinery owned by Contractor or a Contractor-related entity will be paid at a rate shown for such equipment in the equipment rental rate book specified in the Supplementary Conditions. An hourly rate will be computed by dividing the monthly rates by 176. These computed rates will include all operating costs.

3) With respect to Work that is the result of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price ("changed Work"), included costs will be based on the time the equipment or machinery is in use on the changed Work and the costs of transportation, loading, unloading, assembly, dismantling, and removal when directly attributable to the changed Work. The cost of any such equipment or machinery, or parts thereof, must cease to accrue when the use thereof is no longer necessary for the changed Work.

d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as 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 builder's risk or other property insurance established in accordance with Paragraph 6.04), 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 include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses will be included in the Cost of the Work for the purpose of determining Contractor's fee.

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

h. Minor expenses such as communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.

i. The costs of premiums for all bonds and insurance that Contractor is required by the Contract Documents to purchase and maintain.

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

1. Payroll costs and other compensation of Contractor's officers, executives, principals, 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 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here are to be considered administrative costs covered by the Contractor's fee.

2. The cost of purchasing, renting, or furnishing small tools and hand tools.

3. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.

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

5. 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.

6. Expenses incurred in preparing and advancing Claims.

7. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 13.01.B.

D. *Contractor's Fee*

1. When the Work as a whole is performed on the basis of cost-plus-a-fee, then:

a. Contractor's fee for the Work set forth in the Contract Documents as of the Effective Date of the Contract will be determined as set forth in the Agreement.

b. for any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work, Contractor's fee will be determined as follows:

1) When the fee for the Work as a whole is a percentage of the Cost of the Work, the fee will automatically adjust as the Cost of the Work changes.

2) When the fee for the Work as a whole is a fixed fee, the fee for any additions or deletions will be determined in accordance with Paragraph 11.07.C.2.

2. When the Work as a whole is performed on the basis of a stipulated sum, or any other basis other than cost-plus-a-fee, then Contractor's fee for any Work covered by a Change

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Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work will be determined in accordance with Paragraph 11.07.C.2.

E. *Documentation and Audit*: Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor and pertinent Subcontractors will establish and maintain records of the costs in accordance with generally accepted accounting practices. Subject to prior written notice, Owner will be afforded reasonable access, during normal business hours, to all Contractor's accounts, records, books, correspondence, instructions, drawings, receipts, vouchers, memoranda, and similar data relating to the Cost of the Work and Contractor's fee. Contractor shall preserve all such documents for a period of three years after the final payment by Owner. Pertinent Subcontractors will afford such access to Owner, and preserve such documents, to the same extent required of Contractor.

13.02 *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 and by such persons or entities as may be acceptable to Owner and Engineer.

B. *Cash Allowances*: Contractor agrees that:

1. the cash 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, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment for any of the foregoing will be valid.

C. *Owner's Contingency Allowance*: Contractor agrees that an Owner's contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor for Work covered by allowances, and the Contract Price will be correspondingly adjusted.

13.03 *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.

B. 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. Payments to Contractor for Unit Price Work will be based on actual quantities.

C. 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.

D. 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

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thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, and the final adjustment of Contract Price will be set forth in a Change Order, subject to the provisions of the following paragraph.

E. *Adjustments in Unit Price*

1. Contractor or Owner shall be entitled to an adjustment in the unit price with respect to an item of Unit Price Work if:

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

   b. Contractor's unit costs to perform the item of Unit Price Work have changed materially and significantly as a result of the quantity change.

2. The adjustment in unit price will account for and be coordinated with any related changes in quantities of other items of Work, and in Contractor's costs to perform such other Work, such that the resulting overall change in Contract Price is equitable to Owner and Contractor.

3. Adjusted unit prices will apply to all units of that item.

ARTICLE 14—TESTS AND INSPECTIONS; CORRECTION, REMOVAL, OR ACCEPTANCE OF DEFECTIVE WORK

14.01 *Access to Work*

A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and authorities having jurisdiction have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply with such procedures and programs as applicable.

14.02 *Tests, Inspections, and Approvals*

A. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.

B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work will be governed by the provisions of Paragraph 14.05.

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.

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D. Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:

1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;
2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;
3. by manufacturers of equipment furnished under the Contract Documents;
4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and
5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

Such inspections and tests will be performed by independent inspectors, testing laboratories, or other qualified individuals or entities acceptable to Owner and Engineer.

E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.

F. 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, Contractor shall, if requested by Engineer, uncover such Work for observation. Such uncovering will be at Contractor's expense unless Contractor had given Engineer timely notice of Contractor's intention to cover the same and Engineer had not acted with reasonable promptness in response to such notice.

14.03 *Defective Work*

A. *Contractor's Obligation*: It is Contractor's obligation to assure that the Work is not defective.

B. *Engineer's Authority*: Engineer has the authority to determine whether Work is defective, and to reject defective Work.

C. *Notice of Defects*: Prompt written notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.

D. *Correction, or Removal and Replacement*: Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.

E. *Preservation of Warranties*: When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

F. *Costs and Damages*: In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs,

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losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

14.04 *Acceptance of Defective Work*

A. If, instead of requiring correction or removal and replacement of defective Work, Owner prefers to accept it, Owner may do so (subject, if such acceptance occurs prior to final payment, to Engineer's confirmation that such acceptance is in general accord with the design intent and applicable engineering principles, and will not endanger public safety). Contractor shall pay all claims, costs, losses, and damages attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness), and for the diminished value of the Work to the extent not otherwise paid by Contractor. If any such acceptance occurs prior to final payment, the necessary revisions in the Contract Documents with respect to the Work will be incorporated in a Change Order. If the parties are unable to agree as to the decrease in the Contract Price, reflecting the diminished value of Work so accepted, then Owner may impose a reasonable set-off against payments due under Article 15. If the acceptance of defective Work occurs after final payment, Contractor shall pay an appropriate amount to Owner.

14.05 *Uncovering Work*

A. Engineer has the authority to require additional inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.

B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer's observation, and then replace the covering, all at Contractor's expense.

C. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, then 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, and provide all necessary labor, material, and equipment.

1. If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages 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 pending Contractor's full discharge of this responsibility the Owner shall be entitled to impose a reasonable set-off against payments due under Article 15.

2. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, 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, then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.

14.06 *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, then Owner may order Contractor to stop the Work,

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or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work will 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.

14.07 *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 defective Work as required by Engineer, then Owner may, after 7 days' written notice to Contractor, correct or remedy any such deficiency.

B. In exercising the rights and remedies under this Paragraph 14.07, Owner shall proceed expeditiously. In connection with such corrective or 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, 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 incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. 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 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 14.07.

ARTICLE 15—PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD

15.01 *Progress Payments*

A. *Basis for Progress Payments*: The Schedule of Values established as provided in Article 2 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments for Unit Price Work will be based on the number of units completed during the pay period, as determined under the provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.

B. *Applications for Payments*

1. At least 20 days before the date established in the Agreement 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.

2. 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 must also be accompanied by: (a) a bill of sale, invoice, copies of subcontract or purchase order payments, or other documentation

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establishing full payment by Contractor for the materials and equipment; (b) at Owner's request, documentation warranting that Owner has received the materials and equipment free and clear of all Liens; and (c) evidence that the materials and equipment are covered by appropriate property insurance, a warehouse bond, or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

3. Beginning with the second Application for Payment, each Application must include an affidavit of Contractor stating that all previous progress payments received by Contractor have been applied to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

4. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

C. *Review of Applications*

1. Engineer will, within 10 days after receipt of each Application for Payment, including each resubmittal, 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 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, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, and 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:

   a. 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; or

   b. 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.

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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:
    a. to supervise, direct, or control the Work;
    b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto;
    c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work;
    d. to make any examination to ascertain how or for what purposes Contractor has used the money paid by Owner; or
    e. 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 stated in Paragraph 15.01.C.2.
6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:
    a. the Work is defective, requiring correction or replacement;
    b. the Contract Price has been reduced by Change Orders;
    c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
    d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or
    e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.

D. *Payment Becomes Due*

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended (subject to any Owner set-offs) will become due, and when due will be paid by Owner to Contractor.

E. *Reductions in Payment by Owner*

1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:
    a. Claims have been made against Owner based on Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages resulting from Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;

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b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;

c. Contractor has failed to provide and maintain required bonds or insurance;

d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;

e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;

f. The Work is defective, requiring correction or replacement;

g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

h. The Contract Price has been reduced by Change Orders;

i. An event has occurred that would constitute a default by Contractor and therefore justify a termination for cause;

j. Liquidated or other damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work;

k. 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; or

l. Other items entitle Owner to a set-off against the amount recommended.

2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, 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, if Contractor remedies the reasons for such action. The reduction imposed will be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.

3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld will be treated as an amount due as determined by Paragraph 15.01.D.1 and subject to interest as provided in the Agreement.

15.02 *Contractor's Warranty of Title*

A. Contractor warrants and guarantees that title to all Work, materials, and equipment furnished under the Contract will pass to Owner free and clear of (1) all Liens and other title defects, and (2) all patent, licensing, copyright, or royalty obligations, no later than 7 days after the time of payment by Owner.

15.03 *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 and request that Engineer issue a certificate of Substantial Completion. Contractor shall at the same time

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submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.

B. Promptly after Contractor's notification, 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.

C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a preliminary certificate of Substantial Completion which will fix the date of Substantial Completion. Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. Owner shall have 7 days after receipt of the preliminary certificate during which to make written objection to Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the preliminary certificate to Owner, notify Contractor in writing that the Work is not substantially complete, stating the reasons therefor. If Owner does not object to the provisions of the certificate, or if despite consideration of Owner's objections Engineer concludes that the Work is substantially complete, then Engineer will, within said 14 days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion (with a revised punch list of items to be completed or corrected) reflecting such changes from the preliminary certificate as Engineer believes justified after consideration of any objections from Owner.

D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.

E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.

F. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

15.04 *Partial Use or Occupancy*

A. Prior to Substantial Completion of all the Work, Owner may use or occupy 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

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significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:

1. At any time, Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 15.03.A through 15.03.E for that part of the Work.

2. At any time, Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

3. 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 15.03 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.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 6.04 regarding builder's risk or other property insurance.

15.05 *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, or agreed portion thereof, is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

15.06 *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, annotated record documents (as provided in Paragraph 7.12), and other documents, Contractor may make application for final payment.

2. The final Application for Payment must be accompanied (except as previously delivered) by:

   a. all documentation called for in the Contract Documents;

   b. consent of the surety, if any, to final payment;

   c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.

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d. a list of all duly pending Change Proposals and Claims; and

e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, 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, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.

B. *Engineer's Review of Final Application and Recommendation of Payment*: 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 have been fulfilled, Engineer will, within 10 days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the final Application for Payment to Owner for payment. Such recommendation will account for any set-offs against payment that are necessary in Engineer's opinion to protect Owner from loss for the reasons stated above with respect to progress payments. 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. *Notice of Acceptability*: In support of its recommendation of payment of the final Application for Payment, Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to stated limitations in the notice and to the provisions of Paragraph 15.07.

D. *Completion of Work*: The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment and issuance of notice of the acceptability of the Work.

E. *Final Payment Becomes Due*: Upon receipt from Engineer of the final Application for Payment and accompanying documentation, Owner shall set off against the amount recommended by Engineer for final payment any further sum to which Owner is entitled, including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions of this Contract with respect to progress payments. Owner shall pay the resulting balance due to Contractor within 30 days of Owner's receipt of the final Application for Payment from Engineer.

15.07 *Waiver of Claims*

A. By making final payment, Owner waives its claim or right to liquidated damages or other damages for late completion by Contractor, except as set forth in an outstanding Claim,

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appeal under the provisions of Article 17, set-off, or express reservation of rights by Owner. Owner reserves all other claims or rights after final payment.

B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted as a Claim, or appealed under the provisions of Article 17.

15.08 *Correction Period*

A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the Supplementary Conditions or the terms of any applicable special guarantee required by the Contract Documents), Owner gives Contractor written notice that any Work has been found to be defective, or that Contractor's repair of any damages to the Site or adjacent areas has been found to be defective, then after receipt of such notice of defect Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. correct the defective repairs to the Site or such adjacent areas;
2. correct such defective Work;
3. remove the defective Work from the Project and replace it with Work that is not defective, if the defective Work has been rejected by Owner, and
4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting from the corrective measures.

B. Owner shall give any such notice of defect within 60 days of the discovery that such Work or repairs is defective. If such notice is given within such 60 days but after the end of the correction period, the notice will be deemed a notice of defective Work under Paragraph 7.17.B.

C. If, after receipt of a notice of defect within 60 days and within the correction period, Contractor does not promptly comply with the terms of Owner's written 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. Contractor shall pay all 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). Contractor's failure to pay such costs, losses, and damages within 10 days of invoice from Owner will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the failure to pay.

D. 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.

E. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, 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.

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F. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph are not to be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

ARTICLE 16—SUSPENSION OF WORK AND TERMINATION

16.01 *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 written notice to Contractor and Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price or an extension of the Contract Times directly attributable to any such suspension. Any Change Proposal seeking such adjustments must be submitted no later than 30 days after the date fixed for resumption of Work.

16.02 *Owner May Terminate for Cause*

A. The occurrence of any one or more of the following events will constitute a default by Contractor and 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);

2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;

3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or

4. Contractor's repeated disregard of the authority of Owner or Engineer.

B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) 10 days' written notice that Owner is considering a declaration that Contractor is in default and termination of the Contract, Owner may proceed to:

1. declare Contractor to be in default, and give Contractor (and any surety) written notice that the Contract is terminated; and

2. enforce the rights available to Owner under any applicable performance bond.

C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, 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 complete the Work as Owner may deem expedient.

D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within 7 days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.

E. If Owner proceeds as provided in Paragraph 16.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects,

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attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses, and damages exceeds 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.

F. 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, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.

G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond will govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

16.03 *Owner May Terminate for Convenience*

A. Upon 7 days' written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

1. 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. 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; and

3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.

B. Contractor shall not be paid for any loss of anticipated profits or revenue, post-termination overhead costs, or other economic loss arising out of or resulting from such termination.

16.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon 7 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 16.03.

B. 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, 7 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

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provisions of this paragraph are not intended to preclude Contractor from submitting a Change Proposal 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 17—FINAL RESOLUTION OF DISPUTES

17.01 *Methods and Procedures*

A. *Disputes Subject to Final Resolution*: The following disputed matters are subject to final resolution under the provisions of this article:

1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full, pursuant to Article 12; and
2. Disputes between Owner and Contractor concerning the Work, or obligations under the Contract Documents, that arise after final payment has been made.

B. *Final Resolution of Disputes*: For any dispute subject to resolution under this article, Owner or Contractor may:

1. elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions;
2. agree with the other party to submit the dispute to another dispute resolution process; or
3. if no dispute resolution process is provided for in the Supplementary Conditions or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

ARTICLE 18—MISCELLANEOUS

18.01 *Giving Notice*

A. Whenever any provision of the Contract requires the giving of written notice to Owner, Engineer, or Contractor, it will be deemed to have been validly given only if delivered:

1. in person, by a commercial courier service or otherwise, to the recipient's place of business;
2. by registered or certified mail, postage prepaid, to the recipient's place of business; or
3. by e-mail to the recipient, with the words "Formal Notice" or similar in the e-mail's subject line.

18.02 *Computation of Times*

A. When any period of time is referred to in the Contract 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.

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18.03 *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. 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.

18.04 *Limitation of Damages*

A. With respect to any and all Change Proposals, Claims, disputes subject to final resolution, and other matters at issue, neither Owner nor Engineer, nor any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, shall be liable to Contractor for any claims, costs, losses, or damages sustained by Contractor on or in connection with any other project or anticipated project.

18.05 *No Waiver*

A. A party's non-enforcement of any provision will not constitute a waiver of that provision, nor will it affect the enforceability of that provision or of the remainder of this Contract.

18.06 *Survival of Obligations*

A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract, as well as all continuing obligations indicated in the Contract, will survive final payment, completion, and acceptance of the Work or termination of the Contract or of the services of Contractor.

18.07 *Controlling Law*

A. This Contract is to be governed by the law of the state in which the Project is located.

18.08 *Assignment of Contract*

A. Unless expressly agreed to elsewhere in the Contract, no assignment by a party to this Contract of any rights under or interests in the Contract will be binding on the other party without the written consent of the party sought to be bound; and, specifically but without limitation, money that may become due and money that is 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.

18.09 *Successors and Assigns*

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

18.10 *Headings*

A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

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SECTION 501 - SUPPLEMENTARY CONDITIONS

Section Includes:

SC-2.02.A Copies of Documents

SC-2.05.A.2 Schedule of Submittals

SC-2.06 Preconstruction Conference

SC-2.07.A Initial Acceptance of Schedules

SC-2.07.A.2 Schedule of Submittals

SC-3.01 Intent

SC-4.01. A Commencement of Contract Times; Notice to Proceed

SC-4.03.B Reference Points

SC-4.04.C Progress Schedule

SC-4.05. Abnormal Weather Conditions

SC-4.05. Delays in Contractor's Progress

SC-5.01.C. Storage of Materials, Equipment, and Vehicles

SC-5.02.D. Loading of Structures

SC-5.03. Subsurface and Physical Conditions

SC-5.04.A. SC Differing Subsurface and Physical Conditions

SC-5.05.B. Underground Facilities

SC-5.06(A)(3). Hazardous Environmental Conditions

SC-6.01.B. D. and I. Performance, Payment, and Other Bonds

SC-6.03. Contractor's Insurance

SC-6.04.E. Property Insurance

SC-7.02- Supervision and Superintendence

SC-7.03.A. Labor; Working Hours

SC-7.03.C. Work Hour Restrictions

SC-7.03.D- Holiday Work Hours

SC-7.04.D and .E Services, Materials, and Equipment

SC-7.05.A. Contractor's Request; Governing Criteria

SC-7.07.A. Concerning Subcontractors and Suppliers

SC-7.16.B.2. Samples

SC-7.07. Concerning Subcontractors, Suppliers, and Others

SC-7.09.A. Utility Charges.

SC-7.11. Laws and Regulations

SC-7.15. Emergencies.

SC-7.16.G. Shop Drawings and Samples

SC-10.03. Resident Project Representative

SC-11.05(A) Amending and Supplementing the Contract

SC-13.02.B. Cash Allowances.

SC-14.02.B.1 Inspections, Tests, and Approvals

SC-14.03. Defective Work.

SC-15.01.B.1. Applications for Payments

SC-15.01.D. Payment Becomes Due.

SC-15.01.F. Payment for Extra, Additional, or Omitted Work

SC-15.03. Substantial Completion

SC-15.06.A.3 Alternatives to Waivers of Liens.

SC 15.06.D. Completion of Work.

SC-15.07.A. Waiver of Claims

SC-15.08. Correction Period

SC-15.06.A.2. Application for Payment

SC-17.20. Substance Abuse Prevention Program

SC-18.01.A.2. Giving Notice

SC-18.11. Covenant Against Contingent Fees.

SC-18.12. Officials Not to Benefit.

SC-18.13. Other Contracts

Supplementary Conditions

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract. 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 stated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings stated below, which are applicable to both the singular and plural thereof.

The address system used in these Supplementary Conditions is the same as the address system used in the General Conditions, with the prefix "SC" added thereto.

SC-2.02.A COPIES OF DOCUMENTS. Delete Paragraph 2.02.A in its entirety and insert the following in its place:

A. Owner shall furnish to Contractor two fully executed copies of the Contract; One copy is for the Contractor's bonding agency and one copy is for the Contractor's file. Additional printed copies will be furnished upon request at the cost of reproduction. One copy in electronic portable document format (PDF) will also be provided upon request.

SC-2.03.A.2 Schedule of Submittals. Delete Paragraph 2.03.A.2 in its entirety.

SC-2.04. Preconstruction Conference; Designation of Authorized Representatives. Add the following new paragraph after Paragraph 2.04.B:

C. At this conference Owner may designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individual shall have the authority to transmit instructions, receive information, render decisions relative to the Contract, and otherwise act on behalf of Engineer.

SC-2.05.A. Initial Acceptance of Schedules. Delete the first sentence in Paragraph 2.05.A

SC-2.05.A.2. Schedule of Submittals. Delete Paragraph 2.05.A.2 in its entirety.

SC-3.01. Intent. Add the following new paragraph after the first paragraph in 3.01.C:

In case of discrepancy between documents, the governing order is as follows:

1.Addenda

2.Special Provisions (Section 600)

3.Plans

4.Wauwatosa Standard Specifications

5.All Other Specifications

6.Appendices and other documents intended to be incorporated into the contract

If there is a discrepancy on a drawing, the drawing dimension, unless obviously incorrect, govern over scaled dimensions. If there is a discrepancy in the plans, the typical sections or details govern over any standard detail drawing.

SC-3.01. Intent. Add a new paragraph immediately after Paragraph 3.01.H as follows:

I. Some Specification and Drawing text is written in imperative and streamlined form. This imperative language is directed to Contractor, unless specifically noted otherwise. Include the words "shall be" by inference where a colon (:) is used within sentences or phrases.

SC-4.01. A Commencement of Contract Times; Notice to Proceed. Delete Paragraph 4.01.A in its entirety and insert the following in its place:

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 30 days after the time period for acceptance of Bids by Owner stated in the Bid Form or the thirtieth day after the Effective Date of the Agreement, whichever is earlier.

***SC-4.03.B – Reference Points*.** Add the following new paragraph immediately after Paragraph 4.03.A:

B. The Owner will furnish and set the survey stakes for the general location, alignment, grade, and other necessary points with proper notes thereon. The Contractor shall notify the City Engineer not less than seventy-two (72) hours or not less than three (3) working days, whichever is greater, in advance of when and where grade and points are desired.

The Contractor shall be responsible for the preservation of all stakes and marks, and if in the opinion of the City Engineer any of the survey stakes or marks have been carelessly or willfully destroyed or disturbed by the Contractor, the cost to the City of replacing them shall be charged against the Contractor and shall be deducted from the payment for the work.

SC-4.04.C – Progress Schedule. Add the following new paragraph immediately after Paragraph 4.04.B:

C. In addition to submission of the progress schedule, the Contractor shall schedule weekly meetings with the Engineer. The agenda will include, but is not limited to, site safety, review of work progress to date, 3-week schedule, field observations, identified field issues and resolutions, delays, corrective measures to regain the progress schedule, and resident and business impacts.

The Contractor shall provide a 3-week schedule to the Engineer that shows the current week work schedule and proposed work schedule for the following two weeks at these meetings. The Contractor’s project manager and project superintendent shall attend this meeting. A Subcontractor with work shown on the 3-week schedule shall have a representative knowledgeable of the project attend the meeting.

SC-4.05. Abnormal Weather Conditions. Add the following language to Paragraph 4.05.C.2:

(1) The Engineer will award a time extension for severe weather on calendar day and completion date contracts. Submit a request for adverse weather days if the number of adverse weather days exceeds the anticipated number of adverse weather days tabulated below.

TOTAL ANTICIPATED ADVERSE WEATHER DAYS FOR EACH CALENDAR MONTH

Jan: 31[1] Feb: 28[1] Mar: 31[1] April: 5 May: 4 June: 4 July: 3 Aug: 3

Sep: 4 Oct: 5 Nov 1 thru 15: 2 Nov 16 thru 30: 15[1] Dec: 31[1]

[1] Includes an anticipated winter suspension from November 16 through March 31. Multi-year contracts will address the winter suspension dates within the special provisions.

(2) Submit the request to the Engineer at the end of the month. Indicate the number of adverse weather days that occurred during that month. Provide progress schedule documentation to show that the controlling item of work was delayed. Show that the delay was beyond the control of the contractor. The Engineer will assess the contractor's submittal and indicate how many adverse weather days are confirmed.

(3) For each calendar month, the Engineer will grant an adverse weather day for each confirmed adverse weather day that exceeds the number of anticipated adverse weather days. When the contractor requests adverse weather days, the Engineer will give the contractor a monthly written statement showing the number of days credited for adverse weather. At the end of the project, the Engineer will extend time on calendar day and completion date contracts for the cumulative number of severe weather days credited each month. On days where less than 4 hours of controlling items of work were or could have been performed, a full adverse weather day will be granted. On days where 4 or more hours but less than 8 hours of controlling items of work were or could have been performed a half adverse weather day will be granted. Days in which 8 hours or more of a controlling item of work were or could have been performed will not be granted an adverse weather day.

(4) Winter Suspension for Completion Date Contracts

a) The Contractor may request a winter suspension for a completion date contract. If the Engineer determines that conditions do not allow for the completion of the remaining work, the Engineer may approve the Contractor’s request and determine a start date of the winter suspension. The end date of the winter suspension is March 31 or a date mutually agreed upon by both parties. If weather conditions permit work to resume within the winter suspension period, the Engineer may direct the Contractor to resume all or specific work activities.

b) During winter suspension, store all materials in a manner that does not obstruct vehicular and pedestrian traffic, plowing operations, and does not hinder visibility of drivers. The Contractor shall be responsible to protect all stored materials from damage and/or theft. Install traffic control and other safety devices necessary to protect the traveling public and pedestrians. Provide suitable drainage and install temporary erosion control where necessary. If the winter suspension begins when liquidated damages are being assessed, or when the work has not progressed as scheduled and would not have been completed prior to the completion date, the cost of necessary pre-suspension work is incidental. If the winter suspension begins prior to the contract completion date, and the work has progressed as scheduled and would have been completed prior to the completion date, the cost of pre-suspension work will be paid as specified under *SC-15.01.F.*

c) For a winter suspension that begins prior to the contract completion date and the work has progressed as scheduled and would have been completed prior to the completion date, the Engineer will extend contract time to correspond to the end of the winter suspension and liquidated damages will not be assessed during the winter suspension.

d) For a winter suspension that begins when liquidated damages are being assessed or when the work has not progressed as scheduled and would not have been completed prior to the completion date, the engineer will not extend contract time. Time will be suspended until the end of the winter suspension and no work will be permitted unless authorized by the Engineer in writing. Liquidated damages will not be assessed during the winter suspension when no work is occurring. Liquidated damages will resume at the end of the winter suspension and will resume during any calendar days the Engineer authorizes or directs the Contractor to perform contract work during the winter suspension period.

(5) Winter Suspension for Non-Completion Date Contracts

a) The Contractor shall complete all work on Non-Completion Date Contracts prior to the Winter Suspension date of November 15th. If work is not complete prior to the Winter Suspension dates, the Contractor shall ready the project for Winter Suspension per SC-4.05(4)b. and all costs shall be incidental to the contract. If weather conditions permit work to resume within the winter suspension period, the Engineer may direct the Contractor to resume all or specific work activities.

SC-4.05. Delays in Contractor's Progress. Add the following paragraph immediately following Paragraph 4.05.H:

I. The Engineer shall have authority to suspend the work wholly or in part for such period or periods as they may deem necessary, due to unsuitable weather or such conditions as are considered unfavorable for the suitable prosecution of the work

or for such time as it is necessary due to the failure on the part of the Contractor to carry out orders given or perform any and all provisions of the contract.

SC-5.01.C. Storage of Materials, Equipment, and Vehicles. Add the following new language at the end of Paragraph 5.01.C.:

C. Materials shall be so stored as to insure the preservation of their quality and fitness for the work. Stored materials, even though approved before storage, shall be inspected prior to their use in the work and shall meet the requirements of the specifications at the time it is proposed to use them. Stored materials shall be located so as to facilitate prompt inspection. That portion of the public streets or public lands not required for public use or travel may upon approval of the Engineer be used for storage purposes and for placing of the Contractor's plant and equipment, however, adequate storage space is not guaranteed and, additional space, if required, shall be provided by the Contractor at their own expense.

   The Contractor's vehicles, equipment and materials shall not be left on the street except when work operations are actually in progress, unless otherwise authorized by the Engineer.

SC-5.02.D. Loading of Structures. Add the following new language at the end of paragraph 5.02.D:

D. If the Contractor intends to store materials, equipment, or vehicles on a structure, at the Engineer's request, the Contractor shall provide a structural analysis stamped by a licensed Structural Engineer including calculations showing that the loading does not exceed the structural loading and will not endanger the structure or adjacent structures or land to stresses or pressures that will endanger them prior to storing materials, equipment, or vehicles on the structure.

SC-5.03. Subsurface and Physical Conditions. Add the following new paragraphs immediately after Paragraph 5.03.D:

E. The following reports of explorations and tests of subsurface conditions at or contiguous to the Site are known to Owner: None.

F. The following drawings and photographs of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) are known to Owner: None.

G. The reports and drawings identified above are not part of the Contract Documents, but the "technical data" contained therein upon which Contractor may rely, as expressly identified and established above, are incorporated in the Contract Documents by reference. Contractor is not entitled to rely upon any other information and data known to or identified by Owner or Engineer.

H. Copies of reports and drawings identified in SC-5.03.F and SC-5.03.G that are not included with the Bidding Documents may be examined at City of Wauwatosa's City Hall during regular business hours.

SC-5.04.A. SC Differing Subsurface and Physical Conditions. Delete Paragraph 5.04.A in its entirety and insert the following in its place:

A. Notice: If Contractor believes that any subsurface or physical condition 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 5.03 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 the Contractor shall immediately call the attention of the Engineer to such conditions, and, if Contractor finds that the materials differ from those shown on the drawings, or indicated in these specifications, Contractor shall at once make such changes in the drawings and/or specifications, as Contractor may find necessary.

SC-5.05.B. Underground Facilities. Delete Paragraph 5.05.B in its entirety and insert the following in its place:

B. Notice by Contractor:

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown and indicated with reasonable accuracy in the Contract Documents Contractor shall, within two working days 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 7.15.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 or 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 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 12.01.

SC-5.06(A)(3). Hazardous Environmental Conditions. Add the following subparagraphs immediately after Paragraph 5.06(A)(3):

4. The following reports regarding Hazardous Environmental Conditions at the Site are known to Owner: None.

SC-6.01.B. Performance, Payment, and Other Bonds. Add the following new paragraphs immediately after Paragraph 6.01.B:

1. Labor and Material Bond. The Contractor shall furnish a surety bond in an amount at least equal to 100% of the full contract price, such bond to be executed by a surety company acceptable to the Owner. The labor and material bond shall serve as security for the payment of all persons performing labor and all persons furnishing materials in connection with this contract.

2. Premium Payment. The premiums on the performance bond and labor and material bond shall be paid by the Contractor.

3. If Section 71.80(16) Wisconsin Statutes is applicable, Contractor hereby agrees to comply with the requirements of such Section. This Section is applicable to Contractors who are nonresidents of Wisconsin when total contract price exceeds $50,000.00.

SC-6.01.D. Performance, Payment, and Other Bonds. Replace in its entirety the language in Paragraph 6.01.D with the following:

All bonding companies and sureties issuing bonds and/or contract security to Contractor shall be licensed to perform business in the State of Wisconsin.

SC-6.01. Performance, Payment, and Other Bonds. Add the following language immediately following Paragraph 6.01.H.:

I. Should any surety upon the bond for performance of this contract become unacceptable to the Owner, the Contractor must promptly furnish such additional security as may be provided from time to time to protect the interests of the Owner and of persons supplying labor or materials in the prosecution of the work contemplated by this contract.

SC-6.03. Contractor's Insurance. Add the following language immediately after paragraph 6.03.C:

D. The Contractor and the Contractor's insurance company shall be held responsible for and shall save the Owner harmless from all liability for damages occasioned by the digging up, use or occupancy of the street, alley, highway, public grounds and private grounds, or which may result therefrom, or which may result in any way from the negligence or carelessness of the Contractor, their agents, employees or workmen; or by reason of the elements, unforeseen or unusual difficulties, obstructions, or obstacles encountered in the prosecution of the work; and they shall indemnify the Owner for and save it harmless from all claims and liabilities, actions and causes of action, and liens for materials furnished or labor performed in the construction or execution of the work, and from all

costs, charges and expenses incurred in defending such suits or actions, and from and against all claims and liabilities for injury or damage to persons or property emanating from defective or careless work methods, or from and against all claims or liabilities for royalties, license fees, actions, suits, charges and expenses or damage from infringement for reason of the use of any invention or improvement in tools, equipment or plant or any process, device or combination of devices used in the construction of the work.

The Contractor shall not commence work under a contract until they have obtained all insurance required under this paragraph and has filed certificates thereof with the Owner, nor shall the Contractor allow a subcontractor to commence work until all similar insurance required has been so obtained and filed. Contractor shall be required to maintain insurance throughout the duration of the contract until final acceptance of the project.

E . WORKMEN'S COMPENSATION INSURANCE Statutory coverage as required by Chapter 102 of the Statutes of the State of Wisconsin, as revised, and all acts amendatory thereof and supplementary thereto, and for all employees of the Contractor. All subcontractors and suppliers shall furnish to the Contractor and the Owner evidence of similar insurance for all of their respective employees unless such employees are covered by the protection afforded by the Contractor.

F. COMPREHENSIVE GENERAL LIABILITY AND PROPERTY DAMAGE INSURANCE

(1) COMPREHENSIVE GENERAL LIABILITY

The Contractor shall maintain during the life of this Contract, Comprehensive General Liability written in comprehensive form to protect the Contractor, the Owner and Engineer against all claims arising from injuries to members of the public or damage to property of others arising out of any act or omission of the Contractor or their agents, employees, or subcontractors. The policy shall be endorsed to include Notice of Cancellation Endorsement Form IL-7002 10-90 or equivalent endorsement language which is approved by the City Attorney. This endorsement shall be specifically reflected on the Certificate of Insurance form required by Section 6.02, and a copy of said endorsement shall be provided to the Owner when available. In addition, this policy shall specifically insure the contractual liability assumed by the Contract.

The scope of this coverage shall also include the Personal Injury Hazards, including "a", "b", and "c". "a" includes false arrest, malicious prosecution, and un-willful detention or imprisonment. "b" includes libel, slander, and defamation of character. "c" includes wrongful eviction, invasion of privacy and wrongful entry. Employee exclusion shall be removed. In addition, coverage will include broad form property damage, host liquor liability, advertising injury, additional persons insured, extended bodily injury, and incidental medical malpractice.

Comprehensive general liability coverage shall contain no exclusions for explosion, collapse, or underground work (X, C, or U).

The contractor shall also provide completed operation and product liability coverage for the life of the Contract and maintain such coverage for a period of 1 year after final acceptance of the work by the Owner.

The liability limits shall not be less than $1,000,000 combined single limit per occurrence for personal injury, bodily injury and property damage if coverage written on 1973 I.S.O. form or $1,000,000. combined single limit per occurrence with $2,000,000. aggregate for personal injury, bodily injury or property damage if coverage is written on 1986 I.S.O. coverage form.

(2) UMBRELLA/EXCESS LIABILITY

The Contractor shall maintain during the life of this Contract, Umbrella/Excess Liability coverage totaling $5,000,000. If primary comprehensive General Liability is written on a 1986 I.S.O. coverage form, Umbrella/Excess liability shall include a drop down provision to protect, on a primary basis, the contractor, the Owner and Engineer, in the case of exhaustion of the aggregate primary limits.

G. COMPREHENSIVE AUTOMOBILE LIABILITY AND PROPERTY DAMAGE Operations of owner, hired and non-owned motor vehicles.

Bodily Injury	$ 500,000 per person
	$1,000,000 per occurrence
Property Damage	$ 500,000 per occurrence

The Contractor shall file with the Owner a certification of insurance containing a ten (10) day notice of cancellation.

NOTE: The required limits of liabilities may be obtained with primary liability policies or in combination with an umbrella excess third party liability policy.

H. ADDITIONAL INSUREDS All insurance coverages required pursuant to this contract shall name the following persons as additional insured parties:

The Owner and its boards, commissions, committees, authorities, employees, agencies and officers, voluntary associations, other units operating under the jurisdiction and within the appointment of its budget.

SC-6.04.E. Property Insurance*.* Immediately following paragraph 6.04.E, add the following paragraphs*:*

F. Contractor shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof. Contractor shall be responsible for any deductible or self-insured retention. This insurance shall:

1. include the interests of Owner, Contractor, Subcontractors, Engineer, and the officers, directors, partners, employees, agents, and other consultants and

subcontractors of any of them, each of whom is deemed to have an insurable interest and shall be listed as an insured or loss payee;

2. be written on a Builder's Risk "all-risk" policy form that shall at least include insurance for physical loss and 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, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage (other than that caused by flood), and such other perils or causes of loss as may be specifically required by these 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;

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 loss payee to whom a certificate of insurance has been issued; and

8. include coverage for hazardous materials to comply with the requirements of Paragraph 5.06.C of the General Conditions.

SC-7.02- Supervision and Superintendence. Add the following new paragraphs immediately after Paragraph 7.02.B.:

C. The work shall be under the charge and care of the Contractor until final acceptance by the City. The Contractor shall assume all responsibility for injury or damage to the work by action of the elements or for any cause whatsoever, whether arising from the execution or partial or complete failure in execution of the work. The Contractor shall rebuild, restore and make good, at their own expense, all injuries or damages to any portion of the work occasioned by any causes before its completion and acceptance.

SC-7.03.A. Labor; Working Hours. *Add the following new paragraph immediately after Paragraph 7.03.A:*

1. When a person employed by Contractor, or anyone for which Contractor is responsible, is abusive or disrespectful to the general public or to the Owner's representative, such employee shall, upon written request by Owner, be removed from the Work.

SC-7.03.C. Work Hour Restrictions. Delete Paragraph 7.03.C. in its entirety and insert the following in its place:

Work operations in residential areas, including daily startup activities under this contract, shall be limited to the period from 7 A.M. to 7 P.M. Monday thru Friday, during the life of the contract except those work operations identified in the special provisions, if any. If, in the opinion of the Engineer, or their authorized representative, unusual circumstances dictate work outside of these hours is warranted due to an emergency condition, or special circumstance, such authorization by the Engineer or their representative to extend the working hours beyond those stated herein, shall be given in writing and, if authorized, shall be on a single incidence basis for a specific day. For all other work that is not deemed an unusual circumstance, the Contractor shall follow the procedures outlined in the specifications to obtain written permission to perform work.

SC-7.03- Holiday Work Hours. Add the following new paragraph immediately after Paragraph 7.03.C:

D. The Contractor shall not perform work on holidays observed by the Owner without written permission from the Engineer.

SC-7.04 Services, Materials, and Equipment. Add the following new paragraphs immediately after Paragraph 7.04.C.:

D. Clean Up. The Contractor shall at all times keep the premises free from accumulations of waste material or rubbish caused by their employees or work and Contractor shall remove all their rubbish from and about the site and all their tools, equipment, scaffolding and surplus materials and shall leave the work clean and ready for use. In case of dispute, the Owner may remove the rubbish and surplus materials and charge the cost to the Contractor and the Contractor agrees to reimburse such cost to the Owner.

E. Final Cleaning Up. Within fourteen (14) calendar days after the completion of the work and before acceptance and payment will be made, the Contractor shall clean and remove from the site of the work and adjacent property all surplus and discarded materials, rubbish and temporary structures, restore in an acceptable manner all property, both public and private, which has been damaged in the prosecution of the work and shall leave the site of the work in a neat and presentable condition.

SC-7.05.A. Contractor's Request; Governing Criteria. Delete SC 7.05.A. and replace with the following:

A. Contractor's Request; Governing Criteria: Whenever an item of equipment or material is specified or described in the Contract Documents by using the names of one or more proprietary items or specific Suppliers, the Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item 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 is permitted, Contractor may request that Engineer authorize the use of other items of equipment or material, or items from other proposed Suppliers, under the circumstances described below.

4. If Engineer in its sole discretion determines that an item of equipment or material proposed by Contractor is functionally equal to that named and

sufficiently similar so that no change in related Work will be required, Engineer may deem it an "or equal" item, subject to the following. For the purposes of this paragraph, a proposed item of equipment or material may be considered functionally equal to an item so named if:

a. in the exercise of reasonable judgment Engineer determines that the proposed item:

1) is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

2) will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;

3) has a proven record of performance and availability of responsive service; and

4) is not objectionable to Owner. Engineer may object on behalf of on behalf of Owner for any reason in Engineer's discretion.

b. Contractor certifies that, if the proposed item is approved and incorporated into the Work:

1) there will be no increase in cost to the Owner or increase in Contract Times; and

2) the item will conform substantially to the detailed requirements of the item named in the Contract Documents.

SC-7.07.A. Concerning Subcontractors and Suppliers. Add the following new paragraph immediately following Paragraph 7.07.A.:

1. The Contractor must perform with their own organization, work amounting to at least one-third of the original contract amount unless a differing portion is specified in the contract Special Provisions.

SC-7.16.B.2. Samples. Delete Paragraph 7.16.B.2 in its entirety and replace with the following new paragraphs:

A. The Contractor shall provide such facilities as the Engineer may require for collecting and forwarding samples, and shall not make use of or incorporate in the work any material represented by these samples until the tests have been made and the material found to be acceptable in accordance with the requirements of the specifications. The Contractor shall furnish without charge all samples required.

B. When required by the Engineer, representative preliminary samples of the character and quality prescribed shall be submitted by the Contractor or producer for examination and shall be tested in accordance with the methods referred to herein. The acceptance of preliminary sample, however, shall not be construed as acceptance of the material from the same source delivered later. Only the materials actually delivered for the work will be considered and their acceptance or rejection will be based solely on the results of the

tests prescribed in these specifications. All samples shall be submitted before shipment of the material to the site of the work and in ample time to permit making tests or examinations before incorporating the material into the work.

C. All tests shall be made in accordance with the methods described in these specifications. If any specifications are inadvertently omitted, those of the A.S.T.M. or other recognized societies for such materials will be used. References to A.S.T.M. or other recognized societies, specifications shall be understood to mean the latest revision of the standard specifications. Laboratory tests shall be made by a recognized laboratory acceptable to the Engineer. Reports of tests provided by the Contractor shall be submitted promptly to the Engineer.

D. The Contractor shall give timely notice to the Engineer of the place and time of the test to be made, to permit the Engineer to witness the test if they should so desire. All tests shall be made at the sole expense of the Contractor.

SC-7.07. Concerning Subcontractors, Suppliers, and Others. Add new paragraphs immediately after Paragraph 7.07.M:

N. Contractor shall, to the extent practicable, maintain a list of all Subcontractors, Suppliers, and service providers performing, furnishing or procuring labor, services, materials, plans or specifications for the performance of the Work.

SC-7.09.A. Utility Charges. Amend the fourth sentence of Paragraph 7.09.A to read as follows:

Contractor shall pay all charges of utility owners for connections for providing permanent service to the Work.

SC-7.11. Laws and Regulations. Add the following paragraph after Paragraph 7.11.C:

D. Contractor shall assist and cooperate fully with Owner in meeting any obligations under the Wisconsin Public Records law. In the event that Contractor withholds records, for any reason, and said withholding is found to be in violation of the law or a Court Order, Contractor shall indemnify and hold harmless Owner for any and all costs related to the withholding of those records, including, but not limited to, monetary damages of any kind, actual attorney's fees, and litigation costs of any kind.

E. Owner and Contractor recognize that applying applicable Wisconsin public records laws to particular records requests can be difficult in light of copyright and other confidentiality protections. To ensure that applicable laws are followed, both with regard to private rights, and with regard to public records laws, Owner and Contractor agree as follows. When Owner receives public records requests for matters that Owner believes might be proprietary or confidential information. Owner will notify Contractor of the request. Within three (3) days of such notification (subject to extension of time upon mutual written agreement). Contractor shall either provide Owner with the record that is requested for release to the requester or Contractor shall advise Owner that Contractor objects to the release of the requested information and the basis for the objection. If for any reason Owner concludes that Owner is obligated to provide a record to a requester that is in Contractor's possession. Contractor shall provide such records to Owner immediately upon Owner's request. Contractor shall not charge for work performed under this

paragraph except for the "actual. necessary and direct" charge of responding to the records request as that is defined and interpreted in Wisconsin law.

In addition to and not to the exclusion or prejudice of any provisions of this agreement or documents incorporated herein by reference, Contractor shall indemnify and save harmless and agrees to accept tender of defense and to defend and pay any and all legal, accounting, consulting, engineering and other expenses relating to the defense of any claim asserted or imposed upon the Owner, its officers, agents, employees and independent contractors growing out of Owner's denial of a records request. based upon objections made by Contractor; or (ii) Contractor's failure to provide records to Owner upon Owner's request; or (iii) Owner's charges made to a records requester based upon reimbursement of costs Contractor charged to Owner in responding to a records request; or (iv) Owner's lack of timely response to a records request. following Contractor's failure to timely respond to Owner as required herein; or (v) Owner's provision of records to a requester that were provided to Owner by Contractor in response to a records request. Contractor's claims of proprietary rights, or any other copyright or confidentiality claims, shall be waived such that Owner may provide all requested documents, programs, data, and other records to the requestor, upon failure by Contractor to defend, indemnify or hold harmless the Owner as required herein, and/or upon judgment of a court having jurisdiction in the matter requiring release of such records.

F. In carrying out any of the provisions of this contract or in exercising any power or authority granted to the Contractor hereby, there shall be no personal liability upon the Engineer or their authorized assistants, it being understood that in such matters they act as agents and representatives of the Owner.

SC-7.15. Emergencies. Add a new paragraph immediately after Paragraph 7.15.A as follows:

B. In the event it becomes necessary for the Owner to perform emergency maintenance and protection which are the responsibility of Contractor under the Contract Documents, the costs incurred will be charged against Contractor, a Change Order will be issued, and Owner shall be entitled to an appropriate decrease in the Contract Price.

SC-7.16.G. Shop Drawings and Samples. *Add the following paragraphs immediately after Paragraph 7.16.F:*

G. If Contractor requests a change of a previously approved item, Contractor shall reimburse Owner for Engineer's charges for its review time unless the need for such change is beyond the control of Contractor.

SC-10.03. Resident Project Representative. *Add the following new paragraph immediately after Paragraph 10.03.B:*

C. The Resident Project Representative (RPR) will have same authority and responsibilities as Engineer.

SC-11.05(A) Amending and Supplementing the Contract. Add the following new paragraphs immediately after Paragraph 11.05(A):

1. <u>INCREASED OR DECREASED QUANTITIES OF WORK</u>. If the Engineer deems it proper or necessary in the execution of the work to make changes which will increase or

decrease the quantity of labor or material or the expense of the work, such changes shall not annul nor violate the contract or agreement hereby entered into nor release the surety thereon, and the Contractor shall furnish the necessary labor and material to complete the contract as changed.

Items for which quantities change are categorized as major or minor items. A major item shall be considered to be any item whose total cost, determined by multiplying the original quantity and the contract unit price, is equal to or greater than five percent of the total amount of the original contract. A minor item is one of which total cost, determined, as above, is less than five percent of the total amount of the original contract.

When the actual quantity of any major item required to complete the work is increased or decreased, payment for the quantity of work actually performed for such item will be made in accordance with the table below:

Increased or Decreased Quantities of Work

Item	Actual Quantity as % of Contract Quantity	Basis of Payment
Major (≥5% of Total Contract)	75% - 125%	Contract Unit Prices
Major (≥5% of Total Contract)	<75%	Adjusted Unit Prices (not to exceed cost for 75% of contract quantity times the contract unit price)
Major (≥5% of Total Contract)	>125%	Adjusted Unit Prices for units >125% of contract quantity. (Contract Unit Prices for all units up to 125% of contract quantity).
Minor (<5% of Total Contract)	All	Contract Unit Prices

The adjustment or revision of unit prices shall be negotiated on the basis of actual cost for the entire item plus a reasonable allowance for profit and applicable overhead.

If such changes cause an increase or decrease in the time required for its performance, an equitable adjustment shall be made and a Change Order effectuating the change shall be executed. .

No changes shall be made without first obtaining the approval in writing of the Engineer or their duly authorized representative. Any claim for adjustment under this section must be asserted within ten (10) days from the date the change is ordered, unless the Engineer shall for proper cause extend such time. Nothing provided in this section shall excuse the Contractor from proceeding with the prosecution of the work so changed.

2. EXTRA WORK. The Contractor may be ordered by the Engineer to perform additional work and furnish materials which do not appear in the proposal or contract as a specific item accompanied by a unit price, or lump sum price, and which are not included under

the price bid for other items in the contract. All such work and materials shall be designated as extra work. The Contractor shall perform extra work whenever it is deemed necessary or desirable by the Engineer to fully complete the project as contemplated and it shall be done in accordance with the intent of these specifications.

Extra work shall be done under the supervision of the Engineer and their decision shall be final and binding. The plan of the work to be followed, the equipment to be used and the amount and character of labor to be employed shall meet with the approval of the Engineer. Authorization for extra work shall be given by the Engineer in writing in the form of a Change Order. The Contractor shall perform the extra work by force account when so ordered by the Engineer. Work performed on a cost-plus-limited basis shall have itemized statements submitted in accordance with 109.4.5.1(3) of the State Specs. Claims for extra work which have not been authorized by the Engineer will be rejected.

SC-13.02.B. Cash Allowances. Delete Paragraph 13.02.B.1.in its entirety and insert the following in its place:

1. The cash allowances include the cost to Contractor (less any applicable trade discounts) of materials, equipment, and services required by the allowances to be delivered at the Site, or for the Project, and all applicable taxes; and

SC-14.02.B.1 Inspections, Tests, and Approvals. Add the following new paragraphs immediately following Paragraph 14.02.B.:

H. Inspectors, employed by the Owner, shall be authorized to inspect all work done and all material furnished. Such inspection may extend to all or any part of the work and to the preparation, fabrication or manufacture of the materials to be used. The inspector is not authorized to revoke, alter, or waive any requirements of the specifications. Inspector is authorized to call the attention of the Contractor to any failure of the work or material to conform to the specifications and the contract and shall have authority to reject materials or suspend the work until any questions at issue can be referred to and decided by the Engineer.

   The inspector shall in no case act as foreman or perform other duties for the Contractor nor interfere with the management of the work by the latter. Any advice which the inspector may give the Contractor shall in no way be construed as binding the Engineer in any way or releasing the Contractor from fulfilling any of the terms of the contract.

   If the Contractor refuses to suspend operations on verbal order, the Engineer or inspector shall issue a written order giving the reason for shutting down the work. After placing the order in the hands of the Project Manager, Project Superintendent , or Foreman on-site , the inspector shall immediately leave the job. Work done after the inspector leaves the job will not be accepted or paid for.

SC-14.03. Defective Work. Add the following new paragraph immediately following Paragraph 14.03.G.:

H. Failure or neglect on the part of the Engineer to condemn or reject bad or inferior work or materials shall not be construed to imply an acceptance of such work or materials, if it becomes evident at any time prior to the final acceptance of the work by the Owner. Neither shall it be construed as barring the Owner, at any subsequent time, from the

recovery of damages or of such a sum of money as may be needed to build anew all portions of the work in which fraud was practiced or improper materials hidden, wherever found.

SC-15.01.B.1. Applications for Payments. Delete paragraph 15.01.B.1. in its entirety and insert the following in its place:

1. At least forty 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 Contractor shall submit three documents: an invoice from the material or equipment supplier which states item's cost; an item-specific invoice, bill of sale, 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 will be satisfactory to Owner.

   Requests for payment for materials and equipment not incorporated in the Work shall not be made.

SC-15.01.D. Payment Becomes Due. Delete paragraph 15.01.D. in its entirety and insert the following in its place:

D. Within fifteen days after presentation of the Application for Payment to Owner, with the Engineer's recommendation, the amount recommend will (subject to the provisions of paragraph 14.02.D and calendar placement on the next available Board of Public Works Agenda) become due, and when due will be paid by Owner to Contractor.

SC-15.01.F. Payment for Extra, Additional, or Omitted Work. Add the following new paragraphs immediately following Paragraph 15.01.E.:

F. The Owner upon proper action by its governing body, may authorize changes in, additions to, or deductions from the work to be performed or the material to be furnished pursuant to the provisions of the contract or any other contract documents.

   Adjustments, if any, in the amounts to be paid to the Contractor by reason of any such change, addition or deduction shall be determined by one or more of the following methods:

   (a) By unit prices contained in the Contractor’s original bid and incorporated in the construction contract.

   (b) By a supplemental schedule of prices contained in the Contractor’s original bid and incorporated in the construction contract.

   (c) By an acceptable lump sum proposal from the Contractor not to exceed fifteen (15%) percent of the original contract price for all extra, additional or omitted work to comply with Section 62.15(1c) of the Wisconsin Statutes. For lump sum proposals

submitted by a subcontractor, the Owner will allow the contractor a markup on work the subcontractor performs as follows:

- Use a markup of 10% for the first $10,000 of work.
- Use a markup of 2% for work in excess of $10,000.

(d) On a cost-plus-limited basis not to exceed fifteen percent (15%) of the original contract price to comply with Section 62.15 (1c) of the Wisconsin Statutes. A cost-plus-limited basis is defined as the cost of labor, materials and insurance, plus fifteen percent (15%) of the said cost to cover superintendence, general expense, overhead, and profit. Equipment necessary to complete work on a cost-plus-limited basis will be paid as an hourly rate and shall include no mark-up above the hourly rate.

1. Labor – The Owner will pay the contractor's labor costs at the contractor's personnel actual wage rates or wage rates previously agreed upon with the Owner, in writing, for personnel directly involved in producing and supervising the cost-plus-limited basis work. The Owner will only pay for hours that personnel are actually engaged in cost-plus-limited basis work. The Owner will also reimburse the contractor based on actual costs paid to, or on behalf of, workers for subsistence and travel benefits, health and welfare benefits, pension fund benefits and other contractor-paid benefits. The Owner will pay no part of wages or benefits for personnel connected with the contractor's forces above the classification of foreman and having only general supervisory responsibility for the cost-plus-limited basis work.
2. Materials – The Owner will pay the Contractor based on actual invoiced costs, including applicable taxes and actual freight charges, for Engineer-approved materials the contractor uses in force account work. If the contractor uses materials from the contractor's stock, the Owner and the contractor will agree on the price. Do not incorporate materials into the work without agreement. The Owner reserves the right to furnish materials as it deems appropriate. Make no claims for the costs, overhead, or profit on materials that the Owner provides.

3. Insurance – The Owner will pay the contractor based on actual invoiced costs for property damage, liability and workers compensation insurance premiums, unemployment insurance contributions and social security taxes on work performed on a cost-plus-limited basis. The contractor shall furnish satisfactory evidence of the rates actually paid.

4. Equipment – The Owner will pay for the use of contractor-owned equipment the Engineer approves for work on a cost-plus-limited basis only during the hours that it is operated to the nearest half hour. Contractor-owned equipment expense rates will be paid as given in EquipmentWatch Cost Recovery (formerly Rental Rate Blue Book). Base all rates on revisions effective January 1 for all equipment used in that calendar year and provide the Engineer with a copy of the rate sheet for each piece of equipment used.

http://equipmentwatch.com/estimator/

For equipment not listed in EquipmentWatch, provide an expense rate and furnish cost data to support that rate.

Rental equipment will be paid at the rental cost as invoiced by the rental company.

The Owner will not pay rental for tools or equipment with a replacement value of $500 or less.

The Engineer may reject equipment not in good working condition or not properly sized for efficient performance of the work.

If a subcontractor performs work on a cost-plus-limited basis, the Owner will allow the contractor a markup on work the subcontractor performs as follows:

- Use a markup of 10% for the first $10,000 of work.
- Use a markup of 2% for work in excess of $10,000.

No claim for an addition to the contract sum shall be valid unless authorized in writing by the Engineer pursuant to section SC-11.05(A). Final proposed costs, including all back-up documentation, for authorized changes performed on a cost-plus-limited basis shall be submitted to the Engineer within 45 days of completing the authorized work.

SC-15.03. Substantial Completion. Add the following paragraph immediately following Paragraph 15.03.F.:

G. The Contractor, upon receipt of the punch list, shall submit all missing documentation and perform all work enumerated on the punch list within 14 calendar days from the date the Engineer issues the punch list.

If missing documentation and incomplete or unacceptable work remain after the 14 calendar days, the Engineer may restart contract time unless the Engineer and the Contractor mutually agree to extend this 14 calendar day requirement.

SC-15.06.A.3 Alternatives to Waivers of Liens. Delete Paragraph 15.06.A.3. in its entirety.

SC 15.06.D. Completion of Work. Delete Paragraph 15.06.D. in its entirety and insert the following in its place:

D. Completion of Work: The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment, the Common Council, if applicable, has approved of the work and final payment, and the Board of Public Works has ratified final payment, and issuance of notice of the acceptability of the Work has been made.

SC-15.07.A. Waiver of Claims. Delete Paragraph 15.07.A. in its entirety and insert the following in its place:

A. The Owner shall not be precluded or estopped by any measurements, estimate or certificate made either before or after the completion and acceptance of the work and payment therefore, from showing the true amount and character of the work performed and materials furnished by the Contractor, or from showing that any measurement, estimate or certificate is untrue or incorrectly made, or that the work or materials do not conform in fact to the contract. The Owner shall not be precluded or estopped, notwithstanding any such measurement, estimate, certificate and payment in accordance therewith, from recovering from the Contractor and their sureties such damage as it may sustain by reasons of the Contractor's failure to comply with the terms of the contract. Neither the acceptance by the Board of Public Works and/or Common Council, nor any representative of the Board of Public Works and/or Common Council, not any payment for or acceptance of the whole or any part of the work, nor any extension of time, nor any possession taken by the Owner shall operate as a waiver of any portion of the contract or of any power herein reserved, or any right to damages herein provided. A waiver of breach of the contract shall not be held to be a waiver of any other or subsequent breach.

SC-15.08. Correction Period. Delete paragraphs 15.08.A. and 15.08.D in their entirety and insert the following in their place:

A. If within one year after the date of final payment (or such longer period of time as may be prescribed 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 7.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. correct the defective repairs to the Site or such adjacent areas;

2. correct such defective Work, or

3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and

4. 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.

D. In special circumstances where a particular item of equipment is placed in continuous service before Engineer's recommendation of final payment, the correction period for that item may start to run from an earlier date if so provided in the Specifications.

SC-15.08. A *Correction Period.* Add the following new paragraph immediately after paragraph 15.08.A.4:

5. If Contractor cannot correct defective work within thirty days due to prevailing manufacturing or repair time, Contractor shall promptly provide temporary Work, satisfactory to Owner, until Work can be permanently corrected.

SC-15.06.A.2. Application for Payment. Add the following paragraph immediately after Paragraph 15.06.A.2.e :

f. List of all Subcontractors, Suppliers, and service providers required by SC-7.07.N.

SC-17.20. Substance Abuse Prevention Program. Add the following paragraphs immediately following Paragraph 17.19:

The contractor shall develop, implement and maintain a Substance Abuse Prevention Program as established by Section 103.503 of the Wisconsin State Statutes, and all acts amendatory thereof and supplementary thereto. This statute establishes certain prohibitions against the use and distribution of drugs and alcohol by employees of contractors and subcontractors that have been awarded contracts for or are performing work on public works projects subject to Wisconsin's prevailing wage requirements.

The program must cover all union and non-union employees who work on the Owner's construction sites. Failure to implement such a program prior to award shall result in the Bidder being held to be non-responsible. Following award of the Contract if the Contractor breaches the District Policy by failing to have or to effectively implement the policy, the Owner shall consider this a breach of the Contract by the Contractor and may terminate the Contract. This requirement shall be applicable to all subcontractors with subcontracts in excess of one percent (1%) of the bid.

The act specifically provides that effective May 1, 2007, contractors, subcontractors and their respective employees must comply with the following requirements:

1. Employees on covered public works projects are prohibited from (a) using, possessing, attempting to possess, distributing, delivering or being under the influence of drugs while performing work on covered public works projects, and (b) using or being under the influence of alcohol while performing work on covered public works projects.

2. Before a contractor or subcontractor begins a covered public works project, the contractor or subcontractor must have a written program for the prevention of substance abuse, including:

   (a) A prohibition against the use of drugs or alcohol while working on covered public works projects.

   (b) A requirement that contractor's or subcontractor's employees submit to random, reasonable suspicion and post-accident drug and alcohol tests.

   (c) A requirement that contractor's and subcontractor's employees submit to drug and alcohol tests before beginning work on covered public works projects, unless those employees have been participating in a random testing program during the preceding 90 days.

   (d) A procedure for notifying employees that fail a test or refuse to submit to testing that they may not perform work on covered public works projects until they submit to and pass drug and alcohol tests.

3. Each contractor and subcontractor is required to pay for the development, implementation and enforcement of its own substance abuse program. These costs cannot be passed on to covered public works projects.

4. Contractors and subcontractors cannot allow employees that fail a test or refuse to submit to substance abuse tests to work on covered public works projects.

5. All substance abuse testing must be conducted in accordance with guidelines for laboratory testing procedures and chain of custody procedures established by the Substance Abuse and Mental Health Services Administration of the Federal Department of Health and Human Services.

SC-18.01.A.2. Giving Notice. Delete Paragraph 18.01.A.2 in its entirety and insert the following in its place:

2. Delivered at or sent to the last business address known to the giver of the notice by United States Postal Service First-Class or Priority Mail, postage prepaid, or by United Parcel Service of America, Inc. UPS shipping service.

SC-18.11. Covenant Against Contingent Fees. Add the following new paragraph immediately after Paragraph 18.10:

18.11 Covenant Against Contingent Fees.

A. The Contractor warrants that they have not employed any person to solicit or secure this contract upon any agreement for a commission, percentage, brokerage or contingent fees. Breach of this warranty shall give the Owner the right to terminate the contract, or in its discretion to deduct from the contract price or consideration the amount of such commission, percentage, brokerage or contingent fees. This warranty shall not apply to commission payable to Contractors upon contracts or sales secured or made through bona fide established commercial or selling agencies maintained by the Contractor for purposes of securing business.

SC-18.12. Officials Not to Benefit. Add the following new paragraph immediately after Paragraph 18.11

18.12. Officials Not to Benefit

A. No member of the Public Body shall be admitted to any share or part of this contract or to any benefit that may arise there from but this provision shall not be construed to extend to this contract if made with a corporation for its general benefit.

SC-18.13. Other Contracts. Add the following new paragraph immediately after Paragraph 18.12

18.13 Other Contracts.

A. The owner may award other contracts for additional work and the Contractor shall fully cooperate with such Contractors and carefully fit work within the contract including additional work added to the contract to that provided under other contracts as may be directed by the Owner. The Contractor shall not commit or permit any act that will interfere with the performance of work by any other Contractor.

END OF SUPPLEMENTARY CONDITIONS

SECTION 600
SPECIAL PROVISIONS

CONTRACT 26-07

These Special Provisions cover items, correction, deletions or additions to the General Contract Conditions, the Standard Specs, the State Specs, and the City Provisions, and take precedence over those other parts of those specifications which are in conflict herewith.

200.03 - **TIME OF SUBSTANTIAL COMPLETION** The substantial completion date for Contract 26-07 2026 Street & Utility Improvements shall be September 25, 2026.

If the contractor does not complete the work on or before the date set forth above for Contract 26-07 2026 Street & Utility Improvements or within the extra time allowed under a City Engineer granted time extension, the City will assess liquidated damages. The City will deduct $2,185.00 Dollars ($) for every calendar day that the work remains uncompleted from payments due the contractor. An entire calendar day will be assessed for any period of time within a calendar day that the work is not substantially complete beyond 12:01am.

600.1 – Construction Phasing

Contractor shall follow the construction phasing outlined below and as shown in Plan Sheet S01:

A. The Contractor shall coordinate with WE Energies Gas for completion of Stage 1B & Stage 2. The Contractor shall not start work on Stage 1B & Stage 2 until WE Energies Gas relocation work is completed.

B. Prior to starting any work in Stage 1B & Stage 2, all utilities shall be complete in Stage 1A, except for sewer lining and grouting.

C. Stage 1A & 1B, including asphalt binder surface, shall be completed no later than 12 weeks after beginning utility work in Stage 2. The final asphalt surface for Stage 1 may be placed at the same time as the final asphalt surface in Stage 2. If the final Stage 1 surface is completed as part of Stage 2, the Contractor shall ramp or provide other equipment to provide a secure ramp into driveways within Stage 1.

D. The Contractor shall complete all lining and grouting work prior to asphalt paving.

600.2 – Plans and Specifications

A general description of the work along with the locations is contained in the Instructions to Bidders - Section 200. The plans for the construction of this

project consist of 72 sheets with the file numbers 16-1006, 30-821, 41-1010, 15-1095, and 23-285.

600.3 – Permits

A. The sanitary sewer and water main plans must be approved by the MMSD and Wisconsin DNR and accordingly have been submitted by the City for their review and approval. No work on these projects can commence without these agencies' approvals. Variations in workloads at the MMSD and DNR make a determination, as to when approval will be obtained, impossible. However, much of the work does not require approval and, therefore, work could begin immediately. If delays are experienced in receiving approval, the City will entertain a request for a time extension for completion of the work as outlined in 4.05 of the Standard General Conditions.

B. A portion of the storm sewer relay work and the sanitary and storm sewer lining East of Honey Creek and north of Portland Ave requires a Right-of-Entry Permit by Milwaukee County. The City has submitted this permit for their review and approval. No work within Milwaukee County land can commence without this permit approval.

C. The City is working with the property owners of 1077 Perry Court on a construction permit to allow additional area on their property for contractor access and equipment staging, north of the City's utility easement, to complete the proposed storm sewer relay work from existing MH 034 to proposed MH 001.

600.4 – Utility Coordination

It is anticipated that We-Energies Electric and Gas will be performing utility relocation work within the project limits. The Contractor is responsible to coordinate their work with the utility relocates to ensure no delays are encountered.

600.5 – Site Investigation and Representation

Subsurface Investigation Data prepared by Professional Service Industries, Inc. (PSI), is included in the Appendix of this project manual. Contractor shall be responsible to thoroughly review this report. If dewatering is determined to be necessary, this shall be considered incidental to the contract. The Geotechnical Engineering Services Report is for information only.

600.6 – Storm and Sanitary Lateral Investigation and Televising

Storm sewer television inspection records from 2017 prepared by Visu-Sewer for a portion of the project are included in the Appendix of this project manual. Access to additional sanitary and storm television inspection videos completed

by the City of Wauwatosa are available upon request by emailing Jessica Henderson at jhenderson@wauwatosa.net. The lateral inspection reports are for information only.

600.7 – Temporary Water Service

If the contractor plans to utilize temporary water services during replacement of the water main and service laterals, this shall be considered incidental to the contract. Contractor shall supply a temporary water service plan to the City to review and approve.

600.8 – Starting the Work.

Add the following new paragraph immediately after Paragraph 4.02.A of the Standard General Conditions:

A. Upon starting the work, the Contractor shall work continuously and make substantial progress each day until the project is complete. Work days are defined as Monday through Friday (excluding adverse weather days and holidays). **A sum of $900 for each suitable day on which no substantial work or progress is completed may be deducted from any monies due to the Contractor.** Substantial progress will be determined with the City in discussions with the Contractor.

600.8 Holiday Work Hours.

Add the following new paragraph immediately after Paragraph SC-7.03.D of the Supplemental Conditions:

1. Do not perform work on the project during the following holiday periods:

    - Friday, April 3, 2026 for Good Friday
    - Monday, May 25, 2026 for Memorial Day
    - Friday, June 19, 2026 for Juneteenth Day
    - Friday, July 3, 2026 for Independence Day
    - Monday, September 7, 2026, for Labor Day
    - Thursday, November 26, 2026, for Thanksgiving
    - Friday, November 27, 2026, for Thanksgiving

SECTION 601

MEASUREMENT AND PAYMENT

The bid price for each bid item shall include the furnishing of all materials, tools, labor, etc. It shall include excavation, disposition of surplus material, backfilling, surface replacement, sheeting, shoring, auguring, dewatering, and restoration of public of private property disturbed or damaged by the Contractor's operation and cleanup, all as specified.

The item numbers referred to below correspond to the numerical portion of the number in the proposal. Contractor shall refer to the items below, the plans and the specifications for details of the work included.

Any item required to complete the work within each bid item, even if not listed, is considered incidental to that item. All work and costs to complete the project as shown on the plans are included in the following bid items, even if not listed, and all associated work is considered incidental and by submitting and signing the bid proposal the contractor understands the following is a general list of work associated but is not all inclusive and no payment outside of these items will be considered.

DIVISION A – SANITARY SEWER

Item A1-01 – 6" PVC ASTM D-3034 SDR35 Sanitary Lateral

Description This provision describes the installation of PVC sanitary laterals at the locations as shown on the Contract Drawings and directed by the Engineer.

Materials Polyvinyl chloride (PVC) as specified in Section 610.

Construction Sanitary lateral installation shall include all labor, material and equipment necessary for removal of incidental sewer and water main piping that is inactive, removal of incidental manhole structures and duct bank that are inactive, pipe installation including pipe bedding and pipe cover material in the pipe zone, mechanically compacted soil or crushed concrete backfill and compaction, and permanent surface restoration where noted on drawings.

Measurement The City will measure PVC ASTM D-3034 SDR35 Sanitary Lateral by the linear foot, horizontally from the end of the sanitary lateral reconnection (beyond 4 feet) to the limits of the existing pipe at the point of connection.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
A1-01	6" PVC ASTM D-3034 SDR35 Sanitary Lateral	LF

PVC ASTM D-3034 SDR35 Sanitary Lateral shall be paid for at the unit price bid per lineal foot measured horizontally for the various classes, types, backfill and sizes of pipe installed. Payment for pipe will be based on the actual number of feet installed, as measured by the City of Wauwatosa.

Item A1-03 – 8" PVC ASTM D-3034 SDR35 Sanitary Sewer Main

Description This provision describes the installation of 8" PVC sanitary sewer main as shown on the Contract Drawings and directed by the Engineer.

Materials Polyvinyl chloride (PVC) as specified in Section 610.

Construction Sanitary sewer main installation shall include all labor, material and equipment necessary for removal of incidental sewer and water main piping that is inactive, removal of incidental manhole structures and duct bank that are inactive, pipe installation including pipe bedding and pipe cover material in the pipe zone, mechanically compacted soil or crushed concrete backfill and compaction, deflection testing, and permanent surface restoration where noted on drawings.

If the main does not begin and end at a manhole, the contractor shall expose the ends of the proposed main so that the line end grade can be adjusted. In addition to this, the contractor shall expose various utility crossing at locations of possible conflict, as shown on the plans, prior to commencing pipe laying so that either the utilities can be altered or the line and grade of the proposed main can be adjusted. This work will be incidental to the cost of the contract.

The bid prices shall also include the removal of existing pipe, and the removal of all manholes and bases where indicated on the Drawings. It shall also include any necessary alterations to existing manholes, such as, cut-in connections to local manholes, alteration to outside drops, and bulkheading of lines to be abandoned. It shall also include salvaging, for the City, any internal manhole frame/chimney seal found on manholes to be removed.

Measurement The City will measure 8" PVC ASTM D-3034 SDR35 Sanitary Sewer Main by the linear foot, horizontally from center-to-center of manholes or to the limits of the existing pipe remaining, whichever is applicable.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
A1-03	8" PVC ASTM D-3034 SDR35 Sanitary Sewer Main	LF

8" PVC ASTM D-3034 SDR35 Sanitary Sewer Main, shall be paid for at the unit price bid per lineal foot measured horizontally for the various classes, types, backfill and sizes of pipe installed. Payment for pipe will be based on the actual number of feet installed, as measured by the City of Wauwatosa.

A video file of those segments requiring televising shall be furnished to the City for review prior to acceptance. Full payment for pipe in place will not be made until the pipe has successfully passed any deflection tests required. Until successful testing and surface replacement are completed, payment for pipe installation will not exceed 85 percent of the price bid for the various types, sizes and classes of pipe as stated in the Bid.

Full payment will be withheld on any section of pipe deemed by the Director of Public Works to be unsatisfactory due to excessive leakage, unsatisfactory line and grade, or any other cause until such defects have been corrected in accordance with the intent of these Contract Documents.

If, within warranty period, any section of the sewer system, although originally accepted, is actually not acceptable due to subsequent excessive leakage, or any other defects, the Contractor shall repair or replace the affected portion at no cost to the Owner.

Item A1-27, A1-28 – Sanitary Sewer Spot Repairs

Description This provision describes Sanitary Sewer spot repairs at locations as shown on the Contract Drawings and directed by the Engineer.

Materials (Vacant)

Construction Sanitary Sewer Spot Repairs shall include all labor, materials, equipment, and tools necessary and removal, lawn removal (where applicable), excavation, removal, and disposal of excess soil material and debris, removal of incidental sewer and water main piping, removal of incidental structures and ductbank, pipe installation including but not limited to pipe bedding, pipe cover material, all necessary fittings and bends, mechanically compacted backfill and compaction, and surface restoration (as applicable).

Measurement The City will measure Sanitary Sewer Spot Repairs by each repair made, up to and including the specified linear feet from center of coupling to cent of coupling, per each spot repair made for the various classes, types, and sizes of pipe repaired.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
A1-27	Sanitary Sewer Spot Repair 5-10 LNFT	EA
A1-28	Sanitary Sewer Spot Repair 10-15 LNFT	EA

Payment shall be based on the actual number completed, as measured by the Engineer. No additional payment shall be made for extension of the connection limits if the extension of the limits is due to careless, negligent, or otherwise poor craftsmanship removal work by the Contractor, as determined by the Engineer.

Item A2-01, A2-02 – Sanitary Sewer Lining

Description This provision describes sanitary sewer lining as shown on the Contract Drawings and directed by the Engineer.

Materials Cured-in-place pipe (CIPP) as specified in Section 615.

Construction Sanitary Sewer Lining shall include all labor, materials, tools, and equipment necessary for sanitary sewer lining using a cured-in-place pipe (CIPP), including watertight seals at all manholes, reinstatement of active service laterals, providing openings at all manholes unless otherwise specified, and testing.

Measurement The City will measure Sanitary Sewer Lining by the linear foot horizontally from center-to-center of manholes or to the limits of the existing pipe remaining, whichever is applicable.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
A2-01	8” Sanitary Sewer Lining	LF
A2-02	10” Sanitary Sewer Lining	LF

No segment of lining work shall be paid for until after lining and reinstatement of active laterals is completed and televised. Any work necessary to install the liner, including but not limited to cleaning, jetting, and/or removal of obstructions in the mainline, shall be incidental to this item.

Item A2-09, A2-10 – Grouting Lateral from Main

Description This provision describes grouting sanitary laterals from the main at locations as shown on the Contract Drawings and directed by the Engineer.

Materials As specified in Section 615.

Construction Sanitary lateral grouting from mains shall include all labor, materials, equipment, and tools necessary for, testing, installation of grout (gallons of grout to be paid under a separate bid item), and permanent surface restoration (as applicable). TV inspections before and after grouting, including reports and video tapes, shall be paid under a separate bid item.

Measurement The City will measure Grouting Lateral from Main by each sanitary lateral grouted, with all laterals grouted to the right-of-way, but no more than the specified number of feet from the sewer main.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
A2-09	Grouting 10’ Lateral from Main	EA
A2-10	Grouting 15’ Lateral from Main	EA

Sanitary lateral grouting shall be paid at the unit price bid per each lateral grouted for the various classes, types, and sizes of pipes grouted. Payment shall be based on the actual number completed, as measured and confirmed by the Engineer.

Item A2-18 – Lateral Tee Liner at Connection, 8” x 6”

Description This provision describes the installation of sanitary tee liners at locations as shown on the Contract Drawings and directed by the Engineer.

Materials Liners shall be in accordance with NASSCO “Cured-In-Place-Pipe (CIPP) Lateral Seals” specifications except as noted herein.

Construction Tee liners shall include all labor, materials, tools, and equipment necessary for full installation of a lateral t-liner at the lateral connection to the main, including reinstatement of active service laterals (where applicable), providing openings at all manholes unless otherwise specified (where applicable), and testing. Lateral t-liners shall fully seal all portions of the wye, tee, or other fitting or tap which connects the lateral to the mainline sewer. T-liner shall overlap the joint(s) of the mainline edges of the connection fitting to the main by a minimum of 1-inch. “Top-hat” style liners are NOT acceptable. Liner shall extend a minimum of 2 LF up the lateral from the connection at the main.

Measurement The City will measure Tee Liner by each lateral t-liner acceptably installed and completed, as determined and measured by the Engineer.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
A2-18	Lateral Tee Liner at Connection, 8”x6”	EA

No segment of lateral t-liner work shall be paid for until after the work is completed and televised. Any work necessary to perform lateral t-liner installation, including but not limited to cleaning, jetting, and/or removal of obstructions in the mainline, shall be incidental to this item.

Item A2-19 – Grouting Any Length of Sanitary Lateral at Manhole

Description This provision describes grouting sanitary laterals at manhole at locations as shown on the Contract Drawings and directed by the Engineer.

Materials As specified in Section 615.

Construction Sanitary lateral grouting from mains shall include all labor, materials, equipment, and tools necessary for, testing, installation of grout (gallons of grout to be paid under a separate bid item), and permanent surface restoration (as applicable). TV inspections before and after grouting, including reports and video tapes, shall be paid under a separate bid item.

Measurement The City will measure Grouting Any Length of Sanitary Lateral at Manhole by each

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
A2-19	Grouting Any Length of Sanitary Lateral at Manhole	EA

No segment of lining work shall be paid for until after lining and reinstatement of active laterals is completed and televised. Any work necessary to install the liner, including but not limited to cleaning, jetting, and/or removal of obstructions in the mainline, shall be incidental to this item.

Item A2-24 – Removal of Tree Root Obstruction

Description This provision describes the removal of tree roots that obstruct the sanitary laterals at the connection to the main at locations as shown on the Contract Drawings and directed by the Engineer.

Materials (Vacant)

Construction Removal of tree root obstructions shall include all labor, materials, equipment, and tools necessary to effectively remove and dispose of root obstructions at the lateral connections to the sanitary sewer main in advance of grouting activity or T-Lining of a lateral. All methods of removal shall be incidental to this item, including, but not limited to, “open-cut” excavations and permanent restoration of the surface after the completion of the excavation. Removal of fine roots shall be incidental to the grouting item(s).

Measurement The City will measure Removal of Tree Root Obstruction by each lateral in which root removal(s) was performed, as confirmed by the Engineer.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
A2-24	Removal of Tree Root Obstruction	EA

Removal of Tree Root Obstruction shall be paid at the unit price bid per each obstruction removed. Payment shall be based on the actual number completed, as measured and confirmed by the Engineer.

Item A2-25 – Removal of Calcium Deposit at Connection

Description This provision describes the removal of calcium deposits in the sanitary laterals at the connection to the main at locations as shown on the Contract Drawings and directed by the Engineer.

Materials (Vacant)

Construction Removal of calcium deposits shall include all labor, materials, equipment, and tools necessary to effectively remove and dispose of calcium obstructions at the lateral connections to the sanitary sewer main in advance of grouting activity or T-Lining of a lateral. All methods of removal shall be incidental to this item, including, but not limited to, specialized robotic grinding or cutting equipment, and “open-cut” excavations and permanent restoration of the surface after the completion of the excavation. Removal of fine deposits shall be incidental to the grouting item(s).

Measurement The City will measure Removal of Calcium Deposit at Connection by each lateral in which calcium removal(s) was performed, as confirmed by the Engineer.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
A2-25	Removal of Calcium Deposit at Connection	EA

Removal of Calcium Deposit at Connection shall be paid at the unit price bid per each deposit at a connection that is removed. Payment shall be based on the actual number completed, as measured and confirmed by the Engineer.

Item A2-26 – Grout Low Pressure 15’ Lateral from Main

Description This provision describes grouting sanitary laterals from the main at locations as shown on the Contract Drawings and directed by the Engineer.

Materials As specified in Section 615.

Construction Sanitary lateral grouting from mains shall include all labor, materials, equipment, and tools necessary for, testing, installation of grout (gallons of grout to be paid under a separate bid item), and permanent surface restoration (as applicable). TV inspections before and after grouting, including reports and video tapes, shall be paid under a separate bid item.

Measurement The City will measure Grouting Low Pressure 15’ Lateral from Main by each sanitary lateral grouted, with all laterals grouted to the right-of-way, but no more than the specified number of feet from the sewer main.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
A2-26	Grout Low Pressure 15' Lateral from Main	EA

Sanitary lateral grouting shall be paid at the unit price bid per each lateral grouted for the various classes, types, and sizes of pipes grouted. Payment shall be based on the actual number completed, as measured and confirmed by the Engineer.

Item A2-27 – Gallons of Acrylamide Based Sanitary Lateral Grout

Description: The unit bid price for this item shall include all labor, materials, equipment, and tools necessary for provision of grout material, including latex additives.

Materials As specified in Section 615.

Construction (Vacant)

Measurement The City will measure Gallons of Acrylamide Based Sanitary Lateral Grout by the gallon of grout placed, as acceptably completed.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
A2-27	Gallons of Acrylamide Based Sanitary Lateral Grout	GAL

Sanitary lateral grouting shall be paid at the unit price bid per gallons of grout used for the various classes, types, and sizes of pipes grouted. Payment shall be based on the actual number of gallons used, as measured and confirmed by the Engineer.

Item A4-02 – Sanitary Lateral Reconnection

Description This provision describes the reconnection of gravity sanitary lateral to the new sanitary sewer main at locations as shown on the Contract Drawings and directed by the Engineer.

Materials Polyvinyl chloride (PVC) as specified in Section 610.

Construction Sanitary lateral reconnection shall include all labor, material and equipment necessary for removal of incidental sewer and water main piping that is inactive, removal of incidental manhole structures and duct bank that are inactive, pipe installation including pipe bedding and pipe cover material in the pipe zone, all necessary fittings and bends, mechanically compacted soil or crushed concrete

backfill and compaction, and permanent surface restoration where noted on drawings.

The bid prices shall also include any no less than 2 feet nor more than 4 feet of sanitary lateral pipe, transition couplings for connection of dissimilar pipe joints, fittings, and the removal of existing pipe where indicated on the Drawings. It shall also include grouting the sanitary lateral from the sanitary sewer main 15 feet to the residence.

Measurement The City will measure Sanitary Lateral Reconnection as each existing sanitary lateral connected to the sanitary sewer.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
A4-02	Sanitary Lateral Connection	EA

Sanitary Lateral Reconnection shall be paid for at the unit price bid per each connection made to the sanitary sewer main for the various classes, types, backfill and sizes of pipe installed. Payment for connections will be based on the actual number installed, as measured by the City of Wauwatosa.

If, within warranty period, any section of the sanitary lateral connection, although originally accepted, is actually not acceptable due to subsequent excessive leakage, or any other defects, the Contractor shall repair or replace the affected portion at no cost to the Owner.

Item A5-02 – Pro-Ring Chimney Rebuild

Description This provision describes rebuilding existing sanitary manhole chimneys using Pro-Rings at locations as shown on the Contract Drawings and directed by the Engineer.

Materials Cretex Pro-Ring adjusting rings.

Construction Pro-Ring chimney rebuilds shall include all labor, material, equipment, and tools necessary for rebuilding chimney, and shall include
the removal and rebuilding of a chimney section on a per foot basis (0.1 ft.). The contractor shall use new Cretex Pro-Ring adjusting rings system to bring the casting to the proper grade and slope, installation of the new casting(s) and grate(s) on top of the adjusting rings. The removal of the existing chimney rings shall be included in the Bid Item. Manhole frames and covers will be supplied by the City.

Measurement The City will measure Pro-Ring Chimney Rebuild by the vertical foot to the nearest 0.1 feet of new manhole structure and chimney installed (excluding the new frame).

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
A5-02	Pro-Ring Chimney Rebuild	VF

Manhole Rebuild with Pro-Ring chimney shall be paid at the unit price bid per each vertical foot of manhole and chimney acceptably rebuilt, as measured and determined by the Engineer.

Item A5-04 – Replace Frame and Cover, Ex. San. MH's, City Supplied

Description This provision describes replacing existing sanitary frames and covers, as supplied by the City, at locations as shown on the Contract Drawings and directed by the Engineer.

Materials As specified in Section 610.

Construction Replacing existing sanitary manhole frames and covers shall include all labor, materials, equipment, and tools necessary for the removal and installation of a new sanitary manhole frame and cover, as furnished by the City of Wauwatosa, including but not limited to salvaging of the existing frame and cover to the City of Wauwatosa Department of Public Works.

Measurement The City will measure Replace Frame and Cover, Ex. San. MH's, City Supplied by each frame and cover acceptably replaced and Salvaged to the City, as confirmed by the Engineer.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
A5-04	Replace Frame and Cover, Ex. San. MH's, City Supplied	EA

Frames and covers installed as part of a complete manhole rebuild shall NOT be paid under this item.

Item A6-04 – Sanitary Manhole Abandonment After Lining Through

Description The unit bid price for this item shall include all labor, materials, equipment, and tools necessary to abandon a sanitary manhole which has been lined through (i.e. liner extends continuously through the structure and is NOT cut open). Abandonment shall include the backfilling of the manhole with slurry to no more than 4 ft below finished grade, the excavation and disposal off site as needed of the remaining manhole structure, rings, internal seal, frame, and lid within 4 ft of finished grade (if the Contractor chooses to fill with slurry up to the bottom of the adjusting rings, removing parts of the structure below the rings is not required), and

restoration of any private or public property disturbed by the work.

Materials In accordance with the City Specs. See Section 605 for pavement patching information.

Construction Shall be performed after any lining work. In accordance with the City Specs. See Section 605 for pavement patching information.

Payment City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
A6-04	Sanitary Manhole Abandonment After Lining Through	EA

Sanitary Manhole Abandonment shall be paid for at the unit price bid per each manhole abandoned. Payment for pipe will be based on the actual number abandoned, as measured by the City of Wauwatosa.

DIVISION B – WATER MAIN

Item B1-01 – Relay Original Service (ROS-T), Water, HDPE, Partial Trenchless

Description This provision describes relay of the existing pressurized water service to new water main by a trenchless method at locations as shown on the Contract Drawings and directed by the Engineer.

Materials High-density polyethylene (HDPE) as specified in Section 611.

Construction Upon successful testing and obtaining a safe sample, the contractor shall extend new high-density polyethylene, HDPE SDR 9 (CTS) AWWA C-901 from the existing main to the existing service as shown. ROS-T shall be a minimum of 1¼" or larger to match existing. The contractor shall make the wet tap and shall furnish and install a Smith-Blair 372 (stainless steel for PVC) service saddle; a ball corporation stop; fittings; and a ball curb stop, a "Minneapolis Pattern" curb stop box (Ford: EM2-65-56 or A.Y. McDonald: 5614A). The contract price shall include all costs for excavation, abandoning the existing curb stop, materials, polyethylene wrap, bedding and ***Backfill shall be: Mechanically compacted crushed concrete for ROS-T's of all types***. Surface restoration where noted on drawings. The service shall be installed by a trenchless method, such as auguring behind the curb and through the tree root zone (as defined by the tree drip line); curb stop and reconnection point shall be open-cut as needed.

Relay of original water service (ROS-T) shall include all labor, material and equipment necessary for tree removal and trimming as required, pavement saw cutting and removal or lawn removal, excavation, removal and disposal of excess soil material, removal of incidental sewer and water main piping that is inactive, removal of incidental manhole structures and ductbank that are inactive, wet tap on new water main, service saddle, corporation stop, laying of service pipe and fittings

including pipe bedding and cover material in the pipe zone, ball valve curb stop, “Minneapolis Pattern” curb stop box, insulation for frost protection, mechanically compacted crushed concrete backfill as noted on the plan backfill as noted on the plan (mechanically compacted spoil, mechanically compacted crushed concrete or slurry), testing, bacterial disinfection, and permanent surface restoration where noted on drawings.

In addition to this, the contractor shall expose various utility crossing at locations of possible conflict, as shown on the plans, prior to commencing pipe laying so that either the utilities can be altered or the line and grade of the proposed main can be adjusted. Electric and communication poles, pedestals, traffic signals, conduit and cable shall be protected and supported as necessary to install piping. This work will be incidental to the cost of the contract.

Upon completion of the relay of original service, the Contractor shall allow 7 calendar days for the private residence plumber to connect to the new service. The Contractor shall maintain water service to the home during this time.

Measurement The City will measure Relay Original Service (ROS-T), Water, HDPE, Partial Trenchless by the lineal feet, horizontally from center of main to curb stop, acceptably installed.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
B1-01	1 ¼” Relay Original Service (ROS-T), Water, HDPE, Partial Trenchless	LF

Relay Original Service (ROS-T), Water, HDPE, Partial Trenchless shall be paid for at the unit price bid per linear foot made to the new water main for the various classes, types, backfill and sizes of pipe installed. Payment for relay of original water service will be based on the actual number of linear feet, as measured by the City of Wauwatosa.

Item B1-02 – Relay Original Service (ROS), Water, HDPE, Open Cut

Description This provision describes relay of the existing pressurized water service to new water main by an open cut trench method at locations as shown on the Contract Drawings and directed by the Engineer.

Materials High-density polyethylene (HDPE) as specified in Section 611.

Construction Upon successful testing and obtaining a safe sample, the contractor shall extend new high-density polyethylene, HDPE SDR 9 (CTS) AWWA C-901 from the existing main to the existing service as shown. ROS-T shall be a minimum of 1 ¼” or larger to match existing. The contractor shall make the wet tap and shall furnish and install a Smith-Blair 372 (stainless steel for PVC) service saddle; a ball

corporation stop; fittings; and a ball curb stop, a “Minneapolis Pattern” curb stop box (Ford: EM2-65-56 or A.Y. McDonald: 5614A). The contract price shall include all costs for excavation, abandoning the existing curb stop, materials, polyethylene wrap, bedding and ***Backfill shall be: Mechanically compacted crushed concrete for ROS’s of all types***. Surface restoration where noted on drawings.

Relay of original water service shall include all labor, material and equipment necessary for tree removal and trimming as required, pavement saw cutting and removal or lawn removal, excavation, removal and disposal of excess soil material, removal of incidental sewer and water main piping that is inactive, removal of incidental manhole structures and ductbank that are inactive, wet tap on new water main, service saddle, corporation stop, laying of service pipe and fittings including pipe bedding and cover material in the pipe zone, ball valve curb stop, “Minneapolis Pattern” curb stop box, insulation for frost protection, mechanically compacted crushed concrete backfill as noted on the plan backfill as noted on the plan (mechanically compacted spoil, mechanically compacted crushed concrete or slurry), testing, bacterial disinfection, and permanent surface restoration where noted on drawings.

In addition to this, the contractor shall expose various utility crossing at locations of possible conflict, as shown on the plans, prior to commencing pipe laying so that either the utilities can be altered or the line and grade of the proposed main can be adjusted. Electric and communication poles, pedestals, traffic signals, conduit and cable shall be protected and supported as necessary to install piping. This work will be incidental to the cost of the contract.

Upon completion of the relay of original service, the Contractor shall allow 7 calendar days for the private residence plumber to connect to the new service. The Contractor shall maintain water service to the home during this time.

Measurement The City will measure Relay Original Service (ROS), Water, HDPE, Open Cut by the lineal feet, horizontally from center of main to curb stop, acceptably installed.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
B1-02	1 ¼” Relay Original Service (ROS), Water, HDPE, Open Cut	LF

Relay Original Service (ROS), Water, HDPE, Open Cut shall be paid for at the unit price bid per linear foot made to the new water main for the various classes, types, backfill and sizes of pipe installed. Payment for relay of original water service will be based on the actual number of linear feet, as measured by the City of Wauwatosa.

Item B1-08, B1-09 – PVC DR18 C900 Water Main

Description This provision describes installation of PVC DR18 C900 pressurized water main as shown on the Contract Drawings and directed by the Engineer.

Materials Polyvinyl chloride (PVC), DR18 C900 or as shown on the plan sheets and as specified in Section 611.

Construction Water main shall include all labor, material and equipment necessary for tree removal and trimming as required, pavement saw cutting and removal or lawn removal, excavation, removal and disposal of excess soil material, removal of incidental sewer and water main piping that is inactive, removal of incidental manhole structures and ductbank that are inactive, laying and jointing of pipe and fittings including pipe bedding and pipe cover material in the pipe zone, corrosion protection including but not limited to bitumastic type coatings and polyethylene bagging, designated joint restraints, concrete buttresses, tracer wire, insulation for frost protection, testing, bacterial disinfection, backfill as noted on the plan (mechanically compacted spoil, mechanically compacted crushed concrete or slurry), and permanent surface restoration where noted on drawings.

In addition to this, the contractor shall expose various utility crossing at locations of possible conflict, as shown on the plans, prior to commencing pipe laying so that either the utilities can be altered or the line and grade of the proposed main can be adjusted. Electric and communication poles, pedestals, traffic signals, conduit and cable shall be protected and supported as necessary to install piping. This work will be incidental to the cost of the contract.

Full payment for pipe in place will not be made until the pipe has successfully passed any pressure tests required, and continuity testing of tracer wire has been completed. All tests will be witnessed by a City of Wauwatosa representative. Until successful testing and surface replacement are completed, payment for pipe installation will not exceed 85 percent of the price bid for the various types, sizes and classes of pipe as stated in the Bid.

Full payment will be withheld on any section of pipe deemed by the Director of Public Works to be unsatisfactory due to excessive pressure loss, unsatisfactory line and grade, or any other cause until such defects have been corrected in accordance with the intent of these Contract Documents.

If, within warranty period, any section of the water distribution system, although originally accepted, is actually not acceptable due to subsequent excessive pressure loss, or any other defects, the Contractor shall repair or replace the affected portion at no cost to the Owner.

Measurement The City will measure PVC DR18 C900 Water Main by the linear foot measured horizontally along the centerline of the pipe.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
B1-08	6” PVC DR18 C900 Water Main	LF
B1-09	8” PVC DR18 C900 Water Main	LF

PVC DR18 C900 Water Main shall be paid for at the unit price bid per lineal foot measured horizontally for the various classes, types, backfill and sizes of pipe installed. Payment for pipe will be based on the actual number of feet installed, as measured by the City of Wauwatosa.

Item B1-101 – Water Main Abandonment

Description: Abandonment of existing water main

Materials: Pipe filling with approved flowable fill, or approved equal and approved bulkheads.

Construction: water main abandonment shall include all labor, material and equipment necessary to abandon existing water main by filling with approved flowable fill material, including bulkheads; or to entirely remove water main.

Method of Measurement: Water main abandonment will be measured horizontally from pipe end or bulkhead to pipe end or bulkhead.

Basis of Payment: Water main abandonment shall be paid for at the unit price bid per lineal foot measured horizontally for the various classes, types, backfill and sizes of pipe abandoned. Payment for pipe will be based on the actual number of feet abandoned, as measured by the City of Wauwatosa.

Item B2-03 – Connect to Existing Water Main

Description This provision describes connection of new water main to existing water main at the locations as shown on the Contract Drawings and directed by the Engineer.

Materials As specified in Section 611.

Construction Watermain Connections shall include all labor, material and equipment necessary to reconnect to the existing watermain, pavement saw cutting and removal or lawn removal, excavation, removal and disposal of excess soil material, removal of incidental sewer and water main piping that is inactive, the cost of installing additional fittings/bends (generally four 45 degree bends) and all strapping, restraints, and buttresses needed to re-route the water main in accordance with the Project Specifications. All slowing of daily production rates and additional time for offset work shall be factored into the unit bid price for these connections, removal of incidental piping, shutting of valves,

depressurizing or emptying the existing system and all testing and filling of new pipes, pipe installation including pipe bedding and pipe cover material in the pipe zone, all necessary fittings and bends, and backfill as noted on the plan (mechanically compacted spoil, mechanically compacted crushed concrete or slurry).

The bid prices shall also include all ancillary piping/fitting/adaptors/reducers and bends to make the connection up to no more than three feet of the existing pipe that is being connected to (note that the quantity of watermain piping and water service piping may exceed the final installed amount since the first 3 feet for the connection will not be measured), transition couplings for connection of dissimilar pipe joints, fittings, and the removal of existing pipe where indicated on the Drawings.

Measurement The City will measure Connect to Existing Water Main for each new connection to an existing main.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
B2-03	Connect to Existing 6” Water Main	EA

Connect to Existing Water Main shall be paid for at the unit price bid per each connection made to the sanitary sewer main for the various classes, types, backfill and sizes of pipe installed. Payment for connections will be based on the actual number installed, as measured by the City of Wauwatosa.

If, within warranty period, any section of the sanitary lateral connection, although originally accepted, is actually not acceptable due to subsequent excessive leakage, or any other defects, the Contractor shall repair or replace the affected portion at no cost to the Owner.

Item B2-20 – MJ Sleeve

Description This provision describes installation of a mechanical joint sleeve at the locations as shown on the Contract Drawings and directed by the Engineer.

Materials All fittings shall be ductile or cast iron. MEGALUG RETAINER GLANDS SHALL BE USED WITH ALL FITTINGS.

Construction MJ sleeves shall include all labor, material and equipment necessary for overhead tree removal and trimming as required, pavement saw cutting and removal or lawn removal, excavation, removal and disposal of excess soil material, removal of incidental sewer and water main piping that is inactive, removal of incidental manhole structures and ductbank that are inactive, installation of sleeve, masonry support blocking, corrosion protection including but not limited to bitumastic type coatings and polyethylene bagging, designated joint restraints, concrete

buttresses, bracing, blocking, strapping, caps, restraints, insulation for frost protection, backfill as noted on the plan (mechanically compacted spoil, mechanically compacted crushed concrete or slurry), and surface replacement where noted on drawings.

Measurement The City will measure MJ Sleeve as each new sleeve installed.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
B2-20	6” MJ Sleeve	EA

MJ Sleeve shall be paid for at the unit price bid per each for the various types and sizes of sleeves installed. Payment for sleeves will be based on the actual number installed, as measured by the City of Wauwatosa.

Item B3-08, B3-09 – Water Main Gate Valve

Description This provision describes installation of a gate valve at locations as shown on the Contract Drawings and directed by the Engineer.

Materials As specified in Section 611.

Construction Gate valves shall include all labor, material and equipment necessary for overhead tree removal and trimming as required, pavement saw cutting and removal or lawn removal, excavation, removal and disposal of excess soil material, removal of incidental sewer and water main piping that is inactive, removal of incidental manhole structures and duct bank that are inactive, installation of gate valve, masonry support blocking, valve box adaptor, valve box, corrosion protection including but not limited to bitumastic type coatings and polyethylene bagging, designated joint restraints, concrete buttresses, insulation for frost protection, mechanically compacted spoil or crushed concrete backfill and compaction, and surface replacement where noted on drawings.

Measurement The City will measure Water Main Gate Valve as each new gate valve installed.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
B3-08	6” Water Main Gate Valve	EA
B3-09	8” Water Main Gate Valve	EA

Water Main Gate Valve shall be paid for at the unit price bid per each for the various types and sizes of gate valves installed. Payment for resilient wedge gate valves will be based on the actual number installed, as measured by the City of Wauwatosa.

Item B3-18 – Abandon Ex. Water Valve & Box

Description This provision describes abandonment of existing water valves and boxes at locations as shown on the Contract Drawings and directed by the Engineer.

Construction Abandonment of existing water valves and boxes shall include all necessary labor, material and equipment necessary to abandon existing valves and boxes as specified in the Standard Specifications. Where a valve is removed during excavation for the new main, lead or hydrant, no payment will be made under this Item.

Measurement The City will measure Abandon Ex. Water Valve & Box as each valve and box that is acceptably abandoned.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
B3-18	Abandon Ex. Water Valve & Box	EA

Abandon Ex. Water Valve & Box shall be paid for at the unit price per each for the various types and sizes of valves and boxes abandoned. Payment for the abandonment will be made only at those locations where one exists on an unused water service.

Item B5-06 – Tee

Description This provision describes installation of a water main tee at locations as shown on the Contract Drawings and directed by the Engineer.

Materials All fittings shall be ductile or cast iron. MEGALUG RETAINER GLANDS SHALL BE USED WITH ALL FITTINGS.

Construction Tees shall include all labor, material and equipment necessary for overhead tree removal and trimming as required, pavement saw cutting and removal or lawn removal, excavation, removal and disposal of excess soil material, removal of incidental sewer and water main piping that is inactive, removal of incidental manhole structures and ductbank that are inactive, installation of tee, masonry support blocking, corrosion protection including but not limited to bitumastic type coatings and polyethylene bagging, designated joint restraints, concrete buttresses, bracing, blocking, strapping, caps, restraints, insulation for frost protection, backfill as noted on the plan (mechanically compacted spoil, mechanically compacted crushed concrete or slurry), and surface replacement where noted on drawings.

Measurement The City will measure Tees as each new tee installed.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
B5-06	8” x 8” Tee	EA

Tees shall be paid for at the unit price bid per each for the various types and sizes of tees installed. Payment for tees will be based on the actual number installed, as measured by the City of Wauwatosa.

Item B5-68 – Anchor Tee

Description This provision describes installation of a water main anchor tee at locations as shown on the Contract Drawings and directed by the Engineer.

Materials All fittings shall be ductile or cast iron. MEGALUG RETAINER GLANDS SHALL BE USED WITH ALL FITTINGS.

Construction Anchor Tees shall include all labor, material and equipment necessary for overhead tree removal and trimming as required, pavement saw cutting and removal or lawn removal, excavation, removal and disposal of excess soil material, removal of incidental sewer and water main piping that is inactive, removal of incidental manhole structures and ductbank that are inactive, installation of tee, masonry support blocking, corrosion protection including but not limited to bitumastic type coatings and polyethylene bagging, designated joint restraints, concrete buttresses, bracing, blocking, strapping, caps, restraints, insulation for frost protection, backfill as noted on the plan (mechanically compacted spoil, mechanically compacted crushed concrete or slurry), and surface replacement where noted on drawings.

Measurement The City will measure Anchor Tees as each new tee installed.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
B5-68	8” x 6” Anchor Tee	EA

Anchor Tees shall be paid for at the unit price bid per each for the various types and sizes of tees installed. Payment for tees will be based on the actual number installed, as measured by the City of Wauwatosa.

Item B6-18, B6-19 – 45° Bend

Description This provision describes installation of a 45° bend at locations as shown on the Contract Drawings and directed by the Engineer.

Materials All fittings shall be ductile or cast iron. MEGALUG RETAINER GLANDS SHALL BE USED WITH ALL FITTINGS.

Construction 45° Bends shall include all labor, material and equipment necessary for overhead tree removal and trimming as required, pavement saw cutting and removal or lawn removal, excavation, removal and disposal of excess soil material, removal of incidental sewer and water main piping that is inactive, removal of incidental manhole structures and ductbank that are inactive, installation of 45° bends, masonry support blocking, corrosion protection including but not limited to bitumastic type coatings and polyethylene bagging, designated joint restraints, concrete buttresses, bracing, blocking, strapping, caps, restraints, insulation for frost protection, backfill as noted on the plan (mechanically compacted spoil, mechanically compacted crushed concrete or slurry), and surface replacement where noted on drawings.

Measurement The City will measure 45° Bends as each new bend installed.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
B6-18	6” – 45° Bend	EA
B6-19	8” – 45° Bend	EA

45° Bends shall be paid for at the unit price bid per each for the various types and sizes of 45° bends installed. Payment for 45° bends will be based on the actual number installed, as measured by the City of Wauwatosa.

Item B6-34, B6-35 – 22 ½° Bend

Description This provision describes installation of a 22 ½° bend at locations as shown on the Contract Drawings and directed by the Engineer.

Materials All fittings shall be ductile or cast iron. MEGALUG RETAINER GLANDS SHALL BE USED WITH ALL FITTINGS.

Construction 22 ½° Bends shall include all labor, material and equipment necessary for overhead tree removal and trimming as required, pavement saw cutting and removal or lawn removal, excavation, removal and disposal of excess soil material, removal of incidental sewer and water main piping that is inactive, removal of incidental manhole structures and ductbank that are inactive, installation of 22 ½° bends, masonry support blocking, corrosion protection including but not limited to bitumastic type coatings and polyethylene bagging, designated joint restraints, concrete buttresses, bracing, blocking, strapping, caps, restraints, insulation for frost protection, backfill as noted on the plan (mechanically compacted spoil, mechanically compacted crushed concrete or slurry), and surface replacement where noted on drawings.

Measurement The City will measure 22 ½° Bends as each new bend installed.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
B6-34	6” – 22 ½° Bend	EA
B6-35	8” – 22 ½° Bend	EA

22 ½° Bends shall be paid for at the unit price bid per each for the various types and sizes of 22 ½° bends installed. Payment for 22 ½° bends will be based on the actual number installed, as measured by the City of Wauwatosa.

Item B6-51 – 11 ¼° Bend

Description This provision describes installation of a 11 ¼° bend at locations as shown on the Contract Drawings and directed by the Engineer.

Materials All fittings shall be ductile or cast iron. MEGALUG RETAINER GLANDS SHALL BE USED WITH ALL FITTINGS.

Construction 11 ¼° Bends shall include all labor, material and equipment necessary for overhead tree removal and trimming as required, pavement saw cutting and removal or lawn removal, excavation, removal and disposal of excess soil material, removal of incidental sewer and water main piping that is inactive, removal of incidental manhole structures and ductbank that are inactive, installation of 11 ¼° bends, masonry support blocking, corrosion protection including but not limited to bitumastic type coatings and polyethylene bagging, designated joint restraints, concrete buttresses, bracing, blocking, strapping, caps, restraints, insulation for frost protection, backfill as noted on the plan (mechanically compacted spoil, mechanically compacted crushed concrete or slurry), and surface replacement where noted on drawings.

Measurement The City will measure 11 ¼° Bends as each new bend installed.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
B6-51	8” – 11 ½° Bend	EA

11 ¼° Bends shall be paid for at the unit price bid per each for the various types and sizes of 11 ¼° bends installed. Payment for 11 ¼° bends will be based on

Item B6-67 – PVC High Deflection Coupling

Description This provision describes installation of a PVC high deflection coupling at locations as shown on the Contract Drawings and directed by the Engineer.

Materials All fittings shall be PVC.

Construction PVC High Deflection Coupling shall include all labor, material and equipment necessary for overhead tree removal and trimming as required, pavement saw cutting and removal or lawn removal, excavation, removal and disposal of excess soil material, removal of incidental sewer and water main piping that is inactive, removal of incidental manhole structures and ductbank that are inactive, installation of reducer, masonry support blocking, corrosion protection including but not limited to bitumastic type coatings and polyethylene bagging, designated joint restraints, concrete buttresses, bracing, blocking, strapping, caps, restraints, insulation for frost protection, backfill as noted on the plan (mechanically compacted spoil, mechanically compacted crushed concrete or slurry), and surface replacement where noted on drawings.

Measurement The City will measure PVC High Deflection Coupling as each new coupling installed.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
B6-67	8” – PVC High Deflection Coupling	EA

PVC High Deflection Couplings shall be paid for at the unit price bid per each for the various types and sizes of couplers installed. Payment for PVC High Deflection Couplings will be based on the actual number installed, as measured by the City of Wauwatosa.

Item B7-03 – Reducer

Description This provision describes installation of a water main reducer at locations as shown on the Contract Drawings and directed by the Engineer.

Materials All fittings shall be ductile or cast iron. MEGALUG RETAINER GLANDS SHALL BE USED WITH ALL FITTINGS.

Construction Reducers shall include all labor, material and equipment necessary for overhead tree removal and trimming as required, pavement saw cutting and removal or lawn removal, excavation, removal and disposal of excess soil material, removal of incidental sewer and water main piping that is inactive, removal of incidental manhole structures and ductbank that are inactive, installation of reducer, masonry support blocking, corrosion protection including but not limited to bitumastic type coatings and polyethylene bagging, designated joint restraints, concrete buttresses, bracing, blocking, strapping, caps, restraints, insulation for frost protection, backfill as noted on the plan (mechanically compacted spoil, mechanically compacted crushed concrete or slurry), and surface replacement where noted on drawings.

Measurement The City will measure reducers as each new reducer installed.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
B7-03	8” x 6” Reducer	EA

Reducers shall be paid for at the unit price bid per each for the various types and sizes of reducers installed. Payment for reducers will be based on the actual number installed, as measured by the City of Wauwatosa.

Item B8-03 – 8” Cap/Plug

Description This provision describes installation of a water main cap or plug as stated on plan sheets at locations as shown on the Contract Drawings and directed by the Engineer.

Materials All fittings shall be ductile or cast iron. MEGALUG RETAINER GLANDS SHALL BE USED WITH ALL FITTINGS along with buttress.

Construction shall include all labor, material and equipment necessary for overhead tree removal and trimming as required, pavement saw cutting and removal or lawn removal, excavation, removal and disposal of excess soil material, removal of incidental sewer and water main piping that is inactive, removal of incidental manhole structures and ductbank that are inactive, installation of reducer, masonry support blocking, corrosion protection including but not limited to bitumastic type coatings and polyethylene bagging, designated joint restraints, concrete buttresses, bracing, blocking, strapping, caps, restraints, insulation for frost protection, backfill as noted on the plan (mechanically compacted spoil, mechanically compacted crushed concrete or slurry), and surface replacement where noted on drawings.

Measurement The City will measure caps/plugs as each new cap/plug installed.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
B8-03	8” Cap/Plug	EA

Caps/plugs shall be paid for at the unit price bid per each for the various types and sizes of caps/plugs installed. Payment for caps/plugs will be based on the actual number installed, as measured by the City of Wauwatosa.

Item B9-01 – Fire Hydrant

Description This provision describes installation of a fire hydrant at locations as shown on the Contract Drawings and directed by the Engineer.

Materials As specified in Section 611.

Construction Hydrants shall include all labor, material and equipment necessary for overhead tree removal and trimming as required, pavement saw cutting and removal or lawn removal, excavation, removal and disposal of excess soil material, removal of incidental sewer and water main piping that is inactive, removal of incidental manhole structures and ductbank that are inactive, installation of hydrant of a given bury depth, masonry support blocking, drainage stone, corrosion protection including but not limited to bitumastic type coatings and polyethylene bagging, designated joint restraints, concrete buttresses, insulation for frost protection, backfill as noted on the plan (mechanically compacted spoil, mechanically compacted crushed concrete or slurry), and surface replacement where noted on drawings.

Measurement The City will measure Fire Hydrant as each new hydrant installed and acceptably completed.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
B9-01	Fire Hydrant	EA

Fire Hydrant shall be paid for at the unit price bid per each for the various types and sizes of hydrants installed. Payment for hydrants will be based on the actual number installed, as measured by the City of Wauwatosa.

Item B9-02 – Abandon Existing Hydrant

Description This provision describes abandonment and removal of a fire hydrant at locations as shown on the Contract Drawings and directed by the Engineer.

Construction Hydrant abandonment shall include all labor, material and equipment required to remove a hydrant and salvage any hydrant dated 1950 and newer. Hydrants to be abandoned under this item are connected to a water main to be abandoned as part of this contract. The Contractor shall remove the entire hydrant and bulkhead the open end of the remaining hydrant branch and drain if any. Backfill and surface restoration shall be as noted on the plans.

Measurement The City will measure Abandon Existing Hydrant as each hydrant removed or salvaged and abandoned.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
B9-02	Abandon Existing Hydrant	EA

Abandon Existing Hydrant shall be paid for at the unit price bid per each for the various types and sizes of hydrants removed and abandoned. Payment for hydrant abandonment will be based on the actual number removed and abandoned, as measured by the City of Wauwatosa.

DIVISION C – STORM SEWER

Item C1-02 – 6” SDR35 PVC Storm Sewer Laterals

Description This provision describes installation of 6” SDR35 PVC storm sewer laterals at the locations as shown on the Contract Drawings and directed by the Engineer.

Materials Polyvinyl chloride (PVC) as specified in Section 610.

Construction Storm laterals shall include all labor, material and equipment necessary for tree removal and trimming as required, pavement saw cutting and removal or lawn removal, excavation, removal and disposal of excess soil material, removal of incidental sewer and water main piping that is inactive, removal of incidental manhole structures and duct bank that are inactive, pipe installation including pipe bedding and pipe cover material in the pipe zone, mechanically compacted soil or crushed concrete backfill and compaction, and permanent surface restoration where noted on drawings.

Measurement The City will measure 6” SDR35 PVC Storm Sewer Laterals horizontally from the end connection of the lateral at the storm sewer main to a point of termination approximately 24 inches behind the back of pavement curb.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
C1-02	6” SDR35 PVC Storm Sewer Lateral	LF

6” SDR35 PVC Storm Sewer Laterals shall be paid for at the unit price bid per lineal foot measured horizontally for the various classes, types, backfill and sizes of pipe installed. Payment for pipe will be based on the actual number of feet installed, as measured by the City of Wauwatosa.

Item C1-25 – 30” PVC DR18 C900 Storm Sewer Main

Description This provision describes the installation of 30” PVC DR18 C900 storm sewer main as shown on the Contract Drawings and directed by the Engineer.

Materials Polyvinyl chloride (PVC) as specified in Section 610.

Construction Storm sewer shall include all labor, material and equipment necessary for tree removal and trimming as required, pavement saw cutting and removal or lawn removal, excavation, removal and disposal of excess soil material, removal of incidental sewer and water main piping that is inactive, removal of incidental manhole structures and duct bank that are inactive, pipe installation including pipe bedding and pipe cover material in the pipe zone, mechanically compacted spoil or crushed concrete backfill and compaction, and permanent surface restoration where noted on drawings.

In addition to this, the contractor shall expose various utility crossing at locations of possible conflict, as shown on the plans, prior to commencing pipe laying so that either the utilities can be altered or the line and grade of the proposed relay can be adjusted. Electric and communication poles, pedestals, traffic signals, conduit and cable shall be protected and supported as necessary to install piping. This work will be incidental to the cost of the contract.

Measurement The City will measure 30” PVC DR18 C900 Storm Sewer Main horizontally from center-to-center of manholes or to the limits of the existing pipe remaining, whichever is applicable.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
C1-25	30” PVC DR18 C900 Storm Sewer Main	LF

30” PVC DR18 C900 Storm Sewer Main shall be paid for at the unit price bid per lineal foot measured horizontally for the various classes, types, backfill and sizes of pipe installed. Payment for pipe will be based on the actual number of feet installed, as measured by the City of Wauwatosa.

Item C1-31, C1-34 – Class III Reinforced Concrete Storm Sewer

Description This provision describes the installation of Class III reinforced concrete pipe (RCP) storm sewer as shown on the Contract Drawings and directed by the Engineer.

Materials Reinforced concrete pipe (RCP) as specified in Section 610.

Construction Storm sewer shall include all labor, material and equipment necessary for tree removal and trimming as required, pavement saw cutting and removal or lawn removal, excavation, removal and disposal of excess soil material, removal of incidental sewer and water main piping that is inactive, removal of incidental manhole structures and duct bank that are inactive, pipe installation including pipe bedding and pipe cover material in the pipe zone, mechanically compacted soil or

crushed concrete backfill and compaction, and permanent surface restoration where noted on drawings.

In addition to this, the contractor shall expose various utility crossing at locations of possible conflict, as shown on the plans, prior to commencing pipe laying so that either the utilities can be altered or the line and grade of the proposed relay can be adjusted. Electric and communication poles, pedestals, traffic signals, conduit and cable shall be protected and supported as necessary to install piping. This work will be incidental to the cost of the contract.

Measurement The City will measure Class III Reinforced Concrete Storm Sewer horizontally from center-to-center of manholes or to the limits of the existing pipe remaining, whichever is applicable.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
C1-31	24” Class III Reinforced Concrete Storm Sewer	LF
C1-34	36” Class III Reinforced Concrete Storm Sewer	LF

Class III Reinforced Concrete Storm Sewer shall be paid for at the unit price bid per lineal foot measured horizontally for the various classes, types, backfill and sizes of pipe installed. Payment for pipe will be based on the actual number of feet installed, as measured by the City of Wauwatosa.

Item C1-50 – 18” Class IV Reinforced Concrete Storm Sewer

Description This provision describes the installation of 18” Class IV reinforced concrete pipe (RCP) storm sewer as shown on the Contract Drawings and directed by the Engineer.

Materials Reinforced concrete pipe (RCP) as specified in Section 610.

Construction Storm sewer shall include all labor, material and equipment necessary for tree removal and trimming as required, pavement saw cutting and removal or lawn removal, excavation, removal and disposal of excess soil material, removal of incidental sewer and water main piping that is inactive, removal of incidental manhole structures and duct bank that are inactive, pipe installation including pipe bedding and pipe cover material in the pipe zone, mechanically compacted spoil or crushed concrete backfill and compaction, and permanent surface restoration where noted on drawings.

In addition to this, the contractor shall expose various utility crossing at locations of possible conflict, as shown on the plans, prior to commencing pipe laying so that either the utilities can be altered or the line and grade of the proposed relay can be adjusted. Electric and communication poles, pedestals, traffic signals, conduit and

cable shall be protected and supported as necessary to install piping. This work will be incidental to the cost of the contract.

Measurement The City will measure 18” Class IV Reinforced Concrete Storm Sewer horizontally from center-to-center of manholes or to the limits of the existing pipe remaining, whichever is applicable.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
C1-50	18” Class IV Reinforced Concrete Storm Sewer	LF

18” Class IV Reinforced Concrete Storm Sewer shall be paid for at the unit price bid per lineal foot measured horizontally for the various classes, types, backfill and sizes of pipe installed. Payment for pipe will be based on the actual number of feet installed, as measured by the City of Wauwatosa.

Item C1-72 – 29” x 45” Class III HE Reinforced Concrete Storm Sewer

Description This provision describes the installation of 29” x 45” Class III HE reinforced concrete pipe (RCP) storm sewer as shown on the Contract Drawings and directed by the Engineer.

Materials Reinforced concrete pipe (RCP) as specified in Section 610.

Construction Storm sewer shall include all labor, material and equipment necessary for tree removal and trimming as required, pavement saw cutting and removal or lawn removal, excavation, removal and disposal of excess soil material, removal of incidental sewer and water main piping that is inactive, removal of incidental manhole structures and duct bank that are inactive, pipe installation including pipe bedding and pipe cover material in the pipe zone, mechanically compacted spoil or crushed concrete backfill and compaction, and permanent surface restoration where noted on drawings.

In addition to this, the contractor shall expose various utility crossings at locations of possible conflict, as shown on the plans, prior to commencing pipe laying so that either the utilities can be altered or the line and grade of the proposed relay can be adjusted. Electric and communication poles, pedestals, traffic signals, conduit and cable shall be protected and supported as necessary to install piping. This work will be incidental to the cost of the contract.

Measurement The City will measure 29” x 45” Class III HE Reinforced Concrete Storm Sewer horizontally from center-to-center of manholes or to the limits of the existing pipe remaining, whichever is applicable.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
C1-72	29” x 45” Class III HE Reinforced Concrete Storm Sewer	LF

29” x 45” Class III HE Reinforced Concrete Storm Sewer shall be paid for at the unit price bid per lineal foot measured horizontally for the various classes, types, backfill and sizes of pipe installed. Payment for pipe will be based on the actual number of feet installed, as measured by the City of Wauwatosa.

Item C1-123, C1-124 – Class V Reinforced Concrete Storm Sewer

Description This provision describes the installation of Class V reinforced concrete pipe (RCP) storm sewer as shown on the Contract Drawings and directed by the Engineer.

Materials Reinforced concrete pipe (RCP) as specified in Section 610.

Construction Storm sewer shall include all labor, material and equipment necessary for tree removal and trimming as required, pavement saw cutting and removal or lawn removal, excavation, removal and disposal of excess soil material, removal of incidental sewer and water main piping that is inactive, removal of incidental manhole structures and duct bank that are inactive, pipe installation including pipe bedding and pipe cover material in the pipe zone, mechanically compacted soil or crushed concrete backfill and compaction, and permanent surface restoration where noted on drawings.

In addition to this, the contractor shall expose various utility crossing at locations of possible conflict, as shown on the plans, prior to commencing pipe laying so that either the utilities can be altered or the line and grade of the proposed relay can be adjusted. Electric and communication poles, pedestals, traffic signals, conduit and cable shall be protected and supported as necessary to install piping. This work will be incidental to the cost of the contract.

Measurement The City will measure Class V Reinforced Concrete Storm Sewer horizontally from center-to-center of manholes or to the limits of the existing pipe remaining, whichever is applicable.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
C1-123	12” Class V Reinforced Concrete Storm Sewer	LF
C1-124	15” Class V Reinforced Concrete Storm Sewer	LF

Class V Reinforced Concrete Storm Sewer shall be paid for at the unit price bid per lineal foot measured horizontally for the various classes, types, backfill and sizes of

pipe installed. Payment for pipe will be based on the actual number of feet installed, as measured by the City of Wauwatosa.

Item C2-03, C2-05 – Storm Lining

Description This provision describes storm sewer lining as shown on the Contract Drawings and directed by the Engineer.

Materials Cured-in-place pipe (CIPP) as specified in Section 615.

Construction Storm sewer lining shall include all labor, materials, tools, and equipment necessary for storm sewer lining using a cured-in-place pipe (CIPP), including watertight seals at all manholes, preparatory cleaning, TV inspection before and after rehabilitation along with reports and video tapes, bypass pumping of sewage, clearing all obstructions, reinstatement of active service laterals, providing openings at all manholes unless otherwise specified, and testing.

Measurement The City will measure Storm Sewer Lining by the linear foot of sewer main acceptably lined, measured from center of structure to center of structure, as confirmed by the Engineer.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
C2-03	12” Storm Lining	LF
C2-05	18” Storm Lining	LF

No segment of lining work shall be paid for until after lining and reinstatement of active laterals is completed, televised, and all deliverables are received by the Engineer. Any work necessary to install the liner, including but not limited to cleaning, jetting, and/or removal of obstructions in the mainline, shall be incidental to this item.

Item C3-01 to C3-04 – Precast Storm Manhole

Description This provision describes installation of Precast storm manhole structures at the locations as shown on the Contract Drawings and directed by the Engineer.

Materials As specified in Section 610.

Construction Storm manholes shall include all labor, material and equipment necessary for overhead tree removal and trimming as required, pavement saw cutting and removal or lawn removal, excavation, removal and disposal of excess soil material, removal of incidental sewer and water main piping that is inactive, removal of incidental manhole structures and duct bank that are inactive, all necessary bypass pumping, structure installation including base, riser and cone, concrete bench, watertight connection with all incoming and outgoing sewers, stubs,

steps, external perimeter joint sealing band, internal chimney seals, frames and covers, mechanically compacted soil or crushed concrete backfill and compaction, and surface replacement where noted on drawings. Frames and covers shall be provided by the City.

Measurement The City will measure Precast Storm Manholes, by the vertical foot, from the flow line of the outgoing sewer to the top of the manhole casting frame and cover.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
C3-01	48” Dia. Precast Storm Manhole	VF
C3-02	60” Dia. Precast Storm Manhole	VF
C3-03	72” Dia. Precast Storm Manhole	VF
C3-04	84” Dia. Precast Storm manhole	VF

Precast Storm Manholes shall be paid for at the unit price bid per lineal foot measured vertically for the various types, backfill and sizes of manhole installed. Payment for manholes will be based on the actual number of feet installed, as measured by the City of Wauwatosa.

Item C3-42, C3-46 – Catch Basin w/ Sump

Description This provision describes the installation of precast catch basins with sumps at the locations as shown on the Contract Drawings and directed by the Engineer.

Materials As specified in Section 610. Frame and grate as shown on plans. Frames, back boxes and grates shall be provided by the contractor and are incidental to the bid item.

Construction Storm catch basin shall include all labor, materials, and equipment necessary for overhead tree removal and trimming as required, pavement saw cutting and removal and/or lawn removal, excavation, removal and disposal of excess soil material, removal of incidental sewer and water main piping and/or structures that are inactive or will become inactive after completion of the installation of the proposed sewer, removal of incidental manhole structures and ductbank that are inactive or will become inactive after completion of the installation of the proposed sewer, all necessary bypass pumping, structure installation including, but not limited to, base, riser and cone, frames, back boxes and grates, concrete bench, watertight connections at all incoming and outgoing sewers, stubs, steps, backfill as noted on the plan (mechanically compacted spoil, mechanically compacted crushed concrete or slurry), and surface replacement where noted on drawings. Frames, back boxes and grates shall be provided by the contractor and are incidental to the bid item.

Measurement The City will measure catch basins as each installed and acceptably completed.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
C3-42	2.5’ x 3’ Catch Basin w/ 2’ Sump	EA
C3-46	2.5’ x 6’ Catch Basin w/ 2’ Sump	EA

Catch basins shall be paid at the unit price bid per each for the various types and sizes of catch basins installed. Payment for storm catch basins will be based on the actual number installed, as measured by the Engineer.

Item C4-01 – Connect to Existing Storm Structure (Existing Opening)

Description This provision describes connecting the proposed storm sewer to existing storm sewer structure using an existing opening at the locations as shown on the Contract Drawings and directed by the Engineer.

Materials As specified on plans.

Construction Connections to existing storm structures shall include all labor, material and equipment necessary for overhead tree removal and trimming as required, pavement saw cutting and removal or lawn removal, excavation, removal and disposal of excess soil material, removal of incidental sewer and water main piping that is inactive, removal of incidental manhole structures and duct bank that are inactive, all necessary bypass pumping, temporary plugs, core-drill of existing structures when necessary, installation of sleeves between new storm sewer and existing storm sewer or structure, mechanically compacted soil or crushed concrete backfill and compaction, and surface replacement where noted on drawings.

Measurement The City will measure Connections to existing storm structures as each connection to an existing opening.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
C4-01	Connect to Existing Storm Structure (Existing Opening)	EA

Connections to existing storm structures shall be paid for at the unit price bid per each for the various types and sizes of connections installed. Payment for connections to existing storm structures will be based on the actual number installed, as measured by the City of Wauwatosa.

Item C4-04 – Connect to Existing Storm Sewer Main

Description This provision describes connecting new storm sewer main to the existing storm sewer main at the locations as shown on the Contract Drawings and directed by the Engineer.

Construction Connections to existing storm sewer mains shall include all labor, material and equipment necessary for overhead tree removal and trimming as required, pavement saw cutting and removal or lawn removal, excavation, removal and disposal of excess soil material, removal of incidental sewer and water main piping that is inactive, removal of incidental manhole structures and ductbank that are inactive, temporary plugs, installation of sleeves between new storm sewer and existing storm sewer, mechanically compacted spoil or crushed concrete backfill and compaction, and surface replacement where noted on drawings.

Measurement The City will measure Connections to existing storm sewer mains as each new connection installed.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
C4-04	Connect to Existing Storm Sewer Main	EA

Connections to existing storm sewer main shall be paid for at the unit price bid per each for the various types and sizes of connections installed. Payment for connections to existing storm sewer main will be based on the actual number installed, as determined and measured by the Engineer.

Item C4-08 – 6-Inch Lateral, Core Connection to Proposed Storm Sewer

Description Connect new storm piping to existing or new storm sewer

Materials As specified on plans

Construction Core connections shall include all labor, material and equipment necessary for overhead tree removal and trimming as required, pavement saw cutting and removal or lawn removal, excavation, removal and disposal of excess soil material, removal of incidental sewer and water main piping that is inactive, removal of incidental manhole structures and ductbank that are inactive, temporary plugs, core-drill of existing or new storm sewer, installation of sleeves between new storm piping and existing or new storm sewer, mechanically compacted soil or crushed concrete backfill and compaction, and surface replacement where noted on drawings.

Measurement Core connections for new storm piping to existing or new storm sewers will be measured for each new cored connection installed.

Payment Cored connections to new storm sewers shall be paid for at the unit price bid per each for the various types and sizes of cored connections installed. Payment for cored connections to new storm sewers will be based on the actual number installed, as measured by the City of Wauwatosa.

ITEM CODE	DESCRIPTION	UNIT
C4-08	6-Inch Lateral, Core Connection to Proposed Storm Sewer	EA

Item C5-06 – Bulkhead and Abandon Existing Storm Sewer 30" and Smaller

Description Bulkhead and abandonment of existing storm sewer main

Materials Pipe filling with approved grouting material, such as, Elastizell PS120, or equal.

Construction Storm sewer abandonment shall include all labor, material and equipment necessary to abandon existing storm sewers by filling with approved grouting material, including bulkheads.

Measurement Storm sewer abandonment will be measured horizontally from pipe end or bulkhead to pipe end or bulkhead.

Payment Storm sewer abandonment shall be paid for at the unit price bid per lineal foot measured horizontally for the various classes, types, backfill and sizes of pipe abandoned. Payment for pipe will be based on the actual number of feet abandoned, as measured by the City of Wauwatosa.

ITEM CODE	DESCRIPTION	UNIT
C5-06	Bulkhead and Abandon Existing Storm Sewer 30" and Smaller	LF

DIVISION D – PAVING

Item D1-02 – Common Excavation

Description This provision describes performing all site grading including removal of existing asphaltic pavement and existing base course to subgrade elevation.

Materials (Vacant)

Construction Construction shall be in accordance with Section 620 for excavation and includes all excavation required to reach subgrade elevation. Removal of unstable and unsuitable materials below subgrade elevation as the engineer directs will be paid for as Excavation below Subgrade.

Measurement The City will measure Common Excavation as a single lump sum unit of work, acceptably completed.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
D1-02	Common Excavation	LS

Common Excavation, as measured above, is full compensation for all site grading (including any necessary filling), protection of utilities and structures, preparation to subgrade, removal and disposal of asphaltic pavements, existing base course materials, and maintaining drainage over subgrade. Removal of Asphaltic Surface Temporary shall be included in the price bid for Common Excavation.

Item D1-04 – Base Aggregate Dense 1 ¼-Inch

Description This provision describes furnishing and placing Base Aggregate Dense 1 ¼-Inch in accordance with Section 620.

Materials Furnish Materials in accordance with Section 620 for Base Aggregate Dense 1 ¼-Inch.

Construction Construct Base Aggregate Dense 1 ¼-Inch in accordance with Section 620.

Measurement The City will measure Base Aggregate Dense 1 ¼-Inch by the ton acceptably completed. The contractor shall provide copies of the Base Aggregate Dense weight receipts to the Engineer at the end of each day. Tonnage shall be calculated by summing all material receipts from each truckload, with unused material from any truck being deducted from the total.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
D1-04	Base Aggregate Dense 1 ¼-Inch	TON

Base Aggregate Dense 1 ¼-Inch, as measured above, is full compensation for providing material; hauling; and placing to the limits the plans show or as the engineer directs.

Item D1-07 – Excavation below Subgrade

Description This provision describes removal of unsuitable or unstable material below the subgrade as identified by proof rolling at a depth and area determined by the engineer.

Materials (Vacant)

Construction Construction shall be in accordance with Section 620 for excavation and includes all excavation required to remove areas of unstable and unsuitable material below subgrade as identified and directed by the engineer.

Measurement The City will measure Excavation below Subgrade by the cubic yard acceptably completed.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
D1-07	Excavation below Subgrade	CY

Excavation below Subgrade, as measured above, is full compensation for removal, hauling, and disposal of unsuitable or unstable material below subgrade elevation.

Item D1-15 – Removing Concrete Pavement

Description This provision describes removing and disposing of concrete pavement as shown on the Contract Drawings and directed by the Engineer.

Materials (Vacant)

Construction Remove and dispose of concrete pavement including all surfaces or other pavements superimposed on it.

Measurement The City will measure Removing Concrete Pavement by the square yard acceptably completed. The City will measure the removal of concrete curb and gutter in conjunction with the removal of concrete pavement by the square yard acceptably completed under the removing concrete pavement item.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
D1-15	Removing Concrete Pavement	SY

Removing Concrete Pavement, as measured above, is full compensation for sawcutting, removing, and disposing concrete pavement to the limits the plans show or as the engineer directs.

Item D1-16 – Removing Curb and Gutter

Description This provision describes removing and disposing of concrete curb and gutter as shown on the Contract Drawings and directed by the Engineer.

Materials (Vacant)

Construction Remove and dispose of concrete curb and gutter including all surfaces or other pavements superimposed on it.

Measurement The City will measure Removing Curb and Gutter by the linear foot acceptably completed.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
D1-16	Removing Curb and Gutter	LF

Removing Curb and Gutter, as measured above, is full compensation for sawcutting, removing, and disposing concrete curb and gutter to the limits the plans show or as the engineer directs.

Item D1-18 – Removing Concrete Sidewalk and Drive Approach

Description This provision describes removing and disposing of concrete sidewalks and drive approaches at locations as shown on the Contract Drawings and directed by the Engineer.

Materials (Vacant)

Construction Remove and dispose of concrete sidewalk and drive approaches to the limits the plans show.

Measurement The City will measure Removing Concrete Sidewalk and Drive Approach by the square foot acceptably completed.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
D1-18	Removing Concrete Sidewalk and Drive Approach	SF

Removing Concrete Sidewalk and Drive Approach, as measured above, is full compensation for sawcutting, removing, and disposing concrete sidewalk and drive approaches to the limits the plans show or as the engineer directs.

Item D1-19 - Sawcutting

Description This work shall consist of sawcutting through existing pavement or curb and gutter at locations marked in the field or as directed by the Engineer.

Materials and Construction Sawcutting shall be in accordance with Section 620. The cut shall be full depth, and shall run straight and true with the item to be cut.

Wet sawcutting sludge shall be removed from the concrete surface immediately upon completion of each sawcut by methods which minimize the amount of sludge flowing onto or being deposited on existing sidewalks, driveways, and roadway pavement.

Measurement The City will measure Sawcutting by the linear foot and paid for only at the designated locations. Sawcutting required to deepen joints or to correct a slab damaged by the Contractor, which was to remain in place, shall not be a part of this item of work, and will not be measured or paid for.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
D1-19	Sawcutting	LF

Sawcutting, as measured above, is full compensation for labor, tools, equipment, disposal of wet sawcutting sludge, and other incidentals necessary to complete the work.

Item D2-05 – Concrete Curb and Gutter

Description This provision describes furnishing: all materials, equipment, tools, labor and incidentals necessary for the construction of concrete curb and gutter at locations as shown on the Contract Drawings and directed by the Engineer.

Materials The grade and class of all concrete used shall conform to Grade A or Grade A-FA of said State Specs so that a minimum compressive strength of 3600 pounds per square inch is developed in 28 days of curing (Grade A2 may be used for sidewalks). Other grades may be used with the approval of the Engineer. The use of a water reducing admixture is subject to Section 501 of the State Specs.

Construction Curb & gutter construction shall conform to Section 601 of the State Specs. The surface of curb and gutter construction shall be finished by troweling and brushing.

Construct Concrete Curb and Gutter and Concrete Curb and Gutter (Intersections) in accordance with the construction details shown in the plans. Concrete Curb and Gutter (Spot locations) shall be constructed to the cross-section shown for Concrete Curb and Gutter.

Honeycombing occurring along the back of the curb and the flange face shall be pointed with mortar (1 part Portland Cement to three parts Fine Aggregate) after removal of the forms. All excess concrete behind the curb shall be removed before backfilling.

Tie new work to existing concrete pavement using tie bars driven or epoxied into the existing concrete.

Measurement The City will measure Concrete Curb and Gutter by the linear foot measured along the flow line acceptably completed. No deduction will be made for inlet grates within the new curb and gutter.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
D2-05	31” Concrete Curb and Gutter	LF

Concrete Curb and Gutter, as measured above, is full compensation for special construction required at driveways, alleys, and curb ramps; for providing materials, including concrete, expansion joints; for placing, finishing, protecting, and curing; for sawing joints; and restoring the worksite. The City will pay for Concrete Curb and Gutter 50 linear feet or less as Concrete Curb and Gutter (Spot Locations). All tie bars required for construction of this item shall be incidental.

Item D3-01 – Concrete Sidewalk and Driveway, Remove and Replace

Description The unit bid price for this item shall include all labor, materials, equipment, and tools necessary to remove and construct concrete walks as shown on the Contract Drawings and directed by the Engineer.

Materials Furnish material in accordance with Section 620 and Section 621.

Construction Construction shall be in accordance with Section 620 and 621. The slope across the walk shall be 1.5% unless otherwise directed or shown on the plans. The surface of sidewalk construction shall be finished by troweling and brushing, and sidewalks shall be 5 feet wide unless otherwise noted or directed by the Engineer. Concrete sidewalk and concrete drive approaches must be constructed on Base Aggregate Dense 1 ¼-Inch as shown in the plans. Base Aggregate Dense 1 ¼-inch for sidewalk and drive approaches will be paid for separately under the applicable bid item.

Measurement The City will measure Concrete Sidewalk and Driveway bid items by the square foot acceptably completed, as measured and determined by the Engineer.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
D3-01	5” Concrete Sidewalk and Driveway, Remove and Replace	SF

Concrete Sidewalk and Driveway, Remove and Replace, as measured above, is full compensation for removing, placing, finishing, protecting, and curing concrete.

Item D3-03 – 5” Concrete Sidewalk and Driveway

Description This provision describes providing all materials, equipment, tools, labor and incidentals necessary to construct 5” concrete sidewalk and driveway as shown on the Contract Drawings and directed by the Engineer.

Materials All concrete shall be in accordance with Section 620.

All ¾ dense crushed aggregate must be in accordance with Sections 620.

Construction Construction shall be in accordance with Section 620. The slope across the walk shall be 1.5% unless otherwise directed or shown on the plans. The surface of sidewalk construction shall be finished by troweling and brushing, and sidewalks shall be 5 feet wide unless otherwise noted or directed by the Engineer. Concrete Drive Approach must be constructed on 2 inches of Base Aggregate Dense ¾-Inch. Base Aggregate Dense ¾-inch for sidewalk shall be incidental.

Measurement The City will measure 5” Concrete Sidewalk and Driveway bid items by the square foot acceptably completed.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
D3-03	5” Concrete Sidewalk and Driveway	SF

5” Concrete Sidewalk and Driveway, as measured above, is full compensation for placing, finishing, protecting, and curing concrete.

Item D3-07 – 7" Concrete Sidewalk and Driveway

Description This provision describes providing all materials, equipment, tools, labor and incidentals necessary to construct 7” concrete sidewalk and driveway as shown on the Contract Drawings and directed by the Engineer.

Materials All concrete shall be in accordance with Section 620.

All ¾ dense crushed aggregate must be in accordance with Sections 620.

Construction Construction shall be in accordance with Section 620. The slope across the walk shall be 1.5% unless otherwise directed or shown on the plans. The surface of sidewalk construction shall be finished by troweling and brushing, and sidewalks shall be 5 feet wide unless otherwise noted or directed by the Engineer.

Concrete Drive Approach must be constructed on 2 inches of Base Aggregate Dense ¾-Inch. Base Aggregate Dense ¾-inch for sidewalk shall be incidental.

Measurement The City will measure 7” Concrete Sidewalk and Driveway bid items by the square foot acceptably completed.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
D3-07	7” Concrete Sidewalk and Driveway	EA

7” Concrete Sidewalk and Driveway, as measured above, is full compensation for placing, finishing, protecting, and curing concrete.

Item D3-10 – Detectable Warning Field

Description Work under this item includes the installation of Detectable Warning Fields at the curb ramp as shown on the plans.

Materials Furnish cast iron detectable warning fields for curb ramps with a natural patina finish.

Construction Embed detectable warning fields in plastic concrete conforming to manufacturer-recommended procedures. Do not install on hardened concrete.

Measurement The City will measure Detectable Warning Field by the square foot acceptably completed

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
D3-10	Detectable Warning Field	SF

Detectable Warning Field, as measured above, is full compensation for providing the Detectable Warning Field with a natural patina finish.

Item D4-02 – Concrete Pavement, SHES

Description This provision describes providing all materials, equipment, tools, labor and incidentals necessary to construct concrete walks/driveways as shown on the Contract Drawings and directed by the Engineer. The walks/driveways shall be minimum 7” thick concrete, matching the dimensions as shown in the plans.

Materials Per Section 620 and 621.

Construction Construction shall be in accordance with Section 620 and 621.

Measurement The City will measure Concrete Pavement, SHES by the square yard acceptably completed.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
D4-02	7” Concrete Pavement, SHES	SY

Concrete Pavement, SHES, as measured above, is full compensation for removing, placing, finishing, protecting, and curing concrete.

Item D4-20, D4-24 – HMA Pavement

Description This provision describes providing labor and materials in accordance with Section 620 and the State Specs.

Materials Furnish materials in accordance with Section 620 except furnish HMA Pavement meeting the requirements of Section 460 of the State Specs for HMA Pavement.

Construction Construct in accordance with Section 620 for asphalt pavement construction.

Measurement The City will measure HMA Pavement by the ton acceptably completed.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
D4-20	HMA Pavement 3 LT 58-28 S	TON
D4-24	HMA Pavement 5 LT 58-28 S	TON

HMA Pavement, as measured above, is full compensation for materials, cleaning, sweeping and providing tack coat on previously placed asphalt, and placing asphalt pavement to the lines, grades, and thicknesses shown on the plans.

Item D5-01 – Erosion Control

Description This provision describes placing and installing all temporary and premanent erosion control and storm water management measures.

Materials Furnish material in accordance with Section 628 of the State Specs.

Construction Construction shall be in accordance with Section 628 of the State Specs.

Measurement The City will measure Erosion Control by the lump sum acceptably completed.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
D5-01	Erosion Control	LS

Erosion Control, as measured above, is full compensation for cost of erosion control implementation plan; furnishing, hauling, and placement of erosion control materials and storm water management materials; cleanup, and all incidental work related to erosion control and storm water management required by local, state, and federal ordinances, statutes, permits, and regulations; not specifically included for payment under any other unit prices.

Item D5-02 – Topsoil and Sod

Description This provision describes furnishing and placing topsoil and sod at the locations the plan shows and the engineer directs.

Materials Furnish topsoil; bluegrass nursery sod; and Type A granular fertilizer.

Construction Cover the grade with 3 inches of topsoil. Before laying sod, a good butt joint shall be provided in all cases. No scraps of any size will be permitted for use. All sod must be fertilized with a Type A granular fertilizer; cost to be included in bid prices. To make a tight match with the undisturbed sod, a sod cutter may be used to line up and square up the trench. Sod must be placed to a butt joint and not wedged off with topsoil or laid on top of existing lawn. Sod shall be properly rolled or tamped in place and kept moist.

Topsoil must be properly placed within 48 hours after form removal. Sod must be properly placed within three (3) weeks after form removal, unless temperatures are consistently over 82°F during that time.

All sod must be watered thoroughly each day for ten (10) consecutive calendar days (excluding Sundays) by the Contractor.

The Contractor must notify the City when watering on site. In extreme heat, the Contractor must continue watering daily until the sod is accepted as being established by the Engineer. If the Contractor chooses to use City of Wauwatosa water, water may be obtained at the City's Public Works facility at 11100 W. Walnut Road, at the Contractor's expense.

On the last day of the 10- day watering period, the Contractor shall provide written notice to each private property where watering has been completed stating that further watering is the responsibility of the property owner.

Measurement The City will measure Topsoil and Sod by the square foot acceptably completed.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
D5-02	Topsoil and Sod	SF

Top Soil and Sod, as measured above, is full compensation for furnishing and placing earth fill, topsoil, blue grass nursery sod, and Type-A fertilizer; and watering for 10 days.

Item D6-01 – Traffic Control

Description Installation and maintenance of traffic control components for diversion of traffic around the work site.

Materials and Construction Traffic control shall include all traffic control plan preparation, labor, material and equipment necessary for furnishing, maintaining and removing all approved traffic control devices. It shall include placing signs, barricades, and all other items required by the traffic control plan, any necessary covering and uncovering of signs, and removal of all items when traffic control is no longer necessary.

Measurement Traffic control will be measured lump sum for labor and materials.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
D6-01	Traffic Control	LS

Traffic control shall be paid for at 50 percent for maintaining traffic control, and 50 percent for the removal of equipment as determined by the City of Wauwatosa.

Item D6-11 – New Sign Post

Description This provision describes the installation of new sign posts with anchors at the locations as shown on the Contract Drawings and as directed by the Engineer.

Materials Sign posts shall be 2” (2-3/8” O.D) x 10’ Schedule 40 Aluminum extruded post, mill finish, plain end.

Anchor shall be Tapco V-Loc Steel Breakaway post or approved equal.

Construction The Contractor will be required to install the post anchors flush with the surface.

Measurement The sign post and anchor shall be paid per each installed.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
D6-11	New Sign Post	EA

Sign posts shall be paid for at the unit price per each installed, as measured by the Engineer.

Item D6-12 – Sign Removal, Relocation, and Installation

Description This provision describes the removal of existing signs within the work zone, scrapping of all existing signs, posts, and brackets and the reinstallation of signs (to be provided by the City) prior to completion of the project.

Materials All hardware to reinstall signs to poles and light poles shall be furnished by the Contractor. Hardware to reinstall signs shall be provided by Tapco or approved equal.

Z-Brackets: Tapco 037-00005
Top Brackets: Tapco 037-00224
Universal Cross Brackets: Tapco 037-00226
Adjustable Cross Brackets: Tapco
Band Clips: Tapco 038-00007
Band Brackets with bolts: Tapco 035-00010

Construction (Vacant)

Measurement The City will measure Sign Removal, Relocation and Installation for each sign relocated or removed. Signs damaged by the Contractor at any time during this process shall be replaced at the expense of the Contractor. The cost of replacement signs made by City of Wauwatosa Department of Public Works shall be deducted from monies owed to the Contractor.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
D6-12	Sign Removal, Relocation, and Installation	EA

Sign Removal, Relocation and Installation as measured above, is full compensation for removing, scrapping, and installation of signs.

Item D7-01 – Adjusting Water Valve

Description This provision describes adjusting existing water valves to match new and replacement pavement and sidewalk.

Materials

Construction

Measurement The City will measure Adjusting Water Valve by each valve acceptably adjusted.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
D7-01	Adjusting Water Valve	EA

Adjusting Water Valve, as measured above, is full compensation for all labor, tools, and materials required for the adjustment of existing water valve boxes to match new and replacement pavement and sidewalk.

DIVISION E – STREET LIGHTING & COMMUNICATIONS

Item E1-01 – Locate, Test and Protect Existing and New Circuits

Description This work shall start at the notice to proceed and consists of repairing damage to existing circuits, locating existing underground wiring as affected due to work associated with project, testing new equipment, and testing new 600V underground circuit(s).

Materials (Vacant)

Construction If there are overhead and underground utility facilities located within the project limits, refer to the plans and specifications for any anticipated utility adjustments.

The Contractor shall coordinate his construction activities with a call to Diggers Hotline or a direct call to the utilities which have facilities in the area as required per statutes (see General Provisions for a detailed list of utility contact information).

Contractor shall be responsible for locating existing underground street lighting and traffic signal cables within the project limits.

Bidders are advised to contact each utility company prior to preparing their bids. Any damage to public or private utilities shall become the responsibility of the Contractor. Satisfactory repair or replacement shall be completed at the Contractor's expense.

Where there is enclosed or unenclosed lighting cable within the project limits, care must be exercised by the Contractor to avoid damage to the cable during work. Where the Contractor or any of his Subcontractors damage any part of the lighting system which results in inoperative street lights or traffic signals, or an outage has occurred anywhere within the project limits, the damage shall be assessed within 24 hours. The damage shall be repaired within 72 hours by a qualified electrician at the Contractor's expense, and in accordance with City specifications.

Should a reasonable time limit be exceeded, as determined by the Engineer, the City reserves the right to hire a third party, independent of the Contractor, to perform the repair(s). **The cost of hiring a third party and having them repair the damage will be paid for by the Contractor. Contractor agrees they will be informed of the final cost, which will be deducted from monies owed in a subsequent payment.**

In lieu of hiring a third party, the City may also choose to fine the Contractor as they see fit for the circumstances, to be charged each day the lights are not properly functioning outside of Engineer's determined time limit.
Repairs shall be investigated and completed promptly in accordance with City of Wauwatosa specifications (20-inch depth, splices, mason sand envelope, etc.). The City may require temporary repairs at the Contractor's expense, including the installation of overhead facilities, to accelerate the return of functional electrical systems. Backfilling of the curb at repair locations must not be done until all needed repairs have been made and inspected by the City Electrical Supervisor.

When applicable, cable work at existing conduit locations damaged during construction is to be corrected by utilizing newly placed conduit which has been laid as part of the contract work. Frost loops of at least 12 inches shall be provided where cables enter conduit systems. **All buried cable must be enveloped with mason sand.**

The Contractor shall perform acceptance tests for circuits installed under this project and shall record that information on INSULATION AND EQUIPMENT TESTING SCHEDULE after construction is completed. The contractor shall create and provide all documentation to the City at completion of tests (with all system issues corrected).

Testing shall occur in the presence of the Public Works Department personnel. The Contractor and the City shall agree on a time for testing of the completed installation which is generally toward the end of the contract period.

A general system "Test Burn" shall be performed with any failed luminaires being replaced, along with any other non-functioning component. Only one test burn for the purpose of identifying initial failures will be required.

For insulation testing (on new underground conductors): Fuses shall be removed from all fuse holders to not damage LED luminaire drivers during testing. Each conductor (entire length) shall have its insulation tested to ground from the control cabinet. The conductors shall have a reading of infinity, at 1000Vdc impressed voltage to be accepted. If any readings do not meet the infinity requirement, the contractor shall sequentially test each portion (between termination points) of the lighting circuit till the issue(s) can be identified. The issues shall be mitigated by corrections (i.e. tighten lugs) or replacements (i.e. replace defective splices, conductors) - additional splices will NOT be allowed.

If equipment associated with the project does not operate properly or fails the tests as outlined, it is the Contractor's responsibility to determine issues and to correct and/or repair defect at his own expense.

Measurement The City will measure Locate, Test, and Protect Existing and New Circuits as a single complete unit of work.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
E1-01	Locate, Test and Protect Existing and New Circuits	LS

Locate, Test, and Protect Existing and New Circuits, as measured above, is full compensation for testing, locating and protection of existing and new circuits, repairs, replacement materials; for removals and replacement of all installed materials; and for all labor, equipment, tools and incidentals necessary to complete the work.

Item E1-04 – Temporary Lighting

Description The work under this item shall consist of furnishing and installing temporary wood poles, luminaires/arms and aerial cable to maintain partial street lighting in areas of construction. Lighting beyond limits of construction shall be maintained as well. This is in addition to any temporary lighting that may already be indicated on the plans.

The contractor is responsible for determining and providing materials as needed to maintain at least partial lighting during construction. The plan shall be submitted to the City for approval.

Materials
Wood Poles:
Wood poles shall be Class V or larger with a 35' overall length - adjust length as needed to accommodate locations below existing utility poles/lines. The poles shall be northern pine in accordance with ANSI standards 05.1 (specifications and dimensions of wood poles). Pressure treatment shall be 5% pentachlorophenol with a minimum of 8 pounds per cubic foot net retention of the oil-borne preservative.

Down guys shall be galvanized and meet the following requirements:
(1) Three-eighths (3/8) inch nominal diameter 7-strand, zinc coated steel wire conforming to ASTM A475, 11,500 pounds minimum breaking strength, utilities grade or better.
(2) A twin eye 5/8-inch nominal diameter anchor rod with a minimum breaking strength of 11,500 pounds.
(3) An expanding or plate type anchor with an expanded area of 125 square inches or greater. A screw type anchor may be used provided the anchor is 10 inches in diameter, has 78 square inches of area and a rod diameter 1-1/4 inch by 66 inches or larger and galvanized.
(4) A 7-foot PVC or plastic guy guard.
(5) Guy wire clamps shall be 3-bolt and have a minimum breaking strength of 11,500 pounds. A galvanized service sleeve shall be used to hold down the loose guy ends beyond the guy clamp.
(6) The dead-ends shall be made of the same material as the guy wire.
(7) A guy strain insulator ANSI Class 54-2 tensile strength 12,000 pounds maximum cable diameter of ½ inch.
Luminaires/Arms:
High pressure sodium or LED cutoff luminaires of appropriate output. Mast arms of appropriate length.

Aerial Cable:
The aerial cable shall consist of 2 AWG triplex or quadplex assembly of two or three XLP insulated power aluminum conductors respectively with an ACSR bare messenger wire (for use as ground conductor as needed).

<u>Construction</u>
The depth of the wood pole in the ground shall not be less than 5 feet or as directed by the engineer.

Down guys shall be installed on poles that are at the end of an aerial cable run or where aerial cable tension would cause the pole to lean.

The Contractor shall install the overhead lines in a manner which is safe and in accordance with applicable codes, and shall correct excessive sag or loose connections for the length of the contract, or until removal, whichever comes first. The cable shall be a minimum of 20 feet above any roadway surface and 15 feet above other surfaces.

Where necessary to connect to existing underground circuiting, the Contractor shall provide an appropriately sized junction box at the base of the wood pole for an above ground splice. The cable that extends to 10 feet above grade shall be appropriately protected by a plastic cable guard or conduit.

Materials shall be removed immediately after no longer necessary. Holes left after removals shall be backfilled and compacted.

In the event of circuit failures in and near the project area during construction suspected to relate to construction activities, the Contractor, at his expense, shall respond to and troubleshoot outages. Whether or not the problem or solution lies within the project limits, he shall immediately make the necessary repairs per City specifications. The Contractor shall lay out his own work and shall be responsible for determining exact locations for equipment and rough-ins and the exact routing of conduits so as to best fit the layout of his work.

Since damaged cable may not be discovered until non-working hours, the Contractor shall maintain a telephone number by which he can be contacted for said repairs 24 hours/day, 7 days/week, including holidays and weekends. Repairs must be permanent in nature and may include installation of an entire conduit crossing with pull boxes, trenching, cable replacement and other work needed as determined by the City Electrician.

After the Contractor has made sufficient repairs, should the Contractor demonstrate, to the satisfaction of the Engineer, that damage to the underground cable was obviously not a result of construction operations under this contract, and such cables were directed to be repaired by the Engineer, the Contractor shall be reimbursed by the City for actual costs of labor, equipment and material used, plus 15% for profit and overhead.

The Contractor shall also be responsible for repairs for failure to the street lighting cable within the one-year warranty period following contract acceptance which are shown to be a result of the Contractor's construction activities. If the Contractor fails to abide by the requirements herein, the City reserves the right to complete the work independently of the Contractor and deduct the cost thereof from monies due the Contractor under this contract.

The Contractor or his representative shall respond to all emergency calls from the City of Wauwatosa within one (1) hour after notification and provide immediate corrective action. When equipment has been damaged or becomes faulty beyond repair, the contractor shall replace it with new and identical working equipment within one (1) working day. The cost of furnishing and installing the replaced equipment shall be borne by the contractor at no additional expense. The contractor may institute actions to recover damages from a responsible third party. If at any time, the contractor fails to perform all work as specified herein to keep the temporary lighting system in proper operating condition; and if the contractor's designated personnel cannot be contacted, the City shall have the normal maintaining authority to perform the required repair. The cost of the repair shall be paid by the contractor.

Measurement The City will measure Temporary Lighting, completed in accordance with the contract, as a single complete unit of work.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT

E1-04	Temporary Lighting	LS

Temporary Lighting, measured as above, is full compensation for wood poles, guy wires, luminaires, mast arms, wires, conduit, junction boxes, cable guards, for hardware, insulators, tie wire, splices, and circuit cuts; connections to existing lighting units, pull boxes and conduits; for dead ends electrical components; for removals of all installed materials; and for all labor, equipment, tools and incidentals necessary to complete the work.

Item E1-13 – Ground Rod

Description This provision describes providing labor and materials for the installation of Ground Rods in accordance with Section 670, the plan details, and as herein provided.

Materials Furnish ground rods meeting the requirements of Section 670.

Construction The cable shall be installed in accordance with Section 670.

Measurement The City will measure Ground Rod, completed in accordance with the contract, as each individual unit acceptably completed.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
E1-13	Ground Rod	EA

Ground Rod measured as above, is full compensation for furnishing and installing, and for all labor, tools, equipment, materials, and incidentals necessary to complete this item of work.

E1-16 – Composite Pull Box, 13x24x18

Description This work shall consist of furnishing and installing electrical pull boxes in accordance with Section 653 of the Standard Specifications, except as amended by Section 670 of these specifications, the plan details, and as herein provided.

Materials Lighting pull boxes shall be a rectangular composite enclosure with sloping (flared) sides and nominal size as shown on the plans. The composite boxes shall be UL Listed, constructed of polymer concrete and reinforced by a heavy-weave fiberglass. The pull boxes shall be rated for 15,000 lbs. over a 10" x 10" area at a temperature of -50°F (Tier 15 rating). The box shall be furnished with a cover having a "STREET LIGHTING" logo, skid resistant surface with a minimum coefficient of friction of .5 and concrete gray color. The cover fasteners shall be stainless steel captive 3/8-inch hex head bolts with stainless steel inserts.

Construction The pull boxes shall be set flush with the grade or pavement and installed on aggregate per plan details.

Measurement Pull Boxes, completed in accordance with the contract, will be measured as each individual unit acceptably completed.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
E1-16	Composite Pull Box, 13x24x18	EA

Item E1-22 – Removing Pull Boxes

Description This provision describes removing pull boxes in accordance with the pertinent provisions of Section 204 of the Standard Specifications, except as amended by Section 670 of these specifications, the plan details, and as herein provided.

The work under this item consists of removing pull boxes, splicing through the circuit at the given site, salvaging cast iron cover/frame and/or composite boxes/covers, transporting and disposing.

Materials (Vacant)

Construction After removal, City selected cast iron frames/covers and/or composite boxes/covers shall be salvaged and are to be delivered to the City of Wauwatosa Public Works Yard at 11100 W. Walnut Road, Wauwatosa, WI 53226. Contact Traffic and Electrical Supervisor.

Pull boxes to be reinstalled and/or relocated as indicated on the plans shall be salvaged and stored for reuse. Materials (boxes, covers, hardware) shall be protected while stored on site. Any materials damaged, stolen or lost by the Contractor's operations or lack of adequate protection shall be replaced in kind and paid for by the Contractor.

Dispose of remaining materials off site in an appropriate manner.

Remove existing conductors in existing underground conduits/ducts and dispose (recycle) off site in an appropriate manner.

Backfill hole left from removal.

Measurement The City will measure Removing Pull Boxes, completed in accordance with the contract, as a single complete unit of work.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
E1-22	Removing Pull Boxes	EA

Removing Pull Boxes as measured above, is full compensation for removing, salvaging, transporting and/or disposing of the frame, cover and box; splicing through the underground circuit; and for all labor, tools, equipment and incidentals necessary to complete the work.

Item E1-23 – Extend Existing Conduit

Description This provision describes providing labor and materials for the extension of existing conduits at select locations in accordance with Section 690, the plan details, and as herein provided.

Materials For connection to dissimilar duct/conduit types or extension of existing duct as indicated on plans, provide Duraline Shur-Lock II coupling.
The City will provide the 2-inch HDPE conduit.

Construction The extensions shall be installed in accordance with Section 690.

Measurement The City will measure Extend Existing Conduit, completed in accordance with the contract, as each individual unit acceptably completed.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
E1-23	Extend Existing Conduit	EA

Extend Existing Conduit, measured as above, is full compensation for all labor, tools, equipment, materials, and incidentals necessary to complete this item of work.

Item E1-26 – HDPE Duct Bored

Description All work under this item shall be completed in accordance with Section 652 of the Standard Specifications, except as amended by Section 670 of these specifications, the plan details, and as herein provided.

Conductors shall be installed after duct is installed and paid for separately.

Materials The duct shall be UL Listed, Type TC7, Schedule 40, black with red strip, and comply with Section 652 of the State Specs. Engineer approved backfill shall be used.

For connection to dissimilar duct/conduit types or extension of existing duct as indicated on plans, provide Duraline Shur-Lock II coupling.

Construction The duct shall be installed in accordance with Section 652 of the State Specs.

Duct shall be installed between 18” to 24” below grade outside the roadway, and 24” to 30” in a 3” PVC Schedule 40 conduit sleeve within the roadway. Conduit to be paid under a separate bid item. Duct shall be installed 6”-12” along the back of curb, or as shown on the plans.

Duct for this item shall be bored or open cut trench as called for on plans. Backfill any voids left from the work with mechanically compacted crushed concrete and restore any disturbed or damaged areas. All restoration is incidental to this item. Protect surfaces from boring machinery and equipment.

Measurement The City will measure HDPE Duct, completed in accordance with the contract, by the linear foot of completed work.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
E1-26	1” HDPE Duct Bored	LF

HDPE Duct measured as above, is full compensation for furnishing and installing all materials, including but not limited to duct, fittings, and couplings, for excavating trenches, excavating bore pits, boring, placing duct, and backfilling; for restoring disturbed or damaged areas, including but not limited to pavement restoration, seeding and sodding; for transporting and disposing of surplus material; and for all labor, tools, equipment, materials, and incidentals necessary to complete this item of work.

Item E1-42 – PVC Conduit

Description All work under these items shall be completed in accordance with Section 652 of the State Specifications, except as amended by Section 670 of these specifications, the plan details, and as herein provided.

Conductors shall be installed after conduit is installed.

Materials The conduit and fittings shall comply with Section 652 of the State Specifications. Engineer approved backfill shall be used.

Construction The conduit shall be installed in accordance with Section 652 of the State Specifications.

Conduit shall be installed between 24” to 30” below grade at roadway crossings, from back of curb to back of curb (use pavement grade for depth). Conduit shall only be installed in other areas and/or depths if shown on the plans.

Conduit for this item shall be bored or open cut trench. Backfill any voids left from the work with mechanically compacted crushed concrete and restore any disturbed or damaged areas. All restoration is incidental to this item.

An arrow shall be impressed or cut into top of curb by the electrical contractor at any location with a 2-inch conduit crossing in the roadway. Arrows shall be parallel to the crossing.

Measurement The City will measure PVC Conduit, completed in accordance with the contract, by the linear foot of completed work.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
E1-42	2” Diameter Schedule 80 PVC Conduit	LF

PVC Conduit measured as above, is full compensation for furnishing and installing all materials, including but not limited to fittings and couplings, for excavating trenches, excavating bore pits, boring, placing conduit, and backfilling, for restoring disturbed or damaged areas, including but not limited to pavement restoration, seeding and sodding, transporting and disposing of surplus material, and for all labor, tools, equipment, materials, and incidentals necessary to complete this item of work.

Item E2-05 – Electrical Wire

Description All work under this item shall be completed in accordance with Section 655 of the State Specifications, except as amended by Section 670 of these specifications, the plan details, and as herein provided.

Materials The conductors shall comply with Section 655 of the State Specifications.

Refer to Circuit Identification Requirements section for insulation color coding requirements, or code as noted on the plans.

Construction The conductors shall be installed in accordance with Section 655 of the State Specs. Conductors shall NOT be installed until after all conduit, duct, pull boxes, bases, and any other electrical structures are complete. Full acceptance of cable shall not be completed until testing is performed and passed in the presence of a City representative.

Measurement The City will measure Electrical Wire, Lighting, completed in accordance with the contract, by the linear foot.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
E2-05	Electrical Wire 8 AWG	LF

Electrical Wire, Lighting measured as above, is full compensation for furnishing and installing all materials, making connections and testing installed cable system, incidental removal and/or rerouting of existing wiring as needed to complete the work, splicing, and for all labor, tools, equipment, materials, and incidentals necessary to complete this item of work.

Item E3-02 – 23-FT Standard Concrete Light Poles and Arm

Description This work shall consist of installing light poles, mast arms, pole wiring/fusing, fixture, and all miscellaneous hardware required to complete the installation of light poles, in accordance with Section 657 of the State Specifications, except as amended by Section 670 of these specifications, the plan details, and as herein provided.

Materials Furnish materials meeting the requirements of Section 670.

Construction Install the poles as required by plans.

The poles shall be located 2'-6"' to center from the face of the curb. The pole shall be located so that the hand hole shall be on the sidewalk side. The pole shall have a back rake so that the sidewalk face of the pole is vertical. Compacted limestone 3/8" screened chips shall be provided around the base in accordance with the pole detail. The Contractor shall contact the pole supplier to coordinate delivery time and location. The handhole screws on the new poles are to be lubricated with a non-seizing compound.

Furnish and install all incidental items, including but not limited to nut covers, pole wiring/fusing, and grommets necessary to make the unit complete.

Measurement The City will measure Light Pole and Arm, completed in accordance with the contract, as each individual unit completed.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
E3-02	23-FT Standard Concrete Light Poles and Arm	EA

Light Pole and Arm as measured above, is full compensation for materials, including but not limited to poles, arms, transformers, pole wiring/fusing, and hardware as necessary to completely install the pole and mast arm; for transportation, all labor, tools, equipment, materials, and incidentals necessary to complete the work.

Item E3-18 – Removing Direct Buried Lighting Units

Description This special provision describes removing direct buried concrete lighting units in accordance with the pertinent provisions of Section 204 of the Standard Specifications, except as amended by Section 670 of these specifications, the plan details, and as herein provided.

The work under this item consists of removing concrete direct buried lighting pole, arms and luminaires, as shown in the plans, removing lighting unit mounted signs, splicing through the circuit at the given site, transporting and disposing.

Materials (Vacant)

Construction After removal, City selected, as shown on the plans, existing non-bell bottom concrete poles, bell-bottom concrete pole handhole covers, mast arms, signage and luminaires are to be delivered to the City of Wauwatosa Public Works Yard at 11100 W. Walnut Road, Wauwatosa, WI 53226. Contact Traffic and Electrical Supervisor.

Dispose of remaining undesirable existing concrete poles, mast arms, luminaires and pole wiring off site in an appropriate manner.

Remove existing conductors in existing underground conduits/ducts and dispose (recycle) off site in an appropriate manner.

Backfill hole left from removal.

Measurement The City will measure Removing Direct Buried Lighting Units, completed in accordance with the contract, as a single complete unit of work.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
E3-18	Removing Direct Buried Lighting Units	EA

Removing Direct Buried Lighting Units as measured above, is full compensation for removing, transporting and/or disposing of the pole, arms, pole wiring and luminaires; removing lighting unit mounted signs; splicing through the underground circuit; and for all labor, tools, equipment and incidentals necessary to complete the work.

Item E3-25 – Light Fixtures Remove and Reinstall

Description This work shall consist of the removal of existing light fixtures as shown on the plans, and the reinstallation of the light fixtures on new poles prior to completion of the project.

Materials (Vacant)

Construction (Vacant)

Measurement The City will measure Light Fixtures Remove and Reinstall by each individual unit acceptably completed. Fixtures damaged by the Contractor at any time during this process shall be replaced at the expense of the Contractor.

Payment The City will pay for measured quantities at the contract unit price under the following bid items:

ITEM CODE	DESCRIPTION	UNIT
E3-25	Light Fixtures Remove and Reinstall	EA

Light Fixtures Remove and Reinstall, as measured above, is full compensation for all labor, tools, equipment, and incidentals necessary to complete this item of work.

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SECTION 605 – GENERAL PROVISIONS FOR CONSTRUCTION

SECTION 605.1 - GENERAL CONDITIONS

605.1.01 - PLANS AND SPECIFICATIONS

All work performed and all materials supplied under this contract shall be in strict compliance with the Contract Documents including plans and specifications and to all other specifications, codes, and ordinances referred to or established by law. The following Specifications are made a part of these Standard Specifications:

A. The "Standard Specifications for Sewer & Water Construction in Wisconsin" Sixth Edition, December 22, 2003, and any addenda where applicable to sewer and water construction, hereinafter called "Standard Specs."

B. The current edition with supplements of the State of Wisconsin, Department of Transportation, Standard Specifications for Highway and Structure Construction, hereinafter called "State Specs," excluding Bid Items and Part 7 – Quality Management Program. The "current edition" shall include all projects approved for bidding by the Wauwatosa Board of Public Works on or after November 1st of the preceeding year of the edition year. ie - The 2023 Edition would be effective for projects approved from November 1st, 2022 to Oct. 31st, 2023.

In general, all sewer, water, paving, or other construction work in the City of Wauwatosa shall be in accordance with the "Standard Specs", these "City Specs" as they modify and amend the "Standard Specs", "State Specs", and any Contract Special provisions and the terms of the Contract. The Contractor shall also refer to special notes on each sheet of the plans and shall arrange and conduct the work so as to conform to the requirements thereon. These notes shall be an integral and binding part of the specifications.

Copies of the aforementioned Standard Specs are on file at the Engineering Department of the City of Wauwatosa for use and reference on the premises by prospective bidders. An electronic copy of the State Specs can be downloaded from WisDOTs website at the following web address:

https://wisconsindot.gov/Pages/doing-bus/eng-consultants/cnslt-rsrces/rdwy/ss-archive.aspx

605.1.02 - PERMITS AND FEES

The Contractor shall obtain all necessary permits except as noted below. The cost of any permits or fees shall be included in the Contractor's base bid and contract price except where otherwise noted. The amounts for permits and fees are subject to change.

The occupancy permit fee will be waived for this Contract.

There will be ***no*** permit fee for water services or sewer laterals installed or altered. A properly licensed plumber or utility contractor shall do this work, and the Wauwatosa Plumbing Department has authorized the City's Public Works Inspectors to make detailed inspections of any and all portions of work or materials relating to any sewer lateral or water service work. The City's Plumbing Inspector may make verification inspections from time to time.

The Contractor will not be billed by the City for inspection time charged to this project by the Engineering Division except as specified in the Standard Specs on Page 1-49, Subsection 1.10.5: Contractor to be charged for inspection after time allowed for completion has expired.

If L.P. Gas is used in a construction shanty, a permit must be obtained from the Fire Department at the Contractor's expense.

A. USE OF CITY WATER

Water is only available from select hydrants as identified by the City of Wauwatosa Water Department.

The Contractor shall secure permission from the Water Department, obtain all necessary permits, pay any fees **at their own expense**, and notify the Engineer and Fire Department before obtaining water from fire hydrants. The Contractor shall make their own arrangements and pay all costs for water, connecting to hydrants, and transporting the water to the construction work. The water department will bill the Contractor based on the actual metered amount of water used. The contractor shall not use a hydrant without a hydrant meter in place. Use of a hydrant without a meter will result in the contractor being charged a $50 fee per use in addition to being charged for the water to fill the water tank to full capacity with the costs to be deducted from monies due the Contractor.

Upon payment of the fees, the City will furnish one hydrant meter setting with vacuum breaker, backwater valve, and control valve. The Contractor shall be responsible for the meter setting and valves at each location water is drawn. By using the meter setting, cross connections to and contamination of the City's water supply is minimized.

Hoses from hydrants shall not extend across roadways which are open to traffic, unless they are properly protected from any wheel loads. Water main breaks caused by pressure surges introduced into the system from wheel loads or improper use of hydrants shall be repaired at the expense of the Contractor.

The Contractor shall use only special hydrant-operating wrenches to open hydrants. Hydrant valves must be opened "full" since "cracking" the valve causes damage to the hydrant. If any hydrants are damaged, the Contractor will be held responsible and shall notify the appropriate agency and the Engineer so that all damage can be repaired as quickly as possible. Upon completion of the work, the Contractor shall remove all temporary piping and facilities.

Fire hydrants shall be completely accessible to the Fire Department at all times. No material or other obstructions shall be placed closer to a fire hydrant than permitted by ordinances, rules, or regulations, or within 10 feet of a fire hydrant in the absence of such ordinances, rules, or regulations.

605.1.03 - COOPERATION BY CONTRACTOR

A. TRAFFIC

Prior to the preconstruction meeting, the Contractor may be requested by the City to submit to the Engineer, for approval, a written schedule of operations and proposed construction sequencing and staging.

The Contractor shall start work by making the proper notifications as specified, and by placing the necessary detour signs, barricades, warning lights, and warning and information signs to provide for the safety and convenience of the public. Strict adherence to the Manual on Uniform Traffic Control Devices (MUTCD) and Wisconsin MUTCD Supplement is required. Control of arterial traffic shall be in conformance with Section 643 of the current State Specs.

The street shall be kept open to all traffic, and the Contractor shall keep the portions of the street being used by public traffic in such condition that traffic will be reasonably and adequately accommodated, unless otherwise noted. The Contractor shall provide and maintain in safe and adequate condition temporary approaches, crossings, and intersections with roads and necessary driveways. **The Contractor shall bear all of the expense** of maintaining traffic over the section of street undergoing improvement and the construction and maintenance of such approaches, crossings, intersections, and other features as may be necessary without direct compensation except as to those features of such work which are a part of planned, completed construction work.

During the life of the project the Contractor, at all locations, shall provide means satisfactory to the Engineer for crossings for the traffic on intersecting streets in a manner which will not interrupt the flow of such traffic or be harmful to the improvement, unless otherwise noted.

During a suspension of work under the terms of the contract or authorized by the Engineer due to unfavorable weather or other conditions which are not the fault of the Contractor, and which make such suspension advisable, the Contractor shall make passable and shall open to traffic such portions of the street under improvement and such temporary roadways or portions thereof as may be agreed upon between the Contractor and Engineer for temporary accommodation of necessary traffic during the period of suspension. During the period of suspension, the surface maintenance of the traveled way of the temporary route or line of travel agreed upon shall be **at the expense of the Contractor**. When work is resumed, the Contractor shall replace or renew any work or material lost or damaged because of such temporary use of the roadway under improvement. The Contractor shall remove, when required, work or material used in the temporary maintenance

thereof, and shall complete the improvements in every respect as though its prosecution had been continuous and without interference, except as may otherwise have been agreed upon by the Contractor and Engineer at the time arrangements were made for the temporary accommodation of necessary traffic during the anticipated period of suspension.

1. PAYMENT

   If there is a separate bid item for Traffic Control, the lump sum price shall be payment in full for all work specified. **If the contract does not include a separate bid item for Traffic Control, then the work required shall be considered as incidental to the contract.**

2. MATERIALS

   The Contractor shall furnish, install, and maintain during construction all standard construction signing, barricade(s), barricade lights, and delineation necessary to protect the public traveling in and around the project. Signs shall have reflective backgrounds. Barricades and drums left in place to delineate the traveled way through and around obstructions shall have steady burning lighting affixed to each barricade or drum during darkness. All other barricades shall have flashing warning lights.

3. TRENCH RESTORATION

   The Contractor shall replace the pavement in the trench areas, with the specified material, as soon as possible so traffic can utilize the entire width of the roadway, unless otherwise noted. The Contractor shall place a sufficient number of barricades to provide for adequate tapers into and around the sanitary sewer, storm sewer, or water main construction sites.

4. PEDESTRIANS

   The Contractor shall make a special effort to accommodate ADA pedestrian traffic in and through the project, particularly by the required replacement of public sidewalk prior to other work, **at their own expense**. Sidewalks not usable shall be barricaded and clearly signed to indicate that the walk is closed per Part 6 of the MUTCD and Wisconsin MUTCD Supplement, and temporary pathways and/or detours shall also be clearly marked and/or signed in this manner. Where removal of sidewalk keystones (and adjacent stones) are specified at intersections, the new curb radius must be in place prior to such removal. However, if the Contractor elects to remove the walks earlier, the Contractor must provide temporary crushed aggregate to grade in their place. Temporary bridges for pedestrians shall be provided as required by the plans or special provisions or as ordered by the Engineer over new pavement, sidewalks, trenches, street intersections, and any other locations as determined by the Engineer. **This work shall be incidental to the contract**.

B. NOISE AND DUST CONTROL

The Contractor shall so conduct all their operations that they will cause the least annoyance to the residents in the vicinity of the work, and shall comply with all applicable local ordinances, **at the Contractor's own expense**. The compressors, hoists, and other apparatus shall be equipped with such mechanical devices as may be necessary to minimize noise and dust. Compressors shall be equipped with silencers on intake lines.

All gasoline or oil operated equipment shall be equipped with silencers or mufflers on intake and exhaust lines. Storage bins and hoppers shall be lined with material that will deaden the sounds. The operation of dumping rock and of carrying rock away in trucks shall be so conducted as to cause a minimum of noise and dust.

Vehicles carrying rock, concrete, or other material shall be routed over such streets as will cause the least annoyance to the public and shall not be operated on public streets between the hours of 9 p.m. and 7 a.m., or on Saturdays, Sundays, or legal holidays unless approved by the Engineer.

All unpaved streets, roads, detours, or haul roads used in the construction area shall be given an approved dust-preventive treatment or periodically watered to prevent dust. Applicable environmental regulations for dust prevention shall be strictly enforced. **Any application of dust palliative shall be incidental to the contract unless otherwise stated as a separate base bid item.**

C. NOTICE TO UTILITIES

The Contractor shall give notice in writing to all utilities (such as the gas, electric, telephone, transport company, and all other utilities) that may be affected by the Contractor's operations at least 3 working days before starting work.

The Contractor shall contact all private utilities, through Diggers Hotline, for necessary location or relocation of facilities including, but not limited to, poles, wires, and underground services.

Where performing trenchless work operations, the Contractor should expose ("day-light") all known utility crossings to verify the location of underground utilities prior to conducting work operations. The Contractor shall expose **ALL** City facilities, to include public/private sewer & water laterals within the right-of-way. City facilities shall be exposed to 1' below the facility to allow for visual inspect the bore head crossing to ensure no damage has been cone. The Engineer may allow the Contractor to perform pre & post televising on sewer mains and laterals in lieu of daylighting these facilities.

The Contractor shall also contact the Wauwatosa Fire and Police Departments when closing a street to all but municipal access. The Contractor shall also be responsible for notifying residents as necessary in regard to the work or the work of subcontractors. Adjustments to MMSD facilities require 72 hour notice to MMSD.

The Contractor shall not hinder or interfere with any person in the protection of such work, or with the operation of buses, at any time, except with the written permission of the Engineer. The Contractor must obtain all necessary information in regard to existing utilities and shall protect such utilities from injury and shall avoid unnecessary exposure so that they will not cause injury to the public. The cost of making repairs in case of any damage whatsoever shall be borne by the Contractor. The Contractor shall also give 3 working days of notice to the following City of Wauwatosa departments and other affected organizations:

1. Traffic & Electrical Supervisor
   Randy Michelz
   414-471-8429

2. Engineering Division
   7725 W. North Avenue
   Construction Inspection & Survey Engineer
   Nick Deming
   414-479-3541

3. Fire Department
   1643 Underwood Ave.
   911 (Emergencies)
   414-471-8490 (Non-emergencies)

4. Police Department
   1700 N. 116th St.
   911 (Emergencies)
   414-471-8430 (Non-emergencies)

5. Water Department
   Water Department Supervisor
   Adam Florin
   414-471-8480 ex: 5915

6. Street and Sewer Department
   414-471-8422

7. Forestry Section
   Urban Forestry & Grounds Superintendent
   Alex Krutch
   c. 414-975-0635

8. Milwaukee Metropolitan Sewerage Commission
   District Construction Services
   260 W. Seeboth Street
   414-225-2241

9. Digger's Hotline
   800-242-8511 (811)

10. Milwaukee County Transit Company
    David Locher
    1942 N. 17th Street
    Milwaukee, WI 53205
    414-343-1727

D. GRAFFITI

The Contractor shall not allow graffiti to remain on any vehicle, equipment, barricade, materials or structures owned, rented, installed, or constructed by the Contractor. The Contractor shall remove graffiti within 48 hours of discovery **at their own expense.** Failure to remove graffiti within 48 hours may result in the City removing the graffiti at the Contractor's expense. These costs shall be deducted from monies owed to the Contractor.

E. SNOW REMOVAL

Provide for snow removal in those areas closed to traffic and outside of the traveled way as required to facilitate safe construction operations and provide access to residents. Proper drainage and erosion control shall be maintained in order to minimize runoff across lanes open to travel. The City of Wauwatosa or other Authority Having Jurisdiction (AHJ) shall be responsible for maintaining travel lanes fully open to traffic and sidewalks that remain open to traffic or as otherwise defined by city ordinances. The Contractor shall be responsible to clear snow from closed travel lanes (including travel lanes closed to through traffic) and sidewalks to the satisfaction of the City Engineer prior to opening closed lanes and sidewalks to traffic. The contractor shall maintain any and all traffic control for closed lanes and sidewalks that may be impacted by the snow removal operations of the City of Wauwatosa or other AHJ. This work shall be considered incidental to the contract.

605.1.04 - SCOPE OF WORK

A. SITE INVESTIGATION AND REPRESENTATION

The Contractor acknowledges that they have satisfied themselves as to the nature and location of the work, the general and local conditions – particularly those bearing upon the availability of transportation, disposal, handling, and storage of materials, and those bearing upon vehicular access to commercial, industrial, and residential properties – the availability of labor, water, electric power, and roads, uncertainties of weather, river stages, or similar physical conditions at the site, the conformation and conditions of the ground, the character of equipment and facilities needed preliminary to and during the prosecution of the work, and all other matters which can in any way affect the work or the cost thereof under this Contract.

The Contractor further acknowledges that they have satisfied themselves as to the character, quality, and quantity of surface and subsurface materials and groundwater to be encountered from inspecting the site, as well as from information presented herein as a part of these Contract Documents. Any failure by the Contractor to acquaint themselves with all the available information will not relieve the Contractor from responsibility for properly estimating the difficulty or cost of successfully performing the work. Neither the Owner nor the Engineer assumes responsibility for any conclusion or interpretation made by the Contractor on the basis of the information made available by the Owner or the Engineer.

B. FIELD RELOCATION

During the progress of the work, minor relocation of the work may be necessary. Such relocation shall be made only with the agreement of the Engineer. If existing structures are encountered that will prevent construction as shown, notify the Engineer before continuing with the work in order that the Engineer may make such field revisions as necessary to avoid conflict with the existing structures, or to have the affected utility altered by others. The Contractor shall proceed to work on other portions of the project during the delay. No additional compensation will be given for such delays. If the Contractor proceeds with the work despite this interference, they shall be responsible for any damage that may occur.

605.1.05 - PROTECTION OF WORK

A. ACCESS FOR EMERGENCY, PUBLIC TRANSPORTATION AND POSTAL VEHICLES

Notify the fire department, police department, and applicable public and school transportation companies at least 3 working days before closing any street or portion thereof. No closing shall be made without appropriate concurrence of aforementioned departments. Notify said departments when the streets are again passable for emergency vehicles. Maintain vehicle access to consecutive arterial crossings or dead end streets in excess of 300 linear feet, unless special written permission has been obtained from the Fire and Police departments.

The Contractor shall provide a 24 hour emergency telephone number or numbers with the Fire and Police departments so that contact may be made easily at all times in case of barricade or flare trouble or other emergencies.

The Contractor shall develop a written plan for the storage of vehicles and materials at the construction site. This plan shall be submitted to the Engineer for approval prior to starting construction. **If the Contractor wishes to use any property outside the City right-of-way, they must provide written approval from the property owner to the City.**

Maintain postal service facilities in accordance with the requirements of the US Postal Service.

605.1.06 - LEGAL RELATIONS

A. GENERAL

1. SAFETY

The Contractor shall be solely and completely responsible, at their expense, for conditions at the job site, including safety of all persons (including employees) and property during execution of the work. This requirement shall apply continuously and not be limited to normal working hours. Project safety provisions shall conform to US Department of Labor (OSHA) requirements, the Wisconsin Occupational Safety and Health Act, and all other applicable laws including those which may be specified in other parts of these Contract Documents, and shall in any event comply with the common law standards of due care. Where any of these are in conflict, the more stringent shall apply. The Contractor's failure to thoroughly familiarize themselves with these safety provisions shall not relieve the Contractor of responsibility.

2. CONSTRUCTION SAFETY PROGRAM

The Contractor shall develop, and maintain for the duration of the Contract, a safety program that will effectively incorporate and implement, as a minimum, all required safety provisions. The Contractor's Superintendent shall be qualified and experienced in construction safety and shall be at the work site and be authorized to supervise and enforce compliance with the safety program. A written outline of the Contractor's safety program may be required prior to commencing any operations, for record purposes only.

3. SAFETY EQUIPMENT

The Contractor shall maintain at the job site safety equipment applicable to the work as prescribed by the governing safety authorities, including all articles necessary for giving first aid to the injured, and shall establish the procedure for the immediate removal to a hospital or a doctor's care of persons who may be injured on the job site. The Contractor shall do all work necessary to protect the general public from hazards including, but not limited to, surface irregularities or un-ramped grade changes in pedestrian sidewalks or walkways, and trenches or excavations in roadways.

Barricades, lanterns, and proper signs shall be furnished by the Contractor and placed as necessary to insure safety to the public and the work at their own expense.

4. COMPLAINTS

All complaints received by the Contractor shall be reported to the Engineer no later than the working day following receipt thereof. Such reports shall include the name, address, date, time received, date and time of action complained about,

and a brief description of the alleged damages or other circumstances upon which the complaint is predicated.

Each complaint shall be assigned a separate number and all complaints shall be numbered consecutively in order of receipt. In the event more than one complaint is received from the same complainant, each later complaint shall show all previous complaint numbers registered by the same complainant. In addition, a summary report shall be made to the Engineer each month which shall indicate the date, time, and name of the person investigating the complaint, and the amount of damages claimed (or estimate thereof), including the amount of settlement, if any.

When settlement of a claim is made, the claimant shall furnish the Engineer with a copy of the release of claim. The Owner shall be notified immediately, throughout the statutory period of liability, of any formal claims or demands made by attorneys on behalf of claimants, of the serving of any notice, summons, subpoena, or other legal documents incidental to litigation, and for any out-of-court settlement or court verdicts resulting from litigation.

5. NOTICE OF WORK

The Contractor shall provide written notice to the Engineer at least 5 days prior to the start of actual construction. If requested by the City, the Contractor shall provide written notice of work to affected property owners and residents adjacent to the construction at least 3 days prior to the start of actual construction to such properties.

The Contractor shall develop a written plan for the storage of vehicles and materials at the construction site. This plan shall be submitted to the Engineer for approval prior to starting construction. **If the Contractor wishes to use any property outside the City right-of-way, they must provide written approval from the property owner to the City.**

6. TRAFFIC SAFETY AND ACCESS TO PROPERTY

Comply with all laws regarding closing or restricting the use of public streets or highways. No public or private road shall be closed except by express written permission of the Engiener. Conduct the work so as to assure the least possible obstruction to traffic and normal commercial pursuits. Protect all obstructions within traveled roadways by installing signs, barricades, and lights where necessary for the safety of the public.

Signs, barricades, lights, and other traffic control devices shall conform to the requirements of the State of Wisconsin Manual of Uniform Traffic Control Devices (MUTCD).

The convenience of the general public and residents adjacent to the project and the protection of persons and property are of prime importance and shall be

provided for in an adequate and satisfactory manner. During construction operations, construct and maintain such facilities as may be required to provide access by all property owners to their property. Pedestrian access to properties adjacent to the work shall be provided for at all times. **This work shall be incidental to the contract unless otherwise stated as a bid item.**

Where traffic will pass over backfilled areas before they are permanently paved, and where, in the opinion of the Engineer, the final pavement replacement has not followed in a timely fashion, the top of the area shall be maintained with temporary bituminous surfacing that will allow normal vehicular traffic to pass over. **This shall be done at no additional cost to the City**. This does not apply to sections where no surface replacement is called for under this contract. If the Engineer orders this type of restoration for such sections that do not call for surface replacement, the Contractor shall be paid at the amount specified under the temporary asphalt item included in the contract. If a temporary asphalt item is not included within the contract, the Engineer will pay the amount in the Schedule of Fixed Extras.

Temporary access driveways must be provided where required. The Contractor shall maintain access to driveways by use of steel plates, compacted gravel, and/or temporary asphalt when practicable. **This work shall be incidental to the contract unless otherwise stated as a bid item.**

Cleanup operations shall follow immediately behind backfilling and the work site shall be kept in an orderly condition at all times. The Contractor shall immediately clean up accidental spills of any type of material that may be a hazard to safe movement of vehicular traffic. Where the type and amount of spilled material creates a hazard, the Contractor shall immediately post flag persons, initiate cleanup, and advise the Engineer of the spill.

Flag persons shall follow MUTCD requirements and have the proper safety equipment and apparel, per MUTCD and OSHA recommendations.

B. FIRE PREVENTION AND PROTECTION

The Contractor shall execute all work in a fire-safe manner. The Contractor shall supply and maintain on the site adequate firefighting equipment capable of extinguishing incipient fires. The Contractor shall comply with applicable fire prevention laws. Where these laws do not apply, applicable parts of the National Fire Prevention Standard for Safeguarding Building Construction Operations (NFPA No. 241) shall be followed.

605.1.07 - PROSECUTION AND PROGRESS

The work shall be performed at such time and in or on such parts of the project and with such forces, materials, and equipment to prevent any delay to the completion of the project within the time limits stated in the Contract, and in conformance with the Overall Construction Schedule specified herein.

The contractor may petition the Board of Public Works for approval of night work (7 p.m. to 7 a.m.) or Sunday work. The Board generally meets the 1st and 3rd Monday of every month. A request for approval of night or Sunday work must be made on a Board of Public Works Application and received by the appropriate City staff by deadlines indicated on the application form. No fees will be assessed to the Contractor for a request to the Board of Public Works to perform night work or Sunday work. The Contractor shall comply with all applicable requirements of the Owner. Please send an electronic copy of the completed application to BoPW to ndeming@wauwatosa.net and jhenderson@wauwatosa.net by the deadlines listed on the form in addition to any recipients required on the application form.

The Contractor may, with written permission of the Engineer and acquisition of all necessary permits, **and at the contractor's expense**, work outside regular hours of 7 a.m. to 7 p.m., Monday through Friday (City holidays are not considered part of this regular working week). A written request shall be made to the Engineer and allow 7 calendar days for satisfactory arrangements to be made to inspect the work in progress which occurs between 7 p.m. and 7 a.m. or Sundays, and allow 3 regular working days for satisfactory arrangements to be made to inspect the work in progress which occurs on 7 a.m. to 7 p.m. on Saturdays.

The Contractor shall not be allowed to perform work on City holidays without written permission from the Engineer.

If the Contractor schedules work outside regular hours and days which requires an inspector, and does not arrive on site within one hour of the scheduled time on the scheduled day, excluding inclement weather conditions, the Contractor shall be charged a fee of $300 to the City, to be deducted from monies owed to the Contractor. The scheduled day shall count as a working day towards the completion of the project deadline regardless of whether the Contractor works. If the Contractor needs to cancel the work scheduled outside regular hours and days, they must contact the City Engineering Department or the inspector who is scheduled to be on site at least 24 hours in advance of the scheduled time and date.

A. PRECONSTRUCTION CONFERENCE REQUIREMENTS

A preconstruction conference shall be held after the time of the Contract award and before the notice to proceed to discuss the responsibility of each party in the project and to clarify any questions. Required attendance shall include representatives of all contractors, including the superintendents designated for the project, resident engineer in charge of inspection and their principal staff, and representatives of the municipality or governing authority. A representative of the resident inspection staff shall preside over the conference.

The Contractor shall submit to the Engineer for approval a schedule of operations and proposed construction sequencing and staging, as described in section C below. The Engineer may waive this requirement for the convenience of the City. This schedule will be used to check and control the progress of the work.

A suggested format for the preconstruction conference would include but not be limited to the following subjects:

1. Presentation of a proposed *Overall Construction Schedule* by the General Construction Contractor.
2. Presentation of *Traffic Control Plan* by the Contractor.
3. Review of *Erosion Control Plan*.
4. Check off required bonds and insurance certifications prior to notice to proceed.
5. Shop drawing submittal and approval procedure.
6. Chain of command, direction of correspondence, and coordinating responsibility between contractors.
7. Request for a weekly job meeting for all involved.
8. Laboratory testing of materials requirements.
9. Inventory of material stored on site provisions.
10. Progress estimate and payment procedure.

B. PRECONSTRUCTION SURVEY

After the Contract is awarded and before starting the work, the Contractor shall make a thorough examination, and should photograph, in color, if the Contractor feels it is warranted, all existing buildings, structures, and other improvements which are within 100 feet of the work and/or which might be damaged by the Contractor's operations. The examination may be made jointly by the Contractor, the Engineer, and the property owner. The scope of the examination and photographs taken shall include cracks in structures, settlement, leakage, and similar conditions.

The above records and photographs are intended for use as evidence in ascertaining the extent of any damage which may occur as a result of the Contractor's operations and are for the protection of property owners, the Contractor, and the Owner. The records will provide a means of determining whether, and to what extent, damage may have occurred as a result of the Contractor's operation. The City intends to videotape the condition of the roadways and the areas surrounding the project sites when possible.

C. OVERALL CONSTRUCTION SCHEDULE

The Contractor shall prepare and submit to the Engineer within 10 working days after the awarding of the Contract their Overall Construction Schedule. The Overall Schedule shall be comprised of preparatory and construction operations covering all work to be done in connection with the Contract.

Failure to submit the Overall Schedule or subsequent updates of the Schedule shall be considered cause for withholding any partial payments due or that may become due under the Contract.

Therefore, it is imperative that the Contractor adheres to the completion dates listed in the Official Notice and Instructions to Bidders. If after the award of any paving contracts it is determined that a change in sequence would be mutually beneficial to all parties involved, the Engineer shall issue a Contract Modification. However, this modification will not alter the final completion date unless otherwise agreed upon and noted in the Contract Modification.

The Overall Schedule shall meet the following minimum requirements:

1. Include activities that describe essential features of the work and activities that might potentially delay contract completion. Identify activities that are controlling items of work. Procurement of long lead time items shall be included as tasks within the schedule but can exceed the 15 working day duration limit noted below. Build in the specified amount of severe weather days as specified in the contract.
2. Identify the contemplated start and completion dates for each activity. Provide a duration, ranging from one to 15 working days, for each activity. Break longer activities into 2 or more activities distinguished by the addition of a location or some other description.
3. For contracts with 15 activies or less or 8 weeks or less in duration, specify the sequencing of all activities. For contracts with more than 15 activities or longer than 8 weeks in duration, provide a logic diagram that shows the sequence of activities and the scheduling interrelationships among activities. Alternatively, the contractor may identify the activity interrelationships in a tabular listing. Ensure all activity interrelationships are finish to start relationships with no leads or lags. Use only contractual constraints in the schedule logic. The engineer may accept requested exceptions.
4. Provide on or with the schedule the following information:
    a. Work days per week
    b. Number of shifts per day
    c. Number of hours per shift
5. Show completing the work within interim completion dates and the specified contract time or completion date.
6. Provide the engineer with a pdf copy of the information required in items 3 and 4.

Handwritten schedules are NOT acceptable. It is recommended that the contractor include third-party activities related to the contract within the schedule if third-party work is anticipated to occur within coordination of the project.

As the work progresses, the Engineer may request an update to the original progress schedule for reasons including but not limited to the following:

1. The project completion or interim completion targets are delayed 14 calendar days or more for portions of work governed by calendar days or 10 working days or more for portions of work governed by working days.
2. The progress of the work differs significantly from the original progress schedule.

3. A contract change order requires the addition, deletion, or revision of activities that causees a change in the contractor's work sequence or the method and manner of performing the work.

The Overall Schedule shall be incidental to the contract.

605.1.08 - MAILBOXES

(Where Applicable) Maintaining mailboxes along the construction route is the responsibility of the Contractor, including subcontractors, and shall be incidental to the work. The Contractor shall notify the property owner(s), if necessary, prior to the start of work that their mailbox may require removal and replacement. A notification letter will be provided by the Engineer for distribution by the Contractor if requested. Mailboxes which require removal as part of any work shall be carefully removed by the Contractor and delivered to the property owner. Resetting the mail box shall be the responsibility of the Contractor. The Contractor shall also, at their own expense, maintain a temporary mailbox to allow the property owner to continue receiving mail until such time as the permanent resetting is completed. The Contractor shall coordinate the location(s) of any temporary mailboxes with the United States Postal Service and the Engineer. Temporary mailboxes shall be keyed mailboxes unless otherwise approved by the Engineer.

Should a mailbox be damaged as the result of any construction activity, the Contractor shall take the responsibility of repairing, replacing, and/or re-installing it at their own expense, within a reasonable amount of time as determined by the Engineer. The Contractor shall also, at their own expense, maintain a temporary mailbox to allow the property owner to continue receiving mail until such time as the permanent repairs are completed, if needed. Failure of the Contractor to complete this work in a timely fashion, as determined by the Engineer, may result in the City hiring a third party or using a City crew to perform it, at the Contractor's expense, to be deducted from monies owed to the Contractor.

Any and all work relating to mailboxes shall be incidental to the contract unless otherwise listed as a separate base bid item or directed by the Engineer.

605.1.09 - PAYMENT

The work specified in this Section 605 shall be considered **incidental to the contract** and the cost shall be included as part of the appropriate unit price stated in the Proposal unless otherwise stated.

Lump sum amounts are not subject to negotiation for cases where actual amounts of work and/or materials are larger than the engineering estimates.

Existing sign removal and re-installation as indicated on the plans and as directed by the Engineer shall be **incidental** to the contract base price unless otherwise noted.

SECTION 605.2 - CONSTRUCTION GENERAL

605.2.01 – Driveways

Driveway access shall be maintained at all times whenever possible, unless directed by the Engineer or stated on the plans. This may require driveways to be constructed one-half at a time, with steel plates, and/or the coordination with the business or industry, or a temporary driveway access point. This maintenance of approach access shall be considered incidental to the work. Maintenance of driveway access to residential properties may be waived with the written permission of the Engineer.,

The Contractor shall be limited to a maximum of 30 calendar days from the time an approach, its adjacent sidewalks, and/or adjacent curb and gutter is removed, to the time that said pavements have sufficient cure time for bearing vehicle traffic from the street to the property or alley. Failure of the Contractor to meet this deadline will cause the City to charge liquidated damages of $25 per day **per approach** until access is provided.

For contracts that do NOT include replacing all of the curb and gutter and/or all of the existing pavement (ie. selective replacement of these two items), the above time frame is reduced in the following manner, unless otherwise directed by the Engineer or shown in the plans:

- Residential driveways shall be replaced within 5 days after removal of the driveway approach or sidewalk.
- Driveway access to commerical and industrial properties shall be maintained at all times.

605.2.02 - BACKFILL

A. MAINTENANCE OF TRENCH SURFACE

The Contractor will be required to maintain the trench area, during the interval between the sewer or water main installation and the pavement restoration, by keeping it to grade and spreading calcium chloride, if necessary, for dust control. This trench maintenance shall be **incidental** to the contract, unless otherwise noted.

Settlement of replaced pavement over trenches within the warranty period shall be considered the result of improper or inadequate compaction of the subgrade or backfilling materials. The Contractor shall promptly repair all pavement deficiencies noted during the warranty period at no cost to the City.

605.2.03 - PAVEMENT RESTORATION AND SITE RESTORATION

A. PAVEMENT RESTORATION

1. PROTECTION OF STRUCTURES

Provide whatever protective coverings as necessary to protect the exposed portions of bridges, culverts, curbs, gutters, manhole and valve box covers, posts, guard fences, road signs, and any other structures from splashing oil, asphalt, or concrete from the paving operations. Remove any oil, asphalt, concrete, dirt, or any other undesirable matter that may come upon these structures by reason of the paving operations.

Where water valve boxes, manholes, catch basins, or other underground utility appurtenances are within the area to be resurfaced, the structure shall be level with the top of the final restoration grade as directed by the Engineer. If it is evident that these facilities are not in accordance with the proposed finished surface, notify the Engineer a minimum of 14 calendar days in advance so the proper authority can be contacted in order to have the facility altered before proceeding with the resurfacing. Consider any delays experienced from such obstructions as **incidental** to the paving operation.

B. LAWN REPLACEMENT AND LANDSCAPING

Topsoiling, mulching, fertilizing, and seeding shall conform, respectively, to Sections 625, 627, 629, 630 and 631 of the State Specs and as they are amended herein.

All landscaping work must be watered until sustained growth is assured. All watering shall be considered **incidental** to the contract.

Backfill required at curb repairs must be topped with a minimum of 6 inches of screened topsoil to top of curb.

If restoration in accordance with these specifications is not completed (aside from watering) within 2 weeks of the completion of adjacent paving and underground operations (restoration may be delayed with written permission from the Engineer), the City reserves the right to hire a third party, independent of the Contractor, to complete the work, or utilize City workers, to be paid with funds deducted from monies owed to the Contractor. Should the City exercise this right, the Contractor will not be paid for any of the quantities that were completed by the third party or City workers.

1. GENERAL

The Contractor shall give the Engineer at least 3 working days of notice of the time and place of planting and keep them advised of the schedule of planting operations.

2. SOIL PREPARATION

Remove any non-topsoil material to a depth of 6 inches and backfill with topsoil/compost blend as specified in Section 625.2 of the State Specs. Apply a Type A granular fertilizer per the supplier/manufacturer’s specified rate and mix

into the upper 4 to 6 inches of soil thoroughly. Rake or drag area until surface is thoroughly settled with a smooth, firm surface, free of humps or hollows. Ensure proper placement to eliminate the risk of future settling or sinking.

The Contractor shall dispose of all extraneous and excess materials at their expense and in accordance with any Federal, State, or Local laws.

3. SOD

All sod shall be placed on topsoil as specified within 24 hours after it has been cut. It must be staked or pegged on all slopes steeper than one foot vertical to three feet horizontal and where shown on the plans, which shall be incidental. The sod for Type "A" Lawn Replacement shall be a blend of bluegrass and fescues nursery sod, and shall be practically free from weeds or undesirable grasses. Sod must be placed to a butt joint and not wedged-off with topsoil. After being placed, it must be rolled or tamped. **All sod work must be watered for a minimum of 10 consecutive calendar days by the Contractor or until sustained growth is assured. The contractor shall provide 3 days notice to residents prior to turning over watering requirements to the resident.**

4. SEED

All areas designated to be seeded shall be placed on topsoil fertilized with a Type A granular fertilizer fertilizer per the supplier/manufacturer's specified rate and covered with Urban Type B erosion mat, unless otherwise specified. The seed mix for Type "C" Lawn Replacement shall be as noted below unless otherwise noted in the plans, free from weeds or undesirable grasses. After being placed, rake seed/soil as necessary to provide seed to soil contact and covered with mulch or erosion fabric where designated. All seed, mulch, and erosion fabric work must be watered until sustained growth is assured, a minimum of 14 calendar days.

a. General Lawn Areas: Wisconsin Department of Transportation Seed Mixture No. 40. Seeding rate shall be 4-5 pounds per 1000 square feet. Provide the empty seed bags brought to site to the inspector immediately after installation.

b. River Banks, Ravine Slopes, and Drainage Swales: Shady woodland seed mix shall be used for wet mesic to dry mesic soils. Species such as Solomon's Plume, Columbine, Jacob's Ladder, Jackin-the-Pulpit, Wild Geranium, and Early Meadow Rue are representative of a natural woodland. Seeding rate shall be in accordance with suppliers instructions.

C. SIGNAGE

New signs called out to be provided under the contract shall conform to Section 637 of the State Specs. New signs shall be installed on new posts and shall have hardware provided by the Contractor and included with the costs of the signs and/or sign post item(s).

New posts shall be 2” (2 3/8” O.D.) x 10’ Schedule 40 Aluminimum extruded post with a mill finish and plain end. The Post Anchor shall be Tapco V-Loc Steel Breakaway post or Engineer approved equal.

Hardware to attach existing signs to new poles shall be salvaged from the existing signs and posts, unless otherwise noted. New hardware required to resintall existing signs shall be approved by the Engineer prior to ordering.

Signs, posts and materials within the project limits may be removed and salvaged and shall be stored at the DPW Yard until reinstallation. Obtain permission from the Engineer to removal signs, posts, etc. if no item to remove, salvage and reinstall signs exists on the contract. Sign posts that are not V-Loc Steel Breakaway posts shall be disposed of by the Contractor at their expense. If no item to remove, salvage and resintall signs, posts & hardware, the work shall be considered incidental to the contract and performed at the Contractor’s expense. The Contractor shall provide a minimum of 3 days notice to DPW Electrical Superintendent before delivering the signs to the yard.

Prior to delivering the signs to the DPW Yard, the contractor shall provide a detailed list to the DPW Electrical Superintendent containing the following in formation:

1. Description and number of each sign(s) being delivered to the DPW Yard that will be reinstalled
2. Number of brackets being salvaged to the yard
3. Number of poles being salvaged to the yard that will be reinstalled.
4. The list shall have the contract number, the project description, the name of the contractor storing the materials and a contact person listed at the top of the page.

Upon delivery to the DPW Yard, the contractor shall assist the City/consultant inspector on the project to verify that all signs, hardware, posts and other materials contained on the list have been delivered. The Contactor shall store the signs in a manner that will not cause the signs to be damaged while being left in storage. All loose hardware shall be stored together in a labaled box or storage container noting what hardware is stored in each box or storage container. The box or storage container shall also be labeled with the contract number and the project description.

The Contractor shall be responsible for replacing any signs, posts or hardware that are damaged as a result of construction operations or due to improper storage by the contractor. The Contractor shall also be responsible to replace any missing signs, posts or hardware that were not properly delivered and stored to the DPW Yard.

The Contractor shall notify the insepctor of any damaged signs, posts or hardware prior to removal for documentation purposes. Failure to notify the on-site inspector prior to removal may result in the Contractor being responsible for replacement of the damaged signs, posts or hardware.

The Contractor shall immediately notify the Engineer of any signs, posts, or hardware that the Contractor deems unsuitable to be salvaged and reinstalled to allow the Engineer to resolve any concerns prior to reinstallation. The Engineer may require the contractor to furnish new material(s) under the contract using a bid item in the proposal or, if no such item exists for a particular item deemed unsuitable for reinstallation, by negotiating a price for replacement. The City also may elect to provide new material(s) to the contractor for reinstallation at no additional cost to the City.

The Contactor shall provide the DPW Electrical Superintendent with a minimum of 7 calendar day's notice prior to picking up the stored signs, posts and hardware. The City may replace salvaged signs, posts and hardware at their discretion while the signs are in storage at the DPW Yard. Before removing items from the DPW Yard, the contractor shall verify ALL items are present that were documented as delievered to the DPW Yard for storage. Notifiy the Engineer immediately and DO NOT remove any items from the DPW Yard if any item is missing. The Contractor will be responsible to replace any items discovered missing after removal of all items from storage at the DPW Yard.

605.2.04 PROTECTION OF THE ENVIRONMENT

A. GENERAL

The Contractor, in executing the work, shall maintain all work areas on and off the site as needed to keep them free from environmental pollution that would be in violation of any Federal, State, or Local regulations. All costs related to confromance with Protection of The Environment within these City Specs shall be considered incidental to the contract, unless otherwise noted by the Engineer.

B. PROTECTION OF SEWERS

Take adequate measures to prevent the impairment of the operation of the existing sewer system. Prevent construction material, pavement, concrete, earth, or other debris from entering a sewer or sewer structure. All sewer and groundwater flow interfering with construction and requiring diversion shall be diverted to sewers leading to a wastewater treatment plant. Non-sanitary sewage may only be diverted to non-wastewater treated areas if proper erosion and pollution control measures are followed in accordance with Wisconsin DNR regulations.

Prior to commencing excavation and construction, the Contractor shall submit for the City's review detailed plans (including routing and connections) showing how the Contractor intends to handle and dispose of sanitary sewer wastes. By reviewing the plan, the City neither accepts any responsibility for the adequacy thereof nor for any damages to public or private property resulting therefrom, such responsibilities remaining with the Contractor.

C. PROTECTION OF AIR QUALITY

Air pollution shall be minimized by wetting down bare soils during windy periods, by requiring the use of properly operating combustion emission control devices on

construction vehicles and equipment used by contractors, and by encouraging the shutdown of motorized equipment not actually in use.

Burning of waste, debris, and rubbish will not be permitted on the construction site.

If temporary heating devices are necessary for protection of the work, such devices shall be of a type that will not cause pollution of the air.

D. EROSION CONTROL FOR SEWER & WATER INSTALLATIONS IN PAVED AREAS

1. GENERAL

The latest edition of the DNR technical standards shall be adhered to for erosion control installation and maintenance, and shall overrule any potential specifications conflicts herein. Chapter 2.8.0 of the Standard Specs contains the general criteria for erosion control. In addition, since the control of soil erosion is a dynamic process, the Contract requires flexibility by the Contractor to accommodate changing conditions as the project progresses.

Excavated materials and imported backfill materials stored at the project site shall be kept to a minimum and shall be used or removed from the site as soon as practicable, which shall be incidental. Such materials shall be stored in such a manner that will not result in runoff of stockpiled materials. Backfilled trenches and other areas shall be left to the level of the adjacent area or slightly below until restored to reduce the potential for erosion. All excess excavated materials and all excess imported backfill materials shall be promptly removed from the site and disposed of at the Contractor’s expense.

The Contractor shall monitor each location where water may run off the site and shall provide measures to guard against sediments leaving the site. The Contractor shall have adequate erosion fabric fence or bales of hay and means of anchoring the same in place for erosion control as determined necessary by the Engineer. The type and amount of materials required will be determined by the type and amount of open excavation. The Contractor shall schedule the work so that the amount of open excavation and the stockpiling of construction materials on the job site is minimized for erosion control. Diversion berms or sediment filtration berms shall be constructed and maintained as determined necessary by the Engineer. Replacement of preexisting erosion control measures which are disturbed in the course of the work shall be completed promptly following completion of the work on the project causing such disturbance.

Tracking of foreign materials (e.g. mud, stone) on street surfaces shall be controlled during the working day as necessary, but no later than the end of the working day, by one or more of the following methods as required:

a. Hand shoveling material off street pavement.

b. Machine removal (such as with end loader or grader), provided that the results are equal to that of hand shoveling.
c. Sweeping material off street pavement. If using a mechanical sweeper that does not contain a built in water system to mitigate dust, the contractor shall sufficiently wet the surface or the area needing to be swept prior to sweep to reduce the spread of dust.

Specific erosion control measures are shown on the plans and shall be as described in these specifications. Sample details of erosion control devices follow these specifications. All control measures protruding above the normal paved and/or ground surface shall be marked by barricades and flashers. Maintenance of erosion control measures shall be considered **incidental**, including if an erosion control device needs to be replaced.

2. CONTROL OF SURFACE RUNOFF

a. STORM WATER INLET AND CATCH BASIN, hereinafter called inlet protection: Inlet protection shall be installed **prior** to disturbing any pavement or earth areas, and shall remain in place and maintained until the surface is restored with temporary or permanent pavement. Inlet protection shall be installed at all inlets that will receive runoff from the construction site, including adjacent streets and where materials are stockpiled. Depending on the slope of the street, this will include inlets in the block(s) downstream from the work site due to anticipated bypassing. The contractor shall install Type D inlet baskets at all locations permissable. The contractor shall indicate on their erosion control implementation plan those inlets which Type D inlet protection is unable to be place and their proposed substitution.

PLACEMENT: The inlet insert basket or sheet shall fit into the inlet without gaps around the insert as illustrated in the detail drawings. If the inlet being protected has a curb box, the curb box shall be protected as shown in the appropriate detail drawings until inlet protection is no longer needed.

FABRIC SPECIFICATIONS: The filter fabric shall be a geotextile fabric Type FF of polyester, polypropylene, stabilized nylon, polyethylene, or polyvinylidene chloride meeting the following specifications:

- Grab strength: 120 lb. minimum in the machine direction and 100 lb. in the cross machine direction (ASTM D4632).

- The fabric shall have an opening no greater than a number 30 US Standard Sieve.

- Water Flow Rate of approximately 120 gal/min/ft² at 50 MM constant head as determined by multiplying permittivity in sec as determined by ASTM D-4491 by a conversion factor of 74.

- Ultra violet radiation stability of 70% for strength retained at 500 hrs of exposure (ASTM D4355).

MAINTENANCE: Inlet protection shall be inspected by the Contractor within 24 hours after each working day rainfall or daily during periods of prolonged rainfall on working days. Repair or replacement shall be made immediately as incidental to the work.

Sediment deposits shall be removed after each storm event, or more often if the fabric becomes clogged.

b. GUTTER DETENTION

1. In areas where the street grade is greater than 4%, additional control is necessary to reduce flow velocity and to prevent sediment from bypassing the inlet screen/inlet grate screen.

2. Gravel filled nylon bags each containing a minimum of one-half cubic foot of material shall be placed in the gutter section with the long dimension of the bag perpendicular to the curb line, abutting the curb face at approximately 75 foot intervals.

3. Sediment deposits shall be removed after each storm event, or when reaching a maximum depth of 3 inches.

4. If the street is open for traffic, a barricade with flashers shall be placed by each bag.

5. The protection shall be installed prior to disturbing any pavement or earth areas, and shall remain in place and be maintained until the surface is restored with temporary or permanent pavement.

3. CONTROL OF TRENCH SEDIMENT

a. DEWATERING

1. If it becomes necessary to pump water from any trench or excavation, it shall be the Contractor's responsibility to remove particles greater than 100 microns. To demonstrate that settling or filtering is not required, all particles must pass through a US Standard No. 140 sieve.

2. METHODS OF REMOVAL

a. Pumped water requiring particle removal may be settled in portable tanks. The tank capacity must be large enough to allow for sufficient settling time to remove particles greater than 100 microns. The Contractor may add a flocculation substance to enhance the settlement process.

b. A second method of treating pump water may be as shown in the detail drawings, if applicable. This basin should be placed on the paved surface near a protected inlet. If a temporary settling basin is to be left unattended, it shall be covered with a half inch plywood or similar safety cover. Due to space and traffic constraints, this method must have prior approval from the Engineer.

c. The fabric shall be geo-textile fabric, polyester, polypropylene stabilized nylon, polyethylene, or polyvinylidene chloride meeting the following specifications:

- Grab strength: 400 lb. minimum in any principal direction (ASTM D1682)

- Mullen Burst Strength: Minimum 600 psi (ASTM D774)

- The fabric shall have an opening no greater than a number 140 US Standard Sieve, and a minimum permeability of 25 gpm/sq.ft. (Multiply the Permittivity in Sec. from ASTM. D4491-85 Constant Head Test using the conversion factor of 74.)

d. Other methods demonstrated to produce the desired results may be submitted for the approval of the Engineer.

a. DOWNSTREAM SEWER PROTECTION: At the end of each work day, the Contractor shall cover the entire annular space at both ends of the flume with a sheet of filter fabric. The fabric shall be of sufficient width so as to be tightly banded around the sewer pipes and the flume pipe. The fabric shall be geo-textile fabric of polyester, polypropylene, stabilized nylon, polyethylene, or polyvinylidene chloride meeting the following specifications:

- Grab strength: 400 lb. minimum in any principal direction (ASTM D1682)

- Mullen Burst Strength: Minimum 600 psi (ASTM D774)

- The fabric shall have an opening no greater than a number 140 US Standard Sieve, and a minimum permeability of 25 gpm/sq.ft. (Multiply the Permittivity in Sec. from ASTM D4491-85 Constant Head Test using the conversion factor of 74.)

4. PAYMENT

Erosion Control as herein before prescribed, required, and performed will not be separately measured for payment, but will be considered **incidental** to other

items in the contract unless there is a separate bid item specifically for erosion control. Maintenance of any eroision control item shall be considered **incidental.**

D. PROTECTION OF TREES AND SHRUBS

No trees, shrubs, or any other vegetation shall be removed without the written permission of the Engineer.
Unless specifically shown on the plans, or otherwise directed by the Engineer, it is the intent of the work operations under this contract to make every effort to preserve and protect trees and shrubs from damage or removal within the limits of, and adjacent to, the work included in the contract. The Contractor shall take all necessary precautions to protect trees, shrubs, and roots at the work site. Any costs associated with this work and work described within this section shall be considered incidental unless otherwise noted or directed by the Engineer.

There are, at various locations on the project, existing trees and shrubs which will require special care and protection during the removal and subsequent construction of new pavements, curbs, drive approaches, and walks. Prior to beginning construction operations for the removal and/or replacement of these contract work items, the Contractor shall conform to the following procedure:

The Contractor shall, prior to construction, conduct a detailed walk-through field inspection of all potential conflicts of the contract work with trees and shrubs within and adjacent to the project limits. The Contractor shall not excavate or cut the roots of trees or shrubs unless so indicated by the Engineer's written order or explicitly noted on the plans.

1. ROOTS

Root foundations must remain adequate to withstand heavy windstorms. To protect the immediate portion of the tree roots, a Root Protection Zone shall be maintained. This zone is 5 feet on each side of the edge of the tree trunk parallel with the street and from the backside of the curb to the backside of the walk. No construction equipment or materials, sand, soil, gravel, block, or pipe shall be placed, parked, or stored within this area. All cutting for the removal of sod and soil in order to establish a finished grade within this zone must be done manually. No excavation shall occur within this zone unless otherwise directed on the plans or by the Engineer.

Tree roots interfering with the work shall be completely severed with a clean, sharp tool e.g. axe, or chainsaw, and removed with an approved machine or other approved methods. All old walk shall be removed prior to root cutting.

a. <u>SIDEWALKS:</u> The root system on the walk side of the tree shall not be cut by means of mechanical root cutting machines. If root removal is essential to concrete walk replacement, interfering roots shall be manually cut with hand implements. Roots below the proposed walk shall be removed only to a depth of 9 inches below the proposed elevation of the new walk surface. The cut must be within 2 inches of the edge of the proposed sidewalk to avoid cutting

too close to the trunk of the tree. All roots within 2 inches of the bottom of the proposed sidewalk must be removed.

All debris from the root sawing and/or tree removal operations shall be removed from the sidewalk area and root sawing trenches filled with approved topsoil before the end of the work day. All exposed and severed tree roots shall be immediately covered with mulch and watered to prevent drying until such time that the concrete work is complete, the forms removed, and the area between the tree and concrete work backfilled with approved topsoil.

Stumps and roots shall be ground by an Engineer approved mechanical grinding machine to a depth of 18 inches below the proposed ground elevation. Other methods of grubbing may be used only with the approval of the Engineer. All grubbing holes shall be cleaned of chips and grindings and filled with approved compacted backfill, with at least the top 3 inches being topsoil. All debris from root sawing and/or tree removal operations shall be hauled from site and disposed of in a reasonable amount of time, as detemined by the Engineer, and in accordance with any Federal, State, or Local regulations.

Dead, diseased, infected, or infested trees may not be hauled away until a permit has been obtained from the City Forester. No fee will be charged for the permit. Clearing and grubbing shall conform to Section 201 of the current State Specs.

If, in the Engineer's opinion, if it is necessary to alter the methods of construction in the plans to preserve trees and shrubs, the Contractor shall make such changes as directed. Such adjustments may include, but are not limited to, curb, sidewalk, and drive approach dimension changes, including horizontal and/or vertical alignment.

If the Engineer determines that damage to trees has occurred due to negligence of the Contractor, or failure to comply with above procedures and as directed by the Engineer, the Contractor shall be held liable for the basic formula value of such trees, based on caliper size, with such amounts to be deducted from the monies due under the contract (see following Table on the next page).

BASIC FORMULA VALUE OF TREES BASED ON CALIPER SIZE

TRUNK (Diameter)	CROSS-SECTION AREA (Square Inches)	BASIC VALUE (U.S. Dollars)
2		85.00
4		230.00
6		415.00
8		625.00
10		780.00
12	113	3,051.00
13	133	3,591.00
14	154	4,158.00
15	177	4,779.00
16	201	5,427.00
17	227	6,129.00
18	254	6,858.00
19	284	7,668.00
20	314	8,478.00
21	346	9,342.00
22	380	10,260.00
23	415	11,205.00
24	452	12,204.00
25	491	13,257.00
26	531	14,337.00
27	573	15,471.00
28	616	16,632.00
29	661	17,847.00
30	707	19,089.00
31	755	20,385.00
32	804	21,708.00
33	855	23,085.00
34	908	24,516.00
35	962	25,974.00
36	1,018	27,486.00
37	1,075	29,025.00
38	1,134	30,618.00
39	1,195	32,265.00
40	1,257	33,939.00

Diameter: measurements taken 4.5 ft. (1.4m) above ground level.

Basic values established at $27.00 per square inch cross-section of trunk. Basic price based on industry survey and U.S. Department of Labor Consumer Price Index.

F. PROTECTION OF STREET LIGHTS AND TRAFFIC SIGNALS

All electrical work shall, where pertinent, conform to the Wisconsin Electrical Code and good electrical construction practices.

Where there is enclosed or unenclosed lighting cable within the project limits, care must be exercised by the Contractor to avoid damage to the cable during work. Where the Contractor or any Subcontractors damage any part of the lighting system which results in identifiable fault in the wiring, inoperative street lights or traffic signals, or an outage has occurred anywhere within the project limits, the damage shall be repaired by a qualified electrician **at the Contractor's expense** in accordance with City specifications. All lighting systems shall be kept 100% operational.

1. TIME LIMITS FOR REPAIRS

   The Contractor shall have **24 hours** from the report of a problem in the existing or permanent lighting system to inspect and identify the cause, and **2 hours** for a temporary system (if applicable). Repairs shall be made no later than **3 days** after the problem is identified. Should these limits be exceeded, the Engineer reserves the right to hire a third party, independent of the Contractor, or use City workers to perform the repair(s). The cost of hiring a third party or using City workers and having them repair the damage will be paid for by the Contractor. Contractor agrees they will be informed of the final cost, which will be deducted from monies owed in a subsequent payment. In lieu of hiring a third party or using their own staff, the Engineer may also choose to fine the Contractor $100, to be charged each day the lights are not properly functioning outside of aforementioned time limits, and to be deducted from monies owed to the Contractor.

2. TEMPORARY LIGHTING

   If no plans for temporary lighting are included in the Contract Documents, the Contractor may choose, at their own expense, to maintain street lighting via overhead connections to existing poles, the installation of temporary poles and luminaires with their own wiring, or splicing (in existing wires only) around new and/or old pole bases as needed.

Any repairs and/or replacements made by the Contractor shall be incidental to the contract unless otherwise stated as a separate base bid item. Repairs shall be investigated and completed promptly in accordance with City of Wauwatosa specifications, or as instructed by the Engineer if no lighting specifications are included in the Contract Documents. The City may require temporary repairs **at the Contractor's expense**, including the installation of overhead facilities, to accelerate the return of functional electrical systems. Backfilling of the repair locations must not be done until all needed repairs have been made and inspected by the City Electrical Supervisor.

Splices in poles shall be made with reusable set-screw type connectors. Penn Union SX-2 or approved equal, copper service entrance connector, or approved equal. Complete splice with layer of nonstick varnished cambric insulating tape, followed by multiples laps of Scotch 130C rubber insulating tape, followed by multiple laps of Scotch Super 88 vinyl insulating tape. Split bolt compression connectors are not acceptable for this contract.

When applicable, cable work at existing conduit locations damaged during construction is to be corrected by utilizing newly placed conduit which has been laid as part of the contract work. Frost loops of at least 12 inches shall be provided where cables enter conduit systems. **Any direct-buried cable must be enveloped with mason sand.**

G. GENERAL CLEARANCES TO UTILITIES

The following minimum separations for city facilities should be followed when encountering other utilities within the right-of-way, unless more strict requirements are required by other governing bodies:

Water facilities	3 feet (horizontal & vertical)
Sewer pipes and laterals	2 feet (horizontal & vertical)
Lift Stations, Manholes, & Inlets	5 feet (horizontal)
Street light poles	3 feet
Street light cable	2 feet
Fiber cable and hand holes	2 feet
All other facilities not listed	2 feet

SECTION 610 – SEWER AND WATER CONSTRUCTION

SECTION 610 - CONSTRUCTION OF SANITARY AND STORM SEWERS AND LATERALS

New sewer and water construction must be completed prior to the general pavement removal operation. Preparation of the Right-of-Way, saw-cutting and removals shall be in accordance with Section 620 of these specifications.

Inlet shapes are to be altered in accordance with the iron to be used. Masonry shims on sewer structures must fully cover the masonry below. The pitch across the frame should be set to match the concrete curb and gutter cross-section.

Trench work shall not begin so far in advance of rough grading work that the gravel backfill will require more than a 6 week maintenance interval. The Contractor will be required to maintain the trench area during the interval as incidental to the work, by keeping it to grade and spreading calcium chloride, if necessary, for dust control. Aggregate slurry backfill must be used if excavation is to be paved over in less than 10 calendar days or as indicated on the plans. All sewer structure work shall be done in accordance with the Standard Specs and the City Specs.

Excavation and backfilling relating to utility installation is incidental to the utility bid item.

610.1.01 - EXCAVATION

A. GENERAL

Excavation required for this work for the most part is unclassified. Complete all excavation regardless of the type of materials encountered. The Contractor shall make their own estimate of the kind and extent of the various materials which will be encountered in the excavation, including the presence or absence of water. The surface type as shown on the plans is presented only as a guide for the Contractor and does not guarantee the type or depth of material beneath the surface course. No additional compensation will be made for differing surface materials. No additional compensation will be made for any rails, ties, or other unknown structures and objects that may be encountered. The Contractor may make written requests to the Engineer for exceptions to this rule, however the Engineer is under no obligation to approve exceptions.

The Contractor shall expose both ends of spot relays before commencing any pipe laying so that line and grade may be adjusted.

If a concrete cradle, cap, or envelope exists on any sewer to be removed and it is not noted on the plans, payment for the removal will be at 80% of the rate for rock excavation shown in the Schedule of Fixed Extras. The fixed extra price will include

all additional costs including, but not limited to, any additional labor, material, time, equipment, excavation, backfill, shoring, bracing, pavement removal and replacement, fees, and trucking. Excavation by hand means the use of pneumatic hand tools. Mechanical excavation requires the use of special attachments on excavators.

These prices will be used for removals up to 40 linear feet. If the concrete cradle, cap or envelope extends for greater lengths, a price for the remainder of the removal shall be mutually agreed upon with the Engineer before the Contractor continues. When computing the volume removed, no subtraction will be made for the cross-sectional area of the existing pipe. If the concrete cradle, cap, or envelope are shown on the plans, the price of removal should be included in the price for the sewer relay.

The spot relay shall be in a straight line grade from the downstream end of the existing pipe to the upstream end. Additional piping removed and replaced in order to provide positive drainage to the downstream end will be paid at the contract price for a longer spot relay or at the relay contract per linear foot price when the relay exceeds 25.5 linear feet. The pipes coming into and going out of the spot relay shall be checked with a hand level to make sure that they do not back pitch. Additional pipe should be removed to eliminate back-pitch and will be incidental the spot relay/repair.

The location, size, and elevation of all underground structures shown on the plans have been located to a reasonable degree of accuracy, but the City does not guarantee their exact location and data or the location and data of others not shown. Concrete support columns shall be placed on all sewers where shown on the plans and at all other locations not shown where a utility in a rigid conduit is discovered to pass beneath the new sewer by less than 12 inches. Concrete support columns shall be formed. Bank pouring of concrete support columns will not be permitted. The costs of these supports will be considered incidental to the contract.

Bridging, where needed or where directed to be placed, shall be provided and installed by the Contractor at no additional cost to the City.

If any damage occurs to an underground facility, or the damage is found to exist, such that the protective coating of an electrical line is penetrated or gases or liquids are escaping from a broken line which endangers life, health, or property, the Contractor shall immediately call “911” to report the damage location. This call shall be made prior to contacting the utility involved.

1. SALVAGED MATERIALS

See Section 620 of the specifications for materials to be salvaged.

610.1.02 - LAYING OF PIPE

A. BEDDING, COVER, FOUNDATION AND BACKFILL MATERIAL

All sewer pipe shall be laid in a Standard Section, Class "C" bedding of crushed limestone conforming to File No. 3 and Table 32 or Table 38, as applicable to size and type of pipe material, of the Standard Specs, with modifications as specified in Section 3.2.6(i) for PVC pipe of the Standard Specs, unless otherwise noted on the plans. Cover material for pipe shall be the same as that specified for bedding. Risers which do not require a concrete envelope shall be bedded (i.e. surrounded by bedding material) all the way to the top of the riser, and special care shall be taken to “tuck” the bedding tightly around the entire lateral assembly for all laterals to prevent future settling.

Backfill used on this contract for sanitary and storm sewer work shall be either mechanically compacted (unless directed to use flooding by the Engineer) crushed recycled concrete 1-1/4 inch dense meeting the gradation requirements for granular material as specified in Table 37 in Section 8.43.4 of the Standard Specs, or aggregate slurry backfill as specified in Section 8.43.8 of the Standard Specs. The backfill shall be consolidated by mechanical compaction of the trench backfill as specified in Section 2.6.14(b) of the Standard Specs unless otherwise specified by the Engineer.

Lumps of clay, loam, spoils (unless otherwise stated), garbage, organic material, or any other material the Engineer deems unsuitable are not allowed in the backfill, and the Engineer reserves the right to order the Contractor to remove such items from the trench before paving commences, at the Contractor’s expense, should the pieces be deemed unreasonably large and/or numerous. Material resulting from incidents such as, but not limited to, trench wall collapses is NOT excluded from this rule. For instances where the Contractor does not remove unacceptable backfill when directed, they shall be charged a percentage of the price for the pipe over the lineal footage in which the fill is present, to be deducted from monies owed to the Contractor.

B. PIPE AND FITTINGS

Except for lateral reconnections, sizes and strength classifications of sanitary sewer pipe to be used in all locations are indicated on the plans.

All wyes and tees shall be moulded as a single piece only. No wyes or tees with glued and/or fused pieces will be accepted unless the Contractor is given the written permission of the Engineer.

PVC pipe shall conform to ASTM D-3034 SDR35, Type PSM, rubber gasket joints, or ASTM F-789 Type PS-46 for sizes 4 inches through 15 inches and F-679 (T-l)

12454 Type PSM rubber gasket joints for sizes 18 inches through 27 inches. Where PVC pressure pipe is called for on the plans, it shall conform to AWWA C900, Pressure Class 150 (PC150) DR18. Joints shall use elastomeric gaskets.

All concrete pipe to be used for storm sewer on this project shall be reinforced concrete pipe, ASTM C-76 or ASTM C-507, or of the class shown on the plans. Reinforced concrete horizontal elliptical pipe 18 inch or larger in diameter shall conform to ASTM C 507 and of the class as shown on the plans. All reinforced concrete pipe catch basin or inlet leads, regardless of size, shall be ASTM C-76 Class V. Pipe furnished under this classification as manufactured by American Concrete Pipe Co., Inc., Milwaukee and Green Bay, WI, Madison Concrete Pipe, Inc., Madison, WI, County Concrete Corp., Marathon, WI, or equal, shall meet the requirements set forth in ASTM C-76 with "B" or "C" wall for circular pipe and any additional requirements set forth herein and in Chapter 8.6.0 of the Standard Specs. Joints shall use rubber gaskets in all concrete pipes (including circular and elliptical) and concrete box culverts, unless otherwise approved by the Engineer.

Temporary repairs for storm sewers which are to be replaced before the completion of the project may be made with PVC class SDR35 pipe, and the joints may be made by any reasonable means to prevent leaking and backups before the future replacement, at the discretion of the Engineer. Permanent storm spot repairs which were not originally called for on the plans or in a change order may be made with PVC C900 pipe with antihydraulic mortar joints if the Contractor does not wish to use RCP, with the permission of the Engineer and at no additional cost to the City.

Joints for concrete storm sewer reducers and bends shall be submitted to the Engiener and approved prior to construction as part of the shop drawing review.

The Contractor shall bear all costs of testing and shall submit copies of these test reports to the Engineer prior to any pipe installation.

C. JOINTS BETWEEN DISSIMILAR PIPE MATERIALS

When field cutting and/or machining the pipe is necessary, use only tools and methods recommended by the pipe manufacturer and approved by the Engineer. Breaking and chipping the pipe with a wrench, pliers, or a hammer will not be allowed.

Connect dissimilar pipe materials by means of a non-shear flexible compression coupling as specified below for sanitary sewer and for storm sewer, or a concrete closure collar for storm sewers as directed by the Engineer. Install couplings in strict accordance with the manufacturer's recommendations.

Joints on sanitary sewers between dissimilar pipe shall be either a non-shear coupling as manufactured by DFW/HPI or shall be made with flexible mechanical

compression joint coupling conforming to ASTM C-594 Type B with stainless steel bands and shear ring conforming to ASTM A-167 as manufactured by Joints, Inc. (Calder) of Gardena, CA, Fernco Joint Sealer Co. of Ferndale, MI., or as manufactured by Gripper Gasket, LLC of Corona, CA., or equal, and in addition using a transitional bushing conforming to ASTM C-594 Type B when pipe with different outside diameters are to be connected.

If a connection is being made to an existing lined pipe, the connection shall be made with one of the above adaptors directly to the liner of the pipe. A connection to the host pipe will not be permitted.

Joints on storm sewers between dissimilar pipe may be made with either a non-shear flexible mechanical compression joint coupling with No. 305 stainless steel bands or, where this is not possible, a concrete closure collar as shown on the special detail with prior approval of the Engineer.

Use concrete closure collars only on nonflexible pipe storm sewers and when approved by the Engineer, and then only to make connections between dissimilar pipe when standard rubber gasketed joints, mortar, or flexible couplings are impractical.

Before the closure collars are poured, wash the pipe to remove all loose material and soil from the surface on which the concrete will be placed. Wet nonmetallic pipe thoroughly prior to pouring the collars. Wrap and securely fasten a light gauge of sheet metal or building felt around the pipe to insure that no concrete shall enter the line. Place reinforcement as needed. Make the entire collar in one pour using 3000 psi concrete and extend a minimum of 12 inches on each side of the joint. The minimum thickness around the outside diameter of the pipe shall be 6 inches. No collar shall be poured in water. After the collars are poured and have taken their initial set, cure by covering with well-moistened earth. Refer to a special detail drawing(s), if provided.

Payment for connecting dissimilar pipe materials with flexible couplings, non-shear couplings or, when approved by the Engineer, concrete closure collars shall be included in, and incidental to, the prices for pipe stated in the bid unless otherwise noted as a separate item.

D. ABANDONED SEWERS, DRAINS AND SEWER STRUCTURES

Where the plans call for a sewer to be abandoned, the Contractor has the option to either remove or abandon the sewer by bulkheading the ends and filling the pipe with concrete grout as specified in Sections 8.35.4 or 8.35.5 of the Standard Specs, or as directed or approved by the Engineer. Direction of the use of Elastizell PS120 which is not called for on the plans or included in a bid item description shall be paid as an extra cost to the Contractor per cubic yard of material installed.

Bulkheads shall be as specified in Chapter 3.2.25 of the Standard Specs. Where the plans call for removal, the Contractor shall remove the entire pipe including any concrete support and backfill with the material as specified. The cost of this work shall be incidental unless otherwise specified as a separate bid item.

Manholes shall be removed or abandoned where specified or shown on the plans. As with sewers, the Contractor has the option to remove structures which are identified for abandonment but must remove those identified to be removed. The removal shall include the base of the structure. Manhole caps shall be used in the abandonment of sanitary or storm sewer structures and shall be made to the satisfaction of the Engineer. Where a cap is used, the manhole shall be filled with slurry or other suitable materials at least 4 feet below the proposed finished grade. This work shall be incidental to the contract unless noted as a separate bid item.

E. INSULATION AROUND WATER MAINS & APPURTENANCES

The Contractor shall provide and install extruded polystyrene rigid insulation with a minimum of 25 PSI compressive strength, two layers of 2 inch thick by 6 feet long by the width of the trench, between storm sewer and structure installations and all water mains and services at all locations shown on the plans, and at any other location where a water main or service is exposed. Insulation shall also be placed above storm sewers where they cross under water mains and services with less than 12 inches of separation, or as directed by the Engineer. Include costs with the price of the storm sewer relay, repair, extension, or structure, or water main relay, repair, or extension. If the vertical separation is greater than 12 inches and the service or main has a minimum of 6 feet of cover, the insulation need not be installed at locations which are not shown on the plans. Insulation shall be incidental to the work unless noted as a separate bid item.

F. CONNECTION TO EXISTING STRUCTURES

Where the sewer relay, repair, or extension begins or ends with a connection to an existing structure, the Contractor shall remove existing pipe and masonry from the structure as needed to make the new connection. The Contractor shall install an Engineer approved flexible water tight pipe-to-MH seal (“boot”) for all sanitary sewer and other flexible pipe connections. For rigid pipe storm sewer connections, the Contractor may mortar the pipe into place. The structure’s paved invert shall also be modified and rebuilt as needed. All costs shall be included with the price of the sewer unless noted as a separate bid item.

G. CONCRETE BEAMS & CRADLES

Concrete beams/cradles shall be constructed or placed where shown in the plans or as directed by the Engineer. Concrete beams shall conform to File No. 2 of the

Standard Specs. Concrete cradles shall conform to 3.2.6 (c) of the Standard Specifications except as modified herein.

Concrete cradles shall be monolithically poured and must be constructed using wood forms or other Engineer approved forming material. Concrete cradles shall be poured and permitted to cure for a minimum of 24 hours prior to setting the pipe on the cradle. The pipe shall not be placed on blocks or hardwood prior to the the cradle being formed & cured and these materials shall not be incorporated in any way into the cradle.

Concrete cradles Concrete used for concrete cradles shall conform to Section 620 of these specifications.

H. RESTRAINTS FOR ENDWALL SECTIONS AND BOX CULVERTS

Where a storm sewer terminates into an endwall section, the last three sections of pipe into the endwall section, including the joint to the endwall section, shall be mechanically restrained. Submit the type and number of proposed endwall restraints for each joint to the Engineer for review and approval.

Box culverts shall have the last three joint sections restrained at an outfall, similar to an endwall section. Box culverts shall also be mechanically restrained for the last three sections at the end of a run when typing into existing box culvert or a structure. The joint on either side of a new structure shall also be mechanically restrained.

610.1.03 - BUILDING LATERAL SEWERS AND STORM WATER DRAINS

A. GENERAL

The size, type of material, location, and direction of existing building laterals and the approximate distances from the nearest existing downstream manhole are shown on the plans and on the TV inspection logs, available for inspection at the City Engineering Division upon request. The Contractor shall be responsible for locating and verifying the size and type of material of each existing building lateral in the field. This shall include dye testing or electronic locating methods where necessary. This shall be incidental to the work and no additional compensation will be made for the location process or delays caused by this verification.

Make all lateral reconnections in accordance with the details shown in the plans. Materials to be used for this work shall be as specified in Chapter 3.4.0 of the Standard Specs, amended as follows: The material to be used shall be of equal size of the existing lateral and of the same material as the relayed mainline sewer unless otherwise specified on the plans.

Adaptors, couplings, and connectors shall be watertight and as shown on the plans, or shall be approved by the Engineer. Joints shall be rubber gasket as approved by

the State and local plumbing code. Cement mortar or glued joints are not acceptable.

Excavation and backfill shall conform to the applicable requirements of Chapter 3.4.0 of the Standard Specs and as herein modified. The maximum trench width shall be the outside diameter of the pipe plus 24 inches. Bedding shall be the same as required for the mainline. Backfill in the pipe zone shall be the same as required for mainline repair.

Install lateral reconnections in accordance with the applicable requirements of Chapter 3.4.0 of the Standard Specs. Use factory fabricated wyes or tees without glued or fused pieces. Provide bends, suitable lengths of straight pipe, and joints for dissimilar pipe as required. The minimum slope of the lateral reconnection shall be 1/4 inch per foot. Sanitary lateral reconnections which are to be extended shall be laid at normal depth for a new lateral with the adjustment to the existing grade of the lateral being made beginning at 5 feet from the back of curb or where directed by the Engineer.

B. LATERAL AND SUMP PUMP COLLECTOR SYSTEM TRACER WIRE WITH ACCESS BOX

This section shall only be applicable where shown on the plans or directed by the Engineer, and shall be incidental to the cost of lateral installation.

1. DESCRIPTION

When stated on the plans or directed by the Engiener, building sewer laterals and sump pump collector systems shall be installed with a tracer wire in accordance with the State of Wisconsin Administrative Code Chapter SPS 382.30(11)(h). This code requires that all new, non-metallic building sewers (including sanitary, storm, sump pump collector systems and private sanitary sewers) and water services installed must be accompanied by a means of locating the underground pipe.

a. A pipe locator conductor (tracer wire) shall be installed on all non-metallic (PVC, PE, clay, concrete and other non-metallic) sewer laterals and sump pump collector systems within the limits of the project as noted on the plan or directed by the Engineer. The conductor shall be placed along the top of the sewer lateral pipe from the sewer main or structure up to the property line or the end of the installation beyond the roadway as directed by the Engineer. On sump pump collector systems, the conductor shall run from the storm structure to the clean-out and from clean-out to clean-out or as directed by the Engineer.

Wrapping of the tracer wire on the pipe is prohibited. The conductor shall be held in place with ties or hitches spaced no more than 10 feet apart. The ties or hitches shall be spaced no more than 10 feet apart. The conductor shall be a minimum of 12-gauge standard solid copper wire with a green PVC or 30 to 45 MIL of Polyethylene coating to prevent corrosion. The wire shall be rated for buried and wet conditions. The conductor itself will be one continuous loop with the two wire ends connected to the tracer wire access box.

b. The tracer wire shall be brought to the surface at the property line, end of the lateral installed, at each sump pump collector system clean-out, or at a location directed by the Engineer within a covered access device. The covered access device (tracer wire access box) may be a terminal box, valve box, a small diameter PVC conduit or a cleanout. Within the covered access device, the Contractor shall provide an extra 18 inches of wire. The lid of the covered access device shall have “SEWER" permanently engraved on it by the manufacturer. The lids shall be cast iron accompanied with connection holes where the Contractor shall connect the tracer wire with stainless steel terminal bolts. The lid shall be bolted with a standard pentagonal head key.

c. Please be aware that below grade splices are prohibited.

d. Each tracer wire shall be field tested after installation is complete.

e. The Valvco Tracer Wire Access Box (http://www.cptest.com) and the Bingham & Taylor Cathodic Test Box (http://www.binghamandtaylor.com/cathodic.htm) are considered acceptable devices for this specification.

To minimize damage to the tree's root zone during the installation of the sanitary sewer lateral installation, no excavation shall be made within the following limits:

Tree Diameter (In.) (@ 4.5' Above Ground)	No Excavation Limits Distance (ft.) from Trunk
0 - 2	1
3 - 4	2
5 - 9	5
10 - 14	10
15 - 19	12
Over 19	15

The Contractor may encroach on the above limits if the sanitary sewer lateral to which the lateral piping will be connected or the house side of the existing City sidewalk is within the specified no excavation zone. The Contractor shall keep these

excavations as small as possible and shall contact the Engineer at least 3 days prior to starting the installation so they may notify the City Forester.

610.1.04 - MANHOLES

The Contractor shall be responsible for cleaning all sewer and water structures in the project area of all debris at their own expense.

A. INVERTS

Benches on all manholes shall be constructed at a minimum up to the crown of each pipe and sloped as specified for a sanitary or storm manhole as needed. Refer to File No.s 11 and 12 of the Standard Specs.

B. CASTINGS

New frames and covers are required on all new manholes, and new frames, grates, and back boxes are required for new inlet structures unless otherwise noted on the plans, and shall be supplied by the Contractor unless otherwise directed in the contract or by the Engineer. All castings shall be considered incidental to the appicable structure item unless otherwise stated as separate bid items.

Sanitary sewer manhole covers shall be self-sealing with an o-ring gasket and of a non-modernized design. The cover shall weigh approximately 143 pounds. They shall be Neenah R-1661-B or equal. They shall have two concealed pick holes. **The City of Wauwatosa will furnish these self-sealing covers with the new frame and grate unless specified otherwise in the plans. The Contractor shall pick them up at the Municipal Public Works Building at 11100 W. Walnut Road and install them. The contractor shall call 414-471-8422 a minimum of 1 day prior to picking up the materials. The Contractor shall provide all labor & equipment necessary to load the materials and deliver them from the DPW Yard to the jobsite.**

Storm sewer manhole covers shall be as shown in the plan details or equal and of a non-modernized design. The cover shall weigh approximately 152 pounds. Single and double storm sewer inlets shall be as shown in the plan details or equal and of a non-modernized design.

Frames for sanitary and storm sewer MHs shall be compatible with the covers and also be of a non-modernized design. Frames shall weigh approximately 369 pounds.

All manhole frames, iron rings, covers, storm water inlet or catch basin frames, grates, and back boxes which are removed from existing structures and are not reused shall remain the property of the City. The Contractor shall deliver these to the Municipal Public Works Building at 11100 West Walnut Road, Wauwatosa. WI.

C. FRAME/CHIMNEY JOINTS AND SEALS

Unless the manholes are to be adjusted and set to grade under a separate contract, the frame/chimney joints shall be as specified in the Standard Specs. Sanitary sewer manholes shall be constructed with a Type I, flexible watertight frame/chimney joint as detailed in Section 3.5.4(f)1.(a) of the Standard Specs. Seals shall be incidental to any manhole work unless otherwise stated as a separate bid item.

The Engineer approved manhole frame/chimney seal, where required, shall consist of a flexible rubber sleeve, overlapping extension or extensions as needed, and stainless steel bands, and shall extend from the frame to the cone of the new manhole to insure the chimney is fully covered. They shall be furnished and installed by the Contractor and shall be an internal rubber sleeve as manufactured by Cretex Specialty Products, N16 W23390 Stoneridge Drive, Suite A, Waukesha, Wisconsin, 53188, NPC, Inc., 250 Elm Street, PO Box 301, Milford, NH 03055 or Engineer approved equal. The Contractor shall use the proper tools for installation of the seals.

If it appears a flexible rubber seal will not fit or function properly in a manhole, and the Contractor has permission from the Engineer, a mastic seal or equal may be spread on the chimney in lieu of installing the rubber one. The Engineer must be present at the time of installation to verify all chimney joints were thoroughly covered.

1. SURFACE PREPARATION

Surface preparation shall be as follows or as recommended by the manufacturer if their requirements are more stringent:

a. Remove manhole cover and allow any accumulated fumes to dissipate, open additional manholes or use blower to ventilate, if necessary.

b. Power wire brush the lower 3 inches of the manhole frame to remove any loose rust or scale and repair any imperfections by either grinding smooth or filling with mortar. A reasonably smooth, clean sealing surface is required.

c. Realign the casting if it is offset more than approximately 2 inches from the chimney.

d. Make a visible line or series of alignment marks around the frame 2-3/4 inches up from the bottom edge of the frame for normal positioning. The sleeve can be installed higher in the frame if necessary, in which case the marks should be raised accordingly.

e. Provide a 4 inch wide sealing surface on the manhole cone deck (i.e. not on the adjusting rings). Remove all loose and protruding mortar and brick as needed to provide a sealing surface.

f. All sealing surfaces must be circular, reasonably smooth, clean and free of any loose material or excessive voids. If such a surface does not exist for the bottom of the sleeve to seal against, the Contractor shall prepare one. The Contractor shall use one-component, quick-set, high-strength, non-shrink, polymer modified patching mortar which has been formulated for vertical or overhead use to prepare the uniform vertical sealing surface.

g. If the bottom of the sleeve is to seal against the top of an eccentric (straight side) cone and an inadequately high vertical surface does not exist, the contractor shall contact the manufacturer to obtain details for building the required vertical surface.

h. If any caulk is used to fill minor irregularities in the bottom sealing surface, the caulk shall be a butyl rubber caulk conforming to AASHTO M-198, type B. When used, the Contractor shall apply a single bead of the caulk to the center portion of the lower sealing surface of the sleeve. The Contractor shall not use any other type of caulking material. Caulk is considered incidental to the seal installation and the Contractor will not be paid extra for it.

2. CRETEX INTERNAL MANHOLE FRAME CHIMNEY SEAL INSTALLATION

The Contractor shall also refer to the manufacturer's literature for additional installation variations and options.

a. Install the rubber sleeve with the printing at the top and line the top edge up with the previously applied marks. Any flaws in the manhole frame, such as minor cracks, pits or protrusions, shall be repaired by either filling with mortar or grinding smooth.

b. Lightly lubricate the outside of one stainless steel band with gasket lube and install it in the lower band recess so that the slotted end laps over the end with the studs and the studs extend through the adjustment slot. Put on the self-locking nuts and tighten sufficiently to draw the lapped ends of the band close enough to allow the attachment of the expansion tool. Position the expansion tool and expand the band as required to provide a watertight seal and tighten the two lock nuts.

c. Conduct a water leakage test on the lower band under the supervision of the Engineer. The Engineer shall determine how much water should be used for a proper test and shall decide if the seal passes or fails. If it fails, the Contractor may choose to re-install the lower band and repeat the test, or apply a bead of butyl rubber caulk, conforming to AASHTO M-198, Type B, to

the lower sealing surface of the sleeve to fill any minor irregularities in the masonry surface to the satisfaction of the Engineer present.

d. Lubricate the second band and install it in the upper recess, attach the tool and expand as before, keeping the bands parallel and a minimum of approximately 3 inches apart. The bands can be put closer together if excessive sleeve expansion is specifically required.

e. Check the top and bottom edges of the installed sleeve to insure that it has been properly compressed and sealed against the two surfaces.

f. The Engineer will not pay the Contractor for any internal manhole seals unless the Engineer has witnessed a passing water leakage test or witnessed satisfactory application of butyl rubber caulk or mastic.

D. FRAME ADJUSTMENTS & MASONRY

The masonry mortar and concrete bricks shall comply with the requirements of Section 519 of the State Specs and shall be incidental to the work.

Adjustments on manhole frames must be done after the asphalt base/binder has been laid and before the surface course is laid, and shall match 1/4 inch (“string bounce”) below the surface grade. Backfilling around the frames after adjustment shall be done with compacted fill as specified for the pavement base, and compacted asphalt base/binder material. Adjustments shall be incidental to the work unless otherwise specified as a separate bid item, and any adjustment bid item shall include all the labor, equipment, and materials needed.

The minimum dimensions for the pavement box-outs to perform adjustments shall be large enough to fully accommodate compaction by mechanical means. **The use non-mechanical means will not be permitted for compacting the lower layers around manholes without the express written approval of the Engiener.**

While performing the masonry work involved in making adjustments, the Contractor shall provide the means to intercept dropped materials before they reach the bottom of the structure, and shall clean the structure of any such materials at the bottom before final payment will be made. This shall be incidental to the work.

New sewer structures shall be built within approximately 4 inches of grade needed for the frame, requiring final frame setting during adjustments. Sewer structures to be in concrete pavement, at the time the surrounding concrete pavement is poured, shall have frames that are “wedged” high enough during concrete paving that the aggregates in the agitated concrete mix can move freely under the frame, and thus allow the frame to sit on solid concrete.

When additional masonry replacement is required to an extent which includes a normal step location, a new step must be incorporated as part of the work under that item. Replacement of masonry in poor condition is required even if it extends farther than listed on the plans. Sanitary manhole masonry work must be performed before the installation of internal seals or Pro Rings.

E. PRECAST MANHOLE JOINTS

All joints between sanitary manhole sections including base, riser(s), and cone shall be sealed with a high-strength external perimeter sealing band, consisting of a heavy polypropylene backing, rubberized mastic seal, woven polypropylene reinforcing, and heavy-duty steel straps, under the supervision of the Engineer. The external seal shall allow the manhole structure to pass the ASTM C-1244 vacuum test as described in Chapter 3.7.6 of the Standard Specs (see section 610.1.07 C of the City Specs for internal chimney seals). External perimeter sealing band shall be Mar Mac MacWrap or approved equal. Vacuum test shall be performed after all seals are in place, under the supervision of the Engineer, who will decide if it passes.

For sanitary manholes which have an outside drop, an Engineer approved mastic seal shall be used in lieu of Mar Mac MacWrap for all joints which are non-circular around the full perimeter of the manhole at the applicable joint(s). This mastic seal shall also be installed on other non-circular joints at the direction of the Engineer.

All external joint sealing shall be incidental to the cost of the manhole, regardless of sealing method, unless otherwise noted as a separate bid item.

F. BYPASS PUMPING

Contractor shall submit bypass pumping plans for review by the Engineer at least 3 business days prior to the work. A bypass pumping plan is required for ALL bypass pumping that occurs. The Contractor shall notify the Engineer 24 hours prior to commencement of the bypass pumping operation. The Contractor's plan for bypass pumping shall be approved by the Engineer before the Contractor will be allowed to start bypass pumping. This shall be incidental to the utility work.

Bypass Pumping plans shall include but is not limited to all of the information below:

- Locations of the MH where pumping will occur and the discharge MH
- Pump(s) size and flow capacity
- Duration of bypass pumping
- For proposed 24 hr pump operations, provide the following additional information:
    - Back-up system information in event of pump failure

- 24 hour emergency contact

G. MANHOLE CONNECTIONS

Where a new manhole is to connect to an existing sewer that will not be relayed at a later point in the project, up to the first 6 linear feet of pipe used in this connection shall be included in the price of the new manhole and considered incidental to the work.

If the existing pipe is found to be in poor condition, the Contractor shall inspect it to find how much farther they must dig to expose a section in at least acceptable condition. If the length is reasonably short and/or at the Engineer's direction, the Contractor shall be paid for each linear foot of pipe used beyond the initial 6 feet of connection. If the next acceptable pipe is unreasonably far away, the Contractor shall seek instructions from the Engineer for how to proceed.

610.1.05 - CATCH BASINS, STORM WATER INLETS & INLET MANHOLES, AND STORM WATER DRAINS

Storm water inlets and inlet MHs shall be constructed in conformance with File No. 11, 12, and 28 of the Standard Specs modified so as to accommodate the required frame (refer to the standard details and special provisions on the plan), and shall include a 6 inch stub for future lateral connection and a 4 or 6 inch stub for future underdrain connection at locations and directions as shown on the plans or as directed by the Engineer. The cost of these stubs shall be included in the unit price bid per inlet. These stubs shall be made of PVC SDR35 pipe.

The frame, grate, and curb box shall be furnished by the Contractor. The specific casting to be used on the job will be noted on the plans and listed in the special provisions of each individual contract. Castings shall be incidental to the structure unless otherwise noted as a separate bid item.

Storm water inlet manholes shall have a poured bench meeting the requirements of a standard manhole. Where the plans call for the construction of a storm water inlet rather than a manhole or inlet manhole on a storm sewer, the inlet shall also have a paved invert as specified for a standard MH.

Where the depth of the manhole is too shallow to accommodate the standard cone top section, a flat top slab shall be substituted for the cone and shown in the shop drawings. The steps and cover shall be to the side identified on the plans as the straight side. No additional compensation will be given for this change. Payment will be at the per vertical foot bid and contract price.

Underdrains, to be installed where indicated on the plans, shall be 6 inch perforated PVC wrapped in geotextile fabric (a "sock"), and be in accordance with section 612 of

the State Specs. Bedding of 3/8 inch limestone chips shall be used around the entire pipe and be in accordance with Table 32 of section 8.43.2 of the Standard Specs unless otherwise specified.

610.1.06 - ACCEPTANCE AND QUALITY CONTROL OF SANITARY AND STORM SEWERS

A. FINAL SEWER CLEANING

Prior to final acceptance of the sewer system by the Engineer, flush and clean all parts of the system. Remove all accumulated construction debris, rocks, gravel, sand, silt, and other foreign material from the sewer system at or near the closest downstream manhole. If necessary, use water jet, mechanical rodding or bucketing equipment. If any foreign matter is still present in the system upon final televised inspection by the Contractor, re-flush and clean the sections and portions of the lines as required.

The Contractor shall also submit a written report of the sanitary sewer cleaning. This report shall identify the sewer segments cleaned and the type and volume of debris removed from the sanitary sewers.

Perform a mandrel test and provide the results to the Engineer as part of the acceptance process.

B. ACCEPTANCE OF SANITARY AND STORM SEWER RELAYS BY CLOSED CIRCUIT TV VIDEO INSPECTION

Prior to final acceptance of any sanitary sewer or storm sewer spot relay, the Contractor shall inspect by means of remote closed circuit television equipment the entire segment of sanitary sewer, manhole-to-manhole, on which the repair was made, not just the short length repaired out of the manhole. It is the City's intent to have all manhole-to-manhole sewer spans disturbed, replaced, or repaired as part of the contract, to be internally inspected. Sewers shall be cleaned prior to inspection and all manhole connections shall be shown. A USB external hard drive of the inspections shall be furnished to the Engineer for review and acceptance. Televising shall be incidental to the sewer work.

The following conditions shall apply to the sewer acceptance TV inspection:

1. CCTV operators shall be NASSCO trained and certified in the use of Pipeline Assessment and Certification processes and nomenclature.

2. Video shall be furnished on an external USB hard drive that will not be returned to the Contractor.

3. The TV camera shall travel through the sewer at a maximum rate of 30 feet per minute.

4. The camera shall stop at the beginning and end joint of each relay for a 10 second period.

5. The camera shall travel in the downstream in all cases.

6. The lens of the camera shall be cleaned at each MH or when directed by the Engineer.

7. The videos shall have an on-screen display showing, at a minimum, the following:

    a. Upstream and downstream MH numbers
    b. Footage from upstream MH
    c. Date of inspection

8. Sewers shall not be televised within 48 hours of a rainfall event greater than 1/4 inch.

9. Jetting of pipe relay segments shall be completed no less than 30 minutes prior to televising and under normal functioning conditions.

This inspection shall be made as soon as practicable after the backfill has been consolidated. If the Contractor chooses to wait until after paving or restoring the trench surface to televise the sewer, theywill be solely responsible for any costs incurred from any potential repairs required to make the work acceptable, including, but not limited to, additional restoration and/or paving.

Reasons for rejection of the relay will include but not be limited to:

- Dropped joint
- Broken joint
- Open or offset joint
- Sag in repair
- Deflected pipe
- Leaks

The Engineer shall determine if any of these conditions exist and if they are excessive enough to be considered defective and warrant replacement. If directed by the Engineer, the Contractor shall promptly, at their expense, correct all defects.

C. MANHOLE VACUUM TESTING

Contractor shall vacuum test sanitary manholes in accordance with the applicable requirements of Chapter 3.7.6 of the Standard Specs under the supervision of the Engineer. It is highly recommended that the Contractor test sanitary sewer manholes immediately after installation and prior to backfilling. If the Contractor chooses to wait until after paving or restoring the trench surface to vacuum test the manholes, they will be solely responsible for any costs incurred from any potential repairs required to make the work acceptable, including, but not limited to, additional restoration and/or paving.

Plug lift holes with non-shrink grout. If a manhole fails the initial test, make necessary repairs with non-shrink grout or other acceptable and approved materials. The Contractor shall continue re-testing until the Engineer determines a satisfactory test is obtained. All testing shall be incidental to the contract.

D. SEWER TRENCH AND MANHOLE EXCAVATION DYE WATER FLOOD TEST

The City of Wauwatosa, at its discretion, may perform dye water flood testing on all sewer trenches and manhole excavations prior to final surface restoration or final payment to identify infiltration into the system. Dye water flood testing of sewer pipe and manholes shall be in accordance with the applicable requirements of Chapter 3.7.2 Water Infiltration Test of the Standard Specs. Infiltration rates as identified in the Standard Specs shall determine pass or failure of the pipe and manholes. If a pipe or manhole fails the initial test, the Contractor shall make necessary repairs at their own expense with approved materials. The Engineer may continue re-testing until a satisfactory test is obtained.

E. TRENCHLESS UTILITY INSTALLATION NEAR CITY SEWER FACILITIES

The City of Wauwatosa, at its discretion, may require contractors installing utilities using a trenchless method (such as directional boring) within the vicinity of existing storm sewer and existing sanitary sewers, including storm sewer and sanitary sewer laterals, to televise these facilities before and after completing work to ensure that the facilities were not damaged during installation of a trenchless utility. This includes, but is not limited to installation of gas mains and services, electrical lines and services, sewers and laterals, telephone lines, fiber optics, and water mains and services.

Televising requirements shall follow Paragraph B. of this section.

SECTION 611 - CONSTRUCTION OF WATER MAINS AND WATER SERVICES

ALL PERMANENT WATER DISTRIBUTION PRODUCTS SHALL BE MANUFACTURED IN THE USA. NO EXCEPTIONS. MegaLug retainer glands or equal, as approved in writing by the Engineer, shall be required at all mechanical joints.

New water construction must be completed prior to the general pavement removal operation. Preparation of the Right-of-Way, saw-cutting and removals shall be in accordance with Section 620 of these specifications.

Backfill used on this contract for water work shall be either mechanically compacted (unless directed to use flooding by the Engineer) crushed recycled concrete 1-1/4 inch dense meeting the gradation requirements for granular material as specified in Table 37 in Section 8.43.4 of the Standard Specs, or aggregate slurry backfill as specified in Section 8.43.8 of the Standard Specs. The backfill shall be consolidated by mechanical compaction of the trench backfill as specified in Section 2.6.14(b) of the Standard Specs unless otherwise specified by the Engineer. Flooding of trenches shall not be permitted.

Excavation and backfilling relating to utility installation is incidental to the utility bid item.

610.2.01 - EXCAVATION

A. GENERAL

The Contractor will be responsible for cleaning all water structures in the Project Area of all debris.

Excavation required for this work for the most part is unclassified. Complete all excavation regardless of the type of materials encountered. The Contractor shall make their own estimate of the kind and extent of the various materials which will be encountered in the excavation, including the presence or absence of water. The surface type as shown on the plans is presented only as a guide for the Contractor and does not guarantee the type or depth of material beneath the surface course. Removal of buttresses and thrust blocks present on existing water mains shall be incidental to the removal of the water main. No additional compensation will be made for differing surface materials. No additional compensation will be made for any rails, ties, or other unknown structures and objects that may be encountered. The Contractor may make written requests to the Engineer for exceptions to this rule, however the Engineer is under no obligation to approve exceptions.

The Contractor shall expose existing water mains to which the new main will be connected before commencing any pipe laying so that line and grade may be adjusted.

Water mains, services, branch services, and leads which are not installed to the alignment, slope, and depth as shown on the plans shall NOT be paid for or accepted by the Engineer. The Engineer reserves the right to shut down the project, at the Contractor's expense, if the Contractor or any of their subcontractors refuse to

use, or are repeatedly caught not using, Standard Specs construction methods requiring properly set up lasers as guides for excavating and laying pipe. The Contractor shall check the pipe with the laser at least every other pipe section which is laid, and at every fitting and valve. The Contractor shall be required to use the same methods for laying any pressurized system pipe as they would for gravity fed pipe as outlined in the Standard Specs – NO EXCEPTIONS. Any pipes laid to the incorrect alignment, slope, or depth shall be dug up and properly re-installed at the Contractor's expense before they will receive ANY payment for ANY water system work.

The location, size, and elevation of all underground structures shown on the plans have been located to a reasonable degree of accuracy, but the City does not guarantee their exact location and data or the location and data of others not shown. Concrete support columns shall be placed on all mains where shown on the plans and at all other locations not shown where a utility in a rigid conduit is discovered to pass beneath the new main by less than 12 inches. The costs of these supports will be considered incidental to the contract.

Bridging, where needed or where directed to be placed, shall be provided and installed by the Contractor at no additional cost to the City.

The water service relay shall be in a straight line grade from the downstream end of the new pipe to the right-of-way.

If any damage occurs to an underground facility, or the damage is found to exist, such that the protective coating of an electrical line is penetrated or gases or liquids are escaping from a broken line which endangers life, health or property, the Contractor shall immediately call "911" to report the damage location. This call shall be made prior to contacting the utility involved.

610.2.02 - LAYING OF WATER MAIN

A. BEDDING COVER AND FOUNDATION MATERIAL

All water main pipe shall be laid in a standard section conforming File No. 36 of the Standard Specs unless otherwise noted on the plans. 3/8" limestone chips conforming to Table 32 of the Standard Specs shall be used as the bedding and cover material on all water main installations.

Backfill used on this contract for water main work shall be either mechanically compacted crushed concrete meeting the gradation requirements for granular material as specified in Table 37 in Section 8.43.4 of the Standard Specs, or aggregate slurry backfill as specified in Section 8.43.8 of the Standard Specs.

The backfill shall be consolidated by mechanical compaction of the trench as specified in Section 2.6.14(b) of the Standard Specs unless otherwise stated.

Lumps of clay, loam, spoils (unless otherwise stated), garbage, organic material, or

any other material the Engineer deems unsuitable are not allowed in the backfill, and the Engineer reserves the right to order the Contractor to remove such items from the trench before paving commences, at the Contractor's expense, should the pieces be deemed unreasonably large and/or numerous. Material resulting from incidents such as, but not limited to, trench wall collapses is NOT excluded from this rule. For instances where the Contractor does not remove unacceptable backfill when directed, they shall be charged a percentage of the price for the pipe over the lineal footage in which the fill is present, to be deducted from monies owed to the Contractor.

B. INSULATION AROUND WATER MAINS & APPURTENANCES

The Contractor shall provide and install extruded polystyrene rigid insulation with a minimum of 25 PSI compressive strength, two layers of 2 inch thick by 6 feet long by the width of the trench, between storm sewer and structure installations and all water mains and services at all locations shown on the plans, and at any other location where a water main or service is exposed, or as directed by the Engineer. Insulation shall also be placed under water mains and services where they cross over the storm sewer and have a separation of less than 12 inches. Include costs with the price of the storm sewer relay, repair, extension or structure, or water main relay, repair, or extension.

If the vertical separation is greater than 12 inches and the service or main has a minimum of 6 feet of cover, the insulation need not be installed unless shown on the plans. Unless otherwise noted by the Engineer, insulation shall be considered incidental to the work.

C. CHLORINATION AND DISINFECTION

This section shall be incidental to the contract.

Disinfection of water mains shall be in accordance with Sections 4.3.12 and 4.16 of the Standard Specs. The Contractor shall take the necessary samples, under the supervision of the Engineer, and provide all costs for testing. Copies of the test reports shall be furnished to the Engineer and City Water Department. Calcium hypochlorite tablets shall be attached by a food-grade adhesive. Examples of food-grade adhesives are Permatex Form-A-Gasket No. 2 and Permatex Clear RTV Silicone Adhesive Sealant, which are manufactured by Loctite Corporation, Kansas City, KS 66115. These products have both been approved by USDA for uses that may contact edible products. **Other company products, such as Permatex Form-A-Gasket No. 1 are not allowable even though they are listed in the Standard Specs as being acceptable.**

Disinfection of all new, cleaned or repaired water mains shall be in conformance with the latest revisions of Chapter 4.16.0 of the Standard Specs, NR 811.07(3) and AWWA Standard C651.

D. FLUSHING

This section shall be incidental to the contract.

1. REQUIREMENTS FOR FLUSHING

Prior to flushing ANY water from the newly installed water main or existing water main system, the contractor shall adhere to the following requirements:

- The Contractor shall apply for a General Wastewater Permit by submitting an eNOI or NOI along with any other additional information required to the Wisconsin Department of Natural Resources (WDNR) seperately of the City of Wauwatosa WDPES Permit. Contractor shall follow all requirements set forth within the issued permit and the Contractor is solely liable for any violations of the requirements set forth within the permit by the WDNR. A copy of the permit shall be supplied to the City as record that the contractor has successfully received an approved permit from the WDNR. Contractor's shall plan to submit an eNOI or NOI form to the WDNR at least thirty (30) business days before the expected start date of discharge.

  Submit the completed eNOI or NOI to Maya Welch, WDNR, by email at maya.welch@wisconsin.gov.

- If approved by the Engineer, the contractor may elect to discharge flush water into the sanitary sewer system without being required to apply for a WDPES Permit. Prior to dicharging, the Contractor must submit a local sewer flush plan that includes the discharge location into the sanitary sewer, the flow rate of the discharge, and the expected volume of the discharge. Discharge to the sanitary sewer shall not be permitted during a rain event or within 24 hours of a 1 inch or greater rainfall event within MMSDs service area. Discharge into the sanitary sewer system requires a minimum of 3 days notice to the Engineer & MMSD. The Contractor shall contact Micki Klappa-Sullivan at 414-225-2178 or mklappasullivan@mmsd.com and provide the date(s) of the planned flushing event and an approximate of how much water will be discharged into the sanitary sewer system.

2. CLEARING THE MAIN OF HEAVILY CHLORINATED WATER

After the applicable retention period, heavily chlorinated water should not remain in prolonged contact with pipe. In order to prevent damage to the pipe lining or corrosion damage to the pipe itself, the heavily chlorinated water shall be flushed from the main until chlorine measurements show that the concentration in the water leaving the main is no higher than that generally prevailing in the distribution system and is acceptable for domestic use. Prior to final flushing and before connection to the existing main, the Contractor shall initially flush the new main using the temporary vents and filler pipes specified. The required velocity in a water main being flushed shall be 2.5 feet/sec. This equates to the following required flows:

Water Main Diameter (in,)	Flow Required to Produce 2.5 fps
6	200 GPM
8	400 GPM
10	600 GPM
12	900 GPM
16	1600 GPM

3. DISPOSAL OF HEAVILY CHLORINATED AND FLUSHING WATER

The Wisconsin Department of Natural Resources prohibits discharges of chlorinated and/or contaminated water into any surface waters of the State whether directly or indirectly through storm sewers. To be in compliance with these regulations, the Contractor shall apply for a General Wastewater Permit and follow all requirements of the permit unless discharging into the sanitary sewer system following the notices above to MMSD. Appendix B of AWWA Standard 651 contains a list of neutralizing agents and their required dosages.

In addition to the above, the Contractor shall take grab samples a minimum of 2 times per day during flushing. They shall be taken after the neutralizing chemical has been introduced to the flushing water and at the onset of the initial flushing. The Contractor, at their expense, shall have these grab samples analyzed for the following:

- Total Suspended Solids (mg/L)
- pH (s.u.)
- Oil & Grease (mg/L)
- Dissolve Oxygen (mg/L)
- Total Residual Chlorine (mg/L)
- Any additional sampling requirements as required by permits issued by the WDNR.

Copies of all reports associated with the sampling requirements shall be submitted to the City and also to the WDNR as required by the issued permit.

E. BACTERIOLOGICAL TESTS (SAFE SAMPLE)

Incidental to the contract, after final flushing, before the water services are connected, and before the new main is placed into service, a minimum of 2 consecutive sets of acceptable safe samples, taken at least 24 hours apart, shall be obtained. At least one set of samples shall be collected from every 1200 feet of new water main. All safe samples shall show the absence of coliform organisms. Sample reports shall be delivered to the Engineer and City Water Department and approved before “wet” connections may begin. No “wet” connection greater than 20 feet shall be allowed without the written approval of the Engineer in order to reduce the risk of contamination.

F. DISINFECTION PROCEDURES WHEN CUTTING INTO OR REPAIRING EXISTING MAINS

This section shall be incidental to the contract.

The following procedures apply when existing mains are wholly or partially dewatered. After the appropriate procedures have been completed, the existing main may be returned to service prior to completion of bacteriological testing in order to minimize the time customers are out of water. Leaks or breaks that are repaired with clamping devices while the mains remain full of pressurized water present little danger of contamination and require no disinfection.

1. TRENCH TREATMENT

When an existing main is opened, either by accident or by design, the excavation may contain standing water which may be contaminated from nearby sewers. Liberal quantities of hypochlorite applied to open trench areas will lessen the danger from such pollution. Tablets have the advantage in such a situation because they dissolve slowly and continue to release hypochlorite as water is pumped from the excavation.

2. SWABBING WITH HYPOCHLORITE SOLUTION

The interior of all pipe and fittings (particularly couplings and sleeves) used in making the repair shall be swabbed or sprayed with a 1% hypochlorite solution before they are installed.

3. FLUSHING

Thorough flushing is the most practical means of removing possible contamination introduced during repairs. If valve and hydrant locations permit, flush toward the work location from both directions. Flushing shall be started as soon as the repairs are completed and shall be continued until discolored water is eliminated. Flushing shall follow the requirements for flushing stated in Section 611.2.02.D.1.

G. SPECIAL PROCEDURES FOR TAPPING SLEEVE VALVES

This section shall be incidental to the contract.

Before a tapping sleeve is installed, the exterior of the main to be tapped shall be thoroughly cleaned, and the interior surface of the sleeve shall be lightly dusted with calcium hypochlorite powder.

Tapping sleeves are used to avoid shutting down the main to be tapped. After the tap is made, it is impossible to disinfect the annulus without shutting down the main and removing the sleeve. The space between the tapping sleeve and the tapped pipe is normally ½ in., more or less, so that as little as 100 mg/ft² of calcium hypochlorite powder will provide a chlorine concentration of over 50 mg/L.

610.2.03 - WATER MAIN MATERIALS

A. WATER MAIN PIPE

1. DUCTILE IRON

The type of water main pipe to be used on this contract shall be as noted on the plans. Ductile Iron Pipe shall conform to AWWA C-151 Special Class 55 and of the size shown on the plans. The pipe shall have bell and spigot ends designed for a Tyton rubber gasket push-on-joint. All ductile iron pipe and fittings shall be coated as specified in Chapter 8.18.3 of the Standard Specs. All metal pipe, fittings and materials shall be encased in a double layer of polyethylene wrap as specified in Chapter 8.21.0 of the Standard Specs, before bedding and backfilling.

2. PVC/HDPE/NONMETALLIC

The type of water main pipe to be used on this contract shall be as noted on the plans. The size of the pipe shall be as shown on the plans. PVC Pipe shall be C-900 DR18 or less in conformance with AWWA C-900, ASTM D-3139, and ASTM F-477 for sizes 4” through 60”. The pipe shall have integral elastomer bell and spigot ends designed for a rubber gasket push-on-joint. CertaLok® PVC water main pipe shall conform to AWWA C-900 DR18 and installation shall be completed under AWWA C-605. High-Density Polyethylene (HDPE) pipe for directional drilling projects shall be DR11, ductile iron pipe size (DIPS), and pressure class 200 conforming to AWWA C-906. Ductile iron fittings coated as specified in Chapter 8.18.3 of the Standard Specs shall be used with Megalug retainer glands specifically rated for use with selected nonmetallic pipe. All metallic fittings, stand pipes, and other appurtenances used with nonmetallic water main shall be covered in a double, watertight layer of polyethylene wrap, as specified in Chapter 8.21.0 of the Standard Specs, before bedding and backfilling.

a. TRACER WIRE

In open cut/trench construction, all nonmetallic water mains, leads and services shall be installed with a minimum #12 AWG copper clad steel, blue coated, 30 mil minimum HDPE insulated, high strength (minimum 450 lb. break load) tracer wire intended for direct bury, in accordance with Chapter 2.11.2 of the Standard Specs, APWA standards, and the City Specs, as incidental to the cost of the pipe.

For trenchless installation, all nonmetallic water mains, leads, and services shall be installed with tracer wire as noted above, except the tracer wire shall have a minimum break load of 1150lbs. Certain trenchless operations may require a break load above the minimum specified above. The Contractor shall be responsible to select the appropriate break load for the trenchless operation if higher break loads are required for the operation.

Except where the Engineer has given written approval for spliced-in connections, tracer wire systems shall be as continuous as practicable. Connections of tracer wire shall be in a low voltage, lockable, waterproof, underground, dielectric silicone filled connector, and shall be installed in such a manner as to prevent any exposure of uninsulated wire. Copperhead SnakeBite direct bury lug connector 3WB-01 or Engineer approved equal shall be included in the material submittals. No friction fit, twist-on, or taped connectors are allowed. No looping, wrapping, or coiling of tracer wire is allowed. The wire shall be placed along the entire length of the pipe and taped on the top of the pipe at minimum 10 foot intervals. No spray coatings or taped coatings for the wire are allowed. No connections to conductive pipes, fittings, glands, stand pipes, sleeves, or any other non-tracer wire material are allowed – the entire conductive tracer system shall only be constructed of tracer wire and tracer wire connectors as described above.

At the point of connection between metallic water main and any non-metallic water main, the mainline tracer wire shall go to ground using a connection approved in writing by the Engineer to a Copperhead drive-in magnesium grounding anode rod, part # ANO-12, or equal as approved in writing by the Engineer, with 20 feet of #12 AWG copper clad steel wire. Installation of the grounding anode rod shall be directly beneath and in-line with the water main. Excess wire from the grounding anode shall be trimmed to an appropriate length and not coiled.

All mainline dead-ends for non-metallic water mains shall go to ground using the same method described above.

i. TESTING

All new tracer wire installations shall pass testing by locating them using typical 512Hz low frequency line tracing equipment, witnessed by the Contractor and the Engineer before full

payment for all piping will be made. Continuity testing in lieu of actual line tracing shall not be accepted. Testing shall occur prior to construction of the roadway elements.

ii. TERMINATION/ACCESS

Wire shall be brought to the surface at all hydrants and curb stops, unless otherwise directed by the Engineer. At hydrants, wire shall be brought to the surface inside a 2” PVC Schedule 40 vertical sleeve (minimum 3’ bury depth) that is opposite the pumper nozzle on the back of the hydrant, with at least 24” of excess wire to allow for future locating and maintenance. A Tracer Wire access box by Bingham & Taylor, Inc. #P2B200NFG, Copperhead SnakePit #LD14BTP, or approved equal must be visible and accessible and be set to no more than 3” above finish grade.

For curb stops, the wire shall be run directly on the outside of the stand pipe all the way to the surface, and a MINIMUM 6” excess “pigtail” coiled below the cap of the stand pipe. Wire shall NOT be terminated in mainline, branch service, or hydrant valve boxes unless otherwise directed in writing by the Engineer.

For mains without services or hydrants, access locations shall use tracer wire access boxes as approved in writing by the Engineer.

b. RESTRAINED BELL-SPIGOT JOINTS

PVC pipe joints shall be restrained as shown in the plans. PVC bell restraints may be a rodded restraint or an internal restraint. Acceptable internal bell-spigot restraints for PVC pipe are Certa-Lok PVC, RieberLok, or Engineer approved equal.

Internal bell-spigot restraints for PVC pipe shall be labeled “Restrained Joint” with tape at least two inches wide wrapped at least 75% around the circumference of the pipe bell. Marking tape shall be white with synthetic rubber and resins adhesive rated for exterior use with a service temperature range from -15° F to 100° F.

B. HYDRANT LEAD

All hydrant leads shall be as specified on the plans. Nonmetallic leads shall, at a minimum, conform to AWWA C-900 DR14. Ductile iron hydrant leads shall be encased in polyethylene wrap. All types of leads shall be buttressed at the tee and

hydrant ends with concrete and/or hardwood blocks and all joints shall be restrained. The hydrant itself shall be set on concrete or brick blocks. This work shall be incidental to the cost of the hydrant or lead.

All hydrant leads shall have a valve of the appropriate pipe size hung directly on the tee from the main to isolate the hydrant from the main. If the plans show the valve not hung on the tee, the Contractor shall immediately consult the Engineer for direction prior to installing the valve for any hydrant lead. Barring field conditions preventing hanging the valve on the tee, the Contractor should plan to hang the valve on the tee.

C. FITTINGS

All fittings shall be cement lined, ductile iron compact fittings furnished with mechanical joints conforming to ANSI/AWWA C153 and C111, in accordance with section 8.22.0 of the Standard Specs and coated in accordance with section 8.18.3 of the Standard Specs. All fittings shall be 350 psi rated water working pressure. Megalug retainer glands shall be used on all fittings. Glands shall be specifically rated for the main and lead material which is being used. All fittings shall be set and buttressed with concrete and/or hardwood blocks. Where sleeves are required, the Contractor shall use solid iron sleeves, dual purpose sleeves, Romac Alpha couplings or Hymax Grip couplings or Engineer approved equal for both metallic and non-metallic mains.

Where shown on the plans or as approved in writing by the Engineer, restraint strapping shall follow section 4.9.0 of the Standard Specs with number and size of retaining rods recommended by pipe restraint manufacturer for the type and size of pipe used. Metallic water main bell-spigot joints may only use restraining glands in lieu of rodded bell restraints when approved in writing by the Engineer.

All fittings and connections to appurtenances shall use coated, corrosion resistant nuts and bolts (Cor-Blue), which will be incidental to the cost of the fittings. All fittings shall be coated in polyethylene wrap per Chapter 8.21.0 of the Standard Specs.

D. VALVES

All gate valves shall be mechanical joint resilient wedge valves manufactured to meet all applicable requirements of Section 8.27 of the STANDARD SPECS and AWWA C509 or C515. All gate valves shall be 200 psi rated water working pressure. Gate valves are required for valves 12” and smaller. Acceptable resilient seat gate valve manufacturers are:

- American Flow Control Series 2500
- Clow Models Series 2639
- Kennedy Models KS-FW or KS-RW 8571
- Mueller Series 2360
- Or equal as approved in writing by the Engineer

All butterfly valves shall be mechanical joint rubber-seated valves manufactured to meet all applicable requirements of Section 8.28 of the Standard Specs and AWWA C504. All butterfly valves shall be 150 psi rated water working pressure and the operating nut shall be oriented towards the centerline of the road. Acceptable butterfly valve manufacturers are:

- Clow Style 4500
- M & H Style 4500
- Mueller Linseal III Series
- Or equal as approved in writing by the Engineer

Each valve shall be tested by hydrostatic pressure equal to twice the specified working pressure. All valves shall have mechanical joints with Cor-Blue bolts and nuts made of coated corrosion resistant steel. All exposed valve hardware shall be T304 stainless steel. **All valves shall have a non-rising stem and shall open to the right (clockwise).**

Valves for hydrants shall be attached directly to the mechanical joint anchoring tee except where shown otherwise on the plans.

All valves shall be furnished with 6860 series roadway box and cover as manufactured by Tyler Union, Inc. or Engineer approved equal, and shall be in accordance with section 8.29 of the Standard Specs. The valve box shall be a ductile iron, three-piece screw type unit with a 5-¼" shaft and 17-¼" diameter (#6) base, and set to the correct grade for the finished restoration (1/2 inch below grade in turf). The cover shall be marked "WATER".

Gate valves shall also be furnished with a "6 Base Multifit Adaptor" or “Gate Valve Adapter” as manufactured by Adaptor Inc. or Engineer approved equal. Butterfly valves shall be furnished with a "Butterfly Valve Adaptor" as manufactured by Adaptor Inc. or Engineer approved equal.

Glands, nuts and bolts, valve adaptors, stand pipe bases, stand pipes, blocking, and covers, shall be incidental to the valve work.

E. FIRE HYDRANTS

1. GENERAL

All fire hydrants shall fully comply with AWWA STANDARD C-502 latest revisions. Bury depths shall be as shown on the plans, or as needed to suit the site conditions (with approval of the Engineer), or 6’-6” minimum. Pumper nozzle elevation shall be 18”-24” above finished grade (soil grade in turf areas, not vegetation grade). The center of the hydrant shall be 4’ behind the back of curb unless otherwise noted on the plans or directed by the Engineer.

The hydrants shall be designed for 250 psi working pressure and tested to 500 psi hydrostatic pressure test.

The Contractor shall warrant that the fire hydrant and component parts are first quality, conform to the applicable specifications, are free from material defects, faulty construction and poor workmanship, and are suitable for normal usage in a water distribution system. The warranty shall be for 100% of parts and labor. The period of warranty coverage shall be that normally provided by the manufacturer, but not less than 5 years from the date of the hydrant installation. The Contractor agrees to repair or replace within a reasonable time period any hydrant or accessory found to be defective during the warranty period at no cost to the City.

The Contractor shall check the operation of each hydrant and flow test all new hydrants after installation and interconnections are made. In addition, the Contractor shall fully open all new hydrants with all three caps tightened to check for leaks (i.e., pressure test), then fully close the hydrant and loosen all caps.

The Contractor shall make any necessary repairs or replace defective hydrants, and shall conduct the flow testing so as to disturb the surrounding area as little as possible. The Contractor must check the grade in the area to ensure that no soft spots in the grade have been created. Soft areas shall be stabilized or replaced immediately. **All testing shall be performed in the presence of and approved by the Engineer.**

2. TRAFFIC MODEL

The hydrants shall be of the traffic model design consisting of a breakaway safety flange and a safety sleeve coupling. The design shall permit a 360° rotation of the upper nozzle section, or any increment thereof, in any direction. The nozzle placement shall not be restricted by bolt hole placement.

3. EXTENSIONS

Hydrants shall be designed so that an extension may be added to installed hydrants. All extensions shall be made for insertion below the breakaway flange, and shall be available in increments of 6 inches, beginning with 6 inch length.

4. NOZZLE ARRANGEMENT

All hydrants shall have two 2-½ inch hose nozzles and one 4-½ inch pumper nozzle with National Standard threads, with all at the same elevation and the center of the pumper nozzle at least 18 inches from the bury line.

5. NOZZLES

Outlet nozzles shall be made of bronze and be fastened into the nozzle section by mechanical means or caulking. All outlet nozzles shall be safeguarded against

blowing out. For screwed-in outlet nozzles, a pin or other method shall be used to prevent the outlet nozzle from turning or backing out. Screwed-in outlet nozzles shall use “O” rings for pressure seals. Nozzle threads shall be National Standard.

6. INLET CONNECTION

The hydrant shall be furnished with a 6-inch D-150 mechanical joint shoe of the enlarging type designed to accommodate the pipe material shown on the plans.

Shoe bolts and nuts shall be corrosive resistant or 300 Series 18-8 stainless steel or coated, corrosion resistant bolts. The inlet connection shall be 6 inch mechanical joint complete with accessories including gland, gaskets, and corrosion resistant nuts and bolts.

7. HYDRANT VALVE

Hydrants shall have a minimum valve opening of 5-¼ inch diameter. The hydrant valve shall be reversible and designed to close with hydrostatic line pressure. The valve shall be faced with a suitable yielding material. The hydrant valve assembly shall be made of bronze and shall thread into a bronze bushing or drain ring. The valve assembly shall include a drain valve to drain the hydrant automatically each time it is operated. The drain way and cross arm must be constructed of bronze. Lower threads of the operating rod shall be protected by a cap-nut. The main valve and seat ring shall be removable through the upper barrel from above ground without disassembling the ground line flanges. The interface between the ferrous and non-ferrous surfaces shall be coated with anti-seize material. The hydrant shall be equipped with a positive operating drain valve to drain the hydrant when the main valve is closed. The drain valve shall be designed to close when the main valve is opened.

All hydrants shall be of compression type main valve closing with water line pressure.

8. DIRECTION OF OPERATION

Hydrants shall turn counterclockwise (left) to open.

9. OPERATING NUT AND NOZZLE CAP NUTS

All hydrants shall have all bronze 1-½ inch point to flat pentagon shaped operating nut, turn left to open, and shall have 1-½ inch pentagon shape nozzle caps and pumper caps. All operating nuts shall be provided with an internal metal weather shield to protect the operating nut from freezing.

10. LUBRICATION

Hydrants shall be of dry top design with its own lubricating system located in the bonnet which lubricates the upper stem threads each time the hydrant is operated.

Lubricant shall be nontoxic and provide proper lubrication for a temperature range of -30º F to +120º F.

11. BONNET

All threaded and metal to metal bearing surfaces in the bonnet shall be sealed away from the line pressure by no less than two “O” rings. The upper stem shall be provided with a stop.

12. COLOR

The top section of the hydrant shall be primed and painted with a rust inhibitive industrial urethane enamel such as Pennsbury Setter Red No. 9050 or Rustoleum Fire Hydrant Red applied over a base of #1069 Rustoleum Primer, or an approved equal. All exterior parts of the hydrant top section shall be painted as described above.

13. CORROSION RESISTANT NUTS AND BOLTS FOR GLANDS

Cor-Blue corrosion resistant, coated bolts and nuts are required at all locations which will be below ground level under normal conditions. With approval of the Engineer, 300 Series 18-8 stainless steel nuts and bolts may be used. Above ground portions shall have the appropriate grade of stainless steel fastener.

14. ACCEPTABLE HYDRANTS

All hydrants supplied shall be new and unused. Factory rebuilt hydrants are not acceptable. Acceptable hydrants for City of Wauwatosa are as follows:

- Mueller Super Centurion 250™, A423
- AFC Fire Hydrant 5 ¼” Waterous Pacer WB-67 with 16” Breakoff Section

F. WATER SERVICE ALTERATION, RELAY AND RECONNECTION

The reconnection to the existing water main for the corporation stop of the tap service shall be made by the Contractor. Materials and construction shall conform to File No. 52 of the Standard Specs for connecting and replacing original services or File No. 51 for new services with the exception that an approved tapping sleeve shall be used. Reduced Port corporation stops and curb stops shall be ***“ball valve type”*** with 300 psi rated working pressure. Curb stop boxes shall be Minneapolis Style.

1. SERVICES TO METALLIC AND NON-METALLIC MAINS

Unless otherwise noted on the plans, services shall be High Density Polyethylene (HDPE) SDR 9, copper tube size (CTS) conforming to AWWA C-901. The size for Replace Original Service (ROS) shall be a minimum of 1-1/4 inch, and for a Connect Original Service (COS) a minimum of 1 inch or sized to match existing, if larger, or as shown on the plans. The COS shall also match existing material. The

tap and tapping saddle/sleeve shall be 1 inch. The corporation stops shall be 1 inch by 1-1/4 inch. Sizes of taps, saddles, corporation stops, and curb stops shall match the size of the existing for services larger than 1-1/4 inch. All fittings shall be specifically rated for the appropriate water main material and/or polyethylene services (as applicable), and use Engineer approved compression fittings with stainless steel stiffeners for the services. The Contractor shall provide frost protection as shown on the plans, or in locations as described in section 610.2.02 B of these City Specs as incidental to the work.

2. WATER SERVICE FITTINGS

Corporation Stops shall be a reduced port ball valve with AWWA/CC taper thread inlet by compression quick joint coupling outlet for CTS. Curb Stops shall be a reduced port ball valve compression quick joint coupling for CTS on either ends. Corporation Stops, Curb Stops and couplings for nonmetallic services require tubular stainless steel insert stiffeners.

Acceptable corporation stop manufacturers are:

- Ford Quick Joint Model FB1000-xx-Q-NL
- AY McDonald Model 74701BQ
- Equal as approved in writing by the Engineer

Acceptable curb stop manufacturers are:

- Ford Quick Joint Model B44-xxxM-Q-NL
- AY McDonald Model 76104Q
- Equal as approved in writing by the Engineer

Acceptable stainless steel insert stiffener manufacturers for HDPE tubing are:

- Ford 50 Series INSERT-5x style
- AY McDonald 6133T
- Equal as approved in writing by the Engineer

Acceptable service line compression coupling manufacturers are:

- Ford
- AY McDonald
- Philmac UTC
- Equal as approved in writing by the Engineer

Acceptable 3-inch Minneapolis Style curb stop box manufacturers are:

- Ford Model EM2-xx-56
- AY McDonald 5614A
- Equal as approved in writing by the Engineer

Where designated on the plans or ordered by the Engineer, the Contractor shall install the new or replacement tap water service piping by an approved trenchless method, such as drilling, boring, jacking, auger boring, or fluid boring. The trenchless method used shall be capable of installing the water service piping horizontally and level with the water main to within a 12 inch radius of the target at the proposed location of the new curb stop.

The Contractor shall exercise care in locating and excavating, shoring and bracing the starting and recovery pits to assure underground and aboveground structures and trees are not damaged by their operations. Where a trenchless method of installation is required because of the necessity to protect a tree or as directed on the plans, the Contractor shall not drive heavy equipment or store materials within a radius of 5 feet from tree trunks unless the area is paved or protected from soil compaction by the use of planks or similar materials. To minimize damage to the tree's root zone during the installation of the water service piping no excavation shall be made within the following limits:

Tree Diameter (In.) (@ 4.5' Above Ground)	No Excavation Limits Distance (ft.) from Trunk
0 - 2	1
3 - 4	2
5 - 9	5
10 - 14	10
15 - 19	12
Over 19	15

The Contractor may encroach on the above limits if the water main to which the water service piping will be connected or the house side of the existing City sidewalk is within the specified no excavation zone. The Contractor shall keep these excavations as small as possible and shall contact the Engineer at least 3 days prior to starting the installation so they may notify the City Forester.

The City has obtained or is in the process of obtaining right-of-entry permits from affected property owners in order for the Contractor to complete their work on private property. All trees, bushes, shrubs, lawn, walk, driveway, etc. on private property damaged by the Contractor shall be repaired or replaced by the Contractor at no cost to the private property owner, and to the satisfaction of the Engineer. Costs for this work should be included in the bid price for the water service piping. No additional compensation will be made.

Where trenchless methods are required, payment will be per foot from the centerline of the main to the point of reconnection to the existing service behind the walk as measured horizontally and perpendicular to the street without regard to the amount of piping that may be installed in an open cut trench. Where no method is specified or open cut is specified, the Contractor may select any approved method of installation, however, the payment will be at the

open cut per foot bid price.

Existing curb stops shall be abandoned by the Contractor by removing only the top section of the service box and backfilling the remaining hole with suitable material. The cost of this abandonment shall be included in the price for an ROS or COS. Existing services which are replaced shall be disconnected as detailed in the Standard Specs.

G. SERVICE SADDLE

All water service (re)connections 2” and smaller, as well as air vents, for metallic and nonmetallic pipe shall be wet tapped under pressure using a one piece, double bolt, stainless steel service saddle clamp conforming to Smith-Blair 372, with AWWA/CC taper thread or *equal as approved in writing by the Engineer*. Service saddles shall be furnished by the Contractor as incidental to the service.

Services larger than 2” that are installed under pressure require an Engineer approved 2 piece stainless steel, heavy duty tapping sleeve with slip through bolts and a resilient wedge gate valve. Approved stainless steel tapping sleeves include: Smith-Blair 665 or Romac SST III, both with flanged outlet.

The Contractor shall refer to the manufacturer’s instructions for the installation of a specific sleeve.

H. WATER VALVE BOX ADJUSTMENTS

The item for adjusting roadway boxes and curb stop boxes for water valves requires the Contractor to furnish all labor, equipment, and materials necessary to clean, adjust, and repair all boxes for mainline or hydrant gate valves, air vents and curb stop valves lying within the construction limits. This work requires the boxes to be placed at grade and operational (with stable covers) regardless of the amount of cleaning, adjustment, repair, or amount of material required. If no bid item is listed, this work shall be incidental to the contract.

Raising rings, commonly used for resurfacing work, will be reviewed and possibly accepted as an adjustment on a case-by-case basis (existing threaded rings, which are intact, may remain without review) by the Engineer. Also included in this item is any necessary plumbing work in raising or lowering an air vent.

Water curb stop boxes centered less than a foot and a half from the curb face are indicated for adjustment by the Contractor under the item provided. The Contractor shall be held responsible for damage to all water valve boxes.

610.2.04 - HYDROSTATIC TESTS

The Contractor shall provide for the testing of all new mains under the supervision of the Engineer before any “wet” connections are made or new services are relayed or

reconnected, in accordance with Chapter 4.15.0 of the Standard Specs and the following requirements:

A. The duration of the hydrostatic pressure test shall be 150 psi for at least ***2 hours*** in conformance with AWWA 600-93 Section 4.1.1. This is an increase from the 1 hour specified in Chapter 4.15.0 of the Standard Specs.

B. Separate tests on the entire length of new mains between each proposed cut-in connection shall be required. After the service reconnections are made the Contractor will not be allowed to shut down the new proposed main for any reason.

C. Upon completion of all interconnections or offset installations, the section of new main shall be subject to line pressure prior to backfilling. Any visible defects observed in the connecting main shall immediately be repaired by the Contractor at their expense prior to backfilling.

D. Cost of all testing and sampling shall be at the Contractor's expense.

E. After completion of all reconnects and interconnections are completed, the old main shall be abandoned by capping or bulk heading with brick and mortar, a metallic cap with gland appropriate for the main material, or as approved in writing by the Engineer as incidental to the contract.

SECTION 614

TELEVISION INSPECTION SPECIFICATIONS

A. TELEVISION EQUIPMENT

1. All designated sewer sections shall be visually inspected by means of closed-circuit color television.

2. Television equipment shall include television camera, television monitor, cables, power source, lights, and other equipment. The television camera shall be specifically designed and constructed for operation in connection with sewer inspection. ***The Camera shall be capable of a radial view (panning, tilting and rotating to be able to view the entire circumference of the pipe) for inspection of the top, bottom, and sides of pipe and for looking up lateral connections.*** The view seen by the televising camera shall be transmitted to a monitor of not less than 17 inches. The camera, television monitor, and other components of the video system shall be capable of producing a picture quality satisfactory to the Engineer; and if unsatisfactory, the equipment shall be removed and no payment will be made for an unsatisfactory inspection.

3. The camera, television monitor, and other components of the video system shall be capable of producing a minimum 650-line resolution color video picture. The camera shall be mounted on skids suitably sized for each pipe diameter to be investigated or on a self-propelled transporter specifically sized for each pipe diameter to keep it in the center of the pipe.

4. The camera shall be operative in 100 percent humidity conditions and tested at 400 psi. Lighting for the camera shall minimize reflective glare. The lighting shall be supplied by a lamp on the camera, capable of being dimmed or brightened remotely form the control panel. Lighting and camera quality shall be suitable to provide a clear, in-focus picture of the entire inside periphery of the sewer pipe for all conditions encountered during the work. Focal distance shall be adjustable through a range of from 6 inches to infinity.

5. The location meter, for accurately recording the location of the television camera with respect to the reference manhole, shall be a direct reading, above ground, friction clamp device or other suitable equipment. Marking on the cable, or the like, which would require interpolation for depth of manhole, will not be allowed. The meter shall be capable of reducing readings for reverse movement of the camera and shall be capable of being manually re-zeroed for each new segment (MH-to-MH or MH-to-Inlet).

6. The importance of accurate distance measurements is emphasized. The remote reading footage counter shall be accurate to one percent over the length of the particular section being inspected. Accuracy of the measurement meter shall be

checked daily by use of a walking meter, roll-a-tape, or other suitable device. Footage measurements shall begin at the centerline of the upstream manhole and end at the centerline of the downstream manhole. Footage shall be shown on the video data view and recorded at all times.

B. SEWER MAINLINE TELEVISION INSPECTION

1. All sanitary sewer televising work shall be done in accordance with Section 7.1.2 in the Standard Specifications for Sewer and Water Construction in Wisconsin, 6th Edition and the National Association of Sewer Service Companies (NASSCO) and inspection reporting shall be performed by a NASSCO Pipeline Assessment and Certification (PACP) certified user. Reports shall utilize NASSCO's PACP version 7.0 standards and identify defects by category. Each sanitary sewer lateral shall be assigned a NASSCO rating of 1-5.

2. The camera shall be moved through the line in a downstream direction at a uniform rate, stopping when necessary to ensure proper documentation of the sewer's condition but in no case shall the television camera be pulled at a speed greater than 30 feet per minute. ***The Camera shall look up all lateral connections.*** Manual winches, power winches, TV cable, and powered rewinds or other devices that do not obstruct the camera view or interfere with proper documentation or the sewer conditions shall be used to move the camera through the sewer line.

3. If, during the inspection operation, the television camera will not pass through the entire manhole section, the Contractor shall reset up his equipment in an opposite manhole. The Contractor shall provide the additional cleaning, root cutting and mineral deposit removal so that the entire line can be televised. Any necessary cleaning to properly televise the manhole shall be performed in conformance with Section 613 of the Contract Documents.

4. In the event the section being televised has substantial flow entering the sewer between manholes, such that inspection of the sewer is impaired, the Contractor shall coordinate with the owner of the source of flow to have such flow temporarily stopped and/or reschedule television inspection of the particular section to a time when such flow is reduced to permit proceeding with the television inspection.

5. When sewer line depth of flow at the upstream manhole of the section being televised is above the maximum allowable for television inspection, the contractor shall reduce the flow to permit proceeding with the television inspection. In addition, when the sewer line is sagged or depressed, the contractor shall attempt to suction out the sewage by using a sewer jet in close proximity to the television camera.

6. Whenever non-remote powered and controlled winches are used to pull the television camera through the line, telephones, radios, or other suitable means of communication shall be set up between the two manholes or the section being inspected to ensure that adequate communications exist between members of the crews.

7. Footage measurements shall begin at the sewer line point of penetration of the upstream manhole, unless specific permission is given to do otherwise. Footage, to the nearest tenth (0.1') of a foot, shall be shown on the video data view at all times.

8. The lens of the camera shall be cleaned at each MH and when directed by the Engineer. Sewers shall not be televised during rainfall or periods when excessive clearwater is present in the sewer.

C. SEWER LATERAL TELEVISING

1. All sanitary sewer lateral televising work shall be done in accordance with Section 7.1.2 in the Standard Specifications for Sewer and Water Construction in Wisconsin, 6th Edition and the National Association of Sewer Service Companies (NASSCO) and inspection reporting shall be performed by a NASSCO Pipeline Assessment and Certification (PACP) and Lateral Assessment and Certification Program (LACP) certified user. Reports shall utilize NASSCO's PACP standards and identify defects by category. Each sanitary sewer lateral and main shall be assigned a NASSCO rating of 1-5.

2. The contractor shall televise at least 30 feet of each lateral, measured from the center of the mainline pipe. If the contractor cannot reach this distance, a note must be made of the reasoning.

3. All sewer lateral inspection reporting shall include all needed traffic control for the safety of the work crews and public, and any costs of contractor elected nighttime inspection.

4. Properties with more than one service shall have the laterals first inspected to see which lateral is in use. Documentation of capped or abandoned lateral shall be provided to the City.

D. DOCUMENTATION OF THE TELEVISION RESULTS

1. Television inspections must be documented through the use of an in-vehicle computer system. This system must be IBM compatible on an external hard drive or another approved storage medium. All defects and general information on the pipe being viewed along with an index for retrieving the information must be supplied to the City as part of the report.

2. Television inspection logs shall be typed or computer printed and shall be on a form acceptable to the City. Printed location reports shall clearly show the location of each source of infiltration discovered in relation to adjacent manholes. The contractor shall estimate and record the flow rate. In addition, other data of significance including the location of building and house service connections, joints, unusual conditions, roots, storm sewer connections, collapsed sections, presence of scale and corrosion, and other discernible features shall be recorded. A voice recording on the videotapes shall make brief and informative comments on the sewer conditions. The Contractor shall also take photographs of all faults, points of interest and where directed by the Engineer. Copies of the photographs shall be furnished to the City.

3. The measurement of distance to defects is critical in confirming the location of areas to be excavated. All inspections shall start at the center of the manhole or inlet.

4. The contractor shall make color video recordings of the data on the television monitor. A copy of each recording on an external hard drive or another approved storage medium shall be provided to the City.

5. Recorded playback shall be at the same speed that it was recorded. Slow motion or stop motion playback features may be supplied at the option of the contractor. Title to the tape will remain with the City. The Contractor shall have all necessary playback equipment readily accessible for review by the City during the project. Tape speed shall be noted on the recorded videotape.

6. The contractor shall provide a NASSCO-PACP Certified Access Database for all pipe segments evaluated as part of the contract for integration into the City's GIS computer system.

    a. The database shall include information in a format that is compatible with City's GIS system.
        i. Upstream Manhole – As shown on Plans
        ii. Downstream Manhole – As shown on Plans
        iii. Pipe Inpspection ID: [Upstream Manhole]_[Downstream Manhole]

7. Recordings shall include the following information:

    a. Data view (Visible on screen in an inconspicuous place):
        i. Report number
        ii. Date of TV inspection
        iii. Either upstream and downstream manhole numbers, ***formatted to the exact manhole number as shown on the plans***, or address of the lateral being televised

iv. Current distance along reach (counter footage to the nearest tenth of a foot)
v. Printed labels on the recording container and recording with location information, date, format information, and other descriptive information.

b. Audio:
i. Date and time of TV inspection, operator's name and name of adjacent street.
ii. Verbal confirmation of upstream and downstream manhole numbers and TV direction in relation to direction of flow.
iii. Verbal descriptions of pipe size, type and pipe joint length.
iv. Verbal description and location of each service connection and pipe defect.
v. Type of weather during inspection and for the previous 24-hour period.

8. Television inspection logs shall include, but are not limited to, the following information:

a. Date, time, city, street, basin, sewer section, reference manhole number or reference address, name of operator, inspector, and weather conditions.
b. Pipe diameter, pipe material, section length, depth of pipe, length between joints, and corresponding videotape identification.
c. Location of each point of leakage.
d. Location of each service connection.
e. Location of any damaged sections, nature of damage, and location with respect to pipe axis.
f. Deflection in horizontal or vertical alignment of the pipe.

9. The Contractor shall provide one (1) professionally bound copy of the report to the City. A summary shall be included and shall include the television inspection logs as specified. A one-page summary sheet shall also be provided which states the sewer section, length, size, date completed, and totals.

SECTION 615.1
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SECTION 615.1 – GENERAL CONDITIONS FOR SEWER LINING AND GROUTING

615.1 – GENERAL

A. POST CONSTRUCTION TELEVISING OF WORK

The Contractor shall conduct post-construction televising and documentation per Section 614 of these City Specs as incidental to the contract unless otherwise noted in the bid items, including any deliverables.

After grouting is completed, all lateral connections shall be final inspected by means, panning and tilting to view up the lateral from the mainline, by using a color CCTV system. The inspection shall be conducted as per the NASSCO Pipeline Assessment and Certification Program. One external hard drive and hard copy of reports shall be submitted

B. BYPASS PUMPING

The Contractor shall be solely responsible for maintaining commercial and residential sewer service at all times, with the exception of the lateral that is being installed. It shall be the responsibility of the Contractor, in instances of laterals with high flow rates as determined by the Contractor, to coordinate the work with the property owner(s) and/or occupant(s) at the Contractor's expense.

The Contractor shall provide for the bypass flow of sewage around the section or sections of pipe designated for relining. The bypass shall be made by plugging the line at an existing upstream manhole and pumping the flow into a downstream manhole or adjacent system. The pump and bypass lines shall be of adequate capacity and size to handle the flow and to allow CCTV observation of the mainline packer throughout liner installation..

The Contractor shall submit bypass pumping plans for review by the Engineer at least 3 working days prior to the installation of the bypass. The Contractor shall notify the Engineer at least 24 hours prior to commencement of the bypass pumping operation. The Contractor shall not be allowed to start bypassing operations until their plan is approved by the Engineer. The review of the bypassing system by the Engineer shall in no way relieve the Contractor of their responsibility and/or public liability for overflows and/or backups.

C. CLEANING OF SEWER LINES

The Contractor shall remove all internal debris and obstructions which will interfere with the installation of the CIPP from the existing sewer line at their own expense as incidental to lining and grouting, unless otherwise noted in the bid items. All solids or semisolids resulting from the cleaning operations shall be removed from the site and disposed of at the Contractor's expense. All materials shall be removed from the site no less often than at the end of each work day. Under NO circumstance will the Contractor be allowed to accumulate debris or any other materials on the site of work beyond the stated time, except in totally enclosed containers and as approved by the Engineer. Any hazardous waste material encountered during this project will be considered a changed condition.

1. LINE OBSTRUCTIONS

It shall be the responsibility of the installer to clear the line of obstructions such as solids, dropped joints, roots, protruding service connections and collapsed pipe that will prevent the insertion of the liner pipe. If inspection reveals an obstruction that cannot be removed by conventional sewer cleaning equipment, then the Installer shall notify the City.

The Contractor shall remove any protruding tap, root, or deposit to the inside wall of the pipe. In no case shall the pipe be less than 95% open to flow.

At all points where the liner pipe has been exposed (such as service connection fittings, or other points where the old pipe must be removed), the liner pipe and fittings shall be encased in cement-stabilized sand or other high density material as specified by the Owner to prevent deflection due to difference in subsidence.

After the encasement material is in place and accepted by the Owner's representative, backfill is placed and compacted to required finish grade in accordance with the specifications. Particular care should be taken to ensure compaction of earth beneath the lateral pipe in order to reduce subsidence and resultant bending at the lateral connection at the sewer main.

D. OWNER COODRDINATION

The Contractor shall coordinate with the property owner(s) and/or occupant(s) to access their lateral from the internal cleanout for any work which requires cleanout access, including but not limited to any televising or testing.

E. CLEANING AND DISPOSAL

After the installation work has been completed and all testing acceptable, the Contractor shall clean up the entire project area, return the ground cover to grade, and restore any disturbed areas in-kind or as indicated on the plans, at the Contractor's expense unless otherwise noted. All excess material and debris not incorporated into the permanent installation shall be disposed of by the Contractor at their expense.

F. RESPONSIBILITY FOR OVERFLOW OR SPILLS

It shall be the responsibility of the Contractor to schedule and perform his work in a manner that does not cause or contribute to incidence of overflows or spills of sewage from the sewer system. In the event Contractor's work activities contribute to overflows or spills, the Contractor shall immediately take appropriate action at their own expense to contain and stop the overflow, clean up the spillage, disinfect the area affected by the spill, and notify the Engineer and/or property owner in a timely manner.

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SECTION 615.2 – LINING OF SEWER MAINS AND LATERALS

615.2 - SEWER RELINING

A. SCOPE

This section describes the procedures and the work necessary for the reconstruction of existing pipelines and conduits by the installation of structural cured-in-place pipes (CIPP). A CIPP is formed by the insertion of a resin-impregnated flexible felt tube into the existing pipe. The tube is expanded to tightly fit against the original conduit and then cured by circulating hot water or introducing controlled steam within the tube.

The finished CIPP shall extend over the installation length in a continuous, tight fitting, watertight, pipe-within-a-pipe. All liners shall be smooth walled when set.

The Contractor shall provide all materials, labor, equipment, cleaning, and television inspection of the sewer to be lined, installation of the liner, reconnection of service laterals, final television inspection, and testing of the lined pipe system. The Contractor shall also submit a written report of the sanitary sewer cleaning. This report shall identify the sewer segments cleaned and the type and volume of debris removed from the sanitary sewers.

The Contractor shall contact the property owner/residents and businesses within the project limits to inform them of the project and provide them with any information deemed necessary for the successful performance of the contract, and to inform them of temporary sewer service disconnections.

If the Contractor damages the sewer during construction and is unable to complete the lining in a satisfactory manner, the cost of the excavation and/or repairs shall be included in the unit price bid for the cured in place liner.

1. LATERALS

It is the intent of this specification to provide for the rehabilitation of sanitary sewer laterals.

The work to be performed under this Section includes the furnishing of all materials, parts, labor, tools, equipment, and supervision necessary for cleaning and CCTV inspection of the laterals to be lined, liner installation, all quality controls, provide samples for performance of required material tests, final CCTV television inspection, testing of lined pipe system and warranty work, all as specified.

The CIPP shall fit sufficiently tight within the existing lateral so as to not leak at the ends of the liner. If leakage occurs through the wall of the pipe, the liner shall be repaired or removed as recommended by the CIPP manufacturer.

Final approval of the liner installation will be based on lateral televising after CIPP liner installation is complete.

The installed CIPP shall have a long term (50 year) corrosion resistance to the typical chemicals found in domestic sewage.

All materials furnished, as part of this contract shall be marked with detailed product information, stored in a manner specified by the manufacturer and tested to the requirement of this contract.

When cured, the liner shall extend to the downstream-most lateral pipe joint.

The new CIPP lateral shall be a structurally sound, joint-less, corrosion resistant, watertight, and free of all defects that will affect the long-term life and operation of the pipe. The Contractor is responsible for proper, accurate and complete installation of the CIPP.

Neither the CIPP system, nor its installation, shall cause adverse effects to any of the property owner's or City's processes or facilities. The use of the product shall not result in the formation or production of any detrimental compounds or by-products at the receiving wastewater treatment plant. The Contractor shall notify the Engineer and identify any by-products produced as a result of the installation operations, test and monitor the levels, and comply with any and all local waste discharge requirements.

The Contractor shall cleanup, restore existing surface conditions and structures, and repair any of the CIPP system determined to be defective at their own expense unless otherwise noted in the bid items.

The Contractor shall conduct installation operations and schedule cleanup in a manner to cause the least possible obstruction and inconvenience to traffic, pedestrians, businesses, and property owners or tenants.

B. REFERENCES - LINING

This specification references American Society for Testing and Materials (ASTM), National Association of Sewer Service Companies (NASSCO), and American Water Works Association (AWWA) standards which are made part hereof by reference, and shall be the latest edition and revision thereof. If there is a conflict between these standards and this specification, this specification will govern. The ASTM testing specifications referenced are as follows:

1. ASTM D543 Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents

2. ASTM D638 Standard Test Methods for Tensile Properties of Plastics

3. ASTM D790 Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials

4. ASTM D792 Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement

5. ASTM D903 Standard Test Methods for Delamination of Plastic Composites

6. ASTM D2290-17 Standard Test Methods for Tensile, Compressive, and Flexural Creep and Creep-Rupture of Plastics

7. ASTM F1216 Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Insersiton and Curing of Resin-Impregnated Tube

8. ASTM F1743 Standard Practice for Rehabilitation of Existing Pipelines and Condutis by Pulled-in-Place Installation of Cured-in-Place Thermosetting Resin Pipe

9. ASTM D5813 Standard Specification for Cured-in-Place Thermosetting Resin Sewer Pipe

C. QUALITY CONTROL

Though the process may be licensed, no change of material, design values, or procedures may be made during the course of the work without the prior written approval of the Engineer. All liner to be installed under this contract may be inspected at the point of manufacture for compliance with these specificaitons by

the Engineer. The Contractor shall require the manufacturer's cooperation in these inspections. The cost of the plant inspection shall be the responsibility of the Engineer.

At the time of manufacture, each lot of liner shall be inspected for defects. At the time of delivery, the liner shall be homogeneous throughout, uniform in color, and free of cracks, holes, foreign materials, blisters, or deleterious faults.

The Contractor shall have a Quality Control Plan or Procedure in place which allows the Engineer to monitor the resin impregnation process.

D. WARRANTY

All lining work, including any lateral lining, shall be guaranteed for a period of 3 years from the date of substantial completion granted in writing by the Engineer unless otherwise stipulated in writing by the City. During this period, all defects discovered by the City shall be removed and replaced by the Contractor in a satisfactory manner at no cost to the City. The City may conduct independent

television inspections, at its own expense, of the lining work at any time prior to the completion of the warranty period.

E. SUBMITTALS

1. QUALIFICATIONS FOR INSTALLERS OF APPROVED LINING MATERIALS

The Contractor shall submit all required pre-qualification product, manufacturer, and installer documents to the Engineer. For an installer to be accepted, the installer must satisfy all of the following:

a. Insurance, financial and bonding requirements of the City

b. Minimum of three (3) years of active experinece in the commercial installation of the product proposed

c. Successfully installed at least 500 cured-in-place service laterals of the proposed product in sewer systems in the United States

d. Must have minimum three (3) years of experience in the installation of lateral cured-in-place lining

e. The Contractor shall employ a minimum of 1 foreman and 2 crew members with experience of at least 50 liner installations

f. The Contractor shall have the equipment available for the installation and testing of the lateral liner from inside the internal cleanout

g. Acceptable documentation of these minimum requirements shall be submitted to the Engineer, and any intentional misrepresentation of references will be grounds for disqualification

h. Contractor/Manufacturer submit evidence of installer training, testing, and/or certification of being trained to install the product by the Contractor/Manufacturer for the product.

2. PRODUCT QUALIFICATION

Sewer rehabilitation products submitted for approval shall provide third-party test results supporting the short-term and long-term performance, as well as the structural strength of the product. No product will be approved without independent third-party testing verification. The tube and resin manufacturers shall be third-party certified by United States recognized organizational standards. Proof of certification shall be required for approval.

Sewer rehabilitation products submitted for approval must provide third-party test results supporting the short-term and long-term performance as well as

the structural strength of the product. No product will be approved without independent third-party testing verification. The tube and resin manufacturers shall be third-party certified by United States recognized organizational standards. Proof of certification shall be required for approval.

a. ENHANCERS – The use of proven materials that serve to enhance the pipe performance specified herein will be allowed. Proven materials must have passed independent third-party laboratory testing, not excluding long-term structural behavior testing, and must have been successfully installed to repair failing host pipes in the U.S. for at least two (2) years.

b. TESTING – Submit certified test reports demonstrating that the exact resin/liner combination to be used for this project meets the requirements for initial structural properties (performed in accordance with ASTM F1216 and ASTMD790) and chemical resistance (performed in accordance with ASTM F1216 – Appendix X2). Also submit certified test reports demonstrating that the exact resin and comparable liner to be used for this project has been tested for long term flexural modulus of elasticity and long-term flexural strength (i.e. 10,000-hour creep testing performed in accordance with ASTM D2990 for design conditions applicable to this project).

3. PROOF OF PRODUCT USAGE

Only cured-in-place lining products with a proven track record of successful installations will be approved. For cured-in-place liner product to be accepted, it must meet or exceed the following criteria:

a. The product must have been used in three successful cured-in-place lateral lining installation contracts of similar size and scope in the United States.

b. CIPP FOR LATERALS – The product must have been successfully used and installed in a minimum of 2,000 lateral liner installations, and the product must be capable of being installed and tested from the internal cleanout.

Proven materials must have passed independent third-party laboratory testing, not excluding long-term structural behavior testing, and must have been successfully installed to repair failing host pipes in the United States for at least two (2) years. For a product to meet prequalification as a commercially acceptable product, a minimum of 100,000 feet of successful waste water collection system installations in the US must be documented to assure commercial viability of the process.

c. LIMITATION OF UNPROVEN TECHNOLOGY: The use of proven materials that serve to enhance the pipe performance specified herein will

be allowed at the discretion of the Engineer. To limit the City's exposure to unproven pipe reconstruction or rehabilitation products while permitting the establishment and growth of such new product technologies where warranted, the City has established the following parameters:

i. YEARLY FOOTAGE RESTRICTION: If the new product Contractor/Manufacturer does not have a minimum of 2 years of commercial experience in installing/manufacturing the proposed rehabilitation product for essentially trenchless pipeline reconstruction in the United States, the maximum of that Contractor's/Manufacturer's new product footage that will be installed in City's system during any 12-month period will not exceed 5% (at the time of the bid) of the total footage of that Contractor's/Manufacturer's new product installed and accepted in US sewer systems.

ii. DOCUMENTATION: Footage in b.1. above will be documented by the Contractor/Manufacturer of the proposed product. Documentation will include the name, address and reference phone numbers of the users, length and diameter of the product, contract number or name, and official acceptance date by the user.

iii. FINAL ACCEPTANCE: The limitations in b.1. above and documentation requirements in b.2. will be dropped after 3 years of successful performance/maintenance of the City's system and as the product is deemed successful by the Engineer.

iv. TRIAL INSTALLATION: Contractor/Manufacturer may be required to install a minimum test section of approximately 300 feet under the supervision of the Engineer for his review prior to the award of Contract. The test section is to be designated by the Engineer and paid for by the City at 75% of the unit or lump sum prices bid.

4. DESIGN GUIDE SUBMITTAL

Contractor/Manufacturer shall submit the Engineering design guide and quality control procedures for the liner manufacture and installation, including detailed inspection, testing of physical properties, retention of production samples, and taking of field samples. Test results from 10 previous installations must be submitted and shall meet the City's current standards and requirements.

a. DESIGN CALCULATIONS – submit structural design calculations and specification data sheets listing all parameters used in the liner

design and thickness calculations based on Appendix XI of ASTM F1216 for each pipe segment/lateral.

See Section 615.2 G for more details.

5. INSTALLATION QUALITY CONTROL PLAN

   Submit plan or procedures that ensure proper materials and procedures are used in liner shipping and storage and in the resin impregnation process. Submit installation and quality control plan, including mainline sewer and lateral cleaning plan and cleanliness requirements, liner shot plan and sequence, liner installation standard procedures, temperature monitoring plan, and plan to manage flow to/from laterals during lining. The Contractor's Quality Control Plan shall be submitted for review by the Engineer at least 2 weeks prior to the first CIPP installation.

6. CONTINGENCY PLAN

   Submit plan that includes methods and equipment to be used to repair unacceptable liner defects, for removing failed liners, and for availability and accessibility of backup equipment such as air compressors and boilers.

7. MATERIALS AND CURING DETAILS

   The Contractor shall provide submittals on all lining materials and resins and shall furnish manufacturer certification that the lining materials are in compliance with the specifications, codes, and standards referenced herein. The submittals shall include details of all component materials and construction details including complete manufacturer's recommendations for storage procedures and temperature control (step curing temperature/hours at each stage for each section thickness and length) handling, inserting the liner and curing details.

8. BYPASS PUMPING

   The Contractor shall submit bypass pumping plans for review by the Director of Public Works at least 3 working days prior to the work. The Contractor shall notify the Director of Public Works 24 hours prior to commencement of the bypass pumping operation. The Contractor's plan for bypass pumping shall be approved by the Director of Public Works before the Contractor will be allowed to start bypass pumping.

9. CIPP FIELD SAMPLES

   To verify physical properties, the Manufacturer shall submit a minimum of 10 test results from previous field installations of the same resin system and tube materials as proposed for the actual installation. These test results must verify

that the CIPP physical properties specified herein have been achieved in previous field applications.

10. DOCUMENTATION OF LINER INSTALLATION

The Contractor shall submit installation reports for resin impregnation and a curing log of each CIPP (see Section 615.2 J. and K. for details). Installation documentation shall be submitted weekly.

F. MATERIALS

The minimum length of the CIPP shall be that deemed necessary by the Contractor to produce a finished pipe tightly formed to the existing pipe and which effectively spans the distance from the inlet to the outlet of the respective manholes.

The wall color of the interior pipe surface of the pipe after installation shall be a light reflective color so that a clear detail examination with closed circuit television inspection equipment may be made.

1. TUBE

The tube material and design considerations shall meet the requirements of ASTM F1216, Section 5.1. and modified as follows:

a. The tube shall consist of one or more layers of absorbent fabric capable of carrying resin, and capable of withstanding installation pressures and curing temperatures. The tube shall be compatible with the resin system used.

b. The tubes shall have a uniform thickness that, when compressed at installation pressures, will equal the specified nominal tube thickness.

c. The tube shall be fabricated to a size that, when installed, will tightly fit the internal circumference and length of the original pipe. The tube material shall be able to stretch to fit irregular pipe sections and negotiate bends. Allowance should be made for circumferential stretching during inversion.

d. The outside layer of the tube (before inversion) shall be plastic coated with a translucent flexible material that clearly allows inspection of the resin impregnation (wetout) procedure. The plastic coating shall not be subject to delamination after curing. The coating shall be compatible with the resin system used.

e. The tube shall be homogeneous across the entire wall thickness, containing no intermediate or encapsulated elastomeric layers. No

materials shall be included in the tube that are subject to delamination in the CIPP.

f. The wall color of the interior pipe surface of the CIPP after installation shall be white or light brown so that a clear detail examination with closed circuit television inspection equipment may be made.

g. For pull-in methods of lining, the resin soaked felt tube shall have an outer plastic lining that effectively prevents the scrape off or wash off of resin. The outer layer shall have slits cut into the plastic just prior to the pull-in that allow outward migration of resin.

h. The bond between all CIPP layers shall be strong and uniform. All layers, after cure, must form one homogeneous structural pipe wall with no part of the tube left unsaturated by resin. Delaminations in the test samples will be cause for rejection of the line segment rehabilitated. If, in the opinion of the Director of Public Works, the video of the finished liner fails to show similar delamination, then more sampling and retesting of the CIPP liner may be done by the Contractor to verify or refute the previous tests. Costs of the retests shall be the responsibility of the Contractor.

2. RESIN

The resin used shall be a thermoset resin system that is compatible with the CIPP installation. The resin shall be able to cure in the presence of water and the initiation temperature for cure shall be less than 180°F. The resin shall be a corrosion resistant polyester, vinyl ester, or epoxy resin and catallyst system that, when properly cured within the composite liner assembly, meets the requirements of ASTM F1216 and these City Specs.

Thixotropic agents that enable the resin system to possess pseudo plastic fluid flow properties, and that do not interfere with visual inspection, shall be added for viscosity control and to minimize resin washout. Resins may contain pigments that do not interfere with visual inspection of or the physical testing of the CIPP. Filler proprietary materials may be added as long as the final pipe product can meet or exceed the minimum standards set forth in these City Specs.

a. RESIN IMPREGNATION

The tube shall be vacuum-impregnated with resin (wet-out) under controlled conditions. The volume of resin used shall be sufficient to fill all voids in the tube material at nominal thickness and diameter. The volume shall be adjusted by adding excess resin for the change in resin volume due to polymerization, and to allow for any migration of resin into the cracks and joints in the original pipe. A roller system shall be used to uniformly distribute the resin throughout the tube.

Unsaturated areas of the impregnated tube that are to be installed in the host pipe (the downstream turn back and the downtube are excluded) will be cause for rejection. Should the unsaturated section of the tube be noticed before inversion, then the unsaturated area of the tube shall be re-impregnated with resin using methods developed by the Contractor and to the satisfaction of the Engineer.

The Contractor shall designate a location where the CIPP will be vacuum-impregnated prior to installation. The Contractor shall allow the Engineer to inspect the materials and procedures used to vacuum-impregnate the tube.

3. LATERAL LINING

a. LINER ASSEMBLY – The liner assembly shall be continuous, and contiguous, in length and consist of one or more layers of absorbent needle punched felt, circular knit or circular braid that meet the requirements of ASTM F1216 and ASTM D5813 Sections 6 and 8. No intermediate or encapsulated elastomeric layers shall be in the textile that may cause delamination in the CIPP. The textile tube and sheet shall be constructed to withstand installation pressures, have sufficient strength to bridge missing pipe segments, and flexibility to fit irregular pipe sections. The resin saturated textile tube and sheet shall meet ASTM F1216, 7.2 as applicable, and the tube shall have 5% to 10% excess resin distribution (full resin contact with the host pipe) that when compressed and cured will meet or exceed the design thickness.

b. <u>LATERAL LINER TUBE</u> – The exterior of the lateral liner tube shall be laminated with an impermeable, translucent flexible membrane. Longitudinal seams in the tube shall be stitched and thermally sealed. The lateral tube will be continuous in length. The lateral tube will be capable of conforming to offset joints, bends, bells and disfigured pipe sections. For pipe configurations that contain pipe diameter transitions, the transition liner tube must be formed by the manufacturer prior to installation to ensure proper wall thickness per ASTM F1216.

c. <u>BLADDER ASSEMBLY</u> – The liner assembly shall be surrounded by a second impermeable, inflatable, invertible, flexible translucent membrane bladder that will form a liner/bladder assembly. The translucent bladder shall facilitate vacuum impregnation while monitoring the resin saturation process.

d. <u>WATER</u> – Water is only available from select hydrants as identified by the City of Wauwatosa Water Department. See Section 605.1.02(A) for further details.

G. DESIGN CONSIDERATIONS

1. BUCKLING

The Contractor shall be responsible for all aspects of the design of the liner pipe. The Contractor shall guarantee that the installed liner is capable of sustaining outside loads, resisting chemical attack that normally occurs in sanitary and storm sewers, and will maintain hydraulic characteristics over a 50 year design life. No design shall rely on bonding to the existing pipe or rely on the remaining strength of the existing pipe. The minimum acceptable design criteria follows.

The Liner Pipe shall be designed to fit the existing sanitary or storm sewer. Provisions shall be made in the manufacturing process such that the SDR's will be achieved after the pipe has been expanded to the existing pipe.

The existing sewer shall be considered to be in a fully deteriorated gravity pipe condition, and that the original pipe is not structurally sound and cannot support soil and live loads. The CIPP shall be designed to support hydrostatic, soil and live loads. The CIPP liner shall be designed in accordance with ASTM1216, Appendix X1 and the following design conditions:

a. H_w = height of water above top of pipe, ft. (lesser of 12 ft. or exist. cover)

b. H = height of soil above top of pipe, ft. (use maximum existing cover)

c. C = reduction factor for long term effects = 0.50 to 0.66

d. N = factor of safety = 2.0

e. E'_s = modulus of soil reaction, psi = 1,250 psi

f. E_L = long term (50 year) flexural modulus of elasticity (per ASTM D790) = 200,000 psi (minimum)

g. Existing Soil Density, lb./cu.ft. = 130 pcf

h. Live Load, lb./sq.ft. = AASHTO H_{20} Wheel Load of 16,000 lb.

i. Initial Flexural Strength (per ASTM D790) = 4,500 psi

j. Long-Term Flexural Strength (per ASTM D790) = 2,250 psi

k. Minimum ovality of host pipe = 3%

l. Assume no bonding to original pipe.

m. E = initial flexural modulus of elasticity (ASTM D790) = 400,000 psi

NOTE: Flexural modulus has been reduced for long term loading in accordance with the recommendations contained in AASHTO Standard Specifications for Highway Bridges, Section 18, "Soil-Thermo Plastic Pipe

Interaction System." The Director of Public Works has selected this source for 50 year design life. The Contractor may submit other third-party source information for consideration. The Director of Public Works will be the sole judge of the parameters used in design.

EXCLUSIONS: Any layers of the tube that are not saturated with resin prior to the insertion into the existing pipe shall not be included in the structural CIPP wall thickness. No factors of design relating to adhesion to the existing pipe will be allowed in the design.

2. HYDRAULIC CAPACITY

Overall condition of the pipeline system shall be maintained with its hydraulic profile as large as possible. The CIPP shall have a minimum of the full flow capacity of the original pipe before rehabilitation. Offsets of two adjacent pipe sections more than 25% of the diameter of the pipe shall be repaired by grinding and/or straightening the offset to be a usable shape in a manner mutually acceptable between the Contractor and the Director of Public Works.

3. LATERAL TUBES

The CIPP design for the lateral tube shall assume no bonding to the original pipe. The resin saturated lateral tube shall place the resin in full contact with the host pipe. The cured liner shall provide coating on the interior of the sewer mainline or lateral piping for an improved flow rate. The liner shall be smooth and have an average roughness coefficient “n” factor of 0.013 or lower.

H. TESTING REQUIREMENTS

1. CHEMICAL RESISTANCE

The Contractor shall certify that the CIPP meets the chemical resistance requirements of ASTM F1216, Appendix X2. Samples for testing shall be taken of tube and resin system similar to that proposed for actual construction. It is required that samples with and without plastic coating meet these chemical testing requirements.

2. HYDRAULIC CAPACITY

The Contractor shall certify that the CIPP shall have a minimum of the full flow capacity of the original pipe before rehabilitation. Calculated capacities may be derived using a commonly accepted roughness coefficient for the existing pipe material taking into consideration its age and condition. The roughness coefficient of the CIPP shall be verified by third party test data.

3. SAMPLING AND TESTING

The Contractor shall obtain samples and perform the tests as specified in ASTM F 1216 Section 8 to verify that the actual installation meets the required property specifications. Also refer to these City specifications for requirements.

I. INSTALLATION RESPONSIBILITIES FOR INCIDENTAL ITEMS

1. SAFETY

The installer shall carry out his operation in strict accordance with all OSHA and manufacturers' safety requirements. Particular attention is drawn to those safety requirements involving entering confined spaces.

2. TRAFFIC CONTROL

Traffic Control shall be the responsibility of the Contractor and shall conform to MUTCD and other portions of these specifications and the contract Special Provisions. The Contractor shall maintain traffic during working periods. During nonworking periods, the Contractor shall open the entire roadway to traffic.

3. ACCESS

It will be the responsibility of the owner to locate and designate all manhole access points open and accessible for the work, and provide rights of access to these points. If a street must be closed to traffic because of the orientation

of the sewer, the Contractor shall institute the actions necessary to do this for the mutually agreed time period.

4. WATER USAGE

Water is available from specific City hydrants for cleaning, inversion and other work items requiring water. However, the Contractor shall secure permission from the Water Dept. and obtain the necessary permits and pay the fees associated with the permit. Special reference is made to Section 610.1.03A of these City specs.

5. INSPECTION OF PIPELINES

Inspection of pipelines shall be performed by NASSCO PACP certified personnel trained in locating breaks, obstacles and service connections by closed circuit television. The interior of the pipeline shall be carefully inspected to determine the location of any conditions which may prevent proper installation of the impregnated tube including, but not limited to,

protruding taps, collapsed or crushed pipe, and reductions in cross sectional area of more than 20%. Televising and related documetntation shall be per section 614 of these City Specs.

J. INSTALLATION OF CIPP IN MAINLINE SEWERS

1. INSTALLATION

a. The wet out tube shall be inserted through an existing manhole or approved access point by means of an inversion process and the application of a hydrostatic head sufficient to extend it to the next designated manhole or termination point.

b. Tube installation forces or pressures shall be limited so as not to stretch the tube longitudinally by more than 5% of the original length.

c. Before the installation begins, the tube manufacturer shall provide the minimum pressure required to hold the tube tight against the existing conduit, and the maximum allowable pressure so as not to damage the tube. Once the installation has started, the pressure shall be maintained between the minimum and maximum pressures until the installation has been completed.

d. The CIPP liner shall not be installed at a rate over two feet per second as gauged at the point of insertion at the top of the water column.

e. The existing conduit shall be dewatered for any CIPP installation that does not use an inversion method to expand the tube against the pipe wall.

f. For *pull-in methods*, a proofing section shall be pulled through the existing conduit prior to installation. The proofing section shall consist of the materials proposed for rehabilitation. The minimum length of the proofing section shall be 5 feet in length and shall be of like diameter and thickness. If proofing section is damaged, point repairs shall be made to the existing conduit. The proofing process shall be repeated using a new proofing section to verify effective point repairs. Repeat proofing and point repair process until proofing results in no damage to proofing section. Installation of CIPP using pull-in methods can begin after successfully proofing the existing conduit .

g. The standard inversion technique involves the release of any entrapped air or vapor from the turn back end of the uncured CIPP. Typically, this process requires the cutting of the outer plastic lining to allow the air/vapor to escape prior to the submergences of the turn back end of the uncured CIPP. The cuts in the plastic shall be repaired with suitable tape and glue prior to the submergence of the turn back end in the inversion column.

h. The use of a lubricant during inversion is recommended to reduce friction. This lubricant should be poured into the water in the downtube or applied directly to the tube or inflation bladder. Lubricant shall not be used in process where impermeable coatings are perforated prior to tube installation. The lubricant used should be a nontoxic, oil-based product that has no detrimental effects on the tube or boiler and pump system, will not support the growth of bacteria, and will not adversely affect the fluid to be transported.

i. Should and instance arise where two liners are overlaped, the area where they meet shall be sealed with a hydrophilic O-ring or other suitable material approved by the Engineer.

j. The City will entertain proposals for other methods of installation provided the Contractor submits adequate documentation supporting the method. The Director of Public Works will have the final determination of acceptability any installation method. The Contractor shall base his bid on the specified installation methods.

2. CURING

a. After installation is completed, a suitable heat source and water or steam recirculation equipment are required to circulate heated water throughout the pipe. The equipment should be capable of delivering hot water or steam throughout the section to uniformly raise the water temperature above the temperature required to effect a cure of the resin. Water temperature in the line during the cure period should be as recommended by the resin manufacturer.

b. The heat source should be fitted with suitable monitors to gauge the temperature of the incoming and outgoing water supply. Another such gauge should be placed between the impregnated tube and the pipe invert at the termination to determine the temperatures during cure.

c. Initial cure will occur during temperature heat-up and is completed when exposed portions of the new pipe appear to be hard and sound and the remote temperature sensor indicates that the temperature is of a magnitude to realize an exotherm or cure in the resin. After initial cure is reached, the temperature should be raised to the post-cure temperature recommended by the resin manufacturer. The post-cure temperature should be held for a period as recommended by the resin manufacturer, during which time the recirculation of the water and cycling of the boiler to maintain the temperature continues. The curing of the CIPP must take into account the existing pipe material, the resin system, and ground conditions (temperature, moisture level, and thermal conductivity of soil).

3. COOL-DOWN

The CIPP should be cooled to a temperature below 100°F (38°C) before relieving the hydrostatic head. Cool-down may be accomplished by the introduction of cool water into the CIPP to replace water being drained from a small hole made in the downstream end. Care should be taken in the release of the static head so that a vacuum will not be developed that could damage the newly installed pipe.

4. INFLATION BLADDER REMOVAL

For pulled-in place installation techniques where the inflation bladder is designed to not bond to the CIPP, all portions of the bladder material must be removed from the CIPP.

K. INSTALLATION OF CIPP LATERAL LINING

1. EXISTING LATERAL INSPECTION AND PIPE PREPARATION

Inspect lateral prior to lining operations per Section 614 of these City Specs. This initial inspection will determine if the lateral is a candidate for lining rehabilitation. Any issues discovered during this initial investigation that may have an effect on the lining process needs to be discussed with the Engineer to determine how we will proceed. This initial inspection is incidental to the lateral lining bid item.

Cleaning of the lateral in preparation for the lining process is incidental to the lining pay items in this contract. Pipe preparation should be in accordance with manufacturer's specifications to ensure the host pipe is best prepared to

receive the new lateral liner. The lateral shall be cleaned using industry standard cleaning heads, and provide a sufficient cleaned length to ensure existing lateral is prepared for the CIPP lining. It is the responsibility of the Contractor to verify, prior to installation, that all internal debris has been removed from the sewer lateral.

If the lateral has obstructions that the Contractor believes require the use of alternative cleaning and preparation techniques, the Contractor shall notify the Engineer. The Engineer may authorize in writing the use of contingent items for the heavy cleaning of the lateral.

The Contractor is also responsible for contacting the Engineer in case of debris or defects in the mainline sewer that would prohibit the CIPP lining of the specified lateral. The Engineer may authorize in writing the use of

contingent items to perform heavy cleaning of the mainline sewer and/or perform a mainline spot repair.

Inspect and confirm the inside diameter, alignment, length and condition of each lateral to be lined. Field measure lateral diameters, including transitions in lateral diameters, and identify exact locations of fittings and bends. All dimensions shall be field verified by the Contractor prior to delivery of the liner. If unknown physical conditions in the work area that differ materially from those ordinarily encountered are uncovered during the investigation, the Contractor shall notify the Engineer.

If the existing lateral between the mainline sewer and the internal cleanout is found to be damaged through no act of the Contractor, contains an obstruction that cannot be removed by the conventional cleaning equipment, or contains a sag that is unacceptable to the Engineer, submit inspection documentation to the Engineer. The Engineer may authorize the use of contingent bid items to repair the defects in the lateral.

2. RESIN IMPREGNATION

The liner assembly is encapsulated within the translucent bladder (liner/bladder assembly)the entire liner shall be saturated with the resin system (wet-out) under controlled vacuum conditions. The volume of resin used shall be sufficient to fill all voids n the textile lining material at nominal thickness and diameter. The volume shall be adjusted by adding 5-10% excess resin for the change in resin volume due to polymerization and allow for any migration of resin vume due to polymerization and to allow for any migration of resin into the cracks and joints in the original pipe. No dry or unsaturated area in the lateral tube shall be acceptable upon visual inspection. The Contractor shall complete a wet-out process control sheet for every lining completed. The control sheets shall provide, at a minimum, the following information:

- Liner Manufacturer
- Liner Diameter
- Number of Layers
- Resin Amount
- Resin Type
- Resin Manufacturer
- Batch Number (Resin)
- Hardener Name
- Batch Number (Hardener)
- Mixing Ratios
- Vacuum Pressure of Impregnation Process
- Wet-Out Start Time and Date

3. LINER INSERTION

The lateral tube and inversion bladder shall be inserted into the launching device. The launching device is inserted into the pipe and pulled to the point of repair. The pull is complete when the lateral tube is exactly aligned with the lateral pipe connection. The lateral tube is completely protected during the pull. The liner assembly shall not be contaminated or diluted by exposure to dirt or debris during the pull.

4. CURING

After insertion is complete, apply a suitable recirculation system capable delivering air, steam, or water, as required by the liner system manufacturer (or ambient temperature curing), uniformly throughout the section to achieve a consistent cure of the resin. Maintain the curing temperature as recommended by the liner system manufacturer. Prevent excessive temperatures that could scald or bubble the liner.

a. WATER INVERSION PROCESS – If water is used to accomplish the inversion process, the Contractor shall complete an installation process control sheet for every lining completed. The control sheets shall provide the following information:

- Liner Length
- Hydrostatic Head at Point of Inversion
- Hydrostatic Head at Termination Point
- Time When Inversion Process Starts
- Time When Curing Begins and Ends

b. AIR INVERSION PROCESS – If air is used in the inversion process, liner manufacturer shall provide the minimum pressure required to hold the tube tightly against the host pipe, and the maximum pressure allowable to not damage the tube. Once the inversion has started, the pressure shall be maintained between the recommended pressure ranges until the inversion has been completed. Should the pressure deviate from within this range, the installed liner shall be removed. The Contractor shall complete an installation process control sheet for every lining completed. The control sheets shall provide the following information:

- Liner Length
- Minimum Pressure
- Maximum Pressure
- Time and Pressure When Inversion Process Started (and every 10 minutes until inversion process completes)
- Time When Curing Begins and Ends

5. COOL-DOWN

The CIPP shall be cooled to a temperature below 100°F (38°C) before relieving the hydrostatic head. Cool-down may be accomplished by the introduction of cool water into the CIPP to replace water being drained from a small hole made in the downstream end. Care shall be taken in the release of the static head so a vacuum will not be developed, which could damage the newly installed pipe.

6. REMOVAL

After the curing process is complete, the Contractor shall remove all installation and curing equipment from the host pipe. No material other than the cured CIPP shall remain in the host pipe. Remove any excess liner material protruding into the sewer main or manhole by remote robotic cutting equipment, or manual means, in accordance with the manufacturer's instructions. Provide a finished CIPP that is continuous and as free as commercially practicable of visual defects, including but not limited to foreign inclusions, dry spots, pinholes, delamination, and wrinkles in any location in excess of 5% of the host pipe's inside diameter.

L. REINSTATEMENT OF BRANCH CONNECTIONS

After the pipe has been relined and tested (refer to Section 610.3.06.K) only existing active service connections as shown on the plans shall be reconnected. The reconnection of services shall be done without excavation, unless otherwise specified by Owner; this will be accomplished from the interior of the pipeline by a television camera directed cutting device. The location of the service shall be made by inspection of the preconstruction TV tape and other proven detection

methods. The Contractor shall remove and dispose of any pieces or shavings of the liner that result from the opening of the service connection.

All recut service connection shall be brushed smooth and free of burrs and frayed edges, or any restriction preventing free wastewater flow and shall be reinstated to 90% of the original opening. Overcutting of the opening will be cause for rejection. In the event of overcutting or other defect, the Contractor shall either make an open cut saddle type point repair or use an approved method of short-lining of the service that overlaps the overcut or defective portion of the sewer liner.

M. ANNULAR SEAL AT MANHOLES

All manhole to CIPP seals shall be of the hydrophilic elastomer type capable of forming a watertight seal in the presence of water that will fill the annular space without gaps. The material used shall be either Hydrotite or an approved equal.

N. TESTING

1. For each inversion length designated by the Engineer in the contract documents or purchase order, one CIPP sample shall be cut from a section of cured CIPP at an intermediate manhole or at the termination point that has been inverted through a like diameter pipe which has been held in place by a suitable heat sink, such as sandbags. (Note: In areas with limited space and larger diameter pipes, other sampling techniques may be required). In pipes greater than 18-inches in diameter, other sampling and curing techniques may be required. All samples shall be labeled before shipment to the testing laboratory and a duplicate sample shall be provided to the Engineer.

2. The sample should be large enough to provide a minimum of three specimens and a recommended five specimens for flexural testing and also for tensile testing, if applicable. The full CIPP sample wall thickness shall be tested, whenever possible. If the sample is irregular, distorted, or of such thickness that proper testing is inhibited, then the wall thickness shall be machined away from the inside pipe face of the sample only. Thus, the test specimen shall be cut from the outside pipe face of the CIPP sample. For specimens greater than 1/2 inch (12.70 mm) depth, the width-to-depth ratio of the specimen shall be increased to a minimum of 1:1 and shall not exceed 4:1. Test specimens shall be oriented on the testing machine with the interior surface of the CIPP in tension. The following test procedures should be followed after the sample is cured and removed.

    a. FLEXURAL (BENDING) PROPERTIES – The initial tangent flexural modulus of elasticity and flexural stress should be measured for gravity and pressure pipe applications in accordance with Test Method D 790, Test Method I Procedure A, and should meet the requirements of these City Specs.

    b. TENSILE PROPERTIES – The tensile strength should be measured for pressure pipe applications in accordance with Test Method D 638 and must meet the requirements of these City Specs.

3. GRAVITY PIPE LEAKAGE TESTING

Leakage testing of the CIPP shall be conducted after cure and prior to the reinstatement of laterals while under hydrostatic pressure. The downstream (turn back) end of the liner pipe shall be cut out to within two inches of the manhole wall. A standard inflatable sewer plug shall be inserted into the liner pipe and inflated to a pressure that will withstand the static head provided by the water filled down tube. The liner pipe shall then be refilled with water. The water level of the downtube will be observed for five minutes by the Engineer or their representative. The change in water elevation, if any, will be noted, the water loss rate calculated and compared to the acceptable leakage standard for new pipes. The test results shall be judged against the exfiltration limits shown in Table 5 of Section 3.7.2 of the Standard Specs and in general conformance with Section 3.7.4.

4. DELAMINATION TEST

For all CIPP products, a delamination test should be performed on each installation length. The sample shall be fabricated from material taken from the tube and the resin/catalyst system used and cured in a clamped mold placed in the downtube. Delamination testing shall be in accordance with ASTM D 903 with the following exceptions:

a. The rate of travel of the power-actuated grip shall be 1 inch (25 mm)/minute.

b. Five test specimens shall be tested for each inversion specified.

c. The thickness of the test specimen shall be minimized but should be sufficient to adequately test delamination of nonhomogeneous CIPP layers.

d. The peel or stripping strength between any nonhomogeneous layers of the CIPP laminate should be a minimum of 10 lb/in. (178.60 g/mm) of width for typical CIPP applications.

O. INSPECTION & ACCEPTANCE

After all testing and work is completed, the contractor shall internally inspect the CIPP installation by closed circuit television and provide the City with video showing the completed work including the restored conditions. The connections and seals at manholes shall be visually inspected.

1. The relining pipe shall be continuous, without joints over the entire length of the pipe. The liner shall be free of all visual and material defects except those resulting from pre-lined conditions (such conditions shall be brought to the attention of the owner prior to relining). There shall be no pits, pinholes, cracks or crazing, lifts, dry spots or delamination. The surface shall be smooth and free of waviness throughout the pipe.

   Any defects or unacceptable liner determined by the television inspection, test reports for structural values or thickness that will affect the structural integrity of the reconstructed pipe shall be repaired or the Liner replaced at the Contractor's expense. The methods and materials used for the repair or replacement of the failed liner shall be reviewed by the Director of Public Works.

2. WRINKLES

   Wrinkles in the finished liner pipe that are larger than 5 percent of the pipe diameter are unacceptable and shall be removed and repaired by the Contractor at the Contractor’s expense.

3. ANNULAR VOID

   It is the City’s responsibility to demonstrate that a void between the liner pipe and the host pipe wall exists. If so shown, the Contractor shall either devise a method to grout the void to the satisfaction of the Engineer of repair or replace that section of pipe at the Contractor’s expense. Methods of repair shall be proposed by the Contractor and submitted to the Engineer for review. The City may demonstrate the existence of the void by dye water flooding of the upstream manhole and viewing the downstream pipe annular space for tracking. Annular voids shall be considered nonconforming work.

4. CIPP samples shall be prepared and tested in accordance with ASTM F1216, Section 8.1 using either method proposed.

5. Visual inspection of the CIPP shall be in accordance with ASTM F1216, Section 8.4.

6. THIRD PARTY TESTING

   All material testing referred to in this contract specification shall be done by an accredited Third Party testing laboratories. The Contractor shall inform the Engineer at the preconstruction meeting of the laboratory that the Contractor intends to use for the tests. All costs for the testing shall be included in the contract unit prices for the relining work.

7. DIGITAL MEDIA AND WRITTEN REPORTS

The Contractor shall perform pre-installation and post-installation inspections of the pipeline by means of remote controlled closed circuit television in accordance with Section 614 of these City Specs. These inspections shall be recorded on an external USB hard drive. The Contractor shall document these inspections in writing and submit all written reports and video to the Engineer. This work shall be considered incidental to any lining or grouting, except where called out as a separate bid item in the contract documents.

Pre-installation inspection of any pipe run shall be performed not more than 3 calendar days before the start of the lining of that pipe run. If the pre-installation inspection reveals any deficiencies in the cleaning or removal of obstructions, the deficiencies shall be corrected and the pre-installation inspection shall be performed again at no additional cost to the City.

The Contractor shall also submit a written report of the sanitary sewer cleaning. This report shall identify the sewer segments cleaned and the type and volume of debris removed from those sanitary sewers.

8. CIPP LATERAL ACCEPTANCE

All CIPP shall be continuous in length and wall thickness shall be uniform. Installed thickness of the CIPP lateral liner shall be within minus 10 percent and plus 15 percent of the design. The Contractor shall take into account any necessary allowance for longitudinal and circumferential expansion when sizing and installing the liner. The contact tolerance is 1.0 mm. Where any space or gap between the outside surface of the liner and the inside surface of the existing pipe exceeds 1.0 mm, the liner fit will be deemed deficient and corrective action will be required.

Where irregularities of the existing pipe exists such as offset joints, protrusions, bumps, and deformations, and the irregularities remain after the sewer has been prepared in accordance with the Contract Documents, exception to the contact tolerance will be allowed in the irregularity zone at the discretion of the Engineer. The exception shall not present an obstruction to sewage flow.

Acceptance of the CIPP lateral liner will be based on the Engineer's evaluation of the resin impregnation quality control reports, CIPP temperature curing logs, and post construction inspection video, which shall demonstrate:

a. Observed infiltration of the liner is zero
b. All active service connections are open, clear and watertight.
c. There is no evidence of excessive wrinkles, cracks, lifts, scalds, blisters, or delamination in the CIPP.

If any defective CIPP is discovered after it has been installed, it shall be removed and replaced with either a sound liner or a new lateral at no additional cost to the City. Obtain approval of the Engineer for method of repair, which may require field or workshop demonstration.

P. CLEANUP

After the installation work has been completed and all testing acceptable, the Contractor shall clean up the entire project area and return the ground cover to grade. All excess material and debris not incorporated into the permanent installation shall be disposed of by the Contractor. Sidewalk, driveway, street surfaces and lawn areas shall be restored to its preconstruction condition at the Contractor's expense.

615.2.1 – LATERAL LINING SYSTEM

A. GENERAL

These specifications include the minimum requirements for the rehabilitation of lateral connections and their interface with the mainline pipes via CIPP, as shown on the plans and included in the contract documents. The length and type of CIPP installed shall be as specified in the contract documents or as directed by the Engineer.

Lateral CIPP shall be installed from the mainline pipe and extending to the specified length as shown or stated in the contract documents, or as directed by the Engineer. Cleanouts are required where shown on the plans. The installed lateral CIPP system shall be free of all defects that will affect the design, service life, and operation of the lateral interface with the mainline sewer and the specified length of the lateral pipe.

The liner may be inverted or pulled into place from the mainline sewer.

The installed system shall eliminate water leakage into the sewer system over the entire rehabilitated length of sewer.

The prices submitted by the Contractor shall include all costs fot he various bid items necessary for furnishing and installing, complete and in place, the system in accordance with these specifications, except as otherwise directed by the Engineer.

The furnished and installed system shall include all materials, manufacturer’s recommended equipment, and manufacturer’s installation procedures.

The installed system shall be free of all defects that will affect the design, service life, and operation of the lateral and applicable portion of the mainline. The installed system shall eliminate infiltration and exfiltration over the entire length of the system.

The system shall be designed against corrosion and typical chemicals found in domestic sewage or as directed by the Engineer. The manufacturer of the system shall provide testing data that supports the chemical resistance in accordance with ASTM F1216.

The mainline and lateral portion of the system shall be designed to support groundwater loads and structurally replace the host pipe completely. Wall thickness design calculations stamped by a registered professional engineer shall be included with the Contractor's submittals. All design must be supported by third party testing and documentation for the exact product being submitted.

All materials furnished as part of this contract shall be marked with detailed product information, which shall be made available to the Engineer at their request, including any Manufacturer's testing data.

See Section 615.1 of these City Specs for requirements of bypass pumping and other general construction requirements.

B. SUBMITTALS

Product data submittals required for all rehabilitation lateral lining systems proposed for installation under this contract shall include:

- System material type and manufacturer to be used, including catalog data sheets, ASTM references, material composition, manufacturer's recommended specifications, component physical properties, and chemical resistance.
- Manufacturer's detail description of the recommended procedures for handling and storing materials.
- All quality assurance documentation and test reports for the system materials, and testing results of the physical properties, corrosion resistance, and sealing method.
- CIPP wall thickness design calculations based on ASTM F1216, stamped by a registered professional engineer.
- Wetout/cure logs per liner providing details pertaining to the resin type and quantity, catalyst type and quantity, tube type, installation pressures, temperatures and times (as applicable to the curing lateral lining system utilized).
- Qualifications of the Contractor installing the system.

C. QUALITY CONTROL PLAN

A detailed quality control plan (QCP) shall be submitted to the Engineer that fully represents and conforms to these specifications. At a minimum, the QCP shall include the following:

- How the system is prepared for installation
- How the system is installed
- How the completed system is confirmed to be in compliance with the requirements of the contract documents
- Training/Qualifications of personnel preparing and installing the system

Proposed procedures for quality control, product sampling, and testing shall be defined. Proposed methods and procedures for system repair and replacement in the events of product defects or failure shall also be included.

The Contractor shall not receive any additional compensation for the repair or replacement of a system deemed non-conforming to these contract documents by the Engineer.

D. SAFETY

The Contractor shall conform to all work safety requirements of pertinent regulatory agencies, and shall secure the site for working conditions in compliance with those requirements, including confined space entry. This includes the posting of such signs and/or other devices as are necessary for the safety of the work site for both the Contractor and the Public.

E. WARRANTY

All lateral lining work shall be guaranteed for a period of 3 years from the date of substantial completion granted in writing by the Engineer unless otherwise stipulated in writing by the City. During this period, the Engineer reserves the right to inspect and/or test, at their own expense, any and all work performed as part of this contract. Any actionable defects documented during this period by the Engineer shall be repaired or replaced by the Contractor at no additional cost to the City. The Engineer shall have until the end of the warranty period to report the findings of their inspection(s) and/or testing to the Contractor, and the Engineer shall negotiate a reasonable repair schedule for any actionable items found. The warranty shall cover lining repair due to hydrostatic leaks (infiltration) as defined per NASSCO PACP infiltration definitions, and any other work directed by the Engineer to make the finished product meet these specification requirements.

F. MATERIALS

1. GENERAL

“Top-Hat” style liner systems shall NOT be allowed under these specifications without the express written permission of the Engineer.

The system seals the point of connection from the mainline pipe to a connecting lateral pipeline and is normally installed without excavation by the installation of resin-impregnated, flexible laminate installed into the existing service lateral, lapping over the mainline pipe, and sealing the connection.

The portion of the system installed over the mainline pipe shall, at a minimum, extend from one end of the wye fitting to the other, and shall encompass the entire cross section of the pipe, from 12 o’clock to 12 o’clock (“full wrap”). For other lateral connection fitting types, including break-ins, the mainline portion of the system shall extend a minimum of 1-foot in each direction, measured from the center of the lateral pipe, and shall also encompass the entire cross section of the mainline pipe from 12 o’clock to 12 o’clock (“full wrap”).

The distance the lateral system extends up the lateral shall be as noted in the contract documents or as directed by the Engineer. The system shall extend continuously from the sewer main into the lateral and up the lateral to the designated length. The system shall be capable of sealing lateral connections of various types and angles. The resin shall be cured to for the tube into a hard, impermeable pipe-within-a-pipe.

When cured, the system shall seal the connection of the lateral to the mainline in a continuous, tight fitting, watertight pipe-within-a-pipe to eliminate any visible leakage between the lateral and mainline, and shall provide a leak-proof seal to prevent root intrusion, infiltration, and exfiltration between the liner and host pipe.

Systems that use polyester and vinylester resins shall include a method of sealing the connection and the end of the lateral liner as recommended by the manufacturer of the system. The product used in the sealing method shall be installed in accordance with manufacturer’s recommendations.

Systems that use silicate or epoxy shall prepare the host pipe in accordance with the manufacturer’s recommendations. Third party testing data shall be provided to prove the bond strength between the resin and surface to which it is to bond.

The installation of the system will require the product to be capable of being installed without access to the upstream side of the lateral pipe, and capable of navigating bends or other transitions in the lateral.

2. REFERENCES

ASTM F1216 – Standard practice for rehabilitation of existing pipelines and conduits by the inversion and curing of a resin-impregnated tube.

ASTM F1743 – Standard practice for rehabilitation of existing pipelines and conduits by pulled-in-place installation of cured in place thermosetting resin pipe.

ASTM D543 – Practices for evaluating the resistance of plastics to chemical reagents.

ASTM D790 – Test methods for flexural properties of unreinforced and reinforced plastics and electrical insulating materials.

ASTM D5813 – Specification for cured in place thermosetting resin sewer piping systems

ASTM F2019 – Standard practice for rehabilitation of existing pipelines and conduits by the pulled in place installation of glass reinforced plastic (GRP) cured in place thermosetting resin pipe.

NASSCO Guideline Specification for the installation of cured in place pipe (June 2011)

NASSCO Guideline Specifications for cleaning and televising pipelines

3. MATERIAL TYPES

a. Non-Woven Fabric Tube

The fabric tube shall consist of one or more layers of absorbent non-woven felt fabric, felt/fiberglass or fiberglass and meet the requirements of ASTM F1216, ASTM F1743, ASTM D5813, and ASTM F2019. The fabric tube shall be capable of absorbing and curing temperatures and have sufficient strength to bridge missing pipe segments, and stretch to fit irregular pipe sections.

The wet-out fabric tube shall have a uniform thickness and excess resin distribution that when compressed at installation pressures will meet or exceed the design thickness after cure.

The fabric tube shall be manufactured to a size that when installed will tightly fit the internal circumference, meeting applicable ASTM standards or better, of the original pipe or the existing lined pipe. Allowance shall be made for circumferential stretching during installation. The tube shall be properly sized to the diameter of the existing pipe and the length to be rehabilitated and be able to stretch to fit irregular pipe sections and negotiate bends. The Contractor shall determine the minimum tube length necessary to effectively span the designated run. The Contractor shall verify the lengths in the field prior to ordering and prior to impregnation of the tube with resin, to ensure that the tube will have sufficient length to extend the entire length of the run. The contractor shall also measure the inside diameter of the existing pipelines in the field prior to ordering liner so the liner can be installed in a tight-fitted condition.

The outside and/or inside layer of the fabric tube (before installation) shall be coated with an impermeable, flexible membrane that will contain the resin and facilitate vacuum impregnation and monitoring of the resin saturation during the resin impregnation (wetout) procedure.

No material shall be included in the fabric tube that may cause de-lamination in the cured CIPP. No dry or unsaturated layers shall be acceptable up on visual inspection as evident by color contrast between the tube fabric and the activated resin containing a colorant.

The wall color of the interior pipe surface CIPP after installation shall be a light reflective color so that a clear, detailed examination with closed circuit television inspection equipment may be made. The huge of the color shall be dark enough to distinguish a contrast between the fully resin saturated felt fabric and dry or resin lean areas.

Seams in the fabric tube, if applicable, shall meet the requirements of ASTM D5813 H.

The outside of the fabric tube shall be marked with the name of the manufacturer of the CIPP lateral lining system, manufacturing lot and/or production footage, as applicable. The print must be visible during final CCTV inspection.

The minimum length of the fabric tube shall be that deemed necessary by the installer to effectively span the distance specified in the contract documents or as directed by the Engineer.

The nominal fabric tube wall thickness shall be of a dimension to provide a watertight CIPP and a complete structural replacement for the host pipe, without causing an unreasonable reduction in cross section size.

The liner shall be constructed with transitions where applicable.

b. Resin

Theresin shall be corrosion resistant polyester, vinylester, silicate, or epoxy resin and catalyst system and hardener system that, when properly cured within the tube composite, meets the requirements of ASTM F1216, ASTM F1743 or F2019, the physical properties herein, and those, which are to be utilized in the design of the CIPP for this project. The resin shall produce CIPP which will comply with or exceed the structural and chemical resistance requirements of these specifications.

The method of cure may either be from a manufacturer recommended heat source or UV light cure. Method of cure instructions along with a cure log shall be on site at all times.

The resin to tube ratio, by volume, shall be furnished as recommended by the manufacturer.

c. Structural Requirements

The physical properties and characteristics of the finished liner will vary considerably, depending on the types of resin and tube used. It shall be the responsibility of the Contractor to provide a CIPP lateral lining system which meets or exceeds the minimum properties specified herein.

The CIPP shall be designed per ASTM F1216. The CIPP design shall assume no bonding to the original pipe wall

The lateral CIPP shall be designed assuming the following minimum design data, unless otherwise directed by the Engineer:

- Factor of Safety = 2
- Soil Modulus = 1,000 psi
- Soil Density = 120 pcf
- Live Load = H20
- Depth of Cover = as specified
- Groundwater = ½ depth of cover
- Ovality = 2%

The designer of the CIPP system shall set the long term (50 year extrapolated) Creep Retention Factor at 50% of the inidial design flexural modulus as determined by ASTM D-790 test method. This value shall be used unless the Contractor submits long term test data (ASTM D 2990) to substantiate a different retention factor.

The CIPP shall, at a minimum, meet or exceed the structural properties, as listed below:

- Flexural modulus of elasticity: 250,000 psi
- Flexural strength: 4,500 psi

The structural performance of the finished pipe shall be adequate to accommodate all anticipated loads throughout its design life. No CIPP rehabilitation technology will be allowed that requires bonding to the existing pipe for any part of its structural strength.

G. EXECUTION OF LATERAL SEALS

1. GENERAL

Lateral seals shall be installed from the mainline sewer with the lateral CIPP portion that extends up the lateral at the distance specified in the contract documents or as directed by the Engineer. If a clean out is required for installation, the type and location shall be as directed by the Engineer.

2. PREPARATION

Preparation, cleaning, inspection, sewage bypassing, and public notification shall be the responsibility of the Contractor. The Contractor shall clean the interior of the existing host pipe prior to installation of the system. All debris and obstructions that will affect the installation and the final product shall be removed and disposed of off site. All preparation shall be in accordance with the manufacturer’s written installation procedures.

The system shall be constructed of materials and methods that, when installed, shall provide a jointless and continuous, structurally sound CIPP able to withstand all imposed static and dynamic loads on a long term basis.

The Contractor shall only use existing manholes as access points unless given the express written permission of the Engineer, or as shown on the plans.

a. Pre-Cleaning CCTV

If a cross-bore is found, the Contractor shall, at their own expense, request utility locating to identify the cross-bore. Prior to cleaning, the Contractor shall, to all extents possible, televise the service lateral to confirm that cleaning the lateral will not damage or breach a conflicting utility bored through the sewer lateral.

b. Cleaning of Pipe Lines

The Contractor shall remove all internal debris from the pipe line that will interfere with the installation and the final product delivery of the system as required in these specifications. The Contractor shall make use of commercially available industry standard cleaning equipment to prepare the pipe for system installation. Solid debris and deposits shall be removed from the pipeline, if possible, and disposed of properly by the Contractor, in accordance with all federal, state, and local laws. Precaution shall be taken by the Contractor in the use of cleaning equipment to avoid damage to the existing pipe. If the pipe cannot be cleaned sufficiently using industry standard cleaning equipment, the Contractor shall not continue cleaning efforts without the express written permission of the Engineer.

c. Post-Cleaning CCTV

Contractor shall perform post-cleaning video inspections of the pipe(s). Only PACP certified personnel trained in locating breaks, obstacles, and service connections by CCTV shall perform the inspection. The Contractor shall provide the Engineer a copy of the pre- and post-cleaning video and reports as part of the project deliverables.

d. Existing Sewage Flows

If ordinary bypass operations will not suffice for installation, the Contractor, at their own expense, shall contact and work with the property owner and/or upstream property owner(s) to create a plan for reducing water/wastewater use in order to allow for successful installation. Interruptions to flow shall be coordinated with the property owner(s) no fewer than 7 calendar days in advance, and the Contractor shall notify the Engineer of all such plans immediately.

e. Bypass Existing Sewage Flows

The Contractor shall, at their own expense, be responsible for the creation, execution, and management of a bypass plan to allow for proper and successful installation of the lateral CIPP system. See Section 615.1 of these City Specs for further bypassing requirements.

f. Line Obstructions

Contractor, at their own expense, shall be responsible for clearing the line(s) of obstructions which will interfere with the installation and long-term performance of the CIPP system. If pre-installation inspection reveals defects which will not allow for proper CIPP installation and which cannot be rectified with trenchless means, the Contractor shall immediately notify the Engineer of the issues. The Contractor shall NOT perform any open-cut repairs without the express written permission of the Engineer.

g. Locating
The Contractor shall be responsible for confirming the locations of all branch service connections prior to installing and curing the CIPP. Each connection shall be dye tested at the Contractor's expense to determine whether the connection(s) is active or abandoned. Abandoned connections shall be lined through and not reinstated. In the event the status of a service connection cannot be adequately verified through dye testing or televising, the connection shall be reinstated unless otherwise directed in writing by the Engineer.

3. INSTALLATION

The entire liner shall be wetout using vacuum impregnation, including the lateral and mainline portions. A roller table shall also be used for the installation process.

The System shall be loaded inside and/or on a pressure apparatus. The pressure apparatus, attached to a robotic device, shall be positions in the mainline pipe at the service connection. The robotic device, together with a CCTV camera, shall be used to align the lateral portion of the system with the service connection opening. Air pressure, supplied to the pressure apparatus through an air hose, shall be used to invert or expand the resin impregnated CIPP into the lateral pipe, and push the mainline portion of the system against the mainline pipe. The pressure shall be adjusted to the manufacturer's recommended installation pressure to fully install the CIPP into the lateral pipe and hold the system tight to the pipe walls. Care shall be taken during the curing process not to over-stress the tube.

After lateral CIPP installation is completed, the manufacturer's recommended pressure is maintained on the impregnated CIPP for the duration of the curing process. Curing method shall be compatible with the resin selected and shall be in accordance with the manufacturer's recommendations. The initial cure shall be deemed complete when the CIPP has been exposed to the cure source for the time period specified by the manufacturer.

The Contractor shall cool (as applicable) the hardened CIPP before relieving the pressure in the apparatus. Cool-down may be accomplished by the introduction of cool air into the pressure apparatus. Care shall be taken to maintain proper pressure throughout the cure and cool-down period.

If cured by the ambient-cure process, the Contractor shall maintain bladder pressure until the CIPP has completely cured per the manufacturer's recommendations before relieving the pressure in the pressure apparatus.

The finished CIPP shall be free of dry spots, lifts, and de-lamination. The system shall not inhibit the CCTV post lining video inspection of the mainline or service lateral pipes. Frayed ends of the system shall be removed prior to acceptance.

The Contractor shall maintain a visible, written log of all activities in accordance with manufacturer's recommendations, and shall include time/location of wetout, time of insertion, time/location of lateral insertion, bladder pressure requiremetns, required cure time, actual cure time, and cool down duration.

After the work is complete the Contractor shall provide the Engineer with videos and reports showing pre- and post-lining inspections.

4. FINISH

The installed system shall be continuous over the specified length of the sewer line section (including mainline and lateral), and be free from visual defects such as foreign inclusions, dry spots, pinholes, major wrinkles, and de-lamination. The system shall be impervious and free of any leakage from the pipe to the surrounding ground or from the ground to inside the lined pipe.

Any defect, which will or could affect the structural integrity or strength of th system or allow leaks, shall be repaired by the Contractor at their expense.

The system shall provide a watertight seal at the connection to the mainline pipe and for the length of the lateral which was CIPP lined. The following methods are recommended for ensuring a watertight seal:

- 100% Solids Epoxy providing an adhesive bond between the system and the host pipe, installed/applied per the manufacturer's recommendations
- Hydrophilic materials installed/applied per the manufacturer's recommendations

Branch lateral connections or any other pre-existing connection to the service lateral shall be reinstated by a remote controlled robotoic cutting device, either from within the pipeline or externally through a cleanout (where applicable). The reinstated connection shall be brushed to allow for a smooth edge.

The Engineer reserves the right to request CIPP samples for third party materials testing of the physical properties, through the entire duration of the warranty period. Samples shall be furnished at the Contractor's expense, and testing shall be carried out at the Engineer's expense.

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SECTION 615.3 – LINING OF MANHOLES

615.3 – MANHOLE RELINING

A. GENERAL

This specification shall govern all labor, materials, equipment and appliances necessary for the sanitary sewer manhole interior rehabilitation for the purpose of eliminating infiltration and inflow, providing corrosion protection, repair of cracks and voids and restoration of the structural integrity of the manhole as a result to the application of a monolithic fiber-reinforced structural/structurally enhanced cementitious liner to the wall and bench surfaces of concrete, block, brick, or any other masonry construction material.

B. REFERENCES

1. ASTM C78 – Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading).

2. ASTM C109 – Compressive Strength of Hydraulic Cement Mortars (Using 2-inch Cube Specimens).

3. ASTM C321 – Bond Strength of Chemical – Resistant Mortars.

4. ASTM C496 – Splitting Tensile Strength of Cylindrical Concrete Specimens.

5. ASTM C596 – Drying Shrinkage of Mortar Containing Hydraulic Cement.

6. ASTM C952 – Bond Strength of Mortar to Masonry Units.

C. SUBMITTALS

Submit manufacturer's material data and application and installation instructions for all products used.

Provide documentation that the proposed manhole rehabilitation process has a minimum 5-year history for reconstruction of sanitary sewer manholes on projects of similar size and scope.

D. QUALITY ASSURANCE

Use, mix, apply, and cure all products in accordance with the manufacturer's recommendations and instructions.

Provide recommended daily or lot test specimens for compressive strength and other testing per applicable ASTM standards.

E. MATERIALS

1. PATCHING MATERIAL

A quick setting, fiber-reinforced, high early strength, corrosion resistant, hand mixed and hand applied calcium aluminate based, cementitious material for patching and filling voids and cracks.

Material shall have the following minimum requirements:

Compressive Strength	ASTM C-109	6 hr 1,400 psi
Shrinkage	ASTM C-596	0% at 90% R.H.
Bond	ASTM C-321	28 day 150 psi
Cement		Sulfate resistant
Density, when applied		105 ± pcf

2. INFILTRATION CONTROL MATERIAL

A rapid-setting high early strength, hand-applied cementitious product specifically formulated for infiltration control and making repairs to concrete, block, brick, or other masonry structures.

Material shall have the following minimum requirements:

Compressive Strength	ASTM C-109	1hr 600 psi
Compressive Strength	ASTM C-109	24hr 1,800 psi
Bond	ASTM C-321	1hr 30 psi
Bond	ASTM C-321	24hr 80 psi

3. GROUTING MATERIAL

A rapid setting cementitious grout specifically formulated for stopping very active infiltration and filling voids.

A rapid setting chemical grout specifically formulated for stopping very active infiltration.

4. LINER MATERIAL

Material shall be Strong Seal MS-2A or approved equal.

A corrosion resistant, fiber-reinforced, cementitious liner material shall be wet mixed and low-pressure spray applied to form the structural/structurally enhanced monolithic, cementitious liner covering all interior manhole surfaces.
Material shall be pre-mixed and specially formulated to withstand abrasion in sewer networks. Mortar shall be made with Type I or Type III Portland cement. Material shall be sulfate resistant and suitable for application in environments with pH level 3.0 or higher.

Material shall have the following minimum requirements at 28 days:

Compressive Strength	ASTM C-109	9,000 psi
Tensile Strength	ASTM C-496	900 psi
Flexural Strength	ASTM C-78	1,400 psi
Shrinkage	ASTM C-596	0% at 90% R.H.
Bond	ASTM C-952	2,000 psi
Density, when applied		130±5 pcf

5. BONDING COMPOUND

Material shall be a modified cementitious bonding compound material that protects exposed reinforcement steel and enhances bond of overlay to substrate.

6. WATER

Water shall be clean and potable.

F. EXECUTION

1. MANHOLE AND MANHOLE INTERIOR SURFACE PREPARATION

Prepare surfaces in accordance with manufacturer’s instruction and recommendations.

a. Place covers over sewer inverts to prevent extraneous material from entering the sewer lines.

b. Remove foreign, loose and unsound concrete and masonry material from the interior surfaces of the manhole by means of high-pressure (1,500 psi minimum) water spray.

c. Loose, unsound, and protruding concrete and masonry material not able to be removed by high pressure water spray may require the use of mason's or mechanical tools for removal.

d. Clean the interior surfaces of the manhole with high-pressure (1,500 psi minimum) water spray, using detergent, muriatic acid, antibacterial agent, or other chemicals to remove grease, oil, and other contaminants that would prevent good bond between the existing manhole interior surface and the liner material.

e. Active hydrostatic leaks (infiltration) shall be stopped using the rapid-setting, specially formulated infiltration control material.

f. Very active hydrostatic leaks (infiltration) shall be stopped using one of the rapid-setting grouting materials specially formulated for control of very active infiltration.

g. Clean and prepare exposed reinforcement steel, and apply and cure bonding compound material, in accordance with the product manufacturer's instructions and recommendations.

h. Prepare cracks and voids to be patched and filled, and apply and cure patching material, in accordance with the product manufacturer's instructions and recommendations.

i. Prepare, clean, and repair manhole

2. LINER APPLICATION, CURING, AND TESTING

Prepare manhole surfaces, wet batch-mix liner material, low pressure spray apply liner mix to manhole wall and bench surfaces and allow liner to cure in accordance with the product manufacturer's instructions and recommendations.

Liner application shall be ½ inch minimum thickness. The application shall be completed with a minimum of two coats. The first coat shall be applied at a thickness adequate to cover the substrate and be troweled to compact the material into voids and set the bond. The second coat shall be applied to ensure complete coverage at the specified ½ inch minimum thickness.

Inverts shall be lined with patching mix, trowel applied in one coat to ½ inch minimum thickness.

Prepare, label, and submit recommended daily or per lot test specimens for testing.

3. CLEANING

Protect upstream and downstream sewers from excess chemical grout and other construction debris. Clean manhole interiors and remove all construction-related materials, equipment, and appliances from the manholes prior to reinstatement of the manholes to service.

4. ACCEPTANCE TESTING

Upon completion of liner application, curing and cleaning, all manholes shall be visually inspected by Contractor in presence of Owner's Representative.

Visual inspection shall determine if the manhole is free from leaks and defects.

Any leak or defect shall be corrected by the Contractor at no additional cost to Owner.

5. WARRANTY

All lining work shall be guaranteed for a period of 1 year from the date of substantial completion granted in writing by the Engineer unless otherwise stipulated in writing by the City. During this period, all defects discovered by the City shall be removed and replaced by the Contractor in a satisfactory manner at no cost to the City. The City may conduct independent inspections, at its own expense, of the lining work at any time prior to the completion of the warranty period. The warranty shall cover liner repair due to hydrostatic leaks (infiltration).

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SECTION 615.4 – GROUTING OF SEWER MAINS AND LATERALS

615.4 - SEWER GROUTING

A. GENERAL

Provide all labor, materials, tools, equipment and incidentals as shown, specified, and required for testing sewer pipe joints by applying a positive air pressure to the joints, monitoring and recording the pressure in the void. The intent of joint & connection testing is to identify those sewer joints, lateral connections and laterals that are not watertight and that can be successfully sealed by packer injection grouting. This document can be utilized for the following applications:

Test all service lateral connections from the sewer main to a predetermined distance up the sewer lateral.

Test all joints within a predetermined distance in laterals directly connected to manholes.

Provide all labor, materials, tools, equipment, and incidentals as shown, specified, and required to grout pipeline joints, joints in laterals connected to manholes and lateral connections to the mains using the packer injection method.

Packer injection grouting shall be used to reduce groundwater and rainfall induced infiltration flow into the pipeline, seal annular space between liners and host pipes at lateral tap connections, seal pipe joints and tap connections that have failed the test criteria, seal certain defects, prevent further loss of pipe bedding into the pipe, impede the migration of groundwater in the pipe trench, and stabilize the pipe and pipe bedding.

Packer injection grouting shall be accomplished by pressure injection of chemical grout into the soils outside the pipe. Grouts shall be designed to be injected into the soil surrounding the pipe, which stabilizes the pipe bedding and forms an impermeable seal, and into the annular space between close fit liners and host pipes. Adequate volumes of grout must be injected to form an effective seal. This

application will be through joints and penetrations from within the pipe (packer method) and through certain defects in the pipe wall in tandem with a closed-circuit television inspection system.

1. SITE EVIRONMENTAL CONDITIONS

    a. The site is characterized by a water table that is seasonally above the joints but does experience extended periods when the pipe bedding becomes unsaturated.
    b. All pipes are active sewers and have continuous moisture levels to promote consistent hydration of hydrophilic chemical grouts.
    c. There are no freeze/thaw concerns at the depth of the sewers involved in this Work.
    d. There are pipes that are subject to periods of soil dryness.

2. The various pipeline component items subject to these test and seal methods include:

    a. Main Line Joint (MLJ) - joints in mainline segment connected to a manhole at each end. MLJ is defined by the “J” or Joint field in the Pipeline Assessment Certification Program (PACP) Details Section inspection form.

    b. Lateral Tap Connection (LTC) – Tap connection of lateral to mainline sewer, including a defined length of lateral from the tap and any annular space that might be present between a liner and the host pipe in situations where the main line has been lined. LTC is defined within the Tap group of PACP. Appropriate descriptors and modifiers need to be applied per PACP definitions to further define the asset. The Manhole Assessment Certification Program (MACP) and Lateral Assessment Certification Program (LACP) define Tap differently than PACP. Consult a certified PACP/MACP/LACP user for information on providing the appropriate observation code for these applications.

    c. Cured in Place Pipe Liner Annular Space Tap (AST) – Annular space opening at tap cut between liner and host pipe in situations where the main line has been lined. AST is defined within the Tap group of PACP. Appropriate descriptors need to be applied per PACP definitions to further define the asset. MACP and LACP define Tap differently than PACP. Consult a certified PACP/MACP/LACP user for information on providing the appropriate observation code for these applications.

    d. Laterals Connected to Manholes (LCM) – Lateral pipe directly connected to and reached from manhole. LCM is defined within MACP. Consult a certified PACP/MACP/LACP user for information on providing the appropriate observation code for these applications.

    e. Outside Drop Connections (ODC)2 – Drop pipes connected to mainline sewer and manhole including a defined length of drop pipe from the main.

ODC is defined within PACP as Access Point observations. Appropriate descriptors and modifiers need to be applied per PACP definitions to further define the asset. MACP defines this observation differently. Consult a certified PACP/MACP user for information on providing the appropriate observation code for these applications.

f. Longitudinal Fracture Defects (LFD) – Longitudinal or multiple fractures and crack within a pipe.4 LFD is defined within PACP/ LACP as a Structural observation. Appropriate descriptors and modifiers need to be applied to the observation to further define the asset. Consult a certified PACP/LACP user for information on providing the appropriate observation code for these applications

3. GROUT VOLUME GOAL

The calculated volume of grout to be pumped outside the pipe defect to stabilize the pipe bedding and provide a long-lasting seal against groundwater and pipe bedding fine infiltration.

B. REQUIREMENTS

Contract requires work in active sewers. The Contractor shall follow all federal, state and local requirements for safety in confined spaces and uniform traffic controls.

Conduct worker safety training prior to and within one year of start of work that includes reviewing the hazards associated with hoses, pumps, tanks, couplers, compressors, bottles, motors, and all other related application apparatus. Additional safety considerations including safely handling, mixing, and transporting of chemical grouts should be provided by the grout manufacturer/supplier, and should include safe operating practices and procedures, appropriate personal protective equipment (PPE) for the various grouting operations, and proper storage, transportation, mixing, and disposal of grouts, additives, and their associated containers.

Require completion of grout handling and mixing training certification from the grout manufacturer/supplier for personnel working with chemical grouts and additives.

C. SUBMITTALS

Manufacturer’s information and installation procedures for chemical grout shall be submitted to the Engineer prior to performing the grouting. This shall include,

but not be limited to, product data, material samples, sealant mixture design, application/packing procedures, test data, and a detailed description of

equipment and operational procedures used to accomplish the chemical grout sealing. A detailed time schedule shall also be submitted. The Contractor shall provide a minimum 48 hour advance written notice of proposed testing schedules and testing procedures for review and concurrence of the Engineer.

1. QUALIFICATIONS FOR INSTALLERS OF APPROVED GROUTING MATERIALS

   The Contractor shall submit all required pre-qualification product, manufacturer, and installer documents to the Engineer. For an installer to be accepted, the installer must satisfy all of the following:

   a. All MLJ work shall be supervised by a technician. A technician is required for each crew. Technician qualifications shall include:
      i. Previously performed pressure testing and injection grout sealing of a minimum of 3,000 MLJs and 250 LTC/ASTs.
      ii. Successfully completed safety training recommended by grout material and grout equipment suppliers.
      iii. Successfully completed a 16 hour minimum pipeline packer capital grouting field training conducted by a multi-vendor consortium of packer, rig, and grout material vendors

   b. LFD work shall be supervised by a foreman having the following qualifications in addition to those listed in paragraph A above. A foreman is required for each LFD crew. Foreman qualifications are:
      i. Previously performed pressure testing and chemical grout sealing of a minimum of 15 LFDs.
      ii. Successfully completed safety training recommended by grout material and grout equipment suppliers.
      iii. Successfully completed a 16 hour minimum pipeline packer capital grouting field training conducted by a multi-vendor consortium of packer, rig, and grout material vendors.

   c. LCM work shall be supervised by a foreman having the following qualifications in addition to those listed in paragraph A above. A foreman is required for each LCM crew. Foreman qualifications are:
      i. performed pressure testing and chemical grout sealing of a minimum of 30 LCMs.
      ii. Successfully completed safety training recommended by grout material and grout equipment suppliers.
      iii. Successfully completed a 16 hour minimum pipeline packer capital grouting field training conducted by a multi-vendor consortium of packer, rig, and grout material vendors.

d. ODC work shall be supervised by a foreman having the following qualifications in addition to those listed in paragraph A above. A foreman is required for each ODC crew. Foreman qualifications are:
   i. Previously performed pressure testing and chemical grout sealing of a minimum of 10 ODCs.

   ii. Successfully completed safety training recommended by grout material and grout equipment suppliers.
   iii. Successfully completed a 16-hour minimum pipeline packer capital grouting field training conducted by a multi-vendor consortium of packer, rig, and grout material vendors.

e. Insurance, financial and bonding requirements of the City

f. The Contractor shall employ a minimum of 1 foreman and 2 crew members with experience of at least 50 grout installations

g. The Contractor shall have the equipment available for the installation and testing of the grout from inside the internal cleanout

h. Acceptable documentation of these minimum requirements shall be submitted to the Engineer, and any intentional misrepresentation of references will be grounds for disqualification

i. Contracor/Manufacturer submit evidence of installer training, testing, and/or certification of being trained to install the product by the Contractor/Manufacturer for the product

2. CHEMICAL GROUT INFORMATION

Materials submittals shall include a description of chemical grout materials to be used, a description of proposed additives to be use, the manufacturer's recommended procedures for storing, mixing, testing, and handling of chemical grouts, and MSDS sheets for all materials to be used. The Contractor shall also identify the manufacturers and models of the packers to be utilized in performing the work.

Grout information shall also include:

a. Third party testing grout component chemical composition, including primary chemical percentages.

b. Grout mixture ratio (including additives).

c. Procedure for adjusting grout gel time during initial preparation and when it should be adjusted.

d. Procedures for adjusting grout gel time as temperature changes, and at which temperature intervals the grout set times need to be adjusted.

e. Curves of grout gel time versus temperature.

f. Instructions for addition of components.

g. Safety Data Sheets

3. DOCUMENTATION OF GROUT INSTALLATION

Upon completion of each pipe segment, submit to Engineer a report for each joint and/or lateral connection tested, grouted or attempted to be grouted as required by PACP. Televising and documentation shall be in accordance with Section 614 of these City Specs and as required by PACP regulations and Section 33 01 30.16 of NASSCO specifications. Data shall include but not be limited to the following:

- Identification of the sewer pipe section tested by assigned sewer ID (if available) and length.
- Type of pipe material, diameter & depth of pipe to the surface at manholes.
- Length of pipe sections between joints.
- Test pressure used and duration of test.
- Pass/fail results for each joint/connection tested.
- Location stationing of each joint/connection tested and location of any joints/connections not tested with an explanation for not testing.
- Volume of grout material used on each joint or connection.
- Gel set time used (cup test results from tanks).
- When the last cup test was taken. Cup tests shall be done throughout the day to ensure the desired set time is being maintained.
- Grout mix record of the batches mixed including amount of grout and catalyst, additives, temperature of the grout solution in tanks.
- Operator conducting testing and sealing shall be noted on the reports.
- Equipment operating procedures and systems to be used, including manufacturer’s literature on grout pumps (including pump curve demonstrating compliance with required pumping rates), operating pressures, packers, skins, packer mounted gauges, pressure readings on screen, and lateral blockage clearing equipment.
- Packer to pipe void volume between the packers and host pipe and maximum packer end element inflation pressure when new.
- Spare parts list.

- List and corresponding digital images of lateral taps containing roots or other obstructive conditions, in accordance with Section 33 01 30.16, paragraph 3.3 of NAASCO specifications.

Televising shall include testing and sealing operations for each joint/lateral (including inflation and deflation over the joint/lateral) displaying the final air test of joints or laterals. Additional final recording, if specified, shall include inspection of the pipe or lateral after all grouting work is complete.

Upon completion of grouting each segment, submit to the Engineer a report showing the following data for each item tested, grouted, or attempted to be grouted:

- Location of the pipeline segment/lateral address/lateral parcel number in which the testing was done.
- Stationing.
- Location of any items not tested and the reason for not testing.
- Time, date, and temperature.
- Grout mixture formulation, including additives.
- End seal pipe-packer contact pressure and seal pressure.
- Test pressure achieved and the duration of test maintained for each item passing the air test.
- End-of-hoses pump rates.
- In situ packer pumping rate
- Gel time(s) from cup testing and when the last cup test was performed.
- Quantity of grout used to seal each item.
- Step grouting practice, including pump on and off cycle times and volumes, if applicable.
- Post-grout pressure test results.
- Regrouting and retesting giving above data as required.
- Video recording cross-reference index

Documentation of Post-Construction Inspection shall be in accordance with Section 33 01 30.16 of NASSCO Specifications, or in accordance with Grout and Seal codes and reporting per PACP Manual, latest version is a Television Inspection of Sewers specification.

Documentation of Warranty Inspection (if applicable) shall be in accordance with Section 33 01 30.16 of NASSCO Specifications, or in accordance with Grout and Seal codes and reporting per PACP Manual, latest version is a Television Inspection of Sewers specification

D. REFERENCE STANDARDS TO BE USED

National Association of Sewer Service Companies (NASSCO), Inc. prepared Pipeline Assessment and Certification Program (PACP) Reference Manual, latest version.

ASTM F2304 Standard Practice for Rehabilitation of Sewers using Chemical Grouting (latest revision).

ASTM F2454 Standard Practice for Sealing Lateral Connections and lines from the Mainline Sewer Systems by Lateral Packer Method, Using Chemical Grouting (latest revision).

E. PRODUCTS

1. TESTING EQUIPMENT & GROUTING EQUIPMENT

The basic equipment shall consist of a remotely operated television camera capable of pan and tilt, testing and grouting devices (referred to hereafter as packers), grout preparation tanks (Tank A –Base Chemical and Additives and Tank B – Oxidizer Only) and monitoring equipment. The equipment shall be constructed in such a way as to provide means for introducing air under pressure into the void area created by the expanded ends of the packer and a means for continuously measuring the actual static pressure of the test medium and grout within the void area only. Packers shall be expanded by air pressure.

All packers shall be fitted with a void pressure sensor (either a transducer or gauge) mounted on the packer. If using a void gauge as the pressure sensor, the maximum top range shall be 15 psi and readable using the television camera. There can be no check valve between the void space and the pressure sensor. Packer void pressure shall be shown either on- screen or captured on-video. The air test gauge in the control panel in the studio may not be used for air testing or post-grouting pressure confirmation because the length of hose and the presence of check valves renders this technique unreliable and inaccurate at pressures below 12 psi.

Grout control panel shall have gauges for monitoring packer element pressure. Packer element pressure gauges shall have a range of 0-60 psi.

MLJ packers shall have void volume less than 0.3 gallons for 8-inch packers, 0.4 gallons for 10-inch packers and 0.5 gallons for 12-inch packers.

LTC and AST packers shall have mainline void space volume less than 0.75 gallons and sock void space less than 0.2 gallons per foot for 4” diameter socks and 0.25 gallons per foot for 6” diameter socks.

LTC and AST packers shall consist of inflatable mainline end elements and a lateral grouting sock and plug that creates a void area extending beyond the tap or drop connection. Whenever possible, use a lateral sock sized to match the diameter of the lateral being grouted. Effective sealing length shall be feet20., unless required by transition or pipe configuration less than this, otherwise indicated on the plans, or as directed by the Engineer. Where the lateral or drop is capped, utilize alternate lateral grouting plug or equipment sized appropriately for the capped lateral. If the lateral transitions from 6” to 4” in diameter within the view of the mainline camera and less than 2 feet from the tap, use a 4” lateral grouting plug. Maintain a variety of lengths of lateral grouting plugs and adjust length of lateral grout plug as required.

LCM, LACO, ODC, and LFD packers shall consist of a flexible push-pull- type packer. LCM, LACO, and LFD packers shall be sized for the diameter and pipe joint spacing found in the field, have void spaces commensurate with their duty, and be acceptable to the ENGINEER. The packer shall be able to test the items specified and be able to negotiate fittings associated with the pipe construction. If the lateral contains a transition, CONTRACTOR may change out diameters of push packer or grout using a smaller diameter packer but no relief for excess residual grout will be provided nor payment for the extra wasted grout.

Packers operating in concrete, iron, or steel pipe shall obtain airtight seals against surfaces characterized as PACP SAV and as PACP SAP with protrusion less than 3/32” 21using proper packer diameter as determined against actual pipe diameter so long the pipe maintains a near circular geometry using either special skins or by grouting the packer in place. Pipes with mushroom shapes due to chemical attack or invert loss due to erosion are generally not sealable with remote packers.

Grouting equipment shall consist of the packer, hoses, and pumping systems capable of supplying an uninterrupted flow of sealing materials to completely fill the voids. Pump systems shall be sized to deliver a minimum of 3 gpm during end- of-hose pumping tests and achieve at least a 3 gpm uninterrupted pumping rate over a 5-minute period.

A tiger tail, boot, or downhole roller, manhole frame roller, and truck step grid plate or pavement tail or slide are required to protect hoses from chafing.

Equipment for cleaning lateral blockages shall be present on-site while any grouting work is being conducted.

Provide at least one back up bladder or packer on-site for each packer scheduled for work on any given day.

Provide the following spare parts on site, or demonstrate the ability to get these to the site within 24 hours:

- Compressor
- Replacement belts for compressor
- Generator and shore power cable
- Camera
- Crawler and camera repair kit
- Tag winch
- Tag winch motor and tag winch transformer
- Ball valves
- Hose ends
- Pump/pump parts
- Video cable ends
- Chemical hose check valves and stainless steel quick disconnects
- Crawler motor
- LTC packer motor
- Winch motor
- Nozzle
- Root cutter
- Jetter hose ends and swedge kit
- Void pressure transducer or Packer mounted pressure
- gauge (2), depending on packer setup
- Spare lateral grouting sock
- Patch repair kit for lateral grouting sock
- Packer sensor membrane for sensor system
- 3-function rubber check-valves for packer (3)

The device for testing lateral connections shall consist of inflatable mainline end elements and a lateral grouting plug that creates a void area extending beyond the main connection. Whenever possible, use a lateral grouting plug sized to match the diameter of the lateral being grouted with an effective sealing length as shown on the plans or as directed by the Engineer. Where the lateral is capped, utilize alternate lateral grouting plug or equipment sized appropriately for the capped lateral.

In cases were the lateral transitions from 6 inch to 4 inch in diameter, use a 4 inch lateral grouting plug. However, it is possible that due to physical restrictions the lateral plug may not launch and thus the service may not be able to be grouted.

The basic equipment for 4 inch and 6 inch laterals connected to manholes shall consist of a flexible push-type packer and mini-push camera. The device for testing lateral pipe connected to the manhole shall be capable of testing

the joints to the distance shown on the plans or as directed by the Engineer from the manhole toward the building. If the lateral contains a transition, Contractor may change out diameters of push packer or grout lateral using only a 4 inch push packer.

Void pressure data shall be transmitted from the void area to the monitoring equipment or video picture of a pressure gauge mounted on the packer and connected to the void area. All test monitoring shall be above ground and in a location to allow for simultaneous and continuous observation of the televising monitor and test monitoring equipment.

Grouting equipment shall consist of the packer, appropriate pumping and hosing systems capable of supplying an uninterrupted flow of sealing materials to completely fill the voids. Grout pumping system shall be sized to deliver a mixed volume of grout at a minimum of 3 gpm and 30 gallons of uninterrupted flow within 10 minutes.

Volume of mixed grout pumped must be capable of being measured and recorded for each grouted joint/connection. Generally, the equipment shall be capable of performing the specified operations in sewers where flows do not exceed 25% of pipe diameter unless permitted by Engineer.

Connection and lateral service sealing shall be accomplished using the lateral grouting plugs and push packers specified above. Provide back-up bladders for each packer on-site at all times during grouting procedures.

Equipment for cleaning lateral blockages shall be readily available while any lateral grouting work is being performed.

2. GENERAL GROUTS

All grout materials must have the following characteristics:

a. Able to react /perform in the presence of water (groundwater) with minimal dilution while being injected.
b. Maintain a constant viscosity during the pumping process prior to gelling.
c. Prevent the passage of water (infiltration) into the pipe.
d. Not be subject to shrinkage from water loss in conditions where relative humidity in soil is present.
e. Be moderately flexible, yet rigid enough to stand under its own weight.
f. Be chemically stable and resistant to acids, alkalis, and organics found in sewage.
g. Be easily removable from inside the sewer line after gelling.
h. Cause no upset of treatment or pumping system downstream of the grouting location.

Handle, mix, and store grout in accordance with the manufacturer's recommendations. The materials shall be delivered to the site in unopened original manufacturer's containers.

All grout materials used shall meet the following minimum application requirements:

a. All component materials shall be transportable by common carriers.
b. Packing of component materials shall be compatible with field storage requirements.
c. Grout components shall be packed in such a fashion as to provide for maximum worker safety when handling the materials and minimize spillage when preparing for use.
d. Gel initiation shall take place at the point of injection/repair.
e. Cleanup shall be done in accordance with the manufacturer recommendations.

3. CHEMICAL GROUTS

Acrylamide based grout shall have the following characteristics:

a. 95% acrylamide and 5% Methylene-bis acrylamide (MBA).
b. A minimum of 12% acrylamide base material by weight in the total grout mix. A higher concentration of acrylamide base material may be used to increase strength or offset dilution during injection.
c. A viscosity of approximately 2 centipoises, which can be increased with additives.
d. A controllable reaction time from 10 seconds to 5 minutes.

4. ADDITIVES

Additives shall be used within the manufacturers recommended quantities.

When using non-soluble additives the grout tanks must have mechanical mixing devices to keep the additives in suspension and maintain a uniform solution of grout and additive.

a. LATEX

Add Avanti AV 57 (or Engineer approved equal) to increase compressive and tensile strength of grouts to protect against shrinkage, enhance flexibility, and strengthen the grout. Latex shall not contain any organic solvents. The quantity of latex added shall be in accordance with the manufacturer's recommendations and shall take the place of the same volume of water normally added in a non-latex grout batch on the A Tank

(grout tank). The quantity of latex shall be doubled for grouting non-circular defects. Follow manufacturer's recommendations for product handling and mixing. Latex additive shall have the following characteristics:

Solids Content	49% minimum	ASTM D-1010
Viscosity	100-130 cps @ 77oF max	ASTM D-1638
Solvent	Water	

b. FREEZE INHIBITOR

Ethylene glycol may be added to the A and/or B tanks to reduce the freezing temperature35 of the liquid grout during winter operations when the truck interior and hoses cannot be kept above freezing temperatures. Ethylene glycol shall replace the same volume of water normally added to the tanks. Follow manufacturer's recommendations for product handling and mixing to prevent freezing.

c. DYE

When not using latex, add a fluorescent blue dye to the A side grout tank and a fluorescent yellow dye to the B side tank so that pump balance issues can be discerned and so a visual residual layer of green-colored grout remains to provide confirmation that mixed grout was pumped.

d. GEL TIME MODIFIER

Add gel time extending agent in accordance with the manufacturer's recommendations to extend gel time as necessary. Completely dissolve chemical crystals in water before introducing to the grout tank.

615.4.1 - EXECUTION

A. CONTROL TESTS

1. PACKER TESTS

Demonstrate the acceptable performance of packers in the presence of the Engineer by conducting demonstration tests:

a. Conduct this test weekly. For pipe less than or equal to 18 inches in diameter, provide a straight pipe of appropriate diameters and ovality and sufficient length to test MLJ, LTC, LACO, LFD, and LCM packers of

appropriate. The test cylinder shall be equipped with a void release valve to exercise a controlled release of pressurized air to test the packer under both sound and leaking conditions. The test cylinder shall also be equipped with both a local pressure gauge (0-30 psi) and a connection to the packer test control center/studio; these shall both indicate the pressure in the packer void space.

b. With release valve sealed, inflate packer until it contacts the pipe; record this packer-pipe contact pressure. Inflated packer to 15 psi greater than the packer-pipe contact pressure. Generate a void pressure of 10 psi. The equipment shall hold at this test pressure for a period of 60 seconds with a pressure drop of less than 1 psi.

c. If above test is passed, crack the release to simulate a very small leak. After ~20 seconds, seal the release and confirm that a pressure drop has occurred and that the local gauge is within ±1.0 psi of the reading in the control center/studio

d. Conduct this test every segment for MLJ and LTC packers, and every 5th lateral for LCM and LACO packers. After entering each pipeline segment with the MLJ and LTC packer, but prior to the commencement of testing, position the packer on a section of sound sewer pipe between pipe joints, and perform a test. The equipment shall hold a 10-psi test pressure for a period of 30 seconds with a pressure drop of less than 1 psi. In the event of a failed test, repair any defective equipment and re-test to verify proper operation of all equipment at no additional compensation. Should it be found that the barrel of the sewer pipe will not allow valid in situ barrel test requirements due to corrosion or other barrel defects, then the performance testing shall be waived or modified as determined by the Engineer. LFD packers do not need to do this test.

If air testing equipment cannot be performed successfully, repair or otherwise modify air test equipment and repeat the tests until the results are satisfactory to the Engineer. The in-situ barrel test may be required at any other time during the performance of testing work if the Engineer suspects the testing equipment is not functioning properly.

2. PUMP TESTS

At the start of the job and once monthly or every 1000 gallons of grout pumped, whichever is more frequent, pump grout in uninterrupted flow for full 5 minutes to demonstrate the pumping system can operated continuously at a minimum 3 gpm rate and deliver a minimum of 9 gallons within 3 minutes.

At the beginning of each day prior to application of grout, perform a pump test to determine if equal ratios are being pumped from the grout component tanks at the proper rates and to measure pump rates. Pump 1 gallon of grout from each tank into two separate volumetric measuring containers. Take corrective action if unequal quantities are being pumped. Repeat the pump test until equal quantities are pumped from the grout tanks. Record the amount of time required to pump the two gallons and, when using air pumps, count the pump strokes to confirm the number of pump strokes required to achieve the delivery rate.

3. IN-SITU PUMPING CAPACITY TESTS

Once inside the pipe and pumping grout through the packer into the first defect of the segment, record the in-situ pumping rate delivered, and modify the grout gel time as appropriate. Check in situ pumping rate each time the packer is reconnected to the hoses.

4. GROUT GEL TIME TESTS

Perform a grout gel test in the presence of the ENGINEER to determine the grout mixture gel time. If packer is not in the pipe, recycle into the respective tanks or properly dispose any grout remaining in the hoses. Run mixers for a minimum of 1 minute, then allow entrained air to release from the grout tanks a minimum of 5 minutes before collecting grout samples in disposable cups. Ensure equal portions of Tank A and Tank B are collected prior to mixing. If foam is present on surface of tank, collect sample from below the foam. Determine gel time by taking cup samples from each tank:

a. Prior to grouting each day

b. Prior to grouting when a different gel time is required

c. When new batches of grout are mixed

d. When the temperature of the solutions in either of the tanks have changed by more than 5°F from the previous gel test

5. GROUT CONCENTRATION TESTS

When grout is not mixed under the observation of the Engineer, perform a grout concentration test using a Contractor-provided hydrometer or refractometer, temperature gauge, and a grout concentration: temperature chart on demand of the Engineer to determine the grout concentration.

B. PIPE PREPARATION

Clean sewer and remove roots in mainline sewer except minor hair roots prior to testing.

Cut back or otherwise remove any portions of laterals that protrude more than 5/8-inch into the mainline to avoid interference with the testing and sealing equipment.

Install all excavated point repairs specified for the pipe segment prior to conducting any grouting work.

Clean laterals in accordance with ROOTS AND OBSTRUCTIONS IN LATERALS.

In accordance with the Details, plug LCMs that are shown on the drawings as inactive.

Clean all LTCs, ODCs, LCMs, ASTs and LACOs in the project area that are not marked as inactive on the drawings.

Following cleaning, televise all MLJs, LTCs, ODCs, LCMs, LFDs, and LACOs that are not marked as inactive on the drawings. Unless otherwise specified or indicated, LTC inspections will be limited to pan and tilt inspection from mainline camera.

Submit Pre-Construction Inspection for any LTC, LCM, AST, LFD, ODC, or LACO that is found to be inactive or in a condition that cannot be tested and grouted

C. ROOT AND OBSTRUCTIONS IN LATERALS

Remove roots and debris that prohibit testing/grouting from LCMs, and LACOs for the length of lateral to be tested/grouted.

During mainline sewer and/or lateral inspection, document all LTCs containing roots and obstructive conditions that are visible from the mainline pan and tilt camera and present (a) roots greater than fine roots or (b) roots or defects of a nature to prevent testing and sealing of LTC. Engineer will review the LTCs containing roots and obstructions and direct Contractor as to which LTCs are to be (a) cleaned and grouted, either from the main or from the cleanout, (b) grouted without cleaning – in which case such lateral tap would be excluded from warranty testing, or (c) removed from the scope of work – in which case no payment for such lateral will be made. Successful cleaning of LTCs (i.e. such that

the LTC can be effectively grouted and no more than fine hair roots remain) will be paid per the applicable item on the Schedule of Prices. No payment will be made for unsuccessful attempts to clean LTCs.

For each such LTC, submit a screen shot image clearly showing the extent of roots or obstructive condition to Engineer. Submit images in electronic format, labeled and organized in a manner to easily retrieve the image for the LTC in question. The list of LTCs with roots shall include upstream and downstream manhole numbers, station, property address served, plan sheet number where tap is located and photograph of outside cleanout, if present.

D. GROUT PREPARATION

Follow the manufacturer's recommendations for the mixing and safety procedures to protect personnel from any adverse effects of the grouting compounds. Add and mix base components and additives at rates that will eliminate the formation of lumps within grout tanks solutions. Use accurate scale(s) or volumetric containers to measure the various non-water grout solution components as concentrations specified. Thoroughly mix all components in the appropriate tanks. Provide accurate thermometers to verify temperature of grouting components in tanks. Where practical, add majority of needed water to both grout tanks and mix

the base acrylamide into Tank A the evening before to allow the endothermic reaction to complete and ambient temperature to be achieved and mix the latex to allow the surfactant to dissipate and minimize foaming before using grout.

Add gel time extending agent or cool the grout component tanks and/or hoses as necessary to compensate for changes in temperature in grout component tanks or hoses resulting from changes in ambient conditions. The addition of dilution water to extend gel times is only acceptable using the B (non-grout) tank so that the resulting grout still achieves minimum base material concentrations.

During the grouting process, monitor the grout component tanks to make sure that proper ratios are being pumped. If unequal levels are noted in the tanks, repeat the pump test, grout concentration test, and grout gel time test as described above.

E. GROUT VOLUME GOALS AND GEL TIME

Grout Volume Goal: Use the NASSCO Grout Volume and Gel Time Calculator, which considers pipe material, bedding depth, bedding material, and joint spacing, to determine grout volume per defect goals.

1. Vitrified clay pipe (VCP), clay tile pipe (CT), asbestos cement pipe (AC) and unreinforced concrete pipe (CP) are more prone to break/fracture and therefore require bedding grouting as well as defect grouting to provide long-term seal stability. These pipes should use the VCP/CP Grout Volume and Gel Time.

2. Polyvinyl chloride pipe (PVC), ductile iron pipe (DIP), reinforced concrete pipe (RCP), and other flexible pipes are less prone to break/fracture and therefore require less stabilization as well as defect grouting to provide long-term seal stability. These pipes should use the PVC/RCP/DIP Grout Volume and Gel Time.

3. Bedding depth: Assume 3” unless otherwise shown or specified on plans or in specifications or field knowledge provides specific information.

4. Bedding material: Assume sand unless otherwise shown or specified on plans or in specifications or field knowledge provides specific information.

Gel Time:

1. MLJ, LCM, and LACO for VCP, CT, AC, and CP: Calculate gel time using the below formula and NASSCO Calculator.

$$Gel\ Time = \left(\frac{\{Annular\ Space + CouplingSpace\ (gal)\} + \{Grout\ Volume\ Goal * .75\}}{Pumping\ Rate(gpm)}\right)\left(\frac{60sec}{1min}\right)$$

2. MLJ, LCM, and LACO for PVC, RCP, and DIP: Calculate gel time using the below formula and NASSCO Calculator

$$Gel\ Time = \left(\frac{\{Annular\ Space + CouplingSpace\ (gal)\} + \{Grout\ Volume\ Goal * .5\}}{Pumping\ Rate(gpm)}\right)\left(\frac{60sec}{1min}\right)$$

3. LTC for AC, CT, CP, and VCP: Calculate gel time using the below formula and NASSCO Calculator.
   - For CT and CP laterals, assume joint failure rate is 90% and joint spacing is 3’.
   - For VCP and AC laterals, assume joint failure rate is 60% and joint

- spacing is 4’

$$\text{Gel Time} = \left(\frac{\{\text{SockAnnular Space} + \text{Mainline void space(gal)}\} + \{\{[\text{roundup}(1 + (\text{Sock Length /joint spacing}))] \text{ x \#\% joint failure rate}\} \text{ x Grout goal per joint] *.75 (gal)}\}\}}{\text{Pumping Rate(gpm)}}\right)\left(\frac{60\text{sec}}{1\text{min}}\right)$$

4. LTC for PVC, DIP, and RCP: Calculate gel time using the below formula and NASSCO Calculator:
   - For PVC and DIP laterals, assume joint failure rate is 25% and joint
   - spacing is 5’

$$\text{Gel Time} = \left(\frac{\{\text{SockAnnular Space} + \text{Mainline void space(gal)}\} + \{\{[\text{roundup}(1 + (\text{Sock Length /joint spacing}))] \text{ x \#\% joint failure rate}\} \text{ x Grout goal per joint] (gal)}\}\}}{\text{Pumping Rate(gpm)}}\right)\left(\frac{60\text{sec}}{1\text{min}}\right)$$

5. LFD for VCP, CT, AC, and CP: Calculate gel time using the below formula:

$$Gel\ Time = \left(\frac{\{Annular\ Space\ (gal)\} + \{Grout\ Volume\ Goal * .33)\}}{Pumping\ Rate(gpm)}\right)\left(\frac{60sec}{1min}\right)$$

6. LFD for PVC, DIP, and RCP: Calculate gel time using the below formula:

$$Gel\ Time = \left(\frac{\{Annular\ Space\ (gal)\} + \{Grout\ Volume\ Goal * .5\}}{Pumping\ Rate(gpm)}\right)\left(\frac{60sec}{1min}\right)$$

7. Annular Space Grouting: Calculate gel time using the below formula:

$$Gel\ Time = \left(\frac{\{Annular\ Space\} * \{Perimeter\ of\ pipe\} + \{Sealing\ Distance\ from\ tap\ x\ 2\} * 7.48 + Void\ Space\ (gals)}{Pumping\ Rate(gpm)}\right)\left(\frac{60sec}{1min}\right)$$

OR, if only addressing pipes with diameters ≤ 18”:

1. Grout Volume Goal for pipe diameters less than 18”

   a. VCP, AC, CT, and CP: 0.75 gallons per inch diameter for VCP and CP
   b. PVC, DIP, and RCP: 0.5 gallons per inch diameter for VCP and CP

2. Gel Time: Gel times shall be within 10 seconds of the following unless field conditions dictate otherwise and with approval of Engineer.

   a. MLJ, LCM, and LACO: Calculate gel time using the below formula and NASSCO Gel Time Table.

$$Gel\ Time = \left(\frac{\{Annular\ Space + CouplingSpace\ (gal)\} + \{PipeDiameter(inch)x\#groutgoal(gpin - dia\}}{Pumping\ Rate(gpm)}\right)\left(\frac{60sec}{1min}\ \text{x}\ 1.2\right)$$

   b. LTC: Calculate gel time using the below formula and attached Gel Time Table. Assume lateral joint failure rate is:

      - For CT and CP laterals, assume joint failure rate is 90% and joint
      - spacing is 3’
      - For VCP and AC laterals, assume joint failure rate is 60% and joint
      - spacing is 4’
      - For PVC and DIP laterals, assume joint failure rate is 25% and joint
      - spacing is 5’

$$\text{Gel Time} = \left(\frac{\{\text{SockAnnular Space (gal)}\} + \{\{[1 + (\text{Sock Length (ft)/joint spacing})]\ \text{x \#\% joint failure rate}\}\ \text{x [Pipe Diameter (inch) x \# grout goal (gpin-dia)] + Mainline void space (gal)}\}\}}{\text{Pumping Rate(gpm)}}\right)\left(\frac{\text{60sec}}{\text{1min}}\right)$$

   c. LFD: Calculate gel time using the below formula:

$$Gel\ Time = \left(\frac{\{Annular\ Space\ (gal)\} + \{PipeDiameter(inch)x0.25(gpin - dia - ft)x(PipeLength + 2\}}{Pumping\ Rate(gpm)}\right)\left(\frac{60sec}{1min}\right)$$

Where groundwater is entering the pipe from multiple locations near the point of grouting or where grout consistently enters back into the pipe from adjacent joints, lower gel time and/or modify grouting procedures to allow faster grout set times and minimize grout wash-in through adjacent defects. Consult with Engineer before proceeding with any site-specific measures.

F. TESTING AND GROUTING DEFECTS

At the discretion of the Engineer, testing and grouting will not be required on pipes exhibiting defects which can damage equipment or pose a risk of failure during grouting operations. The Contractor shall provide the Engineer with evidence of the defects when they are discovered, and the Engineer shall have the final say as to whether the defect is able to be grouted.

Low-pressure grouting shall be performed where indicated on the plans and as directed by the Engineer. The Engineer reserves the right to direct the Contractor to perform low-pressure grouting on the defects described above.

Test and seal manhole outside drop connection joints using a push packer appropriately sized for diameter and length of outside drop pipe. Test and seal as much of the outside drop connection from the main to the manhole as practical using ODC packer.

Position packers over joints or defects by means of a closed-circuit television camera in the line.

For each joint/lateral/defect tested/grouted, record exact location and volume of grout placed in PACP Remarks field.

For each segment, record ambient temperature, grout tank temperature, gel set test time, and packer inflation pressure in PACP header in appropriate fields.

Specifically identify each tap and break location on the grout report to aid in properly locating joints during warranty testing.

G. JOINT TESTING PROCEDURE FOR MAINLINE SEWER AND LATERALS CONNECTED TO MANHOLES

Joint testing target pressure before grouting shall be equal to ½ psi per vertical foot of pipe depth plus 3 psi; however, target test pressure shall not exceed 12 psi nor be lower than 6 psi unless directed by the ENGINEER. Control test equipment to ensure the specified test pressure is not exceeded by more than 2 psi.

If void pressure gauge is not working or not visible/readable and less than 1/3rd the remaining items to test remain, CONTRACTOR may complete segment using panel gauge but test pressures shall be increased by 5 psi and test time by 5 seconds (to overcome the check valves and regulators in the plumbing). No additional work may be conducted beyond this until the void pressure gauge is working properly.

Test joints on LCMs from the manhole to the distance as shown on the plans or as directed by the Engineer. If there is a transition in the LCM, test the transition unless its offset prevents packer insertion and seal. Direct visual observation shall be used to position the packer.

Test joints on LACOs from the cleanout to the main, to previously grouted joints done during LTC grouting, or until the lateral diameter increases beyond the sealing capabilities of the LACO packer, whichever comes first. Direct visual observation shall be used to position the packer.

Do not test joints with visible longitudinal, spiral, or multiple fractures or cracks or where the packer cannot be seated because of tap connection. Note reason for not testing on the log.

Individually test each MLJ, LACO, ODC, and LCM joints at the above-specified pressure (and retest after sealing) in accordance with the following procedure:

1. The packer shall be positioned within the pipe in such a manner as to straddle the joint to be tested. If uncertain, pump small amount of grout to confirm the void space is properly located (spitting) before inflating the packer.

2. The packer ends shall be expanded to isolate the joint from the remainder of the pipe and create a void area between the packer and the pipe joint. The ends of the testing device shall be expanded against the pipe with sufficient inflation pressure to contain the air within the void without leakage past the expanded ends. Record end seal pipe-packer contact pressure and seal pressure used.

    a. Packer end seal pressures for visually sound VCP shall not be greater than 15 psi more than the required packer-pipe contact pressure.

    b. Packer end seal pressures for VCP with joint defects shall use low pressure MLJ techniques such that the end element pressures shall not be greater than 8 psi more than the required packer-pipe contact pressure.

c. For rough surface pipe such as corroded concrete pipe58, use grout to seal the leaks around the packer end if airtight seal cannot be achieved. Gel time may be reduced to half the normally specified time under these circumstances with the approval of ENGINEER. The CONTRACTOR shall be paid the unit price for grout to seal the packer unless ENGINEER determines that the sewer was inadequately cleaned or the packer is not performing properly but will not be paid the unit price for joint grouting for this activity.

3. Air shall then be slowly introduced into the void area until a pressure equal to the required test pressure is observed on the pressure monitoring equipment. Control inflation rate of the packer to minimize over-pressurization of the void space by adjusting the quick inflate timer to stop rapid inflation before the packer contacts the pipe.

4. After the void pressure is observed to be equal to the required test pressure, the air flow shall be stopped. If the void pressure as measured at the packer decays by more than 1.0 psi below the required test pressure within 15 seconds, the joint will be deemed to have failed the test and shall be sealed.

5. If the void is over pressurized and the void pressure decays, the 15 second period shall begin once the test pressure is achieved. If the void is unavoidably but significantly over pressurized from water or residual grout (e.g., 2x the target test pressure) and the void pressure decays, use a 10 second period to determine if the joint(s) pass or fail.

6. If testing after grouting and the void pressure is unavoidably but significantly over-pressurized from water or residual grout (e.g., 2x the target test pressure) and the void pressure decays, add an additional 2 psi of pressure and use a 10 second period to determine if the joint(s) pass or fail

7. Upon completing the successful testing of each individual joint, the packer shall be deflated with the void pressure meter continuing to display void pressure. Should the void pressure meter fail to drop to ±1 psi, clean the test equipment of residual grout material or make the necessary equipment adjustments to provide for an accurate void pressure reading.

H. LTC TESTING PROCEDURE

LTC void pressure shall be equal to ½ psi per vertical foot of pipe depth plus 3 psi; however, test pressure shall not exceed 10 psi nor be lower than 6 psi unless directed by the ENGINEER. Control test equipment to ensure the specified test pressure is not exceeded by more than 2 psi.

If void pressure gauge is not working or not visible/readable and less than 1/3rd the remaining items to test remain, CONTRACTOR may complete segment using panel gauge but test pressures shall be increased by 5 psi and test time by 5 seconds (to overcome the check valves and regulators in the plumbing). No additional work may be conducted beyond this until the void pressure gauge is working properly.
Air testing LTCs shall be accomplished by isolating the area to be tested with the packer and by applying positive pressure into the isolated void area. A pan and tilt camera shall be used to position the lateral packer. The bladder shall be inverted from the mainline assembly into the lateral pipe and inflated. The mainline elements shall then be inflated to isolate the lateral connection and the portion of the lateral to be tested. A sensing unit shall be located within the void area and will accurately and continuously transmit void pressure readout to the control panel or pressure gauge viewable with CCTV camera.

The test procedure will consist of applying air pressure into each isolated void area. A sensing unit shall be located within the void area and will accurately transmit continuous pressure readout to the control panel. Air shall then be slowly introduced into the void area until a pressure equal to the required test pressure is observed on the pressure monitoring equipment.

After the void pressure is observed to be equal to or greater than the required test pressure, the air flow shall be stopped. If the void pressure decays by more than 1.0 psi within 20 seconds, the LTC will have failed the test and shall be sealed. If the void is over pressurized and the void pressure decays, the 20 second period shall begin once the test pressure is achieved.

After completing the air test for each individual LTC specified herein, deflate the packer, with the void pressure meter continuing to display void pressure. If the void pressure does not drop to ±1 psi, clean the test equipment of residual grout material or make the necessary equipment adjustments to provide for an accurate void pressure reading.

For laterals capped less than two feet from the main, the Contractor may use a mainline packer to test the lateral tap.

Length of lateral to be tested shall be as shown or indicated.

I. LFD AND ANNULAR SPACE TAP TESTING PROCEDURES

Do not test LFDs and annular tap spaces.

J. GROUTING – GENERAL

The pumps, meter, and packer shall be integrated so that grout component proportions, quantities, and pressures can be monitored and regulated in accordance with the type and size of the leak, percentage of voids being filled, type of soil surrounding the pipe, and the rate of flow of the grout in relation to the back pressures.

Grout all MLJ, LTC, LCM and LACO joints that failed the pressure test, that are visibly leaking at a rate classified as ID (dripper) or greater by PACP, or that have fracture, crack, or chipped joint defects originating at the joint and terminating within 8 inches of the joint by the packer injection method. Grout all LFDs or other pipe defects specified or directed without testing. Generally, this shall be accomplished by forcing grout through a system of pumps and hoses into and through the joints of the sewer from the packer within the sewer pipe. Jetting or driving pipes from the surface shall not be allowed.

Record in the Additional Comments fields60 of the PACP header the assumed bedding depth, assumed bedding material, calculated grout volume goal, in situ pump rate, gel time entered calculated by the Grout Volume and Gel Time Calculator, actual initial gel time, and adjusted gel time and time of correction.

When grouting VCP joints with defects originating at the joint, use a low-end element technique (LEET) whereby the end elements are inflated to only 8 psi above pipe-packer contact pressure. Specifically note in the grouting record each joint that has a defect originating from it.

If less than three times the void space or less than 1 gallon of grout above the packer void space is pumped outside the pipe (i.e., not blown by the end elements), whichever is less, the joint will be marked as passing; grout used in this circumstance will not be paid for.61 However, note in the grouting record the volume of grout in excess of void space and blow-by utilized.

If a packer with a higher void space than specified is used, the additional grout used to fill this larger void space shall not be paid for.

After each time pumping grout at one of the above items, if the void space pressure drops faster than the allowable rate at the defined target test pressures, then continue pumping grout in accordance with these procedures. If the void space pressure does not drop, deflate the packer, purge air test line/valve, then re-inflate and retest at target test pressure.

When using grout to seat the packer, retest as above except do not deflate the packer first.

If the item fails this air test, repeat the grouting procedure at no additional cost to

Engineer. Repeat this sequence of air testing, grouting, and subsequent air testing until either the item is sealed, or it is determined that the grout consumption is too high. The final determination to stop subsequent attempts to seal an item will be made jointly between Engineer and Contractor.

Generally, pump to refusal or in accordance with step grouting procedures. Refusal shall mean the mixed grout has flowed through the void space, through any joint failure or defect, into any annular space or surrounding soil; gelled or filled the available void space, annular space, and soil pore space; formed a cohesive seal stopping further grout flow; and an air test as described above is successfully passed.

If grout is observed to enter the pipe upstream or downstream of the packer through defects, taps, liner cut, or joints, either cut pumping rate in half or adjust gel time to half the proscribed rate. Continue to adjust until grout pass-by is no longer an issue. Readjust grout time and pump rate back to proscribed rate if determined warranted by Engineer.

If blow-by occurs before achieving minimum grout volume goal, lower the pumping rate to allow a slower introduction of grout into the void space by decreasing air pressure/feed to air pumps, turning down the pump rate of electric pumps, or manually using a 5-10 second break between each pump stroke. Adjust gel time accordingly if this happens on more than half the items being grouted.

In the grouting record, record in the comments field for each item:

1. Volume of grout in excess of void space and/or blow by pumped into pipe bedding at each joint
2. Step grout increments
3. Whether max grout volume was reached
4. Final test pressure after completion of grouting
5. If joint has J code defect
6. If packer was grouted in place
7. All taps, breaks, and fractures for the purposes of aligning grouting records during warranty testing.

Grouting Packer In Place - Gel time may be reduced from the normally specified time in halves until a testable seal is achieved if pipe wall conditions do not allow a valid packer to successfully seal with the approval of Engineer. The gel time will be established in trials in the presence of Engineer using the adjacent pipe wall where no crack, fracture, or breaks are present.

If the item fails to seal, continue the grouting procedure. Repeat this sequence of grouting and testing until either the item is sealed, or it is determined that the grout consumption is too high. The final determination to stop subsequent attempts to seal an item will be made by Engineer after consultation with Contractor.

For pipes whose crowns are less than 4 feet below grade, provide an observer to monitor for grout short circuiting or piping to the surface.

Remove all grout from pipe that obscures the pipe wall, joint, or defect when conducting post-grouting inspections. Excess grout does not need to be removed from inactive laterals.

All decisions regarding excess grout shall be made by the Engineer based on the Post-Construction Inspection and shall be final.

K. JOINT GROUTING

Stop pumping grout after pumping grout volume goal, wait 1 gel set cycle time (or longer at Contractor's discretion), retest, and if the joint does not pass the air test, then continue grouting by pumping additional grout in 1.5 gallon increments for pipe diameters 4-6 inches, in 2 gallon increments for 8-12, in 2.5 gallon increments for pipe diameters 14-21 inches, and in 3 gallon increments for pipe diameters greater than 21 inches, or until refusal. If necessary to prevent packer blowby, pump in smaller increments. After each step, wait 1 gel set cycle time (or longer at Contractor's discretion) before retesting, and, if needed, continuing with additional grout steps until successful test, until maximum grout volume is reached, or until directed to stop by Engineer.

Curtail grouting when grout rate exceeds twice the Grout Volume Goal.

Where using low end element technique (LEET) for joints with defects, increase the maximum grout per joint by 33%. Notify Engineer verbally and via email of intended changes before making this change.

If more than 16% of the joints (1 in 6) are not passing at Max Grout when using in step grouting procedure, cut your gel time in half. Notify Engineer verbally and via email of intended changes before making this change.

If more than 25% of the joints (1 in 4) need Max Grout volumes using step grouting procedures to achieve seal, cut your gel time in half. Notify Engineer verbally and via email of intended changes before making this change.

Invoke and repeat this process until a gel time of 15 seconds is reached. Do not use gel times less than 15 seconds for MLJs, LCMs, or LACOs.

For any given joint that does not seal at Max Grout, move packer forward to the

next joint, complete test and seal work on that second joint, then return to the joint that did not pass, retest it, and if necessary, pump additional grout using step grouting procedures for up to an additional 4 gallons of grout. This second test shall be considered a verification test.

If after reaching the Max Grout plus four gallons additional grout, the joint continues to fail the air test, note “Max Grout Fail” within the comments for that joint observation.

If after decreasing gel time it is found that grout volume goals are consistently not being met, gel time will be judged to be too short and gel times will be incrementally increased until grout volume goals are consistently achieved. Seek and follow instructions from ENGINEER on when to return to original gel times.

After the final post-grout pressure testing of each joint, move the packer forward, wiping away the excess grout that extends into the pipe, reduces the pipe diameter, or restricts flow. Leave the sealed joints reasonably flush with the existing pipe surface.

For LCM or LACO grouting, confirm through camera inspection lateral flow after completing all sealing of each lateral. If a grout blockage is evident, clear the lateral.

L. LTC AND ODC GROUTING

Grout LTCs or ODCs that do not pass the air test, shows evidence of leakage, or where Contractor has been directed to grout a tap that contains visible roots.

Stop pumping grout after pumping grout volume goal, wait a 1 gel cycle, retest, and if the LTC does not pass the air test continue grouting by pumping additional grout in 2-gallon increments, waiting 1 gel set cycle time between steps, retesting, and, if needed, continuing with additional 2-gallon grout steps until successful test or until directed to stop by Engineer. Record the amount of grout pumped on the sealing log.

Curtail grouting when grout volume reaches thrice the grout volume goal.

If after reaching the Max Grout, the LTC fails the air test, note “Max Grout Fail” within the comments for that LTC observation.

If greater than 20% of LTCs won’t seal when utilizing step grouting and achieving the above maximum grout volume per LTC above, cut gel time in half and maintain pump rate. Invoke this process until a gel time of 20 seconds is reached. Do not use gel times less than 20 seconds for LTCs without approval of Engineer.

If after decreasing gel time it is found that grout volume goals are consistently not

being met, gel time will be judged to be too short and gel times will be incrementally increased until grout volume goals are consistently achieved. Seek and follow instructions from Engineer on when to return to original gel times.

Air tests after grouting LTCs containing roots is not required.

Blockages in the lateral that are not the result of grouting operations shall not be the responsibility of the Contractor.

Confirm lateral flow after sealing of each lateral tap. This can be accomplished by one of the below methods:

1. Visually inspecting the entire length of the grouted lateral

2. With the lateral packer in position, retract the inversion tube and inject air pressure into the lateral. Should a pressure build in the lateral and not drop to approximately zero immediately after the pressurized air is turned off, it will be assumed that the building sewer connection is substantially blocked with grout and the Contractor shall immediately clear the lateral at no additional cost to the Engineer.

3. With the camera viewing the connection point, attempt to obtain a water flush by the occupant. If no water is viewed during this procedure, it will be assumed that the building sewer connection is substantially blocked with grout and the Contractor shall immediately clear the lateral at no additional cost to Engineer

M. LONGITUDINAL FRACTURE DEFECT GROUTING

Pump until refusal or until the grout pumped exceeds 125% of grout volume goal, at which time modify grouting procedure to step grouting by pumping additional grout in 2-gallon increments until refusal, air test pass, maximum grout volume is achieved, or directed to stop or continue by ENGINEER. Record the amount of grout pumped on the sealing log.

Generally, stop grouting when grout rate exceeds 200% of grout volume goal, unless approved by Engineer.

N. VERIFICATION TESTING

Conduct verification testing as directed by ENGINEER for quality control purposes. Engineer will select the MLJs, LTCs, LCMs, or LACOs for pull back testing.

Test on a given line segment or lateral:

1. 5% of the grouted MLJs (minimum of two),
2. 2% of MLJs that passed testing without grouting (minimum of one)
3. 5% of LCM joints (minimum of two)
4. 5% of LACO joints (minimum of two)
5. 10% of the grouted LTCs on a given segment (minimum of one, excluding taps with roots not removed)

Within a sewer line segment or lateral, if any tested items fail the pullback test, retest an additional 10% of said items in that sewer line segment or lateral at no additional cost to Engineer. If any of these tested items fail the pullback test, retest all the remaining said items in that sewer line segment or lateral at no additional cost to Engineer.

O. POST-CONSTRUCTION INSPECTION

Conduct Post-Construction Inspection of all pipes, taps, and laterals tested and/or grouted in accordance with Section 33 01 30.16, Television Inspection of Sewers. Any items found to leak that are not specifically excluded for the purposes of Warranty Testing shall be sealed prior to conducting Post-Construction Inspections. Remove from the pipe wall and bottom any excess grout. Collect and remove from the sewer all excess grout removed from the pipe wall.

P. WARRANTY

All grouting work shall be guaranteed for a period of 1 year from the date of substantial completion granted in writing by the Engineer unless otherwise stipulated in writing by the City. During this period, the Engineer reserves the right to inspect and/or test, at their own expense, any and all work performed as part of this contract. Any actionable defects documented during this period by the Engineer shall be resealed by the Contractor at no additional cost to the City. The Engineer shall have until the end of the warranty period to report the findings of their inspection(s) and/or testing to the Contractor, and the Engineer shall negotiate a reasonable repair schedule for any actionable items found. The warranty shall cover grout repair due to hydrostatic leaks (infiltration) as defined per NASSCO PACP infiltration definitions, and any other work directed by the Engineer to make the finished product meet these specification requirements. Any and all warranty inspections and/or warranty work shall be incidental to this contract.

1. Main Line Joint (MLJ) Warranty Testing

Conduct warranty testing on 15% of MLJs regardless of whether they passed or failed the pre- or post-grouting air test or a minimum of two sewer line segments, whichever is greater, 18 to 24 months after Substantial Completion. ENGINEER will select the pipe segments to be warranty tested, with the selection of pipe segments representative of the inventory of diameters and materials originally tested.

If more than 10% of the warranty tested MLJs fail, test an additional 15% of the pipe segments or two additional sewer line segments, whichever is greater, will be warranty tested at no additional compensation. If more than 10% of the second group of warranty tested MLJs fail, test the MLJs in 50% of the remaining untested pipe segments at no additional compensation. If more than 10% of the warranty tested MLJs fail, test all MLJs in the remaining untested pipe segments at no additional compensation.

Grout and retest all MLJs failing warranty testing regardless of whether they passed or failed the pre- or post-grouting air test at no additional compensation. Grout gel time for warranty testing grouting shall be 30 seconds.

For each pipe warranty tested, perform a Warranty Inspection.

MLJs that received maximum grout volume, regardless of whether achieved a successful post-grouting air test originally or which had joint originating defects, will be tested and, if needed, regrouted, but are exempted from the warranty testing percentages.

2. Laterals Connected to Manholes (LCM), Outside Drop Connections (ODC), and Lateral Accessed from Cleanout (LACO) Warranty Testing

   Conduct warranty testing on 15% of the LCM, ODC, and LACO joints regardless of whether they passed or failed the pre- or post-grouting air test 18 to 24 months after Substantial Completion. ENGINEER will select the LCMs, ODCs, and LACOs to be warranty tested, with the selection of laterals representative of the inventory of diameters and materials originally tested.

   If more than 10% of the warranty tested LCM and LACOs joints fail, test an additional 15% of the LCMs, ODCs, and LACOs at no additional compensation. If more than 10% of the second group of warranty tested LCM, ODCs, and LACOs joints fail, test 100% of the remaining, untested, LCMs, ODCs, and LACOs at no additional compensation.

   Grout and retest all LCM, ODC, and LACO joints failing warranty testing regardless of whether they passed or failed the pre- or post-grouting air test

at no additional compensation. Grout gel time for warranty testing grouting shall be 20 seconds.

Perform a Warranty Inspection of all LCM, ODCs and LACO joints that are warranty tested.

LCM, ODC, and LACO joints that received maximum grout volume, regardless of whether achieved a successful post-grouting air test originally or which had joint originating defects, will be tested and, if needed, regrouted, but are exempted from the warranty testing percentages.

3. Lateral Tap Connection (LTC) Warranty Testing

   Conduct warranty testing on 15% of the LTCs (excluding grouted taps that contained roots) regardless of whether they passed or failed the pre- or post-grouting air test 18 to 24 months after Substantial Completion. ENGINEER will select the LTCs to be warranty tested, with the selection of pipe segments representative of the inventory of diameters and materials originally tested.

   If more than 10% of the warranty tested LTCs fail, test an additional 15% of the LTCs at no additional compensation. If more than 10% of the second group of warranty tested LTCs fail, test 100% of the remaining, untested, LTCs at no additional compensation.

   Grout and retest all LTCs failing warranty testing regardless of whether they passed or failed the pre- or post-grouting air test at no additional compensation. Grout gel time for warranty testing grouting shall be 45 seconds.

   Perform a Warranty Inspection of all LTCs that are warranty tested.

   LTCs that received maximum grout volume, regardless of whether achieved a successful post-grouting air test originally or which had joint originating defects, will be tested and, if needed, regrouted, but are exempted from the warranty testing percentages.

4. Longitudinal Fracture Defects (LFD) Warranty Testing

   Conduct warranty testing on 15% of the LFDs (excluding grouted taps that contained roots) 18 to 24 months after Substantial Completion. ENGINEER will select the LFDs to be warranty tested, with the selection of pipe segments representative of the inventory of diameters and materials originally tested. Warranty testing will consist of visual examination for leakage.

If more than 10% of the warranty tested LFDs fail, test an additional 15% of the LFDs at no additional compensation. If more than 10% of the second group of warranty tested LFDs fail, test 100% of the remaining, untested, LFDs at no additional compensation.

Grout and retest all LFDs failing warranty testing at no additional compensation. Grout gel time for warranty testing grouting shall be 60 seconds.

Perform a Warranty Inspection of all LFDs that are warranty tested.

LFDs that received the maximum grout volume or which did not achieve a successful post-grouting air test originally will be tested and, if needed, regrouted, but are exempted from the warranty testing percentages.

5. CIPP Liner Annular Space Tap (AST) Warranty Testing

   Conduct warranty testing on 15% of the ASTs (excluding grouted taps that contained roots) 18 to 24 months after Substantial Completion. ENGINEER will select the ASTs to be warranty tested, with the selection of pipe segments representative of the inventory of diameters and materials originally tested.

   If more than 10% of the warranty tested ASTs fail, test an additional 15% of the ASTs at no additional compensation. If more than 10% of the second group of warranty tested ASTs fail, test 100% of the remaining, untested, ASTs at no additional compensation.

   Grout and retest all ASTs failing warranty testing at no additional compensation. Grout gel time for warranty testing grouting shall be 30 seconds.

   Perform a Warranty Inspection of all ASTs that are warranty tested.

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SECTION 615.5 – GROUTING OF MANHOLES

615.5 - MANHOLE GROUTING

A. GENERAL

This section includes the material and procedures required for the repair of sanitary sewer manholes by chemical grouting. The Contractor shall provide all labor, materials and equipment to perform the work in accordance with these specifications. Equipment shall include pumps, hoses, gauges, drills, compressors, personal protective equipment and all other items as necessary to complete the work. The Contractor's equipment shall be of a type, capacity and mechanical condition suitable for doing the work in an effective and efficient manner.

1. WORK REQUIRED

Sealing leaks in precast manholes will be accomplished by drilling holes in the area of the leak and injecting chemical grout. If the leak is in a precast joint of the manhole barrel, the entire joint will be grouted by drilling at least three injection holes. If the leak is in the connection to a sewer, the leak will be grouted with an injection hole above the crown and another at the leak. If the leak is located within the frost zone, within 6 feet from the surface or if above bottom cone joint, urethane grout is to be used.

2. DEFINITIONS

CHIMNEY: The cylindrical variable height portion of the manhole structure used to support and adjust the finished grade of the manhole frame. The chimney extends from the top of the corbel or cone to the base of the manhole frame.

CONE OR CORBEL: That portion of the manhole structure, which slopes upward and inward from the barrel of the manhole to the required chimney or frame diameter. "Corbel" refers to a section built of brick or block, while "cone" refers to a precast section.

BARREL: That portion of the manhole structure from the bench to the cone.

PRE-APPROVED EQUAL: A product that meets the applicable material, performance and design life requirements of this specification and has been approved by the Engineer for use on this project a minimum of 7 calendar days prior to bid opening.

DEFECT: A joint that is leaking including the entire circumference of the manhole, each stain or active leak, or cluster of leaks within one square foot in a precast manhole.

3. QUALITY ASSURANCE

Sealing shall be performed by a crew under the direct supervision of a superintendent who has documented experience in the sealing procedures as specified herein and as considered standard in the sewer manhole sealing industry.

Storage, mixing, handling and use of all materials and compounds shall be in strict accordance with manufacturer's instructions and specifications.

a. STANDARDS: National Association of Sewer service Companies (NASSCO) specification guidelines for sewer collection system maintenance and rehabilitation, eighth edition.

4. SUBMITTALS

Manufacturer's information and installation procedures for chemical grout will be submitted to the Engineer prior to performing the grouting. This shall include, but not be limited to, product data, material samples, sealant mixture design, application/packing procedures, test data and a detailed description of equipment and operational procedures to accomplish the chemical grout sealing. A detailed time schedule shall also be submitted.

B. PRODUCTS

1. CHEMICAL GROUT

Water based chemical grouts shall have the following characteristics:

a. A minimum of 10% acrylamide base material by weight in the total grout mix. A higher concentration of acrylamide base material is recommended to increase strength or offset dilution during injection.

b. The ability to tolerate some dilution and react in moving water during injection.

c. A viscosity of approximately 2 centipoise, which can be increased with approved additives.

d. A controllable reaction time from 10 seconds to 1 hour.
e. A reaction (curing) that produces a homogenous, chemically stable, non-biodegradable, firm, flexible gel.

f. The ability to increase mix viscosity, density and gel strength by increased concentrations of the mix constituents or by the use of approved additives.

g. Product Manufacturer: Avanti AV-100, Avanti AV-118, or equal.

2. ADDITIVES

At the Contractor's discretion and according to field conditions, additives may be selected and used within the manufacturers recommended quantities.

a. STRENGTHENING AGENTS

For joint grouting, a latex or “diatomaceous earth” additive may be added to increase compressive and tensile strength. The quantity of strengthening agent additive shall be as recommended by the manufacturer and approved by Engineer. Product Manufacturer: Avanti AV-257 Icoset, DeNeef Reinforcing Agent, or equal.

b. DYE: A manufacturer approved water soluble dye without trace metals may be added to the grout tank(s) for visual confirmation.

c. GEL TIME MODIFIER: A gel time extending agent may be used in accordance with the manufacturer’s recommendations to extend gel time as necessary.

d. FREEZE/THAW: In those lines where the grouting material may be exposed to a freeze-thaw cycle, ethylene glycol or other Engineer approved additive shall be used to prevent chemical grout cracking once set.

When using non soluble additives the grout tanks must have mechanical mixing devices to keep the additives in suspension and maintain a uniform solution of grout and additive.

C. EXECUTION

1. CHEMICAL GROUT PREPARATION

Mix grout in plastic or metal pail. Concrete or wood containers are not allowed. Add accelerator to grout if required and stir to an even consistency.

Utilize positive displacement pumps in accordance with manufacturer's recommendations to inject chemical grout. Pumps must be flushed with washing agent in accordance with manufacturer's recommendations for at least 2 minutes before and after grouting operation.

2. CHEMICAL GROUT INJECTION

Manhole sealing may be accomplished only where the manholes are structurally sound. No sealing shall be attempted where the leakage is unconfinable, such as in brick manholes or where the structural integrity of the manhole has been lost. All manhole sealing shall be done during high groundwater conditions. The properties and characteristics of chemical sealing materials used for manhole sealing shall be as specified.

Manhole grouting shall not be performed until the repair of the manhole frame and grade rings or any other structural manhole repairs are complete. Manhole preparation work shall consist of the removal of any loose debris, grease, slime or old sealants from the manhole cracks, joints or gaps to be sealed. The Contractor shall cut, trim, and/or otherwise remove all roots within the manhole before beginning the grouting and sealing process. Preparation shall also include removal of manhole steps as required. All

foreign and loose material shall be removed by water blasting and/or by hand scraping with a steel wire brush (or other approved tool).

a. Drill injection holes for injection from within the manhole at the rate recommended in the manufacturer's written recommendations. Carefully drill holes through structure wall at 45° angles to intersect the crack at the approximate midpoint of thickness of the wall. Drill injection holes shall extend through the entire manhole wall.

b. Insert a packer and remove grease fitting to allow water to flow through the open packer. Inject chemical grout from the lowest elevation and proceed upward from packer to packer to ensure continuous flow of grout through the crack. Use potable water if necessary to speed the reaction for inactive leaks and/or dry cracks.

c. In cases where there are multiple leaks around the circumference of the manhole, fewer holes may be drilled – providing all leakage is stopped from these holes. Into the previously drilled holes, chemical sealant injection devices shall be placed in such a way that they will provide a watertight seal between the holes and the injection device. A hose, or hoses, shall be attached to the injection device from an injection pump. Chemical sealing materials as specified shall then be pumped through the

hose until material refusal is recorded on the pressure gauge mounted on the pumping unit, or a predetermined quantity of sealant has been injected. Chemical injection pumps shall be equipped with pressure meters that will provide for monitoring pressure during the injection of the chemical sealants. When necessary, fluid bypass lines equipped with pressure-regulated bypass valves shall be incorporated into the pumping system.

d. Care shall be taken during the pumping operation to insure that excessive pressures do not develop and cause damage to the manhole structure. Upon completion of the injection, the devices shall be removed and the remaining holes filled with mortar and troweled flush with the surface of the manhole walls or other surfaces. The mortar used shall be of the “fast-set” type with “non-shrinking” characteristics.

After the manhole sealing operation has been completed, the manhole shall be visually inspected for the elimination of excessive infiltration by the Contractor in the presence of the Owner’s Representative.

All sealed manholes shall be re-inspected 3 months after completion and resealed, if necessary, at no cost to the Owner.

3. PATCHING INJECTION HOLES

Remove excess grout and sealing material from structure surface. Patch injection holes with a quick setting, fiber-reinforced, high early strength, corrosion resistant, hand mixed and hand applied calcium aluminate based, cementitious material for patching and filling voids and cracks.

Material shall have the following minimum requirements:

Compressive Strength	ASTM C-109	6 hr 1,400 psi
Shrinkage	ASTM C-596	0% at 90% R.H.
Bond	ASTM C-321	28 day 150 psi
Cement		Sulfate resistant
Density, when applied		105 ± pcf

4. CHEMICAL GROUT ACCELERATOR

Resin may be mixed with the accelerator as recommended by the manufacturer. Adjust the amount of accelerator as necessary in a manner approved by the manufacturer.

5. CLEANUP

Protect upstream and downstream sewers from excess chemical grout and other construction debris. Remove excess material from omitted surfaces before the material hardens. Use drop cloths or other protective coverings when necessary. Chip away hardened globules, spatter, and excess materials from surfaces, which are not intended to be covered. Prior to demobilization from the site, the Contractor shall remove all construction debris, stabilize any spill areas, and wash roadway areas affected by the sealing operation.

6. WARRANTY

All grouting work shall be guaranteed for a period of 1 year from the date of substantial completion granted in writing by the Engineer unless otherwise stipulated in writing by the City. During this period, all defects discovered by the City shall be removed and replaced by the Contractor in a satisfactory manner at no cost to the City. The City may conduct independent inspections, at its own expense, of the grouting work at any time prior to the completion of the warranty period. The warranty shall cover liner repair due to hydrostatic leaks (infiltration).

SECTION 615.6

NAASCO SPECIFICATIONS FOR CURED-IN-PLACE-PIPE (CIPP) LATERAL SEALS

Begin section 615.6 on the following page.

Cured-In-Place-Pipe (CIPP) LATERAL SEALS

PERFORMANCE SPECIFICATION GUIDELINE

October 2016

NASSCO

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PART 1 - GENERAL

1.1 Description of work and product delivery

1.1 A. These Specifications include the minimum requirements for the rehabilitation of lateral connections and their interface with the main-line pipes via Cured-In-Place-Pipe (CIPP) as shown on the plans and included as part of these [contract documents]. The lateral seal will include an Owner specified length of lateral pipeline that will also be rehabilitated in conjunction with the lateral/mainline connection, as a one piece integrated system.

1.1 B. The rehabilitation of lateral connections and a portion of the lateral pipeline shall be accomplished by the installation of a Cured-In-Place-Pipe (CIPP) system installed from the main-line pipeline extending up the specified length of the lateral. The system may or may not require the use of cleanouts on the lateral pipeline. The installed system shall be free of all defects that will affect the design, service life and operation of the lateral interface with the main-line and the specified length of the lateral pipe.

1.1 C. The liner may be inverted or pulled into place from the mainline sewer.

1.1 D. The installed system shall eliminate water leakage into the sewer system over the entire rehabilitated length of sewer.

1.1 E. The prices submitted by the Contractor, shall include all costs for the various bid items necessary for furnishing and installing, complete and in place, the system in accordance with these specifications, except for those specified otherwise by the Owner.

1.1 F. The furnished and installed system shall include all materials, manufacturer's recommended equipment and manufacturer's installation procedures.

1.1 G. At the discretion of the Owner, the system manufacturer may submit to the Owner, a minimum of 14 calendar days in advance of a bid date, all required product information to obtain pre-approval system status. Those systems that have been pre-approved will not need to be re-submitted as required in the submittal section of these specifications unless any of the system components have changed from those pre-approved by the Owner. All other component products will be required to meet the submittal requirements as contained herein.

1.1 H. At the discretion of the Owner, the system installer may submit to the Owner, a minimum of 14 calendar days in advance of a bid date, all required qualifications information to obtain pre-approval system installer status. Those system installers that have been pre-approved will be allowed to bid on the specified project scope.

1.1 I. The installed system shall be free of all defects that will affect the design, service life and operation of the lateral and applicable portion of the main-line.

1.1 J. The installed system shall eliminate infiltration and ex-filtration over the entire length of the system.

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1.1 K. The system shall be designed against corrosion and typical chemicals found in domestic sewage, unless otherwise specified in the detailed section of the contract documents. The manufacturer of the system shall provide testing data that supports the chemical resistance in accordance with ASTM F1216.

1.1 L. The mainline and lateral portion of the system shall be designed for Partially or Fully Deteriorated design conditions per ASTM F1216 as specified by the Owner. Partially deteriorated designs conditions assume the CIPP liner is designed to support groundwater loads, while fully deteriorated design conditions assume the CIPP liner is designed to structurally replace the host pipe completely. Wall thickness design calculations stamped by a registered professional engineer shall be submitted. All design must be supported by third party testing and documentation for the exact product that is being submitted.

1.1 M. Flow entering the lateral or main-line shall be bypassed if necessary for the installation of the system.

1.1 N. All materials furnished as part of this contract shall be marked with detailed product information, stored in a manner specified by the manufacturer and tested to the requirements of this contract.

1.1 O. Testing shall be executed by the owner or by the contractor in the presence of the owner. Testing requirements will be provided by the Owner.

1.1 P. Warranty inspections shall be executed by the Owner or its representative. Any defects found shall be repaired or replaced by the Contractor according to manufacturer's recommendations.

1.2 Performance Work Statement (PWS) Submittal

1.2 A. The Contractor shall submit, to the Owner, a Performance Work Statement (PWS) package at a predetermined time set by the Owner, which clearly defines the proposed system delivery in conformance with the requirements of the contract documents.

1.2 B. Clearly indicate that the system will conform to the project requirements as outlined in the Description of Work, Scope of Work Included and as further delineated in these contract documents.

1.2 C. Certify at the time of the bid, that the designated items included in the contract documents were visited, inspected and evaluated by the Contractor or Contractor's Representative, prior to submitting a bid.

1.2 D. Where the scope of work is specifically delineated in the contract documents, a detailed installation plan describing all preparation work, cleaning operations, pre-inspections, sewage flow maintenance, traffic control, installation procedure, method of curing, quality control, testing to be performed, final inspection, warrantees furnished and all else necessary and appropriate for a complete system installation, shall be submitted.

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1.2 E. A detailed installation schedule shall be prepared, submitted and conform to the requirements of these contract documents.

1.2 F. The manufacturer's description of the system materials is to be furnished for the project. Material descriptions shall be sufficiently detailed in the submittals to verify conformance to these specifications and/or shall conform to the pre-approved system submission.

1.2 G. The Contractor's experience with the system proposed for use in this contract. The name and experience of each lead individual performing work on this contract shall be submitted. If personnel are substituted after bid submittal the name and experience of the individual shall be submitted to the Owner for approval before starting any work.

1.3 Submittals (after contract award)

1.3 A. Product data submittals required for all rehabilitation lateral lining systems proposed for installation under this contract shall include:

1. System material type and manufacturer to be used including: catalog data sheets, ASTM references, material composition, manufacturers recommended specifications, component physical properties and chemical resistance.

2. Manufacturer's detailed description of the recommended procedures for handling and storing materials

3. Manufacturers detailed description of the recommended system installation process

4. Copies of independent testing performed on the CIPP liner composite verifying the product meets the requirements as specified in these contract documents and the manufacturers design.

5. By-Pass Pumping Plan if applicable to the system being installed.

6. Traffic Control plan, if applicable for the system being installed.

7. Certified statement, from the manufacturer, that the contractor/installer is an approved installer of the system with certificates of completed training for each crew member involved. This requirement shall comply with the specific system requirements specified in the contract documents

8. Submittal of all quality assurance documentation and test reports for system installed. (After Rehabilitation Completion)

9. CIPP wall thickness design calculations based upon ASTM F1216 assuming either Fully or Partially Deteriorated conditions, as specified by the owner. The designs will be stamped by a Professional Engineer if required by the Owner.

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10. Wetout/cure logs per liner providing details pertaining to the resin type and quantity, catalyst type and quantity, tube type, installation pressures, temperatures and times (as applicable to the curing lateral lining system utilized), and pertinent Owner/User project specific data.

11. Third party testing of the physical properties, corrosion resistance and sealing method.

12. Health and Safety plan detailing the site specific safety requirements.

13. Qualifications of the Contractor to install the system.

14. Qualifications of the proposed system to meet the requirements of the Contract.

1.4 Quality Control Plan (QCP)

1.4 A. A detailed quality assurance plan (QCP) shall be submitted to the Owner that fully represents and conforms to the quality control requirements of these specifications. At a minimum the QCP shall include the following:
1. How the system is prepared for installation
2. How the system is installed
3. How the completed system is confirmed to be in compliance with the requirements of the Contract.
4. Training/Qualifications of personnel preparing and installing the system

1.4 B. Proposed procedures for quality control, product sampling and testing shall be defined.

1.4 C. Proposed methods for product performance controls, including method of and frequency of product sampling and testing as applicable.

1.4 D. Proposed methods and procedures for system repair or replacement, (as defined in Section 1.6) in the event of product defects or failure.

1.5 Lateral Lining System repair/replacement

1.5 A. Due to defects in preparation and/or installation, systems will occasionally need to be repaired or partially replaced. The Manufacturer shall outline specific repair or replacement procedures for potential issues that may occur during the installation of the system. Repair/replacement procedures shall be as recommended by the system manufacturer and shall be submitted as part of the PWS.

1.5 B. Issues, that may not affect the operation and long term life of the product, shall be identified and defined by the Manufacturer.

1.5 C. Repairable issues that may occur in the system shall be specifically based on Manufacturer's recommendations, including a detailed step-by-step repair procedure, resulting in a finished product meeting the estimated life cycle of the component and requirements of these contract specifications.

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1.5 D. Un-repairable issues that may occur in the system shall be clearly defined based on the Manufacturer's recommendations. The Contractor, together with the manufacturer, shall define the best recommended procedure for the total removal and replacement of the system.

1.5 E. The Contractor shall receive no additional compensation for the repair or replacement of system deemed non-conforming to the requirements of these contract documents and unacceptable by the Owner.

1.6 Safety

1.6 A. The Contractor shall conform to all work safety requirements of pertinent regulatory agencies, and shall secure the site for working conditions in compliance with the same. The Contractor shall erect such signs and other devices as are necessary for the safety of the work site.

1.6 B. The Contractor shall perform all of the Work in accordance with applicable OSHA safety standards. Emphasis shall be placed upon the requirements for entering confined spaces.

1.6 C. The Contractor shall have on the job site at all times at a minimum the following safety equipment:

1. Gas monitor capable of testing and detecting for combustible gas, oxygen deficiency and hydrogen sulfide.
2. Confined space access and retrieval winch system.
3. Ventilating fans with large diameter ventilating hose.
4. Safety harness and life lines.
5. Other equipment as may be required for a specific project
6. All equipment to be available for use, in sufficient quantity, by the Contractor, Engineer and Owner for the duration of the project.

1.6 D. All entries into or work within confined spaces shall be conducted in accordance with the U.S. Department of Health and Human Services/National Institute for Occupational Safety and Health [DHHS (NIOSH)] Publication No. 87-113, A Guide to Safety in Confined Spaces.

1.7 Warranty

1.7 A. The materials used for the project shall be certified by the manufacturer for the specified purpose. The manufacturer shall warrant the SYSTEM materials to be free from defects in raw materials for one (1) year after installation or from the date of acceptance by the Owner, whichever is later. The Contractor shall warrant the system for a period of one (1) year.

1.8 Warranty Inspections

1.8 A. The Owner shall perform, at its own cost, warranty inspections with its own personnel or personnel independent of the installation contractor.

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1.9 Measurement and payment

1.9 A. Typical bid items consist of:
1. Clean and CCTV of specified lateral, including specified length of lateral pipeline, per Each
2. Furnish and install system, including Owner specified length of CIPP lateral liner, per EA
3. Furnish and install CIPP lateral liner extending beyond item 2, per LF

1.9 B. Measurements for each item furnished and installed to the satisfaction of the Owner shall be at the units of measure contained in the Bid Proposal.

1.9 C. Payment for each item shall be in accordance with the contract documents at the unit or lump sum prices bid therefore in the Bid Proposal.

PART 2 - LATERAL LINING PRODUCTS

2.1 Lateral seals

2.1 A. General

1. The system seals the point of connection from a main-line pipe to a connecting lateral pipeline and is normally installed without excavation by the install of a resin-impregnated, flexible laminate installed into the existing service lateral, lapping over the main-line pipe, sealing the connection.

2. The system can be specified one of the following:
   (a) Tee/full wrap section with a full circumferential CIPP liner inside the main pipe and a tube which shall extend continuously from the sewer main into the lateral for an Owner specified distance
   (b) Flange/brim CIPP connection seal and tube which shall extend continuously from the sewer main into the lateral for an Owner specified distance.
   (c) A system that is similar to those listed above and acceptable to the Owner.

3. The system shall extend an Owner specified length into the lateral.

4. The Contractor will determine the need for a clean out on the lateral(s) specified for rehabilitation.

5. The system shall be capable of sealing a combination of “tees” and “wyes” of varying angles. The resin shall be cured to form the tube into a hard impermeable pipe-within-a-pipe.

6. When cured, the system shall seal the connection of the lateral to the mainline in a continuous tight-fitting, watertight pipe-within-a-pipe to eliminate any visible

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leakage between the lateral and mainline and shall provide a leak-proof seal to prevent root intrusion, infiltration, and ex-filtration between the liner and host pipe.

7. Systems that use polyester and vinylester resins shall include a method of sealing the connection and the end of the laterals liner as recommended by the manufacturer of the system. The product used in the sealing method shall be installed in accordance with manufacturer's recommendations. The sealing method shall be tested by simulating groundwater pressure using a third party and stamped by an engineer.

8. Systems that use silicate or epoxy shall prepare the host pipe in accordance with manufacturer's recommendations. Third party testing shall be provided to prove the bond strength between the resin and surface it is to bond to.

9. The installation of the system will require the product to be capable of installing without access to the upstream side of the lateral pipe and capable of navigating bends or other transitions in alignment as identified by the owner in the contract bid documents.

2.1 B. References

1. ASTM F1216 – Standard practice for rehabilitation of existing pipelines and conduits by the inversion and curing of a resin-impregnated tube.

2. ASTM F1743 – Standard practice for rehabilitation of existing pipelines and conduits by pulled-in-place installation of cured in place thermosetting resin pipe.

3. ASTM D543 – Practices for evaluating the resistance of plastics to chemical reagents.

4. ASTM D790 – Test methods for flexural properties of unreinforced and reinforced plastics and electrical insulating materials.

5. ASTM D5813 – Specification for cured in place thermosetting resin sewer piping systems.

6. ASTM F2019 – Standard practice for rehabilitation of existing pipelines and conduits by the pulled in place installation of glass reinforced plastic (GRP) cured in place thermosetting resin pipe.

7. NASSCO Guideline Specification for the installation of cured in place pipe (June 2011).

8. NASSCO Guideline Specifications for cleaning and televising pipelines

2.1 C. Materials

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1. Non-woven fabric tube

   (a) The fabric tube shall consist of one or more layers of absorbent non-woven felt fabric, felt/fiberglass or fiberglass and meet the requirements of ASTM F 1216, ASTM F 1743, ASTM D 5813 & ASTM F2019. The fabric tube shall be capable of absorbing and carrying resins, constructed to withstand installation pressures and curing temperatures and have sufficient strength to bridge missing pipe segments, and stretch to fit irregular pipe sections.

   (b) The wet-out fabric tube shall have a uniform thickness and excess resin distribution that when compressed at installation pressures will meet or exceed the design thickness after cure.

   (c) The fabric tube shall be manufactured to a size that when installed will tightly fit the internal circumference, meeting applicable ASTM standards or better, of the original pipe or the existing lined pipe. Allowance shall be made for circumferential stretching during installation. The tube shall be properly sized to the diameter of the existing pipe and the length to be rehabilitated and be able to stretch to fit irregular pipe sections and negotiate bends. The Contractor shall determine the minimum tube length necessary to effectively span the designated run. The Contractor shall verify the lengths in the field prior to ordering and prior to impregnation of the tube with resin, to ensure that the tube will have sufficient length to extend the entire length of the run. The Contractor shall also measure the inside diameter of the existing pipelines in the field prior to ordering liner so that the liner can be installed in a tight-fitted condition.

   (d) The outside and/or inside layer of the fabric tube (before installation) shall be coated with an impermeable, flexible membrane that will contain the resin and facilitate vacuum impregnation and monitoring of the resin saturation during the resin impregnation (wetout) procedure.

   (e) No material shall be included in the fabric tube that may cause de-lamination in the cured CIPP. No dry or unsaturated layers shall be acceptable upon visual inspection as evident by color contrast between the tube fabric and the activated resin containing a colorant.

   (f) The wall color of the interior pipe surface of CIPP after installation shall be a light reflective color so that a clear detailed examination with closed circuit television inspection equipment may be made. The hue of the color shall be dark enough to distinguish a contrast between the fully resin saturated felt fabric and dry or resin lean areas.

   (g) Seams in the fabric tube, if applicable, shall meet the requirements of ASTM D5813. H.

   (h) The outside of the fabric tube shall be marked with the name of the manufacturer of the CIPP lateral lining system, manufacturing lot and/or production footage, as applicable. The print must be visible during final CCTV inspection.

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(i) The minimum length of the fabric tube shall be that deemed necessary by the installer to effectively span the distance specified by the Owner.

(j) The nominal fabric tube wall thickness shall be constructed, as a minimum, to the nearest 0.5 mm increment, Wall thickness transitions, in 0.5 mm increments or greater as appropriate, may be fabricated into the fabric tube between installation entrance and exit access points. The quantity of resin used in the impregnation shall be sufficient to fill all of the felt voids for the nominal felt thickness.

(k) The liner shall be constructed with transitions where applicable.

2. Resin

(a) The resin shall be a corrosion resistant polyester, vinyl ester, silicate or epoxy resin and catalyst system and hardener system that, when properly cured within the tube composite, meets the requirements of ASTM F1216, ASTM F1743 or F2019, the physical properties herein, and those, which are to be utilized in the design of the CIPP for this project. The resin shall produce CIPP, which will comply with or exceed the structural and chemical resistance requirements of this specification.

(b) The method of cure may either be from a manufacturer recommended heat source, light cure or by ambient temperature. Method of cure instructions along with a cure log shall be on-site at all times.

(c) The resin to tube ratio, by volume, shall be furnished as recommended by the manufacturer.

3. Structural requirements

(a) The physical properties and characteristics of the finished liner will vary considerably, depending on the types of resin and tube used. It shall be the responsibility of the Contractor to provide a CIPP lateral lining system which meets or exceeds the minimum properties specified herein.

(b) The CIPP shall be designed per ASTM F1216. The CIPP design shall assume no bonding to the original pipe wall.

(c) The lateral CIPP shall be designed assuming the following minimum design data, unless otherwise modified by the Owner:

(i) Factor of Safety = 2
(ii) Soil Modulus = 1,000 psi
(iii) Soil Density = 120 pcf
(iv) Live Load = H20
(v) Depth of Cover = as specified
(vi) Groundwater = ½ depth of cover
(vii) Ovality = 2%

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(d) The design engineer shall set the long term (50 year extrapolated) Creep Retention Factor at 50% of the initial design flexural modulus as determined by ASTM D-790 test method. This value shall be used unless the Contractor submits long term test data (ASTM D2990) to substantiate a different retention factor.

(e) The cured pipe material (CIPP) shall, at a minimum, meet or exceed the structural properties, as listed below.

(i)	Flexural modulus of elasticity:	250,000 psi
(ii)	Flexural strength:	4,500 psi

4. The structural performance of the finished pipe shall be adequate to accommodate all anticipated loads throughout its design life. No cured-in-place pipe rehabilitation technology will be allowed that requires bonding to the existing pipe for any part of its structural strength.

PART 3 - EXECUTION

3.1 Lateral seals

3.1 A. General

1. Lateral seals are typically installed from the lined main-line with a lateral CIPP portion that extends up the lateral at an Owner specified distance.

2. Clean-outs are recommended but <u>not</u> always required to successfully install a lateral seal. Clean-outs shall be installed at the Owners' discretion. If the Owner decides clean outs are preferred, the owner shall specify the type of cleanout.

3.1 B. Preparation

1. Preparation, cleaning, inspection, sewage by-passing and public notification are the responsibility of the Contractor, with the assistance of the Owner. The Contractor shall clean the interior of the existing host pipe prior to installation of the system. All debris and obstructions, that will affect the installation and the final product shall be removed and disposed of. All preparation shall be in accordance with the manufacturer's written installation procedures.

2. The system shall be constructed of materials and methods, that when installed, shall provide a jointless and continuous structurally sound CIPP able to withstand all imposed static and dynamic loads on a long-term basis, as specified by the Owner.

3. The Contractor may, under the direction of the Owner, utilize any of the existing manholes in the project area as installation access points or excavate access points at predetermined locations.

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4. Pre-Cleaning CCTV – The Contractor shall request utility locating (as required by the Owner or local Government) to identify potential cross-bore utilities within the proximity of the service lateral to be cleaned for rehabilitation, if applicable. Prior to cleaning, the Contractor shall to all extents possible, televise the service lateral to confirm that cleaning the lateral will not damage or breach a conflicting utility bored through the sewer lateral (such as natural gas or power) when the utility locate indicates a potential conflict.

5. Cleaning of Pipe Lines - The Contractor shall remove all internal debris from the pipe line that will interfere with the installation and the final product delivery of the system as required in these specifications. The Contractor shall make use of commercially available industry standard cleaning equipment to prepare the pipe for system installation. Solid debris and deposits shall be removed from the pipeline, if possible, and disposed of properly by the Contractor. Precaution shall be taken, by the Contractor in the use of cleaning equipment to avoid damage to the existing pipe. If the pipe cannot be cleaned sufficiently using industry standard cleaning equipment then additional cleaning will be considered changed conditions.

6. Post-Cleaning CCTV – Upon completion of the cleaning, the Contractor shall then perform a Post-Cleaning CCTV Inspection, which typically acts as the Pre-rehabilitation CCTV Inspection.

7. Existing Sewage Flows – The Contractor shall provide flow diversion or stoppage requirements to the owner to assist in developing plan including notifying upstream users to temporary stop using their water/wastewater during the system installation.

8. Bypass Existing Sewage Flows - When circumstances require continuous service, for the flow of the service connection (such as medical facilities or laboratories), the Contractor will install a temporary sewage by-pass system, if required by the Owner. Once the rehabilitation process has begun, existing sewage flows shall be maintained, until the system is fully installed. The Contractor shall coordinate sewer bypass and flow interruptions with the Owner at least 7 days in advance and with the property owners and businesses at least 1 business day in advance. The pump and bypass lines shall be of adequate capacity and size to handle typical flows.

9. Contractor shall perform post-cleaning video inspections of the pipelines. Only PACP certified personnel trained in locating breaks, obstacles and service connections by closed circuit television shall perform the inspection. The Contractor shall provide the Owner a copy of the pre-cleaning and post-cleaning video and suitable log, and/or in digital format for review prior to installation of the CIPP and for later reference by the Owner, if specifically required by the Owner.

10. Line Obstructions - It shall be the responsibility of the Contractor to clear the line of obstructions that will interfere with the installation and long-term performance of the system. If pre-installation inspection reveals an obstruction, misalignment, broken or collapsed section or sag that was not identified as part of the original

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scope of work and will prohibit proper installation of the system, the Contractor may be directed by the Owner to correct the problem(s) prior to installing the system by utilizing open cut repair methods. This work will be considered changed conditions, or if there is an existing bid item for this work, the Contractor shall be compensated under the particular pay item designated for open cut point repairs.

11. The Contractor shall be responsible for confirming the locations of all branch service connections prior to installing and curing the CIPP. If required in the contract documents, each connection will be dye tested to determine whether or not the connection is live or abandoned. The cost for dye testing of existing service connections shall be compensated at the unit price bid. In the event the status of a service connection cannot be adequately defined, the Owner will make the final decision, prior to installation and curing of the liner, as to the status. Typically only service connections deemed “active” shall be reopened by the Contractor. Reinstatement in small diameter pipes typically requires a cleanout for external reinstatement.

12. The Contractor shall be allowed use water from an owner-approved fire hydrant in the project vicinity. Use of an approved double check backflow assembly shall be required, unless an open gap exists in the Contractor’s equipment. Contractor shall provide his own approved assembly. Contractor shall pay current market price for all water usage, unless otherwise specified by the Owner.

3.1 C. Install

1. The entire liner shall be wetout using vacuum impregnation including the lateral and mainline portions.

2. The system shall be loaded inside and/or on a pressure apparatus. The pressure apparatus, attached to a robotic device, shall be positioned in the mainline pipe at the service connection. The robotic device, together with a CCTV camera, shall be used to align the lateral portion of the system with the service connection opening. Air pressure, supplied to the pressure apparatus through an air hose, shall be used to invert or expand the resin impregnated CIPP into the lateral pipe, and push the main-line portion of the system against the main-line pipe (typically lined pipe). The pressure shall be adjusted to the manufacturer’s recommended installation pressure to fully install the CIPP into the lateral pipe and hold the system tight to the pipe walls. Care shall be taken during the curing process not to over-stress the tube.

3. After lateral CIPP installation is completed, manufacturer’s recommended pressure is maintained on the impregnated CIPP for the duration of the curing process. Curing method shall be compatible with the resin selected and shall be in accordance with manufacturer’s recommendations. The initial cure shall be deemed to complete when the CIPP has been exposed to the UV light, heat source or held in place for the time period specified by the manufacturer.

4. The Contractor shall cool (if heat cured) the hardened CIPP before relieving the pressure in the apparatus. Cool-down may be accomplished by the introduction of

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cool air into the pressure apparatus. Care shall be taken to maintain proper pressure throughout the cure and cool-down period.

5. If cured by ambient-cure process, the Contractor shall maintain bladder pressure until CIPP has completely cured per manufacturer's recommendations before relieving the pressure in the pressure apparatus.

6. The finished CIPP shall be free of dry spots, lifts and de-lamination. The system shall not inhibit the closed circuit television post video inspection of the mainline or service lateral pipes. Frayed ends of the system shall be removed prior to acceptance.

7. Contractor shall maintain a visible, written log of all activities in accordance with manufacturers' recommendations and shall include time/location of wet out, time of insertion, time/location of lateral insertion, bladder pressure requirements, required cure time, actual cure time, and cool down duration.

8. During the warranty period, any defects which will affect the integrity of strength of the system and allow leaks shall be repaired at the Contractor's expense in a manner mutually agreed upon by the Manufacturer, City and the Contractor.

9. After the work is completed, the Contractor will provide the City with the specified video format showing the completed work including the restored conditions.

3.1 D. Finish

1. The installed system shall be continuous over the specified length of the sewer line section (including main-line and lateral) and be free from visual defects such as foreign inclusions, dry spots, pinholes, major wrinkles and de-lamination. The system shall be impervious and free of any leakage from the pipe to the surrounding ground or from the ground to inside the lined pipe.

2. Any defect, which will or could affect the structural integrity or strength of the system or allow leaks, shall be repaired at the Contractor's expense,

3. The system shall provide a watertight seal at the connection to the main-line pipe and for the length of the lateral CIPP lined. The following methods/materials are recommended for ensuring a water tight seal:

   (a) 100% Solids Epoxy providing an adhesive bond between the system and the host pipe, installed/applied per the manufacturer's recommendations.

   (b) Hydrophilic materials installed/applied per the manufacturer's recommendations

4. Branch lateral connections or any other pre-existing connection to the service lateral shall be reinstated by a remote controlled robotic cutting device, either from within the pipeline or externally through a cleanout. The reinstated connection shall be brushed to allow for a smooth edge.

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5. Cured samples of the CIPP may be required for testing physical properties in accordance with the requirements specified herein. The test shall be performed by an independent 3rd party laboratory, if required by the Owner and as recommended by the system manufacturer.

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END OF SECTION 615.6

SECTION 620 – REMOVALS, EARTHWORK AND GRADING

620.1 – REMOVALS

1. PREPARATION OF RIGHT-OF-WAY

Should any tree, shrub, or plant that has been disturbed or otherwise damaged by the Contractor die within one year from the time that it was disturbed or damaged, they shall replace such tree, shrub, or plant in kind and size or satisfactorily compensate the property owner. Proof of satisfactory compensation to a property owner shall be a written release from the property owner to the Contractor, a copy of which shall be provided to the Engineer.

The Contractor shall not store materials and equipment over tree roots in grounds belonging to the Milwaukee County Parks system in the area between the curb and sidewalks or bike paths, or any other County property without County permission. The Contractor shall develop a written plan for the storage of vehicles and materials at the construction site. This plan shall be submitted to the Engineer for their approval prior to starting construction. **If the Contractor wishes to use any property outside the City right-of-way, they must provide written approval from the property owner to the City.**

a. TRACKING PADS

Tracking Pads, where shown in the plan, shall be constructed according to Section 628.2.14 & 628.3.16 of the State Specs. Tracking Pads should be reviewed on a minimum of a weekly basis and replaced or reworked as needed to minimize material tracked onto adjacent roads. If directed by the Engineer, the Contractor shall replace or rework the Tracking Pad within 24 hours of the request being made. Tracking Pads shall be considered incidental to the contract unless a pay item is provided for in the contract.

2. CLEARING AND GRUBBING

If clearing and grubbing is required by the contract, clearing and grubbing shall be per Section 201 of the State Specs.

The Contractor shall dispose of all stumps, roots, brush, waste logs and limbs, timber tops, and debris resulting from clearing and grubbing by chipping or removing the material from the right-of way. Burning of debris or burying debris within the right of way is not permitted.

The contractor shall not remove City trees unless directed in writing by the Engineer or explictly shown to be removed by the Conctrator in the plan.

a. Tree Trimming

If tree trimming of private trees overhanging the right-of-way or an easement is required under the contract, the contractor shall hired a certified arborist to perform the tree trimming. Symmetrically trim lower limbs or branches of trees left in place and overhanging the right-of-way or easement to at least 18 feet above the finished grade but no more than 24 feet above finished grade unless otherwise authorized in writing by the Engineer. Trim tree branches using generally accepted horticultural practices.

The Contractor shall not trim any City owned tree. If the Contractor believes a City owned tree or trees requires trimming, the Contractor shall notify the Engineer prior to the Pre-Construction Conference to see if City Forces can trim the tree(s). The Engineer will consult with the City Forester to determine if the tree(s) can be trimmed. The City will not accept any additional costs from the Contractor regardless of whether or not the tree(s) can be trimmed.

3. SAWCUTTING

All sawing is considered incidental to the contract unless otherwise noted.

Sawcutting consists of sawing existing concrete or asphaltic pavements, curb and gutter, driveways, or sidewalks, and the washing of the sawing debris at locations where cuts have been made in areas still open to traffic, or as directed by the Engineer. The saw cuts shall be straight, vertical, and to the full depth of the pavement. All debris and residue created from sawcutting shall be immediately removed and cleaned up by the Contractor to the satisfaction of the Engineer. Debris and residue shall not be washed down into the storm sewer. Utility trenches shall be sawed prior to pavement removal unless otherwise approved by the Engineer.

For sawing that is not straight or for sawing where the debris and residue is not properly cleaned, 5% of the pavement cost may be credited to the project if the Contractor does not re-saw or cleanup as directed. Any re-cuts or extra cleaning shall be at the Contractor’s expense.

For trenches, the width of pavement cut shall be sufficiently sized to allow for a minimum of an 8 inch undisturbed ledge on each side, where gravel backfill is used. The contractor may elect to re-saw prior to pavement replacement at the contractor’s own expense. The Engineer may direct the Contractor to re-saw areas where damage has occurred to the existing pavement. Curbs and sidewalks shall be completely removed to existing expansion or scored joints sawed full depth, falling within 4 feet of the normal restoration limits, as directed by the Engineer.

4. REMOVAL OF PAVEMENT AND ANCILLARY CONCRETE

Saw all pavements (bituminous and concrete), curb & gutter, driveway aprons, and sidewalk prior to removal as incidental to the work unless otherwise noted as a base bid item. All concrete or asphalt over concrete base shall be sawed to the full depth of the concrete except where noted on the plans, and in accordance with Section 203.3.2.2 of the State Specs.

The Contractor shall use appropriate concrete breaking machinery to minimize disruption to nearby residents and businesses. The Engineer reserves the right to order the Contractor to change the method of pavement breaking during the progress of the work if damages seem likely to occur. In any event, the Contractor shall be solely responsible for all damages

The edges of existing pavements to remain in place shall be cut as straight lines with vertical faces. The defective pavement shall be removed from an area without damaging the remaining pavement. Damage to pavements due to the Contractor's negligence, as determined by the Engineer, shall be replaced as directed by the Engineer at the expense of the Contractor.

Service walks, fences, and other structures within the grading limits belonging to abutting property owners shall be removed and delivered to the abutting property when ordered by the Engineer. Any other material not required by the City shall become the property of the Contractor, who shall remove and dispose of such material at their own expense.

5. MILLING ASPHALT & CONCRETE

The Contractor shall use a self-propelled milling machine with depth, grade, and slope controls. Mill to depth identified in the plans +/- 0.25 inches or as directed by the Engineer. Shroud the drum to prevent discharging loosened material into adjacent work areas or live traffic lanes. Provide an engineer-approved dust control system. Millings shall be disposed of by the contractor unless otherwise noted.

If no milling depth is given on the plans for milled butt joints, butt joints shall be milled to a minimum of 2 inches in dpeth where matching into existing pavement unless otherwise approved by the Engineer.

All milled butt joints, in driveways where there is no existing joint, are to be sawed, prior to milling.

6. PAVEMENT CORE HOLES

If pavement cores are necessary to locate underground utilities, the pavement cores maybe salvaged and temporarily reinstated prior to a permanent pavement repair being completed. Reinstatement of a core shall not be considered a permanent

repair unless so authorized in writing by the Engineer and shall only apply in certain special conditions at the discretion of the Engineer. Core hole plugs shall be reinstated with Utilibond or UtiliGrout 2-part epoxy mix, or approved equal.

Pavement repairs shall be a minimum of a 4’ x 4’ repair area in all pavements. For concrete pavements, the minimum area may be larger depending on the location of surrounding joints.

For cores in the curb flange, a minimum of a 5’ section shall be replaced. If the core is within 3’ of a joint or crack in the curb and gutter, replace the section to the joint or 3” beyond the crack. Replace the entire section if less than 5’ of the piece of curb and gutter impacted will remain in place.

For cores in sidewalk and driveway approaches, the Contractor shall replace the entire sidewalk square or driveway approach panel. If the core hole is completed in a curb ramp (including the curb and gutter), curb ramp landing, and/or sidewalk square adjacent to the landing, the complete curb ramp will be required to be replaced.

7. SALVAGED MATERIALS

Existing iron on structures to be abandoned or rebuilt and hydrants to be removed shall be removed by the Contractor using reasonable care. These salvaged items will become property of the City and shall be delivered to the City's Public Works Building at 11100 W. Walnut Rd. by the Contractor, even if they are damaged or broken. The Contractor shall be fined $20 per frame, lid/cover, and back-box which is unaccounted for at the end of the project, to be deducted from monies owed to the Contractor. Internal manhole chimney seals shall be removed and disposed of by the Contractor as incidental to the work.

620.2 – EXCAVATION AND GRADING

1. GENERAL

Excavation and Grading work shall be performed in accordance with Section 205, 207, 208, 211, and 305 of the State Specs, except as modified herein, to the depths and thicknesses indicated on the plans. The removal of asphalt pavement shall be incidental to common excavation. In cases where asphalt pavement overlays concrete pavement, the removal of the asphalt shall be incidental to the concrete pavement removal item. References to Section 700 of the State Spec can be omitted unless otherwise noted in the plans or special provisions.

Excavation and disposal of excess material to the specified depth of the new pavement is required and will be paid for under the unit bid item for removals, but the removal of temporary pavement shall be considered incidental to the price of placing said pavement.

The approaches to the street being graded shall be sloped as indicated on the plan or as directed in the field by the Engineer to reasonably accommodate any equipment or vehicles entering the site. The side slopes shall be graded at a 6-to-1 slope. If due to the existing grades a 6-1 slope cannot be achieved, the maximum permitted slope shall be 4-1 unless otherwise directed by the Engineer. The Contractor shall notify the Engineer where a maximum 6-1 slope cannot be achieved and obtain the variance in writing from the Engineer prior to grading.

All sidewalks shall be graded for four (4) inches of base aggregate dense unless otherwise noted.

2. EXCAVATION

Surplus excavation must be wasted by the Contractor, at their expense, in locations permitted to such disposal outside the right-of-way (unless otherwise indicated). The estimated quantity for grading is based on information provided by the cross-sections of the roadway and does not include the excavation or backfill for utility excavations. If a Common Excavation item is not included in the contract, backfilling and beveling along replaced pavement, sidewalk, driveway approaches, curb & gutter and other hard surface restoration is considered incidental to the contract.

Earth in excavation shall be removed to the proper cross section as shown or noted on the plans. The Contractor shall dispose of all excess earth not required in the Contract, and shall also dispose of earth not suitable in the judgment of the Engineer to be used in the work.

Large rocks, 6” in diameter or larger, and other obstructions shall be removed to a depth of not less than 2 foot below subgrade within the road bed or 3’ below the finished grade if outside the road bed. The cost of this work is to be included in the bid price for excavation.

3. EARTH FILL

Earth taken from excavation shall be placed in embankment to the proper cross section as shown on the plans. Such filling shall be placed in layers not to exceed 8 inches in depth and shall be uniformly spread and compacted in such a manner and with such equipment as is deemed acceptable by the Engineer. All sod and other vegetable matter shall be stripped from the ground surface before any filling operations begin. Material used in the preparation of the subgrade shall consist of suitable sand, clay, earth, or gravel, and be free from animal, vegetable, or any other organic matter.

The Contractor shall grade the area around the sidewalk to the proper cross section or depth noted for topsoil before paving. This work shall be done by hand methods

or by use of equipment which, in the opinion of the Engineer, will not cause damage to the curb, walk, or trees. Backfill material placed between the curb and the lot line shall be free from roots, rocks, and construction debris, and shall be subject to the approval of the Engineer.

4. SUBGRADE

Before depositing stone, the Contractor shall shape the subgrade by scarifying, blading, leveling, and rolling as required to prove the required grade and cross-section Areas which are inaccessible to the roller shall be thoroughly compacted with a plate compactor. Use of plate compactors for utility frame adjustments is not permitted. The Contractor shall not do unnecessary hauling upon the finished subgrade. Any ruts or holes that develop during trucking operations in the subgrade or dense graded base shall be re-graded and compacted at the expense of the Contractor.

The Contractor shall conduct their operations so as to not expose the subgrade to precipitation that may cause the subgrade to become unstable. If the Contractor fails to protect the subgrade with the means and methods used, the Contractor shall bear all costs to stabilize or undercut the unstable material.

Subgrade under open graded base areas shall not be compacted or subjected to excessive construction equipment traffic prior to geotextile placement. Where erosion of subgrade has caused accumulation of fine materials or surface ponding, remove material with light equipment and scarify underlying soils to a minimum depth of 6 inches with a York rake or equivalent and light tractor. Fill and lightly re-grade any areas damaged by erosion, ponding, or traffic compaction before placing stone. Bed bottoms are level grade.

5. PROOF ROLL

The Contractor shall attempt to locate any soft or spongy areas in the subgrade using a method approved by the Engineer. Any soft or spongy areas in the subgrade must be removed and replaced with suitable material as directed by the Engineer prior to placement of the base aggregate and prior to any forecasted precipitation once the existing subgrade has been exposed. The Engineer may also require a proof roll of the dense graded base before paving operations begin.

6. EXCAVATION BELOW SUBGRADE (EBS)

Undercutting of unstable subgrade or base must be authorized by the Engineer. The volume of material removed will be determined either by direct measurement or markings on the subgrade/base measured by the Engineer. The Contractor shall make undercuts approximately 1 foot deep unless instructed otherwise by the Engineer. The aggregate used to fill the undercuts shall be as shown in the plans or

as directed by the Engineer. Undercuts required due to subgrade exposure to precipitation shall be completed at the cost of the Contractor.

7. UNDERDRAINS

Underdrain installation shall conform to Section 612 of the State Specs unless otherwise noted.

In applications with open graded base for porous surfaces, such as asphalt or permeable pavers, the underdrain piping shall be perforated or slotted rigid PVC pipe manufactured in accordance with ASTM D-3034. Perforations shall be 3/8” on 12” centers.

8. GEOSYNTHETICS

Furnish and install geotextiles for subgrade separation and stabilization, drainage filtration, subgrade reinforcement, and under culverts and riprap as shown in the plans or directed by the Engineer. Geosynthetics shall conform to the requirements of Section 645 of the State Specs. The City may request samples for testing from the job site.

For applications with open graded base for porous surfaces, such as asphalt or permeable pavers, the Contractor shall provide non-biodegradable, nonwoven fabric made from 100 percent polypropylene staple filaments as manufactured by the following or an approved equal:

a) Carthage Mills - Series: FX-80HS.
b) TenCate Geosynthetics North America Mirafi - Series: 160N.
c) Propex Inc. - Series: Geotex 801
d) US Fabrics, Inc. - Series: 205NW

9. DENSE GRADED BASE

Dense graded base shall be 1-1/4 inch per section 305.2.1 of the State Specs, constructed to the thickness as shown on the plans or as directed in the field by the Engineer, and constructed in accordance with State Spec 305, except as noted herein, to the compacted thickness shown on the plans or stated in the proposal. All organic material shall be removed from the site of the work and shall not be used as part of the base or subgrade material, and this shall be considered incidental to the work.

a. MATERIALS

The 1-1/4 inch crushed aggregate shall conform to the following gradation requirements:

Table 1

SIEVE SIZE	PERCENT PASSING BY WEIGHT
31.5mm (1 ¼ in.)	95 to 100
25mm (1 in.)	-
19mm (3/4 in.)	70 to 93
9.5mm (3/8 in.)	42 to 80
4.75mm (No. 4)	25 to 63
2.00mm (No. 10)	16 to 48
0.425mm (No. 40)	8 to 28
0.075mm (No. 200)	2 to 12

If the Contractor requests to use 1-1/4 inch recycled concrete in lieu of crushed aggregate and the request is approved by the Engineer, the 1-1/4 inch recycled concrete shall meet the gradations listed in Table 1 above.

The stone shall be shaped and thoroughly compacted to the specified thickness to at least 95% of maximum density.

b. PLACEMENT

Crushed dense graded base (gradation 1-1/4 inch) shall be placed and compacted to lifts no thicker than 6 inches until the overall thickness indicated by the plans is reached. Compaction shall be to 95% of maximum density per section 305.3.2 of the State Specs. Soft or yielding spots must be reworked or removed, replaced, and rolled until the dense graded base is uniformly compacted over its entire length and width with no tendency to ravel.

Where the contract specifies or allows 1 ¼-inch base, do not place reclaimed asphalt or blended materials below virgin aggregate materials unless the Engineer allows in writing.

c. PAYMENT

No payment will be made for dense graded base quantities exceeding 125% of the final estimated quantities as computed by the City unless additional earth excavation has been approved by the Engineer. Dense graded base may be incidental to some items in the contract and will not be paid under the Dense Graded Base bid item, if present in the contract.

10. OPEN GRADED BASE

Open Graded Base shall be constructed to the thickness as shown on the plans or as directed in the field by the Engineer, and constructed in accordance with State Spec 310, except as noted herein.

a. Materials

Crushed stone shall contain a minimum of 90% fractured faces and have a LA Abrasion of less than 40 per ASTM C 131. Do not use rounded river gravel for vehicular applications. All stone materials shall be washed with less than 2% passing the No. 200 sieve.

Gradation Requirements:

Table 1
ASTM No. 57 Base

SIEVE SIZE	PERCENT PASSING BY WEIGHT
37.5 mm (1 1/2 in.)	100
25 mm (1 in.)	95 to 100
12.5 mm (1/2 in.)	25 to 60
4.75 mm (No. 4)	0 to 10
2.36 mm (No.8)	0 to 5

Table 2

ASTM No. 8 Base

SIEVE SIZE	PERCENT PASSING BY WEIGHT
12.5 mm (1/2 in.)	100
9.5 mm (3/8 in.)	85-100
4.75 mm (No. 4)	10-30
2.36 mm (No.8)	0-10
1.16 mm (No. 16)	0-5

Table 3
ASTM No. 2 Subbase

SIEVE SIZE	PERCENT PASSING BY WEIGHT
75 mm (3 in.)	100
63 mm (2 1/2 in.)	90 to 100
50 mm (2 in.)	35 to 70
37.5 mm (1 1/2 in.)	0 to 15
19 mm (3/4 in.)	0 to 5

Gradation Requirements for open graded aggregates not specifically listed in Tables 1 through 3 above shall conform to Section 310 of the State Specs, if not defined elsewhere in the plans or these specifications.

621– CONCRETE CONSTRUCTION

621.1 GENERAL PROVISIONS FOR CONCRETE CONSTRUCTION

Concrete construction shall conform to Sections 415, 416, 501, 601, and 602 of the State Specs, except as modified herein. All concrete provided shall be Grade A or Grade C concrete with class C fly ash being the only acceptable Supplemental Cementious Material (SCM). Grade E shall only be used in locations shown in the plans or directed in writing by the Engineer. Quality Control (QC) field testing referenced in Section 700 of the State Specs for concrete is not required unless otherwise noted within Section 600 or Section 601 of these specifications. Voluntary QC field testing may be done at the Contractor's own discretion and own expense. The City will perform QV testing as noted in these specifications.

The Engineer reserves the right to reject any concrete at the Contractor's expense that does not reasonably meet the mix specifications, or is not reasonably workable enough to be properly placed in areas including, but not limited to, corners and angles.

If required by the City, the Contractor shall provide "high-early strength" concrete at the rate listed in the Schedule of Fixed Extras for the specified pavement type unless it is a specific bid item.

The Contractor will be required to remove all broken concrete, excess dirt, debris, and any other materials resulting from the work and dispose of it with their own resources at the Contractors own expense.

The Contractor particularly warrants and agrees, when signing this contract, that they will replace, within a year after **final acceptance** of the work under the contract, any pavement, curb, walk, stairs, or driveway that develops pop-outs, scaling, spalling of the surface, structural defects, or any other nonconforming defects as determined by the Engineer.

1. CONCRETE MARKING STAMPS

   The Contractor shall mark the ends of each portion of concrete work with a stamp that shall show "City of Wauwatosa", the year in which the work was placed, and the name of the contracting company that performed the work. All concrete work shall be marked including but not limited to, pavement, curb and gutter, sidewalk, and driveway aprons. Failure by the Contractor to properly mark the concrete or if the stamp is missing or contains incorrect information, the Contractor will be required to remove and replace the concrete from joint to joint or as otherwise determined by the Engineer.

2. TUNNELING

Tunneling under curbs and sidewalks is optional and at the expense of the Contractor, unless otherwise stated. However, should any subsequent cracking, subsidence, or any other indication of failure occur within the warranty period, the damaged section shall promptly be replaced by the Contractor at no additional cost to the Owner. Tunneling under pavement is not permitted.

621.2 MATERIALS

1. CONCRETE

The grade and class of all concrete used shall conform to Grade A or Grade C of the State Specs (excluding all SCMs other than class C fly ash) so a minimum compressive strength of 3600 pounds per square inch is developed in 28 days of curing. Where the plans call for Special High Early Strength (SHES) Concrete Pavement, the contractor shall conform to the requirements of 416.2.5 of the State Specs. Other grades may be used only with the written approval of the Engineer. The use of a water reducing admixture is subject to Section 501 of the State Specs. The Contractor shall provide a list of concrete mix product codes, admixture product information sheets, and their relative WisDOT concrete grades from the concrete supplier.

a. COLORING AND STAMPING CONCRETE

Coloring and Stamping Concrete, where shown in the plans, shall conform to the requirements Section 405 of the State Specs.

2. TYPE B AGGREGATE SLURRY BACKFILL ALONG CURB FLANGE

When indicated in the plans to slurry backfill along the curb flange, the slurry backfill should conform to Section 6.43.9 of the Standard Specs, *with the addition of one bag of fly ash* per cubic yard. The mix shall be deposited in the trench directly from a concrete transit mix truck.

3. REINFORCING STEEL

Provide reinforcing steel as specified that conforms with Section 505 of the State Specs.

4. EXPANSION JOINTS

Joint material shall conform to 415.2.3 of the State Specs.

5. CURING COMPOUNDS

   Liquid Membrane-Forming Curing Compounds shall conform to the requirements of Section 415.2.4 of the State Specs. Curing compounds shall be used on all concrete pavements and ancillary concrete such as, but not limited to curbs and gutter, walks, and drive approaches.

6. JOINT SEALING

   All joints shall be sealed with a hot applied joint sealant conforming to the Specification for Joint and Crack Sealants, Hot-Applied, for Concrete and Asphalt Pavements, ASTM Designation D6690, type II. A Certification of Compliance shall be furnished to the Engineer prior to application.

621.3 FORMS

Forms shall be used when concrete is not being poured against existing pavement. The construction of sidewalks without forms is prohibited. The side pitch of sidewalks shall be ¼ inch per foot and shall slope toward the street unless otherwise noted or shown in the plans.

The forms shall be clean, straight, of sufficient strength to resist springing out of shape, and an approved type of metal or wood extending the full depth of the concrete, and shall be equipped with fastening devices to prevent movement in any direction. All foreign material shall be removed from forms that have been previously used. Flexible forms of an approved type shall be used for all inside radii under 200 feet. Flexible face/outside forms shall be used on radii of less than 300 feet. When flange forms without a bar recess are used, the Contractor shall provide a metal parting strip for the reinforcing steel so that the steel will be fully exposed when the forms are removed, or drill in the rebar at their own expense when the concrete is hardened.

All rubble, broken concrete, and other debris shall be removed from the area between the curb and lot line before the curb forms are set.

The forms shall be set upon the prepared subgrade to proper line and grade and firmly staked in position. Areas which are inaccessible to a mechanical vibratory roller shall be compacted by using an approved mechanical compactor. Non-mechanical compaction methods will NOT be permitted. Before steel reinforcing or concrete is placed, the contact surfaces of the forms shall be cleaned and oiled.

The Contractor must continually have, in advance of the concrete pour, at least 200 linear feet of form setting, fine grading, and compacting completed for inspection.

For pavement and sidewalk, forms and form pins shall not be removed for at least 4 hours after the concrete is finished, unless approved by the Engineer. The removal

of forms and form pins shall be at a time and in a manner which will not cause damage to the newly poured concrete.

Where finishing machinery is to ride on the forms, the Contractor shall use an approved type of “Road” form. The foundation under the forms shall be firm and cut true to grade so that the form, when set upon, will be firmly in contact for its whole length and at the desired grade. The material under the forms shall be mechanically tamped so no settlement or springing of forms under the finishing equipment occurs.

The Contractor shall, at their own expense, repair lighting systems which are damaged by their form pins. Refer to Section 605 of the City Specs for repair requirements.

1. ADJUSTING UTILITY FRAMES AND WATER VALVES

   a. ADJUSTING UTILITY FRAMES

      Concrete around utility frames, water valves, or any other fixtures shall not be placed until such frames and fixtures have been accurately adjusted, properly secured, and set to the required alignment and grade by the Contractor.

      For concrete paving, the practice of boxing out covers and then placing adjacent concrete promotes random cracking and will NOT be permitted. Whenever possible, the frames may be adjusted and set to grade on a full bed of mortar in advance of the paving operation or curb and gutter placement (except of asphalt pavement and asphalt resurfacing projects where the manhole frames shall only be adjusted after the lower layer(s) of hot mix asphalt pavements is completed). Otherwise frames shall be “wedged” high enough during concrete paving that the aggregates in the agitated concrete mix can move freely under the frame, and thus allow the frame to sit on solid concrete.

      If the condition of the structure to be adjusted requires masonry repairs beyond 6 inches of vertical feet from the bottom of the frame, the additional repairs beyond this limit shall be paid per the relevant bid item, or if no bid item exists the Fixed Extra rate.

   b. ADJUSTING WATER VALVES

      The Contractor shall furnish all labor and equipment necessary to adjust all water valve boxes within the street right-of-way within the actual work limits. This work requires the boxes to be placed at finished grade and be operational.

After the concrete is installed, if the City Water Department determines the valve is inoperable due to displacement or faulty adjusting or lack of protection, the Contractor will be required to perform all work necessary to correct the condition with materials, and make the valve operational at the Contractor's own expense within 5 days of notification by the City.

c. SURFACE REQUIREMENTS

The Contractor shall set the frames, grates, lids, and water valves accurately so the complete installation is at the correct elevation required to fit the adjoining surfaces. The frames shall be set in pavement areas so that they comply with the following surface requirements.

Place a 6 foot straightedge over the centerline of each frame or water valve parallel to the direction of traffic at the completion of the paving. Make a measurement at each side of the frame and average the two measurements. If this average is greater than 5/8 inch, reset the frame to the correct plane and elevation. If this average is 5/8 inch or less but greater than 3/8 inch, the City will allow the frame to remain in place but shall pay only 50% of the contract unit price for adjusting catch basin frames, manhole frames or water valves. If the frame is higher than the adjacent pavement, then make the two measurements at each end of the straightedge and average them. Frames protruding more than 1/8 inch above the pavement grade shall be reset based on the average.

After the concrete is installed, if the City Water Department determines the valve is inoperable due to displacement or faulty adjusting or lack of protection, the Contractor will be required to perform all work necessary to correct the condition with materials, and make the valve operational at the Contractor's own expense within 5 days of notification by the City.

621.4 PLACING CONCRETE

After all the form work has been completed and inspected, and before placing concrete, the forms shall be oiled, checked for correct line and grade, and the compacted base checked for correct elevation. All debris shall be removed from the pouring area. The compacted base shall then be sprinkled with sufficient water to thoroughly dampen it.

The concrete shall then be placed in as nearly a continuous operation as possible to the proper height, consolidated, and stuck-off flush with the top of the forms in a manner which the Engineer finds satisfactory. No concrete that has partially hardened or been contaminated by foreign material shall be deposited on the work, nor shall re-tempered concrete be used. The Engineer reserves the right to reject any nonconforming concrete at any time.

2. EXPANSION JOINTS

Expansion joints of ½ inch thick material, i.e. “felt”, shall be used at any location where sidewalks abut other buildings or pavements, e.g. driveways and curb heads, or any other location as directed by the Engineer. They shall also be placed approximately every 100 feet or as directed by the Engineer when pouring continuous, new sidewalk. Expansion joints in curbs shall conform to 601.3.6 of the State Specs. Unless otherwise directed by the Engineer, place expansion joints at 3 feet on either side of an inlet frame. The Engineer may further decide to have expansion joints placed at any spot and in any thickness where they see fit, and **at all locations the expansion material must be to the full depth of the cross section.**

Expansion joints are also required around any hydrant, power pole, light pole base, or structure next to which concrete is being poured, and at any other location as directed by the Engineer. Felted isolation box outs around applicable items above shall be 30” x 30” unless otherwise shown in the plans or directed by the engineer.

3. TIME OF HAULING READY MIXED CONCRETE

Concrete shall be discharged at the work site within 1-1/2 hours after the cement has been added to the water and/or the aggregates, except for high-early strength concrete mixes which shall be discharged within 45 minutes of water added to cement and SHES concrete shall be discharged per the requirements in 416.2.5 of the State Specs. The Engineer, at their discretion, may still choose to reject loads at the Contractor’s expense if the discharged concrete does not appear to reasonably meet the mix specifications, regardless of whether the allotted discharge time for that mix type has passed.

4. SIDEWALK

Sidewalks shall be a minimum of 7 inches thick at alleys and driveways and 5 inches thick at all other locations unless otherwise noted in the plans or directed by the Engineer.

The cross-slope of the walk shall be ¼ inch per foot (approximately 2%) unless otherwise directed or shown on the plans.

The detectible warning fields used in pedestrian ramps shall be **cast iron of a natural patina** finish unless otherwise directed by the Engineer. Warning fields with coatings of any kind are not allowed unless directed by the Engineer. Installation shall conform to the manufacturer’s recommended procedures.

The surface of sidewalk construction shall be finished by troweling and brushing, and sidewalks shall be 5 feet wide unless otherwise noted or directed by the Engineer. The Contractor must provide compacted crushed aggregate when

necessary to fill up to subgrade for walk construction. Compacted crushed aggregate is to be considered incidental to the work unless otherwise stated as a separate bid item. Expansion joints must be used where sidewalks abut any other pavement or as directed by the Engineer. All joints must be hand cut. Where sidewalk is being installed on a radius of less than 250 feet flexible forms shall be used.

Where non-continuous walk removal and replacement is encountered, the Contractor shall replace the walk sections within 4 business days after removal. In the case of walk abutting commercial properties such as hospitals, churches, businesses, schools, or as directed by the Engineer, the walk shall be replaced within 1 calendar day. Backfilling and cleanup at each work location shall be completed within 5 business days after the finishing operation. Extensions to these deadlines may be made with written approval of the Engineer. Requests to use temporary access must be submitted to and approved in writing by the Engineer. Temporary access shall be at the Contractor's expense unless otherwise explicitly noted in writing by the Engineer.

a. TREE ARCS

Where "half moon" tree arccs are required, roots shall be cut manually, using only hand tools, after the adjacent concrete slabs have been removed. Manual root cutting shall be performed along the line needed to accommodate the flexible form used to construct the tree arc. Non-manual means to cut roots shall not be permitted unless otherwise approved in writing by the Engineer.

Contractor shall make every effort to safeguard and preserve all trees and tree roots not within the limits of root removal specified and/or approved by the Engineer.

b. ROOTS OUTSIDE OF TREE ARCS

Tree roots at sidewalk slabs marked with a "T" not at tree arcs shall be cut by the contractor at six (6) inches outside of the sidewalk area using hand tools, a root cutting machine, or other engineer approved method. Machine root cutting must be completed prior to removing adjacent concrete slabs. Root cutting using hand tools may be done after the adjacent concrete slabs have been removed.

Machine cuts shall be made along the length of the slabs only where slabs are marked for removal with a "T" due to root damage. Root cutting before slab removal is not allowed at any other locations. Cuts shall be made perpendicular to the lenth of the root and shall be done in a manner so as not to splinter the wood. Cutting depth shall be nine (9) inches from the proposed sidewalk surface.

5. DRIVE APPROACHES

The drive approaches and drives shall be constructed so the width at the sidewalk edge is equal to the width of the private portion of the driveway, or as directed by the Engineer. The approaches and flares for approaches shall be placed as directed by the Engineer (typically 3 feet from the start of the flare to the start of the transition), and the transitions in the curb head from the bottom of the driveway to the end of the flare shall be 1 foot unless otherwise directed by the Engineer. The shape shall be as marked by the Engineer.

The Engineer may require moving replacement service walks and adjusting driveways. The Contractor shall leave curb openings for driveway approaches as indicated and as further directed by the Engineer. Approaches shall have expansion joints where they abut other pavements and sidewalk, unless otherwise directed by the Engineer.

All approaches, including at alleys, shall have a minimum of 7 inches of concrete and 6 inches of mechanically compacted crushed recycled aggregate unless otherwise noted or directed by the Engineer.

Backfilling and cleanup at each work location shall be completed within 5 business days after the finishing operation, unless otherwise approved by the Engineer.

6. CURB & GUTTER

All curb heads must be 7 inches thick and 6 inches high (to the gutter line), with a 24 inch wide gutter and 1-1/4 inches in the pan, unless otherwise shown in the plan. Refer to the “Concrete Curb and Gutter Detail” in the plans for more information. One (1) inch expansion material shall be installed at 3’ from the edges of inlets and catch basin castings. When abutting asphalt pavements, curb joints shall be 10-12 foot intervals, except as specifically noted in the plans and special provisions, or as directed by the Engineer. One (1) inch expansion material is required at the end of all radius points at intersections or sharp curves in the street and at a maximum interval of 300’.

Honeycombing occurring along the back of the curb and the flange face shall be pointed with mortar (1 part Portland Cement to three parts Fine Aggregate) after removal of the forms. All excess concrete behind the curb shall be removed before backfilling.

7. CONCRETE STEPS

The existing concrete step shall be completely removed and new step formed and poured.

The dimensions of the new step shall match the existing one as closely as practicable, however the Engineer may change the final dimensions as they see fit. Any reinforcement for the step(s) required by the Engineer shall be considered incidental to the contract. No additional payments shall be made for any concrete required by a change in dimensions.

8. SLIP FORM MACHINES

During slip-form construction, the Contractor shall not leave up overnight the lines which control the machine sensors ("string line") unless authorized by the Engineer. If permitted, the Contractor shall take all measures to ensure the string line is visible and shall verify that the line and grade is correct prior to beginning or continuing slip-form construction.

The Contractor may, with prior approval of the Engineer, elect to use a machine for placing, forming, and consolidating concrete pavement and ancillary concrete. The resulting concrete work shall be of such quality as to equal or exceed that produced by hand methods.

Before pouring with the slip form machine, the following should be checked by the Contractor: the tracing area shall be uniformly graded so as not of produce undue stress on the self-leveling mechanisms, the machine must have an operational, calibrated variable slope control in order to vary the flange or widening pitch, and **the cross-section of the slip form machine shall be the cross-section called for on the plans**. All vibrators must be operational and the machine must be set at the correct line and grade.

Curb and gutter machinery and/or machines which form integral curb and pavement shall not be utilized to construct curbs with a radius of 30 feet or less.

Supports for the line and grade control line shall have a maximum spacing of 25 feet.

If machine methods are used for forming and finishing curb and gutter, the Contractor may saw contraction joints approximately 1/8th inch thick and 2 inches deep, cut to the cross section of the curb. The equipment used in sawing shall meet the approval of the Engineer. The sawing shall be done as soon as practicable after the concrete has set sufficiently to preclude raveling during the sawing and before any cracking takes place in the concrete.

621.5 CONCRETE JOINTS

The depth of joints must be 1/3 the thickness of the pavement. Joints in the curb section must be a minimum of 2 inches deep. Joints in pavement and curb section shall be sawed unless otherwise permitted by the Engineer.

Contraction joints shall be cut in drive approaches as specified and shown on the plans or details, or as directed by the Engineer at a minimum depth of 1-3/4 inches.

Sawing expansion joints and joints in sidewalks is prohibited.

Any required tie bars shall be considered incidental to any concrete work

1. PAVEMENT

Transverse joints in concrete pavement are required at 10-15 foot intervals as directed by the Engineer, except as otherwise indicated. The Engineer may require joints to vary to match the center of a driveway, utility cover, or any other structure as they see fit. Curb joints must match pavement joints.

a. CONSTRUCTION JOINTS: Shall be constructed at the formed edges of all pavement slabs. Reinforcing bars, No. 4 bar x 30 inches long deformed bars shall be placed at 30 inch centers midway between the top and bottom of the slab. The ends of the rods shall be bent down or suitable chairs provided so that the main portion of the bar is parallel to the surface of the slab. The reinforcing bars shall be straightened after the forms are removed and before the adjacent slab is poured. Transverse constrution joints with pavement thicknesses 8” or greater shall be doweled.

Construction joints shall be provided at the end of each day’s pour or at locations where the interval of time between loads of concrete exceeds 1 hour. Construction joints shall be constructed only at regular planned joint locations.

b. CONTRACTION/TRANSVERSE JOINTS: All transverse joints shall be installed at right angles or radial to the centerline of the pavement unless otherwise shown in the plans or directed by the Engineer. Contraction joints shall be provided at approximately 10-15 foot intervals or as directed by the Engineer. The joint spacing and the decision concerning the location of sawed or formed contraction joints shall be entirely at the discretion of the Engineer. Pavement thicknesses 8” thick or greater shall be doweled.

Sawed contraction joints shall be provided to a depth of 1/3rd of the pavement thickness by using a blade that cuts approximately 1/8th of an inch in width. During the finishing sequence, hand cut joints shall be provided at a minimum of approximately 80 foot intervals. The length of time between the finishing of

the concrete and the sawing of joints shall not exceed 12 hours for transverse joints and 24 hours for longitudinal joints. “Soft-cut” or other methods for the construction of contraction joints shall be subject to the approval of the Engineer prior to their use.

c. LONGITUDINAL JOINTS: Reinforcing bars, No. 4 bars x 30 inches in length, shall be placed at 36 inch centers midway between the top and bottom of the slab during pouring. Longitudinal joints shall be constructed as and in the locations shown on the plans. Joints shall be true to line and perpendicular to the surface of the pavement. Longitudinal joints may consist of construction joints where new work joins work previously completed. All other longitudinal joints shall be constructed by sawing in accordance with the plans, or any method approved by the Engineer.

The equipment used in any sawing of joints shall meet the approval of the Engineer. The sawing shall be done as soon as practicable after the concrete has set sufficiently to preclude raveling during the sawing and before any cracking takes place in the concrete.

d. BASE PATCHING:

Base Patching Construction shall conform to the State Specs 390.3 for concrete patching and as modified by these specifications. Base patching shall use grade A concrete, grade B concrete is not permitted. A minimum of 6 inches in depth of 1 ¼ inch base aggregate shall be placed prior to pouring the concrete base patch. Base aggregate shall be incidental to the base patching Item(s) unless otherwise noted in the plans.

Base Patching shall be tied with reinforcing bars, No. 6 x 12 inches in length at 30 inch centers midway between the top and bottom of the slab, on all sides to the existing concrete. Transverse joints in base patching for pavement thicknesses 8 inches thick or greater shall be doweled at intermediate joints within the repair area and at construction joints where matching transverse joints in the existing/adjacent pavements. Required reinforcing bars and dowel bars shall be included within the costs of the Base Patching item(s).

e. CONCRETE REPAIR AND REPLACEMENT:

Concrete Pavement Repair and Replacement shall conform to the State Specs 416.3.7 and as modified by these specifications. The existing base shall be removed and new 1 ¼ inch base aggregate a minimum of 6 inches in depth shall be placed unless otherwise noted in the plans or approved by the Engineer. Base aggregate shall be incidental to the Concrete Pavement Repair and Replacement item(s) unless otherwise noted in the plans.

Transverse joints in Concrete Pavement Repair and Replacement for pavement thicknesses 8 inches thick or greater shall be doweled and dowels shall be

included in the costs of the Concrete Pavement Repair and Replacement item(s). Reinforcing bars, No. 6 bars x 12 inches in length, shall be placed at 30 inch centers midway between the top and bottom of the slab along longitudinal joints. Required reinforcing bars and dowel bars shall be included within the costs of the Concrete Pavement Repair and Replacement item(s).

2. CURB & GUTTER

   When concrete curb and gutter abuts new concrete pavement, contraction joints shall be constructed coincident with pavement joints at approximately 10-15 foot intervals or as directed by the Engineer. Contraction joints abutting other pavement types other than concrete shall be placed at approximately 10 foot intervals or as directed by the Engineer. Joints are required at the beginning and end of each radius. Trim ends of existing curbs to be joined to a vertical plane.

   The curb and gutter section shall be tied to the concrete pavement or concrete base by reinforcing tie bars, with spacing no greater than 30 inches on center. Curbs shall be tied in at the pan only – no rebar shall be installed in the curb head. Parting strips shall be used when practicable or as directed by the Engineer. The Contractor may elect, at their own expense, to drill in tie bars after the concrete has hardened. The cost of reinforcement shall be included in the price for curb and gutter. **Tie bars between existing and proposed curbs shall be in the flange/gutter only and NOT in the curb head.**

   Backfilling behind curb and gutter is considered incidental to the work.

3. SIDEWALK

   Joints shall be tooled in at a minimum of 1-3/4 inches deep. Joints for sidewalks shall be cut at approximately 5 foot intervals unless directed otherwise by the Engineer.

621.6 FINISHING

A metal straightedge must be used on the gutter lines along driveway openings. The curb and gutter crew must also be provided with templates or "gauges" in order to obtain the proper depth from the top of a back form to the top of the concrete along driveway openings. At said driveway openings, construction procedure must provide a smooth and uniform vertical plane along the back in order to receive the expansion joint material. The height of this back edge shall be level with the flange edge of the curb unless otherwise directed by the Engineer.

Excessive troweling and watering will not be permitted. Surface applications to hasten hardening are prohibited. Patching will not be permitted except upon approval of the Engineer.

All concrete construction shall have applied approved curing compounds as stated in Section 415.2.4 of the State Specs, forming emulsions or emulsifiable

concentrates for curing and protection of concrete surfaces, as soon as practicable after the surface water sheen has disappeared from the fresh concrete. Costs shall be included with the price of the concrete.

The Contractor shall make an impression of an arrowhead in the concrete curb to indicate the location of all new and existing street lighting conduit crossings, which shall be incidental, or they may elect to grind in equivalent arrows after the concrete has hardened. Marking of all new and existing street lighting conduit crossings shall be incidental to the contract.

The alignment of the curbs in existing streets must be matched in all locations. The proposed dimension at the sidewalk for each new concrete approach is indicated on the plan or marked in the field by the Engineer. All portions of non-concrete service walks necessarily disturbed for the curb construction must be salvaged and piled in such a manner as to protect them from damage during the work and shall be replaced in kind when work is complete, except concrete walks indicated by the Engineer for removal and new replacement. This work shall be incidental unless otherwise noted in the plans or directed by the Engineer.

The Contractor shall provide for a minimum of one finisher to remain on the project site after final finishing of all concrete until such time as said concrete has hardened sufficiently to resist surface scarring caused by footprints, handprints, or any other type of imprint, malicious or otherwise. An unreasonable amount of leaf imprints will be considered nonconforming. The finisher shall actively and continuously patrol on foot the newly placed concrete and repair any damage to the surface that might be sustained as described above. The cost for providing the finisher(s) and necessary equipment and materials shall be considered incidental to the contract unit price for each specific concrete item.

1. PAVEMENT

   a. GENERAL

      The sequence of operations shall be strike-off, consolidation, screeding, float finishing, straight-edging, and final surface finish. The machine method of strike-off and consolidation shall be employed, except for those areas where the slab width is variable for strips or lanes of pavement uniformly less than 10 feet in width, and other areas where the use of machine methods is impractical, as determined by the Engineer who will then allow hand methods. All finishing equipment and tools shall be cleaned immediately after use and kept clean so as to maintain such equipment in satisfactory condition during use. The Contractor shall provide whatever assistance is requested by the Engineer to check the adjustment and operating condition of the machine.

b. MACHINE STRIKE-OFF

1. After the concrete is deposited, the surface of the pavement shall be struck off by the use of an approved type of finishing machine. The screeds shall be adjusted to the grades indicated on the plans. The surface of the pavement shall be struck off a sufficient number of times to form a consolidated mass of concrete with a mortar surface at finished grade.

2. Immediately after the last pass of the finishing machine, the surface of the pavement shall be floated by the use of an approved mechanically operated float or a “pan” attached to the finishing machine. Each type of float finisher shall be in first class mechanical condition, adjusted to conform to required crown and grade and shall be capable of producing the required surface finish. The width of the “pan” type of float shall be less than the width to be paved.

3. The finishing of the pavement shall comply with the provisions of “Hand Strike-Off” as described in section “c” below. Unless otherwise specified, provide a final finish with an Engineer approved artificial turf drag or equal. Use a drag made of molded polyethylene with synthetic turf blades approximately 0.85 inches long containing approximately 7200 individual blades per square foot. Use a seamless strip of artificial turf approximately full pavement width and of sufficient size that during the finishing operation approximately 2 feet of turf, measured parallel to the pavement centerline, is in contact with the pavement surface. Pull the drag with an Engineer approved device that allows control of the time and rate of texturing. Operate the drag in the longitudinal direction to produce a finish acceptable to the Engineer. Weight the drag as necessary to maintain contact with the pavement. Keep each drag clean and free of particles of hardened concrete. Replace the drag as necessary to produce the desired finish.

4. All edges of each slab, including the edges of the joints, shall be floated by hand and finished with an edging tool with a ½ inch radius. At the proper time, depending upon the rate of set of the concrete, the contraction joints shall be re-cut and the finishing of the joints completed. The completed pavement surface, including areas at expansion and contraction joints, shall not deviate more than 1/8th of an inch from the edge of a 10 foot testing device.

5. <u>SLIP FORM MACHINE STRIKE-OFF:</u> Before constructing pavement with slip form machines, the following shall be checked by the Engineer and Contractor: the tracking area shall be uniformly graded so as not to produce undue stress on the self-leveling mechanisms. The machine must have an operational, calibrated, variable slope control. The machine must

have the ability to produce a cross section complying with the required crown sections shown on the plans or in the special provisions.

All vibrators must be in good operating condition. Slumped edges must be immediately corrected by the use of forms. In all cases, the use of the slip form machine shall produce a continuous cross section as shown on the plans. The use of hand methods in conjunction with the slip form equipment may be allowed only with the permission of the Engineer. The Engineer reserves the right to reject the use of this machine.

c. HAND STRIKE-OFF

1. After the concrete is deposited, the surface of the pavement shall be struck off with an approved type of screed that is cut to the required form of the pavement surface. A mechanical vibrator shall be attached to the screed. The surface of the pavement shall be struck off a sufficient number of times to form a consolidated mass of concrete with a mortar surface at finished grade.

2. The entire surface shall then be floated by means of a long handled float until all surface irregularities are corrected. The pavement must then be checked by pulling a 10 foot metal straight edge over the surface. For this purpose, the Contractor shall furnish and use an accurate 10 foot straight edge with a handle at least 3 feet longer than one-half the width of the slab. The straight edge shall then be held in successive positions parallel to the street centerline in contact with the surface and the whole area gone over from one side of the slab to the other as necessary. Advance along the street in successive stages of not more than one-half the length of the straight edge. Any depressions found shall be immediately filled with fresh concrete, struck off, consolidated, and refinished. Projections also shall be struck off and finished. The straight edge testing and refloating shall continue until the entire surface is found to be free from observable deviations or irregularities and the slab has the required grade and contour. Following this, the pavement shall be finished by dragging a seamless strip of artificial turf or a broom over the full width of the pour. This operation shall be done at such times and in such a manner that will produce a surface texture satisfactory to the Engineer.

3. All edges of each slab, including the edges of the joints, shall be floated by hand and finished with an edging tool with ½ inch radius. At the proper time, depending upon the rate of set of the concrete, the contraction joints shall be re-cut and the finishing of the joint completed. The completed pavement surface, including areas at expansion and contraction joints, shall not deviate more than 1/8th of an inch from the edge of 10 foot testing device.

4. CONCRETE BASE

   a. After depositing the concrete, the surface of the pavement shall be struck off with an approved type of screed that is cut to the required form of the pavement surface. A mechanical vibrator shall be attached to the screed unless otherwise allowed by the Engineer. The surface of the pavement shall be struck off a sufficient number of times to form a consolidated mass of concrete with a mortar surface at the depth below finished grade as indicated on the plans. A finishing machine will not be required unless stipulated in the Special Provisions.

   b. The entire surface shall then be floated by means of a long handled float until all the surface irregularities are corrected.

   c. Concrete Base to receive a asphalt overlay does not require a broomed finish and shall not have curing compound applied.

2. SIDEWALK

   After deposing the concrete, the surface of the walk shall be struck off at finished grade with an approved type of screed. A mechanical vibrator shall be attached to the screed if directed by the Engineer.

   The surface shall then be worked with metal floats until a uniform mortar surface is obtained. A hand float operated in a circular motion shall be the final floating operation. Immediately after the water glaze or sheen has disappeared, the surface troweling shall be performed with a rectangular steel trowel operated by hand in a circular motion. The application of neat cement to the surface is prohibited.

   As soon as the concrete will retain its shape, the joints shall be re-cut with the jointer and the edges of all slabs rounded with an edging tool having ¼ inch radius. After all troweling and edging is completed and the concrete has attained a partial set, the surface shall be brushed with a damp, soft bristle brush.

3. CURB & GUTTER

   Immediately after depositing and spading the concrete, the exposed surfaces shall be floated with metal floats, troweled, and edged. As soon as the concrete has sufficiently set, the face forms shall be removed and separator plates withdrawn. All exposed surfaces shall be checked with a clean metal straight edge 10 feet in length. All deviations shall be immediately corrected. The edges along the back of curb, flange, and the joints shall be finished with suitable tools.

The radii at the top and bottom of the curb face shall be rounded with special tools that fit the cross section. All exposed surfaces shall then be troweled smooth.

As soon as partial set has taken place and the water glaze or sheen has disappeared, the surface shall be brushed lightly with a damp, soft bristle brush.

621.7 CURING TIME AND CLEANUP

Before opening the street to vehicular traffic, the Contractor shall clean the area of all forms, lumber, dirt, and other debris to the satisfaction of the Engineer.

The newly placed concrete shall be protected from carrying vehicular traffic until sufficient curing time has elapsed to permit traffic to use the area, i.e. when the concrete reaches 3000 psi or more in compressive strength. If new concrete is opened to traffic before the results of cylinder breaks are delivered, and the strength is found to be below 3000 psi on the day traffic was first allowed, to be determined by the Engineer, the City may require the Contractor to credit the project all or part of the cost for the concrete work since such pavement would be nonconforming. In severe cases the City may direct the Contractor to remove and replace the pavement at the Contractors own expense.

When a concrete saw has been utilized to cut joints, the Contractor will be required to clean the area of all forms, lumber, dirt, and other debris. All debris and residue created by the sawcutting shall be removed in accordance with Section 620.1.3 of the specifications.

The Contractor shall restore in an acceptable manner all property, both public and private, which has been damaged in the prosecution of the work, and shall remove all surplus and discarded materials, rubbish, and temporary structures from the right-of-way and any adjacent properties to the satisfaction of the Engineer. The Contractor shall restore all work completed under other previous contracts which has been damaged by the Contractors operations, in a manner in conformance with the specifications for the item(s) involved.

All cleanup, repair, and restoration work shall be considered incidental unless otherwise indicated as separate bid items in the proposal.

621.8 CONCRETE WORK DURING COLD WEATHER

Concrete shall be placed in accordance with Section 415 of the State Specs. The Engineer, at their discretion, may order the concrete work to cease, irrespective of air temperature, if it is anticipated that the temperature and/or wind chill will drop below freezing.

The Contractor shall remove and replace at their expense any concrete damaged by frost or freezing, irrespective of the fact that the Contractor may have had the approval of the Engineer to pour said concrete.

When concreting during cold weather, the water and the aggregates in the concrete mixture may be heated. When specifically allowed by the Engineer, the Contractor may use magnesium free calcium chloride as an admixture in the concrete at their own expense. The maximum quantity to be used shall not exceed 1% of the cement content of the mix.

Other methods of protection from freezing may be used with the written approval of the Engineer.

All costs, including but not limited to associated with cold weather concrete work shall be at the expense of the Contractor, unless specifically called out as a base bid item. If cold weather protection for concrete is required, the covering shall remain in place for the full duration of the concrete curing period when temperatures fall within ranges requiring concrete to be covered.

621.9 JOINT SEALING

Joint Sealing shall consist of cleaning the joint in preparation for sealing and sealing all contraction and expansion joints in the concrete pavement with a hot applied joint sealing material. The work shall conform to the plan details and as follows.

Joints shall not be sealed until they have been inspected and approved by the Engineer. All contraction and expansion joints in concrete pavement shall be sealed with a hot-poured sealer. All sawed transverse and longitudinal joints shall be sealed with a hot-poured sealer.

The operation of sealing shall be performed as soon as practicable upon elapse of the curing period and, in any event, prior to the time traffic of any kind uses the pavement unless otherwise approved by the Engineer. Application of the joint sealer shall be made when the joint surfaces are clean and dry.

1. Immediately before sealing the joint, thoroughly clean the joints of all laitance, curing compound, and other foreign material. Exposed joint faces shall be cleaned by sandblasting or water blasting with sufficient pressure to thoroughly and completely clean the joint. A multiple-pass technique shall be used until the surfaces are free of material that might prevent bonding. For the final cleaning immediately prior to installation of the sealer, the joints shall be blown clean with oil-free compressed air. The joint faces must be surface dry when sealant is applied.

2. The sealing compound shall be heated to the pouring temperature recommended by the manufacturer in an approved kettle or tank,

constructed as a double boiler, with the space between the inner and outer shells filled with oil or other satisfactory heat transfer medium. The heating kettle shall be equipped with a mechanical agitator, positive temperature control, and an approved dial thermometer for checking temperatures of the compound. The heating kettle, if and when operated on concrete, shall be properly insulated against the radiation of heat to the concrete surface.

3. The sealing compound shall NOT be heated above the maximum safe heating temperature as specified by the manufacturer. Any material heated above the maximum safe heating temperature shall be discarded.

4. Pouring of joints shall be made when the sealing material is at the required temperature and, insofar as practicable, the sealing compound shall be maintained at a uniform temperature during pouring operations. Pouring shall not be permitted when the temperature of the sealing compound in the applicator, as it is applied to the joint, is more than 10° F below the recommended pouring temperature. Pouring of the molten sealer in the joint opening shall be done with such equipment that the sealer completely fills the joint opening **without overflowing on the adjoining surface and when finished** and, after shrinkage, the sealer is approximately flush with the adjoining surfaces. In the event satisfactory sealing of a joint is not accomplished in a single pouring, the sealing compound shall be placed in two pourings. At least one-half of the required amount shall be placed in the first pouring, and the second pouring shall follow the first as soon as practicable after the first pouring has attained maximum shrinkage, but not later than one hour after the first pouring.

621.10 TESTING

The Engineer may, at any time, perform one or a combination of concrete tests including, but not limited to, strength, air content, slump, and temperature as they see fit. The Engineer may also perform plant inspections and source material testing in accordance with the State Specs. The Contractor is free to perform their own testing at their own expense whenever they choose.

Should the Engineer perform testing but the Contractor chooses not to test on their own, the Contractor waives their right to dispute any testing results, except in cases where gross negligence of acceptable industry methods was documented. The Contractor is solely responsible to cast strength cylinders for their use to determine the permissible timing to reopen concrete pavements, approaches, and sidewalk to use that they determine necessary and/or to meet specific contract requirements. If strength cylinders are not cast, the contractor shall not open concrete to traffic until

the concrete has accrued the specified number of curing days as outlined in section 415.3.15 of the State Specs.

621.11 PAYMENT

1. THICKNESS TOLERANCES

   Payment adjustments for thickness for any pavement items, including but not limited to streets, alleys, walks, and drives, may be made in accordance with the table shown below, at the discretion of the Engineer:

Deficiency in Thickness Determined by Cores (in.)	Proportional Part of Bid Price Allowed
0.00 to 0.25	100%
0.26 to 0.35	80%
0.36 to 0.45	72%
0.46 to 0.55	68%
0.56 to 0.75	57%
0.76 to 1.00	50%
Greater than 1.00	Remove & Replace

   Areas of pavement determined to be deficient in thickness by more than 1 inch shall be removed and replaced by the Contractor at their expense with concrete pavement of specified plan thickness. The Engineer may permit the deficient pavement to remain in place, in which case the value of the nonconforming area will be deducted from monies owed to the Contractor.

   If sidewalk requires coring to determine thickness, a panel that is cored will be required to be removed and replaced. If any deficiency in thickness greater than 0.25” exists in the cored panel, the contractor shall remove and replace the cored panel at cost to the City. If the panel is of acceptable thickness, the City will pay under the contract bid price the cost to remove and replace the panel.

2. VERIFICATION TESTING

   City Verification cylinders will be at a minimum taken as follows by HTCP or ACI certified technicians:

   a. Class I Concrete, as defined by Section 715 of the State Specs, will have (3) cylinders made for testing at least once per 800 CY of concrete placed or at minimum of once daily.

   b. Class II Concrete, as defined by Section 716 of the State Specs, will have (3) cylinders made for testing at least once per 400 CY of concrete placed.

c. Class III Concrete, as defined by Section 716 of the State Specs, is tested at random and at the direction of the Engineer.

The City will have a certified testing lab test the cylinders for compressive strength. Payment adjustments for any concrete items, including but not limited to streets, alleys, walks, and drives, may be made in accordance with the table shown below, at the discretion of the Engineer, for the full amount of concrete placed between City Verification Cylinders:

Deficiency in Average Strength Determined by Cast Cylinders	Proportional Part of Bid Price Allowed
3600 PSI or Greater	100%
3400 – 3599 PSI	95%
3000 – 3399 PSI	90%
2500 – 2999 PSI	80%
Less than 2500 PSI	Remove & Replace

The Contractor, at their own cost, may elect to take cylinders at the same or increased frequency for their own quality control purposes.

621.12 BRICK PAVERS

The paving block installation shall be rigid and shall not be displaced even when subjected to heavy loads. Paving Blocks shall be reset to match the existing pattern. They shall be sawcut as required to fit existing conditions and shall tightly abut all existing construction without gaps. Material for setting bed course and the joints between the pavers shall consist of a wet mixture of 1-part Portland cement to 10 parts mason sand. Where Paving Blocks abut existing curb, the finished surface shall be 1/2-inch above the top-of-curb.

Sealant shall be placed at all joints between paver block and water, gas, or other utility boxes. Sealant for joints around utility boxes shall be SikaFlex 1A, as manufactured by Sika Corp, Lyndhurst, NJ, 800-933-7452, or approved equal. Color shall be concrete gray unless otherwise specified or noted in the plans. Seal around all utility boxes with specified material in accordance with manufacturer's requirements.

Where there are existing gaps wider than ½ inch between blocks to be removed and reset or replaced, paver blocks shall be cut with a saw to provide the pieces necessary to fill in the gaps.

Bricks that are part of an adjacent driveway, sidewalk, carriage walk, or other feature shall be removed as necessay to complete the scope of work, salvaged and stored in a safe location and reinstalled within 5 days of the sidewalk being replaced even if these bricks are within the right-of-way. Reinstallation of privately owned sidewalk bricks shall match the existing condition of the

sidewalk prior to the work taking place. Removal, salvaging, storing and reinstallation of bricks that are part of an adjacent driveway, sidewalk, carriage walk, or other feature shall be considered incidental to the contract.

621.13 MUDJACKING

1. GENERAL

The Contractor shall furnish all equipment, tools, and other apparatus necessary for the proper construction and acceptable completion of the work specified under this contract. The equipment shall be approved by the Engineer prior to starting the work, and maintained in good working condition by the Contractor during the progress of the work.

All necessary hoses, valves, valve manifolds, and positive cut-off and bypass provisions to control pressure and volume, pressure gauges with gauge protectors, expanding packers for positive seal grout injection, wood plugs, hole washing tools, and drill steel and bits shall be provided by the Contractor.

Prior to jacking any pavement, the slabs shall be closely examined for any existing cracks. This investigation shall be performed by the Contractor and the Engineer. Both parties shall agree regarding the existing condition of the pavement, and existing cracks shall be noted or marked.

The Contractor shall replace or repair any slabs broken due to jacking as determined by the Engineer. The Engineer may require the removal and replacement of the entire slab or a portion of the slab damaged by radial or transverse cracks.

2. WATER SUPPLY

If water tanks are not an integral part of the grout delivery machine, the Contractor shall supply water for delivery to the work site. See section 605.1.02A. Use of City Water for more information.

3. INJECTION HOLES & DRILLING

An air compressor and rock drill or other device capable of drilling the grout injection holes through the sidewalk slab and base material shall be provided. The equipment shall be in good condition. The holes shall be vertical and round. Down-feed pressure whether by hand or mechanical means shall not exceed 200 psi. Holes shall be drilled to prevent breakout at the bottom of the pavement.

Grout injection holes shall be drilled in a pattern approved by the Engineer. Holes shall not be larger than 2 inches in diameter, drilled vertically to a depth

sufficient to penetrate through any chemically stabilized base, but not more than 3 inches into the subgrade. Holes shall be drilled so that breakout shall not occur at the bottom of the slab.

Subject to the Engineer's approval, holes may be washed or air blown to create a small cavity to allow the initial spread of grout.

After jacking has been completed at any one hole, the packer shall be removed and the hole temporarily plugged immediately with a tapered wooden plug. The temporary wooden plugs shall not be removed until the grout has set sufficiently so that back pressure will not force it through the hole. Each hole shall be permanently sealed flush with the pavement surface with a fast setting sand/cement or other patch material approved by the Engineer. The patch material shall have a minimum thickness of 3 inches.

4. WEATHER LIMITATIONS

Pavement mudjacking shall not be performed when the ambient temperature at the bottom of the pavement slab is less than 40° F, or when the subgrade or subbase is frozen.

5. GROUT MIXTURE

At least 2 weeks before the start of mudjacking operations, the Contractor shall submit the grout mix design to the Engineer for approval. Submit a mix design for each type of grout or blended material including a complete list of ingredients, admixtures, and set time.

6. JACKING

An expanding rubber packer or other approved device providing a positive seal and connected to the discharge hose on the grout plant shall be lowered into the holes. The discharge end of the packer or hose shall not extend below the lower surface of the concrete pavement. The Contractor shall pump in a pattern and in the amount required to raise the pavement to within 1/4 inch of finial grade. Grade tolerances shown in this section shall be applicable to transverse grades as well as longitudinal grades. Continuous pressures to 200 psi will be permitted. Pressures to 300 psi will be allowed only for short periods. In the event the pavement is bonded to the subgrade, brief pressure rises (10 seconds or less) to 600 psi will be allowed. **Loss of grout through cracks, joints, other injection holes, or from back pressure in the hose or in the shoulder area will not be tolerated.** Grout held in the mixer or in the injection pump or hose for more than 1 hour after mixing shall not be used for jacking.

The slabs shall not be raised more than 1/4 inch when pumping in any one hole at any time. No part of the slab shall lead any other part of the slab or any

adjacent slab more than 1/4 inch at any time. The entire slab and all adjacent slabs shall be kept on the same plane at all times, within the 1/4 inch tolerance. The Contractor shall make observations to assure that when pumping from one hole, the grout flows to adjacent holes to ensure that all voids are filled. The Contractor may cut a slab to prevent breakage when it is bound against an adjoining slab. If the temperature is 80° F, or higher during the jacking operation, the slabs shall be sufficiently moistened to prevent expansion of the slabs.

Upon completion of jacking operations, slabs within the work area shall present an even grade at each joint and shall not vary from the final elevations by more than 1/4 inch. If slabs are found that are lower than the specified tolerance from the final grade, these slabs shall be further jacked until the tolerance is met. Should any over-jacking be greater than 1/4 inch the Engineer has the option to require removal and replacement of the pavement. These repairs shall be accomplished at no additional cost to the City.

The Contractor shall not permit pedestrian traffic on the pavement slab until the grout has set for a minimum of 24 hours.

7. ACCEPTANCE OF WORK

Prior to acceptance, the Contractor shall remove loose concrete, joint filler, or grout spilled on the surface or shoulder. Waste construction material shall be removed and the surrounding areas shall be left in a neat, orderly condition by the Contractor prior to opening to traffic or final acceptance.

622 – ASPHALT CONSTRUCTION

622.1 GENERAL PROVISIONS ASPHALT CONSTRUCTION

This work shall consist of the construction of plant mixed hot mix asphalt (HMA) pavement on the approved prepared foundation, base/binder course, or existing surface in accordance with the specifications and in reasonably close conformity with the lines, grades, thicknesses, and typical cross sections shown on the plans or established by the Engineer.

Asphalt construction shall conform to the requirements of Sections 450, 455, 460, and 465 of the State Specs and as modified herein. In the State Specs, *Upper Layer* and *Lower Layer* are synonymous with surface course and binder course respectively.

Asphalt pavement shall not be placed during rainfall, snow storms, or any imminent weather that might adversely affect the construction. Asphalt pavement shall not be applied on wet material or wet sub-layers or when the aggregate base and/or existing base is frozen. The Contractor shall notify the Engineer and proceed with construction once the surfaces and material are dry enough to proceed with construction unless the otherwise directed by the Engineer. The Engineer will verify if previously frozen grade is

All asphalt used for this contract shall have the grade PG58-28 unless given written direction by the Engineer or otherwise specified in the plans.

622.2 MATERIALS

1. HMA MIXTURE DESIGN

For each course, the Contractor shall submit, for the Engineer's review, an asphaltic mix design meeting all necessary criteria. The asphaltic mix design shall consist of aggregate gradations, aggregate blend percentages, Job Mix Formula (JMF), recommended asphalt content, recommended plant mix temperature range, and shall be signed by a Certified Asphaltic Technician III. The design shall be conducted according to procedures in the latest version of the Department's Test Method 1559, Standard Method of Asphaltic Mix Design. The Contractor will run tests on the quality of the aggregates, review the asphaltic mixture design and issue a report. The asphaltic mixture design shall be in effect until modified, in writing, by the Engineer.

The submitted mix design report must be approved by the Engineer or their authorized testing laboratory before paving can begin.

a. <u>RECYCLED PAVEMENT</u>: The Contractor may, at their option, use recycled asphalt pavement. The bituminous base or base/binder course mixtures may contain a combined maximum of 35% (25% combined maximum for surface course mixtures) of fractionated reclaimed asphaltic pavement (FRAP) and reclaimed asphaltic pavement (RAP). The City Engineer reserves the right to approve the source and actual quantity of

the reclaimed asphalt pavement to be used. Recycled asphaltic shingles (RAS) are not permitted.

b. SAMPLES

For the purpose of mix design verification, the Contractor shall supply aggregate samples (upon request only), representative of the average gradation of the job materials, along with the complete Contractor Asphaltic Mix Design, to the City at least 14 calendar days prior to use in the work. No aggregate shall be used in the production of mixtures without prior approval of the Engineer.

The Engineer may at any time request that a sample of HMA be taken from the field or plant by the Contractor at the Contractor's expense, or perform a plant inspection.

2. POROUS ASPHALT MIX DESIGNS

Where the plans call for porous asphalt, the contractor shall provide mix designs that meet the following design requirements.

	12.5 mm Mix	9.5 mm Mix
Percent Binder Content[1]	5.5 minimum	5.5 minimum
Binder Grade[2]	PG 64-22	PG 64-22
Percent Air Voids (Va @ 50 gyrations)	18 – 20	18 – 20
Percent Tensile Strenth Ratio minimum (TSR @ 5 cycles freeze/thaw per ASTM D4867[3])	80 minimum	80 minimum
Percent Draindown at Production Temperature[4]	0.3 maximum	0.3 maximum

[1] - 5.75 - 6.0 percent recommended.
[2] - Minimum high temperature of 64 degrees C recommended.
[3] - Cantabro Abrasion test is not included in mix design guidelines.
[4] - Effective measures to reduce draindown include use of washed manufactured sand in lieu of crusher screenings and fibers. A slight reduction in production temperature may also be considered.

622.3 PREPARATION OF BASE

The surface of the base shall be clean, dry, and free of foreign material before paving commences. If the HMA is being placed in multiple lifts, each lift shall be clean, dry, and free of foreign material before applying tack coat for the next lift. The binder and surface course mixtures shall be laid only upon a base which is dry, and only when weather conditions are suitable as determined by the Engineer.

When directed by the Engineer, all breakups, depressions, or any other distressed or unsatisfactory areas of the existing foundation to be paved will be repaired, and

the surface cleaned, prior to placement of the binder and/or surface course. The cost of preparing the foundation to be paved, repairing the old existing base or pavement, and prime or tack coats are incidental to the pavement construction and should not be considered a separate item *unless so designated in the proposal.*

1. CONCRETE BASE PREPARATION

   Prior to HMA pavement resurfacing, the surface of the existing concrete pavement shall be prepared as follows:

   Existing asphaltic surface and all loose patching material or asphaltic patches which protrude above the existing concrete pavement shall be removed to the satisfaction of the Engineer.

   a. JOINT AND CRACK REPAIR

      Perform Joint and Crack Repair on existing surfaces as shown in the plan or as directed by the Engineer.

      Joint, crack, and pavement surface spalls exceeding 1-1/2 inches in width, with a depth of less than 4 inches, shall have all loose or deteriorated concrete removed to sound concrete. The void shall be vacuumed thoroughly clean. Any joint and crack repair over 4 inches deep will be removed and replaced and paid under the respective items for concrete base patching. Tie bars must be used in any area where patches abut existing concrete.

      The cleaned void shall be filled with HMA to the level of the pavement and compacted motorized rollers approved by the Engineer. HMA shall be placed in lifts to ensure complete compaction.

   Requests for use of alternate methods and materials must be submitted at least 1 week prior to the date of proposed use.

622.4 ADJUSTING UTILITY FRAMES & WATER VALVES

1. UTILITY FRAMES

The Contractor shall adjust to finished grade all catch basins and City manhole frames. The masonry mortar and concrete bricks shall comply with the requirements of section 519 of the State Specs. Utility frame adjustments may include rebuilding block or brick as designated on the plans, or as determined by the Engineer.

The Contractor shall remove the existing catch basin or manhole frame, adjust the top of the existing masonry structure, and reinstall the frame. If the condition of the structure to be adjusted requires masonry repairs beyond 6 inches of vertical feet from the bottom of the frame, the additional repairs beyond this limit shall be paid per the relevant bid item, or if no bid item exists the Fixed Extra rate.

Adjustment on manhole frames in asphalt pavement to finished grade shall only be done after the binder layer(s) of hot mix asphalt pavement is completed on asphalt pavement and asphalt resurfacing projects. The binder layers of hot mix asphalt pavement shall be removed only after a vertical edge has been sawed in a box around the frame. The removal and sawing of any lower layers shall be incidental to the work. Backfilling around the frames after adjustment shall be done with compacted fill as specified for the pavement base, and compacted asphalt base/binder material, at Contractor's expense.

The area of asphalt removed around the frame shall be large enough to fully accommodate compaction by a self-propelled pneumatic roller completely within the patched area. **The use of plate compactors will not be permitted for compacting the base aggregate dense and lower layer of HMA around manholes.** The surface layer on the pavement shall not be applied until the all patched areas around the adjusted manhole frames have had a minimum of 12 hours elapse since the binder material was placed. Metal adjusting paving rings installed on top of the casting frame shall not be used unless approved by the Engineer in writing.

If only one layer of asphalt is to be laid, then the adjustment of catch basin and manhole frames shall be done before the upper layer is placed.

While performing the masonry work involved in making adjustments, the Contractor should provide the means to intercept dropped materials before they reach the bottom of the structure.

2. ADJUSTING WATER VALVE BOXES

The Contractor shall furnish all labor and equipment necessary to adjust all water valve boxes within the street right-of-way within the actual work limits. This work requires the boxes to be placed at finished grade and be operational.

In asphaltic pavement, all valve boxes shall be set to finished grade after any binder courses and prior to installation of the surface course.

After the pavement is installed, if the City Water Department determines the valve is inoperable due to displacement or faulty adjusting or lack of protection, the Contractor will be required to perform all work necessary to correct the condition with materials, and make the valve operational at the Contractor’s own expense within 5 days of notification by the City.

3. SURFACE REQUIREMENTS

The Contractor shall set the frames, grates, lids, and water valves accurately so the complete installation is at the correct elevation required to fit the adjoining surfaces. The frames shall be set in pavement areas so that they comply with the following surface requirements.

Place a 6 foot straightedge over the centerline of each frame or water valve parallel to the direction of traffic at the completion of the paving. Make a measurement at each side of the frame and average the two measurements. If this average is greater than 5/8 inch, reset the frame to the correct plane and elevation. If this average is 5/8 inch or less but greater than 3/8 inch, the City will allow the frame to remain in place but shall pay only 50% of the contract unit price for adjusting catch basin frames, manhole frames or water valves. If the frame is higher than the adjacent pavement, then make the two measurements at each end of the straightedge and average them. Frames protruding more than 1/8 inch above the pavement grade shall be reset based on the average.

The Engineer in the field is permitted to direct adjustment measurements to be taken at different locations and/or with different reference points wherever they deem necessary e.g. if a frame is close to the edge of the curb flange.

622.5 HMA ASPHALT PAVING

Placing of the asphalt mixtures shall be as continuous as possible. The width of paving passes shall be adjusted so the locations of longitudinal joints do not coincide for successive passes. However, whatever the width of a pass, the action of the spreader on the mat must be uniform throughout the width of the mat.

The finishing machines shall lap previously laid HMA material a minimum of 3 inches and the material left sufficiently high to allow for compaction. The longitudinal joints in each layer shall be offset from the previous layer by a minimum of 6 inches.

When the surface has cooled to a temperature of 140° F or less, the edges of longitudinal joints shall be painted with hot asphalt cement, or heated to the point of softening with an infrared joint heater, before work is resumed.

No asphalt mixtures shall be laid when the air temperature is at or below 40° F unless permitted by the Engineer and the Contractor has received approval of a cold weather paving plan. Binder mixture shall be spread at a temperature between 225° F and 325° F, and the surface mixture at a temperature between 250° F and 340° F.

The use of hand tampers or other non-mechanical compaction methods is prohibited. The Contractor shall protect all sections of the newly compacted mixture from traffic until they have been cooled and hardened to the satisfaction of the Engineer.

1. TACK COAT OF CONCRETE OR HMA PAVEMENT

   Except when otherwise specifically provided by the contract or ordered by the Engineer, penetration tack coat shall be placed in a single application. Tack Coat shall conform to 455.2.5 of the State Specs. Surfaces shall be clean and dry before tack coat is applied.

   Tack coat shall not be applied when the surface temperature is less than 32° F. Exceptions will be permitted only with prior written approval of the Engineer.

All sweeping, cleaning and preparation of the binder surface must be completed prior to placing the next layer of asphalt. The surface shall be reasonably free of loose dirt, dust, or other foreign matter.

After the binder or concrete base has been placed, as applicable, apply an asphalt tack coat at 0.05 to 0.07 gallons per square yard after dilution to the surface of concrete base or the binder course and to the edges of the existing pavement, and on any subsequent lifts of binder course. The Engineer may adjust the application rate based on surface conditions. Also tack coat manhole and inlet frames below grade.

The rate of application of asphaltic material shall be determined on the basis of the condition of the surface to be treated and the requirements to produce contemplated results and the amount per square yard to be applied will be specified by the Engineer. The asphaltic material shall not be applied at such a rate as will cause it to flow off the surface. The grade of emulsified asphalt and the time interval between application of tack and laying of HMA pavement shall also be entirely at the discretion of the Engineer.

In addition to the general application of a "tack" coat prior to laying the final surface, hand spraying of "tack" must be performed along all curb flanges and all transverse butt joints and feathered ends. The distributor truck must remain within 500 feet of the surfacing crew to avoid "tacking" too far ahead. The Contractor may be required to remove "tack" that may have been tracked, or carelessly sprayed, on concrete surfaces.

The Contractor shall apply tack coat as directed by the Engineer. Tack shall be considered **incidental** to paving unless noted as a separate bid item.

2. COLD WEATHER PAVING

Cold Weather Paving operations shall be implemented by the Contractor if paving operations are being conducted when the atmospheric temperature is at or below 40°F. The Contractor shall conform to the requirements of Section 450.3.2.1.2 of the State Specs when performing Cold Weather Paving. Binder layers of asphalt shall not be placed in temperatures below 32°F unless approved in writing by the Engineer. Binder layers may be placed once the atmospheric temperature reaches 32°F and is rising. The surface layer of asphalt shall not be placed in temperatures at or below 36°F unless approved in writing by the Engineer. Binder layers may be placed once the atmospheric temperature reaches 36°F and is rising.

Cold Weather Paving shall be considered incidental to the contract unless a separate bid item is provided in the contract.

622.6 POROUS ASPHALT PAVING

Do not install when ambient air temperature at pavement site in shade away from artificial heat is below 60 degrees F or when actual ground temperature is below 50 degrees F unless permitted in writing by the Engineer.

Paint contact surfaces, such as permeable paver edge restraints, and concrete pavement, with a thin, uniform coat of Type RS-1 emulsified asphalt immediately before asphalt mixture is placed against them. Coat surfaces of manhole, inlet, and utility frames with oil to prevent bond with asphalt pavement.

The use of surge bins shall not be permitted.

Equip pavers with a joint heater capable of heating longitudinal edge of previously placed mat to a surface temperature of 200 degrees F, or higher if necessary, to achieve bonding of newly placed mat with previously placed mat.

Rollers shall be two-axle tandem rollers with a gross mass (weight) of not less than 8 tons and not more than 12 tons and capable of providing a minimum compactive effort of 250 pounds per inch of width of drive roll. Rolls shall be at least 42 inches in diameter. Do not stop or park rollers on freshly placed mat. Vibratory rollers shall not be used.

The porous asphalt mixture, at time of discharge from haul vehicle, shall be within 10 degrees F of compaction temperature for approved mix design.

Place porous asphalt in a single lift of 4 inches thickness unless otherwise specified in the plans.

Before completing paving operations, test the full permeability of pavement surface by application of clean water at rate of at least 5 gpm over surface, using a hose or other distribution device.

After final rolling, do not permit vehicular traffic of any kind on surface until cooling and hardening has taken place, and in no case within first 48 hours.

The Contractor shall ensure that at no point after placement of the porous asphalt shall any eqiupment or materials be stored upon the porous pavement. The Contractor shall keep the porous pavement free of soil, dirt, debris and foreign material that may clog the porous asphalt. The Engineer reserves right to require that Work adjacent to pavement, such as landscaping, cleanup, and turf establishment, is completed prior to installation of porous asphalt course, when this work could cause damage to pavement.

622.7 QUALITY CONTROL

The cost of furnishing a quality control program and providing the tests and reports as specified, including density testing, shall be considered incidental to the pavement bid item.

The Contractor shall provide and maintain a quality control program. A quality control program is defined as all activities, including mix design, process control inspection, sampling and testing, and necessary process adjustments related to producing and placing HMA pavement conforming to the specifications.

The testing shall include density testing of in-place HMA pavement with the use of nuclear density gauges. Section 460 of the State Specs shall be modified by these specifications to require the Contractor to test for nuclear density a minimum of every 300 feet. The Contractor shall perform HMA pavement density testing with nuclear gauges operated by a Nuclear Technician I who has been certified by the Highway Technician Certification Program. The Contractor shall furnish nuclear gauges from the State of Wisconsin's most current "List of Approved Nuclear Density Gauges".

The Contractor shall select the test site, station, and offset distance randomly as specified in the State of Wisconsin Construction & Materials Manual. When requested, the Contractor shall provide the Engineer with the original data sheet for each lot within 24 hours of testing completion for that lot. A lot represents 750 tons of a mixture placed within a single layer for each location and target maximum density category.

The Contractor shall not re-roll compacted mixtures with deficient density test results or operate continuously below the specified minimum density. The Contractor shall stop production, identify the source of the problem, and make corrections to produce work meeting specification requirements.

1. POROUS ASPHALT PRODUCTION QUALITY CONTROL

   The Contractor shall provide at their expense, and with Engineer approval, a third-party Inspector to oversee and document mix production. Submit mix testing results during production to Inspector. Quality Control Plan may be altered at discretion of Engineer on basis of feasible testing as suggested by asphalt supplier. The plant shall employ a Quality Control Technician (QCT) that performs QC/QA testing and will be certified in discipline of HMA Plant Technician by relevant certifying agency.

   The Contractor shall sample, test, and evaluate mix in accordance with methods and minimum frequencies in Table 1 on page 622-8.

Table 1

Test	Minimum Frequency	Test Method
Temperature in Truck at Plant	6 times per day	
Gradation	Greater of either (a) 1 per 500 tons (b) 2 per day, or (c) 3 per job	AASHTO T30
Binder Content	Greater of either (a) 1 per 500 tons, (b) 2 per day, or (c) 3 per job	AASHTO T164
Air Void Content	Greater of either (a) 1 per 500 tons, (b) 2 per day, or (c) 3 per job	ASTM D6752
Binder Draindown	Greater of either (a) 1 per 500 tons, (b) 2 per day, or (c) 3 per job	ASTM D6390

If an analyzed sample is outside testing tolerances, take corrective action. After taking corrective action, sample and test resulting mix. If re-sampled mix test values are outside tolerances, immediately inform Engineer. If the Engineer determines that it is in best interest of project that production is ceased. Contractor is responsible for mix produced for project.

Produced paving mixture produced shall not vary from design criteria for aggregate gradation and binder content by more than stated tolerances. Testing tolerances during production for air void content, binder draindown, and TSR shall be within limits in table below.

Sieve Size	Percent Passing
19mm (3/4 in.)	-
12.5 mm (1/2 in.)	±6.0
9.5 mm (3/8 in.)	±6.0
4.75 mm (No. 4)	±5.0
2.36 mm (No.8)	±4.0
0.075mm (No. 200)	±2.0
Percent PGAB	+0.4, -0 .2

Should the paving mixture produced vary from designated grading or asphalt content by more than above tolerances, the Contractor shall immediately make proper changes until it is within these tolerances.

Should mix not meet tolerances specified above upon repeat testing, Engineer may reject further loads of mix.

Any mix that is loaded into trucks during time that plant is changing operations to comply with a failed test shall not be accepted, and should be immediately recycled at the plant by the Contractor.

622.8 PAYMENT

Tack coat shall be paid per gallon if it is included in the proposal as its own bid item. Otherwise it shall be incidental to the work.

SECTION 670
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SECTION 670 – Street Lighting

670.1 – GENERAL

The Contractor shall coordinate with WE Energies to energize service at electrical service/lighting control cabinets and disconnect any electrical services as needed at their own expense.

A. PROJECT REQUIREMENTS

All electrical work shall be performed by a state licensed electrical contractor, and where pertinent, conform to the State of Wisconsin Electrical Code and good electrical construction practices. The Contractor shall maintain the street lighting systems in such a fashion as to provide for their continuous operation throughout the contract to extent required, which shall be incidental to the work unless stated as a separate bid item.

Work shall conform to Sections 204, 651, 652, 653, 654, 655, 656, 657 and 659 of the latest State Specs and the latest adopted State of Wisconsin Electrical Code, except as modified herein, and the City Specs.

The work under this section includes additions and modifications to the existing City of Wauwatosa street lighting system as shown on the drawings and as specified. All work, including repairs, shall be inspected by City staff. The Contractor shall furnish and install, as incidental unless specifically noted as a separate bid item, all items needed to make the proposed system complete from the source of supply to the most remote unit. Such items include, but are not limited to, wire nuts, grommets, tape, connectors, conduit lock-nuts varnish, and putty.

The Contract drawings for electrical work are in part diagrammatic, intended to convey the scope of work and indicate the general arrangement of, including but not limited to, equipment, cable, conduits, and approximate sizes and locations of equipment and material. They are not to be used for obtaining lineal runs of wire or conduit. Unless otherwise noted, no measurement of an electrical drawing derived by scaling shall be used as a dimension with which to work. Dimensions noted are subject to field measurement of existing construction. All required measurements shall be performed by the Contractor prior to the installation of equipment.

Traffic control devices required for the street lighting work shall be considered incidental to the work under this Contract if a bid item for traffic control is not listed in the proposal. See Section 605 General Provisions in the City Specs for more details on traffic control requirements.

1. CONTINUOUS OPERATION OF STREET LIGHTS

If there are overhead and underground utility facilities located within the project limits, refer to the plans and specifications for any anticipated utility adjustments.

The Contractor shall coordinate his construction activities with a call to Diggers Hotline or a direct call to the utilities which have facilities in the area as required per statutes (see General Provisions for a detailed list of utility contact information).

Contractor shall be responsible for locating existing underground street lighting and traffic signal cables within the project limits.

Bidders are advised to contact each utility company prior to preparing their bids. Any damage to public or private utilities shall become the responsibility of the Contractor. Satisfactory repair or replacement shall be completed at the Contractor's expense.

Where there is enclosed or unenclosed lighting cable within the project limits, care must be exercised by the Contractor to avoid damage to the cable during work. Where the Contractor or any of his subcontractors damage any part of the lighting system which results in inoperative street lights or traffic signals, or an outage has occurred anywhere within the project limits, the damage shall be repaired by a qualified electrician at the Contractor’s expense in accordance with City specifications. All lighting systems shall be kept 100% operational.

a. TIME LIMITS FOR REPAIRS

The Contractor shall have **24 hours** from the report of a problem to inspect and identify the cause. Repairs shall be made no later than **3 days** after the problem is identified. The Contractor may also, at their own expense, install overhead facilities to accelerate the return of functional electrical systems to meet the time limits outlined herein.

Should these limits be exceeded, the Engineer reserves the right to hire a third party, independent of the Contractor, or use City workers to perform the repair(s). The cost of hiring a third party or using City workers and having them repair the damage will be paid for by the Contractor. Contractor agrees they will be informed of the final cost, which will be deducted from monies owed in a subsequent payment. In lieu of hiring a third party or using their own staff, the Engineer may also choose to fine the Contractor as they see fit for the circumstances, to be charged each day the lights are not properly functioning outside of aforementioned time limits,

and to be deducted from monies owed to the Contractor.

b. TEMPORARY LIGHTING

If no plans for temporary lighting are included in the Contract Documents, the Contractor may choose, at their own expense, to maintain street lighting via overhead connections to existing poles, the installation of temporary poles and luminaires with their own wiring, or splicing (in existing wires only) around new and/or old poles and/or pole bases, as needed.

Temporary lighting systems shall maintain equal or better lighting levels throughout the area of construction. The Contractor may propose to reduce these levels by submitting a plan to the City for review and approval to reduce light levels on the project. The plan shall indicate all existing and new lighting proposed to be in service and show what lighting is being proposed to be reduced or removed as part of the temporary lighting for the project. If the City does permit reduced lighting levels within the construction, the Contractor is still responsible for maintaining connections to allow 100% lighting capacity for any circuit(s) that continue beyond the construction limits of the project.

Whenever the Contractor is doing work that involves splicing into existing lighting systems, a tag system shall be employed at the distribution center.

The Contractor shall attach an appropriate tag on all circuits which are required to be opened during the course of his work. Such tags shall bear the date, Contractor's name, and individual worker's name indicating to others that work is being performed on the system.

At the conclusion of work operations on a particular distribution center, the Contractor shall remove such tags and re-energize the affected circuits.

See section 670.1 B. 8 below for detailed requirements.

i. All temporary lighting shall be in accordance with Wisconsin Electrical Code, the sections of the State Specs as mentioned in Section 670.1 A. above, the City Specs, and any applicable Federal, State, and Local laws.

2. PERSONNEL QUALIFICATIONS

Perform all electrical work using a journey worker electrician or an

electrical apprentice under the onsite supervision of a journey worker electrician. Electrical work is defined as any electrical and related construction required to be performed by the Contractor under this contract.

3. QUALITY ASSURANCE

All electrical materials shall conform to the latest requirements of the Wisconsin State Electrical Code (defined as the NEC plus the Wisconsin Supplemental Volumes).

All electrical materials to be furnished and installed under the contract shall comply with the provisions of the Underwriters Laboratories, Inc. and shall be UL listed and labeled.

B. GENERAL MATERIAL REQUIREMENTS

All materials furnished by the Contractor for lighting installation under this contract are subject to approval by the Engineer. Materials and equipment by manufacturers other than those specifically named will not be considered. Unless otherwise stipulated in the specifications or noted on the drawings, all materials and equipment incorporated in the work shall be new and unused and in complete accordance with the specification requirements. Materials and/or work not specifically identified as or in a bid item shall be considered incidental to work, and shall be included with the cost in appropriate bid item(s). All electrical materials to be furnished and installed under the contract shall comply with the provisions of the Underwriters Laboratories, Inc. (UL) and shall be UL listed and labeled.

It is the Contractor's responsibility to verify the catalog numbers shown on the plans and specifications, and update same before submitting shop drawings. Any catalog number revisions or subsequent material cost increases shall be made at no additional cost to the contract whether it is because of a different type or mounting due to project conditions, discontinued catalog numbers or other such issues. In the case of discontinued catalog numbers, the electrical contractor shall bring it to the Engineer's attention with the manufacturer's recommended substitution before shop drawings are submitted so that the appropriate equipment can be selected by the Engineer.

Bonding wire shall be installed in conduits for equipment grounding. All equipment shall be grounded as required.

1. CABLE, DUCT, AND CONDUIT

a. ELECTRICAL WIRE

All conductors and tracer wire shall be in strict accordance with Section 655 of the State Specs. Conductors shall be of the gage indicated on the plans, stranded copper, XLP insulated, USE rated wire, placed where indicated on the plans, with number of required conductors as indicated on the plans. Conductors shall be installed in duct. No direct-bury proposed conductors shall be allowed without the written permission of the Engineer.
Feeder conductors shall be black or red, and where two of this type are called for on the plans, one shall be black and one shall be red. Neutral conductors shall be white and grounding conductors shall be green. Tracer wire shall be orange or of the color indicated on the plans. Other cable types shall be of the color indicated on the plans or as directed by the Engineer.

b. HDPE Duct

Duct shall be in accordance with Section 655 of the State Specs, Type TC7, Schedule 40, UL listed, and shall be black with a red stripe for electrical installations. Duct shall be installed in the size(s), location, and number as indicated on the plans, and all the way through the tops of bases.

c. Nonmetallic Conduit/PVC

All conduits and sleeves shall be rigid PVC Schedule 40 in accordance with Section 652 of the State Specs, and of the size(s) indicated on the plans. Conduit sleeves for HDPE duct shall be installed at any roadway crossing, in concrete bases, and any other location as shown on the plans and in the detail drawings.

In junction boxes, ducts that are entering shall be cut off no higher than one-half the depth of the box but a minimum of 3” above the gravel base in the box unless otherwise approved by the Engineer.

2. FIXTURES/LUMINAIRES

The contractor shall consult the plans and/or proposal for product numbers and types of fixtures/luminaires to be installed. Either a 10% overage of fixtures or 3 each, whichever is greater, shall be delivered to the City Department of Public Works and shall be incidental to the bid item for fixtures/luminaires.

LED luminaires shall be of a slim, low profile design that minimizes wind loading. Luminaires shall be constructed of cast and extruded aluminum with integral, weather-tight LED driver components with high

performance aluminum heat-sinks. Each luminaire shall use a terminal block for power input suitable for #6 through #14 AWG wire.

The arm mount luminaire shall be designed for installation on a 2-inch nominal diameter mast arm.

Luminaire design shall be modular to accommodate varied lighting output by use of LED light bar modules and/or differing driver outputs. The LED shall have a nominal color temperature of 3000K with a minimum of 70 CRI. Drivers shall operate with an input voltage ranging from 120-277V, 50/60 Hertz, +/-10% as standard. LED drivers shall have a power factor greater than 90%. Anticipated L90 at 25°C shall be 100,000 hours or greater. All luminaires shall come equipped with an integral surge suppression protection standard and a quick disconnect harness suitable for mate and break under load provided on power feed to the driver.

The finish shall be factory applied powder coat durable Gray topcoat, providing resistance to corrosion, ultraviolet degradation, and abrasion. Luminaire manufacturer shall provide a minimum of 10-year warranty on materials and finish.

Luminaires shall be rated and/or certified UL listed for wet locations, IP-66 minimum enclosure rating, IDK dark sky full cutoff compliant, and Design Light Consortium (DLC) qualified. Luminaires shall be provided in a 3000K temperature color unless otherwise specified or directed by the Engineer.

Pole and Bracket Cable shall consist of two insulated single conductors for each luminaire. Conductors shall be stranded copper, AWG #10, 600V, Type XLP-USE having an insulation thickness of at least 45-mils. The conductors shall be continuous, without splices from the underground feeder connection or fuse holder, to the terminals at the luminaire. A sufficient length of excess cable shall be provided at each pole to permit the removal and servicing of the fuse assembly from outside the pole.

3. THREADED FASTNER REQUIREMENTS

These special provisions require the corrosion preventative compound described in Sections 657.3.1(3) and 657.3.5 of the State Specs. Any and all fasteners and other attachment hardware used on the pole

shaft shall be stainless steel unless otherwise approved by the Engineer.

All threaded fasteners (including but not limited to anchor bolts, screws, and bolts) shall be liberally coated with an Engineer approved anti-seize compound, and excess shall be wiped off. Excepting fasteners inside control cabinets, fasteners up to half an inch in diameter shall be stainless steel. Rust, corrosion, and anti-seize protection shall be provided at all threaded assemblies by coating all mating surfaces with an Engineer approved compound. Aerosol cans of anti-seize material are NOT acceptable. Anti-seize material shall be painted or dipped on threads.

4. FINISH REPAIRS

Unless otherwise specified, mars and scratches on painted equipment shall be touched up with two coats of color matched synthetic resin enamel, or with two coats of color matched zinc rich paint acceptable to the Engineer or as directed by the Engineer. Cold galvanizing paint shall be applied to steel surfaces prior to applying paint.

5. PULL BOXES

Covers for pull boxes shall say “STREET LIGHTING” when used in a lighting circuit.

Pull boxes shall be rectangular precast polymer concrete, reinforced by a heavy-weave fiberglass (Quazite or Engineer approved equal), 17”x30” with 18” depth, style Quazite PT, open bottom (flared), and Tier 15 rated. Covers shall be heavy duty, bolted, skid resistant with a minimum coefficient of friction of 0.5, and in concrete gray color. The cover fasteners shall be stainless steel captive 3/8-inch hex head bolts with stainless steel inserts.

Pull boxes shall be placed at all locations indicated on the plans or approved by the Engineer. When indicated on the plans, “communications” pull boxes, as described below, shall be used in the street lighting work where shown, and shall read “STREET LIGHTING” on the cover.

a. COMMUNICATIONS

Pull boxes for communications shall be the same as described above, except they shall have nominal sizes of 24”x36” and 42”

deep, unless otherwise shown on the plans. The cover shall read "COMMUNICATIONS".

6. LIGHT POLES

a. ALUMINUM LIGHT POLES

Light poles shall be Valmont brand or Engineer approved equal.

The completed lighting unit shall be of such design as will withstand all loads to which the units will be subjected in the field, including the loads applied by the materials attached to the lighting units, in conformance with the latest edition of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals. Use a design life of 25 years. Design to withstand a 3 second gust wind speed of 90mph (145km/h).

Poles shall be one extruded piece of 25-foot tapered aluminum, with 6063 satin finish, 0.156 wall thickness, 4-bolt mounting with 11 ½" bolt circle, and single member 6-foot mast arm, or as shown in the plan details. Pole shall be Part No.RTA25C8B4 with No. 69772-001 mast arm as manufactured by Hapco Aluminum Pole Products or Engineer approved equal, unless otherwise shown. Any and all fasteners and other attachment hardware for the pole shaft shall be stainless steel unless otherwise directed or approved by the Engineer, and shall be incidental to the pole.

Shafts with arm mounted luminaires shall have a J-hook at the top of each pole to provide strain relief for the cable.

Provide a welded mounting plate to accommodate side mount luminaire(s) as incidental to the pole. Exact dimensions to be coordinated with the luminaire to match end (arm) dimensions.

b. CONCRETE POLES

The poles shall be sky gray colored, polished finished with acrylic seal.

All standards furnished shall be cast in metal molds true to design. Time of mixing shall be sufficient to ensure that all particles shall be thoroughly wetted.

The pole shafts shall be fiber reinforced, air-entrained concrete, with 5/8” minimum coverage over reinforcement (7,000 psi minimum). Concrete shall be placed in one continuous operation. When filled, the mold shall be rotated at a high speed to insure a dense concrete by centrifugal force, and produce a cable raceway throughout the length of the standard not less than 2 ½” at the location of the hand holes and a minimum of 1 ½” at top of pole. The poles shall then be polished to a smooth ground finish. Reinforcing shall be in accordance with this specification to assure that no cracking shall occur during normal handling.

The span concrete poles are to be octagonal in shape and carry a 0.125 inch/foot taper, and have a sky gray finish. Shaft length is in general to be a minimum of 27'-7" and a maximum of 28'-0". The pole is to be 23'-0" above grade. The butt diameter shall be 8" minimum and the top diameter shall be 5" minimum. The hand hole shall be 2 ½” x 12” minimum and 18" above grade and located on the opposite side of the pole from the curb. Two cable entrances shall be provided across from one another to run parallel with the curb line. Cable entrances shall be 18" below grade and a minimum size of 2-1/4" x 8". Cable entrances shall be sufficient in size to allow a single 1” conduit to enter the pole and terminate no less than 3” below the hand hole but no more than 6” below the hand hole.

The hand-hole cover shall be flush with pole. Poles shall be furnished with flush aluminum cover plate for hand hole and all other necessary hardware. This hardware shall include a removable metal cap which will protect the required open cable raceway at the top from the weather, nonferrous inserts for securing accessories such as cast aluminum pole cap, bracket brace, hand hole cover, etc., 6'-0" x 2" dia. mast arm of galvanized steel or aluminum with 1-1/4" slip fitter, stainless steel or silicone bronze nuts and bolts. Brackets for mast arm are to be one piece (no welds).

Manufacturer's conformance to specifications shall be certified by an independent testing laboratory.

All poles shall be guaranteed against defect for a period of 5 yrs. If defects are discovered, poles shall be replaced on a two-for-one basis.

c. POLE CABLE & FUSE

Conductors from the underground cable network shall be Type RHW-2/USE-2 (XLP) individual conductors. In each utilized phase

conductor in the hand-hole, there shall be installed a 1-pole secondary inline 600 VAC fuse assembly as manufactured by BUSS Tron HEB series fuse holder with weatherproof boots, or Engineer approved equal, with a KTK fuse. Conductors shall have sufficient length to permit removal of the fuse assembly through the hand-hole of the pole.

Exposed ends of fuse holders shall be taped thoroughly with 3M 130C linerless rubber insulating tape and 3M Scotch Super 88 vinyl tape or Engineer approved equal.

d. BASES

Shall be constructed in accordance with Section 654 of the WisDOT Standard Specifications and as shown on the plans, and the requirements of the pole manufacturer.

Light pole bases shall be round, 20” diameter by 5’ deep reinforced concrete, unless otherwise shown on the plans. Bases shall have anchor bolts cast in place with the base. The Contractor shall confirm bolt placing and circle diameters with the pole supplier(s) before pouring bases. Bases of a non-circular shape will not be accepted unless such bases are noted to be installed in the plans.

Bases shall be excavated by use of a circular auger. Top surfaces of concrete bases shall be trowel finished and level with a 1-inch chamfer around the entire top edge. Backfilling and compaction of areas disturbed by construction operations shall be considered incidental. All form material exposed to view shall be removed by the contractor.

Factory made PVC elbows shall be cast in the base as sleeves for the cable-in-duct, incidental to the base. Location and size shall be as shown on the details or directed by the Engineer. Elbows shall be installed in an orientation as to permit conduit to be installed in as nearly a straight-line run as possible, without bends. It is acceptable to the Engineer if the Contractor achieves this by “crisscrossing” the vertical portions of the elbows in the base, and/or orienting the elbows so the tops protrude from the top of the base and are cut down later, in order to create a more gradual curve inside the concrete. The sleeve opening in the side of the base shall be no less than 18” below the concrete top of the base.

Bases shall be constructed so as to center the pole on the concrete. The Engineer may require off-center pole bases to be removed and reinstalled at the Contractor’s expense, or the Engineer may reduce payment for each off-center base. Sonotube

and other forming materials shall be removed from the exposed portion of bases before completion.

7. LIGHTING CONTROL CABINET

The lighting control cabinet shall include a new concrete foundation, NEMA 3R enclosure, panelboard, time clocks, contactors, photocontrol, circuit breakers, wiring, and all equipment and materials as shown in the plans and as listed below, as incidental to the cabinet item. The cabinet with all of its electrical components, wiring and parts shall be listed and labeled by Underwriters Laboratories (UL) or other nationally recognized testing laboratory as a completely assembled unit.

All materials furnished for this portion of the work shall be Listed and Labeled by UL or other National Recognized Testing Laboratory.

Provide factory PAINTED finish on enclosure, meter pedestal and exterior mounted disconnect switch and any exposed conduits to match color of street lighting poles/luminaires.

Provide “LIGHTING CONTACTOR” or “RECEPTACLE CONTACTOR” (1/4”) engraved identification plaque on respective contactor.

Provide “LIGHTING” or “RECEPTACLE” (1/4”) engraved identification plaque on respective H-O-A switch.

a. ENCLOSURE

Control enclosure shall be manufactured by Bison Pro Fab (800) 825-5805, APX Enclosures (717) 328-9399, or Engineer approved equal.

Control enclosure shall be NEMA-3R made from 12-gauge Type 304 stainless steel. Seams shall be continuously welded and ground smooth. All hardware shall be type 304 stainless steel.

Enclosure shall be free standing with an overall height of 54-inches, a width of 48-inches and a depth of 24-inches. Enclosure shall have a 2-inch wide inside flange at the front, back, and sides for anchoring to base. Side and back walls shall be stiffened with 2 vertical stainless-steel equipment mounting rails per wall. The door frame shall be double flanged.

The cabinet top shall be sloped to drain and shall have a drip shield over door. Provide screened vent slots (1/8-inch x 1-inch) under the cabinet overhang located in the top face above door opening.

Outer door shall be NEMA 3R, 12-gauge stainless steel, with cellular neoprene gasket and a three-position door stop rod. Door shall be hinged with a continuous 14-gauge stainless steel hinge secured with ¼-20 stainless steel carriage bolts. Provide 3-point latching system with ¾-inch diameter stainless steel padlocking handle. Also provide a Corbin No.2 deadbolt lock with 2 keys.

Enclosure shall have a 0.125-inch thick 5052-H32 aluminum mounting panel at back (interior) of enclosure.

Provide plastic print pocket attached to inside of door.

All abandoned cables shall be removed from the lighting control cabinet.

b. MAIN DISCONNECT

Fusible 200A, 2-pole, 600VAC, NEMA 4X stainless steel, heavy duty with insulated groundable neutral assembly, service ground kit and lockable in ON & OFF positions. Mount directly to back of enclosure as appropriate. Provide Bussmann 200A, 600V FRS-R Class RK5 fuses.

c. CONTACTORS

Contactors shall be 200A, 2-pole, mechanically held, 120V coil, Square-D #8903-SVO10-V02, and shall be mounted directly to back panel. The Contractor shall construct a separate latching/unlatching circuit using an 8-pin DPDT relay and socket (120Vcoil, 10A contacts) Square-D or Engineer approved equal.

d. CONTROL TRANSFORMER

Shall be 240VAC Primary, 120VAC Secondary, 1PH, 3KVA, Square-D #3S1F. The Contractor shall furnish Square-D #9080FB1211R fuse block assembly with 15A fuse to protect the line side of the transformer.

e. TIME CLOCK

The time clock shall be astronomical with non-volatile EEPROM memory, battery backup, -40°F to 155°F operating range, LCD display, daylight saving time and leap year correction. The Contractor shall provide an Intermatic #ET8215C.

f. SECONDARY LOAD CENTER

The Contractor shall provide circuit breaker enclosure for secondary circuits, Square-D #QO24L70S with one 20A breaker (#QO120) for maintenance circuit, one 15A breaker (#QO115) for photocell circuit, and one #PK0GTA2 Ground Bar.

g. PHOTOCELL

The photocell shall be of the button type and installed in the overhang of the control cabinet facing north. The Contractor shall apply silicon caulk to maintain the integrity of the enclosure. The photocell shall be rated for 120V, 1800W with 30-60 second delay between “ON-OFF” operations and be warranted for 5-years by the manufacturer. Photocell shall be Intermatic #K4021C or Engineer approved equal.

h. HAND-OFF-AUTO SWITCH

Switch shall be Square-D #9001-KS43B switch body, #9001-KA1 contact block and #9001-KN760WP nameplate mounted in Hoffman #E-1PB one-hole box.

i. OTHER DEVICES

Furnish one 120V GFI duplex service receptacle in the surface mounted box and one 120V LED light fixture. The light fixture shall be surface mounted type with gasketed vapor tight globe, wire guard, lamp, and separate on/off switch in surface mounted box.

j. DUPLEX GFCI RECEPTACLE – Shall be Hubbell #GFR20ILA (20A)

k. 4” SQ DEEP BOX – Shall be Appleton #4SDEK with #8362 Cover

l. VAPOR TIGHT FIXTURE – Shall be E-conolight #E-VT1L141NG

m. 4” OCT. BOX – Shall be Appleton #4SDEK with #8362 cover

n. LAMP – Shall be GE 60W/A19

o. LIGHT SWITCH – Shall be Hubbell #CS1221I (20A)

p. 4” SQ DEEP BOX – Shall be Appleton #4SDEK with #8361 Cover

q. NEUTRAL AND GROUND BAR – 240V CIRCUITS

Shall be 1/4”x4”x12” Copper Bus Bar with mounting hardware. The Contractor shall provide Burndy #KA4C (#14-#4 AWG) or #KA25 (#4-#1/0 AWG) copper mechanical lugs for all conductors to the bus bar, or Engineer approved equal. Appropriate sizes and quantities shall be determined from the plans and details, and space shall be left for future lugs on the bar. Insulated standoffs shall be provided for the neutral bar. A separate copper grounding bar shall be mounted within the cabinet, identical to the Neutral Bar, for terminating field equipment grounding conductors.

r. PANELBOARD

Panelboard shall include 240/480 volt, 400A Square ‘D’ panel, 200A main circuit breaker, and 40A branch circuit breakers and ground bar as follows:

i. Panelboard: (1) – Square-D 400A, 600V, I-Line, #HKA-225-S4
ii. Ground Bar: (1) – Square-D #PK0GTA2
iii. Main Breaker: (1) – Square-D 2-Pole, 200A, 600V, I-Line, #JGA26200AB
iv. Circuit Breakers: (12) – Square-D I-Line one pole, 40A, #FA-14040

Fillers (Square-D #HNM1BL or #HNM4BL) shall be provided as required.

s. METER PEDESTAL

A new meter pedestal (‘Milbank’ or Engineer approved equal) shall be furnished and installed under this item. The Contractor shall arrange for and pay all permits and fees associated with installation of the meter pedestal as incidental to the cabinet work unless a separate bid item is noted.

The Contractor shall furnish and install an Engineer approved meter pedestal, conduit fittings (10,000 AIC or as required by the

local utility), ground rod(s) and connection(s), and all necessary conductors and equipment required by the State Electrical Code and the utility for a service connection. Meter shall be located on the side of the cabinet as appropriate.

t. CONCRETE BASE

The concrete base shall be as shown on the plans and shall comply with the requirements of Section 654 of the WDOT Standard Specifications. Conduit shall be Schedule 80 PVC electrical conduit and shall conform to the requirements of Section 652 of the State Specs.

Anchor rods, nuts, and washers shall conform to the requirements of ASTM A449 or A687 (Grade 105). The entire length of the anchor rods, and the nuts and washers thereof, shall be hot-dip zinc coated in accordance with AASHTO M232.
Concrete Masonry shall conform to the requirements of Concrete Masonry, Grade A, AFA, A-S, A-IS or A-IP, Section 501 of the State Specs.

u. CONSTRUCTION

The cables shall be trained in straight horizontal and vertical directions and be parallel next to and adjacent to other cables whenever possible, using cable clamps attached with #10 screw to mounting panel, Panduit CCH series or Engineer approved equal. Adhesive type clamps are not allowed. All equipment shall be mounted to the panel in the enclosure unless otherwise indicated on the plans or directed by the Engineer. Refer to the plans and details for equipment layout within the cabinet. The cabinet interior shall be cleaned of all construction debris prior to final acceptance.

v. PROGRAM TIME CLOCKS AS FOLLOWS

Lights: turn on 20 minutes after sunset and off 20 minutes before sunrise.

Receptacles: turn on 1 hour prior to sunset and turnoff at midnight. Verify with City or Engineer prior to programming

8. TEMPORARY LIGHTING (WHERE APPLICABLE)

Temporary lighting shall be installed where called out on the plans. If no plans for temporary lighting are provided, the Contractor may still choose – at their own expense – to install Engineer approved temporary lighting (see Section 670.1 A. 1. b. above for additional information).

Regardless of whether temporary lighting is on the plans or the Contractor elects to install it, they shall be responsible for determining and providing any and all materials, labor, equipment, and miscellaneous supplies as needed to maintain lighting during construction, as incidental to the temporary lighting. All temporary lighting shall require submittals (and if applicable, plan drawings) approved by the Engineer. Maintenance of temporary lighting shall be incidental to the work.

a. MATERIALS

i. WOOD POLES

All temporary poles shall be wood unless otherwise approved in writing by the Engineer. Wooden poles shall be Class V or larger with a 35 ft. overall length, but this length shall be adjusted as needed to accommodate locations below existing utility poles and/or lines, and adjustments shall be incidental to the poles. The poles shall be northern pine in accordance with ANSI Standard 05.1 for Specifications and Dimensions of Wood Poles. All poles shall be pressure treated with 5% pentachlorophenol with a minimum of 8 pounds per cubic foot net retention of the oil-borne preservative. Provide 4 AWG copper wiring in accordance with Section 655 for pole wiring. The depth of the wood pole in the ground shall not be less than 5 feet or as directed by the engineer.

ii. DOWN GUYS

All down guys shall be galvanized, 3/8-inch nominal diameter, 7 strand, zinc coated steel wire conforming to ASTM A475, with 11,500 lbs. minimum breaking strength, and utilities grade or better. All guys shall have a 7-foot PVC or plastic guy guards. All guys shall have a guy strain insulator in accordance with ANSI Class 54-2, a tensile strength of 12,000 lbs., and a maximum cable diameter of 1/2-inch.

Anchor rods shall be twin-eye 5/8-inch nominal diameter with a minimum breaking strength of 11,500 lbs. Anchors shall be expanding or plate type with an expanded area of 125 square inches or greater. A screw type anchor may be used provided the anchor is at least 10-inches in diameter, has 78 square inches of an area, and an anchor rod diameter 1-1/4-inch by 66-inches or larger, and galvanized.

Guy wire clamps shall be 3-bolt and have a minimum breaking strength of 11,500 lbs. A galvanized service sleeve shall be used to hold down the loose guy ends beyond the guy clamp.

The dead ends shall be made of the same material as the guy wire.

iii. LUMINAIRES AND ARMS

Fixtures shall be high pressure sodium or LED cutoff luminaires of appropriate output, and mast arms shall be of appropriate length.

iv. AERIAL CABLE

The aerial cable shall consist of #2 AWG triplex or quadplex assembly of two or three XLP insulated power aluminum conductors, respectively, with an ACSR bare messenger wire (may be used as ground conductor if needed).

b. CONSTRUCTION

i. POLES

The depth of pole in the ground shall be no less than 5-feet, or as directed by the Engineer. All poles which are at the end of an aerial cable run, or where aerial cable tension could cause the pole to lean, shall have down guys installed. Any backfill in the hole around the buried section of pole shall be either stone chips, slurry, or other non-compressible material approved by the Engineer. Backfill shall be incidental to the pole.

ii. CABLE

The Contractor shall install the overhead lines in a manner which is safe and in accordance with all applicable codes, and shall correct excessive sag or loose connections until removal of the temporary system is acceptable to the Engineer, or until the final payment of the contract.

Cable shall be a minimum of 20-feet above any roadway or driving surface, and minimum 15-feet above all other surfaces.

Where necessary to connect to existing underground circuiting, the Contractor shall provide an appropriately sized, temporary junction box at the base of the wood pole for an above-ground splice. The cable that extends above grade shall be appropriately protected by a plastic cable guard or conduit for a minimum of 10 vertical feet.

iii. REMOVALS

Temporary lighting shall only be removed when the proposed permanent system is fully tested and functional, or with the express written permission of the Engineer. Once criteria for removals are met, all materials shall be removed as soon as practicable, and any voids or holes left by the temporary system shall be backfilled in compliance with Section 670.1 C. of the City Specs below.

iv. FAILURES, DAMAGE, AND MALFUNCTIONS

All temporary lighting shall be maintained in accordance with Section 670.1 A. 1 of the City Specs, as incidental to the contract, from the time of installation through the time of disconnection at the start of removals.

In the event of circuit failures in and near the project area during construction suspected to relate to construction activities, the Contractor, at his expense, shall respond to and troubleshoot outages. Whether or not the problem or solution lies within the project limits, he shall immediately make the necessary repairs per City specifications. The Contractor shall lay out his own work and shall be responsible for determining exact locations for equipment

and rough-ins and the exact routing of conduits so as to best fit the layout of his work.

Since damaged cable may not be discovered until non-working hours, the Contractor shall maintain a telephone number by which he can be contacted for said repairs 24 hours/day, 7 days/week, including holidays and weekends. Repairs must be permanent in nature and may include installation of an entire conduit crossing with pull boxes, trenching, cable replacement and other work needed as determined by the City Electrician.

Contractor shall be responsible for making repairs to street lighting and traffic signal systems which are believed to have been damaged as a result of the contractor's construction operations. After the Contractor has made sufficient repairs, should the Contractor demonstrate, to the satisfaction of the Engineer, that damage to the underground cable was obviously not a result of construction operations under this contract, and such cables were directed to be repaired by the Engineer, the Contractor shall be reimbursed by the City for actual costs of labor, equipment and material used on a cost-plus-limited basis per the terms of the contract.

The Contractor shall also be responsible for repairs for failure to the street lighting cable within the one-year warranty period following contract acceptance which are shown to be a result of the Contractor's construction activities. If the Contractor fails to abide by the requirements herein, the City reserves the right to complete the work independently of the Contractor and deduct the cost thereof from monies due the Contractor under this contract.

The Contractor or his representative shall respond to all emergency calls from the City of Wauwatosa within one (1) hour after notification and provide immediate corrective action. When equipment has been damaged or becomes faulty beyond repair, the contractor shall replace it with new and identical working equipment within one (1) working day. The cost of furnishing and installing the replaced equipment shall be borne by the contractor at no additional expense. The contractor may institute actions to recover damages from a responsible third party. If at any time, the contractor fails to perform all work as specified herein to keep the

temporary lighting system in proper operating condition; and if the contractor's designated personnel cannot be contacted, the City shall have the normal maintaining authority to perform the required repair. The cost of the repair shall be paid by the contractor.

C. REMOVAL OF EXISTING LIGHTING

Holes left by all removals shall be backfilled with an Engineer approved material. This work shall be incidental to removals.

Where indicated on the plans or as directed by the Engineer, the Contractor may be required to salvage and deliver selected existing light poles, arms, luminaires, pull boxes, frames/covers, signs, or other materials – to be determined on a contract-by-contract basis – to the City of Wauwatosa Public Works Yard at 11100 W. Walnut Rd., Wauwatosa, WI 53226. Contact Randy Michelz, Traffic and Electrical Supervisor, (414) 471-8429

1. LIGHTING UNITS

Where indicated on the plans, lighting units shall be completely removed including pole (direct-bury or base mounted), base (as applicable), mast arm, luminaire, pole wiring, and all appurtenances, and the existing underground cables and conduits/ducts shall be cut off and safely abandoned below ground or temporarily spliced as required to maintain operation of the street lighting, all incidental to the removal unless otherwise noted as a separate base bid item. Except where noted on the plans, all of the above materials shall be disposed of offsite by the Contractor as incidental to all removals. The Contractor shall notify the Wauwatosa Electrical Supervisor 48 hours prior to the removal of the lighting units.

Any partial removal of lighting units shall only be as specifically indicated on the plans, or as directed by the Engineer.

2. CABLE, DUCT, AND CONDUIT

Where new underground conduit or duct is to be installed, the Contractor shall remove existing underground conduits/ducts (note conduits and ducts only need to be removed where exposed after abandonment; no filling or pulling of abandoned runs required) and their wiring, and dispose of/recycle offsite in an appropriate manner, as incidental to removals and proposed installations. All unused or

abandoned wires shall be removed from light poles, junction boxes, ducts, conduits, and the lighting control cabinet. Incidental splices shall be made where needed to maintain continuous operation of the lighting system.

3. SIGNS ON POLES

Signs attached to the existing poles shall be removed by the Contractor. The signs shall be placed on temporary posts, salvaged, or disposed of offsite as directed by the Engineer or shown on the plans. The Contractor shall reinstall the signs, or install new signs if so called for on the plans, on the nearest available new lighting unit or as indicated on the plans. Removing, temporarily posting, disposing of (where applicable), and reinstalling existing signs or installing new ones shall be considered incidental to the work unless otherwise noted as a separate base bid item. It may be noted on the plans the City of Wauwatosa is furnishing some signs.

4. PULL BOXES

Where indicated on the plans, existing pull boxes, frames, hardware, and covers shall be completely removed. The existing pull box frames, covers, hardware, and all other materials therein shall be disposed of off-site by the Contractor as incidental to removals. The existing underground cables and conduits/ducts in the pull box shall be cut off and safely abandoned below ground or temporarily spliced as required to maintain operation of the street lighting, incidental to the removal.

5. CABINETS

Cabinets shall be removed where indicated on the plans. Cabinets shall have all conductors and electric services disconnected in a safe manner. Unless otherwise indicated on the plans, removal shall include as incidental to the work the entire cabinet, the entire base including conduits, ducts, and cable, all internal and external electrical components, wiring, and hardware, meter pedestal (where applicable; unless otherwise indicated as a separate bid item), and any other interior or exterior attachments and their materials. The Contractor shall coordinate cabinet removals with WE Energies, the Engineer, and the City of Wauwatosa Electrical Supervisor as incidental to the removal.

D. INSTALLATION

1. HDPE DUCT

Duct shall be installed 6”-12” from the back of curb, at a depth of 24”-30” of cover from the top of curb. The Contractor shall lay or bore the duct empty, i.e. without any proposed cable inside.

In the roadway (not driveways or walks), duct shall be installed in a 3” PVC Schedule 40 conduit sleeve at a depth of 18”-24” of cover for the sleeve from the top of pavement unless otherwise noted in the plans, but the sleeves shall be installed empty before the duct is pulled through. Duct shall NOT be placed in any sleeves before the sleeves are installed. PVC crossings shall extend 6”-12” beyond the back of curb. Compacted gravel (or spoils in turf areas) may be used for bedding and backfill material but it must be free from all rocks, pebbles, broken concrete, clay chunks or other material that may cause damage to the duct (or conduit). Backfill in these areas shall be thoroughly compacted to prevent future settlement. In paved (or brick paver) areas, the backfill for trenches shall be slurry where directed by the Engineer. Mason sand bedding is only required around direct-buried cable.

Should two or more crossings be required at a location, each crossing shall have its own HDPE duct in its own PVC sleeve, and the crossings shall be laid side-by-side at the same depth. Separate borings and trenches are not required.

The location of each crossing through a roadway shall be marked by arrowhead chisel marks or stamps in the curb edge at the top of curb. If curb at the crossings is to be replaced as part of this contract or from damage, then these marks shall be made in the proposed curb after it is installed.

a. SLC TRANSITION/SHUR-LOCK II BENDS

Where indicated on the plans or as directed by the Engineer, Duraline Shur-Lock II couplers shall be used with Schedule 40 PVC conduit bends, of the size to match the HDPE conduit, to accomplish 90° turns in duct alignments. Couplers shall be sized as appropriate. Where used, Shur-Lock II fittings shall be noted on the as-built drawings and the Contractor shall verify to the Engineer the installation of the SLC transition is complete prior to backfilling. Transitions shall not be paid for unless confirmation of their installation has been made by the Engineer, or proof of their installation is provided to the Engineer, AND they are clearly shown on the as-built drawings. If the Contractor fills their excavation without notifying the Engineer or before the Engineer is able to

confirm installation, the Contractor shall, at their own expense, re-excavate and re-fill around the SLC for the Engineer's verification.

2. PVC CONDUIT

Unless otherwise noted on the plans, PVC conduit shall only be used as a sleeve for HDPE duct. Boring is only required where indicated on the plans. Boring in areas where it is not shown or directed by the Engineer shall NOT require any additional payment to the Contractor, unless the Engineer agrees in writing to extra costs before the work is performed.

Where the earth trench meets conduit that is either above or below the trench line, the trench line shall be sloped at a grade of not more than two inches (2") per foot to the conduit. The conduit is not to be bent up to meet the trench line. Where trench is excavated around the conduit end; any fill material placed beneath such conduit shall be properly compacted.

The material excavated from the trench shall be stored in such a manner as to do no damage to the adjacent public or private property. All surplus material shall be removed at the Contractor's expense and on the same day as it is excavated unless otherwise permitted in writing by the Engineer. The Contractor shall be strictly responsible for any damage done to adjacent public or private property arising from the excavation of the cable trench, laying the cables, or backfilling the trench. During the period trenches are left open, they shall be either covered or barricaded to the satisfaction of the Engineer.

Conduit sleeves shall be installed at any location where cable needs to cross under a roadway pavement (sleeves at driveways, walks, and trees are not required). These sleeves shall be installed perpendicular to the centerline of the road, at a depth of 18”-24” of cover from the top of pavement. The ends of these sleeves shall extend 6”-12” behind the back of curb. Compacted gravel (or spoils in turf areas) may be used for bedding and backfill material but it must be free from all rocks, pebbles, broken concrete, clay chunks or other material that may cause damage to the duct (or conduit). Backfill in these areas shall be thoroughly compacted to prevent future settlement. In paved (or brick paver) areas, the backfill for trenches shall be slurry where directed by the Engineer. Mason sand bedding is only required around direct-buried cable.

a. BASES

Sleeves shall be placed in all bases (including, but not limited to, for light poles and cabinets), with PVC bends oriented to

accommodate future pulling of duct and cable, and of the size and quantity as indicated on the plans.

For light pole bases, factory made PVC elbows shall be cast in the base as sleeves for the cable-in-duct, incidental to the base. Location and size shall be as shown on the plans or directed by the Engineer. Elbows shall be installed in an orientation as to permit conduit to be installed in as nearly a straight-line run as possible, without bends. It is acceptable to the Engineer if the Contractor achieves this by “crisscrossing” the vertical portions of the elbows in the base, and/or orienting the elbows so the tops protrude from the top of the base and are cut down later, in order to create a more gradual curve inside the concrete. The sleeve opening in the side of the base shall be no less than 18” below the concrete top of the base.

3. CABLE

All new cable shall be installed in HDPE duct. Cable shall NOT be installed before the duct is placed in the ground or bases. The Contractor shall exercise care in the installation of the cable-in-duct to ensure that the completed raceway is smooth and free of kinks and sharp bends. The Contractor shall verify that the conductors are free to move in the duct after installation. At the request of the Engineer, the Contractor shall demonstrate free movement of the conductors within the duct after installation and that the conductors can be easily removed and replaced.

Frost loops of at least 12 inches shall be provided where cables enter conduit systems. At any location where existing direct-buried cable is exposed, mason sand shall be used as a bedding material around the cable before backfilling.

Conductors in poles, pull boxes, or other terminations shall be marked with blue tape wrap to identify the set of conductors emanating from the distribution center (feeder). Neutral conductors shall be identified with white tape wrap, and grounding conductors shall be identified with green tape wrap.

4. PULL BOXES

Ground rods (5/8” x 8’) shall be installed in all pull boxes where new construction meets the existing lighting system, and where indicated on the plans. Ground rods shall be paid per the bid item in the plans; if no such bid item exists, ground rods shall be incidental to the contract.

The new pull boxes shall be installed flush with grade, on 12 inches of crushed stone base, or as shown on the plan details, if applicable. Where the pull box joins new and existing cable, sections of existing electrical cables shall be routed through the new box and placed so as to be slack and readily accessible. In locations where, new concrete is to be placed around the new box, the seam between the cover and the rim of the box and the bolt holes in the cover shall be taped to prevent accidental introduction of concrete into the seam or bolt holes.

The Contractor shall make every effort to prevent any damage to the existing electrical cables during the removal and installation process. Damage to cables incurred during the removal or installation process shall be repaired by the Contractor at the Contractor's expense.

The pull boxes shall be set flush with the grade or pavement and installed on aggregate per plan details.

All junction box covers are to be bolted down.

5. POLES

Each light pole shall be identified with 5-character, self-adhesive street light numbers. This identification shall consist of 2.5-inch tall black letters (2-inch on residential streets), numbers on a white background, die cut from engineer grade reflectorized sheeting. The identification number shall be assembled as a vertical label applied to the streetlight poles on the quadrant of the surface on the pole that faces oncoming traffic. The top of the label shall be installed at 5 feet above the ground line. Verify pole numbers with Engineer prior to installation of identification labels.

Poles on residential streets and decorative style poles shall NOT have number labels installed on the outside of the pole unless specifically called for on the plans.

Furnish and install all incidental items, such as hardware, transformer, pole wiring/fusing, grommets, etc. necessary to make the unit complete.

Furnish only items (Pole assembly and transformer) are to be delivered (in appropriate packaging/protective materials) to the City of Wauwatosa Public Works Yard at 11100 W. Walnut Road, Wauwatosa, WI 53226. Contact Randy Michelz, Traffic and Electrical Supervisor, 414-471-8429.

a. POLE CONNECTIONS

In circuits with two feeds, red cable shall be used for even numbered poles, and black cable shall be used for odd numbered poles. Contractor shall verify the circuit is appropriately balanced amongst all appurtenances it powers.

6. LUMINAIRES/FIXTURES

Luminaires and their respective arms (where applicable) shall be installed in accordance with Sections 657 and 659 of the State Specs and the manufacturer's requirements.

E. SPLICING REQUIREMENTS

Insulated cables shall be installed in continuous lengths without splices from terminal to terminal. Splicing will be permitted only in hand holes of poles, transformer bases, junction boxes or as otherwise provided on the plans. All splices other than underground cast-in-place splices shall be readily accessible.

Existing direct-buried cable may be spliced into new poles, cabinets, and pull boxes, but new cable-in-duct shall not.

1. LIGHTING UNITS

Splices in poles shall be made with reusable set-screw type connectors. Polaris IPL4 Connectors or approved equal. Complete splice with layer of nonstick varnished cambric insulating tape, followed by multiples laps of Scotch 130C rubber insulating tape, followed by multiple laps of Scotch Super 88 vinyl insulating tape. Split bolt compression connectors are not acceptable for this contract. Splice blocks will not be accepted.

Splices in poles shall be incidental to the pole bid item.

2. UNDERGROUND/PULL BOXES

Splices shall accept quantity and size of conductors required at individual pull boxes (which may be of differing configurations), be direct burial and submersible rated. Polaris Submersible Pedestal Connector ISB2, or approved equal. No splices are allowed in pull boxes, unless indicated on the plans or otherwise approved by the Engineer.

Splices underground are only for extension of direct buried cables or repairs as approved by the City.

3. BOLLARDS

Utilize silicon-filled wire connectors of proper size equal to King Dryconn waterproof connectors.

F. WARRANTY

The electrical contractor shall provide a written labor warranty for a minimum of 1 year after final acceptance of project installation. Warranty shall include materials damaged by Contractor's installation, otherwise materials shall be warranted by manufacturer. The Contractor shall be responsible during warranty period to coordinate replacement materials under warranty.

G. SUBMITTAL REQUIREMENTS

The Contractor shall furnish a complete list and cut sheets/shop drawings of materials to be furnished and used for lighting and electrical. Such list shall include the names and addresses of manufacturers, together with catalog numbers, certificates of compliance, specifications, and other product information requested by the Engineer. Catalog numbers shall be identified on respective data sheet. The list and cut sheets/shop drawings shall be submitted within 21 calendar days of the award of the contract. No materials shall be incorporated into the lighting system prior to the written approval of the Engineer. Approval does not change the intent of the specifications. The Contractor shall not substitute or make changes in material without resubmittal for approval.

The following list is a general list of items shall be submitted for approval and shall not be considered an exhaustive list of items to be submitted:

- Lighting Control Cabinet (materials and equipment layout/wiring diagrams)
- Fuse Holders/Fuses
- Splices
- Duct
- Conduit (including connectors)
- Electrical Wire (underground and pole wiring)
- Wire Identification
- Pull Boxes
- Poles
- LED Luminaires
- LED Bollards (if applicable)

- Temporary Lighting Plan and Materials (if applicable)
- As-built Drawings (Prior to final payment).

The Contractor is allowed 1 submittal of each item for approval. If more submittals are required, the Contractor will be charged $250 per item (e.g. duct, electrical wire) for additional review time with payment made with re-submittal, to be deducted from monies owed to the Contractor.

1. SUBSTITUTIONS

   Any request for substitutions will only be reviewed by the City and Engineer after the award of the contract following the bid opening. Materials, equipment or methods of installation other than those named, will be considered only if such articles are in accordance with the general requirements and are similar in composition, dimension, construction, capacity, aesthetics, finish and performance.

   In any case where the Contractor wishes to use equipment or methods other than those listed by name, such equipment shall be considered a substitution and must be approved by the City and Engineer. To gain approval for substitutions, the Contractor shall submit the following to the City and Engineer for review.

   Documentation from the equipment manufacturer indicating where this equipment meets and does not meet the specifications or drawings as written. This documentation shall state all exceptions taken to the specification and the reasons for such exceptions. All documentation relative to the request for substitution shall be submitted on the manufacturer's letterhead and signed by a representative of the manufacturer. Equipment and materials submitted for review without proper documentation will be rejected without review.

   a. <u>MANUFACTURER'S CUT SHEETS:</u> Cut sheets shall be originals as are contained in the manufacturer's catalog. Photocopies of these sheets will not be accepted for review.

   b. <u>LUMINAIRES:</u> Request for substitutions shall include photometric test reports performed by an independent testing laboratory, as well as a summary of energy loading. Calculations indicating lighting levels and uniformities based on plan layout shall be included in the request. Photometric calculations for specified luminaire and submitted substitution shall be submitted for review. Substitutions shall meet or exceed photometric and energy use of specified luminaires. No substitution request will be considered if calculations are not submitted. Any luminaires on project that have specified same manufacturer/luminaire family elsewhere will require acceptable substitution requests for ALL related luminaires from an

equivalent manufacturer/luminaire family - no exceptions.

The Contractor shall provide samples of the proposed equipment for the Engineer's review, if requested by the latter, and any other information or materials as requested by the Engineer to establish equality.

The Contractor shall acknowledge that they have reviewed the submission criteria for the request for substitution by stamping the submission with a review stamp or acknowledgment by an accompanying letter.

Review fees are $250 per each bid item substitution request, to be deducted from monies owed to the Contractor.

H. CIRCUIT IDENTIFICATION REQUIREMENTS

Color coding shall be accomplished by use of cable jackets of the proper color. All tails of all splices shall be coded. Secondary distribution circuits shall be color-coded with even circuits red, odd circuits black, neutral conductor white, and the ground conductor shall be green.

Each of the line-side underground conductors at every pole, bollard and pull box shall additionally have a 6" wrap of blue electrical tape applied to identify the set of conductors emanating "from" the control cabinet.

Each accessible location of underground cable in control cabinets, pull boxes, and pole/transformer bases shall have a permanent embossed 304 stainless steel tag with 3/16" characters (equal to Panduit #MEHT187 system) attached in a "flag" manner using a black outdoor rated nylon tie. The tag shall include information identifying the cabinet and conductor circuit number (i.e. L-3).

I. BRANCH CIRCUIT TAG OUT REQUIREMENTS

The Contractor may, at his option, work on live circuits or he may disconnect and tag out circuits. Any branch circuit not disconnected and tagged out shall be considered live, and the Contractor shall restrict his work force to those qualified to work on live circuits. Disconnection may be made by disconnecting branches at the overcurrent device.

Tag outs shall be made with manufactured electrical warning tags furnished by the Contractor and endorsed with the name of the Contractor, the date, and the project I.D. The Contractor shall clear all completed tag outs by the end of the workday.

J. EQUIPMENT BONDING REQUIREMENTS

Bonding wire shall be installed in conduits for equipment grounding. All equipment shall be grounded as required.

K. TESTING REQUIREMENTS

The Contractor shall perform acceptance tests for circuits installed under this project, and shall record that information on “Insulation and Equipment Testing Schedule” at the end of this Section 670 after construction is completed, as incidental to the contract. The Contractor shall create and provide all documentation to the City at completion of tests, with all system issues corrected at the Contractor’s expense and all tests passing.

All testing shall occur in the presence of the Engineer or the City Electrical Superintendent. The Contractor and the City shall agree on a time for testing of the completed installation with the required parties present.

The contractor shall create and provide all documentation to the City at completion of tests (with all system issues corrected).

The cost of testing shall be considered incidental to the installation of all electrical items and will not be paid for separately or as an extra/change order.

The lighting system is not complete until all electrical work is complete and inspected by the Engineer, and all electrical systems work properly.

A general system “Test Burn” shall be performed with any failed luminaires being replaced, along with any other non-functioning component(s) at the Contractor’s expense. Only one test burn for the purpose of identifying initial failures will be required. Insulation testing shall also be performed, as detailed below.

1. INSULATION TESTING/”MEGGER” TEST

   On new underground conductors, fuses shall be removed from all fuse holders to not damage LED luminaire drivers during testing. Each conductor (entire length) shall have its insulation tested to ground from the control cabinet. The conductors shall have a reading of infinity at 1000Vdc impressed voltage to be accepted. If any readings do not meet the infinity requirement, the Contractor shall sequentially test each portion of the lighting circuit between termination points until the issue(s) can be identified. The issue(s) shall be mitigated by corrections or replacements including, but not limited to, tightening lugs, or replacing defective splices and conductors. Additional splices will NOT be allowed.

Testing instruments shall be accurate and reliable. It is strongly recommended that this testing be carried out after each span of cable is installed in a section of duct.

Light fixtures (LED and HPS) and existing conductors shall NOT be part of the insulation testing.

If equipment associated with the project does not operate properly or fails the tests as outlined, it is the Contractor's responsibility to determine issues and to correct and/or repair each defect at their own expense. If the Contractor does not test the new installation(s) prior to backfilling, paving, or any other surface restoration, they shall bear the expense of any excavations and/or removals required to complete repairs and testing

L. AS-BUILT INFORMATION

Upon completion of the project, the Contractor shall prepare an easily readable as-built plan and deliver one original copy to the Engineer. All changes from the original plan that were built into the project shall be noted in **red permanent ink** upon the original plans. As-built information shall be turned over along with testing results.

Any angled segments/shortcuts, bends, or any other locations where the new construction deviates from the specified plan locations, dimensions, alignments, or materials, shall be CLEARLY noted in the as-built so the City can provide accurate locating services in the future. As-built plans shall be submitted to the City within 3 weeks of the Engineer granting substantial completion of the project or for any portion of the project granted substantial completion.

M. ENERGY REBATES

The Contractor shall provide the Engineer with a copy of material invoice (pricing not necessary) for indicating proof of purchase, quantities, and complete manufacturer name/catalog number of luminaires provided on project. The City shall use this information to apply for any available rebates.

N. EXAMPLE TESTING REPORT TABLE

INSULATION AND EQUIPMENT TESTING FOR **PROJECT: _____**					**COMPANY:** _____ _____
EQUIPMENT OR CIRCUIT NAME:	TEST BY:	TEST RESULT: PASS OR FAIL	DATE TESTED:	OWNER OR ENGINEER PRESENT:	COMMENTS:

SECTION 690

GENERAL PROVISIONS FOR COMMUNICATIONS

690.01 – UNDERGOUND CONSTRUCTION SPECIFICATIONS

A. Duct Placement Guidelines

The Contractor may be required to install new duct as referenced on the CAD plans. All ducts are already purchased and available for pick up by the Contractor at the City of Wauwatosa Public Works Facility located at 11100 W. Walnut Road. The Contractor will not be responsible for purchasing duct for this project.

Duct shall be 2” SDR 11 HDPE duct unless otherwise specified in the plans. The Contractor will be required to provide all mule tape necessary for cable installations whether it be included with the duct at the time of purchase or provided and installed separately. All ducts will be placed on the routes identified in the attached CAD Plans. All ducts must maintain a minimum horizontal clearance zone of 24” when paralleling other underground utilities with the exception of water and sewer (storm and sanitary) mains where parallel runs must maintain 60” horizontal clearance.

All underground ducts must be placed a minimum of 36” below finished grade wherever possible. Instances where the duct must be placed at a shallower or drastically deeper depth must be brought to the attention of the Project Manager prior to installation.

The Owner’s Project Manager will be on site to coordinate actual placement. Routes will be marked with the use of paint and flags when necessary. The Contractor must not place duct along the route without first reviewing the individual areas with the Project Manager. This measure is designed to avoid instances where the new duct may encroach the restricted clearance zones of other utilities or extend outside the Right-of-Way. Contractor must ensure that route and right-of-way markings remain visible to avoid unnecessary re-marking trips/additional costs.

All exposed duct ends must be covered with a temporary plug or adequately sealed with duct tape to prevent the ingress of dirt, water, and debris prior to the installation of the cable, locate wire, and mule tape.

B. Handhole Placement Guidelines

The Contractor may be required to place new handholes as referenced on the CAD plans. All handholes are already purchased and available for pick up by the Contractor at the City of Wauwatosa Public Works Facility located at 11100 W. Walnut Road. The Contractor will not be responsible for purchasing and handholes for this project. See the included CAD drawings for placement location of the handholes.

The handholes must sit parallel with adjacent streets, buildings, or other structures and must be flush with all surrounding surfaces, and if installed on a slope or grade the handhole must follow the contour of the grade as much as possible. All handholes must be placed a minimum of 12” from the edge of a sidewalk, curb, or

driveway approach. When a handhole is to be placed next to another handhole, a minimum of 24” of separation from edge to edge is required.

The installed handholes must sit atop a 12” bed of ¾” washed, crushed stone for drainage – pea gravel or other stone smaller than ¾” is not an acceptable base for drainage. All fill around the handhole must be mechanically compacted in 12” layers to within 8” from the top to prevent settling.

Inside each new handhole the Contractor will be required to install a single 5’ long by 1/2” diameter copper clad ground rod. The ground rod must not protrude more than 5” above the surface of the crushed stone bed. After ground rod installation, the Contractor must equip the top with a conductor clamp that will allow the Contractor to tie a #12 AWG UL TYPE USE 2/RHH/RHW-2 Outdoor rated PVC jacketed stranded copper locate wire to the end.

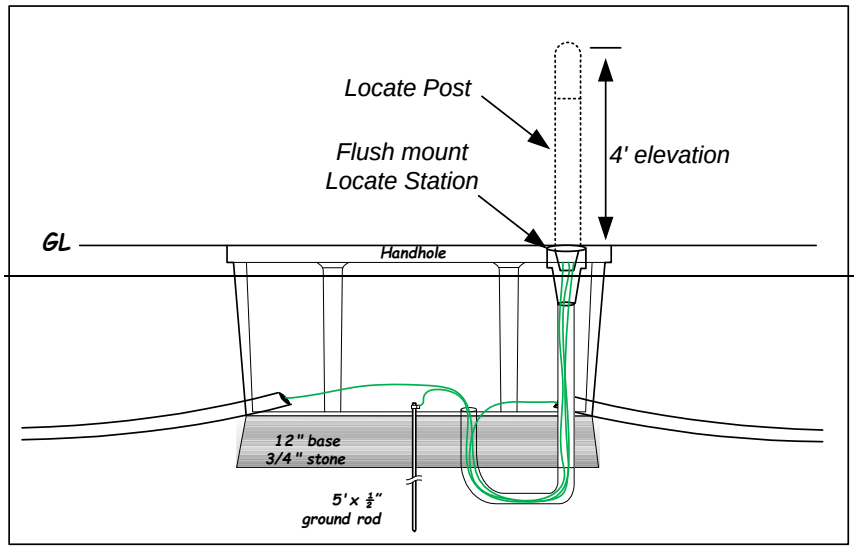
C. Locate Station Placement Guidelines

The Contractor may be required to install flush mount locate stations adjacent to handholes identified on the CAD Drawings. The Locate Stations will be used to access the locate wires for future locating purposes.

Between the handhole and locate station the contractor must install a short length of 1-1/4” underground plowduct. This will facilitate the installation of the locate wires into the post from the handhole.

At no time will a locate station be installed in a location where it impedes or can be damaged by the removal of the handhole lid.

Detail Drawing of Handhole and Locate Station Installation



D. Fiber Optic Cable Installation Guidelines

The Contractor can install the fiber optic cable by hand or with the use of pneumatic/hydraulic installation equipment. However, the means of installation, the Contractor must take care to not exceed the cable's maximum pulling tension (typically 600lbs). The Contractor must utilize sheaves and a breakaway/swivel device at all times while installing the fiber optic cables. Multiple swivels must be used; one for the cable, and another set 8" back from the first for the mule tape. Cable guide placed on end of duct while pulling cable is preferred.

At each handhole the Contractor must store a minimum of 150 feet of cable slack (unless otherwise noted on the CAD Plans) neatly coiled and stored upright in the handhole and labeled at each end with a permanent label, identifying the Cable's owner and identifying the specific cable strand count. Suitable labels for this purpose are Panduit #PST-FO.

Following cable, locate wire, and mule tape installation, all occupied ducts must be plugged using a split plug appropriately sized to accommodate the cable diameter – do not use foam, putty, or tape to permanently plug any duct. All spare ducts must only contain mule tape for future installations and be sealed using properly sized duct plugs.

Contractor may have to re-deploy for Cable Pulling and Splicing due to fiber availability.

E. Mule Tape Installation Guidelines

The Contractor will be required to install a single 1,800 lb. mule tape within the plowduct with the locate wire and fiber optic cable.

690.02 – INTERIOR CONSTRUCTION SPECIFICATIONS

A. Above Ground Exterior to Interior Transition

In instances where the underground plowducts extend to the exterior of a building whose entry point is above grade, the Contractor is required to transition below grade from each plowduct to a Galvanized Rigid Steel pipe that extends up the side of the exterior wall to an elevation shown on the accompanying Interior Drawings. At the below-grade transition point where the rigid pipe meets the plowduct, the Contractor must utilize a watertight fitting that is rated for underground use (Shur-Lock SL 602C 200 or approved equivalent). The Project Manager must approve the final location of building risers.

At the top of the rigid pipe run, the Contractor must core a 2" hole into the building and install a 12"x12"x6" NEMA 3R rated pull box over the hole and aligned so the building core is situated at the top of the pull box. The core into the building must be sleeved with EMT. Interior EMT extending to a termination room can extend through the core to satisfy this sleeve requirement, however instances where Interior EMT is not being placed the Contractor must sleeve the core with EMT and securely fasten the sleeve to the exterior pull box and inside the building. All sleeves/EMT ends must be equipped with collared fittings to avoid cable damage.

The Contractor must install a 1/2” Rigid Steel pipe stubbed below the ground level to the elevation noted on the attached interior drawings. This pipe will house the locate wire that runs back to the nearest locate post or housing along the plowduct path. At the bottom of this 1/2” pipe the Contractor must install a steel single gang outdoor outlet box with waterproof cover. A 12” coil of locate wire must be housed inside the single-gang outlet box.

All exterior pipes and boxes must be securely fastened to the building wall with anchors and fastening hardware suitable for a permanent installation into the materials comprising the wall.

B. Interior EMT Installation

Where any conduit penetrates any interior concrete/block wall cores, the Contractor must seal around the conduit with mortar.

Where the interior conduit passes through any non-concrete/block wall the Contractor must create a hole through the wall only large enough for the conduit to pass through, then seal around the conduit with ASTM E814 (UL 1479) approved fire stop materials.

Prior to cutting or coring into or through any building structure that could be deemed as “building support structure” the Contractor must obtain permission from the Project Manager.

The Contractor must take all necessary precautions to prevent activation of building alarms, such as fire or security. Conduits the enter rooms that are sealed for the sake of Halon release systems must be sealed to ensure that the room's integrity is maintained.

At each end, and along the interior conduit path approximately every 10 feet, the Contractor must label the EMT with a warning label identifying the contents as a fiber optic cable. Suitable labels are Panduit’s #PCV-FOB.

Along the interior EMT conduit path the contractor may be required to install various sizes of Type 1 pull boxes fitted with a screw cover for pulling assistance, duct access, and cable storage. Pull Box location and size is detailed on each building’s Interior Piping Drawing. At every pull box (and building entry box) the contractor must use screw type fittings to attach the conduit to the box.

The interior conduit will need to be bonded to a ground point at each building. The Project Manager will determine the ground points. Cable used to Bond the EMT to the Building Ground Electrode will be no smaller than a #6 AWG Stranded copper and must have a green jacket suitable for interior use.

C. Interior Cable Installation

At each site the cable will be installed within existing cable tray to an existing data rack. At some point within the cable tray, NEMA box, or cabinet as defined on the Interior plans in each building the Contractor must store a 30’ expansion loop.

Following the installation of the fiber optic cable through the exterior and interior EMT conduit, the Contractor must seal the conduit ends (where the EMT enters the outside pull box and where the EMT enters the termination room) with ASTM E814 (UL 1479) approved fire stop materials.

690.03 – CABLE SPLICING, TERMINATION, AND TESTING SPECIFICATIONS

A. Cable Pre-Acceptance Testing

Prior to release to the Contractor, the Owner will require the Contractor crews to perform “pre-acceptance testing” with an Optical Time Domain Reflectometer (OTDR) on each fiber optic cable. The pre-acceptance testing will verify the performance of the cable prior to it being released into the Contractor’s possession. Pre-acceptance testing must be performed on every cable strand at 1310nm and 1550nm only from the exposed end of the cable.

Pre-acceptance tests are intended to identify damaged strands, macro-bends, and strand breaks. Because of this, test results must be clean, i.e. no events being reported that are not there. Poor BFA mating, dirty BFA interface, etc. will cause dirty traces that report multiple events which are not there. Care must be taken to set up the BFA and OTDR parameters to eliminate these events.

Test results must be provided to and approved by the Project Manager prior to release of the cable to the Contractor for installation. Pre-acceptance testing should be completed within the first 5 business days of receipt.

B. Outdoor Fusion Splicing

The Contractor will be required to Fusion Splice the fiber optic cables at each of the splice points identified on the CAD Plans.

C. Indoor Fiber Termination

All cable terminations will be performed by splicing factory terminated single strand fiber optic cable pigtails to the ends of the outdoor fiber optic cables. The Contractor will be required to install all Owner-provided Termination and Splice equipment as well as route all pre-terminated pigtails between devices.

D. Fusion Splicing Equipment

All cable strand splicing will be performed using a fusion splice machine that is capable of splicing within a 0.2dB loss tolerance and equipped with either live monitoring or a Local Injection Detection (LID) testing system, thus ensuring the splice quality while the splice is set up in the machine.

All splices will be protected with appropriate fusion splice sleeves fitted with steel-reinforcing rod(s) (provided by the Contractor).

E. Cable Testing

Following the splicing and termination procedures the Contractor will be required to test each strand using an OTDR and Power Meter Light Source (PMLS) at 1310nm

and 1550nm. Each terminated strand will be tested between the sites along the ring with both devices at both wavelengths. This totals 8 tests per strand. **All OTDR tests must be performed using a launch cable that is at least 500 meters in length and with an event threshold setting of equal to or less than 0.01db per event**. This will allow the inspector to review the initial connector interface and all splices or anomalies that register greater than 0.01 along the trace.

F. OTDR Viewing Software

Prior to the OTDR testing the Contractor must provide a copy of the OTDR viewing software that can allow a user to electronically review the test results.

G. Test Documentation

Following the OTDR testing the Contractor must provide the Owner with one electronic copy of each test performed. Prior to testing, the Contractor will be provided with the strand identification and labeling plan, the electronic copies of the test results must match the labeling scheme provided to the Contractor.

Following the PMLS testing, the Contractor must provide the Owner with test results showing the total link loss between each site along with the average loss for each strand. The test results must be provided on any Windows® compatible electronic spreadsheet.

H. Optical Loss Budget

The Contractor will be provided with optical link budgets for each installed cable strand. Budget losses are calculated using the total link loss between sites, and then averaging the result of both directions using the parameters identified in Table 1 below. The test results provided to the Project Manager must confirm that 100% of all installed strands perform within the optical loss budget and within the specific tolerances for individual events identified in Table 1 below.

Note that even though a link loss test may show a loss that is within the optical budget, any event shown by the OTDR report that exceeds its thresholds listed in Table 1 will result in a failed test result and must be remedied prior to system acceptance by the Owner. Instances where individual tolerances cannot be met must be reviewed with the Project Manager prior to completion.

Table 1

Event	**Wavelength**	**Threshold (dB)**
Coupler Loss	1310nm	0.4dB
	1550nm	0.4dB
Splice Loss	1310nm	0.2dB
	1550nm	0.2dB
Cable Attenuation	1310nm	.35dB/Km
	1550nm	.25dB/Km

690.04 – EQUIPMENT AND MATERIAL STORAGE

The Contractor will be required to store all equipment to include vehicles, machines, tools, consumables and other work-related materials off-site during times when work is not being performed in the immediate vicinity.

690.05 – PROJECT FOREMAN

The Contractor must assign one Foreman to the Project who will take instruction for all Prime and Subcontracted crews. This Foreman must be on site and act as the single point of contact for the appointed Project Manager until the Project is completed.

690.06- Encroachment, Excavation and Obstruction Permits

The Contractor must abide by all permitting ordinances, restrictions, and municipal codes. Any permitting authority restoration, guidelines, and requirements supersedes any provisions in this document.

690.07-Underground Utility Locating

The Contractor must abide by WI State Statute § 182.0175 which outlines the responsibility of the Contractor when excavating on or near underground facilities. The Contractor must have all underground utilities, private or otherwise, located during the course of construction at their expense. The Contractor must notify Digger's Hotline three (3) days or more prior to commencement of any underground excavation. The Contractor may not perform work for the Owner under any Digger's Hotline locate ticket other than its own.

The Contractor must work with Private property owners to ensure all private utilities on private property are properly located. Private facilities may not be registered with Diggers Hotline therefore prior to any work being performed on private property the Contractor will be required to notify the proper personnel to have any private facilities located.

All underground utility locations shown are approximate. Utility information was provided in response to planning locate requests. Construction contractor is responsible for determining the location of municipal, and private utilities; complete repair of any and all damages & restoration incurred shall be at the expense of the contractor. Facility placement subject to change upon field locate completion. Right-of-way is depicted based on field observations and the latest state and county records available. This data has been prepared, in part, by information furnished by others. While the information is believed to be reliable, Multimedia Communication & Engineering, Inc. (MC&E) assumes no responsibility for the accuracy of this data for any errors, or omissions that may have been incorporated into it as a result of incorrect information provided to MC&E.

690.08-Soil Condition/Depth of Installation Clause

The Contractor must inform the Project Manager immediately upon discovery of any underground conditions such as limestone or boulder fields that adversely affect its ability to drill or otherwise excavate through an area or at the specified depth to the extent where additional resources not included in its price are deemed necessary. The Project Manager and Contractor Foreman together will determine the need for additional resources and costs. If granted, approval for the additional expenses will be delivered in the form of a Change Order from the Owner prior to continuation in that area. Additional charges for placement of the duct at a depth deeper than 36" for the sake of avoiding utilities or other obstructions will typically not be granted.

690.09-Worksite Safety

The Contractor is responsible for the safety of all persons and property inside the construction zone. This entails deploying proper barricades, traffic control plans, and or flagmen to protect vehicles and pedestrians passing by or through the work zone, along with ensuring that equipment operators utilize ground spotters when necessary.

Open ground must be properly barricaded at all times that the Contractor is not in the immediate vicinity of the open ground. Open ground areas that are to remain open overnight or over any extended period of time must be barricaded in a fashion that will make the open area easily detectable and avoidable by passersby.

Potholes/core holes in the immediate vicinity of the work zone during working hours can be covered with a cone; however, Type II barricades must be placed over any pothole left open overnight. Steel plates over street or sidewalk cores, or the temporary replacement of cores, are the only acceptable means by which to cover the core hole when the Contractor is not physically on-site performing work.

All work areas, both interior and outdoor, must remain clean and free of all rubbish and tools not in use at all times. At the end of each workday, the Contractor must clean the worksite and secure all equipment and tools.

Worksite safety procedures must follow and comply with the guidelines and requirements of all applicable Municipal and OSHA standards.

690.10-Traffic Control Plan

The Contractor must provide an approved Traffic Control Plan consistent with the guidelines set forth in the WDOT Manual on Maintenance Work Zone Traffic Control Guidelines for all construction being performed.

690.11-Excavations

Excavations shall not remain open in excess of three (3) calendar days unless specific permission is obtained from the Owner prior to the third day.

In all streets, alleys, sidewalks or other public ways, whether improved or unimproved, all excavated material shall be removed, and the trench shall be completely backfilled with sand or gravel, unless permission is obtained from the Owner to use excavated material for backfill.

Contractor must not disturb any right-of-way markers, property pins, or survey markers. If disturbed, the pin or marker will need to be reset by a certified land surveyor at the contractors own expense.

690.12-Hard Surface Potholing

The Contractor will be allowed to mechanically core through hard surface streets to locate existing utilities provided that the restoration of the core be performed per the Municipal Regulations For Filling Cuts or Excavations.

Potholing is not allowed in sidewalks and ADA compliant or non-compliant pedestrian ramps. Any hard surface excavations within any sidewalk or ramp panels will result in the Contractor's replacement of the entire panel, along with adjacent panels at the Contractor's expense. Each panel replacement will be inspected by the City.

At no time can the Contractor perform any excavation that undermines the adjacent in-tact surfaces, thereby making vertical mechanical compaction impossible and creating future potential for subsurface failure.

690.13-Restoration Guidelines

Restorations must follow the specific guidelines set forth by the City of Wauwatosa and as shown on the plans.

690.14-Erosion Control Policy

Any prolonged open excavations or standing debris piles may require erosion control practices such as sandbagging around the area or placing hay bales around the area. The permitting authority will determine the need for such barriers on a case by case basis.

The Contractor must employ good housekeeping practices that will prevent the ingress of any excavated materials into the Municipal storm water system. This includes properly covering storm sewer inlets with DOT Filter Fabric (DOT Type FF, not felt or silt fence material) near areas where excavation and directional drilling operations occur. DOT Type C Inlet protection standards apply (2x4 across back of inlet with DOT Filter Fabric over inlet held in place by inlet cover).

Municipal Erosion Control Applications may be necessary for any areas where excavation beyond that of bore pits, utility locates, and handhole placement occurs. At no time can spoils or other debris be stored or piled in the street gutter.

SECTION 700 - CONTRACT

THIS contract made this _____ Day of _____ , 20 ___ by and between _____ hereinafter called the "Contractor" and the City of Wauwatosa, Wisconsin, hereinafter called the "City".

WITNESSETH, that the Contractor and the City for the consideration stated herein, agree as follows:

ARTICLE I. SCOPE OF WORK The Contractor shall perform everything required to be performed and shall provide and furnish all labor, material and equipment for the work of _____

_____

_____

all in strict accordance with the Plans and Specifications, including any or all addenda prepared by the City of Wauwatosa Engineering Services Division under the direction of the Director of Public Works, acting and in these contract documents referred to as the Director of Public Works, which plans and specifications are made a part of this contract in strict compliance with the Contractor's proposal and the other contract documents herein mentioned which are a part of this contract and the Contractor shall do everything required by this contract and the other contract documents constituting a part hereof.

ARTICLE II. THE CONTRACT PRICE In consideration of the completion of the work described herein and in fulfillment of all stipulations of this contract to the satisfaction and acceptance of the Director of Public Works and the City, the City shall pay and the Contractor further agrees to receive and accept payment based on the prices hereto attached, which prices shall agree with those in the accepted Contractor's proposal as filed with the City of Wauwatosa, Wisconsin on the _____ day of _____ , 20 ___ , as full compensation subject to the additions or deductions provided therein, in current funds.

ARTICLE III. COMPONENT PARTS OF THE CONTRACT This contract consists of the following component parts, all of which are as fully a part of this contract as if herein set out verbatim, if not attached as if hereto attached.

1. Addenda (if applicable)
2. Special Provisions (Section 600)
3. Plans
4. General Conditions (Section 500; Section 501, if applicable)
5. Advertisement for Bids (Section 100)
6. Instructions to Bidders (Section 200)
7. Contractor's Proposal (Section 300)
8. Federal Funding Requirements & Minimum Wage Scale (Section 400)
9. Contract (Section 700)
10. All Other Specifications
11. Appendices and other documents intended to be incorporated into the contract
12. Bonds (Section 800)

In the event any provision in any of the above component parts of this contract conflicts with any provision in any other of the component parts, the provision in the component part first enumerated above shall govern over any component part which follows it numerically except as may otherwise be specifically stated.

IN WITNESS WHEREOF, the parties hereto have caused this instrument to be executed in four original counterparts the day and year first above written.

(SEAL) _____
Contractor

_____
Address

Attest: _____

_____ By _____

_____ _____
Title Title

(SEAL)

CITY OF WAUWATOSA
Owner

Attest:

_____ By _____
City Clerk Mayor

_____
City Clerk

Provision has been made to pay the liability that will accrue under this contract up to the original amount thereof as specified in the Common Council resolution authorizing the same. Liability in excess of the original amount of this contract may accrue only after additional endorsement hereon by the City Comptroller as to provision of funds therefor.

_____ , 20 ___ _____
City Comptroller

Approved as to form _____ , 20 ___ .

_____
City Attorney

*CORPORATE CERTIFICATE

I, _____ certify that I am the _____ of the Corporation named as Contractor hereinabove; that _____ _____ , who signed the foregoing contract on behalf of the Contractor was then _____ of said Corporation; that said contract was duly signed for and in behalf of said Corporation by authority of its governing body, and is within the scope of its Corporate Powers.

_____ Corporate Seal

* If the Contractor is a corporation, the above Corporate Certificate should be executed.

If the contract is signed by the secretary of the Corporation, the above certificate should be executed by some other officer of the Corporation, under the corporate seal. In lieu of the foregoing certificate, there may be attached to the contract copies of so much of the records of the Corporation as will show the official character and authority of the officers signing, duly certified by the secretary or assistant secretary under the corporate seal to be true copies.

The full name and business address of the Contractor should be inserted and the contract should be signed with his official signature. Please have the names of the signing party or parties typewritten or printed under all signatures to the contract.

If the contractor should be operating as a partnership, each partner should sign the contract. If the contract is not signed by each partner, there should be attached to the contract a duly authenticated power of attorney evidencing the signer's (signers') authority to sign such contract for and in behalf of the partnership.

If the contractor is an individual, the trade name (if the contractor is operating under a trade name) should be indicated in the contract and the contract should be signed by such individual. If signed by one other than the contractor, there should be attached to the contract a duly authenticated power-of-attorney evidencing the signer's authority to execute such contract for and in behalf of the Contractor.

CERTIFICATE OF INSURANCE

DATE (MM/DD/YYYY)

PRODUCER

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 **A**

COMPANY **B**

COMPANY **C**

COMPANY **D**

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, NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATION MAY BE ISSUED OR MAY PERTAIN, THE ISSUANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

CO LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YYYY)	POLICY EXPIRATION DATE (MM/DD/YYYY)	LIMITS	
	GENERAL LIABILITY				GENERAL AGGREGATE	$
	☐ COMMERCIAL GENERAL LIABILITY				PRODUCTS-COMP/OP AGG	$
	☐ CLAIMS MADE ☐ OCCUR				PERSONAL & ADV INJURY	$
	☐ OWNER'S & CONTRACTOR'S PROT				EACH OCCURRENCE	$
	_____				FIRE DAMAGE (Any one fire)	$
					MED EXP (Any one person)	$
	AUTOMOBILE LIABILITY				COMBINED SINGLE LIMIT	$
	☐ ANY AUTO					
	☐ ALL OWNED AUTOS				BODILY INJURY (Per Person)	$
	☐ SCHEDULED AUTOS					
	☐ HIRED AUTOS				BODILY INJURY (Per Accident)	$
	☐ NON-OWNED AUTOS					
	_____				PROPERTY DAMAGE	$
	GARAGE LIABILITY				AUTO ONLY-EA ACCIDENT	$
	☐ ANY AUTO				OTHER THAN AUTO ONLY:	
	_____				EACH ACCIDENT	$
					AGGREGATE	$
	EXCESS LIABILITY				EACH OCCURRENCE	$
	☐ UMBRELLA FORM				AGGREGATE	$
	☐ OTHER THAN UMBRELLA FORM					$
	WORKERS' COMPENSATION AND EMPLOYERS' LIABILITY				☐ STATUTORY LIMITS	$
	THE PROPRIETOR/ PARTNERS/EXECUTIVE OFFICERS ARE: ☐ INCL ☐ EXCL				EACH ACCIDENT	$
					DISEASE-POLICY LIMIT	$
					DISEASE-EACH EMPLOYEE	$
	OTHER					$
						$
						$

DESCRIPTION OF OPERATIONS/LOCATION/VEHICLES/SPECIAL ITEMS

CERTIFICATE HOLDER

City of Wauwatosa
7725 W. North Avenue
Wauwatosa, WI 53213

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING COMPANY WILL MAIL 10 DAYS WRITTEN NOTICE TO THE CITY OF WAUWATOSA.

AUTHORIZED REPRESENTATIVE:

_____

CERTIFICATION OF COMPLIANCE WITH UNEMPLOYMENT INSURANCE AND SOCIAL SECURITY ACT REQUIREMENTS

The Contractor hereby certifies that he has heretofore complied and will during the progress of the work, comply with the Wisconsin Unemployment Insurance Act and will hold the City harmless from any liability for benefits under such Act or Acts by reason of discontinuance by the Contractor of the employment of any person engaged by the Contractor upon the work. The Contractor also hereby certifies that he will during the progress of the work comply with the Federal Social Security Act and will hold the City harmless from any Social Security payments and provisions required by such Act respecting his or his subcontractors' employees.

_____
Contractor Name

_____
Contractor Signature

_____
Date

Accepted by City:

_____
City Attorney

_____
Date

DEBARMENT CERTIFICATION FORM

The Contractor certifies that, neither the Contractor firm nor any owner, partner, director, officer, or principal of the Contractor, nor any person in a position with management responsibility or responsibility for the administration of federal funds:

(a) Is presently debarred, suspended, proposed for debarment, and declared ineligible or voluntarily excluded from covered transactions by any federal or state department/agency;

(b) Has within a three-year period preceding this certification been convicted of or had a civil judgment rendered against it for: commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public transaction or contract (federal, state, or local); violation of federal or state antitrust statutes; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(c) Is presently indicted for or otherwise criminally or civilly charged by a governmental entity (federal, state, or local) with commission of any of the offenses enumerated in paragraph (b) above; or

(d) Has within a three-year period preceding this certification had one or more public transactions or contracts (federal, state, or local) terminated for cause or default.

If the contractor is “Actively” registered with SAMS (Service for Award Management), the following UEI (Unique Entity ID) number has been assigned: _____

The Contractor further certifies that it shall not knowingly enter into any transaction with any subcontractor, material supplier, or vendor who is debarred, suspended, declared ineligible, or voluntarily excluded from covered transactions by any federal or state department/agency.

Dated this _____ day of _____, 20 _____

By_____
Authorized Signature for Contractor

_____
Printed Name and Title

Subscribed and sworn to before me this _____

_____, 20_____

_____
(Notary Signature)

Notary Public, State of _____

My Commission expires: _____

SECTION 800 - BONDS
BID BOND

KNOW ALL MEN BY THESE PRESENTS, THAT we _____

_____

(hereinafter called the Principal) and _____

_____
(hereinafter called the Surety), A corporation chartered and existing under the laws of the State of _____, with its principal offices in the City of _____, and authorized to do business in Wauwatosa, Wisconsin, in the full and just sum of _____ _____ Dollars ($_____) good and lawful money of the United States of America, to be paid upon demand of the CITY OF WAUWATOSA, WISCONSIN, to which payment, well and truly to be made, the Principal and the Surety bind themselves, their heirs, executors, administrators and assigns, jointly and severally and firmly by these presents.

WHEREAS, The Principal is about to submit, or has submitted to the City of Wauwatosa, Wisconsin, a proposal for furnishing all labor, materials, equipment and incidentals necessary to _____
_____
_____ and;

WHEREAS, The Principal desires to file this bond in accordance with law, in lieu of a certified bidder's check otherwise required to accompany this proposal.

NOW, THEREFORE: The conditions of this obligation are such that if the Proposal is accepted, the Principal shall, within ten days after the date of receipt of a written notice of award of contract, execute a contract in accordance with the Proposal and upon the terms, conditions, and price(s) set forth therein, of the form and manner required by the City of Wauwatosa, Wisconsin and execute a sufficient and satisfactory contract performance bond payable to the City of Wauwatosa, Wisconsin, in an amount of One Hundred Percent (100%) of the total Contract price, in form and with security satisfactory to said City, then this obligation to be void; otherwise to be and remain in full force and virtue in law; and the Surety shall, upon failure of the Principal to comply with any or all of the foregoing requirements within the time specified above, immediately pay to the aforesaid City, upon demand, the amount hereof in good and lawful money of the United States of American, not as a penalty but as liquidated damages.

IN TESTIMONY THEREOF, the Principal and Surety have caused these presents to be duly signed and sealed this _____ day of _____ 20 ___.

_____

Principal

By _____

(Seal)

_____

Surety

_____

(Seal)

Countersigned _____

Local Resident Producing Agent for _____

_____

(Note: This form of bond must be executed after the award of the contract.)

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, That we, _____
_____
_____ as Principal, and _____
_____
as Surety, are held and firmly bound unto the City of Wauwatosa, 7725 W. North Avenue, Wauwatosa, Wisconsin 53213, hereinafter called the City, in the penal sum of _____
_____Dollars, ($_____)
lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

The condition of this Obligation is such, that whereas the principal has executed the attached Agreement dated _____
_____

Now, Therefore, if the attached agreement is executed on behalf of the City and if the Principal shall well and truly perform and fulfill all the undertakings, covenants, terms and conditions of the said agreement, and any and all duly authorized modifications of the said agreement that may hereafter be made and shall pay to each and every person or party entitled thereto all the claims for work or labor performed or materials furnished, including premiums for Worker's Compensation Insurance, for or in or about or under such agreement as provided in Section 779.14 and 779.15 of the Wisconsin Statutes, and any such authorized extension or modification of said agreement, then this obligation to be void, otherwise to remain in full force and virtue.

And the said Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the agreement or to work to be performed thereunder or the specifications accompanying the same shall in any wise affect its obligations on this bond, it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the agreement to the work or to the specifications.

IN WITNESS WHEREOF the above-bounden parties have executed this instrument, in _____ original counterparts, under their several seals this _____ day of _____, 20___, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

In presence of:

_____	_____ (SEAL)
	(Individual Principal)
_____	_____
	(Business Address)
_____	_____ (SEAL)
_____	_____
	(Business Address)
Attest:	
	_____
	(Corporate Principal)
	_____
	(Business Address)
_____	By _____ (Affix Corporate Seal)
Attest:	
	_____
	_____
	(Corporate Surety)
	_____
	(Business Address)
_____	By _____ (Affix Corporate Seal)
	_____

Approved _____, 20 ___.

_____

_____ Mayor
(Title)

NOTE: The Bond must be approved and the approval dated in every case; refer to Section 779.14 and 779.15 Wisconsin Statutes. The title of the person signing must be indicated.

LABOR & MATERIAL PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS:

That _____
(Here insert full name and address or legal title of Contractor)

_____
as Principal, hereinafter called Principal, and _____

_____
(Here insert full name and address or legal title of surety)

as Surety, hereinafter called Surety, are held and firmly bound unto the City of Wauwatosa, 7725 West North Avenue, Wauwatosa, Wisconsin 53213, as Obligee, hereinafter called City for the use and benefit of claimants as hereinbelow defined, in the amount of _____
_____ Dollars (_____),
for the payment whereof Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Principal has by written agreement dated _____,
20 __, entered into a contract with City for _____

_____
(Here insert full name, address and description of project)
in accordance with Drawings and Specifications prepared by _____

_____
(Here insert full name and address or legal title of Director of Public Works)
which contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Principal shall promptly make payment to all claimants as hereinafter defined, for all labor, material used or reasonably required for use in the performance of the Contract, then this obligation shall be void; otherwise it shall remain in full force and effect, subject, however, to the following conditions.

1. A claimant is defined as one having a direct contract with the Principal or with a Subcontractor of the Principal for labor, material, or both, used or reasonably required for use, in the performance of the Contract, labor and material being construed to include that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental of equipment directly applicable to the Contract.

2. The above name Principal and Surety hereby jointly and severally agree with the City that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such claimant's work or labor was done or performed, or materials were furnished by such claimant, may sue on this bond for the use of such claimant, prosecute the suit to final judgment for such sum or sums as may be justly due claimant, and have execution thereon. The City shall not be liable for the payment of any costs or expenses of any such suit.

3. No suit or action shall be commenced hereunder by any claimant:
a) Unless claimant, other than one having a direct contract with the Principal, shall have given written notice to any two of the following: The Principal, the City, or the Surety above named, within ninety (90) days after such claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same by registered mail or certified mail, postage prepaid, in an envelope addressed to the Principal, City or Surety, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the State in which the aforesaid project is located, save that such service need not be made by a public officer.

b) After the expiration of one (1) year following the date on which Principal ceased work on said Contract or after the expiration of one (1) year following the date of Substantial Completion of the Project, whichever is later, it being understood, however, that if any limitation embodied in this bond is prohibited by any law controlling the construction hereof such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.

c) Other than in a state court of competent jurisdiction in and for the county or other political subdivision of the State in which the Project, or any part thereof, is situated, or in the United States District Court for the district in which the Project, or any part thereof, is situated, and not elsewhere.

4. The amount of this bond shall be reduced by and to the extent of any payment of payments made in good faith hereunder, inclusive of the payment by Surety of mechanics' liens which may be filed of record against said improvement whether or not claim for the amount of such lien be presented under and against this bond.

Signed and sealed this _____ day of _____, 20 ___.

_____
(Principal) (Seal)

_____ By _____
(Witness) (Title)

_____
(Surety) (Seal)

_____ By _____
(Witness) (Attorney-in-Fact)

AFFIDAVIT

(To be attached to all contracts)

STATE OF WISCONSIN)
)SS.
COUNTY)

_____ being first duly sworn on oath deposes and says he is _____

_____(Attorney-in-fact or agent) of

_____(Bonding Company)

surety on the attached contract number _____ executed by

_____ (Contractor).

Affiant further deposes and says that no officer, official or employee of the City of Wauwatosa has any interest directly or indirectly, or is receiving any premium, commission fee or other thing of value on account of the same or furnishing of the bond, undertaking or contract of indemnity, guaranty, or suretyship in connection with the above mentioned contract.

Signed _____

Subscribed and sworn to before me

This _____ day of _____, A.D.; 20 ____.

_____ (Notary Public)

_____ County, Wisconsin

My Commission expires _____.

APPENDIX

Professional Service Industries, Inc.
821 Corporate Court
Waukesha, WI 53189
Phone: (262) 521-2125
Fax: (262) 521-2471

January 5, 2026

City of Wauwatosa
7725 W. North Avenue
Wauwatosa, WI 53213

Attn: Ms. Jessica Henderson
Civil Engineer

Re: Geotechnical Exploration and Evaluation
Proposed Street Replacement and Utility Installation
Perry Court, Laurel Court, and Maple Terrace
Wauwatosa, Wisconsin
PSI Project No. 00523584

Dear Ms. Henderson:

The geotechnical exploration and evaluation for the referenced project has been completed. An electronic copy of the report is being provided via email. Hard copies can be issued upon request. After you have had the opportunity of reading the report, please call at any time with any questions or comments you may have. Professional Service Industries, Inc. (PSI), an Intertek Company, appreciates the opportunity to be of service on this project and looks forward to continuing as your geotechnical consultant during the design and construction phases, as well as your upcoming projects.

Sincerely,

PROFESSIONAL SERVICE INDUSTRIES, INC.

Ilyas Ahmed
Staff Engineer

1/5/26
James M. Becco, P.E.
Principal Consultant

WISCONSIN
JAMES M. BECCO
E-27254
MUKWONAGO
WI
PROFESSIONAL ENGINEER

Christopher D. Volkert
Project Geologist

The above Professional Engineering Seal and signature is an electronic reproduction of the original seal and signature. Original hard copies can be provided upon request. This electronic reproduction shall not be construed as an original or certified document.

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INTRODUCTION

General

This report presents the results of the geotechnical exploration and evaluation for the proposed Street Replacement and Utility Installation project in Wauwatosa, Wisconsin. The work was performed for City of Wauwatosa, at the request of Ms. Jessica Henderson.

Purpose

The purpose of this study was to evaluate the surface and subsurface conditions at specific boring locations on the site, and to establish parameters for use by the design engineers in preparing the pavement designs and installation of new utilities for the proposed project.

Scope

The scope of services included a site reconnaissance, the subsurface exploration, a determination of soil characteristics by field and laboratory testing, and an evaluation of the data obtained. The scope of the field exploration program, including the number, depth, and location of the borings, was determined by the client.

Authorization

The description of services and authorization to perform this geotechnical exploration and evaluation were in the form of a signed contract between City of Wauwatosa and PSI, dated November 25, 2025; referring PSI proposal No. 464219, dated November 7, 2025. This report has been prepared on behalf of, and exclusively for the use of City of Wauwatosa. The information contained in this report may not be relied upon by any other parties without the express written consent of PSI.

SITE AND PROJECT DESCRIPTION

Site Features

The project site consists of the planned reconstruction and the installation of utility lines on Perry Court, from Laurel Court to end of both cul-de-sacs; on Laurel Court, from Maple Terrace to end of cul-de-sac; and on Maple Terrace, from 76th Street to 75th Street. The project is in an urban area of Wauwatosa, Wisconsin, surrounded by residential properties. The existing roadways are 2-lanes of asphalt pavement with concrete curb and gutter.

Project Description

The project will consist of the full asphalt reconstruction of Maple Terrace from 75th Street to 76th Street; Perry Court from Laurel Court to end of both cul-de-sacs; and Laurel Court from Maple Terrace to end of cul-de-sac in Wauwatosa, Wisconsin. The project will include the installation of a new 30-inch diameter storm sewer line and an 8-inch diameter water main relay. The depth of the lines and the installation method were not provided. For the purpose of this report is presumed that the lines will not bear deeper than 15 feet below the existing surface, and that they will be installed using open cut trenching.

The new pavement will consist of hot-mix asphalt (HMA). This report is based on the new pavement surface elevation generally matching that of the existing pavement. No horizontal alignment changes are planned. No other details were provided.

When additional information regarding the project becomes available, and/or if any of the information discussed herein differs from current plans or changes as design progresses, PSI must be informed so that any necessary revisions to this report can be made.

EXPLORATION AND LABORATORY PROCEDURES

Field Exploration

PSI's field exploration program consisted of performing four (4) soil borings for this project. B-1 was performed within Maple Street to a depth of about 20 feet below the existing grade. B-2 was performed within Laurel Court to a depth of about 20 feet below the existing grade. B-3 and B-4 were performed within Perry Court to a depth of about 20 feet below the existing grade. The number, depth, and approximate locations of the soil borings were provided by the client. The borings were staked in the field by the client. The approximate locations of the borings performed are shown on the Boring Location Plan (Figure 1), which is provided in the Appendix of this report. Surface elevations were not provided to PSI for use in this report.

The soil test borings were performed with an all-terrain vehicle (ATV) mounted rotary drilling rig utilizing continuous flight hollow stem augers to advance the holes. Representative samples were obtained by the Standard Penetration Test (SPT) method using split-spoon sampling procedures in general accordance with ASTM D-1586 procedures. Samples were collected at 2.5-foot intervals to 10 feet, and then at 5-foot intervals thereafter to the end of the borings. The standard penetration value (N) is defined as the number of blows of a 140-pound hammer, falling thirty (30) inches, required to advance the split-spoon sampler one (1) foot into the soil. The sampler is lowered to the bottom of the drill hole and the number of blows recorded for each of the three (3) successive increments of six (6) inches penetration. The "N" value is obtained by adding the second and third incremental numbers. The SPT provides a means of estimating the relative

density of granular soils and comparative consistency of cohesive soils, thereby providing a method of evaluating the relative strength and compressibility characteristics of the subsoils.

The soil samples were transferred into clean glass jars immediately after retrieval and returned to the laboratory upon completion of the field operations. Samples will be discarded unless other instructions are received. All soil samples were visually classified in general accordance with the Unified Soil Classification System (ASTM D- 2488-75). A description of the subsurface conditions encountered at each boring location is shown on the enclosed Soil Boring Logs. After completion of the borings, the auger holes were backfilled to the ground surface with bentonite chips and the surface patched with high strength quick-setting concrete.

A copy of the Soil Boring Logs and Boring Location Plan (Figure 1) are enclosed in the Appendix. The soil stratification shown on the logs represents the approximate soil conditions in the actual boring locations at the time of the exploration. The terms and symbols used on the logs are described in the General Notes found in the Appendix.

Laboratory Physical Testing

Soil samples obtained from the exploration were visually classified in the laboratory, and subjected to testing, which included moisture content determination. Selected cohesive soil samples were tested in with a calibrated hand penetrometer to aid in evaluating the soil strength characteristics. The values of strength tests performed on soil samples obtained from the auger samples are considered approximate, recognizing that this method provides a representative but somewhat disturbed soil sample. The laboratory testing was performed in general accordance with the respective ASTM methods, as applicable, and the results are shown on the boring logs in the Appendix.

DESCRIPTION OF SUBSURFACE CONDITIONS

General

A description of the subsurface conditions encountered at the test boring locations is shown on the Soil Boring Logs. The lines of demarcation shown on the logs represent approximate boundaries between the various soil classifications. It must be recognized that the soil descriptions are considered representative for the specific test hole locations, but that variations may occur between and beyond the sampling intervals and boring locations. Soil depths, topsoil and layer thicknesses, and demarcation lines utilized for preconstruction planning should not be expected to yield exact and final quantities. A summary of the major soil profile components is described in the following paragraphs.

Existing Pavement Section

The pavement materials present at the borings consisted of about 2.25 to 5 inches of hot-mix asphalt, followed by about 4 to 6 inches of concrete. The asphalt and concrete were underlain by about 4 to 5.75 inches of base course classified as lean clay, clayey sand, and silty sand. The approximate thickness of the asphalt and base course observed at each of the boring locations is indicated in the summary table below to the nearest 0.25 inch for asphalt and 0.5 inch for base course.

Table 1: Pavement Section Thickness

Boring Location	Boring No.	HMA Thickness (in)	Concrete Thickness (in)	Base Thickness (in)	Visual Base Classification (USCS)
Maple Terrace	B-1	2.75	4	4.75	CL
Laurel Court	B-2	4.25	5	5.75	SC
Perry Court	B-3	5	6	4	SM
Perry Court	B-4	2.25	4	4	SM

Subsurface Conditions

The natural soils encountered below the pavement at the borings consisted of fine to medium sand, lean clay, sandy lean clay, silty sand, and clayey sand to the maximum depth explored of about 20 feet below existing grade. Strength tests on the cohesive natural soils indicated soft to very stiff consistency with unconfined compressive strengths ranging from 0.4 to 3.1 tons per square feet (tsf). The granular natural soils were loose to dense in relative density, with N-values ranging from 9 to 47 blows per foot (bpf).

The foregoing discussion of soil conditions on this site represents a generalized soil profile as determined at the test boring locations. A more detailed description and supporting data for each test location can be found on the individual Soil Boring Logs included in the Appendix.

Groundwater Observations

Groundwater observations were made during the drilling operations, and in the open boreholes upon completion. Groundwater was encountered during auger advancement within B-2 and B-4 at a depth of about 17 feet and 12 feet below existing grade, respectively. No groundwater was observed within remaining borings during auger advancement or upon completion of drilling and removal of the augers.

It must be recognized that groundwater levels fluctuate with time due to variations in seasonal precipitation, lateral drainage conditions, and soil permeability characteristics. Longer term monitoring would be required to further evaluate groundwater levels on this site.

EVALUATION AND RECOMMENDATIONS

General Development Considerations

The soils encountered in the borings can generally be used for support of the planned utilities. However, zones of soft/lower strength soils (such as at B-4) may be encountered. Additionally, substantial instability with excavation sidewalls and subgrades may be experienced within open trench excavations, especially within granular soils. The removal and replacement of soft, loose, wet, or otherwise unsuitable materials will may be necessary. Substantial difficulty with groundwater and/or perched zones may also be experienced during excavation activities in at least some areas. An adequate dewatering effort will be necessary.

In general, the soils encountered below the existing pavement section materials at boring locations appear to be suitable for support of typical flexible or rigid pavements when properly prepared and designed. Proper drainage of the newly constructed pavement will be necessary.

Existing Subgrade Analysis

The subgrade soils encountered immediately below the existing pavement section generally consisted of lean clay and silty/clayey sand, with an estimated visual AASHTO classification of A-6 and A-2-4, respectively. The cohesive soils are generally rated as poor for pavement subgrade support, based upon their high fine contents, high shrink-swell potential, moderate to high frost susceptibility, poor drainage characteristics and a high potential for loss of strength when they become wet. The granular soils are generally rated as fair for pavement subgrade support, based on their low to moderate shrink/swell potential and frost susceptibility, and fair drainage characteristics. Provided that the subgrade soils are prepared as outlined in the Site Preparation section of this report, the in-place subgrade soils and any new structural fill can be used for standard flexible or rigid pavement construction.

Analysis of the visual soil classification, and field and laboratory testing information has been made in determining pertinent engineering properties of the subgrade soils as described in the Wisconsin Soils Manual for Pavement Section Design. Based on the engineering properties determined from the subgrade soils tested and with proper subgrade preparation as outlined in this report, the following pavement subgrade design coefficients are recommended for the planned pavement reconstruction.

Table 2: Pavement Subgrade Design Coefficients

Soil Parameter	Value	Value
AASHTO Soil Classification	A-6	A-2-4
Drainage	Poor	Good
Shrink-Swell Potential	Moderate to High	Low to Moderate
Frost Index	F-3	F-3
Design Group Index (DGI)	14	10
Estimated California Bearing Ratio (CBR)	4	4.5
Estimated Resilient Modulus (Mr)	2800	4500
Estimated Modulus of Subgrade Reaction (k)	125 pci	200 pci

Pavement Subgrade Preparation

The WisDOT Standard Specifications referenced in the following sections refers to the "State of Wisconsin Standard Specifications for Highway and Structure Construction," latest edition, with current interim specifications.

The removal of the existing pavement section should generally be performed in accordance with the methods and procedures outlined in Section 204 of the WisDOT Standard Specifications. The existing pavement section, and any topsoil, vegetation or other deleterious materials present must be removed from all areas of new construction, and the resulting subgrade must be prepared as outlined in Section 211 of WisDOT Standard Specification.

After removal of the existing pavement section, the exposed aggregate base, or subgrade soils materials must be thoroughly compacted with appropriate compaction equipment and then proofrolled to detect unstable, yielding soils. This should consist of overlapping passes in a perpendicular grid pattern, with a fully loaded tandem-axle dump truck, or other equipment of similar size and weight suitable for the encountered surface conditions. Proofrolling should be performed in consultation with the geotechnical engineer at the time of construction. Some difficulty with subgrade preparation may be experienced, especially in wet or cold weather, or during thawing conditions. Additionally, instability can become more severe in silty and clayey materials, which are considered to be moderately to highly moisture sensitive. It is generally recommended that earthwork be carried out during relatively warm, dry weather. Any soft, wet, or otherwise unstable zones which cannot be improved by scarification and aeration, must be removed and replaced with compacted structural fill, such as clean crushed stone, possibly in conjunction with the use of a geotextile fabric. Lime, lime kiln dust, fly ash, or Portland cement modification are additional remedial measures which can be considered for clayey and some silty soils. However, this must only be performed at the direction and under the supervision of the geotechnical engineer. A proper mix design must be performed prior to the performance of any

modification. Long construction delays and substantial difficulty with subgrade stabilization may be experienced if the soils are wet or are otherwise at high moisture contents at the time of construction.

When a firm and stable subgrade is established, any low and/or undercut areas may be raised to planned grades with properly placed and compacted structural fill. Any new fill should be a clean granular soil, free of organic matter, frozen soil, or other deleterious material, such as those materials meeting the gradations outlined in Section 209 or 305 of the State of Wisconsin Standard Specification for Highway and Structure Construction. If fine-grained soils, such as those with high silt or clay content are used, they should generally be placed over large open areas, where conditions are more favorable for the proper placement and compaction of such materials. It must be recognized that high silt or clay content materials are difficult to compact when placed at moisture contents beyond a few percent of the optimum moisture content. In addition, the near surface soils across the site are considered to be highly moisture sensitive; therefore, some difficulty with subgrade preparation should be expected, especially if they become wet during construction. Fill must be placed in layers of not more than nine (9) inches in thickness, at moisture contents at or near optimum, and be compacted to a minimum density of 95 percent of the maximum dry density as determined by ASTM designation D-698. Silt, clay, and wet granular soils are not suitable for reuse as compacted fill in trenches, or adjacent to foundation stem walls or retaining walls.

Proper moisture control is essential to reduce the amount of compaction effort necessary to achieve the desired densities. This is especially true of clayey soils, where scarification and aeration may be required to achieve near optimum moisture levels prior to compaction. A sheepsfoot roller is generally required for compaction of clayey soils, whereas a vibratory smooth drum roller is preferred for granular material. Small hand-operated compactors should be used in confined areas; granular fills are generally more readily compacted to the required densities in such applications.

The selection of fill materials for various applications should be done in consultation with the soils engineer. Similarly, the evaluation of the subgrade and placement and compaction of fill for structural applications should be monitored and tested by a qualified representative of the soils engineer.

Pavement Drainage Considerations

The existing pavement project is located in an area that experiences annual freeze/thaw cycles and the subgrade soils encountered have been classified as highly susceptible to frost action when free water is present. In order to reduce the potential for frost action, it will be necessary to control surface runoff and water seepage as complete removal and replacement of the frost susceptible subgrade soils is not considered economically feasible. Proper sloping and/or a suitable drainage system must be included. Underdrains can be placed within the subgrade, just

below the granular base, to help reduce the potential for trapping water within the base layer. Underdrains should also be placed in low spots in the pavement, at the toe of slopes that are draining toward pavement surfaces, and where undercuts have been filled with granular soils. Underdrains should be pitched to the relief end of the drain tile system, and the relief end should be daylighted to adjacent ditches or be connected to the storm sewer (where permissible by the appropriate municipality as necessary). The drain tile should consist of a 4-inch diameter perforated PVC pipe placed beneath the base layer, extending at least 8 inches into the subgrade. The pipe should be surrounded by 1-inch size clean stone, with the pipe and stone being wrapped with a geotextile filter fabric to reduce the potential of soils from migrating into and obstructing the pipe.

Pavement Maintenance

It should be recognized that all pavements require regular maintenance and occasional repairs to keep the pavements in a serviceable condition. Maintenance is necessary to reduce the effects of pavement stress caused by changes in temperature and moisture, repetitive traffic loadings, and movement of the subgrade soils. As pavement distress is observed, it should be repaired as quickly as possible. Timely sealing of joints and cracks is recommended in order to reduce the potential for water to enter the pavement section, which can cause rapid deterioration of the pavement during freeze-thaw cycles. Unrepaired areas will generally lead to more severe and widespread distress, and eventually, pavement disintegration. Therefore, annual maintenance should include sealing of cracks and joints and maintaining surface drainage to avoid ponding water on or near the pavements. The need for such maintenance and repair is not necessarily indicative of premature pavement failure. However, if appropriate maintenance and repairs are not performed on a timely basis, the serviceable life of the pavement can be reduced substantially.

Utility Construction

Planned utility excavation depths were not provided. Substantial excavation instability (caving and sloughing of sidewalls) and groundwater related problems may be experienced in some areas. A substantial loss in strength, along with loosening/softening may also occur when the confining effect of the overburden is removed. Undercutting and replacement with compacted structural granular fill, along with the inclusion of suitable geogrid reinforcement (evaluated and designed by an experienced firm), may provide a sufficient bridging effect, as well as a relatively stable subgrade on which to place the piping, manholes, and other structures. The use of a “mud” mat could also be considered as a means of achieving a stable subgrade. However, it is recommended that such method(s) be conducted on a trial basis to evaluate potential effectiveness prior to full scale pipe installation. It must be recognized that an adequate dewatering effort, and the use of a suitable bracing system will be required.

Where undercutting is performed, the excavation must extend laterally beyond the perimeter of the utility for a distance at least equal to 0.5 feet for every one foot of removal below the utility bottom. Backfill must be placed in layers of not more than nine (9) inches in thickness, at moisture contents at or near optimum, and be compacted to a minimum density of 95 percent of the maximum dry density as determined by ASTM designation D-698 (Standard Proctor). An adequate dewatering effort will be necessary. Utility piping, manholes and other structures supported on the existing soils, or newly placed compacted structural fill used to replace unsuitable materials, may be designed for a net allowable soil bearing pressure of 1,000 to 3,000 psf, dependent upon bearing depth and location.

It must be recognized that proper selection and compaction of the pipe bedding and cover materials is essential. This should be done in accordance with the standard specification for sewer construction. Bedding material exhibiting a well-defined moisture density relationship must be compacted to at least 95 percent of ASTM D-698 (Standard Proctor).

It is recommended that well graded granular soils such as those specified in Tables 37 and 39 of the Standard Specification for Sewer and Water Construction be utilized as backfill in utility trenches to reduce the potential for consolidation and settlement of the backfill. All fill soils must be placed and compacted under engineering-controlled conditions, to provide suitable support for overlaying structures and roadways. Silt, clay, organic, and wet soils are not recommended for reuse as backfill within utility trenches due to the substantial difficulty of obtaining proper compaction in confined areas. Substantial importing of suitable granular fill is likely to be required.

Placement of bedding and cover material shall be sufficient to protect the type of pipe selected as specified by the pipe manufacturer. Trench backfill should be placed in layers not more than 9 inches in loose thickness before compaction (12 inches if using a well graded granular material with proper compaction equipment), except that the first lift of backfill placed over the pipe can be increased to 24 inches if necessary to protect the pipe from compaction equipment. Subsequently thinner lifts may be required depending on the type and size of compaction equipment available.

Each lift of backfill above the pipe bedding and cover must be compacted to a density of at least 95 percent of the maximum dry density as determined by the Standard Proctor method (ASTM D-698).

As with all excavation work, all open cut trenches must be properly shored and braced as required by applicable federal and state OSHA codes, and as necessary to protect life and property.

Groundwater Control

Groundwater observations were made during the drilling operations, and in the open boreholes upon completion. Groundwater was encountered during advancement within B-2 and B-4 at a depth of about 17 feet and 12 feet below existing grade, respectively. Dependent upon planned bearing depths, some difficulty with groundwater may be experienced. A gravity drainage system and filtered sump pump may be adequate to control low volume perched water. However, for excavations encroaching upon or extending below the groundwater, or for large volume perched zones, prolonged dewatering with a series of sumps may be necessary to facilitate construction.

Seasonal variations, site drainage conditions, soil permeability, and other factors can cause substantial variation in groundwater levels at varying times of the year.

Excavations

Sloping, shoring or bracing of the excavation sidewalls will be necessary to protect life and property. Substantial sloughing and caving, and subgrade instability may be experienced within unprotected excavations. The degree of excavation instability problems is dependent upon the depth and length of time that excavations remain open, excavation bank slopes, water levels and the effectiveness of any dewatering systems. However, severe instability may occur within organic, granular, or soft clay soils, especially encroaching upon and extending below the groundwater or perched zones. All excavations must be performed with caution and utilize methods which will prevent undermining or destabilization of slopes, buildings, utilities, pavements, sidewalks or other structures. All excavation work must be performed in accordance with OSHA and local building code requirements.

Where excavations encroach upon or extend below the groundwater or perched zones and into organic, granular, or soft clay soils, a substantially unstable subgrade may develop when the confining effect of the overburden is removed. Severe sloughing or caving of sidewalls may also occur. Extensive overexcavation of softened or loosened soils, in conjunction with the use of a crushed stone working mat, may be necessary to establish a stable bearing subgrade. Additionally, significantly widened excavations may result, or be required to maintain or achieve sidewall stability.

All excavations must be performed with caution and utilize methods which will prevent undermining or destabilization of slopes, buildings, utilities, pavements, sidewalks or other structures. The use of a properly designed shoring and bracing, sheet piling, or underpinning system must be utilized as necessary to adequately protect buildings, utilities, pavements, and other structures. This must be performed by an experienced specialty contractor. Additionally, extreme care must be used during the installation of any bracing system, especially those using driven or vibratory methods, in order to avoid damaging existing buildings, utilities, and other structures. Consideration should be given to the performance of video and/or photographic

documentation of the condition of nearby buildings, utilities, and other structures prior to installation. In addition, monitoring of such structures must be performed from the time of commencement and extending through completion of the installation activities.

It is mandated that excavations, whether they are for utility trenches, basement excavations or footing excavations, be constructed in accordance with current Occupational Safety and Health Administration (OSHA) guidelines to protect workers and others during construction. PSI recommends that these regulations be strictly enforced. The contractor is solely responsible for designing and constructing stable, temporary excavations and should shore, slope, or bench the sides of the excavations as required to maintain stability of both the excavation sides and bottom. The contractor's "responsible person", as defined in 29 CFR Part 1926, should evaluate the soil exposed in the excavations as part of the contractor's safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, state, and federal safety regulations. PSI is providing this information solely as a service to our client. PSI does not assume responsibility for construction site safety or the contractor's or other parties' compliance with local, state, and federal safety or other regulations.

REPORT LIMITATIONS

The recommendations submitted are based on the available subsurface information obtained by PSI and design details furnished by the client. If there are revisions to the plans for this project or if deviations from the subsurface conditions noted in this report are encountered during construction, PSI should be notified immediately to determine if changes in the recommendations are required. It is recommended that the pavement reconstruction operations be monitored by PSI, to test and evaluate the subgrades, base and pavement materials.

The findings, recommendations, specifications, or professional advice contained herein have been made in accordance with generally accepted professional geotechnical engineering practices in the local area. No warranties are implied or expressed.

Appendix A

Boring Location Plan
Soil Boring Logs
General Notes

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Proposed Street Replacement and Utility Installation
Perry Court, Laurel Court, and Maple Terrace
Wauwatosa, WI

SCALE: 1 inch = 150 feet (approx.)

DATE: 12/30/2025

FIGURE 1: BORING LOCATION PLAN

PROJECT NUMBER: 00523584

BORING B-1

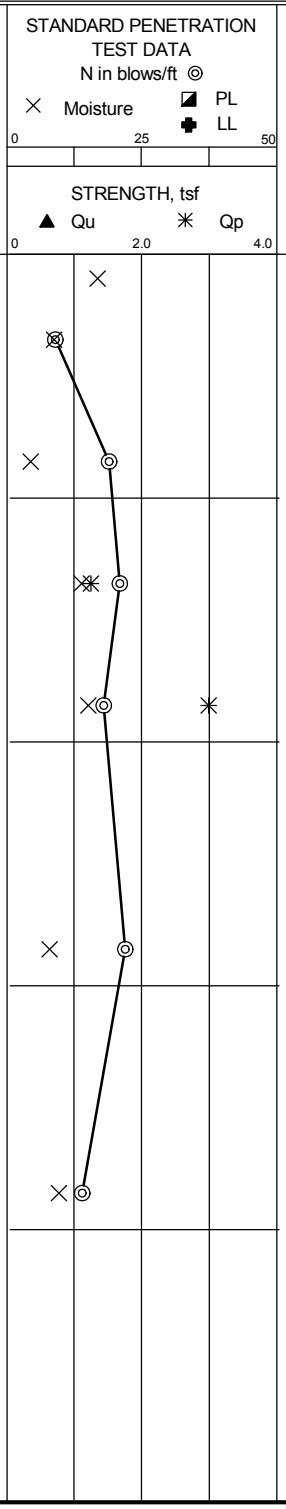
DATE STARTED:	12/5/25	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	12/5/25	**DRILLER:** RB	**LOGGED BY:** AW
COMPLETION DEPTH	20.0 ft	**DRILL RIG:**	Diedrich HD D-50 ATV Rig #419
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	N/A	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	
REMARKS:			

Water

While Drilling	Not Observed
Upon Completion	Not Observed
Delay	N/A

BORING LOCATION:
Maple Terrace
Wauwatosa, WI

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	Additional Remarks
	0					Asphalt (2.75"± Thick)	ASPH			
						Concrete (4"± Thick)	CONC		17	
						Base, Dark Brown Lean Clay with Sand and Gravel, Moist (4.75"± Thick)	CL			
				1	16	Brown Fine to Medium Sand with Gravel, Damp	SP	5-4-5 N=9	9	
				2	9			8-10-9 N=19	4	
	5					Mottled Brown Lean Clay with Sand and Gravel, Moist	CL			
				3	14			10-12-9 N=21	14	
						Brown Sandy Lean Clay, Moist	CL			
				4	10			9-9-9 N=18	15	
	10									
						Gray Silty Sand with Gravel, Moist	SM			
				5	16			8-10-12 N=22	8	
	15									
				6	14			5-6-8 N=14	10	
	20					End of Boring at 20 Feet				



intertek psi

Professional Service Industries, Inc.
821 Corporate Court, Suite 100
Waukesha, WI 53189
Telephone: (262) 521-2125

PROJECT NO.: 00523584
PROJECT: Proposed Street Replacement and Utility
LOCATION: Perry Court
Wauwatosa, WI

The stratification lines represent approximate boundaries. The transition may be gradual.

BORING B-2

DATE STARTED:	12/11/25	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	12/11/25	**DRILLER:** RB	**LOGGED BY:** AW
COMPLETION DEPTH	20.0 ft	**DRILL RIG:**	Mobile Drill B-57
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	N/A	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	
REMARKS:			

Water

While Drilling	17 feet
Upon Completion	Not Observed
Delay	N/A

BORING LOCATION:
Laurel Court
Wauwatosa, WI

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0 – 25 – 50) STRENGTH, tsf ▲ Qu ✳ Qp (0 – 2.0 – 4.0)	Additional Remarks
	0					Asphalt (4.25"± Thick)	ASPH		6		
						Concrete (5"± Thick)	CONC				
				1	8	Base, Grayish Brown Clayey Sand with Gravel, Moist (5.75"± Thick)	SC	3-3-4 N=7	17		Q_r = 0.4 tsf
						Brown Lean Clay with Sand, Moist					
				2	16		CL	3-4-7 N=11	17	>>	Q_r = 3.1 tsf
	5			3	16			5-7-12 N=19	15		Q_r = 1.1 tsf
						Grayish Brown Lean Clay with Sand, Moist					
				4	18		CL	3-6-7 N=13	21		Q_r = 2.0 tsf
	10										
						Grayish Brown Sandy Lean Clay with Gravel, Moist					
				5	18		CL	9-14-12 N=26	10		
	15										
						Gray Clayey Sand with Gravel, Wet					
				6	14		SC	36-26-21 N=47	8		
	20					End of Boring at 20 Feet Cave In at 2 Feet					

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Professional Service Industries, Inc.
821 Corporate Court, Suite 100
Waukesha, WI 53189
Telephone: (262) 521-2125

PROJECT NO.: 00523584
PROJECT: Proposed Street Replacement and Utility
LOCATION: Perry Court
Wauwatosa, WI

The stratification lines represent approximate boundaries. The transition may be gradual.

BORING B-3

DATE STARTED:	12/11/25	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	12/11/25	**DRILLER:** RB	**LOGGED BY:** AW
COMPLETION DEPTH	20.0 ft	**DRILL RIG:**	Mobile Drill B-57
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	N/A	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	
REMARKS:			

Water		
While Drilling	Not Observed	
Upon Completion	Not Observed	
Delay	N/A	

BORING LOCATION:
Perry Court
Wauwatosa, WI

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0 – 25 – 50) STRENGTH, tsf ▲ Qu ✳ Qp (0 – 2.0 – 4.0)	Additional Remarks
	0					Asphalt (5"± Thick)	ASPH				
						Concrete (6"± Thick)	CONC		6		
						Base, Grayish Brown Silty Sand with Gravel, Damp (4"± Thick)	SM				
				1	10	Mottled Brown Lean Clay with Sand and Gravel, Moist	CL	15-14-10 N=24	14		
	5			2	4			14-14-12 N=26	15		
				3	16	Brownish Gray Lean Clay with Sand, Moist	CL	6-5-7 N=12	19		
	10			4	16	Gray-Brown Lean Clay with Sand, Moist	CL	4-6-10 N=16	16		>>✳ Q_r = 3.0 tsf
	15			5	16	Grayish Silty Sand with Gravel, Moist	SM	7-9-11 N=20	9		
	20			6	12			4-6-9 N=15	8		
						End of Boring at 20 Feet Cave In at 4 Feet					

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Professional Service Industries, Inc.
821 Corporate Court, Suite 100
Waukesha, WI 53189
Telephone: (262) 521-2125

PROJECT NO.: 00523584
PROJECT: Proposed Street Replacement and Utility
LOCATION: Perry Court
Wauwatosa, WI

The stratification lines represent approximate boundaries. The transition may be gradual.

BORING B-4

DATE STARTED:	12/11/25	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	12/11/25	**DRILLER:** RB	**LOGGED BY:** AW
COMPLETION DEPTH	20.0 ft	**DRILL RIG:**	Mobile Drill B-57
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	N/A	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	
REMARKS:			

Water

While Drilling	12 feet
Upon Completion	Not Observed
Delay	N/A

BORING LOCATION:
Perry Court
Wauwatosa, WI

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0 – 25 – 50) STRENGTH, tsf ▲ Qu ✳ Qp (0 – 2.0 – 4.0)	Additional Remarks
	0					Asphalt (2.25"± Thick)	ASPH				
						Concrete (4"± Thick)	CONC		6		
						Base, Brownish Gray Silty Sand and Gravel, Moist (4"± Thick)	SM				
				1	14	Brown Sandy Lean Clay, Moist	CL	2-3-4 N=7	21		Q_r = 0.4 tsf
				2	16			2-3-3 N=6	19		Q_r = 0.4 tsf
	5					Brown Fine to Medium Sand, Moist					
				3	12		SP	2-3-6 N=9	10		
						Brown Lean Clay with Sand, Moist					
				4	16			5-6-12 N=18	13	>>	Q_r = 2.3 tsf
	10						CL				
						Gray Lean Clay with Sand, Moist					
				5	14			4-8-8 N=16	18		Q_r = 0.2 tsf
	15						CL				
				6	16			4-7-9 N=16	17		Q_r = 1.0 tsf
	20					End of Boring at 20 Feet Cave In at 4.5 Feet					

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Professional Service Industries, Inc.
821 Corporate Court, Suite 100
Waukesha, WI 53189
Telephone: (262) 521-2125

PROJECT NO.: 00523584
PROJECT: Proposed Street Replacement and Utility
LOCATION: Perry Court
Wauwatosa, WI

The stratification lines represent approximate boundaries. The transition may be gradual.

GENERAL NOTES

SAMPLE IDENTIFICATION

The Unified Soil Classification System (USCS), AASHTO 1988 and ASTM designations D2487 and D-2488 are used to identify the encountered materials unless otherwise noted. Coarse-grained soils are defined as having more than 50% of their dry weight retained on a #200 sieve (0.075mm); they are described as: boulders, cobbles, gravel or sand. Fine-grained soils have less than 50% of their dry weight retained on a #200 sieve; they are defined as silts or clay depending on their Atterberg Limit attributes. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size.

DRILLING AND SAMPLING SYMBOLS

SFA: Solid Flight Auger - typically 4" diameter flights, except where noted.
HSA: Hollow Stem Auger - typically 3¼" or 4¼ I.D. openings, except where noted.
M.R.: Mud Rotary - Uses a rotary head with Bentonite or Polymer Slurry
R.C.: Diamond Bit Core Sampler
H.A.: Hand Auger
P.A.: Power Auger - Handheld motorized auger

SS: Split-Spoon - 1 3/8" I.D., 2" O.D., except where noted.
ST: Shelby Tube - 3" O.D., except where noted.
RC: Rock Core
TC: Texas Cone
BS: Bulk Sample
PM: Pressuremeter
CPT-U: Cone Penetrometer Testing with Pore-Pressure Readings

SOIL PROPERTY SYMBOLS

N: Standard "N" penetration: Blows per foot of a 140 pound hammer falling 30 inches on a 2-inch O.D. Split-Spoon.
N_{60}: A "N" penetration value corrected to an equivalent 60% hammer energy transfer efficiency (ETR)
Q_u: Unconfined compressive strength, TSF
Q_p: Pocket penetrometer value, unconfined compressive strength, TSF
w%: Moisture/water content, %
LL: Liquid Limit, %
PL: Plastic Limit, %
PI: Plasticity Index = (LL-PL),%
DD: Dry unit weight, pcf
▼,▽,▼ Apparent groundwater level at time noted

RELATIVE DENSITY OF COARSE-GRAINED SOILS

Relative Density	N - Blows/foot
Very Loose	0 - 4
Loose	4 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	50 - 80
Extremely Dense	80+

ANGULARITY OF COARSE-GRAINED PARTICLES

Description	Criteria
Angular:	Particles have sharp edges and relatively plane sides with unpolished surfaces
Subangular:	Particles are similar to angular description, but have rounded edges
Subrounded:	Particles have nearly plane sides, but have well-rounded corners and edges
Rounded:	Particles have smoothly curved sides and no edges

GRAIN-SIZE TERMINOLOGY

Component	Size Range
Boulders:	Over 300 mm (>12 in.)
Cobbles:	75 mm to 300 mm (3 in. to 12 in.)
Coarse-Grained Gravel:	19 mm to 75 mm (¾ in. to 3 in.)
Fine-Grained Gravel:	4.75 mm to 19 mm (No.4 to ¾ in.)
Coarse-Grained Sand:	2 mm to 4.75 mm (No.10 to No.4)
Medium-Grained Sand:	0.42 mm to 2 mm (No.40 to No.10)
Fine-Grained Sand:	0.075 mm to 0.42 mm (No. 200 to No.40)
Silt:	0.005 mm to 0.075 mm
Clay:	<0.005 mm

PARTICLE SHAPE

Description	Criteria
Flat:	Particles with width/thickness ratio > 3
Elongated:	Particles with length/width ratio > 3
Flat & Elongated:	Particles meet criteria for both flat and elongated

RELATIVE PROPORTIONS OF FINES

Descriptive Term	% Dry Weight
Trace:	< 5%
With:	5% to 12%
Modifier:	>12%

GENERAL NOTES

(Continued)

CONSISTENCY OF FINE-GRAINED SOILS

Q_U - TSF	N - Blows/foot	Consistency
0 - 0.25	0 - 2	Very Soft
0.25 - 0.50	2 - 4	Soft
0.50 - 1.00	4 - 8	Firm (Medium Stiff)
1.00 - 2.00	8 - 15	Stiff
2.00 - 4.00	15 - 30	Very Stiff
4.00 - 8.00	30 - 50	Hard
8.00+	50+	Very Hard

MOISTURE CONDITION DESCRIPTION

Description	Criteria
Dry:	Absence of moisture, dusty, dry to the touch
Moist:	Damp but no visible water
Wet:	Visible free water, usually soil is below water table

RELATIVE PROPORTIONS OF SAND AND GRAVEL

Descriptive Term	% Dry Weight
Trace:	< 15%
With:	15% to 30%
Modifier:	>30%

STRUCTURE DESCRIPTION

Description	Criteria
Stratified:	Alternating layers of varying material or color with layers at least ¼-inch (6 mm) thick
Laminated:	Alternating layers of varying material or color with layers less than ¼-inch (6 mm) thick
Fissured:	Breaks along definite planes of fracture with little resistance to fracturing
Slickensided:	Fracture planes appear polished or glossy, sometimes striated
Blocky:	Cohesive soil that can be broken down into small angular lumps which resist further breakdown
Lensed:	Inclusion of small pockets of different soils
Layer:	Inclusion greater than 3 inches thick (75 mm)
Seam:	Inclusion 1/8-inch to 3 inches (3 to 75 mm) thick extending through the sample
Parting:	Inclusion less than 1/8-inch (3 mm) thick

SCALE OF RELATIVE ROCK HARDNESS

Q_U - TSF	Consistency
2.5 - 10	Extremely Soft
10 - 50	Very Soft
50 - 250	Soft
250 - 525	Medium Hard
525 - 1,050	Moderately Hard
1,050 - 2,600	Hard
>2,600	Very Hard

ROCK BEDDING THICKNESSES

Description	Criteria
Very Thick Bedded	Greater than 3-foot (>1.0 m)
Thick Bedded	1-foot to 3-foot (0.3 m to 1.0 m)
Medium Bedded	4-inch to 1-foot (0.1 m to 0.3 m)
Thin Bedded	1¼-inch to 4-inch (30 mm to 100 mm)
Very Thin Bedded	½-inch to 1¼-inch (10 mm to 30 mm)
Thickly Laminated	1/8-inch to ½-inch (3 mm to 10 mm)
Thinly Laminated	1/8-inch or less "paper thin" (<3 mm)

ROCK VOIDS

Voids	Void Diameter
Pit	<6 mm (<0.25 in)
Vug	6 mm to 50 mm (0.25 in to 2 in)
Cavity	50 mm to 600 mm (2 in to 24 in)
Cave	>600 mm (>24 in)

GRAIN-SIZED TERMINOLOGY

(Typically Sedimentary Rock)

Component	Size Range
Very Coarse Grained	>4.76 mm
Coarse Grained	2.0 mm - 4.76 mm
Medium Grained	0.42 mm - 2.0 mm
Fine Grained	0.075 mm - 0.42 mm
Very Fine Grained	<0.075 mm

ROCK QUALITY DESCRIPTION

Rock Mass Description	RQD Value
Excellent	90 -100
Good	75 - 90
Fair	50 - 75
Poor	25 -50
Very Poor	Less than 25

DEGREE OF WEATHERING

Slightly Weathered:	Rock generally fresh, joints stained and discoloration extends into rock up to 25 mm (1 in), open joints may contain clay, core rings under hammer impact.
Weathered:	Rock mass is decomposed 50% or less, significant portions of the rock show discoloration and weathering effects, cores cannot be broken by hand or scraped by knife.
Highly Weathered:	Rock mass is more than 50% decomposed, complete discoloration of rock fabric, core may be extremely broken and gives clunk sound when struck by hammer, may be shaved with a knife.

SOIL CLASSIFICATION CHART

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

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CITY OF WAUWATOSA WI

CCTV

Upstream MH	Downstream MH
ST14-035A	ST14-035

Date	Time	Location (Street)	Job Number
07/19/2018	11:24 AM	N PERRY CT	17470W-01

Use of Sewer	Pipe Size	Material	Jt. Spacing	Shape	Survey Direction
Stormwater	12	Reinforced Concrete Pipe	8	Circular	Upstream

Pre-Cleaning	Weather	Surface	US MH Depth	DS MH Depth	Flow Direction
Jetting	Dry	Asphalt	4.5	6.5	N

Media No.	Surveyed Length	Total Length	Surveyor	Certificate No.	Truck No.
HARD DRIVE	31.2	31.2	MIKE FABIAN	U-1116-0776149	235

Comments

DIVISION C

Ftg.	Code	Description	Position	Cont.	Comment
31.2	ACB	Access Point - Catch Basin			ENDING CATCH BASIN:ST14-035A
29.3	CM	Crack Multiple	12 to 12		
24.2	CM	Crack Multiple	12 to 12		
13.7	CM	Crack Multiple	12 to 12		
12.4	FL	Fracture Longitudinal	6		
12.2	CL	Crack Longitudinal	12	F01	
10.8	BVV	Pipe Broken: Void Visible	6 to 9		
10.2	CM	Crack Multiple	3 to 8		
5.6	CL	Crack Longitudinal	12	S01	
5.6	FL	Fracture Longitudinal	6		
3.0	FL	Fracture Longitudinal	6		
3.0	CL	Crack Longitudinal	12		
0.0	MWL	Water Level			
0.0	AMH	Access Point - Manhole			Starting Manhole: ST14-035

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CITY OF WAUWATOSA WI

CCTV

Upstream MH	Downstream MH
ST14-035B	ST14-035

Date	Time	Location (Street)	Job Number
07/19/2018	12:08 PM	N PERRY CT	17470W-01

Use of Sewer	Pipe Size	Material	Jt. Spacing	Shape	Survey Direction
Stormwater	12	Reinforced Concrete Pipe	8	Circular	Upstream

Pre-Cleaning	Weather	Surface	US MH Depth	DS MH Depth	Flow Direction
Jetting	Dry	Asphalt	4.5	6.5	S

Media No.	Surveyed Length	Total Length	Surveyor	Certificate No.	Truck No.
HARD DRIVE	29.4	29.4	MIKE FABIAN	U-1116-0776149	235

Comments

DIVISION C

Ftg.	Code	Description	Position	Cont.	Comment
29.4	ACB	Access Point - Catch Basin			ENDING CATCH BASIN:ST14-035B
25.7	CM	Crack Multiple	11 to 1		
0.0	MWL	Water Level			
0.0	AMH	Access Point - Manhole			Starting Manhole: ST14-035

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CCTV

Upstream MH	Downstream MH
ST14-036A	ST14-036

Date	Time	Location (Street)	Job Number
07/19/2018	10:16 AM	N PERRY CT	17470W-01

Use of Sewer	Pipe Size	Material	Jt. Spacing	Shape	Survey Direction
Stormwater	12	Reinforced Concrete Pipe	8	Circular	Upstream

Pre-Cleaning	Weather	Surface	US MH Depth	DS MH Depth	Flow Direction
Jetting	Dry	Asphalt	3	3	S

Media No.	Surveyed Length	Total Length	Surveyor	Certificate No.	Truck No.
HARD DRIVE	23	23	MIKE FABIAN	U-1116-0776149	235

Comments

DIVISION C -- ONSCREEN INDEX ERROR USM IS ST14-036A

Ftg.	Code	Description	Position	Cont.	Comment
23.0	ACB	Access Point - Catch Basin			ENDING CATCH BASIN:ST14-036A
21.0	CM	Crack Multiple	12 to 12	F01	
20.9	CC	Crack Circumferential	12 to 12		
15.1	CM	Crack Multiple	12 to 12	S01	
6.6	CC	Crack Circumferential	12 to 12		
0.0	MWL	Water Level			
0.0	AMH	Access Point - Manhole			Starting Manhole: ST14-036

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CCTV

Upstream MH	Downstream MH
ST14-036	ST14-035

Date	Time	Location (Street)	Job Number
07/19/2018	10:41 AM	N PERRY CT	17470W-01

Use of Sewer	Pipe Size	Material	Jt. Spacing	Shape	Survey Direction
Stormwater	12	Reinforced Concrete Pipe	8	Circular	Downstream

Pre-Cleaning	Weather	Surface	US MH Depth	DS MH Depth	Flow Direction
Jetting	Dry	Asphalt	3	10	W

Media No.	Surveyed Length	Total Length	Surveyor	Certificate No.	Truck No.
HARD DRIVE	97.4	97.4	MIKE FABIAN	U-1116-0776149	235

Comments

DIVISION C

Ftg.	Code	Description	Position	Cont.	Comment
0.0	AMH	Access Point - Manhole			Starting Manhole: ST14-036
0.0	MWL	Water Level			
1.0	CL	Crack Longitudinal	12		
1.0	DSGV	Deposits Settled: Gravel	5 to 8		WANDERING
2.0	CC	Crack Circumferential	12 to 12		
6.4	CC	Crack Circumferential	12 to 12		
28.9	CM	Crack Multiple	8 to 1		
42.2	RPR	Point Repair - Pipe Replaced			PVC
47.4	MMC	Material Change			CONCRETE
89.1	CL	Crack Longitudinal	8		
92.9	CM	Crack Multiple	7 to 5		
94.8	CC	Crack Circumferential	12 to 12		
97.4	AMH	Access Point - Manhole			ENDING MANHOLE:ST14-035

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CCTV

Upstream MH	Downstream MH
ST14-037	ST14-036

Date	Time	Location (Street)	Job Number
07/19/2018	10:35 AM	N PERRY CT	17470W-01

Use of Sewer	Pipe Size	Material	Jt. Spacing	Shape	Survey Direction
Stormwater	12	Reinforced Concrete Pipe	8	Circular	Upstream

Pre-Cleaning	Weather	Surface	US MH Depth	DS MH Depth	Flow Direction
Jetting	Dry	Asphalt	3	3	W

Media No.	Surveyed Length	Total Length	Surveyor	Certificate No.	Truck No.
HARD DRIVE	31.9	31.9	MIKE FABIAN	U-1116-0776149	235

Comments

DIVISION C

Ftg.	Code	Description	Position	Cont.	Comment
31.9	ACB	Access Point - Catch Basin			ENDING CATCH BASIN:ST14-037
23.2	MMC	Material Change			PVC
23.2	CM	Crack Multiple	12 to 12	F01	
17.3	CM	Crack Multiple	12 to 12	S01	
16.9	MMC	Material Change			CONCRETE
8.9	MMC	Material Change			PVC
7.5	DAE	Deposits Attached: Encrustation	6 to 11		
6.6	CM	Crack Multiple	5 to 7		
2.0	CL	Crack Longitudinal	12		
1.0	FM	Fracture Multiple	12 to 12		
0.0	MWL	Water Level			
0.0	AMH	Access Point - Manhole			Starting Manhole: ST14-036

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CCTV

Upstream MH	Downstream MH
ST14-038	ST14-037

Date	Time	Location (Street)	Job Number
07/19/2018	10:03 AM	N PERRY CT	17470W-01

Use of Sewer	Pipe Size	Material	Jt. Spacing	Shape	Survey Direction
Stormwater	12	Reinforced Concrete Pipe	8	Circular	Downstream

Pre-Cleaning	Weather	Surface	US MH Depth	DS MH Depth	Flow Direction
Jetting	Dry	Asphalt	3	3	S

Media No.	Surveyed Length	Total Length	Surveyor	Certificate No.	Truck No.
HARD DRIVE	16.4	16.4	MIKE FABIAN	U-1116-0776149	235

Comments

DIVISION C

Ftg.	Code	Description	Position	Cont.	Comment
0.0	AMH	Access Point - Manhole			Starting Manhole: ST14-038
0.0	MWL	Water Level			
3.5	FM	Fracture Multiple	4 to 8		
4.7	CM	Crack Multiple	10 to 2		
5.0	B	Pipe Broken	10 to 2		AT JOINT
5.0	CL	Crack Longitudinal	12		
5.9	CL	Crack Longitudinal	5		
6.7	FM	Fracture Multiple	3 to 9		
6.7	CM	Crack Multiple	9 to 3		
8.9	CL	Crack Longitudinal	12		
11.5	MMC	Material Change			PVC
16.4	ACB	Access Point - Catch Basin			ENDING CATCH BASIN:ST14-037

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Upstream MH	Downstream MH
ST14-040A	ST14-040

Date	Time	Location (Street)	Job Number
07/19/2018	2:51 PM	N PERRY CT	17470W-01

Use of Sewer	Pipe Size	Material	Jt. Spacing	Shape	Survey Direction
Stormwater	12	Polyvinyl Chloride	8	Circular	Upstream

Pre-Cleaning	Weather	Surface	US MH Depth	DS MH Depth	Flow Direction
Jetting	Dry	Asphalt	4	4	W

Media No.	Surveyed Length	Total Length	Surveyor	Certificate No.	Truck No.
HARD DRIVE	19.6	19.6	MIKE FABIAN	U-1116-0776149	235

Comments

DIVISION C

Ftg.	Code	Description	Position	Cont.	Comment
0.0	AMH	Access Point - Manhole			Starting Manhole: ST14-040
0.0	MWL	Water Level			
14.3	FM	Fracture Multiple	5 to 8		
19.6	ACB	Access Point - Catch Basin			ENDING CATCH BASIN:ST14-040A

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CCTV

Upstream MH	Downstream MH
ST14-040B	ST14-040

Date	Time	Location (Street)	Job Number
07/19/2018	3:06 PM	N PERRY CT	17470W-01

Use of Sewer	Pipe Size	Material	Jt. Spacing	Shape	Survey Direction
Stormwater	12	Reinforced Concrete Pipe	8	Circular	Upstream

Pre-Cleaning	Weather	Surface	US MH Depth	DS MH Depth	Flow Direction
Jetting	Dry	Asphalt	4	4	E

Media No.	Surveyed Length	Total Length	Surveyor	Certificate No.	Truck No.
HARD DRIVE	6.5	6.5	MIKE FABIAN	U-1116-0776149	235

Comments

DIVISION C

Ftg.	Code	Description	Position	Cont.	Comment
0.0	AMH	Access Point - Manhole			Starting Manhole: ST14-040
0.0	MWL	Water Level			
6.5	ACB	Access Point - Catch Basin			ENDING CATCH BASIN:

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CCTV

Upstream MH	Downstream MH
ST14-040	ST14-035

Date	Time	Location (Street)	Job Number
07/19/2018	12:55 PM	N PERRY CT	17470W-01

Use of Sewer	Pipe Size	Material	Jt. Spacing	Shape	Survey Direction
Stormwater	18	Reinforced Concrete Pipe	8	Circular	Upstream

Pre-Cleaning	Weather	Surface	US MH Depth	DS MH Depth	Flow Direction
Jetting	Dry	Asphalt	10.5	10.5	N

Media No.	Surveyed Length	Total Length	Surveyor	Certificate No.	Truck No.
HARD DRIVE	43.6	43.6	MIKE FABIAN	U-1116-0776149	235

Comments

DIVISION C

Ftg.	Code	Description	Position	Cont.	Comment
43.6	AMH	Access Point - Manhole			ENDING MANHOLE:ST14-040
42.0	CM	Crack Multiple	11 to 11	F01	
41.0	FL	Fracture Longitudinal	6	F02	
7.4	FL	Fracture Longitudinal	6	S02	
2.0	CM	Crack Multiple	12 to 12	S01	
0.0	MWL	Water Level			
0.0	AMH	Access Point - Manhole			Starting Manhole: ST14-035

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CITY OF WAUWATOSA WI

CCTV

Upstream MH	Downstream MH
ST14-041	ST14-040

Date	Time	Location (Street)	Job Number
07/19/2018	1:09 PM	N PERRY CT	17470W-01

Use of Sewer	Pipe Size	Material	Jt. Spacing	Shape	Survey Direction
Stormwater	18	Reinforced Concrete Pipe	8	Circular	Downstream

Pre-Cleaning	Weather	Surface	US MH Depth	DS MH Depth	Flow Direction
Jetting	Dry	Asphalt	9	10.5	N

Media No.	Surveyed Length	Total Length	Surveyor	Certificate No.	Truck No.
HARD DRIVE	156.6	156.6	MIKE FABIAN	U-1116-0776149	235

Comments

DIVISION C

Ftg.	Code	Description	Position	Cont.	Comment
0.0	AMH	Access Point - Manhole			Starting Manhole: ST14-041
0.0	MWL	Water Level			
2.0	SRI	Surface: Roughness Increased	5 to 7	S02	REPEATED CONTINUOUS DEFECT
46.0	CM	Crack Multiple	5 to 7	S01	WANDERING
65.8	CM	Crack Multiple	9 to 3		
69.3	FL	Fracture Longitudinal	6	S03	
71.9	CM	Crack Multiple	11 to 2		
77.2	CM	Crack Multiple	7 to 5	S04	
98.7	IS	Infiltration - Stain	3 to 9		
100.7	CM	Crack Multiple	5 to 7	F01	
100.7	CM	Crack Multiple	7 to 5	F04	
113.7	FM	Fracture Multiple	4 to 8		
113.7	CM	Crack Multiple	6 to 5	S05	
118.8	FM	Fracture Multiple	4 to 8		
143.6	DAE	Deposits Attached: Encrustation	1 to 5		
147.8	CM	Crack Multiple	4 to 6		
154.3	CM	Crack Multiple	7 to 5	F05	
154.3	FL	Fracture Longitudinal	6	F03	
154.3	SRI	Surface: Roughness Increased	5 to 7	F02	
156.6	AMH	Access Point - Manhole			ENDING MANHOLE:ST14-040

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CITY OF WAUWATOSA WI

CCTV

Upstream MH	Downstream MH
ST14-042A	ST14-042

Date	Time	Location (Street)	Job Number
07/19/2018	2:23 PM	N PERRY CT	17470W-01

Use of Sewer	Pipe Size	Material	Jt. Spacing	Shape	Survey Direction
Stormwater	12	Reinforced Concrete Pipe	8	Circular	Upstream

Pre-Cleaning	Weather	Surface	US MH Depth	DS MH Depth	Flow Direction
Jetting	Dry	Asphalt	4	4	N

Media No.	Surveyed Length	Total Length	Surveyor	Certificate No.	Truck No.
HARD DRIVE	6	6	MIKE FABIAN	U-1116-0776149	235

Comments

DIVISION C

Ftg.	Code	Description	Position	Cont.	Comment
6.0	ACB	Access Point - Catch Basin			ENDING CATCH BASIN:ST14-042A
0.0	MWL	Water Level			
0.0	AMH	Access Point - Manhole			Starting Manhole: ST14-042

Visu-Sewer
Inspect. Maintain. Rehabilitate.
www.Visu-Sewer.com

CITY OF WAUWATOSA WI

CCTV

Upstream MH	Downstream MH
ST14-042B	ST14-042

Date	Time	Location (Street)	Job Number
07/19/2018	2:40 PM	N PERRY CT	17470W-01

Use of Sewer	Pipe Size	Material	Jt. Spacing	Shape	Survey Direction
Stormwater	12	Reinforced Concrete Pipe	8	Circular	Upstream

Pre-Cleaning	Weather	Surface	US MH Depth	DS MH Depth	Flow Direction
Jetting	Dry	Asphalt	4	4	S

Media No.	Surveyed Length	Total Length	Surveyor	Certificate No.	Truck No.
HARD DRIVE	18	18	MIKE FABIAN	U-1116-0776149	235

Comments

DIVISION C

Ftg.	Code	Description	Position	Cont.	Comment
18.0	ACB	Access Point - Catch Basin			ENDING CATCH BASIN:ST14-042B
9.4	CC	Crack Circumferential	12 to 12		
0.0	MWL	Water Level			
0.0	AMH	Access Point - Manhole			Starting Manhole: ST14-042

Visu-Sewer
Inspect. Maintain. Rehabilitate.
www.Visu-Sewer.com

CITY OF WAUWATOSA WI

CCTV

Upstream MH	Downstream MH
ST14-042	ST14-041

Date	Time	Location (Street)	Job Number
07/19/2018	1:37 PM	N PERRY CT	17470W-01

Use of Sewer	Pipe Size	Material	Jt. Spacing	Shape	Survey Direction
Stormwater	18	Reinforced Concrete Pipe	8	Circular	Upstream

Pre-Cleaning	Weather	Surface	US MH Depth	DS MH Depth	Flow Direction
Jetting	Dry	Asphalt	8	9	N

Media No.	Surveyed Length	Total Length	Surveyor	Certificate No.	Truck No.
HARD DRIVE	71.9	71.9	MIKE FABIAN	U-1116-0776149	235

Comments

DIVISION C

Ftg.	Code	Description	Position	Cont.	Comment
71.9	AMH	Access Point - Manhole			ENDING MANHOLE:ST14-042
69.7	FL	Fracture Longitudinal	6	F02	
69.7	SRI	Surface: Roughness Increased	5 to 7	F01	
63.2	FM	Fracture Multiple	4 to 8		
55.3	FL	Fracture Longitudinal	6	S02	
52.4	FL	Fracture Longitudinal	7		
42.5	FL	Fracture Longitudinal	6		
34.1	FL	Fracture Longitudinal	6		
30.5	FL	Fracture Longitudinal	6		
15.3	FL	Fracture Longitudinal	6		
2.0	SRI	Surface: Roughness Increased	5 to 7	S01	REPEATED CONTINUOUS DEFECT
0.0	MWL	Water Level			
0.0	AMH	Access Point - Manhole			Starting Manhole: ST14-041

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CITY OF WAUWATOSA WI

CCTV

Upstream MH	Downstream MH
ST14-044	ST14-042

Date	Time	Location (Street)	Job Number
07/19/2018	1:53 PM	N PERRY CT	17470W-01

Use of Sewer	Pipe Size	Material	Jt. Spacing	Shape	Survey Direction
Stormwater	18	Reinforced Concrete Pipe	8	Circular	Upstream

Pre-Cleaning	Weather	Surface	US MH Depth	DS MH Depth	Flow Direction
Jetting	Dry	Asphalt	8	8	W

Media No.	Surveyed Length	Total Length	Surveyor	Certificate No.	Truck No.
HARD DRIVE	127.6	127.6	MIKE FABIAN	U-1116-0776149	235

Comments

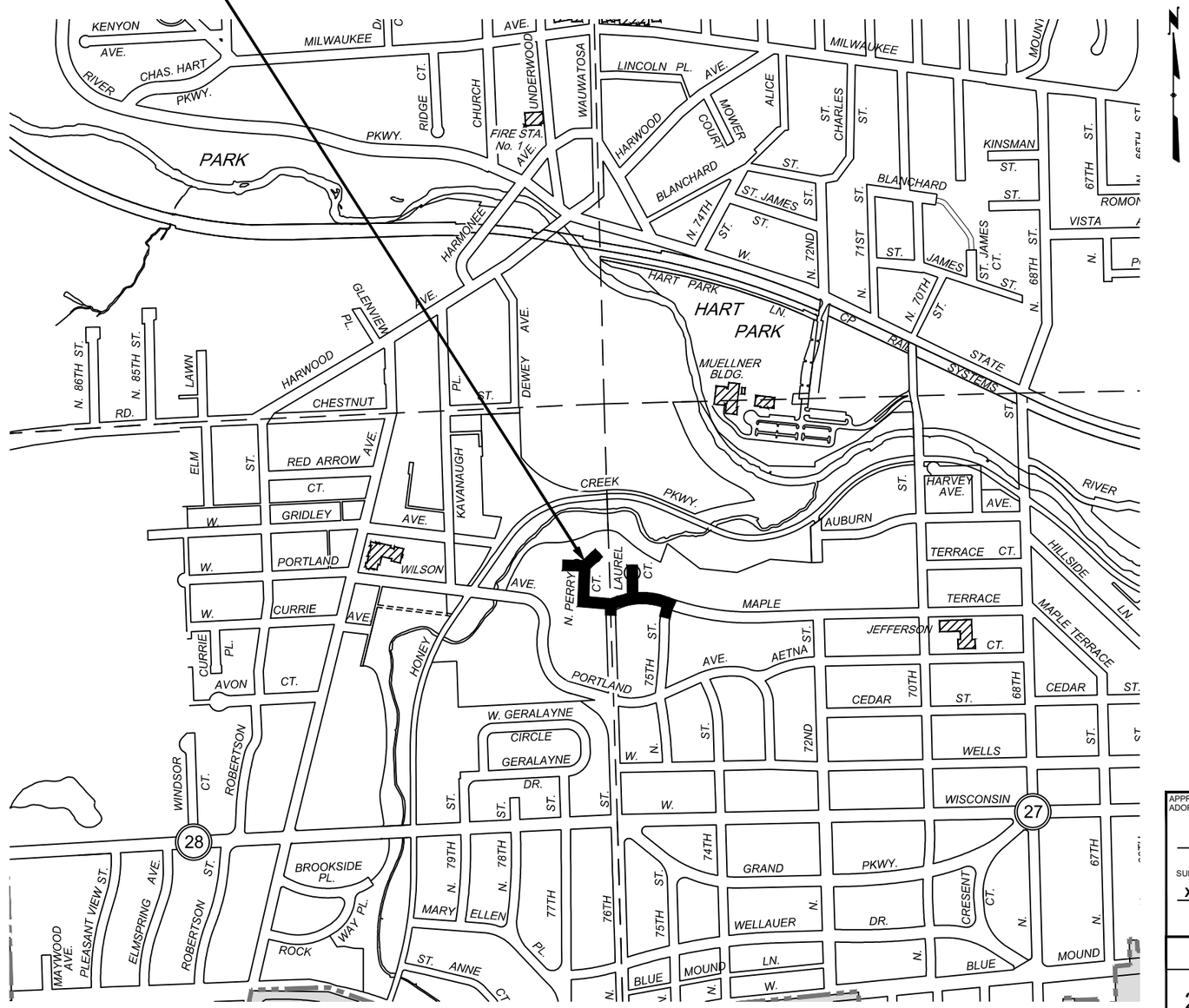
DIVISION C

Ftg.	Code	Description	Position	Cont.	Comment
127.6	AMH	Access Point - Manhole			ENDING MANHOLE:ST14-044
126.0	SRI	Surface: Roughness Increased	5 to 7	F04	
115.4	FL	Fracture Longitudinal	6	F03	
58.1	CM	Crack Multiple	8 to 4		
52.6	CM	Crack Multiple	7 to 5		
22.7	CL	Crack Longitudinal	12	F02	
20.6	FL	Fracture Longitudinal	6	S03	
2.0	CL	Crack Longitudinal	12	S02	
2.0	SRI	Surface: Roughness Increased	5 to 7	S04	REPEATED CONTINUOUS DEFECT
0.0	MWL	Water Level			
0.0	AMH	Access Point - Manhole			Starting Manhole: ST14-042

CITY OF WAUWATOSA
CONTRACT 26-07
2026 STREET & UTILITY IMPROVEMENTS
N. PERRY CT., MAPLE TER., & LAUREL CT.
PROJECT #1026

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

PROJECT LOCATION



ISSUED FOR CONSTRUCTION
XXX XXTH 2026

APPROVED BY THE BOARD OF PUBLIC WORKS OF THE CITY OF WAUWATOSA, WISCONSIN BY RESOLUTION ADOPTED:

DATE _____ CITY CLERK _____

SUBMITTED FOR APPROVAL:

XXX. XXTH, 2026
DATE

CITY ENGINEER
REG. PROF. ENGR. _____

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

2026 STREET & UTILITY IMPROVEMENTS

VARIOUS LOCATIONS

SCALE: AS NOTED | SHEETS:

PLAN INDEX		
SHEET No.	DESCRIPTION	FILE No.
SANITARY SEWER		
A01	SANITARY SEWER RELAY	16-1006
A02	SANITARY SEWER RELINING	16-1006
A03	SANITARY SPOT REPAIR DETAIL	16-1006
A05-A07	SANITARY SEWER DETAILS	16-1006
WATER MAIN		
B01	REMOVALS & ABANDONMENT	30-821
B02-B07	WATER MAIN RELAY	30-821
STORM SEWER		
C01-C02	REMOVALS & ABANDONMENT	41-1010
C03-C12	STORM SEWER RELAY	41-1010
C13-C14	STORM SEWER RELINING	41-1010
C15-C16	STORM SEWER DETAILS	41-1010
ELECTRIC		
E01	STREET LIGHTING PROJECT AREA	23-285
E02-E04	STREET LIGHTING REMOVALS	23-285
E05-E07	PROPOSED STREET LIGHTING	23-285
E08-E09	STREET LIGHTING DETAILS	23-285
PAVING		
D01	GENERAL NOTES	15-1095
D02	PAVING OVERVIEW	15-1095
D03-D04	TYPICAL SECTIONS	15-1095
D05-D09	CONSTRUCTION DETAILS	15-1095
D10-D11	REMOVALS	15-1095
D12-D16	PLAN AND PROFILE	15-1095
D17-D21	PAVEMENT GRADES	15-1095
D22-D25	CURB RAMP DETAILS	15-1095
D26-D27	TRAFFIC CONTROL	15-1095
D28	SIGNING PLAN	15-1095
D29-D33	MISC. QUANTITIES	15-1095
D34-D51	CROSS SECTIONS	15-1095
STAGING		
S1	CONSTRUCTION STAGING PLAN	
S2	CONSTRUCTION ACCESS & STAGING	

PROJECT COORDINATION:

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PROJECT MANAGER

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414-479-3444
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MOBILE: 414-881-4743
JONATHON.SCHALOW@WE-ENERGIES.COM

WE ENERGIES - ELECTRIC EMERGENCY
PHONE (800) 662-4797

TRAFFIC & ELECTRICAL SUPERVISOR

TROY GRUENER
414-471-8429
TGRUENER@WAUWATOSA.NET

FIRE DEPARTMENT

1643 UNDERWOOD AVE.
911 (EMERGENCIES)
414-471-8490 (NON-EMERGENCIES)

POLICE DEPARTMENT

1700 N. 116TH ST.
911 (EMERGENCIES)
414-471-8430 (NON-EMERGENCIES)

WATER DEPARTMENT

WATER DEPARTMENT SUPERVISOR
ADAM FLORIN
414-471-8480 EX: 5915
AFLORIN@WAUWATOSA.NET

STREET AND SEWER DEPARTMENT

414-471-8422

FORESTRY SECTION

URBAN FORESTRY & GROUNDS SUPERINTENDENT
ALEX KRUTCH
C.414-975-0635
AKRUTSCH@WAUWATOSA.NET

DIGGER'S HOTLINE

800-242-8511 (811)

MILWAUKEE COUNTY PARKS

SARAH TOOMSEN
9480 WATERTOWN PLANK ROAD
WAUWATOSA, WI 53226
414-257-7275
SARAH.TOOMSEN@MILWAUKEECOUNTYWI.GOV

WE ENERGIES - GAS

JOE DABLE
500 S 116TH AVE
WEST ALLIS, WI 53214
414-303-0310
JOE.DABLE@WE-ENERGIES.COM

WE ENERGIES - GAS EMERGENCY
PHONE (800) 261-5325

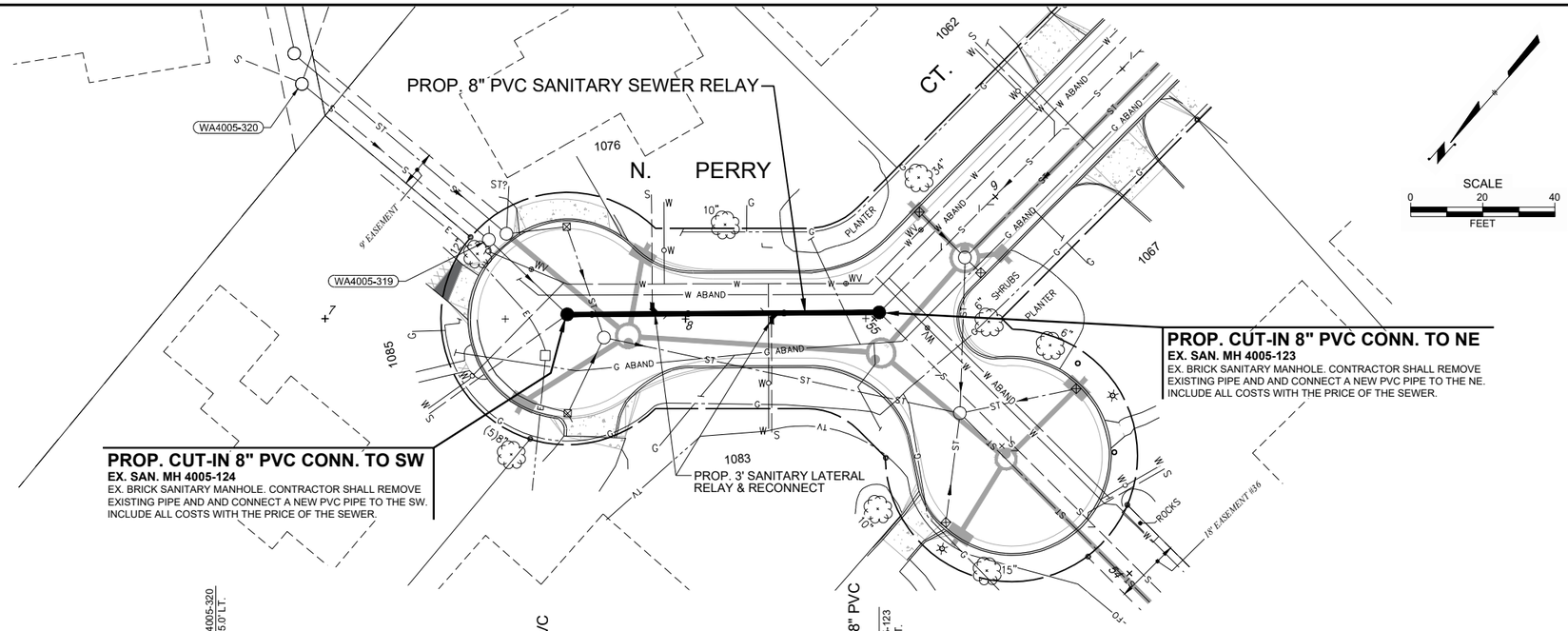
DATE	DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

CONTACT INFORMATION

CONTRACT: 26-07
FILE NO:
DRAWN BY:
CHECKED BY:
SCALE:

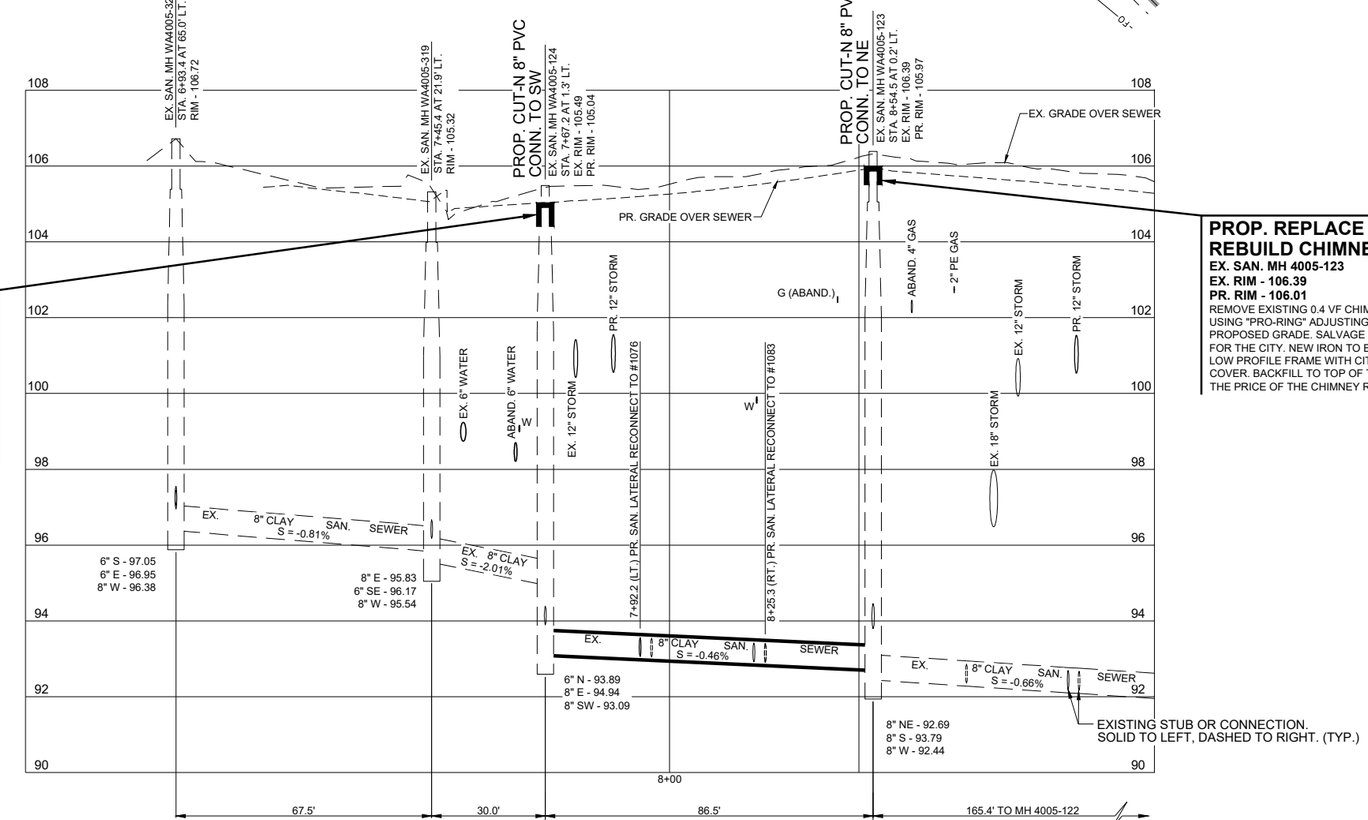
EXISTING SANITARY MANHOLES				
Basin	#	Location	Rim Elev.	Invert Elev.
4005	WA4005-123	8+54.5 AT 0.2' LT.	106.39	8" W - 92.44 8" NE - 92.69 8" S - 93.79
4005	WA4005-124	7+67.2 AT 1.3' LT.	105.49	8" SW - 93.09 6" N - 93.89 8" E - 94.94
4005	WA4005-319	7+45.4 AT 21.9' LT.	105.32	8" W - 95.54 8" E - 95.83 6" SE - 96.17
4005	WA4005-320	6+93.4 AT 65.0' LT.	106.72	6" S - 97.05 8" W - 96.38 6" E - 96.95



PROP. CUT-IN 8" PVC CONN. TO SW
EX. SAN. MH 4005-124
EX. BRICK SANITARY MANHOLE. CONTRACTOR SHALL REMOVE EXISTING PIPE AND AND CONNECT A NEW PVC PIPE TO THE SW. INCLUDE ALL COSTS WITH THE PRICE OF THE SEWER.

PROP. CUT-IN 8" PVC CONN. TO NE
EX. SAN. MH 4005-123
EX. BRICK SANITARY MANHOLE. CONTRACTOR SHALL REMOVE EXISTING PIPE AND AND CONNECT A NEW PVC PIPE TO THE NE. INCLUDE ALL COSTS WITH THE PRICE OF THE SEWER.

PROP. 3' SANITARY LATERAL RELAY & RECONNECT



PROP. REPLACE FRAME/COVER & REBUILD CHIMNEY 1.1 VF
EX. SAN. MH 4005-124
EX. RIM - 105.49
PR. RIM - 105.04
REMOVE EXISTING 1.1 VF CHIMNEY, ADDING 0.6 VF OF CHIMNEY USING "PRO-RING" ADJUSTING RINGS TO BRING MANHOLE TO PROPOSED GRADE. SALVAGE EXISTING IRON AND INTERNAL SEAL FOR THE CITY. NEW IRON TO BE A CITY SUPPLIED NEENAH R-1661-B FRAME WITH CITY SUPPLIED SELF SEALING SANITARY COVER. BACKFILL TO TOP OF TRENCH. INCLUDE ALL COSTS WITH THE PRICE OF THE CHIMNEY REBUILD.

PROP. REPLACE FRAME/COVER & REBUILD CHIMNEY 0.4 VF
EX. SAN. MH 4005-123
EX. RIM - 106.39
PR. RIM - 106.01
REMOVE EXISTING 0.4 VF CHIMNEY, ADDING 0.4 VF OF CHIMNEY USING "PRO-RING" ADJUSTING RINGS TO BRING MANHOLE TO PROPOSED GRADE. SALVAGE EXISTING IRON AND INTERNAL SEAL FOR THE CITY. NEW IRON TO BE A CITY SUPPLIED NEENAH R-1661-A LOW PROFILE FRAME WITH CITY SUPPLIED SELF SEALING SANITARY COVER. BACKFILL TO TOP OF TRENCH. INCLUDE ALL COSTS WITH THE PRICE OF THE CHIMNEY REBUILD.

PROP. 86.5 L.F. OF 8" PVC PIPE SANITARY SEWER RELAY ASTM D-3034 SDR 35 **TYPE PSM RUBBER GASKET JOINTS.** FULL DEPTH SAW CUTS REQUIRED. STANDARD CLASS "C" BEDDING. ***MECHANICALLY COMPACTED CRUSHED CONCRETE BACKFILL.*** BACKFILL TO TOP OF TRENCH. INCLUDE ALL COSTS WITH THE PRICE OF THE RELAY.

Underground utilities have been shown to a reasonable degree of accuracy using diggers hotline field locates and record drawings. However, the city does not guarantee their exact size, location or depth or that of others not shown. The contractor shall verify the existence of these utilities and those not shown. Costs for locating and delay shall be incidental to the contract.

DATE	DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

SANITARY SEWER RELAY
N. PERRY CT.

FROM: NORTH CUL-DE-SAC
TO: 90' SOUTHWEST

CONTRACT:	26-07
FILE NO:	16-1006
DRAWN BY:	C.R.
CHECKED BY:	M.J.A.
SCALE:	AS SHOWN

A01

EX. SANITARY MANHOLES

MH#	DEPTH
WA4005-013	11.5'
WA4005-014	10.3'
WA4005-016	9.5'
WA4005-029	11'
WA4005-041	9.2'
WA4005-042	9.4'
WA4005-043	12.9'
WA4005-122	14.1'
WA4005-123	12.1'
WA4005-124	12'
WA4005-125	12.2'
WA4005-319	9.9'
WA4005-320	9.6'

PROP. REPLACE FRAME/COVER & REBUILD CHIMNEY 0.4 VF
EX. Sanitary MH WA4005-319
EX. RIM - 105.32
PR. RIM - 105.12
Remove existing 0.3 VF chimney, add 0.4 VF of chimney using "Pro-Ring" adjusting rings only to bring manhole to proposed grade. No internal seal installation required. Salvage existing iron and internal seal for the City. New iron to be a City supplied Neenah R-1661-A frame with City supplied self sealing sanitary cover. Backfill to top of trench. Include all other costs with the price of the chimney rebuild.

PROP. REPLACE FRAME/COVER
EX. Sanitary MH WA4005-320
EX. RIM - 106.72
Salvage existing iron and internal seal for the City. New iron to be a City supplied Neenah R-1661-A frame with City supplied self sealing sanitary cover.

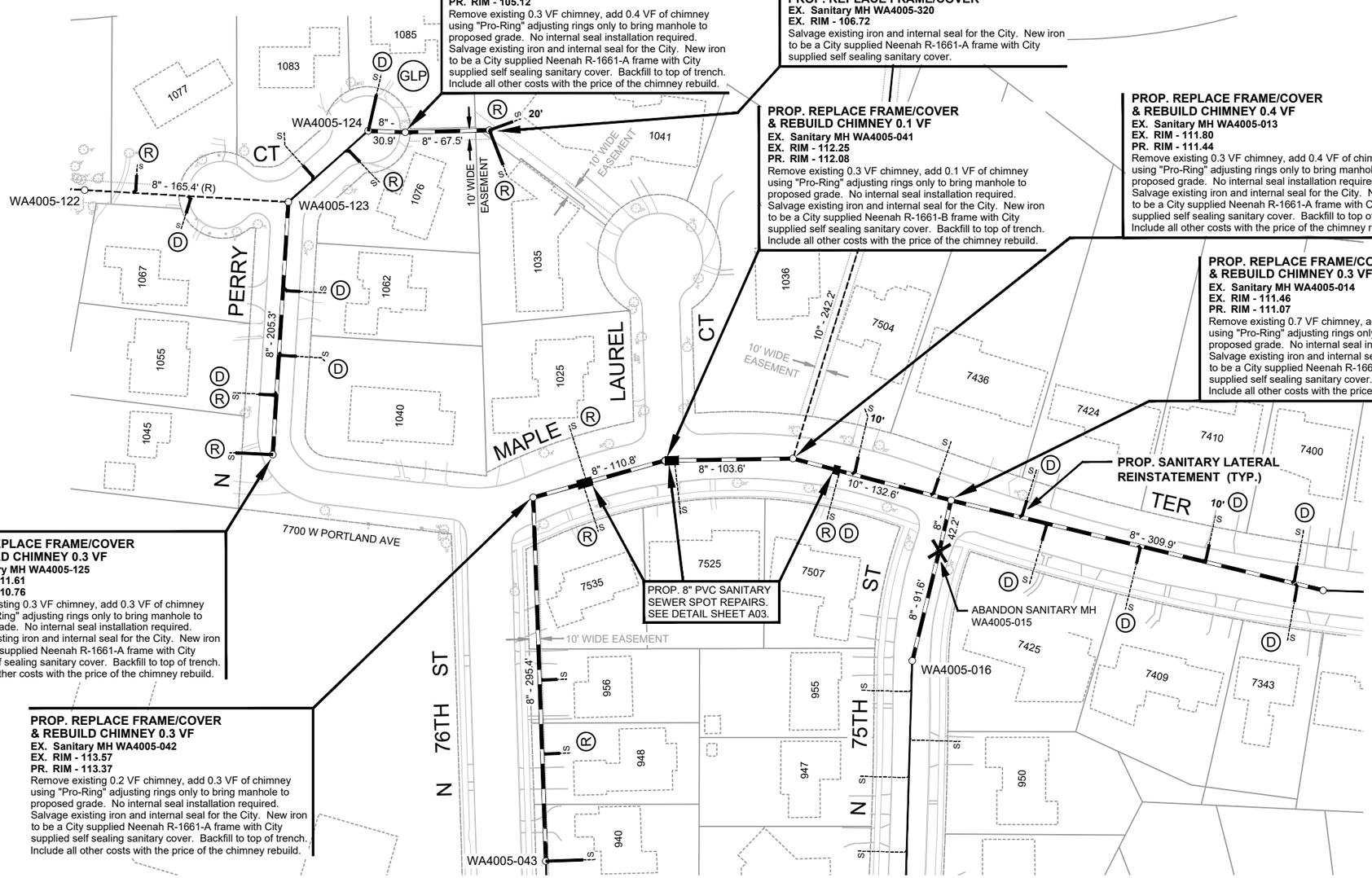
PROP. REPLACE FRAME/COVER & REBUILD CHIMNEY 0.1 VF
EX. Sanitary MH WA4005-041
EX. RIM - 112.25
PR. RIM - 112.08
Remove existing 0.3 VF chimney, add 0.1 VF of chimney using "Pro-Ring" adjusting rings only to bring manhole to proposed grade. No internal seal installation required. Salvage existing iron and internal seal for the City. New iron to be a City supplied Neenah R-1661-B frame with City supplied self sealing sanitary cover. Backfill to top of trench. Include all other costs with the price of the chimney rebuild.

PROP. REPLACE FRAME/COVER & REBUILD CHIMNEY 0.4 VF
EX. Sanitary MH WA4005-013
EX. RIM - 111.80
PR. RIM - 111.44
Remove existing 0.3 VF chimney, add 0.4 VF of chimney using "Pro-Ring" adjusting rings only to bring manhole to proposed grade. No internal seal installation required. Salvage existing iron and internal seal for the City. New iron to be a City supplied Neenah R-1661-A frame with City supplied self sealing sanitary cover. Backfill to top of trench. Include all other costs with the price of the chimney rebuild.

PROP. REPLACE FRAME/COVER & REBUILD CHIMNEY 0.3 VF
EX. Sanitary MH WA4005-014
EX. RIM - 111.46
PR. RIM - 111.07
Remove existing 0.7 VF chimney, add 0.3 VF of chimney using "Pro-Ring" adjusting rings only to bring manhole to proposed grade. No internal seal installation required. Salvage existing iron and internal seal for the City. New iron to be a City supplied Neenah R-1661-A frame with City supplied self sealing sanitary cover. Backfill to top of trench. Include all other costs with the price of the chimney rebuild.

PROP. REPLACE FRAME/COVER & REBUILD CHIMNEY 0.3 VF
EX. Sanitary MH WA4005-125
EX. RIM - 111.61
PR. RIM - 110.76
Remove existing 0.3 VF chimney, add 0.3 VF of chimney using "Pro-Ring" adjusting rings only to bring manhole to proposed grade. No internal seal installation required. Salvage existing iron and internal seal for the City. New iron to be a City supplied Neenah R-1661-A frame with City supplied self sealing sanitary cover. Backfill to top of trench. Include all other costs with the price of the chimney rebuild.

PROP. REPLACE FRAME/COVER & REBUILD CHIMNEY 0.2 VF
EX. Sanitary MH WA4005-042
EX. RIM - 113.57
PR. RIM - 113.37
Remove existing 0.2 VF chimney, add 0.3 VF of chimney using "Pro-Ring" adjusting rings only to bring manhole to proposed grade. No internal seal installation required. Salvage existing iron and internal seal for the City. New iron to be a City supplied Neenah R-1661-A frame with City supplied self sealing sanitary cover. Backfill to top of trench. Include all other costs with the price of the chimney rebuild.



LEGEND

- FACTORY WYE CONNECTION. GROUT 15' UNLESS OTHERWISE NOTED
- TAP OR BREAK-IN CONNECTION. GROUT 15' UNLESS OTHERWISE NOTED
- MANHOLE CONNECTION. GROUT 30' UNLESS OTHERWISE NOTED
- RISER CONNECTION. GROUT 1.5' UNLESS OTHERWISE NOTED
- 8" - 110.8' (R) EX SANITARY SEWER - RELINED
- CLAY SANITARY SEWER TO BE LINED
- (R) REMOVAL OF ROOTS WHICH MAY IMPEDE GROUTING
- (D) REMOVAL OF CALCIUM WHICH MAY IMPEDE GROUTING IS REQUIRED PRIOR TO GROUTING OR CAPPING ACTIVITY
- (GLP) GLP - GROUT WITH LOWER PRESSURE. LATERAL CONNECTION SEALING FROM THE MAINLINE BY PACKER INJECTION USING 70% OF STANDARD GROUT PRESSURES

SCALE 0 50 100 FEET

The sanitary sewer repairs must be completed by the open-cut contractor prior to relining. **No** TV inspection of the sanitary sewer main by the open-cut contractor is required.

Underground utilities have been shown to a reasonable degree of accuracy using diggers hotline field locates and record drawings. However, the city does not guarantee their exact size, location or depth or that of others not shown. The contractor shall verify the existence of these utilities and those not shown. Costs for locating and delay shall be incidental to the contract.

DATE	DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

SANITARY SEWER RELINING
VARIOUS STREETS

FROM: EAST OF N 75TH ST
TO: N PERRY CT

CONTRACT: 26-07
FILE NO: 16-1006
DRAWN BY: WAT
CHECKED BY: MJA
SCALE: AS SHOWN

A02

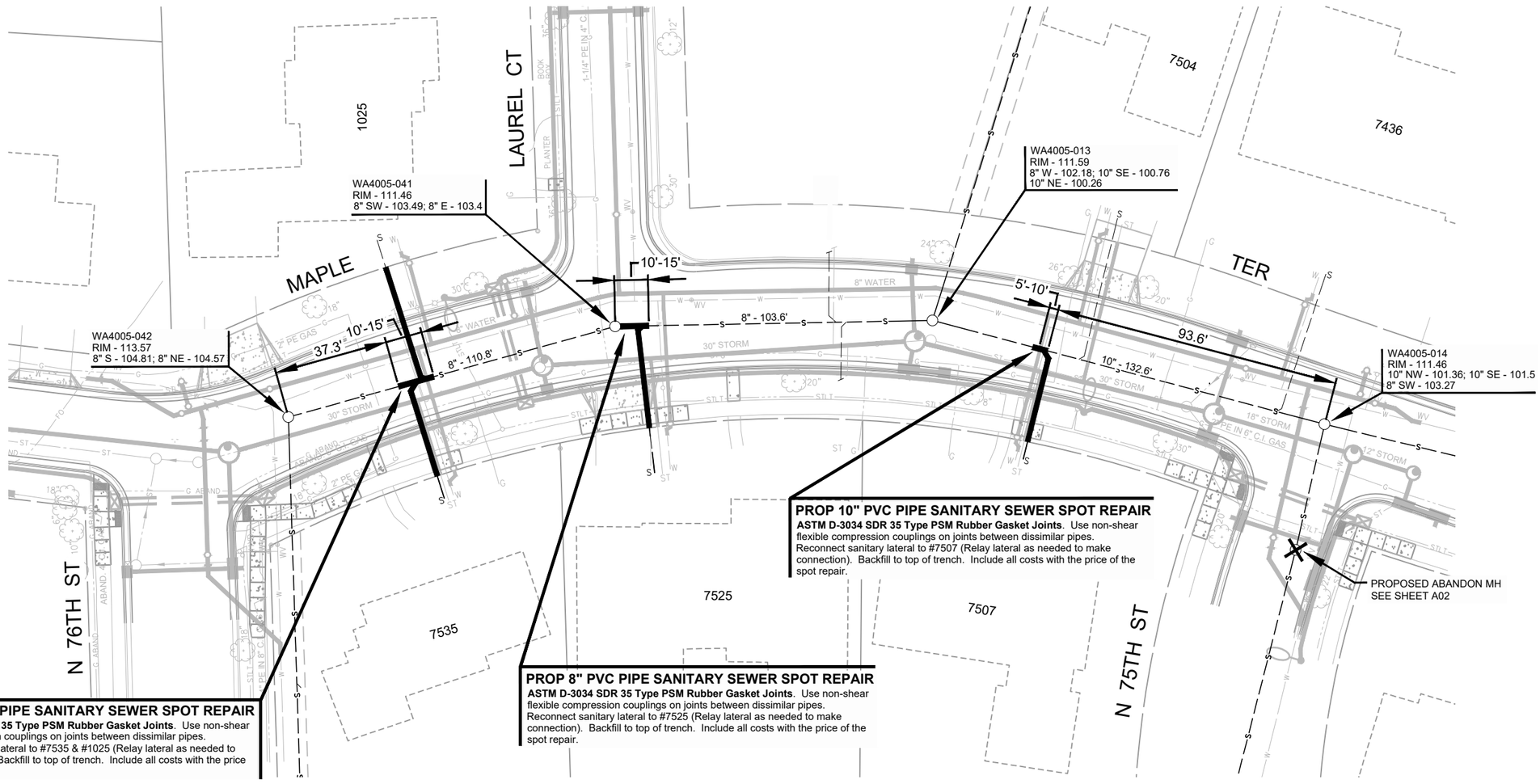
FILE NAME : S:\DEPARTMENT FOLDERS\ENGINEERING\ACAD_PROJECTS\26-07 PERRY CT\DESIGN\PERRY CT_SANITARY LINING.DWG PLOT DATE : 1/15/2026 12:24 PM PLOT BY : WTREU

PROP. EROSION CONTROL INLET BASKETS
Install in all the inlets and catch basins directly down-surface of all open-cut work or where required by the City Engineer prior to starting work. These inlets and catch basins have curb boxes. Inlet control must be removed when work is complete. Costs to be incidental to contract.

PROP. 6" PVC SANITARY LATERAL RELAY

Address	Length (L.F.)
7507	28.3'
7525	31.2'
7535	30.7'
1025	36.3'

Laterals shall be PVC ASTM D-3034 SDR35 with Type PSM Rubber Gasket Joints. Connect to existing lateral using appropriately sized Fernco Strongback RC-5000 coupling with concrete collar. Full depth saw cuts required. Standard Class "C" bedding. ***Mechanically compacted crushed concrete backfill***. Backfill to top of trench. Include all costs with the price of the sanitary lateral relay.



PROP 10" PVC PIPE SANITARY SEWER SPOT REPAIR
ASTM D-3034 SDR 35 Type PSM Rubber Gasket Joints. Use non-shear flexible compression couplings on joints between dissimilar pipes. Reconnect sanitary lateral to #7507 (Relay lateral as needed to make connection). Backfill to top of trench. Include all costs with the price of the spot repair.

PROP 8" PVC PIPE SANITARY SEWER SPOT REPAIR
ASTM D-3034 SDR 35 Type PSM Rubber Gasket Joints. Use non-shear flexible compression couplings on joints between dissimilar pipes. Reconnect sanitary lateral to #7525 (Relay lateral as needed to make connection). Backfill to top of trench. Include all costs with the price of the spot repair.

PROP 8" PVC PIPE SANITARY SEWER SPOT REPAIR
ASTM D-3034 SDR 35 Type PSM Rubber Gasket Joints. Use non-shear flexible compression couplings on joints between dissimilar pipes. Reconnect sanitary lateral to #7535 & #1025 (Relay lateral as needed to make connection). Backfill to top of trench. Include all costs with the price of the spot repair.

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The sanitary sewer repairs must be completed by the open-cut contractor prior to relining. **NO** TV inspection of the sanitary sewer main by the open-cut contractor is required.

SCALE
0 20 40
FEET

DATE	DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

SANITARY SEWER SPOT REPAIR DETAIL

MAPLE TER

FROM: N 76TH ST
TO: N 75TH ST

CONTRACT: 26-07
FILE NO: 16-1006
DRAWN BY: WAT
CHECKED BY: MJA
SCALE: AS SHOWN

A03

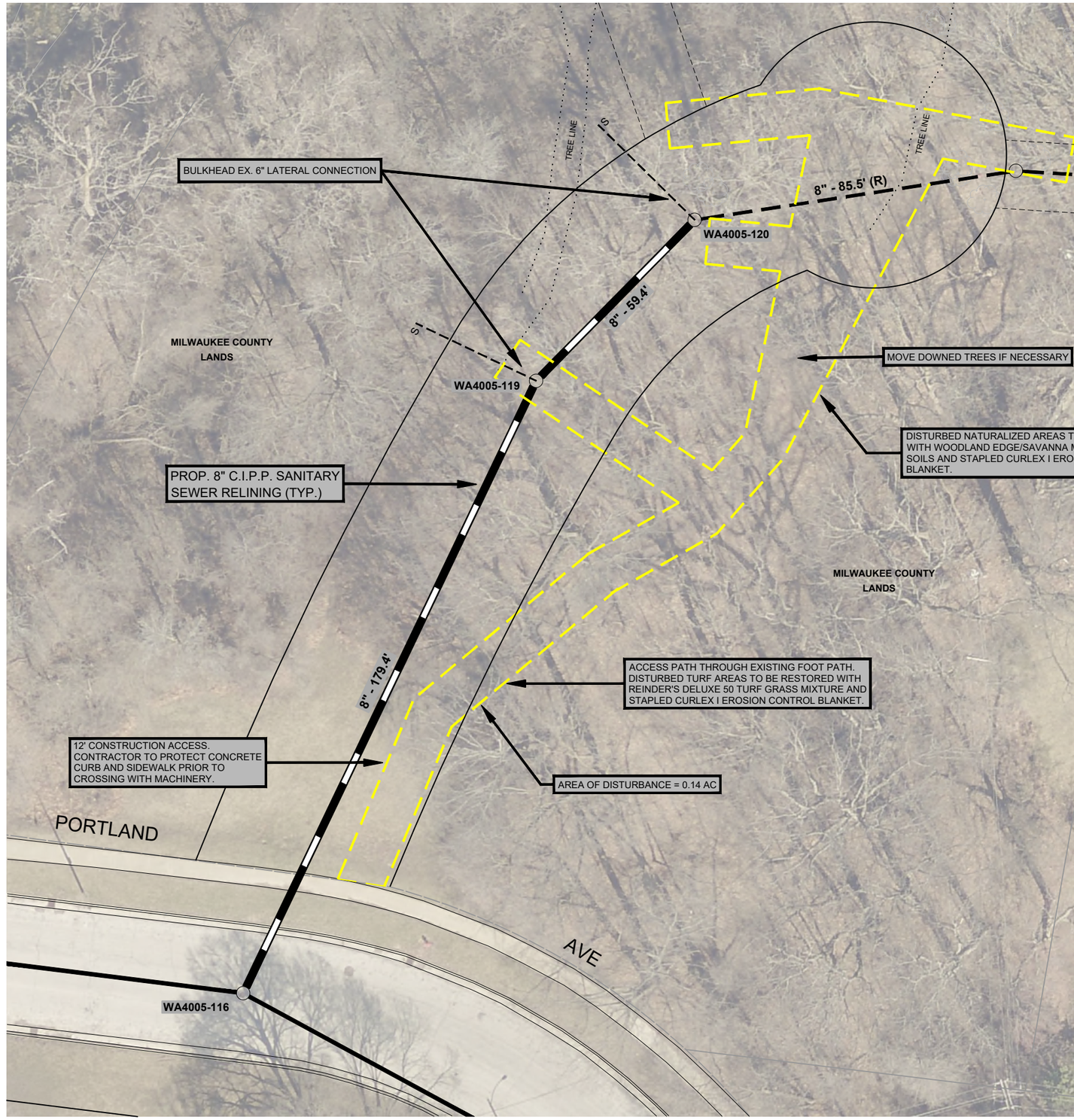
NOTE:

1. CONTRACTOR SHALL BE RESPONSIBLE FOR SITE INVESTIGATION, AT THEIR OWN EXPENSE, PRIOR TO SUBMITTING A BID FOR THIS CONTRACT. CONTRACTOR SHALL INCLUDE ANY COSTS ASSOCIATED WITH ACCESSING MH'S WA4005-119 & WA4005-120 DURING THE COURSE OF THE WORK IN THEIR BASE BID FOR THIS CONTRACT. THE CONTRACTOR SHALL NOT RECEIVE ANY EXTRA, CHANGE ORDER, OR OTHER ADDITIONAL COMPENSATION FOR PERFORMING WORK IN, AROUND, OR DUE TO MH'S WA4005-119 & WA4005-120.

2. CONTRACTOR SHALL BE RESPONSIBLE, AT THEIR OWN EXPENSE, FOR PRESERVING AND PROTECTING ALL MILWAUKEE COUNTY LAND IN OR ADJACENT TO CITY EASEMENTS, INCLUDING BUT NOT LIMITED TO TREES, SHRUBS, PATIOS, DRIVEWAYS, BUILDINGS AND ANY OTHER ITEMS OR VEGETATION OWNED BY MILWAUKEE COUNTY ADJACENT TO OR WITHIN THE EASEMENT. CONTRACTOR SHALL NOT DAMAGE, ADJUST OR MODIFY ANY MILWAUKEE COUNTY LANDS WITHOUT THE EXPRESS WRITTEN CONSENT OF MILWAUKEE COUNTY.

EX. SANITARY MANHOLES

MH#	DEPTH
WA4005-116	15.6'
WA4005-119	11.1'
WA4005-120	11.3'



SCALE
0 15 30
FEET

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DATE	DESCRIPTION

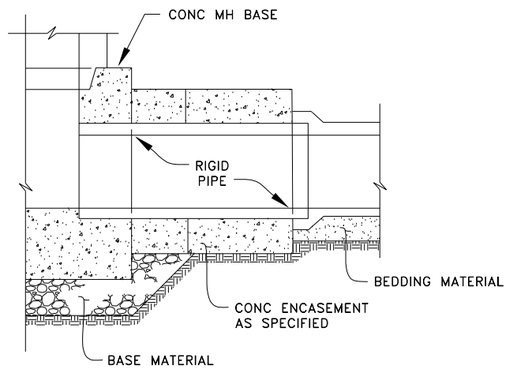
CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

SANITARY SEWER RELINING
IN EASEMENT
FROM: PORTLAND AVE
TO: 240'± N OF PORTLAND AVE

CONTRACT:	26-07
FILE NO:	16-1006
DRAWN BY:	WAT
CHECKED BY:	MJA
SCALE:	AS SHOWN

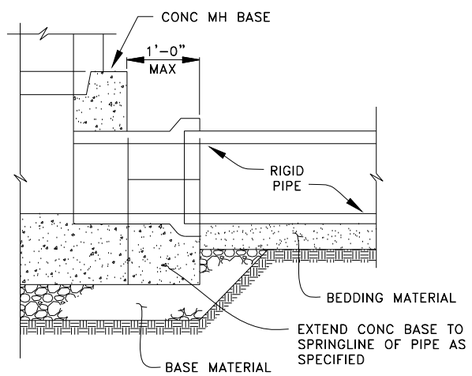
A04

FILE NAME : S:\DEPARTMENT FOLDERS\ENGINEERING\ACAD_PROJECTS\26-07 PERRY CT\DESIGN\PERRY CT_SANITARY LINING.DWG PLOT DATE : 1/15/2026 12:25 PM PLOT BY : WTREU



RIGID PIPE LAID UP TO CONCRETE MH

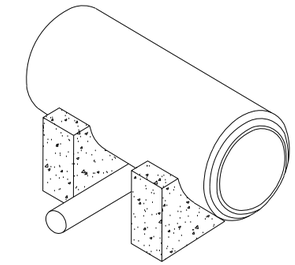
N.T.S.



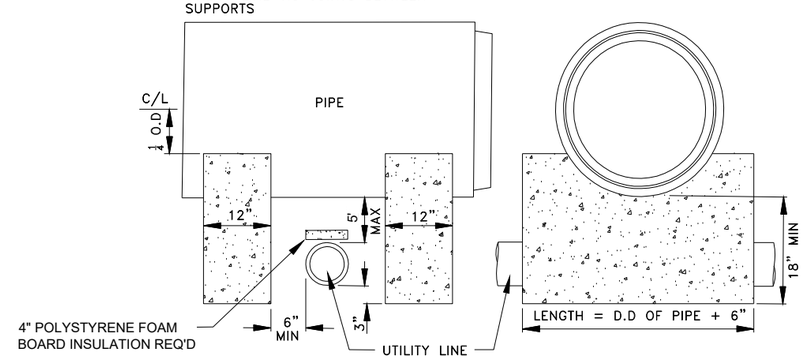
RIGID PIPE LAID OUT OF CONCRETE MH

N.T.S.

PIPE SUPPORTS SHALL BE INSTALLED FOR SEWERS OVER 10" IN DIAMETER WHEN CLEARANCE BETWEEN BOTTOM OF PIPE & TOP OF UTILITY LINE IS 12" OR LESS

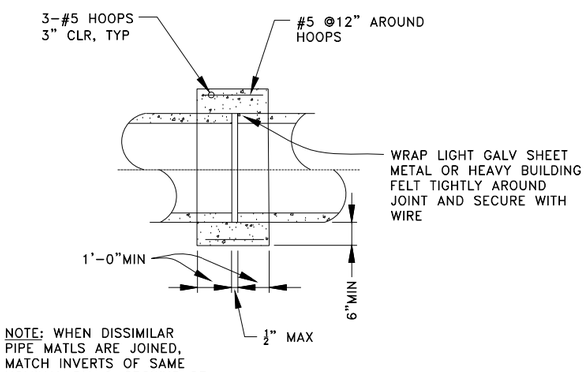


FOR NEW INSTALLATIONS CENTER 1 FULL LENGTH OF PIPE OVER UTILITY LINE–NO JOINTS BETWEEN SUPPORTS



STANDARD CONCRETE SUPPORT COLUMN

N.T.S.



NOTE: WHEN DISSIMILAR PIPE MATLS ARE JOINED, MATCH INVERTS OF SAME NOMINAL DIA & CROWNS OF DIFFERENT DIAMETERS

CONCRETE CLOSURE COLLAR

N.T.S.

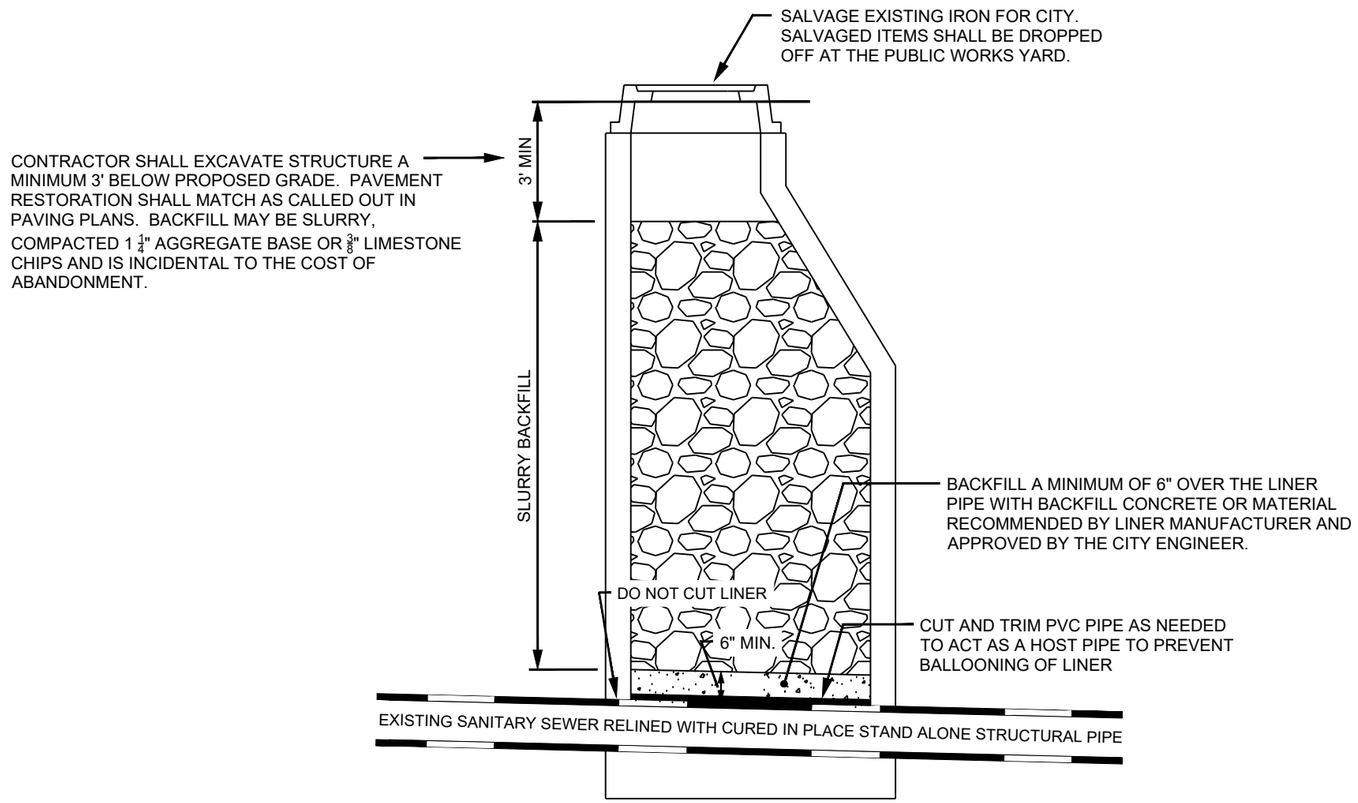
DATE	DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

SANITARY SEWER DETAILS

CONTRACT: 26-07
FILE NO.:
DRAWN BY: C.R.
CHECKED BY:
SCALE: AS SHOWN

A05



ABANDON SANITARY MANHOLE BY FILLING AFTER RELINING

DATE	DESCRIPTION

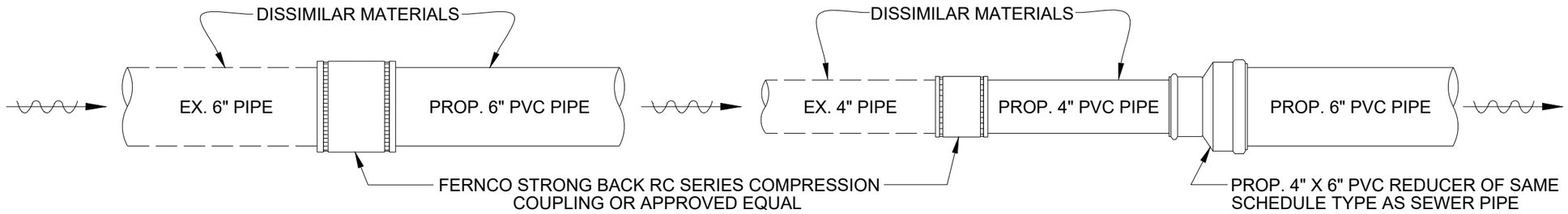
CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

SANITARY SEWER DETAILS

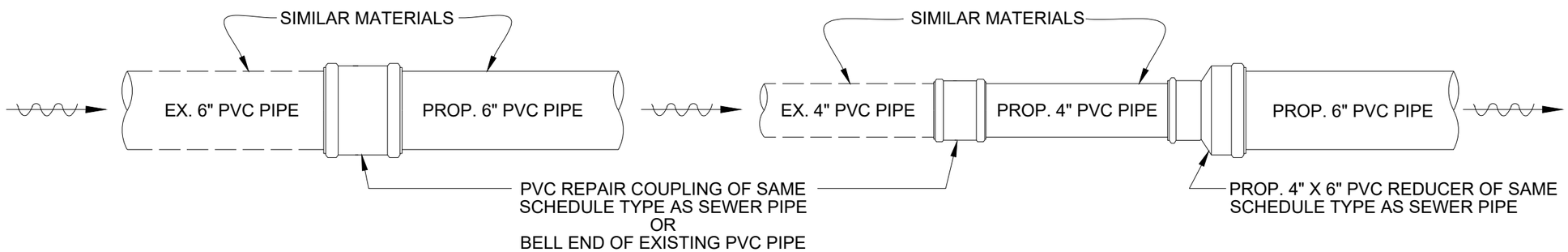
CONTRACT: 26-07
FILE NO: 16-1006
DRAWN BY: WAT
CHECKED BY: MJA
SCALE: NTS

A06

If pipes are dissimilar use Fernco Strong Back RC Series compression coupling or approved equal.



If pipes are similar PVC material use PVC repair coupling of same schedule type as sewer pipe.



DATE	DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

SANITARY SEWER DETAILS

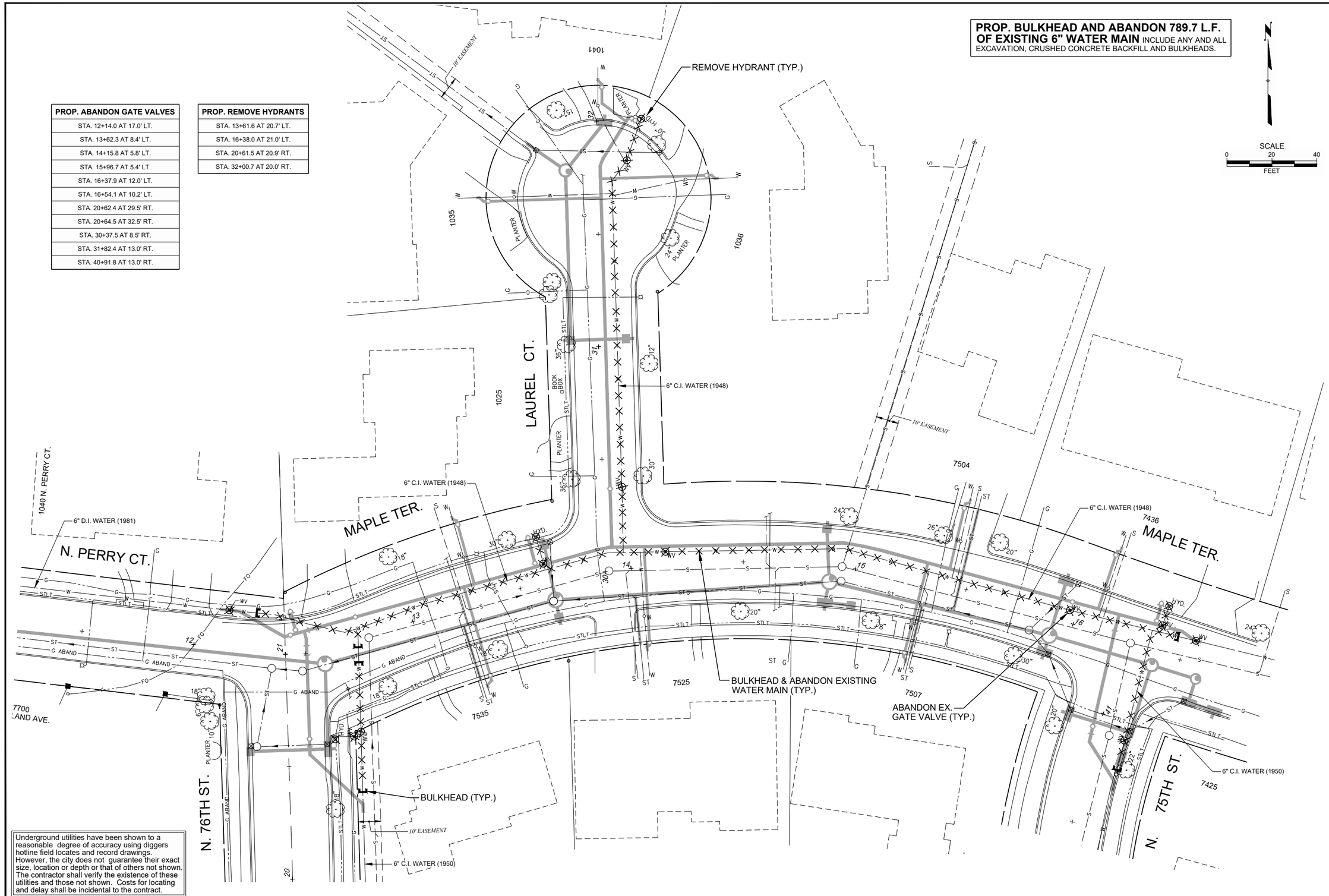
CONTRACT: 26-07
FILE NO:
DRAWN BY: C.R.
CHECKED BY:
SCALE: AS SHOWN

A07

PROP. BULKHEAD AND ABANDON 789.7 L.F. OF EXISTING 6" WATER MAIN INCLUDE ANY AND ALL EXCAVATION, CRUSHED CONCRETE BACKFILL AND BULKHEADS.

PROP. ABANDON GATE VALVES
STA. 12+14.0 AT 17.0' LT.
STA. 13+62.3 AT 8.4' LT.
STA. 14+15.8 AT 5.8' LT.
STA. 15+96.7 AT 5.4' LT.
STA. 16+37.9 AT 12.0' LT.
STA. 16+54.1 AT 10.2' LT.
STA. 20+62.4 AT 29.5' RT.
STA. 20+64.5 AT 32.5' RT.
STA. 30+37.5 AT 8.5' RT.
STA. 31+82.4 AT 13.0' RT.
STA. 40+91.8 AT 13.0' RT.

PROP. REMOVE HYDRANTS
STA. 13+61.6 AT 20.7' LT.
STA. 16+38.0 AT 21.0' LT.
STA. 20+61.5 AT 20.9' RT.
STA. 32+00.7 AT 20.0' RT.



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DATE	DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

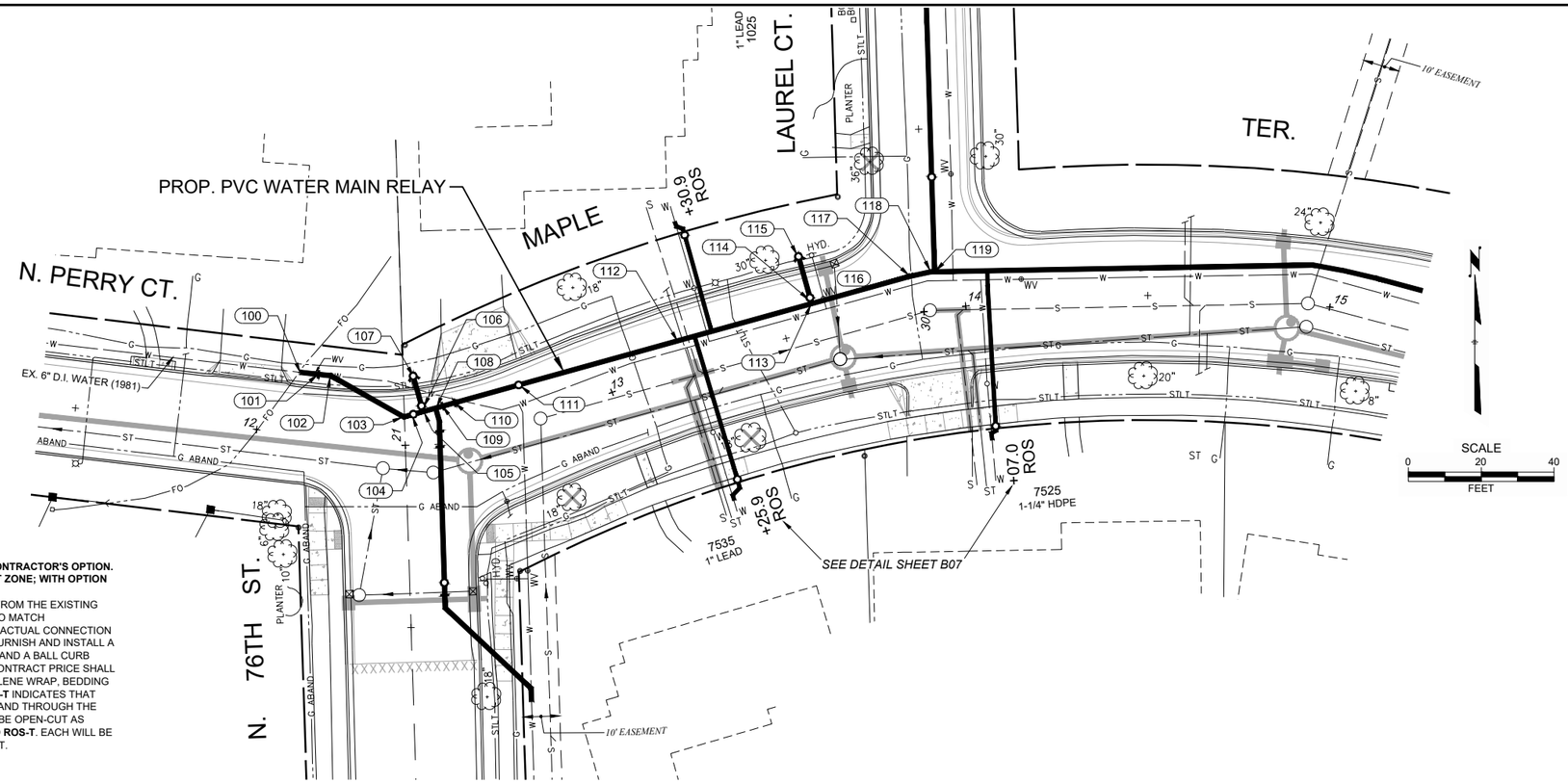
WATER MAIN REMOVALS & ABANDONMENT

N. 75TH ST., N. 76TH ST., LAUREL CT., MAPLE TER. & N. PERRY CT.

CONTRACT:	26-07
FILE NO:	30-821
DRAWN BY:	C.R.
CHECKED BY:	M.M.
SCALE:	AS SHOWN

B01

FILE NAME : S:\DEPARTMENT FOLDERS\ENGINEERING\ACAD_PROJECTS\26-07 PERRY CT\DESIGN\PERRY CT WATER REMOVALS.DWG PLOT DATE : 1/15/2026 2:26 PM PLOT BY : C.R.

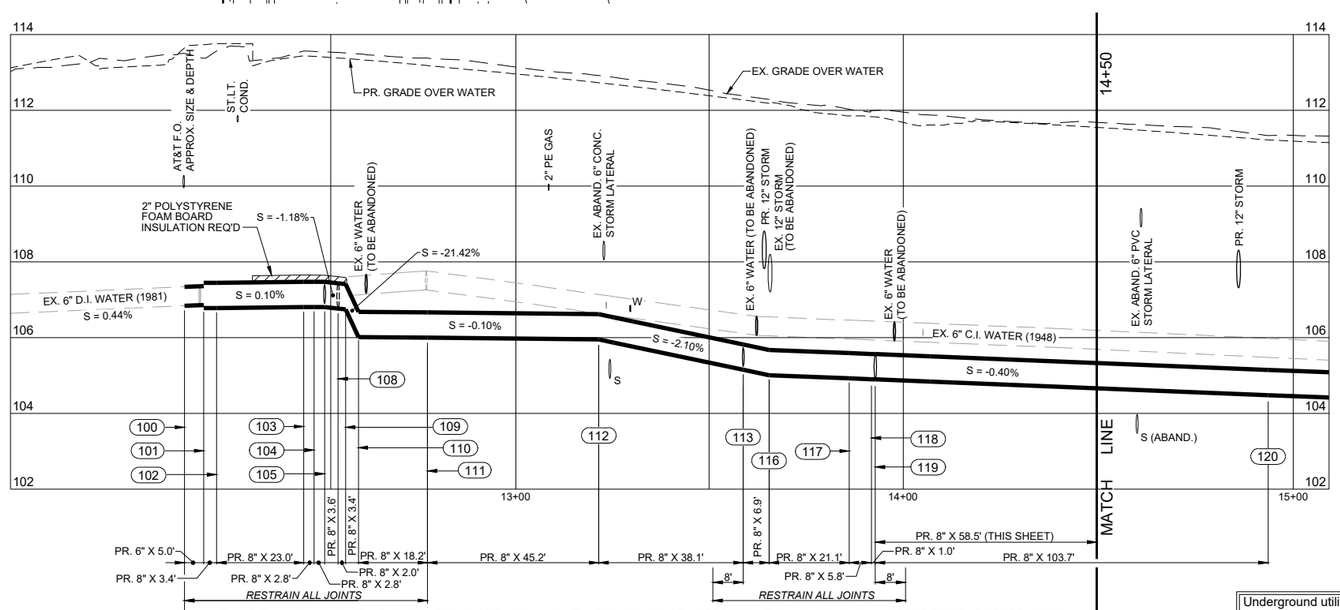


REPLACE (ROS) & (ROS-T), ORIGINAL TAP SERVICE

ROS: REPLACE ORIGINAL TAP SERVICE BY OPEN-CUT OR TRENCHLESS METHOD; THIS SHALL BE THE CONTRACTOR'S OPTION.
ROS-T: REPLACE ORIGINAL TAP SERVICE BY USING A *TRENCHLESS METHOD*, THROUGH THE TREE ROOT ZONE; WITH OPTION TO OPEN-CUT REMAINDER.

THE CONTRACTOR SHALL EXTEND NEW HIGH-DENSITY POLYETHYLENE, HDPE SDR 9 (CTS) AWWA C-901 FROM THE EXISTING MAIN TO THE EXISTING SERVICE AS SHOWN. **ROS** AND **ROS-T** SHALL BE A MINIMUM OF 1¼" OR LARGER TO MATCH EXISTING. THE STATION SHOWN ON THE PLAN IS THE PROPOSED LOCATION OF THE SERVICE RUN -- THE ACTUAL CONNECTION TO THE NEW MAIN WILL BE TO EITHER SIDE. THE CONTRACTOR SHALL MAKE THE WET TAP AND SHALL FURNISH AND INSTALL A SMITH-BLAIR 372 (STAINLESS STEEL FOR PVC) SERVICE SADDLE; A BALL CORPORATION STOP; FITTINGS; AND A BALL CURB STOP, A "MINNEAPOLIS PATTERN" CURB STOP BOX (FORD: EM2-65-56 OR A.Y. MCDONALD: 5614A). THE CONTRACT PRICE SHALL INCLUDE ALL COSTS FOR EXCAVATION, ABANDONING THE EXISTING CURB STOP, MATERIALS, POLYETHYLENE WRAP, BEDDING AND ***MECHANICALLY COMPACTED CRUSHED CONCRETE BACKFILL.*** BACKFILL TO TOP OF TRENCH. **ROS-T** INDICATES THAT THE SERVICE SHALL BE INSTALLED BY A TRENCHLESS METHOD, SUCH AS AUGURING BEHIND THE CURB AND THROUGH THE TREE ROOT ZONE (AS DEFINED BY THE TREE DRIP LINE); CURB STOP AND RECONNECTION POINT SHALL BE OPEN-CUT AS NEEDED. INCLUDE THE COSTS OF ANY TREE AND SCRUB REMOVAL. SEPARATE PAYMENTS FOR **ROS** AND **ROS-T**. EACH WILL BE PAID PER L.F. ANY TEMPORARY WATER TO EXISTING SERVICES, SHALL BE INCIDENTAL TO THE CONTRACT.

#	Description	Location	Top of Prop. Main
100	PROP.6" CUT-IN CONNECTION WITH SLEEVE	12+10.0 AT 17.0' LT.	107.34
101	PROP. 8" X 6" MJ REDUCER	12+15.0 AT 17.0' LT.	107.44
102	PROP. 8" X 22-1/2° MJ BEND	12+18.4 AT 17.0' LT.	107.45
103	PROP. 8" X 45° MJ BEND	12+40.4 AT 7.7' LT.	107.47
104	PROP. 8" MJ/RW GATE VALVE	12+43.3 AT 8.5' LT.	107.47
105	PROP. 8" X 6" MJ HYDRANT ANCHOR TEE & GRADE BREAK	12+46.2 AT 9.2' LT.	107.48
106	PROP. 6" MJ R/W GATE VALVE (HUNG ON TEE -- TEMPORARY PLUG DURING TESTING)	12+46.0 AT 9.9' LT.	107.42
107	PROP. HYDRANT #1 7.0' BURY DEPTH -- CL SHOE - 107.35 (INSTALL AFTER TESTING AND SAFE SAMPLE)	12+43.3 AT 18.9' LT.	107.60
108	PROP. 8" X 8" MJ TEE	12+50.0 AT 9.9' LT.	107.43
109	PROP. 8" X 11-1/4° MJ VERT. BEND	12+52.2 AT 10.3' LT.	107.41
110	PROP. 8" X 11-1/4° MJ VERT. BEND	12+56.0 AT 10.8' LT.	106.68
111	PROP. 8" MJ R/W GATE VALVE	12+76.5 AT 11.4' LT.	106.66
112	PROP. GRADE BREAK	13+21.4 AT 7.4' LT.	106.62
113	PROP. 8" X 6" MJ HYDRANT ANCHOR TEE	13+58.8 AT 7.7' LT.	105.82
114	PROP. 6" MJ R/W GATE VALVE (HUNG ON TEE)	13+58.8 AT 8.5' LT.	105.74
115	PROP. HYDRANT #2 7.0' BURY DEPTH -- CL SHOE - 107.39	13+58.2 AT 21.1' LT.	105.64
116	PROP. GRADE BREAK	13+65.5 AT 8.2' LT.	105.68
117	PROP. 3.3° HORIZ. BEND USING A 8" PVC HIGH DEFLECTION COUPLING	13+86.1 AT 10.2' LT.	105.59
118	PROP. 8" X 11-1/4° MJ-PE BEND	13+91.8 AT 10.6' LT.	105.57
119	PROP. 8" X 8" MJ TEE	13+92.8 AT 10.4' LT.	105.56



PROP. 235.8 L.F. OF 8" OF AND 28.5 L.F. OF 6" PVC AWWA C900-16 DR-18 WATER MAIN AND RESTRAINED HYDRANT LEAD RELAY RUBBER GASKET PUSH-ON JOINTS. FULL DEPTH SAWCUTS REQUIRED.

POLYETHYLENE ENVELOPE FOR FITTINGS. 3/8" LIMESTONE CHIP BEDDING & COVER. ***MECHANICALLY COMPACTED CRUSHED CONCRETE BACKFILL.*** BACKFILL TO TOP OF TRENCH. INCLUDE ALL COSTS WITH THE PRICE OF WATER MAIN RELAY. ANY TEMPORARY WATER TO EXISTING SERVICES, SHALL BE INCIDENTAL TO THE CONTRACT.

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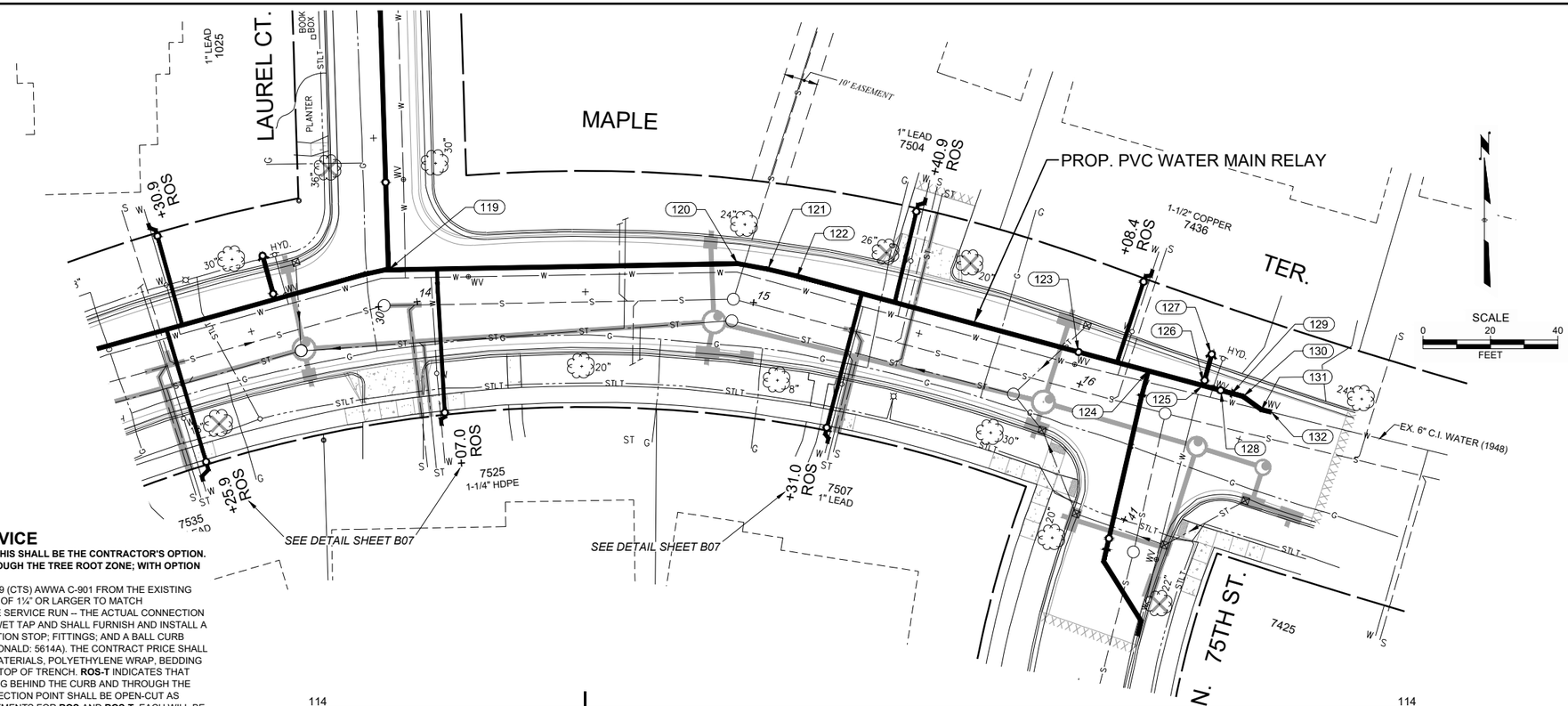
DATE	DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

WATER MAIN RELAY
MAPLE TER.
FROM: N. 76TH ST. TO: N. 75TH ST.

CONTRACT: 26-07
FILE NO: 30-821
DRAWN BY: C.R.
CHECKED BY: M.M.
SCALE: AS SHOWN

B02

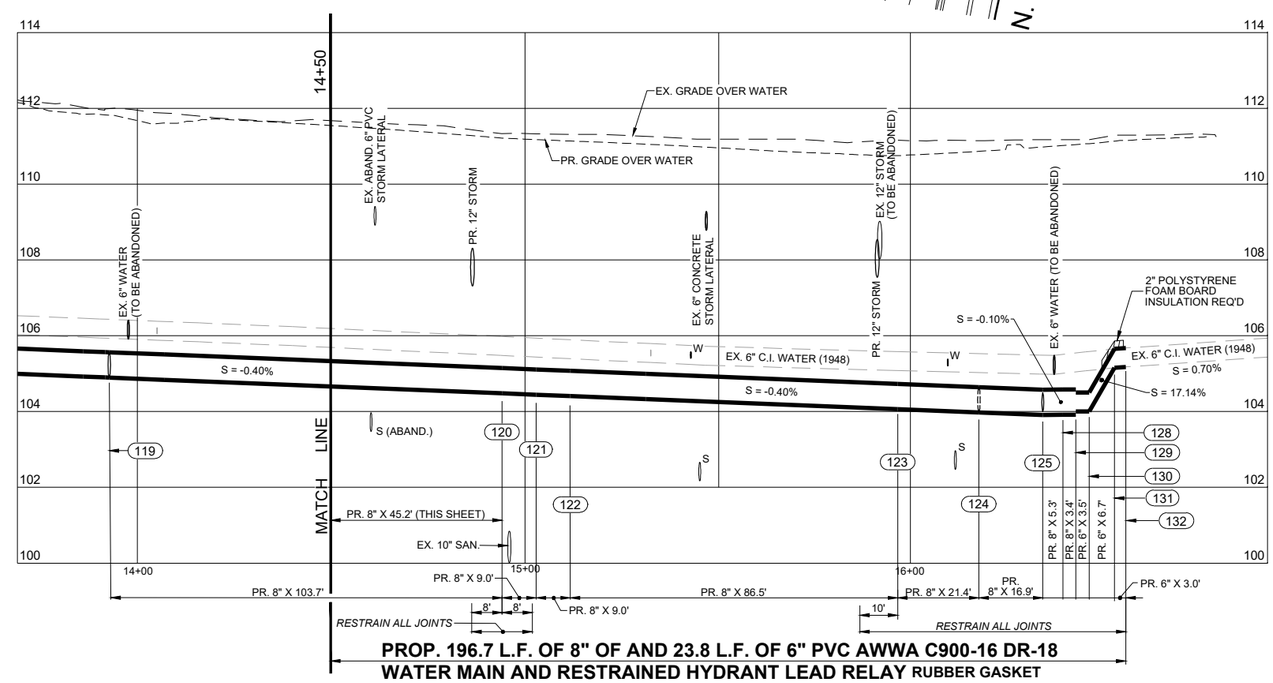


REPLACE (ROS) & (ROS-T), ORIGINAL TAP SERVICE

ROS: REPLACE ORIGINAL TAP SERVICE BY OPEN-CUT OR TRENCHLESS METHOD; THIS SHALL BE THE CONTRACTOR'S OPTION.
ROS-T: REPLACE ORIGINAL TAP SERVICE BY USING A *TRENCHLESS METHOD*, THROUGH THE TREE ROOT ZONE; WITH OPTION TO OPEN-CUT REMAINDER.

THE CONTRACTOR SHALL EXTEND NEW HIGH-DENSITY POLYETHYLENE, HDPE SDR 9 (CTS) AWWA C-901 FROM THE EXISTING MAIN TO THE EXISTING SERVICE AS SHOWN. **ROS** AND **ROS-T** SHALL BE A MINIMUM OF 1¼" OR LARGER TO MATCH EXISTING. THE STATION SHOWN ON THE PLAN IS THE PROPOSED LOCATION OF THE SERVICE RUN -- THE ACTUAL CONNECTION TO THE NEW MAIN WILL BE TO EITHER SIDE. THE CONTRACTOR SHALL MAKE THE WET TAP AND SHALL FURNISH AND INSTALL A SMITH-BLAIR 372 (STAINLESS STEEL FOR PVC) SERVICE SADDLE; A BALL CORPORATION STOP; FITTINGS; AND A BALL CURB STOP, A "MINNEAPOLIS PATTERN" CURB STOP BOX (FORD: EM2-65-56 OR A.Y. MCDONALD: 5614A). THE CONTRACT PRICE SHALL INCLUDE ALL COSTS FOR EXCAVATION, ABANDONING THE EXISTING CURB STOP, MATERIALS, POLYETHYLENE WRAP, BEDDING AND ***MECHANICALLY COMPACTED CRUSHED CONCRETE BACKFILL.*** BACKFILL TO TOP OF TRENCH. **ROS-T** INDICATES THAT THE SERVICE SHALL BE INSTALLED BY A TRENCHLESS METHOD, SUCH AS AUGURING BEHIND THE CURB AND THROUGH THE TREE ROOT ZONE (AS DEFINED BY THE TREE DRIP LINE); CURB STOP AND RECONNECTION POINT SHALL BE OPEN-CUT AS NEEDED. INCLUDE THE COSTS OF ANY TREE AND SCRUB REMOVAL. SEPARATE PAYMENTS FOR **ROS** AND **ROS-T**. EACH WILL BE PAID PER L.F. ANY TEMPORARY WATER TO EXISTING SERVICES, SHALL BE INCIDENTAL TO THE CONTRACT.

#	Description	Location	Top of Prop. Main
120	PROP. 8" X 11-1/4° MJ BEND	14+94.1 AT 10.9' LT.	105.15
121	PROP. 3.0° HORIZ. BEND USING A 8" PVC HIGH DEFLECTION COUPLING	15+02.9 AT 10.4' LT.	105.11
122	1.9° HORIZ. DEFLECTION POINT	15+11.6 AT 9.6' LT.	105.08
123	PROP. 8" MJ R/W GATE VALVE	15+96.4 AT 8.8' LT.	104.73
124	PROP. 8" X 8" MJ TEE	16+17.9 AT 10.5' LT.	104.64
125	PROP. 8" X 6" MJ HYDRANT ANCHOR TEE & GRADE BREAK	16+34.8 AT 11.7' LT.	104.58
126	PROP. 6" MJ R/W GATE VALVE (HUNG ON TEE)	16+34.8 AT 12.4' LT.	104.51
127	PROP. HYDRANT #3 7.5' BURY DEPTH -- CL SHOE - 104.43	16+34.2 AT 21.3' LT.	104.68
128	PROP. 8" MJ R/W GATE VALVE	16+40.2 AT 12.0' LT.	104.58
129	PROP. 8" X 6" MJ REDUCER	16+43.6 AT 12.2' LT.	104.50
130	PROP. 6" X 22-1/2° MJ BEND & GRADE BREAK	16+47.1 AT 12.4' LT.	104.51
131	PROP. 6" X 22-1/2° MJ BEND & GRADE BREAK	16+53.6 AT 10.4' LT.	105.65
132	PROP.6" CUT-IN CONNECTION WITH DUAL PURPOSE SLEEVE	16+56.6 AT 10.6' LT.	105.68



PROP. 196.7 L.F. OF 8" OF AND 23.8 L.F. OF 6" PVC AWWA C900-16 DR-18 WATER MAIN AND RESTRAINED HYDRANT LEAD RELAY RUBBER GASKET

PUSH-ON JOINTS. FULL DEPTH SAWCUTS REQUIRED. POLYETHYLENE ENVELOPE FOR FITTINGS. 3/8" LIMESTONE CHIP BEDDING & COVER. ***MECHANICALLY COMPACTED CRUSHED CONCRETE BACKFILL.*** BACKFILL TO TOP OF TRENCH. INCLUDE ALL COSTS WITH THE PRICE OF WATER MAIN RELAY. ANY TEMPORARY WATER TO EXISTING SERVICES, SHALL BE INCIDENTAL TO THE CONTRACT.

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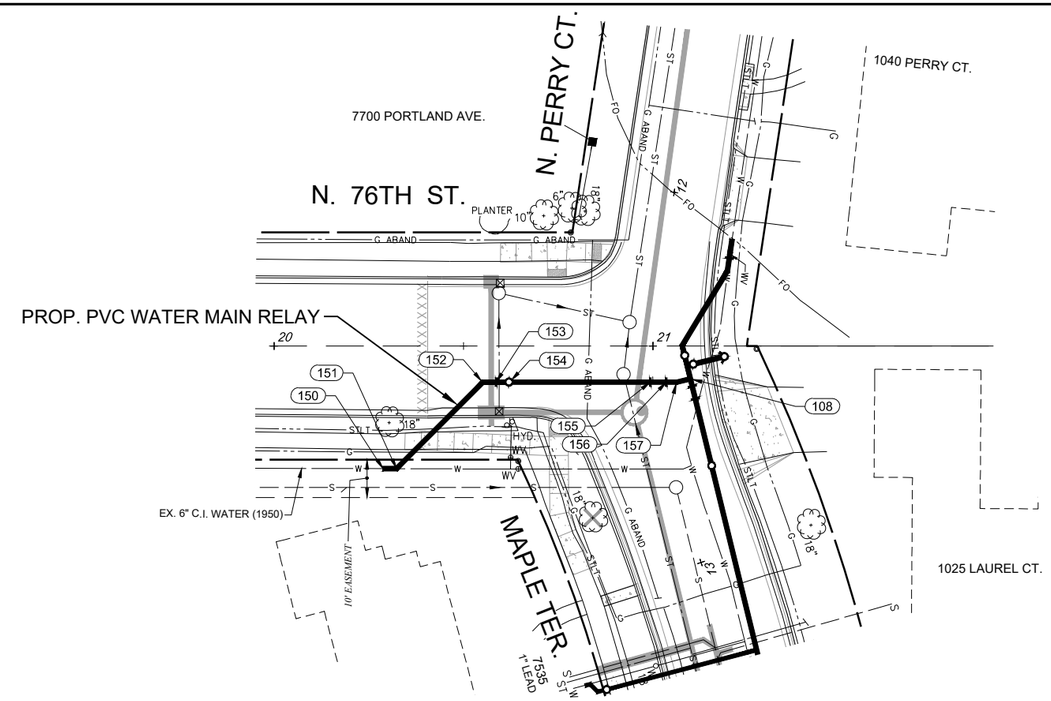
DATE	DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

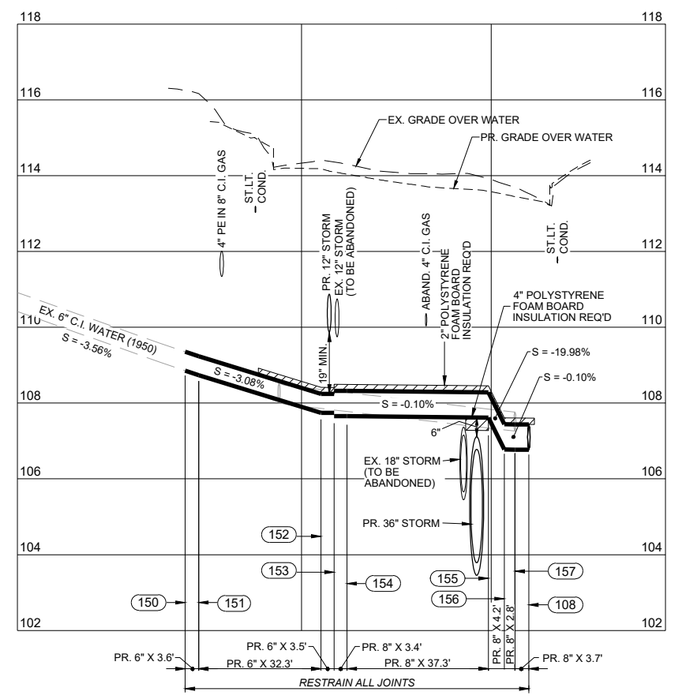
WATER MAIN RELAY
MAPLE TER.
TO: N. 75TH ST.
FROM: N. 76TH ST.

CONTRACT: 26-07
FILE NO: 30-821
DRAWN BY: C.R.
CHECKED BY: M.M.
SCALE: AS SHOWN

B03



#	Description	Location	Top of Prop. Main
108	PROP. 8" X 8" MJ TEE	12+50.0 AT 9.9' LT.	107.43
150	PROP. 6" CUT-IN CONNECTION WITH DUAL PURPOSE SLEEVE	20+28.7 AT 32.3' RT.	109.36
151	PROP. 6" X 45° MJ BEND & GRADE BREAK	20+32.3 AT 32.3' RT.	109.24
152	PROP. 6" X 45° MJ BEND & GRADE BREAK	20+55.1 AT 9.5' RT.	108.24
153	PROP. 8" X 6" MJ REDUCER	20+58.6 AT 9.5' RT.	108.32
154	PROP. 8" MJ/RW GATE VALVE	20+62.0 AT 9.5' RT.	108.32
155	PROP. 8" X 11-1/4° MJ VERT. BEND	12+50.5 AT 0.7' RT.	108.28
156	PROP. 8" X 11-1/4° MJ VERT. BEND	12+50.7 AT 3.5' LT.	107.44
157	PROP. 8" X 11-1/4° MJ BEND	12+50.8 AT 6.3' LT.	107.44



PROP. 51.4 L.F. OF 8" OF AND 39.4 L.F. OF 6" PVC AWWA C900-16 DR-18 WATER MAIN RELAY

RUBBER GASKET PUSH-ON JOINTS. FULL DEPTH SAWCUTS REQUIRED. POLYETHYLENE ENVELOPE FOR FITTINGS. 3/8" LIMESTONE CHIP BEDDING & COVER. ***MECHANICALLY COMPACTED CRUSHED CONCRETE BACKFILL.*** BACKFILL TO TOP OF TRENCH. INCLUDE ALL COSTS WITH THE PRICE OF WATER MAIN RELAY. ANY TEMPORARY WATER TO EXISTING SERVICES, SHALL BE INCIDENTAL TO THE CONTRACT.

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DATE | DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

WATER MAIN RELAY

MAPLE TER.

FROM: N. 76TH ST.
TO: N. 75TH ST.

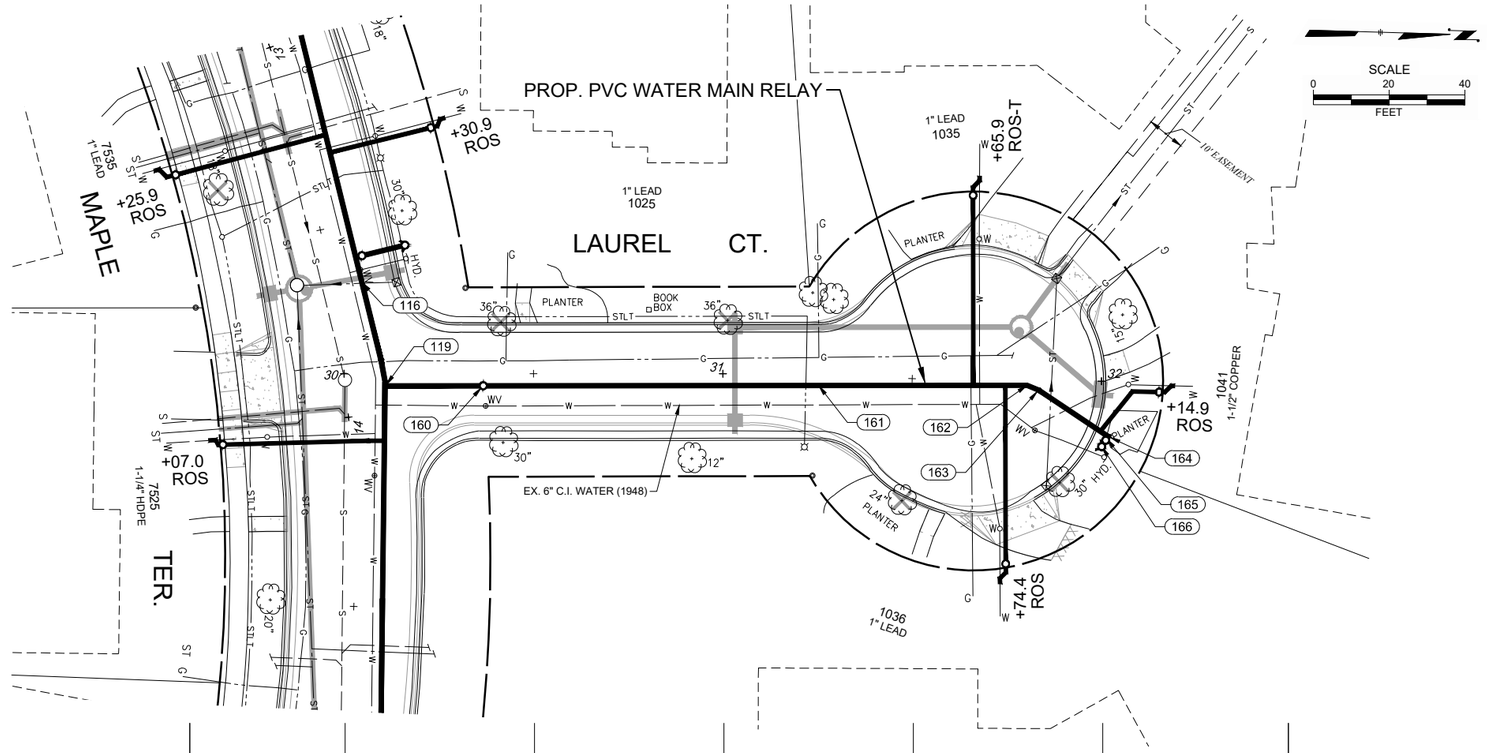
CONTRACT: 26-07
FILE NO: 30-821
DRAWN BY: C.R.
CHECKED BY: M.M.
SCALE: AS SHOWN

B04

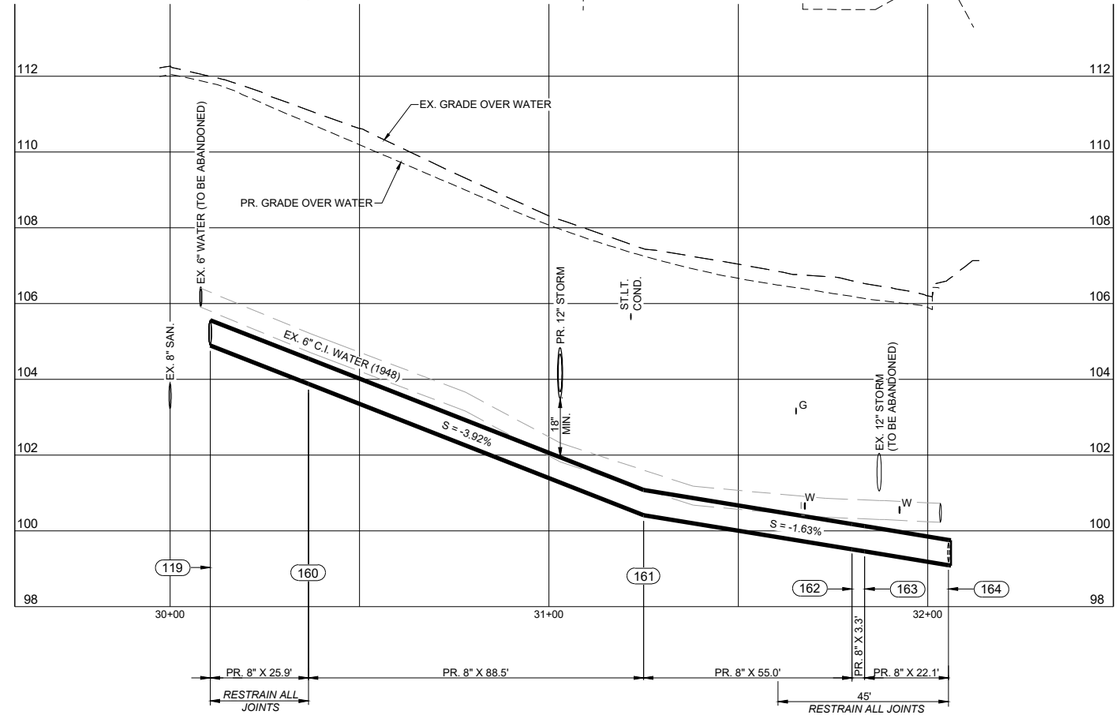
REPLACE (ROS) & (ROS-T), ORIGINAL TAP SERVICE

ROS: REPLACE ORIGINAL TAP SERVICE BY OPEN-CUT OR TRENCHLESS METHOD; THIS SHALL BE THE CONTRACTOR'S OPTION.
ROS-T: REPLACE ORIGINAL TAP SERVICE BY USING A *TRENCHLESS METHOD*, THROUGH THE TREE ROOT ZONE; WITH OPTION TO OPEN-CUT REMAINDER.

THE CONTRACTOR SHALL EXTEND NEW HIGH-DENSITY POLYETHYLENE, HDPE SDR 9 (CTS) AWWA C-901 FROM THE EXISTING MAIN TO THE EXISTING SERVICE AS SHOWN. **ROS** AND **ROS-T** SHALL BE A MINIMUM OF 1¼" OR LARGER TO MATCH EXISTING. THE STATION SHOWN ON THE PLAN IS THE PROPOSED LOCATION OF THE SERVICE RUN -- THE ACTUAL CONNECTION TO THE NEW MAIN WILL BE TO EITHER SIDE. THE CONTRACTOR SHALL MAKE THE WET TAP AND SHALL FURNISH AND INSTALL A SMITH-BLAIR 372 (STAINLESS STEEL FOR PVC) SERVICE SADDLE; A BALL CORPORATION STOP; FITTINGS; AND A BALL CURB STOP, A "MINNEAPOLIS PATTERN" CURB STOP BOX (FORD: EM2-65-56 OR A.Y. MCDONALD: 5614A). THE CONTRACT PRICE SHALL INCLUDE ALL COSTS FOR EXCAVATION, ABANDONING THE EXISTING CURB STOP, MATERIALS, POLYETHYLENE WRAP, BEDDING AND ***MECHANICALLY COMPACTED CRUSHED CONCRETE BACKFILL.*** BACKFILL TO TOP OF TRENCH. **ROS-T** INDICATES THAT THE SERVICE SHALL BE INSTALLED BY A TRENCHLESS METHOD, SUCH AS AUGURING BEHIND THE CURB AND THROUGH THE TREE ROOT ZONE (AS DEFINED BY THE TREE DRIP LINE); CURB STOP AND RECONNECTION POINT SHALL BE OPEN-CUT AS NEEDED. INCLUDE THE COSTS OF ANY TREE AND SCRUB REMOVAL. SEPARATE PAYMENTS FOR **ROS** AND **ROS-T**. EACH WILL BE PAID PER L.F. ANY TEMPORARY WATER TO EXISTING SERVICES, SHALL BE INCIDENTAL TO THE CONTRACT.



#	Description	Location	Top of Prop. Main
119	PROP. 8" X 8" MJ TEE	13+92.8 AT 10.4' LT.	105.56
160	PROP. 8" MJ R/W GATE VALVE & GRADE BREAK	13+95.3 AT 36.2' LT.	104.55
161	PROP.GRADE BREAK	31+25.4 AT 2.9' RT.	101.08
162	PROP. 8" X 22-1/2° MJ BEND	31+80.3 AT 1.1' RT.	100.18
163	PROP. 8" X 11-1/4° MJ BEND	31+83.4 AT 2.3' RT.	100.13
164	PROP. 8" X 6" MJ HYDRANT ANCHOR TEE WITH PLUG & BUTTRESS TO NORTHEAST	32+01.8 AT 14.6' RT.	99.76
165	PROP. 6" MJ R/W GATE VALVE (HUNG ON TEE)	32+01.4 AT 15.2' RT.	99.69
166	PROP. HYDRANT #4 7.5' BURY DEPTH -- CL SHOE - 99.48	32+00.1 AT 17.3' RT.	99.73



PROP. 194.9 L.F. OF 8" OF AND 3.2 L.F. OF 6" PVC AWWA C900-16 DR-18 WATER MAIN AND RESTRAINED HYDRANT LEAD RELAY

RUBBER GASKET PUSH-ON JOINTS. FULL DEPTH SAWCUTS REQUIRED. POLYETHYLENE ENVELOPE FOR FITTINGS. 3/8" LIMESTONE CHIP BEDDING & COVER. ***MECHANICALLY COMPACTED CRUSHED CONCRETE BACKFILL***. BACKFILL TO TOP OF TRENCH. INCLUDE ALL COSTS WITH THE PRICE OF WATER MAIN RELAY. ANY TEMPORARY WATER TO EXISTING SERVICES, SHALL BE INCIDENTAL TO THE CONTRACT.

Underground utilities have been shown to a reasonable degree of accuracy using diggers hotline field locates and record drawings. However, the city does not guarantee their exact size, location or depth or that of others not shown. The contractor shall verify the existence of these utilities and those not shown. Costs for locating and delay shall be incidental to the contract.

DATE	DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

WATER MAIN RELAY
LAUREL CT.

FROM: MAPLE TER.
TO: NORTH END

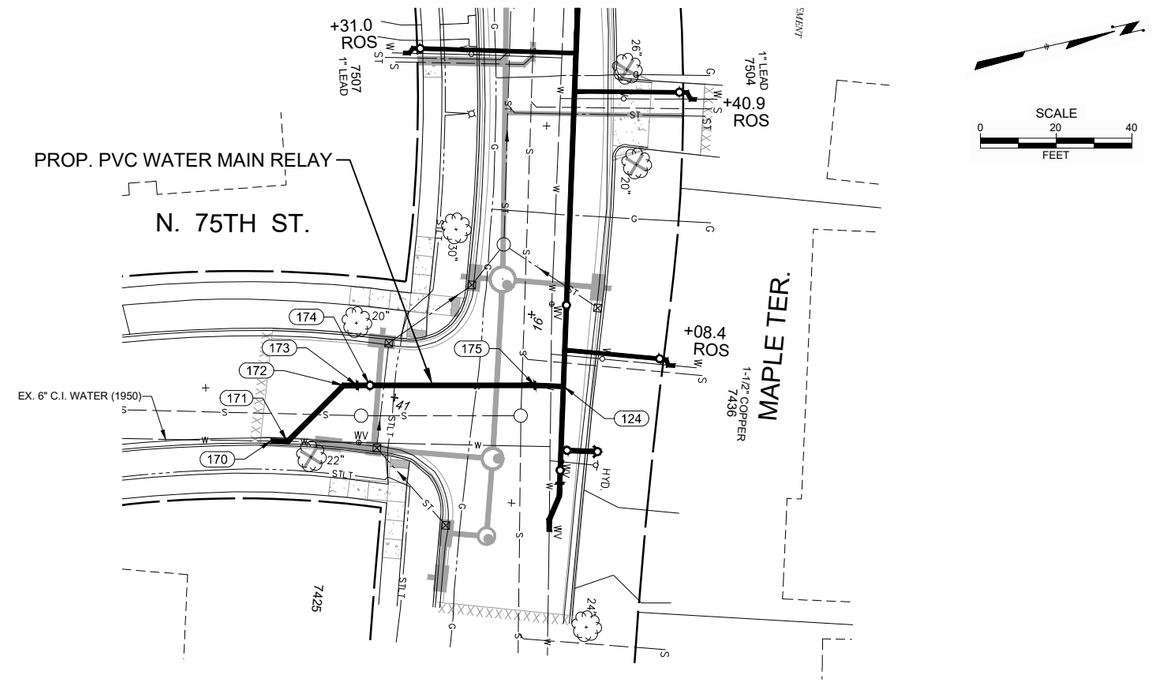
CONTRACT: 26-07
FILE NO.: 30-821
DRAWN BY: C.R.
CHECKED BY: M.M.
SCALE: AS SHOWN

B05

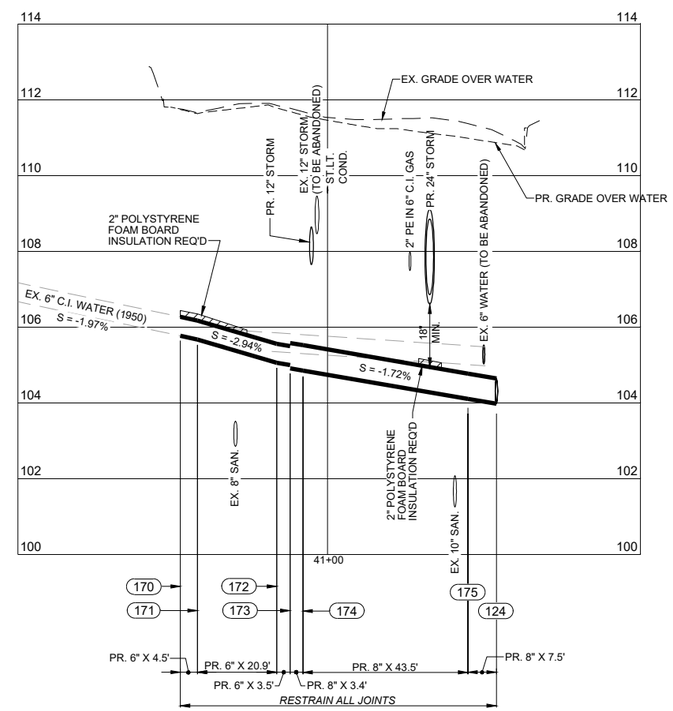
REPLACE (ROS) & (ROS-T), ORIGINAL TAP SERVICE

ROS: REPLACE ORIGINAL TAP SERVICE BY OPEN-CUT OR TRENCHLESS METHOD; THIS SHALL BE THE CONTRACTOR'S OPTION.
ROS-T: REPLACE ORIGINAL TAP SERVICE BY USING A *TRENCHLESS METHOD*, THROUGH THE TREE ROOT ZONE; WITH OPTION TO OPEN-CUT REMAINDER.

THE CONTRACTOR SHALL EXTEND NEW HIGH-DENSITY POLYETHYLENE, HDPE SDR 9 (CTS) AWWA C-901 FROM THE EXISTING MAIN TO THE EXISTING SERVICE AS SHOWN. **ROS** AND **ROS-T** SHALL BE A MINIMUM OF 1¼" OR LARGER TO MATCH EXISTING. THE STATION SHOWN ON THE PLAN IS THE PROPOSED LOCATION OF THE SERVICE RUN -- THE ACTUAL CONNECTION TO THE NEW MAIN WILL BE TO EITHER SIDE. THE CONTRACTOR SHALL MAKE THE WET TAP AND SHALL FURNISH AND INSTALL A SMITH-BLAIR 372 (STAINLESS STEEL FOR PVC) SERVICE SADDLE; A BALL CORPORATION STOP; FITTINGS; AND A BALL CURB STOP, A "MINNEAPOLIS PATTERN" CURB STOP BOX (FORD: EM2-65-56 OR A.Y. MCDONALD: 5614A). THE CONTRACT PRICE SHALL INCLUDE ALL COSTS FOR EXCAVATION, ABANDONING THE EXISTING CURB STOP, MATERIALS, POLYETHYLENE WRAP, BEDDING AND ***MECHANICALLY COMPACTED CRUSHED CONCRETE BACKFILL.*** BACKFILL TO TOP OF TRENCH. **ROS-T** INDICATES THAT THE SERVICE SHALL BE INSTALLED BY A TRENCHLESS METHOD, SUCH AS AUGURING BEHIND THE CURB AND THROUGH THE TREE ROOT ZONE (AS DEFINED BY THE TREE DRIP LINE); CURB STOP AND RECONNECTION POINT SHALL BE OPEN-CUT AS NEEDED. INCLUDE THE COSTS OF ANY TREE AND SCRUB REMOVAL. SEPARATE PAYMENTS FOR **ROS** AND **ROS-T**. EACH WILL BE PAID PER L.F. ANY TEMPORARY WATER TO EXISTING SERVICES, SHALL BE INCIDENTAL TO THE CONTRACT.



#	Description	Location	Top of Prop. Main
124	PROP. 8" X 8" MJ TEE	16+17.9 AT 10.5' LT.	104.64
170	PROP. 6" CUT-IN CONNECTION WITH DUAL PURPOSE SLEEVE	40+67.5 AT 14.1' RT.	106.27
171	PROP. 6" X 45° MJ BEND & GRADE BREAK	40+72.2 AT 14.0' RT.	106.17
172	PROP. 6" X 45° MJ BEND & GRADE BREAK	40+86.3 AT 1.7' LT.	105.56
173	PROP. 8" X 6" MJ REDUCER	40+89.8 AT 2.0' LT.	105.58
174	PROP. 8" MJ/RW GATE VALVE	40+93.2 AT 2.4' LT.	105.52
175	PROP. 2.2° HORIZ. DEFLECTION POINT	16+18.5 AT 3.0' LT.	104.77



PROP. 54.4 L.F. OF 8" OF AND 29.0 L.F. OF 6" PVC AWWA C900-16 DR-18 WATER MAIN RELAY
RUBBER GASKET PUSH-ON JOINTS. FULL DEPTH SAWCUTS REQUIRED. POLYETHYLENE ENVELOPE FOR FITTINGS. 3/8" LIMESTONE CHIP BEDDING & COVER. ***MECHANICALLY COMPACTED CRUSHED CONCRETE BACKFILL.*** BACKFILL TO TOP OF TRENCH. INCLUDE ALL COSTS WITH THE PRICE OF WATER MAIN RELAY. ANY TEMPORARY WATER TO EXISTING SERVICES, SHALL BE INCIDENTAL TO THE CONTRACT.

Underground utilities have been shown to a reasonable degree of accuracy using diggers hotline field locates and record drawings. However, the city does not guarantee their exact size, location or depth or that of others not shown. The contractor shall verify the existence of these utilities and those not shown. Costs for locating and delay shall be incidental to the contract.

DATE	DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

WATER MAIN RELAY
MAPLE TER.

FROM: N. 76TH ST.
TO: N. 75TH ST.

CONTRACT: 26-07
FILE NO: 30-821
DRAWN BY: C.R.
CHECKED BY: M.M.
SCALE: AS SHOWN

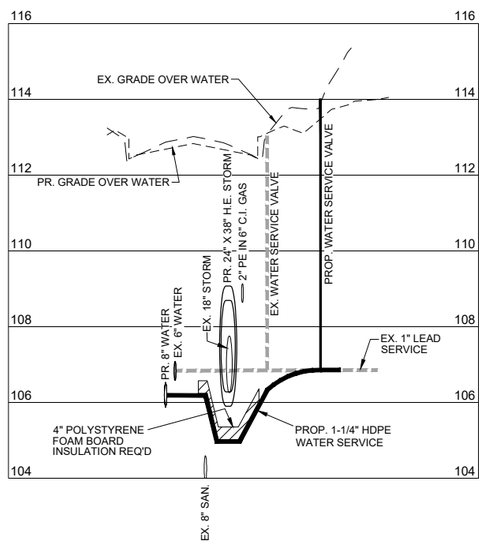
B06

REPLACE (ROS) & (ROS-T), ORIGINAL TAP SERVICE

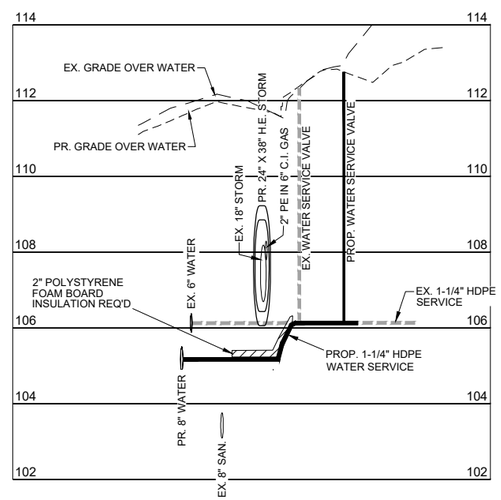
ROS: REPLACE ORIGINAL TAP SERVICE BY OPEN-CUT OR TRENCHLESS METHOD; THIS SHALL BE THE CONTRACTOR'S OPTION. ROS-T: REPLACE ORIGINAL TAP SERVICE BY USING A *TRENCHLESS METHOD*, THROUGH THE TREE ROOT ZONE; WITH OPTION TO OPEN-CUT REMAINDER.

THE CONTRACTOR SHALL EXTEND NEW HIGH-DENSITY POLYETHYLENE, HDPE SDR 9 (CTS) AWWA C-901 FROM THE EXISTING MAIN TO THE EXISTING SERVICE AS SHOWN. **ROS** AND **ROS-T** SHALL BE A MINIMUM OF 1¼" OR LARGER TO MATCH EXISTING. THE STATION SHOWN ON THE PLAN IS THE PROPOSED LOCATION OF THE SERVICE RUN -- THE ACTUAL CONNECTION TO THE NEW MAIN WILL BE TO EITHER SIDE. THE CONTRACTOR SHALL MAKE THE WET TAP AND SHALL FURNISH AND INSTALL A SMITH-BLAIR 372 (STAINLESS STEEL FOR PVC) SERVICE SADDLE; A BALL CORPORATION STOP; FITTINGS; AND A BALL CURB STOP, A "MINNEAPOLIS PATTERN" CURB STOP BOX (FORD: EM2-65-56 OR A.Y. MCDONALD: 5614A). THE CONTRACT PRICE SHALL INCLUDE ALL COSTS FOR EXCAVATION, ABANDONING THE EXISTING CURB STOP, MATERIALS, POLYETHYLENE WRAP, BEDDING AND ***MECHANICALLY COMPACTED CRUSHED CONCRETE BACKFILL.*** BACKFILL TO TOP OF TRENCH. **ROS-T** INDICATES THAT THE SERVICE SHALL BE INSTALLED BY A TRENCHLESS METHOD, SUCH AS AUGURING BEHIND THE CURB AND THROUGH THE TREE ROOT ZONE (AS DEFINED BY THE TREE DRIP LINE); CURB STOP AND RECONNECTION POINT SHALL BE OPEN-CUT AS NEEDED. INCLUDE THE COSTS OF ANY TREE AND SCRUB REMOVAL. SEPARATE PAYMENTS FOR **ROS** AND **ROS-T**. EACH WILL BE PAID PER L.F. ANY TEMPORARY WATER TO EXISTING SERVICES, SHALL BE INCIDENTAL TO THE CONTRACT.

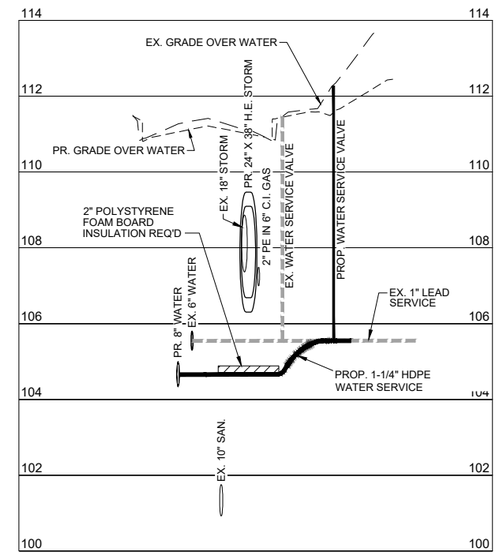
SCALE
0 20 40
FEET



WATER SERVICE REPLACEMENT TO #7535



WATER SERVICE REPLACEMENT TO #7525



WATER SERVICE REPLACEMENT TO #7507

Underground utilities have been shown to a reasonable degree of accuracy using diggers hotline field locates and record drawings. However, the city does not guarantee their exact size, location or depth or that of others not shown. The contractor shall verify the existence of these utilities and those not shown. Costs for locating and delay shall be incidental to the contract.

WATER SERVICE REPLACEMENT DETAILS FOR #7507, #7525, AND #7535 MAPLE TERRACE

DATE	DESCRIPTION
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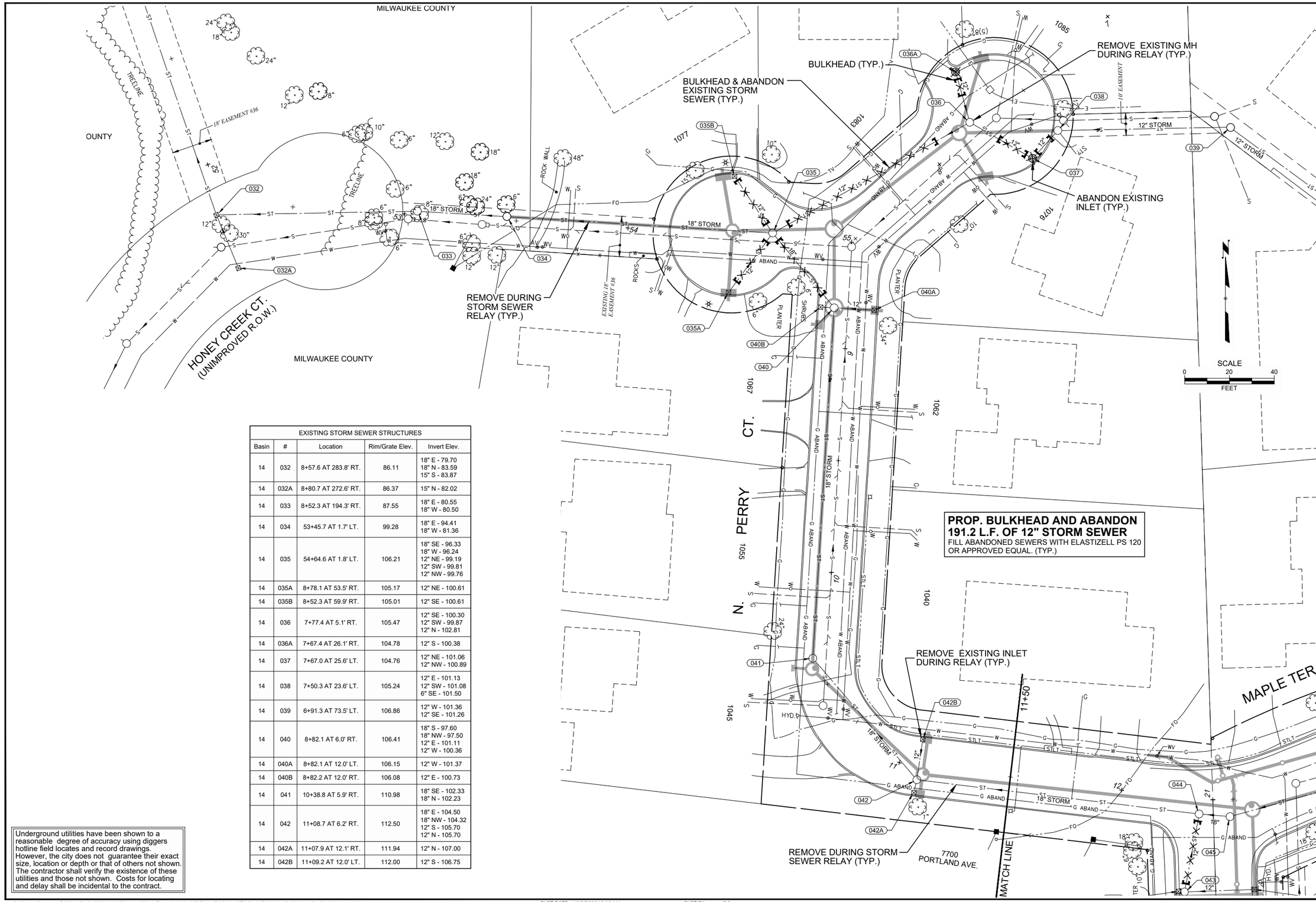
CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

WATER MAIN RELAY
MAPLE TER.
FROM: N. 76TH ST.
TO: N. 75TH ST.

CONTRACT: 26-07
FILE NO: 30-821
DRAWN BY: C.R.
CHECKED BY: M.M.
SCALE: AS SHOWN

B07



EXISTING STORM SEWER STRUCTURES				
Basin	#	Location	Rim/Grate Elev.	Invert Elev.
14	032	8+57.6 AT 283.8' RT.	86.11	18" E - 79.70 18" N - 83.59 15" S - 83.87
14	032A	8+80.7 AT 272.6' RT.	86.37	15" N - 82.02
14	033	8+52.3 AT 194.3' RT.	87.55	18" E - 80.55 18" W - 80.50
14	034	53+45.7 AT 1.7' LT.	99.28	18" E - 94.41 18" W - 81.36
14	035	54+64.6 AT 1.8' LT.	106.21	18" SE - 96.33 18" W - 96.24 12" NE - 99.19 12" SW - 99.81 12" NW - 99.76
14	035A	8+78.1 AT 53.5' RT.	105.17	12" NE - 100.61
14	035B	8+52.3 AT 59.9' RT.	105.01	12" SE - 100.61
14	036	7+77.4 AT 5.1' RT.	105.47	12" SE - 100.30 12" SW - 99.87 12" N - 102.81
14	036A	7+67.4 AT 26.1' RT.	104.78	12" S - 100.38
14	037	7+67.0 AT 25.6' LT.	104.76	12" NE - 101.06 12" NW - 100.89
14	038	7+50.3 AT 23.6' LT.	105.24	12" E - 101.13 12" SW - 101.08 6" SE - 101.50
14	039	6+91.3 AT 73.5' LT.	106.86	12" W - 101.36 12" SE - 101.26
14	040	8+82.1 AT 6.0' RT.	106.41	18" S - 97.60 18" NW - 97.50 12" E - 101.11 12" W - 100.36
14	040A	8+82.1 AT 12.0' LT.	106.15	12" W - 101.37
14	040B	8+82.2 AT 12.0' RT.	106.08	12" E - 100.73
14	041	10+38.8 AT 5.9' RT.	110.98	18" SE - 102.33 18" N - 102.23
14	042	11+08.7 AT 6.2' RT.	112.50	18" E - 104.50 18" NW - 104.32 12" S - 105.70 12" N - 105.70
14	042A	11+07.9 AT 12.1' RT.	111.94	12" N - 107.00
14	042B	11+09.2 AT 12.0' LT.	112.00	12" S - 106.75

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DATE	DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

STORM SEWER REMOVALS & ABANDONMENT

N. 75TH ST., N. 76TH ST., PERRY CT., LAUREL CT. & MAPLE TER.

CONTRACT: 26-07
FILE NO.: 41-1010
DRAWN BY: C.R.
CHECKED BY: M.J.A.
SCALE: AS SHOWN

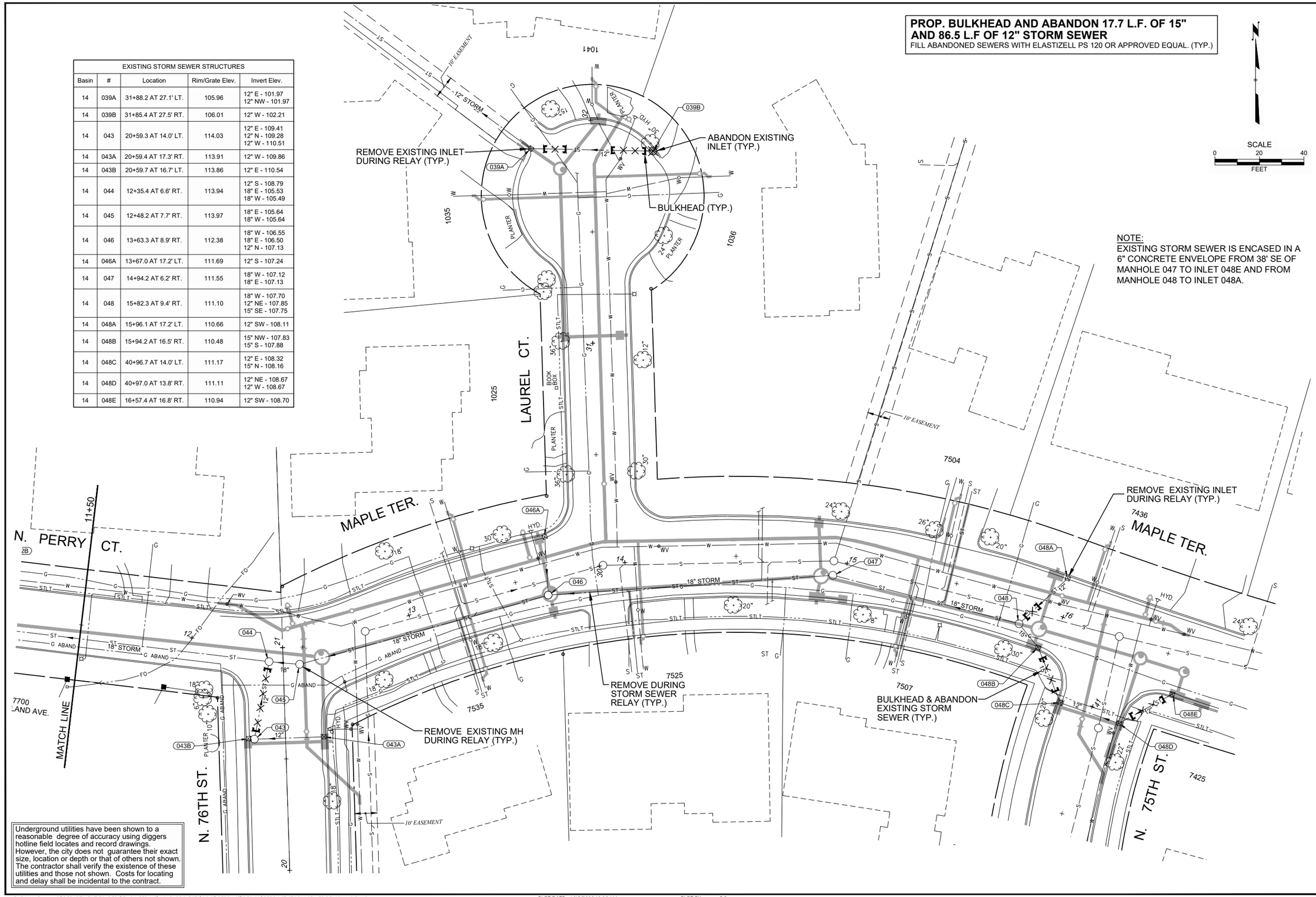
C01

FILE NAME : S:\DEPARTMENT FOLDERS\ENGINEERING\ACAD_PROJECTS\26-07 PERRY CT\DESIGN\PERRY CT STORM SEWER REMOVALS.DWG PLOT DATE : 1/15/2026 10:26 AM PLOT BY : C.R.

PROP. BULKHEAD AND ABANDON 17.7 L.F. OF 15" AND 86.5 L.F OF 12" STORM SEWER

FILL ABANDONED SEWERS WITH ELASTIZELL PS 120 OR APPROVED EQUAL. (TYP.)

EXISTING STORM SEWER STRUCTURES				
Basin	#	Location	Rim/Grate Elev.	Invert Elev.
14	039A	31+88.2 AT 27.1' LT.	105.96	12" E - 101.97 12" NW - 101.97
14	039B	31+85.4 AT 27.5' RT.	106.01	12" W - 102.21
14	043	20+59.3 AT 14.0' LT.	114.03	12" E - 109.41 12" N - 109.28 12" W - 110.51
14	043A	20+59.4 AT 17.3' RT.	113.91	12" W - 109.86
14	043B	20+59.7 AT 16.7' LT.	113.86	12" E - 110.54
14	044	12+35.4 AT 6.6' RT.	113.94	12" S - 108.79 18" E - 105.53 18" W - 105.49
14	045	12+48.2 AT 7.7' RT.	113.97	18" E - 105.64 18" W - 105.64
14	046	13+63.3 AT 8.9' RT.	112.38	18" W - 106.55 18" E - 106.50 12" N - 107.13
14	046A	13+67.0 AT 17.2' LT.	111.69	12" S - 107.24
14	047	14+94.2 AT 6.2' RT.	111.55	18" W - 107.12 18" E - 107.13
14	048	15+82.3 AT 9.4' RT.	111.10	18" W - 107.70 12" NE - 107.85 15" SE - 107.75
14	048A	15+96.1 AT 17.2' LT.	110.66	12" SW - 108.11
14	048B	15+94.2 AT 16.5' RT.	110.48	15" NW - 107.83 15" S - 107.88
14	048C	40+96.7 AT 14.0' LT.	111.17	12" E - 108.32 15" N - 108.16
14	048D	40+97.0 AT 13.8' RT.	111.11	12" NE - 108.67 12" W - 108.67
14	048E	16+57.4 AT 16.8' RT.	110.94	12" SW - 108.70



NOTE:
EXISTING STORM SEWER IS ENCASED IN A 6" CONCRETE ENVELOPE FROM 38' SE OF MANHOLE 047 TO INLET 048E AND FROM MANHOLE 048 TO INLET 048A.

Underground utilities have been shown to a reasonable degree of accuracy using diggers hotline field locates and record drawings. However, the city does not guarantee their exact size, location or depth or that of others not shown. The contractor shall verify the existence of these utilities and those not shown. Costs for locating and delay shall be incidental to the contract.

DATE	DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

STORM SEWER REMOVALS & ABANDONMENT

N. 75TH ST., N. 76TH ST., PERRY CT., LAUREL CT. & MAPLE TER.

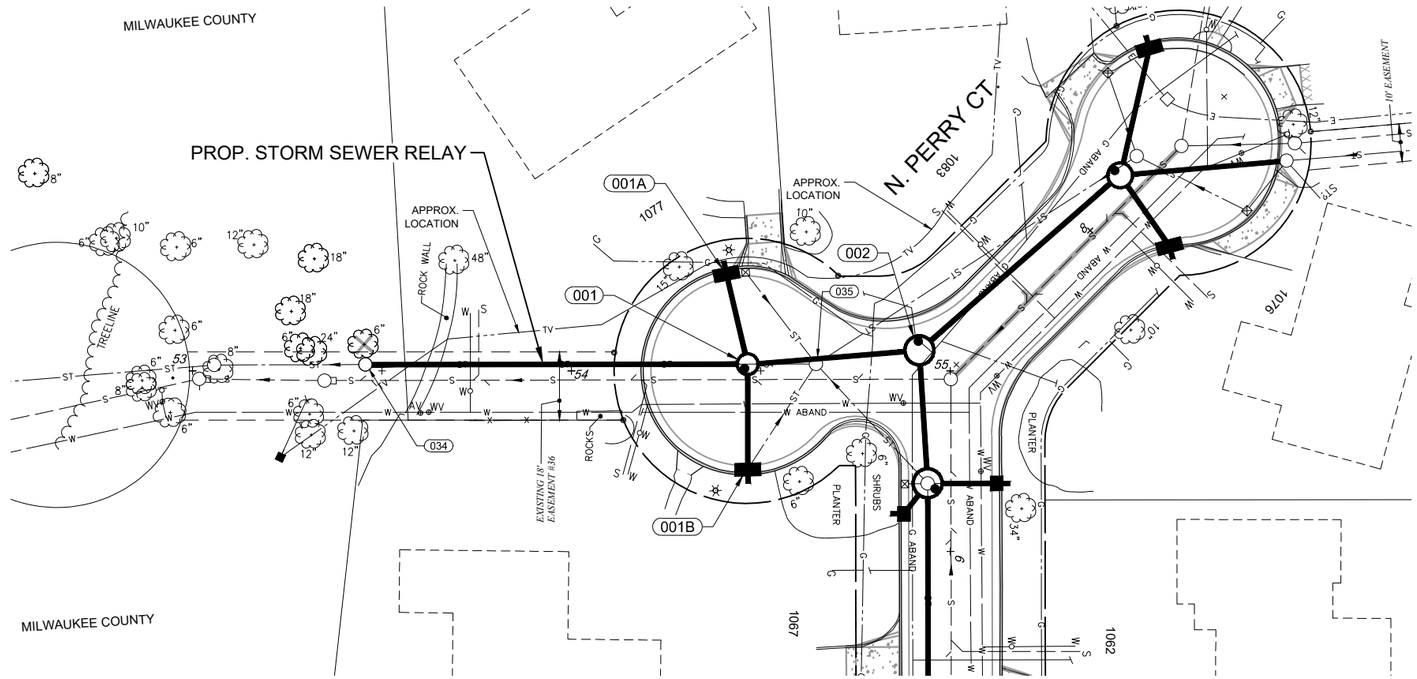
CONTRACT:	26-07
FILE NO:	41-1010
DRAWN BY:	C.R.
CHECKED BY:	M.J.A.
SCALE:	AS SHOWN

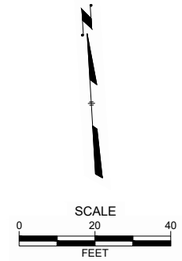
C02

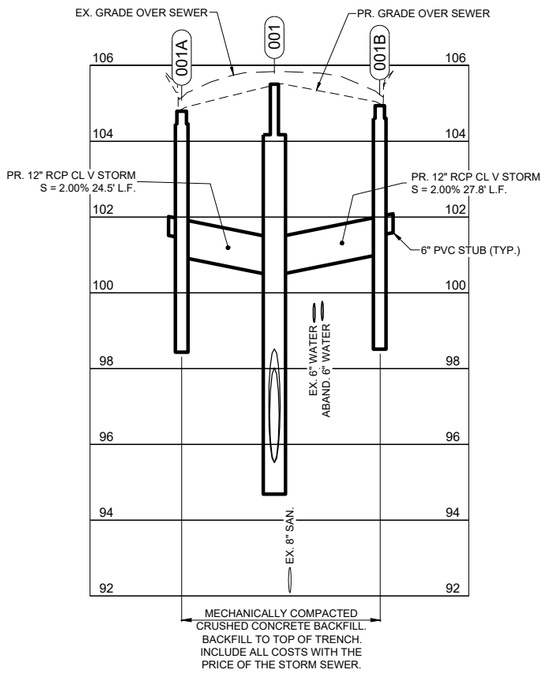
FILE NAME : S:\DEPARTMENT FOLDERS\ENGINEERING\ACAD_PROJECTS\26-07 PERRY CT\DESIGN\PERRY CT STORM SEWER REMOVALS.DWG PLOT DATE : 1/15/2026 10:26 AM PLOT BY : C.R.

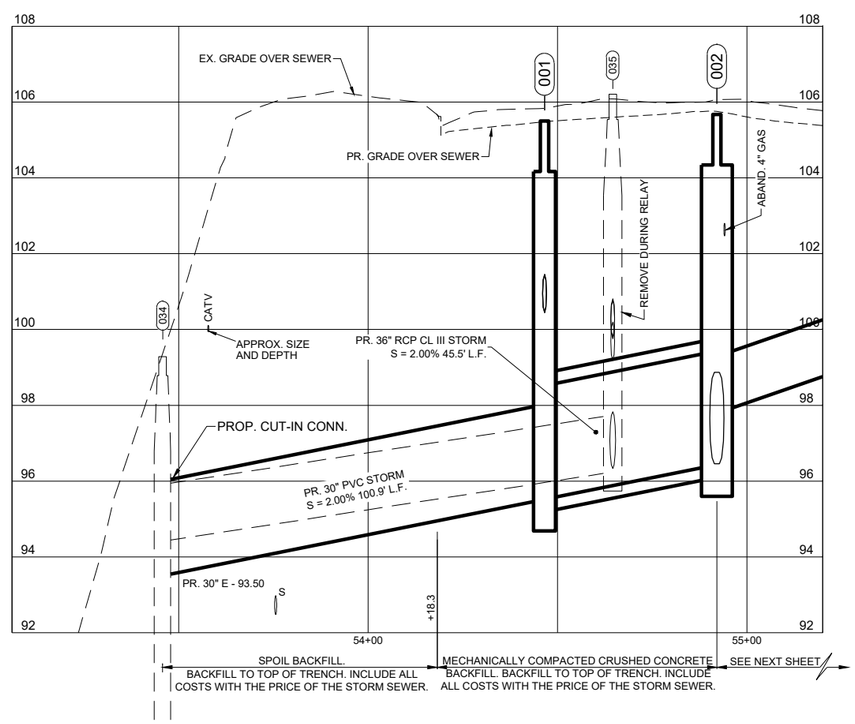
Underground utilities have been shown to a reasonable degree of accuracy using diggers hotline field locates and record drawings. However, the city does not guarantee their exact size, location or depth or that of others not shown. The contractor shall verify the existence of these utilities and those not shown. Costs for locating and delay shall be incidental to the contract.

EXISTING STORM SEWER STRUCTURES			
#	Location	Rim/Grate Elev.	Invert Elev.
034	53+45.7 AT 1.7' LT.	99.28	18" E - 94.41 18" W - 81.36
035	54+64.6 AT 1.8' LT.	106.21	18" SE - 96.33 18" W - 96.24 12" NE - 99.19 12" SW - 99.81 12" NW - 99.76









PROPOSED STORM SEWER MANHOLES WITH FLAT-TOP SLABS

#	Dia.	Location (Center of Structure)	Prop. Rim Elev.	Invert Elevations
001	60"	54+46.6 AT 1.8' LT.	105.50	12" N - 100.45 12" S - 100.46 30" W - 95.52 36" E - 95.52
002	84"	8+52.3 AT 9.7' RT.	105.68	45" S - 96.46 18" NE - 97.79 36" W - 96.43

PROPOSED RECTANGULAR CATCH BASINS

#	Size	Location (C/L Structure)	Location (Face of Curb)	Prop. Grate Elev. (at gutter)	Prop. Neenah Castings	Sump (V.F.)	Invert Elevations
001A	30" X 72"	54+41.0 AT 25.6' LT.	54+40.8 AT 26.31' LT	104.79	R-3293-2	2.0	12" S - 100.94 6" N - 101.44
001B	30" X 72"	54+46.6 AT 26.1' RT.	54+46.6 AT 26.9' RT	104.94	R-3293-2	2.0	12" N - 101.01 6" S - 101.52

DATE	DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

STORM SEWER RELAY

EASEMENT

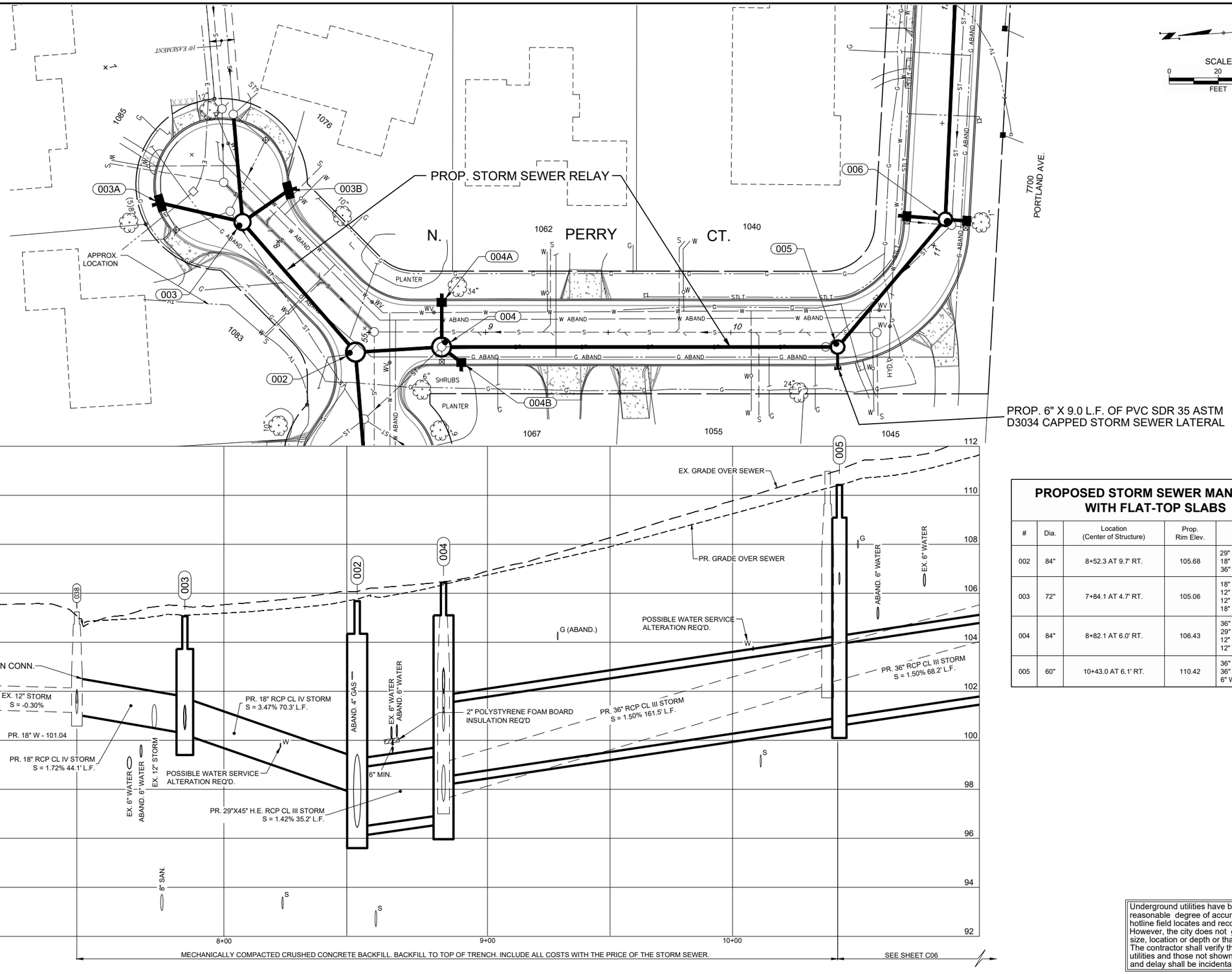
N. PERRY CT.

FROM: 66' W. OF N. PERRY CT.
TO: N. PERRY CT.

FROM: ESMT. W. OF N. PERRY CT.
TO: 90' EAST

CONTRACT: 26-07
FILE NO: 41-1010
DRAWN BY: B.T.
CHECKED BY: J.H.
SCALE: AS SHOWN

C03



PROPOSED STORM SEWER MANHOLES WITH FLAT-TOP SLABS

#	Dia.	Location (Center of Structure)	Prop. Rim Elev.	Invert Elevations
002	84"	8+52.3 AT 9.7' RT.	105.68	29" X 45" S - 96.46 18" NE - 97.79 36" W - 96.43
003	72"	7+84.1 AT 4.7' RT.	105.06	18" SW - 100.23 12" SE - 100.43 12" N - 100.43 18" E - 100.28
004	84"	8+82.1 AT 6.0' RT.	106.43	36" S - 98.50 29" X 45" N - 96.96 12" E - 101.90 12" SW - 101.97
005	60"	10+43.0 AT 6.1' RT.	110.42	36" SE - 100.93 36" N - 100.93 6" W - 106.35

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DATE	DESCRIPTION

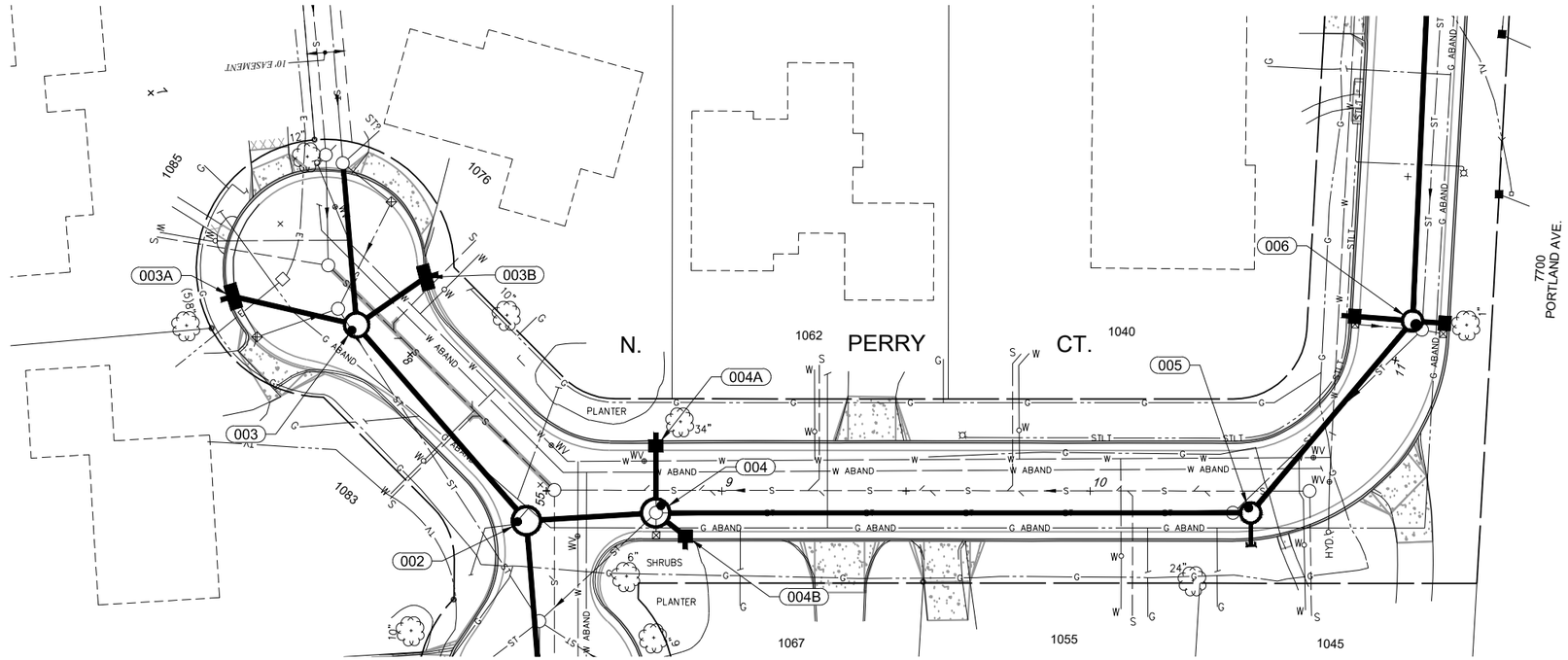
CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

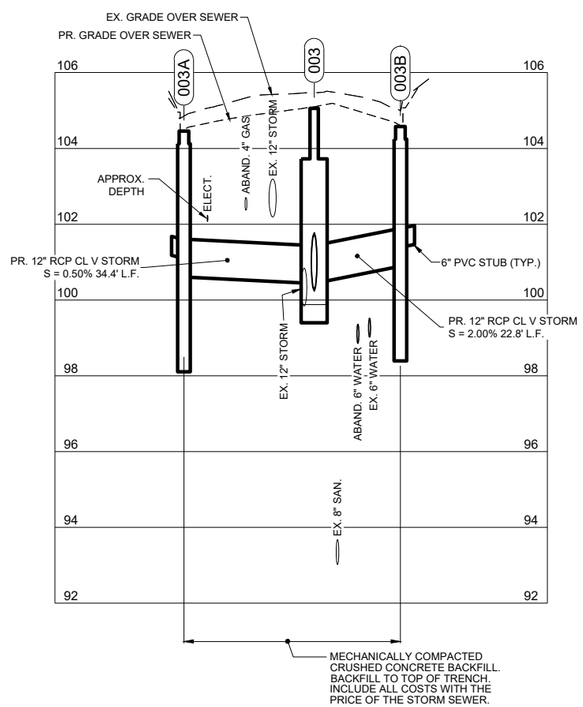
STORM SEWER RELAY
N. PERRY CT.
FROM: EASEMENT NE OF N. PERRY CT.
TO: MAPLE TER.

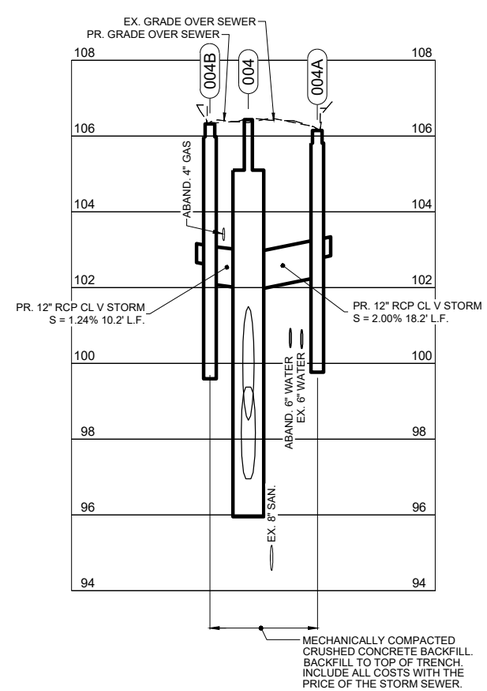
CONTRACT: 26-07
FILE NO.: 41-1010
DRAWN BY: B.T.
CHECKED BY: J.H.
SCALE: AS SHOWN

C04

FILE NAME : S:\DEPARTMENT FOLDERS\ENGINEERING\ACAD_PROJECTS\26-07 PERRY CT\DESIGN\PERRY CT PROP STORM.DWG
PLOT DATE : 1/16/2026 1:09 PM
PLOT BY : C.R.







PROPOSED RECTANGULAR CATCH BASINS

#	Size	Location (C/L Structure)	Location (Face of Curb)	Prop. Grate Elev. (at gutter)	Prop. Neenah Castings	Sump (V.F.)	Invert Elevations
003A	30" X 72"	7+55.0 AT 22.9' RT.	7+54.7 AT 26.6' RT	104.46	R-3293-2	2.0	12" S - 100.61 6" N - 101.10
003B	30" X 72"	7+88.2 AT 17.7' LT.	7+88.5 AT 18.4' LT.	104.57	R-3293-2	2.0	12" NW - 100.89 6" SE - 101.39
004A	30" X 36"	8+82.1 AT 12.2' LT.	8+82.1 AT 13.0' LT	106.15	R-3246-AL	2.0	12" W - 102.26 6" E - 102.76
004B	30" X 36"	8+90.0 AT 12.3' RT.	8+90.0 AT 13.0' RT	106.32	R-3246-AL	2.0	12" NE - 102.09 6" W - 102.59

PROPOSED STORM SEWER MANHOLES WITH FLAT-TOP SLABS

#	Dia.	Location (Center of Structure)	Prop. Rim Elev.	Invert Elevations
003	72"	7+84.1 AT 4.7' RT.	105.06	18" SW - 100.23 12" SE - 100.43 12" N - 100.43 18" E - 100.28
004	84"	8+82.1 AT 6.0' RT.	106.43	36" S - 98.50 45" N - 96.96 12" E - 101.90 12" SW - 101.97

Underground utilities have been shown to a reasonable degree of accuracy using diggers hotline field locates and record drawings. However, the city does not guarantee their exact size, location or depth or that of others not shown. The contractor shall verify the existence of these utilities and those not shown. Costs for locating and delay shall be incidental to the contract.

DATE	DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

STORM SEWER RELAY

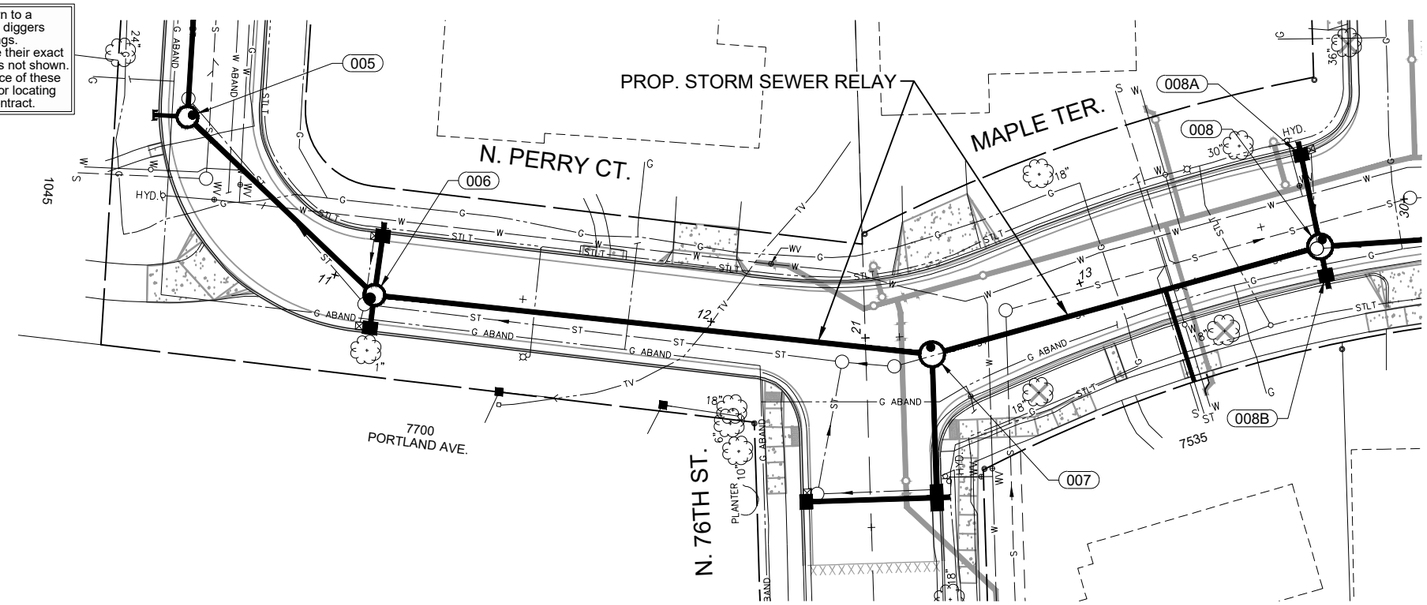
N. PERRY CT.

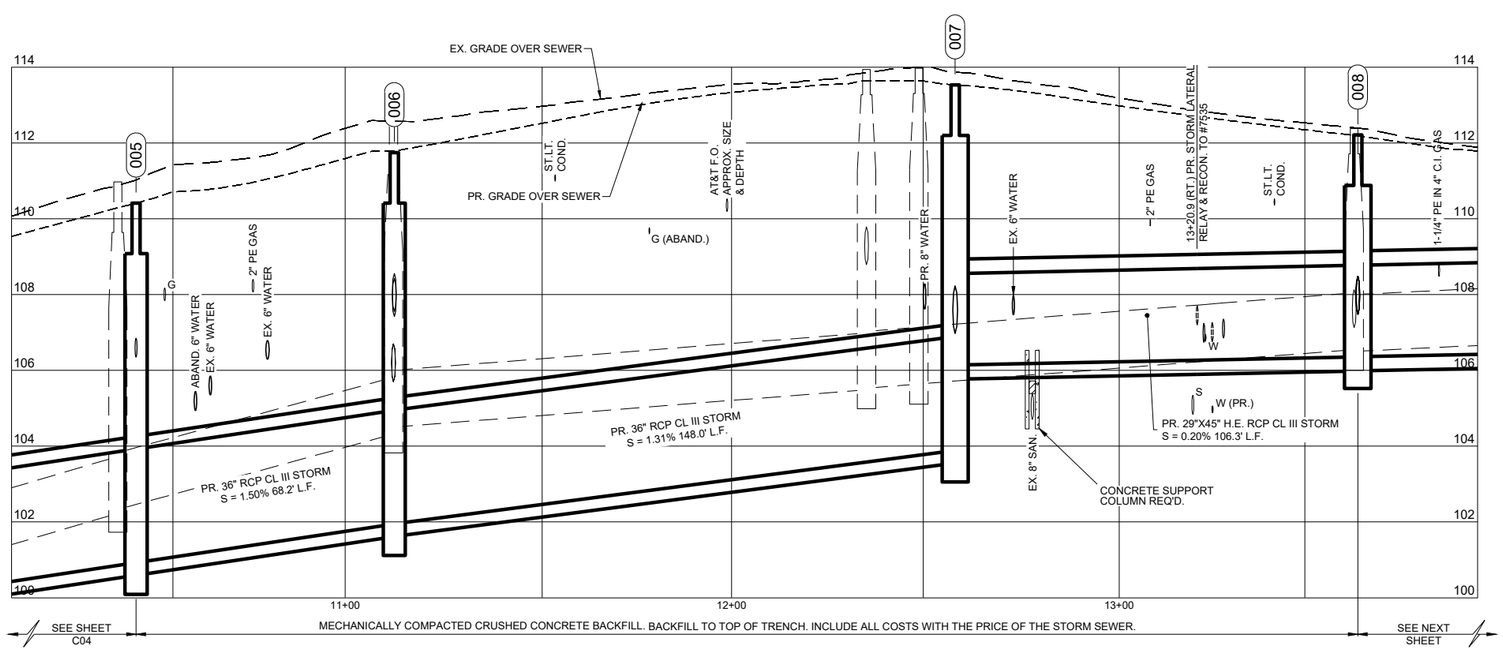
FROM: EASEMENT NE OF N. PERRY CT.
TO: N. 76TH ST.

CONTRACT: 26-07
FILE NO.: 41-1010
DRAWN BY: B.T.
CHECKED BY: J.H.
SCALE: AS SHOWN

C05

Underground utilities have been shown to a reasonable degree of accuracy using diggers hotline field locates and record drawings. However, the city does not guarantee their exact size, location or depth or that of others not shown. The contractor shall verify the existence of these utilities and those not shown. Costs for locating and delay shall be incidental to the contract.





PROPOSED STORM SEWER MANHOLES WITH FLAT-TOP SLABS

#	Dia.	Location (Center of Structure)	Prop. Rim Elev.	Invert Elevations
005	60"	10+43.0 AT 6.1' RT.	110.42	36" SE - 100.93 36" N - 100.93 6" W - 106.35
006	60"	11+11.0 AT 3.5' RT.	111.75	36" E - 101.95 36" NW - 101.95 12" S - 107.56 12" N - 107.42
007	72"	12+57.8 AT 5.6' RT.	113.54	15" S - 106.98 36" W - 103.89 29" X 45" E - 106.14
008	72"	13+64.3 AT 8.5' RT.	112.21	29" X 45" E - 106.36 29" X 45" W - 106.36 12" S - 107.48 12" N - 107.48

SCALE 0 20 40 FEET

DATE	DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

STORM SEWER RELAY

N. PERRY CT.

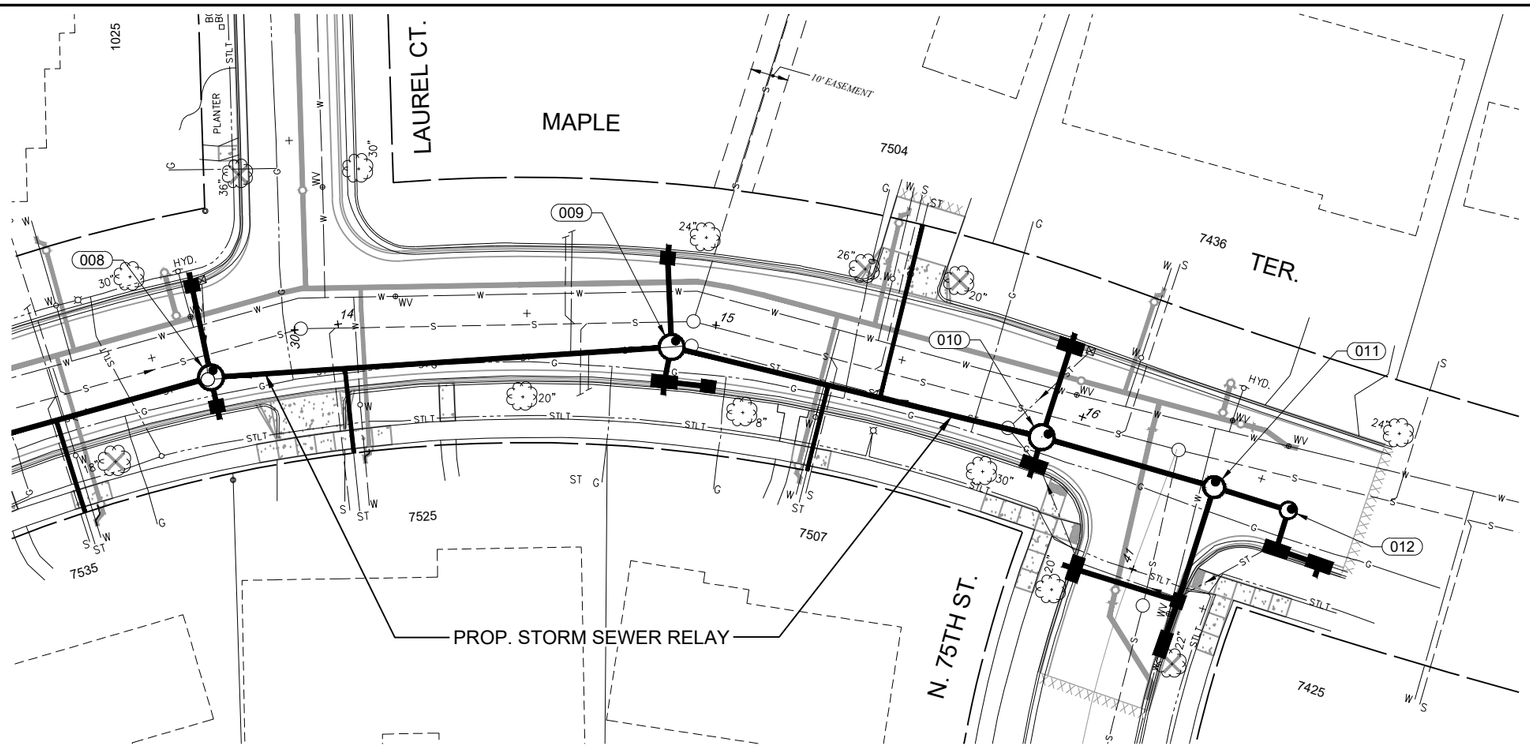
FROM: ESMT. NW OF N. PERRY CT.
TO: N. 76TH ST.

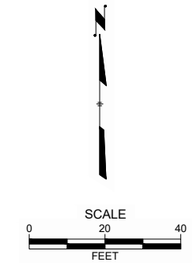
MAPLE TER.

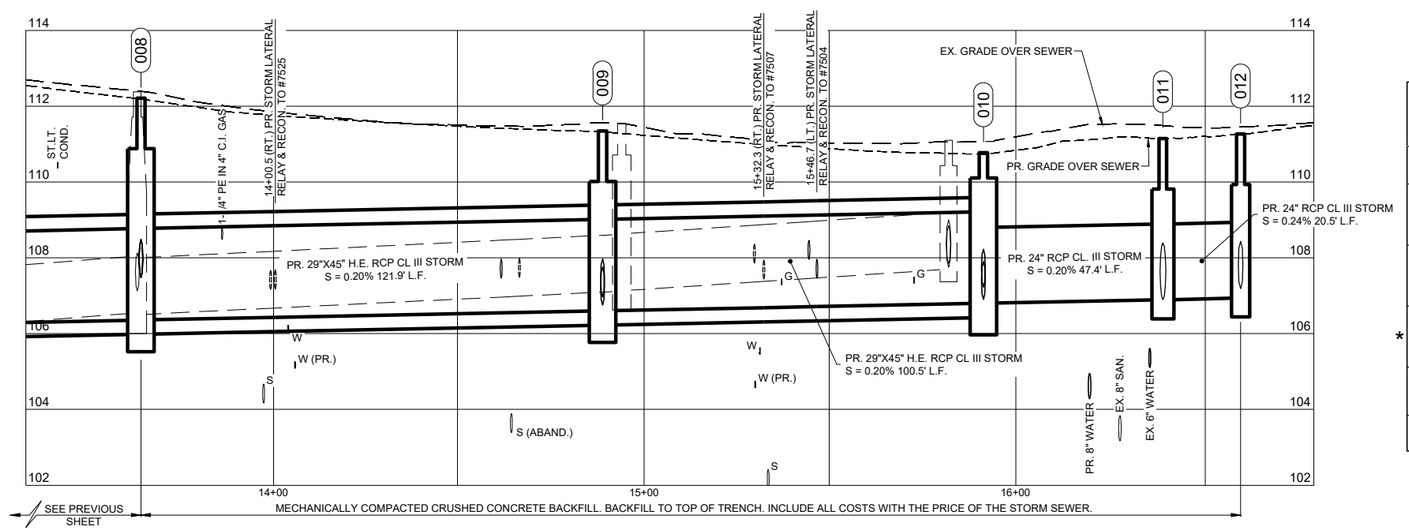
FROM: N. 76TH ST.
TO: N. 75TH ST.

CONTRACT: 26-07
FILE NO.: 41-1010
DRAWN BY: B.T.
CHECKED BY: J.H.
SCALE: AS SHOWN

C06







PROPOSED STORM SEWER MANHOLES WITH FLAT-TOP SLABS

#	Dia.	Location (Center of Structure)	Prop. Rim Elev.	Invert Elevations
008	72"	13+64.3 AT 8.5' RT.	112.21	29" X 45" E - 106.36 29" X 45" W - 106.36 12" S - 107.48 12" N - 107.48
009	72"	14+88.9 AT 7.0' RT.	111.35	29" X 45" E - 106.60 29" X 45" W - 106.60 12" S - 106.75 12" N - 106.97
* 010	72"	15+91.7 AT 8.7' RT.	110.78	24" E - 106.80 29" X 45" W - 106.80 12" N - 106.90 12" S - 107.23
011	60"	16+38.8 AT 6.0' RT.	111.15	18" S - 106.89 24" W - 106.89 24" E - 106.89
012	48"	16+59.3 AT 5.8' RT.	111.27	24" W - 106.94 15" S - 107.19

* USE NEENAH R-1661-A FRAME

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DATE	DESCRIPTION

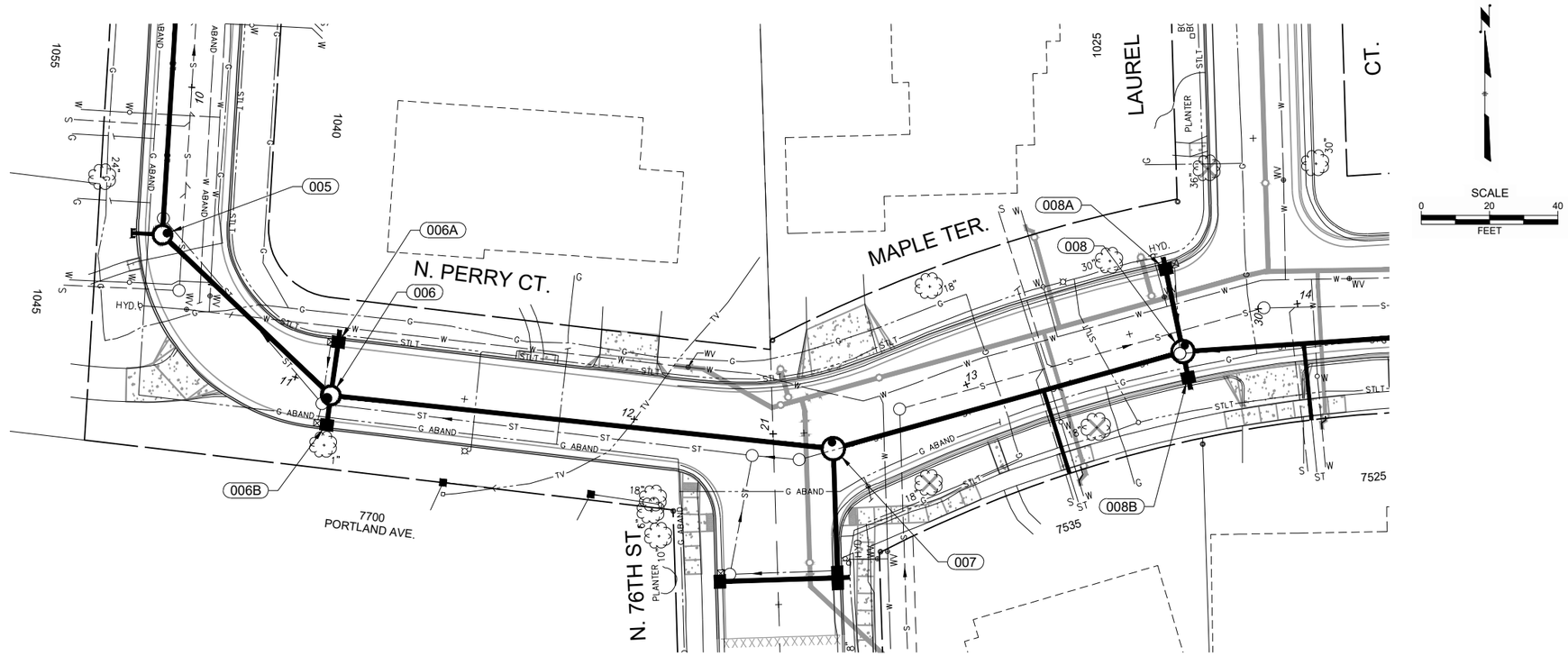
CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

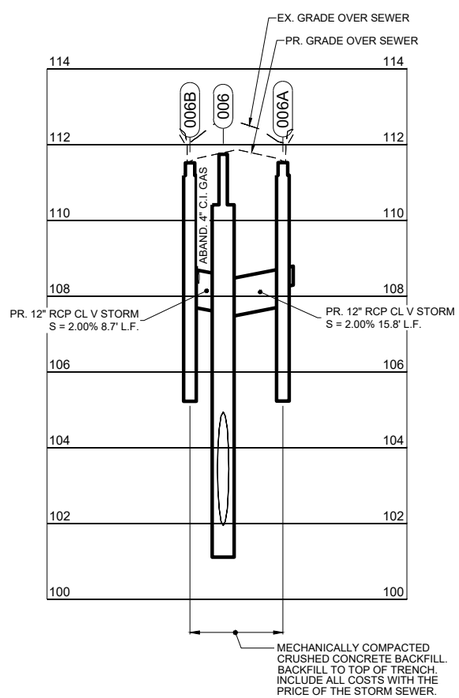
STORM SEWER RELAY
MAPLE TER.

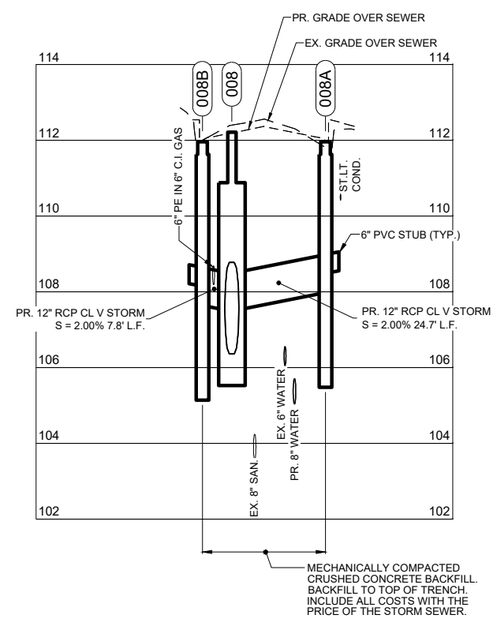
FROM: N. 76TH ST.
TO: N. 75TH ST.

CONTRACT: 26-07
FILE NO.: 41-1010
DRAWN BY: B.T.
CHECKED BY: J.H.
SCALE: AS SHOWN

C07







PROPOSED RECTANGULAR CATCH BASINS

#	Size	Location (C/L Structure)	Location (Face of Curb)	Prop. Grate Elev. (at gutter)	Prop. Neenah Castings	Sump (V.F.)	Invert Elevations
006A	30" X 36"	11+11.3 AT 12.2' LT.	11+11.3 AT 13.0' LT	111.53	R-3246-AL	2.0	12" S - 107.74 6" N - 108.24
006B	30" X 36"	11+10.8 AT 12.3' RT.	11+10.8 AT 13.0' RT	111.52	R-3246-AL	2.0	12" N - 107.73
008A	30" X 36"	13+64.2 AT 16.3' LT.	13+64.2 AT 17.0' LT	111.96	R-3246-AL	2.0	12" S - 107.98 6" N - 108.48
008B	30" X 36"	13+64.2 AT 16.2' RT.	13+64.2 AT 17.0' RT	111.96	R-3246-AL	2.0	12" N - 107.64 6" S - 108.14

PROPOSED STORM SEWER MANHOLES WITH FLAT-TOP SLABS

#	Dia.	Location (Center of Structure)	Prop. Rim Elev.	Invert Elevations
006	60"	11+11.0 AT 3.5' RT.	111.75	36" E - 101.95 36" NW - 101.95 12" S - 107.56 12" N - 107.42
008	72"	13+64.3 AT 8.5' RT.	112.21	29" X 45" E - 106.36 29" X 45" W - 106.36 12" S - 107.48 12" N - 107.48

Underground utilities have been shown to a reasonable degree of accuracy using diggers hotline field locates and record drawings. However, the city does not guarantee their exact size, location or depth or that of others not shown. The contractor shall verify the existence of these utilities and those not shown. Costs for locating and delay shall be incidental to the contract.

DATE	DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

STORM SEWER RELAY

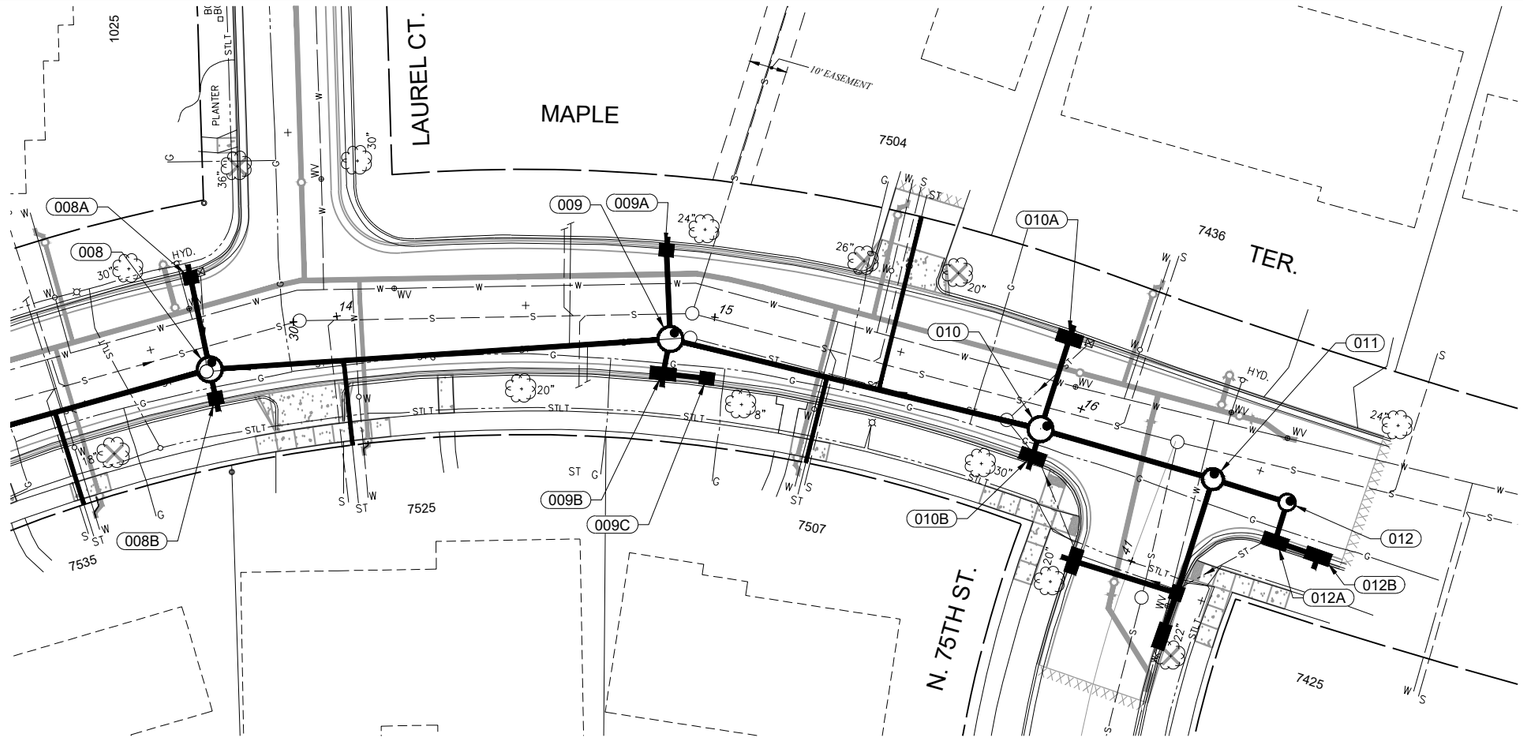
MAPLE TER.
FROM: N. 76TH ST.
TO: N. 75TH ST.

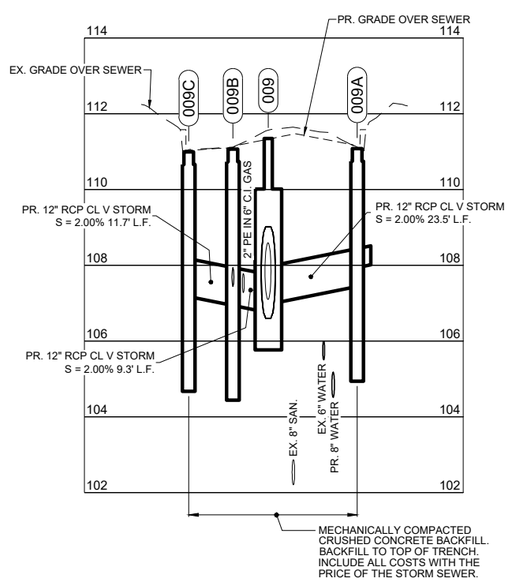
N. PERRY CT.
FROM: ESMT. NW OF N. PERRY CT.
TO: N. 76TH ST.

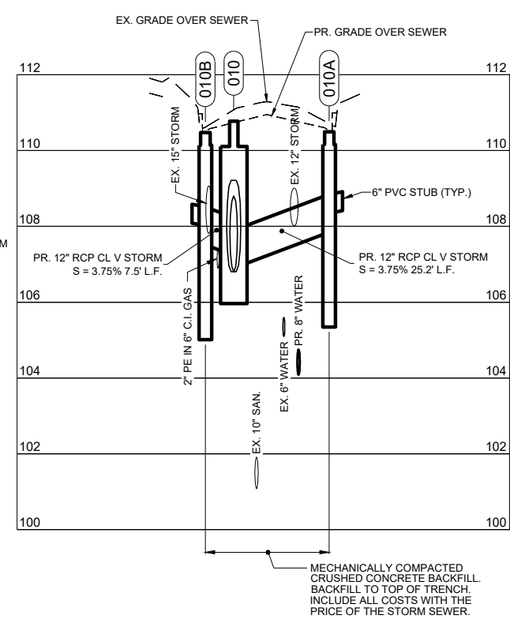
CONTRACT: 26-07
FILE NO.: 41-1010
DRAWN BY: B.T.
CHECKED BY: J.H.
SCALE: AS SHOWN

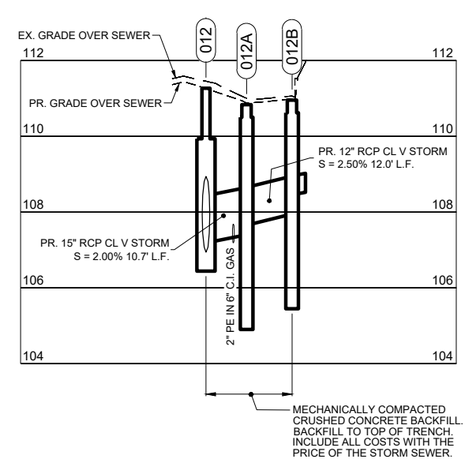
C08

Underground utilities have been shown to a reasonable degree of accuracy using diggers hotline field locates and record drawings. However, the city does not guarantee their exact size, location or depth or that of others not shown. The contractor shall verify the existence of these utilities and those not shown. Costs for locating and delay shall be incidental to the contract.









PROPOSED RECTANGULAR CATCH BASINS

#	Size	Location (C/L Structure)	Location (Face of Curb)	Prop. Grate Elev. (at gutter)	Prop. Neenah Castings	Sump (V.F.)	Invert Elevations
009A	30" X 36"	14+85.7 AT 16.3' LT.	14+85.8 AT 17.0' LT	111.08	R-3293-2	2.0	12" S - 107.44 6" N - 107.94
009B	30" X 72"	14+87.8 AT 16.2' RT.	14+87.8 AT 17.0' RT	111.07	R-3293-2	2.0	12" N - 106.94 12" E - 106.94 6" S - 107.44
009C	30" X 36"	15+00.0 AT 16.2' RT.	15+00.0 AT 17.0' RT	111.00	R-3246-AL	2.0	12" W - 107.17
010A	30" X 72"	15+90.6 AT 16.5' LT.	15+90.6 AT 17.2' LT	110.50	R-3293-2	2.0	12" S - 107.84 6" N - 108.34
010B	30" X 72"	15+92.3 AT 16.2' RT.	15+92.3 AT 16.2' RT	110.48	R-3293-2	2.0	12" N - 107.51 6" S - 108.01
012A	30" X 72"	16+59.4 AT 16.5' RT.	16+59.4 AT 17.2' RT	110.84	R-3293-2	2.0	12" E - 107.65 15" N - 107.40
012B	30" X 72"	16+71.3 AT 16.8' RT.	16+71.2 AT 17.6' RT	110.95	R-3293-2	2.0	12" W - 107.95 6" S - 108.45

PROPOSED STORM SEWER MANHOLES WITH FLAT-TOP SLABS

	#	Dia.	Location (Center of Structure)	Prop. Rim Elev.	Invert Elevations
	009	72"	14+88.9 AT 7.0' RT.	111.35	29" X 45" E - 106.60 29" X 45" W - 106.60 12" S - 106.75 12" N - 106.97
*	010	72"	15+91.7 AT 8.7' RT.	110.78	24" E - 106.80 29" X 45" W - 106.80 12" N - 106.90 12" S - 107.23
	012	48"	16+59.3 AT 5.8' RT.	111.27	24" W - 106.94 15" S - 107.19

* USE NEENAH R-1661-A FRAME

DATE	DESCRIPTION

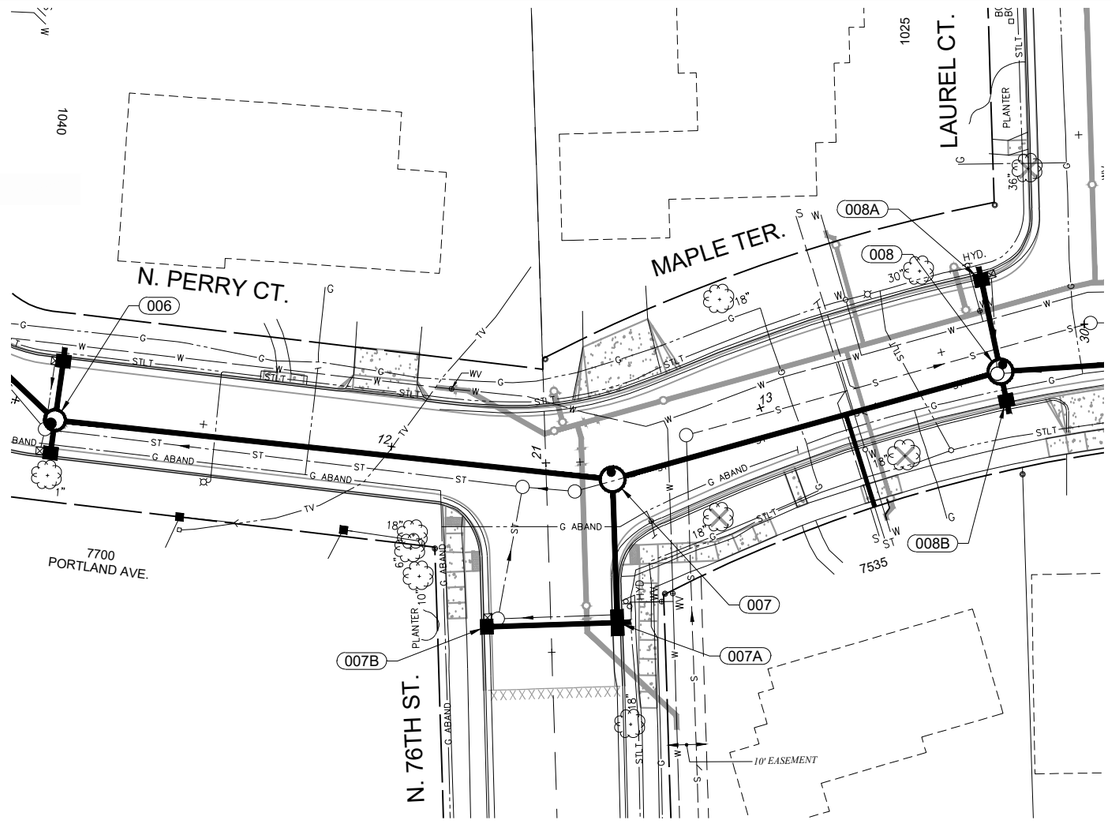
CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

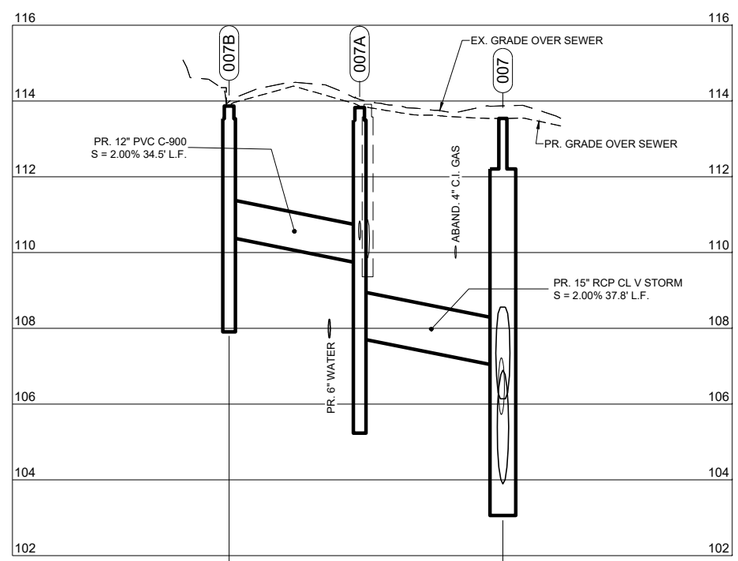
STORM SEWER RELAY
MAPLE TER.

FROM: N. 76TH ST.
TO: N. 75TH ST.

CONTRACT: 26-07
FILE NO.: 41-1010
DRAWN BY: B.T.
CHECKED BY: J.H.
SCALE: AS SHOWN

C09





PROPOSED RECTANGULAR CATCH BASINS

#	Size	Location (C/L Structure)	Location (Face of Curb)	Prop. Grate Elev. (at gutter)	Prop. Neenah Castings	Sump (V.F.)	Invert Elevations
007A	30" X 72"	20+57.3 AT 17.5' RT.	20+57.3 AT 18.3' RT	113.82	R-3293-2	2.0	15" N - 107.73 12" W - 109.71 6" E - 110.33
007B	30" X 36"	20+57.3 AT 16.9' LT.	20+57.3 AT 17.7' LT	113.86	R-3246-AL	2.0	12" E - 110.40

PROPOSED STORM SEWER MANHOLES WITH FLAT-TOP SLABS

#	Dia.	Location (Center of Structure)	Prop. Rim Elev.	Invert Elevations
007	72"	12+57.8 AT 5.6' RT.	113.54	15" S - 106.98 36" W - 103.89 29" X 45" E - 106.14

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SCALE
0 20 40
FEET

DATE	DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

STORM SEWER RELAY

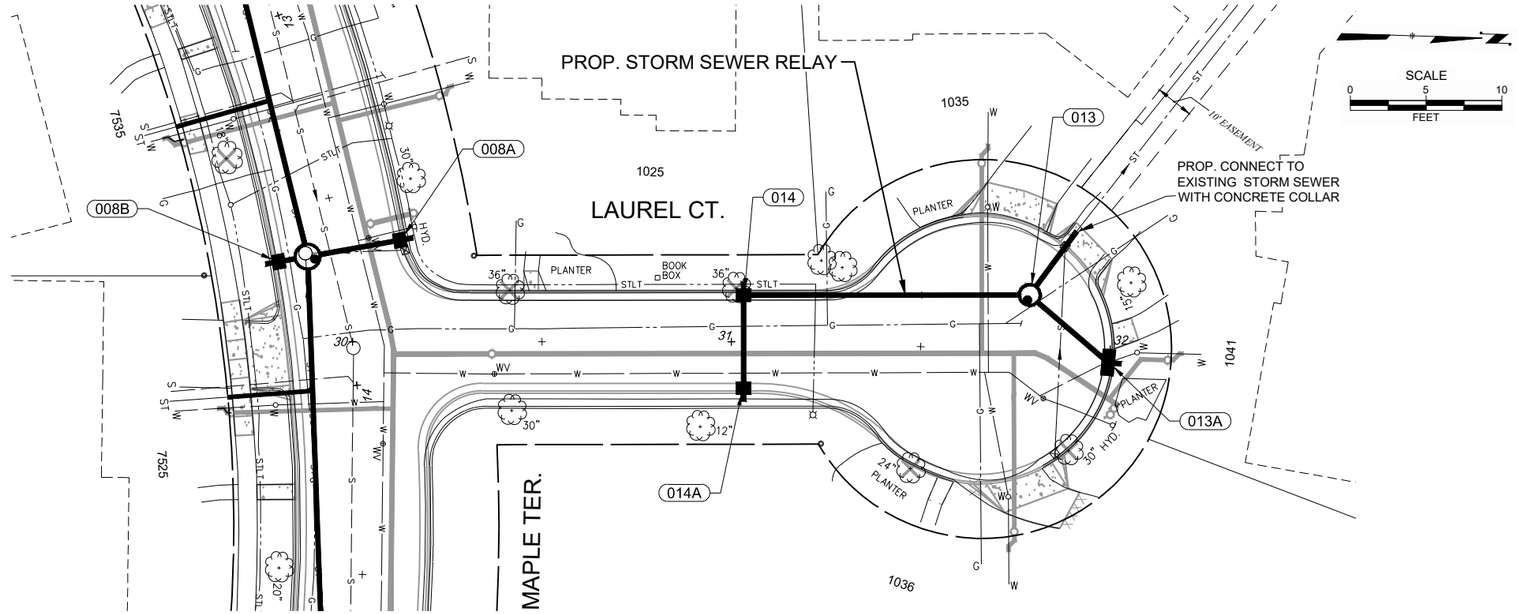
N. 76TH ST.

FROM: 50' SOUTH OF MAPLE TER.
TO: MAPLE TER.

CONTRACT: 26-07
FILE NO.: 41-1010
DRAWN BY: B.T.
CHECKED BY: J.H.
SCALE: AS SHOWN

C10

FILE NAME : S:\DEPARTMENT FOLDERS\ENGINEERING\ACAD_PROJECTS\26-07 PERRY CT\DESIGN\PERRY CT PROP STORM.DWG
PLOT DATE : 1/16/2026 1:10 PM
PLOT BY : C.R.

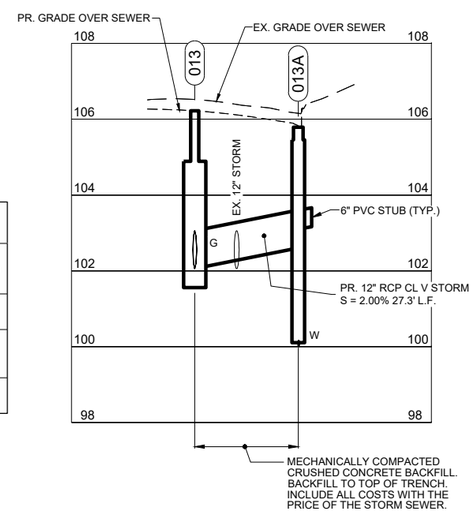


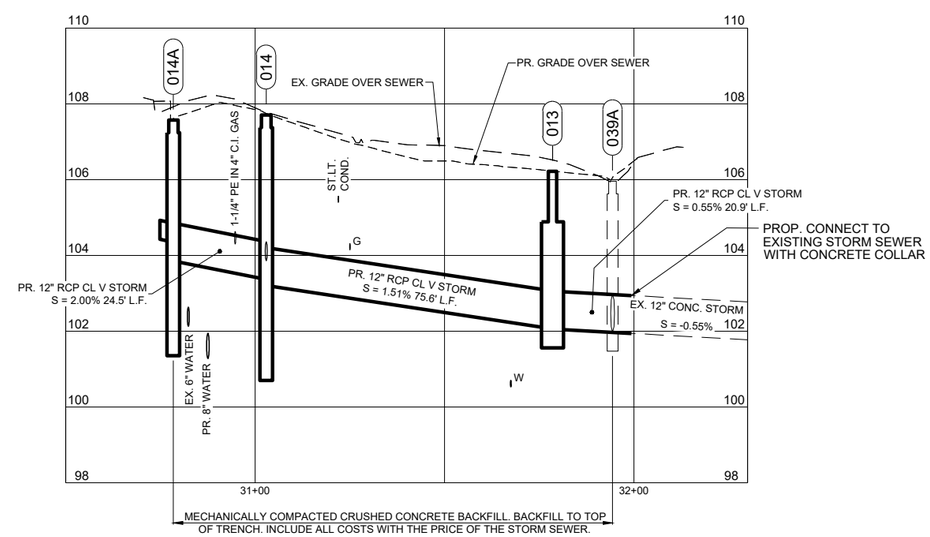
PROPOSED STORM SEWER MANHOLES WITH FLAT-TOP SLABS

#	Dia.	Location (Center of Structure)	Prop. Rim Elev.	Invert Elevations
013	60"	31+78.8 AT 14.3' LT.	106.22	12" S - 102.06 12" NE - 102.06 12" NW - 102.06

PROPOSED RECTANGULAR CATCH BASINS

#	Size	Location (C/L Structure)	Location (Face of Curb)	Prop. Grate Elev. (at gutter)	Prop. Neenah Castings	Sump (V.F.)	Invert Elevations
013A	30" X 72"	31+99.5 AT 3.5' RT.	32+00.0 AT 3.6' RT	105.79	R-3293-2	2.0	12" SW - 102.61 6" N - 103.10
014	30" X 36"	31+03.2 AT 12.3' LT.	31+03.0 AT 13.0' LT	107.71	R-3293-2	2.0	12" E - 103.36 12" N - 103.20 6" W - 103.86
014A	30" X 36"	31+03.2 AT 12.3' RT.	31+03.2 AT 13.0' RT	107.57	R-3293-2	2.0	12" W - 103.85 6" E - 104.35





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DATE	DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

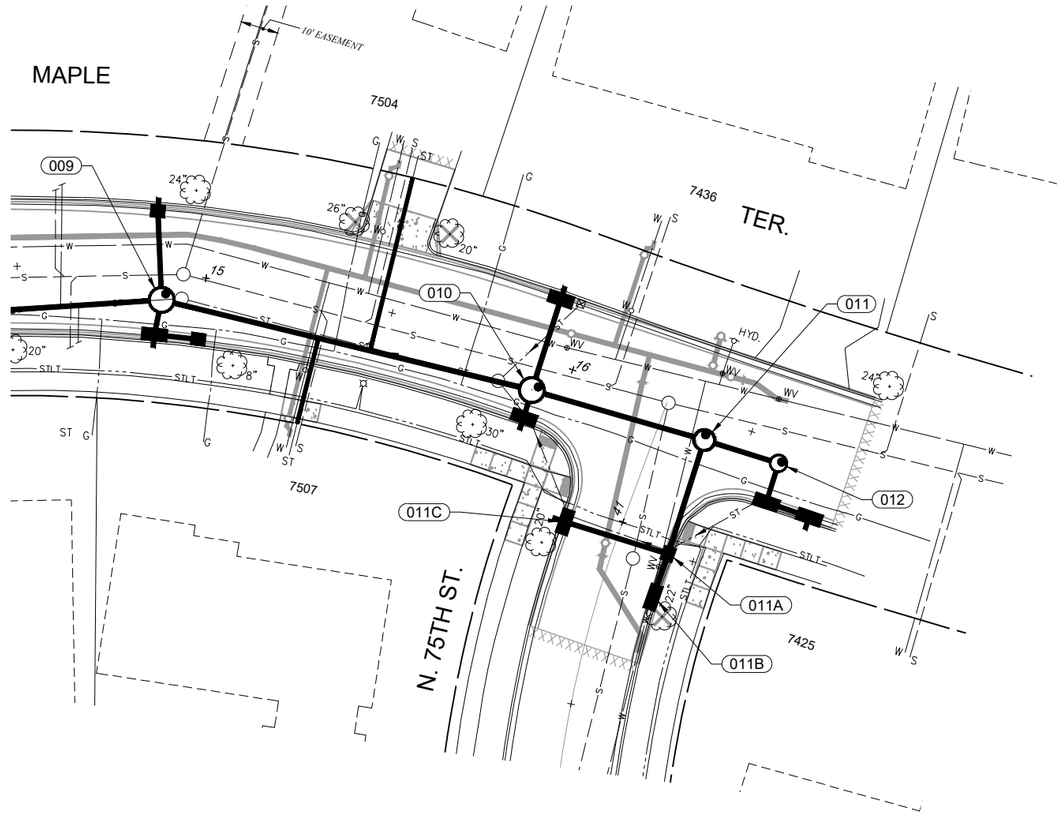
STORM SEWER RELAY
LAUREL CT.

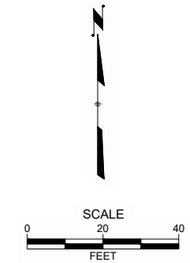
FROM: MAPLE TER.
TO: NORTH END

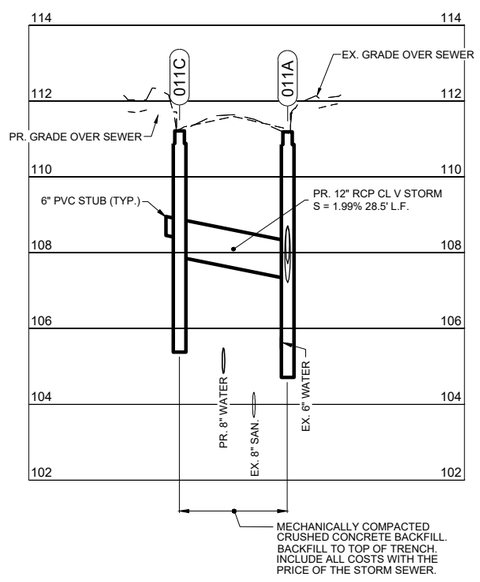
CONTRACT: 26-07
FILE NO.: 41-1010
DRAWN BY: B.T.
CHECKED BY: J.H.
SCALE: AS SHOWN

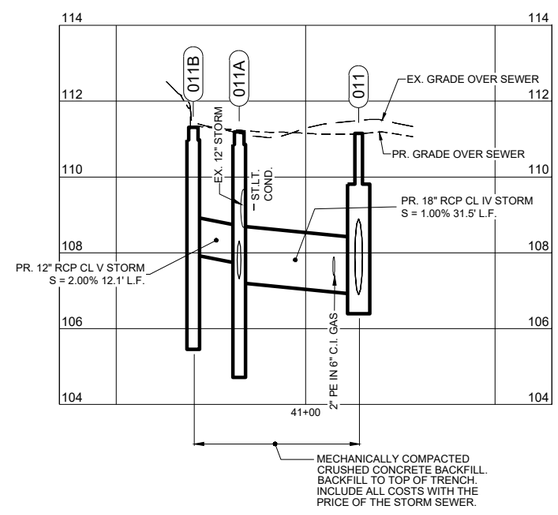
C11

FILE NAME : S:\DEPARTMENT FOLDERS\ENGINEERING\ACAD_PROJECTS\26-07 PERRY CT\DESIGN\PERRY CT PROP STORM.DWG
PLOT DATE : 1/16/2026 1:10 PM
PLOT BY : C.R.









PROPOSED RECTANGULAR CATCH BASINS

#	Size	Location (C/L Structure)	Location (Face of Curb)	Prop. Grate Elev. (at gutter)	Prop. Neenah Castings	Sump (V.F.)	Invert Elevations
011A	30" X 36"	40+96.1 AT 14.3' RT.	40+96.1 AT 15.0' RT.	111.19	R-3293-2	2.0	12" S - 107.71 12" W - 107.31 18" N - 107.21
011B	30" X 72"	40+83.4 AT 14.3' RT.	40+83.4 AT 14.8' RT	111.31	R-3293-2	2.0	12" N - 107.95
011C	30" X 72"	40+94.9 AT 14.2' LT.	40+94.9 AT 15.0' LT	111.21	R-3293-2	2.0	12" E - 107.88 6" W - 108.38

PROPOSED STORM SEWER MANHOLES WITH FLAT-TOP SLABS

#	Dia.	Location (Center of Structure)	Prop. Rim Elev.	Invert Elevations
011	60"	16+38.8 AT 6.0' RT.	111.15	18" S - 106.89 24" W - 106.89 24" E - 106.89

Underground utilities have been shown to a reasonable degree of accuracy using diggers hotline field locates and record drawings. However, the city does not guarantee their exact size, location or depth or that of others not shown. The contractor shall verify the existence of these utilities and those not shown. Costs for locating and delay shall be incidental to the contract.

DATE	DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

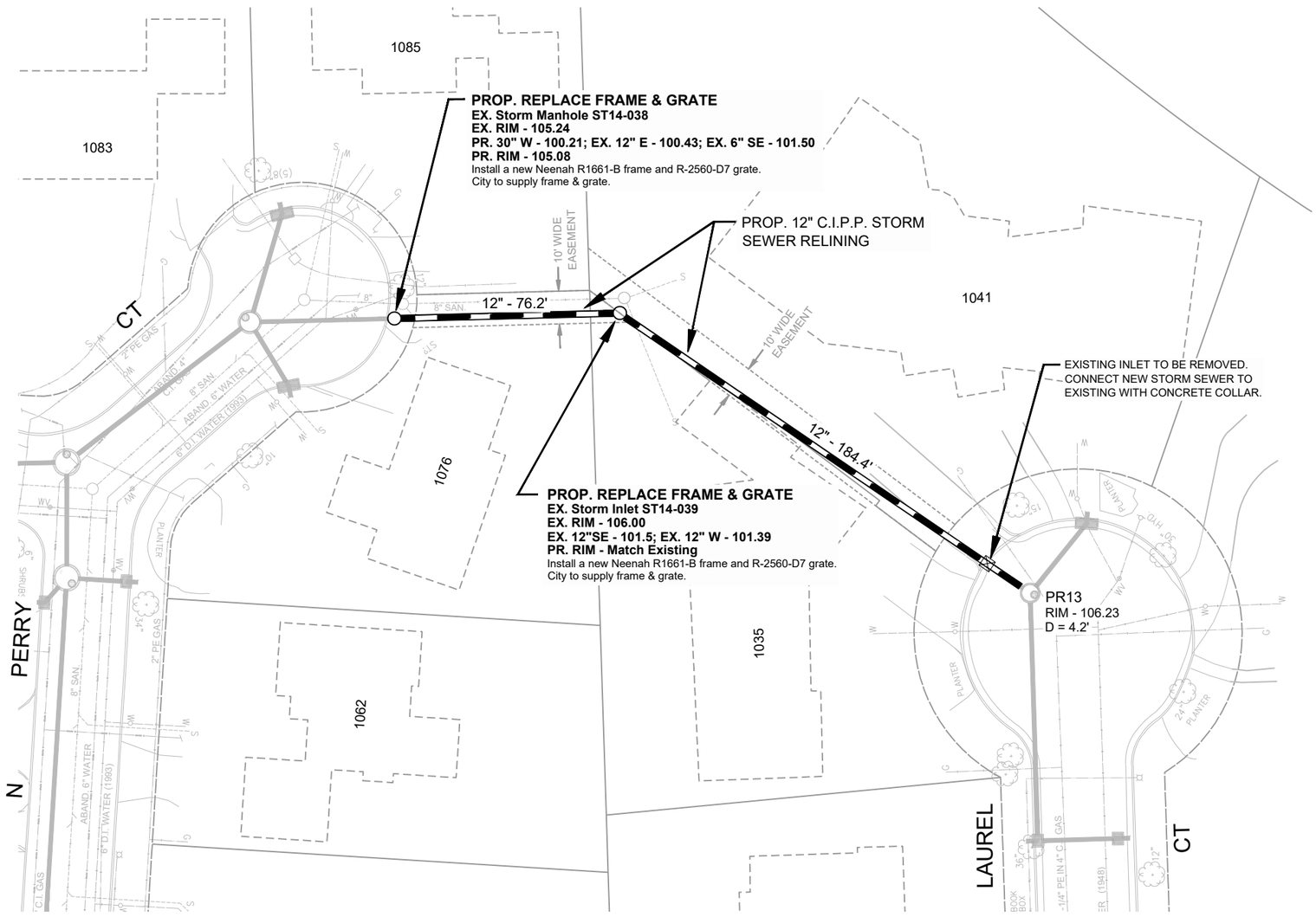
STORM SEWER RELAY

N. 75TH ST.

FROM: 55' SOUTH OF MAPLE TER.
TO: MAPLE TER.

CONTRACT: 26-07
FILE NO.: 41-1010
DRAWN BY: B.T.
CHECKED BY: J.H.
SCALE: AS SHOWN

C12



Underground utilities have been shown to a reasonable degree of accuracy using diggers hotline field locates and record drawings. However, the city does not guarantee their exact size, location or depth or that of others not shown. The contractor shall verify the existence of these utilities and those not shown. Costs for locating and delay shall be incidental to the contract.

SCALE
0 20 40
FEET

DATE	DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

STORM SEWER RELINING
IN EASEMENT

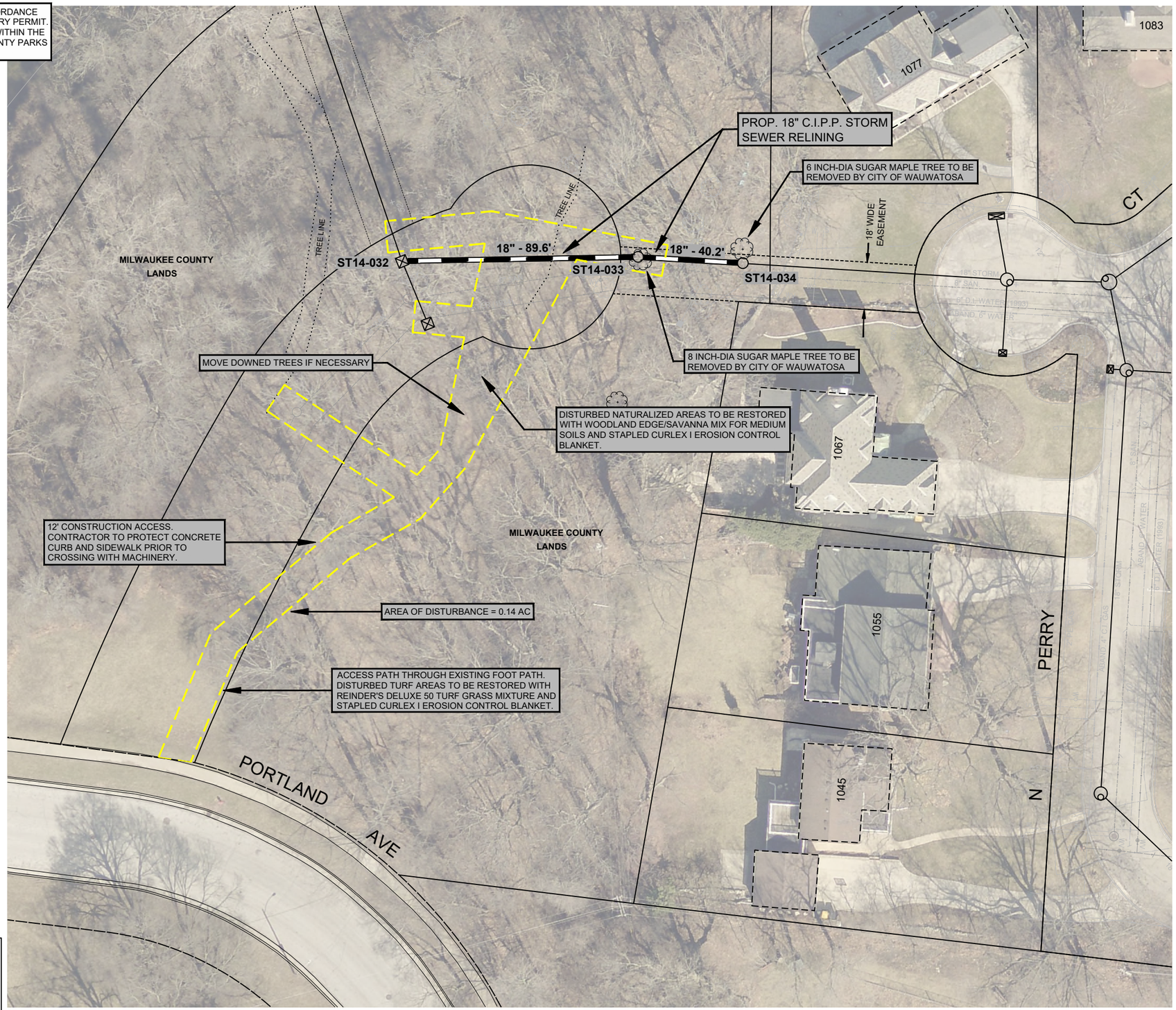
FROM: LAUREL CT
TO: N PERRY CT

CONTRACT: 26-07
FILE NO: 41-1010
DRAWN BY: WAT
CHECKED BY: MJA
SCALE: AS SHOWN

C13

FILE NAME : S:\DEPARTMENT FOLDERS\ENGINEERING\ACAD_PROJECTS\26-07 PERRY CT\DESIGN\PERRY CT_STORM SEWER LINING.DWG PLOT DATE : 1/15/2026 12:48 PM PLOT BY : WTREU

NOTE: ACCESS TO EASEMENT SHALL BE IN ACCORDANCE WITH MILWAUKEE COUNTY PARKS RIGHT OF ENTRY PERMIT. CONTRACTOR SHALL ACCESS ALL WORK FROM WITHIN THE 12' UTILITY EASEMENT. NOTIFY MILWAUKEE COUNTY PARKS FIVE DAYS PRIOR TO ANY WORK.



Underground utilities have been shown to a reasonable degree of accuracy using diggers hotline field locates and record drawings. However, the city does not guarantee their exact size, location or depth or that of others not shown. The contractor shall verify the existence of these utilities and those not shown. Costs for locating and delay shall be incidental to the contract.

SCALE
0 20 40
FEET

DATE	DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

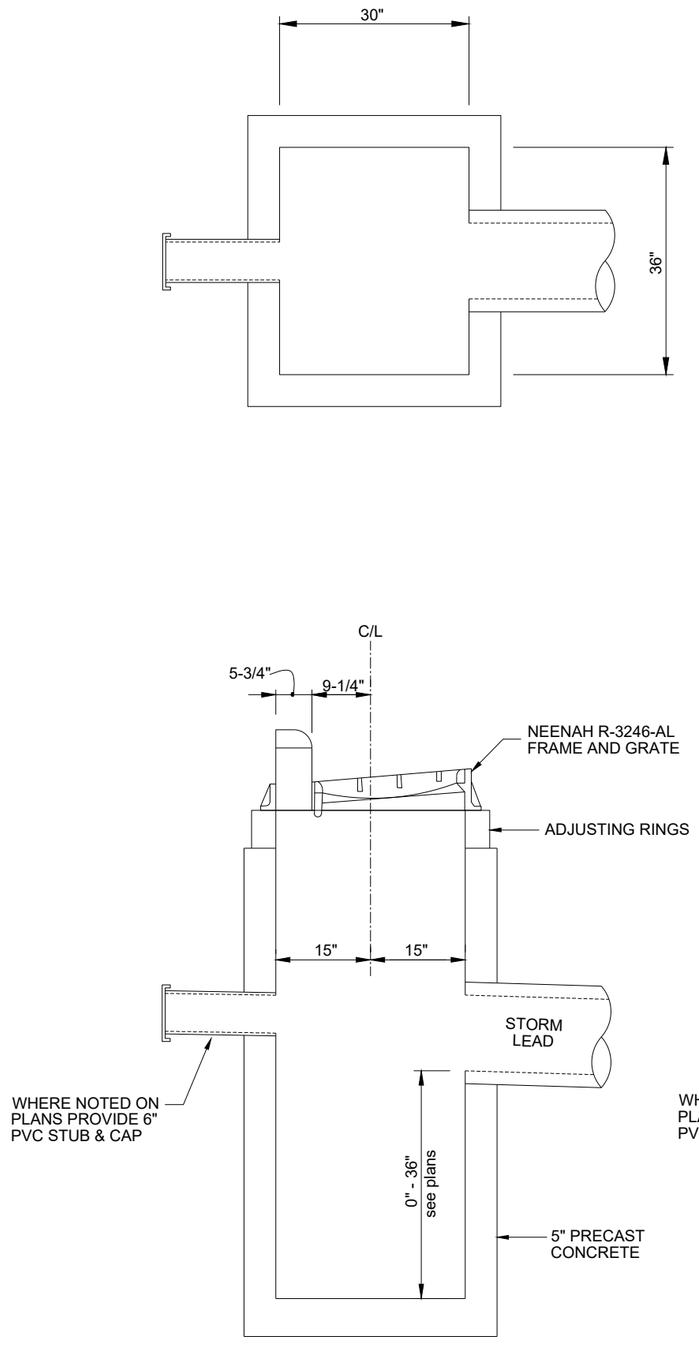
STORM SEWER RELINING
IN EASEMENT

FROM: N PERRY CT
TO: WEST IN EASEMENT

CONTRACT:	26-07
FILE NO:	41-1010
DRAWN BY:	WAT
CHECKED BY:	MJA
SCALE:	AS SHOWN

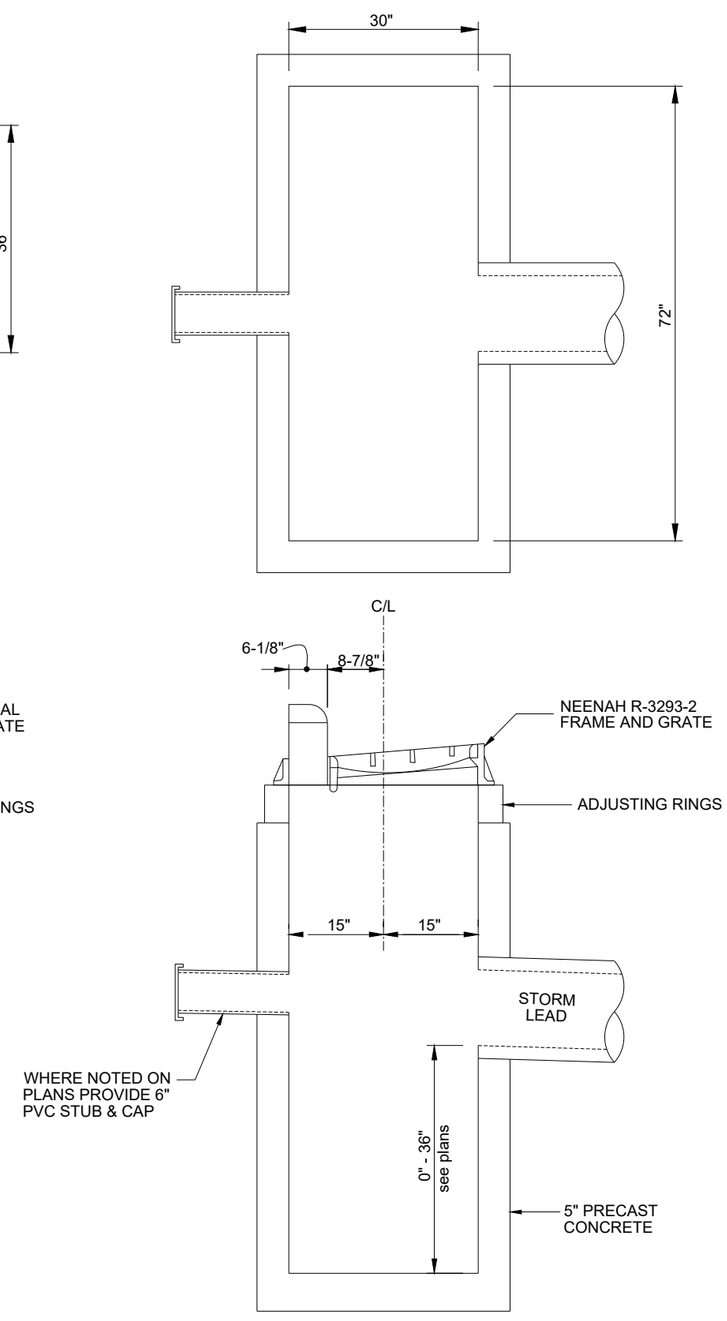
C14

FILE NAME : S:\DEPARTMENT FOLDERS\ENGINEERING\ACAD_PROJECTS\26-07 PERRY CT\DESIGN\PERRY CT_STORM SEWER LINING.DWG PLOT DATE : 1/15/2026 12:49 PM PLOT BY : WTREU



30" X 36" STORM SEWER CATCH BASIN

N.T.S.



30" X 72" STORM SEWER CATCH BASIN

N.T.S.

STORM SEWER NOTES:

1. ALL IRON FROM EXISTING STRUCTURES WHICH ARE CALLED OUT FOR REMOVAL OR REPLACEMENT SHALL BE SALVAGED TO THE CITY OF WAUWATOSA DEPARTMENT OF PUBLIC WORKS.
2. ALL NEW MANHOLE FRAMES AND COVERS SHALL BE PROVIDED BY THE CITY OF WAUWATOSA AT THE DEPARTMENT OF PUBLIC WORKS. CONTRACTOR SHALL CALL AT LEAST ONE WORKING DAY IN ADVANCE TO CITY DPW TO ARRANGE PICKUP OF FRAMES AND COVERS.
3. CONTRACTOR SHALL EXPOSE EXISTING STORM SEWER AT ALL LOCATIONS PRIOR TO START OF CONSTRUCTION TO VERIFY EXACT LOCATION AND INVERT OF EXISTING SEWER. ANY DISCREPANCIES SHALL BE REPORTED TO ENGINEER TO ALLOW DESIGN MODIFICATIONS AS REQUIRED. EXISTING SANITARY SEWER AND WATER MAIN CROSSINGS HAVE BEEN SHOWN IN THE PROFILE ALONG THE STORM SEWER BASED ON BEST AVAILABLE RECORDS. ELECTRIC, TELEPHONE, GAS, STREET LIGHTING, WATER AND SANITARY SERVICES ARE SHOWN IN PLAN AND PROFILE VIEW BASED ON BEST AVAILABLE RECORDS. CONTRACTOR SHALL LOCATE SERVICES IN THE FIELD AND CROSSING OF THESE SERVICES ARE INCIDENTAL TO UNIT BID PRICE FOR STORM SEWER.
4. STORM LATERAL LOCATIONS ARE APPROXIMATE ONLY. FINAL LOCATION SHALL BE DETERMINED IN FIELD DURING CONSTRUCTION. ALL STORM LATERALS SHALL HAVE 3' TO 4' OF COVER AT 2' BEHIND BACK OF CURB. ALL STORM LATERALS SHALL HAVE A MINIMUM OF 1/4 INCH PER FOOT POSITIVE SLOPE.
5. ALL STORM SEWER ELEVATIONS ON PLANS ARE INVERT ELEVATIONS.
6. ALL CATCH BASINS/INLETS OFFSETS ARE TO FACE OF CURB.
7. CONSTRUCT ALL SEWER IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS FOR SEWER AND WATER CONSTRUCTION IN WISCONSIN, LATEST EDITION- INCLUDING ADDENDUMS.
8. ALL RIM ELEVATIONS ARE APPROXIMATE, AND SHALL BE VERIFIED IN THE FIELD DURING CONSTRUCTION.
9. ALL INLET AND CATCH BASIN GRATE ELEVATIONS ARE FROM CURB FLOW LINE.
10. BYPASS PUMPING SHALL BE INCIDENTAL TO STORM SEWER CONSTRUCTION.
11. CONTRACTOR SHALL ABANDON ALL STORM SEWER IN LINE WITH PROPOSED SEWER BY REMOVING ALL EXISTING PIPE AND MANHOLES. ABANDONMENT IS INCIDENTAL TO PROPOSED SEWER INSTALLATION.
12. CONTRACTOR SHALL RECONNECT ALL EXISTING LIVE STORM SEWER LINES OR LATERALS TO THE PROPOSED STORM SEWER SYSTEM.
13. ALL UTILITY INSTALLATIONS SHALL HAVE MECHANICALLY CRUSHED CONCRETE BACKFILL CONSOLIDATED BY MECHANICAL COMPACTION, UNLESS INDICATED OTHERWISE ON THE PLANS.

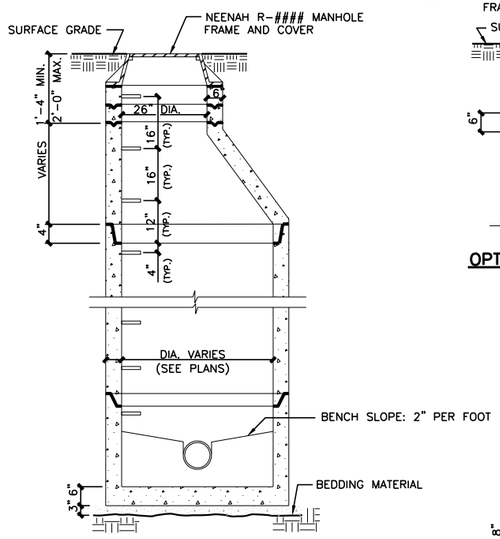
DATE	DESCRIPTION
.	
.	

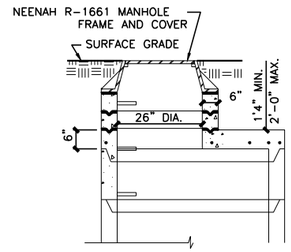
CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

STORM SEWER DETAILS

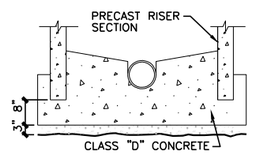
CONTRACT: 26-07
FILE NO: 41-1010
DRAWN BY: BJT
CHECKED BY: MA
SCALE: AS SHOWN

C15





OPTIONAL FLAT-TOP SECTION



OPTIONAL POURED BASE

GENERAL NOTES

FLAT TOP SLAB MAY BE USED FOR 5'-0" AND 6'-0" DIA. MANHOLES.

PRECAST CONCRETE ADJUSTING RINGS TO BE REINFORCED WITH ONE HOOP OF STEEL CENTERED WITHIN THE RING. WHERE NECESSARY, RINGS SHALL BE GROOVED TO RECEIVE STEP.

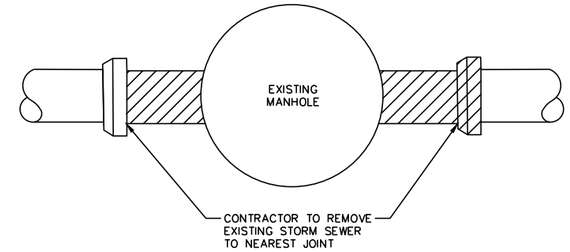
CONCRETE AND STEEL REINFORCEMENT SHALL CONFORM TO DESIGNATION C-478 REQUIREMENTS OF ASTM SPECIFICATIONS.

JOINTS SHALL BE WATERTIGHT AND SHALL BE MADE USING RUBBER GASKETS OR BUTYL RUBBER MASTIC MATERIAL.

AREA OF CIRCUMFERENTIAL STEEL = 0.12 SQ. INCH PER LINEAL FOOT.

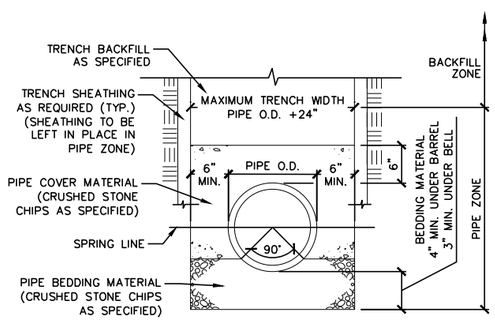
3" BEDDING MATERIAL REQUIRED UNDER BASE. MANHOLES TO BE BACKFILLED WITH GRANULAR BACKFILL MATERIAL.

PRECAST MANHOLE



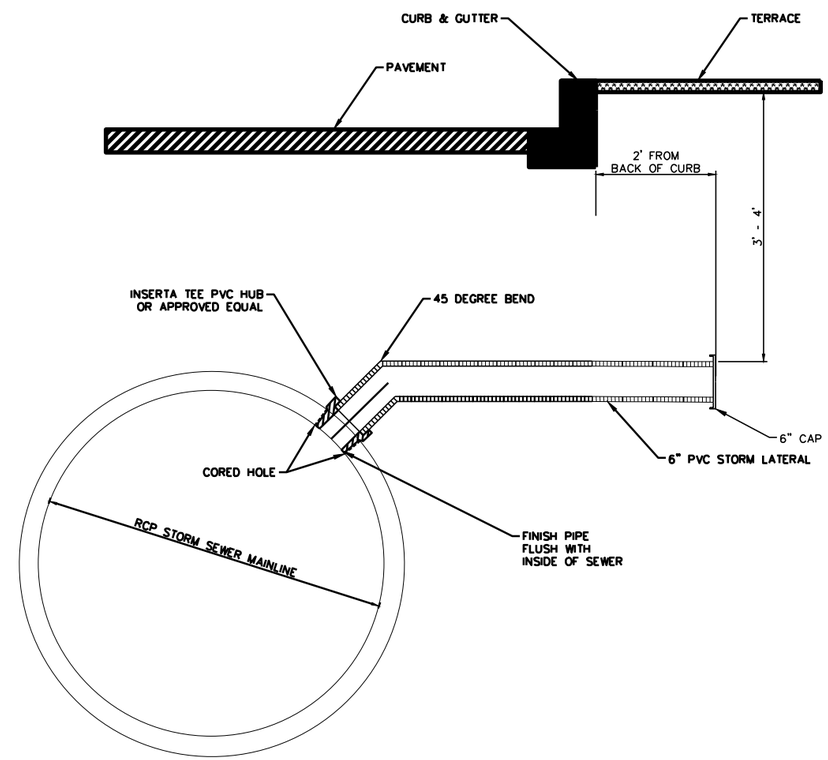
STORM MANHOLE CUT-IN CONNECTION

N.T.S.



NOTE: 3" OF ADDITIONAL CRUSHED STONE REQUIRED IN WET TRENCH AT NO ADDITIONAL COST.

CLASS "C" BEDDING DETAIL FOR STORM SEWER



GENERAL NOTES:

1. CORED CONNECTIONS - CORING SHALL BE UNDERSTOOD TO MEAN CUTTING A CIRCULAR HOLE INTO THE MAIN SEWER USING A MECHANICALLY-POWERED HOLLOW CYLINDRICAL BIT. THE FITTING AND METHOD OF ATTACHMENT TO THE MAIN SEWER SHALL BE APPROVED BY THE CITY OF WAUWATOSA.
2. ALL ADHESIVES USED SHALL BE COMPATIBLE TO THE PIPE MATERIAL.
3. PVC SHALL BE SDR 35
4. CORE HOLE SHALL BE SMALLER THAN OUTSIDE DIAMETER OF BELL.
5. HORIZONTAL LOCATION IS APPROXIMATE
6. CONTRACTOR IS RESPONSIBLE FOR FINAL VERTICAL PROFILE. BENDS AND FITTINGS ARE OPTIONAL TO AVOID UTILITY CONFLICTS. ANY BENDS AND FITTINGS ARE INCIDENTAL TO THE STORM LATERAL UNIT PRICE.

STORM LATERAL CONNECTION TO SEWER

DATE	DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

STORM SEWER DETAILS

CONTRACT:	26-07
FILE NO.:	41-1010
DRAWN BY:	BJT
CHECKED BY:	MA
SCALE:	AS SHOWN

C16

GENERAL NOTES

1. ELEVATIONS SHOWN FOR CURB AND GUTTER ARE FLANGE LINE ELEVATIONS UNLESS OTHERWISE NOTED
2. NO TREES OR SHRUBS SHALL BE DISTURBED WITHOUT THE WRITTEN APPROVAL OF THE ENGINEER
3. CONTRACTOR SHALL PRESERVE AND PROTECT ALL RETAINING WALLS AND OTHER APPURTENANCES ADJACENT TO THE PROJECT.
4. A SAWCUT IS REQUIRED AT THE EDGE OF ALL CURB AND GUTTER, SIDEWALK, AND PAVEMENT REPLACEMENT LOCATIONS. SAWING FOR CURB AND GUTTER AND SIDEWALK IS INCIDENTAL TO THE CONTRACT.
5. SIDEWALKS TO REMAIN OPEN AT ALL TIMES AND CONTRACTOR IS REQUIRED TO PROVIDE ADA ACCESSIBLE SURFACE AT THE END OF EACH WORKING DAY WHERE THEY EXCAVATED FOR LATERALS.
6. NO TRUCKING OR STAGING ON HONEY CREEK PARKWAY
7. CONTRACTOR MUST MAINTAIN DRIVEUP ACCESS TO MAILBOXES AT ALL TIMES.
8. INSTALL IN ALL INLETS AND CATCH BASINS DIRECTLY DOWN-SURFACE OF ALL OPEN-CUT WORK PRIOR TO STARTING WORK OR WHERE REQUIRED BY THE CITY ENGINEER. INLET CONTROL MUST BE REMOVED WHEN WORK IS COMPLETED. COST TO BE INCIDENTAL TO CONTRACT.

ORDER OF PAVING PLAN SHEETS

GENERAL NOTES

PAVING OVERVIEW

TYPICAL SECTIONS

CONSTRUCTION DETAILS

REMOVALS

PLAN AND PROFILE

PAVEMENT GRADES

CURB RAMP DETAILS

TRAFFIC CONTROL

SIGNING PLAN

MISCELLANEOUS QUANTITIES

CROSS SECTIONS

CONSTRUCT HMA PAVEMENT WITH THE FOLLOWING

	LOWER LAYER		UPPER LAYER	
LOCATION	HMA	DEPTH	HMA	DEPTH
PERRY COURT	3 LT 58-28 S	3 1/2-INCH	5 LT 58-28 S	2-INCH
LAUREL COURT	3 LT 58-28 S	3 1/2-INCH	5 LT 58-28 S	2-INCH
MAPLE TERRACE	3 LT 58-28 S	3 1/2-INCH	5 LT 58-28 S	2-INCH

DATE	DESCRIPTION
2/11/2021	ISSUED FOR BIDDING

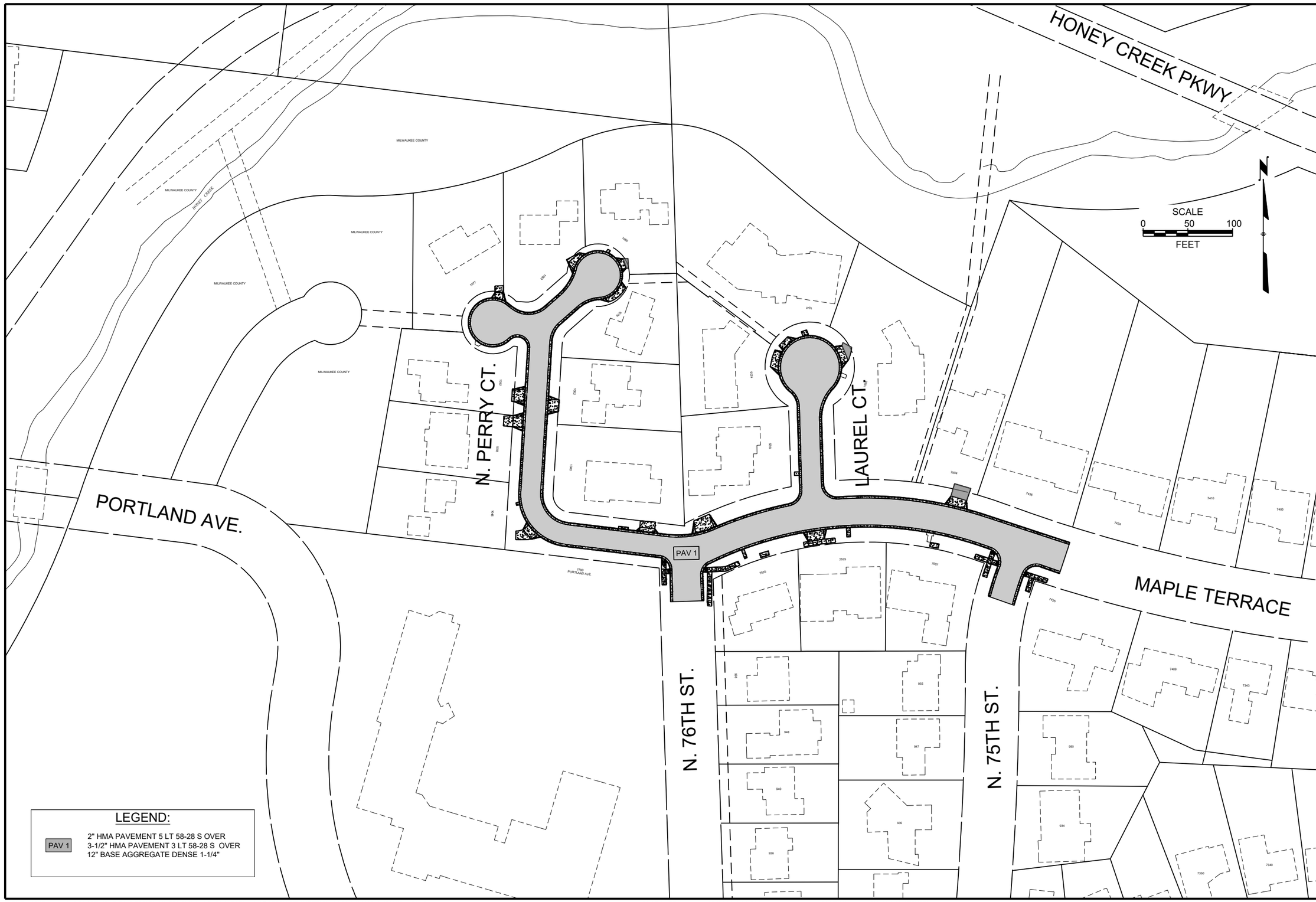
CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

PAVING GENERAL NOTES

2026 STREET & UTILITY IMPROVEMENTS

CONTRACT: 26-07
FILE NO: 15-1095
DRAWN BY: BT
CHECKED BY: JH
SCALE: AS SHOWN

D01



DATE	DESCRIPTION
2/11/2021	ISSUED FOR BIDDING

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

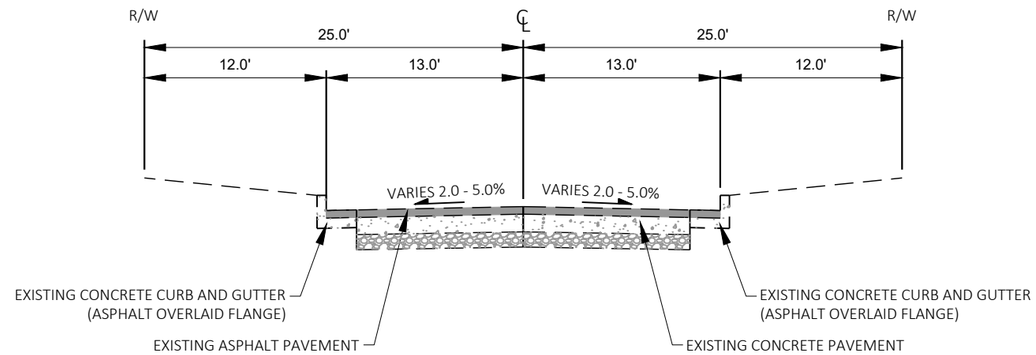
PAVING OVERVIEW

2026 STREET & UTILITY IMPROVEMENTS

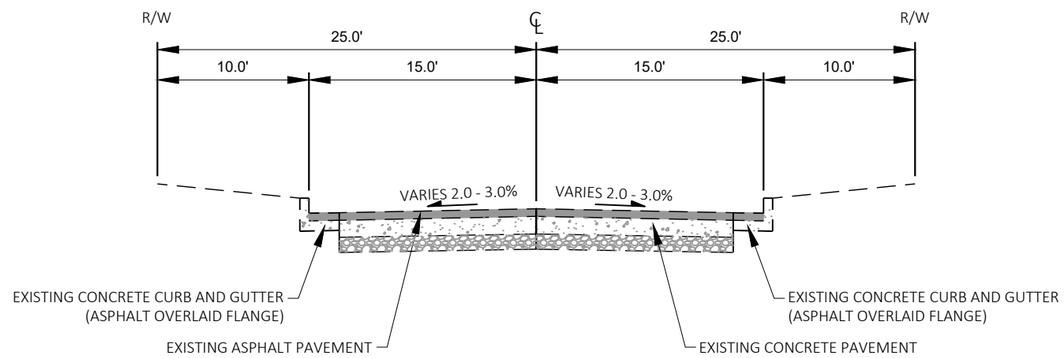
CONTRACT: 26-07
FILE NO: 15-1095
DRAWN BY: RC
CHECKED BY: JH
SCALE: AS SHOWN

D02

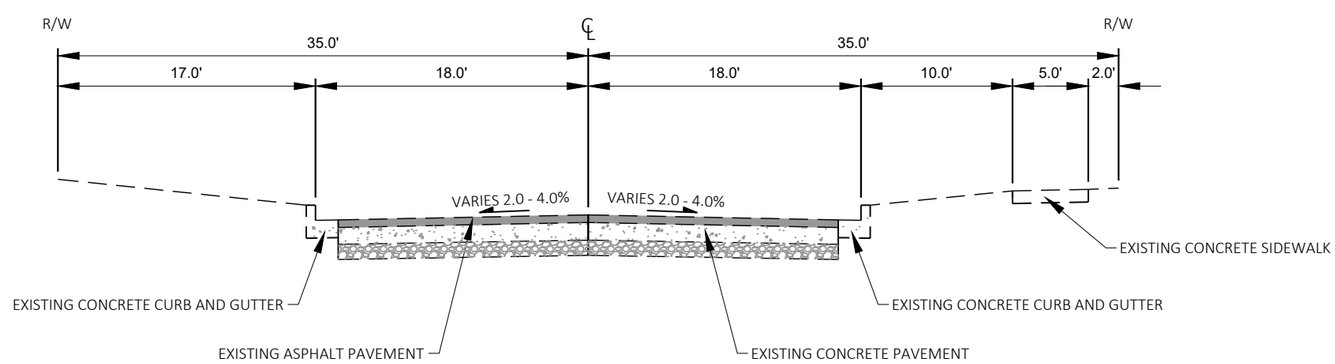
FILE NAME : S:\DEPARTMENT FOLDERS\ENGINEERING\ACAD_PROJECTS\26-07 PERRY CT\SHEETSPLAN\02 PAVING OVERVIEW.DWG
LAYOUT NAME - PAVING OVERVIEW
PLOT DATE : 1/15/2026 4:21 PM
PLOT BY : RYAN CHRISTENSEN



EXISTING TYPICAL SECTION
N PERRY COURT
TERMINI TO N. 76TH ST.



EXISTING TYPICAL SECTION
LAUREL COURT
TERMINI TO MAPLE TERRACE



EXISTING TYPICAL SECTION
MAPLE TERRACE
N. 75TH ST TO N. 76TH ST.

DATE	DESCRIPTION

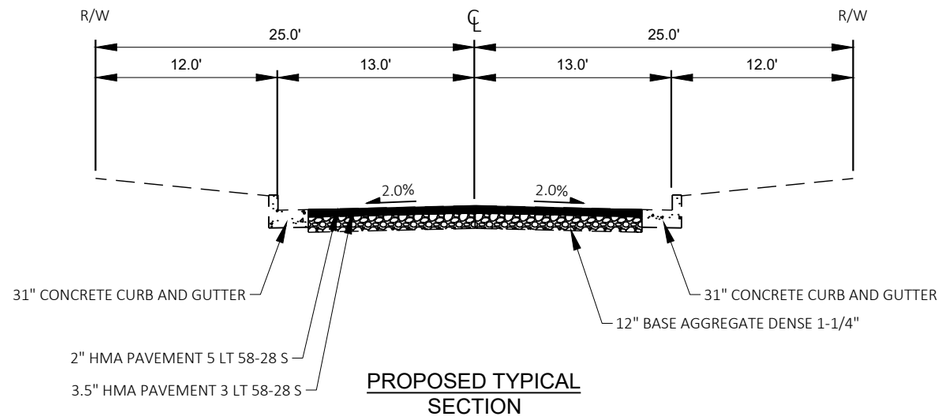
CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

EXISTING TYPICAL SECTIONS

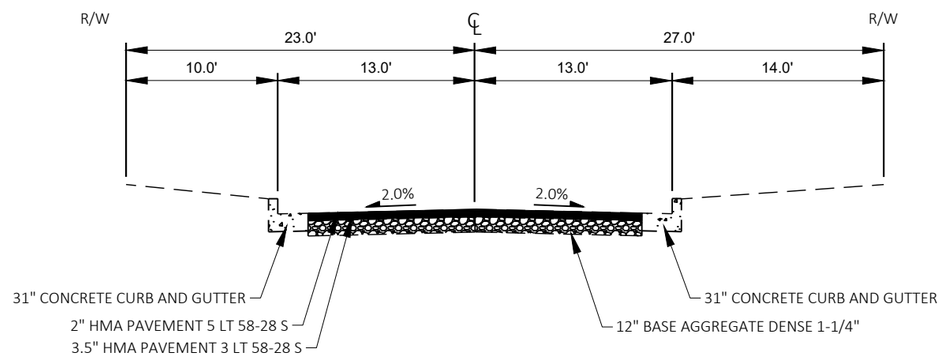
PERRY CT, LAUREL CT, & MAPLE TERRACE

CONTRACT: 26-07
FILE NO: 15-1095
DRAWN BY: RC
CHECKED BY: JH
SCALE: NOT TO SCALE

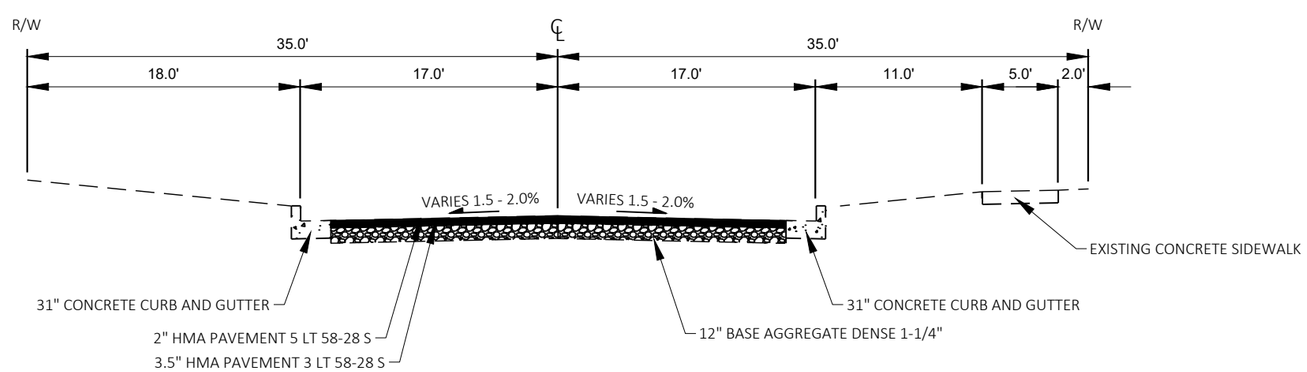
D03



PROPOSED TYPICAL SECTION
N PERRY CT
TERMINI TO N. 76TH ST.



PROPOSED TYPICAL SECTION
LAUREL COURT
TERMINI TO MAPLE TERRACE



PROPOSED TYPICAL SECTION
MAPLE TERRACE
N. 75TH ST TO N. 76TH ST.

DATE	DESCRIPTION

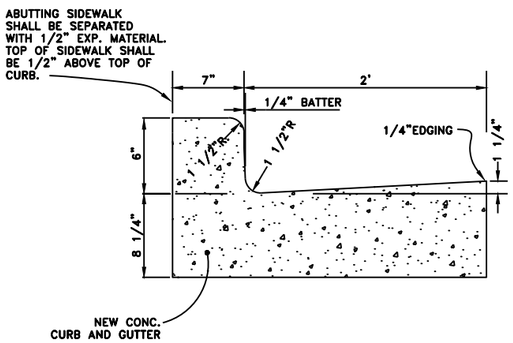
CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

PROPOSED TYPICAL SECTIONS

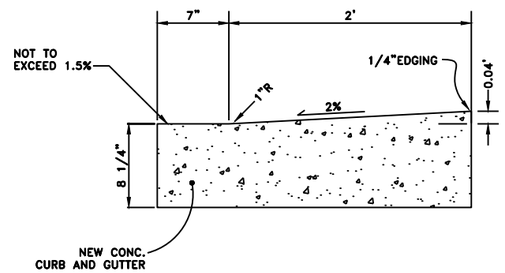
PERRY CT, LAUREL CT, & MAPLE TERRACE

CONTRACT: 26-07
FILE NO: 15-1095
DRAWN BY: RC
CHECKED BY: JH
SCALE: NOT TO SCALE

D04



31" CONCRETE
CURB AND GUTTER



CONCRETE CURB AND GUTTER
AT DRIVEWAY OPENING

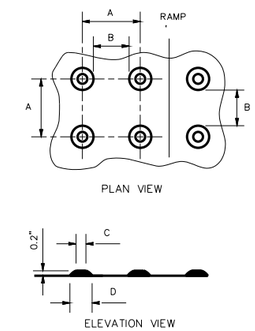
GENERAL NOTES

DETECTABLE WARNING FIELDS THAT ARE INSTALLED AS A GROUP OR SIDE BY SIDE, SHALL BE FROM THE SAME MANUFACTURER.

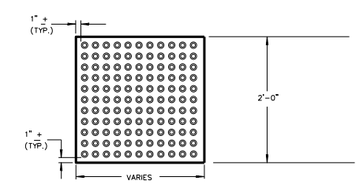
PLACE ALL DETECTABLE WARNING FIELD SYSTEMS IN ACCORDANCE TO THE MANUFACTURER'S RECOMMENDATION.

	MIN.	MAX.
A	1.6"	2.4"
B	0.65"	1.5"
C	*	*
D	0.9"	1.4"

* THE C DIMENSION IS 50% TO 65% OF THE D DIMENSION.



TRUNCATED DOMES
DETECTABLE WARNING PATTERN DETAIL



RECTANGULAR
PLATES

DETECTABLE WARNING FIELDS

DATE	DESCRIPTION
2/11/2021	ISSUED FOR BIDDING

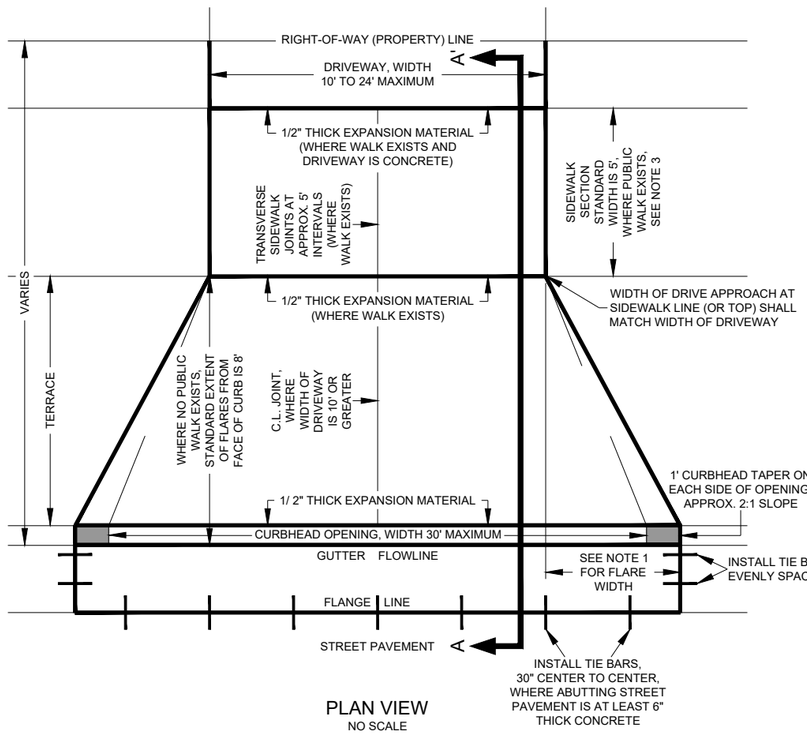
CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

CONSTRUCTION DETAILS

2026 STREET & UTILITY IMPROVEMENTS

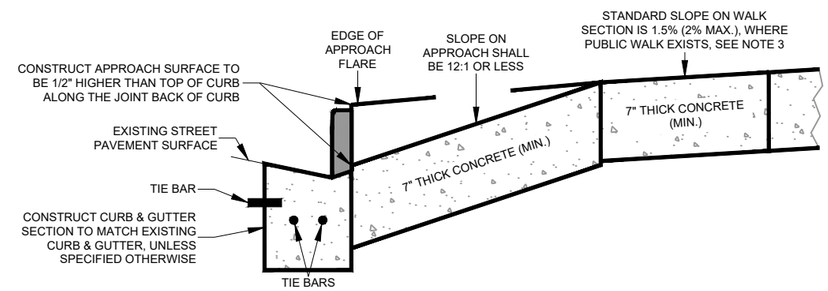
CONTRACT: 26-07
FILE NO: 15-1095
DRAWN BY: RC
CHECKED BY: JH
SCALE: NOT TO SCALE

D05

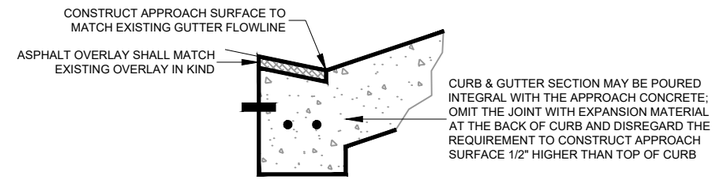


PLAN VIEW
NO SCALE

SECTION A - A'
(VERTICAL DIMENSION EXAGGERATED FOR CLARITY)



WHERE EXISTING GUTTER PAN HAS AN ASPHALT OVERLAY



CITY OF WAUWATOSA
DRIVE APPROACH DETAIL

NOTES:

1. FLARE WIDTH SHALL BE EITHER 4' OR EQUAL TO 1/2 THE EXTENT OF THE TERRACE (ROUNDED TO THE NEAREST FOOT), WHICHEVER IS LESS.
2. WHERE POSSIBLE, DRIVE APPROACHES SHALL BE CONSTRUCTED SO THAT 8" OF WATER DEPTH IN THE GUTTER FLOWLINE CANNOT LEAVE THE CITY PUBLIC RIGHT-OF-WAY. EXCEPTIONS MUST BE APPROVED IN WRITING BY THE ENGINEERING SERVICES.
3. SIDEWALK SECTION IS OPTIONAL WHERE NO PUBLIC SIDEWALK EXISTS. IF THE OPTIONAL SIDEWALK SECTION IS OMITTED THEN A STRAIGHT GRADE MAY BE BUILT FROM BACK OF CURB TO 15' BACK OF CURB FACE OR TO THE RIGHT-OF-WAY (PROPERTY) LINE, WHICHEVER IS LESS; SLOPE SHALL BE 12:1 OR LESS.

DATE	DESCRIPTION
2/11/2021	ISSUED FOR BIDDING

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

CONSTRUCTION DETAILS

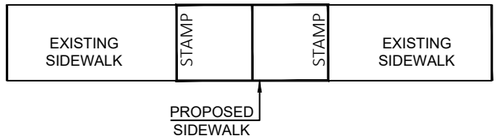
2026 STREET & UTILITY IMPROVEMENTS

CONTRACT: 26-07
FILE NO: 15-1095
DRAWN BY: RC
CHECKED BY: JH
SCALE: NOT TO SCALE

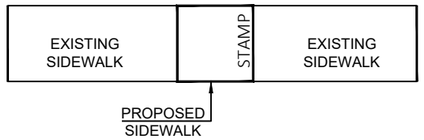
D06

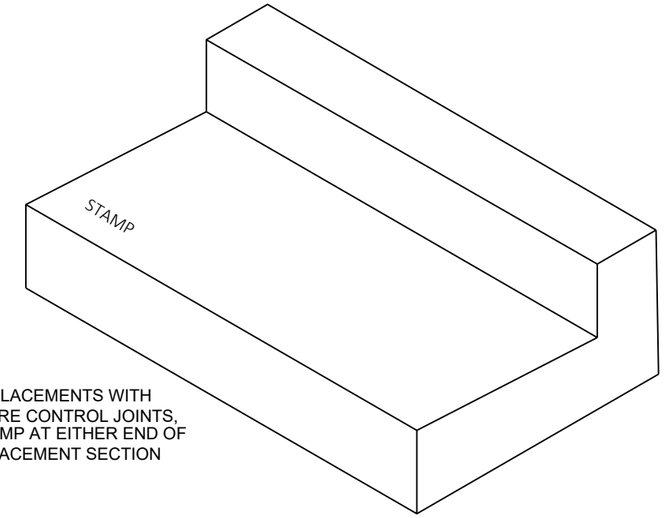
CITY OF WAUWATOSA
20XX
<COMPANY>

MULTIPLE SIDEWALK SQUARE REPLACEMENT

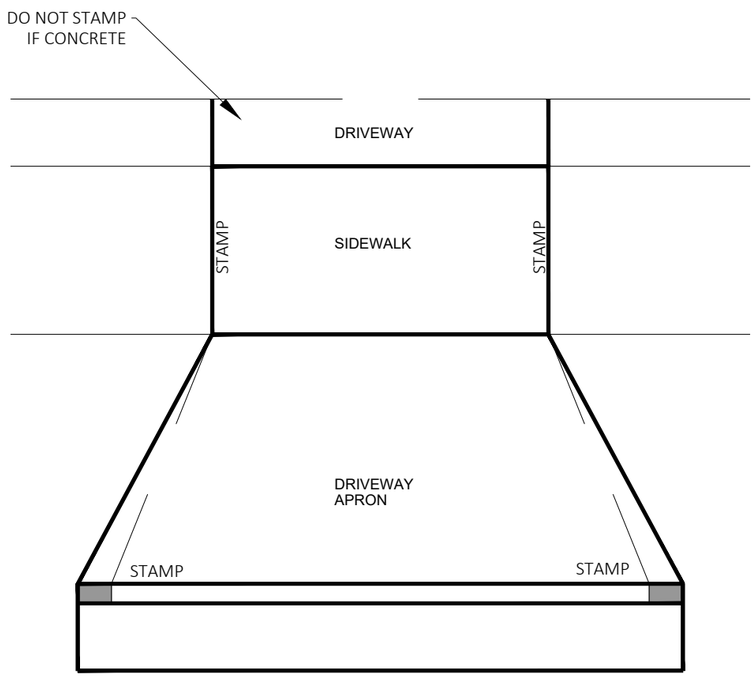


SINGLE SIDEWALK SQUARE REPLACEMENT



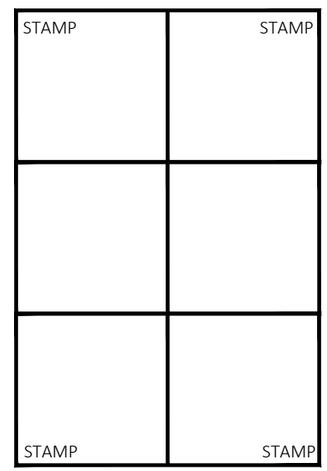


FOR REPLACEMENTS WITH ONE OR MORE CONTROL JOINTS, PLACE A STAMP AT EITHER END OF THE REPLACEMENT SECTION

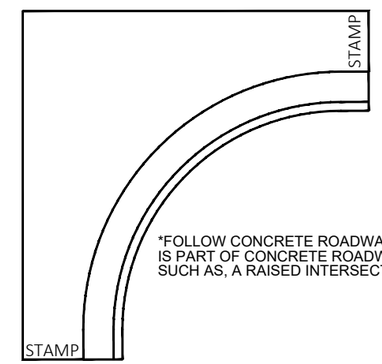


DRIVEWAY STAMP DETAIL

CONCRETE ROADWAY



RADIUS REPLACEMENT*



*FOLLOW CONCRETE ROADWAY DETAIL IF RADIUS IS PART OF CONCRETE ROADWAY REPLACEMENT, SUCH AS, A RAISED INTERSECTION

PAVEMENT STAMP DETAILS

CITY OF WAUWATOSA
CONCRETE STAMP DETAIL

GENERAL NOTES FOR CONCRETE STAMPS:

1. THE CONTRACTOR STALL MARK THE ENDS OF EACH PORTION OF CONCRETE WORK WITH A STAMP THAT SHALL SHOW "CITY OF WAUWATOSA", THE YEAR IN WHICH THE WORK WAS PLACED, AND THE NAME OF THE CONTRACTING COMPANY THAT PERFORMED THE WORK.
2. LETTER SIZE SHALL BE 1" TALL
3. STAMP NOT REQ'D ON CONCRETE TO BE OVERLAID

DATE	DESCRIPTION
2/11/2021	ISSUED FOR BIDDING

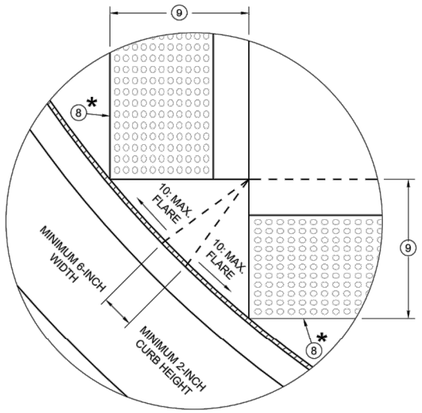
CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

CONSTRUCTION DETAILS

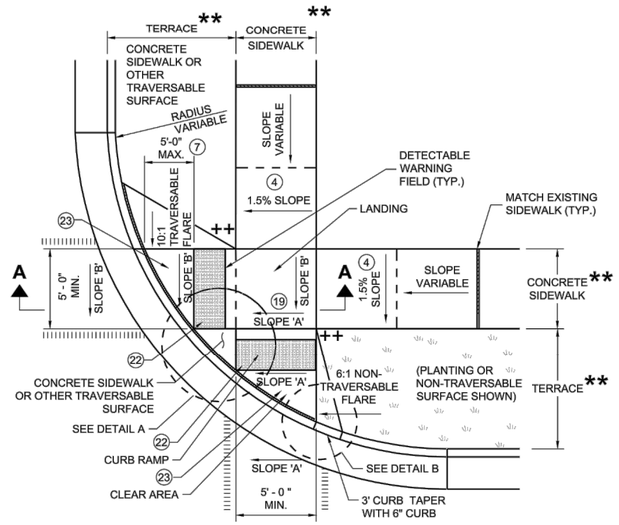
2026 STREET & UTILITY IMPROVEMENTS

CONTRACT: 26-07
FILE NO: 15-1095
DRAWN BY: RC
CHECKED BY: JH
SCALE: NOT TO SCALE

D07



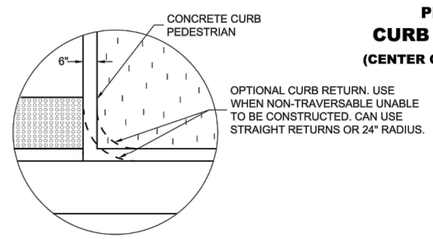
DETAIL A



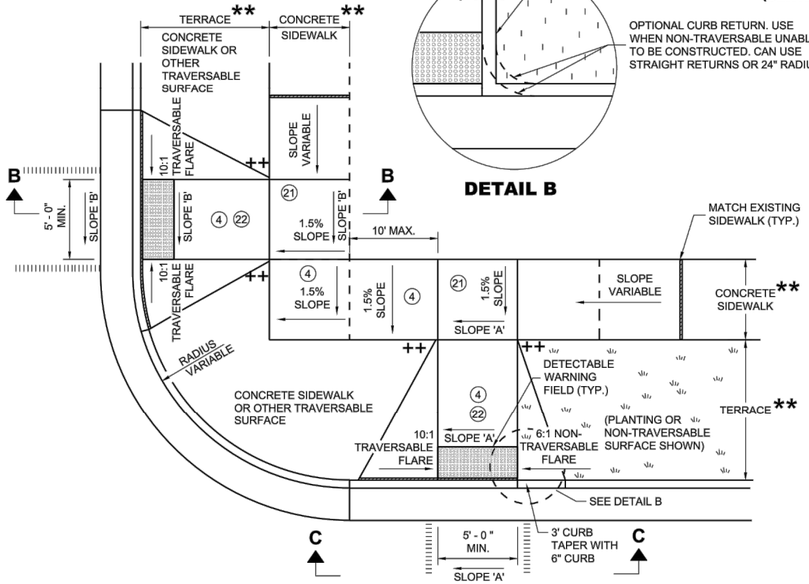
PLAN VIEW

CURB RAMP TYPE 2

(CENTER OF CORNER RADIUS)



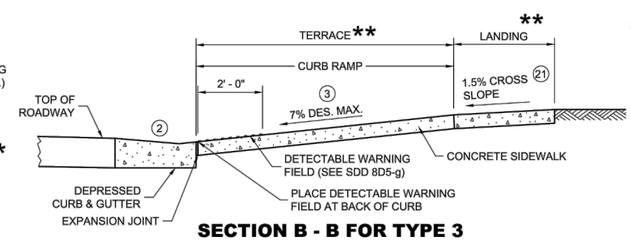
DETAIL B



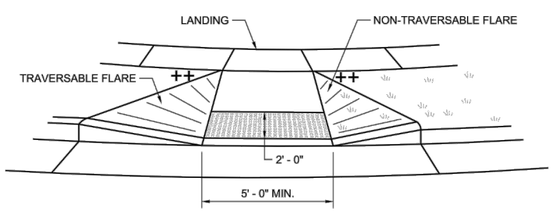
PLAN VIEW

CURB RAMP TYPE 3

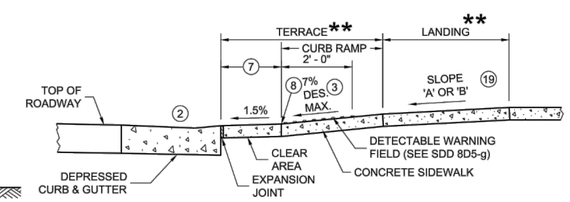
(OUTSIDE OF CROSSWALK AREA)



SECTION B - B FOR TYPE 3



VIEW C - C FOR TYPE 3



SECTION A - A FOR TYPE 2

LEGEND

- ½" EXPANSION JOINT SIDEWALK
- CONTRACTION JOINT SIDEWALK
- PAVEMENT MARKING CROSSWALK (WHITE)
- * MAXIMUM 2.1% SLOPE IN ALL DIRECTIONS IN FRONT OF GRADE BREAK
- ** WIDTH SHOWN ELSEWHERE IN THE PLANS
- ++ CONSTRUCT 6" WEDGE TO AVOID CONCRETE BREAKAGE

GENERAL NOTES

AVOID PLACING DRAINAGE STRUCTURES, JUNCTION BOXES OR OTHER OBSTRUCTIONS IN FRONT OF CURB RAMP ACCESS AREAS.

DETAILS OF CONSTRUCTION, MATERIALS AND WORKMANSHIP NOT SHOWN ON THIS DRAWING SHALL CONFORM TO THE PERTINENT REQUIREMENTS OF THE STANDARD SPECIFICATIONS AND THE APPLICABLE SPECIAL PROVISIONS.

DETECTABLE WARNING FIELDS THAT ARE INSTALLED AS A GROUP OR SIDE BY SIDE SHALL BE FROM THE SAME MANUFACTURER.

(2) GRADE CHANGE BETWEEN GUTTER COUNTER SLOPE AND THE CURB RAMP SLOPE IS DESIRABLY 11% OR LESS AND SHALL NOT EXCEED 13.3%. TYPICAL GUTTER COUNTER SLOPE IS 4% BUT MAY BE MODIFIED TO FIT FIELD CONDITIONS. PROVIDE LONGITUDINAL DRAINAGE AROUND CURB AND AWAY FROM CURB RAMP. NO VERTICAL LIPS OR DISCONTINUITIES ARE ALLOWED. SLOPE OF CURB HEAD OPENING SHALL MATCH THE RAMP SLOPE, MINIMALLY 1.5%, DESIRABLY 7% OR LESS, AND SHALL NOT EXCEED A MAXIMUM OF 8.3%. WHEN ADJACENT TO 1.5% LANDING, CONSTRUCT CURB HEAD OPENING AT 1.5% IN THE DIRECTION OF PEDESTRIAN TRAVEL.

(3) MAXIMUM 8.3% CURB RAMP SLOPE IS ALLOWABLE WITH GUTTER COUNTER SLOPE OF 5% MAXIMUM AND A 13.3% MAXIMUM GRADE CHANGE.

(4) ±0.5% CONSTRUCTION TOLERANCE IN SIDEWALK CROSS SLOPE. THE SIDEWALK CROSS SLOPE SHALL NOT EXCEED 2.1% WITHOUT PRIOR APPROVAL FROM THE ENGINEER.

(7) WHEN GRADE BREAK DISTANCE EXCEEDS 5 FEET, USE RADIAL DETECTABLE WARNING FIELD PER SDD 8D5-f.

(8) PROVIDE GRADE BREAK PERPENDICULAR TO DIRECTION OF WHEELCHAIR TRAVEL.

(9) WHEN DISTANCE IS LESS THAN 6' - 0", IT MAY BE DIFFICULT TO ACHIEVE A 7% DESIGN MAXIMUM SLOPE OR FLATTER ALONG THE RAMP. REDUCE CURB HEIGHT IN TRIANGLE AREA TO ACHIEVE 7% DESIGN MAXIMUM SLOPE OR FLATTER ON RAMP. CONSTRUCT 2-INCH MINIMUM CURB HEIGHT BETWEEN 10:1 FLARES.

(17) A MAXIMUM 2-INCH CONCRETE BORDER IS PERMITTED ALONG ALL SIDES OF THE DETECTABLE WARNING FIELD SURFACE.

(19) WHERE A LANDING SERVES TWO CURB RAMPS, THE LANDING SLOPE SHALL NOT EXCEED THE CROSS SLOPE AT THE BOTTOM OF THE RAMP OR WITHIN THE CROSSWALK PARALLEL TO THE DIRECTION OF TRAVEL.

(21) PROVIDE A LANDING WITH A SLOPE PARALLEL TO ROADWAY THAT MATCHES SLOPE AT THE BOTTOM OF THE ADJACENT RAMP. SLOPE PERPENDICULAR TO ROADWAY SHALL BE 2.1% MAXIMUM. STANDARD LANDING SIZE IS 5 FEET BY 5 FEET.

(22) THE ENTIRE RAMP SHALL BE A PLANAR SURFACE. DO NOT WARP THE RUNNING SLOPE OR CROSS SLOPE OF THE RAMP. WARPING OF THE SIDEWALK CROSS SLOPE SHALL TAKE PLACE BETWEEN THE LANDING AND MATCH POINT.

(23) THE CLEAR AREA BETWEEN THE BOTTOM OF RAMP AND BACK OF CURB SHALL BE SLOPED SO THAT WATER DRAINS OUT OF ONE SIDE OR BOTH SIDES OF THE CURB OPENING.

CURB RAMPS TYPE 2 AND 3

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

6

SDD 08D05-22b

DATE	DESCRIPTION
2/11/2021	ISSUED FOR BIDDING

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

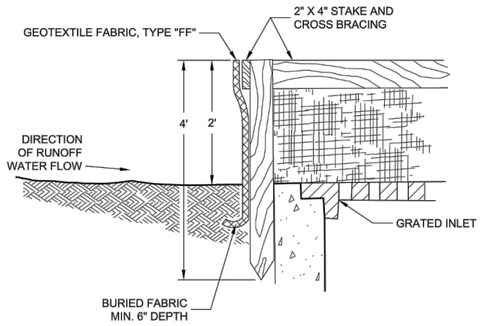
CONSTRUCTION DETAILS

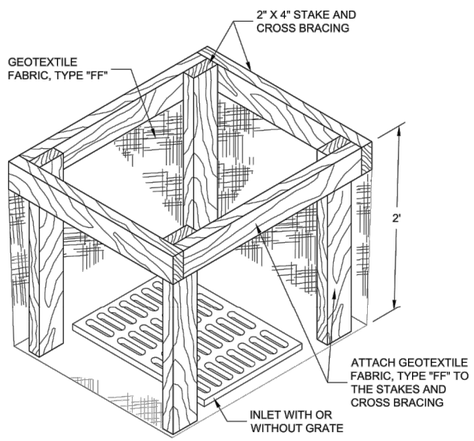
2026 STREET & UTILITY IMPROVEMENTS

CONTRACT: 26-07
FILE NO: 15-1095
DRAWN BY: RC
CHECKED BY: JH
SCALE: NOT TO SCALE

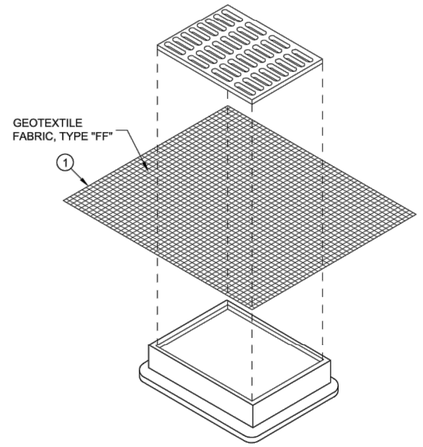
D08

SDD 08E10 Inlet Protection, Types A, B, C and D



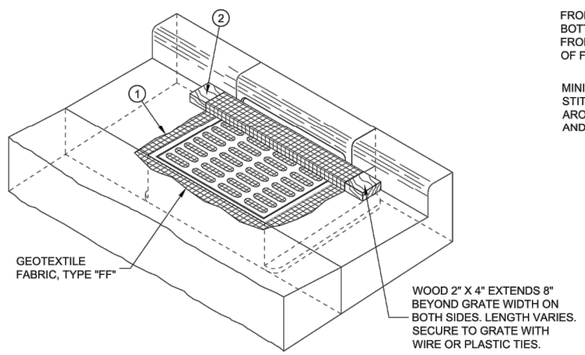


INLET PROTECTION, TYPE "A"

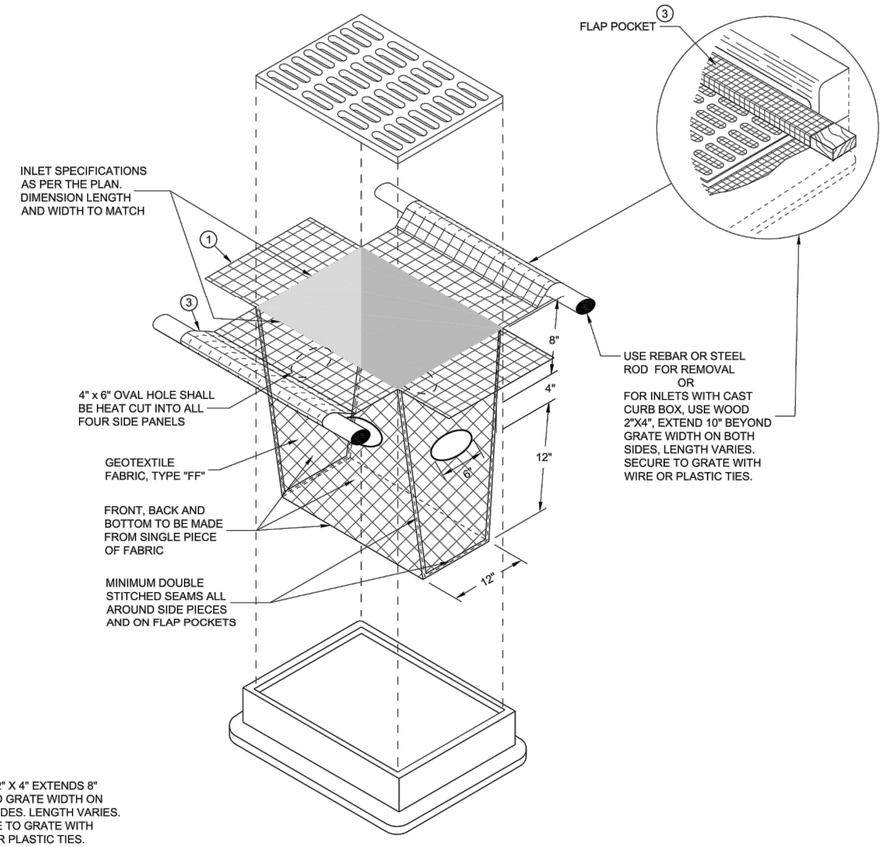


INLET PROTECTION, TYPE "B" (WITHOUT CURB BOX)

(CAN BE INSTALLED IN ANY INLET WITHOUT A CURB BOX)



INLET PROTECTION, TYPE "C" (WITH CURB BOX)



INLET PROTECTION, TYPE "D"

(CAN BE INSTALLED IN ANY INLET WITH OR WITHOUTA CURB BOX AS PER NOTE 2)

GENERAL NOTES

INLET PROTECTION DEVICES SHALL BE MAINTAINED OR REPLACED AT THE DIRECTION OF THE ENGINEER.

MANUFACTURED ALTERNATIVES APPROVED AND LISTED ON THE DEPARTMENT'S EROSION CONTROL PRODUCT ACCEPTABILITY LIST MAY BE SUBSTITUTED.

WHEN REMOVING OR MAINTAINING INLET PROTECTION, CARE SHALL BE TAKEN SO THAT THE SEDIMENT TRAPPED ON THE GEOTEXTILE FABRIC DOES NOT FALL INTO THE INLET. ANY MATERIAL FALLING INTO THE INLET SHALL BE REMOVED IMMEDIATELY.

1. FINISHED SIZE, INCLUDING FLAP POCKETS WHERE REQUIRED, SHALL EXTEND A MINIMUM OF 10" AROUND THE PERIMETER TO FACILITATE MAINTENANCE OR REMOVAL.
2. FOR INLET PROTECTION, TYPE C (WITH CURB BOX), AN ADDITIONAL 18" OF FABRIC IS WRAPPED AROUND THE WOOD AND SECURED WITH STAPLES. THE WOOD SHALL NOT BLOCK THE ENTIRE HEIGHT OF THE CURB BOX OPENING.
3. FLAP POCKETS SHALL BE LARGE ENOUGH TO ACCEPT WOOD 2X4.

INSTALLATION NOTES

TYPES B & C

TRIM EXCESS FABRIC IN THE FLOW LINE TO WITHIN 3" OF THE GRATE.

THE CONTRACTOR SHALL DEMONSTRATE A METHOD OF MAINTENANCE, USING A SEWN FLAP, HAND HOLDS OR OTHER METHOD TO PREVENT ACCUMULATED SEDIMENT FROM ENTERING THE INLET.

TYPE D

TRIM EXCESS FABRIC IN THE FLOW LINE TO WITHIN 3" OF THE GRATE.

DO NOT INSTALL INLET PROTECTION TYPE D IN INLETS SHALLOWER THAN 30", MEASURED FROM THE BOTTOM OF THE INLET TO THE TOP OF THE GRATE.

THE INSTALLED BAG SHALL HAVE A MINIMUM SIDE CLEARANCE, BETWEEN THE INLET WALLS AND THE BAG, MEASURED AT THE BOTTOM OF THE OVERFLOW HOLES, OF 3". WHERE NECESSARY THE CONTRACTOR SHALL CINCH THE BAG, USING PLASTIC ZIP TIES, TO ACHIEVE THE 3" CLEARANCE. THE TIES SHALL BE PLACED AT A MAXIMUM OF 4" FROM THE BOTTOM OF THE BAG.

INLET PROTECTION TYPES A, B, C AND D

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

APPROVED
10/16/02 — DATE
/S/ Beth Cannestra — ROADWAY STANDARDS DEVELOPMENT ENGINEER
FHWA

6

SDD 08E10 - 02

DATE	DESCRIPTION
2/11/2021	ISSUED FOR BIDDING

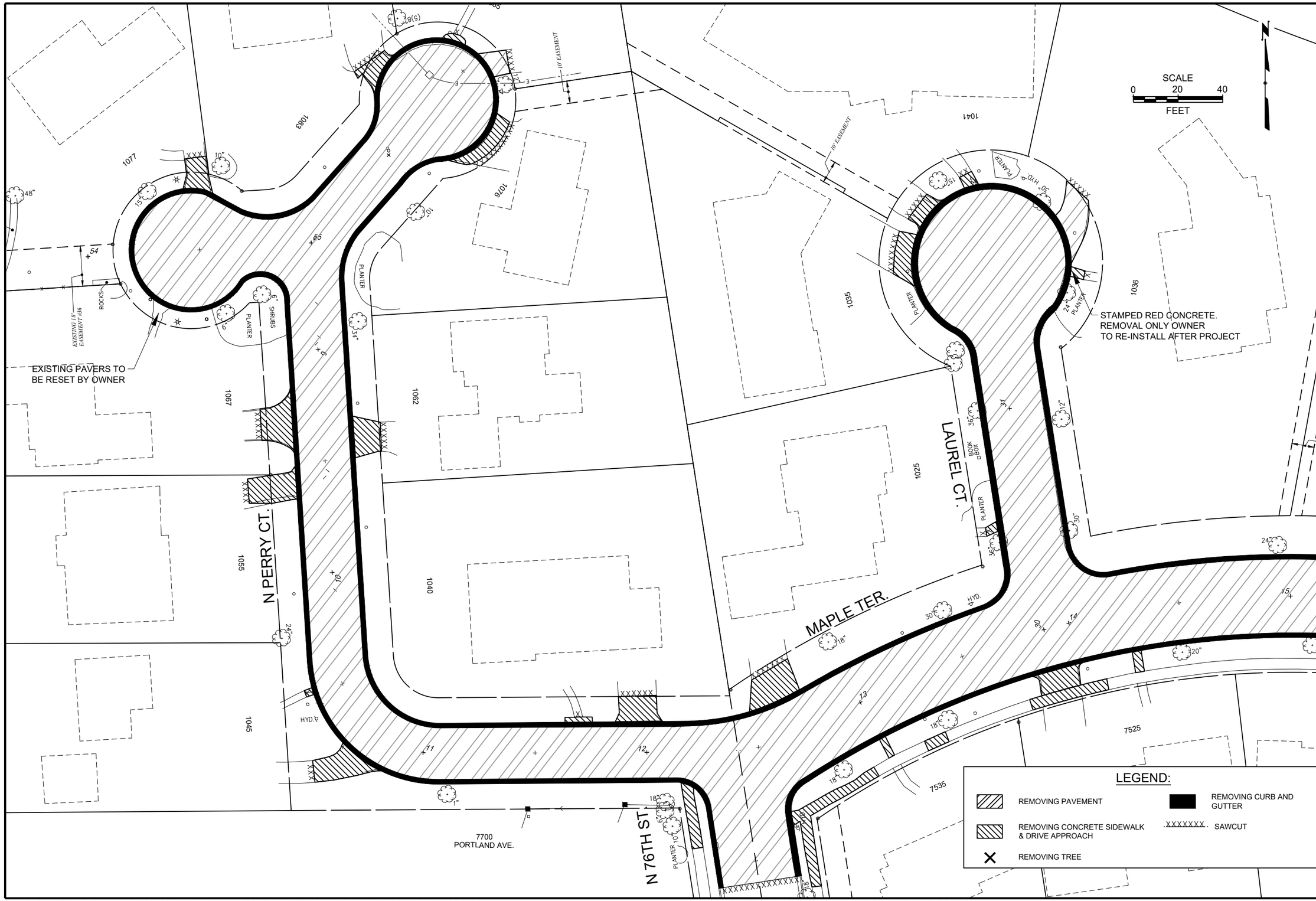
CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

CONSTRUCTION DETAILS

2026 STREET & UTILITY IMPROVEMENTS

CONTRACT: 26-07
FILE NO.: 15-1095
DRAWN BY: RC
CHECKED BY: JH
SCALE: NOT TO SCALE

D09



DESCRIPTION	DATE

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

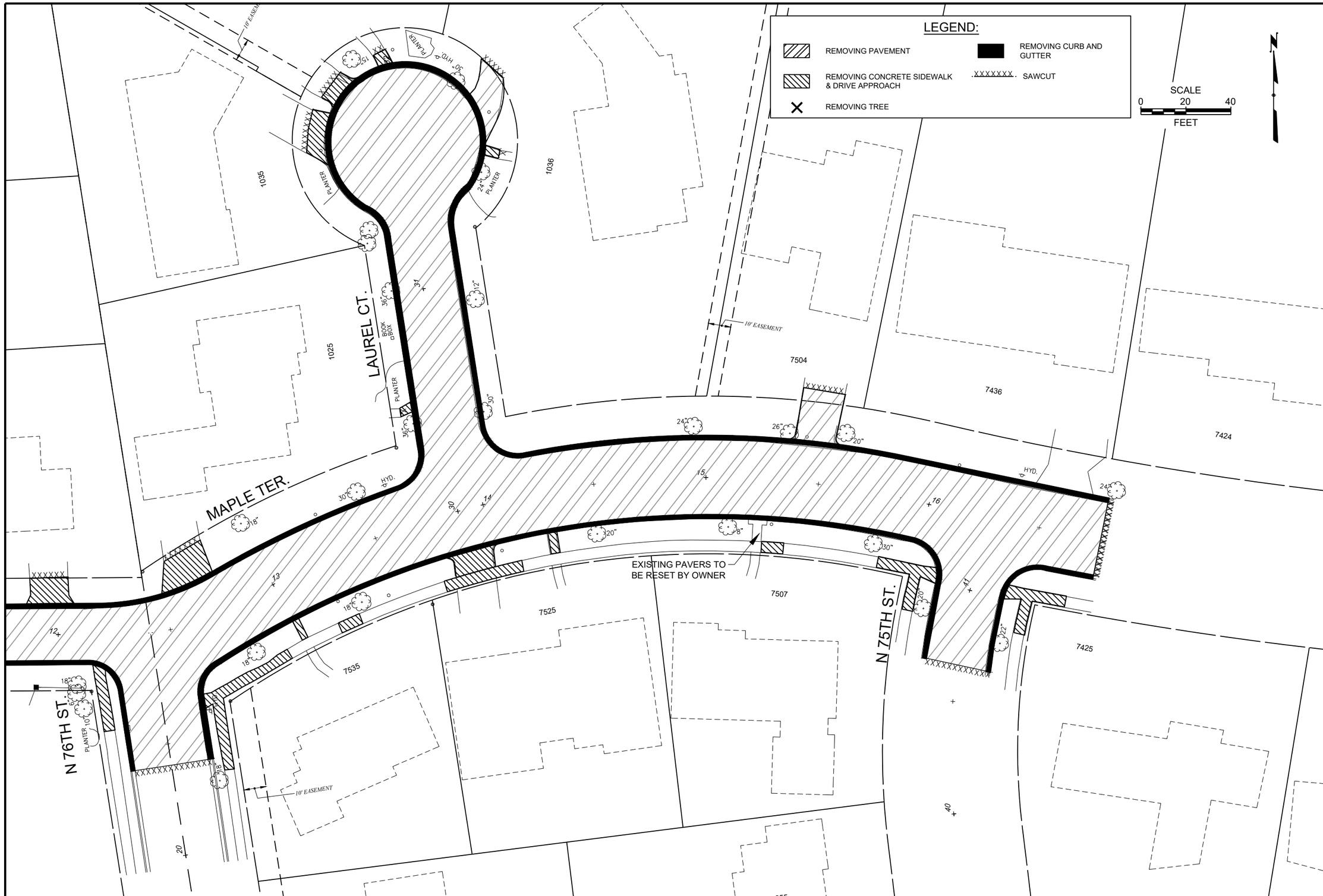
REMOVALS

PERRY CT, LAUREL CT, &
MAPLE TERRACE

CONTRACT: 26-07
FILE NO: 15-1095
DRAWN BY: BT
CHECKED BY: JS
SCALE: AS SHOWN

D10

FILE NAME : S:\DEPARTMENT FOLDERS\ENGINEERING\ACAD_PROJECTS\26-07 PERRY CT\SHEETSPLAN\05 REMOVALS.DWG
LAYOUT NAME : Sheet 1
PLOT DATE : 1/16/2026 2:42 PM
PLOT BY : RYAN CHRISTENSEN



DESCRIPTION	DATE

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

REMOVALS

PERRY CT, LAUREL CT, &

MAPLE TERRACE

CONTRACT:	26-07
FILE NO:	15-1095
DRAWN BY:	BT
CHECKED BY:	JS
SCALE:	AS SHOWN

D11

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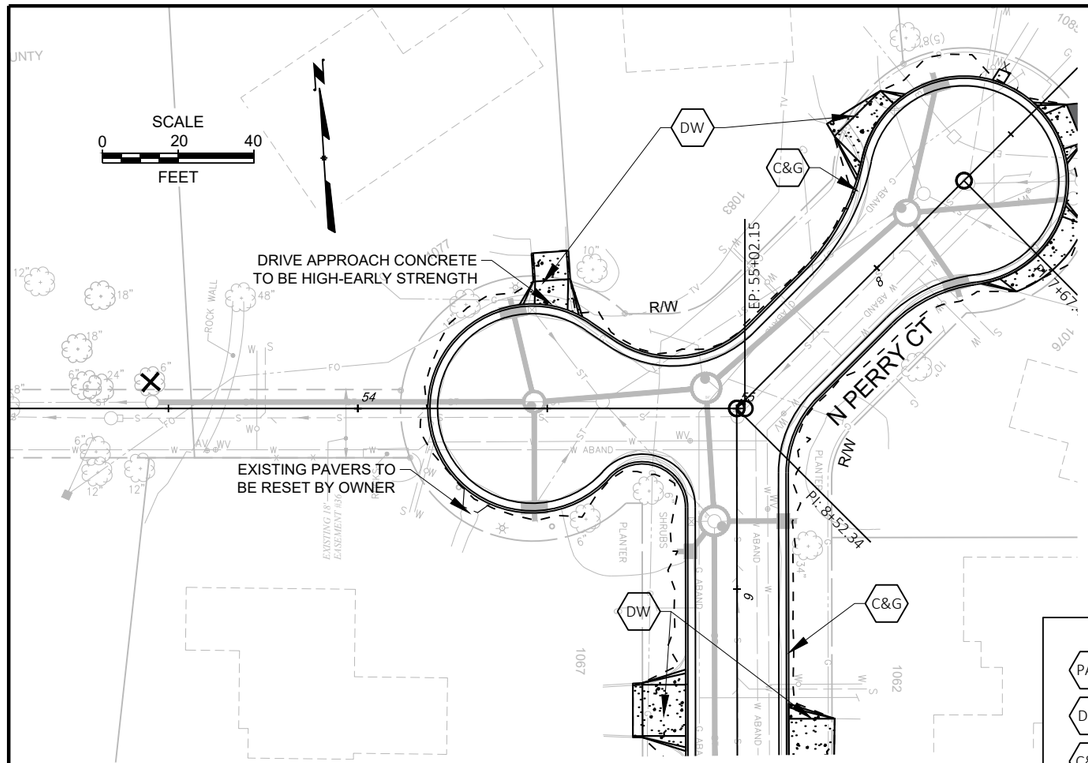
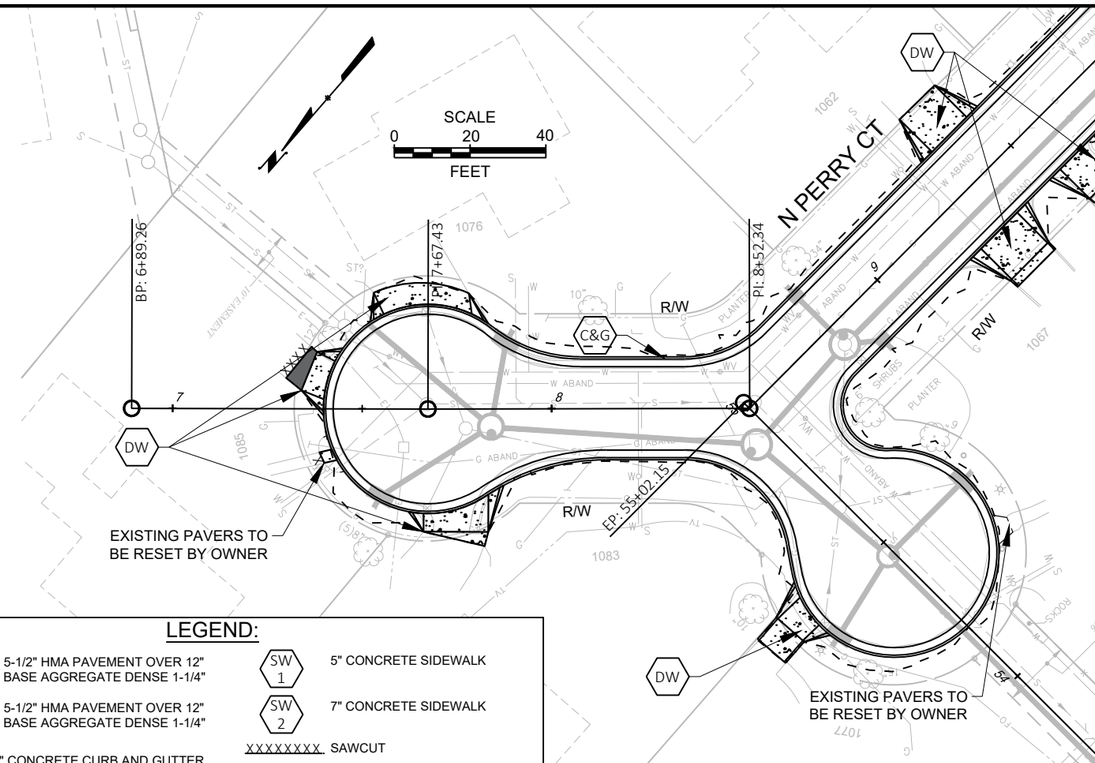
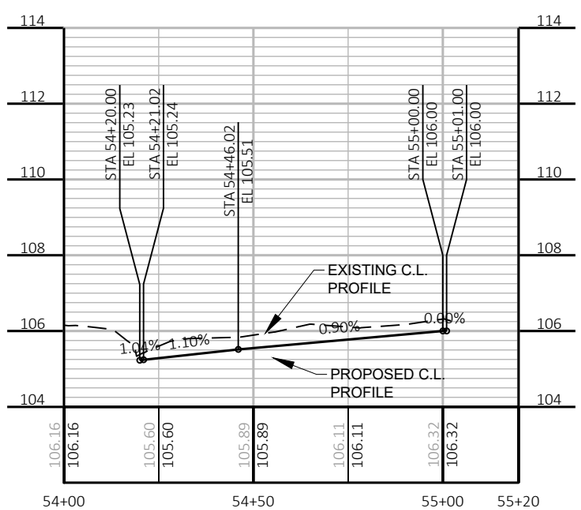
PLOT BY : RYAN CHRISTENSEN

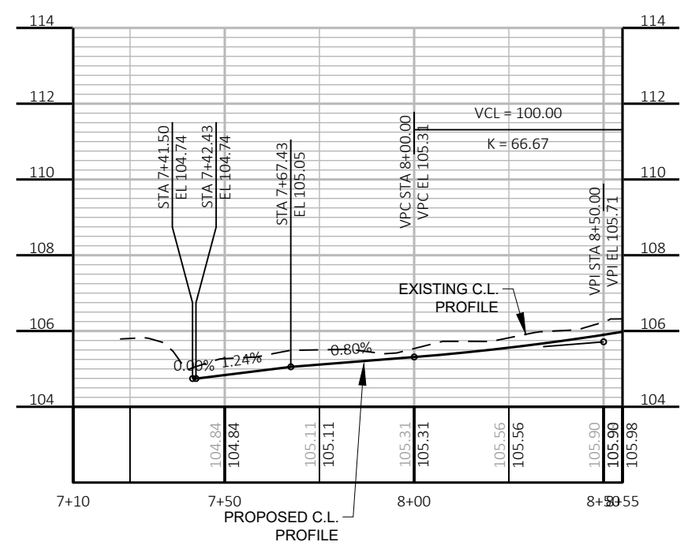




LEGEND:

PAV	5-1/2" HMA PAVEMENT OVER 12" BASE AGGREGATE DENSE 1-1/4"	SW 1	5" CONCRETE SIDEWALK
DW	5-1/2" HMA PAVEMENT OVER 12" BASE AGGREGATE DENSE 1-1/4"	SW 2	7" CONCRETE SIDEWALK
C&G	31" CONCRETE CURB AND GUTTER	XXXXXXXX	SAWCUT
		x	REMOVE ONLY





DATE	DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

TYPE A RECONSTRUCTION
PERRY CT, MAPLE TER, LAUREL CT

FROM: N PERRY CT
TO: N 75TH ST

CONTRACT: 26-07
FILE NO: 15-1059
DRAWN BY: BT
CHECKED BY: JH
SCALE: AS SHOWN

D12

FILE NAME : S:\DEPARTMENT FOLDERS\ENGINEERING\ACAD_PROJECTS\26-07 PERRY CT\SHEETSPLAN\06 PLAN AND PROFILE.DWG
LAYOUT NAME - Sheet 1

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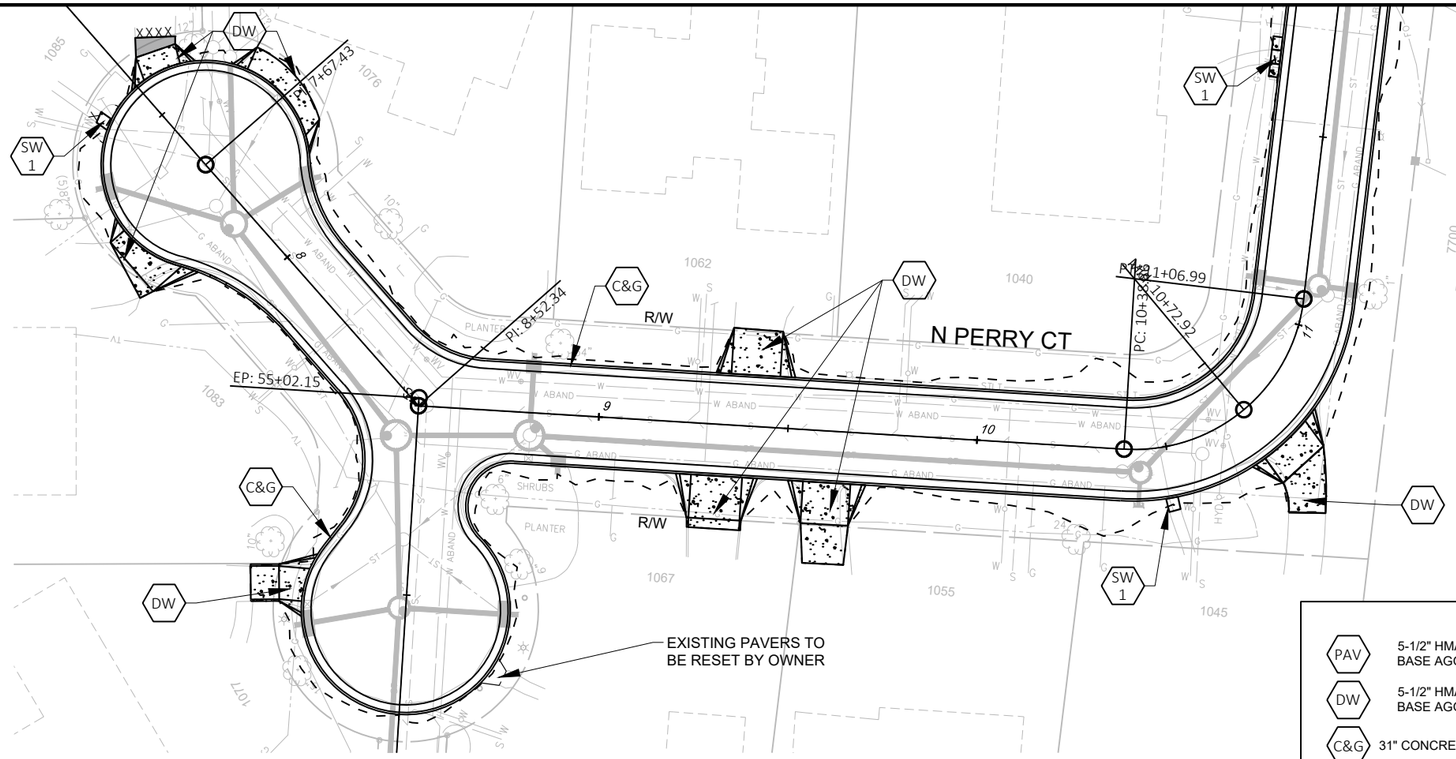
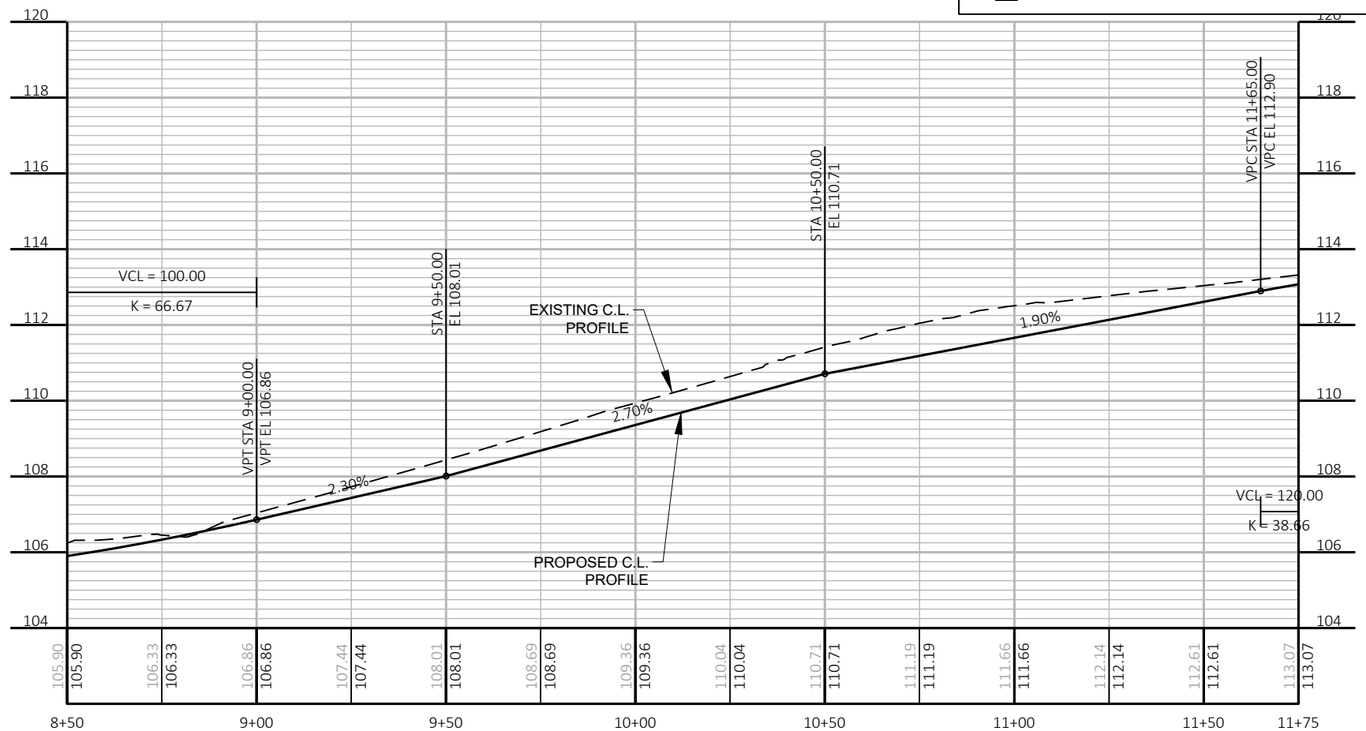


LEGEND:

PAV	5-1/2" HMA PAVEMENT OVER 12" BASE AGGREGATE DENSE 1-1/4"	SW 1	5" CONCRETE SIDEWALK
DW	5-1/2" HMA PAVEMENT OVER 12" BASE AGGREGATE DENSE 1-1/4"	SW 2	7" CONCRETE SIDEWALK
C&G	31" CONCRETE CURB AND GUTTER	XXXXXXXX	SAWCUT
		X	REMOVE ONLY



DESCRIPTION

DATE

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

TYPE A RECONSTRUCTION

PERRY CT, MAPLE TER, LAUREL CT

FROM: N PERRY CT

TO: N 75TH ST

CONTRACT:	26-07
FILE NO:	15-1059
DRAWN BY:	BT
CHECKED BY:	JH
SCALE:	AS SHOWN

D13

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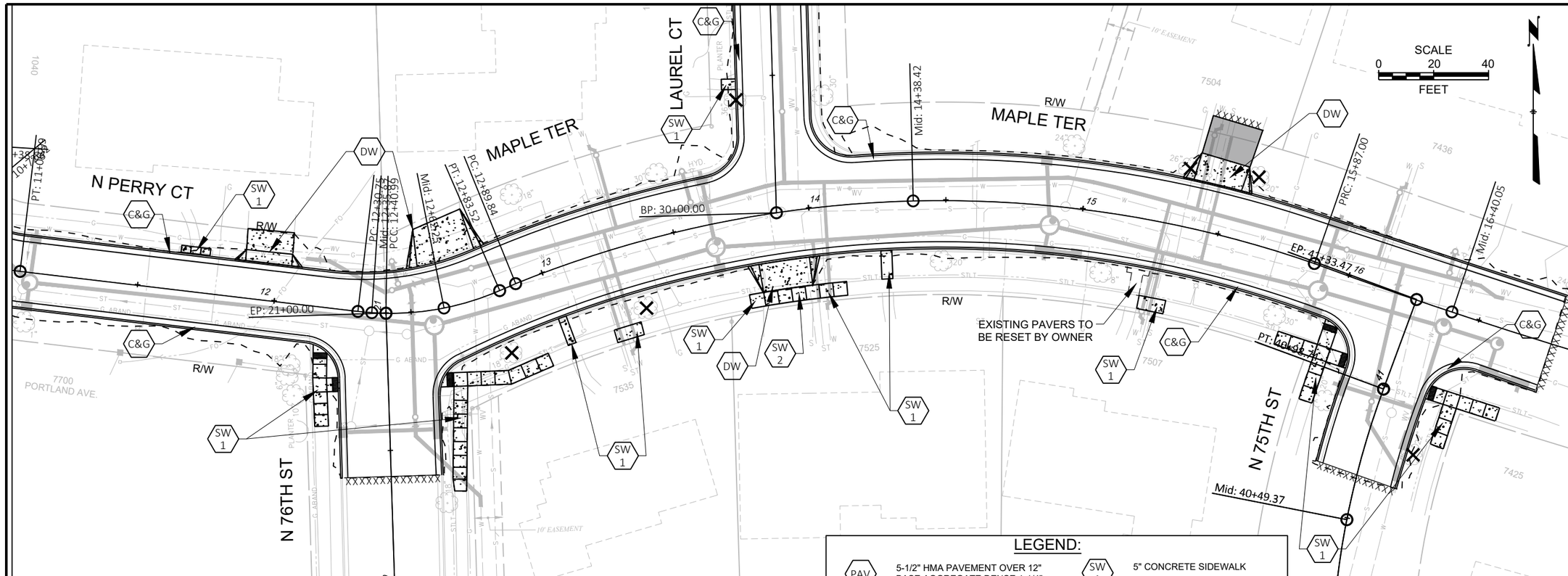

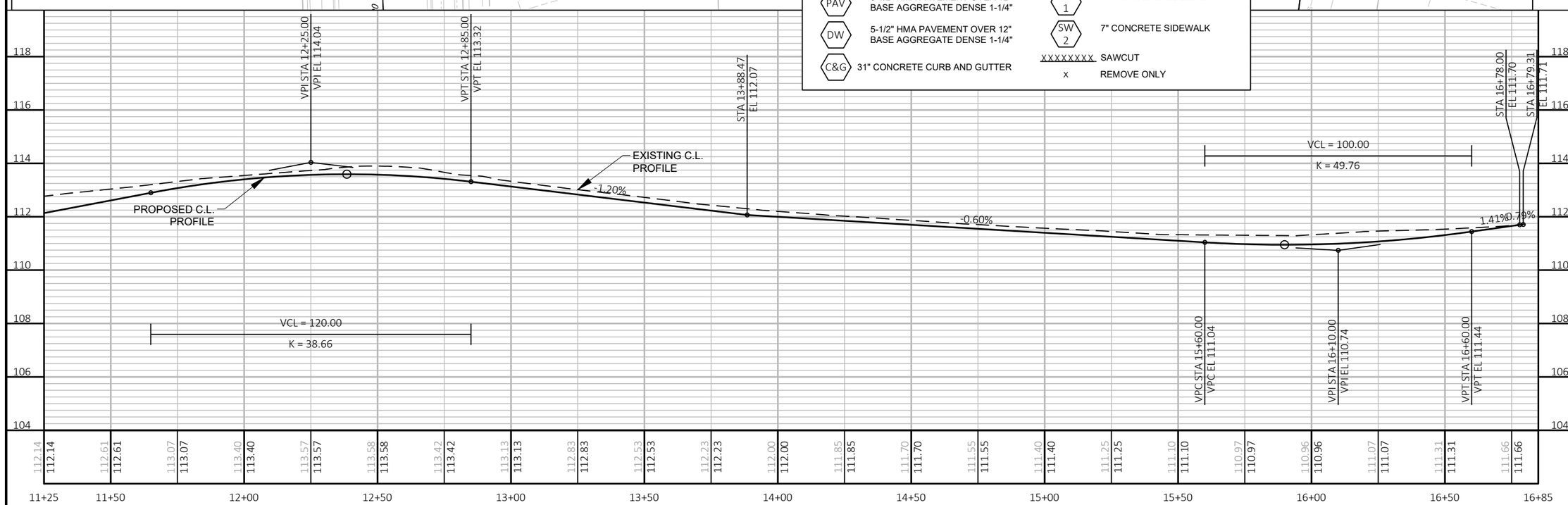

DATE	DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

TYPE A RECONSTRUCTION

PERRY CT, MAPLE TER, LAUREL CT

TO: N 75TH ST

FROM: N PERRY CT

CONTRACT: 26-07
FILE NO: 15-1059
DRAWN BY: BT
CHECKED BY: JH
SCALE: AS SHOWN

D14

FILE NAME : S:\DEPARTMENT FOLDERS\ENGINEERING\ACAD_PROJECTS\26-07 PERRY CT\SHEETSPLAN\06 PLAN AND PROFILE.DWG
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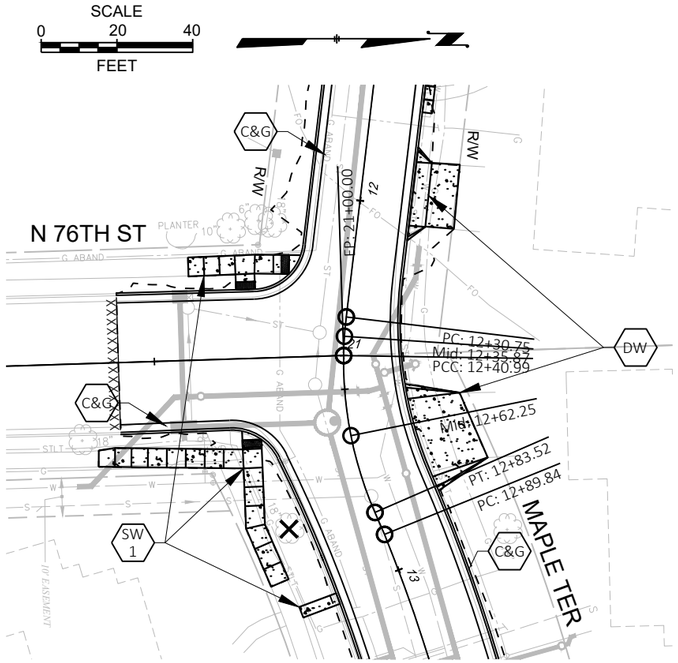
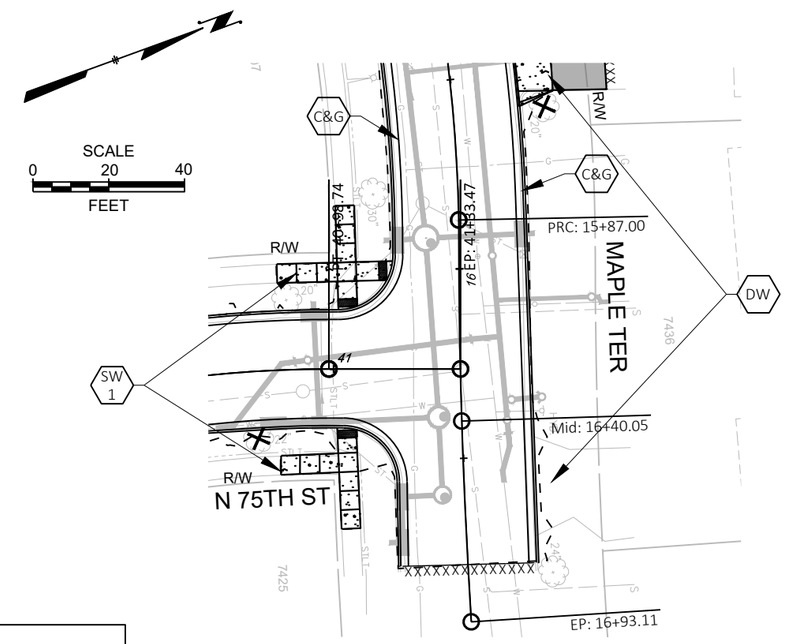
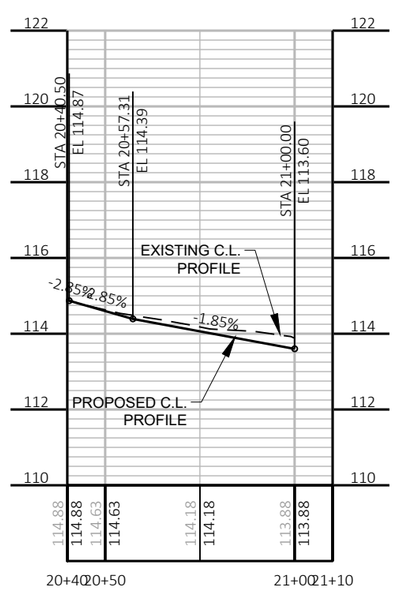
PLOT DATE : 1/16/2026 2:47 PM PLOT BY : RYAN CHRISTENSEN PLOT SCALE : ##########

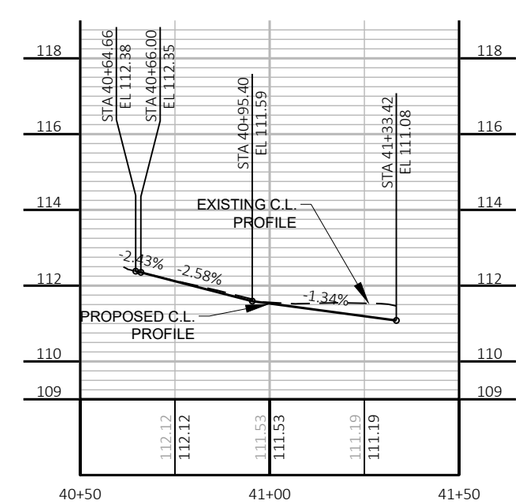




LEGEND:

PAV	5-1/2" HMA PAVEMENT OVER 12" BASE AGGREGATE DENSE 1-1/4"	SW 1	5" CONCRETE SIDEWALK
DW	5-1/2" HMA PAVEMENT OVER 12" BASE AGGREGATE DENSE 1-1/4"	SW 2	7" CONCRETE SIDEWALK
C&G	31" CONCRETE CURB AND GUTTER	XXXXXXXX	SAWCUT
		x	REMOVE ONLY





DATE	DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

TYPE A RECONSTRUCTION

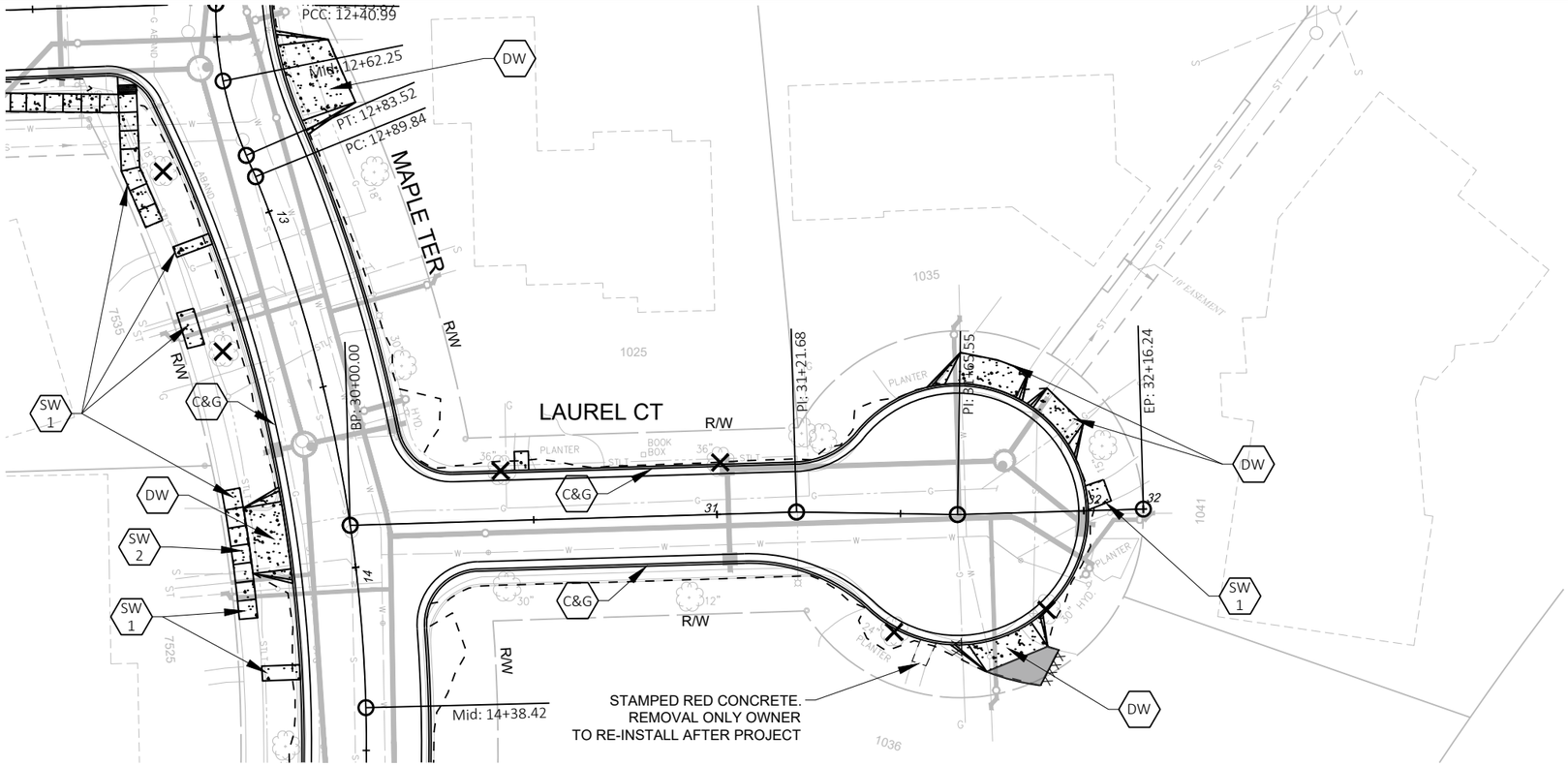
PERRY CT, MAPLE TER, LAUREL CT

FROM: N PERRY CT
TO: N 75TH ST

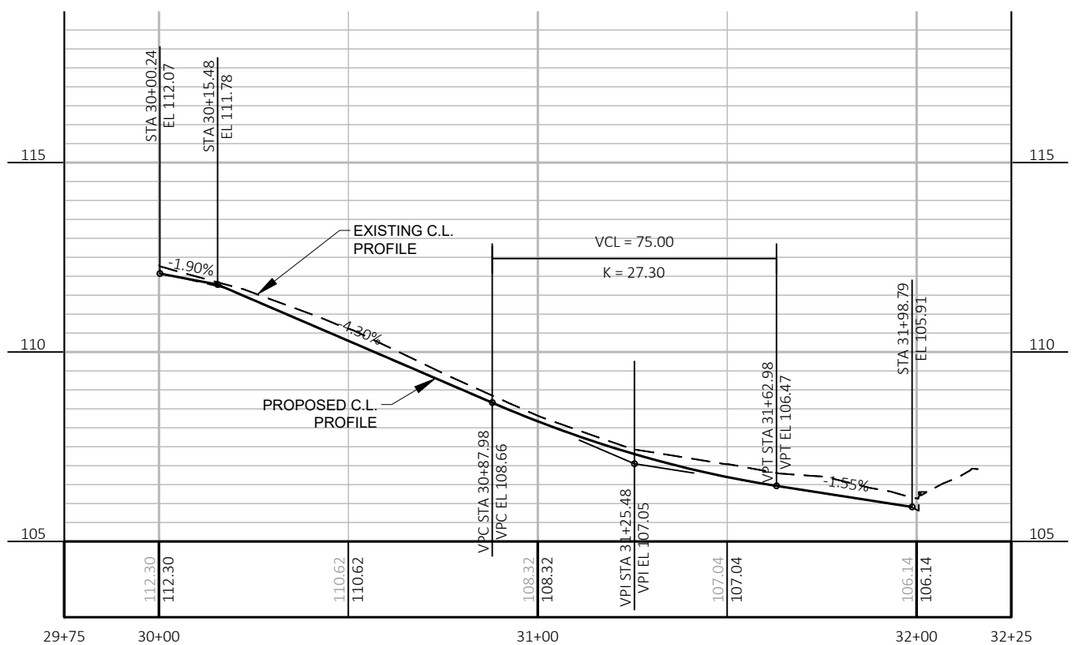
CONTRACT: 26-07
FILE NO: 15-1059
DRAWN BY: BT
CHECKED BY: JH
SCALE: AS SHOWN

D15

FILE NAME : S:\DEPARTMENT FOLDERS\ENGINEERING\ACAD_PROJECTS\26-07 PERRY CT\SHEETSPLAN\06 PLAN AND PROFILE.DWG
LAYOUT NAME - Sheet 4
PLOT DATE : 1/16/2026 2:47 PM PLOT BY : RYAN CHRISTENSEN PLOT SCALE : ##########



SCALE
0 20 40
FEET



LEGEND:

PAV	5-1/2" HMA PAVEMENT OVER 12" BASE AGGREGATE DENSE 1-1/4"	SW 1	5" CONCRETE SIDEWALK
DW	5-1/2" HMA PAVEMENT OVER 12" BASE AGGREGATE DENSE 1-1/4"	SW 2	7" CONCRETE SIDEWALK
C&G	31" CONCRETE CURB AND GUTTER	XXXXXXXX	SAWCUT
		x	REMOVE ONLY

DATE	DESCRIPTION

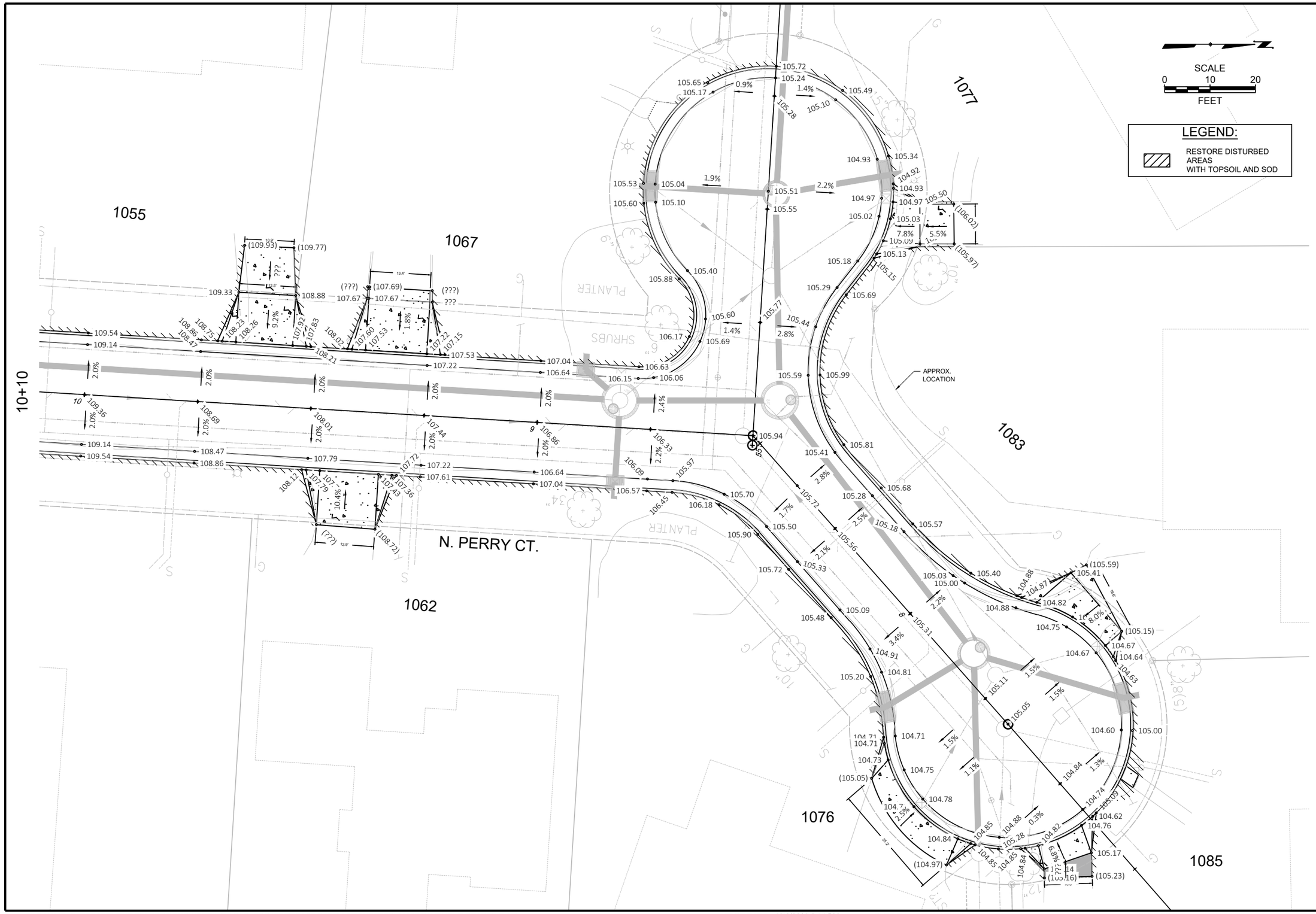
CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

TYPE A RECONSTRUCTION
PERRY CT, MAPLE TER, LAUREL CT
FROM: N PERRY CT TO: N 75TH ST

CONTRACT: 26-07
FILE NO: 15-1059
DRAWN BY: BT
CHECKED BY: JH
SCALE: AS SHOWN

D16

FILE NAME : S:\DEPARTMENT FOLDERS\ENGINEERING\ACAD_PROJECTS\26-07 PERRY CT\SHEETSPLAN\06 PLAN AND PROFILE.DWG
LAYOUT NAME - Sheet 5
PLOT DATE : 1/16/2026 2:47 PM PLOT BY : RYAN CHRISTENSEN PLOT SCALE : ##########



DESCRIPTION

DATE

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

PAVEMENT GRADES

N PERRY CT, MAPLE TERR, LAUREL CT

FROM: N PERRY CT

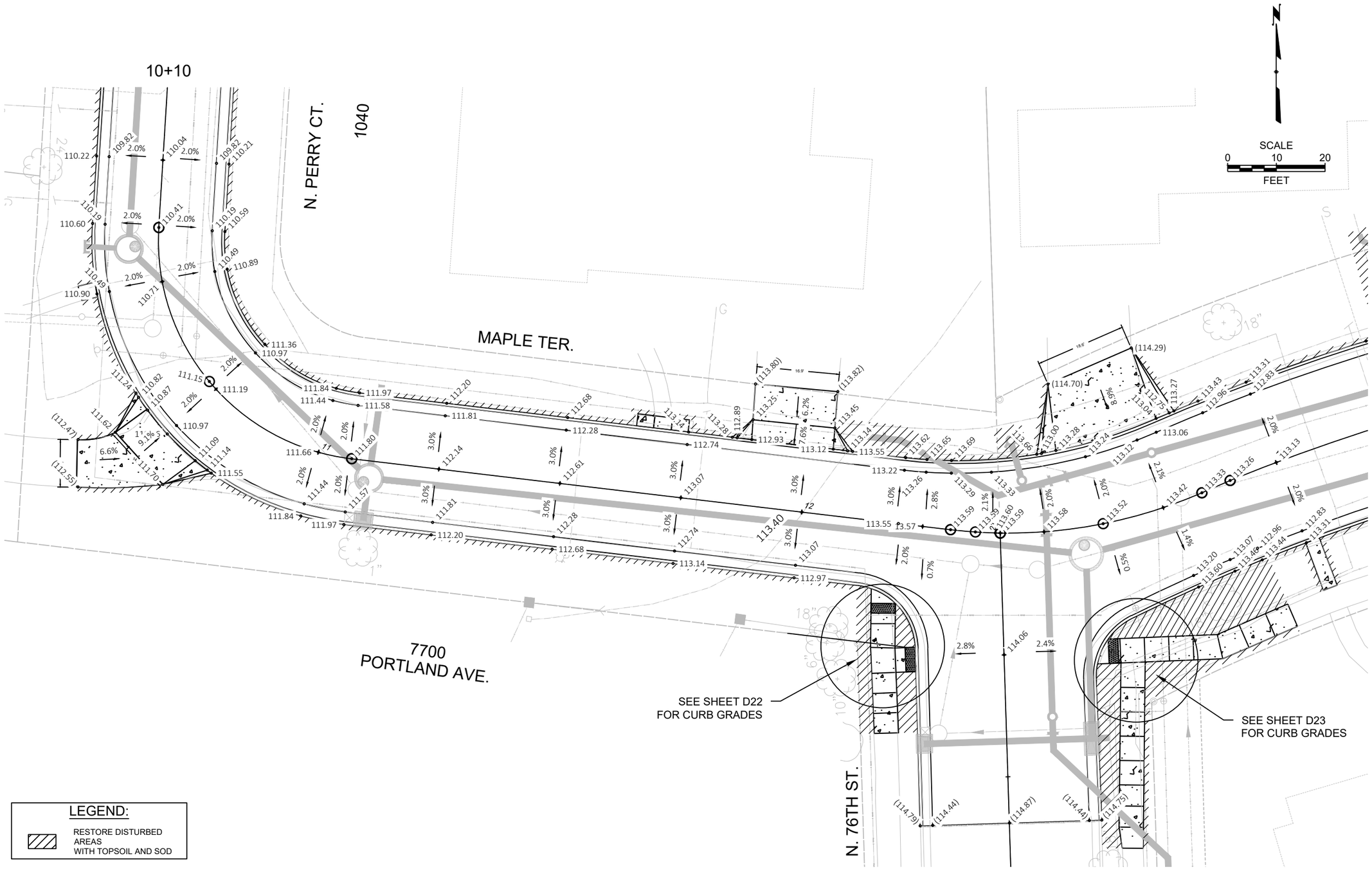
TO: N 75TH ST

CONTRACT: 26-07
FILE NO: 15-1095
DRAWN BY: RC
CHECKED BY: JH
SCALE: AS SHOWN

D17

FILE NAME :S:\DEPARTMENT FOLDERS\ENGINEERING\ACAD_PROJECTS\26-07 PERRY CT\SHEETSPLAN\07 PAVEMENT GRADES.DWG
LAYOUT NAME - Sheet 1

PLOT DATE : 1/16/2026 2:11 PM PLOT BY : BRYAN THEISEN PLOT SCALE : ##########



DATE	DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

PAVEMENT GRADES

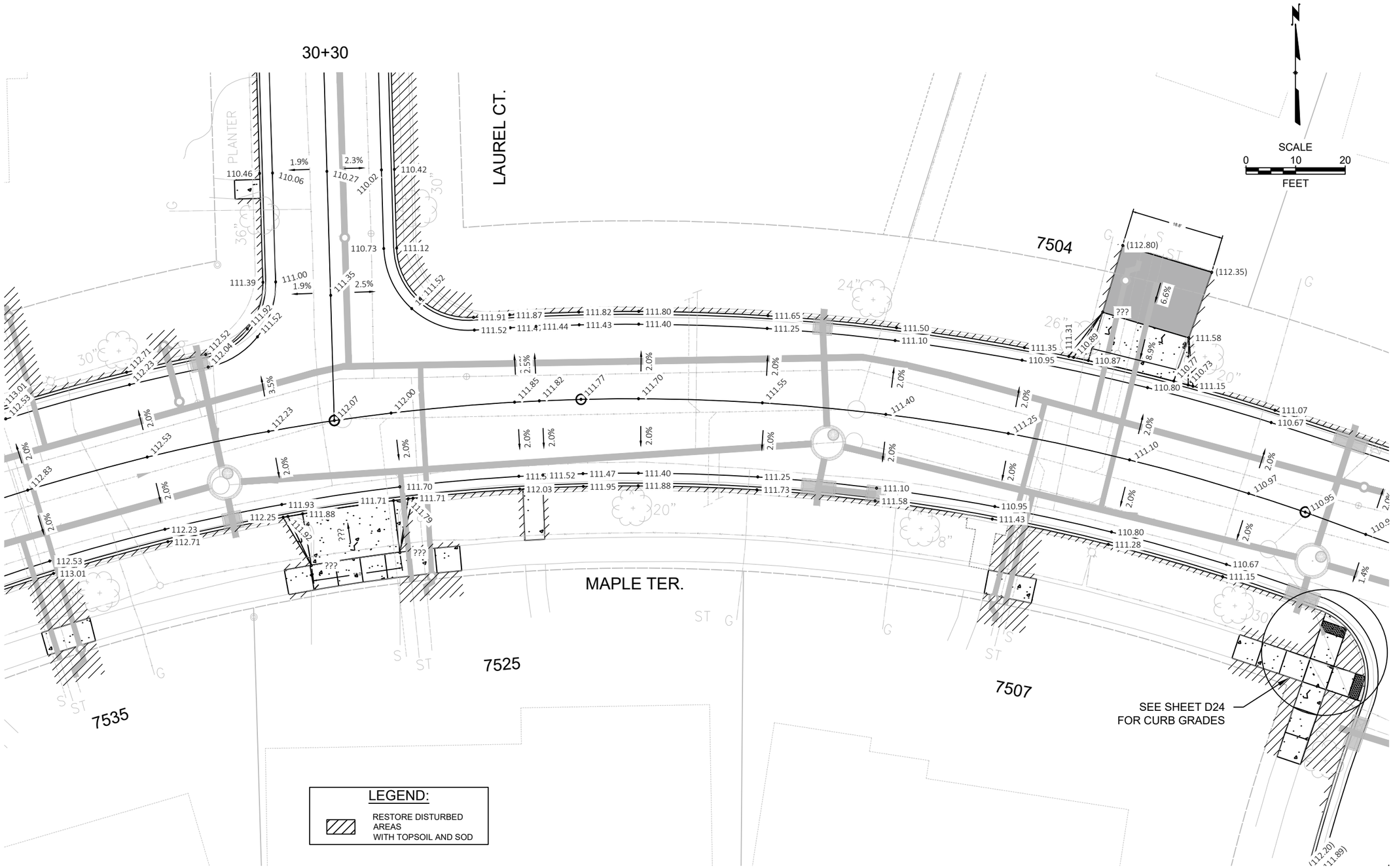
N PERRY CT, MAPLE TERR, LAUREL CT

FROM: N PERRY CT
TO: N 75TH ST

CONTRACT: 26-07
FILE NO: 15-1095
DRAWN BY: RC
CHECKED BY: JH
SCALE: AS SHOWN

D18

FILE NAME :S:\DEPARTMENT FOLDERS\ENGINEERING\ACAD_PROJECTS\26-07 PERRY CT\SHEETSPLAN\07 PAVEMENT GRADES.DWG
LAYOUT NAME - Sheet 2
PLOT DATE : 1/16/2026 2:11 PM PLOT BY : BRYAN THEISEN PLOT SCALE : ##########



DATE	DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

PAVEMENT GRADES

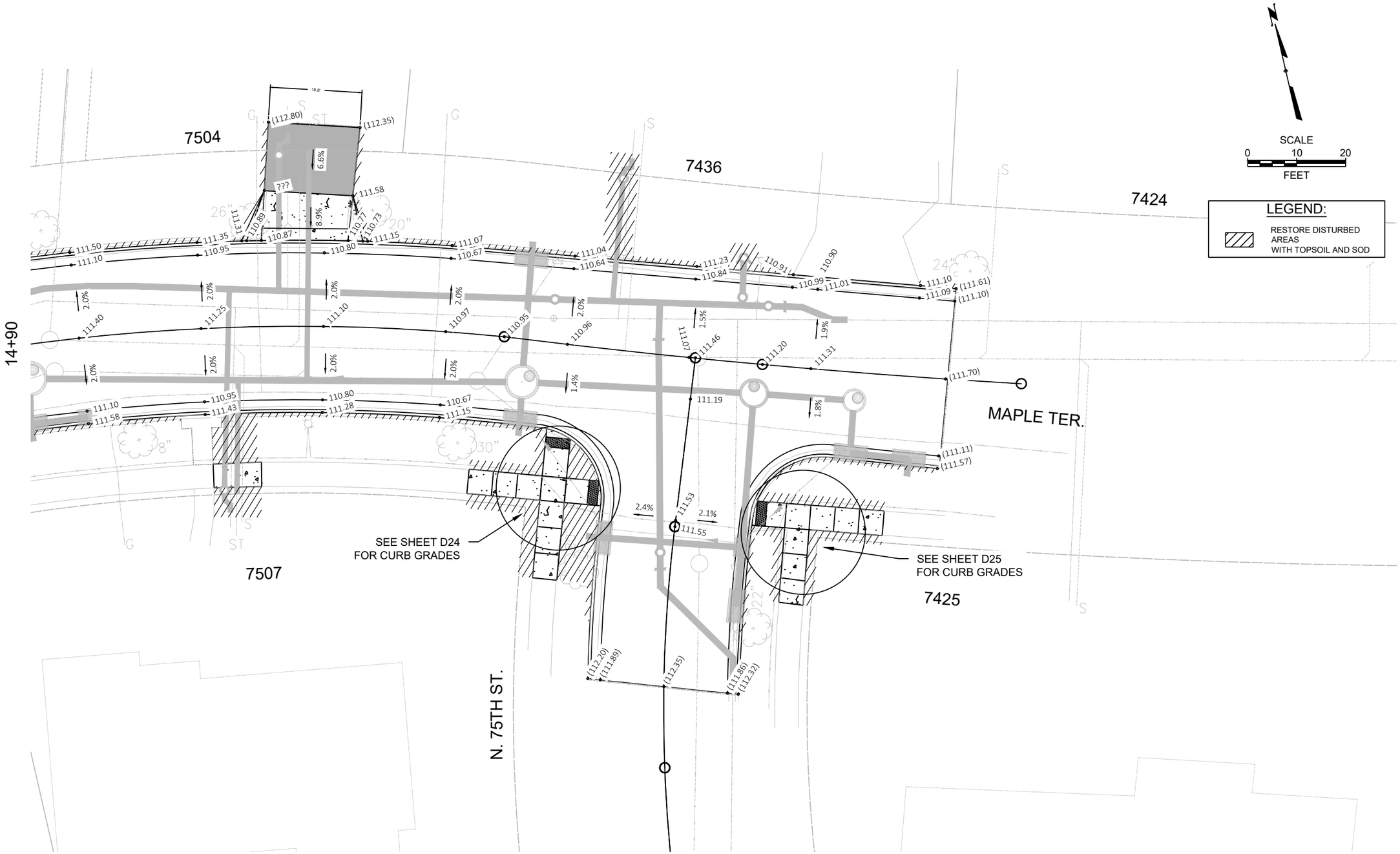
N PERRY CT, MAPLE TERR, LAUREL CT

FROM: N PERRY CT
TO: N 75TH ST

CONTRACT: 26-07
FILE NO: 15-1095
DRAWN BY: RC
CHECKED BY: JH
SCALE: AS SHOWN

D19

FILE NAME :S:\DEPARTMENT FOLDERS\ENGINEERING\ACAD_PROJECTS\26-07 PERRY CT\SHEETSPLAN\07 PAVEMENT GRADES.DWG
LAYOUT NAME - Sheet 3
PLOT DATE : 1/16/2026 2:11 PM PLOT BY : BRYAN THEISEN PLOT SCALE : ##########



DATE	DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

PAVEMENT GRADES

N PERRY CT, MAPLE TERR, LAUREL CT

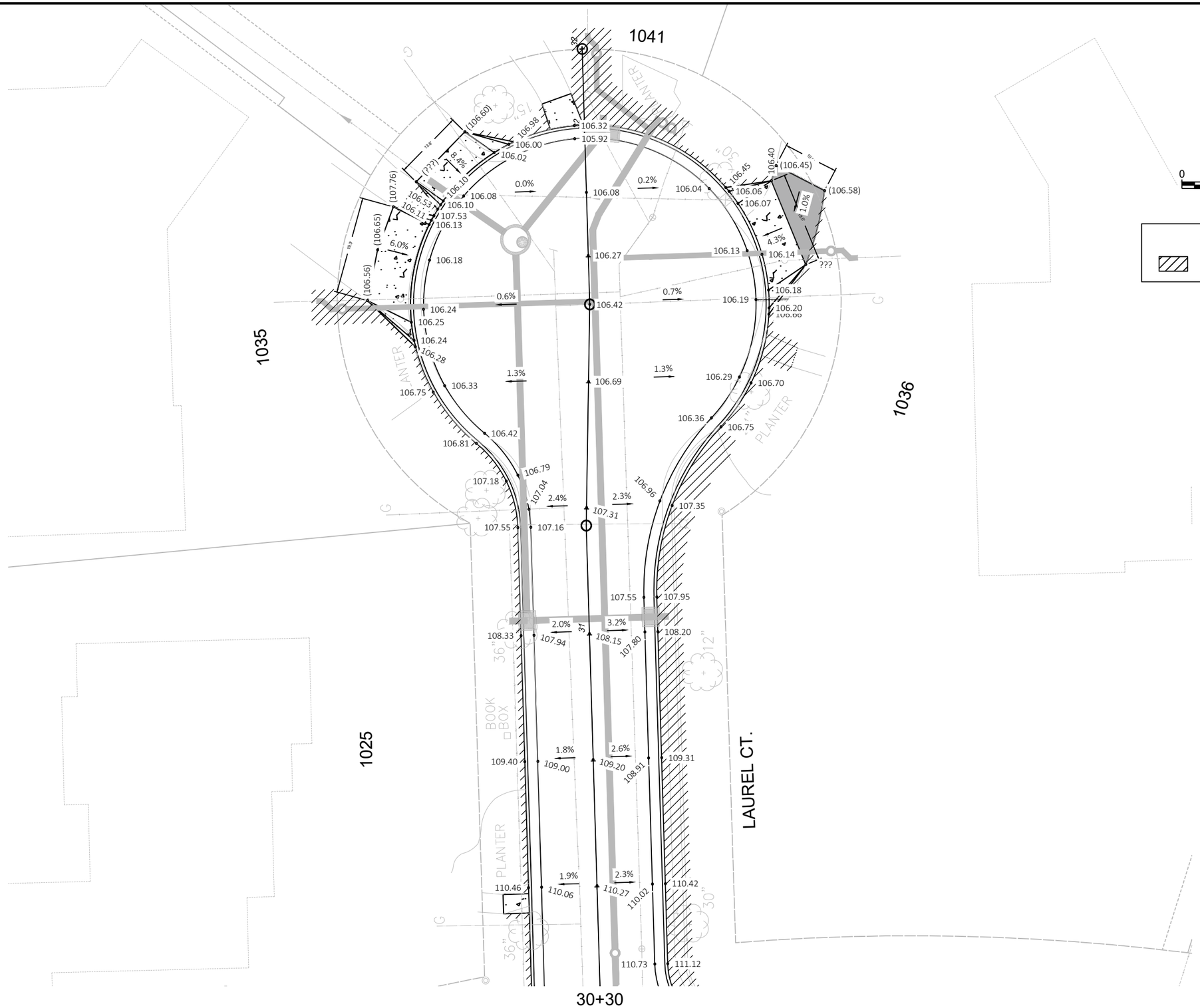
FROM: N PERRY CT
TO: N 75TH ST

CONTRACT:	26-07
FILE NO:	15-1095
DRAWN BY:	RC
CHECKED BY:	JH
SCALE:	AS SHOWN

D20

FILE NAME :S:\DEPARTMENT FOLDERS\ENGINEERING\ACAD_PROJECTS\26-07 PERRY CT\SHEETSPLAN\07 PAVEMENT GRADES.DWG
LAYOUT NAME - Sheet 4

PLOT DATE : 1/16/2026 2:11 PM PLOT BY : BRYAN THEISEN PLOT SCALE : ##########



SCALE
0 10 20
FEET

LEGEND:

RESTORE DISTURBED AREAS WITH TOPSOIL AND SOD

DATE	DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

PAVEMENT GRADES

N PERRY CT, MAPLE TERR, LAUREL CT

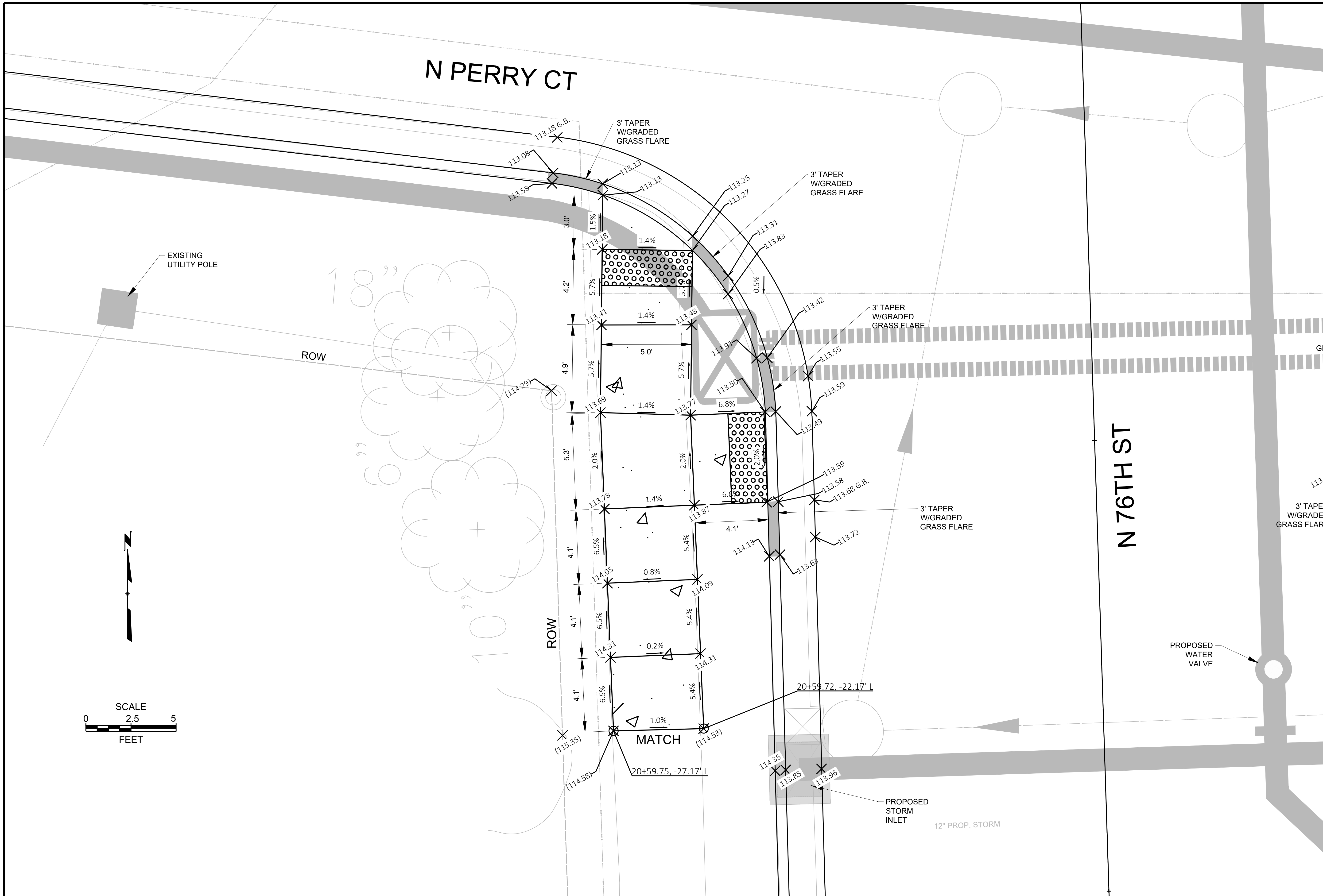
FROM: N PERRY CT
TO: N 75TH ST

CONTRACT:	26-07
FILE NO:	15-1095
DRAWN BY:	RC
CHECKED BY:	JH
SCALE:	AS SHOWN

D21

FILE NAME :S:\DEPARTMENT FOLDERS\ENGINEERING\ACAD_PROJECTS\26-07 PERRY CT\SHEETSPLAN\07 PAVEMENT GRADES.DWG
LAYOUT NAME - Sheet 5

PLOT DATE : 1/16/2026 2:11 PM PLOT BY : BRYAN THEISEN PLOT SCALE : ##########



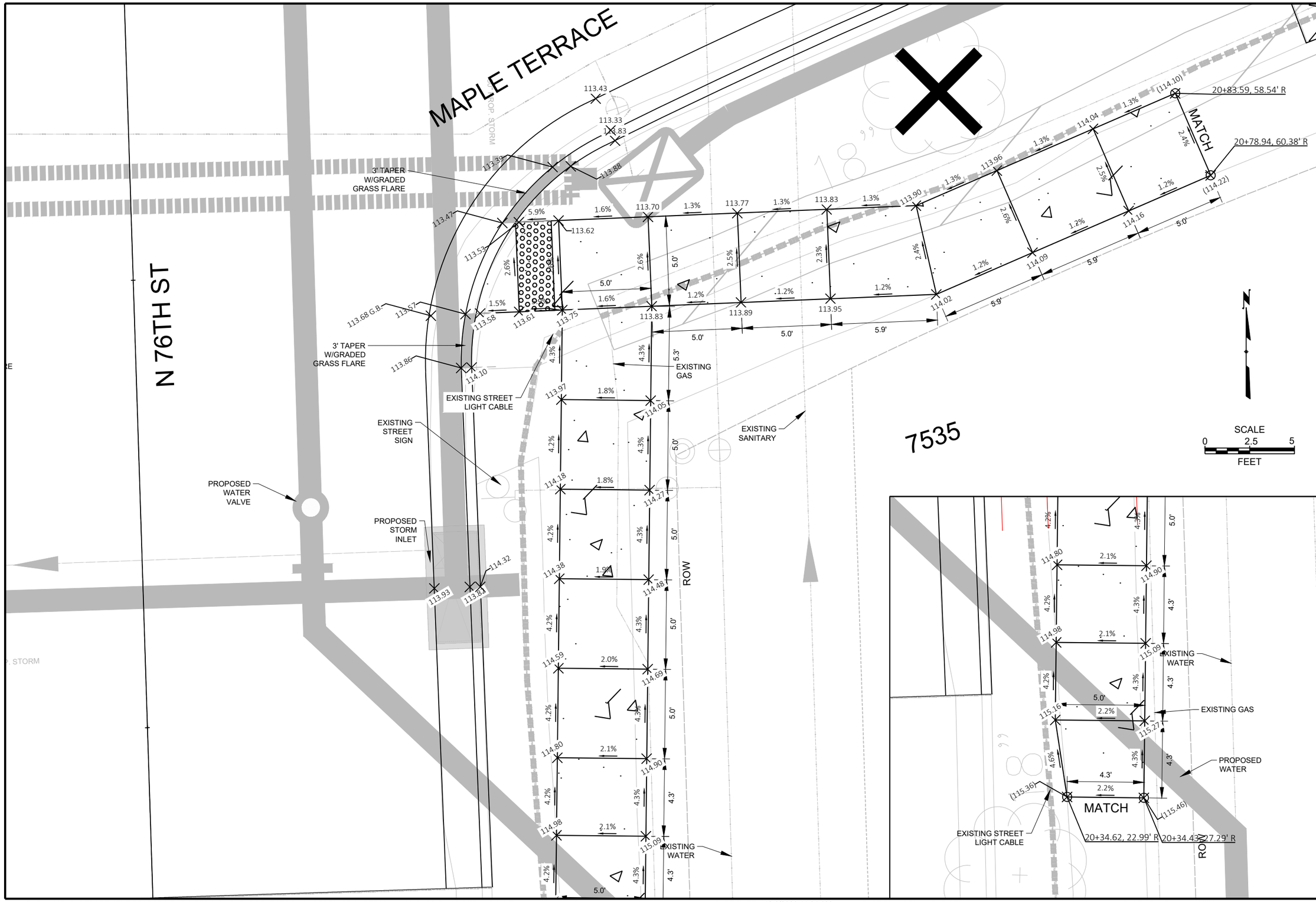
CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

DATE	DESCRIPTION

CURB RAMP DETAILS
N. 76TH ST. & PERRY CT.
S.W. QUADRANT

CONTRACT:	26-07
FILE NO:	15-1095
DRAWN BY:	BT
CHECKED BY:	JH
SCALE:	AS SHOWN

D22



DESCRIPTION	DATE

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

CURB RAMP DETAILS

N. 76TH ST. & MAPLE TERRACE

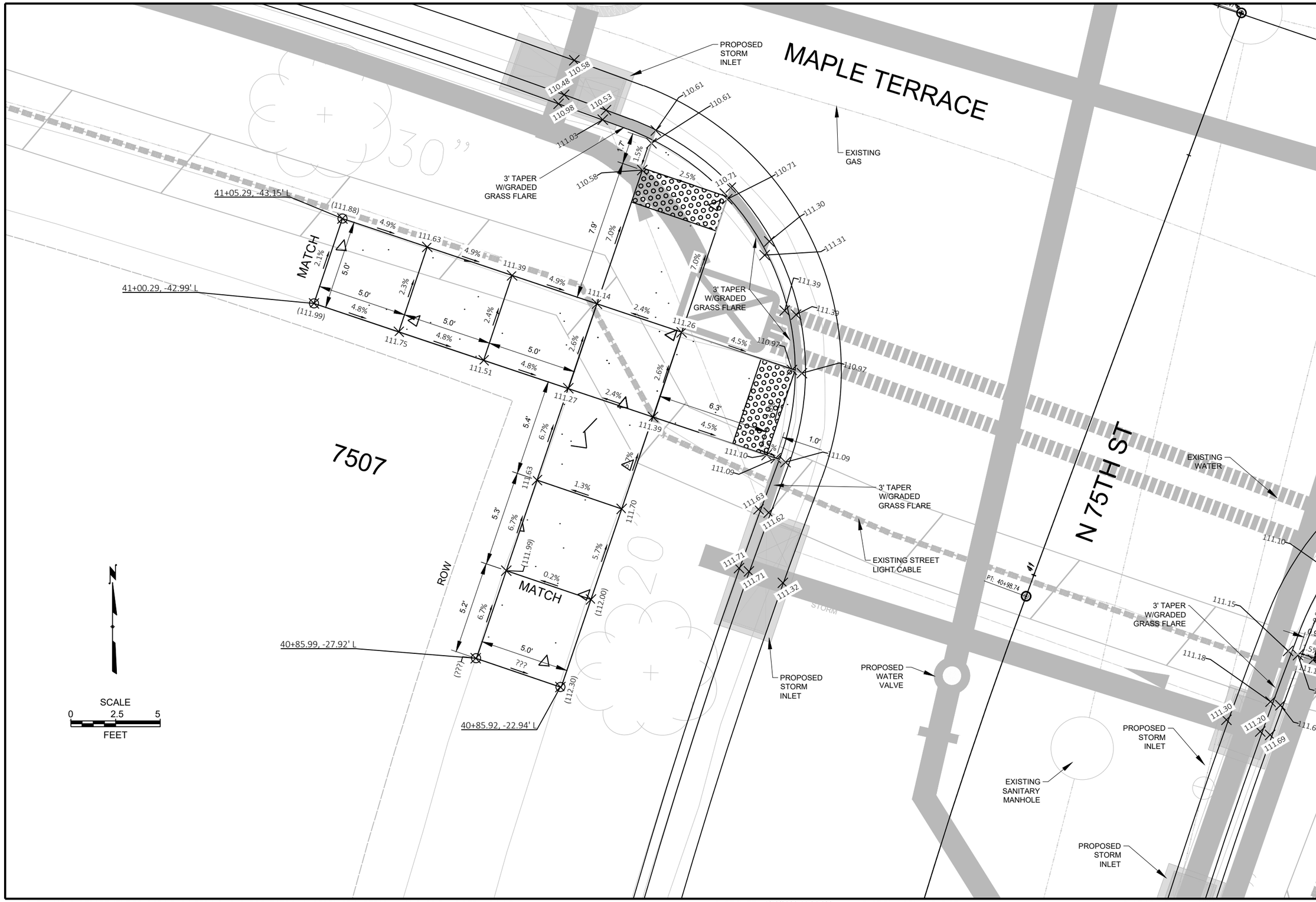
S.E. QUADRANT

CONTRACT:	26-07
FILE NO:	15-1095
DRAWN BY:	BT
CHECKED BY:	JH
SCALE:	AS SHOWN

D23

FILE NAME :S:\DEPARTMENT FOLDERS\ENGINEERING\ACAD_PROJECTS\26-07 PERRY CT\SHEETSPLAN\08 CURB RAMP DETAILS.DWG
LAYOUT NAME - Sheet 2

PLOT DATE : 1/16/2026 11:24 AM PLOT BY : BRYAN THEISEN PLOT SCALE : ##########



DATE	DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

CURB RAMP DETAILS

N. 75TH ST. & MAPLE TERRACE

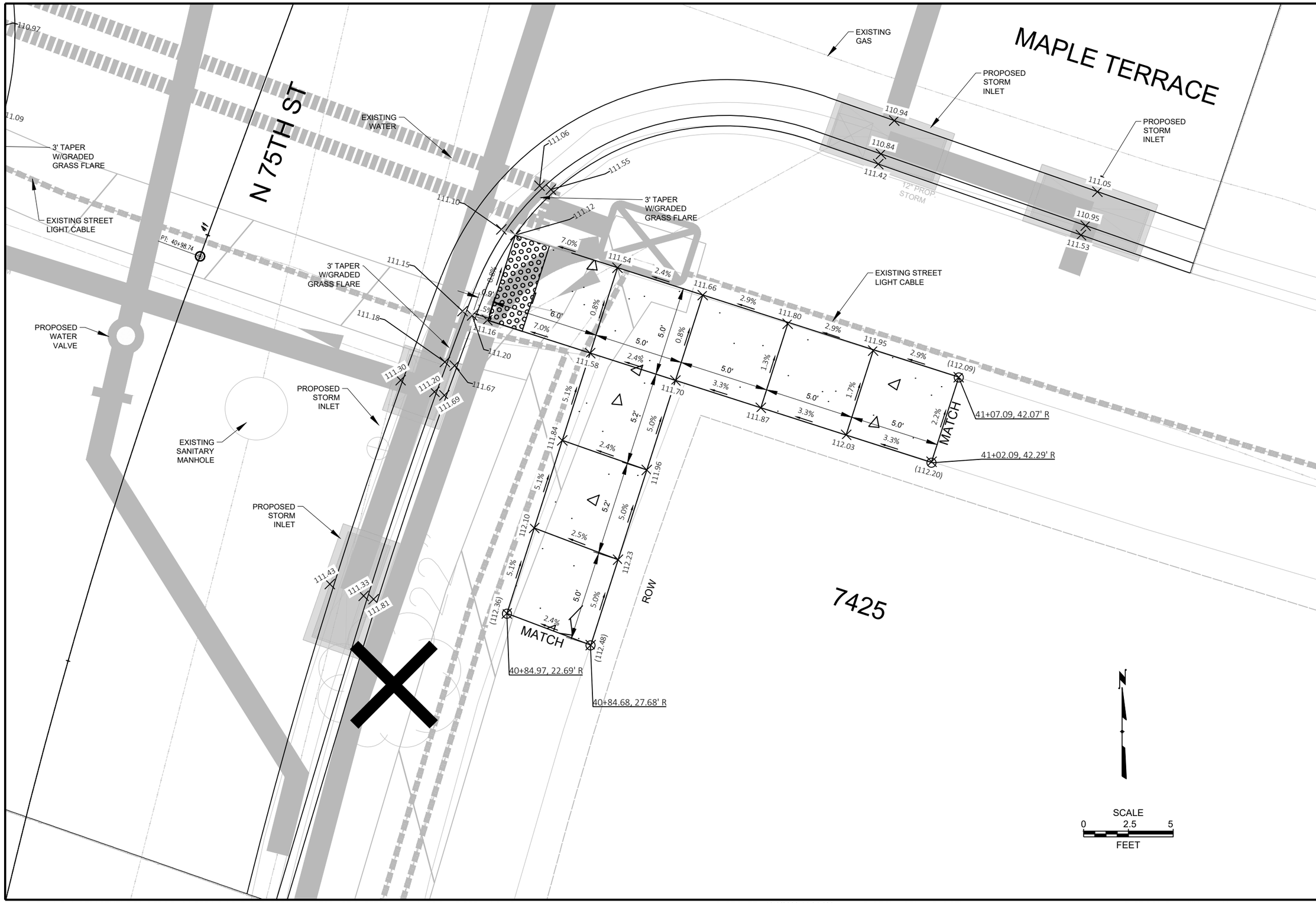
S.W. QUADRANT

CONTRACT:	26-07
FILE NO:	15-1095
DRAWN BY:	BT
CHECKED BY:	JH
SCALE:	AS SHOWN

D24

FILE NAME :S:\DEPARTMENT FOLDERS\ENGINEERING\ACAD_PROJECTS\26-07 PERRY CT\SHEETSPLAN\08 CURB RAMP DETAILS.DWG
LAYOUT NAME - Sheet 3

PLOT DATE : 1/16/2026 11:24 AM PLOT BY : BRYAN THEISEN PLOT SCALE : ##########



DESCRIPTION	DATE

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

CURB RAMP DETAILS
N. 75TH ST. & MAPLE TERRACE
S.E. QUADRANT

CONTRACT:	26-07
FILE NO:	15-1095
DRAWN BY:	BT
CHECKED BY:	JH
SCALE:	AS SHOWN

D25

FILE NAME :S:\DEPARTMENT FOLDERS\ENGINEERING\ACAD_PROJECTS\26-07 PERRY CT\SHEETSPLAN\08 CURB RAMP DETAILS.DWG
LAYOUT NAME - Sheet 4

PLOT DATE : 1/16/2026 11:24 AM PLOT BY : BRYAN THEISEN PLOT SCALE : ##########

GENERAL NOTES

1. ALL TRAFFIC CONTROL SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF PART 6 OF THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES, 2009 EDITION WITH WISCONSIN DPT SUPPLEMENT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ADEQUATE BARRICADES, SIGNS, AND OTHER DEVICES NECESSARY TO PROTECT THE WORK ZONE, THE MOTORING PUBLIC, AND PEDESTRIANS.

2. AT NO TIME SHALL ANY HAULING, STAGING, OR DELIVERIES BE ALLOWED ON RESIDENTIAL SIDE STREETS AROUND THE PROJECT AREA. CONSTRUCTION ACCESS OF EQUIPMENT AND WORKERS SHALL BE RESTRICTED AS CLOSELY TO THE IMMEDIATE, ACTIVE WORK AREA AS MUCH AS PRACTICABLE.

3. STAGING OF SUPPLIES AND EQUIPMENT SHALL ONLY BE ALLOWED ON STREETS AS SHOWN ON THIS SHEET. AT NO TIME SHALL STAGING BE ALLOWED TO BLOCK ANY DRIVEWAY OR INTERSECTION.

4. ALL SIGNS SHALL BE MOUNTED AT HEIGHTS AND LOCATIONS WHICH ALLOW FOR CLEAR VISIBILITY.

5. SIGNS MAY BE MOUNTED ON EXISTING CITY POLES. MOUNTING METHOD SHALL BE NON-DESTRUCTIVE.

6. ALL SIGNS SHALL BE 48" X 48" UNLESS OTHERWISE NOTED.

7. ALL TYPE III BARRICADES SHALL BE 8-FEET WIDE.

8. THE EXACT LOCATION AND SPACING OF ALL TRAFFIC CONTROL DEVICES SHALL BE ADJUSTED TO FIT FIELD CONDITIONS AS APPROVED AND/OR DIRECTED BY THE ENGINEER.

9. THE CONTRACTOR SHALL COVER ANY SIGN CONFLICTING WITH THE TRAFFIC CONTROL IN OPERATION AS NEEDED OR AS DIRECTED BY THE ENGINEER. COVERING OF SIGNS AND BAGGING OF SIGNALS IS INCIDENTAL TO THE "TRAFFIC CONTROL" BID ITEM. AFFECTED SIGNS SHALL BE RESTORED TO PRE-CONSTRUCTION CONDITION AS INCIDENTAL TO THE "TRAFFIC CONTROL" BID ITEM FOLLOWING THE REMOVAL OF TEMPORARY TRAFFIC CONTROL.

10. SIGNS WHICH WILL BE IN PLACE LESS THAN 7 CONTINUOUS DAYS AND NIGHTS MAY BE MOUNTED ON PORTABLE SUPPORTS.

11. THESE DRAWINGS ARE INFORMATIONAL ONLY AND PROVIDE GUIDANCE TO THE LEVEL OF TRAFFIC CONTROL QUALITY NECESSARY. THESE DRAWINGS CANNOT BE USED AS PART OF THE CONTRACTOR'S TRAFFIC CONTROL SUBMITTAL. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PREPARING A TRAFFIC CONTROL PLAN AND OBTAINING WRITTEN APPROVAL OF THAT PLAN FROM THE ENGINEER AS INCIDENTAL TO THE "TRAFFIC CONTROL" BID ITEM.

12. EXTRA SIGNS AND BARRICADES SHALL BE USED AS DIRECTED BY THE ENGINEER AND PAID UNDER THEIR RESPECTIVE BID ITEMS, IF PROVIDED. IF NO ADDITIONAL BID ITEMS ARE PRESENT IN THE CONTRACT, ADDITIONAL SIGNS DIRECTED BY THE ENGINEER ARE INCIDENTAL TO THE "TRAFFIC CONTROL" BID ITEM.

DATE	DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

TRAFFIC CONTROL

N PERRY CT, MAPLE TERR, LAUREL CT

FROM: PERRY CT
TO: N 75TH ST

CONTRACT: 26-07
FILE NO: 15-1095
DRAWN BY: RC
CHECKED BY: JMS
SCALE: AS SHOWN

D26

PHASE 1 :

- LOCAL ACCESS MUST BE PROVIDED FOR RESIDENTS.
- TEMPORARY MAILBOXES TO BE PROVIDED BY CONTRACTOR AND SHALL BE ACCESSIBLE AT ALL TIMES
- NO TRUCKING ON HONEY CREEK PARKWAY

LEGEND:

- WORK ZONES AND STAGING AREA
- POST MOUNTED SIGN
- TYPE III BARRICADE (8' EQUIVALENT) AND WARNING LIGHTS

DATE	DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

TRAFFIC CONTROL
N PERRY CT, MAPLE TERR, LAUREL CT

FROM: PERRY CT
TO: N 75TH ST

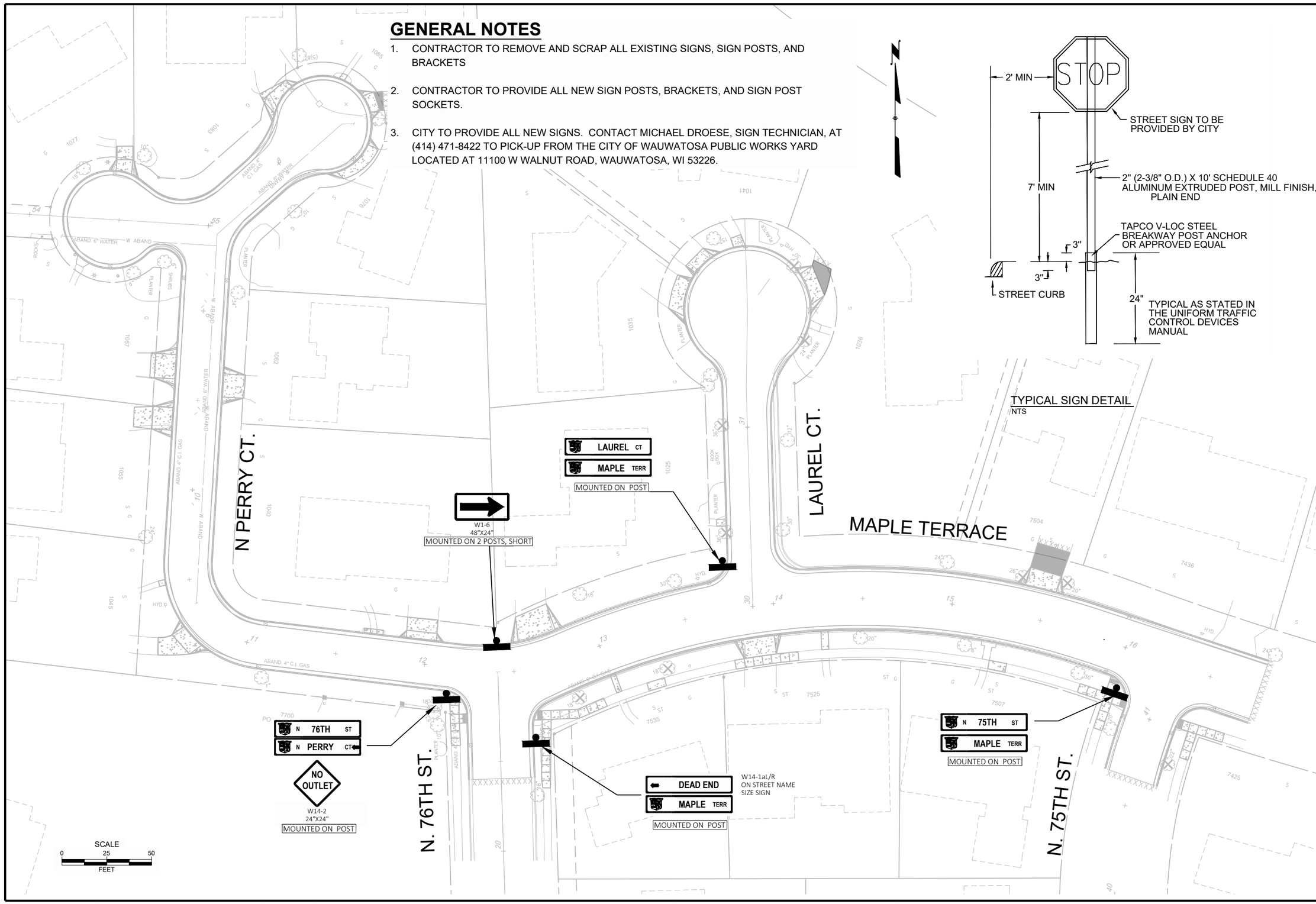
CONTRACT: 26-07
FILE NO: 15-1095
DRAWN BY: RC
CHECKED BY: JMS
SCALE: AS SHOWN

D27

FILE NAME : S:\DEPARTMENT FOLDERS\ENGINEERING\ACAD_PROJECTS\26-07 PERRY CT\SHEETSPLAN\10 TRAFFIC CONTROL PLAN.DWG PLOT DATE : 1/16/2026 11:52 AM

GENERAL NOTES

1. CONTRACTOR TO REMOVE AND SCRAP ALL EXISTING SIGNS, SIGN POSTS, AND BRACKETS
2. CONTRACTOR TO PROVIDE ALL NEW SIGN POSTS, BRACKETS, AND SIGN POST SOCKETS.
3. CITY TO PROVIDE ALL NEW SIGNS. CONTACT MICHAEL DROESE, SIGN TECHNICIAN, AT (414) 471-8422 TO PICK-UP FROM THE CITY OF WAUWATOSA PUBLIC WORKS YARD LOCATED AT 11100 W WALNUT ROAD, WAUWATOSA, WI 53226.



TYPICAL SIGN DETAIL
NTS

DATE	DESCRIPTION
2/11/2021	ISSUED FOR BIDDING

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

SIGNING PLAN

2026 STREET & UTILITY IMPROVEMENTS

CONTRACT:	26-07
FILE NO:	15-1095
DRAWN BY:	BJT
CHECKED BY:	JH
SCALE:	AS SHOWN

D28

FILE NAME : S:\DEPARTMENT FOLDERS\ENGINEERING\ACAD_PROJECTS\26-07 PERRY CT\SHEETSPLAN\12 SIGN PLAN.DWG
LAYOUT NAME - SIGN PLAN
PLOT DATE : 1/16/2026 9:39 AM
PLOT BY : BRYAN THEISEN

DIVISION D - ROADWAY

NO.	ITEM CODE	ITEM	QUANTITY	UNIT
D1	D1-02	COMMON EXCAVATION	1	LS
D2	D1-04	BASE AGGREGATE DENSE 1 $^{1}/_{4}$ INCH	3,971	TON
D3	D1-07	EXCAVATION BELOW SUBGRADE	430	CY
D4	D1-15	REMOVING CONCRETE PAVEMENT	4,294	SY
D5	D1-16	REMOVING CURB AND GUTTER	2,541	LF
D6	D1-18	REMOVING CONCRETE SIDEWALK AND DRIVE APPROACH	2,367	SF
D7	D1-19	SAWCUTTING	346	LF
D8	D2-05	31" CONCRETE CURB AND GUTTER	2,565	LF
D9	D3-01	5" CONCRETE SIDEWALK (REMOVED AND REPLACED)	1,387	SF
D10	D3-03	5" CONCRETE SIDEWALK	1,026	SF
D11	D3-07	7" CONCRETE SIDEWALK AND DRIVEWAY	3,016	SF
D12	D3-10	DETECTABLE WARNING FIELD	60	SF
D13	D4-02	7" CONCRETE PAVEMENT, SHES	19	SY
D14	D4-20	3 LT 58-28 S HMA PAVEMENT	828	TON
D15	D4-24	5 LT 58-28 S HMA PAVEMENT	488	TON
D16	D5-01	EROSION CONTROL	1	LS
D17	D5-02	TOPSOIL AND SOD	5,864	SF
D18	D6-01	TRAFFIC CONTROL	1	LS
D19	D6-11	NEW SIGN POST	6	EA
D20	D6-12	SIGN REMOVAL, RELOCATION, AND RE-INSTALLATION	5	EA
D21	D7-01	ADJUSTING WATER VALVE	6	EA

DESCRIPTION
DATE

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

MISCELLANEOUS QUANTITIES

2026 STREET & UTILITY IMPROVEMENTS

CONTRACT: 26-07
FILE NO: 15-1095
DRAWN BY: RC
CHECKED BY: JH
SCALE: N/A

D29

REMOVING CONCRETE PAVEMENT

LOCATION			D4 SY
STREET			
	N PERRY CT	TO STA 16+78	4,294
	TOTAL		**4,294**

SAWCUTTING

LOCATION			D7 LF
N 76TH ST			38
N 75TH ST			31
STA 16+78			38
1085 N PERRY CT			14
1083 N PERRY CT			17
1077 N PERRY CT			10
1076 N PERRY CT			26
1067 N PERRY CT			15
1062 N PERRY CT			13
1055 N PERRY CT			11
1045 N PERRY CT			13
1040 N PERRY CT			21
1041 LAUREL CT			20
1036 LAUREL CT			17
1035 LAUREL CT			20
1025 LAUREL CT			23
7504 MAPLE TER			19
	TOTAL		**346**

REMOVING CURB AND GUTTER

LOCATION				D5 LF
STREET				
	N PERRY CT	TO	STA 12+62	1,230
NORTH SIDE	STA 12+68	TO	STA 13+66	105
	LAUREL CT (13+66)	TO	LAUREL CT (14+18)	431
NORTH SIDE	STA 14+18	TO	STA 16+78	268
SOUTH SIDE	N 75TH ST	TO	N 76TH ST	426
SOUTH SIDE	N 75TH ST	TO	STA 16+78	81
	TOTAL			**2,541**

DESCRIPTION

DATE

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

MISCELLANEOUS QUANTITIES

2026 STREET & UTILITY IMPROVEMENTS

CONTRACT: 26-07
FILE NO: 15-1095
DRAWN BY: RC
CHECKED BY: JH
SCALE: N/A

D30

CONCRETE CURB AND GUTTER

LOCATION			OFFSET	D8 *31" CONCRETE CURB AND GUTTER LF	D2 *BASE AGGREGATE DENSE 1 1/4-INCH TONS	D17 *TOPSOIL AND SOD SF
STREET						
N PERRY CT	TO	STA 12+62		1,226	82	2,452
STA 12+62	TO	STA 13+66	LT	105	7	210
LAUREL CT (13+66)	TO	LAUREL CT (14+18)		436	29	872
STA 14+18	TO	STA 16+78	LT	267	18	534
N 75TH ST	TO	N 76TH ST	RT	427	28	854
N 75TH ST	TO	STA 16+78	RT	82	5	164
1077 N PERRY CT DW				16	1	32
1067 N PERRY CT DW				6	0	12
				--	--	--
				--	--	--
				--	--	--
				--	--	--
TOTAL				**2,565**	**171**	**5,130**

*ADDITIONAL QUANTITIES SHOWN ELSEWHERE

HMA PAVEMENT

LOCATION			D2 *BASE AGGREGATE DENSE 1 $^{1}/_{4}$-INCH TON	D14 3 LT 58-28 S HMA PAVEMENT TON	D15 5 LT 58-28 S HMA PAVEMENT TON
N PERRY CT	TO	STA 16+78	2,750	828	473
1085 N PERRY CT DW			10	--	2
1036 LAUREL CT DW			10	--	4
7504 MAPLE TER DW			20	--	9
TOTAL			**2,790**	**828**	**488**

*ADDITIONAL QUANTITIES SHOWN ELSEWHERE

DESCRIPTION

DATE

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

MISCELLANEOUS QUANTITIES

2026 STREET & UTILITY IMPROVEMENTS

CONTRACT: 26-07
FILE NO: 15-1095
DRAWN BY: RC
CHECKED BY: JH
SCALE: N/A

D31

CONCRETE DRIVE APPROACH AND CARRIAGE WALK ITEMS

STREET	ADDRESS	D4 *REMOVING CONCRETE SIDEWALK AND DRIVE APPROACH SF	D2 *BASE AGGREGATE DENSE 1 1/4-INCH TONS	D9 ***5" CONCRETE SIDEWALK (REMOVE AND REPLAPCED) SF	D11 7" CONCRETE SIDEWALK AND DRIVEWAY SF	D13 7" CONCRETE PAVEMENT SHES SY	REMARKS
	1085 N PERRY CT	27	--	10	--	--	CW
		--	3	--	82	--	DRIVE APPROACH
	1083 N PERRY CT	112	6	--	170	--	DRIVE APPROACH
	1077 N PERRY CT	134	6	--	--	19	DRIVE APPROACH
	1076 N PERRY CT	155	6	--	163	--	DRIVE APPROACH
	1067 N PERRY CT	256	9	--	236	--	DRIVE APPROACH
	1062 N PERRY CT	188	8	--	204	--	DRIVE APPROACH
	1055 N PERRY CT	264	11	--	306	--	DRIVE APPROACH
	1045 N PERRY CT	--	--	11	--	--	CW
		264	10	--	282	--	DRIVE APPROACH
	1040 N PERRY CT	--	--	27	--	--	CW
		198	8	--	214	--	DRIVE APPROACH
	1041 LAUREL CT	--	--	38	--	--	CW
		84	4	--	108	--	DRIVE APPROACH
	1036 LAUREL CT	--	6	--	168	--	DRIVE APPROACH
		27	--	--	--	--	CW - REMOVE ONLY
	1035 LAUREL CT	163	7	--	183	--	DRIVE APPROACH
	1025 LAUREL CT	300	13	--	356	--	DRIVE APPROACH
		--	--	20	--	--	CW
	7535 MAPLE TER	--	--	32	--	--	CW
	7525 MAPLE TER	--	1	42	--	--	CW
		195	9	--	236	--	DRIVE APPROACH
	7504 MAPLE TER	--	8	--	212	--	DRIVE APPROACH
			--	--	--	--	
	TOTAL	**2,367**	**115**	**180**	**2,920**	**19**	

*ADDITIONAL QUANTITIES SHOWN ELSEWHERE
***CARRIAGE WALK AND SERVICE WALK QUANTITIES ONLY. ADDITIONAL QUANTITIES SHOWN ELSEWHERE

DESCRIPTION
DATE

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

MISCELLANEOUS QUANTITIES

2026 STREET & UTILITY IMPROVEMENTS

CONTRACT: 26-07
FILE NO: 15-1095
DRAWN BY: RC
CHECKED BY: JH
SCALE: N/A

D32

CONCRETE SIDEWALK ITEMS

LOCATION		OFFSET	D2 *BASE AGGREGATE DENSE 1 1/4-INCH TONS	D9 *5" CONCRETE SIDEWALK (REMOVED AND REPLACED) SF	D11 7" CONCRETE SIDEWALK (REMOVED AND REPLACED) SF	D17 *TOPSOIL AND SOD SF
MAPLE TER						
	STA 13+19 TO STA 13+30	RT	1.0	49	--	20
	STA 13+73 TO STA 13+78	RT	0.5	24	--	10
	STA 13+78 TO STA 13+99	RT	2.5	--	96	--
	STA 13+99 TO STA 14+12	RT	1.5	60	--	24
	STA 15+26 TO STA 15+37	RT	1.0	48	--	20
	TOTAL		**7**	**181**	**96**	**74**

*ADDITIONAL QUANTITIES SHOWN ELSEWHERE

CONCRETE CURB RAMPS

LOCATION	QUADRANT	D6 REMOVING CONCRETE SIDEWALK SF	D2 *BASE AGGREGATE DENSE 1 1/4-INCH TONS	D10 *5" CONCRETE SIDEWALK SF	D12 DETECTABLE WARNING FIELD SF	SF TOPSOIL AND SOD SF
INTERSECTION OF MAPLE TERRACE AND N 76TH ST	SE	350	10	392	10	330
	SW	142	5	163	20	90
	NW	--	--	--	--	--
	NE	--	--	--	--	--
	SUBTOTAL	**492**	**15**	**555**	**30**	**420**
INTERSECTION OF MAPLE TERRACE AND N 75TH ST	SE	212	6	210	10	75
	SW	191	7	261	20	165
	NW	--	--	--	--	--
	NE	--	--	--	--	--
	SUBTOTAL	**403**	**13**	**471**	**30**	**240**
	TOTAL	**895**	**28**	**1,026**	**60**	**660**

*ADDITIONAL QUANTITIES SHOWN ELSEWHERE

DESCRIPTION
DATE

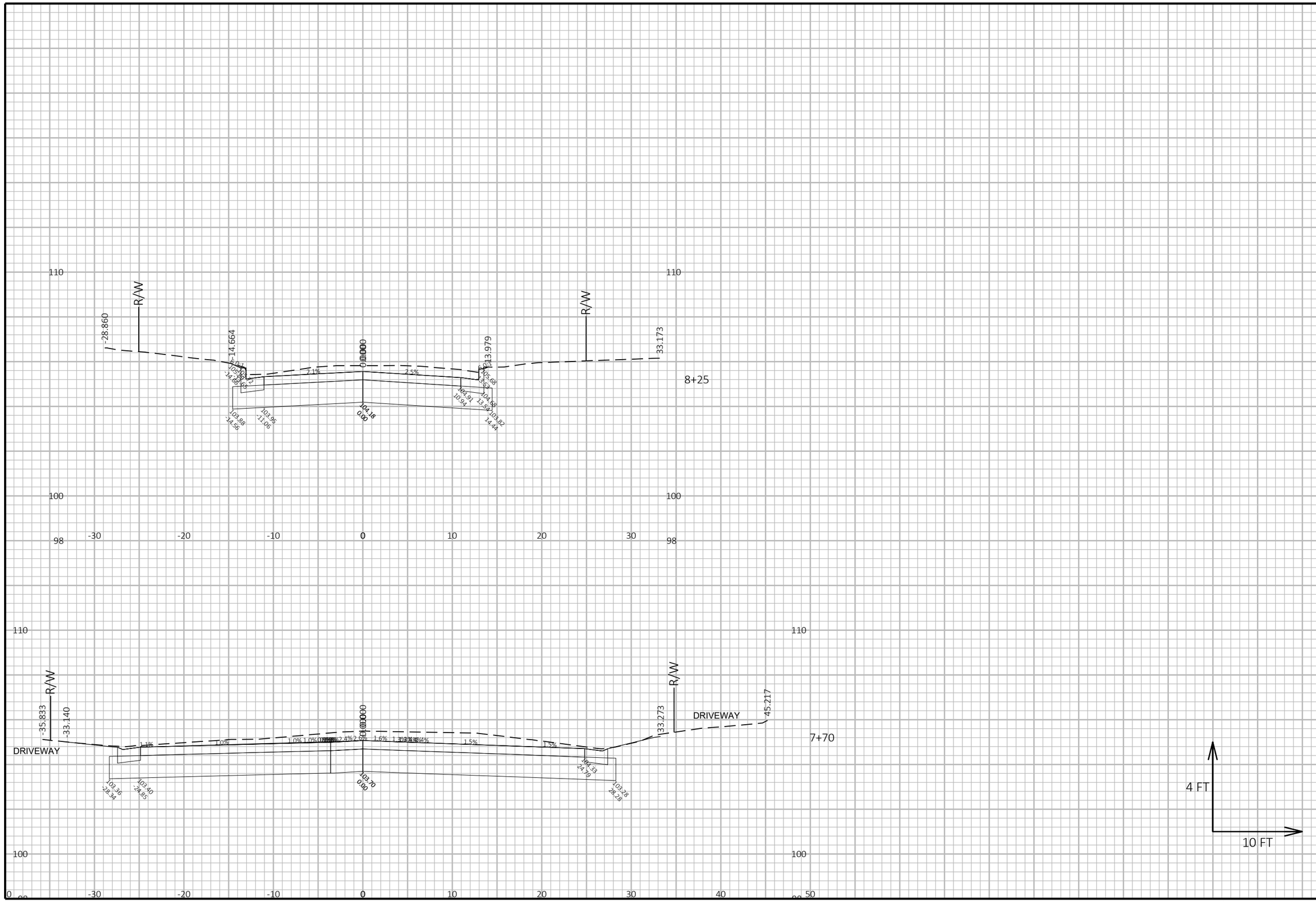
CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

MISCELLANEOUS QUANTITIES

2026 STREET & UTILITY IMPROVEMENTS

CONTRACT: 26-07
FILE NO: 15-1095
DRAWN BY: RC
CHECKED BY: JH
SCALE: N/A

D33



DATE	DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

CROSS SECTIONS

PERRY CT. & MAPLE TER.

CONTRACT:	26-07
FILE NO:	15-1095
DRAWN BY:	BT
CHECKED BY:	JS
SCALE:	AS SHOWN

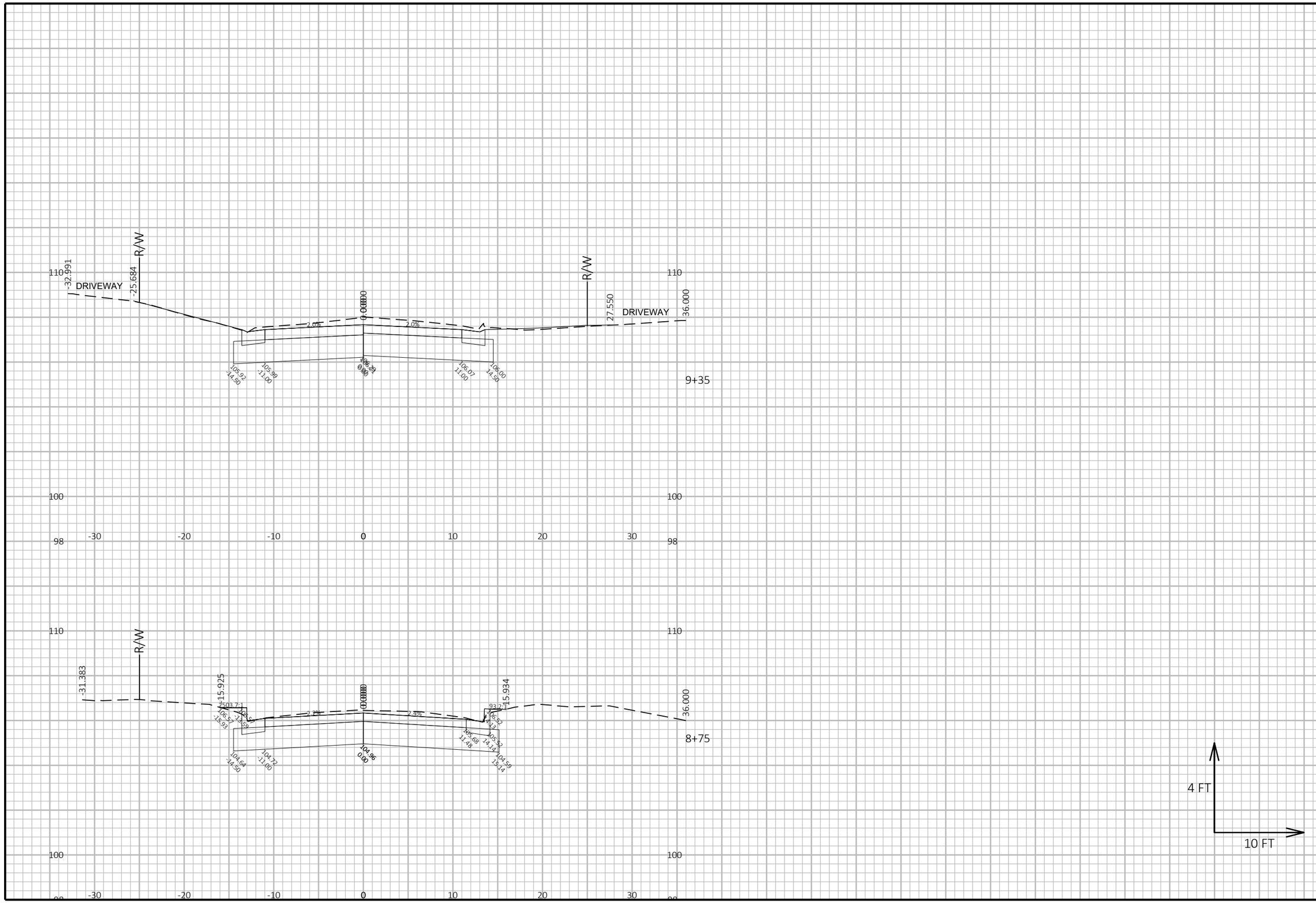
D34

FILE NAME : S:\DEPARTMENT FOLDERS\ENGINEERING\ACAD_PROJECTS\26-07 PERRY CT\SHEETSPLAN\09 CROSS SECTIONS.DWG
LAYOUT NAME - PERRY 1

PLOT DATE : 1/16/2026 2:13 PM

PLOT BY : BRYAN THEISEN

PLOT SCALE : 1 IN:10 FT HORZ. / 1 IN:4 FT VERT.



DESCRIPTION	DATE

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

CROSS SECTIONS

PERRY CT. & MAPLE TER.

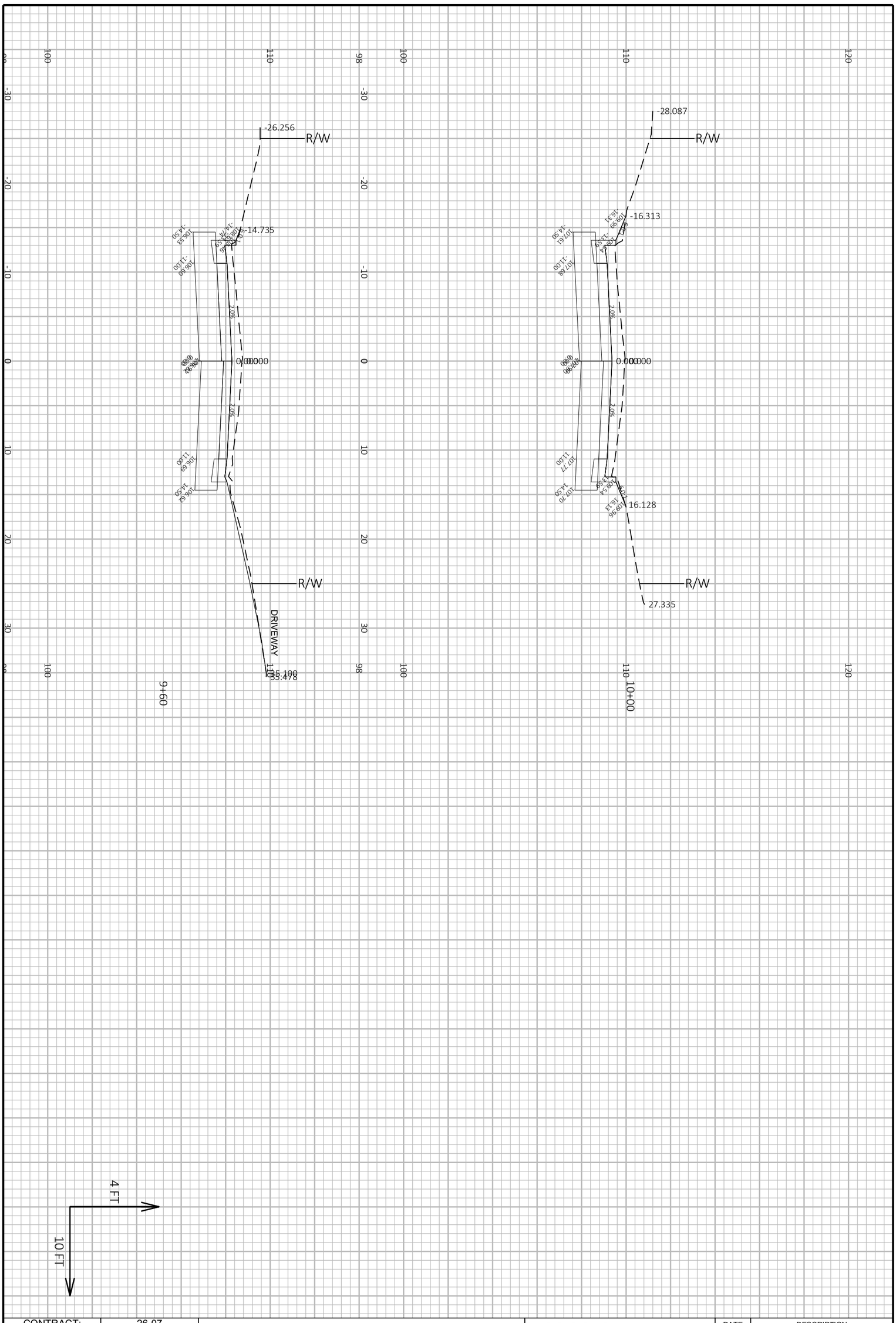
CONTRACT:	26-07
FILE NO:	15-1095
DRAWN BY:	BT
CHECKED BY:	JS
SCALE:	AS SHOWN

D35

FILE NAME : S:\DEPARTMENT FOLDERS\ENGINEERING\ACAD_PROJECTS\26-07 PERRY CT\SHEETSPLAN\09 CROSS SECTIONS.DWG
LAYOUT NAME - PERRY 2

PLOT DATE : 1/16/2026 2:13 PM PLOT BY : BRYAN THEISEN

PLOT SCALE : 1 IN:10 FT HORZ. / 1 IN:4 FT VERT.



CONTRACT:	26-07
FILE NO:	15-1095
DRAWN BY:	BT
CHECKED BY:	JS
SCALE:	AS SHOWN

D36

CROSS SECTIONS

PERRY CT. & MAPLE TER.

CITY OF WAUWATOSA

ENGINEERING SERVICES DIVISION

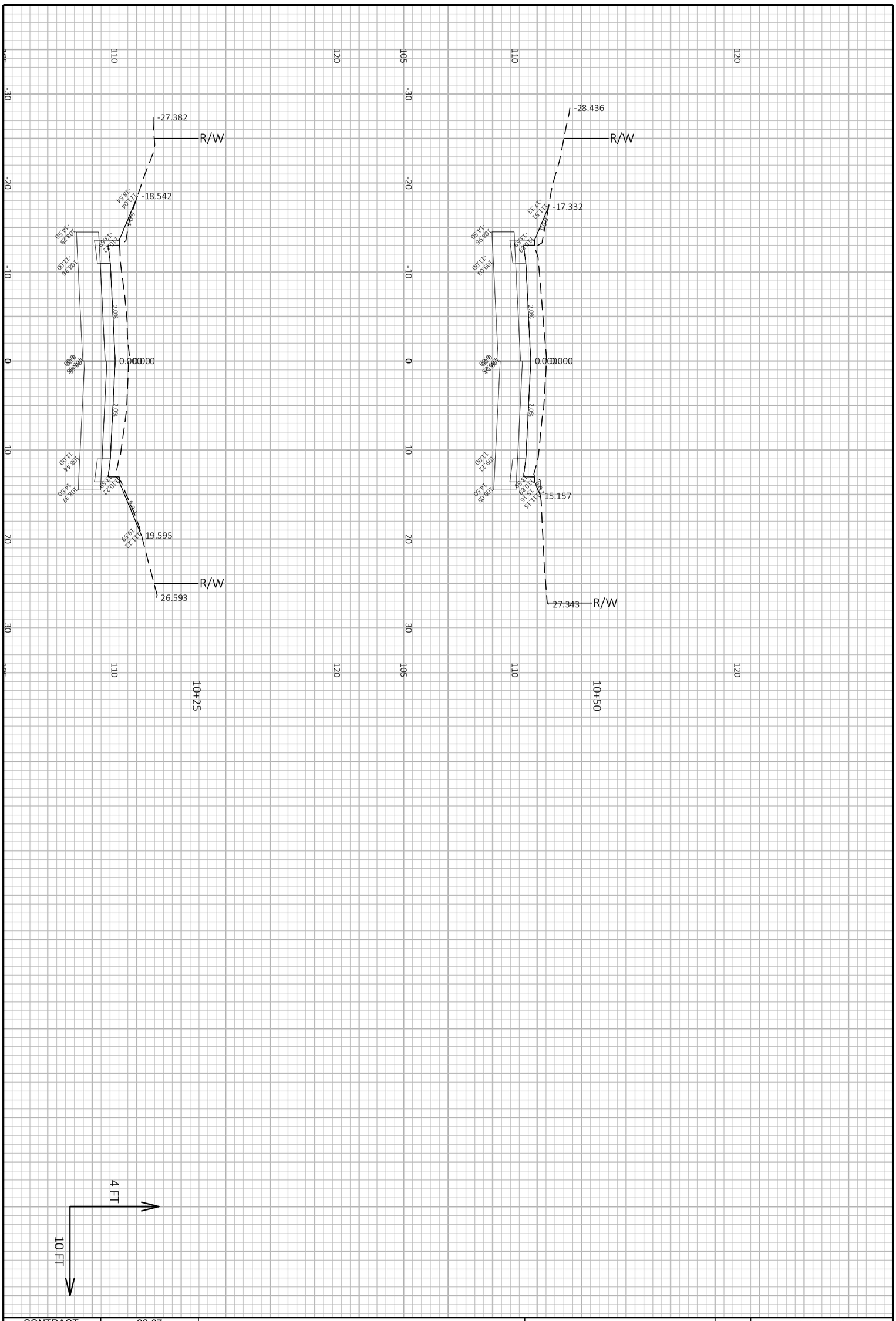
DATE	DESCRIPTION

FILE NAME : S:\DEPARTMENT FOLDERS\ENGINEERING\ACAD_PROJECTS\26-07 PERRY CT\SHEET\PLAN\09 CROSS SECTIONS.DWG
LAYOUT NAME - PERRY 3

PLOT DATE : 1/16/2026 2:14 PM

PLOT BY : BRYAN THEISEN

PLOT SCALE : 1 IN:10 FT HORZ. / 1 IN:4 FT VERT.



CONTRACT:	26-07
FILE NO:	15-1095
DRAWN BY:	BT
CHECKED BY:	JS
SCALE:	AS SHOWN

D37

CROSS SECTIONS

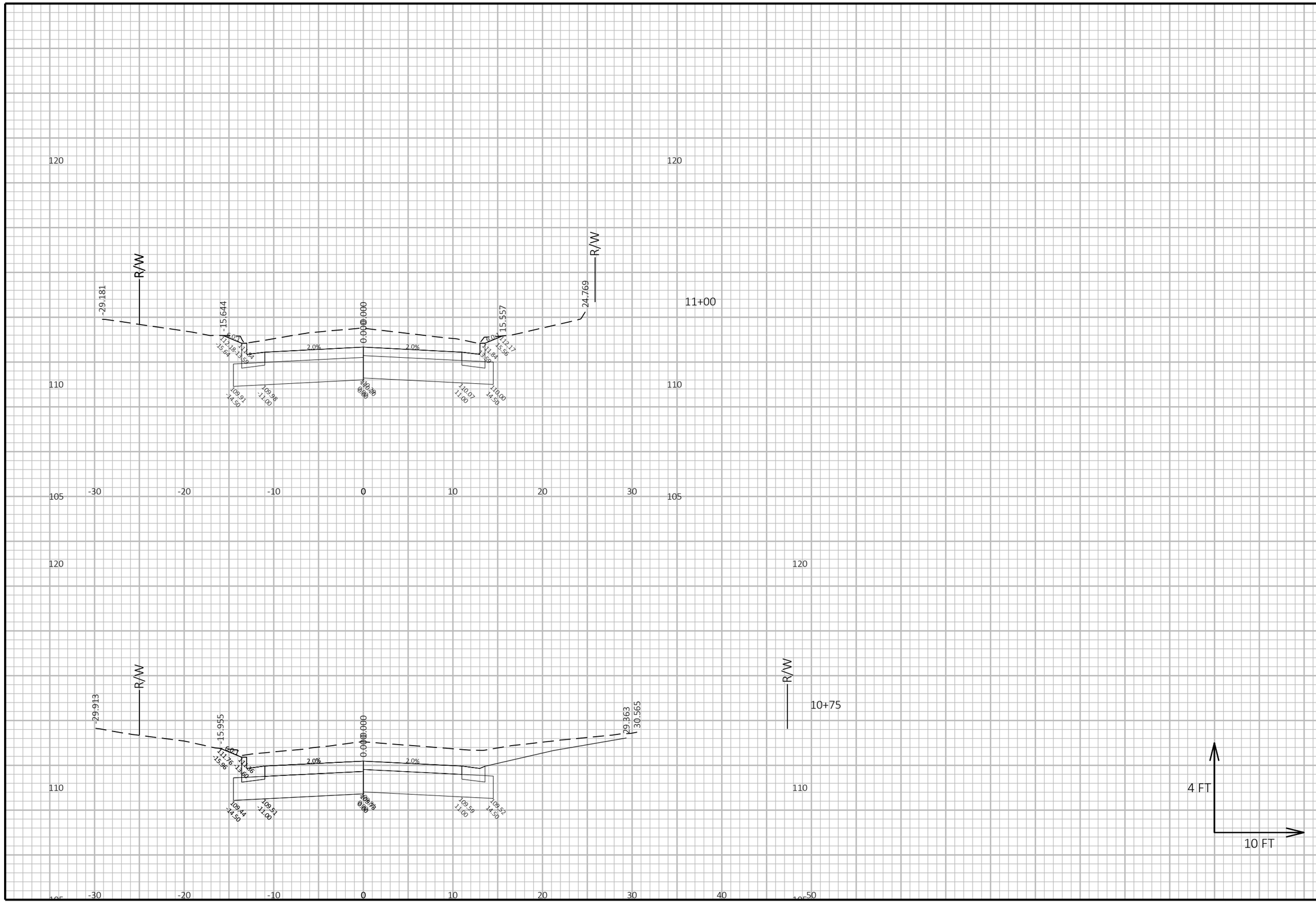
PERRY CT. & MAPLE TER.

CITY OF WAUWATOSA

ENGINEERING SERVICES DIVISION

DATE	DESCRIPTION

FILE NAME : S:\DEPARTMENT FOLDERS\ENGINEERING\ACAD_PROJECTS\26-07 PERRY CT\SHEET\PLAN\09 CROSS SECTIONS.DWG
LAYOUT NAME : PERRY 4
PLOT DATE : 1/16/2026 2:14 PM
PLOT BY : BRYAN THEISEN
PLOT SCALE : 1 IN:10 FT HORZ. / 1 IN:4 FT VERT.



DATE	DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

CROSS SECTIONS

PERRY CT. & MAPLE TER.

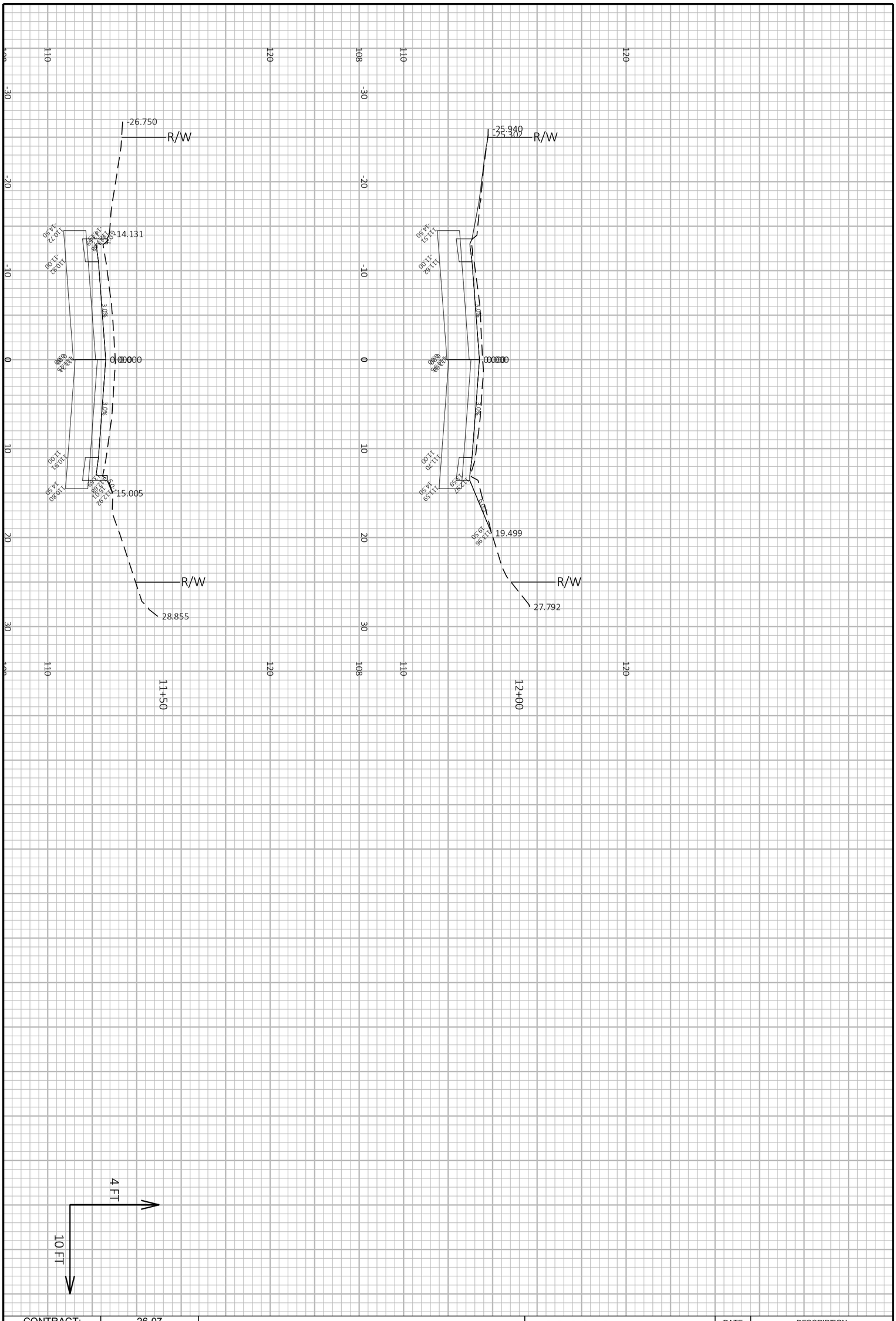
CONTRACT:	26-07
FILE NO:	15-1095
DRAWN BY:	BT
CHECKED BY:	JS
SCALE:	AS SHOWN

D38

FILE NAME : S:\DEPARTMENT FOLDERS\ENGINEERING\ACAD_PROJECTS\26-07 PERRY CT\SHEETSPLAN\09 CROSS SECTIONS.DWG
LAYOUT NAME - PERRY 5

PLOT DATE : 1/16/2026 2:14 PM PLOT BY : BRYAN THEISEN

PLOT SCALE : 1 IN:10 FT HORZ. / 1 IN:4 FT VERT.



CONTRACT:	26-07
FILE NO:	15-1095
DRAWN BY:	BT
CHECKED BY:	JS
SCALE:	AS SHOWN

D39

CROSS SECTIONS

PERRY CT. & MAPLE TER.

CITY OF WAUWATOSA

ENGINEERING SERVICES DIVISION

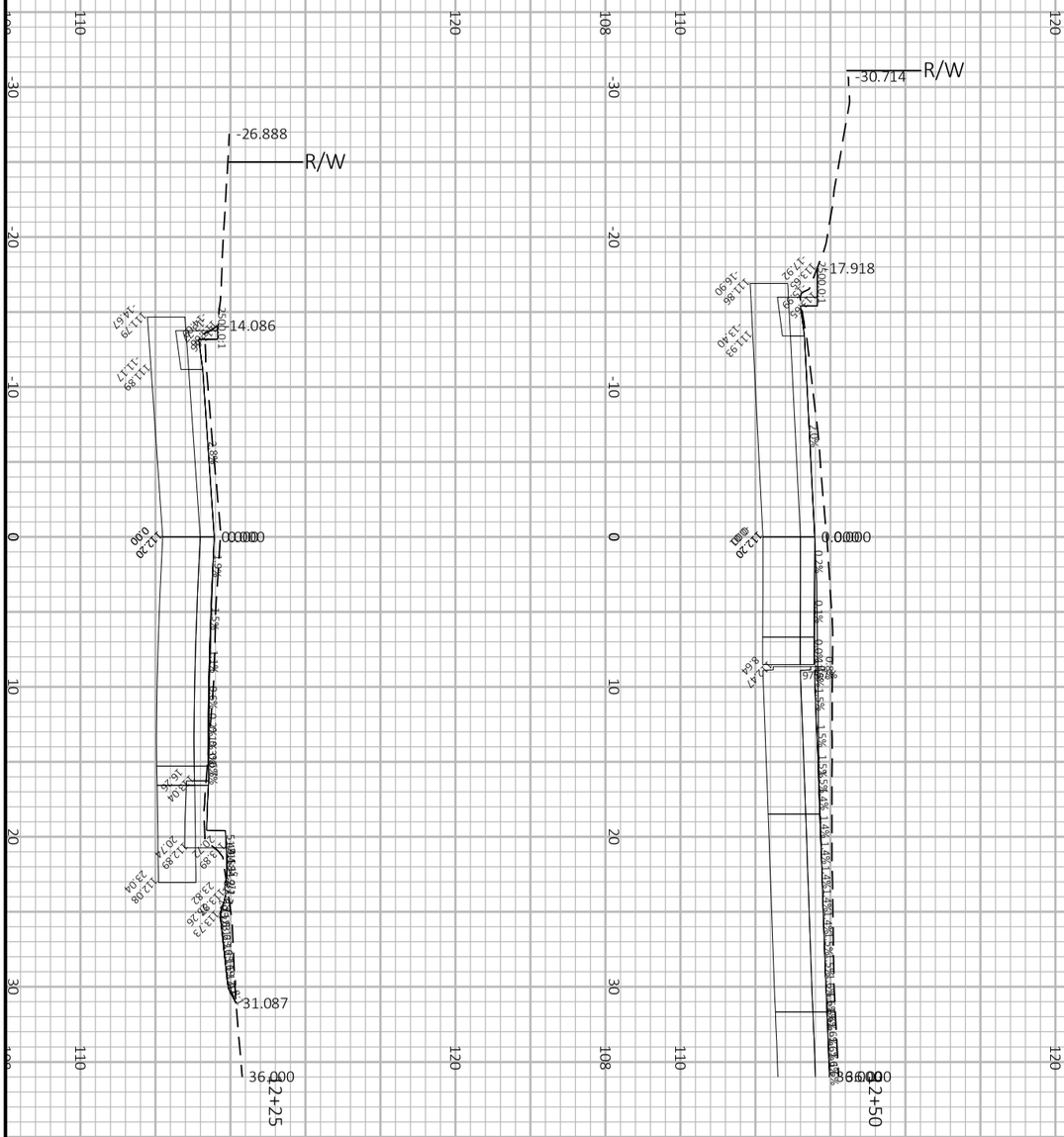
DATE	DESCRIPTION

FILE NAME : S:\DEPARTMENT FOLDERS\ENGINEERING\ACAD_PROJECTS\26-07 PERRY CT\SHEET\PLAN\09 CROSS SECTIONS.DWG
LAYOUT NAME - PERRY 6

PLOT DATE : 1/16/2026 2:14 PM

PLOT BY : BRYAN THEISEN

PLOT SCALE : 1 IN:10 FT HORZ. / 1 IN:4 FT VERT.



4 FT

10 FT

CONTRACT:	26-07
FILE NO:	15-1095
DRAWN BY:	BT
CHECKED BY:	JS
SCALE:	AS SHOWN

D40

CROSS SECTIONS

PERRY CT. & MAPLE TER.

CITY OF WAUWATOSA

ENGINEERING SERVICES DIVISION

DATE	DESCRIPTION

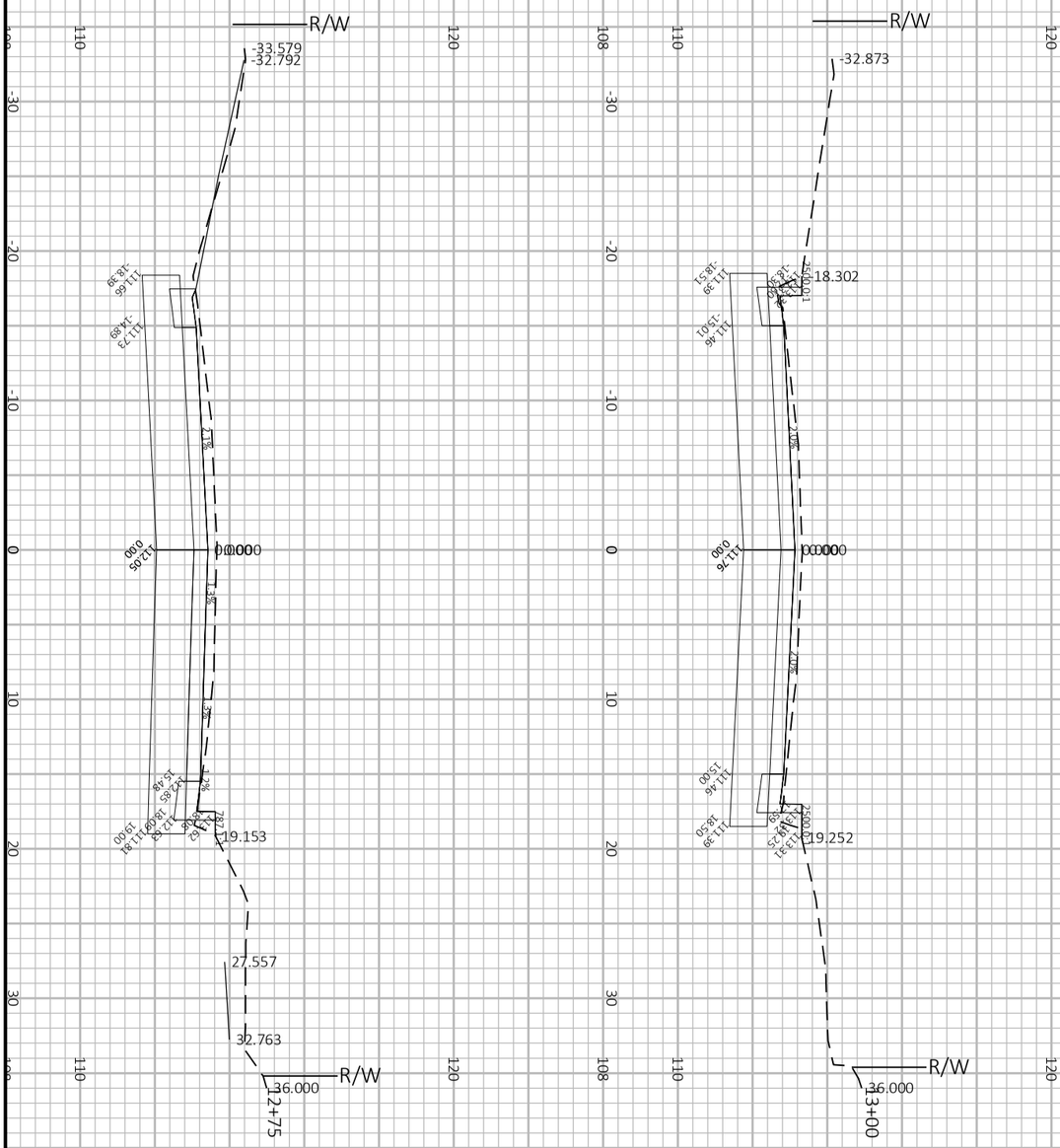
FILE NAME : S:\DEPARTMENT FOLDERS\ENGINEERING\ACAD_PROJECTS\26-07 PERRY CT\SHEET SPLAN\09 CROSS SECTIONS.DWG

LAYOUT NAME : PERRY 7

PLOT DATE : 1/16/2026 2:14 PM

PLOT BY : BRYAN THEISEN

PLOT SCALE : 1 IN:10 FT HORZ. / 1 IN:4 FT VERT.



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LAYOUT NAME - PERRY 8
PLOT DATE : 1/16/2026 2:14 PM
PLOT BY : BRYAN THEISEN
PLOT SCALE : 1 IN:10 FT HORZ. / 1 IN:4 FT VERT.

CONTRACT:	26-07
FILE NO:	15-1095
DRAWN BY:	BT
CHECKED BY:	JS
SCALE:	AS SHOWN

D41

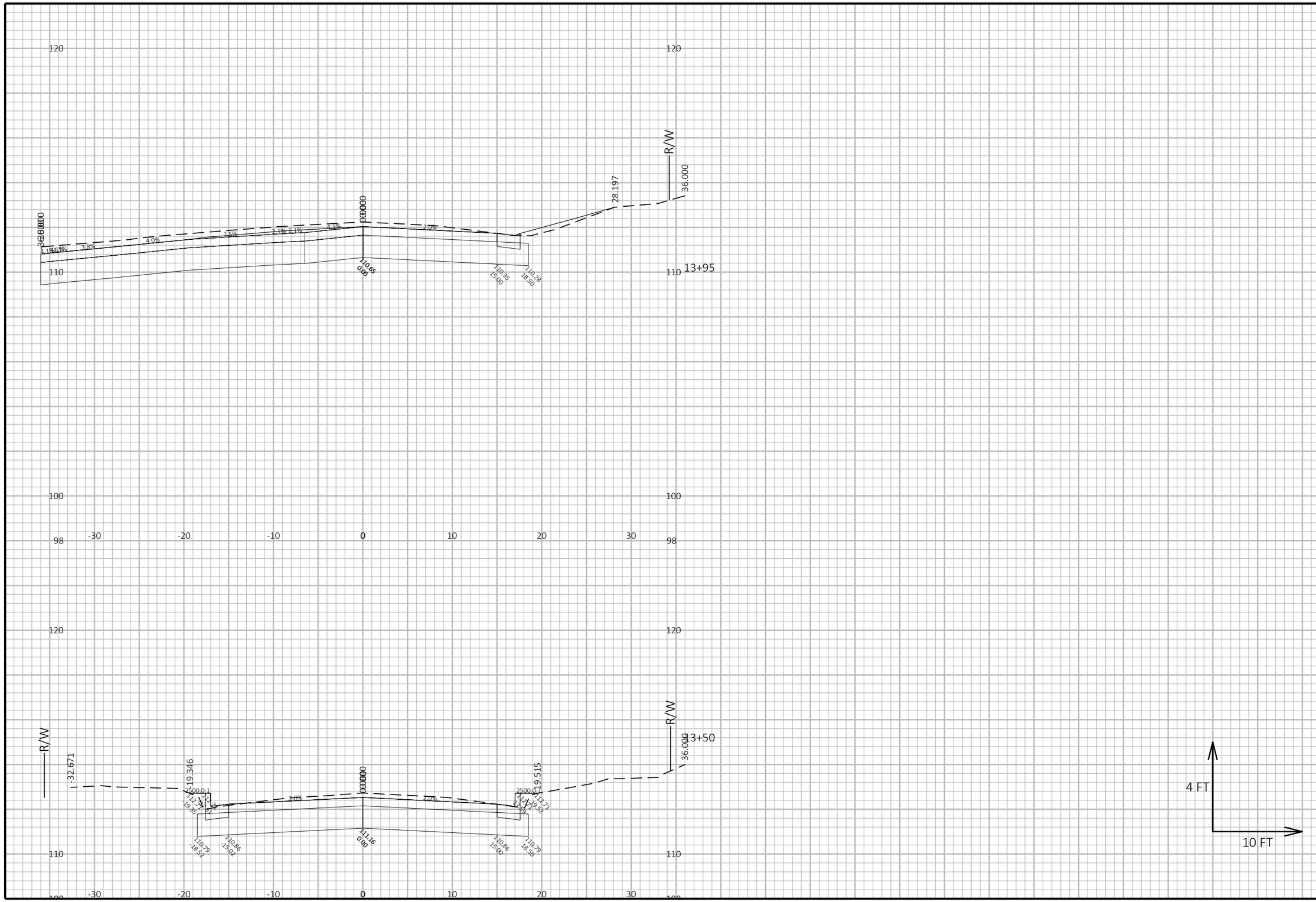
CROSS SECTIONS

PERRY CT. & MAPLE TER.

CITY OF WAUWATOSA

ENGINEERING SERVICES DIVISION

DATE	DESCRIPTION



DATE	DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

CROSS SECTIONS

PERRY CT. & MAPLE TER.

CONTRACT: 26-07
FILE NO: 15-1095
DRAWN BY: BT
CHECKED BY: JS
SCALE: AS SHOWN

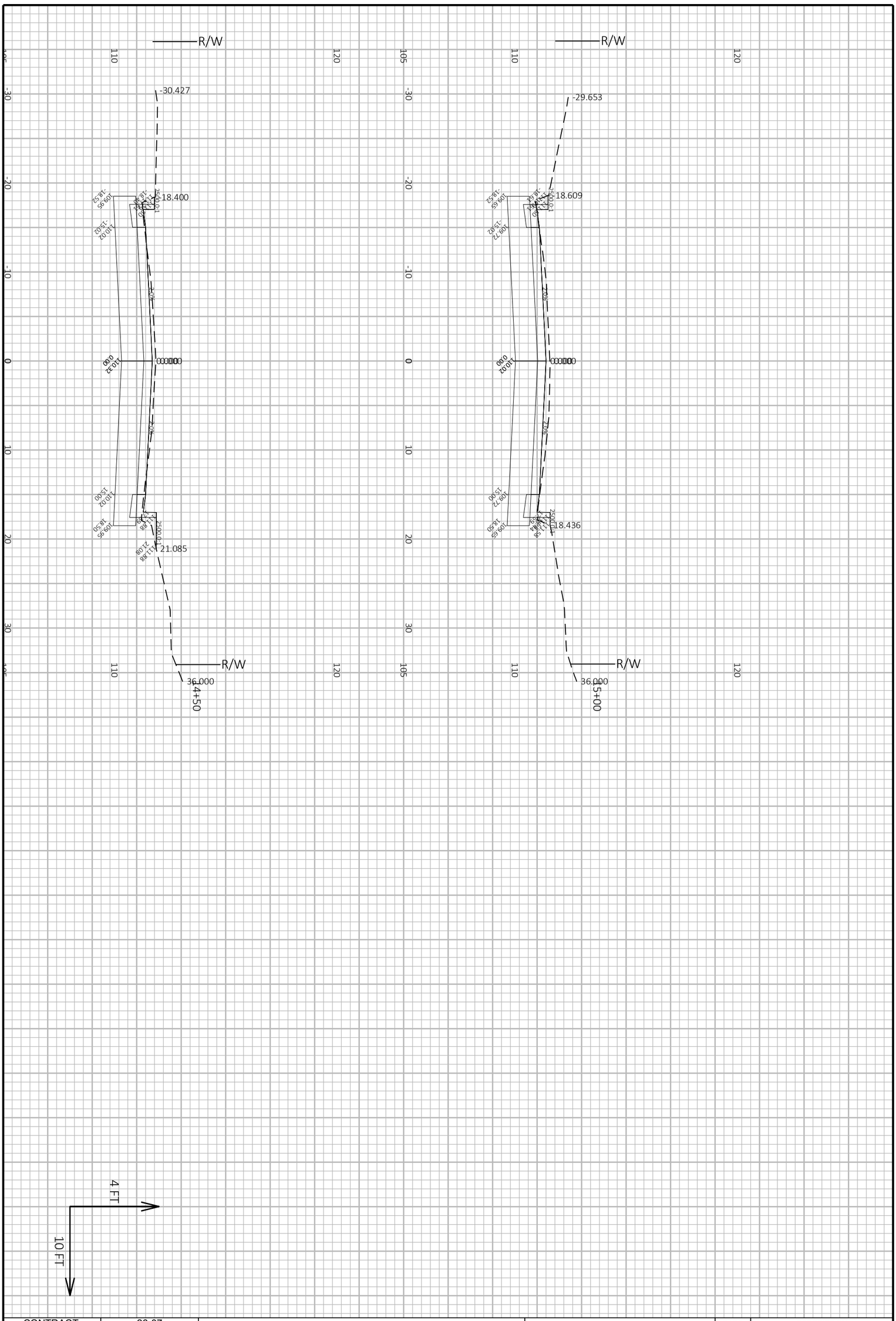
D42

FILE NAME : S:\DEPARTMENT FOLDERS\ENGINEERING\ACAD_PROJECTS\26-07 PERRY CT\SHEETSPLAN\09 CROSS SECTIONS.DWG
LAYOUT NAME - PERRY 9

PLOT DATE : 1/16/2026 2:14 PM

PLOT BY : BRYAN THEISEN

PLOT SCALE : 1 IN:10 FT HORZ. / 1 IN:4 FT VERT.



CONTRACT:	26-07
FILE NO:	15-1095
DRAWN BY:	BT
CHECKED BY:	JS
SCALE:	AS SHOWN

D43

CROSS SECTIONS

PERRY CT. & MAPLE TER.

CITY OF WAUWATOSA

ENGINEERING SERVICES DIVISION

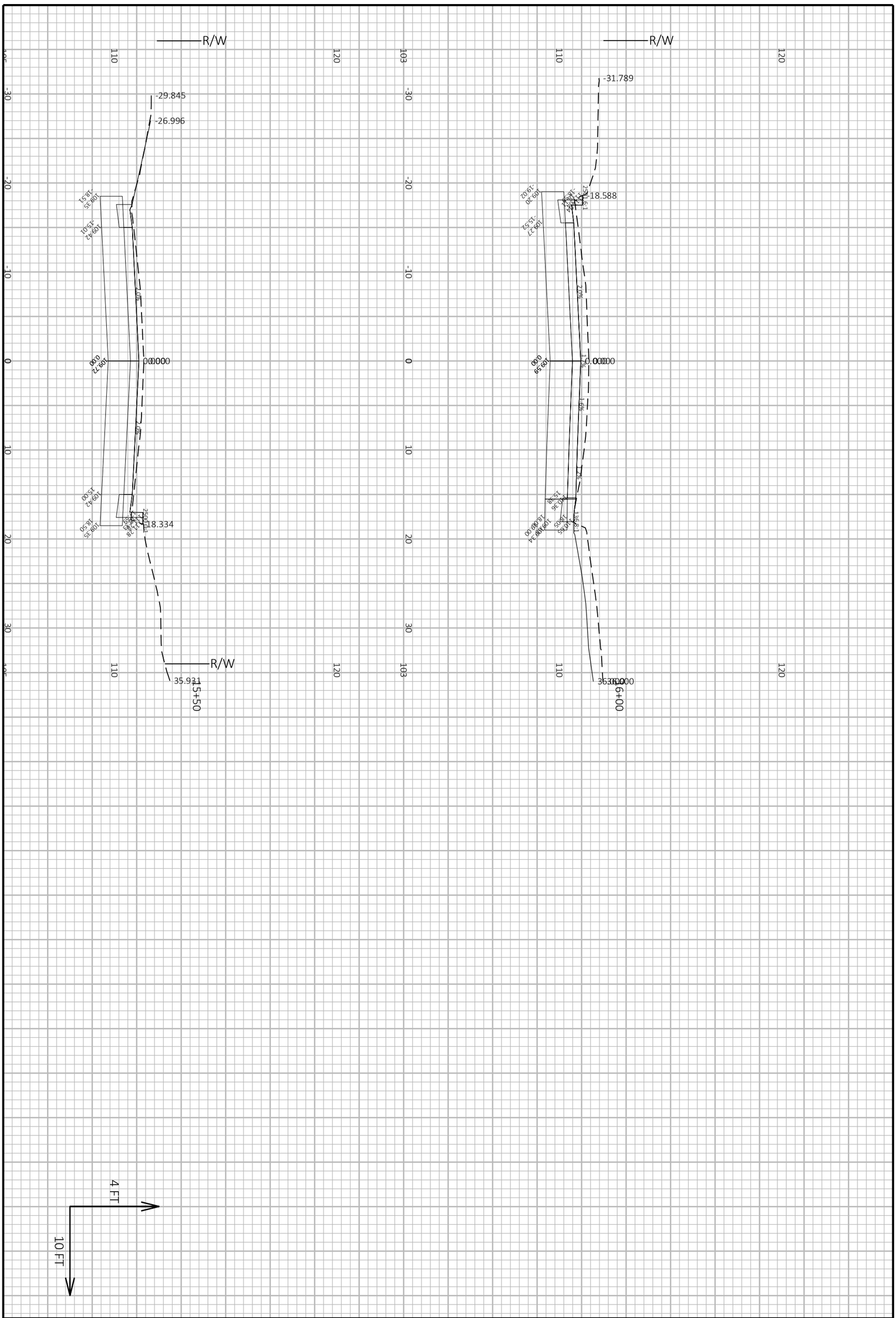
DATE	DESCRIPTION

FILE NAME : S:\DEPARTMENT FOLDERS\ENGINEERING\ACAD_PROJECTS\26-07 PERRY CT\SHEET\PLAN\09 CROSS SECTIONS.DWG
LAYOUT NAME : PERRY 10

PLOT DATE : 1/16/2026 2:14 PM

PLOT BY : BRYAN THEISEN

PLOT SCALE : 1 IN:10 FT HORZ / 1 IN:4 FT VERT.



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LAYOUT NAME : PERRY 11
PLOT DATE : 1/16/2026 2:14 PM
PLOT BY : BRYAN THEISEN
PLOT SCALE : 1 IN:10 FT HORZ. / 1 IN:4 FT VERT.

CONTRACT:	26-07
FILE NO:	15-1095
DRAWN BY:	BT
CHECKED BY:	JS
SCALE:	AS SHOWN

D44

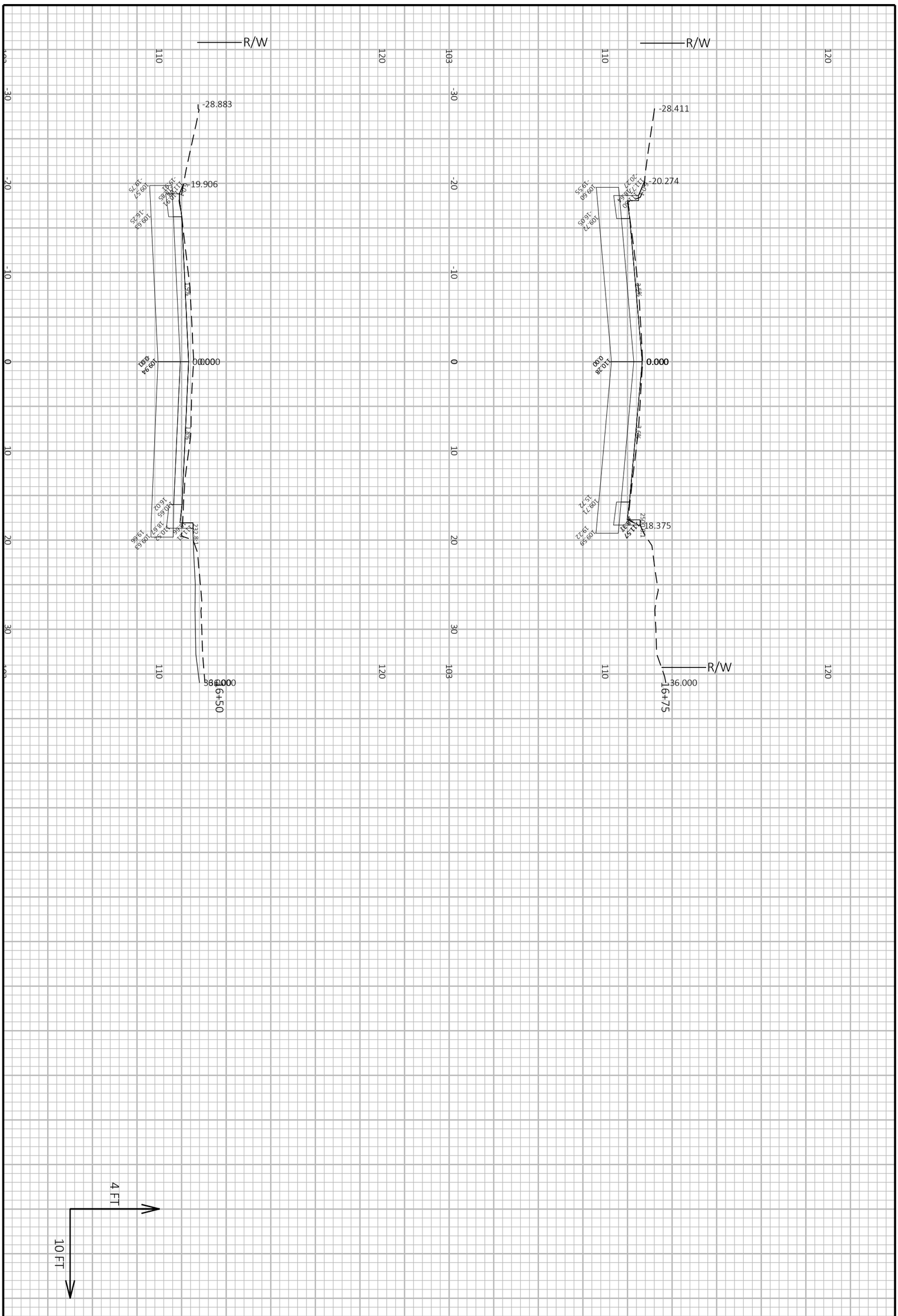
CROSS SECTIONS

PERRY CT. & MAPLE TER.

CITY OF WAUWATOSA

ENGINEERING SERVICES DIVISION

DATE	DESCRIPTION



CONTRACT:	26-07
FILE NO:	15-1095
DRAWN BY:	BT
CHECKED BY:	JS
SCALE:	AS SHOWN

D45

CROSS SECTIONS

PERRY CT. & MAPLE TER.

CITY OF WAUWATOSA

ENGINEERING SERVICES DIVISION

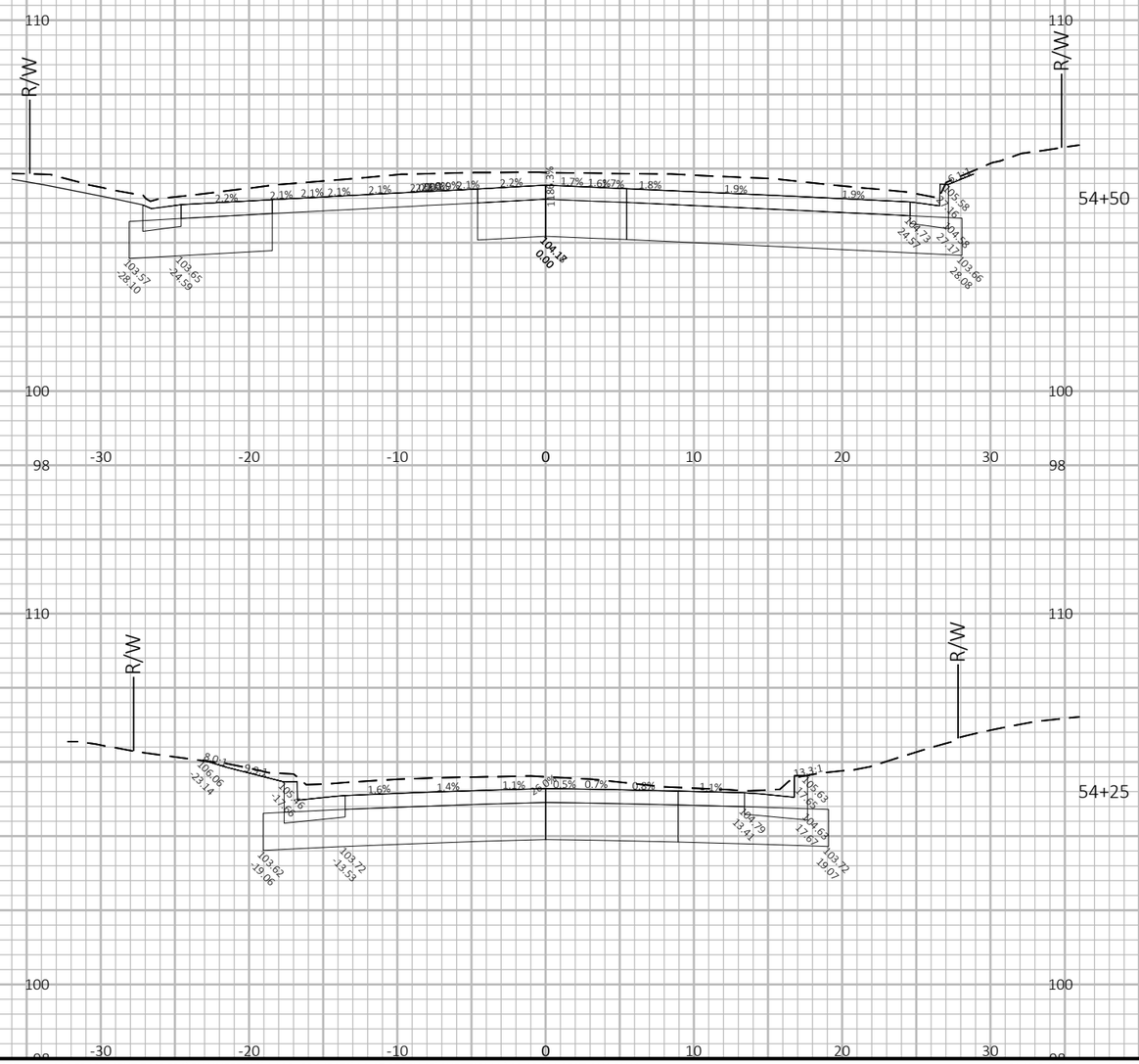
DATE	DESCRIPTION

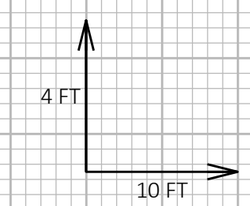
FILE NAME : S:\DEPARTMENT FOLDERS\ENGINEERING\ACAD_PROJECTS\26-07 PERRY CT\SHEET\PLAN\09 CROSS SECTIONS.DWG
LAYOUT NAME - PERRY 12

PLOT DATE : 1/16/2026 2:14 PM

PLOT BY : BRYAN THEISEN

PLOT SCALE : 1 IN:10 FT HORZ / 1 IN:4 FT VERT.





DATE	DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

CROSS SECTIONS
PERRY CT. & MAPLE TER.

CONTRACT:	26-07
FILE NO:	15-1095
DRAWN BY:	BT
CHECKED BY:	JS
SCALE:	AS SHOWN

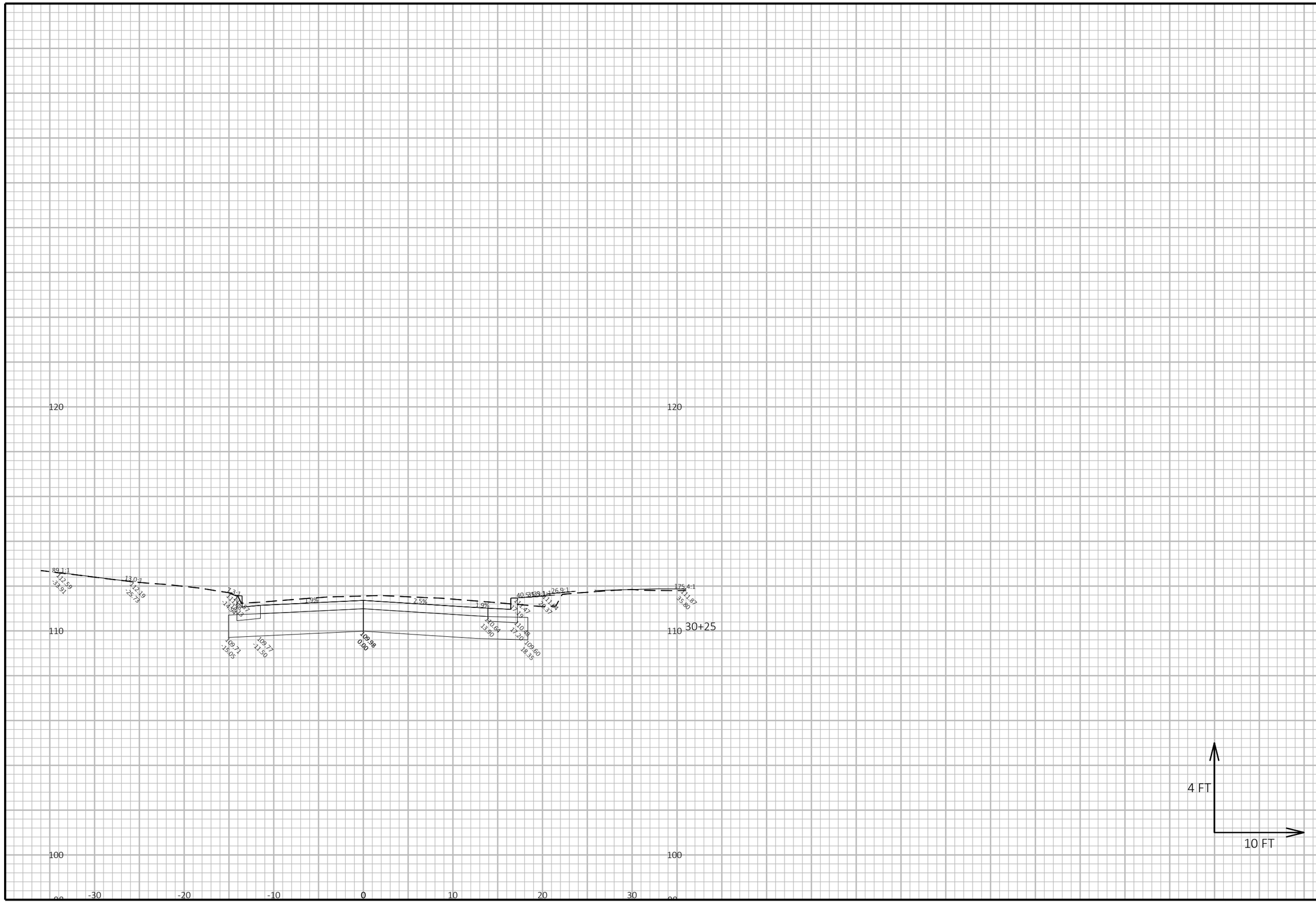
D46

FILE NAME : S:\DEPARTMENT FOLDERS\ENGINEERING\ACAD_PROJECTS\26-07 PERRY CT\SHEETSPLAN\09 CROSS SECTIONS.DWG
LAYOUT NAME - PERRY EASEMENT

PLOT DATE : 1/16/2026 2:14 PM

PLOT BY : BRYAN THEISEN

PLOT SCALE : 1 IN:10 FT HORZ. / 1 IN:4 FT VERT.



DESCRIPTION

DATE

CITY OF WAUWATOSA

ENGINEERING SERVICES DIVISION

CROSS SECTIONS

LAUREL CT.

CONTRACT: 26-07

FILE NO: 15-1095

DRAWN BY: BT

CHECKED BY: JS

SCALE: AS SHOWN

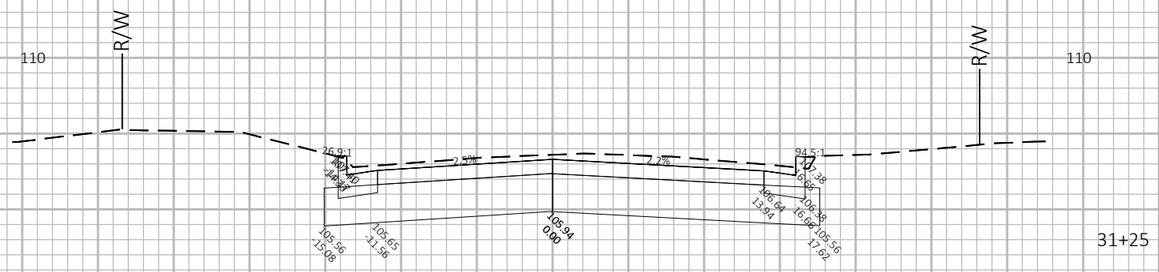
D47

FILE NAME : S:\DEPARTMENT FOLDERS\ENGINEERING\ACAD_PROJECTS\26-07 PERRY CT\SHEETSPLAN\09 CROSS SECTIONS.DWG
LAYOUT NAME - LAUREL 1

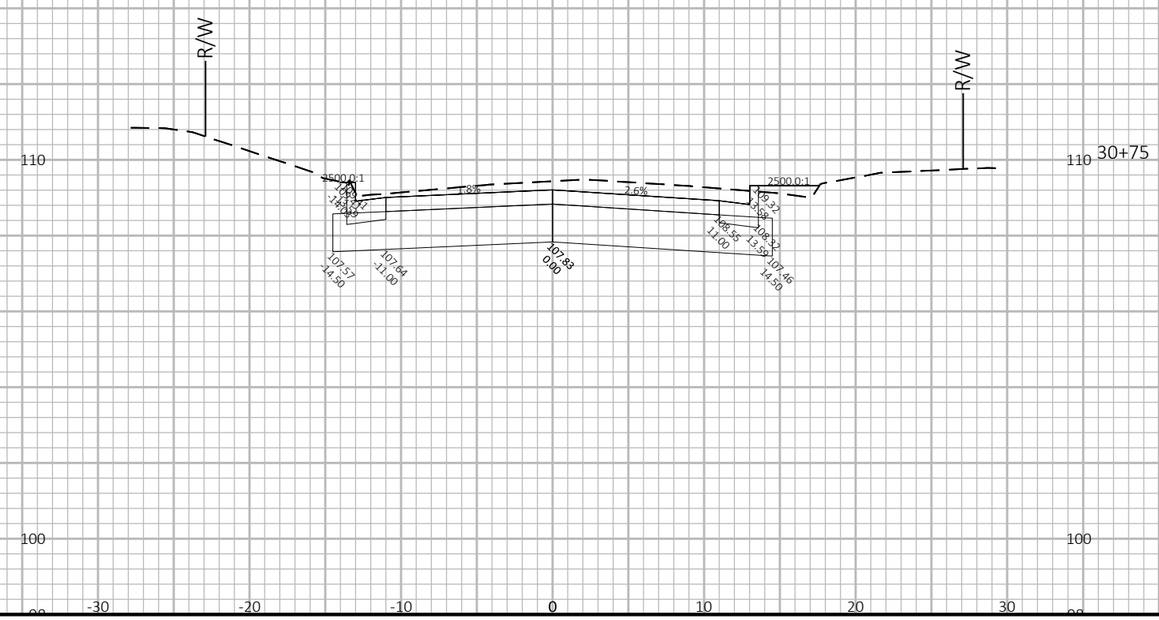
PLOT DATE : 1/16/2026 2:14 PM

PLOT BY : BRYAN THEISEN

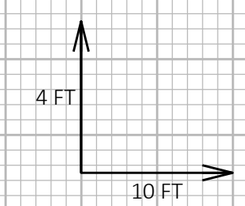
PLOT SCALE : 1 IN:10 FT HORZ. / 1 IN:4 FT VERT.



31+25



30+75



DATE	DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

CROSS SECTIONS

LAUREL CT.

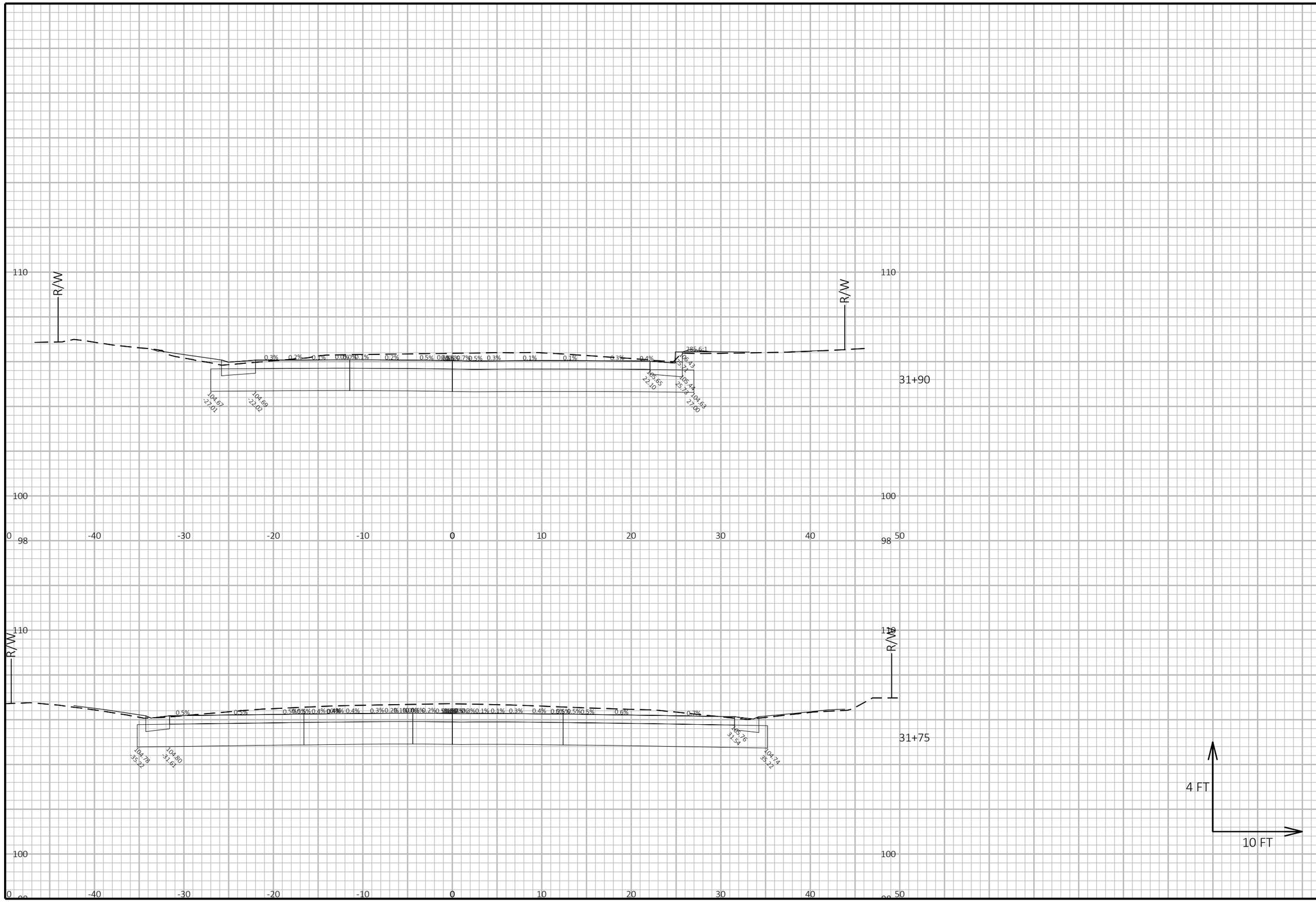
CONTRACT:	26-07
FILE NO:	15-1095
DRAWN BY:	BT
CHECKED BY:	JS
SCALE:	AS SHOWN

D48

FILE NAME : S:\DEPARTMENT FOLDERS\ENGINEERING\ACAD_PROJECTS\26-07 PERRY CT\SHEETSPLAN\09 CROSS SECTIONS.DWG
LAYOUT NAME - LAUREL 2

PLOT DATE : 1/16/2026 2:15 PM PLOT BY : BRYAN THEISEN

PLOT SCALE : 1 IN:10 FT HORZ. / 1 IN:4 FT VERT.



DATE	DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

CROSS SECTIONS

LAUREL CT.

CONTRACT: 26-07
FILE NO: 15-1095
DRAWN BY: BT
CHECKED BY: JS
SCALE: AS SHOWN

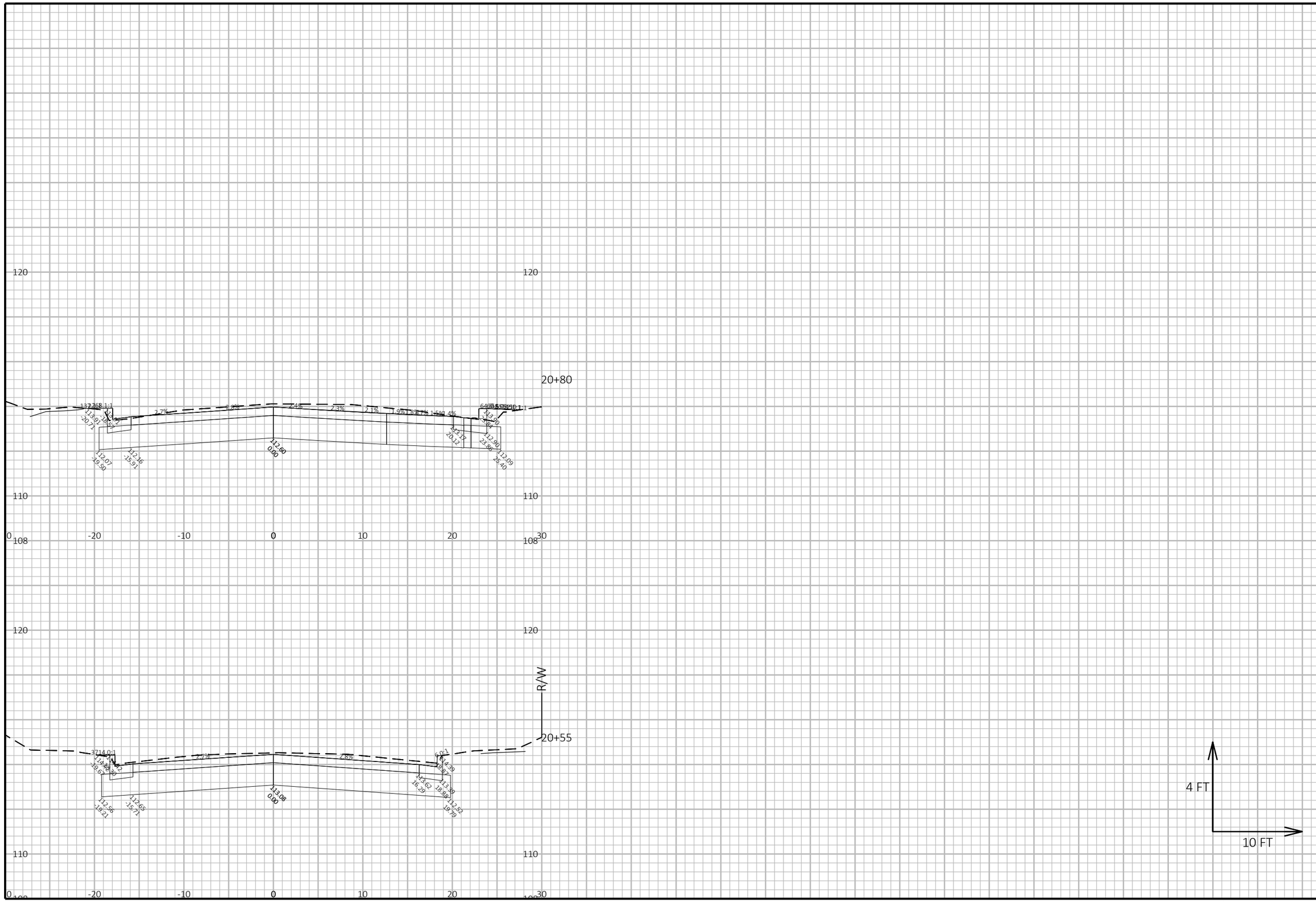
D49

FILE NAME : S:\DEPARTMENT FOLDERS\ENGINEERING\ACAD_PROJECTS\26-07 PERRY CT\SHEETSPLAN\09 CROSS SECTIONS.DWG
LAYOUT NAME - LAUREL 3

PLOT DATE : 1/16/2026 2:15 PM

PLOT BY : BRYAN THEISEN

PLOT SCALE : 1 IN:10 FT HORZ. / 1 IN:4 FT VERT.



DATE	DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

CROSS SECTIONS

N. 76TH ST.

CONTRACT: 26-07
FILE NO: 15-1095
DRAWN BY: BT
CHECKED BY: JS
SCALE: AS SHOWN

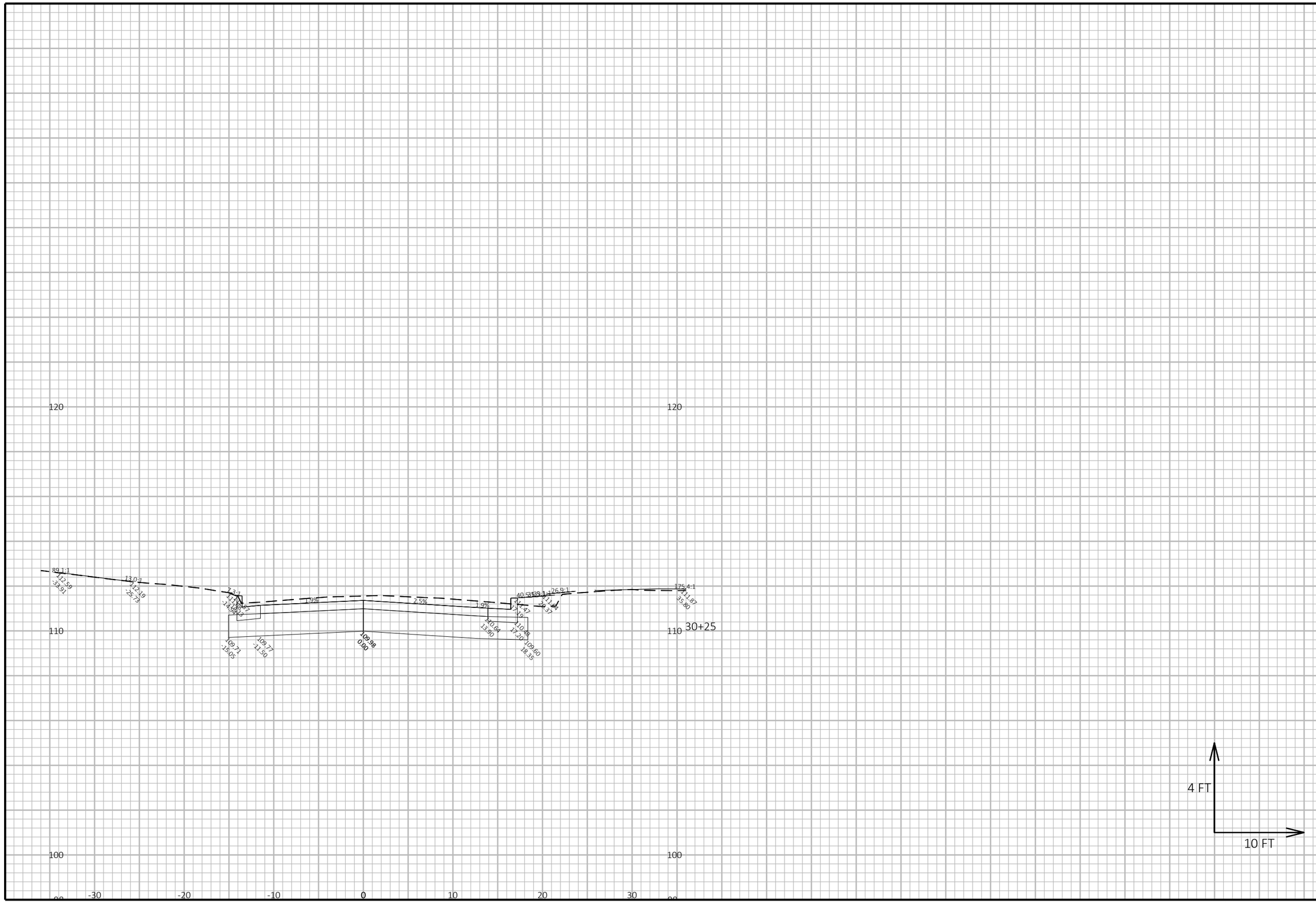
D50

FILE NAME : S:\DEPARTMENT FOLDERS\ENGINEERING\ACAD_PROJECTS\26-07 PERRY CT\SHEETSPLAN\09 CROSS SECTIONS.DWG
LAYOUT NAME - N 76TH ST

PLOT DATE : 1/16/2026 2:15 PM

PLOT BY : BRYAN THEISEN

PLOT SCALE : 1 IN:10 FT HORZ. / 1 IN:4 FT VERT.



DATE	DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

CROSS SECTIONS

N. 75TH ST.

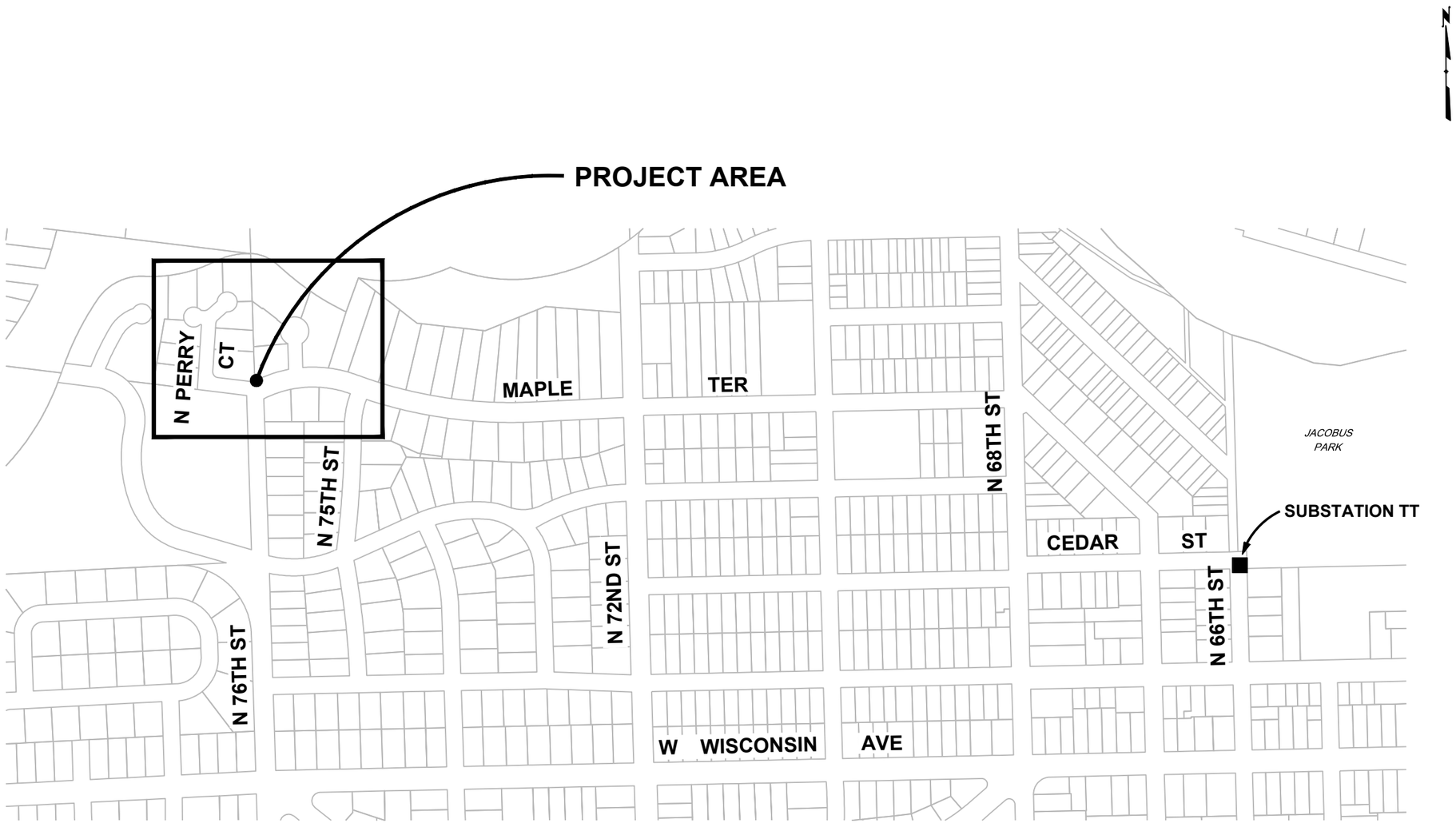
CONTRACT:	26-07
FILE NO:	15-1095
DRAWN BY:	BT
CHECKED BY:	JS
SCALE:	AS SHOWN

D51

FILE NAME : S:\DEPARTMENT FOLDERS\ENGINEERING\ACAD_PROJECTS\26-07 PERRY CT\SHEETSPLAN\09 CROSS SECTIONS.DWG
LAYOUT NAME - N 75TH ST

PLOT DATE : 1/16/2026 2:15 PM PLOT BY : BRYAN THEISEN

PLOT SCALE : 1 IN:10 FT HORZ. / 1 IN:4 FT VERT.



DATE	DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

STREET LIGHTING PROJECT AREA

CONTRACT:	26-07
FILE NO:	23-285
DRAWN BY:	WAT
CHECKED BY:	MPS
SCALE:	

E01

FILE NAME : S:\DEPARTMENT FOLDERS\ENGINEERING\ACAD_PROJECTS\26-07 PERRY CT\DESIGN\PERRY CT_ST LIGHTING.DWG PLOT DATE : 1/15/2026 12:42 PM PLOT BY : WTREU

GENERAL NOTES (STREET LIGHTING REMOVAL PLANS)

1. EXISTING INFORMATION IS BASED ON AVAILABLE ORIGINAL PLANS AND SITE OBSERVATIONS AND IS NOT GUARANTEED 100% ACCURATE. CONTRACTOR TO VERIFY EXISTING CONDITIONS AND ADJUST REMOVAL AND INSTALLATION ACCORDINGLY.
2. LIGHT POLES (BEING REMOVED) AND UNDERGROUND CABLES (TO BE ABANDONED) ARE DIRECT BURY, UNLESS OTHERWISE NOTED.
3. CABINET 'TT' (240/480V) IS LOCATED ON THE SOUTHEAST CORNER OF N. 66th ST AND CEDAR ST.
4. AFTER REMOVAL, PULL BOX COVERS ARE TO BE DELIVERED TO THE CITY OF WAUWATOSA PUBLIC WORKS YARD LOCATED AT 11100 W WALNUT RD. CONTACT THE CITY ELECTRICAL DEPT. FOR COORDINATION. POLES ARE TO BE DISPOSED OF BY THE CONTRACTOR.
5. COORDINATE CABINET LOCKOUTS WITH THE CITY OF WAUWATOSA ELECTRICAL DEPT.

LEGEND (STREET LIGHTING REMOVALS)

	EXISTING WAUWATOSA LIGHTING UNIT TO REMAIN
	EXISTING WAUWATOSA LIGHT POLE TO BE REMOVED. FIXTURE TO BE REUSED
STLT	EXISTING CABLE
STLT	EXISTING DIRECT BURY CABLE TO BE ABANDONED
CIR B	CIRCUIT NUMBER
REM	EXISTING PULL BOX TO BE REMOVED

CITY OF WAUWATOSA NUMBERING SCHEME

TT-B-01
- POLE NUMBER
- CIRCUIT NUMBER
- CONTROL CABINET (SOURCE)

TT-B-01JB
- PULL BOX NUMBER
- CIRCUIT NUMBER
- CONTROL CABINET (SOURCE)

DESCRIPTION

DATE

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

STREET LIGHTING REMOVALS

VARIOUS STREETS

FROM: N 75TH ST

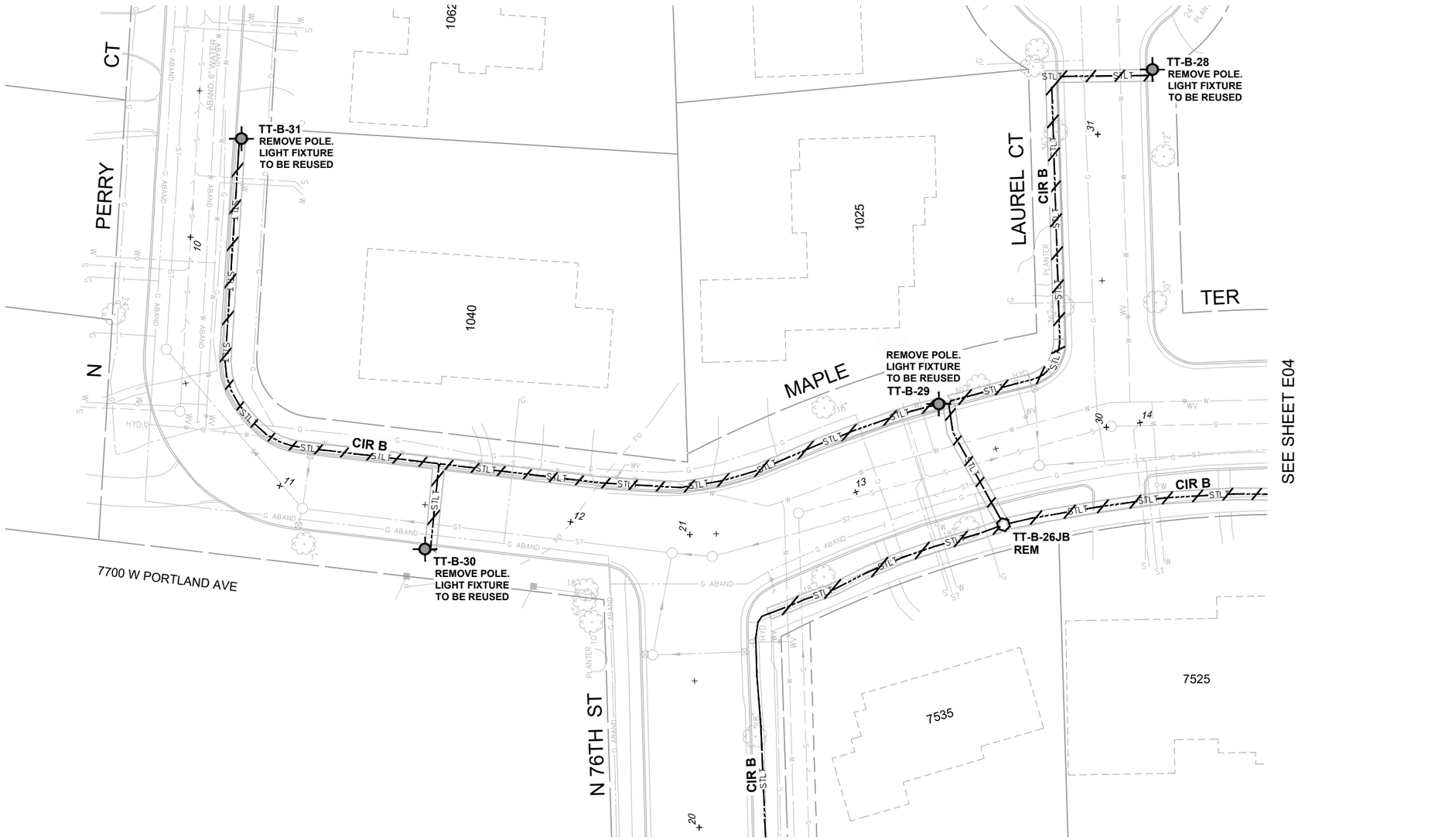
TO: N PERRY CT

CONTRACT: 26-07
FILE NO: 23-285
DRAWN BY: WAT
CHECKED BY: MPS
SCALE:

E02

***NOTE**

- **SUBSTATION TT IS ON THE NE CORNER OF N 66th ST & CEDAR ST**
- **EXISTING CABLE IS 3 - #4 DIRECT BURY**



Underground utilities have been shown to a reasonable degree of accuracy using diggers hotline field locates and record drawings. However, the city does not guarantee their exact size, location or depth or that of others not shown. The contractor shall verify the existence of these utilities and those not shown. Costs for locating and delay shall be incidental to the contract.

SCALE
0 20 40
FEET

DATE	DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

STREET LIGHTING REMOVALS

VARIOUS STREETS

FROM: N 75TH ST

TO: N PERRY CT

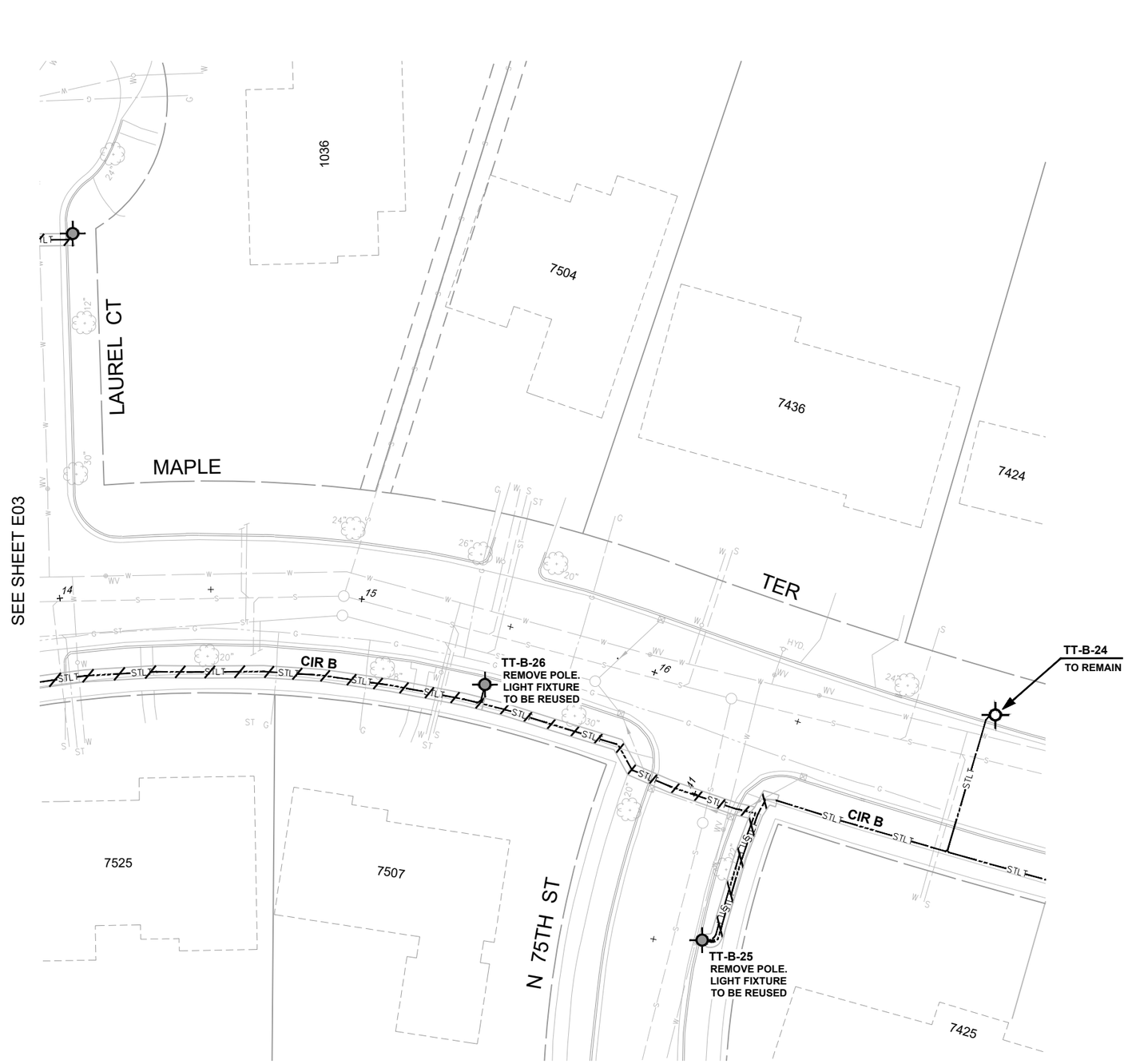
CONTRACT:	26-07
FILE NO:	23-285
DRAWN BY:	WAT
CHECKED BY:	MPS
SCALE:	

E03

FILE NAME : S:\DEPARTMENT FOLDERS\ENGINEERING\ACAD_PROJECTS\26-07 PERRY CT\DESIGN\PERRY CT_ST LIGHTING.DWG PLOT DATE : 1/15/2026 12:43 PM PLOT BY : WTREU

***NOTE**

- **SUBSTATION TT IS ON THE NE CORNER OF N 66th ST & CEDAR ST**
- **EXISTING CABLE IS 3 - #4 DIRECT BURY**



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SCALE
0 20 40
FEET

DATE	DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

STREET LIGHTING REMOVALS

VARIOUS STREETS

FROM: N 75TH ST

TO: N PERRY CT

CONTRACT: 26-07
FILE NO: 23-285
DRAWN BY: WAT
CHECKED BY: MPS
SCALE:

E04

FILE NAME : S:\DEPARTMENT FOLDERS\ENGINEERING\ACAD_PROJECTS\26-07 PERRY CT\DESIGN\PERRY CT_ST LIGHTING.DWG PLOT DATE : 1/15/2026 12:43 PM PLOT BY : WTREU

GENERAL NOTES (PROPOSED STREET LIGHTING PLANS)

1. COORDINATE LIGHTING REMOVAL AND INSTALLATION WITH CONSTRUCTION TO MINIMIZE DURATION OF OUTAGE(S) TO EXTENT POSSIBLE.
2. EXACT LOCATIONS OF LIGHTING UNITS, PULL BOXES, AND WIRING SHALL BE VERIFIED WITH THE CITY AND SUBJECT TO ADJUSTMENT BASED ON CONFLICTS WITH UNDERGROUND UTILITIES.
3. MATERIALS AND WORK NOT SPECIFICALLY IDENTIFIED AS A BID ITEM SHALL BE INCIDENTAL AND INCLUDED IN A RELATED BID ITEM.
4. THE INTENT IS TO INSTALL NEW LIGHTING DUCTS BETWEEN BACK OF CURB AND TREES WHERE INDICATED. THE EXACT ROUTE OF DUCTS SHALL BE ADJUSTED AS NECESSARY DUE TO UTILITY CONFLICTS. ANY ADJUSTMENTS SHALL BE BROUGHT UP TO THE CITY FOR APPROVAL.
5. CURB HEADS ARE TO BE ETCHED WITH AN ARROW WHERE NEW CROSSINGS ARE INSTALLED.
6. NEW LIGHTING HDPE DUCTS SHALL HAVE A MINIMUM OF 18" AND A MAXIMUM OF 24" OF COVER. CONTRACTOR SHALL INSTALL ALL DUCT LENGTHS PRIOR TO PULLING CABLE THROUGH.
7. NEW PVC CONDUIT SHALL HAVE A MINIMUM OF 24" AND A MAXIMUM OF 30" OF COVER.
8. IN PULL BOXES: SPLICES SHALL ONLY OCCUR IN CONDUCTORS AS NECESSARY DUE TO SPLITTING CIRCUIT CONDUCTORS IN MULTIPLE DIRECTIONS (CONDUCTORS THAT ARE ONLY ROUTED THROUGH A PULL BOX SHALL NOT BE SPLICED). CONTRACTOR TO PROVIDE 10 FEET OF SLACK ON ALL CONDUCTORS IN PULL BOX. INCOMING LINE SIDE CONDUCTORS SHALL BE MARKED WITH BLUE TAPE.
9. HDPE DUCT AND PVC CONDUIT TO BE DIRECTIONAL BORED. STREET CROSSINGS IN AREAS WHERE PAVEMENT IS TO BE REPLACED CAN BE OPEN CUT.
10. EXISTING OR TEMPORARY LIGHTING SYSTEM TO REMAIN LIVE UNTIL NEW SYSTEM, INCLUDING POLES, IS READY FOR ACTIVATION.
11. EXISTING CIRCUIT IS A 3-WIRE CIRCUIT (ONE RED WIRE, ONE BLACK WIRE AND ONE WHITE WIRE). NEW STREET LIGHT CABLE SHALL BE 3 - #8 AWG USE/XLP WIRES (ONE RED, ONE BLACK, ONE WHITE) WITH ONE #8 AWG USE/XLP GREEN GROUND WIRE INSTALLED IN 1" HDPE DUCT. INCOMING (LINE SIDE) CONDUCTORS IN POLES AND PULL BOXES SHALL BE MARKED WITH BLUE TAPE.
12. CONTACT THE CITY OF WAUWATOSA ELECTRICAL DEPT. TO COORDINATE CABINET LOCKOUT.

LEGEND (PROPOSED STREET LIGHTING PLANS)

	EXISTING WAUWATOSA LIGHTING UNIT TO REMAIN
	PROPOSED DIRECT BURY CONCRETE POLE WITH EXISTING WAUWATOSA LED LIGHT FIXTURE
STL	EXISTING CABLE (3 NO. 4 DIRECT BURY)
	PROPOSED HDPE DUCT 3 - #8 AWG COPPER USE/XLP WIRE & 1 - #8 AWG COPPER USE/XLP GREEN INSULATED GROUND WIRE IN 1" DUCT OR AS SHOWN ON THE PLAN
	PROPOSED SINGLE 2 INCH SCH 80 PVC CONDUIT SLEEVE
	PROPOSED COMPOSITE PULL BOX (STREET LIGHTING). SEE PLAN FOR SIZES
CIR B	CIRCUIT NUMBER

CITY OF WAUWATOSA NUMBERING SCHEME

TT-B-01
- POLE NUMBER
- CIRCUIT NUMBER
- CONTROL CABINET (SOURCE)

TT-B-01JB
- PULL BOX NUMBER
- CIRCUIT NUMBER
- CONTROL CABINET (SOURCE)

DESCRIPTION

DATE

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

PROPOSED STREET LIGHTING

VARIOUS STREETS

FROM: N 75TH ST

TO: N PERRY CT

CONTRACT: 26-07
FILE NO: 23-285
DRAWN BY: WAT
CHECKED BY: MPS
SCALE:

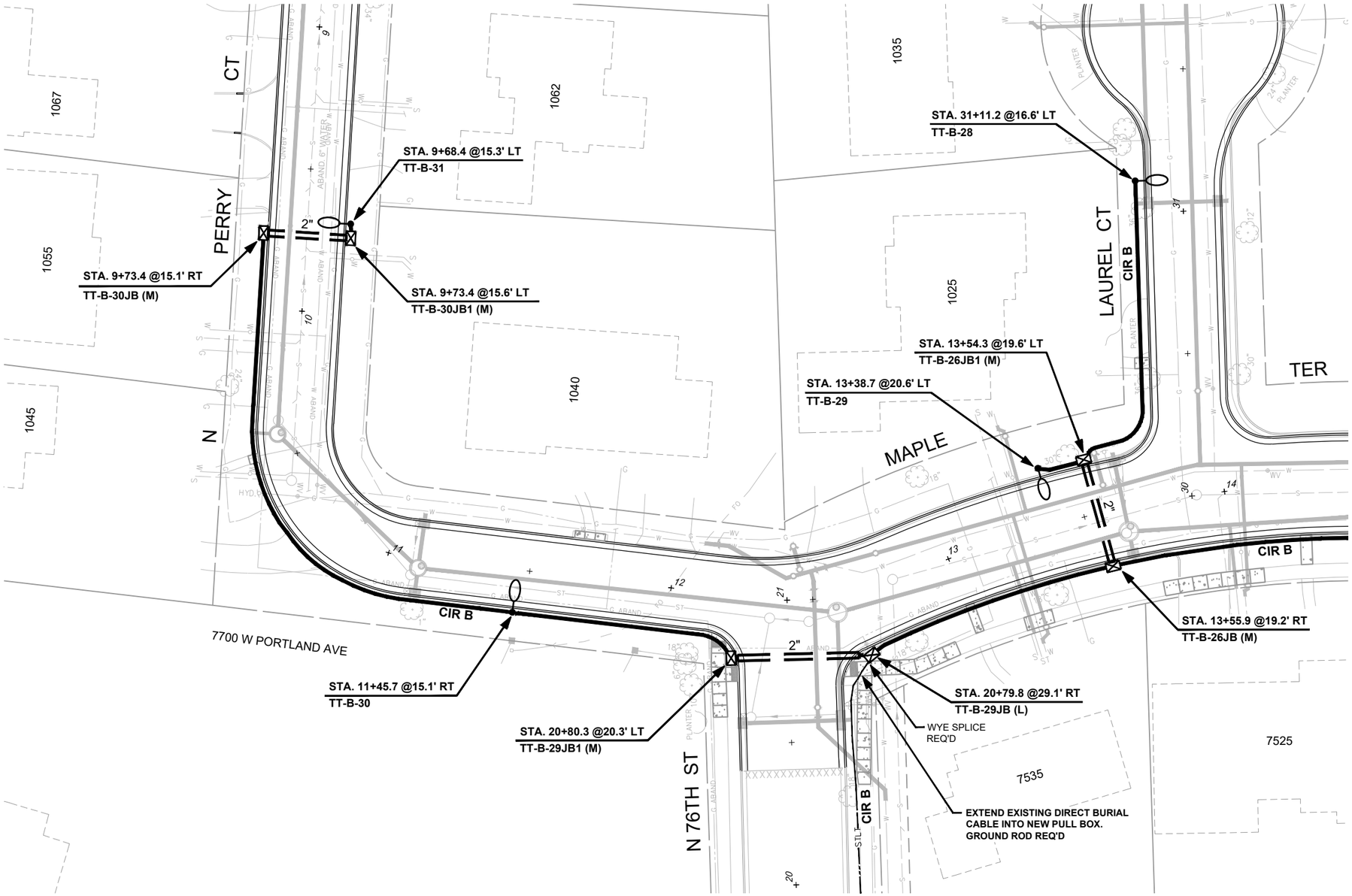
E05

PULL BOX SIZES

(S) = 11"(W)x18"(L)x18"(D)
(M) = 13"(W)x24"(L)x18"(D)
(L) = 17"(W)x30"(L)x18"(D)

***NOTE**

- SUBSTATION TT IS ON THE NE CORNER OF N 66th ST & CEDAR ST
- EXISTING CABLE IS 3 - #4 DIRECT BURY



Underground utilities have been shown to a reasonable degree of accuracy using diggers hotline field locates and record drawings. However, the city does not guarantee their exact size, location or depth or that of others not shown. The contractor shall verify the existence of these utilities and those not shown. Costs for locating and delay shall be incidental to the contract.

SCALE
0 20 40
FEET

DATE	DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

PROPOSED STREET LIGHTING
VARIOUS STREETS

FROM: N 75TH ST
TO: N PERRY CT

CONTRACT: 26-07
FILE NO: 23-285
DRAWN BY: WAT
CHECKED BY: MPS
SCALE:

E06

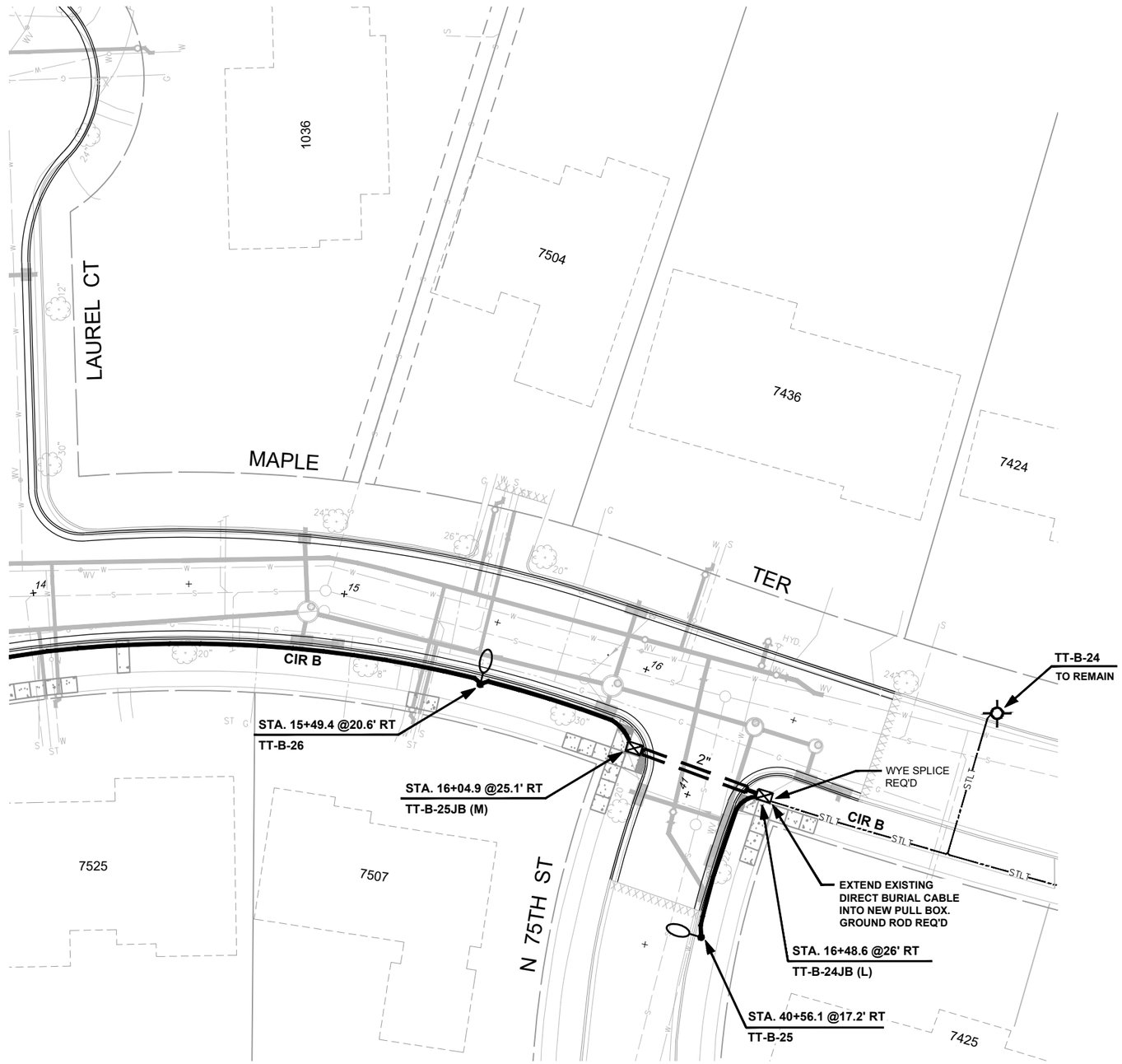
FILE NAME : S:\DEPARTMENT FOLDERS\ENGINEERING\ACAD_PROJECTS\26-07 PERRY CT\DESIGN\PERRY CT_ST LIGHTING.DWG PLOT DATE : 1/15/2026 12:46 PM PLOT BY : WTREU

PULL BOX SIZES

(S) = 11"(W)x18"(L)x18"(D)
(M) = 13"(W)x24"(L)x18"(D)
(L) = 17"(W)x30"(L)x18"(D)

***NOTE**

- SUBSTATION TT IS ON THE NE CORNER OF N 66th ST & CEDAR ST
- EXISTING CABLE IS 3 - #4 DIRECT BURY



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DATE	DESCRIPTION

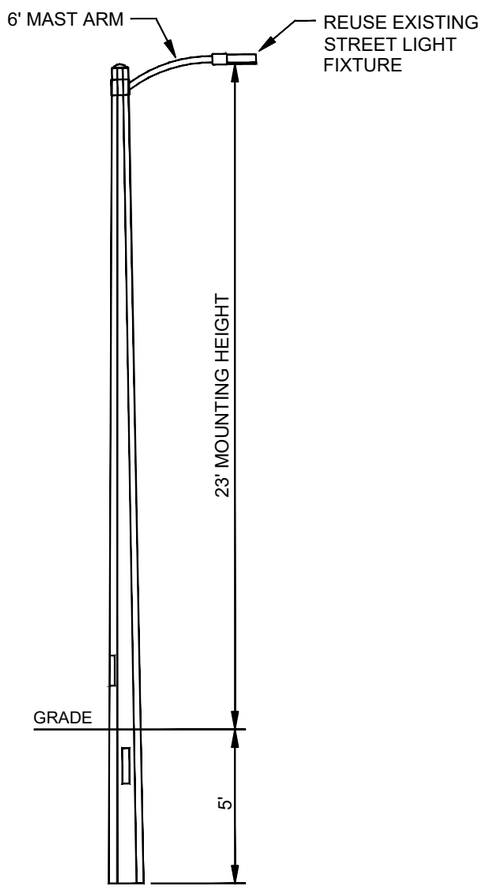
CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

PROPOSED STREET LIGHTING
VARIOUS STREETS

FROM: N 75TH ST
TO: N PERRY CT

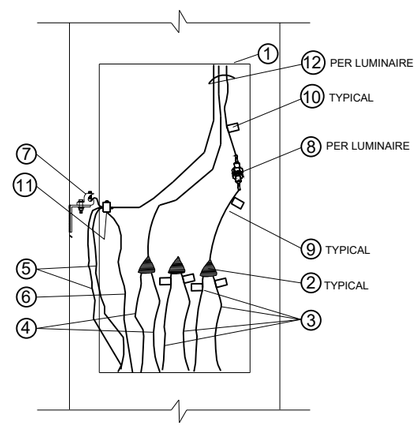
CONTRACT: 26-07
FILE NO: 23-285
DRAWN BY: WAT
CHECKED BY: MPS
SCALE:

E07



CONCRETE POLE DETAIL

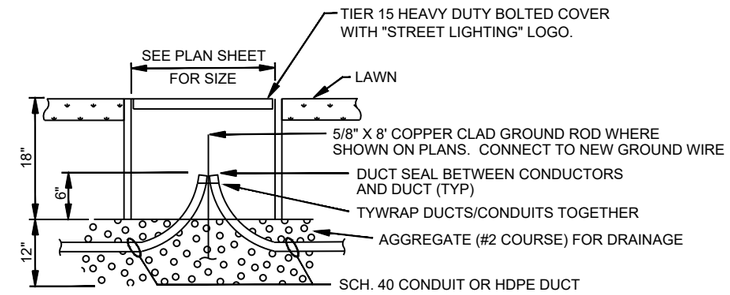
NTS



1. HANDHOLE AND COVER
2. INSULATED SPLICE
3. UNGROUNDED CONDUCTORS
4. GROUNDED CONDUCTORS
5. SYSTEM GROUNDING CONDUCTORS
6. GROUND CONDUCTOR TO GROUND ROD
7. HANDHOLE GROUNDING LUG
8. INLINE FUSE ASSEMBLY W/5A KTK FUSE WITH WEATHERPROOF BOOTS
9. 12" PIGTAIL BETWEEN SPLICE AND FUSE ASSEMBLY
10. CIRCUIT TAG
11. REVERSIBLE PRESSURE OR COMPRESSION GROUNDING CONNECTION (NOT INSULATED)
12. 3#12 RHW/USE TO LUMINAIRE

STANDARD POLE WIRING DETAIL

NTS

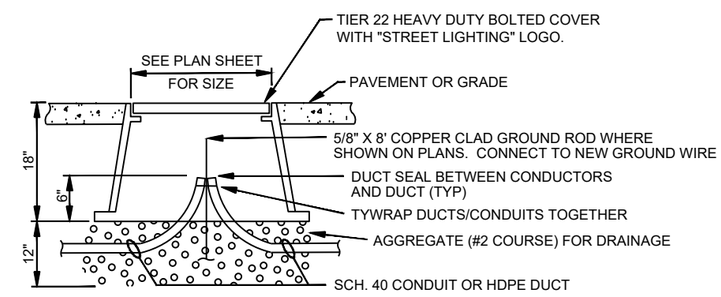


NOTE:

1. PULL BOX IS A UL (PT1730BA18) LISTED CONCRETE COMPOSITE
2. INCOMING LINE SIDE CONDUCTORS SHALL BE MARKED WITH BLUE TAPE
3. CONTRACTOR TO PROVIDE 10' OF SLACK ON ALL CONDUCTORS IN PULL BOX

PULL BOX (IN GRASS)

NTS



NOTE:

1. PULL BOX IS A UL (PT1730BA18) LISTED CONCRETE COMPOSITE
2. INCOMING LINE SIDE CONDUCTORS SHALL BE MARKED WITH BLUE TAPE
3. CONTRACTOR TO PROVIDE 10' OF SLACK ON ALL CONDUCTORS IN PULL BOX

PULL BOX (IN CONCRETE)

NTS

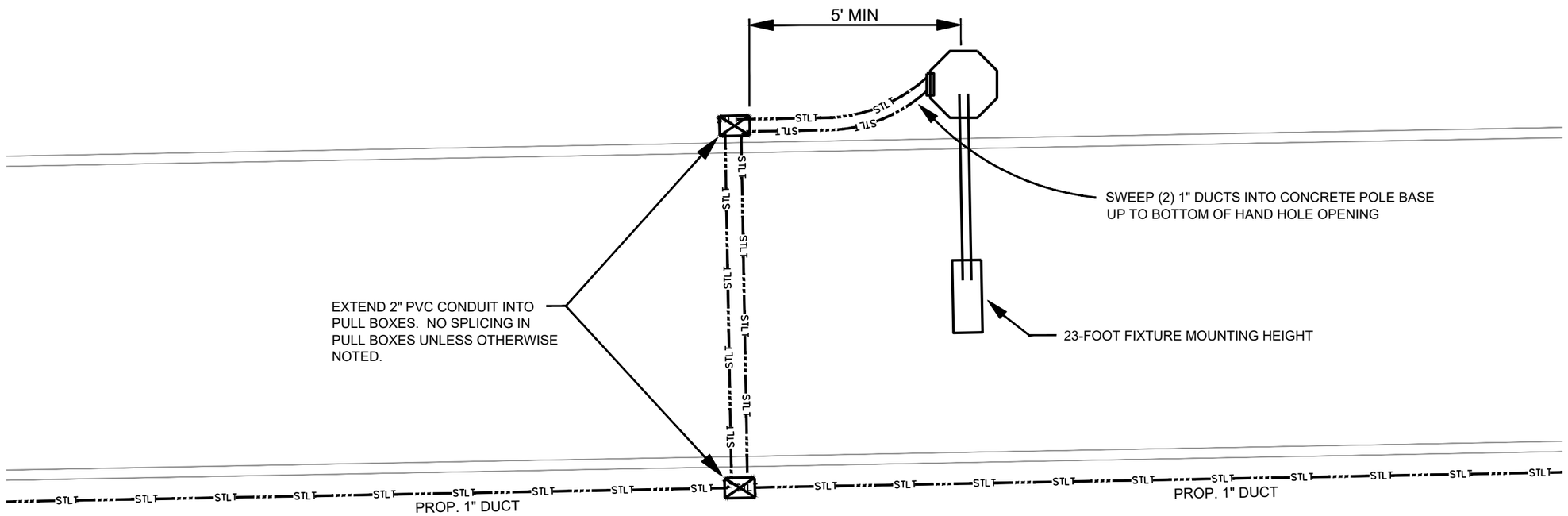
DATE	DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

STREET LIGHTING DETAILS

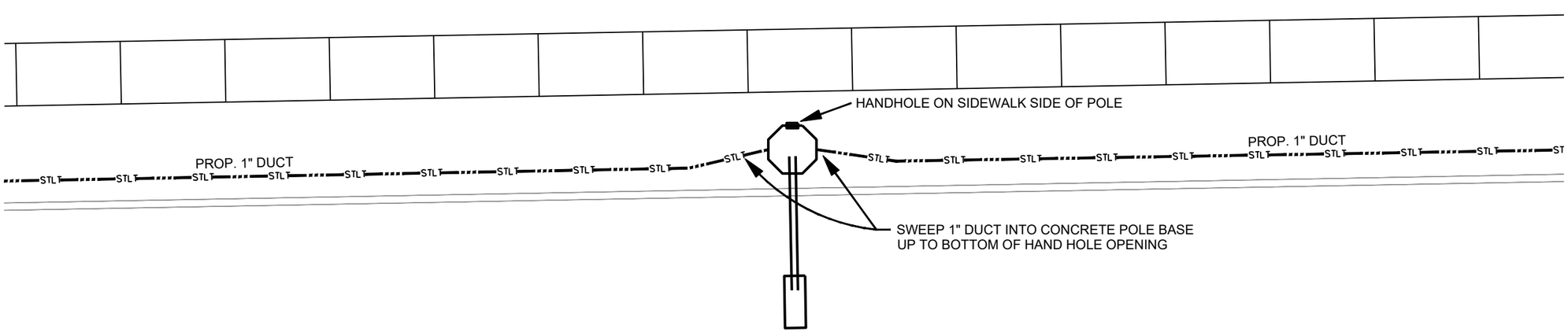
CONTRACT: 26-07
FILE NO: 23-285
DRAWN BY: WAT
CHECKED BY: MPS
SCALE:

E08



CONDUIT CROSSING DETAIL

NTS



1" CONDUIT CONNECTION TO POLE

NTS

DATE	DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

STREET LIGHTING DETAILS

CONTRACT: 26-07
FILE NO: 23-285
DRAWN BY: WAT
CHECKED BY: MPS
SCALE:

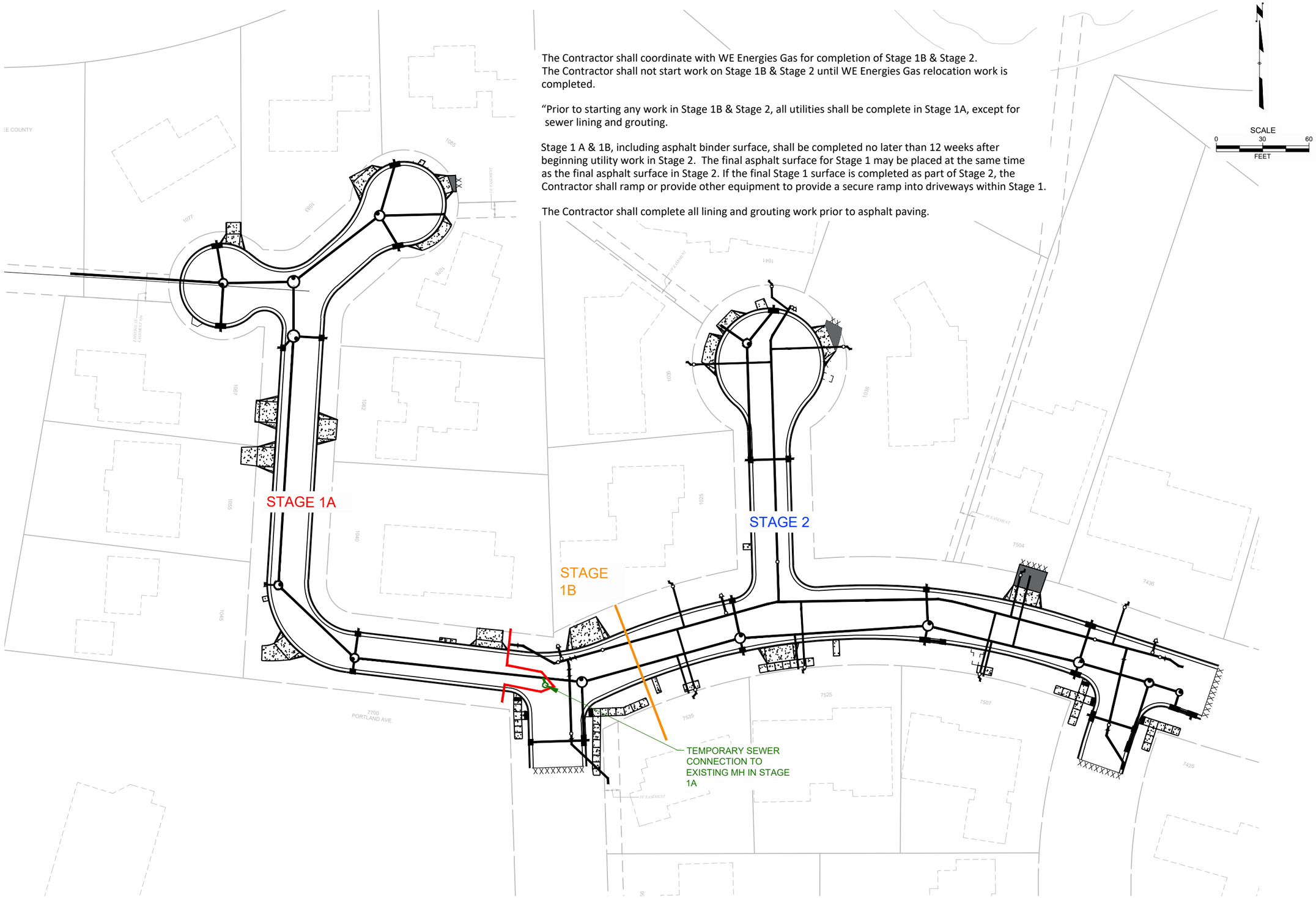
E09

The Contractor shall coordinate with WE Energies Gas for completion of Stage 1B & Stage 2.
The Contractor shall not start work on Stage 1B & Stage 2 until WE Energies Gas relocation work is completed.

"Prior to starting any work in Stage 1B & Stage 2, all utilities shall be complete in Stage 1A, except for sewer lining and grouting.

Stage 1 A & 1B, including asphalt binder surface, shall be completed no later than 12 weeks after beginning utility work in Stage 2. The final asphalt surface for Stage 1 may be placed at the same time as the final asphalt surface in Stage 2. If the final Stage 1 surface is completed as part of Stage 2, the Contractor shall ramp or provide other equipment to provide a secure ramp into driveways within Stage 1.

The Contractor shall complete all lining and grouting work prior to asphalt paving.



DATE	DESCRIPTION

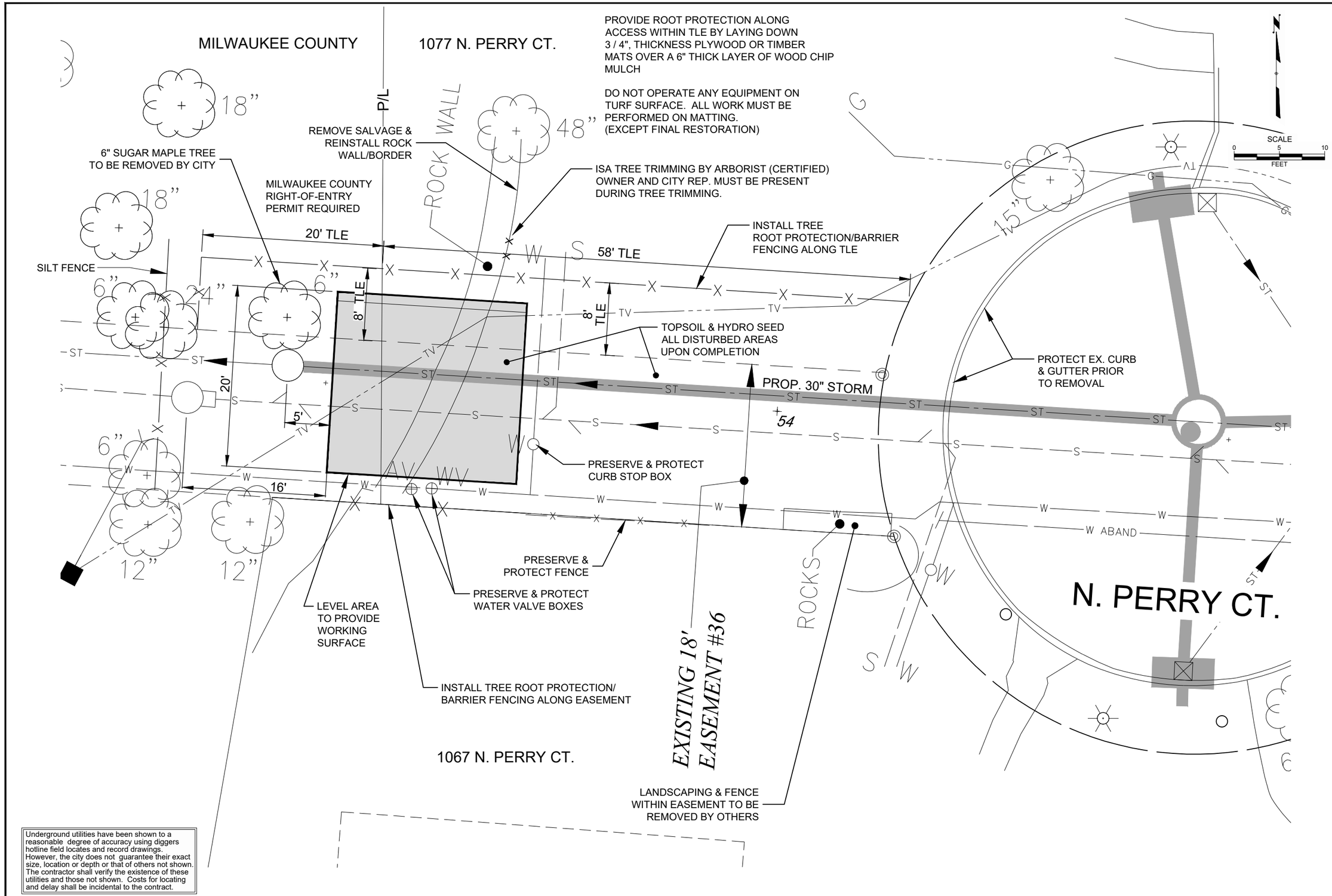
CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

CONSTRUCTION STAGING PLAN
PERRY CT, MAPLE TERR, & LAUREL CT

CONTRACT:	26-07
FILE NO:	.
DRAWN BY:	BJT
CHECKED BY:	JH
SCALE:	AS SHOWN

S01

FILE NAME : S:\DEPARTMENT FOLDERS\ENGINEERING\ACAD_PROJECTS\26-07 PERRY CT\SHEETSPLAN\CONSTRUCTION SEQUENCE.DWG PLOT DATE : 1/16/2026 11:21 AM PLOT BY : BRYAN THEISEN



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DATE	DESCRIPTION

CITY OF WAUWATOSA
ENGINEERING SERVICES DIVISION

CONSTRUCTION ACCESS & STAGING
EASEMENT WEST OF N. PERRY CT.

FROM: 80' WEST OF N. PERRY CT.
TO: N. PERRY CT.

CONTRACT:	26-07
FILE NO:	41-1010
DRAWN BY:	B.T.
CHECKED BY:	J.H.
SCALE:	AS SHOWN

S02

FILE NAME : S:\DEPARTMENT FOLDERS\ENGINEERING\ACAD_PROJECTS\26-07 PERRY CT\DESIGN\PERRY CT S02.DWG PLOT DATE : 1/16/2026 11:56 AM PLOT BY : C.R.