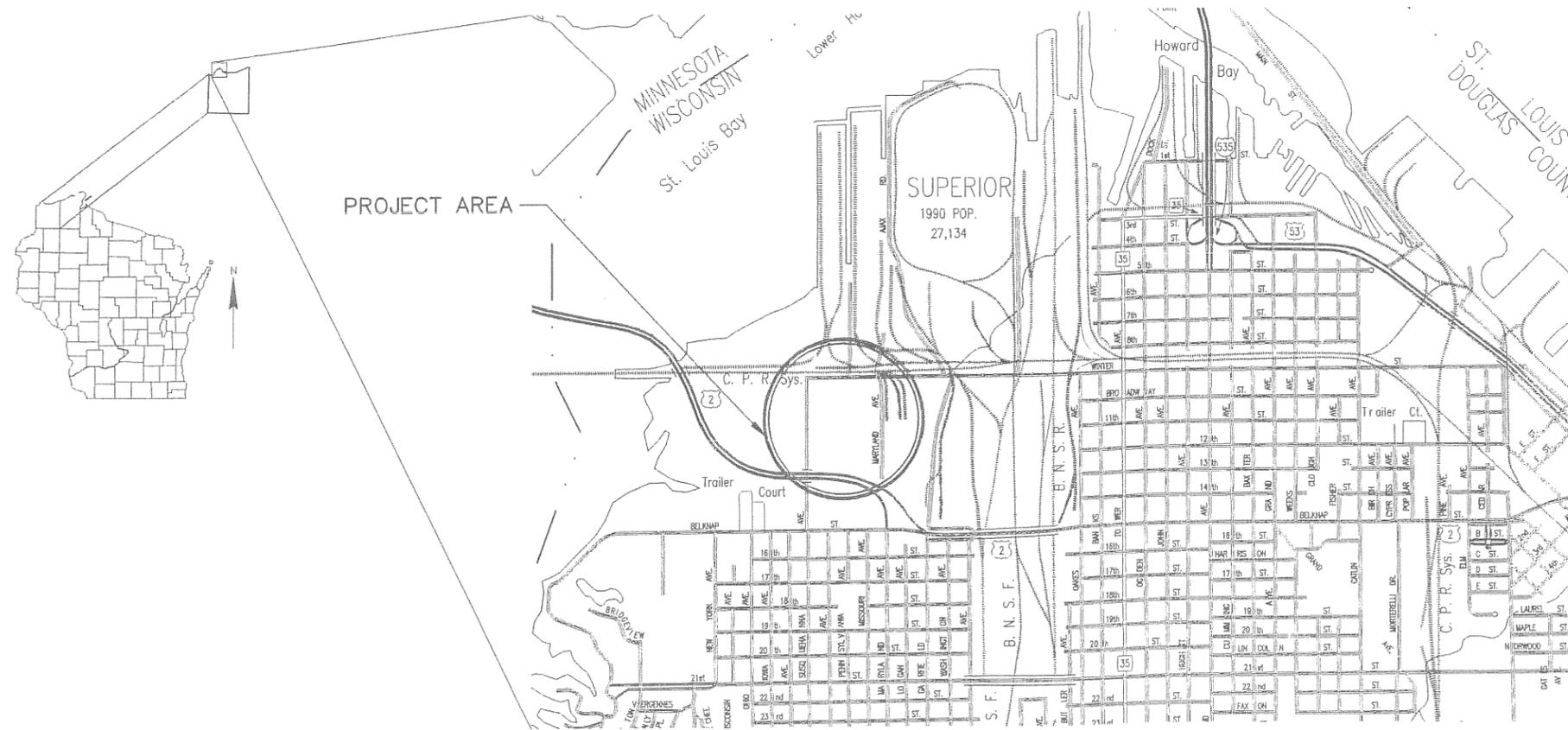


VINJE INDUSTRIAL PARK UTILITY & ROADWAY INFRASTRUCTURE

SUPERIOR, WISCONSIN

PROJ. # 041350



NOT TO SCALE

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CALL DIGGERS' HOTLINE
(800) 242-8511
2040 W. WISCONSIN AVE.
STE. 10
MILWAUKEE, WI 53233

CONTRACTOR SHALL FIELD VERIFY THE LOCATIONS AND ELEVATIONS OF EXISTING UTILITIES AND TOPOGRAPHIC FEATURES PRIOR TO THE START OF CONSTRUCTION. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER OF ANY DISCREPANCIES OR VARIATIONS FROM THE PLANS.

APPROVALS:

CITY OF SUPERIOR _____ DATE _____

KRECHARD
ASSOCIATES P.A.
Engineers & Architects

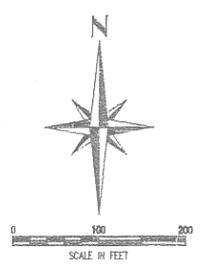
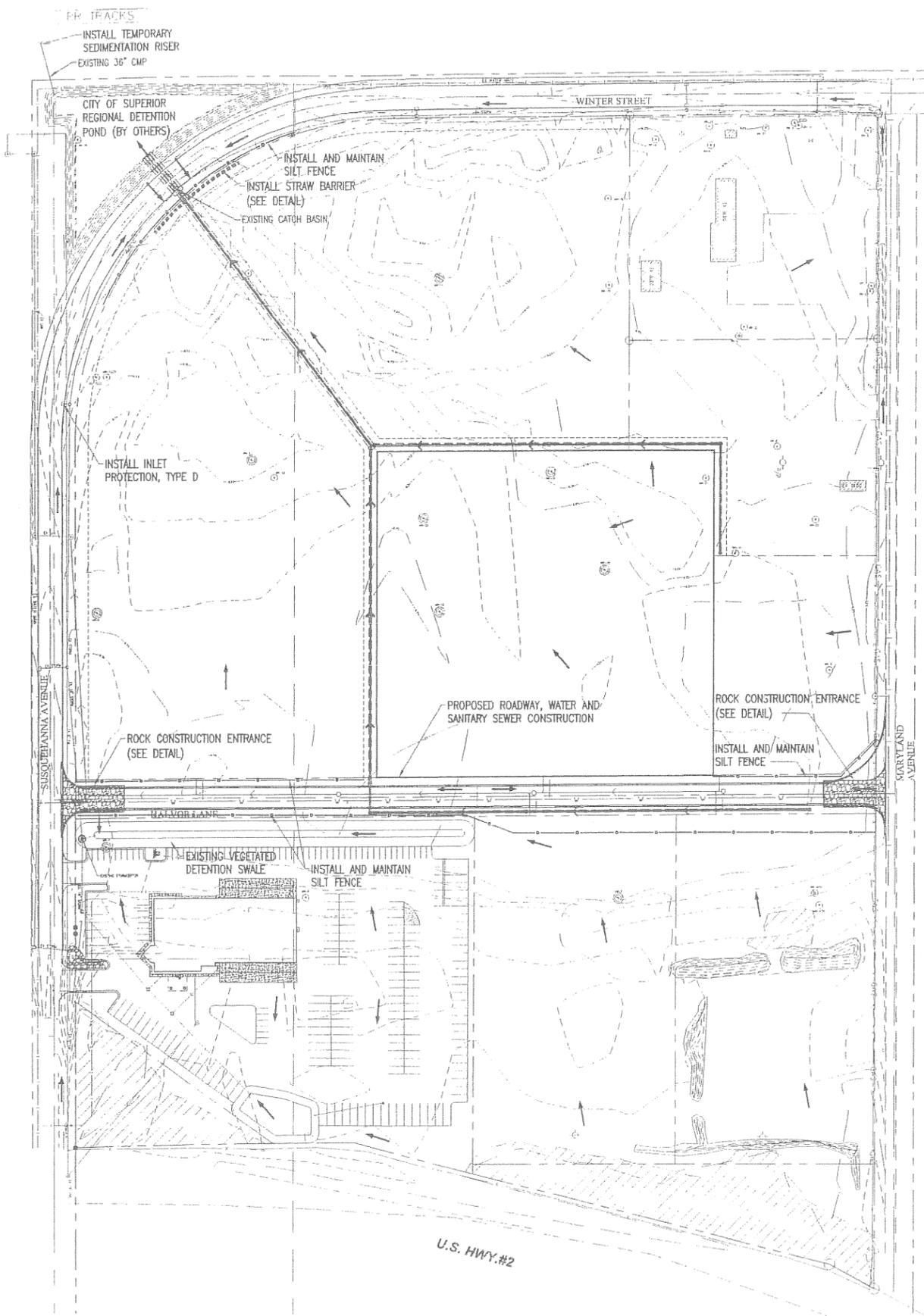


DATE	REV.	DESCRIPTION	REV. BY:

VINJE INDUSTRIAL PARK
UTILITY & ROADWAY
INFRASTRUCTURE
SUPERIOR, WISCONSIN

JOB No: 041350
DATE: 8-7-05
DRAWN BY: SC
CHECKED BY: MC

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PROSECUTION OF WORK

THE PROJECT INCLUDES CONSTRUCTION OF THE ROADWAY HALVOR LANE, WATER AND SANITARY SEWER EXTENSIONS THROUGH THE SITE, STORM SEWER, AND CONNECTION TO THE EXISTING STORMWATER VEGETATED DETENTION SWALE FOR RUNOFF FROM THE NEW ROADWAY. THE EXISTING SITE IS A GRASSY AREA THAT WAS PREVIOUSLY GRADED. SOILS CONSIST OF TOPSOIL UNDERLAIN BY CLAY SUBSOILS. THE SITE IS A REDEVELOPMENT OF A PREVIOUS INDUSTRIAL SITE. THE AREA OF SITE DISTURBANCE IS 3.2 ACRES. THE PROJECT CONSISTS OF 1.10 ACRES OF NEW IMPERVIOUS SURFACE.

- THE SEQUENCE OF THE WORK SHALL BE AS FOLLOWS:
- INSTALL TEMPORARY SEDIMENTATION RISER.
 - INSTALL SILT FENCE WHERE SHOWN IN PLANS.
 - STRIP AND STOCKPILE TOPSOIL ALONG WATERMAIN AND SANITARY SEWER ROUTES.
 - INSTALL SANITARY SEWER AND WATERMAIN AT PROPOSED LOCATIONS.
 - INSTALL ALL STORM SEWER PIPING THROUGHOUT THE PROJECT, PROVIDE INLET PROTECTION ON ALL STRUCTURES.
 - COMPLETE TOPSOIL STRIPPING AND STOCKPILING ALONG HALVOR LANE. INSTALL ROCK CONSTRUCTION ENTRANCES PRIOR TO EARTHMOVING ACTIVITIES.
 - PERFORM EXCAVATION OF ROADBED, WITH PLACEMENT OF GRANULAR ROADBED MATERIAL CONCURRENT WITH EXCAVATION PROGRESS. RUNOFF TO THE ROADBED SHALL BE CONTAINED WITHIN THE ROADBED.
 - INSTALL CURB AND GUTTER, COMPLETE BITUMINOUS PAVING OF HALVOR LANE.
 - GRADE AREAS BEHIND CURB AND GUTTER, PLACE TOPSOIL, AND SEED ALL DISTURBED AREAS.
 - ONCE ALL DISTURBED AREAS ARE STABILIZED, SILT FENCE AND TEMPORARY SEDIMENT CONTROL DEVICES SHALL BE REMOVED AND DISPOSED OF.

EROSION CONTROL NOTES

- WSDOT STANDARD SPECIFICATIONS AND SPECIAL PROVISIONS SHALL APPLY.
 - THE CONTRACTOR IS RESPONSIBLE FOR EROSION AND SEDIMENT CONTROL ON THIS PROJECT. HE/SHE SHALL PLACE OR OTHERWISE CONSTRUCT EROSION CONTROL AND SEDIMENT CONTAINMENT DEVICES TO PREVENT THE RUNOFF, TRACKING OR LOSS OF SEDIMENT FROM DISTURBED AREAS OF THE PROJECT SITE.
 - RECEIVING WATER IS ST. LOUIS BAY.
 - PROVIDE A MINIMUM 3 INCHES TOPSOIL ON ALL DISTURBED AREAS TO BE SEED OR SODED.
 - PROVIDE AND INSTALL MULCH CONFORMING TO WSDOT 627 ON ALL SLOPES 3:1 AND FLATTER. PROVIDE DISC ANCHORING.
 - PROVIDE TYPE B ANALYSIS FERTILIZER ACCORDING TO WSDOT 629.
 - TEMPORARY SEEDING SHALL CONSIST OF ANNUAL RYE GRASS APPLIED AT 80 LBS/ACRE
 - PROVIDE WSDOT SEED MIXTURE #10 AT 65 LBS/ACRE ON ALL DISTURBED AREAS.
 - ALL EXPOSED SOIL AREAS MUST HAVE TEMPORARY EROSION PROTECTION OR PERMANENT COVER FOR THE EXPOSED SOIL AREAS YEAR ROUND, ACCORDING TO THE FOLLOWING TABLE OF SLOPES AND TIME FRAMES:
- | TYPE OF SLOPE | TIME | (TIMES INDICATED REFLECT THE MAXIMUM TIME AN AREA CAN REMAIN OPEN WHEN IT IS NOT BEING ACTIVELY WORKED.) |
|-------------------|---------|--|
| STEEPER THAN 3:1 | 7 DAYS | |
| 10:1 TO 3:1 | 14 DAYS | |
| FLATTER THAN 10:1 | 21 DAYS | |
- PIPE INLETS AND OUTLETS MUST BE PROVIDED WITH TEMPORARY OR PERMANENT ENERGY DISSIPATION WITHIN 24 HOURS OF INSTALLATION.
 - ALL STORM DRAIN INLETS MUST BE PROTECTED BY APPROPRIATE BEST MANAGEMENT PRACTICES (BMP'S) DURING CONSTRUCTION UNTIL ALL SOURCES WITH POTENTIAL FOR DISCHARGING TO THE INLET HAVE BEEN STABILIZED.
 - TEMPORARY SOIL STOCKPILES MUST HAVE SILT FENCE OR OTHER EFFECTIVE SEDIMENT CONTROLS, AND CANNOT BE PLACED IN SURFACE WATERS, INCLUDING STORM WATER CONVEYANCES SUCH AS CURB & GUTTER SYSTEMS, OR CONDUITS AND DITCHES.
 - VEHICLE TRACKING OF SEDIMENT FROM THE CONSTRUCTION SITE MUST BE MINIMIZED BY BMP'S SUCH AS STONE PADS (SEE ROCK CONSTRUCTION ENTRANCE DETAIL), CONCRETE OR STEEL WASH RACKS, OR EQUIVALENT SYSTEMS. STREET SWEEPING MUST BE USED IF SUCH BMP'S ARE NOT ADEQUATE OR PREVENT SEDIMENT FROM BEING TRACKED ONTO THE STREET.
 - THE CONTRACTOR MUST ROUTINELY INSPECT THE SITE ONCE EVERY 7 DAYS DURING ACTIVE CONSTRUCTION AND WITHIN 24 HOURS AFTER A RAINFALL EVENT GREATER THAN 0.5 INCHES IN 24 HOURS.
 - SEDIMENT AND EROSION CONTROL DEVICES SHALL BE FUNCTIONAL BEFORE LAND IS OTHERWISE DISTURBED ON THE SITE.
 - THE SURFACE OF STRIPPED AREAS SHALL BE PERMANENTLY OR TEMPORARILY PROTECTED FROM SOIL EROSION WITHIN 15 DAYS AFTER FINAL GRADE IS REACHED. STRIPPED AREAS NOT AT FINAL GRADE THAT WILL REMAIN UNDISTURBED FOR MORE THAN 15 DAYS AFTER INITIAL DISTURBANCE SHALL BE PROTECTED FROM EROSION AREAS WITHIN 200 FEET OF WATERS OF THE STATE SHALL BE PROTECTED WITHIN 24 HOURS OF CONNECTING THE DRAINAGEWAY TO SURFACE WATER.
 - THE FOLLOWING CONTROLS WILL BE IMPLEMENTED AT THE CONSTRUCTION SITE:
 - A. EROSION AND SEDIMENT CONTROLS
 - EROSION CONTROL BLANKETS SHALL BE USED ON ALL SLOPES 1:3 OR STEEPER AND OVER 5 FEET HIGH AND TO A 10 FOOT WIDTH IN ALL DITCH BOTTOMS.
 - PERMANENT VEGETATION WILL BE ESTABLISHED AFTER TOPSOIL IS RESPREAD.
 - SILT FENCES AND STRAW BALES WILL MINIMIZE SEDIMENT FROM DISCHARGING FROM SITE.
 - STORM INLETS AND OUTLET APRONS SHALL BE PROTECTED WITH SEDIMENT CONTAINMENT DEVICES.
 - STABILIZED CONSTRUCTION ENTRANCE.
 - ALL SLOPES AND DITCHES SHALL BE STABILIZED PRIOR TO OPENING NEW CULVERTS INTO EXISTING DRAINAGE WAYS.
 - WATER PUMPED OR OTHERWISE DISCHARGED FROM THE SITE DURING CONSTRUCTION DEWATERING SHALL BE DIRECTED TOWARD SEDIMENT CONTAINMENT DEVICES.
 - ANY SOIL MUD OR DEBRIS WASHED, TRACKED OR DEPOSITED ONTO PAVED SURFACES SHALL BE REMOVED PRIOR TO THE END OF EACH WORK DAY.
 - STABILIZED CONSTRUCTION ENTRANCE(S) SHALL BE REMOVED AND AREA RESTORED AFTER GRADING IS COMPLETE.
 - ALL SILT FENCE AND BALE CHECKS SHALL BE CLEANED OF SEDIMENT WHEN THE SEDIMENT REACHES 1/3 THE HEIGHT OF THE SILT FENCE OR BALE CHECK.
 - THE CONTRACTOR SHALL MAINTAIN THE SEDIMENT AND EROSION CONTROL MEASURES IDENTIFIED ON THIS PLAN UNTIL THE SITE IS STABILIZED. ALL EROSION AND SEDIMENT CONTROL DEVICES SHALL BE INSPECTED AFTER EACH RAIN EVENT. ALL NONFUNCTIONAL DEVICES SHALL BE REPAIRED OR REPLACED WITH NO ADDITIONAL COMPENSATION MADE THEREOF. IT IS THE CONTRACTORS RESPONSIBILITY TO KEEP A WRITTEN WEEKLY LOG OF INSPECTIONS AND MAINTENANCE OF EROSION AND SEDIMENT CONTROL FOR THE PROJECT SITE. THESE LOGS ARE TO BE MAINTAINED ONSITE FOR PERIODIC AGENCY REVIEW.

KRECH OLIVARD & ASSOCIATES, P.A.
 1000 W. WISCONSIN AVENUE
 SUITE 200
 MILWAUKEE, WISCONSIN 53233
 TEL: 414.224.2200
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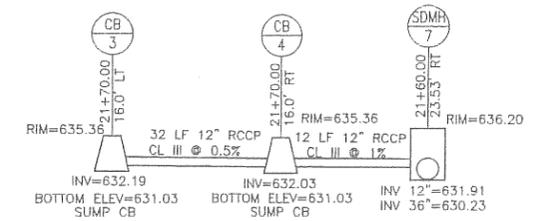
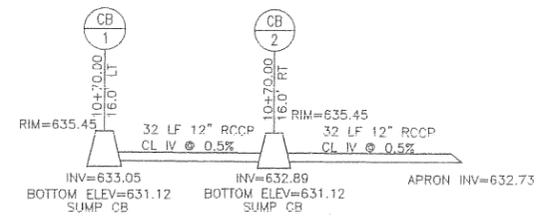


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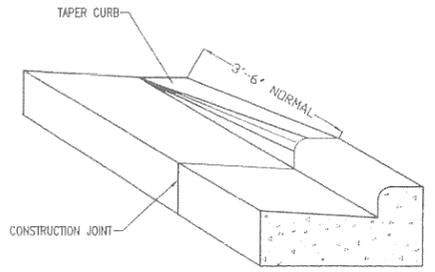
VINJE INDUSTRIAL PARK
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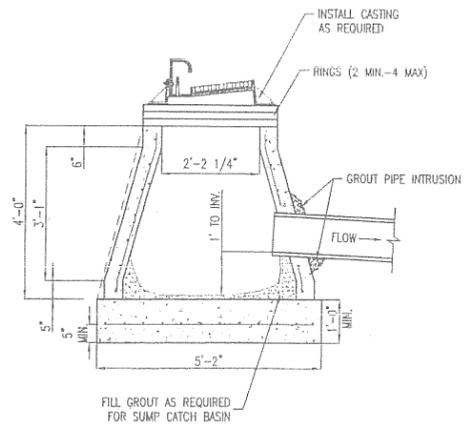
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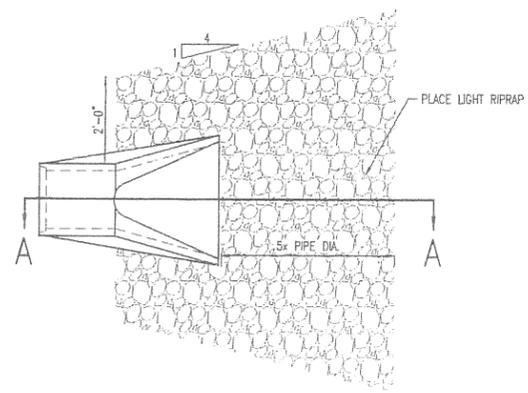
CATCH BASIN DETAILS



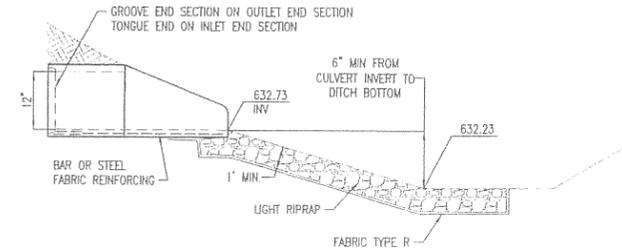
DETAIL OF CURB & GUTTER TERMINI



SUMP CATCH BASIN



TOP VIEW



SECTION A-A

CMP/RCP APRON

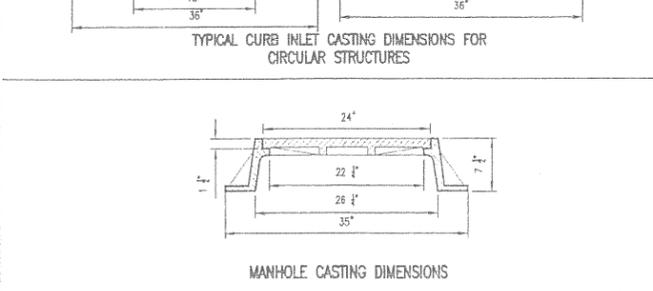
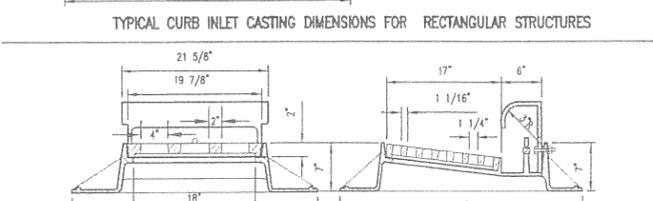
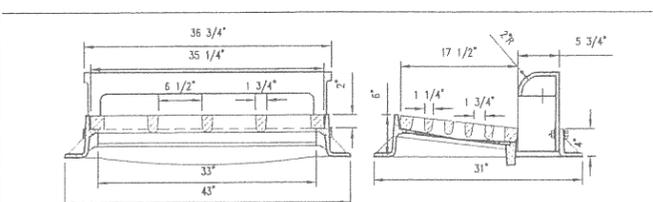
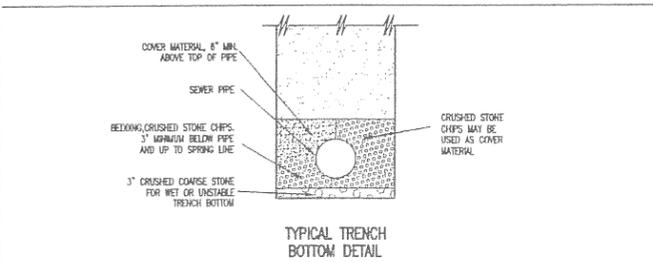
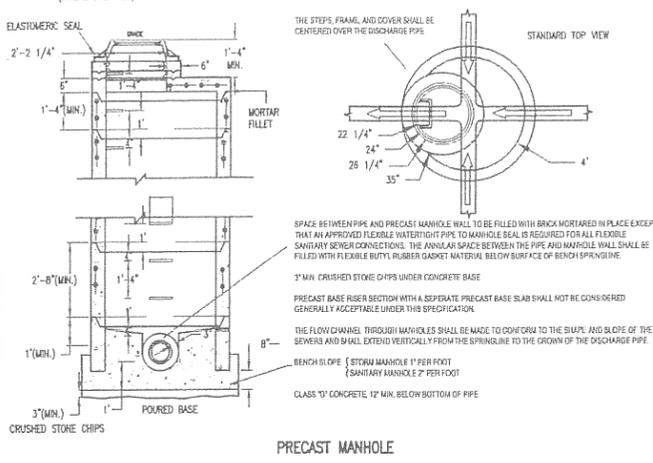
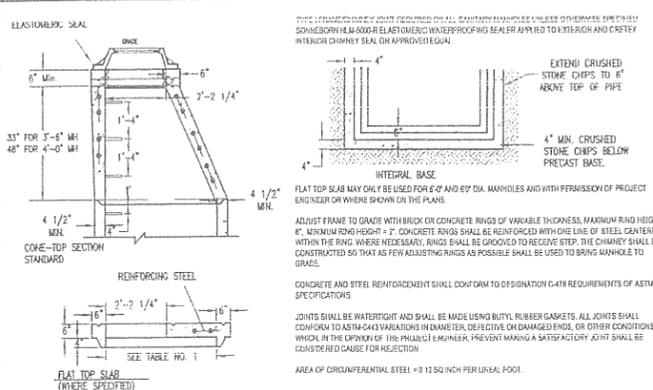


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General:
The Contractor shall comply with the most current edition of Standard Specifications for Sewer & Water Construction in Wisconsin.

SANITARY PIPE AND JOINT MATERIALS
Materials used in open trench construction of nonpressure sanitary sewers shall be restricted to the following: Reinforced Concrete Pipe (RCP), Ductile Iron Pipe (DI), and Polyvinyl Chloride Pipe (PVC). All material used for sanitary sewer construction shall be free from defects that impair service. Each length of pipe and fitting used in a sanitary sewer shall be stamped or indelibly marked with the manufacturer's name or mark. The substitution of any other type of pipe, or monolithic section, may only be used with the approval of the Wastewater Division of Public Works (WDPW). Where the substitution of a short length of monolithic concrete sewer is approved, the section shall be reinforced as directed by the Project Engineer.

STORM PIPE AND JOINT MATERIALS
Materials used in open trench construction of storm sewers shall be restricted to the following: RCP and Polyethylene Pipe with a smooth liner and corrugated exterior (PE). All material used for storm sewer construction shall be free from defects that impair service. Each length of pipe and fitting used in a storm sewer shall be stamped or indelibly marked with the manufacturer's name or mark. The substitution of any other type of pipe, or monolithic section, may only be used with the approval of the WDPW. Where the substitution of a short length of monolithic concrete sewer is approved, the section shall be reinforced as directed by the Project Engineer.

CULVERT PIPE AND JOINT MATERIALS
Materials used in construction of culverts shall be restricted to the following: RCP, PE, and Corrugated Steel Culvert Pipe (CSCP). The substitution of any other type of pipe may only be used with the approval of the WDPW. All material used for culvert construction shall be free from defects that impair service. Each length of pipe and fitting used in a culvert shall be stamped or indelibly marked with the manufacturer's name or mark.

PIPE & FITTING MATERIALS
The following are minimum standards for nonpressure pipe:
1. Polyvinyl Chloride (PVC) bell and spigot sewer pipe shall meet the requirements of D3034 (1981). PVC shall be type FPM SDR-35 unless otherwise specified. Joints shall be rubber gasket bell and spigot joints unless otherwise specified.
2. Reinforced Concrete Pipe (RCP) bell and spigot sewer pipe shall meet the requirements of C78 (1982). RCP shall be Class III unless otherwise specified. Joints shall be rubber gasket bell and spigot joints conforming to ASTM C443 (1979) unless otherwise specified.
3. Steel Pipe shall be welded from steel plate or spiral welded from steel coil. The minimum yield strength shall be 36,000 psi. For casing pipe the minimum wall thickness shall be 0.026 inches. The minimum inside diameter of the steel casing shall be not less than 6 inches greater than the maximum outside diameter of the carrier pipe. The steel casing pipe shall be epoxy coated on inside and outside surfaces.
4. Ductile Iron (DI) bell and spigot sewer pipe, fittings, and joints shall meet the requirements of AWWA C100 (1977).
5. Corrugated Polyethylene Pipe (PE) with a smooth liner shall conform to ASTM F884 or AASHTO M294, Type S. PE pipe conforming to ASTM F884 shall be not less than Class 100 (Ring Stiffness Constant = 100) and carrier pipe shall be not less than Class 160. Joints shall be watertight, bell and spigot type with rubber gaskets conforming to ASTM F477. Split-joint joints which are not watertight are not adequate under these specifications. Pipe fittings shall conform to AASHTO M294 or ASTM F884. Fittings shall be suitable for specified pipe joints. PE pipe shall conform to ASTM F894 (e.g. Spirulite as manufactured by Chevron) or AASHTO M294, Type S (e.g. Hancor Blue Seal as manufactured by Hancor Corporation).
6. Corrugated Steel Culvert Pipes (CSCP) shall be industry standard galvanized corrugated steel culvert pipe. Corrugations shall be 2 2/3 inches by 1/2-inch. Steel thickness shall be 0.052-inch for 8-inch diameter pipe and 0.084-inch for diameters from 10 to 48 inches. Joints shall be industry standard connecting bands subject to the approval of the WDPW.

JOINT ASSEMBLY OF POLYETHYLENE AND POLYVINYL CHLORIDE PIPING
Lubricated spigot end shall be inserted into receiving pipe bell until marked line is even with edge of bell. Assembly resulting in over-insertion, ruffled gaskets, split bells, failure to pass acceptance testing or damage to previously assembled joints will be considered sufficient cause for rejection of the Work.

COUPLINGS
Where pipe couplings are required to join pipes of dissimilar material, they shall be fully stainless steel shielded rubber couplings intended for underground use. Clamps shall be nut-and-bolt clamps, worm-drive or T-bolt clamps shall not be generally acceptable under this specification. Couplings shall be Flex-Seal Adjustable Repair Couplings as manufactured by Mission Rubber Company or approved equal.

BEDDING
Lift thickness for bedding materials shall not exceed 12 inches. Bedding shall be compacted by hand, or mechanically compacted by equally careful means, to a minimum of 90% of Standard Proctor Density. Pipe bedding shall be as follows:
1. Rigid Pipe Unless otherwise specified on the plans, the Standard Section shall be used. The Standard Section bedding has a foundation formed as follows: A layer of Crushed Stone Chips is spread over the bottom of the trench so that after the pipe has been placed thereon, imbedded to grade, and aligned, there remains a 4-inch minimum depth of Crushed Stone Chips below the pipe barrel and a minimum of 3 inches below the bell for pipe 27 inches in diameter or smaller, a minimum of 4 inches below the pipe for diameters up to 54 inches, and a minimum of 6 inches below the pipe for diameters 60 inches or larger. If excavation has been carried deeper than 6 inches below the pipe barrel, the excess depth shall be filled with Backfill Concrete or Crushed Stone meeting the gradation requirements of ASTM C-33 Size 4. Care shall be taken to insure that the pipe does not rest directly on the bell but is uniformly supported through its entire length. Wood foot blocks of 2-inch minimum thickness may be used at joints of pipe 36 inches in diameter and larger provided that the bedding material is mechanically compacted under the lower 60-degree quadrant of the pipe. Supporting blocks are not permitted under pipe less than 36 inches in diameter.
2. Plastic Pipe Plastic pipe, including but not limited to PVC and PE, shall be laid with bedding material of Crushed Stone Chips which shall be placed below and around the pipe up to the spring line in such a manner as to provide adequate side support and to prevent lateral movement of the pipe. The layer of Crushed Stone Chips shall be spread over the bottom of the trench so that after the pipe has been placed thereon, imbedded to grade, and aligned, there remains a 4-inch minimum depth of Crushed Stone Chips below the pipe for pipe 36 inches in diameter or smaller, a minimum of 6 inches below the pipe for diameters larger than 36 inches. If excavation has been carried deeper than 6 inches below the pipe barrel, the excess depth shall be filled with Backfill Concrete or Crushed Stone meeting the gradation requirements of ASTM C-33 Size 4.
3. Ductile Iron Sewer Pipe Ductile iron sewer pipe shall be laid according to the specifications for Plastic Pipe, except that bedding material may be Crushed Stone Chips or Cover Material.
4. Corrugated Steel Culvert Pipe Corrugated Steel Culvert Pipe shall be laid according to the specifications for Plastic Pipe.

CRUSHED STONE CHIPS
Crushed Stone Chips shall mean granular material resulting from the mechanical compaction of rock, boulders, large cobble stones, or pea gravel of which 85% to 100% of particles have faces have been fractured by crushing operations.

MANHOLE BASES
Concrete manhole bases shall be as follows:
1. Precast Manhole With Integral Base The excavation shall be made deep enough so that after the bottom manhole barrel section with the integral base has been placed thereon, set to grade, and plumbed, there remains a minimum depth of bedding material below the bottom of the base equal to the depth of bedding material of the adjacent sewers. The annular space between the manhole excavation and the outside manhole wall shall be backfilled with bedding material up to the spring line of the incoming pipe.
2. Field Poured Base For Precast Manhole The Precast Manhole bottom barrel shall be set on concrete brick or solid block so that the bottom of this section is below the spring line of the outlet pipe, set for proper location and plumbed. The concrete base of Class D concrete shall have a minimum thickness of 12 inches below the invert of the outlet sewer. The manhole base shall substantially conform to the required shape and dimensions; the excavation shall be back formed, if necessary, to achieve this end. If excavation in stable soil has been carried below the required depth, such excess depth shall be filled with concrete. Excess concrete shall not be deposited around the manhole in such a manner that will interfere with possible future connections. The pipe shall be supported on brick or solid concrete blocks for the pouring of the concrete base. The concrete support for rigid pipe shall end in a vertical plane flush with the face of the pipe bell.
3. Separate Concrete Base Slab Separate concrete base slabs shall not generally be acceptable under these specifications.

FLOW CHANNEL
The flow channel through manholes shall be made to conform to the shape and slope of the sewers and shall extend vertically from the springline to the crown of the discharge pipe.

PIPE TO MANHOLE CONNECTION
Connection shall be water tight in all manholes. Where groundwater conditions are unfavorable inlet and outlet pipes shall be joined to sanitary manholes with a gasketed flexible watertight connection or any watertight connection arrangement that allows differential settlement of the pipe and manhole wall to take place.

The manhole connection of pipe sewers shall be accomplished by one of the following:
1. Connection Of Rigid Pipe To Precast Manholes The rigid pipe to Precast Manhole connection shall be by means of brick and mortar or by an approved flexible watertight pipe to manhole seal for pipe diameters up to 24 inches in 48-inch manholes. For brick and mortar connection, a minimum of mortar shall be added to the mortar to produce a lumpy texture. Mortar shall be packed in and troweled off. Larger diameter pipe connections shall be as shown on the Contract Drawings. This seal shall meet the physical requirements of ASTM C923. Holes in Precast Manholes shall be cored or preformed.
2. Connection Of Plastic Pipe To Precast Manholes All plastic pipe shall be connected to Precast Manholes by means of an approved flexible watertight pipe to manhole seal. This seal shall meet the physical requirements of both ASTM C-425 and C-433.

Pipe entering a manhole through this seal shall be laid in accordance with the bedding section requirements and shall not be rigidly supported as required for nonflexible connections.

To maintain the seal flexibility that portion of the annular space between the pipe and the manhole wall below the spring line of the pipe, shall be plugged with butyl rubber gasket material prior to the placing of concrete in the manhole.

MANHOLE MATERIALS
Sanitary manholes shall be precast concrete. Risers and tops shall conform to ASTM C-478.

MANHOLE DIAMETER
The minimum diameter of manholes shall be 48 inches. Larger diameter manholes shall be used as indicated on the plan and profile drawings.

MANHOLE STEPS
Manhole Steps shall be installed in all manholes and structures in excess of 4 feet deep, and be aligned so as to form a continuous ladder with the Manhole Steps equally spaced vertically in the completed manhole at a design distance of 16 inches on center and shall be centered over the discharge pipe. The steps shall project a minimum clear distance of 4 inches from the wall of the riser or cone section measured from the point of embedment.

CHIMNEY SEALS
Chimney Seals shall be manufactured seals installed on new or existing sanitary manholes. The flexible portion of the seal shall be natural or synthetic rubber conforming to applicable requirements of ASTM C-923. All metal parts shall be Type 304 stainless steel. The seal shall prevent leakage of water into the manhole at the area of the joint between the manhole frame, chimney, and corbel continuously throughout a 20-year design life. The seal shall remain flexible while allowing repeated vertical movements of the frame of up to two inches occurring at rates not less than 0.10 inches per minute.

ELASTOMERIC WATERPROOFING SEAL
All masonry work shall be cured a minimum of 24 hours prior to applying an elastomeric waterproofing seal. All surfaces shall be cleaned and primed in accordance with the manufacturer's recommendation. Elastomeric Waterproofing Sealer shall be applied so that it forms a continuous membrane, 100-mil thick, extending from a point 4 inches below the chimney to a point 2 inches above the frame flange. The WDPW shall be applied so that it requires bond breaker (duct tape) be placed completely around the manhole circumference and centered over the mortar joint between the frame and chimney or cone. Adjacent backfill shall not be placed within 24 hours of applying the sealer.

ELASTOMERIC SEALER
Elastomeric Waterproofing Sealer shall be a single component moisture curing polyurethane applied to form a continuous membrane. The sealer shall be Sonneborn HLM 5000-R, Temproof 60, Duramen V500, Thiodeck CF, Sikaflex 1A, or approved equal.

PHASING & CONSTRUCTION SCHEDULE
A Phasing & Construction Schedule shall be submitted to the City of Superior Wastewater Division of Public Works upon request. The Phasing & Construction Schedule shall indicate the Contractors plan for progression of the Work.

CONSTRUCTION QUALITY TESTING
Project acceptance shall not occur until all of the Construction Quality Testing reports have been delivered and approved by the WDPW. Personnel certified for the applicable class of testing shall perform construction quality testing. All construction quality testing must be performed under the observation of the WDPW (this requirement does not apply to materials testing such as gradation testing, concrete compressive strength testing, and other laboratory testing or written notice must be provided to the WDPW 3 business days prior to the inspection). All construction quality testing reports shall include testing methods and results of the testing. The reports shall clearly indicate any deficiencies observed.

1. Deflection Testing Deflection tests shall be performed for flexible pipe installations except sanitary relays with active connected building sewers. The go-no-go device shall be 92.5% of the minimum acceptable internal diameter of the specified pipe.
2. Telescoping Testing Telescoping shall be performed for all sewer installations of pipe 8 inches in diameter or larger. VHS videotapes of the telescoping shall be produced for installations requiring Telescoping Reports. Telescoping Reports shall include the video tape(s). The video shall be produced such that the display indicates the date of telescoping, line number, direction of travel, and relative position (footage count) of the camera for the duration of telescoping. The video shall be produced with a "crawler" or "tractor" type camera, or other device approved by the Project Engineer, so that the camera retains a generally vertical alignment. The device shall maintain the camera near the center of the pipe being inspected. The resolution, lighting, and contrast shall be adequate to capture details within the pipe. The use of "pan and tilt" is required for inspection of Building Sewer and Storm Drain connections. Black and white video does not meet the requirements under this specification.
3. Leakage Testing Groundwater infiltration into gravity sewer systems shall be minimized. Leakage testing shall be performed in accordance with Chapter 3.7 of the most current edition of Standard Specifications for Sewer & Water Construction in Wisconsin.

GRADES FOR SETTING MANHOLE FRAMES
The manhole frame shall be set at the elevation given on the plan or, when no such elevation is given, they shall be set as follows:
1. Within A Traveled Roadway Within a traveled roadway or in the shoulders of a highway, the top of the manhole frame shall be set 1/2-inch below the shoulder or pavement surface.
2. In Other Locations In other locations, the top of the frame shall be set at the proposed or established grade, whichever is higher.

CHIMNEY
A chimney having a minimum height of 6 inches, constructed of precast concrete adjusting rings shall be built on top of the corbel section or flat slab up to the elevation at which the frame is set. The chimney shall be constructed so that as few adjusting rings as possible shall be used to bring the manhole to grade.

ADJUSTING RINGS
Concrete adjusting rings shall substantially conform to the diameter dimensions of the respective manhole corbel and shall have height of two (2) to six (6) inches. Concrete adjusting rings shall be reinforced with No. 2 reinforcing rod centered within the ring. Cracks, exposed bar, or other damage or defect, shall be considered cause for rejection of adjusting rings. The Contractor shall wear brush and wipe clean adjusting rings to remove surface contaminants prior to placement and shall moisten the adjusting rings to receive mortar.

CASTINGS
All manhole and inlet castings shall conform to the requirements of ASTM A-48, Class No. 30-B and shall be free from cracks, holes, swells, and cold shuts.
1. Standard Manhole Castings Castings shall be Neenah R-1670, East Jordan Ironworks 112021 or approved equal, unless otherwise specified. Standard manhole castings where frames with grated manhole covers are required, castings shall be Neenah R-2500 or approved equal. Covers shall be "Self Sealing", "T-Seal" or "Gasket Sealed" covers with "SANITARY" or "STORM" labels as applicable, or other labels approved as equal.
2. Bolt Down Manhole Castings Bolt down castings shall be Neenah R-1916-D or approved equal, and shall be secured to the manhole wall with one-inch diameter anchor bolts as directed by the WDPW. Covers shall be "Self Sealing", "T-Seal" or "Gasket Sealed" covers with "SANITARY" or "STORM" labels as applicable, or other labels approved as equal.
3. Curb Inlet Castings Circular Typical curb inlet castings for circular structures shall be Neenah R-3235 Type C, approved equal, or approved alternate.
4. Curb Inlet Castings - Rectangular Typical curb inlet castings for rectangular structures shall be Neenah R3290, East Jordan Ironworks 7030, approved equal, or approved alternate.

FRAME / CHIMNEY JOINTS
All manhole chimneys shall be constructed with flexible watertight frame / chimney joints. All frame / chimney joints for sanitary sewer manholes shall be Type I Chimney Joints unless otherwise specified. All frame / chimney joints for storm sewer manholes shall be Type III Chimney Joints unless otherwise specified.
1. Type I Chimney Joint Type I Chimney Joint shall be a Type III Chimney Joint and an internal chimney seal. Chimney seals shall be Cratex® internal chimney seals or approved equal.
2. Type II Chimney Joint Type II Chimney Joint omitted.
3. Type III Chimney Joint Type III Chimney Joint shall be a mortar joint. The mortar Frame / Chimney joint and typical joints between concrete adjusting rings shall be one (1) inch in thickness and the full width of the adjusting ring. The interior shall be back-plastered with 1/2-inch of mortar or other approved sealer. An Elastomeric Waterproof Seal shall be applied to the exterior of the chimney.

CHIMNEY SEAL
Chimney Seals shall be manufactured seals installed on new or existing sanitary manholes. The flexible portion of the seal shall be natural or synthetic rubber conforming to applicable requirements of ASTM C-923. All metal parts shall be Type 304 stainless steel. The seal shall prevent leakage of water into the manhole at the area of the joint between the manhole frame, chimney, and corbel continuously throughout a 20-year design life. The seal shall remain flexible while allowing repeated vertical movements of the frame of up to two inches occurring at rates not less than 0.10 inches per minute.

ELASTOMERIC WATERPROOFING SEAL
All masonry work shall be cured a minimum of 24 hours prior to applying an elastomeric waterproofing seal. All surfaces shall be cleaned and primed in accordance with the manufacturer's recommendation. Elastomeric Waterproofing Sealer shall be applied so that it forms a continuous membrane, 100-mil thick, extending from a point 4 inches below the chimney to a point 2 inches above the frame flange. The WDPW shall be applied so that it requires bond breaker (duct tape) be placed completely around the manhole circumference and centered over the mortar joint between the frame and chimney or cone. Adjacent backfill shall not be placed within 24 hours of applying the sealer.

ELASTOMERIC SEALER
Elastomeric Waterproofing Sealer shall be a single component moisture curing polyurethane applied to form a continuous membrane. The sealer shall be Sonneborn HLM 5000-R, Temproof 60, Duramen V500, Thiodeck CF, Sikaflex 1A, or approved equal.

PHASING & CONSTRUCTION SCHEDULE
A Phasing & Construction Schedule shall be submitted to the City of Superior Wastewater Division of Public Works upon request. The Phasing & Construction Schedule shall indicate the Contractors plan for progression of the Work.

CONSTRUCTION QUALITY TESTING
Project acceptance shall not occur until all of the Construction Quality Testing reports have been delivered and approved by the WDPW. Personnel certified for the applicable class of testing shall perform construction quality testing. All construction quality testing must be performed under the observation of the WDPW (this requirement does not apply to materials testing such as gradation testing, concrete compressive strength testing, and other laboratory testing or written notice must be provided to the WDPW 3 business days prior to the inspection). All construction quality testing reports shall include testing methods and results of the testing. The reports shall clearly indicate any deficiencies observed.

1. Deflection Testing Deflection tests shall be performed for flexible pipe installations except sanitary relays with active connected building sewers. The go-no-go device shall be 92.5% of the minimum acceptable internal diameter of the specified pipe.
2. Telescoping Testing Telescoping shall be performed for all sewer installations of pipe 8 inches in diameter or larger. VHS videotapes of the telescoping shall be produced for installations requiring Telescoping Reports. Telescoping Reports shall include the video tape(s). The video shall be produced such that the display indicates the date of telescoping, line number, direction of travel, and relative position (footage count) of the camera for the duration of telescoping. The video shall be produced with a "crawler" or "tractor" type camera, or other device approved by the Project Engineer, so that the camera retains a generally vertical alignment. The device shall maintain the camera near the center of the pipe being inspected. The resolution, lighting, and contrast shall be adequate to capture details within the pipe. The use of "pan and tilt" is required for inspection of Building Sewer and Storm Drain connections. Black and white video does not meet the requirements under this specification.
3. Leakage Testing Groundwater infiltration into gravity sewer systems shall be minimized. Leakage testing shall be performed in accordance with Chapter 3.7 of the most current edition of Standard Specifications for Sewer & Water Construction in Wisconsin.

Crushed Stone Chips shall consist of clean, hard, tough, durable material crushed from bedrock, dolomite, or granite as in the opinion of the WDPW are suitable. "Crushed Pea Gravel" or "1 inch Minus" are generally acceptable under this specification.

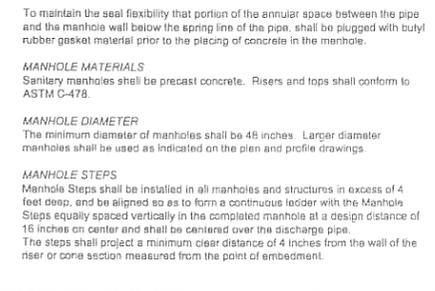
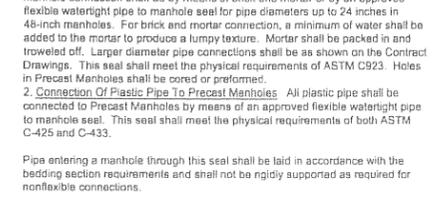
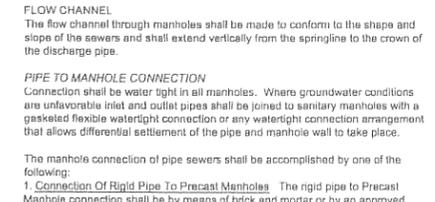
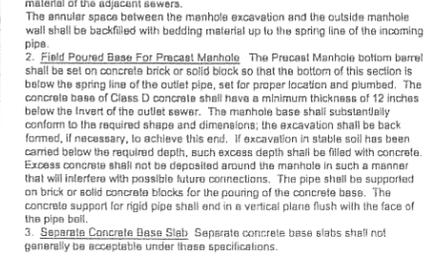
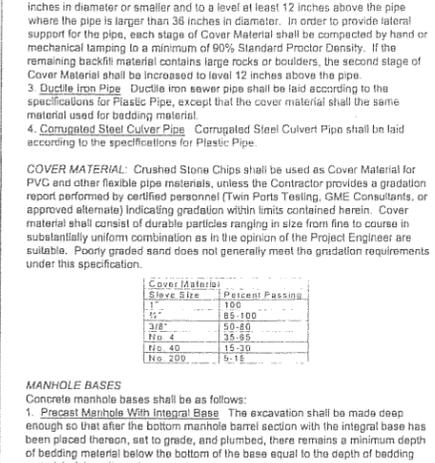
Crushed Stone Chips	1 1/2"	3/4"
Curve Size	15 Passing	15 Passing
3/4"	100	100
3/8"	100	100
No. 20	100	100
No. 40	100	100
No. 60	100	100
No. 100	100	100
No. 200	100	100

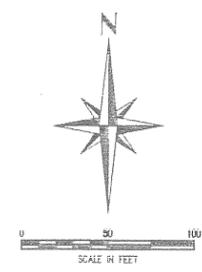
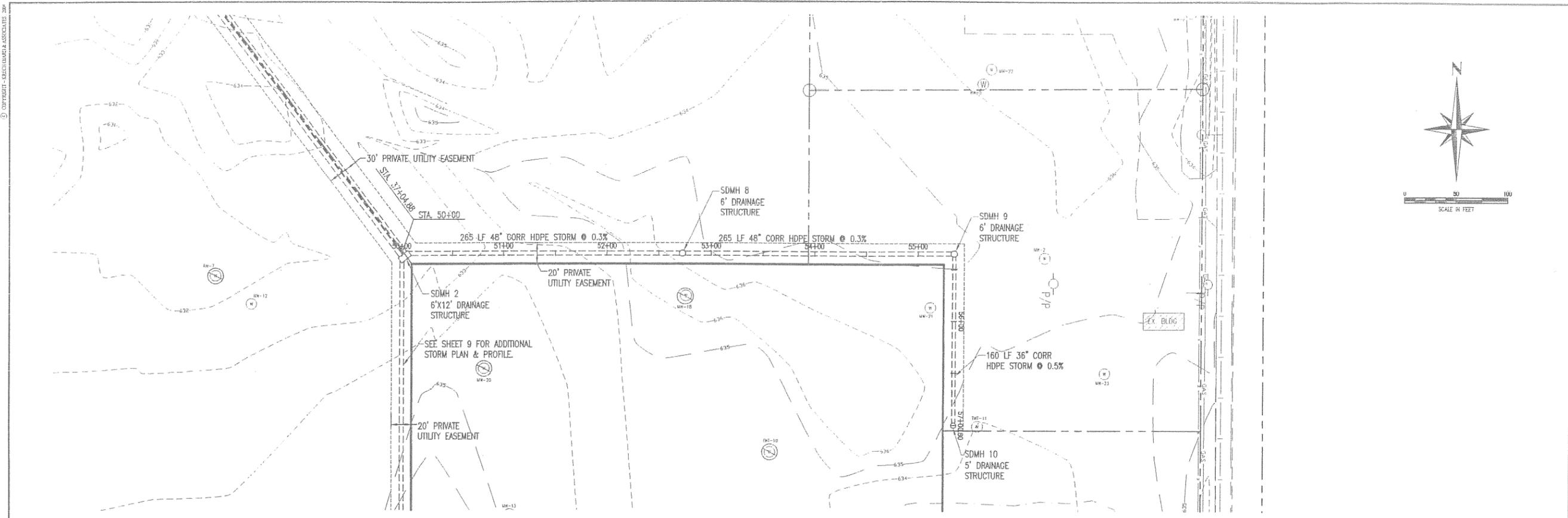
COVER
Lift thickness for pipe cover shall not exceed 12 inches. Crushed Stone Chips may be substituted for Cover Material in sewer installation. Cover shall be mechanically tamped to a minimum of 90% of Standard Proctor Density.

1. Rigid Pipe After the pipe has been properly laid and jointed, Cover Material shall be placed around the sides of the pipe less than 36 inches in diameter and up to a level 6 inches above the pipe barrel. This material shall be placed by hand or equally careful means. Where pipe 36 inches in diameter or larger is being installed, Granular Backfill may be used as Cover Material. Where this provision is used, the Bedding Material shall be extended to the spring line of the pipe.
2. Plastic Pipe Plastic pipe, including but not limited to PVC and PE, shall be laid with Crushed Stone Chips placed in not less than two stages, one to the top of the pipe and the other to a level at least 6 inches above the pipe for sizes 36 inches in diameter or smaller and to a level of at least 12 inches above the pipe where the pipe is larger than 36 inches in diameter. In order to provide lateral support for the pipe, each stage of Cover Material shall be compacted by hand or mechanical tamping to a minimum of 90% Standard Proctor Density. If the remaining backfill material contains large rocks or boulders, the second stage of Cover Material shall be increased to level 12 inches above the pipe.
3. Ductile Iron Pipe Ductile iron sewer pipe shall be laid according to the specifications for Plastic Pipe, except that the cover material shall be the same material used for bedding material.
4. Corrugated Steel Culvert Pipe Corrugated Steel Culvert Pipe shall be laid according to the specifications for Plastic Pipe.

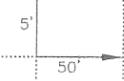
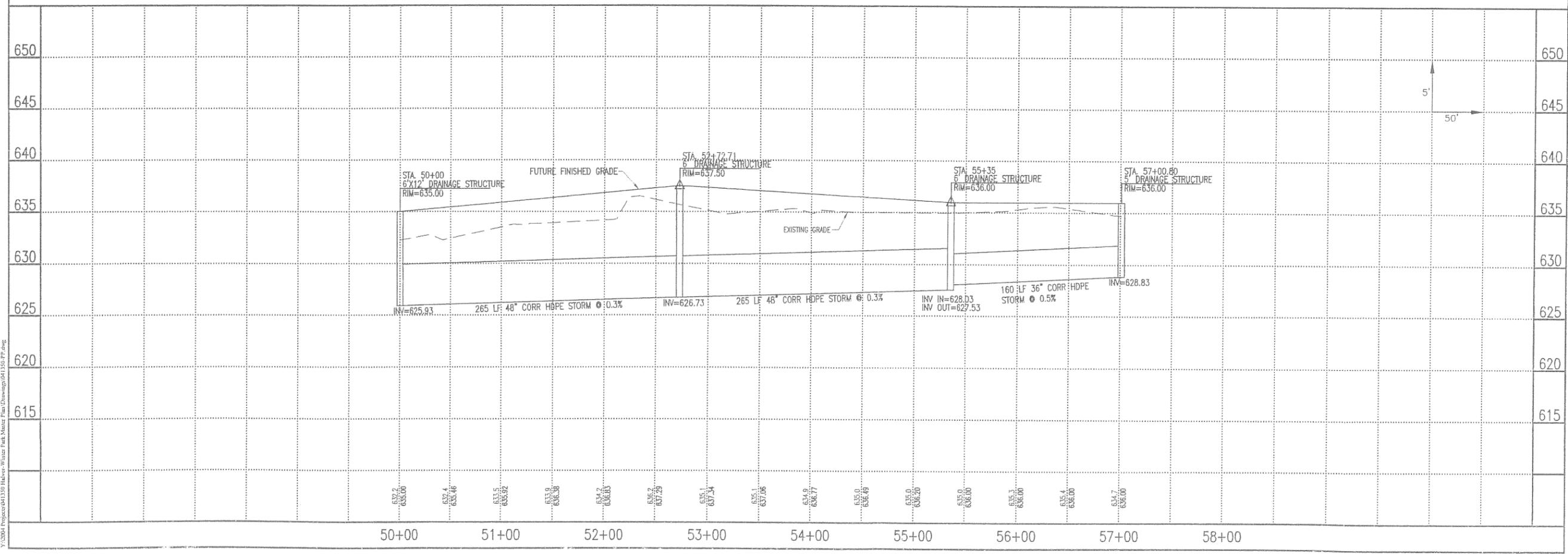
COVER MATERIAL
Crushed Stone Chips shall be used as Cover Material for PVC and other flexible pipe materials, unless the Contractor provides a gradation report performed by certified personnel (Twin Ports Testing, GME Consultants, or approved alternate) indicating gradation within limits contained herein. Cover material shall consist of durable particles ranging in size from fine to coarse in substantially uniform combination as in the opinion of the Project Engineer are suitable. Poory graded sand does not generally meet the gradation requirements under this specification.

Cover Material	Percent Passing
Curve Size	15 Passing
1 1/2"	100
3/4"	85-100
3/8"	100
No. 20	100
No. 40	100
No. 60	100
No. 100	100
No. 200	100





KRECH OJARD
 ASSOCIATES, INC.
 ENGINEERS & ARCHITECTS
 SUPERIOR, WISCONSIN



REV. BY:	DESCRIPTION	DATE	REV.

VINIE INDUSTRIAL PARK
 UTILITY & ROADWAY
 INFRASTRUCTURE
 SUPERIOR, WISCONSIN

JOB No: 041350
 DATE: 08/07/05
 DRAWN BY: KJ
 CHECKED BY: