
STANDARD SPECIFICATIONS MANUAL

STORM SEWER & STREET CONSTRUCTION

For The

VILLAGE OF HARRISON CALUMET COUNTY, WISCONSIN

FEBRUARY 2016
UPDATED FEBRUARY 2023

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Prepared By:



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CHANGE ORDER PROCEDURES

PART 1 - GENERAL

1.1 SUBMITTALS

- A. Submit name of the individual authorized to receive change documents and be responsible for informing others in CONTRACTOR's employ or Subcontractors of changes to the Work.
- B. Change Order Forms: Form provided by ENGINEER.

1.2 DOCUMENTATION OF CHANGE IN CONTRACT SUM / PRICE & CONTRACT TIME

- A. Maintain detailed records of Work done on a time and material or force account basis. Provide full information required for evaluation of proposed changes, and to substantiate costs of changes in the Work.
- B. Document each quotation for a change in cost or time with sufficient data to allow evaluation of the quotation.
- C. On request, provide additional data to support computations:
 - 1. Quantities of products, labor and equipment.
 - 2. Taxes, insurance and bonds.
 - 3. Overhead and profit.
 - 4. Justification for any change in contract time.
 - 5. Credit for deletions from contract, similarly documented.
- D. Support each claim for additional costs and for Work done on a time and material or force account basis, with additional information:
 - 1. Origin and date of claim.
 - 2. Dates and times Work was performed, and by whom.
 - 3. Time records and wage rates paid.
 - 4. Invoices and receipts for products, equipment and subcontracts, similarly documented.

1.3 CHANGE PROCEDURES

- A. Refer to General Conditions.
- B. The ENGINEER will advise of minor changes in the Work not involving an adjustment to contract sum/price or contract time as authorized by EJCDC C-700 (2007), Paragraph 9.04 by issuing a written field order.
- C. The ENGINEER may issue a proposal request or notice of change, which includes a detailed description of a proposed change with supplementary or revised Drawings and Specifications and a change in Contract Time for executing the change. CONTRACTOR will prepare and submit an estimate within 10-days.
- D. The CONTRACTOR may propose a change by submitting a request for change to the ENGINEER, describing the proposed change and its full effect on the Work, with a statement describing the reason for the change, and the effect on the Contract Sum/Price and Contract Time with full documentation and a statement describing the effect on Work by separate or other CONTRACTORS.
- E. All Change Order related Work shall be started and completed only after formal approval by the OWNER. Any Work completed by the CONTRACTOR without formal approval, shall not constitute Work that the OWNER is required to pay for.

1.4 CONSTRUCTION CHANGE AUTHORIZATION

- A. ENGINEER may issue a document instructing the CONTRACTOR to proceed with a change in the Work, for subsequent inclusion in a Change Order.
- B. The document will describe changes in the Work and will designate method of determining any change in Contract Sum/Price or Contract Time.
- C. Promptly execute the change in Work.

1.5 STIPULATED SUM CHANGE ORDER

- A. Based upon proposal request and CONTRACTOR's price quotation or CONTRACTOR's request for a Change Order, as recommended by ENGINEER.

1.6 UNIT PRICE CHANGE ORDER

- A. For pre-determined Unit Prices and quantities, the Change Order will be executed on a Fixed Unit Price Basis.
- B. For unit costs or quantities of units of Work, which are not pre-determined, execute Work under a Construction Change Authorization.
- C. Changes in Contract Sum/Price or Contract Time will be computed as specified for Time & Material or Force Account Change Order.

1.7 TIME & MATERIAL OR FORCE ACCOUNT CHANGE ORDER

- A. Submit itemized account and supporting data after completion of change, within time limits indicated in the conditions of the Contract.
- B. ENGINEER will determine the change allowable in Contract Sum/Price and Contract Time, as provided in the Contract Documents.
- C. Maintain detailed records of Work done on Time & Material or Force Account basis.
- D. Provide full information required for evaluation of proposed changes, and to substantiate costs for changes in the Work.

1.8 EXECUTION OF CHANGE ORDERS

- A. Execution of Change Orders: ENGINEER will issue Change Orders for signatures of parties, as provided in the General Conditions of the Contract.

1.9 CORRELATION OF CONTRACTOR SUBMITTALS

- A. Promptly revise Schedule Of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum/Price.
- B. Promptly revise Progress Schedules to reflect any change in Contract Time, revise sub-schedules to adjust time for other items of Work affected by the change and resubmit.
- C. Promptly enter changes in Project Record Documents.

PART 2 - PRODUCTS

Not Applicable.

PART 3 - EXECUTION

Not Applicable.

END OF SECTION

SECTION 01 29 00.00

APPLICATIONS FOR PAYMENT

PART 1 - GENERAL

1.1 FORMAT

- A. CONTRACTOR shall use the Application for Payment form provided by ENGINEER in the Contract Documents, including continuation sheets when required.
- B. For each listed item in the Schedule Of Values, provide a column for listing: Item Number; Description of Work; Scheduled Value; Previous Applications; Work in Place and Stored Materials under this Application; Authorized Change Orders; Total Completed and Stored to Date of Application; Percentage of Completion; Balance to Finish; and Retainage.

1.2 PREPARATION OF APPLICATIONS

- A. Refer to General Conditions for basic provisions regarding CONTRACTOR(s) Applications for Payment.
- B. Applications for Payment shall be based upon the percentage of completion of items enumerated in the Schedule of Values, required in Division 1, Section 01 20 01.00 - Contract Considerations, and/or the Unit Price Schedule, whichever is applicable. A copy of each appropriate Schedule shall be attached to each Application for Payment.
- C. Incomplete or inadequate submittals will be returned to the CONTRACTOR. The Schedule of Values and Application for Payment shall be neatly typed and presented in a professional manner.
- D. Execute certification by signature of authorized officer.
- E. Each Application for Payment shall be accompanied by an updated Construction Schedule and lien waivers.
- F. Final Application for Payment will not be processed unless accompanied with Record Drawings.
- G. List each authorized Change Order as an extension on continuation sheet, listing Change Order number and dollar amount as for an original item of work.
- H. Prepare Application for Final Payment (refer to Division 1, Section 01 77 00.00 - Contract Close-Out).

1.3 SUBMITTAL PROCEDURES

- A. Three (3) copies of each Application For Payment for work on this project shall be delivered to the ENGINEER no later than the tenth (10th) day of the month, and shall include all work completed as of the last day of the previous month. One (1) additional copy shall go directly to the ENGINEER's On-Site Representative.
- B. Payment Period: Submit at monthly intervals, as stipulated in the Agreement.

1.4 SUBSTANTIATING DATA

- A. When ENGINEER requires substantiating information, submit data justifying dollar amounts in question.
- B. Provide one (1) copy of data with cover letter for each copy of submittal. Show Application number and date, and line item by number and description.

1.5 UNIT PRICES

- A. When Unit Prices constitute the basis for payment for work performed on this project, the CONTRACTOR shall be paid at the Unit Prices Bid for the actual number of units constructed. Measurements or other determinations necessary to fix the number of units constructed shall be made in a manner acceptable to the OWNER and the ENGINEER.
- B. For Lump Sum bid projects, the Unit Prices shall only be used when increasing or decreasing the amount of work called for on the Drawings and in this Specification. Therefore, the Unit Prices shall come into effect only after the Bidding.

1.6 PAYMENT FOR STORED EQUIPMENT

- A. CONTRACTOR may apply for payment for equipment that has not been delivered to the job site, but is in storage, provided a Storage Agreement has been executed with the OWNER.
- B. The 'Storage Agreement' follows this Section.

PART 2 - PRODUCTS

Not Applicable.

PART 3 - EXECUTION

Not Applicable.

END OF SECTION

STORAGE AGREEMENT

**SPECIAL PROCEDURE FOR OBTAINING PAYMENT FOR MATERIALS
NOT STORED AT THE SITE OF THE WORK**

OWNER: _____

Project Name: _____

Contract Number: _____

Due to the limited amount of space available for the storage of materials at the site of the _____
_____ (Project), the Owner will, under the following
conditions, approve partial payments for certain materials stored off the premises.

1. Prior Approval. The Contractor shall obtain the approval of the Owner before making any arrangements to obtain a certification for payment for materials stored off the site. Materials must be suitable for storage and must be properly packaged.
2. Storage Site. The Contractor shall provide and maintain a suitable storage site and proper storage conditions, which must be approved in advance by the Owner. The site must be within the State of _____.
3. Storage Conditions. The material covered by the Request For Certification For Partial Payment must be stored above grade, and must be properly protected at all times against weather, heat, cold, moisture and other hazards as the material may require. The storage conditions must be approved by the Owner. All protection must be provided by the Contractor at their own expense, and must be maintained throughout the storage period.

Material must not be commingled with other similar material but must be stored by itself and must be plainly labeled "Owner."

It must be stored so that it can be readily inspected, measured and counted at all times by the Owner's representatives.

4. Bill Of Sale. Request for Certification For Partial Payment for materials stored under the above conditions must be accompanied by a Bill of Sale, properly identifying the material and transferring ownership of the materials to the Owner. The Bill of Sale must be accompanied by an inventory of the stored material together with a description of the storage site by street number and city, or by legal description of the premises.
5. Insurance. The Contractor shall provide and maintain Builder's Risk, Fire and Extended Coverage Insurance on the stored material in the amount of 100% of the value thereof, under the same conditions as for material stored on the site of the project. Unless specifically exempted by the Owner, the Contractor shall provide insurance against loss by theft or vandalism, and the Owner shall be named the beneficiary under the policy, as trustee for all concerned.
6. Responsibility. The Contractor agrees that in accepting partial payment for the stored materials, the Contractor is, in no way, relieved of responsibility for the safe storage of the material and its safe transportation to and installation in the work, or for furnishing and installing the material in strict accordance with plans and specifications.

The Contractor also agrees that acceptance by the Owner of a Bill of Sale for the material does not imply acceptance of the material, which shall be subject to final acceptance or rejection up to the time the Contractor's work is completed and finally accepted.

The Contractor also agrees that the usual guarantees covering their work under the Drawings, Specifications and Contract, are in no way impaired as a result of the partial payment and the acceptance of the Bill of Sale.

The Owner accepts no responsibility in connection with the material.

7. Acceptance. The Contractor shall indicate his acceptance of the above conditions by signing and returning one copy of this Storage Agreement, proof of insurance, and bill of sale.

ACCEPTED:

_____ Contractor

_____ Authorized Signature

_____ Printed or Typed Name
Date _____

STORAGE CONDITIONS APPROVED:

_____ Owner-Authorized Signature

_____ Printed or Typed Name
Date _____

Material Stored: _____

Site: _____

SECTION 01 31 00.00

COORDINATION & MEETINGS

PART 1 - GENERAL

1.1 COORDINATION

- A. Each CONTRACTOR shall be responsible for developing an overall Project Schedule in conjunction with the GENERAL CONTRACTOR. The GENERAL CONTRACTOR shall have the prime responsibility for the scheduling and coordination of the work by each CONTRACTOR.
- B. The GENERAL CONTRACTOR, all other Prime CONTRACTORS, and all Subcontractors shall coordinate their work and shall cooperate with all other trades to facilitate the general progress of the work. Each trade shall afford all other trades every reasonable opportunity for the installation of their work and for the storage of their material.
- C. Each 'trade' shall perform its work in proper sequence in relation to that of other CONTRACTORS or trades, as required by construction progress.
- D. Each CONTRACTOR shall arrange their work and dispose of their materials so as not to interfere with the work or storage of materials of other CONTRACTORS, and each shall join their work to that of others in accordance with the intent of the Drawings and Specifications.
- E. All Mechanical and Electrical CONTRACTORS shall work in cooperation with the GENERAL CONTRACTOR, and with each other; and fit their piping, duct work, conduit, etc., into the structures as job conditions demand. All final decisions as to the right-of-way and run of pipe, ducts, etc., will be made by the ENGINEER or their Representative at meetings with responsible representatives of Mechanical Trades CONTRACTORS.
- F. No CONTRACTOR shall endanger any work of another and shall not cut or alter such work of any other CONTRACTOR without the consent of the other CONTRACTOR.
- G. It shall be the responsibility of all CONTRACTORS and all Subcontractors to keep constant check on the progress of the work, so the particular trade can ensure preparation for installation of that trade's work and not cause delay in the progress of the work.
- H. The CONTRACTOR shall give due notice and proper information to other CONTRACTORS of any special provisions necessary for the placing or setting of their work coming in contact with work of other CONTRACTORS. Failing to do so in proper time, the CONTRACTOR shall be held responsible and shall pay for any and all alterations and repairs necessitated by such neglect.
- I. Any cost caused by defective or ill-timed work shall be borne by the party responsible therefore.

- J. After OWNER occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of OWNER's activities.
- K. In finished areas (except as otherwise indicated) conceal pipes, ducts and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

1.2 GRADES, LINES & LEVELS

A. Building Construction:

1. The ENGINEER will establish a bench mark and two (2) perpendicular base lines on the construction site. The CONTRACTOR shall utilize this information to establish and maintain their own benchmarks and base lines to be used to locate all structures, utilities and facilities shown on the Drawings and be responsible for the accuracy of their placement, as well as the continued maintenance of their accurate position throughout the construction period.
2. The CONTRACTOR shall exercise proper care in the preservation of such stakes set by the ENGINEER for their use or the use of others; and, if the CONTRACTOR displaces, loses or removes them during their operations, they will be reset by the ENGINEER at the CONTRACTOR's expense.

B. Pipe Line Construction:

1. Primary line and grade will be furnished by the OWNER and will be established by the ENGINEER. In open cut construction, line and grade stakes will be set parallel to the proposed sewer or water main and offset therefrom in a manner that will best serve the CONTRACTOR's work operations, wherever practical. Stakes will be set opposite each sewer appurtenance or water main fitting and change in line and grade. The CONTRACTOR shall render whatever assistance may be required by the ENGINEER and shall arrange their work operations in such manner as to avoid interference with the establishment of primary lines and grades. The CONTRACTOR shall check the accuracy of line and grade stakes by means of visual and taping checks and shall be responsible for the protection and preservation of such stakes. The cost of re-staking, due to the CONTRACTOR's negligence, shall be borne by the CONTRACTOR responsible. The CONTRACTOR shall bear sole responsibility for the correct transfer of all construction lines and grades from the primary line and grade points, and for the correct alignment and grade of the finished structure, based upon the primary line and grade established by the ENGINEER.

C. Street Construction:

1. The ENGINEER will furnish primary line and grade parallel to the proposed work and offset therefrom in a manner that will best serve the CONTRACTOR's work operations, wherever practical. The CONTRACTOR shall render whatever assistance may be required by the ENGINEER, and shall arrange work operations in such manner to avoid interference with the establishment of primary lines and grades. The CONTRACTOR shall check the accuracy of line and grade stakes by means of visual and taping checks and be responsible for the protection and

preservation of such stakes. The cost of re-staking, due to the CONTRACTOR's negligence, shall be borne by the CONTRACTOR. The CONTRACTOR shall bear sole responsibility for the correct transfer of all construction lines and grades from the primary line and grade points, and for the correct alignment and grade of the finished work, based upon the primary line and grade established by the ENGINEER.

2. The CONTRACTOR shall provide the necessary facilities such as levels, rulers and line(s) for transferring the grade and line from the ENGINEER's stakes to the work. The CONTRACTOR shall preserve primary line and grade stakes, undisturbed and shall furnish and set the string lines or grading stakes. Not less than 1-day's production worth of string lines or grading stakes shall be set initially and checked immediately visually for error in line or grade. The string lines shall be stout twill fastened to supporting stakes spaced adequately to permit support of the string without distortion or misalignment. The string shall be pulled sufficiently tight to remove any noticeable or measurable sag. Grading stakes shall be placed at locations established by the CONTRACTOR. Elevations shall be transferred from the primary line and grade stakes by the CONTRACTOR. In case the visual inspection of the string lines or grading stakes discloses an apparent error, the ENGINEER shall be immediately notified.

1.3 ALTERATION PROJECT PROCEDURES

- A. Materials: As specified in product sections; match existing products and work for patching and extending work.
- B. Close openings in exterior surfaces to protect existing work from weather and extremes of temperature and humidity.
- C. Remove, cut and patch work in a manner to minimize damage and to provide a means of restoring products and finishes to original or specified condition.
- D. Refinish visible existing surfaces to remain in renovated rooms and spaces, to specified condition for each material, with a neat transition to adjacent finishes.
- E. Where new work abuts or aligns with existing, perform a smooth and even transition. Patched work to match existing adjacent work in texture and appearance.
- F. When finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to ENGINEER.
- G. Where a change of plane of occurs, submit recommendation for providing a smooth transition for ENGINEER review.
- H. Patch or replace portions of existing surfaces, which are damaged, lifted, discolored or showing other imperfections.
- I. Finish surfaces as specified in individual product sections.

1.4 CUTTING & PATCHING

- A. Each CONTRACTOR shall be responsible for their own cutting and patching but the work must be performed by Tradespersons experienced in the type of work involved.
- B. Submit written request in advance of cutting or altering elements which affects:
 - 1. Structural integrity of element.
 - 2. Integrity of weather-exposed or moisture-resistant elements.
 - 3. Efficiency, maintenance or safety of element.
 - 4. Visual qualities of sight-exposed elements.
 - 5. Work of OWNER or separate CONTRACTOR.
- C. Execute cutting, fitting and patching, including excavation and fill, to complete work, and to:
 - 1. Fit the several parts together, to integrate with other work.
 - 2. Uncover work to install or correct ill-timed work.
 - 3. Remove and replace defective and non-conforming work.
 - 4. Remove samples of installed work for testing.
 - 5. Provide openings in elements of work for penetrations of mechanical and electrical work.
- D. Execute work by methods, which will avoid damage to other work, and provide proper surfaces to receive patching and finishing.
- E. Cut rigid materials using masonry saw or core drill.
- F. Restore work with new products in accordance with requirements of Contract Documents.
- G. Fit work tight to pipes, sleeves, ducts, conduit and other penetrations through surfaces.
- H. Maintain integrity of wall, ceiling or floor construction; completely seal voids.
- I. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for an assembly, refinish entire unit.
- J. Identify any hazardous substance or condition exposed during the work to the ENGINEER for decision or remedy.

1.5 PRE-CONSTRUCTION CONFERENCE

- A. A Pre-Construction Conference will be held, after the time of Contract award, to discuss the responsibility of each part to 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 observation and principal staff, and representatives of the municipality or governing authority. A representative of the Resident Observation staff will preside over the conference.
- B. A suggested format would include, but not be limited to, the following subjects:
1. Presentation of a proposed Construction Schedule by the GENERAL CONTRACTOR.
 2. Check of required bonds and insurance certifications prior to the Notice to Proceed.
 3. Shop Drawing submittal and approval procedure.
 4. Chain of command, direction of correspondence and coordinating responsibility between CONTRACTORS.
 5. Request for a weekly job meeting for all involved.
 6. If a remodel or alteration project, introduction of the plant superintendent and discussion of the need for maintenance of operations through the construction period, accommodations for plant employees and partial OWNER occupancy.
 7. Equal opportunity requirements.
 8. Laboratory testing of material requirements.
 9. Inventory of material stored on-site provisions.
 10. Progress estimate and payment procedure.
 11. Posting of signs, if applicable.

1.6 PROGRESS MEETINGS

- A. Progress meetings will be held at regularly scheduled intervals to discuss items that shall directly affect the progress of the project and to adjust the construction progress schedule (or CPM if required, Network Analysis Schedules) so as to assure timely completion of the project. All CONTRACTORS may be requested to attend.
- B. Agenda:
1. Review Minutes of previous meetings.
 2. Review of work progress.
 3. Field observations, problems and decisions.

4. Identification of problems that impede planned progress.
5. Review of submittals schedule and status of submittals.
6. Review of off-site fabrication and delivery schedules.
7. Maintenance of Progress Schedule.
8. Corrective measures to regain projected schedules.
9. Planned progress during succeeding work period.
10. Coordination of projected progress.
11. Maintenance of quality and work standards.
12. Effect of proposed changes on progress schedule and coordination.
13. Other business relating to work.

1.7 PRE-INSTALLATION CONFERENCES

- A. When required in an individual Specification Section, convene a Pre-Installation Conference at work site prior to commencing work of the Section.
- B. Require attendance of parties directly affecting, or affected by, work of the specific Section.
- C. Notify ENGINEER 4-days in advance of meeting date.
- D. Prepare Agenda, preside at Conference, record Minutes and distribute copies within 2-days after Conference to participants, with two (2) copies to ENGINEER.
- E. Review conditions of installation, preparation and installation procedures, and coordination with related work.

1.8 JOB SITE ADMINISTRATION

- A. CONTRACTOR's Responsibilities:
 1. The GENERAL CONTRACTOR shall be responsible for the general supervision and direction of the work in accordance with the General Conditions.
 2. Each CONTRACTOR shall assure their work is accomplished in conformance with the Contract Documents.
 3. Each CONTRACTOR shall supervise all assembly of materials and all labor to complete their work on the project.

4. Each CONTRACTOR shall proceed with the work in accordance with the schedule established in such a manner as to ensure completion of the work within the time allotted.

B. ENGINEER's Responsibilities & Authority:

1. Refer to the Standard General Conditions of the Construction Contract.
2. The ENGINEER will establish the standards of acceptability for materials and workmanship furnished by the CONTRACTOR.
3. The ENGINEER will observe work quality and quantity of the CONTRACTOR according to Contract requirements.
4. The ENGINEER will have the authority to recommend to the OWNER rejection of materials or workmanship that does not meet Contract requirements.
5. The ENGINEER will act as the OWNER's representative and have authorities, as described in the General Conditions.

PART 2 - PRODUCTS

Not Applicable.

PART 3 - EXECUTION

Not Applicable.

END OF SECTION

SECTION 01 33 00.00

SUBMITTALS

PART 1 - GENERAL

1.1 CONSTRUCTION PROGRESS SCHEDULES

- A. The CONTRACTOR shall provide a Construction Progress Schedule. An up-date of this Schedule shall accompany each Application for Payment. If an up-dated Schedule has not been submitted, processing of the Application for Payment will be withheld.
- B. Show complete sequence of construction by activity, identifying work of separate stages and other logically grouped activities. Indicate the early and late start, early and late finish, float dates and duration.
- C. Show complete sequence of construction by activity, identifying work of separate stages and other logically grouped activities. Indicate the early and late start, early and late finish, float dates and duration.
- D. Indicate estimated percentage of completion for each item of work at each submission.
- E. Indicate submittal dates required for Shop Drawings, product data, samples and product delivery dates, including those furnished by OWNER and under Allowances.

1.2 SHOP DRAWINGS, PRODUCT DATA & SAMPLES

- A. After checking and verifying all field measurements, material requirements, etc., the CONTRACTOR shall submit to the ENGINEER for review, in accordance with the accepted schedule of Shop Drawing submissions, seven (7) copies of all Shop Drawings, which shall have been checked by and stamped with the approval of the CONTRACTOR and identified as stated below. The data shown on the Shop Drawings shall be complete with respect to dimensions, design criteria, materials of construction and the like to enable the ENGINEER to review the information as required. [If the CONTRACTOR requires more than four (4) copies of reviewed Shop Drawings, they shall increase the number submitted. The ENGINEER will retain three (3) copies for their use.]
- B. Shop Drawings shall be submitted for the following materials and equipment as applicable.
 - 1. All pre-assembled or manufactured building components (doors and windows, toilet partitions, hardware, etc.)
 - 2. All heating equipment and accessory items.
 - 3. All electrical equipment, fixtures and controls.
 - 4. All process equipment items, valves, controls, etc.
 - 5. Any other items that the CONTRACTOR feels require review by the ENGINEER.

- C. All Shop Drawings shall be certified by the CONTRACTOR and/or Manufacturer, and shall bear the name of the Manufacturer, the name of the project, the name of the CONTRACTOR, and the name of the ENGINEER. All Shop Drawings shall be written in English with English units. All Shop Drawings not containing these provisions may be returned.
- D. The ENGINEER will review Shop Drawings and samples with reasonable promptness, but the ENGINEER's review shall be only for conformance with the general, overall design concept of the project. The acceptance of a separate item as such will not indicate acceptance of the assembly in which the item functions. The CONTRACTOR shall make any corrections required by the ENGINEER and shall return the required number of corrected copies of Shop Drawings and resubmit new samples until noted 'revised by ENGINEER'. The CONTRACTOR shall direct specific attention in writing on resubmitted Shop Drawings, to revisions other than the corrections called for by the ENGINEER on previous submissions. The CONTRACTOR's stamp of approval on any Shop Drawing or sample shall constitute a representation to the OWNER and ENGINEER that the CONTRACTOR has either determined and verified all quantities, dimensions, field construction criteria, materials, catalog numbers and similar data or they assume full responsibility for doing so, and that they have reviewed each Shop Drawing or sample with the requirements of the work and the Contract Documents.
- E. Where a Shop Drawing or sample submission is required by the Specifications, no related work shall be commenced until the submission has been reviewed by the ENGINEER. A copy of each reviewed Shop Drawing and each reviewed sample shall be kept in good order by the CONTRACTOR at the site and shall be available to the ENGINEER.
- F. The ENGINEER's review of Shop Drawings or samples shall not relieve the CONTRACTOR from their responsibility for any deviations from the requirements of the Contract Documents unless the CONTRACTOR has in writing called the ENGINEER's attention to such deviation at the time of submission and the ENGINEER has given written acceptance to the specific deviation. Any review by the ENGINEER shall not relieve the CONTRACTOR from responsibility for errors or omissions in the Shop Drawings.

1.3 MANUFACTURER'S INSTRUCTIONS

- A. When specified in individual Specification Sections, submit Manufacturer's printed instructions for delivery, storage, assembly, installation, start-up, adjusting and finishing, in quantities specified for product use.
- B. Identify conflicts between Manufacturers' instructions and contract documents.

1.4 MANUFACTURER'S CERTIFICATES

- A. When specified in individual Specification Sections, submit Manufacturers' certificate to ENGINEER for review, in quantities specified for product data.
- B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference date, affidavits and certifications as appropriate.
- C. Certificates may be recent or previous test results on material or product, but must be acceptable to ENGINEER.

1.5 CONSTRUCTION PHOTOGRAPHS

- A. Construction photographs will not be required unless specifically stated in the division where the specific aspect of the work to be photographed is specified. In all cases where construction photographs are called for, the cost shall be included in the CONTRACTOR's Bid.

PART 2 - PRODUCTS

Not Applicable.

PART 3 - EXECUTION

Not Applicable.

END OF SECTION

SECTION 01 42 00.00

REFERENCE STANDARDS

PART 1 - GENERAL

1.1 QUALITY ASSURANCE

- A. Any material or operation specified by reference to a Code (Federal, State or local), publication, published specification of a Manufacturer, a society, an association or other published standards, shall comply with requirements of the listed document, except when more rigid requirements are specified or are required by applicable Codes.
- B. Conform to reference standard by date of issue current on date of Contract Documents.
- C. Obtain copies of standards when required by Contract Documents.
- D. Maintain copy at job site during submittals, planning and progress of the specific work, until Substantial Completion.
- E. Should specified reference standards conflict with Contract Documents, request clarification from ENGINEER before proceeding.
- F. The contractual relationship of the parties to the Contract shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.2 ABBREVIATIONS & SYMBOLS

- A. In general, abbreviations and symbols will be listed and defined on the Drawings. Symbols will not be used in the Specification text. Since the number of abbreviations which could be used might cover several pages, abbreviations used shall be defined in that part of the Specifications to which they apply unless the usage is so generally understood that definition is believed unnecessary.

1.3 SCHEDULE OF REFERENCES

AA	Aluminum Association 818 Connecticut Avenue, N.W. Washington, DC 20006	ACI	American Concrete Institute Box 19150 Reford Station Detroit, MI 48219
AABC	Associated Air Balance Council 1000 Vermont Avenue, N.W. Washington, DC 20005	ADC	Air Diffusion Council 230 North Michigan Avenue Chicago, IL 60601
AASHTO	American Association of State Highway & Transportation Officials 444 North Capitol Street, N.W. Washington, DC 20001	AGC	Associated General Contractors of America 1957 E Street, N.W. Washington, DC 20006

AI	Asphalt Institute Asphalt Institute Building College Park, MD 20740	ASTM	American Society for Testing & Materials 1916 Race Street Philadelphia, PA 19103
AIA	American Institute of Architects 1735 New York Avenue, N.W. Washington, DC 20006	AWI	Architectural Woodwork Institute 2310 South Walter Reed Drive Arlington, VA 22206
AISC	American Institute of Steel Construction 400 North Michigan Avenue Eighth Floor Chicago, IL 60611	AWPA	American Wood-Preservers' Association 7735 Old Georgetown Road Bethesda, MD 20014
AISI	American Iron & Steel Institute 1000 16th Street, N.W. Washington, DC 20036	AWS	American Welding Society 550 LeJeune Road, N.W. Miami, FL 33135
AITC	American Institute of Timber Const. 333 W. Hampden Avenue Englewood, CO 80110	AWWA	American Water Works Association 6666 West Quincy Avenue Denver, CO 80235
AMCA	Air Movement & Control Association 30 West University Drive Arlington Heights, IL 60004	BIA	Brick Institute of America 11490 Commerce Park Drive Reston, VA 22091
ANSI	American National Standards Institute 1430 Broadway New York, NY 10018	CDA	Copper Development Association 57th Floor, Chrysler Building 405 Lexington Avenue New York, NY 10174
APA	American Plywood Association Box 11700 Tacoma, WA 98411	CLFMI	Chain Link Fence Mfgs Institute 1101 Connecticut Avenue, N.W. Washington, DC 20036
ARI	Air-Conditioning & Refrig. Institute 1501 Wilson Boulevard Arlington, VA 22209	CRSI	Concrete Reinforcing Steel Institute 933 Plum Grove Road Schaumburg, IL 60195
ASHRAE	American Society of Heating, Refrig. & Air Conditioning Engineers 1791 Tullie Circle, N.E. Atlanta, GA 30329	DHI	Door & Hardware Institute 7711 Old Springhouse Road McLean, VA 22102
ASME	American Society of Mech. Engineers 345 East 47th Street New York, NY 10017	EJCDC	Engineers' Joint Contract Documents Comm. American Consulting Engineers Council 1015 15th Street, N.W. Washington, DC 20005
ASPA	American Sod Producers Association 4415 West Harrison Street Hillside, IL 60162	EJMA	Expansion Joint Manufacturers Assoc. 25 North Broadway Tarrytown, NY 10591

FGMA Flat Glass Marketing Association
3310 Harrison
White Lakes Professional Building
Topeka, KS 66611

FM Factory Mutual System
1151 Boston-Providence Turnpike
P.O. Box 688
Norwood, MA 02062

FS Federal Specification
General Services Administration
Specifications & Consumer Information
Distribution Section (WFSIS)
Washington Navy Yard, Bldg. 197
Washington, DC 20407

GA Gypsum Association
1603 Orrington Avenue
Evanston, IL 60201

ICBO International Conf. of Building Officials
5360 S. Workman Mill Road
Whittier, CA 90601

IEEE Inst. of Electrical & Electronics Engrs
345 East 47th Street
New York, NY 10017

IMIAC International Masonry Industry
All-Weather Council
International Masonry Institute
815 15th Street, N.W.
Washington, DC 20005

MBMA Metal Building Manufacturer's Assoc.
1230 Keith Building
Cleveland, OH 44115

MFMA Maple Flooring Manufacturers Assoc.
60 Rivere Drive
Northbrook, IL 60062

MIL Military Specification
Naval Publications and Forms Center
5801 Tabor Avenue
Philadelphia, PA 19120

ML/SFA
Metal Lath/Steel Framing Association
221 North LaSalle Street
Chicago, IL 60601

NAAMM
National Association of
Architectural Metal Manufacturers
221 North LaSalle Street
Chicago, IL 60601

NCMA National Concrete Masonry Association
P.O. Box 781
Herndon, VA 22070

NEBB Nat'l Environmental Balancing Bureau
8224 Old Courthouse Road
Vienna, VA 22180

NEMA National Electrical
Manufacturers' Association
2101 'L' Street, N.W.
Washington, DC 20037

NFPA National Fire Protection Association
Battery March Park
Quincy, MA 02269

NFPA National Forest Products Association
1619 Massachusetts Avenue, N.W.
Washington, DC 20036

NSWMA
National Solid Wastes
Management Association
1730 Rhode Island Ave., N.W.
Washington, DC 20036

NTMA National Terrazzo & Mosaic Assoc.
3166 Des Plaines Avenue
Des Plaines, IL 60018

NWMA National Woodwork Manufacturers Assoc.
205 W. Touhy Avenue
Park Ridge, IL 60068

PCA Portland Cement Association
5420 Old Orchard Road
Skokie, IL 60077

PCI Prestressed Concrete Institute
201 North Wells Street
Chicago, IL 60606

PS Product Standard
U. S. Department of Commerce
Washington, DC 20203

RIS Redwood Inspection Service
One Lombard Street
San Francisco, CA 94111

RCSHSB
Red Cedar Shingle &
Handsplit Shake Bureau
515 116th Avenue
Bellevue, WA 98004

SDI Steel Deck Institute
P.O. Box 9506
Canton, OH 44711

SDI Steel Door Institute
712 Lakewood Center North
14600 Detroit Avenue
Cleveland, OH 44107

SIGMA Sealed Insulating Glass Manufacturers
Association
111 East Wacker Drive
Chicago, IL 60601

SJI Steel Joist Institute
1205 48th Avenue North, Suite A
Myrtle Beach, SC 29577

SMACNA
Sheet Metal & Air Conditioning
Contractors' National Association
8224 Old Court House Road
Vienna, VA 22180

SSPC Steel Structures Painting Council
4400 Fifth Avenue
Pittsburgh, PA 15213

TCA Tile Council of America, Inc.
Box 326
Princeton, NJ 08540

UL Underwriters' Laboratories, Inc.
333 Pfingston Road
Northbrook, IL 60062

WCLIB West Coast Lumber Inspection Bureau
6980 S.W. Varns Road
Box 23145
Portland, OR 97223

WWPA Western Wood Products Association
1500 Yeon Building
Portland, OR 97204

PART 2 - PRODUCTS

Not Applicable.

PART 3 - EXECUTION

Not Applicable.

END OF SECTION

SECTION 01 45 00.00

QUALITY CONTROL

PART 1 - GENERAL

1.1 QUALITY ASSURANCE / CONTROL OF INSTALLATION

- A. Monitor quality control over Suppliers, Manufacturers, products, services, site conditions and workmanship, to produce work of specified quality.
- B. Comply fully with Manufacturers' instructions, including each step in sequence.
- C. Should Manufacturers' instructions conflict with Contract Documents, request clarification from ENGINEER before proceeding.
- D. Comply with specified standards as a minimum quality for the work except when more stringent tolerances, Codes or specified requirements indicate higher standards or more precise workmanship.
- E. Perform work by persons qualified to produce workmanship of specified quality.
- F. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.
- G. The OWNER, through their Authorized Representative, shall have power to direct the order and sequence of the work. If at any time before the commencement or during the progress of the work, the materials and appliances used, or to be used, appear to OWNER's Representative as insufficient or improper for securing the quality of work required, or the required rate of progress, they may order the CONTRACTOR to increase their efficiency or improve the character of their equipment and the CONTRACTOR shall conform to such order; but failure of the OWNER's Representative to demand any increase of such efficiency or improvement shall not release the CONTRACTOR from their obligation to secure the quality of work or the rate of progress specified.

1.2 REFERENCES

- A. Conform to reference standard current on date of Bid Opening.
- B. Obtain copies of standards when referenced by Contract Documents.
- C. Should specified Reference Standards conflict with contract documents, request clarification for ENGINEER before proceeding.
- D. The contractual relationship of the parties to the contract shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.3 TESTING LABORATORY SERVICES - GENERAL

- A. Where the services of Certified Testing Laboratories are required as a part of this Contract, they are specifically noted in the Division where the product, material or result of construction methods are specified. The CONTRACTOR shall review the Specifications carefully to determine the extent of the testing required.
- B. Within 10-days of issuance of Notice to Proceed, the CONTRACTOR shall provide to the ENGINEER as a Submittal six (6) copies listing the required testing and the name, address and telephone number of the testing laboratory that will perform the tests.
- C. All costs for testing services not specifically designated as the responsibility of the OWNER, shall be paid for by the CONTRACTOR.

1.4 TESTS ON CONCRETE

- A. Non-Building Construction:
 - 1. All tests of concrete shall be made by an approved independent testing and inspection laboratory at the expense of the CONTRACTOR. The testing laboratory shall furnish the ENGINEER with five (5) copies of all test reports. The testing laboratory shall make preliminary 7-day tests of the mix after it has been designed and before the first concrete is poured. Not less than one (1) test for each twenty-five (25) cubic yards of concrete for each class of concrete placed shall be required, and in any event not less than one (1) test for each day's pour of each class of concrete. Not less than two (2) specimens shall be made for each test. Specimens shall be made and cured in accordance with current ASTM Specifications C-39, "Test For Compressive Strength Of Cylindrical Concrete Specimens" and C-31, "Making & Curing Concrete Compressive & Flexural Strength Test Specimens In The Field".
 - 2. The standard age of test shall be 28-days, but both 7-day and 28-day tests shall be used at the beginning of construction.
 - 3. If the average strength of the laboratory control cylinders for any portion of the structure falls below the compressive strength required for the design, the ENGINEER shall have the right to order a change in the proportions or the water content of the concrete for the remaining portions of the structure.
 - 4. In addition, where there is question as to the quality of the concrete in the structure, the ENGINEER may require tests in accordance with Specifications "Obtaining & Testing Drilled Cores & Sawed Beams of Concrete" (ASTM Designation C-42), or order load tests for that portion of the structure where the questionable concrete has been placed. The load test shall be made in accordance with Section 202 of the current ACI Building Code for Reinforced Concrete (ACI 318) and criterion of acceptability of the concrete under test shall be that given therein. These tests shall be paid for by the CONTRACTOR.
- B. Building Construction:
 - 1. Refer to Division 3 - Concrete.

1.5 TESTS ON CONCRETE PIPE

- A. Pipe specimens for testing shall be selected by the ENGINEER in the field. The samples selected shall be hauled by the CONTRACTOR to the nearest testing laboratory to be tested by the three (3) edge bearing method. The quantity of pipe to be tested shall be not less than 0.5% of the number of pipe in each size of pipe furnished, excepting that in no case shall less than two (2) specimens be furnished. The cost of the pipe, cartage and testing and the furnishing of testing certificates shall be included in the CONTRACTOR's Bid Price.

PART 2 - PRODUCTS

Not Applicable.

PART 3 - EXECUTION

Not Applicable.

END OF SECTION

SECTION 01 50 00.00

CONSTRUCTION FACILITIES & TEMPORARY CONTROLS

PART 1 - GENERAL

1.1 TEMPORARY WATER

A. Arrangements According to Availability:

1. If there is an existing building or hydrant on the site from which water can be taken, the CONTRACTOR responsible for plumbing work shall provide hose bibs from which CONTRACTORS can obtain an adequate supply of water. Each user shall supply their own hose. The CONTRACTOR shall pay for the water.
2. If water cannot be obtained, as above, but the water main from which the permanent water service will be taken is in place, the CONTRACTOR responsible for the plumbing work shall arrange with the local Water Utility to have the permanent tap made and run the new service as required by the Contract Documents to the building or buildings and provide hose bib connections for use by all CONTRACTORS. Each CONTRACTOR shall furnish their own hoses. The CONTRACTOR shall pay for the water.
3. If the OWNER has a water works system, but water is not available at the site of the work, the OWNER shall provide a source of supply for all CONTRACTORS and pay for the water. Each CONTRACTOR who will use the water shall pay for getting it to the site of the work.
4. If the OWNER does not have a water supply, each CONTRACTOR requiring water shall make their own arrangements to obtain water and shall pay for it.

1.2 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain State Board Of Health approved chemical toilet(s) for the use of all workers of all trades. Place toilet(s) in an inconspicuous place, keep clean, and remove from site at the completion of the project.
- B. Do not use OWNER's facilities.

1.3 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas to allow for OWNER's use of site, and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
- B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing buildings.
- C. It is the responsibility of the CONTRACTOR to protect all trees, shrubs, lawns, etc., not specifically designated for removal by the ENGINEER.

- D. Protect non-owned vehicular traffic, stored materials, site and structures from damage.

1.4 FENCING

- A. New fences are covered in Division 32 - Exterior Improvements.
- B. Existing fences, which interfere with the work, shall be removed by the General CONTRACTOR and restored to their original condition when the work is done, unless the Contract Documents indicate otherwise.
- C. Provide adequate fencing for safety and security purposes. This shall be the sole responsibility of the General CONTRACTOR.

1.5 BARRICADES & WARNING DEVICES

- A. The devices and materials and provisions as specified herein are minimum requirements and do not relieve the CONTRACTOR from compliance with Federal, State and local requirements. Prior to the placement of devices intended to close an alley, street, highway, thoroughfare, traffic lane or public or private way the CONTRACTOR shall obtain written permission from the authorized official of the municipality and, if applicable, the appropriate county or state highway official or property owner. The CONTRACTOR shall notify the chiefs of the Fire and Police Departments of the municipalities concerned prior to any such closure.
- B. The CONTRACTOR shall be responsible for the erection and maintenance of all barricades, guardrail, lights and signs necessary for public safety and convenience. All hazards within the limits of the work or on detour around the work must be marked with well-painted well-maintained barricades, lanterns, torches, flares, reflectors, electric lights, flashers, or caution, warning and directional signs in sufficient quantity and size to adequately protect life and property. These safeguards shall be moved, changed, increased or removed as required during the progress of the work to meet changing conditions.
- C. The CONTRACTOR shall conduct all traffic control operations in accordance with the latest issues of the Manual On Uniform Traffic Control Devices (MUTCD) and the Wisconsin Department Of Transportation Standard Specifications For Highway & Structure Construction.
- D. Barricades shall be maintained in rigidly assembled condition. They shall be kept clean and the reflecting strips in good repair so as to be readily discernible at all times.
- E. Proper provisions shall be made for handling of materials for the protection of all traffic and the public. Reasonable and satisfactory provisions shall be made for travel on sidewalks, cross-walks, streets, roads, railroads and private ways.
- F. The CONTRACTOR shall also comply with Occupational Safety & Health Act (OSHA) requirements issued by the Federal Government and/or adopted by the State and local laws, rules and regulations, as they apply.
- G. The OWNER reserves the right to remedy any neglect on the part of the CONTRACTOR as regards the protection of the work and public after 24-hours notice in writing, except in

case of emergency when it shall have the right to remedy any neglect without due notice, and, in either case, to deduct the cost of such remedy from any money due or to become due the CONTRACTOR.

1.6 WATER CONTROL

- A. Grade site to drain. Maintain excavations free of water. Provide, operate and maintain pumping equipment.
- B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

1.7 PROTECTION OF INSTALLED WORK

- A. Protect installed work and provide special protection as required.
- B. Provide temporary and removable protection for installed products. Control activity in immediate work area to minimize damage.
- C. Provide protective coverings at walls, projections, jambs, sills and soffits of openings.
- D. Protect finished floors, stairs and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- E. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or Roofing Material Manufacturer.
- F. Prohibit traffic from landscaped areas.

1.8 SECURITY

- A. The OWNER and ENGINEER are not responsible for security on the site.
- B. Provide security guards (if deemed necessary) and take other precautionary measures as deemed necessary to protect persons or property. The CONTRACTOR will be held responsible for loss or injury to persons or property where work is involved.

1.9 ACCESS ROADS

- A. Construct and maintain temporary roads accessing public thoroughfares to serve construction area.
- B. Extend access roads and relocate as work progress requires. Provide detours necessary for unimpeded traffic flow.
- C. Provide and maintain access to fire hydrants, free of obstructions.
- D. The OWNER shall provide a place of ingress and egress for the CONTRACTOR to the site of the work. If an easement is required, it shall be obtained by the OWNER.

- E. Permanent access roads and parking areas will be covered in Division 32 - Exterior Improvements.

1.10 PARKING

- A. If the site is large enough, the OWNER shall permit the CONTRACTOR to park their own and employees' vehicles on the site without charge. If the site is not large enough, the CONTRACTOR shall make their own parking arrangements.
- B. Designate one (1) parking space for the OWNER and ENGINEER.

1.11 PROGRESS CLEANING

- A. Maintain areas free of waste materials, debris and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces and other closed or remote spaces, prior to enclosing the space.
- C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- D. Remove waste materials, debris and rubbish from site weekly; and dispose off-site.

1.12 FIELD OFFICES & SHEDS

- A. The General CONTRACTOR and their Subcontractors shall maintain such temporary field offices and sheds on the site as may be necessary in the proper conduct of the work. These shall be located so as to cause no interference to any work to be performed on the site. Such structures and facilities are to be the property of the CONTRACTOR. Upon completion of the project, the CONTRACTOR shall remove such temporary structures and facilities from the site.
- B. In addition to their own requirements, the General CONTRACTOR shall provide office space for the ENGINEER at the project site. This shall be a separate structure with access stairs provided. The office shall be weather-tight and of sufficient size (minimum of 300 square feet) to accommodate the furniture listed below without crowding. The office shall have at least six (6) operable windows with storm sash and screens. The doors shall be provided with a lock and two (2) keys. The General CONTRACTOR shall furnish the office with the following furniture and equipment, which shall remain the property of the General CONTRACTOR and be claimed by them at the completion of the work.
 - 1. One (1) sloping top plan table or drafting table with suitable stool.
 - 2. Two (2) 30" x 60" desk(s) with at least one (1) lockable file drawer with keys for 8½" x 11" files, and two (2) swivel chair(s) with arm rests.
 - 3. Two (2) 52-inch high, four (4) drawer, vertical, locking file cabinet(s) for 8½" x 11" files.

4. Two (2) 42" wide x 28" high x 18" deep, two (2) drawer, locking, lateral file(s) with retracting front.
 5. One (1) plan rack with six (6) 42" clamp(s) for vertical plan storage.
 6. Two (2) 36" wide x 96" long folding table(s), with ¾" solid core and plastic laminate top.
 7. Twenty (20) steel, folding chairs.
 8. One (1) 48" wide x 36" high, wall-mounted, erasable white board, with markers.
 9. Road Runner / SBC DSL, or equivalent, high speed, internet service, with connection to wireless routed included. CONTRACTOR shall include cost for installation and monthly service in Bid price.
 10. Linksys, Model WRT 54GS, Wireless-G, broadband, internet sharing router with speed boosters, SPI firewall, 2.4 GHz/channel, four (4) 10/100 RJ-45 switched ports, IEEE 802.3, 802.3u, 802.11g and 802.11b compliant.
 11. Dell™, multi-function laser printer, Model 1600n, stand-alone copier, and PC printer/scanner, Windows XP supported. Load with software to provide .pdf files of scanned documents automatically.
 12. Appropriate lighting, and heating and air conditioning.
- C. The CONTRACTOR shall pay for heat, light, janitorial service and telephone service for the ENGINEER's office.
- D. The office space shall be clean, neat and professional in appearance. The ENGINEER shall have the option of rejecting sub-standard accommodations.

1.13 REMOVAL OF UTILITIES, FACILITIES & CONTROLS

- A. Remove temporary above grade or buried utilities, equipment, facilities, materials, prior to Final Application for Payment.
- B. Clean and repair damage caused by installation or use of temporary work.
- C. Restore existing facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

1.14 TEMPORARY FIRST AID FACILITIES

- A. All CONTRACTORS shall comply with the requirements of the Manual of Accident Prevention in Construction, Associated General Contractors of America, Inc., latest edition, Section 2, First Aid, and have on the site a first aid kit, dust-proof, protected from heat and moisture and containing, as a minimum, the first aid items listed according to the number of employees.

1.15 TEMPORARY FIRE PROTECTION

- A. All CONTRACTORS shall comply with the requirements of the Manual of Accident Prevention in Construction, Associated General Contractors of America, Inc., latest edition, Section 36, Fire Hazards & Prevention. The CONTRACTORS shall not block access to any fire hydrants, valves, manholes, fire alarm or police call boxes. The CONTRACTOR shall post fire department telephone numbers at the job site and keep a fire extinguisher on the job site. The General CONTRACTOR shall have a carbon dioxide extinguisher available at the job site.

PART 2 - PRODUCTS

Not Applicable.

PART 3 - EXECUTION

Not Applicable.

END OF SECTION

SECTION 01 57 00.00

TEMPORARY CONTROLS

PART 1 - GENERAL

1.1 WATER CONTROL

- A. Grade site to drain. Maintain excavations free of water. Provide, operate and maintain pumping equipment.
- B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

1.2 DUST CONTROL

- A. Execute work by methods to minimize raising dust from construction operations.
- B. Provide positive means to prevent air-borne dust from dispersing into atmosphere.

1.3 EROSION & SEDIMENT CONTROL

- A. Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
- B. Minimize amount of bare soil exposed at one time.
- C. Provide temporary measures such as berms, dikes and drains, to prevent water flow.
- D. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
- E. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.
- F. All erosion and sediment control practices shall be in accordance with the Wisconsin Department Of Natural Resources (DNR) Construction Site Best Management Practice Handbook.

1.4 POLLUTION CONTROL

- A. Provide methods, means and facilities to prevent contamination of soil, water and atmosphere from discharge of noxious, toxic substances and pollutants produced by construction operations.

PART 2 - PRODUCTS

Not Applicable.

PART 3 - EXECUTION

Not Applicable.

END OF SECTION

SECTION 01 60 00.00

MATERIAL & EQUIPMENT

PART 1 - GENERAL

1.1 PRODUCTS

- A. Products: Means new material, machinery, components, equipment, fixtures and systems forming the work. Does not include machinery and equipment used for preparation, fabrication, conveying and erection of the work. Products may also include existing materials or components required for reuse.
- B. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.
- C. Provide interchangeable components of the same Manufacturer, for similar components.

1.2 QUALITY

- A. Unless otherwise specifically provided for in the Specifications, all equipment, materials and articles incorporated in the Work are intended to be new and of the most suitable grade of their representative kinds for the purpose.
- B. Quality of Work is the sole responsibility of the CONTRACTOR.

1.3 TRANSPORTATION & HANDLING

- A. Except for OWNER procured equipment and materials, it shall be the responsibility of the CONTRACTOR to furnish all material and equipment to the job site.
- B. Products received by truck shall be unloaded on the site of the work by the CONTRACTOR. All handling costs incidental to the installation of products shall be paid by the CONTRACTOR.
- C. Promptly inspect shipments to assure that products comply with requirements, quantities are correct and products are undamaged.
- D. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement or damage.

1.4 STORAGE & PROTECTION

- A. The CONTRACTOR shall provide protection against vandalism, rain, wind, storms, cold or heat so as to maintain all work, materials, apparatus, equipment and fixtures incorporated in the work or stored on the site, free from injury or damage. At the end of the day's work, the CONTRACTOR shall cover all new work likely to be damaged. Items that require dry storage, such as electrical controls and motors, shall be stored in a dry building and not under tarps.

PART 2 - PRODUCTS

Not Applicable.

PART 3 - EXECUTION

Not Applicable.

END OF SECTION

SECTION 01 77 00.00

CONTRACT CLOSE-OUT

PART 1 - GENERAL

1.1 CLOSE-OUT PROCEDURES

- A. Submit written certification that Contract Documents have been reviewed, work has been inspected by the CONTRACTOR, and that work is complete in accordance with Contract Documents and ready for OWNER's inspection.
- B. Provide submittals to ENGINEER that are required by governing or other authorities.
- C. Submit final Application For Payment identifying total adjusted contract sum, previous payments and sum remaining due.
- D. OWNER will occupy the work, as specified in Division 1, Section 01 11 00.00 - Summary Of Work.

1.2 FINAL CLEANING

- A. Execute final cleaning prior to final review.
- B. Clean debris from roofs, gutters, downspouts and drainage systems.
- C. Clean site; sweep paved areas, rake clean landscaped surfaces.
- D. Remove waste and surplus materials, rubbish and construction facilities from the site.
- E. Keep the site neat and orderly during the course of the work. Perform work to bring the site up to an acceptable standard, if found substandard by the ENGINEER, in a prompt manner.

1.3 PROJECT RECORD DOCUMENTS

- A. Maintain on-site, one (1) set of the following record documents; record actual revisions to the work:
 - 1. Contract Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other modifications to the Contract.
 - 5. Reviewed Shop Drawings, product data and samples.

- B. Store record documents separate from documents used for construction.
- C. Record information concurrent with construction progress.
- D. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
 - 1. Manufacturer's name and product model and number.
 - 2. Product substitutions or alternates utilized.
 - 3. Changes made by Addenda and modifications.
- E. Record documents and Shop Drawings: Legibly mark each item to record actual construction including:
 - 1. Measured depths of foundations in relation to benchmark datum.
 - 2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - 3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the work.
 - 4. Field changes of dimension and detail.
 - 5. Details not on original Contract Drawings.
- F. Submit documents to ENGINEER with claim for final Application For Payment.
- G. Provide acceptable Record Drawings prior to final payment.

1.4 GUARANTEES, WARRANTIES & BONDS

- A. Comprehensive information concerning guarantees, warranties and bonds is given in the General Conditions.
- B. The Specifications may state that the OWNER requires additional bonds beside those required by the General Conditions, such as a bond to be furnished with roofing may be required, etc. Such requirements will be stated in the pertinent division of the Specifications.

PART 2 - PRODUCTS

Not Applicable.

PART 3 - EXECUTION

Not Applicable.

END OF SECTION

DIVISION 31 – EARTHWORK

- SECTION 31 10 00.00 SITE PREPARATION & EROSION CONTROL
- SECTION 31 20 00.00 EARTH WORK
- SECTION 31 23 19.00 DEWATERING

SECTION 31 10 00.00

SITE PREPARATION & EROSION CONTROL

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Methods for clearing the site, disposal of materials cleared from the site, and erosion control for earthwork operations.

1.2 MEASUREMENT PROCEDURES

- A. Measure in the units specified in the contract bid forms.

1.3 PAYMENT PROCEDURES

- A. Pay as specified in the contract bid forms.

1.4 REFERENCES

- A. Construction Site Erosion & Sediment Control Standards (Conservation Practice Standards) – Wisconsin Department of Natural Resources

1.5 SUBMITTALS

- A. Submit the following to the ENGINEER a minimum of 10 days prior to incorporation into the project:
 - 1. Manufacturer's data on erosion control material and devices.
 - 2. Erosion control plan.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Erosion Control
 - 1. Acceptable Materials
 - a. On Wisconsin Department of Transportation (WisDOT) Erosion Control Product Acceptability List (PAL)

PART 3 - EXECUTION

3.1 CONSTRUCTION

A. Methods

1. Remove obstructions such as mounds of dirt, stone or debris.
2. Remove and replace obstructions such as street signs, small culverts and end walls, advertising signs and guard posts, located in construction easements or right-of-ways.
3. Preserve and protect trees or shrubs from damage or injury. Do not remove or trim trees or shrubs unless specifically allowed in the contract documents. Cut interfering tree roots 1-inch or greater in diameter perpendicular to the direction of growth on the tree side of the trench. Treat cut roots with a tree wound dressing.
4. Provide access to private and public property at all times. Notify property owners of specific access arrangements during construction.

B. Disposal

1. Dispose of the material in conformance with all national laws, ordinances and regulations governing the disposal of such materials and items.
2. Burning
 - a. Burn only if permitted by OWNER.
 - b. Burn in accordance with laws, ordinances, and regulations regarding burning.
 - c. Burn in a manner that will not injure or endanger items to be preserved or left in place.
 - d. Burn in a manner as to prevent the fire from spreading to areas adjoining the right-of-way.
 - e. If clearing and grubbing is completed in times when burning is not permitted, pile all material to be burned outside the slope lines and return such material to the grade and burn it at a time when burning is permitted.
3. Obtain written permission to place material on private property or on land not associated with the project from the property owner or other responsible party. Include language absolving the ENGINEER and the OWNER from any and all responsibility in connection with the placing of material on said property. Provide copy of written permission to the ENGINEER upon request.

C. Erosion Control

1. Perform erosion control measures to control water pollution, erosion and siltation through the use of intercepting embankments, berms, dikes, dams, silt fences, settling basins, slope paving, ditch checks, rip-rap, mulches, erosion mats, seeding, sodding, plantings and other erosion control devices or methods.
2. Coordinate temporary erosion control measures with permanent erosion control measures to assure economical, effective and continuous erosion control.
3. Submit a detailed plan and schedule of construction operations for accomplishing temporary and permanent erosion control work relating to grubbing, grading, excavation, paving and other work which might create erosion.
4. Minimize the area of erosive land exposed to the elements, and minimize the duration of such exposure.
5. Perform construction in and adjacent to rivers, streams, lakes or other waterways in such a manner as to avoid washing, sloughing or deposition of materials into waterways which would result in undue or avoidable contamination, pollution or siltation of such waterways.
6. Perform grubbing and grading operations in proper sequence with other work to minimize erosion. Construct intercepting ditches or dikes, as soon as practical, after clearing and grubbing operations are completed.
7. Furnish, install, maintain and remove erosion and sediment control facilities in accordance with Wisconsin Department of Natural Resources Technical Standards.
8. Install and maintain erosion control (Best Management Practices) in accordance with applicable permits.
9. Inspect site weekly and within 24-hours following a rainfall of 0.5-inches (in 24-hours) or greater. Prepare and retain inspection forms.

D. Conservation

1. Prevent injury to trees, shrubs, vines, plants, grasses and other vegetation growing on areas outside of the areas to be cleared and grubbed. Confine the dragging, piling and burning of debris, the piling of material of various kinds, and the performing of other work which may be injurious to vegetation to areas which carry no vegetation or which will be covered by embankments or disturbed by excavation.
2. Remove low-hanging or unsound branches as required from trees and shrubs that are to remain in place.
3. Remove shrubbery, brush, trees and other vegetation from areas outside of the areas to be cleared and grubbed, when removal is required by the contract documents. Remove dead vegetation, logs, stumps, limbs, sticks and other

undesirable matter occurring on areas where live shrubbery, brush, trees and other desirable vegetation are to be left in place.

4. Backfill stump holes and other holes from removed obstructions with suitable material and compact in accordance with the requirements for compaction control and testing except in areas to be excavated
5. Comply with all applicable local laws and ordinances and air pollution control rules.

E. Lot Corners

1. Protect all survey corners in project area. Replace any damaged or removed corners using a registered land surveyor.
2. CONTRACTOR may request ENGINEER to locate and mark these corners prior to commencing work at CONTRACTOR's expense.

END OF SECTION

SECTION 31 20 00.00

EARTHWORK

PART 1 - GENERAL

1.1 SUMMARY

- A. This section outlines acceptable methods for the excavating, placing, grading, stabilizing and compacting of earth at the project site.

1.2 SUBMITTALS

- A. Furnish OWNER with the proposed source or sources of topsoil to be used at least fifteen (15) working days prior to delivery.
- B. Obtain soil samples from the intended topsoil source. Perform a soil analysis through a soil testing laboratory to ensure conformity with the specifications.
- C. Do not deliver topsoil to the work site prior to review by the OWNER. Any delay caused by the failure of soil tests to meet these specifications is the sole responsibility of the CONTRACTOR.

1.3 MEASUREMENT PROCEDURES

- A. Roadway Excavation (Common Excavation, Rock Excavation, & Marsh Excavation)
 - 1. Measured in cubic yards in their original position, computed by the method of average end areas.
 - 2. Measure rock excavation using vertical measurements for determining end areas within the limits of the roadbed (defined as the shoulder slopes or 1 foot behind the back of curb) extending from the surface of the rock to an elevation 6-inches below the sub-grade or finished surface of the earth grade. Measure boulders and surface stone of one-half (½) cubic yard or more in volume individually and the volume computed from average dimensions taken in three (3) directions.
 - 3. Measure marsh excavation in its original position by the average end area method to the extent that a reasonably well defined trench of required cross section is excavated and formed, having relatively stable side slopes and the bottom of which is the bottom of the marsh or satisfactory support for the backfill and embankment.
 - 4. Excavation Below Subgrade (EBS) to be measured in cubic yards in the original position, computed by the method of average end areas.

1.4 PAYMENT PROCEDURES

- A. Payment for excavation items is full compensation as set forth on the Bid Forms without measurement thereof. Any modifications to the Contract quantity, caused by corrections or modifications to the original Contract, which have been approved by the ENGINEER,

will be measured in place by the cubic yard for common excavation.

- B. Payment for EBS areas will be unit price paid for common excavation unless specified otherwise in the Special Provisions. For EBS performed after placing base, EBS will be paid at two (2) times the Contract unit price for common excavation.

PART 2 – PRODUCTS

Not Applicable

PART 3 - EXECUTION

3.1 PROTECTION OF EXISTING STRUCTURES & UTILITIES

- A. Protect against damage surfaces and features, including buildings, pavements, trees and shrubs, within and adjacent to the construction easement or right-of-way, which are to be saved as indicated on the drawings or by the ENGINEER.
- B. Support and protect existing gas pipes, water pipes, steam pipes, electric and telephone other surface or subsurface structures, either of a private or of public ownership, whether or not indicated or shown on the drawings. Perform such work at CONTRACTOR'S expense, and according to their own drawings.
- C. Contact public utilities for the location of their underground structures such as ducts, mains or services for electric power, gas and telephone. Support above ground poles for electric power, lighting and telephone wires and cables. If the CONTRACTOR damages such utilities or subsurface structures, they shall make settlement with the OWNER(s) of the utility (ies).

3.2 INTERFERENCE OF UNDERGROUND STRUCTURES

- A. Notify ENGINEER and OWNER when an unknown underground structure is encountered in the trench or tunnel and because of interference part or all of the structure requires relocation.
- B. Notify the ENGINEER and the OWNER of underground structure of CONTRACTOR'S desire to temporarily relocate such structure or to discontinue the service therein, and receive from the OWNER of such underground structure permission for such relocation or discontinuance of service if the relocation is to be made for CONTRACTOR'S convenience. Replace structure to original position and condition. Structure OWNER may perform the work in connection with said relocation, discontinuance or replacement at the CONTRACTOR'S expense. No extra compensation will be paid for unavoidable delays caused by the interference of existing underground structures.
- C. Protect, support, or brace existing underground structures where the excavation of either a trench or tunnel extends under or approaches it.

3.3 WASTE OR EXCESS MATERIAL DISPOSAL

A. Surplus Earth

1. Surplus earth is the CONTRACTOR's property.
2. Haul surplus material to CONTRACTOR procured dump site.

B. Surplus Rock

1. Surplus rock is the CONTRACTOR's property.
2. Haul surplus material to CONTRACTOR's procured dump site.
3. Remove excavated material classified as rock excavation not meeting the requirements for backfill material from the project site.

3.4 ROADWAY EXCAVATION, BACKFILL & COMPACTION

A. Subgrade Preparation

1. Construct subgrade to the width and section shown on the plans. Shape and compact the subgrade to within 0.10 feet of the plan elevation.
2. Subgrade preparation shall include grading and rolling to the proposed crown, as shown on the typical roadway sections.
3. A proof roll of the subgrade, witnessed by an OWNER representative and/or the OWNER'S ENGINEER, shall be performed with a loaded quad axle dump truck after the subgrade preparation is completed.
4. Once the subgrade has been prepared, the CONTRACTOR shall contact the ENGINEER for an elevation check. Copies of the subgrade elevation checks to be sent to the OWNER for approval, prior to installation of aggregate base. Subgrade elevation checks to be performed at 50' stations and include centerline and both edges.

B. General

1. Consists of the excavation and satisfactory disposal of all materials taken from within the right-of-way for the construction of the roadway, roadbed, embankments, earth sub-grade and shoulders, intersections, side ditches and dikes, channels and waterways, and shall also include the grading of entrances, approaches, parking lots, ditches and channels beyond the right-of-way. Includes the removal and satisfactory disposal of surface and base courses, embankment surcharge, masonry walls, foundations of buildings or other structures that lie within the right-of-way, stone fences, stone piles and surplus and unsuitable materials; the replacement of unsuitable material with satisfactory material; the trimming and finishing of the roadway; and maintaining such work in a finished condition until acceptance.

2. Does not include material obtained from borrow pits outside the right-of-way limits, nor does it include excavation for structures or other excavation items for which separate and specific methods of measurement and basis of payment are provided elsewhere in the specifications and contract.
3. Conform to Section 205, "Roadway and Drainage Excavation", State of Wisconsin, Department of Transportation, Standard Specifications for Highway & Structure Construction, latest edition.

C. Classification of Excavation

1. Rock Excavation

a. Includes:

- 1) Hard, solid rock in ledges, bedded deposits and un-stratified masses and all conglomerate deposits or any other material so firmly cemented as to present all the characteristics of solid rock; which material is so hard or so firmly cemented that, as determined by the ENGINEER, it is not practical to excavate and remove same without blasting or the use of rippers.
- 2) Rock boulders having a volume of one-half (½) cubic yard or more.

b. Does not include plain or bituminous bound bases or surface courses of macadam, gravel or broken stone.

2. Marsh Excavation

a. Includes:

- 1) Excavation below the original ground level of marshes and swamps underlying proposed embankments, within the limits indicated on the drawings or as determined by the ENGINEER, and necessary or desirable to ensure a stable foundation for embankment or to accelerate the subsidence of unstable material under embankment load.

b. Does not include old road cores so designated on the drawings to be salvaged and used in the construction of embankments

3. Common Excavation

a. Includes any and all materials encountered in the performance of the work under roadway excavation other than specific materials that have been classified rock excavation or marsh excavation.

4. Excavation Below Subgrade (EBS)

a. Includes any and all unsuitable materials located below finished subgrade elevation.

D. Construction Methods

1. Clear and grub and remove topsoil before ground is broken or embankments are placed.
2. Maintain the roadway, ditches and channels in a well drained condition at all times by keeping the excavation areas and embankments sloped to the approximate section of the ultimate earth grade. Provide temporary drainage until permanent drainage work is completed. Temporary drainage installations are incidental to the construction of the work.
3. Utilize suitable material removed from excavation in the construction of the roadway, as far as practicable, and at such other places as shown on the drawings. Undercut or underfill excavated slopes or areas and embankment slopes or areas, designated to be covered with topsoil or salvaged topsoil, to the necessary depth to provide for the specified amount of topsoil or salvaged topsoil to be placed.
4. Construct Inlets, outlets, swamp, berm and intercepting ditches, dikes or intercepting embankments and channels as shown on the drawings or as directed by the ENGINEER and maintain to the required section until acceptance. Perform in proper sequence with other work to provide adequate drainage and to minimize erosion and siltation. Excavate suitable material from ditches and channels and use in the construction of the roadway and backfilling of abandoned ditches and channels. Do not place waste or surplus excavation within 3 feet from the edge of the ditch or channel or within such greater distance, as may be required, to ensure stability of the side slopes. Spread waste or surplus material in thin uniform layers neatly leveled and shaped. Remove roots, stumps, logs and other objectionable material in the slopes and bottoms of ditches and channels and the holes backfilled with suitable material. Provide suitable outlets or flumes from intercepting ditches to roadway ditches where necessary.
5. Remove rock to a depth of approximately 6-inches below the earth sub-grade between limits of the shoulder slopes. Backfill for areas of excavation below sub-grade in rock excavation with select material obtained from roadway and excavation. Drain un-drained pockets in the rock surface or fill the depressions with approved impermeable material.
6. Muck or Peat Marshes
 - a. Complete treatment as soon as practicable in order to obtain maximum settlement prior to proposed base and surface construction.
 - b. Excavate wet marshes having relatively unstable side slopes beginning at one end and proceed in one direction to the full width across the entire marsh immediately ahead of backfilling.
 - c. Excavate and backfill to provide the complete removal or displacement of all peat or muck from within lateral limits called for on the drawings or as staked by the ENGINEER, and to the bottom of the marsh or to firm support.

- d. Excavate any displaced peat or muck accumulating ahead of the advancing embankment toe to provide removal of or to facilitate displacement of underlying peat or muck.

E. Backfill & Embankments

- 1. Roadway backfill consists of placing in embankments and in miscellaneous backfills material obtained from roadway excavation or borrow excavation.
- 2. Materials for Embankment
 - a. Suitable materials containing no logs, stumps, brush or other perishable material.
 - b. No frozen lumps of soil are allowed.
 - c. The top 12-inches of earth embankments are free from stone, broken concrete or other materials that would significantly affect scarifying, compacting and finishing the sub-grade.
- 3. Do not construct embankments in freezing weather except when the materials used are from rock excavation or of a granular nature and contain only minor quantities of silt, clay, loam or similar materials. Construct embankment in layers. Construct embankment beginning at the lowest point of the fill below the grade, at the bottom of ravines and in layers by spreading and leveling the material during placement. Spread individual layers evenly to uniform thickness throughout and parallel with the finished grade for the full width of the embankment, unless otherwise directed.
- 4. Grade, trim and finish prior to construction of the sub-base, base or surface courses. Adjust slopes to avoid injury to standing trees or to harmonize with existing landscape features, especially at the intersection of cuts and fills, to make the transition gradual. Round the crests of earth-cut banks. Construct earth slopes to a surface that will merge with adjacent terrain and be in substantial accordance with the cross sections.

F. Compaction

- 1. Compact in accordance with the requirements for standard compaction unless special compaction is called for on the drawings or in the contract. Do not compact embankment material when the moisture content is such as to cause excessive rutting by the hauling equipment or excessive displacement or distortion under the compacting equipment. Allow materials to dry prior to compacting. Add water to embankment materials with insufficient moisture content.
- 2. Roadway Excavation Backfill
 - a. Compaction requirements are listed in Table 31 20 00.00-1, located at the end of this section.

- b. Perform the number of compaction tests specified in the Special Provisions, if applicable.
 - c. Perform proof roll test prior to placement of aggregate base.
3. Crushed Stone Paving
- a. Compact crushed stone or aggregate base course to 95% of maximum density in accordance with the requirements of ASTM D-1557, Modified Proctor Test.
 - b. Perform the number of compaction tests specified in the Special Provisions, if applicable.
 - c. Perform proof roll test with loaded quad axle truck prior to project acceptance. All soft areas shall be removed and reconstructed.

3.7 ROCK REMOVAL

A. Rock Classification

- 1. Includes:
 - a. Solid or ledge rock, including shale and slate, sandstone or other hard materials that are not decomposed, weathered, loose, layered or shattered, and require the continuous use of pneumatic tools, drilling and blasting, or heavy ripping.
 - b. Boulders and pieces of concrete or masonry exceeding 2,000 pounds in weight, or one-half (½) cubic yard in volume.
- 2. Provide the ENGINEER sufficient notice (at least 24-hours) in order to make the measurements necessary for volume computation.

B. Removal by Blasting

- 1. Comply with requirements of Wisconsin Administrative Code Section Ind. 5 and local ordinances.
- 2. Damage to Existing Facilities
 - a. Remove damaged facilities and reconstruct, or furnish materials and perform such work or repairs or replacements as the ENGINEER may order.
 - b. Repair or replace at own expense.
 - c. CONTRACTOR is responsible for any and all damages and claims arising from such blasting or by accidental explosions, and for the defense of all actions arising from such causes.

3. Blasting Subcontractor
 - a. Furnish a certificate of insurance to the OWNER for the limits specified in the General Requirements.
 - b. Provide the OWNER proof that they have the proper Blasters' License Classification, as defined in the Wisconsin Administrative Code Department Of Commerce (DOC), Chapter Ind. 5.12 to perform the work in this project.

- C. Pre-Blast Survey
 1. Perform a re-blast survey on all buildings and improvements within and adjacent to the area of rock removal.
 2. Survey includes:
 - a. Videotapes or compact discs of improvements, building exteriors and building interiors, where access can be obtained from property owners.
 - b. Inspection results and confirmation of contact with property owners.
 3. Notify in writing each property owner located adjacent to an area to be blasted of the proposed schedule for blasting at least 1-week prior to the date blasting is scheduled for that area. Provide ENGINEER and OWNER a copy of the notification.

- D. Blasting Requirements
 1. Perform all blasting within public highway right-of-way either directly or under direct supervision of a qualified blaster who has a currently effective Class IV Blaster's License issued by the State of Wisconsin. Provide copies of the license verifying class and issuance dates to the ENGINEER within 30-days of contract award.
 2. Comply with all state and federal codes applicable to the storage and use of explosives and, particularly, to the Explosives and Blasting Codes as administered by the Wisconsin Department Commerce (DOC), Chapter IND 5, Mine Safety Section. [The provisions specified in the Federal (OSHA) Standards; these specifications; and local codes and ordinances.] Copies of the code are available from "WI Department of Administration, Document Sales and Distribution Section, 202 South Thornton Avenue, P.O. Box 7840, Madison, WI 53707-7840"; "docsales@doa.state.wi.us"; or "[http://www.doa.state.wi.us/section detail.asp](http://www.doa.state.wi.us/section_detail.asp)".
 3. Notify appropriate officials of the Mine Safety Section of the State of Wisconsin DOC prior to any of the proposed blasting. Do not commence blasting until the said department has indicated its approval or its non-objection.

4. Notify by contacting:
Wisconsin Department of Commerce
Mine Safety Section
201 East Washington Avenue, Room #103
Madison, WI 53703
Telephone: (608) 266-7529
5. Provide sufficient warning signs and devices and perform operations in a manner to assure that persons and properties are protected from injury or damage throughout all phases of the work.
6. Provide precautions against the use of radio-frequency devices in blasting environments.
7. Confine blasting operations to hours approved by the OWNER. Do not perform blasting over any weekend or on any holiday.
8. Notify public utilities, private or cooperatively owned utilities and the owner and occupants of properties that might be affected by the work.
9. Signs for Blasting Areas
 - a. Consult the Institute of Makers of Explosives, Publication No. 20, "Radio Frequency Energy, A Potential Hazard in the Use of Electric Blasting Caps", for information on guidelines for safe operation. This publication provides tables of recommended safety distances, which will give the blaster a high degree of assurance that their blasting layout should be safe against radio frequency (RF) initiation.
 - 1) Blasting Zone Sign (W22-1)
 - a) Provide a **BLASTING ZONE (1000) FT** sign in advance of the **TURN OFF 2-WAY RADIO** and **END BLASTING ZONE** signs. Cover or remove the sign sequence when there are no explosives in the area or the area is otherwise secured.
 - 2) Turn Off 2-Way Radio (W22-2)
 - a) Provide **TURN OFF 2-WAY RADIO** sign in advance of the **BLASTING ZONE (1000) FT** sign and **END BLASTING ZONE** sign at least 1,000-feet from the beginning of the blasting zone. Cover or remove the sign sequence when there are no explosives in the area or the area is otherwise secured.
 - 3) End Blasting Zone (W22-3)
 - a) Provide **END BLASTING ZONE** sign a minimum of 1,000-feet beyond the blasting zone.

E. Vibration Limitation & Recording

1. Furnish, install and operate instrumentation and provide a qualified blasting specialist to supervise the installation of the instruments and interpret the recorder results.
2. Submit plan for monitoring blasting operations to assure compliance with the vibration limitation prior to commencement of the blasting operations. Include the following in the plan:
 - a. Recommended vibration limitation.
 - b. Seismograph recordings of vibrations for each blasting occurrence.
 - c. Names of the trained personnel provided to operate the equipment and interpret the recordings.
3. Prove blasting so that vibrations reaching adjacent structures and facilities are within safe limits.
4. Monitor vibrations by measuring the peak particle velocity in the vicinity of blasting. Peak particle velocity is the maximum of the three (3) velocity components, measured in three (3) mutually perpendicular directions at any point by an appropriate instrument. Do not exceed 2.0-inches per second peak particle velocity on or at the structure closest to the point of blasting operations.
5. Measure the air blast pressure with an instrument making a permanent record for each blast when blasting at the ground surface is conducted in the vicinity of a structure susceptible to damage. Do not exceed 0.01 psi mean peak over-pressure at the nearest structure or at the nearest project property line, except as modified herein.
6. Blast Vibration Specialist
 - a. Supervise establishment of the program and initial operation of the equipment.
 - b. Visit the job site at least once per week
 - c. Inspect the recording program and interpretation of records.
 - d. Check the operations.
 - e. Provide the ENGINEER with a comprehensive written report of the vibration measuring program and an analysis of the velocity and over-pressure recordings within 30-days after completion of the blasting operations,
7. Suspend blasting operations immediately in the event any recordings indicate that the vibration limits are being exceeded. Report this Immediately to the ENGINEER. Reduce the size of loads, use millisecond delay detonators, or take other appropriate measures to reduce the resulting vibrations.

8. Provide results and interpretation of all blasting records to the ENGINEER within 24-hours of blasting.

F. Blasting Records

1. Provide a record of each blast detonated and make records available to the OWNER at all times. Include the following:
2. Depth of blast holes and the location of the blast point in relation to the project stationing.
 - a. Type and strength of explosives, type of blasting caps and distribution of delays used.
 - b. Vibration record.
 - c. Total explosive loading per round and per delay.
 - d. Comments by the blaster in charge regarding any misfires, unusual results or unusual effects.
 - e. Date and exact time of blast.
 - f. Name of person in responsible charge of loading and firing and blaster permit number.
 - g. Signature and title of person making recording entries.
3. Any other records required by State in which the work is performed, and local codes and regulations.

END OF SECTION

TABLE 31 20 00.00-1

Excavated Area	Percent Compaction Fine-Grained Soil	Percent Compaction Coarse-Grained Soil	Relative Density *
Within 10' of building lines under footings, floor slabs and structures attached to buildings (i.e., walls, stoops, steps); and the upper 4' or a distance twice the trench width, whichever is greater, of any trench located under any concrete or asphalt paved surfaces.	90%	95%	70%
10' beyond building lines under walks, driveways, curbing, concrete or asphalt paving; sub-grade preparation; and the remaining section of any trench located under these paved surfaces.	80%	90%	60%
10' beyond building lines under seeded, sodded and landscaped areas, and any trench located under these areas.	80%	90%	---
<p>Coarse-grained soils are classified as those soils with more than 50% (by weight) larger than the No. 200 mesh sieve and with a plastic index less than 4.</p> <p>Compaction requirements maximum density shall be determined by AASHTO Designation T99, Method C, with replacement of the fraction of material retained in the 3/4-inch sieve with No. 4 to 3/4-inch material.</p>			
<p><i>* Minimum relative density requirements apply to coarse-grained soils and apply only in cases where the percentage compaction requirements are not being reached.</i></p>			

SECTION 31 23 19.00

DEWATERING

PART 1 - GENERAL

1.1 DEFINITIONS

A. Dewatering

1. Temporary removal of large amounts of groundwater or surface water which adversely affect the performance of the work and/or have the potential of causing loss or damage to adjacent properties.

1.2 PAYMENT PROCEDURES

- ###### A. Include dewatering in the earthwork or trenching costs unless specified otherwise in the Special Provisions.

1.3 SUBMITTALS

- ###### A. Submit shop drawings (plan and details) in accordance with Division 1, Section 01 33 00.00 - Submittals, to demonstrate clearly to the ENGINEER the method or methods proposed for dewatering. Include all equipment, materials and complete layout of site showing well locations, pipe routes, any excavations and sheeting locations. Obtain the ENGINEER's review and examination prior to dewatering of the site.
- ###### B. Submit dewatering operations plans to CONTRACTOR's independent and qualified Geotechnical Engineer registered in the state the work is being performed. Submit CONTRACTOR's Engineer's sealed review plans to the ENGINEER for review.

1.4 QUALITY ASSURANCE

- ###### A. Protection of life, structures and property (on-site and off-site).
1. Execute work to ensure against damages to property and buildings to remain. Do not interfere with use of property or buildings.
- ###### B. Control the water source during excavation.
- ###### C. Support structures including, but not limited to: footings, foundations, basement or house walls, concrete driveways, utilities or streets, curbs and sidewalks that become unstable and vulnerable to collapse or settlement due to removal or disturbance of ground water. Support includes, but is not limited to: shoring, sheeting, bracing, underpinning, driving piles or sheeting, excavation, backfilling, compaction grouting, and placing new structural components.
- ###### D. Pay for all loss or damage arising from removal or disturbances of groundwater (including, but not limited to, any such claims for subsidence of soil, utilities, cracked basement or house walls, foundations, concrete driveways, and the like, any such claims for slumping

and the loss of lateral support rendering walls unstable and vulnerable to collapse) that may occur in the prosecution of the work. If the CONTRACTOR fails to correct the damage or destruction resulting from their operations, the OWNER may, 30-days after notifying the CONTRACTOR in writing, proceed to repair, rebuild or otherwise restore such damaged property as may be deemed necessary, and deduct this cost from the contract. Indemnify and hold the OWNER and the ENGINEER harmless from claims by property owner for damages to their property as a result of dewatering whether or not such dewatering operations were reviewed by the ENGINEER.

- E. If groundwater control or dewatering operations cause a reduction of water supplies to adjoining or nearby residences or business due to decreased well capacity, impaired or changed water quality or dried up wells, provide an adequate temporary water supply to the affected properties immediately. Restore permanent water supply to affected residences or businesses with 48 hours after the complaint is received.
- F. Interview owners of applicable properties within a corridor of 100-feet, minimum, on each side of centerline for sewer excavation to determine the existence of wells, well locations, well yield and water quality. Provide the survey results to the ENGINEER a minimum of 10-days prior to construction.

PART 2 - PRODUCTS

2.1 PROVIDE ALL MATERIALS FOR DEWATERING

PART 3 - EXECUTION

3.1 WATER REMOVAL

- A. Provide suitable means to promptly remove and dispose of all water entering excavations.
- B. Keep the excavation dry and do not allow water to enter the trench until backfilling is complete, or until such earlier time as directed by the OWNER.
- C. Install well points, tight sheeting, drains, or other devices in water bearing sand or quicksand to keep the excavation dry.
- D. Dispose of all water in a suitable manner without damage to adjacent property or sewers.
- E. Do not dispose water into an existing sanitary or combined sewer.
- F. Provide check dikes or other devices to retain the water, so as to permit eroded or suspended soils to settle and to prevent this soil from being carried into streams, lakes or other nearby bodies of water.
- G. Furnish and operate suitable pumps on a 24-hour basis to keep trench excavations free of water until services have been placed and backfilling is completed.
- H. Direct surface drainage away from excavated areas.

- I. Control the grading in and adjacent to excavations to prevent water running into excavated areas or onto adjacent properties or public thoroughfares.
- J. Remove materials and equipment at completion of dewatering operations.
- K. Obtain and comply with any discharge permits required from regulatory agencies.
- L. Dewater to 3-feet below bottom of excavation.
- M. Dewater from outside of the open excavation if necessary to allow compaction of backfills.

END OF SECTION

DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 32 11 23.00 BASE AGGREGATES

SECTION 32 12 16.00 ASPHALTIC CONCRETE PAVING

SECTION 32 13 13.00 CONCRETE PAVEMENTS

SECTION 32 13 73.00 ASPHALTIC CONCRETE CRACK SEAL

SECTION 32 15 00.00 CHIP SEAL

SECTION 32 16 13.00 CONCRETE CURB & GUTTER

SECTION 32 16 23.00 CONCRETE SIDEWALK & DRIVEWAYS

SECTION 32 19 00.00 PAVEMENT REPAIR & RESURFACING

SECTION 32 92 00.00 LANDSCAPING

SECTION 32 11 23.00

BASE AGGREGATES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Material requirements, submittals, breaker run stone, testing and placement procedures.

1.2 MEASUREMENT PROCEDURES

- A. Aggregate bases and breaker run stone.
 - 1. Measured by the ton, unless specified otherwise in the contract documents.
- B. For weighed aggregate with a moisture content greater than 7% the ENGINEER shall reduce the ticket weight by the weight of water exceeding 7%.

1.3 PAYMENT PROCEDURES

- A. Aggregate bases and breaker run stone.
 - 1. Paid by the ton, unless specified otherwise in the contract documents.

1.4 REFERENCES

- A. AASHTO Designation T2 - Sampling of Aggregates
- B. AASHTO Designation T11 - Materials Passing the No. 200 Sieve
- C. AASHTO Designation T27 - Gradation
- D. AASHTO Designation T30 - Gradation of Extracted Aggregate
- E. AASHTO Designation T89 - Liquid Limit
- F. AASHTO Designation T90 - Plasticity Index
- G. AASHTO Designation T96 - Wear
- H. AASHTO Designation T99 - Moisture/Density
- I. AASHTO Designation T103 - Freeze/Thaw Soundness
- J. AASHTO Designation T104 - Soundness of Aggregate
- K. AASHTO Designation T113 - Deleterious Materials
- L. AASHTO Designation T191 - In Place Density

- M. AASHTO Designation T255 - Moisture Content Testing Properties
- N. Section 211 of the Current Edition of the Wisconsin Department of Transportation Standard Specifications for Highway and Structure Construction, including the latest Supplemental Specifications.
- O. Section 301 of the Current Edition of the Wisconsin Department of Transportation Standard Specifications for Highway and Structure Construction, including the latest Supplemental Specifications.
- P. Section 305 of the Current Edition of the Wisconsin Department of Transportation Standard Specifications for Highway and Structure Construction, including the latest Supplemental Specifications.
- Q. Section 311 of the Current Edition of the Wisconsin Department of Transportation Standard Specifications for Highway and Structure Construction, including the latest Supplemental Specifications.

1.5 SUBMITTALS

- A. Submit the following a minimum of 10-days prior to commencement of construction:
 - 1. Test results from an OWNER approved independent certified testing laboratory indicating that any aggregate material incorporated into the work is in compliance with these contract specifications.
 - 2. When requested by the OWNER must submit a representative sample of the aggregate incorporated into the work to a certified testing laboratory to determine the moisture content.
 - 3. For each load of base aggregate provide a delivery ticket containing the following information:
 - a. Date.
 - b. Name of quarry.
 - c. Project name and location of delivery.
 - d. Truck number.
 - e. Gross weight of vehicle, tare weight of vehicle, and subtraction to obtain net weight.
 - f. Signature of responsible party representing the CONTRACTOR.

PART 2 - PRODUCTS

2.1 BASE AGGREGATE DENSE AND BREAKER RUN STONE

A. General

1. Provide base aggregates from an ENGINEER-approved source conforming the Section 301 of the Wisconsin Department of Transportation Standard Specifications.
2. Provide breaker run stone in accordance with Section 311 of the Wisconsin Department of Transportation Standard Specifications, latest edition.
3. Recycled material may be used for base course if specified in the Contract Documents or approved by the ENGINEER.
4. Lime sludge obtained from the waste product of the paper manufacturing process is not acceptable.

B. Equipment

1. Provide equipment to furnish and install base aggregates in accordance with Section 301 of the Current version of Wisconsin Department of Transportation (DOT) Standard Specifications for Highway & Structure Construction.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Preparation of Foundation

1. Prepare the foundation as specified in Sections 211 and 301 of the Wisconsin Department of Transportation Standard Specifications, latest edition.

B. Constructing Base

1. Construct base in accordance with Section 301 of the Wisconsin Department of Transportation Standard Specifications, latest edition.
2. Construct the base to the width and section shown on the plans. Shape and compact the base surface to within 0.10 feet of the plan elevation.
3. Proof Rolling:
 - a. To be witnessed by an OWNER Representative and/or the Owner's Engineer.
 - b. A proof roll of the subgrade, witnessed by an OWNER representative and/or the OWNER'S ENGINEER, shall be performed with a loaded quad axle dump truck after the subgrade preparation is completed.

A minimum quad axle dump truck weight of 70,000 lbs with weight ticket verification is required.

- c. Re-compact any areas showing appreciable displacement either laterally or longitudinally.
 - d. After proof roll, remove areas of yielding subgrade as 'EBS performed after placing base'. Payment for EBS performed after placing base will be paid at two (2) times the Contract unit price for common excavation. For backfill and restoration with aggregate base as directed by the ENGINEER, payment will be at the Contract unit price for each material used to fill the excavation.
4. Once the base has been prepared, the CONTRACTOR shall contact the ENGINEER for an elevation check. Copies of the base elevation checks to be sent to the OWNER for approval. Base elevation checks to be performed at 50' stations and include centerline and both edges.

C. Constructing Aggregate Shoulders

- 1. Construct aggregate shoulders in accordance with Section 305 of the Wisconsin Department of Transportation Standard Specifications, latest edition.
- 2. No salvaged aggregate may be used for aggregate shoulders.

D. Dust Abatement

- 1. Minimize the dispersion of dust from all base course by applying water or other approved dust control measures as provided by the contract or required by the ENGINEER and/or OWNER.
- 2. Water used for dust abatement is incidental to the base aggregate bid item(s) unless specified otherwise in the Special Provisions.

3.2 FIELD QUALITY CONTROL

A. Sampling and Testing

- 1. Sample and test aggregate in accordance with Wisconsin Department of Transportation Sampling & Testing Special Provision 301-010 QMP Base Aggregate with the Exception of Department Testing (13.8).

END OF SECTION

BREAKER RUN GRADATION

Sieve Size	Percent Passing (by weight)
5-Inch (125 mm)	90 – 100
1 ½-Inch (37.5 mm)	20 – 50
No. 10 (2.00 mm)	0 – 10

1. Furnish a material that has a minimum of 50 percent, by count, of the number of particles retained on the 1½-inch (37.5 mm) sieve with at least two fractured faces.
2. The department will assess select crushed material acceptability based primarily on the ENGINEER'S visual inspection. The department may also test for gradation or fracture.

BASE AGGREGATE GRADATIONS (WisDOT 305)

Except for reclaimed asphaltic pavement, conform to the following gradation requirements:

Sieve Size	Percent Passing By Weight		
	3-Inch (75 mm)	1 ¼-Inch (31.5 mm)	¾-Inch (19.0 mm)
3-inch (75 mm)	90 – 100	--	--
1 ½-inch (37.5 mm)	60 – 85	--	--
1 ¼-inch (31.5 mm)	--	95 – 100	--
1-inch (25.0 mm)	--	--	100
¾-inch (19.0 mm)	40 – 65	70 – 93	95 – 100
3/8-inch (9.5 mm)	--	42 - 80	50 – 90
No. 4 (4.75 mm)	15 – 40	25 - 63	35 - 70
No. 10	10 – 30	16 – 48	15 -55
No. 40 (425 μm)	5 – 20	8 – 28	10 – 35
No. 200 (75 μm)	2.0 – 12.0	2.0 – 12.0 ⁽¹⁾⁽²⁾	5.0 – 15.0 ⁽³⁾

⁽¹⁾ Limited to a maximum of 8.0 percent for base placed between old and new pavement.

⁽²⁾ 8.0 – 15.0 percent if base is ≥50 percent crushed gravel.

⁽³⁾ 4.0 – 10.0 percent if base is ≥50 percent crushed gravel.

Unless the plans or special provisions specify otherwise, do the following:

1. Use 1 ¼-inch (31.5 mm) base in top 4 or more inches (75 mm) of base. Use 3-inch (75 mm) base or 1 ¼-inch (31.5 mm) base in the lower base layers.
2. Use ¾-inch (19.0 mm) base in the top 3-inches (75 mm) of the unpaved portion of the shoulder. Also, if using 3-inch (75 mm) base in the lower base layers, use ¾-inch (19.0 mm) base in the top 3-inches (75 mm) of the shoulder foreslopes. Use ¾-inch (19.0 mm) base or 1 ¼-inch (31.5 mm) base elsewhere in shoulders.

SECTION 32 12 16.00

ASPHALTIC CONCRETE PAVING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Requirements for all types of central plant mixed asphaltic pavements.

1.2 MEASUREMENT PROCEDURES

- A. Measure by the ton, unless otherwise specified in the contract documents.
- B. Weigh at certified weight scales.

1.3 PAYMENT PROCEDURES

- A. Asphaltic concrete mixtures and asphaltic materials for prime and tack coats
- B. Pay by the ton, unless otherwise specified in the contract documents.
- C. Pay for prime and tack coats within the unit price for hot mix asphalt pavement unless otherwise specified in the contract.
- D. Price includes preparation of foundation, adjusting manholes, inlets, valves and other fixtures, quality management program testing, and submittals, unless otherwise specified in the contract documents.
- E. Pay one-half the unit price per ton for excess material beyond the allowable yield.

1.4 REFERENCES

- A. Part IV of the Wisconsin Department of Transportation (DOT) Standard Specifications for Highway & Structure Construction, latest edition, and as amended by the Wisconsin Department of Transportation Supplemental Specifications, latest edition.

1.5 DEFINITIONS

- A. Asphalt pavements
 - 1. One or more courses of an asphaltic mixture consisting of asphaltic-coated mineral aggregates constructed on a prepared foundation.

1.6 SUBMITTALS

- A. Submit test results from the CONTRACTOR's Quality Control Program including:
 - 1. Aggregates.

2. Asphaltic Materials.
 3. Asphalt Mix Design.
- B. Submit results of density tests taken in accordance with these contract specifications prior to final acceptance and payment.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Aggregates, asphaltic materials, and composition of mixtures.
1. Meet requirements of Part IV of the Wisconsin Department Of Transportation (DOT) Standard Specifications for Highway & Structure Construction, latest edition, and as amended by the Wisconsin Department of Transportation Supplemental Specifications, latest edition.
- B. Asphaltic concrete pavement materials.
1. Mix Type E-0.3, E-1 or E-3, as specified on the Bid Form. The CONTRACTOR shall provide a current mix design that will be used on the project. Asphalt concrete pavement for patching and leveling may be Type MV.
 2. Asphalt concrete pavement for patching and leveling
 - a. Type MV

2.2 QUALITY CONTROL

- A. Provide and maintain a Quality Management Program in accordance with Section 460.2.8 of the Wisconsin Department Of Transportation (DOT) Standard Specifications for Highway & Structure Construction, latest edition, except Department Testing will not be provided.

PART 3 - EXECUTION

3.1 PREPARATION OF FOUNDATION

- A. Crushed Aggregate Base Course
1. Scarify, shape, trim, and compact the surface of base aggregate where necessary to provide the required cross-sectional contour, a profile free from abrupt changes in elevations and a surface free from pits, hollows, depressions or projections above the normal surface.
 2. Shape and trim using long wheel base motor graders or sub-grade finishers designed for the purpose.

3. Proof roll existing base aggregate using a loaded quad axle truck. Remove and reconstruct areas showing appreciable displacement either laterally or longitudinally.

B. Asphaltic Treated Surfaces & Pavements

1. Prepare sections of existing asphaltic surfaces that are to remain in place by removing all localized areas that exhibit a tendency to ravel, shove, bleed or are otherwise unsuitable to serve as a base for the proposed asphaltic resurfacing.
2. Clean all loose material from holes or pits in the existing asphaltic surface and fill with asphaltic surfacing mixture furnished under the appropriate item of the contract.

C. Concrete Pavements

1. Remove surplus crack and joint sealing material from the surface of the pavement.
2. Remove protruding joint materials, including fillers and sealers, from joints and cracks to at least the surface of the existing concrete.
3. Completely remove unstable patches of asphaltic materials used to fill localized pits, depressions or badly spalled or disintegrated areas of the old pavement to the underlying concrete. Remove loose concrete or concrete with incipient spalling within or contiguous to such areas.

D. Asphaltic Surface to be Pulverized

1. Pulverized material shall conform to the following gradation requirements: 100% of the bituminous-base mixture shall pass a 3-inch square screen, and 97% shall pass a 2-inch square screen. Material larger than 3-inches shall be removed. Should these requirements not be met after one pass of the pulverizing equipment, additional passes, as necessary, shall be made at no additional cost. The pulverizing shall be for the full width of the pavement and shall be a minimum depth of 8-inches. The roadway surface material and the base material shall be pulverized and mixed in the pulverization process and left in place.
2. After pulverizing is completed, compact with "sheep's foot roller and fine grade this base. Compact and grade the same day pulverizing occurs. Application of water, if necessary, to result in a dense, compacted street base, is incidental to the Contract. The aggregate base shall be graded to the width of the proposed asphalt pavement plus aggregate shoulder width. Aggregate shoulder widths are to be 2 feet in width unless specified otherwise in the Contract. Aggregate shouldering to be completed by the OWNER.
3. Haul excess material from the pulverizing operation to the location indicated in the Special Provisions. The cost for removal of the excess base course is incidental to the Contract.

4. The lower layer asphalt pavement is to be placed within seven (7) days of the final grading of the base course. The upper layer pavement is to be placed within seven (7) days of the lower layer asphalt pavement.

3.2 TACK COAT

A. Application

1. Apply asphaltic material only during daylight hours and when the air temperature is 36°F or more, and when the surface of the previously prepared base or existing surface is dry and reasonably free of loose dirt, dust or other foreign matter. Do not apply when the weather or road bed conditions are unfavorable or prior to impending rains when it appears probable that the material may be exposed to rains during the penetration period.
2. Apply a tack coat of asphaltic material of the class, type and grade selected, applied at the rate specified by the ENGINEER.
3. Apply tack coat to approximately that area of the surface that can reasonably be expected to be paved during the same day.

3.3 TRANSPORTATION & DELIVERY OF MIXTURES

A. General

1. Deliver the asphaltic mixture to the receiving hopper of the paver at temperatures not lower than 250°F and the recommended plant mix temperature range given in the mixture design.
2. Cover all loads during inclement weather, when the ambient air temperature falls below 65°F, or when the length of haul would cause a loss of mixture temperature greater than 20°F from the designated delivery temperature.
3. Deliver and place mixture during daylight hours, unless artificial light satisfactory to the ENGINEER is provided.

B. Delivery Tickets

1. Furnish delivery tickets with each load of asphalt pavement or prime and tack coats containing the following information:
 - a. Date and time dispatched.
 - b. Name of asphaltic concrete plant.
 - c. Project name and location of delivery.
 - d. Truck number.
 - e. Type of material (i.e. binder, surface, asphaltic material for prime or tack coat).

- f. Tickets for asphaltic material (prime or tack coat) shall contain asphalt grade designation.
- g. Gross weight of the vehicle, tare weight of the vehicle and subtraction to obtain the net weight.
- h. Signature of responsible party representing the CONTRACTOR.
- i. If only a partial load of asphaltic material is used on the project, weigh the truck weighed again with the remaining material to determine the actual weight of the material used. Show this information on the original ticket for that load.

3.4 SPREADING & FINISHING

A. General

- 1. Place asphaltic mixture only on a prepared, firm and compacted base, foundation course or existing pavement, which is substantially surface dry and free of loose and foreign material.
- 2. Reject asphaltic mixture, which, in the judgment of the ENGINEER, is not sufficiently mixed or is defective in any manner.
- 3. Do not place asphaltic mixture over frozen sub-grade or base or where the roadbed underlying the foundation or base is temporarily unstable from the effects of frost heaving.
- 4. Do not place asphaltic mixture when it is raining or snowing. Remove and replace any mixture exposed to rain or snow before final rolling, which has, in the judgment of the ENGINEER, been adversely affected. This will be at the CONTRACTOR's expense.
- 5. Do not place asphaltic mixture when the air temperature approximately 3-feet above ground at the site of the work, in the shade and away from the effects of artificial heat, is less than 35°F, except that binder and base course mixtures may be placed at a lesser temperature when satisfactory to the ENGINEER.

B. Compaction

- 1. Lower Course: Compact binder course to a density of not less than 89.5%¹ for E-0.3, E-1 and E-3 mixes of the laboratory density when the binder is constructed on crushed aggregate base course.
- 2. Upper Layer: Compact surface course to a density of not less than 91.5% for E-0.3, E-1 and E-3 mixes, of the laboratory density.

¹ Revised: 10/2005

3. Roll the entire surface until achieving the specified compaction and, to the extent practicable, eliminating all roller marks. If turning or reversing the roller, or other operations, causes any scuffing or displacement, immediately correct the damage and revise the rolling procedures to prevent further damage.
4. Remove and replace areas with excess material. Compact replaced mixture immediately to conform with the adjacent pavement.

C. Density Testing

1. Approved Methods

a. Sawed or Cored Samples

- 1) Cut samples from the completed work with power equipment, and restore the surface with new, well compacted mixture.
- 2) Remove samples of at least 28 square inches for each determination. This area may be obtained by removing one square cut sample or one or more round cores.
- 3) Perform laboratory tests on these samples in accordance with AASHTO T-166 (ASTM D-2726).
- 4) Test 3 random samples from each 750 tons of mixture placed within a single layer for each location with a target maximum density category indicated in table 460-3 of the Wisconsin Department Of Transportation (DOT) Standard Specifications for Highway & Structure Construction, latest edition.

b. Nuclear Density Testing

- 1) Test 5 random locations for each 750 tons of mixture placed within a single layer. Meet target maximum density category indicated in table 460-3 of the Wisconsin Department Of Transportation (DOT) Standard Specifications for Highway & Structure Construction, latest edition.

2. Perform testing using the CONTRACTOR's quality control, certified testing laboratory.

a. Identify sample locations on the laboratory results.

D. Joints

1. Offset longitudinal joints from the preceding layer by 6-inches with the joint in the top layer at the centerline or lane line location.
2. When placing an asphaltic mat next to an older, high-type asphaltic mat, saw the old mat back on a straight line to provide a butt-joint for the full depth of the new mat.

3. Clean longitudinal and transverse joints that have become coated with dust. If necessary, paint with hot asphalt cement, cutback or emulsified asphalt to ensure a tightly bonded and sealed joint.

E. Adjusting Manholes, Catch Basins, Inlets & Valves

1. Adjust manholes, catch basins, inlets, valves and other fixtures to the required alignment and grade. This work includes the repair of the uppermost 12-inches of the existing concrete masonry manhole, catch basin, or inlet structure.
2. Elevation checks to be performed for manhole castings, water valve boxes and other fixtures located within the pavement area prior to paving operations.
3. Manhole castings, water valve boxes and other fixtures located within the pavement area to be adjusted to ½ to 1-inch below finished upper layer pavement surface.

F. Surface Requirements

1. Test the pavement surface at selected locations using a 10-foot straight edge or other specified device. Variations greater than 1/8-inch from the testing edge of the straight edge between any two (2) contacts with the same surface are not allowed on surface course. Variations greater than 1/4-inch from the testing edge of the straight edge between any two (2) contacts with the surface are not allowed on binder courses, shoulder surfacing and surfacing on temporary connections and by-passes.

G. Yield

1. Place and compact the asphaltic concrete mixtures such that the average yield does not exceed the yield as determined by using the laboratory mix design (ASTM D-1559-76 or AASHTO T245-90).
2. Compute the average yield on a daily basis. Apply any required corrections to placement operations by the following day's work.

END OF SECTION

SECTION 32 13 13.00
CONCRETE PAVEMENTS

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Material requirements, reinforcement, joints, placement procedures, and testing procedures.

1.2 RELATED SECTIONS

- A. Division 32, Section 32 11 23.00 – Base Aggregates

1.3 MEASUREMENT PROCEDURES

A. Concrete Pavements

1. Concrete pavement is measured by the square yard, unless otherwise specified in the Contract Documents.
2. Fillets for widened sections will be measured as pavement.
3. A measured deduction for fixtures in the pavement will be made if the following exist:
 - a. The surface area of the fixture is greater than 9 square feet.

- B. Reinforcement and dowel basket assemblies will be measured according to the Contract Documents, if a separate Bid Item exists for reinforcement or dowel baskets.

1.4 PAYMENT PROCEDURES

A. Concrete Pavement

1. Measure concrete pavement by the square yard, unless specified otherwise in the Contract Documents.
2. Price includes:
 - a. Furnishing, installing, curing and protecting all materials incorporated into the work.
 - b. Saw cutting, jointing, sealing joints, reinforcement, preparation of the foundation, adjusting fixtures, testing, and required submittals.
3. Pay for reinforcement according to the following:
 - a. If a Bid item exists, pay reinforcement according to the Specifications.

- b. If no Bid Item exists, reinforcement is considered part of the concrete pavement. No extra compensation will be given for it.

1.5 REFERENCES

- A. Section 415 of the Current Edition of the Wisconsin Department of Transportation Standard Specifications for Highway and Structure Construction.
- B. Section 501 of the Current Edition of the Wisconsin Department of Transportation Standard Specifications for Highway and Structure Construction.
- C. Section 505 of the Current Edition of the Wisconsin Department of Transportation Standard Specifications for Highway and Structure Construction.
- D. AASHTO T22 – Compressive Strength of Concrete Cylinders
- E. AASHTO T23 – Method of Making and Curing Concrete Specimens in the Field
- F. AASHTO T24 – Compressive Strength of Concrete Cores

1.6 SUBMITTALS

- A. Manufacturer's Certifications
 - 1. Submit the following a minimum of 10 days prior to incorporation into the work for review by the ENGINEER.
 - a. Certified test analysis for all elements of the specifications both physical and chemical.
 - b. Certificate of compliance, signed by a responsible company officer, stating all material furnished meets contract specifications.
- B. Materials
 - 1. Submit the following certifications a minimum of 10 days prior to incorporating a material into the work for review by the ENGINEER.
 - a. Portland Cement – Section 501
 - b. Reinforcement – Section 505
 - 1) All reinforcement including dowel bars, tie bars, metal chairs, tie wire, and other appurtenances shall be epoxy coated.
 - c. Expansion Joint Filler – Section 415.2.3
 - d. Joint Sealer – Section 502.2.9
 - e. Pre-Formed Elastomeric Compression Joint Sealers – Section 502.2.8

- f. Concrete Curing Compounds – Section 415.2.4
 - 1) Including liquid curing compound, polyethylene sheeting and burlap.

C. Mix Design

- 1. Submit a mix design a minimum of ten (10) days prior to incorporation into the work for review by the ENGINEER.
- 2. For each cement used on the project indicate the brand and source.
- 3. Include the following in the mix design in accordance with Section 501.3.2 of the Wisconsin Department of Transportation Specifications:
 - a. Any necessary adjustments for the specific gravity of the aggregates used.
 - b. Any necessary adjustments to master limits of the job mix required by the contract specifications.

D. Concrete Test Results

- 1. Submit all test results, from an OWNER approved certified testing laboratory, within 48 hours of test completion.
- 2. The test results should include at a minimum the following:
 - a. Compressive Strength of Concrete Cylinders or Compressive Strength of Concrete Cores
 - b. Slump
 - c. Air Entrainment
- 3. Send a copy of the test results to the concrete supplier, OWNER and ENGINEER.

PART 2 – PRODUCTS

2.1 CONCRETE MATERIALS

A. General

- 1. Concrete must consist of Portland cement, fine aggregate, coarse aggregate, and water proportioned and mixed according to the following:
 - a. Portland Cement
 - 1) Conform to Section 501.2.1 of the Wisconsin Department of Transportation Specifications.

- b. Air Entraining Admixtures
 - 1) Conform to Section 501.2.2 of the Wisconsin Department of Transportation Specifications.
- c. Retarding and Water Reducing Admixtures
 - 1) Conform to Section 501.2.3 of the Wisconsin Department of Transportation Specifications.
 - 2) Type A and D admixtures shall not be added to the same batch of concrete.
- d. Water
 - 1) Conform to Section 501.2.4 of the Wisconsin Department of Transportation Specifications.
- e. Aggregates
 - 1) Conform to Section 501.2.5 of the Wisconsin Department of Transportation Specifications.
- f. Composition of Concrete
 - 1) Conform to master limits of A, A-FA, A-T or A-S as specified in Section 501.3.2 of the Wisconsin Department of Transportation Specifications.
- g. High Early Strength Concrete
 - 1) If high early strength concrete is required by the specifications or chosen by the CONTRACTOR at their own expense it may be made with the following:
 - a) High early strength cement (Type III).
 - b) An additional amount of the same cement used in the original mix conforming to the Grade C or Grade E master limits.
 - 2) Conform to Section 501.3.2 of the Wisconsin Department of Transportation Specifications.

B. Equipment

1. Conform to Section 415.3 of the Wisconsin Department of Transportation Specifications for all equipment used to furnish and install materials in accordance with these contract specifications.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Preparation of Foundation

1. Includes, but is not limited to the following:
 - a. Restore the base to pavement ready condition.
 - b. Repair unstable areas in the base course.
 - c. Place new base course according to Section 32 11 23.00 –Base Aggregate.
2. Areas of the foundation that cannot be prepared by machine methods may be prepared by hand or other methods approved by the ENGINEER.
3. The foundation should be moist not saturated at the time of placing concrete.
4. If required by the ENGINEER, moisten the foundation with water no less than 6 hours prior to placing the concrete.
5. Prepare the foundation to be 1 foot wider on each side of the planned new pavement width (2 feet wider for integral pavement), or as shown on the plans.
6. Shape and trim the foundation to the plan required line, grade, and cross section.
7. Perform compaction with suitable equipment and follow the compaction procedures outlined in Section 32 11 23.00 – Base Aggregate. Perform proof roll of base with load quad axle truck. Remove and reconstruct all soft areas.
8. Prepare no less than 300 feet of foundation in advance of concrete placement operations unless approved by the ENGINEER.
9. Irregularities in the foundation caused by trucks or equipment must be repaired and compacted ahead of concrete paving operations.

3.2 SAW CUTTING

- A. Saw cutting is required on all pavements to be removed, as shown on the plans, or specified by the ENGINEER.

- B. Perform saw cutting according to the following:
 - 1. Place full depth saw cuts as indicated on the plans.
 - 2. Perform saw cutting so that the surface to remain is vertical for its full depth.

3.3 ADJUSTING MANHOLES, INLETS, AND VALVES

- A. Adjust all manholes, inlets, valves, and other fixtures to the plan grade and alignment.
- B. Manhole and inlet adjustment includes the repair of the uppermost 12-inches of the existing masonry structure.

3.4 PLACING CONCRETE

- A. Place concrete pavement in accordance with Section 415.3 of the Wisconsin Department of Transportation Specifications.

3.5 REINFORCEMENT

- A. When required by the contract, place concrete reinforcement in accordance with Section 415.3.5 of the Wisconsin Department of Transportation Specifications.
- B. All reinforcement to be incorporated into the work shall meet the requirements of Section 505 of the Wisconsin Department of Transportation Specifications.

3.6 LONGITUDINAL JOINTS

- A. Construct longitudinal joints in accordance with Section 415.3.7.2 of the Wisconsin Department of Transportation Specifications.

3.7 TRANSVERSE JOINTS

- A. Construct transverse joints in accordance with Section 415.3.7.3 of the Wisconsin Department of Transportation Specifications.

3.8 CONSOLIDATION & FINISHING

- A. Finish the pavement surface in accordance with Section 415.3.8 of the Wisconsin Department of Transportation Specifications.

3.9 CURING OF CONCRETE

- A. Cure concrete in accordance with Section 415.3.12 of the Wisconsin Department of Transportation Specifications, except when curing in cold weather.

3.10 COLD WEATHER CONCRETING

- A. Suspend concreting operations if the descending air temperature in the shade and away from artificial heat falls below 35°F. Do not resume concreting operations until the

ascending air temperature in the shade and away from artificial heat reaches 30°F. Maintain the concrete temperature at the point of placement at or above 50°F.

3.11 SEALING JOINTS

- A. Joint sealant material conforms to the requirements of the Specifications for Joint Sealant, Hot-Poured, for Concrete and Asphalt Pavement, ASTM Designation: D 3405.
- B. Seal all construction, longitudinal and transverse concrete pavement and concrete curb and gutter joints, including the joint between the pavement and the curb and gutter, and the transverse joints on curb and gutter to the face of the curb. Tool the sealant flush with or recessed up to a maximum of 1/16-inch \pm 1/64-inch below the concrete surface. Overbonding will not be allowed. Remove material remaining on the surface of the pavement without damaging the sealant in the joint.

3.12 FIELD QUALITY CONTROL

A. Air Entrainment

- 1. Perform in accordance with Section 501.3.2.4.2 of the Wisconsin Department of Transportation Specifications.
- 2. Perform daily air tests according to the following:
 - a. Perform a minimum of two tests per day, per mix design.
 - b. Results of the air test must be signed daily by the CONTRACTOR or his representative.
 - c. Submit daily air test results to the OWNER or his representative.

B. Concrete Consistency / Slump

- 1. Perform consistency/slump test on formed (not slip-formed) concrete pavement. Slump must be 4-inches or less.
- 2. Perform daily consistency / slump tests according to the following:
 - a. Perform a minimum of two tests per day, per mix design.
 - b. Sign the results of the slump tests.
 - c. Submit daily slump test results to the OWNER or his representative.

C. Compressive Strength Testing

- 1. Test Procedure
 - a. Follow Sections 415.3.15.2 and 501.3.10 of the Wisconsin Department of Transportation Specifications to determine the compressive strength of the concrete.

- b. Make and test concrete cylinders according to AASHTO T22 and T23.
- c. Perform testing of concrete cylinders by an OWNER approved, independent, certified testing laboratory.

2. Testing Frequency

- a. At a minimum, perform testing according to the following:
 - 1) Once per day.
 - 2) One test for each 150 cubic yards.
- b. Make a minimum of three cylinders for each test.
- c. For each test, record the station and location where the cylinders were made.

3. Compressive Strength Requirements

- a. Test cylinders at 7 days and 28 days.
- b. Prior to opening any new pavement to traffic, two cylinder tests must show a minimum of 3000 psi.
- c. In addition to the above, follow Section 415.3.15.1 of the Wisconsin Department of Transportation Specifications to determine when to open the new pavement to traffic.
- d. Obtain the ENGINEER'S approval prior to opening any new pavement to traffic.
- e. If strength attained by the concrete is in question, follow Section 415.3.15.2 of the Wisconsin Department of Transportation Specifications.

END OF SECTION

SECTION 32 13 73.00

ASPHALTIC CONCRETE CRACK SEAL

PART 1 - GENERAL

1.1 SUMMARY

- A. Routing and sealing of longitudinal and transverse cracks and joints in an asphaltic concrete roadway surface.
- B. Routing (if necessary) and sealing of longitudinal joint between the edge of asphalt and concrete gutter flange on urban street sections.

1.2 MEASUREMENT PROCEDURES

- A. CONTRACTOR measures pounds of sealant used on each street. Use manufacturer's weights and conversion from gallons to pounds based on specific gravity provided by Supplier.

1.3 PAYMENT PROCEDURES

- A. Pay for Asphaltic Concrete Crack Seal at the Contract unit price per pound, which includes routing, cleaning, furnishing, heating, placing and blotting the sealant and traffic control.

1.4 REFERENCES

- A. ASTM D-6690 Standard Specification - Joint & Crack Sealants, Hot Applied, For Concrete & Asphalt Pavements.

1.5 SUBMITTALS

- A. Submit Certificate of Compliance to ENGINEER / ARCHITECT prior to application of materials.
- B. Submit quantities with street location to the ENGINEER at the end of each workday.

1.6 WARRANTY

- A. Provide 3-year warranty on product and installation.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Conform to ASTM Designation D-6690 - Joint & Crack Sealants, Hot Applied, For Concrete & Asphalt Pavements.
- B. Blocking Medium: Inert, compressible material, which is compatible with the sealant.

PART 3 - EXECUTION

3.1 CONSTRUCTION

A. Routing

1. Use mechanical, power driven routing equipment capable of cutting a reservoir to the required dimensions.
2. Rout cracks and joints 1/8-inch to 3/4-inch wide to a width and depth of 3/4-inch. Clean cracks and joints 3/4-inch wide and greater to a depth equal to the width of the crack or joint.
3. Rout reservoir with vertical walls and flat bottom.
4. Do not rout when roadway is wet.

B. Cleaning

1. Clean with air compressor producing a minimum of 125 cfm output and equipped with a maximum 3/4-inch nozzle.
2. Dry all cracks with a heat lance torch.
3. Thoroughly clean cracks and joints of dust, dirt and loose materials.
4. Apply an approved herbicide on any vegetation.
5. Re-clean any cracks or joints left open overnight.
6. Remove routed asphalt and foreign material from roadway by vacuum sweeping prior to opening to traffic.

C. Sealing

1. Fill cracks 3/8-inch or more wide below the routed and/or cleaned reservoir with a blocking medium to a depth equal to the width of the reservoir.
2. Place sealant within 72-hours of routing.
3. Seal in dry conditions only.
4. Adhere to sealant manufacturer's recommended handling, mixing and application temperature restrictions.
5. Apply sealant with a pressure type applicator.

6. Overfill reservoir and squeegee to provide a film of sealant 1 to 3-inches wide on both sides of reservoir. Use a “U” shaped squeegee. Remove any excess sealant.
7. Place blotting material over the sealant immediately after placement at intersections, super-elevated curves, grades steeper than 4%, or when traffic will be allowed prior to track-free status.
8. Repair or refill any part of a sealed reservoir damaged by traffic.

D. Seasonal & Temperature Limitations

1. Rout and seal during daylight hours.
2. Seal when ambient air temperature is 45°F or greater.
3. Seal when pavement temperature is 45°F or greater.
4. Complete crack sealing by October 15.

E. Traffic Control & Work Zones

1. Work on one-half of the roadway at a time.
2. Routing and crack sealing is one (1) work zone. Do not exceed 1-mile length of any work zone at any time.
3. Furnish and maintain barricades and flashers, as specified in the “Manual On Uniform Traffic Control Devices”, latest edition, as a minimum requirement.

F. Schedules

1. Crack seal roads in the order of the listing in the Special Provisions. Written permission is required to deviate from this order.
2. Inform OWNER at least 24-hours in advance of crack sealing work.
3. OWNER reserves right to adjust number of streets to coincide with budget.

END OF SECTION

SECTION 32 15 00.00

CHIP SEAL

PART 1 - GENERAL

1.1 SUMMARY

- A. Surface preparation and placement of single-layer aggregate chip seal on an asphaltic concrete roadway surface.

1.2 UNIT PRICES

- A. Pay for Chip Seal at the Contract Unit Price per square yard.

1.3 MEASUREMENT PROCEDURES

- A. Measure chip seal placed on street.

1.4 PAYMENT PROCEDURES

- A. Pay for Chip Seal at the Contract Unit Price per square yard, which includes cleaning, furnishing, heating, placing, rolling, sweeping and traffic control.

1.5 REFERENCES

- A. State of Wisconsin Department of Transportation (WisDOT) - Standard Specifications For Highway & Structure Construction, latest edition.
- B. U.S. Department of Transportation - Federal Highway Administration Manual on Uniform Traffic Control Devices, latest edition.
- C. AASHTO M-140 Anionic Emulsified Asphalt.
- D. AASHTO M-208 Cationic Emulsified Asphalt.
- E. AASHTO M-316 Polymer-Modified Cationic Emulsified Asphalt.

1.6 SUBMITTALS

- A. Submit Certificate Of Compliance to ENGINEER / ARCHITECT prior to application of materials.
- B. Submit Construction Schedule showing work sequence, estimated number of working days, number of crews anticipated, and two (2) telephone numbers where CONTRACTOR can be reached at all times.
- C. Submit list of subcontractors.
- D. Submit quantities with street location to the ENGINEER at the end of each workday.

1.7 PROJECT SITE CONDITIONS

- A. Temperature must be 60°F or above.

1.8 SCHEDULING

- A. Notify property owners or occupants in writing 3 to 5-days prior to construction. Copy OWNER with this notification.
- B. Notify police, fire and utility departments a minimum of three (3) working days prior to construction.
- C. Complete roadways in order listed within the Contract Documents, unless otherwise directed by the OWNER.

1.9 WARRANTY

- A. Provide a 3-year warranty on product and installation.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Bituminous Materials.
 - 1. Binder Bitumen.
 - a. Anionic HFRS-2 conforming to AASHTO M-140.
 - b. Cationic CRS-2 conforming to AASHTO M-208.
 - c. Polymer Modified Cationic CRS-2P conforming to AASHTO M-316.
 - 2. Conform to requirements of Section 455 of the State of Wisconsin, Department of Transportation (WisDOT) - Standard Specifications For Highway & Structure Construction, latest edition.
- B. Aggregates:
 - 1. Stone or Gravel
 - a. A minimum of 60%, by count, of aggregate retained on the No. 4 sieve shall have one or more fractured face.
 - b. Less than 5% by count thin or elongated pieces based on a 5:1 ratio.
 - c. Percentage of wear (AASHTO T96 Abrasion Test) less than 40.

- d. Test aggregate for compatibility with emulsified asphalt being used.
- e. Conform to the following gradation:

Sieve Size	Percentage Passing By Weight
½ Inch	100
3/8 Inch	95 – 100
No. 4	0 – 60
No. 16	0 - 5

2. Black Boiler Slag

- a. Hard, durable particles of black boiler slag.
- b. Cover aggregate shall be an industrial by-product (coal ash, foundry process waste or other non-hazardous solid waste) may be used to produce seal coat aggregate provided it meets the characterization requirements for Category 1 or 2 industrial by-product as set forth in NR538.08, Wisconsin Administrative Code.
- c. ENGINEER / OWNER to be furnished with a Certificate of Compliance that certifies to which category the industrial by-product conforms.
- d. Aggregate retained on the No. 4 (4.75 mm) sieve shall have 10%, by weight, or less thin or elongated pieces based on a 5:1 ratio.
- e. The percent wear, measured according to AASHTO T96, shall not exceed 50 after 500 revolutions.
- f. At least 95%, by count, of the aggregate retained on the No. 4 (4.75 mm) sieve shall have one or more fractured face.
- g. The sodium sulfate soundness, measured according to AASHTO T104, shall not exceed 15% loss.
- h. Conform to the following gradation requirements:

Sieve Size	Percentage Passing By Weight
3/8 Inch (9.5 mm)	100
No. 4 (4.75 mm)	90 – 100
No. 8 (2.26 mm)	45 – 75
No. 40 (425 um)	0 – 8
No. 200 (75 um)	0 – 2

2.2 EQUIPMENT

A. Aggregate Spreaders:

1. Pull-type or self-propelled mounted on pneumatic tires.
2. Width of spread not less than 12-feet.
3. Capable of spreading aggregate at rate of 10 to 30 pounds per square yard without contact of the wheels of the spreader with the treated surface until the aggregate has been spread.

B. Bitumen Distributors:

1. Mounted on pneumatic tired truck.
2. Provide with burners with heating coils and thermometer indicating tank bitumen temperature.
3. Vertically adjustable spray bars of not less than 12-feet spray width.
4. Capable of spray rates from 0.03 to 0.5 gallons per square yard at a speed of up to 20-miles per hour.
5. Operate according to manufacturer's instructions for use of spray bar height above surface, nozzle size and angle of spray fan, and tables or rates of distribution in gallons per square yard for tachometer readings.

C. Brooms:

1. Power-driven rotary driven by auxiliary motor or power take-off.

D. Rollers:

1. Self-propelled pneumatic tired roller with 7.50 x 15 size tires or larger.
2. Produce compressive force of 200 pounds per inch width of roller or greater.
3. Tire inflation 60 psi or greater.
4. Steel roller may be used for finishing work only if directed by ENGINEER.

PART 3 - EXECUTION

3.1 PREPARATION

A. Surface Preparation:

1. Clean entire roadway surface using combination of power brooms and hand brooms, if necessary.
2. Remove all foreign material including dust from depressions.
3. Haul all foreign material away from site.
4. Apply cold patch asphalt to depressed areas less than 50 square feet as directed by ENGINEER.

3.2 APPLICATION

A. Heating Bituminous Materials:

1. Heat to following temperature ranges:

Designation	Temperature
HFRS-2, CRS-2, CRS-2P	125°F - 185°F

B. Spreading Binder Bitumen:

1. Apply at a rate of 0.38 gallon per square yard unless directed otherwise by OWNER or ENGINEER.
2. Apply with a minimum longitudinal lap between adjacent applications.
3. Apply in lengths that can be completely covered with aggregate within 5-minutes and can be completely rolled within 30-minutes.

C. Spreading Cover Aggregates:

1. Spread at rate of 25 pounds per square yard, unless directed otherwise by OWNER or ENGINEER.
2. When treatment is for 2-lanes, place 1-lane at a time.

D. Rolling:

1. Roll within 30-minutes of spreading bitumen.
2. Roll from outer edges toward center with one-half the roller width overlap.
3. Roll at speeds not greater than 5 mph.
4. Roll a minimum of 10-passes.

E. Finishing & Opening To Traffic:

1. Open to traffic after cover coat has been spread, smooth and rolled.
2. Remove remaining aggregate by vacuum machinery after asphalt has set, but in no circumstances, more than 1-week after placement.

F. Traffic Control:

1. Close streets to through traffic during sealing operation.
2. Minimize length of time any street is closed to traffic.
3. Provide adequate warning signs and barricades. Minimum standard is the Manual on Uniform Traffic Control Devices.
4. Route trucks and equipment in a direction opposite the progress of the chip seal operation. Trucks and equipment must not disturb freshly placed surface.

END OF SECTION

SECTION 32 16 13.00

CONCRETE CURB & GUTTER

PART 1 – GENERAL

1.1. SECTION INCLUDES

- A. Material requirements, reinforcement, joints, placement procedures, and testing procedures.

1.2. RELATED SECTIONS

- A. Section 32 11 23.00 – Base Aggregates

1.3. MEASUREMENT PROCEDURES

- A. Concrete Curb & Gutter

1. Curb or curb and gutter is measured by the linear foot unless specified otherwise in the Contract Documents.
2. Curb or curb and gutter is measured along either of the following:
 - a. Flow line of gutter.
 - b. Face of curb.

1.4. PAYMENT PROCEDURES

- A. Concrete Curb & Gutter

1. Pay by the linear foot unless specified otherwise in the Contract Documents.
2. Price includes all work associated with the installation, curing, and testing of curb or curb and gutter.
3. Pay for materials or processes involved in the installation, curing, or testing, of either type of curbing as a separate Bid Item only if provided in the Contract.

1.5. REFERENCES

- A. Section 415 of the Current Edition of the Wisconsin Department of Transportation Standard Specifications for Highway and Structure Construction for products and execution only.
- B. Section 501 of the Current Edition of the Wisconsin Department of Transportation Standard Specifications for Highway and Structure Construction for products and execution only.

- C. Section 505 of the Current Edition of the Wisconsin Department of Transportation Standard Specifications for Highway and Structure Construction for products and execution only.
- D. AASHTO T22 – Compressive Strength of Concrete Cylinders
- E. AASHTO T23 – Method of Making and Curing Concrete Specimens in the Field
- F. AASHTO T24 – Compressive Strength of Concrete Cores
- G. Section 601 of the Current Edition of the Wisconsin Department of Transportation Standard Specifications for Highway and Structure Construction for products and execution only.

1.6. SUBMITTALS

- A. Manufacturer's Certifications
 - 1. Submit the following a minimum of 10 days prior to incorporation into the work for review by the ENGINEER.
 - a. Certified test analysis for all elements of the specifications both physical and chemical.
 - b. Certificate of compliance, by responsible company officer, stating all material furnished meets Contract Specifications.
- B. Materials
 - 1. Submit the following certifications a minimum of 10 days prior to incorporating a material into the work for review by the ENGINEER.
 - a. Portland Cement
 - b. Reinforcement
 - 1) All reinforcement including dowel bars, tie bars, metal chairs, tie wire, and other appurtenances shall be epoxy coated.
 - c. Expansion Joint Filler
 - d. Joint Sealer
 - e. Pre-Formed Elastomeric Compression Joint Sealers
 - f. Concrete Curing Compounds
 - 1) Including liquid curing compound, polyethylene sheeting and burlap.

C. Mix Design

1. Submit a mix design a minimum of ten (10) days prior to incorporation into the work for review by the ENGINEER.
2. For each cement used on the project indicate the brand and source.
3. Include the following in the mix design in accordance with Section 501.3.2 of the Wisconsin Department of Transportation Specifications:
 - a. Any necessary adjustments for the specific gravity of the aggregates used.
 - b. Any necessary adjustments to master limits of the job mix required by the Contract Specifications.

D. Concrete Test Results

1. Submit all test results, from an OWNER approved certified testing laboratory, within 48 hours of test completion.
2. The test results should include at a minimum the following:
 - a. Compressive Strength of Concrete Cylinders or Compressive Strength of Concrete Cores
 - b. Slump
 - c. Air Entrainment
3. Send a copy of the test results to the concrete supplier, OWNER and ENGINEER.

PART 2 – PRODUCTS

2.1. CONCRETE MATERIALS

A. General

1. Concrete must consist of Portland cement, fine aggregate, coarse aggregate, and water proportioned and mixed according to the following:
 - a. Portland Cement
 - 1) Conform to Section 501.2.1 of the Wisconsin Department of Transportation Specifications.

- b. Air Entraining Admixtures
 - 1) Conform to Section 501.2.2 of the Wisconsin Department of Transportation Specifications.
- c. Retarding and Water Reducing Admixtures
 - 1) Conform to Section 501.2.3 of the Wisconsin Department of Transportation Specifications.
 - 2) Do not add Type A and D admixtures to the same batch of concrete.
- d. Water
 - 1) Conform to Section 501.2.4 of the Wisconsin Department of Transportation Specifications.
- e. Aggregates
 - 1) Conform to Section 501.2.5 of the Wisconsin Department of Transportation Specifications.
- f. Composition of Concrete
 - 1) Conform to master limits of A, A-FA, A-T or A-S as specified in Section 501.3.2 of the Wisconsin Department of Transportation Specifications.
- g. High Early Strength Concrete
 - 1) If high early strength concrete is required by the specifications or chosen by the CONTRACTOR at their own expense it may be made with the following:
 - a) High early strength cement (Type III).
 - b) An additional amount of the same cement used in the original mix conforming to the Grade C or Grade E master limits.
 - 2) Conform to Section 501.3.2 of the Wisconsin Department of Transportation Specifications.

B. Equipment

- 1. Conform to Section 415.3 of the Wisconsin Department of Transportation Specifications for all equipment used to furnish and install materials in accordance with these contract specifications.

PART 3 – EXECUTION

3.1. INSTALLATION

A. Preparation of Foundation

1. Includes, but is not limited to the following:
 - a. Restore the base to pavement ready condition.
 - b. Repair unstable areas in the base course.
 - c. Place new base course according to Section 32 11 23.00 – Base Aggregate.
2. Prepare areas of the foundation that cannot be prepared by machine methods by hand or other methods approved by the ENGINEER.
3. Moisten but do not saturate the foundation at the time of placing concrete.
4. If required by the ENGINEER, moisten the foundation with water no less than 6 hours prior to placing the concrete.
5. Prepare the foundation to be 1 foot wider on each side of the planned new pavement width, or as shown on the plans.
6. Shape and trim the foundation to the plan required line, grade, and cross section.
7. Perform compaction with suitable equipment and follow the compaction procedures outlined in Section 32 11 23.00 – Base Aggregate. Perform proof roll of base with loaded quad axle truck. Remove and reconstruct all soft areas.
8. Prepare no less than 300 feet of foundation in advance of concrete placement operations unless approved by the ENGINEER.
9. Repair and compact irregularities in the foundation caused by trucks or equipment ahead of concrete paving operations.
10. Construct the foundation and base for integral curb and gutter 2 feet wider than the back of curb.

3.2. SAW CUTTING

- A. Saw cutting is required on all curb and gutter to be removed, as shown on the plans, or specified by the ENGINEER.
- B. Perform saw cutting according to the following:
 1. Place full depth saw cuts as indicated on the plans.
 2. Perform saw cutting so that the surface to remain is vertical for its full depth.

- 3.3. ADJUSTING MANHOLES, INLETS, AND VALVES
- A. Adjust all manholes, inlets, valves, and other fixtures to the plan grade and alignment.
 - B. Manhole and inlet adjustment includes the repair of the uppermost 12-inches of the existing masonry structure.
- 3.4. PLACING CONCRETE
- A. Place concrete curb and gutter in accordance with Section 601 of the Wisconsin Department of Transportation Specifications.
- 3.5. REINFORCEMENT
- A. When required by the contract place concrete reinforcement in accordance with Section 415.3.5 of the Wisconsin Department of Transportation Specifications.
 - B. Meet the requirements of Section 505 of the Wisconsin Department of Transportation Specifications.
- 3.6. TRANSVERSE JOINTS
- A. Construct transverse joints in accordance with Section 415.3.7.3 of the Wisconsin Department of Transportation Specifications.
- 3.7. CONSOLIDATION & FINISHING
- A. Float and brush the face surfaces of the curb or curb and gutter. Round the back edge of curbs, the edge of the gutter next to the pavement, and edges next to expansion joints or induced contraction joints, with a ¼-inch radius edger.
- 3.8. CURING OF CONCRETE
- A. Cure concrete in accordance with Section 415.3 of the Wisconsin Department of Transportation Specifications except when curing in cold weather.
- 3.9. COLD WEATHER CONCRETING
- A. Suspend concreting operations if the descending air temperature in the shade and away from artificial heat falls below 35°F. Do not resume concreting operations until the ascending air temperature in the shade and away from artificial heat reaches 30°F. Maintain the concrete temperature at the point of placement at or above 50°F.
- 3.10. SEALING JOINTS
- A. Joint sealant material conforms to the requirements of the Specifications for Joint Sealant, Hot-Poured, for Concrete and Asphalt Pavement, ASTM Designation: D 3405.
 - B. Seal all construction, longitudinal and transverse concrete pavement and concrete curb and gutter joints, including the joint between the concrete pavement and the curb and gutter, and the transverse joints on curb and gutter to the face of the curb. Tool the sealant flush

with or recessed up to a maximum of 1/16-inch \pm 1/64-inch below the concrete surface. Overbonding will not be allowed. Remove material remaining on the surface of the pavement without damaging the sealant in the joint.

3.11. FIELD QUALITY CONTROL

A. Air Entrainment

1. Perform in accordance with Section 501.3.2.4.2 of the Wisconsin Department of Transportation Specifications.
2. Perform daily air tests according to the following:
 - a. Perform a minimum of two tests per day, per mix design.
 - b. Results of the air test must be signed daily by the CONTRACTOR or his representative.
 - c. Submit daily air test results to the OWNER or his representative.

B. Concrete Consistency / Slump

1. Perform daily consistency / slump tests according to the following:
 - a. Perform a minimum of two tests per day, per mix design.
 - b. Sign the results of the slump tests.
 - c. Submit daily slump test results to the OWNER or his representative.
2. Maintain slump at 2.5-inches or less for slip-formed curb and gutter and 4-inches or less for non-slip-formed curb and gutter.

C. Compressive Strength Testing

1. Test Procedure
 - a. Follow Sections 415.3.15.2 and 501.3.10 of the Wisconsin Department of Transportation Specifications to determine the compressive strength of the concrete.
 - b. Make and test concrete cylinders according to AASHTO T22 and T23.
 - c. Perform testing of concrete cylinders by an OWNER approved, independent, certified testing laboratory.

2. Testing Frequency

- a. At a minimum, perform testing according to the following:
 - 1) Once per day.
 - 2) One test for each 150 cubic yards.
- b. Make a minimum of three cylinders for each test.
- c. For each test, record the station and location where the cylinder were made.

3. Compressive Strength Requirements

- a. Test cylinders at 7 days and 28 days.
- b. Prior to opening any new pavement, to traffic two cylinder tests must show a minimum of 3000 psi.
- c. In addition to the above, follow Section 415.3.15.1 of the Wisconsin Department of Transportation Specifications to determine when to open the new pavement to traffic.
- d. Obtain the ENGINEER'S approval prior to opening any new pavement to traffic.
- e. If strength attained by the concrete is in question, follow Section 415.3.15.2 of the Wisconsin Department of Transportation Specifications.

END OF SECTION

SECTION 32 16 23.00

CONCRETE SIDEWALK & DRIVEWAYS

PART 1 – GENERAL

1.1. SECTION INCLUDES

- A. Material requirements, reinforcement, joints, placement procedures, and testing procedures.

1.2. RELATED SECTIONS

- A. Section 32 11 23.00 – Base Aggregates

1.3. MEASUREMENT PROCEDURES

- A. Concrete Sidewalk & Driveway
 - 1. 6-inch thick concrete sidewalk, including handicap ramps, and driveways are measured by the square foot unless specified otherwise in the Contract Documents.
 - 2. 4-inch thick concrete sidewalk is measured by the square foot unless specified otherwise in the Contract Documents.
 - 3. Completed and accepted sidewalk will be measured for payment.

1.4. PAYMENT PROCEDURES

- A. Concrete Sidewalk & Driveway
 - 1. Pay for 6-inch thick concrete sidewalk, including handicap ramps, and driveways by the square foot unless specified otherwise in the Contract Documents.
 - 2. Pay for 4-inch thick concrete sidewalk by the square foot unless specified otherwise in the Contract.
 - 3. No additional compensation will be provided for items necessary to complete the installation of concrete sidewalk and driveways unless provided for in the Contract.

1.5. REFERENCES

- A. Section 416 of the Current Edition of the Wisconsin Department of Transportation Standard Specifications for Highway and Structure Construction for products and execution only.
- B. Section 501 of the Current Edition of the Wisconsin Department of Transportation Standard Specifications for Highway and Structure Construction for products and execution only.

- C. Section 505 of the Current Edition of the Wisconsin Department of Transportation Standard Specifications for Highway and Structure Construction for products and execution only.
- D. AASHTO T22 – Compressive Strength of Concrete Cylinders
- E. AASHTO T23 – Method of Making and Curing Concrete Specimens in the Field
- F. AASHTO T24 – Compressive Strength of Concrete Cores
- G. Section 602 of the Current Version of the Wisconsin Department of Transportation Standard Specifications for Highway and Structure Construction for products and execution only.

1.6. SUBMITTALS

- A. Manufacturer's Certifications
 - 1. Submit the following a minimum of 10 days prior to incorporation into the work for review by the ENGINEER.
 - a. Certified test analysis for all elements of the Specifications both physical and chemical.
 - b. Certificate of compliance, signed by a responsible company officer, stating all material furnished meets Contract Specifications.
- B. Materials
 - 1. Submit the following certifications a minimum of 10 days prior to incorporating a material into the work for review by the ENGINEER.
 - a. Portland cement.
 - b. Reinforcement.
 - 1) Epoxy coated reinforcement including dowel bars, tie bars, metal chairs, tie wire, and other appurtenances.
 - c. Expansion joint filler.
 - d. Joint sealer.
 - e. Pre-formed elastomeric compression joint sealers.

- f. Concrete Curing Compounds.
 - 1) Including liquid curing compound, polyethylene sheeting and burlap.
- g. Curb ramp detectable warning fields.

C. Mix Design

- 1. Submit a mix design a minimum of ten (10) days prior to incorporation into the work for review by the ENGINEER.
- 2. For each cement used on the project indicate the brand and source.
- 3. Include the following in the mix design:
 - a. Any necessary adjustments for the specific gravity of the aggregates used.
 - b. Any necessary adjustments to master limits of the job mix required by the Contract Specifications.

D. Concrete Test Results

- 1. Submit all test results, from an OWNER approved certified testing laboratory, within 48 hours of test completion.
- 2. The test results should include at a minimum the following:
 - a. Compressive Strength of Concrete Cylinders or Compressive Strength of Concrete Cores
 - b. Slump
 - c. Air Entrainment
- 3. Send a copy of the test results to the concrete supplier, OWNER and ENGINEER.

PART 2 – PRODUCTS

2.1. CONCRETE MATERIALS

A. General

- 1. Concrete must consist of Portland cement, fine aggregate, coarse aggregate, and water proportioned and mixed according to the following:

- a. Portland Cement
 - 1) Conform to Section 501.2.1 of the Wisconsin Department of Transportation Specifications.
- b. Air Entraining Admixtures
 - 1) Conform to Section 501.2.2 of the Wisconsin Department of Transportation Specifications.
- c. Retarding and Water Reducing Admixtures
 - 1) Conform to Section 501.2.3 of the Wisconsin Department of Transportation Specifications.
 - 2) Do not add Type A and D admixtures to the same batch of concrete.
- d. Water
 - 1) Conform to Section 501.2.4 of the Wisconsin Department of Transportation Specifications.
- e. Aggregates
 - 1) Conform to Section 501.2.5 of the Wisconsin Department of Transportation Specifications.
- f. Composition of Concrete
 - 1) Conform to master limits of A, A-FA, A-T or A-S as specified in Section 501.3.2 of the Wisconsin Department of Transportation Specifications.
- g. High Early Strength Concrete
 - 1) If high early strength concrete is required by the Specifications or chosen by the CONTRACTOR at their own expense it may be made with the following:
 - a) High early strength cement (Type III).
 - b) An additional amount of the same cement used in the original mix conforming to the Grade C or Grade E master limits.
 - 2) Conform to Section 501.3.2 of the Wisconsin Department of Transportation Specifications.

B. Equipment

1. Conform to Section 416.3 of the Wisconsin Department of Transportation Specifications for equipment used to furnish and install materials in accordance with these Contract Specifications.

PART 3 – EXECUTION

3.1. INSTALLATION

A. Preparation of Foundation

1. Includes, but is not limited to the following:
 - a. Restore the base to pavement ready condition.
 - b. Repair unstable areas in the base course.
 - c. Place new base course according to Section 32 11 23.00 – Base Aggregate.
2. Prepare areas of the foundation that cannot be prepared by machine methods by hand or other methods approved by the ENGINEER.
3. Prepare the foundation to be moist not saturated at the time of placing concrete.
4. If required by the ENGINEER, moisten the foundation with water no less than 6 hours prior to placing the concrete.
5. Prepare the foundation to be 1 foot wider on each side of the planned new sidewalk or driveway width, or as shown on the plans.
6. Shape and trim the foundation to the plan required line, grade, and cross section.
7. Perform compaction with suitable equipment and follow the compaction procedures outlined in Section 32 11 23.00 – Base Aggregate. Remove and reconstruct all soft areas.
8. Prepare no less than 300 feet of foundation in advance of concrete placement operations unless approved by the ENGINEER.
9. Repair and compact irregularities in the foundation caused by trucks or equipment ahead of concrete placing operations.
10. Construct the sidewalk foundation at least 1 foot wider on each side than the proposed sidewalk and extending no less than 1 foot beyond each edge of the sidewalk. Construct sidewalks on a 4-inch layer of compacted crushed aggregate base course and driveways on a 6-inch layer of compacted crushed aggregate base course unless otherwise shown in the Contract Documents.

3.2. SAW CUTTING

- A. Saw cutting is required on all sidewalk and driveways to be removed, as shown on the plans, or specified by the ENGINEER.
 - B. Perform saw cutting according to the following:
 - 1. Place full depth saw cuts as indicated on the plans.
 - 2. Perform saw cutting so that the surface to remain is vertical for its full depth.
- 3.3. ADJUSTING MANHOLES, INLETS, AND VALVES
- A. Adjust all manholes, inlets, valves, and other fixtures to the plan grade and alignment.
 - B. Include the repair of the uppermost 12-inches of the existing masonry structure in manhole and inlet adjustment.
- 3.4. PLACING CONCRETE
- A. Place concrete driveway in accordance with Section 416 and concrete sidewalk in accordance with Section 602 of the Wisconsin Department of Transportation Specifications .
- 3.5. REINFORCEMENT
- A. When required by the Contract place concrete reinforcement in accordance with Section 415.3.5 of the Wisconsin Department of Transportation Specifications.
 - B. Meet the requirements of Section 505 of the Wisconsin Department of Transportation Specifications.
- 3.6. LONGITUDINAL JOINTS
- A. Construct longitudinal joints in accordance with Sections 416 and 602 of the Wisconsin Department of Transportation Specifications.
- 3.7. TRANSVERSE JOINTS
- A. Construct transverse joints in accordance with Sections 416 and 602 of the Wisconsin Department of Transportation Specifications.
- 3.8. CONSOLIDATION & FINISHING
- A. Finish the driveway or sidewalk surface with a light broom finish.
- 3.9. CURING OF CONCRETE
- A. Cure concrete in accordance with Section 415.3.12 of the Wisconsin Department of Transportation Specifications, except when curing in cold weather.

3.10. COLD WEATHER CONCRETING

- A. Suspend concreting operations if the descending air temperature in the shade and away from artificial heat falls below 35°F. Do not resume concreting operations until the ascending air temperature in the shade and away from artificial heat reaches 30°F. Maintain the concrete temperature at the point of placement at or above 50°F.

3.11. FIELD QUALITY CONTROL

A. Air Entrainment

- 1. Perform in accordance with Sections 501.3.2.4.2 of the Wisconsin Department of Transportation Specifications.
- 2. Perform daily air tests according to the following:
 - a. Perform a minimum of two tests per day, per mix design.
 - b. Results of the air test must be signed daily by the CONTRACTOR or his representative.
 - c. Submit daily air test results to the OWNER or his representative.

B. Concrete Consistency / Slump

- 1. Perform in accordance with Section 415.3.6 of the Wisconsin Department of Transportation Specifications.
- 2. Perform daily consistency / slump tests according to the following:
 - a. Perform a minimum of two tests per day, per mix design.
 - b. Sign the results of the slump tests.
 - c. Submit daily slump test results to the OWNER or his representative.

C. Compressive Strength Testing

- 1. Test Procedure
 - a. Follow Sections 415.3.15.2 and 501.3.10 of the Wisconsin Department of Transportation Specifications to determine the compressive strength of the concrete.
 - b. Make and test concrete cylinders according to AASHTO T22 and T23.
 - c. Perform testing of concrete cylinders by an OWNER approved, independent, certified testing laboratory.

2. Testing Frequency

- a. At a minimum, perform testing according to the following:
 - 1) Once per day.
 - 2) One test for each 150 cubic yards.
- b. Make a minimum of three cylinders for each test.
- c. For each test, record the station and location where the cylinder were made.

3. Compressive Strength Requirements

- a. Test cylinders at 7 days and 28 days.
- b. Prior to opening any new driveways to traffic, two cylinder tests must show a minimum of 3000 psi.
- c. In addition to the above follow Section 415.3.15.1 of the Wisconsin Department of Transportation Specifications to determine when to open the new driveways or sidewalks to traffic.
- d. Obtain the ENGINEER's approval prior to opening any new pavement to traffic.
- e. If strength attained by the concrete is in question, follow Section 415.3.15.2 of the Wisconsin Department of Transportation Specifications.

3.12. CURB RAMPS

- A. The Type 1 curb ramp should be used only when site conditions prevent the installation of Type 2 curb ramp.
- B. Grade change between gutter flag slope and the curb ramp slope shall not exceed 11% maximum. Maximum curb ramp slope not to exceed 8.33% (12H:1V). When necessary, the sidewalk elevation may be lowered to meet the grade change requirements between the gutter flag slope and curb ramp slope.

3.13. CURB RAMP DETECTABLE WARNING FIELDS

- A. Furnish cast iron detectable warning fields for curb ramps.
- B. Install detectable warning fields for curb ramps conforming to manufacturer recommended procedures.
- C. Payment for the curb ramp detectable warning field bid item is full compensation for providing the warning field.

END OF SECTION

SECTION 32 19 00.00

PAVEMENT REPAIR & RESURFACING

PART 1 - GENERAL

1.1. DESCRIPTION

- A. Wherever any paved or graveled surface (including curb and gutter and sidewalk) has been damaged or removed by the CONTRACTOR, replace or repair existing improvements at the CONTRACTOR's expense. Replace with the same material, thickness and type as the existing disturbed surface
- B. The OWNER will perform repairs or replacements if the CONTRACTOR is negligent in completing the repairs in a reasonable time period. The OWNER may deduct the cost for such work from the monies due the CONTRACTOR.
- C. Repair disturbed areas as specified herein or in accordance with other sections of the Specification.
- D. Maintain barricades, guard rails, signs and warning devices to provide traffic control during the construction period and during repairs to paved areas. Provide dust control during this same period, seeing that the areas are oiled, watered, or treated with calcium chloride.

1.2. RELATED SECTIONS

- A. Section 31 20 00.00 Earthwork
- B. Section 32 11 23.00 Base Aggregates
- C. Section 32 12 16.00 Asphaltic Concrete Paving
- D. Section 32 13 13.00 Concrete Pavements
- E. Section 32 16 13.00 Concrete Curb & Gutter
- F. Section 32 16 23.00 Concrete Sidewalk & Driveways
- G. Section 33 05 22.00 Utility Trenching and Backfilling

1.3. REGULATORY REQUIREMENTS

- A. Contact State and County Highway Departments before preparing the bid to determine their requirements.

PART 2 - PRODUCTS

2.1. GENERAL

- A. Meet requirements of Section 32 11 23.00 Base Aggregates.
- B. Meet requirements of Section 32 12 16.00 Asphaltic Concrete Paving.
- C. Meet requirements of Section 32 13 13.00 Concrete Pavements.
- D. Meet requirements of Section 32 16 13.00 Concrete Curb and Gutter.
- E. Meet requirements of Section 32 15 23.00 Concrete Sidewalk and Driveways.

PART 3 - EXECUTION

3.1. GENERAL

- A. Compact backfill material in accordance with the requirements of Section 33 05 22.00 – Utility Trenching and Backfilling and/or Section 31 20 00.00 – Earthwork.
- B. Remove the materials placed to the depth required for the pavement specified. Sawcut the adjoining pavement edges to provide neatly trimmed edges clean of any shattered or split material. Compact sub-grade with suitable equipment.

3.2. CONCRETE PAVEMENTS

- A. Provide an aggregate base a minimum of 6-inches thick.
- B. Replace concrete pavement to the same thickness as the adjoining slab. Provide a minimum thickness of 6-inches.
- C. Saw pavement using a diamond saw to make straight, full depth cuts without causing further cracking of the surrounding pavement. Remove the spalled concrete with a light hammer.
- D. Install tie bars in all the replaced concrete pavement. Drill tie bars in accordance with Wisconsin Department of Transportation (DOT) design. Install number 6x12-inch deformed bars spaced at 3 feet on longitudinal joints and 1 foot on transverse joints.
- E. Perform work in accordance with the requirements of Section 32 13 13.00 - Concrete Pavements.

3.3. ASPHALT PAVEMENT & ASPHALT DRIVEWAYS

- A. Replace asphalt pavement to the same thickness as adjoining pavement. Place a minimum thickness of 3-inches asphalt pavement over a 12-inch aggregate base.
- B. Place asphalt with a paving machine if the trench width exceeds 4 feet.

- C. Perform work in accordance with the requirements of Section 32 12 16.00 - Asphaltic Concrete Paving.

3.4. GRAVEL SURFACES

- A. Replace gravel roadway or walkway surface with a cross section conforming to the adjacent base course or a minimum of 12-inches of Base Aggregate in accordance with Section 32 11 23.00 – Base Aggregates.

3.5. CONCRETE SURFACES

A. Concrete Curb & Gutter

- 1. Replace curb and gutter with curb and gutter having a cross section conforming to the adjacent curbing. Perform work in accordance with the requirements of Section 32 16 13.00 - Concrete Curb & Gutter.

B. Sidewalks & Driveways

- 1. Replace sidewalks and driveways with the same thickness and width to conform to adjacent walks and driveways. Perform work in accordance with the requirements of Section 32 16 23.00 - Concrete Sidewalk & Driveways.

3.6. TEMPORARY RESURFACING & MAINTENANCE

- A. If site conditions (such as cold weather) preclude placing the permanent pavement replacement, the OWNER may instruct the CONTRACTOR to place temporary asphalt cold mix patches in open excavation or place asphalt around manhole castings to prevent damage by snow plows.
- B. The OWNER may deduct the cost for any maintenance or emergency repair work provided by the OWNER in areas that have not yet been paved from the monies due the CONTRACTOR.

3.7. REQUIREMENTS BY OTHERS

- A. Repair streets, highways, alleys, highway shoulders, ditches or other surfaces that occur on County or State Highways or property in accordance with the County or State Highway Departments. Acquire County or State Highway Department approval before the work will be accepted by the OWNER. When special backfill is required by the County or State Highway Departments, include the cost of hauling away the surplus material removed from the trench and the cost of furnishing, hauling and placing special backfill in the unit price bid for the items in which such backfill is required.

END OF SECTION

SECTION 32 92 00.00

LANDSCAPING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Restoration, seed, fertilizer, mulch, sod, trees, shrubs, biofiltration prairie plants, prairie seed, and wetland plants.

1.2 MEASUREMENT PROCEDURES

- A. The OWNER reserves the right to modify the landscaping limits during construction. Payment will be based on the final quantity and unit price bid for each bid item.

1.3 REFERENCES

- A. Conform to the Standard Specifications for Road and Bridge Construction of the State of Wisconsin, Current Edition, in addition to the requirements of this section.

1.4 DEFINITIONS

- A. Restoration include the items of topsoil, seed, fertilizer and mulch, unless otherwise noted.
- B. 'Catch' or Uniform Stand: Germination/sprouting of seed resulting in plants of mature height and density. For seed mixture in Table 32 92 00.00-1 80% density is required.
- C. Deconsolidation: Loosening or decreasing density of soil by mechanical methods.

PART 2 - PRODUCTS

2.1 APPROVED SUPPLIERS

- A. Prairie seed and wetland plants approved suppliers (*this is not an exclusive list*):
 - 1. Marshland Transplant
P.O. Box 1 - Berlin, WI 54923
Telephone: (920)361-4200
 - 2. Agrecol
2918 Agricultural Drive - Madison, WI 53718
Telephone: (608)226-2544

3. Oak Prairie Farm
W4642 Highway '33' - Pardeville, WI 53954
Telephone: (800)894-3884
4. Prairie Nursery
P.O. Box 306, W5856 Dyke Avenue - Westfield, WI 53964
Telephone: (800)476-9453
5. Prairie Moon Nursery
31837 Bur Oak Lane
Route 3, Box 1633 - Winona, MN 55987
Telephone: (866)417-8156
6. Ion Exchange
1878 Old Mission Road - Harpers Ferry, IA 52146-7533
Telephone: (800)291-2143
7. Shooting Star Native Seed
20740 County Road 33 - Box 191 - Spring Grove, MN 44974
Telephone: (507)498-3944

2.2 TOPSOIL

- A. Friable soil, obtained from natural, well-drained areas.
- B. Free from refuse, heavy weeds or grasses.
- C. Free from heavy roots, clay lumps, stones larger than 1-inch in size, sticks, brush, litter and other deleterious substances.
- D. Maximum 5% by volume of the following: Stones smaller than 1-inch, coarse sand and small clay lumps.
- E. Free from insoluble carbonates and conform to the following requirements (verified by soil analysis):
 1. Between 1% and 13% organic matter, as determined by the test for organic matter in accordance with ASTM D2974.
 2. Between 12% and 50% clay, as determined in accordance with ASTM D422.
 3. Less than 55% sand content, as determined in accordance with ASTM D422.
 4. PH between 5.0 and 8.0 as determined in accordance with ASTM D4972.
 5. Meet the following mechanical criteria: 100% passes the 1-inch screen; 90-100% passes the No. 10 mesh sieve; and 40-60% passes the No. 100 mesh sieve.
- F. Furnish the OWNER with the proposed source or sources of topsoil to be used at least fifteen (15) working days prior to delivery. Obtain soil samples from the intended topsoil source and have a soil analysis performed by a soil testing laboratory to ensure conformity

with the preceding specification. Do not deliver topsoil to the work site prior to review by the OWNER.

2.3 SALVAGED TOPSOIL

- A. Consists of the natural loam, sandy loam, silt loam, silty clay loam or clay loam humus-bearing soils available from the over-lying portions of the areas contemplated by the plans or contract to be occupied by the completed roadway.

2.4 SEED

- A. Mixed and guaranteed by the dealer as provided in Table 32 92 00.00-1, located at the end of this section.
- B. Composed of seeds of the purity, germination and proportions, by weight, as given in Table 32 92 00.00-1, located at the end of this section.
- C. Seed mixture selection:
 - 1. Seed Mixture #1: On average loam, heavy clay or moist soils.
 - 2. Seed Mixture #2: On light, dry, sandy or gravelly soils.
 - 3. Seed Mixture #1 or #2: On all ditches, in-slopes, median areas and low fill areas.
 - 4. Seed Mixture #3: On rural areas and high cut and fill slopes, generally exceeding 6 to 8 feet.
 - 5. Seed Mixture #4: In urban or other areas where a lawn type turf is desired.
 - 6. Seed Mixture #2 or #3: Suitable on very steep slopes where sterile soil and erosion conditions exist when used in conjunction with erosion control mat specified by the ENGINEER.

2.5 PRAIRIE SEED

- A. Consists of:
 - 1. Genotypes from Wisconsin or the first tier of counties in Iowa, Illinois and Minnesota.
 - 2. Harvested in the season immediately preceding the planting season.
 - 3. 95% pure live seed and free of weed seeds to the limits allowable under the Federal Seed Act and applicable State seed laws.
 - 4. No noxious weed seeds.

- B. Deliver to the project site in the dealer's original, sealed bag and labeled in accordance with USDA Rules and Regulations under the current Federal Seed Act. Guarantee that each species is true to name, as labeled on the package.
- C. Pack to maintain dormancy and prevent damage during transit, storage, and seeding operations (cool and dry). Remove and prairie seed that is wet, moldy or otherwise damaged from the project site.
- D. Inoculate legume seed in the prairie seed mixture with the proper strain of rhizobium and scarify, if necessary.
- E. The prairie seed mixtures listed in Table 32 92 00.00-2 (Mesic Prairie) and Table 32 92 00.00-3 (Wet to Wet Mesic Prairie) are general mixtures and may be revised by the ENGINEER on a project by project basis depending upon the size and location of the project.

2.6 WETLAND PLANTS

- A. Consists of:
 - 1. Genotypes from within 200-miles of the project site.
 - 2. Guarantee each wetland plant is true to name.
 - 3. Pot size of 2-inches, $\pm\frac{1}{2}$ -inch.
 - 4. Supply topsoil within pots free of noxious vegetation and seeds.
 - 5. Healthy plants free of damage, discoloration, wilting and insect infestation.
 - 6. Inspected for plant disease and insect infestation in accordance with applicable State and Federal laws.
- B. Deliver to the project site in enclosed vehicles or containers to prevent wind and sun damage. Pack dormant plants to maintain dormancy and prevent damage during transit, storage, and planting operations (cool and moist). Temporarily store dormant wetland plants in a refrigerated space if planting will not occur immediately. Do not store dormant plants for more than 1-week. Water actively growing wetland plants as needed and maintain in a healthy state if planting will not occur immediately. Handle plants with care to prevent injury. Do not drop or dump plants from vehicles or containers.
- C. The shallow and/or deep marsh wetland plant species to be specified by the ENGINEER based upon size and location of the project.

2.7 BIOFILTRATION PRAIRIE PLANTS

- A. Consists of:
 - 1. Genotypes from within 200-miles of the project site.

2. Guarantee each prairie plant is true to name.
 3. Pot size of at least 3-inches.
 4. Supply topsoil within pots free of noxious vegetation and seeds.
 5. Healthy and free of damage, discoloration, wilting and insect infestation.
 6. Inspected for plant disease and insect infestation in accordance with applicable State and Federal laws.
- B. Deliver to the project site in enclosed vehicles or containers to prevent wind and sun damage. Pack dormant plants to maintain dormancy and prevent damage during transit, storage and planting operations (cool and moist). Do not store dormant prairie plants for more than 1-week. Water actively growing prairie plants as needed and maintain in a healthy state if planting will not occur immediately. Handle prairie plants with care to prevent injury. Do not drop or dump plants from vehicles or containers.
- C. The prairie plant species is listed in Table 32 92 00.00-4 (Biofiltration Prairie Plants) are general listing of plant species and are not specific to any project. The ENGINEER may substitute or replace prairie plant species on a project by project basis.

2.8 FERTILIZER

- A. Use fertilizers for seeding, sodding, or other plantings that are standard, commercial, packaged or bulk products, in granular or liquid form conforming to Wisconsin Statutes and the Wisconsin Administrative Code Chapter ATCP 40. Ensure that each container of packaged fertilizer is plainly marked with the analysis of the contents showing minimum percentages of total nitrogen, available phosphoric acid, and soluble potash.
- B. If using fertilizer with a total of nitrogen, phosphoric acid, and potash greater than 32%, apply them at a rate that provides equal nitrogen, phosphoric acid, and potash.
- C. Fertilizer shall conform to the following minimum requirements:
1. Nitrogen, Not Less Than..... 16%
 2. Phosphoric Acid, Not Less Than 6%
 3. Potash, Not Less Than 6%
- D. The total of nitrogen, phosphoric acid, and potash shall equal at least 32%.
- E. Total nitrogen shall at least equal the sum of the phosphoric acid and soluble potash.

2.9 MULCH

- A. Straw or hay in an air-dry condition, free of noxious weed seeds and objectionable foreign matter.

- B. Use emulsified asphalt meeting the requirements of Type SS-1 of the Specifications for Emulsified Asphalt, AASHTO Designation M140, if asphalt is used. Use materials approved by the ENGINEER prior to use lieu of asphaltic materials for binding mulch.

2.10 SOD

- A. Dense, well-rooted growth of permanent and desirable grasses, which are indigenous to the general locality where it is to be used and practically free from weeds or undesirable grasses. Do not use sod with clover.
- B. Cut sod when the grass on the sod is approximately 2-inches (if longer, cut the grass to approximately this length) and the sod has been raked free of debris. Cut sod in uniform strips approximately 1'-6" x 6'-0", but not larger than is convenient for handling and transporting.
- C. Cut thickness of the sod as uniform as possible, approximately 3/4-inch or more, depending on the nature of the sod, so that practically all of the dense root system of the grasses will be retained, but exposed, in the sod strip and so that the sod can be handled without undue tearing or breaking.
- D. In the event the sod which is to be cut is in a dry condition, so as to cause crumbling or breaking during cutting operations, apply water in sufficient quantities to provide a well moistened condition of the sod, to the depth to which it is to be cut, at least 12-hours before cutting the sod.

2.11 TREES & SHRUBS

- A. Meet the specifications of Section 632 of the State of Wisconsin Department of Transportation, Division of Highways, Standard Specification for Highway & Structure Construction, pertaining to the materials, methods and labor to be furnished.

PART 3 - EXECUTION

3.1. TOPSOIL

- A. Grass areas require 4-inches of topsoil.
- B. Prairie grass areas require 6-inches of topsoil. Finish grade 6-inches and deconsolidate to a minimum depth of 3-inches using a disc or other acceptable equipment.
- C. Wetland/safety shelf areas require 12-inches of topsoil. Finish grade 12-inches and thoroughly deconsolidate to a minimum depth of 9-inches using a plow or other equipment. Deconsolidate topsoil to the point that the soil is very soft for planting of aquatic plants. Do not drive any equipment on topsoil after deconsolidation. If a vehicle is driven on the topsoil following final deconsolidation, the CONTRACTOR may be required by the OWNER to thoroughly deconsolidate the soil again.
- D. Rake or drag the surface of the topsoil until smooth, friable and of uniformly fine texture.

3.2. SEEDING

A. Acceptable methods:

1. Base Method

- a. Rake the ground until the surface is smooth, friable and of uniformly fine texture immediately before any seed is sown.
- b. Seed areas evenly with a mechanical spreader at the rate of 5-pounds per 1,000 square feet for Seed Mixtures #1 through #4, and at the rate of ½-pound per 1,000 square feet for Seed Mixture #5.
- c. Rake lightly and roll with a 200-pound roller, and then water with a fine spray.

2. CONTRACTOR'S Option: Vary the method of seeding in accordance with Standard Specifications for Road and Bridge Construction of the State of Wisconsin, Current Edition, at the discretion of the CONTRACTOR, to establish a smooth, uniform, turf composed of the grasses specified using the seeding rates in base method.

- B. Reseed any areas which fail to show a 'catch' or uniform stand with the original mixture. Repeat such re-seeding until final acceptance.
- C. Repair damage resulting from erosion, gullies, washouts or other causes by filling with topsoil, tamping, re-fertilizing and re-seeding without extra cost to the OWNER.
- D. Seed all disturbed areas in the project area unless otherwise specified.

3.3. PRAIRIE SEED

- A. Notify the ENGINEER at least three (3) business days before the scheduled date and time of the prairie grass planting. Allow ENGINEER to observe the original, unopened prairie seed packages prior to mixing and planting the prairie grass. Install prairie seeds and cover crop in the fall, between October 15th and November 15th, at the locations shown on the drawing(s).

B. Prairie Site Preparation

1. Deconsolidate and finish grade the topsoil to a minimum depth of 4-inches using a disc, rototill or other tillage equipment followed by a fine drag (finishing with a bulldozer is not sufficient) until smooth, friable and of uniformly fine texture. If the pond is completed between January 1st and August 31st, seed the prairie areas with Annual Rye (certified weed-free) at a rate of 80 lbs./acre. If the pond is completed between September 1st and December 31st, seed the prairie with winter wheat (certified weed-free) at a rate of 131 lbs./acre and Annual Rye (certified weed-free) at a rate of 30 lbs./acre. Place mulch over the prairie areas at a rate of 2-tons/acre immediately after seeding in accordance with Method C. Spray with glyphosate at a rate of 2-quarts/acre within a week of September 10th, if vegetation greater than 6-inches is present, killing at least 99% of all plants. Spray with

glyphosate at a rate of 2-quarts/acre and Milestone Herbicide (Dow Agrosiences) at a rate of 7oz./acre, the third week of May of the following year, killing at least 99% of all plants. Do not kill the wetland plants on the adjacent wetland/safety shelf in the pond, if wetland plants were installed. Spray with glyphosate at a rate of 2-quarts/acre and Triplet Selective Herbicide (Riverdale or approved equal) at a rate of 2-quart/acre the third week of June, killing at least 99% of all plants. Spray with glyphosate at a rate of 2-quarts/acre the first week of August. Spray with glyphosate at a rate of 2-quarts/acre the third week of September. Use herbicide solutions containing 1% ammonium sulfate and 1% nonionic surfactant for all herbiciding events. Contact Stuart Boerst of McMAHON via e-mail (sboerst@mcmgrp.com) a minimum of three (3) business days prior to each site preparation herbiciding event to provide the date of the herbiciding activity. Failure to conduct the site preparation herbiciding may result in the CONTRACTOR conducting an additional one year of site preparation herbiciding at the CONTRACTORs expense. Seed in accordance with the following paragraphs in the fall, between October 15th and November 15th, but before the ground is frozen.

- C. Harrow the prairie area to a depth of ½-inch using the drag setting prior to prairie seeding. Sow prairie seed uniformly with a Brillion-type mechanical planter. Calibrate the mechanical planter properly for uniform distribution of seed. Distribute seed quantities and types evenly across the entire area.
- D. Do not perform broadcast seeding when winds exceed 5-miles per hour or when the seed bed is not in proper condition. Do not seed on saturated or frozen topsoil.
- E. Sow the cover crop seed before or during prairie seeding unless approved by ENGINEER.
- F. Cover areas planted with prairie seed with erosion control blanket, Wisconsin Department Of Transportation (DOT), Class I, Type A (DS-150), where specified on the drawings, immediately after seeding the prairie seed mix. Do not extend the erosion control blanket onto the safety shelf of the pond. Mulch the other areas at a rate of 3-tons per acre immediately after seeding the prairie. Use wheat or oat straw mulch. Place mulch in accordance with Method C.
- G. Do not use fertilizer for the prairie seed planting.
- H. Use a company with at least 3-years of experience and able to provide references for three (3) successful projects for planting the prairie seed.
- I. Provide warranty that 75% (minimum) of the prairie grasses and forbs will be growing at the end of the second full growing season, with an average area density of, at least, five (5) plants/square foot of any seeded prairie grass or forb for every 2,000 square feet.

3.4. WETLAND PLANTS

- A. Notify the ENGINEER at least 3-days before the scheduled date and time of the wetland planting. Allow the wetland plants to be observed by the ENGINEER prior to planting.

- B. Notify the ENGINEER at least 3-days before the scheduled date and time of the deconsolidation of the safety shelf topsoil. Thoroughly deconsolidate the topsoil to a minimum depth of 9-inches and finish grade just prior to allowing the pond to fill with water using a plow or other tillage equipment. The equipment shall make at least three (3) passes to properly deconsolidate the topsoil. Deconsolidate topsoil to the point that the soil is very soft for planting of aquatic plants. Do not drive any equipment on topsoil after deconsolidation. If a vehicle is driven on the topsoil following final deconsolidation, thoroughly deconsolidate the soil again.
- C. Install wetland plants between July 1st and July 31st of the given year with sufficient water. Apply herbicide twice to kill cattails and all other vegetation prior to installing wetland plants. Perform the second herbicide application at least 1-week after the first herbiciding events. Kill at least, 95% of the vegetation with the herbiciding. Do not kill the plants on the adjacent prairie.
- D. Install goose protection fencing for all planting areas prior to installation of the wetland plants. Locate the fencing on the inside and outside edges of the safety shelf / wetland area. Use black polypropylene fencing with a ½” – 1” mesh size that is 3 feet tall. Support the fencing using the appropriate stakes and fasteners. Install the fencing flush with the ground surface to the point that will not allow goslings to pass beneath the fence. Use black polypropylene fencing with a ½” – 1” mesh size that is 2 feet tall, for the fencing along the drop-off into the deep basin. Place the fencing on the ‘edge’ of the drop off with 1 foot above the normal water level and 1 foot below the normal water level. Support the fencing with the appropriate stakes and fasteners. Connect strings to all stakes from the ‘shoreline fence’ and ‘drop off fence’ to form a crosshatch ‘X’ pattern over the top of the safety shelf. Select the appropriate goose protection fencing meeting these Specifications and maintain goose protection fencing in good condition during the first year of plant establishment. Submit a description and/or drawing of the proposed goose protection fencing for review. Remove the goose protection fencing after the second growing season.
- E. Install wetland plants in general accordance with the drawing(s). Do not revise the wetland plant locations without approval of the ENGINEER. Install plant species with a minimum distance of 3 feet between plants.
- F. Do not plant if site conditions are not suitable.
- G. Use a company with at least 3-years of experience and able to provide references for three (3) successful projects.
- H. Provide warranty that 75% (minimum) of each wetland plant species will be growing after September 30th of the year the plants were installed at the site.

3.5. BROADLEAF HERBICIDING OF NON-PRAIRIE AREAS

- A. Broadleaf herbicide non-prairie areas as shown on the landscape plan the first week of May and third week of August following pond completion. Herbicide with Triplet Selective Herbicide (Riverdale) or equivalent at a rate of 2 quarts/acre and 1% ammonium sulfate. Do not kill prairie plants in the prairie areas (if prairie has been seeded).

3.6. BIOFILTRATION PRAIRIE PLANTS

- A. Notify the ENGINEER at least 3-days before the scheduled date and time of the prairie planting. Allow ENGINEER to observe the plants prior to planting.
- B. Deconsolidate and finish grade the topsoil to a maximum depth of 3-inches. Rake or drag the topsoil before planting so it is smooth, friable and of uniformly fine texture. Spray the existing vegetation with glyphosate herbicide at least 3-days before installing prairie plants.
- C. Install biofiltration prairie plants between May 15th and October 30th of the given year.
- D. Install prairie plants in accordance with the drawings. Do not make substantial changes in the prairie plant locations without approval of the ENGINEER. Install plants with a minimum distance of 1 foot between plants.
- E. Do not perform planting if site conditions are not suitable.
- F. Use a biofiltration prairie plant company with at least 3-years of experience planting prairie plants and be able to show three (3) successful projects.
- G. Provide a warranty that 75% (minimum) of each prairie plant species will be growing at the end of the first full growing season.

3.7. FERTILIZER

- A. Apply fertilizer containing 32% total of nitrogen, phosphoric acid, and potash at 7 pounds per 1,000 square feet, unless the Contract specifies otherwise. For fertilizer that contains a different percentage of components, determine the new application rate by multiplying the specified rate by a dimensionless conversion factor determined as follows:

$$\text{Conversion Factor} = 32 / \text{New Percentage of Components}$$

- B. If fertilizing areas to receive sod, spread the fertilizer uniformly over the soil before sodding at the rate of 7 pound per 1,000 square feet and then work the fertilizer into the soil as part of the site preparation under Section 3.1.

3.8. MULCH

A. General

1. Place mulch on a given area within 3-days after the seeding has been completed.
2. Do not perform mulching operations during periods of excessively high winds, which would preclude the proper placing of the mulch.
3. Place mulch such that it is loose or open enough to allow some sunlight to penetrate and air to slowly circulate, but thick enough to shade the ground, conserve soil moisture and prevent or reduce erosion.
4. Maintain the mulched area and repair any areas damaged by wind, erosion, traffic, fire or other causes prior to final or partial acceptance of work under the contract documents.

B. Placing

1. Perform the work in accordance with Method A, Method B or Method C, or a combination thereof, unless a specific method is specified in the contract documents.

- a. Method A

- 1) Spread the mulching material over the designated area to a loose depth of ½ to 1½-inches. Apply at a rate such that the resulting cover conforms to the requirements specified under Mulch, General. Loosen or fluff the mulch material from compacted bales before spreading in place. Unless otherwise directed, begin mulching operations at the top of the slopes and proceed downward.
- 2) Securely anchor straw or hay mulch by the use of an approved netting securely pegged or stapled in place. Another acceptable method is to secure the mulch means of heavy biodegradable twine fastened by pegs or staples to form a grid of from 6 to 10 feet spacing.
- 3) Another acceptable method is to place approved erosion control blankets or mats in lieu of separate applications of mulch and netting.

- b. Method B

- 1) Treat straw or hay with a tackifier (as detailed in the following paragraphs), blow it from a machine and uniformly deposit it over designated areas on one operation. Place straw or hay uniformly over the area to a depth of ½ to 1-inch, using 1½ to 3-tons of mulch per acre. Mix and place tackifier in accordance with guidelines of the tackifier Product Acceptability List (PAL), Current Edition, published by the Wisconsin Department of Transportation. Place mulch within the above-designated limits and vary the rate of application of the mulch and the tackifier during mulching operations to produce the desired results. Use an approved type machine which will blow or eject by constant air stream, a controlled amount of mulch and which will introduce into the air stream a spray of tackifier to partially coat the straw or hay, producing a spotty tack sufficient to hold together and retain in place the deposited straw or hay. As an option, apply the tackifier as an overspray in a separate operation after placing the straw or hay.
- 2) Apply wood fiber, wood chips or similar material with approved blowing machines or other approved methods which will place a controlled amount of mulch uniformly over the area to a depth of ½ to 1½-inches. Treat areas to be mulched with wood chips 1 lb.

of available nitrogen per 1,000 square feet of area either prior to or after application of the chips.

3) Feed the mulch material into the blowing machine to produce a constant and uniform ejection from the discharge spout, operated in a position to produce a mulch of uniform depth and coverage.

a) Tackifiers - General Specifications:

- i Latex-Base: Meet the following requirements:
 - (i) Composition, by weight, of the latex emulsion polymer
 - 02.B.1.b.3.a.i.1. 48% Styrene
 - 02.B.1.b.3.a.i.2. 50% Butadiene
 - 02.B.1.b.3.a.i.3. 2% additive
 - (ii) 42.0 to 46.0% solids
 - (iii) pH, as shipped, of 8.5 to 10.0.
 - (iv) Do not allow the emulsion to freeze or to be exposed to sunlight for a prolonged period of time.
- ii Guar Gum: Consist of a minimum of 9% Guar gum weight with the remainder being dispersing and cross-linking additives.
- iii Other Tackifiers: Include, but not be limited to: Water soluble natural vegetable gums or Guar gums blended with gelling and hardening agents or a water soluble blend of hydrophilic polymers, viscosifiers, sticking aids, and other gums.

b) Tackifiers - Construction Methods:

- i Mulch Anchoring: Anchor mulch by spraying the tackifier immediately after the mulch has been placed. Do not spray during periods of windy conditions that would prevent the proper placement of adhesive. Protect all traffic, signs, structures and other objects from being marked or disfigured by the tackifier material. Apply tackifiers at the following minimum rates per acre:
 - (i) Latex-Base: Mix 15-gallons of adhesive or the manufacturer's recommended rate, whichever is greater, with a minimum of 250-lbs. of recycled newsprint as a tracer with 375-gallons of water.
 - (ii) Guar Gum: Mix 50-lbs. of dry adhesive and a minimum of 250-lbs. of recycled newsprint as a tracer with 1,305-gallons of water.
 - (iii) Other Tackifiers: (Hydrophilic Polymers) mix 97 lbs. of dry adhesive or

the manufacturer's recommended rate, whichever is greater and a minimum of 250-lbs. recycled newsprint as a tracer with 1,305-gallons of water.

c) Approved Tackifiers:

i Latex Base Adhesive:

<u>Product</u>	<u>Manufacturer</u>
BUTOFAN NS268	BASF Corporation

ii Guar Gum Base Adhesive:

<u>Product</u>	<u>Manufacturer</u>
Lawn Tack	Amturf Seeds
Second Nature	
Tacpac GTX	Central Filter Corp.
Finn A500 Hydro-Stik	Finn Corporation
Eco Tak-OP	Eastern Products, Inc.
Landtack	Erosion Control Tech.

iii Other Tackifiers (Hydrophillic Polymers):

<u>Product</u>	<u>Manufacturer</u>
Exact-Tac (E-T)	American Excelsior
Con-Tack A/T	Con Wed
Eco Tak-SAT	Eastern Products, Inc.
RMB Plus	Reinco Company

c. Method C

- 1) Spread the straw or hay mulch uniformly over the designated areas to a loose depth of ½ to 1½-inches, using 1½ to 3-tons of mulch per acre, by blowing from a machine, as described in Method B, or by other approved methods.
- 2) Immediately after spreading, anchor the mulch in the soil by the use of a mulch tiller consisting of a series of dull, flat discs with notched edges. Use discs approximately 20-inches in diameter and spaced at about 8-inch centers. Use tiller equipped with a ballast compartment to permit adjustment of the weight for depth control.
- 3) Impress the mulch in the soil to a depth of approximately 1½ to 2½-inches in one (1) pass of the tiller traveling longitudinally. Do not operate mulch tillers on slopes so steep that damage to the mulch, seed bed or soil occurs. Anchor the mulch on such areas by either Method A or Method B. Use tractors equipped and operated to minimize the disturbance or displacement of the soil.

Provide more than one pass of the tiller to assure adequate anchoring of the mulch, if required.

3.9. SOD

- A. Moisten the earth bed upon which the sod is placed, if not naturally sufficiently moist, and place the sod within approximately 24-hours after the sod has been cut.
- B. Place sod on slopes in horizontal strips beginning at the bottom of the slope and working upward.
- C. Place sod so that the joints caused by abutting ends of sod strips are not continuous. Place each sod strip to abut snugly against the strip previously laid.
- D. Roll the sod firmly or lightly tamp with suitable wooden or metal tampers to "wet" or press the sod into the underlying soil.
- E. At such points where water will start flowing over a sodded area, turn the upper edges of the sod strips into the soil below the adjacent area and place a layer of earth over this juncture. Compact earth to conduct the surface water over the upper edge of the sod.
- F. Turn in and treat as previously described the end strips at the limits of the sodded areas wherever practicable.
- G. Allow for settlement in the areas being sodded.
- H. OWNER will not accept or pay for any sod that has been frozen prior to laying or which is laid during freezing weather or upon a frozen bed until it has become evident in the following growing season that such sod has not suffered any damage. Remove and replace any sod laid under these conditions which does not establish itself during the following growing season.
- I. After sodding has been completed, clear the surface of loose sod, excess soil or other foreign materials. Scatter a thin layer of topsoil over the sod as a top dressing and thoroughly moisten by sprinkling with water.
- J. Provide the initial watering immediately after the application of the fertilizer. OWNER (or property owner) is responsible for subsequent watering.

3.10. TREES & SHRUBS

- A. Place plants for best appearance.
- B. Set plants vertical.
- C. Remove non-biodegradable root containers.
- D. Set plants in pits or beds, partly filled with prepared topsoil mix at a minimum depth of 6-inches under each plant. Remove wire and loosen ropes from the root ball.

- E. Place bare root plant material so roots lie in a natural state. Backfill soil mixture in 6-inch layers. Maintain plant materials in a vertical position.
- F. Saturate soil with water when the pit or bed is half full of topsoil and again when full.
- G. See notes on plans or Tree Planting Detail for additional planting instructions.
- H. Review the tree conditions after one full growing season. Replace any dead trees.

END OF SECTION

TABLE 32 92 00.00-1

TABLE OF SEED MIXTURES

<u>Species</u>	<u>MIXTURES</u>					
	<u>% Purity</u>	<u>% Germination</u>	<u>% in #1</u>	<u>% in #2</u>	<u>% in #3</u>	<u>% in #4</u>
Kentucky Bluegrass	98	85	50	10	20	50
Creeping Red Fescue	97	85	25	--	30	30
Perennial Ryegrass	97	90	25	30	--	--
Hard Fescue	97	85	--	25	25	--
Tall Fescue	98	85	--	35	--	--
Improved Fine Perennial Rye Grass	96	85	--	--	25	20

Table 32 92 00.00-2**MESIC PRAIRIE
2 Feet & Above NWL**

Latin Name	Common Names	Amount /	Total
		Acre	1.0 acres
<i>Agastache foeniculum</i>	Lavender Hyssop	1.0 oz.	1.0 oz.
<i>Allium cernuum</i>	Nodding Pink Onion	1.0 oz.	1.0 oz.
<i>Andropogon gerardii</i>	Big Bluestem	2.0 oz.	2.0 oz.
<i>Aquilegia canadensis</i>	Columbine	0.4 oz.	0.4 oz.
<i>Asclepias tuberosa</i>	Butterfly Weed	8.0 oz.	8.0 oz.
<i>Aster azureus</i>	Sky Blue Aster	0.5 oz.	0.5 oz.
<i>Aster laevis</i>	Smooth Blue Aster	2.0 oz.	2.0 oz.
<i>Aster novae-angliae</i>	New England Aster	0.4 oz.	0.4 oz.
<i>Astragalus canadensis</i>	Canada Milk Vetch	1.0 oz.	1.0 oz.
<i>Baptisia bracteata</i>	Cream False Indigo	0.4 oz.	0.4 oz.
<i>Baptisia lactea</i>	White False Indigo	3.0 oz.	3.0 oz.
<i>Bouteloua curtipendula</i>	Side Oats Grama	80.0 oz.	80.0 oz.
<i>Carex vulpinoidea</i>	Brown Fox Sedge	1.0 oz.	1.0 oz.
<i>Coreopsis palmata</i>	Prairie Coreopsis	1.5 oz.	1.5 oz.
<i>Dalea candida</i>	White Prairie Clover	7.0 oz.	7.0 oz.
<i>Dalea purpurea</i>	Purple Prairie Clover	24.0 oz.	24.0 oz.
<i>Dodecatheon meadia</i>	Shooting Star	1.0 oz.	1.0 oz.
<i>Echinacea pallida</i>	Pale Purple Coneflower	10.0 oz.	10.0 oz.
<i>Echinacea purpurea</i>	Purple Coneflower	10.0 oz.	10.0 oz.
<i>Elymus canadensis</i>	Canada Wild Rye	8.0 oz.	8.0 oz.
<i>Eryngium yuccifolium</i>	Rattle Snake Master	5.0 oz.	5.0 oz.
<i>Euphorbia corollata</i>	Flowering Spurge	0.2 oz.	0.2 oz.
<i>Geum triflorum</i>	Prairie Smoke	0.2 oz.	0.2 oz.
<i>Helianthus occidentalis</i>	Western Sunflower	0.5 oz.	0.5 oz.
<i>Heliopsis helianthoides</i>	Ox Eye Sunflower	1.0 oz.	1.0 oz.
<i>Liatris aspera</i>	Rough Blazingstar	4.0 oz.	4.0 oz.
<i>Liatris ligulistylis</i>	Meadow Blazingstar	5.0 oz.	5.0 oz.
<i>Liatris pycnostachya</i>	Prairie Blazingstar	10.0 oz.	10.0 oz.
<i>Lobelia siphilitica</i>	Great Blue Lobelia	0.3 oz.	0.3 oz.
<i>Monarda fistulosa</i>	Bergamot	0.3 oz.	0.3 oz.
<i>Parthenium integrifolium</i>	Wild Quinine	3.0 oz.	3.0 oz.
<i>Penstemon digitalis</i>	Smooth Penstemon	3.0 oz.	3.0 oz.
<i>Phlox pilosa</i>	Downy Phlox	1.0 oz.	1.0 oz.
<i>Physostegia virginiana</i>	Obedient Plant	2.0 oz.	2.0 oz.
<i>Pycnanthemum virginianum</i>	Common Mountain Mint	0.2 oz.	0.2 oz.
<i>Ratibida pinnata</i>	Yellow Coneflower	0.1 oz.	0.1 oz.
<i>Rudbeckia hirta</i>	Black Eyed Susan	2.5 oz.	2.5 oz.
<i>Rudbeckia subtomentosa</i>	Sweet Black Eyed Susan	2.5 oz.	2.5 oz.
<i>Schizachyrium scoparium</i>	Little Bluestem	240.0 oz.	240.0 oz.
<i>Silphium integrifolium</i>	Rosin Weed	0.2 oz.	0.2 oz.
<i>Silphium laciniatum</i>	Compass Plant	0.5 oz.	0.5 oz.
<i>Silphium terebinthinaceum</i>	Prairie Dock	0.2 oz.	0.2 oz.
<i>Solidago rigida</i>	Stiff Goldenrod	0.4 oz.	0.4 oz.
<i>Solidago speciosa</i>	Showy Goldenrod	3.0 oz.	3.0 oz.
<i>Sorghastrum nutans</i>	Indiangrass	96.0 oz.	96.0 oz.
<i>Sporobolus heterolepis</i>	Prairie Dropseed	10.0 oz.	10.0 oz.
<i>Tradescantia ohioensis</i>	Ohio Spiderwort	8.0 oz.	8.0 oz.
<i>Veronicastrum virginicum</i>	Culvers Root	1.0 oz.	1.0 oz.
<i>Zizia aurea</i>	Golden Alexanders	3.0 oz.	3.0 oz.
TOTAL		565.3 oz.	565.3 oz.

COVER CROP		Amount/	Total
Latin Name	Common Names	Acre	1.0 acres
<i>Lolium multiflorum</i>	Annual Rye	30.0 lbs.	30.0 lbs.

Table 32 92 00.00-3
WET TO WET-MESIC PRAIRIE
 2-Foot Above NWL To NWL

Latin Name	Common Names	Amount /		Total	
		Acre		1.0	acres
<i>Andropogon gerardia</i>	Big Bluestem	4.0	oz.	4.0	oz.
<i>Asclepias incarnata</i>	Marsh Milkweed	5.0	oz.	5.0	oz.
<i>Asclepias tuberosa</i>	Butterfly Weed	3.0	oz.	3.0	oz.
<i>Aster laevis</i>	Smooth Blue Aster	2.0	oz.	2.0	oz.
<i>Aster novae-angliae</i>	New England Aster	1.0	oz.	1.0	oz.
<i>Aster prenanthoides</i>	Crooked-Stem Aster	0.5	oz.	0.5	oz.
<i>Aster puniceus</i>	Swamp Aster	1.0	oz.	1.0	oz.
<i>Astragalus canadensis</i>	Canada Milk Vetch	2.0	oz.	2.0	oz.
<i>Calamagrostis canadensis</i>	Bluejoint Grass	0.5	oz.	0.5	oz.
<i>Carex bebbii</i>	Bebb's Sedge	4.0	oz.	4.0	oz.
<i>Carex comosa</i>	Bottlebrush Sedge	4.0	oz.	4.0	oz.
<i>Carex hystericina</i>	Porcupine Sedge	4.0	oz.	4.0	oz.
<i>Carex lacustris</i>	Lake Sedge	0.5	oz.	0.5	oz.
<i>Carex stipata</i>	Fox Sedge	4.0	oz.	4.0	oz.
<i>Carex stricta</i>	Tussock Sedge	0.2	oz.	0.2	oz.
<i>Carex vesicaria</i>	Tufted Lake Sedge	4.0	oz.	4.0	oz.
<i>Carex vulpinoidea</i>	Brown Fox Sedge	4.0	oz.	4.0	oz.
<i>Cassia hebecarpa</i>	Wild Senna	1.0	oz.	1.0	oz.
<i>Chelone glabra</i>	White Turtlehead	0.3	oz.	0.3	oz.
<i>Echinacea pallida</i>	Pale Purple Coneflower	5.0	oz.	5.0	oz.
<i>Echinacea purpurea</i>	Purple Coneflower	5.0	oz.	5.0	oz.
<i>Eleocharis palustris</i>	Great Spike Rush	2.0	oz.	2.0	oz.
<i>Elymus virginicus</i>	Virginia Wild Rye	20.0	oz.	20.0	oz.
<i>Eryngium yuccifolium</i>	Rattlesnake Master	5.0	oz.	5.0	oz.
<i>Eupatorium maculatum</i>	Joe-Pye Weed	1.0	oz.	1.0	oz.
<i>Eupatorium perfoliatum</i>	Boneset	0.4	oz.	0.4	oz.
<i>Gentiana andrewsii</i>	Bottle Gentian	0.4	oz.	0.4	oz.
<i>Glyceria canadensis</i>	Rattlesnake Manna Grass	2.5	oz.	2.5	oz.
<i>Glyceria striata</i>	Fowl Manna Grass	2.0	oz.	2.0	oz.
<i>Helenium autumnale</i>	Sneezeweed	0.4	oz.	0.4	oz.
<i>Helianthus annuus</i>	Ox-eye Sunflower	1.0	oz.	1.0	oz.
<i>Hypericum pyramidatum</i>	Great St. John's Wort	0.2	oz.	0.2	oz.
<i>Juncus effusus</i>	Soft Rush	0.2	oz.	0.2	oz.
<i>Leersia oryzoides</i>	Rice Cut Grass	1.0	oz.	1.0	oz.
<i>Liatris spicata</i>	Marsh Blazingstar	7.0	oz.	7.0	oz.
<i>Liatris pycnostachya</i>	Prairie Blazingstar	7.0	oz.	7.0	oz.
<i>Lobelia cardinalis</i>	Cardinal Flower	1.0	oz.	1.0	oz.
<i>Lobelia siphilitica</i>	Great Blue Lobelia	2.0	oz.	2.0	oz.
<i>Lycopus americanus</i>	Water Horehound	0.5	oz.	0.5	oz.
<i>Mimulus ringens</i>	Monkey Flower	1.0	oz.	1.0	oz.
<i>Monarda fistulosa</i>	Bergamot	0.2	oz.	0.2	oz.
<i>Penstemon digitalis</i>	Smooth Penstemon	3.0	oz.	3.0	oz.
<i>Physostegia virginiana</i>	Obedient Plant	2.0	oz.	2.0	oz.
<i>Pycnanthemum virginianum</i>	Common Mountain Mint	0.2	oz.	0.2	oz.
<i>Rudbeckia hirta</i>	Black-Eyed Susan	2.5	oz.	2.5	oz.
<i>Rudbeckia subtomentosa</i>	Sweet Black-Eyed Susan	2.5	oz.	2.5	oz.
<i>Scirpus acutus</i>	Hardstem Bulrush	0.5	oz.	0.5	oz.
<i>Scirpus atrovirens</i>	Green Bulrush	0.5	oz.	0.5	oz.
<i>Scirpus cyperinus</i>	Wool-Grass	0.1	oz.	0.1	oz.
<i>Scirpus pungens</i>	Three Square Bulrush	1.0	oz.	1.0	oz.
<i>Scirpus validus</i>	Softstem Bulrush	1.0	oz.	1.0	oz.
<i>Silphium perfoliatum</i>	Cupplant	0.3	oz.	0.3	oz.
<i>Silphium terebinthinaceum</i>	Prairie Dock	1.0	oz.	1.0	oz.
<i>Solidago riddellii</i>	Riddell's Goldenrod	4.0	oz.	4.0	oz.
<i>Spartina pectinata</i>	Prairie Cordgrass	8.0	oz.	8.0	oz.
<i>Thalictrum dasycarpum</i>	Purple Meadow Rue	0.5	oz.	0.5	oz.
<i>Tradescantia ohioensis</i>	Ohio Spiderwort	8.0	oz.	8.0	oz.
<i>Vernonia fasciculata</i>	Ironweed	3.0	oz.	3.0	oz.
<i>Verbena hastata</i>	Blue Vervain	2.0	oz.	2.0	oz.
<i>Veronicastrum virginicum</i>	Culvers Root	1.0	oz.	1.0	oz.
<i>Zizia aurea</i>	Golden Alexanders	3.0	oz.	3.0	oz.
TOTAL		153.9	oz.	153.9	oz.

COVER CROP		Amount/		Total	
Latin Name	Common Names	Acre		1.0	acres
<i>Lolium multiflorum</i>	Annual Rye	30.0	lbs.	30.0	lbs.

TABLE 32 92 00.00-4**BIOFILTRATION PRAIRIE PLANTS**

Latin Name	Common Name(s)	Bloom Time	Height	Color	Plant Spacing	No. of Plants
<i>Andropogon scoparius</i>	Little Bluestem	Aug. - Oct.	2' - 3'	Crimson (Fall)	1' - 2'	
<i>Asclepias incarnata</i>	Marsh Milkweed	June - Aug.	3' - 5'	Red / Pink	1' - 2'	
<i>Asclepias tuberosa</i>	Butterfly Weed	June - Aug.	2' - 3'	Orange	1' - 2'	
<i>Aster laevis</i>	Smooth Blue Aster	Aug. - Oct.	2' - 4'	Blue	1' - 2'	
<i>Aster novae-angliae</i>	New England Aster	Aug. - Oct.	3' - 4'	Purple	1' - 2'	
<i>Carex vulpinoidea</i>	Brown Fox Sedge	May - June	1' - 3'	Green	1' - 2'	
<i>Chelone glabra</i>	White Turtlehead	Aug. - Sept.	2' - 4'	White / Cream	1' - 2'	
<i>Dodecatheon meadia</i>	Shooting Star	May - June	1' - 2'	White / Pink	1' - 2'	
<i>Echinacea pallida</i>	Pale Purple Coneflower	June - July	3' - 4'	Purple	1' - 2'	
<i>Echinacea purpurea</i>	Purple Coneflower	July - Aug.	3' - 4'	Purple	1' - 2'	
<i>Eryngium yuccifolium</i>	Rattlesnake Master	June - Aug.	3' - 4'	White	1' - 2'	
<i>Eupatorium maculatum</i>	Joe-Pyeweed	Aug. - Sept.	4' - 5'	Pink	1' - 2'	
<i>Gentiana andrewsii</i>	Bottle Gentian	Aug. - Oct.	1' - 2'	Blue	1' - 2'	
<i>Iris versicolor</i>	Blue Flag Iris	June - July	2' - 3'	Blue	1' - 2'	
<i>Liatris aspera</i>	Rough Blazingstar	Aug. - Sept.	2' - 4'	Purple / Pink	1' - 2'	
<i>Liatris pycnostachya</i>	Prairie Blazingstar	July - Aug.	3' - 4'	Purple / Pink	1' - 2'	
<i>Lobelia cardinalis</i>	Cardinal Flower	July - Sept.	2' - 4'	Red	1' - 2'	
<i>Lobelia siphilitica</i>	Great Blue Lobelia	July - Sept.	2' - 4'	Blue	1' - 2'	
<i>Monarda fistulosa</i>	Bergamot	July - Aug.	3' - 5'	Lavender	1' - 2'	
<i>Parthenium integrifolium</i>	Wild Quinine	June - Sept.	3' - 4'	White	1' - 2'	
<i>Penstemon digitalis</i>	Smooth Penstemon	June - July	2' - 3'	White	1' - 2'	
<i>Petalostemum purpureum</i>	Purple Prairie Clover	June - July	2' - 3'	Purple	1' - 2'	
<i>Rudbeckia hirta</i>	Black Eyed Susan	June - Sept.	1' - 3'	Yellow	1' - 2'	
<i>Rudbeckia subtomentosa</i>	Sweet Black-eyed Susan	Aug. - Oct.	3' - 4'	Yellow	1' - 2'	
<i>Solidago rigida</i>	Stiff Goldenrod	Aug. - Sept.	3' - 4'	Yellow	1' - 2'	
<i>Solidago speciosa</i>	Showy Goldenrod	Aug. - Sept.	2' - 3'	Yellow	1' - 2'	
<i>Sporobolus heterolepis</i>	Prairie Dropseed	Aug. - Sept.	2' - 4'	Gold	1' - 2'	
<i>Tradescantia ohimensis</i>	Ohio Spiderwort	June - Aug.	2' - 4'	Blue	1' - 2'	
<i>Veronia fasciculata</i>	Ironweed	July - Sept.	4' - 5'	Purple	1' - 2'	
<i>Veronicastrum virginicum</i>	Culvers Root	July - Aug.	3' - 4'	White	1' - 2'	
<i>Zizia aurea</i>	Golden Alexanders	May - June	2' - 3'	Yellow	1' - 2'	

DIVISION 33 – UTILITIES

SECTION 33 01 30.16 CLEANING & VIDEO INSPECTION OF PIPE LINE

SECTION 33 05 22.00 UTILITY TRENCHING AND BACKFILLING

SECTION 33 40 00.00 STORM SEWERAGE

SECTION 33 01 30.16

CLEANING & VIDEO INSPECTION OF PIPE LINE

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. Provide cleaning and video inspection for approximately _____ feet of storm sewer, including catch basin, yard drain and inlet leads and laterals.
- B. Provide required signage and traffic control to assure a safe project.
- C. Provide work in the areas shown on the drawings and map provided in the Contract Documents.

1.2 SUBMITTALS

A. Qualifications:

- 1. Submit for review by the OWNER and ENGINEER, a resume showing that the CONTRACTOR proposed for this project has at least 5-years of experience in pipe line cleaning and video inspection.
- 2. Provide a list of at least three (3) sewer cleaning and televising projects (with similar sized pipe) with references including the following:
 - a. Location.
 - b. Date.
 - c. Diameter and Length of Interceptor.
 - d. Project Cost.
 - e. Client Contact Person.
 - f. Telephone Number.

B. Work Plan & Schedule:

- 1. Submit, for review by the OWNER and ENGINEER, a proposed plan of action for cleaning and inspection of the storm sewers.

C. Product Data:

- 1. Submit technical literature detailing the construction and capabilities of the equipment proposed for this cleaning and inspection.

1.3 TRAFFIC CONTROL

A. Barricades & Warning Devices:

1. Comply with Federal, State, and local requirements. Obtain written permission from the authorized official of the Municipality and, if applicable, the appropriate County or State Highway Official or property owner prior to placing devices intended to close alleys, streets, highways, thoroughfare, traffic lane, or public or private way. Notify the Chiefs of the Fire and Police Department(s) of the affected municipality(ies) prior to any such closure.
2. Erect and maintain barricades, guardrails, lights and signs necessary for public safety and convenience. Mark all hazards within the limits of the work or on detour around the work with well-painted, well-maintained, barricades, lanterns, torches, flares, reflectors, electric lights, flashers or caution, warning and directional signs in sufficient quantity and size to adequately protect life and property. Move, change, increase or remove these safeguards as required during the progress of the work to meet changing conditions.
3. Conduct traffic control operations in accordance with the latest issues of the "Manual On Uniform Traffic Control Devices" (MUTCD) and the "Wisconsin Department of Transportation (DOT) Standard Specifications For Road & Bridge Construction".
4. Maintain barricades in rigidly assembled condition. Keep barricades clean and the reflecting strips in good repair so as to be readily discernible at all times.
5. Handle materials using provisions for the protection of traffic and the public. Make reasonable and satisfactory provisions for travel on sidewalks, cross-walks, streets, roads, railroads and private ways.
6. Comply with "Occupational Safety & Health Act" (OSHA) requirements issued by the Federal Government and/or adopted by the State and local laws, rules and regulations, as they apply.
7. The OWNER reserves the right to remedy any neglect on the part of the CONTRACTOR as regards the protection of the work and public after 24-hours notice, in writing. In the case of emergency, the OWNER reserves the right to remedy any neglect without due notice. In either case, the cost of such remedy will be deducted from any money due or to become due to the CONTRACTOR.

1.4 SECURITY

- A. Provide site security. Provide (if deemed necessary) such watchmen and take such other precautionary measures as deemed necessary to protect CONTRACTOR's interests.

1.5 POLLUTION CONTROL

- A. Comply with all Federal, State and local requirements covering pollution control.
- B. Ensure that all incoming wastes receive treatment equivalent to the treatment currently being provided.

1.6 TEMPORARY FIRST AID FACILITIES

- A. Comply with the requirements of the "Manual of Accident Prevention in Construction", Associated General Contractors of America, Inc., latest edition, Section 2, First Aid, and supply on the site a first aid kit, dust-proof, protected from heat and moisture and containing, as a minimum, the first aid items listed according to the number of employees.

1.7 SEWER FLOW CONTROL

- A. When sewer depth of flow at the upstream manhole of the manhole section being worked is above the maximum allowable for television inspection, joint testing and/or sealing; reduce the flow to the level shown below by operation of pump stations, plugging or blocking of the flow, or by pumping and bypassing of the flow, as specified.
- B. Do not exceed the depth of flow shown below for the respective pipe sizes, as measured in the manhole when performing television inspection.
 - 1. 6 to 10-inch Pipe 20% Of Pipe Diameter
 - 2. 12 to 24-inch Pipe 25% Of Pipe Diameter
 - 3. 27-inch & Larger Pipe..... 30% Of Pipe Diameter
- C. Plugging Or Blocking:
 - 1. Insert a sewer line plug into the line upstream of the section being worked. Use a plug designed so that all or any portion of the sewage can be released. During television inspection or testing and sealing operations, reduce flow to within the limits specified above. After the work has been completed, remove plug and restore flow to normal.
- D. Pumping & Bypassing:
 - 1. When pumping and bypassing is required, supply pumps, conduits and other equipment to divert the flow of sewage around the manhole section where work is being performed. Provide a bypass system of sufficient capacity to handle existing flow, plus additional flow that may occur during a rainstorm. Furnish the necessary labor and supervision to set up and operate the pumping and bypassing system. If pumping is required on a 24-hour basis, equip engines in a manner to keep noise to a minimum.
- E. Flow Control Precautions:
 - 1. When flow in a sewer line is plugged, blocked or bypassed, protect the sewer lines from damage that might result from sewer surcharging. Ensure that sewer flow control operations do not cause flooding or damage to public or private property being serviced by the sewers involved.

PART 2 - PRODUCTS

2.1 VIDEO RECORDING

- A. Record inspection on a DVD, capable of being viewed on a DVD player or Windows® media player.

2.2 CLOSED CIRCUIT TELEVISION CAMERA

- A. Television equipment includes television camera, television monitor, cables, power source, lights and other equipment. Use a television camera specifically designed and constructed for operation in connection with sewer inspection meeting these minimum requirements:
 - 1. Pan & Tilt Radial View Color Sewer TV Camera.
 - 2. 360 Degree Radial x 300 Degree Pan & Tilt Viewing Field.
 - 3. Multi-Conductor.
 - 4. Remote Adjustable Optical Focus, Remote Light Compensating Iris.
 - 5. Automatic White Balance Circuitry, NTSC Color.
 - 6. Low Light, 3 Lux Camera.
- B. Provide a pan and tilt view camera specifically designed to provide a close-up view of sewer pipe walls and lateral entrances through the use of a low light sensitive camera, movable camera head and directional lighting. The unit is color, and designed for operation through up to 2,000 feet of multi-conductor cable in storm and storm sewers. Chassis construction is 100% solid state circuitry designed to withstand shocks and vibration normally sustained while being pulled through a pipe. The image pick-up device is a low light sensitive, 3 Lux, solid-state camera incorporating the latest high resolution closed circuit television technology. Operating climatic ranges of the camera are 14°F to 86°F, and up to 100% relative humidity.
- C. Provide remote reading footage counter accurate to 1% over the length of the particular section being inspected and mounted over the television monitor.

2.3 SEWER CLEANING EQUIPMENT

- A. Provide a jet cleaner with a vacuum/air transport debris removal system.
- B. Provide a water pump system on the cleaning vehicle with the ability to pump between 50 to 65-gallons per minute at a pressure of 1,200 to 1,500 pounds per square inch. Do not provide units with pumps smaller than this.

PART 3 - EXECUTION

3.1 PREPARATION / COORDINATION

- A. Provide equipment and manpower to clean and televise the storm sewer.
- B. Notify the ENGINEER / ARCHITECT and the OWNER immediately if the inspection must be suspended due to adverse weather conditions or unforeseen obstacles.
- C. Dispose of debris removed from the sewers during the cleaning process in compliance with all Federal, State and local requirements. Dispose of these materials and pay all fees associated with the disposal. The OWNER will not provide a disposal site.
- D. Purchase water used by the sewer cleaning equipment from either the Waverly Sanitary District or Darboy Joint Sanitary District No. 1.
 - 1. Contact Robert Krueger, Waverly Sanitary District at (920) 585-6864 or Steve Lamers, Darboy Joint Sanitary District No. 1 at (920) 419-2612 for current rates.

3.2 TELEVISION INSPECTION

- A. Move the camera through the line in either direction at a uniform rate, stopping when necessary to ensure proper documentation of the sewer's condition. Do not pull the camera at a speed greater than 30 feet per minute. Use manual winches, power winches, TV cable and powered rewinds, or other devices that do not obstruct the camera view or interfere with proper documentation of the sewer conditions, to move the camera through the sewer line. If, during the inspection operation, the television camera will not pass through the entire manhole section, reset the equipment in a manner so the inspection can be performed from the opposite manhole.
- B. In the event the section being televised has substantial flow entering the sewer between manholes, such that inspection of the sewer is impaired, coordinate with the OWNER of 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.
- C. When sewer line depth of flow at the upstream manhole of the section being televised is above the maximum allowable for television inspection, reduce the flow to permit proceeding with the television inspection.
- D. Whenever non-remote powered and controlled winches are used to pull the television camera through the line, use telephones, radios or other suitable means of communication between the two (2) manholes of the section being inspected to ensure that adequate communications exist between members of the crews.
- E. Check accuracy of the measurement meters daily by use of a walking meter, roll-a-tape or other suitable device. Begin footage measurements at the sewer line point of penetration of the upstream manhole, unless specific permission is given to do otherwise. Show footage on the video data view at all times.

3.3 DOCUMENTATION OF TELEVISION RESULTS

- A. Document television inspections through the use of an in-vehicle computer system. This system must be IBM compatible on a CD. Supply a report documenting defects and general information on the pipe being viewed along with an index for retrieving the information to the OWNER.
- B. Provide typed or computer printed television inspection logs to the OWNER. Show the location, in relation to adjacent manholes, of each source of infiltration discovered in the location reports. Record other data of significance, including the location of buildings and house service connections, joints, unusual conditions, roots, storm sewer connections, collapsed sections, presence of scale and corrosion, and other discernible features. Provide a voice recording on the DVD with brief and informative comments on the sewer conditions.
- C. Prepare color DVD recordings of the data on the television monitor. Provide two (2) copies of each DVD; one (1) for the OWNER, and one (1) for the ENGINEER.
- D. Record for playback at the same speed that it was recorded. Provide tabs for the start of each sewer segment. Provide title to the DVD to the OWNER. Provide DVD's and necessary playback equipment for review by the OWNER during the project.
- E. Include the following information on the DVDs:
 - 1. Data View:
 - a. Report number.
 - b. Date of television inspection.
 - c. Upstream and downstream manholes numbers.
 - d. Current distance along reach.
 - e. Printed labels on the container and DVD, with location information, date, format information and other descriptive information.
 - 2. Audio:
 - a. Date and time of television inspection, operator name and name of adjacent street.
 - b. Verbal confirmation of upstream and downstream manhole numbers and TV direction in relation to direction of flow.
 - c. Verbal description of pipe size, type and pipe joint length.
 - d. Verbal description and location of each service connection and pipe defect.
 - e. Type of weather during inspection.

- F. Include the following information on the computerized logs:
 - 1. Location of each point of leakage.
 - 2. Location of each service connection.
 - 3. Location of any damaged sections, nature of damage and location with respect to pipe axis.
 - 4. Deflection in alignment or grade of pipe.
 - 5. Record of repairs and quantity of sealing material used (if applicable).
 - 6. Date, time, municipality, street, basin, manhole section, reference manhole number, name of operator, inspector and weather conditions.
 - 7. Pipe diameter, pipe material, section length and corresponding DVD identification.
- G. Complete and submit to the OWNER storm manhole record information for each manhole in the project.
- H. Provide sufficient information for evaluation purposes for rehabilitation, repair, and replacement strategies on the television inspection DVD. Provide a high quality DVD to allow the pipe to be evaluated for trenchless rehabilitation.

3.4 CLEANING REQUIREMENTS

- A. Remove debris and sediment to assure that the storm sewer can perform as designed.

3.5 MANHOLE INSPECTION REPORTS

- A. Complete a Manhole Inspection Report for each manhole.
- B. Provide digital photographs of each manhole including:
 - 1. Casting / frame at ground surface.
 - 2. Bench.
 - 3. General inside.
 - 4. Observed leaks or structural failures.
- C. Provide printed copies of digital photos with all photographs of each structure on one (1) each 8½" x 11" sheet.
- D. Provide a computer CD with all pictures indexed by a structure identification number, which is the same as the structure identification number included in the televising reports.

3.6 LATERAL TELEVISIONING / TRACING

- A. Televising and trace laterals utilizing a camera launched from the main line sewer.
- B. Mark laterals along the ground surface using marking flags, paint or washable chalk as appropriate. The OWNER or ENGINEER will field collect the markings to identify the route of the lateral from the main sewer line to the building.

END OF SECTION

SECTION 33 05 22.00

UTILITY TRENCHING AND BACKFILLING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Installing underground utilities using the open cut trenching method.

1.2 RELATED SECTIONS

- A. Section 33 40 00.00 – Storm Sewerage

1.3 MEASUREMENT PROCEDURES

A. Rock Excavation in Trenches

1. Measure 1 foot outside the wall lines of the manhole.
2. Measure a 30-inch width for pipe sized up to and including 12-inch pipe.
3. Measure the nominal inside pipe diameter plus 18-inches for pipes larger than 12-inches.
4. Measure to a maximum depth of 6-inches below the outside bottom of the pipe barrel.
5. Measure 1 foot outside of the outside wall surfaces of manhole.

1.4 PAYMENT PROCEDURES

- A. Include cost of trenching, backfilling, and compacting backfill in the unit price bid per foot for the type of pipe installed.
- B. Rock Excavation in Trenches
 1. Pay per cubic yard of rock removed.
 2. Additional rock removed for CONTRACTOR's convenience will not be paid.

PART 2 – PRODUCTS

Not Applicable

PART 3 – EXECUTION

3.1 PROTECTION OF EXISTING STRUCTURES & UTILITIES

- A. Protect against damage surfaces and features, including buildings, pavements, trees and shrubs, within and adjacent to the construction easement or right-of-way, which are to be saved as indicated on the drawings or by the ENGINEER.
- B. Support and protect existing gas pipes, water pipes, steam pipes, electric and telephone other surface or subsurface structures, either of a private or of public ownership, whether or not indicated or shown on the drawings. Perform such work at CONTRACTOR'S expense, and according to their own drawings.
- C. Contact public utilities for the location of their underground structures such as ducts, mains or services for electric power, gas and telephone. Support above ground poles for electric power, lighting and telephone wires and cables. If the CONTRACTOR damages such utilities or subsurface structures, they shall make settlement with the OWNER(s) of the utility (ies).

3.2 INTERFERENCE OF UNDERGROUND STRUCTURES

- A. Notify ENGINEER and OWNER when an unknown underground structure is encountered in the trench or tunnel of the proposed utility and because of interference part or all of the structure requires relocation.
- B. Notify the ENGINEER and the OWNER of underground structure of CONTRACTOR'S desire to temporarily relocate such structure or to discontinue the service therein, and receive from the OWNER of such underground structure permission for such relocation or discontinuance of service if the relocation is to be made for CONTRACTOR'S convenience. Replace structure to original position and condition. Structure OWNER may perform the work in connection with said relocation, discontinuance or replacement at the CONTRACTOR'S expense.
- C. Protect, support, or brace existing underground structures where the excavation of either a trench or tunnel extends under or approaches it.

3.3 TRENCHING

- A. Support tunnel sections exceeding 2 feet in length in accordance with the applicable codes.
- B. Excavate the maximum typical trench width from 2 feet above the top of the pipe to the trench bottom to the outside diameter of the pipe plus 24-inches. Excavate wider to facilitate trench shields or trench boxes, if applicable. Keep the trench walls vertical whenever possible. Do not side slope or "bench down" in the trench where the trench is excavated within a permanent pavement or where such side-sloping or benching would encroach upon private property or endanger existing or future underground utilities or structures.
- C. Excavate trenches straight between designated angle points to permit the pipe to be laid straight and true to line and grade.

- D. Where the normal trench width below 2 feet above the top of the pipe is exceeded for any reason, except due to the use of tight sheeting, furnish an adequate section for the actual trench width. Accomplish this by furnishing a stronger pipe, a concrete cradle, cap, or envelope, whichever is an adequate section. You may use tight sheeting in lieu of a stronger pipe section to maintain the required trench width for the required height and depth. When the pipe specified is strong enough for the actual trench width, no further provision is required for the greater trench width.
- E. Excavate the trench to the required depth below the flow line (invert) of the pipe line being constructed allowing for the thickness of the pipe and the depth required for bedding. If the CONTRACTOR excavates too deep for underground mains, refill all such excavated space with such material and in such manner as directed by the OWNER. Refill the excavated space below the main(s) with special bedding if required by the specifications.
- F. Backfill as speedily as possible. Do not leave backfilling unfinished more than 100 feet behind the completed pipe work unless permitted by the OWNER. Do not perform new trenching when earlier trenches need backfilling or labor is needed to restore the surfaces of streets or other areas to a safe and proper condition. Do not excavate more than one (1) street crossing by the same trench at any one time. Install and maintain barricades and warning devices around open trenches.
- G. Place steel plates with minimum dimensions of 4' x 8' x 1" to bridge open trenches crossing roadways. Secure the plates against the possibility of shifting or dropping into the excavation. During winter months, do not leave these plates in the roadway overnight unless approved by the OWNER.
- H. Unstable Foundation
 - 1. Remove and replace undesirable material below the trench bottom, manhole or any structure, such as organic soils, etc., which cannot adequately support the sewer, with crushed stone. OWNER will pay for additional excavation and stone fill in accordance with the prices listed in the Schedule of Supplemental Unit Prices. Where the distance to stable ground is excessive, the OWNER reserves the right to order, in writing, as an extra, such other types of foundation as deemed necessary.
 - 2. Inform ENGINEER immediately, and later in writing, of all locations of unstable trench conditions where additional stone fill is required.
- I. Pipe Bedding Sections & Materials
 - 1. Use one of the following bedding sections for pipe line construction, unless otherwise stated in the Special Provisions.
 - 2. Standard Section, Class C
 - a. Excavate trench to allow 4-inches of bedding material under the pipe barrel and 3-inches of bedding material under the bell.
 - b. Place and compact bedding material to springline of the pipe.

- c. Place and compact excavated material to a point 2 feet above the top of the pipe. Acceptable excavated material is free of stones larger than 2-inches in diameter, sections of concrete, or any material considered unsuitable for backfill by the ENGINEER.
 - d. Acceptable bedding material is shown in Table 33 05 22.00-2, Table 33 05 22.00-3 or Table 33 05 22.00-4 (located at the end of this section).
 - e. Fill excess depth with Class D concrete or crushed stone if excavation is deeper than 6-inches below the pipe barrel.
3. Compacted Section, Class B
- a. Excavate trench to allow 4-inches of bedding material under the pipe barrel and 3-inches of bedding material under the bell.
 - b. Place and compact bedding material to a point 12-inches above the top of the pipe.
 - c. Acceptable bedding material is shown in Table 33 05 22.00-2, Table 33 05 22.00-3 or Table 33 05 22.00-4 (located at the end of this section).
 - f. Fill excess depth with Class D concrete or crushed stone if excavation is deeper than 6-inches below the pipe barrel.
4. Submit bedding material sieve analysis to ENGINEER prior to the beginning of construction.
5. Provide up to an additional 3-inches of crushed stone below the 4-inch pipe bedding as required to facilitate trench drainage in wet trench conditions. Include in the unit price bid per foot of pipe line.

J. Backfilling Trenches

1. Excavated Material for Backfill
- a. Acceptable excavated material: loam, clay or other materials that, in the judgment of the ENGINEER, are suitable for backfilling.
 - b. Unacceptable backfill materials: vegetable or other organic matter, all types of refuse, large pieces or fragments of concrete, large stones or boulders and such other material as in the judgment of the ENGINEER are unsuitable for backfilling, and frozen backfill.
 - c. Replace unacceptable excavated material with suitable clay, loam, or gravel backfill upon the written order of the OWNER as an extra.
 - d. Backfill the trench section above the bedding section of all pipe lines to a level 3 feet above the pipe with material free of any stones or concrete larger than 3-inches in diameter.

e. Do not use excavated rock within 10 feet of any manhole.

2. Special Backfill

a. Backfill with special backfill under aggregate bases or paved surfaces.

b. Acceptable material:

1) 1¼-inch base aggregate dense.

c. Mechanically compact special backfill.

K. Surface Restoration

1. Restore the project area to a "before construction" condition. The opinion of the OWNER is final in determining the condition of the project site restoration.

2. Restore asphalt, concrete or gravel surfaces in accordance with the requirements of the base aggregates, asphaltic concrete paving, concrete pavements, concrete curb & gutter, concrete sidewalk & driveway, and pavement and resurfacing specifications.

3. Restore unpaved surfaces in accordance with the requirements of the landscaping specification.

L. Compaction of Trench Backfill

1. Compaction Requirements (see Table 33 05 22.00-1, located at the end of this section).

2. Acceptable Methods

a. Mechanical Compaction

1) Compact initial lift to 2 feet thick.

2) Compact subsequent lifts to 12-inches to 15-inches thick.

M. Notify ENGINEER and OWNER a minimum of 48 hours prior to commencing work.

3.4 PIPE BORING & JACKING

A. CONTRACTOR'S Option

1. For pipe installations shown as open cut, CONTRACTOR may bore or jack pipe at CONTRACTOR's expense unless specified elsewhere or indicated on the drawings.
2. Submit for review details giving the limits of the proposed jacking or boring, the method and equipment to be used and the location of the shaft, pit or approach tunnel.
3. Obtains permits and conform to the requirements of the railroad or highway permit issued for this work.

B. Boring

1. Unless the Railroad or Highway Department has a preference, bore using one of the following methods:
 - a. Push conduit pipe into the earth as the boring auger drills out the ground.
 - b. Drill hole through the earth and push the conduit pipe into the hole after the drill auger has completed the bore.
2. Bore hole larger than the outside diameter of the bell of the pipe to be installed.
3. Boring without a casing pipe is limited to a maximum of 16 feet with no water pipe joint permitted within the bore.

C. Jacking

1. Do not perform jacking: 1) in dry sand; 2) in gravelly soil known to contain large boulders; 3) through fills where logs or stumps are known to exist; or 4) where it is impractical to lower the water table below the excavation.
2. Test soil conditions by boring or sampling before deciding upon jacking in all questionable soils.
3. Excavate approach trench into the fill, embankment or virgin soil far enough to provide a jacking face of 3-feet or more above the pipe. Securely shore open face to prevent slipping or raveling. Provide a sump for drainage of trench. Provide a backstop of sufficient strength to take thrust of jack.

D. Casing Pipes

1. Meet the requirements of the highway department or the railroad.

E. Inserted Pipe

1. The carrier pipe shall be as specified in the Special Provisions, if applicable.

2. Support and brace sewer pipe to prevent shifting or flotation. Fill annular space between carrier pipe and casing pipe with blown sand or cement grout.
3. Install inserted pipe to line and grade shown on the drawings or as directed by the ENGINEER. Failure to install the casing pipe that permits installation of the carrier pipe to the specified grade may be cause for rejection of the work.
4. Water Main:
 - a. Support carrier pipe with Pipe Line Seal & Insulator, Inc. (PSI)'s stainless steel casing spacers.
 - b. Install spacers a maximum of 1 foot from ball and flange of each pipe.
 - c. Install spacers a maximum of 10 feet apart.
 - d. Do not fill annular space.
 - e. Install PSI, Model W, wrap-around casing end seal.

3.5 ROCK REMOVAL

A. Rock Classification

1. Includes:
 - a. Solid or ledge rock, including shale and slate, sandstone or other hard materials that are not decomposed, weathered, loose, layered or shattered, and require the continuous use of pneumatic tools, drilling and blasting, or heavy ripping.
 - b. Boulders and pieces of concrete or masonry exceeding 2,000 pounds in weight, or one-half (½) cubic yard in volume.
2. Provide the ENGINEER sufficient notice (at least 24-hours) in order to make the measurements necessary for volume computation.

B. Removal by Blasting

1. Comply with requirements of Wisconsin Administrative Code Section Ind. 5 and local ordinances.
2. Damage to Existing Facilities
 - a. Remove damaged facilities and reconstruct them, or furnish materials and perform such work or repairs or replacements as the OWNER may order.
 - b. Repair or replace at own expense.

- c. CONTRACTOR is responsible for any and all damages and claims arising from such blasting or by accidental explosions, and for the defense of all actions arising from such causes.
 - 3. Blasting Subcontractor
 - a. Furnish a certificate of insurance to the OWNER for the limits specified in the General Requirements.
 - b. Provide the OWNER proof that they have the proper Blasters' License Classification, as defined in the Wisconsin Administrative Code Department Of Commerce (DOC), Chapter Ind. 5.12 to perform the work in this project.
- C. Pre-Blast Survey
 - 1. Perform a pre-blast survey on all buildings and improvements within and adjacent to the area of rock removal.
 - 2. Survey includes:
 - a. Videotapes or compact discs of improvements, building exteriors and building interiors, where access can be obtained from property owners.
 - b. Inspection results and confirmation of contact with property owners.
 - 3. Notify in writing each property owner located adjacent to an area to be blasted of the proposed schedule for blasting at least 1-week prior to the date blasting is scheduled for that area. Provide ENGINEER and OWNER a copy of the notification.
- D. Blasting Requirements
 - a. Perform all blasting within public highway right-of-way either directly or under direct supervision of a qualified blaster who has a currently effective Class IV Blaster's License issued by the State of Wisconsin. Provide copies of the license verifying class and issuance dates to the ENGINEER within 30-days of contract award.
 - b. Comply with all state and federal codes applicable to the storage and use of explosives and, particularly, to the Explosives and Blasting Codes as administered by the Wisconsin Department Commerce (DOC), Chapter IND 5, Mine Safety Section. [The provisions specified in the Federal (OSHA) Standards; these specifications; and local codes and ordinances.] Copies of the code are available from "WI Department of Administration, Document Sales and Distribution Section, 202 South Thornton Avenue, P.O. Box 7840, Madison, WI 53707-7840"; "docsales@doa.state.wi.us"; or "[http://www.doa.state.wi.us/section detail.asp](http://www.doa.state.wi.us/section_detail.asp)".
 - c. Notify appropriate officials of the Mine Safety Section of the State of Wisconsin DOC prior to any of the proposed blasting. Do not commence blasting until the said department has indicated its approval or its non-objection.

- d. Notify by contacting:
 - Wisconsin Department of Commerce
 - Mine Safety Section
 - 201 East Washington Avenue, Room #103
 - Madison, WI 53703
 - Telephone: (608) 266-7529
- e. Provide sufficient warning signs and devices and perform operations in a manner to assure that persons and properties are protected from injury or damage throughout all phases of the work.
- f. Provide precautions against the use of radio-frequency devices in blasting environments.
- g. Confine blasting operations to hours approved by the OWNER. Do not perform blasting over any weekend or on any holiday.
- h. Notify public utilities, private or cooperatively owned utilities and the owner and occupants of properties that might be affected by the work.
- i. Signs for Blasting Areas
 - 1) Consult the Institute of Makers of Explosives, Publication No. 20, "Radio Frequency Energy, A Potential Hazard in the Use of Electric Blasting Caps", for information on guidelines for safe operation. This publication provides tables of recommended safety distances, which will give the blaster a high degree of assurance that their blasting layout should be safe against radio frequency (RF) initiation.
 - a) Blasting Zone Sign (W22-1)
 - (1) Provide a **BLASTING ZONE (1000) FT** sign in advance of the **TURN OFF 2-WAY RADIO** and **END BLASTING ZONE** signs. Cover or remove the sign sequence when there are no explosives in the area or the area is otherwise secured.
 - b) Turn Off 2-Way Radio (W22-2)
 - (1) Provide **TURN OFF 2-WAY RADIO** sign in advance of the **BLASTING ZONE (1000) FT** sign and **END BLASTING ZONE** sign at least 1,000-feet from the beginning of the blasting zone. Cover or remove the sign sequence when there are no explosives in the area or the area is otherwise secured.

c) End Blasting Zone (W22-3)

- (1) Provide **END BLASTING ZONE** sign a minimum of 1,000-feet beyond the blasting zone.

E. Vibration Limitation & Recording

1. Furnish, install and operate instrumentation and provide a qualified blasting specialist to supervise the installation of the instruments and interpret the recorder results.
2. Submit plan for monitoring blasting operations to assure compliance with the vibration limitation prior to commencement of the blasting operations. Include the following in the plan:
 - a. Recommended vibration limitation.
 - b. Seismograph recordings of vibrations for each blasting occurrence.
 - c. Names of the trained personnel provided to operate the equipment and interpret the recordings.
3. Prove blasting so that vibrations reaching adjacent structures and facilities are within safe limits.
4. Monitor vibrations by measuring the peak particle velocity in the vicinity of blasting. Peak particle velocity is the maximum of the three (3) velocity components, measured in three (3) mutually perpendicular directions at any point by an appropriate instrument. Do not exceed 2.0-inches per second peak particle velocity on or at the structure closest to the point of blasting operations.
5. Measure the air blast pressure with an instrument making a permanent record for each blast when blasting at the ground surface is conducted in the vicinity of a structure susceptible to damage. Do not exceed 0.01 psi mean peak over-pressure at the nearest structure or at the nearest project property line, except as modified herein.
6. Blast Vibration Specialist
 - a. Supervise establishment of the program and initial operation of the equipment.
 - b. Visit the job site at least once per week
 - c. Inspect the recording program and interpretation of records.
 - d. Check the operations.
 - e. Provide the ENGINEER with a comprehensive written report of the vibration measuring program and an analysis of the velocity and over-pressure recordings within 30-days after completion of the blasting operations,

7. Suspend blasting operations immediately in the event any recordings indicate that the vibration limits are being exceeded. Report this Immediately to the ENGINEER. Reduce the size of loads, use millisecond delay detonators, or take other appropriate measures to reduce the resulting vibrations.
8. Provide results and interpretation of all blasting records to the ENGINEER within 24-hours of blasting.

F. Blasting Records

1. Provide a record of each blast detonated and make records available to the OWNER at all times. Include the following:
 - a. Depth of blast holes and the location of the blast point in relation to the project stationing.
 - b. Type and strength of explosives, type of blasting caps and distribution of delays used.
 - c. Vibration record.
 - d. Total explosive loading per round and per delay.
 - e. Comments by the blaster in charge regarding any misfires, unusual results or unusual effects.
 - f. Date and exact time of blast.
 - g. Name of person in responsible charge of loading and firing and blaster permit number.
 - h. Signature and title of person making recording entries.
 2. Any other records required by State in which the work is performed, and local codes and regulations.
- G. Provide personnel fully trained in their respective duties as part of the directional drilling crew and in safety
- H. Provide project specific training if any potential hazards may be encountered which have not already been included in personnel's training.

END OF SECTION

TABLE 33 05 22.00-1

Excavated Area	Percent Compaction Fine-Grained Soil	Percent Compaction Coarse-Grained Soil	Relative Density *
Within 10' of building lines under footings, floor slabs and structures attached to buildings (i.e., walls, stoops, steps); and the upper 4' or a distance twice the trench width, whichever is greater, of any trench located under any concrete or asphalt paved surfaces.	90%	95%	70%
10' beyond building lines under walks, driveways, curbing, concrete or asphalt paving; sub-grade preparation; and the remaining section of any trench located under these paved surfaces.	80%	90%	60%
10' beyond building lines under seeded, sodded and landscaped areas, and any trench located under these areas.	80%	90%	---

Coarse-grained soils are classified as those soils with more than 50% (by weight) larger than the No. 200 mesh sieve and with a plastic index less than 4.

Compaction requirements maximum density shall be determined by AASHTO Designation T99, Method C, with replacement of the fraction of material retained in the 3/4-inch sieve with No. 4 to 3/4-inch material.

** Minimum relative density requirements apply to coarse-grained soils and apply only in cases where the percentage compaction requirements are not being reached.*

TABLE 33 05 22.00-2

BEDDING MATERIAL FOR SEWERS 18-INCHES IN DIAMETER OR LESS

Crushed pit-run gravel, pea gravel or crushed stone chips shall conform substantially to these grading requirements: (3/8-inch size).

Sieve Size	Percentage Passing By Weight
1-inch	100
3/4-inch	95-100
3/8-inch	30-55
No. 4	0-10
No. 8	0-5

TABLE 33 05 22.00-3

BEDDING MATERIAL FOR SEWERS LARGER THAN 18-INCHES IN DIAMETER

Crushed pit-run gravel, pea gravel or crushed stone chips shall conform substantially to these grading requirements: (3/4" size).	
Sieve Size	Percentage Passing By Weight
1-inch	100
3/4-inch	95-100
3/8-inch	20-55
No. 4	0-10

TABLE 33 05 22.00-4

BEDDING MATERIAL FOR WATER MAINS & FORCE MAINS

Bedding sand shall consist of durable particles ranging in size from fine to coarse in a substantially uniform combination. Unwashed bank-run sand, rejected concrete sand and crushed bank-run gravel will be considered generally acceptable under this specification. The presence of approximately 6% of fine clay or loam particles is desirable, but clay or loam lumps are not permitted. The maximum moisture content shall be 10%. Bedding sand shall conform substantially to these grading requirements:	
Sieve Size	Percentage Passing By Weight
1-inch	100
No. 16	45-80
Material Finer Than No. 200	2-10

SECTION 33 40 00.00

STORM SEWERAGE

PART 1 - GENERAL

1.1. SECTION INCLUDES

- A. Storm sewer, manholes, inlets, cleanouts, fittings and accessories.

1.2. RELATED SECTIONS

- A. Section 31 23 19.00 – Dewatering
- B. Section 33 05 22.00 – Utility Trenching and Backfilling

1.3. MEASUREMENT PROCEDURES

A. Storm Sewer Main:

1. Measure by distance in lineal feet.
2. Measure from centerline of manhole to centerline of manhole or end of pipe size specified.
3. Do not measure through end sections.

B. Manholes:

1. Measure by height (vertical distance) in vertical feet.
2. Measure from invert (flow line) of lowest outgoing pipe to top of manhole casting.

C. Inlet and Catch Basin Leads:

1. Measure by distance in lineal feet.
2. Measure from centerline of manhole to centerline of inlet (catch basin) or from centerline of inlet (catch basin) to centerline of inlet (catch basin).

D. Storm Sewer Laterals:

1. Measure by distance in lineal feet.
2. Measure from outer wall of storm sewer main to end of storm sewer lateral.

- E. Endwalls & Outfall Structures:
 - 1. Measure on an each basis.
- F. Inlets & Catch Basins
 - 1. Measure on an each basis.
 - 2. Include structure, adjusting rings and casting as one unit.
- G. Cleanouts:
 - 1. Measure on an each basis.
 - 2. Include wye, bends and cleanout cover as one unit.

1.4. REFERENCES

- A. AASHTO M-36 - Corrugated Steel Pipe, Metallic-Coated, For Sewers & Drains.
- B. AASHTO M-167 - Corrugated Steel Structural Plate, Zinc-Coated, For Field-Bolted Pipe, Pipe-Aches & Arches.
- C. AASHTO M-190 - Bituminous Coated Corrugated Metal Culvert Pipe & Pipe-Arches.
- D. AASHTO M-198 - Joints For Concrete Pipe, Manholes & Precast Box Sections Using Preformed Flexible Joint Sealants.
- E. AASHTO M-294 - Corrugated Polyethylene Pipe, 300 to 1200-mm Diameter.
- F. ASTM C-76 - Standard Specification For Reinforced Concrete Culvert, Storm Drain & Sewer Pipe.
- G. ASTM C-443 - Standard Specification For Joints For Concrete Pipe & Manholes, Using Rubber Gaskets.
- H. ASTM C-478 - Standard Specification For Precast Reinforced Concrete Manhole Sections.
- I. ASTM C-507 - Standard Specification For Reinforced Concrete Elliptical Culvert, Storm Drain & Sewer Pipe.
- J. ASTM C-655 - Standard Specification For Reinforced Concrete D-load Culvert, Storm Drain & Sewer Pipe.
- K. ASTM D-471 - Standard Test Method For Rubber Property - Effect Of Liquids.
- L. ASTM D-1784 - Standard Specification For Rigid Poly(Vinyl Chloride)(PVC) Compounds & Chlorinated Poly(Vinyl Chloride)(CPVC) Compounds.

- M. ASTM D-2321 - Standard Practice For Underground Installation Of Thermoplastic Pipe For Sewers & Other Gravity-Flow Applications.
- N. ASTM D-3034 - Standard Specification For Type PSM Poly(Vinyl Chloride)(PVC) Sewer Pipe & Fittings.
- O. ASTM D-3212 - Standard Specification For Joints For Drain & Sewer Plastic Pipes Using Flexible Elastomeric Seals.
- P. ASTM D-3350 - Standard Specification For Polyethylene Plastics Pipe & Fittings Material.
- Q. ASTM F-477 - Standard Specification For Elastomeric Seals (Gaskets) For Joining Plastic Pipe.
- R. ASTM F-679 - Standard Specification for Poly(Vinyl Chloride)(PVC) Large Diameter Plastic Gravity Flow Sewer Pipe & Fittings.
- S. ASTM F-794 - Standard Specification For Poly(Vinyl Chloride)(PVC) Profile Gravity Sewer Pipe & Fittings, Based On Controlled Inside Diameter.
- T. ASTM F-949 - Standard Specification For Poly(Vinyl Chloride)(PVC) Corrugated Sewer Pipe With A Smooth Interior & Fittings.
- U. ASTM F-2736 – Standard Specification for 6 to 30 In. Polypropylene (PP) Corrugated Single Wall and Double Wall Pipe
- V. ASTM F-2881 – Standard Specification for 12 to 60 In. Polypropylene (PP) Dual Wall Pipe and Fittings for Non-Pressure Storm Sewer Applications

1.5. SHOP DRAWINGS

- A. Supply shop drawings for manholes, catch basins, inlets, castings, lateral connections and all other appurtenances.
 - 1. Submit a minimum of four (4) sets of shop drawings.

1.6. QUALITY ASSURANCE / CONTROL SUBMITTALS

- A. Submit manufacturer’s test report.
- B. Submit Certificate Of Conformance signed by authorized agent of the manufacturer or supplier.

1.7. CLOSEOUT SUBMITTALS

- A. Record Drawings:
 - 1. Submit one (1) set of record drawings to ENGINEER at completion of project.

2. Prepare record drawings by marking up a set of drawings showing all changes from the original drawings.
3. Show underground exterior sewers, underground interior sewers, gas lines, water lines, electrical conduit, telephone cable, and any other underground facilities encountered during construction.
4. Keep record drawings in a clean location during construction.
5. Show the following measurement on the record drawings:
 - a. Length between manholes, based upon center of castings.
 - b. Manhole depths, rim to invert, and any other pipe elevations within the manhole.
 - c. Length of lateral, measured horizontally from the outer wall of the sewer main to the end of the lateral pipe.
 - d. Lateral location, measured from center of downstream manhole to wye or tee.
 - e. Length of riser, measured from the outer wall of the sewer main to the bend point.
 - f. Depth of lateral at the property line, measured from the top of the pipe to the ground elevation (preferably sidewalk or curb).
 - g. Inlet locations, station and offset.
 - h. Inlet lead length, based upon center of castings.

1.8. DELIVERY, STORAGE & HANDLING

A. Receiving & Storing Pipe & Accessories:

1. Check all pipe and accessories for loss or damage in transit when received from the carrier and at the time of unloading.
2. Check all pipe for proper identification markings as required for the specific material and that the pipe and accessories delivered to the site meet the appropriate material specifications.
3. Reject delivered pipe and accessories until Items 1. and 2. (above) have been satisfied.
4. Store pipe and accessories in accordance with the storage requirements and recommendations of the manufacturer.

5. Unload and distribute pipe and accessories using adequate and proper equipment so as not to damage the material.
6. Remove material not meeting specifications or found to have cracks, flaws or other defects by the CONTRACTOR, ENGINEER or OWNER.

PART 2 - PRODUCTS

2.1 MATERIALS - SEWER PIPE

A. Polyvinyl Chloride (PVC) SDR Pipe SDR 35 & Fittings:

1. Conform To:
 - a. ASTM D-3034 - Standard Specification For Type PSM Poly(Vinyl Chloride)(PVC) Sewer Pipe & Fittings.
 - b. ASTM D-3212 - Standard Specification For Joints For Drain & Sewer Plastic Pipes Using Flexible Elastomeric Seals.
 - c. ASTM F-477 - Standard Specification For Elastomeric Seals (Gaskets) For Joining Plastic Pipe.
2. Deliver pipe and fittings marked as follows (pipe marked every 5 feet or less):
 - a. Manufacturer's name or trademark.
 - b. Nominal pipe size.
 - c. The PVC cell classification, e.g., 12454.
 - d. The legend "SDR-35 PVC Sewer Pipe".
 - e. ASTM Designation D-3034.
3. Deliver all pipe and fittings on any one (1) project from one (1) manufacturer.
4. Acceptable Pipe Sizes: 4-inch through 15-inch.

B. Polyvinyl Chloride (PVC) Ribbed Sewer Pipe:

1. Conform To:
 - a. ASTM D-3212 - Standard Specification For Joints For Drain & Sewer Plastic Pipes Using Flexible Elastomeric Seals.
 - b. ASTM F-477 - Standard Specification For Elastomeric Seals (Gaskets) For Joining Plastic Pipe.

- c. ASTM F-794 - Standard Specification For Poly(Vinyl Chloride)(PVC) Profile Gravity Sewer Pipe & Fittings Based On Controlled Inside Diameter.
 2. Deliver pipe and fittings marked as follows (pipe marked every 5 feet or less):
 - a. Manufacturer's name or trademark.
 - b. Nominal pipe size.
 - c. The PVC cell classification, e.g., 12454-C.
 - d. The legend "PS46 PVC Sewer Pipe" or "PS10 PVC Sewer Pipe".
 - e. ASTM Designation F-794.
 3. Deliver all pipe and fittings on any one (1) project from one (1) manufacturer.
 4. Acceptable Pipe Sizes: 4-inch through 48-inch.
 5. Install to depths of twenty (20) vertical feet or less, as measured from the pipe invert to the existing or future ground elevation, whichever is greater.
- C. Polyvinyl Chloride (PVC) Corrugated Sewer Pipe:
1. Conform To:
 - a. ASTM F-477 - Standard Specification For Elastomeric Seals (Gaskets) For Joining Plastic Pipe.
 - b. ASTM F-679 - Standard Specification For Poly(Vinyl Chloride)(PVC) Large-Diameter Plastic Gravity Sewer Pipe & Fittings.
 - c. ASTM F-949 - Standard Specification For Poly(Vinyl Chloride)(PVC) Corrugated Gravity Sewer Pipe with a Smooth Interior & Fittings.
 2. Deliver pipe and fittings marked as follows (pipe marked every 5 feet or less):
 - a. Manufacturer's name or trademark.
 - b. Nominal pipe size.
 - c. The PVC cell classification, e.g., 12454.
 - d. Designation "ASTM F-949 (46 psi)" or "ASTM F-949 (115 psi).
 - e. Extrusion code, including date and location of manufacturer.
 3. Deliver all pipe and fittings on any one (1) project from one (1) manufacturer.
 4. Acceptable Pipe Sizes: 4-inch through 36-inch.

D. High Density Polyethylene (HDPE) Corrugated Pipe:

1. Conform To:
 - a. AASHTO M-294 - Corrugated Polyethylene Pipe, 300 to 1500-mm Diameter.
 - b. ASTM D-3350 - Standard Specification For Polyethylene Plastics Pipe & Fittings Material Resin Cell Classification 33543OC.
2. Deliver pipe and fittings marked as follows (pipe marked every 5 feet or less):
 - a. Manufacturer's name or trademark.
 - b. Nominal pipe size.
 - c. Plant designation code.
 - d. AASHTO Designation M-294.
 - e. Date of manufacture or an appropriate Code.
3. Deliver all pipe and fittings on any one (1) project from one (1) manufacturer.
4. Acceptable pipe sizes: 12-inch through 60-inch.
5. Type S pipe with outer corrugated pipe wall and a smooth inner liner.

E. Polypropylene Pipe:

1. Conform To:
 - a. ASTM-F-2736 – Standard Specification for 6 to 30 In. Polypropylene (PP) Corrugated Single Wall And Double Wall Pipe
 - b. ASTM F-2881 - Standard Specification For 12 to 60 In. Polypropylene (PP) Dual Wall Pipe and Fittings for Non-Pressure Storm Sewer Applications
2. Deliver pipe and fittings marked as follows (pipe marked every 5 feet or less):
 - a. Manufacturer's name or trademark.
 - b. Nominal pipe size.
 - c. Plant designation code.
 - d. AASHTO Designation M-294.

- e. Date of manufacture or an appropriate Code.
 - 3. Deliver all pipe and fittings on any one (1) project from one (1) manufacturer.
 - 4. Acceptable pipe sizes: 12-inch through 60-inch.
 - 5. Dual wall pipe with outer corrugated pipe wall and a smooth interior wall.
 - 6. Dual gasket joints.
- F. Corrugated Metal Pipe:
- 1. Conform To:
 - a. AASHTO M-36 - Corrugated Steel Pipe, Metallic-Coated For Sewers & Drains.
 - b. AASHTO M-167 - Corrugated Steel Structural Plate, Zinc-Coated For Field-Bolted Pipe, Pipe-Aches & Arches.
 - c. AASHTO M-190 - Bituminous Coated Corrugated Metal Culvert Pipe & Pipe-Arches.
 - 2. Acceptable Pipe Sizes: Conform to Table 33 40 00.00-1 and Table 33 40 00.00-2 at end of this section.
 - 3. Acceptable Coupling Band Sizes:
 - a. A minimum of 7-inches wide for diameters of 8-inches through 30-inches.
 - b. A minimum of 12-inches wide for pipe with diameters 36-inches through 60-inches.
 - c. A minimum of 24-inches wide for pipe with diameters greater than 60-inches. Construct bands to lap on an equal portion of each of the pipe sections to be connected and preferably connect at the ends by galvanized angles having minimum dimensions of 2-inches x 2-inches x 3/16-inch.
 - 4. Acceptable Coupling Band Thickness:
 - a. Minimum 0.052-inch thick (18 gauge).
 - b. For smooth lined pipe, minimum 0.064-inch thick (16 gauge).
 - 5. Bituminous Coated Corrugated Metal Pipe:
 - a. Minimum coating thickness (inside and outside) of 0.05-inches measured on the crests of the corrugations.
 - 6. Bituminous Coated & Paved Corrugated Metal Pipe & Pipe Arch:

- a. Minimum pavement width of one-quarter ($\frac{1}{4}$) the circumference, centered over the flat-bottom section of the pipe arch.
- b. Minimum pavement thickness of 1/8-inch and a maximum thickness of $\frac{1}{2}$ -inch above the crest of the corrugations.

7. Smooth-Lined Corrugation Metal Pipe:

- a. Apply pavement by a centrifugally spun method to a minimum thickness of 1/8-inch and a maximum thickness of $\frac{1}{2}$ -inch above the crests of the corrugations.
- b. Locate rivets in the inside valleys of the corrugations.
- c. Form butt joint between connecting pipes with a tolerance of $\frac{1}{4}$ -inch. When the joint opening between two (2) coupled pipes exceeds $\frac{1}{4}$ -inch, fill this entire space with approved bituminous filler material.

G. Reinforced Concrete Pipe:

1. Conform To:

- a. ASTM C-76 - Standard Specification For Reinforced Concrete Culvert, Storm Drain & Sewer Pipe.
- b. ASTM C-443 - Standard Specification For Joints For Concrete Pipe & Manholes, Using Rubber Gaskets.
- c. ASTM C-507 - Standard Specification For Reinforced Concrete Elliptical Culvert, Storm Drain & Sewer Pipe.
- d. ASTM C-655 - Standard Specification For Reinforced Concrete D-Load Culvert, Storm Drain & Sewer Pipe.
- e. ASTM D-471 - Standard Test Method For Rubber Property - Effect Of Liquids.

2. Deliver pipe and fittings marked as follows (pipe marked every 5 feet or less):

- a. Class of pipe.
- b. Nominal pipe size.
- c. Date of manufacture.
- d. Name or trademark of the manufacturer.

3. Deliver all pipe and fittings on any one (1) project from one (1) manufacturer.

4. Acceptable Pipe Sizes: All sizes.

5. Acceptable Pipe Classes: Class III or greater.
6. Cure pipe no less than 7-days prior to incorporation into the work.
7. Joints:
 - a. Rubber O-ring type gaskets conforming to the requirements of ASTM C-443.
8. Fittings & Connections:
 - a. Precast fittings unless otherwise specified in the Special Provisions.
9. Inspection & Rejection:
 - a. Inspect pipe at the job site. ENGINEER may also inspect pipe.
 - b. Reject Pipe Due To Any Of The Following:
 - 1) Variations in any dimensions exceeding that allowed in the ASTM standard.
 - 2) For bell and spigot pipe, fractures or cracks passing through the barrel or socket, except that a single crack not exceeding 2-inches in length at either end of pipe or a single fracture in the socket not exceeding 3-inches in width nor 2-inches in length shall not be considered cause for rejection unless these defects exist in more than 5% of the entire shipment or delivery. For tongue and groove pipe, fractures or cracks through the barrel except for a single crack that does not exceed the depth of the joint and can be effectively sealed.
 - 3) Blisters where the surface is broken or which project more than 1/8-inch above the surface.
 - 4) Defects that indicate imperfect proportioning, mixing and molding.
 - 5) Surface defects indicating honeycombing or open texture.
 - 6) Cracks sufficient to impair the strength, durability or serviceability of the pipe.
 - 7) Damaged ends, where such damage would prevent making a satisfactory joint.
 - 8) Variation of more than 1/8-inch per lineal foot in alignment of pipe intended to be straight.

- 9) Failure to give a clear ringing sound when placed on end and dry-tapped with a light hammer.
 - 10) Insecure attachment of spurs on branches and fittings.
 - 11) The complete absence of distinct web-like markings from the external surface of the pipe made by any process in which the forms are removed immediately after the concrete has been placed, which is indicative of a deficiency of water in the concrete mix, unless all specimens submitted for test that do not have such web-like markings have passed the physical tests required by the specifications.
- c. Stamp rejected pipe "Rejected".
 - d. Do not deface or otherwise damage pipe.
 - e. Replace all rejected pipe with pipe that conforms to ASTM Standards at no expense to OWNER.

2.2 MANHOLES

A. Conform To:

- 1. AASHTO M-198 Joints for Concrete Pipe, Manholes & Precast Box Sections Using Preformed Flexible Joint Sealants.
- 2. ASTM C-443 - Standard Specification For Joints For Concrete Pipe & Manholes, Using Rubber Gaskets.
- 3. ASTM C-478 - Standard Specification For Precast Reinforced Concrete Manhole Sections.

B. Precast Manhole Sections:

- 1. Acceptable joints and gaskets.
- 2. Rubber gaskets conforming to ASTM C-433.
- 3. An approved butyl joint sealant meeting the requirements of AASHTO M-198.
- 4. Reject gaskets, if they show surface checking, weathering or other deterioration prior to installation.
- 5. Acceptable Manhole Steps:
 - a. Specified on the contract drawings or in Special Provisions.
- 6. Acceptable adjusting rings.

7. Precast Concrete:
 - a. Manhole base section.
 - b. Integrally cast bottom and barrel section.
 - c. Factory manufactured invert.
 - d. Field constructed invert.
 - e. Appropriate opening sizes to accept sewer pipes.

C. Inspection & Rejection:

1. Inspect manhole sections and cones upon arrival at job site.
2. Reject Manhole Sections & Cones For Any Of The Following Reasons:
 - a. Fracture or cracks passing through the wall, except for a single end crack that does not exceed the depth of the joint.
 - b. Defects that indicate imperfect proportioning, mixing and molding.
 - c. Surface defects indicating honeycombed or open texture.
 - d. Damaged ends, where such damage would prevent making a satisfactory joint.
 - e. Manhole steps out of line or not properly spaced.
 - f. Internal diameter of the manhole section varying more than 1% from the nominal diameter.
 - g. Any continuous crack having a surface width of 0.01-inch or more and extending for a length of 12-inches or more, regardless of position in the section wall.

D. Manhole Castings:

1. Furnish and install manhole casting type specified in the detail drawings or in the Special Provisions.

E. Pipe To Manhole Connections:

1. Flexible pipe to manhole connections are not required.
2. Water stops required on all plastic pipe.

2.3 CATCH BASINS & INLETS

A. Definition:

1. Inlet: A storm water inlet of precast construction without a sump.
2. Catch Basin: A storm water inlet of precast construction having a sump.
3. The detail and size of the inlet or catch basin are specified on the contract drawings or Special Provisions.

2.4 SEWER SERVICE LATERALS

A. Connections To New Sewers:

1. Connect using in-line wyes or tees factory fabricated of the same material as the sewer main.
2. Provide wyes with the proper bend to permit laying of the lateral at right (90°) angles to the sewer main.

B. Connections To Existing Sewers:

1. PVC Sewer Main:

- a. PVC water-proof saddles of the same pipe composition and brand as the existing sewer main.
- b. Provide stainless steel bands on each side of the saddle.

2. Concrete, Asbestos Cement Or Vitrified Clay Sewer Main:

a. Saddle Connection:

- 1) Cast iron or aluminum saddles.
- 2) Provide stainless steel bands on each side of the saddle.

b. Rubber Boot Connection:

- 1) Conform to ASTM C-443.
- 2) Submit a shop drawing of the connection materials prior to installation.

3. Other Materials Main:

- a. Submit the proposed fitting material to be used for lateral connections the ENGINEER for review prior to installation.

C. Lateral Pipe and Fittings:

1. Schedule 40 PVC.

D. Cleanouts

1. Riser pipe material to be Schedule 40 PVC.
2. Frost sleeve material to be Schedule 40 PVC unless in vehicular travel areas. Cast iron to be used in vehicular travel areas.
3. Threaded cap required for both riser pipe and frost sleeve.

PART 3 - EXECUTION

3.1 INSTALLATION - SEWER PIPE

A. General Requirements:

1. Related Section:
 - a. Section 33 05 22.00 – Utility Trenching and Backfilling.
2. References:
 - a. ASTM D-2321 - Standard Practice For Underground Installation Of Thermoplastic Pipe For Sewers & Other Gravity-Flow Applications.
3. Lower all pipe, fittings and accessories into the trench in such a manner as to prevent damage to the materials.
4. Do not drop or dump materials into the trench. Clean foreign matter or dirt from within the pipe before installation.
5. Install pipe to uniform line and grade. Reject work with noticeable variations from true alignment and grade. Insert pipe to ensure that the entering pipe is forced tightly against the last pipe installed. Hold pipe firmly in place while backfill is being placed around the pipe in order to ensure against any movement from true alignment or grade.
6. Install pipe starting at the lowest point in the proposed sewer line. Install pipe with the bell end of the bell and spigot pipe or with the receiving groove end of tongue and groove pipe pointing upgrade. Install pipe so that each pipe rests upon the full length of its barrel with holes excavated to accommodate bells where bell and spigot are used.
7. Heat the pipe and jointing materials so as to prevent freezing of the joint. Do not install pipe on frozen ground.

8. Install sewer pipe, including laterals, (except reinforced concrete pipe) using Class B bedding. Install reinforced concrete pipe using Class C bedding. Install other bedding types as specified in the contract drawings and specifications and meet the requirements set forth in Section 31 20 00.00 – Earthwork, Pipeline Trenching, Backfilling & Compacting.
9. Install red plastic coated #10 AWG solid copper tracer wire to all storm sewer main, inlet, catch basin and yard drain leads and lateral pipe. Tracer wires along leads and laterals to be solder connected to the tracer wire along the main line. Tracer wires are to be securely attached to each pipe length a minimum of three times. Tracer wires are to be fastened to the inside of all manhole, inlet, catch basin and yard drain structures below the casting with an OWNER approved anchor, leaving a 24-inch pigtail. Tracer wire to be securely fastened to flared end sections at storm sewer outfalls. A tracer wire test is to be conducted on the complete storm sewer system, witnessed by an OWNER Representative.

B. Class B Bedding:

1. Excavate trench to allow 4-inches of bedding material under the pipe barrel and 3-inches of bedding material under the bell.
2. Place and compact bedding material to a level 12-inches above the top of the pipe.
3. Acceptable bedding material is shown in Tables 33 40 00.00-2 and 33 40 00.00-3.

C. Class C Bedding:

1. Excavate trench to allow 4-inches of bedding material under the pipe barrel and 3-inches of bedding material under the bell.
2. Place and compact bedding material to springline of the pipe.
3. Place and compact excavated material to a point 2 feet above the top of the pipe.
4. Acceptable bedding material is shown in Tables 33 40 00.00-3 and 33 40 00.00-4.

D. Other Bedding:

1. Refer to Section 33 05 22.00 – Utility Trenching and Backfilling for other bedding and backfill requirements.

E. Connections To New Sewers:

1. Install wye or tee branches for service connections at locations directed by the OWNER or ENGINEER.
2. Do not connect sewer service to a manhole without written approval of the OWNER or ENGINEER.

F. Connections To Existing Sewers:

1. OWNER will furnish location information of existing tee or wye. Connect lateral at this location.
2. Cut-in Wye or tee on an existing PVC sewer main.
3. Install saddles of the same pipe composition and brand as the sewer main.
4. Place saddle in the correct position on the pipe and scribe a line marking a saddle opening. Cut hole outlined on the pipe shall using a keyhole or saber saw. Remove disc cut from the pipe from the main sewer. Clean and dry both the bottom surface of the saddle and the mating area on the pipe with a clean cloth dampened with methyl ethyl ketone (MEK) and solvent cement brushed liberally on both mating surfaces. Place saddle over the hole in the pipe and drawn down firmly with a stainless steel strap on each side of the saddle.

G. Connections To Existing Concrete, Asbestos Cement Or Vitrified Clay Main:

1. Cut a circular hole into the main sewer using a mechanically-powered hollow cylindrical bit. Install a cast iron or aluminum saddle centered in the cored hole and secured to the pipe with an epoxy adhesive compatible with the materials. If the saddle cannot be adequately secured to the pipe, strap it to the pipe with stainless steel bands. Do not extend saddle beyond the inner diameter of the sewer main. Connect sewer service lateral to the saddle with an approved flexible water-proof connector secured to each pipe end with stainless steel bands. Backfill and compact the area around the connection with bedding material.
2. The ENGINEER or OWNER must approve other methods of sewer service connection in writing.

H. Lateral Services:

1. Install lateral at uniform grade from the sewer main to the clean-out. Terminate at a minimum depth of 3-feet below finish grade. Laterals installed with less than 3-feet of cover shall require the approval of the ENGINEER. Install lateral at a grade of not less than 0.01% (1%) and not more than 0.02% (2%) unless otherwise specified on the contract drawings and specifications.
2. Install a clean-out at the end of the storm sewer lateral.
3. Mark the end of the sewer lateral with a 2-foot length of 2-inch by 4-inch lumber.
4. Install red plastic coated #10 AWG solid copper tracer wire from main to end of lateral.

3.2 MANHOLES

A. General Requirements:

1. Excavate to the size required for the manhole to be constructed with sheathing and bracing as necessary to protect the workers and prevent loss of ground.
2. Increase or decrease the depth of the manhole as required to meet the requirements of the site conditions as determined by OWNER or ENGINEER.

B. Manhole Castings:

1. Set manhole casting at the elevation given on the contract drawings.
2. Provide concrete adjusting rings between the casting and the precast manhole section, but not more than 9-inches of adjusting rings.

C. Connections To Existing Manholes Or Existing Sewers:

1. Cut a new connection to an existing manhole or sewer structure where there is no connection. Cut a neat hole in the wall of the manhole. Shape the bottom of the manhole to fit the invert of the connection. Insert a length of sewer pipe through the opening. Fill around the pipe with a 1:2 cement mortar. Trowel the cement mortar inside and outside of the manhole to a neat finish.
2. Connect to an existing sewer or manhole connection stub with the same type of material and the same type of joint as the connection stub. No adapter will be accepted. If the pipe materials and/or the joints differ, replace existing connection stub with a new connection stub of the same type of material and joint as the new sewer to be extended.
3. Include the cost for connection to an existing manhole or existing sewer in the unit price bid for the sewer main, unless otherwise specified in the Special Provisions.

3.3 CATCH BASINS & INLETS

- #### A. Excavate for the catch basin or storm inlet to the size required for the structure to be constructed.

3.4 CONSTRUCTION TOLERANCES

- #### A. Verify catch basin, inlet, and manhole invert elevations. Inform OWNER and ENGINEER of any elevations that vary more than 0.10 feet from plan elevations.
- #### B. Reset catch basin, inlet, and/or manhole if invert elevations vary more than 0.10 feet from plan elevation at CONTRACTOR's expense. OWNER may waive this requirement.

- C. If catch basin / inlet invert elevations are within 0.10 feet but catch basin / inlet lead is back pitched, reset catch basin / inlet and/or replace catch basin / inlet lead to obtain positive slope at CONTRACTOR's expense.

3.5 FIELD QUALITY CONTROL

A. Testing:

- 1. Perform deflection test for PVC and other flexible thermoplastic sewer pipe as follows:

- a. Requirements:

- 1) Do not exceed 5% of the normal inside diameter of the round pipe if tested within 30-days of installation. Do not exceed 7.5% of the normal inside diameter of the round pipe if tested after 30-days of installation. Repair and retest any section not meeting these requirements. Perform testing under the observation of the ENGINEER.

- b. Test Method:

- 1) Test entire length of installed sewer main with an approved go-no-go testing device. Use rigidly constructed cylinder, or other approved shape, which will not change shape or size when subjected to forces exerted on it by the pipe wall.
- 2) Use testing device that is 95% of the sewer line inside diameter if tested within 30-days of installation, and 92.5% if tested after 30-days of installation.
- 3) Furnish the testing device, all materials, equipment and labor for making this acceptance test.
- 4) Perform the test after all backfill has been placed and consolidated, but before paving is constructed.
- 5) Acceptable sections are where the device passes through the entire section between manholes or other structures in one (1) pass when pulled by hand without the use of excessive force.
- 6) Repair and retest sections that do not pass test.
- 7) Perform all tests under the observation of OWNER or ENGINEER.

B. Leakage Testing:

- 1. Perform infiltration testing, if required in the Special Provisions.

C. Televising:

1. Televising all storm sewer main, catch basin, inlet and yard drain leads and storm sewer laterals in accordance with Section 33 01 30.16.

D. Tracer Wire Test:

1. Conduct a tracer wire test on the completed storm sewer system in the presence of an OWNER Representative and/or ENGINEER.

3.5 CLEANING

A. Final Inspection:

1. Clean every sewer, manhole, inlet or other accessory prior to final inspection.
2. Remove all lumps of cement, protruding gaskets, rubbish and improper objects. Flush any sewer main containing sand, gravel, clay or foreign materials. Cost of water for flushing storm sewer is incidental to the Contract.

END OF SECTION

TABLE 33 40 00.00-1

CORRUGATED METAL PIPE DIMENSIONS & GAUGES

<u>Nominal Diameter</u>	<u>Minimum Gauge No.</u>	<u>Sheet Thickness</u>	<u>Area</u>
6-inches	18	0.052-inch	0.20 sq. ft.
8-inches	16	0.064-inch	0.35 sq. ft.
10-inches	16	0.064-inch	0.55 sq. ft.
12-inches	16	0.064-inch	0.79 sq. ft.
15-inches	16	0.064-inch	1.23 sq. ft.
18-inches	16	0.064-inch	1.77 sq. ft.
21-inches	16	0.064-inch	2.41 sq. ft.
24-inches	14	0.079-inch	3.14 sq. ft.
30-inches	14	0.079-inch	4.91 sq. ft.
36-inches	12	0.109-inch	7.07 sq. ft.
42-inches	12	0.109-inch	9.62 sq. ft.
48-inches	12	0.109-inch	12.57 sq. ft.
54-inches	12	0.109-inch	15.90 sq. ft.
60-inches	10	0.138-inch	19.64 sq. ft.

Do not vary the average inside diameter of circular pipe more than $\pm 1/2$ -inch or 1%; whichever is greater, from the nominal diameter.

TABLE 33 40 00.00-2

CORRUGATED METAL PIPE ARCH DIMENSIONS & GAUGES

<u>Pipe Arch Size</u>	<u>Equivalent Diameter</u>	<u>Span</u>	<u>Rise</u>	<u>Minimum Gauge No.</u>	<u>Sheet Thickness</u>	<u>Area</u>
14 x 9-inches	12-inches	14-inch	9-inch	16	0.064-inch	1.1 sq. ft.
17 x 13-inches	15-inches	17-inch	13-inch	16	0.064-inch	1.1 sq. ft.
21 x 15-inches	18-inches	21-inch	15-inch	16	0.064-inch	1.5 sq. ft.
24 x 18-inches	21-inches	24-inch	18-inch	16	0.064-inch	2.2 sq. ft.
28 x 20-inches	24-inches	28-inch	20-inch	14	0.079-inch	2.8 sq. ft.
35 x 24-inches	30-inches	35-inch	24-inch	14	0.079-inch	4.4 sq. ft.
42 x 29-inches	36-inches	42-inch	29-inch	12	0.109-inch	6.4 sq. ft.
49 x 33-inches	42-inches	49-inch	33-inch	12	0.109-inch	8.7 sq. ft.
57 x 38-inches	48-inches	57-inch	38-inch	12	0.109-inch	11.4 sq. ft.
64 x 43-inches	54-inches	64-inch	43-inch	12	0.109-inch	14.3 sq. ft.
71 x 47-inches	60-inches	71-inch	47-inch	10	0.138-inch	17.6 sq. ft.

Do not vary the span and rise dimensions more than ± 1 -inch or 2% of the equivalent circular diameter, whichever is greater. Fabricate connecting lengths of pipe to form a butt with a tolerance of $1/4$ -inch. When the joint opening between two (2) coupled pipes exceeds $1/4$ -inch, fill this entire space with an approved bituminous filler material.

TABLE 33 40 00.00-3

BEDDING MATERIAL FOR SEWERS 18-INCHES IN DIAMETER OR LESS

Crushed pit-run gravel, pea gravel or crushed stone chips conforming to these grading requirements: (3/8-inch size).	
Sieve Size	Percentage Passing By Weight
1-inch	100
3/4-inch	95-100
3/8-inch	30-55
No. 4	0-10
No. 8	0-5

TABLE 33 40 00.00-4

BEDDING MATERIAL FOR SEWERS LARGER THAN 18-INCHES IN DIAMETER

Crushed pit-run gravel, pea gravel or crushed stone chips conforming to these grading requirements: (3/4" size).	
Sieve Size	Percentage Passing By Weight
1-inch	100
3/4-inch	95-100
3/8-inch	20-55
No. 4	0-10

SPECIAL PROVISIONS

STORM SEWER & STREET CONSTRUCTION

For The
VILLAGE OF HARRISON
CALUMET COUNTY, WISCONSIN

Updated February 2023
Contract No. H0006-09-22-00204

I. GENERAL

- A. These Special Provisions take precedence over the General Conditions, Supplementary General Conditions and General Specifications.
- B. Any bid items with a Wisconsin DOT item number included in the description shall be furnished and installed in accordance with the corresponding Wisconsin DOT specification.
- C. A minimum of ten (10) days notice shall be to the OWNER by the CONTRACTOR before beginning construction. A pre-construction conference shall be scheduled at which the CONTRACTOR's supervisor, who will be on-site during the work, must be present. Prior to the pre-construction conference, the CONTRACTOR shall submit a construction schedule to the OWNER showing the work sequence, estimated number of working days, number of crews anticipated and two (2) telephone numbers where a representative can be reached at all times.
- D. The CONTRACTOR shall notify the local police, fire and utilities as well as utility departments a minimum of ten (10) days prior to commencement of work.
- E. All bid prices shall include restoration to original conditions, unless otherwise specified on the plans or specifications. This includes driveways, culvert end walls, mailboxes, shrubs, trees, etc.
- F. The CONTRACTOR shall conduct the work specified within the contract during regular working hours. **NO** work shall be performed on Saturday, Sunday or any legal holiday without the OWNER's written consent.
- G. No roadway closures are permitted without written authorization from the OWNER. The CONTRACTOR shall maintain emergency vehicle access on the job at all times. Reasonable vehicular and pedestrian access shall be provided for residential driveways during construction and at the end of each workday. The CONTRACTOR shall

SPECIAL PROVISIONS

coordinate and maintain access for refuse collection throughout construction. The CONTRACTOR shall coordinate with residents to allow parking on one-side of the roadways during construction.

- H. CONTRACTOR to notify residents via letter a minimum of two days prior to work on street begins. The CONTRACTOR shall prepare a copy of the letter for review during the pre-construction conference.
- I. Construction Operations
 - 1. Protect and preserve known property and survey marks and land monuments.
 - 2. Perform survey work using global positioning or conventional methods. Establish additional benchmarks and control points as necessary to support the method of operation.
 - 3. The CONTRACTOR may substitute conventional subgrade staking for global positioning system (GPS) machine guidance. The OWNER and/or the ENGINEER may require the CONTRACTOR to revert to conventional subgrade staking methods for all or part of the work at any point during construction if, in the ENGINEER's opinion, the GPS machine guidance is producing unacceptable results.
 - 4. CONTRACTOR to coordinate with the ENGINEER throughout the course of construction to ensure that the work performed using GPS machine guidance conforms to the contract tolerances.

II. STORM SEWER CONSTRUCTION

- A. Acceptable Materials:
 - 1. Storm sewer mains shall be as follows:
 - a. Polyvinyl Chloride (PVC) SDR 35 (4-inch through 24-inch)
 - b. Polyvinyl Chloride (PVC) Ribbed (All sizes)
 - c. Polyvinyl Chloride (PVC) Corrugated (All sizes)
 - d. High Density Polyethylene (HDPE) Corrugate (All sizes)
 - e. Polypropylene (PP) (All sizes)
 - f. Reinforced Concrete Pipe (RCP) (All sizes)

SPECIAL PROVISIONS

- g. Corrugated Metal Pipe (CMP) (Culverts only)
2. Manholes and Inlets:
- a. All new storm sewer manholes, inlets and yard drains shall be precast structures.
 - b. All storm sewer manholes and catch basins are to be constructed with a minimum 12-inch sump. Yard drains do not have sumps.
 - c. All storm sewer manhole and inlet rim elevations in new subdivisions are to be set at gravel elevation. Yard drains and storm manholes located outside of the roadway are to be set at finished elevation.
 - d. Prior to final asphalt paving, the top adjustment ring for manholes located within the roadway, shall be replaced with a rubber adjustment ring. The maximum adjustment ring to be 4-inches. Tapered rings are to be utilized whenever possible to match the cross-slope of the road. Catch basins are not required to have a rubber adjustment ring.
 - e. Catch basin and yard drain leads to be a minimum of 12-inch diameter.
3. Laterals
- a. Storm sewer laterals to be Schedule 40 PVC.
 - b. A cleanout and frost sleeve are to be installed at the roadway right-of-way for all storm sewer laterals.
 - c. Storm sewer lateral connections to new sewers to be saddle wyes or Inserta-Tees.
 - d. Storm sewer lateral connections to existing sewers to be saddle wyes or Inserta-Tees.
4. Underdrains
- a. Roadway subsurface underdrains to be installed as shown on the typical roadway section and as shown on the plan drawings.
 - b. Acceptable pipe materials include corrugated polyethylene pipe (HDPE) or polyvinyl chloride (PVC) pipe. Underdrain piping to be wrapped with a geotextile sock.

SPECIAL PROVISIONS

- c. Subsurface underdrains to be installed and discharge into a storm sewer catch basin. Underdrains to extend 25 feet each direction at a minimum slope of 0.50%.
- d. Underdrains to be installed in a 12" x 12" trench located below the curb and gutter and backfilled with open graded clear stone.

B. Construction

- 1. If less than 2-feet of cover over storm sewer, RCP Class IV pipe is required.
- 2. If between 2-feet and 3-feet of cover over storm sewer, RCP Class III or greater pipe is required.
- 3. If 3-feet of cover or greater, any of the acceptable pipe materials listed may be used.
- 4. Areas of disturbed pavement shall be restored with a minimum of 12- inches of base aggregate dense (6-inches of 3-inch, 6-inches of 1 1/4-inch) and a minimum of 4-inches of HMA pavement (2 1/4-inch lower layer, 1 3/4-inch upper layer). Existing asphalt shall be saw-cut to provide a clean joint for the new asphalt.

C. Culverts

- 1. Acceptable pipe material is corrugated metal (CMP) or reinforced concrete (RCP).
- 2. Fabricated flared end sections are required for all culvert pipes.
- 3. Culvert to be installed on a minimum of 3-inches of crushed aggregate bedding and backfilled with 1 1/4-inch minus crushed aggregate.

- D. All storm sewer, including catch basin leads, yard drain leads and laterals are to be cleaned and televised prior to acceptance and/or asphalt paving.

III. ROADWAY CONSTRUCTION

A. Curb and Gutter

- 1. The type of concrete curb and gutter to be installed is as specified on the plan drawings and/or in the Developer's Agreement.

- a. Urban local roadway sections to be constructed with 30-inch mountable concrete curb and gutter.
 - b. Urban collector and arterial roadway sections to be constructed with 30-inch non-mountable (barrier-type) concrete curb and gutter.
2. All concrete curb and gutter to be continuously reinforced with two (2) #4 rebar with minimum 3" clearance.

B. Subbase

1. Construct subbase, removing unsuitable materials and replacing with suitable material.
2. Compact the prepared subbase and perform proof roll test with a fully loaded quad-axle truck. A VILLAGE representative must be present during the proof roll test. ENGINEER to perform subgrade elevation check prior to placement of aggregate base.
3. Areas that subgrade is unsuitable, excavate poor soils, install Type 1 Geogrid and backfill with 3-inch Base Aggregate Dense.
4. Install SAS Fabric prior to placement of aggregate base.

C. Base Aggregate Dense

1. Construct aggregate base over a prepared subgrade as follows:
 - a. Local roadway section to be constructed with 12-inches of base aggregate dense (6-inches of 3-inch and 6-inches of 1 ¼-inch).
 - b. Collector roadway section to be constructed with 15-inches of base aggregate dense (9-inches of 3-inch and 6-inches of 1 ¼-inch).
 - c. Arterial roadway section to be constructed with 18-inches of base aggregate dense (12-inches of 3-inch and 6-inches of 1 ¼-inch).
2. Aggregate shoulders to be constructed along rural sections to a minimum width of 2-feet unless specified otherwise in the Contract. Aggregate shouldering to be completed by the OWNER.

D. Asphalt Pavement

1. Hot Mix Asphalt (HMA) pavements to be installed in two (2) lifts as follows:

SPECIAL PROVISIONS

- a. Local roadway sections to be constructed with 4-inches of HMA pavement: 2 1/4-inch 3 LT 58-28S lower layer and 1 3/4-inch 4 LT 58-28S upper layer.
 - b. Collector roadway sections to be constructed with 4-inches of HMA pavement: 2 1/4-inch 3 LT 58-28S lower layer and 1 3/4-inch 4 LT 58-28S upper layer.
 - c. Arterial roadway sections to be constructed with 5-inches of HMA pavement: 3-inch 3 MT 58-28S lower layer and 2-inch 4 MT 58-28S upper layer.
2. Existing pavement edges shall be saw cut or milled to provide a straight line for construction of a full depth butt joint, including driveways.
 3. The CONTRACTOR shall submit asphalt weight tickets to the ENGINEER, with the location designated, to verify yields on the pavement.
 4. Quality Control Testing
 - a. CONTRACTOR to conduct asphalt quality control testing in accordance with Section 460.2.8.2 of the Wisconsin Department of Transportation Standard Specifications.
 - b. CONTRACTOR to submit the test results to the ENGINEER daily. Control charts to be submitted to the ENGINEER within 10-days after paving is completed.
 - c. Payment of the asphalt QC program is incidental to the contract unless there is a specific Contractor Quality Control Testing bid item.
 - d. Sampling and testing requirements to comply with Section 460.2.8.2.1.3.1, regardless of the contract size with the exception of the following:
 1. An on-site laboratory is not required for testing.
 2. Split sample portions to be retained for a period of 14-days after contract completion.
 3. Number of samples per day for testing to comply with paragraph (5), but a minimum of one (1) sample per day is required.

SPECIAL PROVISIONS

- e. For CONTRACTOR Non-Performance of QMP testing, the OWNER will deduct 10% of the bid item unit price for the amount of material represented and allowed to remain in place. However, the OWNER may require the removal and replacement of the untested material.

IV. ROADWAY REPAIRS

- A. Wherever any areas within the Village roadway right-of-way has been damaged or removed by the CONTRACTOR, replace or repair existing improvements at the CONTRACTOR's expense. Replace with the same material, thickness and type as the existing disturbed surface.
- B. Repair disturbed areas as specified herein or in accordance with other sections of the Specification.
- C. Concrete Pavement
 - 1. Replace aggregate base to the same thickness as existing with a minimum thickness of 6-inches.
 - 2. Replace concrete pavement to the same thickness as the adjoining slab with a minimum thickness of 6-inches.
 - 3. Areas of concrete pavement repair to be completed in accordance with Section 32 11 23.00 Base Aggregates and Section 32 13 13.00 Concrete Pavements.
- D. Asphalt Pavement & Asphalt Driveways
 - 1. Replace asphalt pavement to the same thickness as the adjoining pavement. Install a minimum HMA Pavement thickness of 4-inches over 12-inches of aggregate base.
 - 2. Areas of asphalt pavement repair to be completed in accordance with Section 32 11 23.00 Base Aggregates and Section 32 12 16.00 Asphaltic Concrete Paving.
- E. Concrete Curb & Gutter, Sidewalk and Driveways
 - 1. Replace curb and gutter with curb and gutter having the same cross-section conforming to the adjacent curbing. Tie replacement curb and gutter to existing curb and gutter with two (2) 12-inch No. 6 tie bars. Perform work in accordance with Section 32 16 13.00 Concrete Curb & Gutter.

SPECIAL PROVISIONS

2. Replace sidewalks and concrete driveways with the same thickness and width to conform to adjacent walks and driveways. A minimum sidewalk thickness of 4-inches over 4-inches of aggregate base in non-traffic areas and a minimum sidewalk thickness of 6-inches over 6-inches of aggregate base in traffic areas. A minimum concrete driveway thickness of 6-inches over 6-inches of aggregate base. Install ½-inch expansion joint filler between replacement sidewalk and existing sidewalk. Perform work in accordance with Section 32 16 23.00 Concrete Sidewalk & Driveways.

D. Lawn Turf Restoration

1. Repair disturbed turf areas with a minimum of 4-inches of topsoil, seed mixture #4, fertilizer and mulch. Areas of turf repairs to be completed in accordance with Section 32 92 00.00 Landscaping.

V. LANDSCAPING AND RESTORATION

- A. Lawn restoration shall include placement of topsoil, seed, fertilizer and mulch. Mulch is required in areas that are **not** proposed with erosion mat. Salvaged topsoil may be used.
- B. The CONTRACTOR shall use seed mixture #4, as shown in Table 32 92 00.00-1 for lawn type turf areas.
- C. Ditch elevation checks will be required after final grading of topsoil prior to seeding.
- D. Topsoil to be graded to match the top edge of shoulder point.

VI. EROSION CONTROL

- A. The CONTRACTOR shall comply with the Erosion Control Plan (ECP) & Storm Water Management Plan (SWMP).
- B. All construction activities must be in compliance with the DNR Storm Water Discharge Permit. The CONTRACTOR will be responsible for all inspections and preparation of all inspection reports as required by the permit.
- C. The CONTRACTOR shall control erosion in accordance with the Technical Standards and the plan drawings. CONTRACTOR is responsible for providing, installing and maintaining all erosion control devices until the site has been stabilized. CONTRACTOR is responsible for the removal of all temporary erosion control devices upon project acceptance and final site stabilization.
- D. The CONTRACTOR is responsible to sweeping the streets as needed throughout construction. Streets shall also be swept at the end of each workday.

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E. Construction Site Inspection Reports

1. The CONTRACTOR is responsible for all inspections and preparation of all inspection reports as required by the permit.
2. The CONTRACTOR will be required to provide the OWNER/ENGINEER with original Construction Site Inspection Reports with 24-hours of completion of each report. The OWNER/ENGINEER will observe the BMP's installed and/or documented, and notify the CONTRACTOR of any necessary corrective action. In the event corrective action is necessary, a policy establishing timelines for corrective actions will be implemented, similar to the WDOT Erosion Control Order. If the CONTRACTOR fails to comply with the timeline established in the Erosion Control Order, the OWNER will first notify the Wisconsin DNR of CONTRACTOR non-compliance; and secondly, complete the corrective actions needed.
3. The Erosion Control Plan, Storm Water Management Plan and all inspection reports are to remain on-site, in a secure area, provided by the CONTRACTOR, until permit coverage is terminated.

F. Amendments

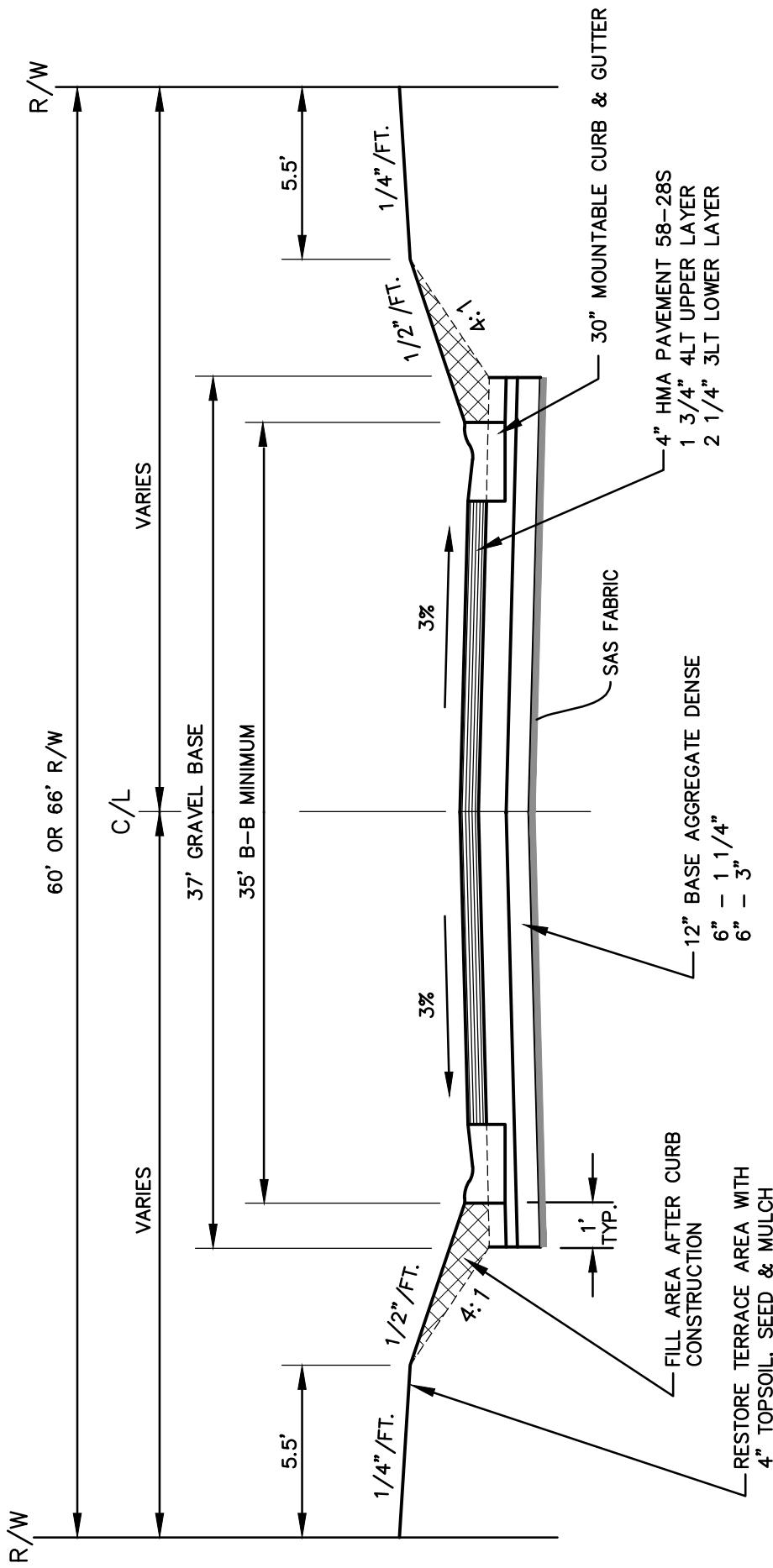
1. The CONTRACTOR is responsible for amending the Erosion Control Plan if: There is a change in construction, operation or maintenance at the site which has the reasonable potential for the discharge of pollutants carried by construction site runoff; or if the DNR notifies the OWNER of changes needed in the plan. The DNR and OWNER shall be notified five (5) working days prior to making changes to the plan.
2. In the event that the Erosion Control Plan is required to be amended, as stated in (1) above, the CONTRACTOR may contract with the ENGINEER to amend the plan.

VII. TRAFFIC CONTROL

- A. CONTRACTOR to notify emergency services a minimum of 2-days prior to beginning work. Emergency services shall have access through the project at any time during construction.
- B. The CONTRACTOR shall prepare and submit a traffic control plan for review and approval, to the OWNER/ENGINEER, prior to the preconstruction conference.

END OF SECTION

SPECIAL PROVISIONS



NOTE:
 SUMP PUMPS ARE REQUIRED TO BE
 CONNECTED TO A STORM SEWER
 COLLECTION SYSTEM WHEN AVAILABLE.

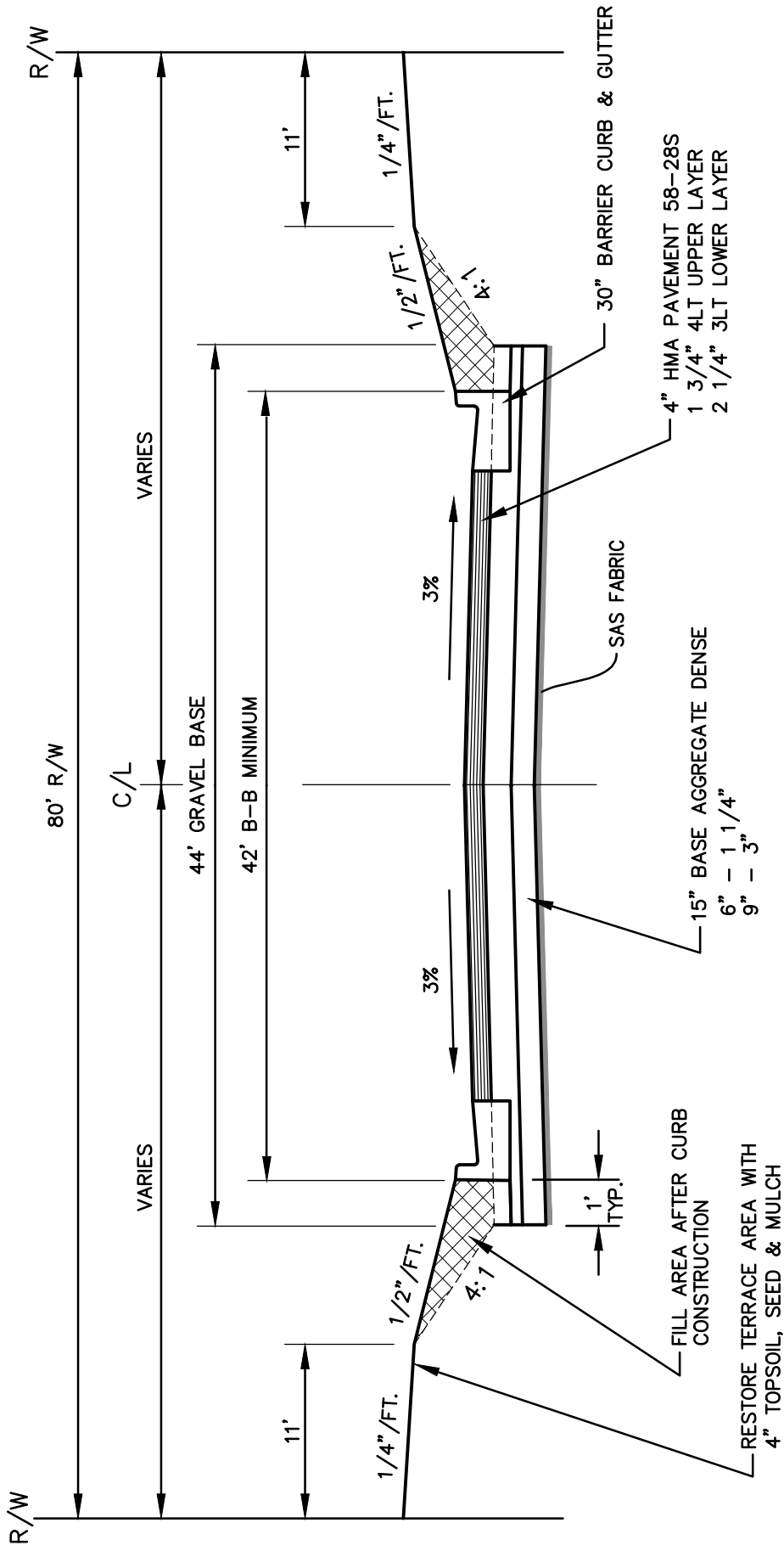
HARRISON

URBAN LOCAL STREET SECTION

(SANITARY DISTRICT DEVELOPMENTS)

McMAHON
 ENGINEERS ARCHITECTS

1445 McMAHON DRIVE NEENAH, WI 54956
 Mailing: P O BOX 1025 NEENAH, WI 54957-1025
 Tel: (920) 751-4200 Fax: (920) 751-4284
 www.mcengrp.com



NOTE:
SUMP PUMPS ARE REQUIRED TO BE
CONNECTED TO A STORM SEWER
COLLECTION SYSTEM WHEN AVAILABLE.

HARRISON

URBAN COLLECTOR STREET SECTION

(SANITARY DISTRICT DEVELOPMENTS)

McMAHON

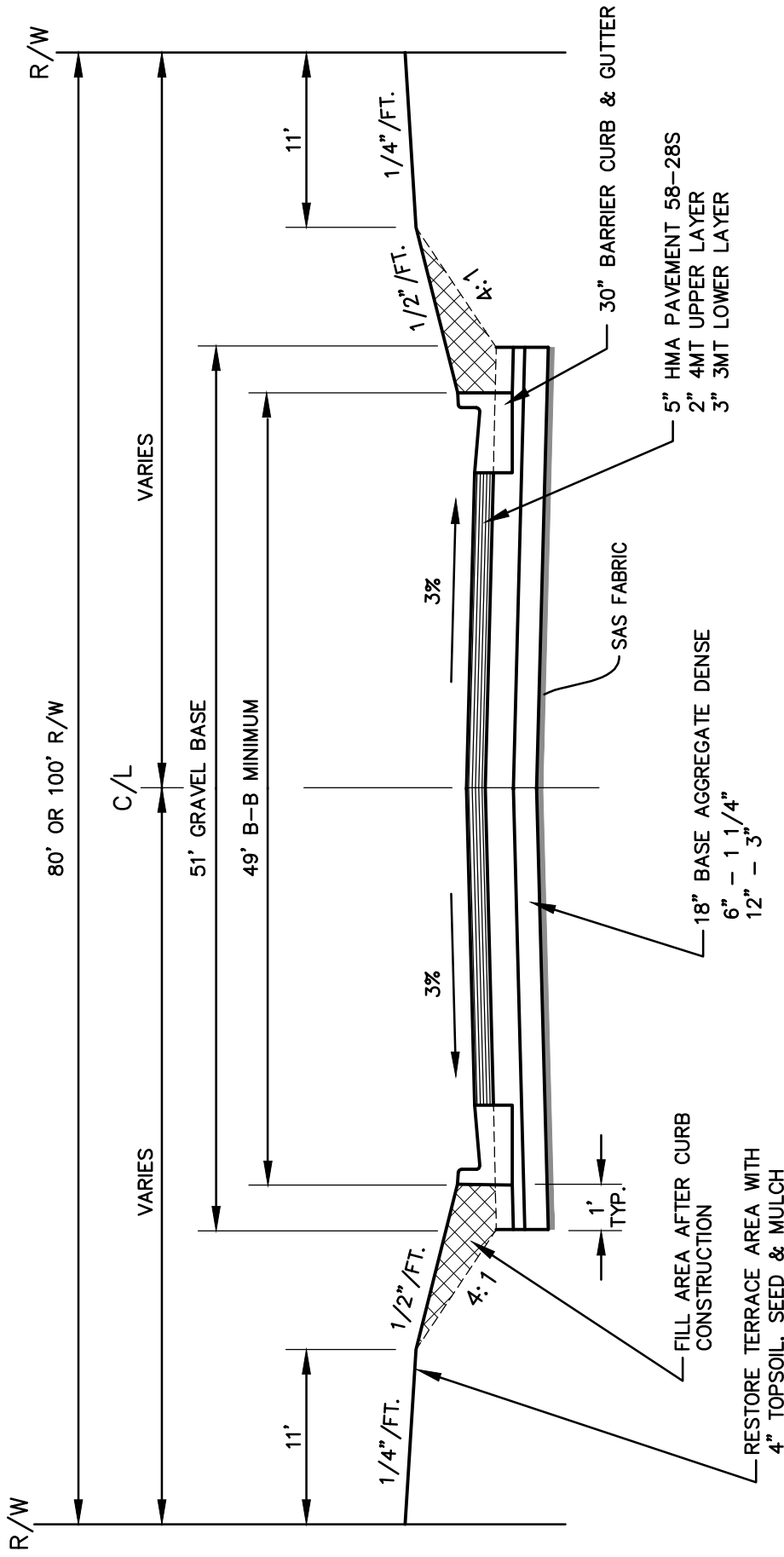
ENGINEERS ARCHITECTS

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NOTE:
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HARRISON

URBAN ARTERIAL STREET SECTION

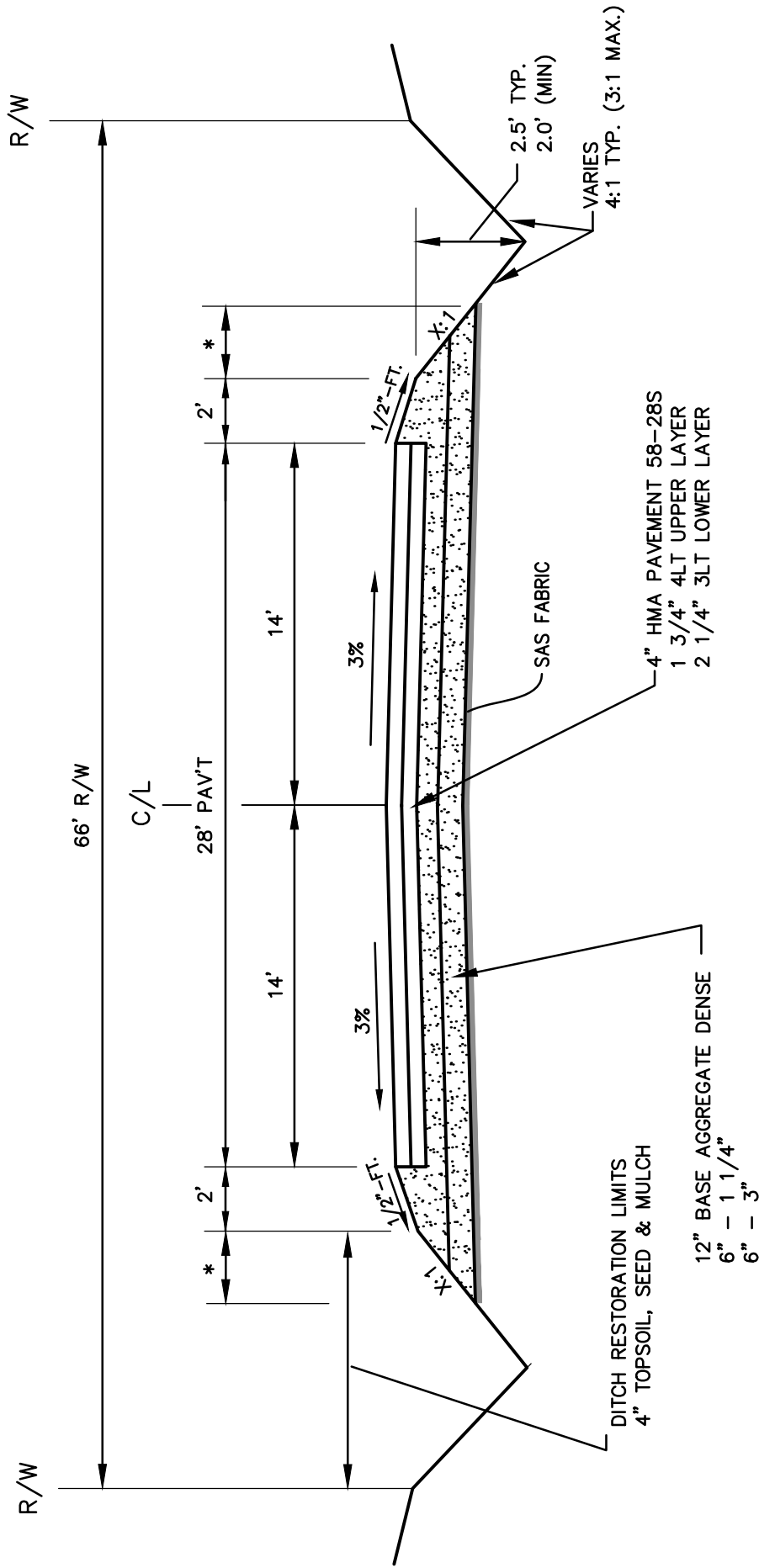
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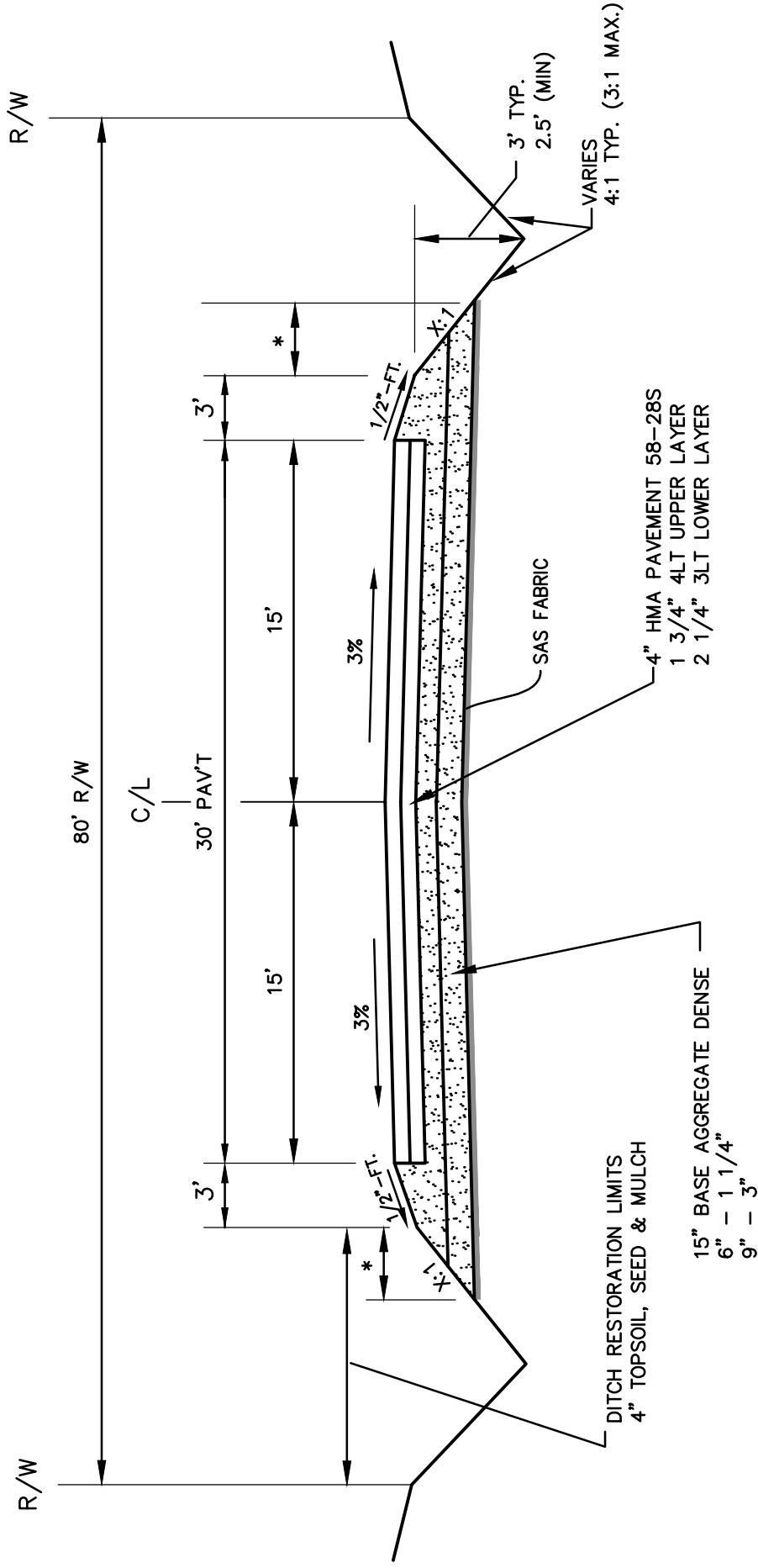


HARRISON RURAL LOCAL STREET SECTION

(NON-SANITARY DISTRICT DEVELOPMENTS)

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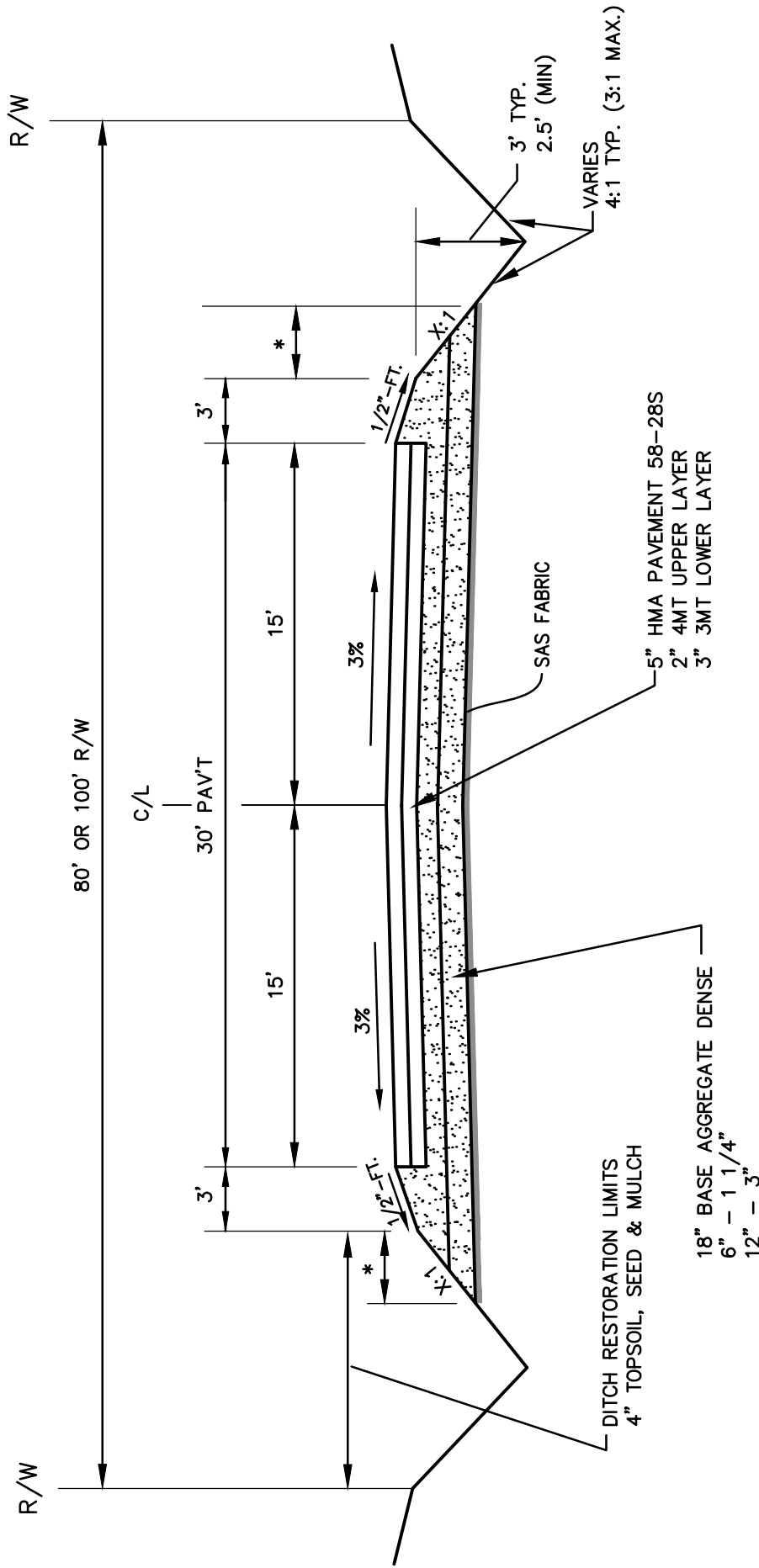
* 3.03' IF X = 3; 4.03' IF X = 4

HARRISON RURAL COLLECTOR STREET SECTION

(NON-SANITARY DISTRICT DEVELOPMENTS)

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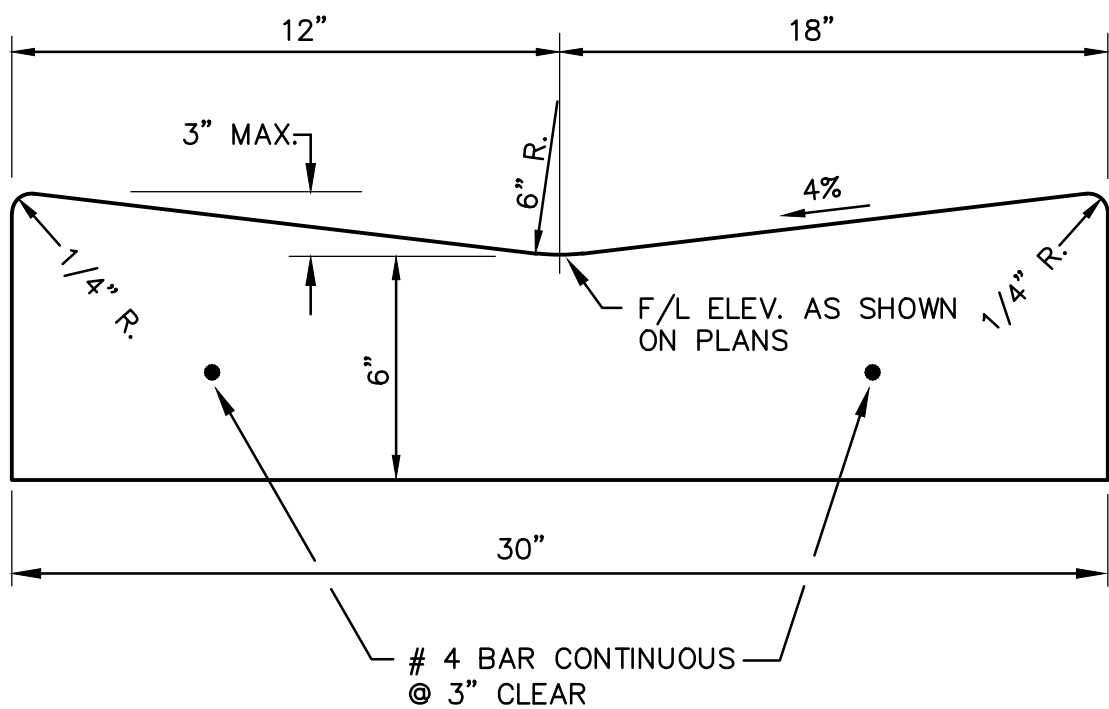
* 4.03' IF X = 3; 5.37' IF X = 4

HARRISON RURAL ARTERIAL STREET SECTION

(NON-SANITARY DISTRICT DEVELOPMENTS)

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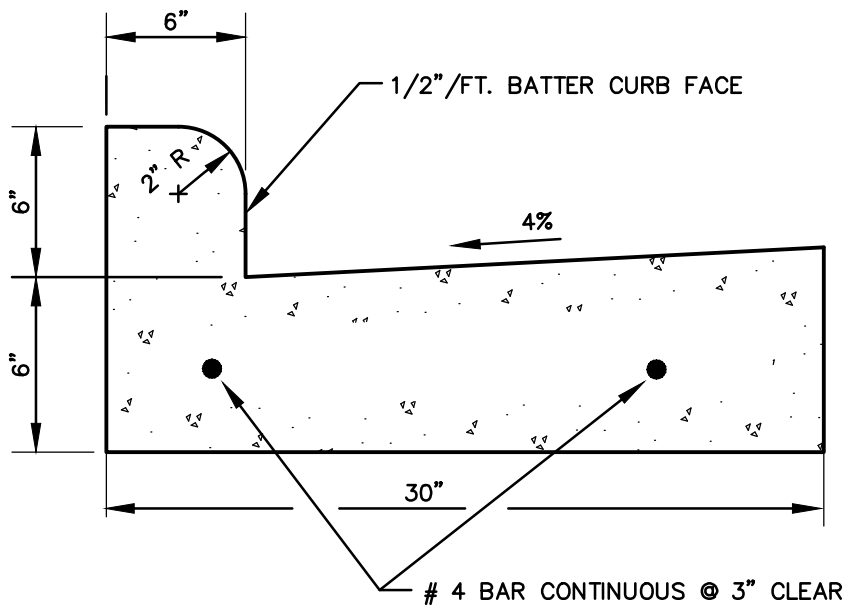


30" MOUNTABLE CURB & GUTTER

McMAHON

ENGINEERS ARCHITECTS

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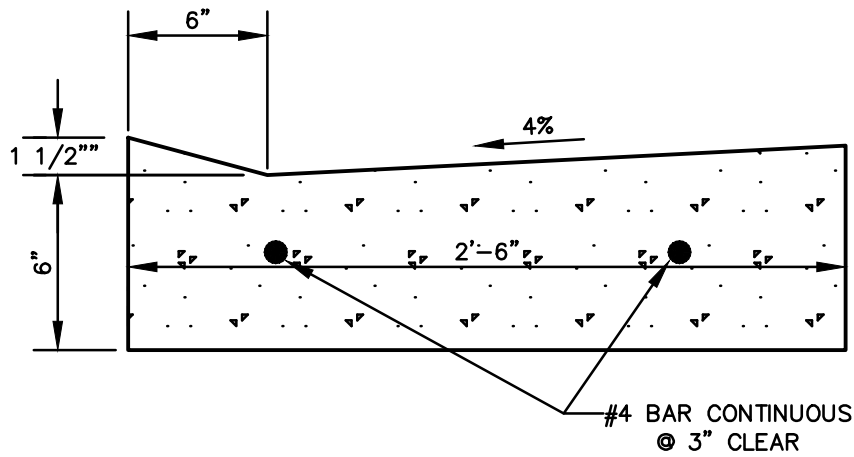


30" BARRIER CURB AND GUTTER

McMAHON

ENGINEERS ARCHITECTS

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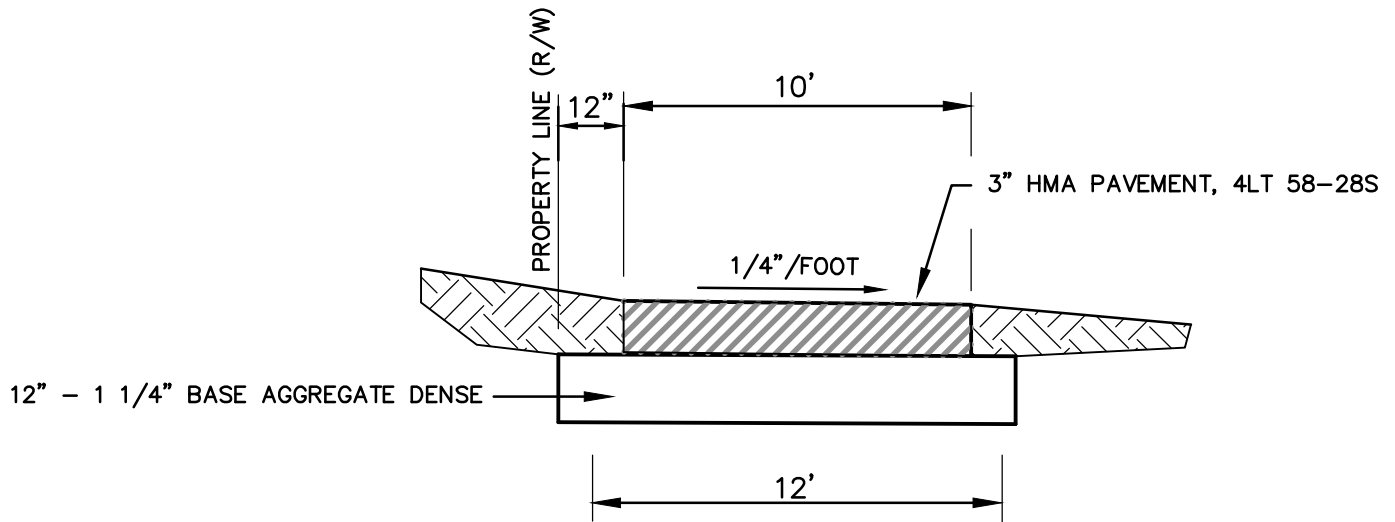


DRIVEWAY OPENING CURB AND GUTTER

McMAHON

ENGINEERS ARCHITECTS

1445 McMAHON DRIVE NEENAH, WI 54956
 Mailing: P.O. BOX 1025 NEENAH, WI 54957-1025
 Tel: (920) 751-4200 Fax: (920) 751-4284
 www.mcmgrp.com

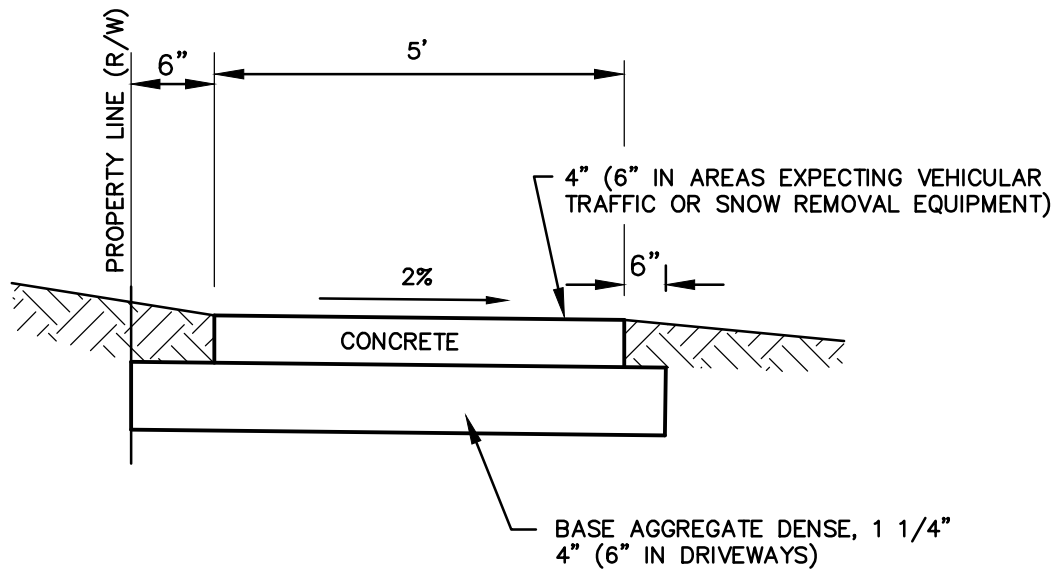


ASPHALT TRAIL

McMAHON

ENGINEERS ARCHITECTS

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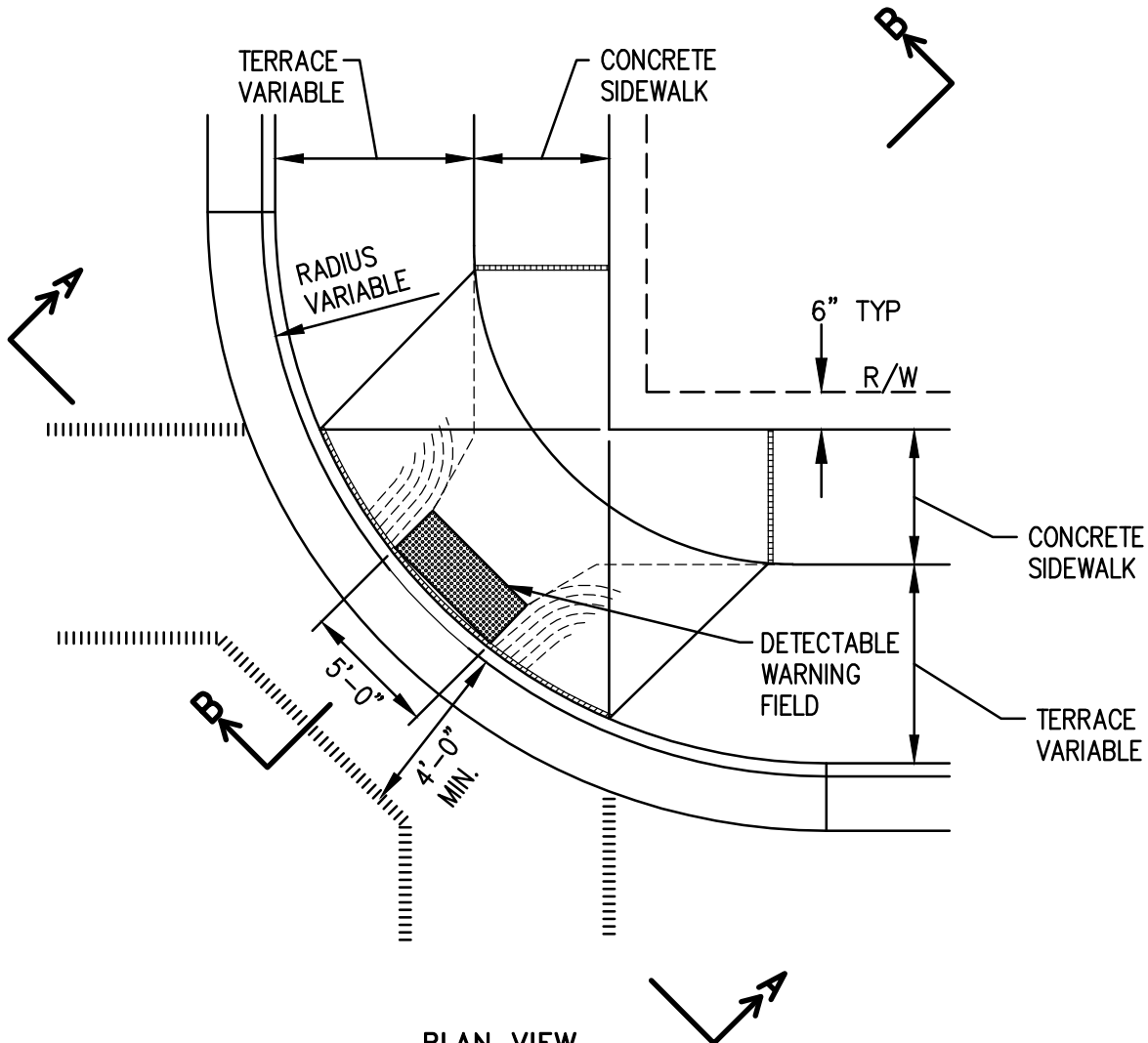


CONCRETE SIDEWALK

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ENGINEERS ARCHITECTS

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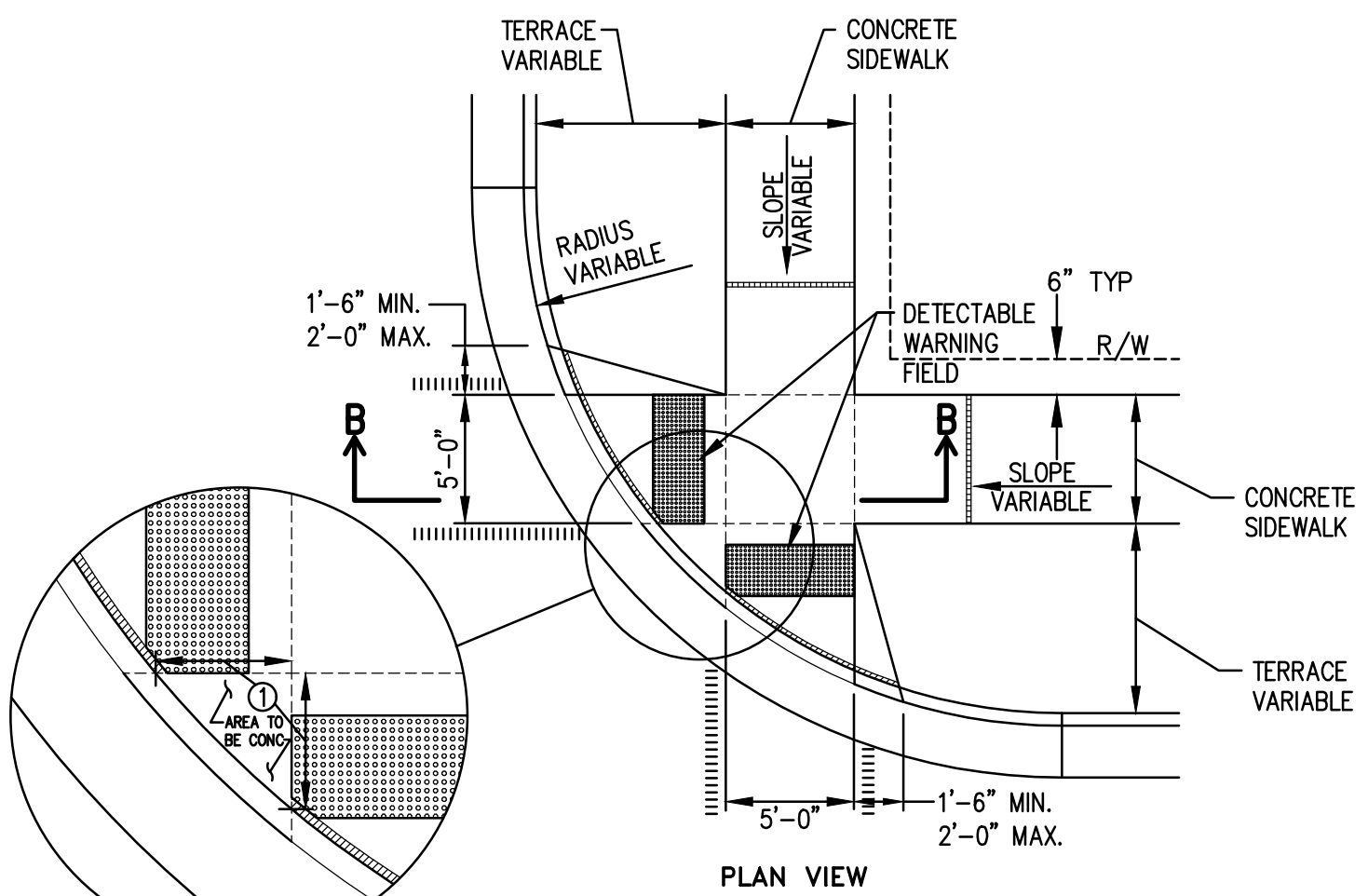


PLAN VIEW
TYPE 1 RAMP
 (CENTER OF CORNER RADIUS)

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ENGINEERS ARCHITECTS

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① WHEN THIS DISTANCE IS LESS THAN THAN 6'-0" IT MAY BE DIFFICULT TO ACHIEVE A 12H:1V SLOPE., OR FLATTER, ON THE RAMP. REDUCE CURB HEIGHT IN TRIANGLE AREA TO ACHIEVE 12H:1V SLOPE, OR FLATTER, ON RAMP. 2" MINIMUM CURB HEIGHT.

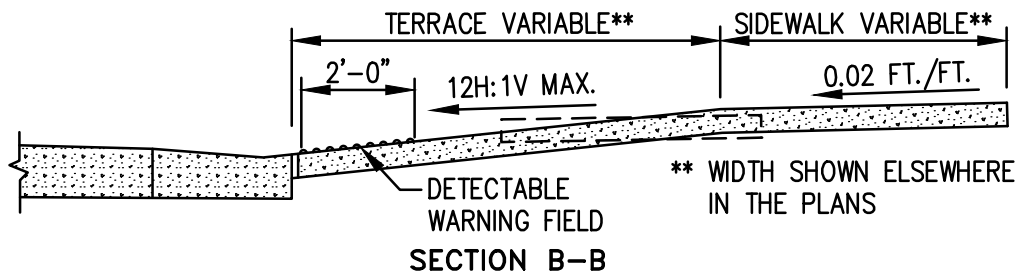
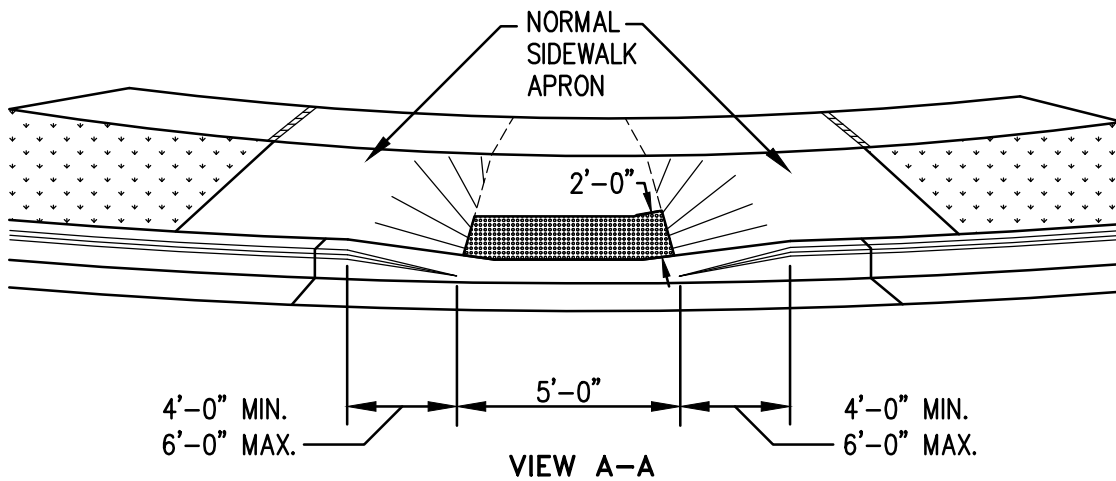
TYPE 2 RAMP
(ON LINE WITH SIDEWALK)

McMAHON
ENGINEERS ARCHITECTS

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Tel: (920) 751-4200 Fax: (920) 751-4284
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LEGEND

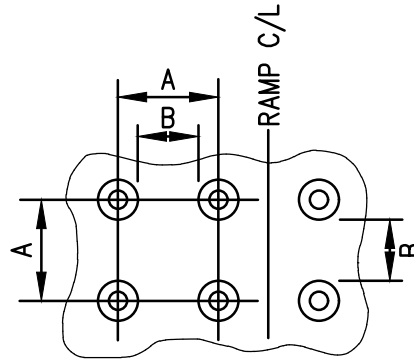
-  1/2" EXPANSION JOINT-SIDEWALK
-  CONTRACTION JOINT FIELD LOCATED
-  PAVEMENT MARKING CROSSWALK (WHITE)



McMAHON

ENGINEERS ARCHITECTS

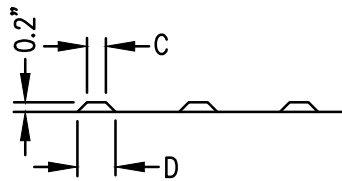
1445 McMAHON DRIVE NEENAH, WI 54956
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 Tel: (920) 751-4200 Fax: (920) 751-4284
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PLAN VIEW

	MIN.	MAX.
A	1.6"	2.4"
B	0.65"	1.5"
C	*	*
D	0.9"	1.4"

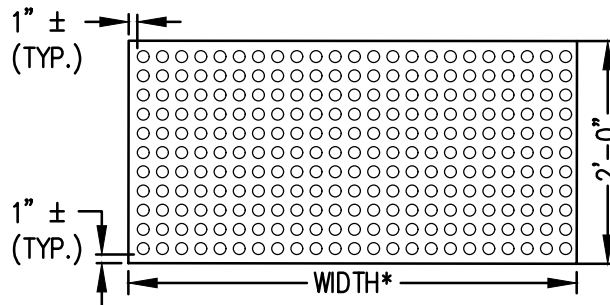
* THE C DIMENSION IS 50% TO 65% OF THE D DIMENSION.



ELEVATION VIEW

TRUNCATED DOMES

DETECTABLE WARNING
PATTERN DETAIL



PLAN VIEW

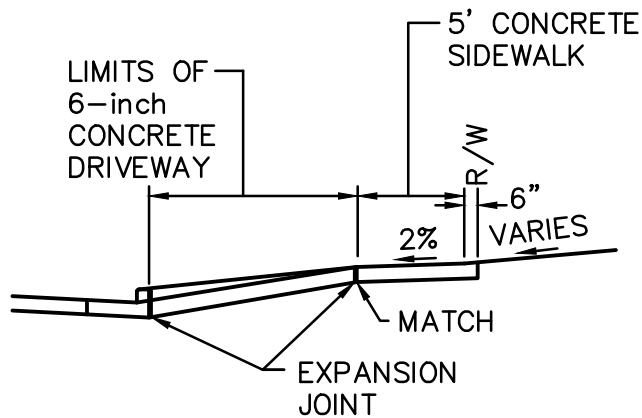
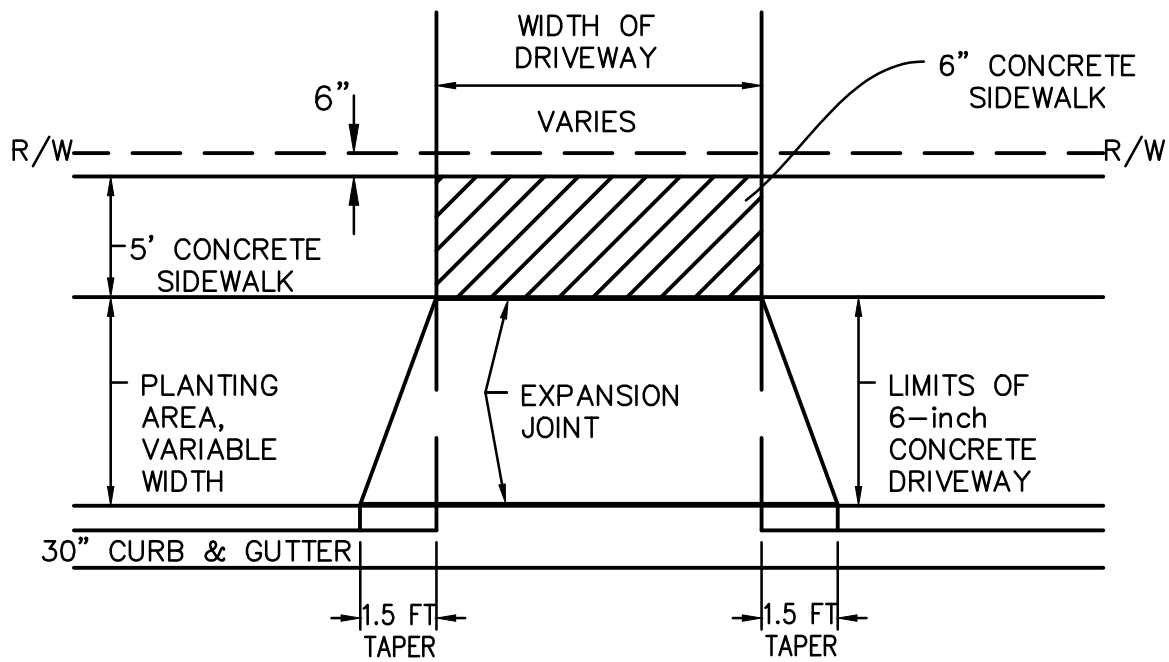
CAST IRON DETECTABLE WARNING FIELD (TYPICAL)

* THE TOTAL INSTALLED WIDTH
OF THE DETECTABLE WARNING
FIELD TO EQUAL THE CURB
OPENING WIDTH

McMAHON

ENGINEERS ARCHITECTS

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CONCRETE DRIVEWAY DETAIL

McMAHON

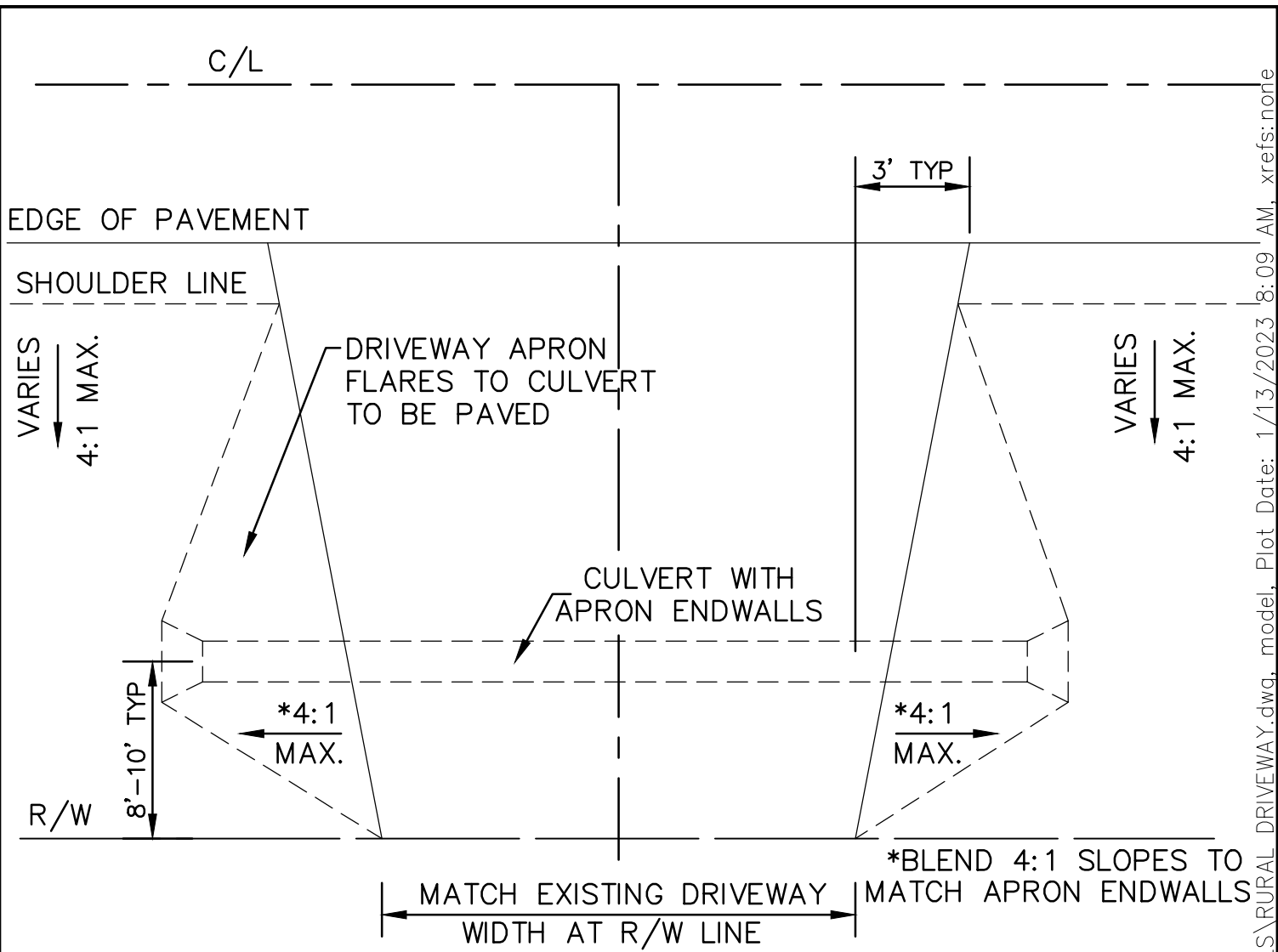
ENGINEERS ARCHITECTS

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Tel: (920) 751-4200 Fax: (920) 751-4284

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RURAL DRIVEWAY

GENERAL NOTES FOR DRIVEWAYS

DRIVEWAY APRON MATERIALS AND TRANSITION AREAS TO BE SAME AS EXISTING.

FOR ASPHALTIC DRIVEWAYS USE 12" BASE AGGREGATE DENSE AND 3" HMA TYPE E-0.3

FOR GRAVEL DRIVEWAYS USE 12" BASE AGGREGATE DENSE 1 1/4"

MAX. DRIVEWAY SLOPES IN CUT OR FILL TO BE 8%

CULVERT LENGTHS SHOWN ON PLAN IS FOR PIPE LENGTH ONLY.

RESIDENTIAL CULVERT LENGTHS:
30' MINIMUM; 36' MAXIMUM

AGRICULTURAL CULVERT LENGTHS:
40' MINIMUM; 60' MAXIMUM

ALL OTHER USES:
30' MINIMUM; 60' MAXIMUM

McMAHON

ENGINEERS ARCHITECTS

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Mailing: P.O. BOX 1025 NEENAH, WI 54957-1025
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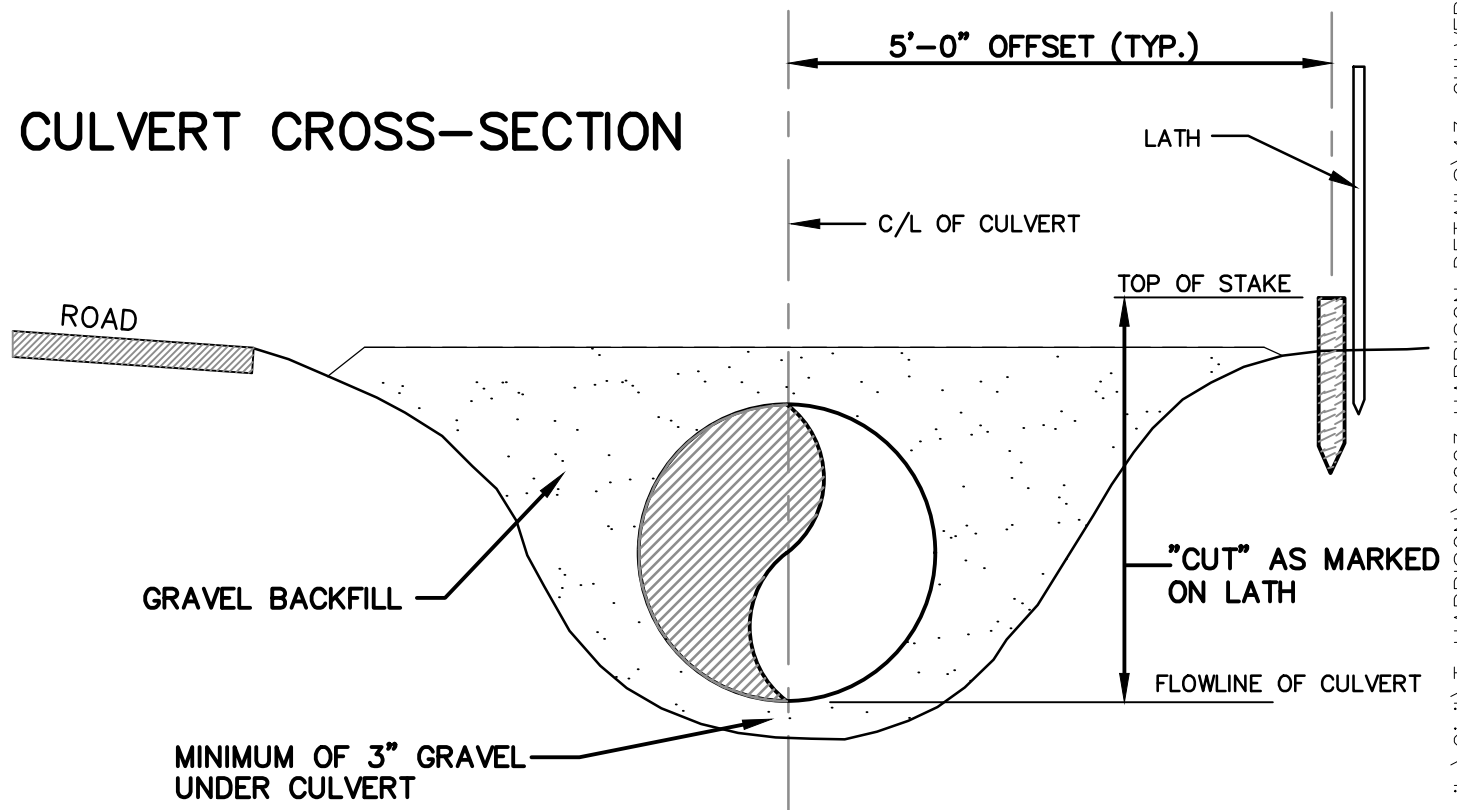
mcbing, w: \CAD\Details\Civil\T-HARRISON\2023 HARRISON DETAILS\RURAL DRIVEWAY.dwg, model, Plot Date: 1/13/2023 8:09 AM, xrefs:none

CULVERT SPECIFICATIONS AND INSTALLATION PROCEDURE

INSTALLATION PROCEDURE

1. THE APPLICANT MUST PLACE A STAKE IN THE CENTER OF THE CULVERT LOCATION IN THE DITCH LINE.
2. CONTACT THE VILLAGE OF HARRISON BUILDING INSPECTOR ONE WEEK PRIOR TO INSTALLING THE CULVERT.
3. A GRADE STAKE WILL BE SET 5 FEET FROM THE CENTER OF THE CULVERT AT EACH END OF THE CULVERT.
4. THE "CUT" (DISTANCE FROM TOP OF STAKE TO FLOWLINE OF CULVERT) WILL BE MARKED IN INCHES ON A LATH PLACED NEXT TO THE GRADE STAKE (SEE DIAGRAM).
5. THE CULVERT CAN NOW BE INSTALLED. EXCAVATE DEEP ENOUGH TO ALLOW FOR THE MINIMUM OF 3 INCHES OF GRAVEL UNDERNEATH THE PIPE PLUS THE WALL THICKNESS OF THE PIPE. REMEMBER, THE "CUT" IS FROM THE TOP OF THE STAKE TO THE INSIDE BOTTOM (FLOWLINE) OF THE PIPE.
6. DO NOT REMOVE THE GRADE STAKES UNTIL THE INSTALLATION HAS BEEN INSPECTED BY THE VILLAGE OF HARRISON BUILDING INSPECTOR.
7. UPON COMPLETION OF THE INSTALLATION, CONTACT THE VILLAGE OF HARRISON BUILDING INSPECTOR FOR THE CULVERT TO BE INSPECTED.

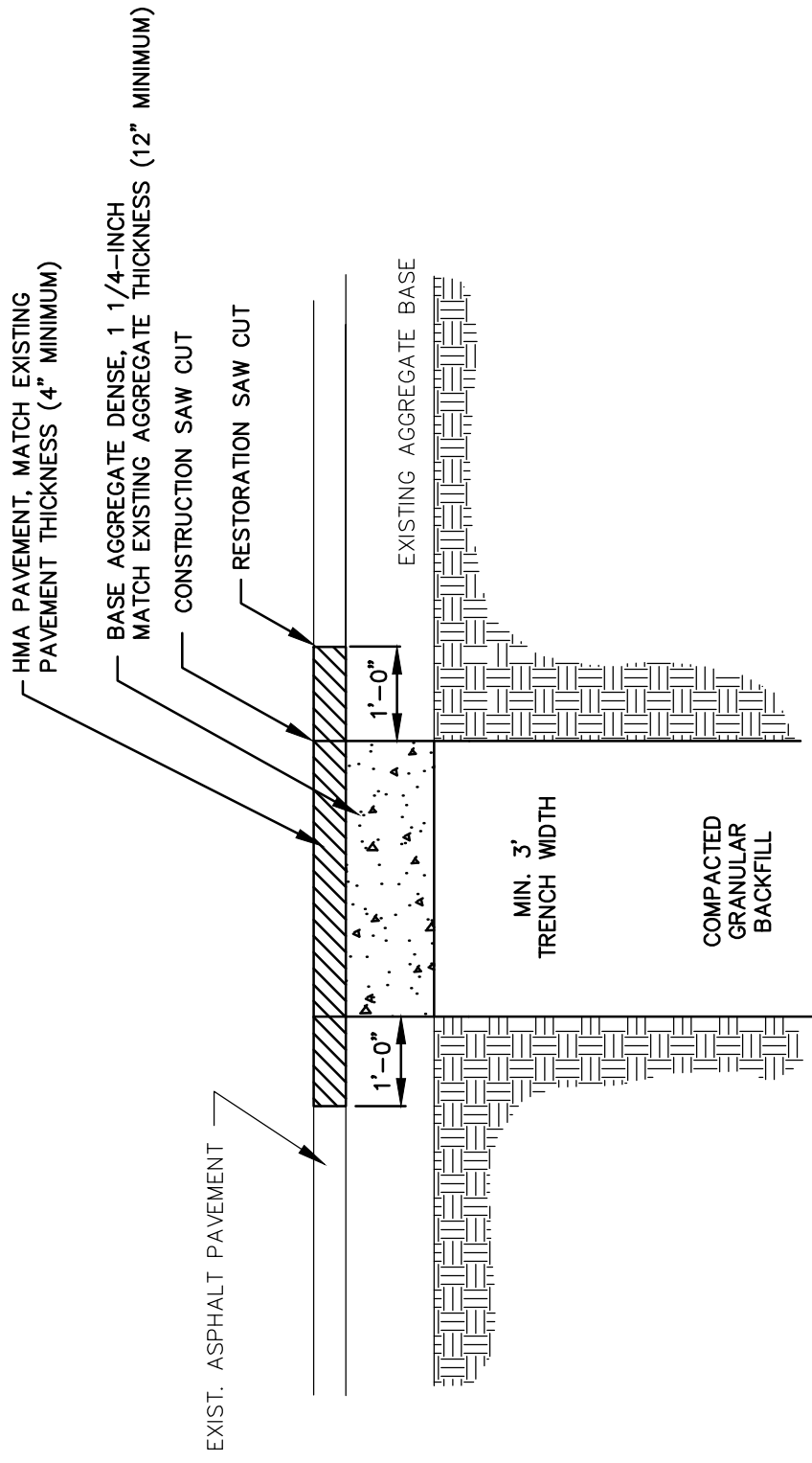
CULVERT CROSS-SECTION



McMAHON

ENGINEERS ARCHITECTS

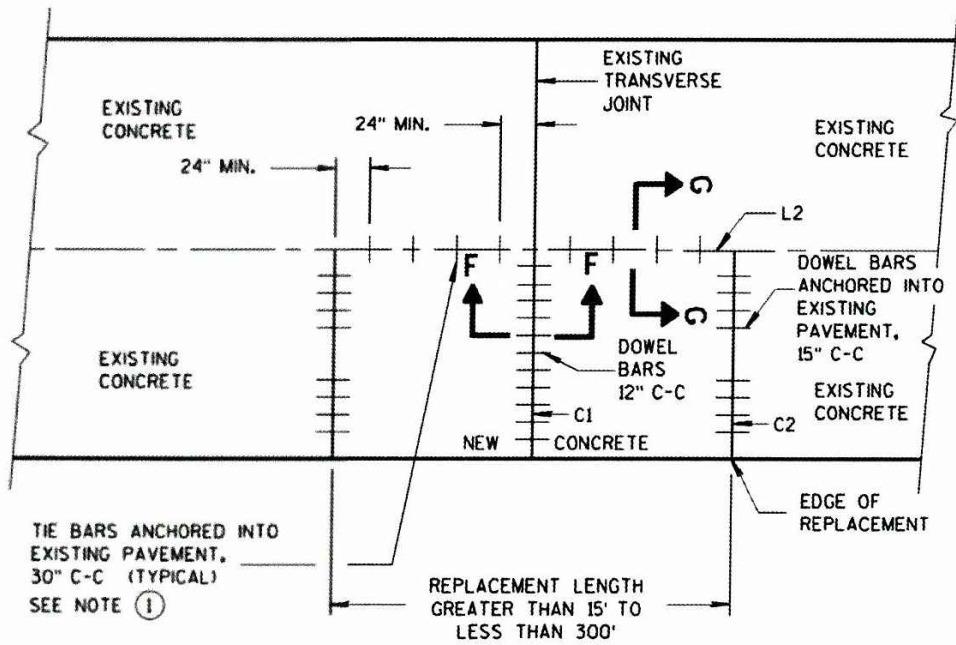
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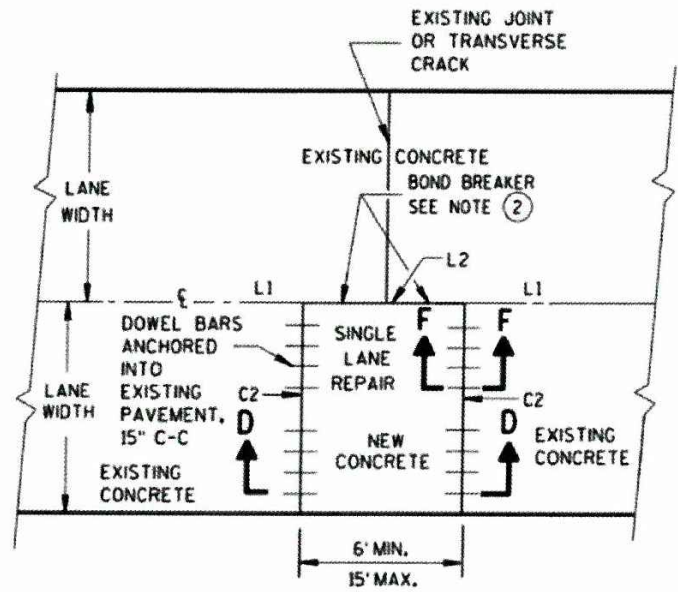
ASPHALT PAVEMENT RESTORATION

McMAHON
ENGINEERS ARCHITECTS

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**PLAN VIEW
SINGLE LANE
CONCRETE PAVEMENT REPLACEMENT**

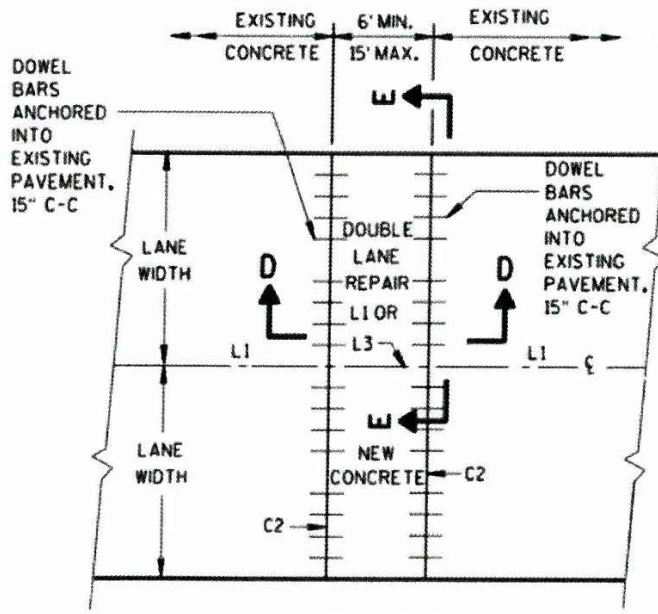


**PLAN VIEW
SINGLE LANE
CONCRETE PAVEMENT REPAIR**

McMAHON

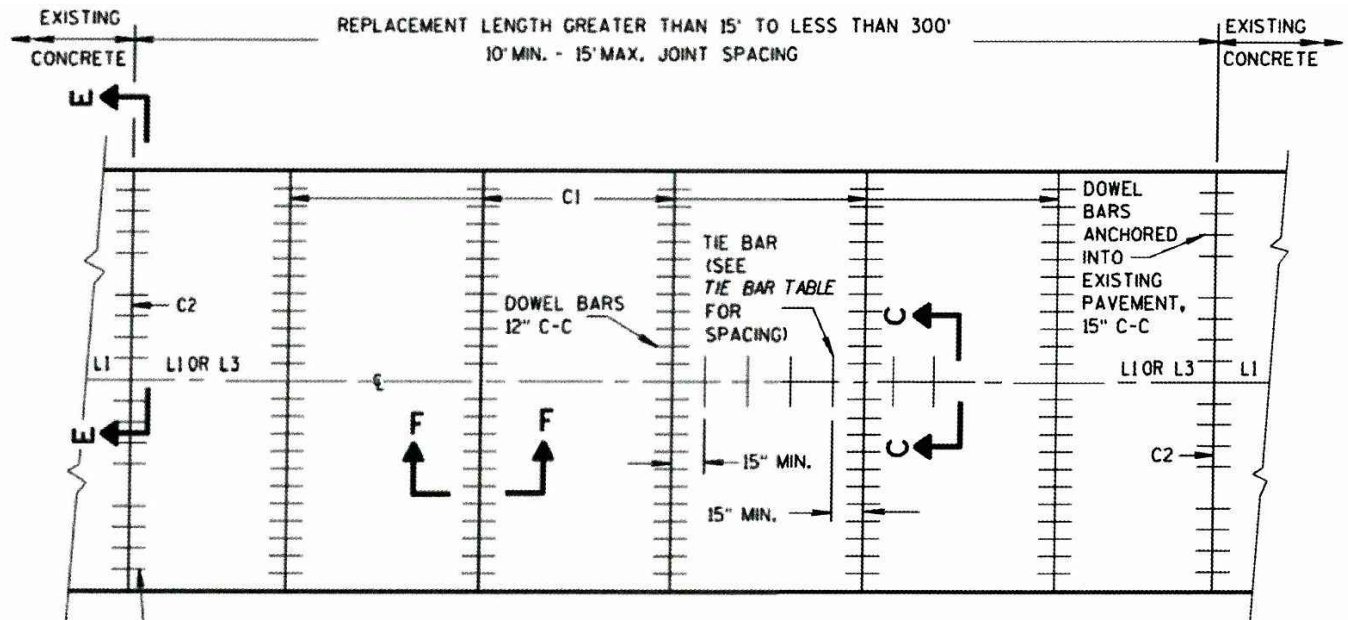
ENGINEERS ARCHITECTS

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 Tel: (920) 751-4200 Fax: (920) 751-4284
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PLAN VIEW

MULTI-LANE CONCRETE PAVEMENT REPAIR



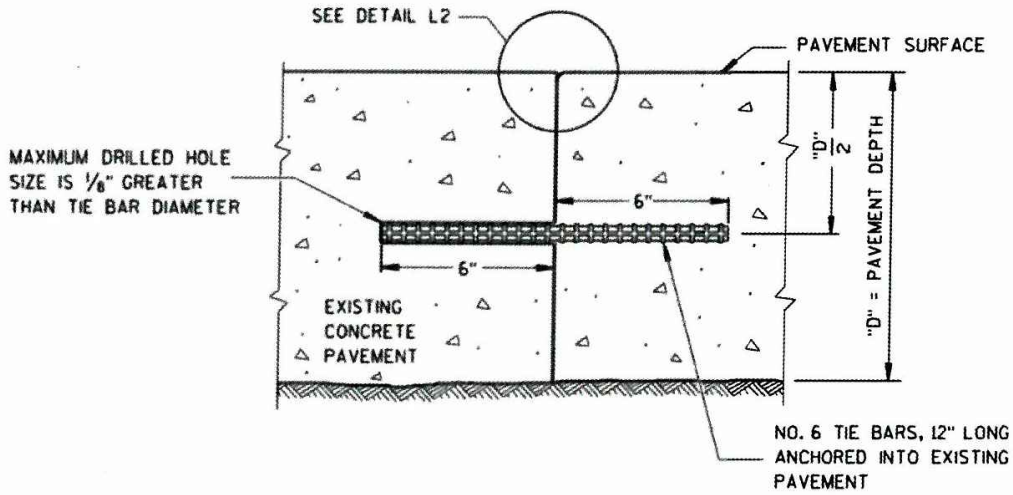
PLAN VIEW

MULTI-LANE CONCRETE PAVEMENT REPLACEMENT

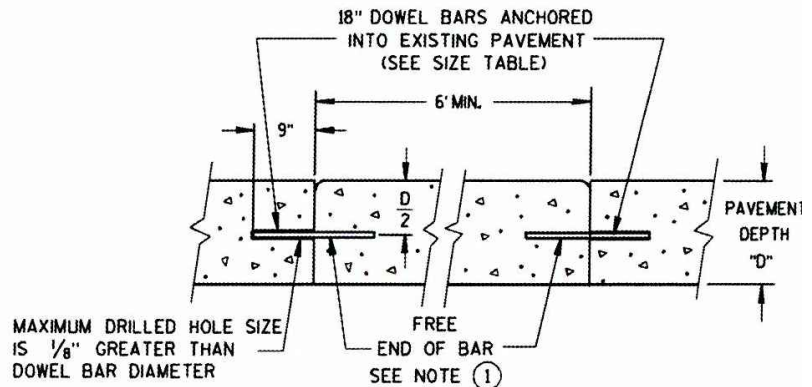
McMAHON

ENGINEERS ARCHITECTS

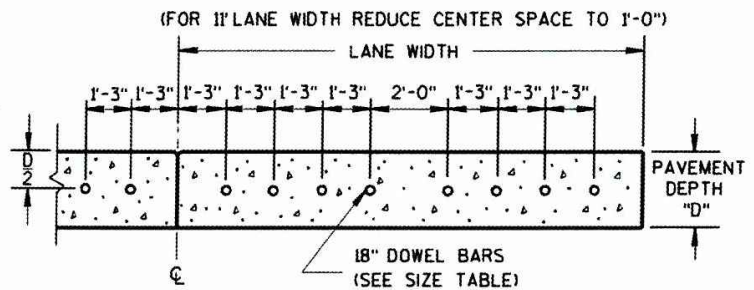
1445 McMAHON DRIVE NEENAH, WI 54956
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SECTION G-G
**TIE BARS ANCHORED
 INTO EXISTING PAVEMENT**



SECTION D-D



SECTION E-E
DRILLED DOWEL BAR CONSTRUCTION JOINT

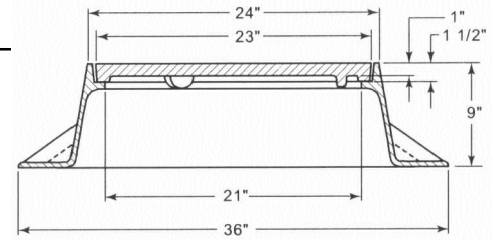
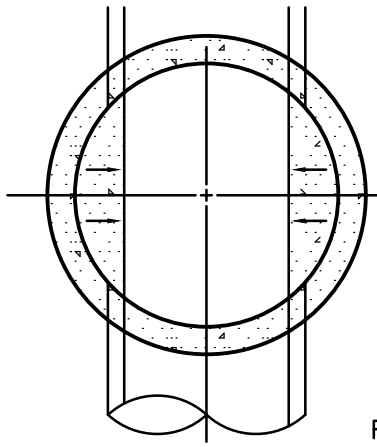
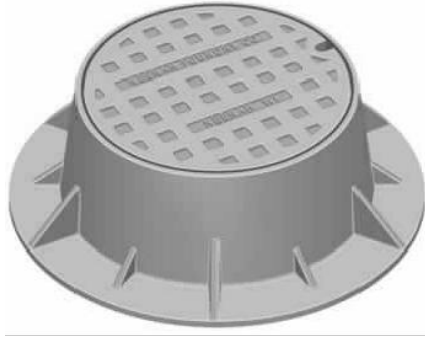
**PAVEMENT DEPTH, DOWEL BAR SIZE
 AND JOINT SPACING TABLE**

PAVEMENT DEPTH (D)	DOWEL BAR DIAMETER	CONTRACTION JOINT SPACING
5 1/2", 6", 6 1/2"	NONE	12'
7", 7 1/2"	1"	14'
8", 8 1/2"	1 1/4"	15'
9", 9 1/2"	1 1/4"	15'
10" & ABOVE	1 1/2"	15'

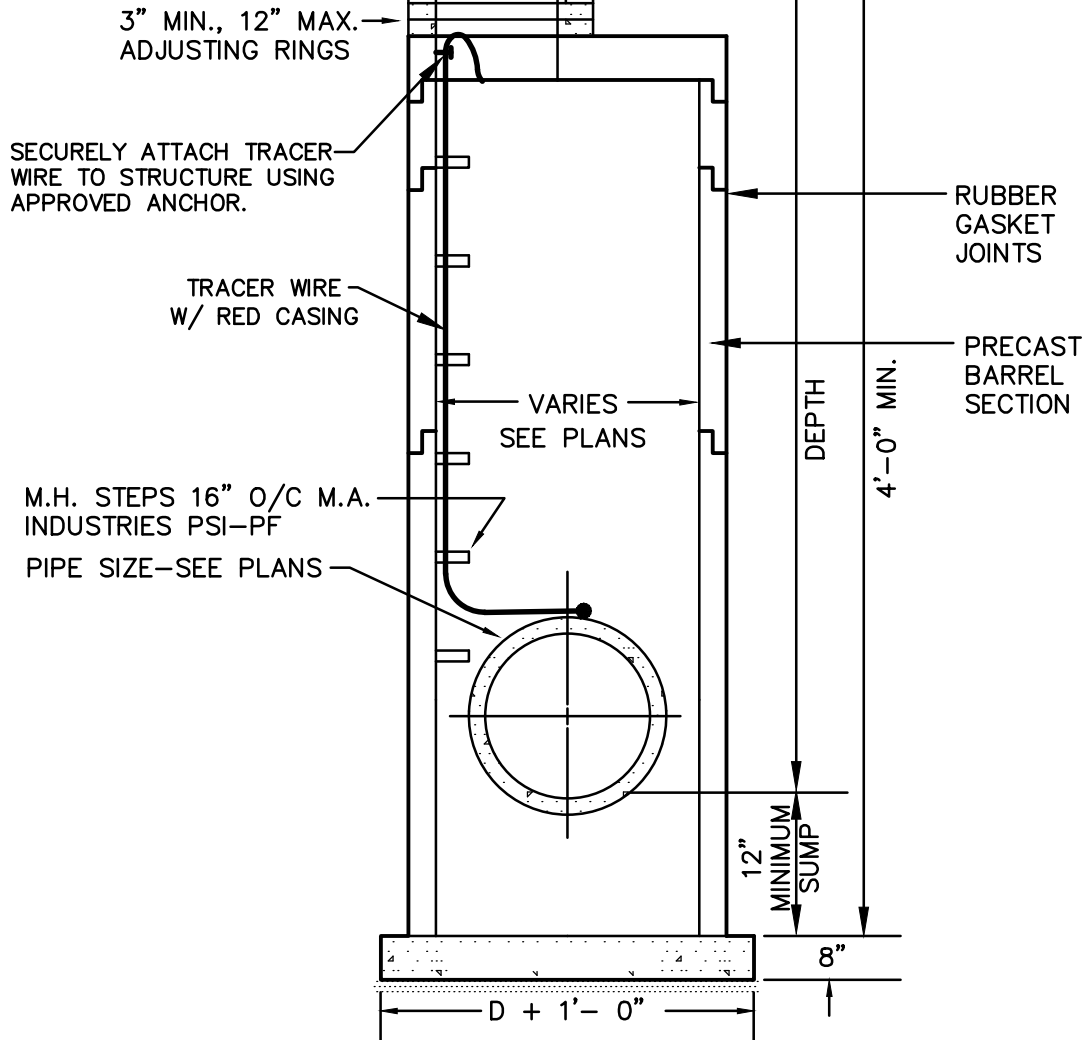
McMAHON

ENGINEERS ARCHITECTS

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FRAME & GRATE NEENAH
FNDY. NO. R-1550-B OR
EQUAL



STORM SEWER M.H. DETAIL

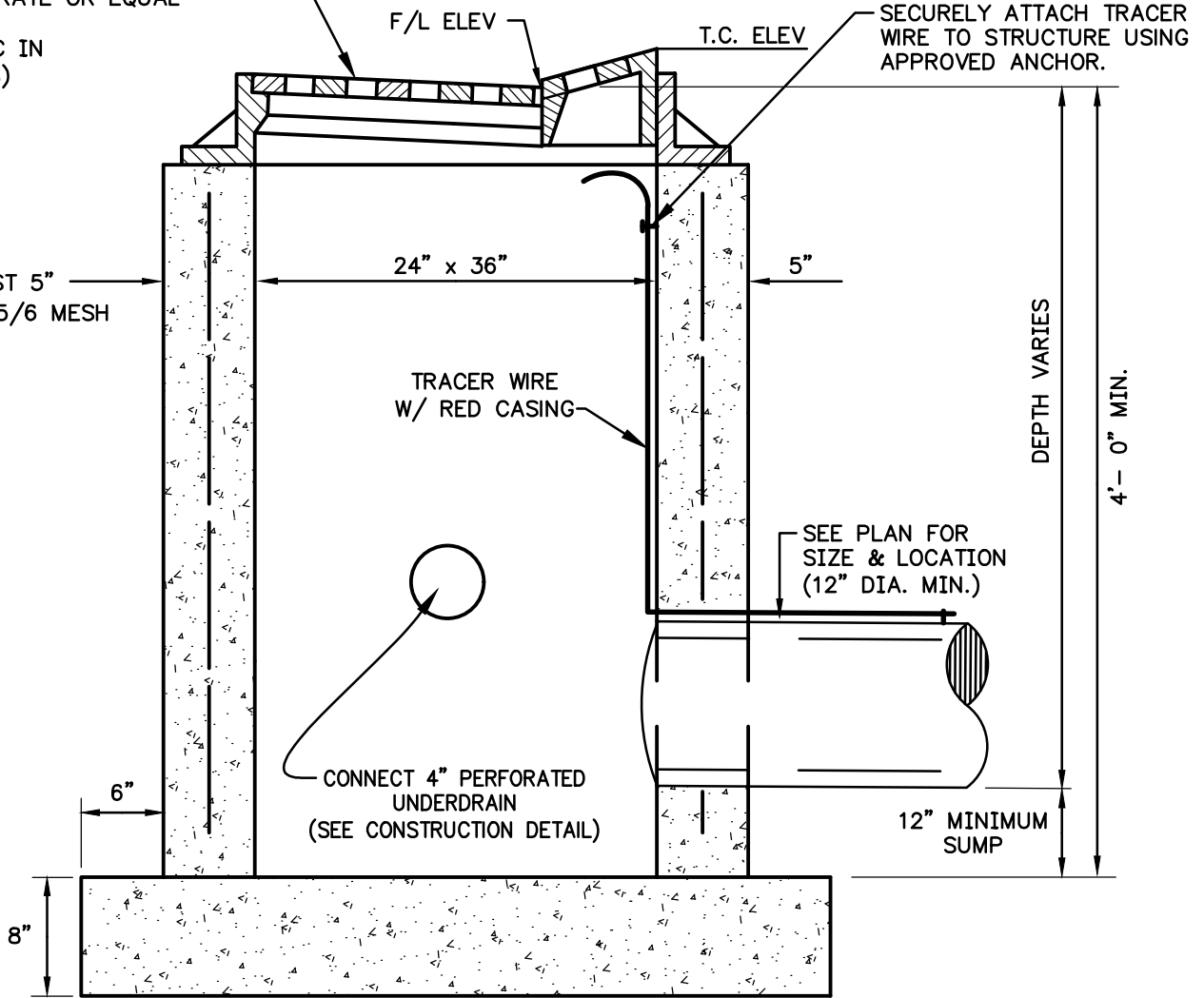
McMAHON

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FRAME & GRATE, NEENAH FNDY.
NO. R-3067 WDOT HM WITH
TYPE 'L' GRATE OR EQUAL

(R-3067-C IN
DRIVEWAYS)

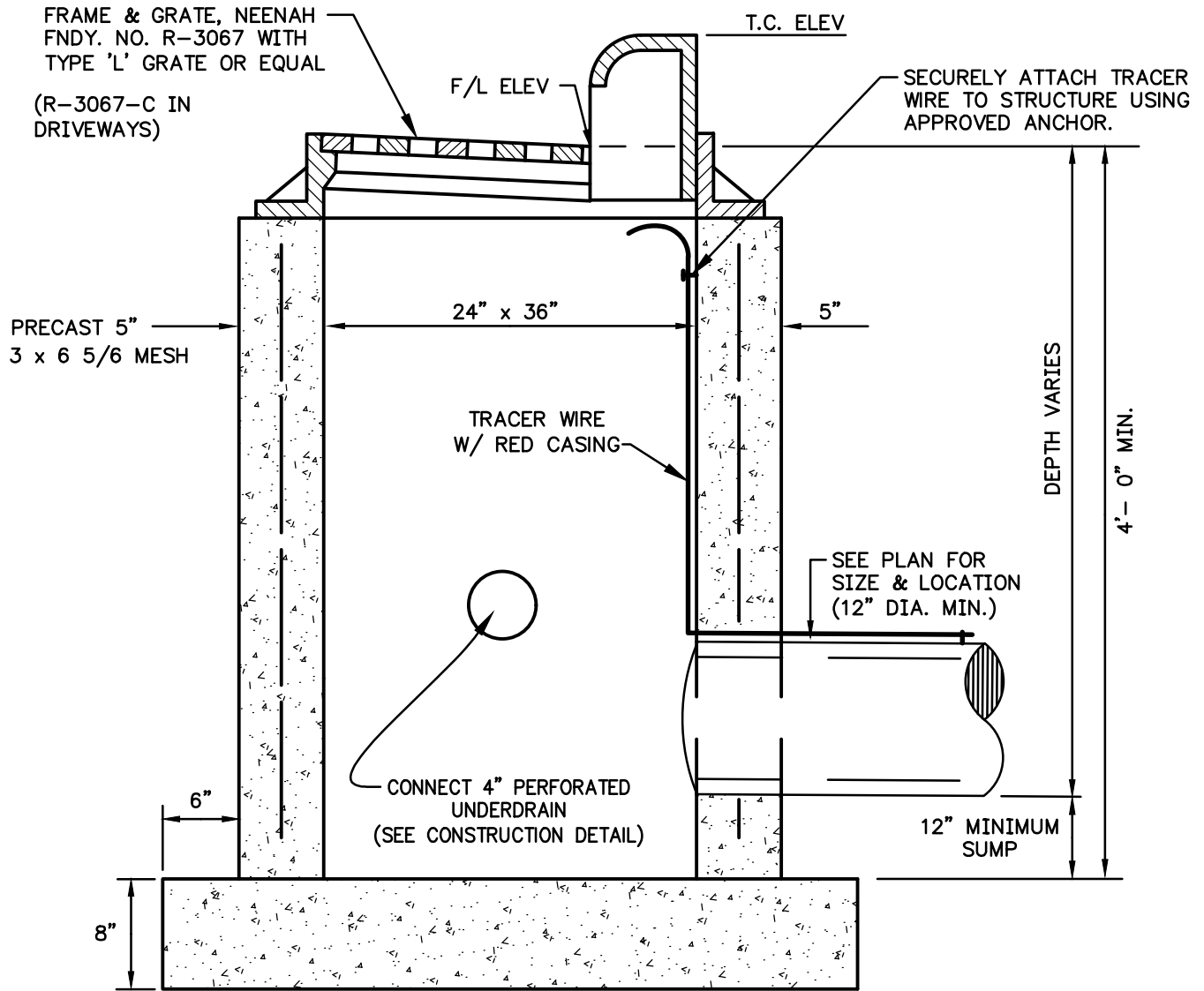


STORM SEWER CATCH BASIN (FOR 30" MOUNTABLE CURB & GUTTER)

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ENGINEERS ARCHITECTS

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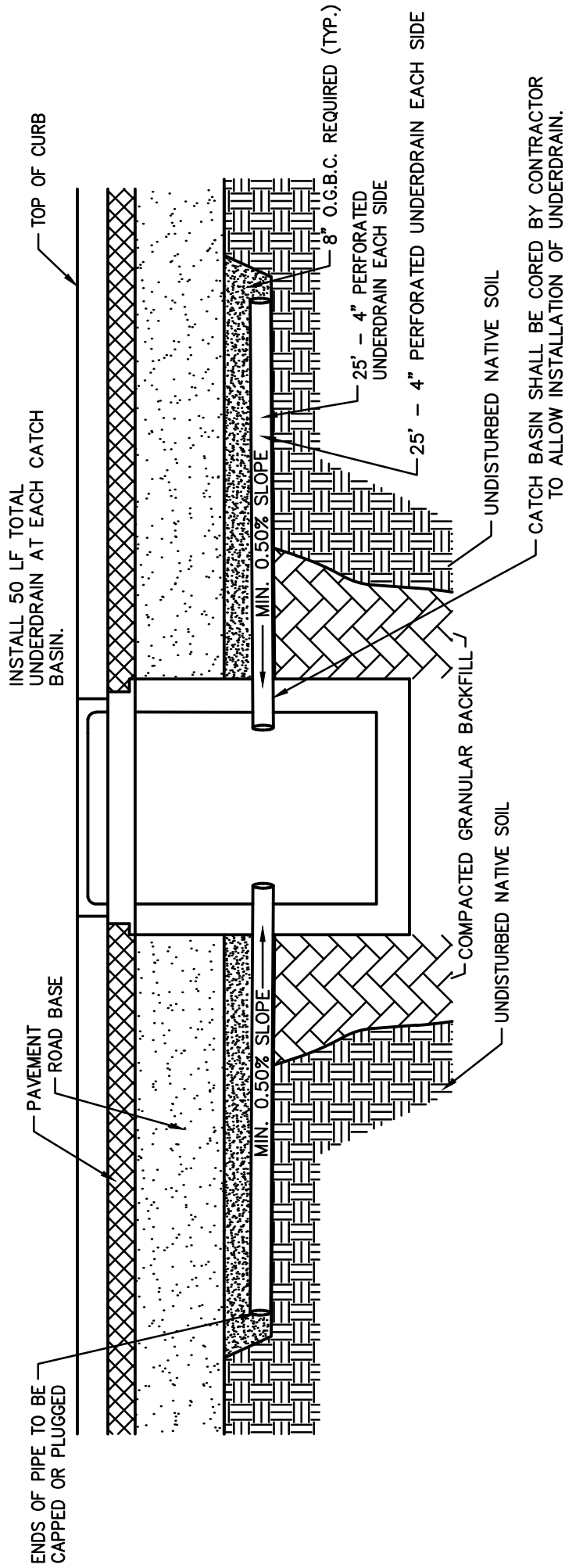


STORM SEWER CATCH BASIN (FOR 30" BARRIER CURB & GUTTER)

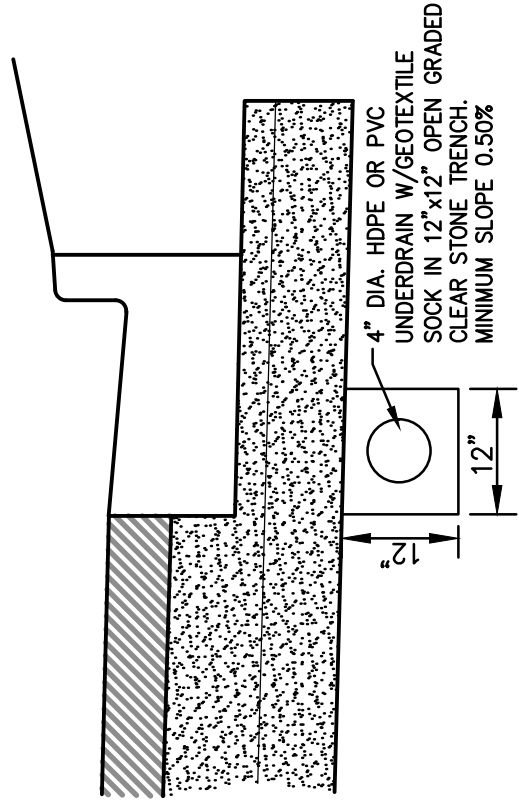
McMAHON

ENGINEERS ARCHITECTS

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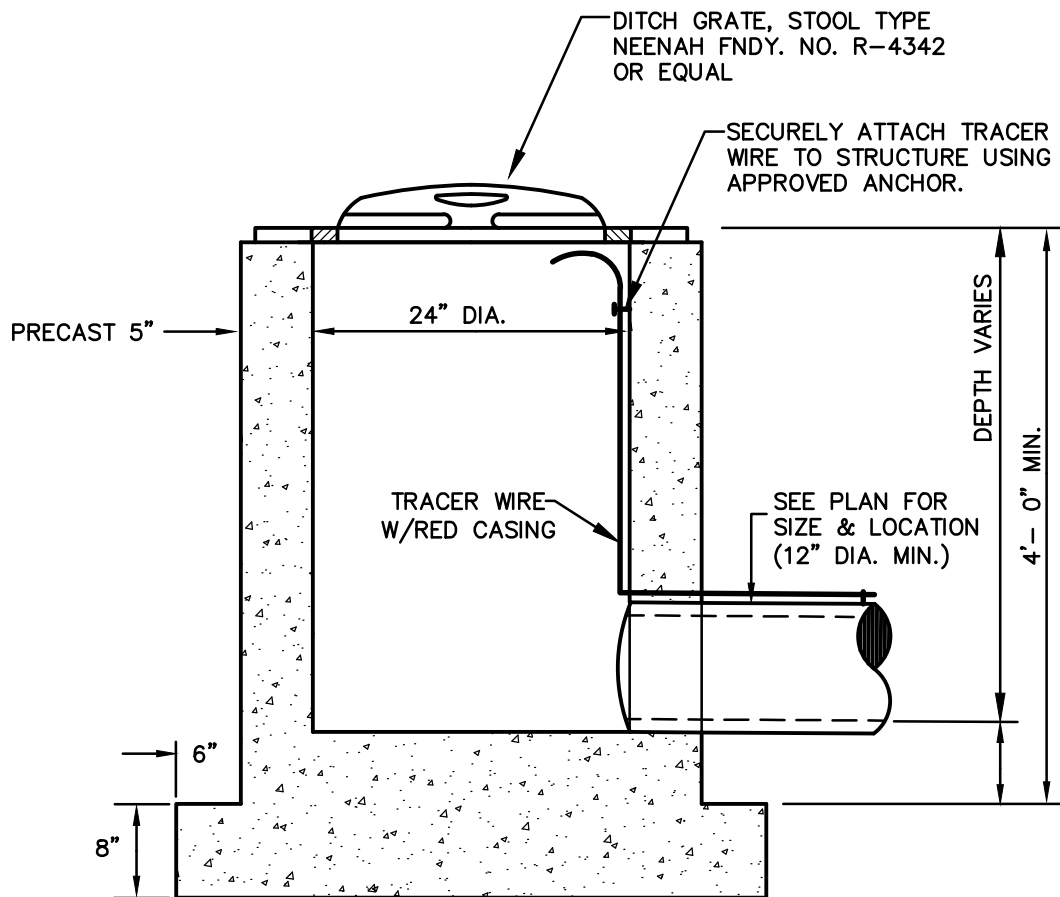
UNDERDRAIN DETAIL FOR CATCH BASIN



UNDERDRAIN

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ENGINEERS ARCHITECTS

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DITCH INLET/YARD DRAIN

McMAHON

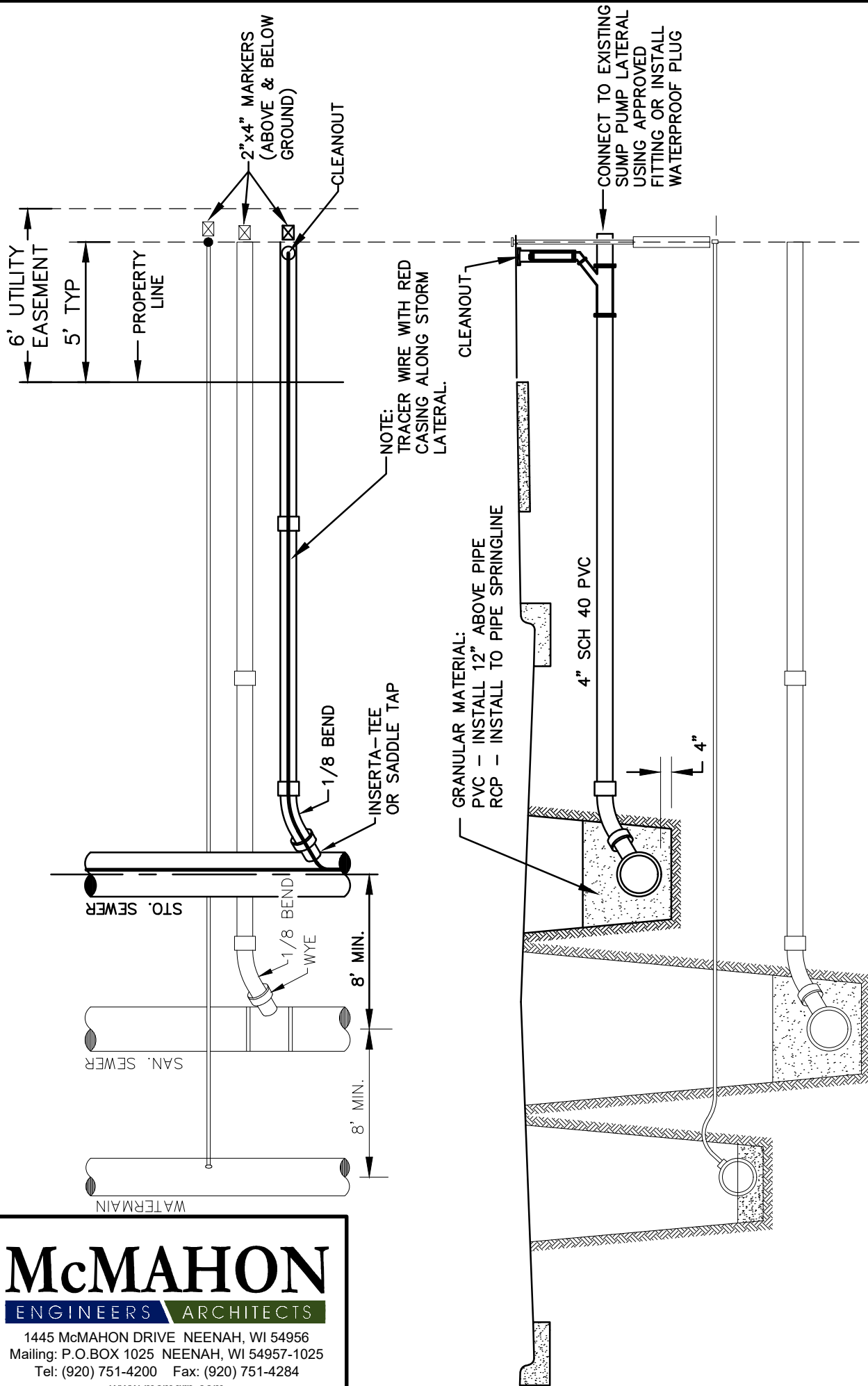
ENGINEERS ARCHITECTS

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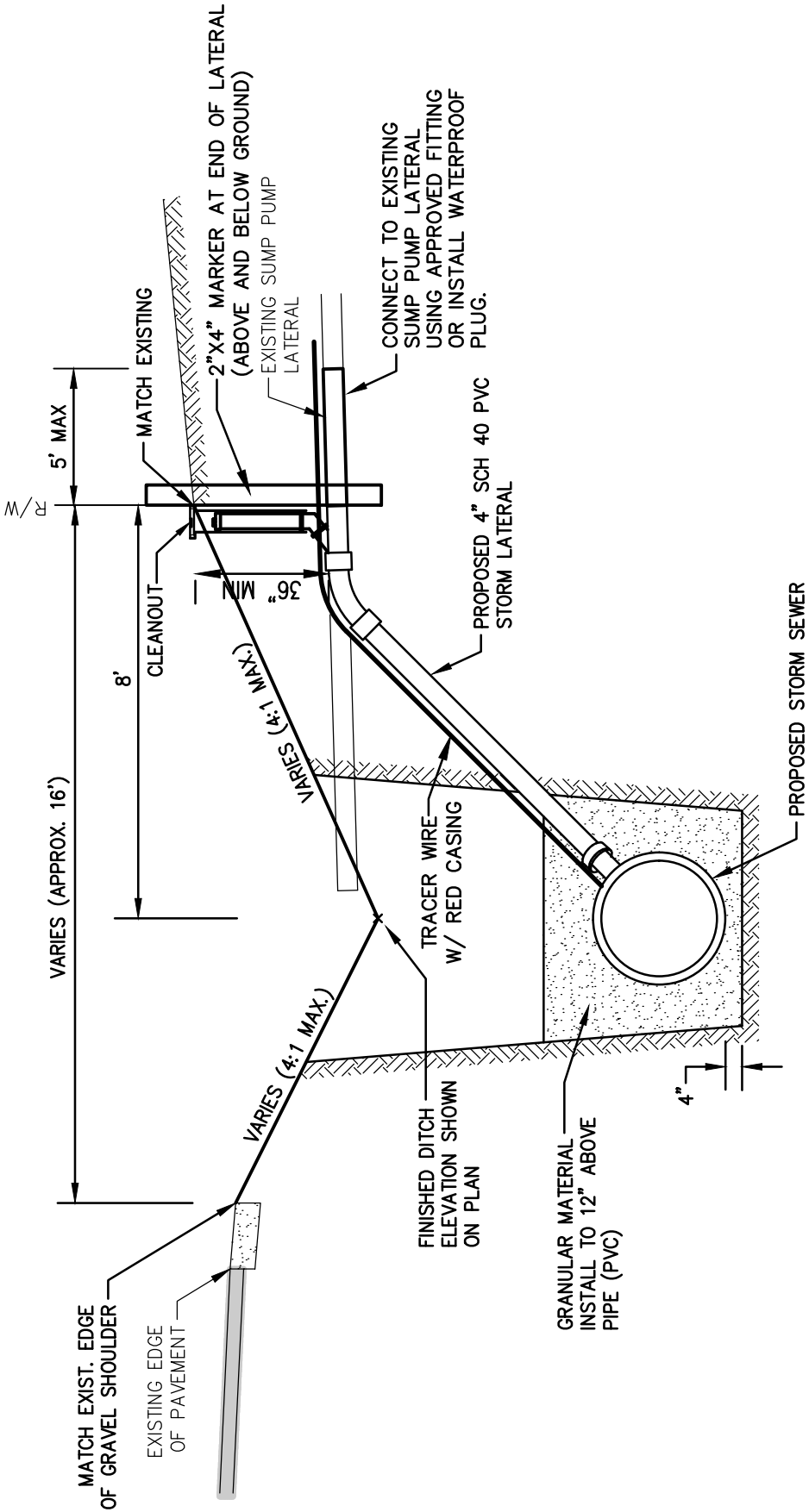
ENGINEERS ARCHITECTS

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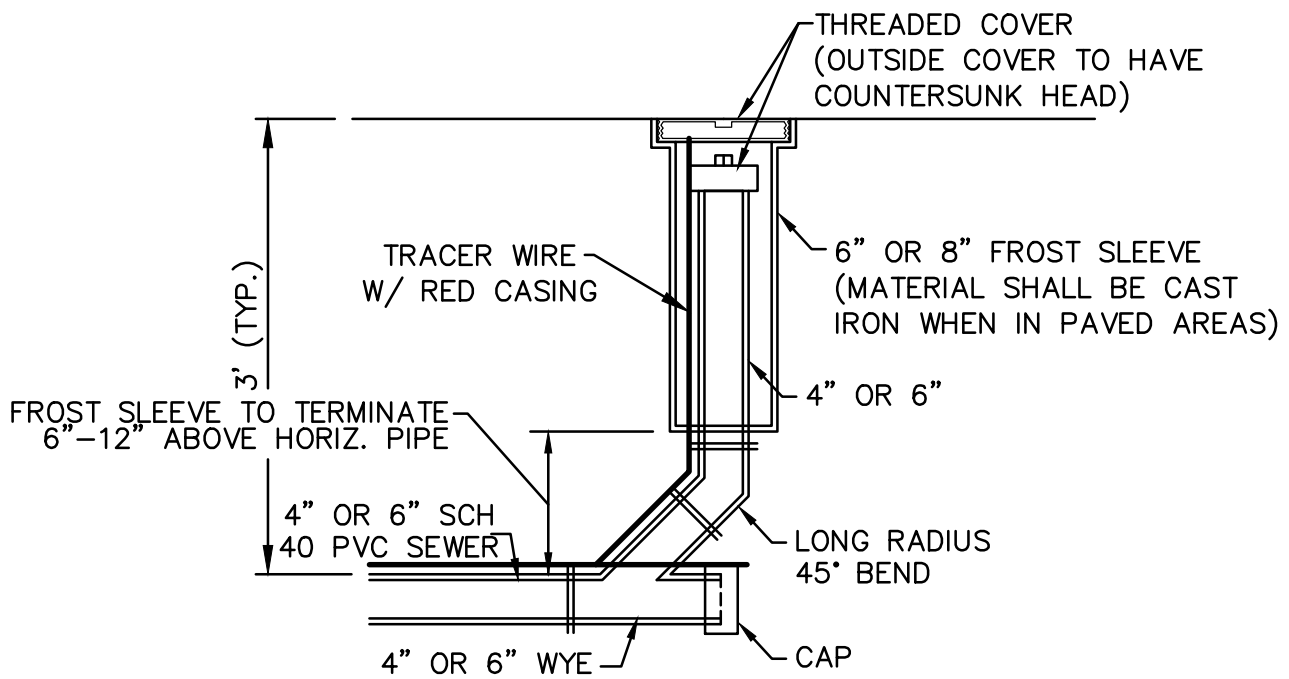
NOTE:
 SANITARY SEWER AND
 WATERMAIN CONSTRUCTION
 SPECIFICATIONS BY OTHERS.

TYPICAL STORM SEWER LATERAL TO R/W



TYPICAL STORM LATERAL TO R/W

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 ENGINEERS ARCHITECTS
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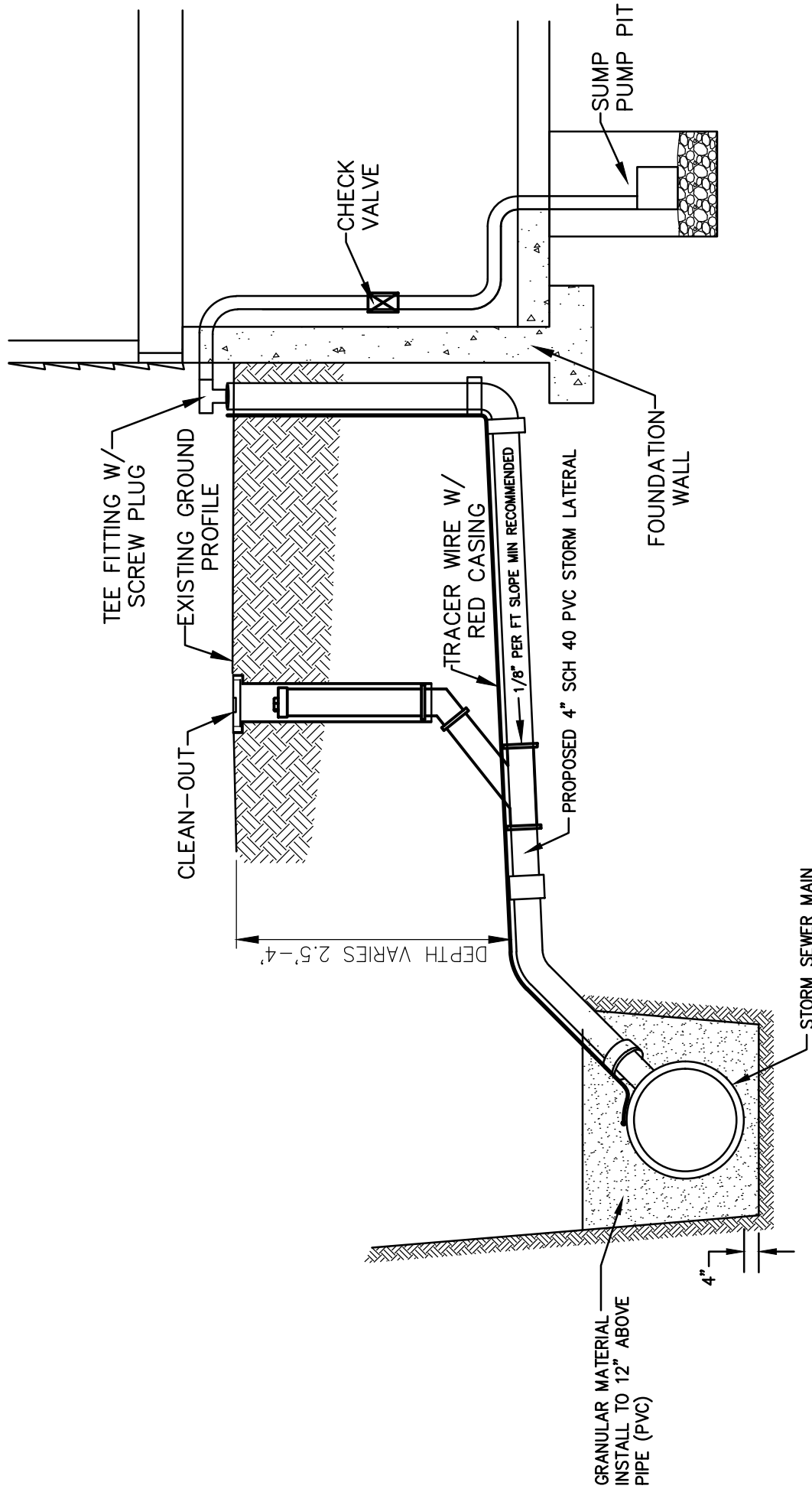


STORM SEWER LATERAL CLEANOUT

McMAHON

ENGINEERS ARCHITECTS

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TYPICAL STORM LATERAL CONNECTION TO HOME

McMAHON

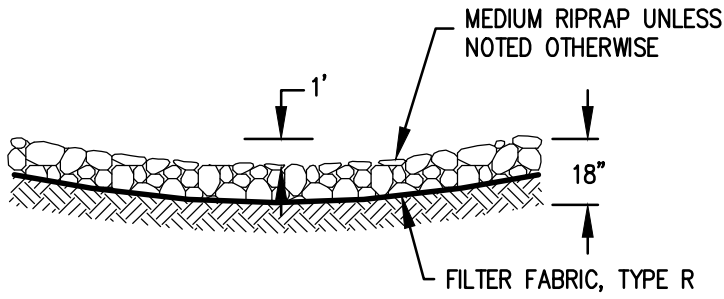
ENGINEERS ARCHITECTS

1445 McMAHON DRIVE NEENAH, WI 54956

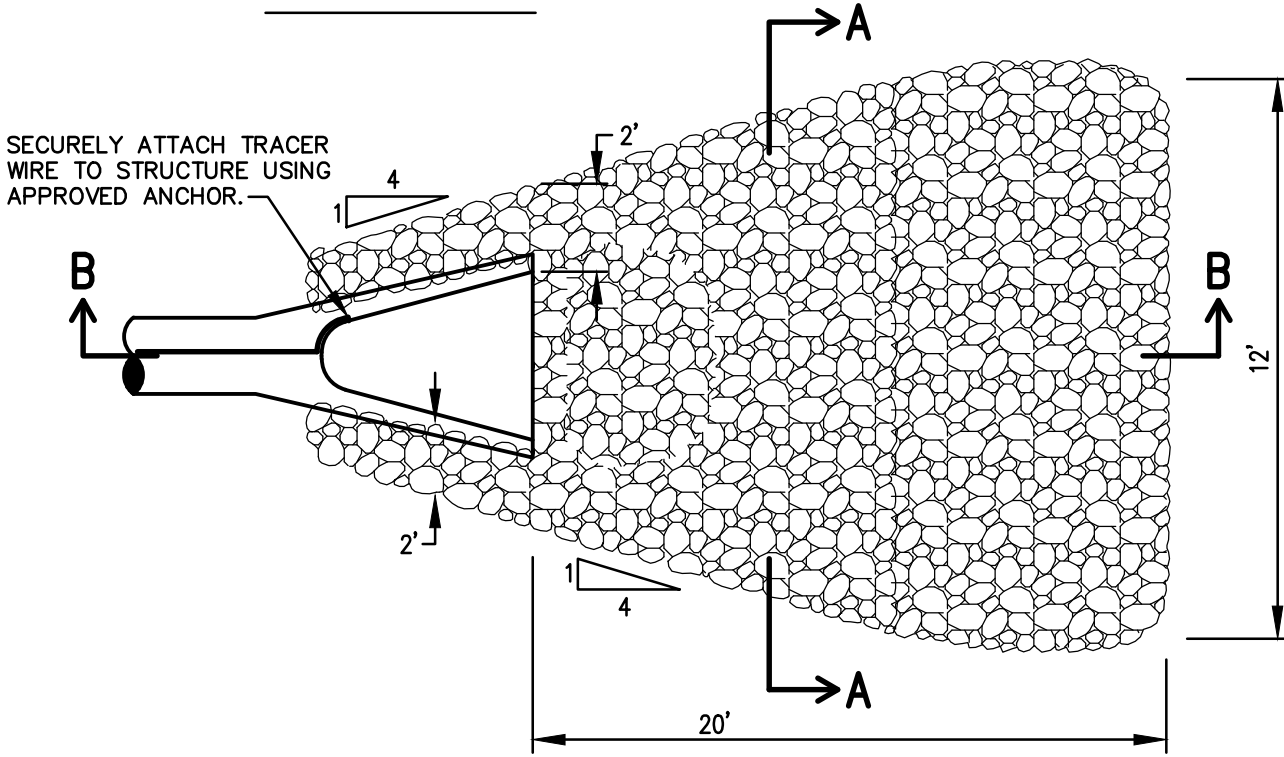
Mailing: P. O. BOX 1025 NEENAH, WI 54957-1025

Tel: (920) 751-4200 Fax: (920) 751-4284

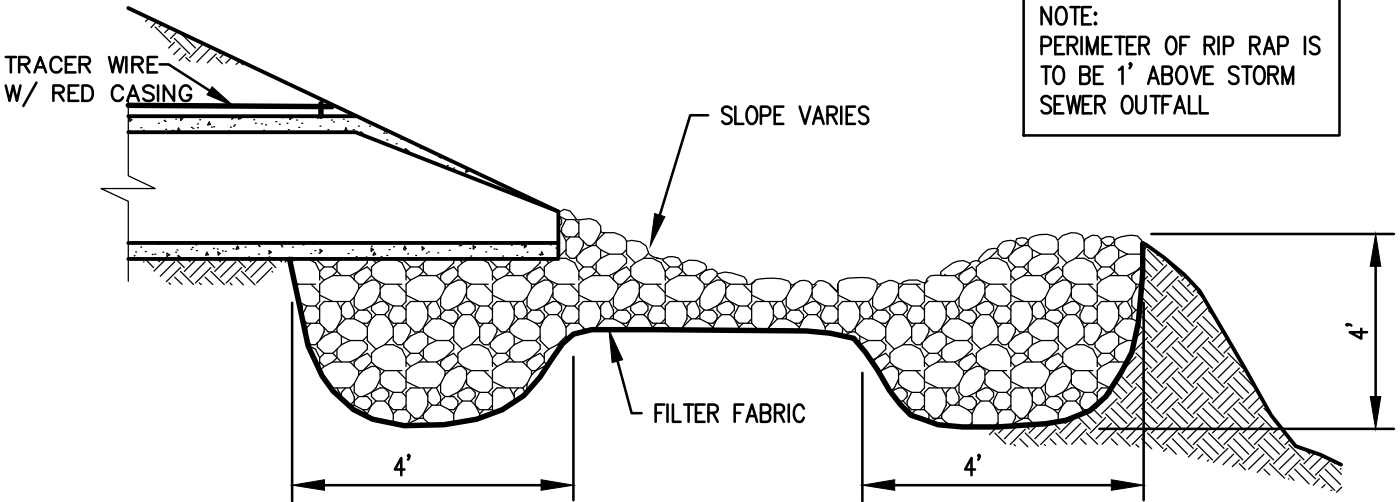
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SECTION A-A



PLAN



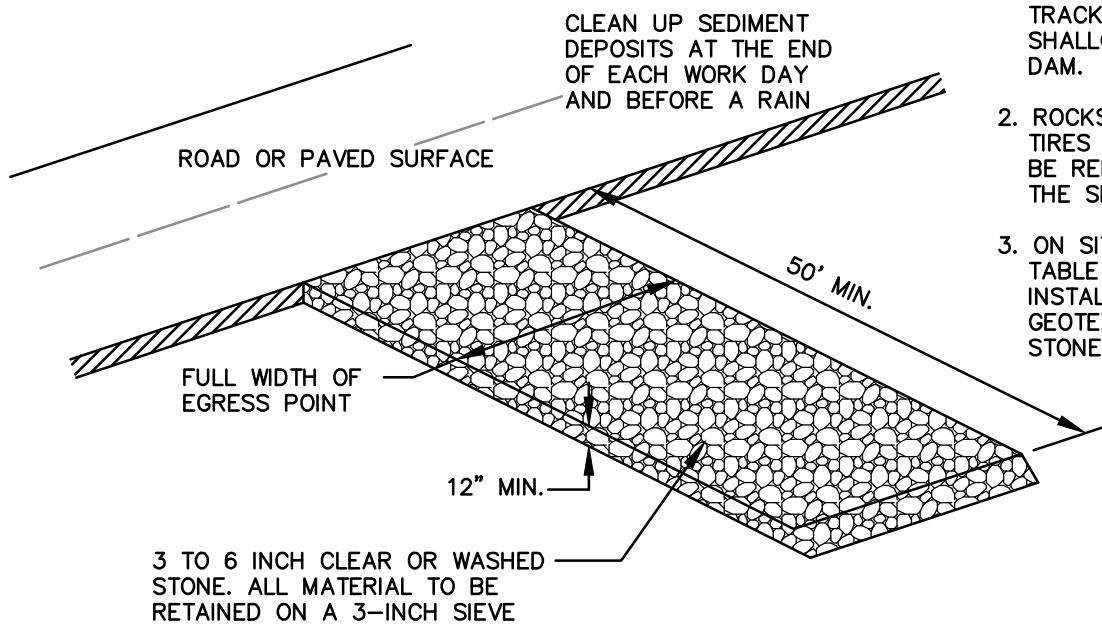
SECTION B-B

RIPRAP AT STORM SEWER

McMAHON

ENGINEERS ARCHITECTS

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1. DIVERT FLOW AWAY FROM TRACKING PAD USING CULVERTS, SHALLOW TRENCH OR DIVERSION DAM.
2. ROCKS LODGED BETWEEN THE TIRES OF DUAL VEHICLES SHALL BE REMOVED PRIOR TO LEAVING THE SITE.
3. ON SITES WITH A HIGH WATER TABLE OR STURATED SOILS, INSTALL A DOT TYPE R GEOTEXTILE FABRIC UNDER STONE TRACKING PAD.

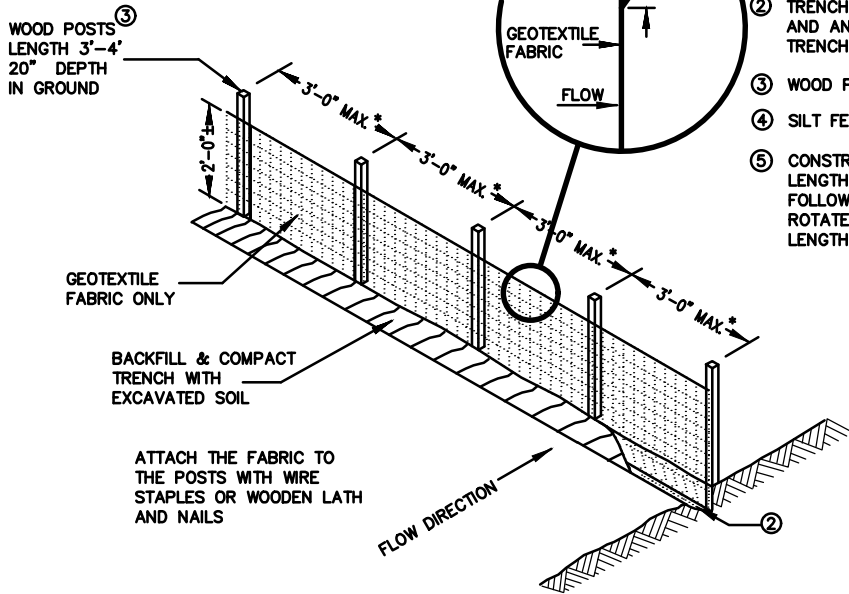
STONE TRACKING PAD

McMAHON

ENGINEERS ARCHITECTS

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NOTE: ADDITIONAL POST DEPTH OR TIE BACKS MAY BE REQUIRED IN UNSTABLE SOILS

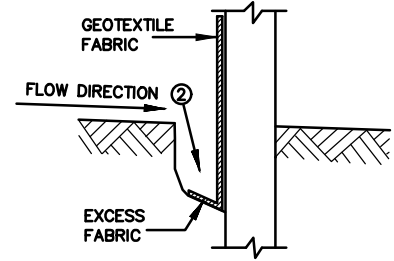


SILT FENCE

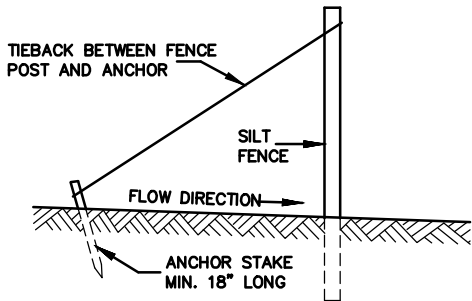
* NOTE: 8'-0" POST SPACING ALLOWED IF A WOVEN GEOTEXTILE FABRIC IS USED.

GENERAL NOTES

- ① HORIZONTAL BRACE REQUIRED WITH 2" X 4" WOODEN FRAME OR EQUIVALENT AT TOP OF POSTS.
- ② TRENCH SHALL BE A MINIMUM OF 4" WIDE & 6" DEEP TO BURY AND ANCHOR THE GEOTEXTILE FABRIC. FOLD MATERIAL TO FIT TRENCH AND BACKFILL & COMPACT TRENCH WITH EXCAVATED SOIL.
- ③ WOOD POSTS SHALL BE A MINIMUM SIZE OF 1 1/2" X 1 1/2" OF OAK OR HICKORY.
- ④ SILT FENCE TO EXTEND ACROSS THE TOP OF THE PIPE.
- ⑤ CONSTRUCT SILT FENCE FROM A CONTINUOUS ROLL IF POSSIBLE BY CUTTING LENGTHS TO AVOID JOINTS. IF A JOINT IS NECESSARY USE ONE OF THE FOLLOWING TWO METHODS; A) OVERLAP THE END POSTS AND TWIST, OR ROTATE, AT LEAST 180 DEGREES, B) HOOK THE END OF EACH SILT FENCE LENGTH.

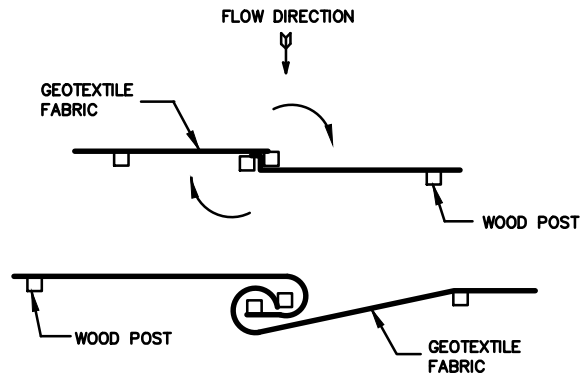


TRENCH DETAIL

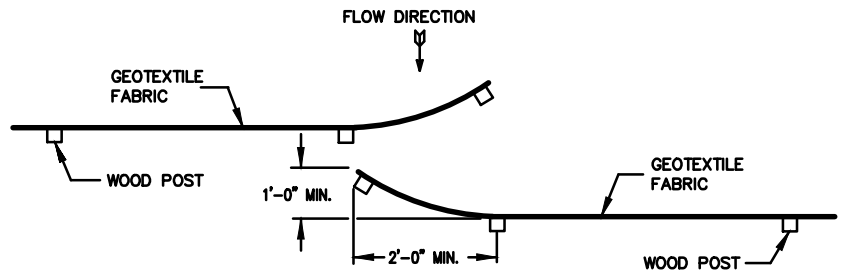


SILT FENCE TIE BACK

(WHEN ADDITIONAL SUPPORT REQUIRED)



TWIST METHOD



HOOK METHOD

JOINING TWO LENGTHS OF SILT FENCE

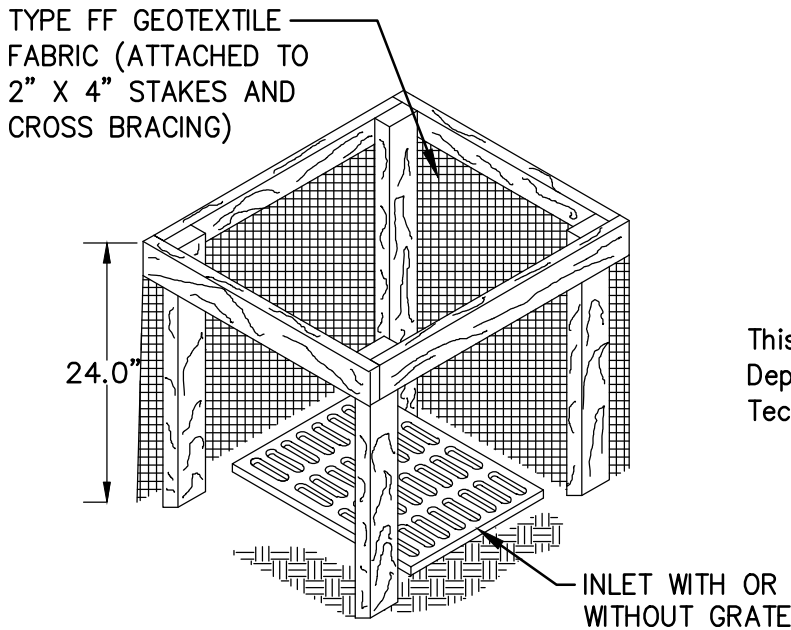
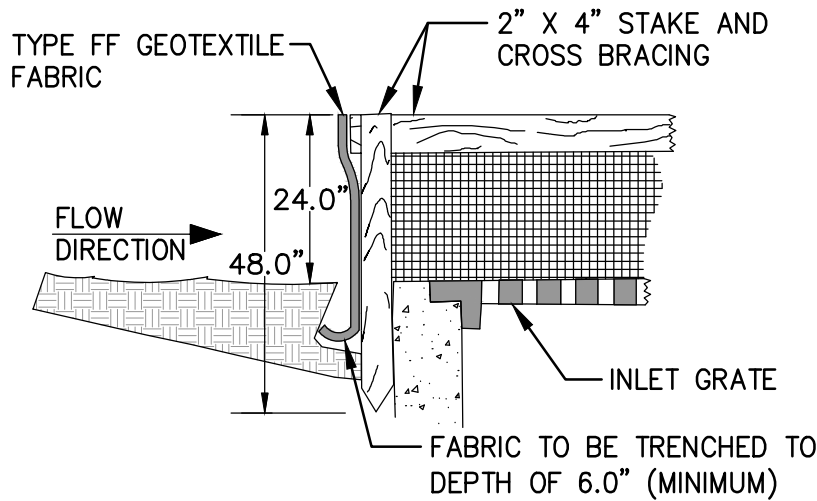
This drawing based on Wisconsin Department of Transportation Standard Detail Drawing 8 E 10-2.

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This drawing based on Wisconsin Department of Natural Resources Technical Standard No. 1060.

INLET PROTECTION, TYPE A

GENERAL NOTES

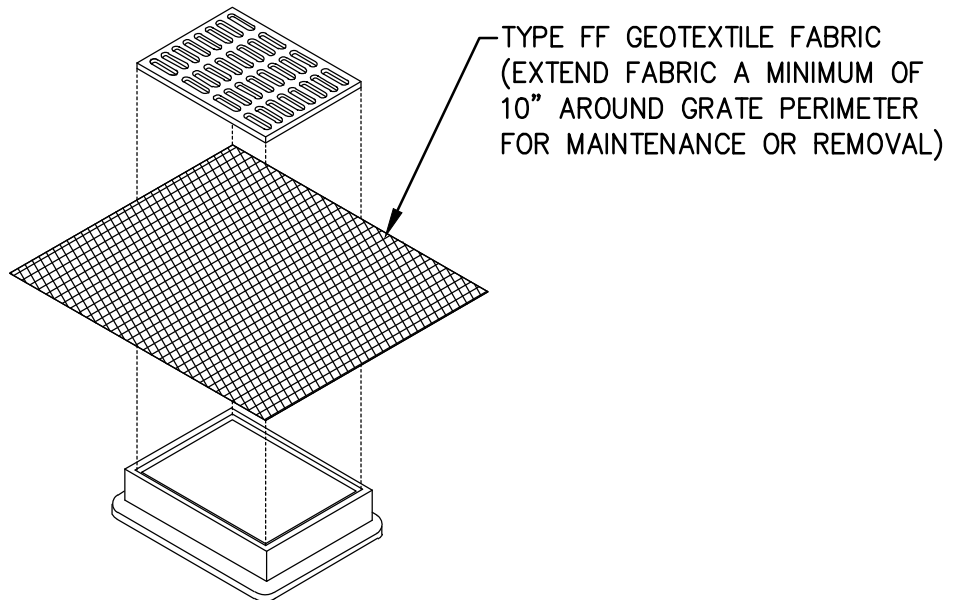
MAINTENANCE NOTES

1. WHEN REMOVING OR MAINTAINING INLET PROTECTION, CARE SHALL BE TAKEN SO THAT THE SEDIMENT TRAPPED IN THE FABRIC DOES NOT FALL INTO THE STRUCTURE. MATERIAL THAT HAS FALLEN INTO THE INLET SHALL BE IMMEDIATELY REMOVED.
2. GEOTEXTILE FABRIC TYPE FF FOR FLAPS, TOP AND BOTTOM OF OUTSIDE OF FILTER BAG. FRONT, BACK, AND BOTTOM OF FILTER BAG BEING ONE PIECE.
3. FRONT LIFTING FLAP IS TO BE USED WHEN REMOVING AND MAINTAINING FILTER BAG.
4. SIDE FLAPS SHALL BE A MAXIMUM OF TWO INCHES LONG. FOLD THE FABRIC OVER AND REINFORCE WITH MULTIPLE STITCHES.
5. FLAP POCKETS SHALL BE LARGE ENOUGH TO ACCEPT WOOD 2" x 4". THE REBAR, STEEL PIPE, OR WOOD SHALL BE INSTALLED IN THE REAR FLAP AND SHALL NOT BLOCK THE TOP HALF OF THE CURB FACE OPENING.

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INLET PROTECTION, TYPE B

WITHOUT CURB BOX

This drawing based on Wisconsin
Department of Natural Resources
Technical Standard No. 1060.

GENERAL NOTES

MAINTENANCE NOTES

1. WHEN REMOVING OR MAINTAINING INLET PROTECTION, CARE SHALL BE TAKEN SO THAT THE SEDIMENT TRAPPED IN THE FABRIC DOES NOT FALL INTO THE STRUCTURE. MATERIAL THAT HAS FALLEN INTO THE INLET SHALL BE IMMEDIATELY REMOVED.

1. TAPER BOTTOM OF BAG TO MAINTAIN THREE INCHES OF CLEARANCE BETWEEN THE BAG AND THE STRUCTURE, MEASURED FROM THE BOTTOM OF THE OVERFLOW OPENINGS TO THE STRUCTURE WALL.
2. GEOTEXTILE FABRIC TYPE FF FOR FLAPS, TOP AND BOTTOM OF OUTSIDE OF FILTER BAG. FRONT, BACK, AND BOTTOM OF FILTER BAG BEING ONE PIECE.
3. FRONT LIFTING FLAP IS TO BE USED WHEN REMOVING AND MAINTAINING FILTER BAG.
4. SIDE FLAPS SHALL BE A MAXIMUM OF TWO INCHES LONG. FOLD THE FABRIC OVER AND REINFORCE WITH MULTIPLE STITCHES.
5. FLAP POCKETS SHALL BE LARGE ENOUGH TO ACCEPT WOOD 2" x 4". THE REBAR, STEEL PIPE, OR WOOD SHALL BE INSTALLED IN THE REAR FLAP AND SHALL NOT BLOCK THE TOP HALF OF THE CURB FACE OPENING.

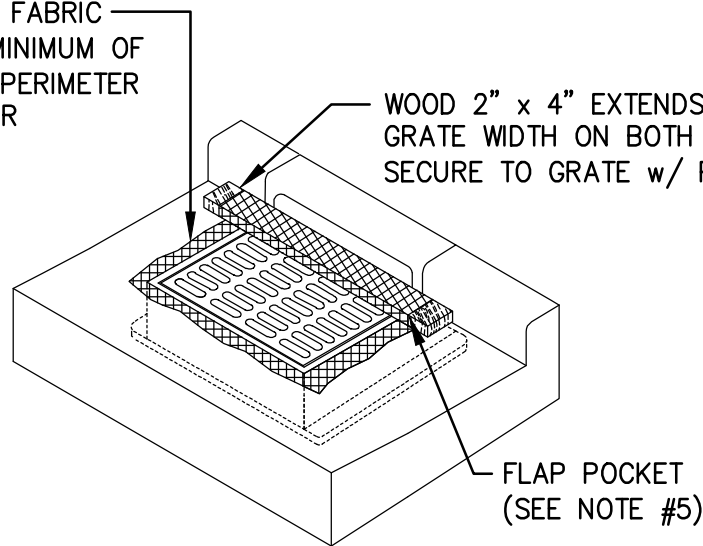
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TYPE FF GEOTEXTILE FABRIC
(EXTEND FABRIC A MINIMUM OF
10" AROUND GRATE PERIMETER
FOR MAINTENANCE OR
REMOVAL)

WOOD 2" x 4" EXTENDS 8" BEYOND
GRATE WIDTH ON BOTH SIDES,
SECURE TO GRATE w/ PLASTIC TIES



INLET PROTECTION, TYPE C

WITH CURB BOX

This drawing based on Wisconsin
Department of Natural Resources
Technical Standard No. 1060.

GENERAL NOTES

MAINTENANCE NOTES

1. WHEN REMOVING OR MAINTAINING INLET PROTECTION, CARE SHALL BE TAKEN SO THAT THE SEDIMENT TRAPPED IN THE FABRIC DOES NOT FALL INTO THE STRUCTURE. MATERIAL THAT HAS FALLEN INTO THE INLET SHALL BE IMMEDIATELY REMOVED.

1. TAPER BOTTOM OF BAG TO MAINTAIN THREE INCHES OF CLEARANCE BETWEEN THE BAG AND THE STRUCTURE, MEASURED FROM THE BOTTOM OF THE OVERFLOW OPENINGS TO THE STRUCTURE WALL.
2. GEOTEXTILE FABRIC TYPE FF FOR FLAPS, TOP AND BOTTOM OF OUTSIDE OF FILTER BAG. FRONT, BACK, AND BOTTOM OF FILTER BAG BEING ONE PIECE.
3. FRONT LIFTING FLAP IS TO BE USED WHEN REMOVING AND MAINTAINING FILTER BAG.
4. SIDE FLAPS SHALL BE A MAXIMUM OF TWO INCHES LONG. FOLD THE FABRIC OVER AND REINFORCE WITH MULTIPLE STITCHES.
5. FLAP POCKETS SHALL BE LARGE ENOUGH TO ACCEPT WOOD 2" x 4". THE REBAR, STEEL PIPE, OR WOOD SHALL BE INSTALLED IN THE REAR FLAP AND SHALL NOT BLOCK THE TOP HALF OF THE CURB FACE OPENING.

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FLAP POCKET
(SEE NOTE #5)

SIDE FLAP
(SEE NOTE #4)

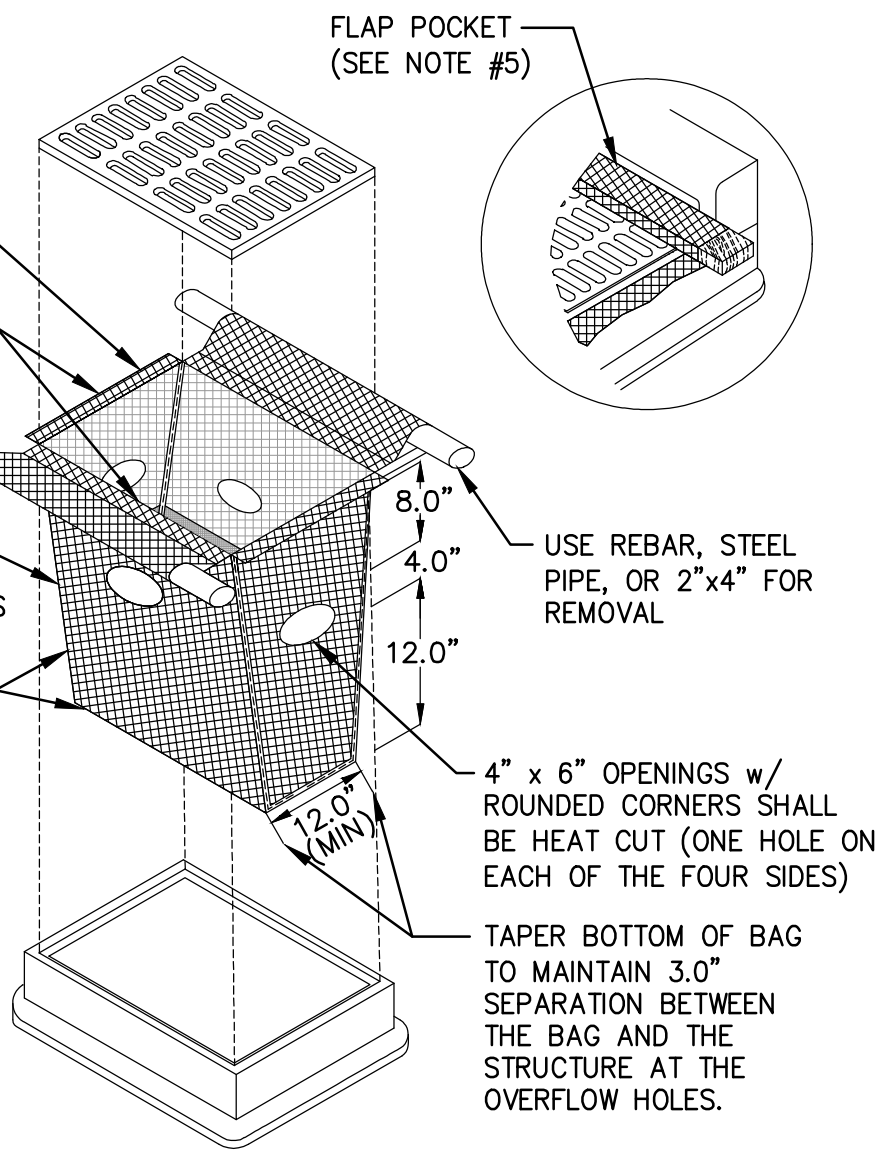
LENGTH AND WIDTH DIMENSIONS
SHALL BE PER PLAN

FRONT LIFTING FLAP
(SEE NOTE #3)

MINIMUM DOUBLE STITCHED
SEAMS ALL AROUND SIDE
PIECES AND ON FLAP POCKETS

TYPE FF GEOTEXTILE FABRIC
(FRONT, BACK, AND BOTTOM
TO BE A SINGLE PIECE OF FF
FABRIC)

This drawing based on Wisconsin
Department of Natural Resources
Technical Standard No. 1060.



USE REBAR, STEEL
PIPE, OR 2"x4" FOR
REMOVAL

4" x 6" OPENINGS w/
ROUNDED CORNERS SHALL
BE HEAT CUT (ONE HOLE ON
EACH OF THE FOUR SIDES)

TAPER BOTTOM OF BAG
TO MAINTAIN 3.0"
SEPARATION BETWEEN
THE BAG AND THE
STRUCTURE AT THE
OVERFLOW HOLES.

INLET PROTECTION, TYPE D

CAN BE INSTALLED IN INLETS
WITH OR WITHOUT CURB BOXES

GENERAL NOTES

MAINTENANCE NOTES

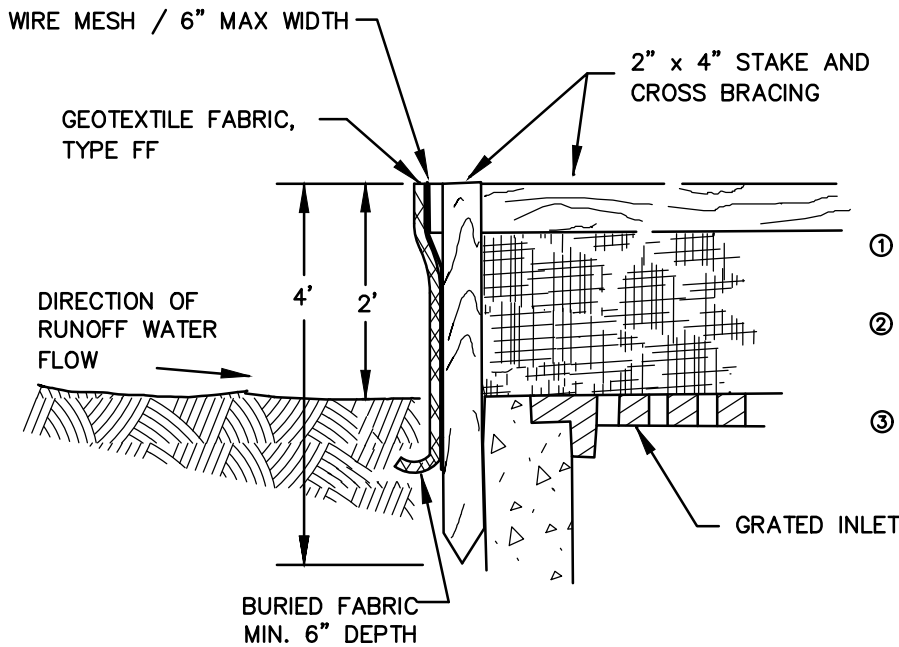
1. WHEN REMOVING OR MAINTAINING INLET PROTECTION, CARE SHALL BE TAKEN SO THAT THE SEDIMENT TRAPPED IN THE FABRIC DOES NOT FALL INTO THE STRUCTURE. MATERIAL THAT HAS FALLEN INTO THE INLET SHALL BE IMMEDIATELY REMOVED.

1. TAPER BOTTOM OF BAG TO MAINTAIN THREE INCHES OF CLEARANCE BETWEEN THE BAG AND THE STRUCTURE, MEASURED FROM THE BOTTOM OF THE OVERFLOW OPENINGS TO THE STRUCTURE WALL.
2. GEOTEXTILE FABRIC TYPE FF FOR FLAPS, TOP AND BOTTOM OF OUTSIDE OF FILTER BAG. FRONT, BACK, AND BOTTOM OF FILTER BAG BEING ONE PIECE.
3. FRONT LIFTING FLAP IS TO BE USED WHEN REMOVING AND MAINTAINING FILTER BAG.
4. SIDE FLAPS SHALL BE A MAXIMUM OF TWO INCHES LONG. FOLD THE FABRIC OVER AND REINFORCE WITH MULTIPLE STITCHES.
5. FLAP POCKETS SHALL BE LARGE ENOUGH TO ACCEPT WOOD 2" x 4". THE REBAR, STEEL PIPE, OR WOOD SHALL BE INSTALLED IN THE REAR FLAP AND SHALL NOT BLOCK THE TOP HALF OF THE CURB FACE OPENING.

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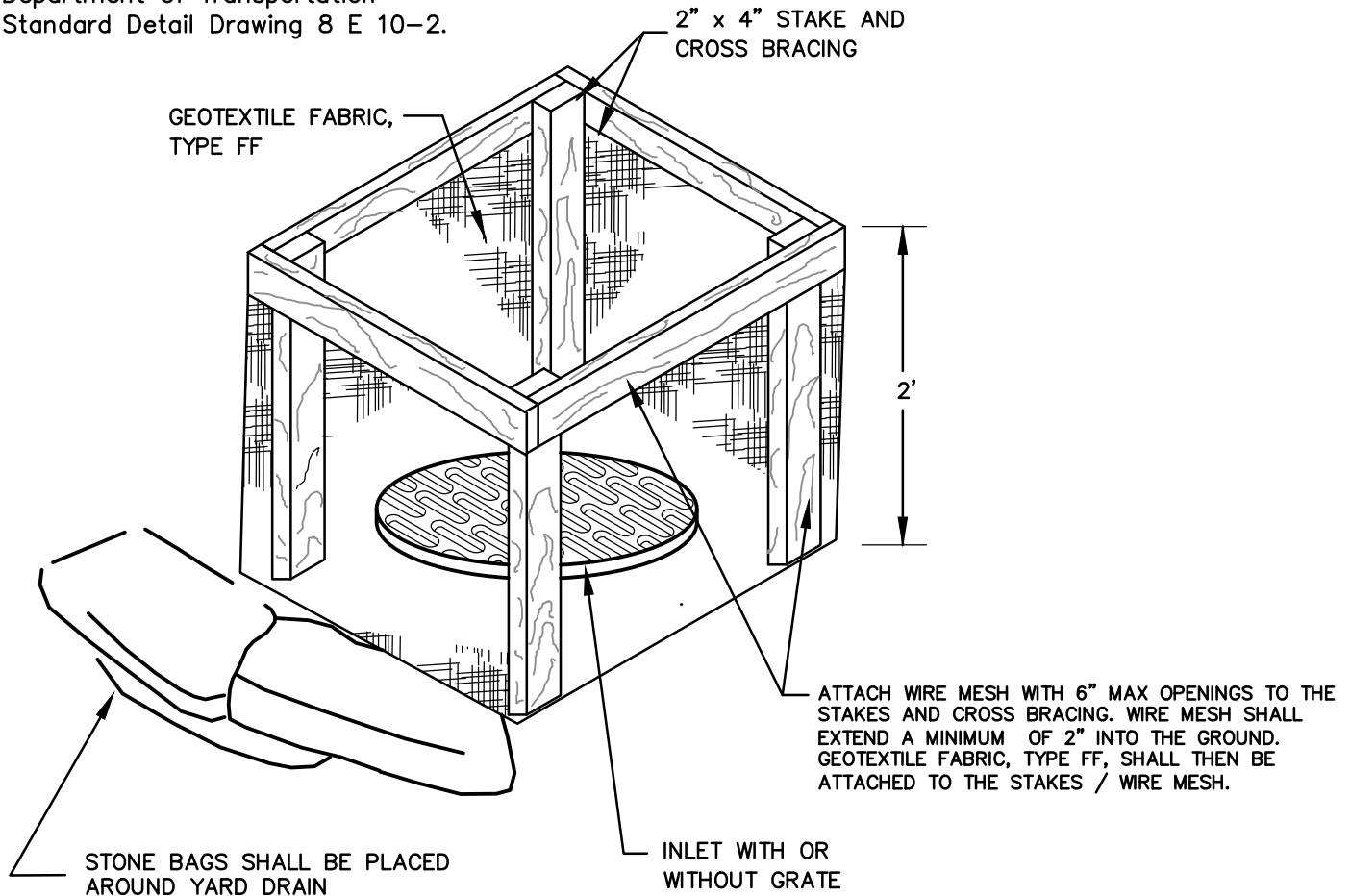
GENERAL NOTES

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.

This drawing based on Wisconsin Department of Transportation Standard Detail Drawing 8 E 10-2.

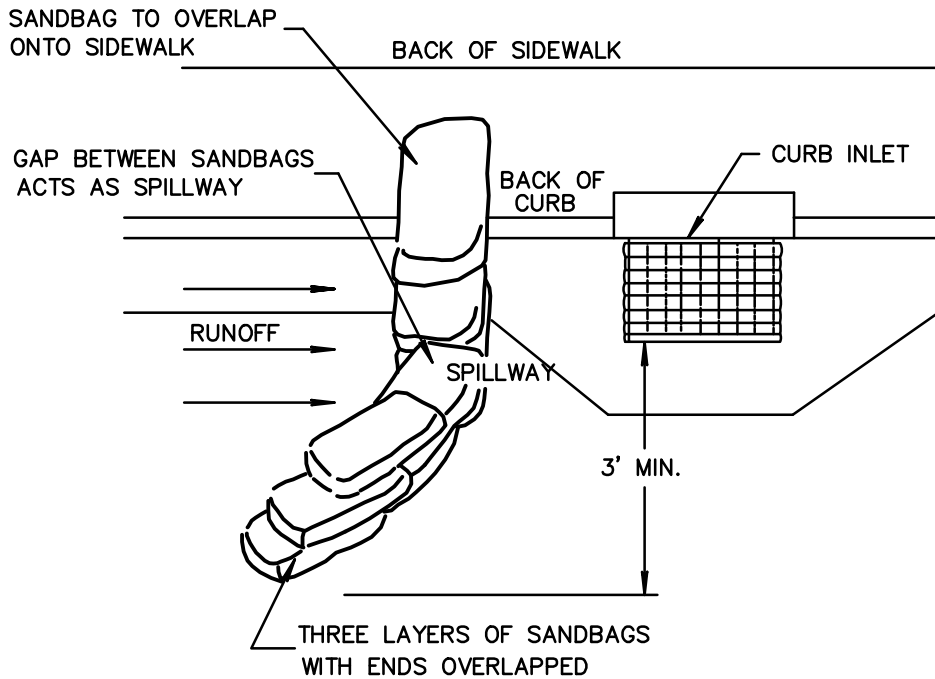


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YARD DRAIN PROTECTION

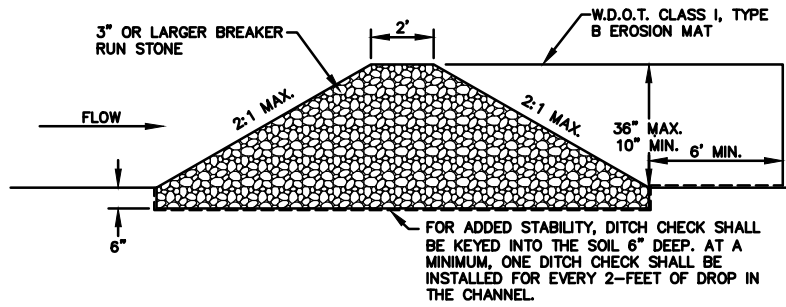


CURB INLET SEDIMENT BARRIER
 (FILTER BAG TYPE)

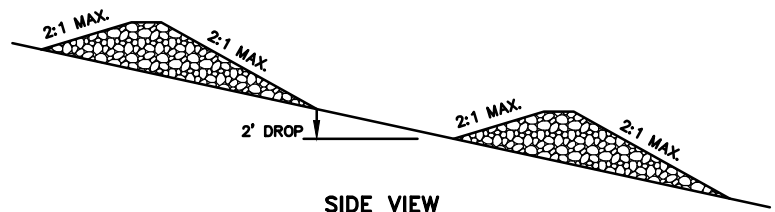
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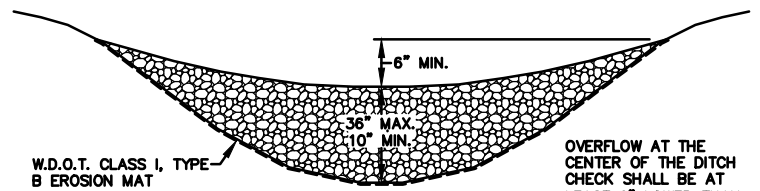
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SIDE VIEW

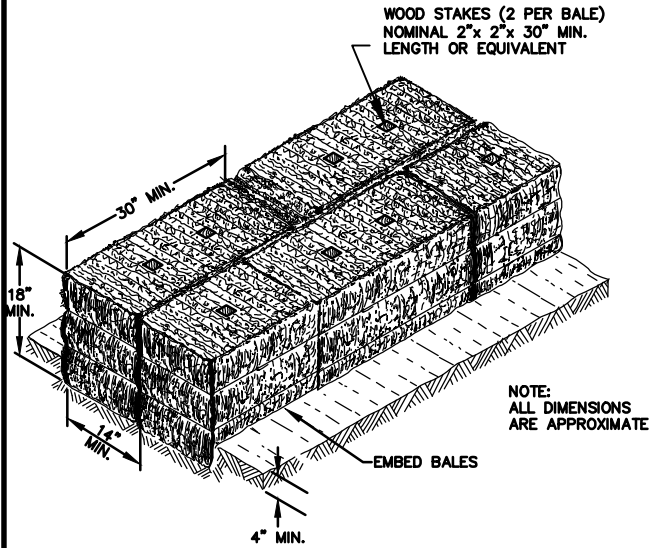


SIDE VIEW

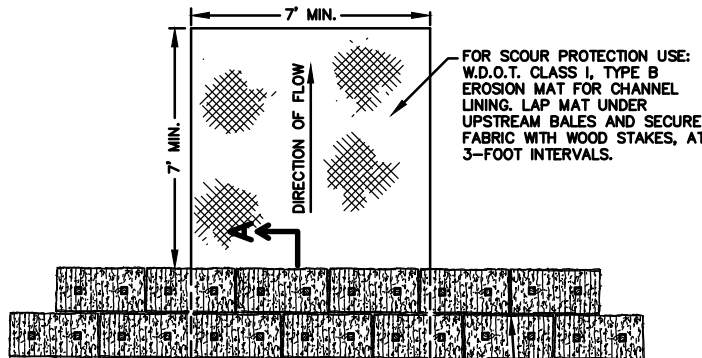


FRONT ELEVATION

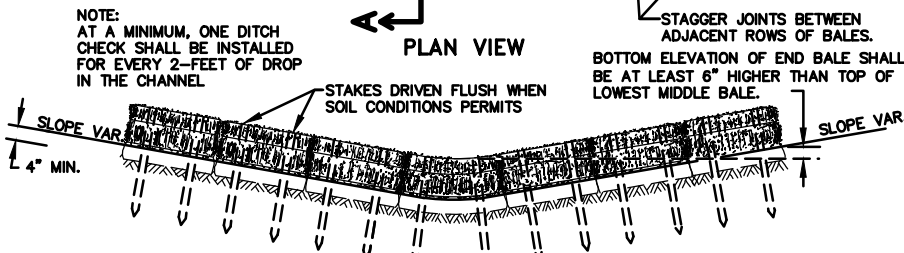
STONE OPTION



SECTION A-A



PLAN VIEW



FRONT ELEVATION

BALE OPTION

This drawing based on W.D.O.T. S.D.D. 8 E 8-3

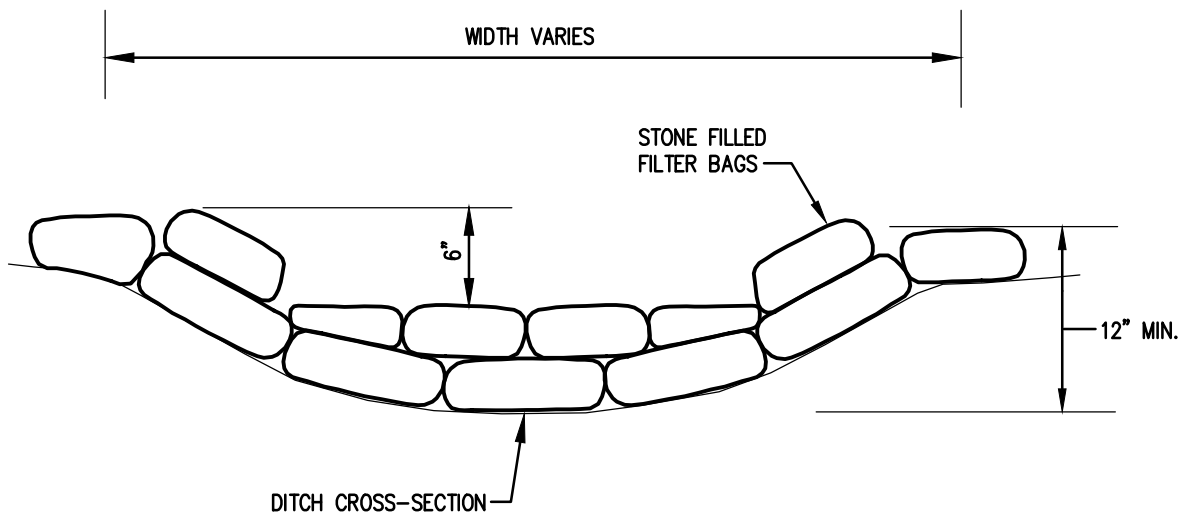
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TEMPORARY DITCH CHECK

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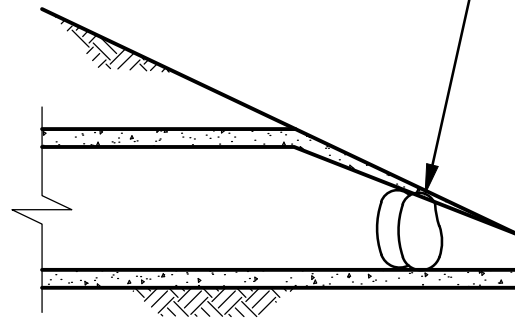
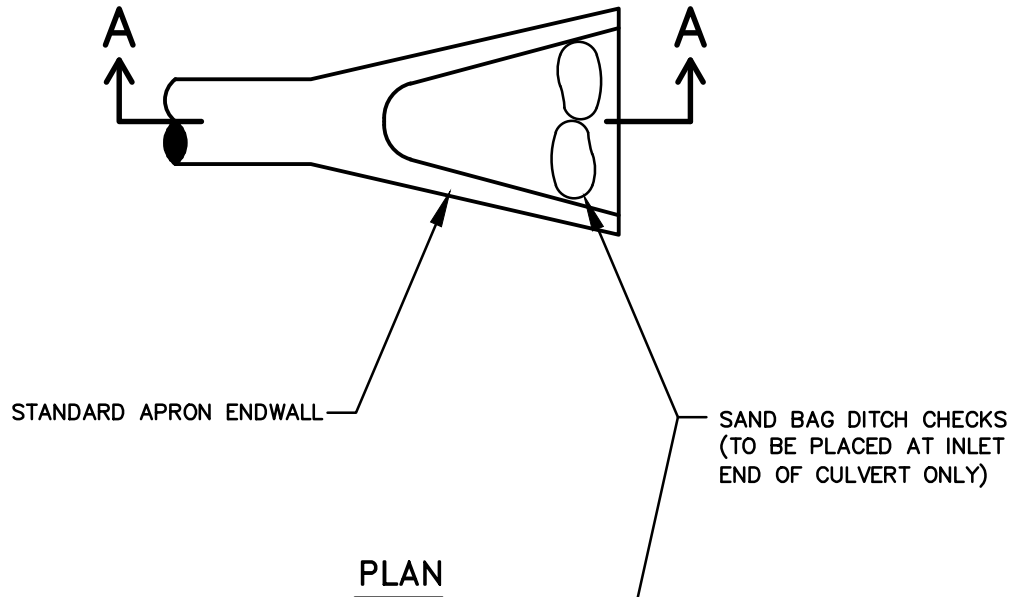
STONE DITCH CHECK BAGS SHALL BE BURLAP OR SYNTHETIC NET BAGS OF SUFFICIENT STRENGTH TO HOLD AGGREGATE SECURELY, WITH A MESH SIZE OF 1/8-INCH. THE BAGS SHALL BE 24-INCHES LONG BY 12-INCHES WIDE BY 6-INCHES HIGH. THE AGGREGATE IN THE BAGS SHALL CONFORM TO THE SIZE REQUIREMENTS FOR COURSE AGGREGATE FOR CONCRETE MASONRY, NUMBER 2.

STONE DITCH CHECK

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CULVERT PIPE DITCH CHECKS

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