Exhibit A

Ordinance Permit 20210010001

October 6, 2022

Anne Gardner
Lead Landscape Architect
City of Saint Paul Department of Parks and Recreation
Saint Paul, MN

Re: Certificate of Compliance for Design
Highland Bridge Mississippi River Boulevard Crossing; Permit No. **20210010001**
TKDA Project No.17921.002

Dear Mrs. Gardner:

TKDA, as design Engineer of Record and under contract with the City of Saint Paul Parks and Recreation Department, completed the design of the public infrastructure as part of in the Highland Bridge Mississippi River Boulevard Crossing (the "Project"). The Project's public infrastructure is depicted in Exhibit A. TKDA's design conformed to the appropriate specifications and provisions of the City of Saint Paul Department of Public Works' *Standard Supplemental Specifications for Construction of Public Infrastructure by Private Developers Policy*, as amended.p

During construction, TKDA did not provide regular field observation, but stayed generally informed of construction progress and consulted with the City on questions related to the design of the Project. TKDA has been provided a copy of the Certificate of Compliance for Installation, dated September 27, 2022, by of Craig Alberg, PE (WSB). I understand that Mr. Alberg was the field engineer who provided daily observation or was responsible for overseeing the daily observation of the construction the public infrastructure.

Based on the foregoing, I certify that the design of the public infrastructure associated with the Project conformed to the appropriate specifications and provisions of the City of Saint Paul Department of Public Works' *Standard Supplemental Specifications for Construction of Public Infrastructure by Private Developers Policy*, as amended; further, Mr. Alberg's Certification of Compliance for Installation is consistent with our general understanding of the progress of construction and my visual observations of the as-built condition; and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Jonathan N. Libby

Date: 10/6/2022 Lic. No.: 51276

JNL:ces
LF 22-040

Exhibit G GA

Form of Completion Certificate

CITY OF SAINT PAUL DEPARTMENT OF PUBLIC WORKS

Certificate of Compliance for installation

I hereby certify that work completed under this Ordinance Permit and materials provided for installation conform to the appropriate specifications and provisions of and the Department of Public Works, City of Saint Paul, Minnesota, *Standard Supplemental Specifications for Construction of Public Infrastructure by Private Developers Policy*, as amended, and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Highland Bridge Mississippi River Boulevard Crossing
Project Description

20210010001
Permit Number

47538 9/27/22
(Signature and License No.) Date

WSB
Organization (Print)

1/2012

Exhibit H

Form of Public Infrastructure Conveyance

PUBLIC INFRASTRUCTURE CONVEYANCE

BUILDING PERMIT #20 21 252385 (MRB Crossing)

This Public Infrastructure Conveyance Agreement ("Agreement") is made and entered into effective _____, 20____, by and between PROJECT PAUL, LLC, a Delaware limited liability company ("Developer"), and CITY OF SAINT PAUL, MINNESOTA, a municipal corporation existing under the laws of the State of Minnesota ("City").

NOW, THEREFORE, in consideration of the mutual obligations of the parties hereto, each of them does hereby covenant and agree as follows:

1. Notification. The Developer has delivered to the City a duly executed Certificate of Completion and, thereafter, the City has determined that the applicable components of the Public Infrastructure as described in **Exhibit A** hereto (the "Infrastructure") appear to have been constructed in accordance with the approved plans and specifications and the preliminary and final plat and has so notified the Developer in writing. As a result, via this Agreement, the Developer is conveying the Property to the City in accordance with the Site Improvement Performance Agreement, dated December ___, 2019. The acceptance of the Infrastructure does not take effect until the Saint Paul City Council accepts the Infrastructure via Resolution.

2. Representations. The Developer hereby represents, certifies, and promises to the City the following:

(a) With respect to the Property, Developer has complied with the provision of the Redevelopment Agreement, dated December 19, 2019, including that the Property conveyed to the City in this Agreement is completely constructed, is free of defects, and is free and clear of any encumbrances or liens.

(b) A final walk-through inspection with appropriate City staff has been completed and any required corrective work required prior to acceptance (written punch list) determined through said walk-through or as determined under the normal and ordinary course of on-site observations by City staff or those hired by the City to complete such observations, has been completed.

(c) The following documents respecting the Property are complete, accurate, and have been filed with the appropriate department(s) of the City of Saint Paul:

(i) As-Built Plans acceptable to the Department of Parks and Recreation are on file with said Department.

(ii) Certificate of Completion signed by Engineer of Record who is a licensed Professional Engineer with the State of Minnesota per Minnesota State Statute 326.

(iii) Operation and Maintenance plans.

(d) Developer has undertaken any and all necessary actions to assign warranties it owns or possesses on or with the Property to the City.

(e) Developer will duly execute and deliver any other documents as may be reasonably and customarily required in connection with the transfer of the Property to the City.

3. Conveyance. The Developer hereby dedicates, conveys and assigns in good title to the City of Saint Paul, together with all hereditaments and appurtenances all rights, entitlements, benefits, permits, approvals, and licenses that pertain to, with, or in the Property in its entirety, without reservation or exception, together with all warrantees, free and clear of any mortgage, pledge, hypothecation, encumbrance, lease, license, lien or others security interest. If necessary, Developer shall execute a recordable Warranty Deed to be recorded with the Ramsey County Registrar's Office.

IN WITNESS WHEREOF, the City and Developer have caused this Agreement to be duly executed in their names and on their behalf, all on or as of the date first above written.

PROJECT PAUL, LLC,
a Delaware limited liability company

By: Ryan Companies US, Inc., a Minnesota corporation, its Sole Member

By: DocuSigned by: E1430C9DF3EB48A...

Name: Maureen Michalski

Its Vice President

BAR IS ONE INCH ON ORIGINAL DRAWING. IF NOT ONE INCH ON THIS DRAWING ADJUST SCALES ACCORDINGLY.

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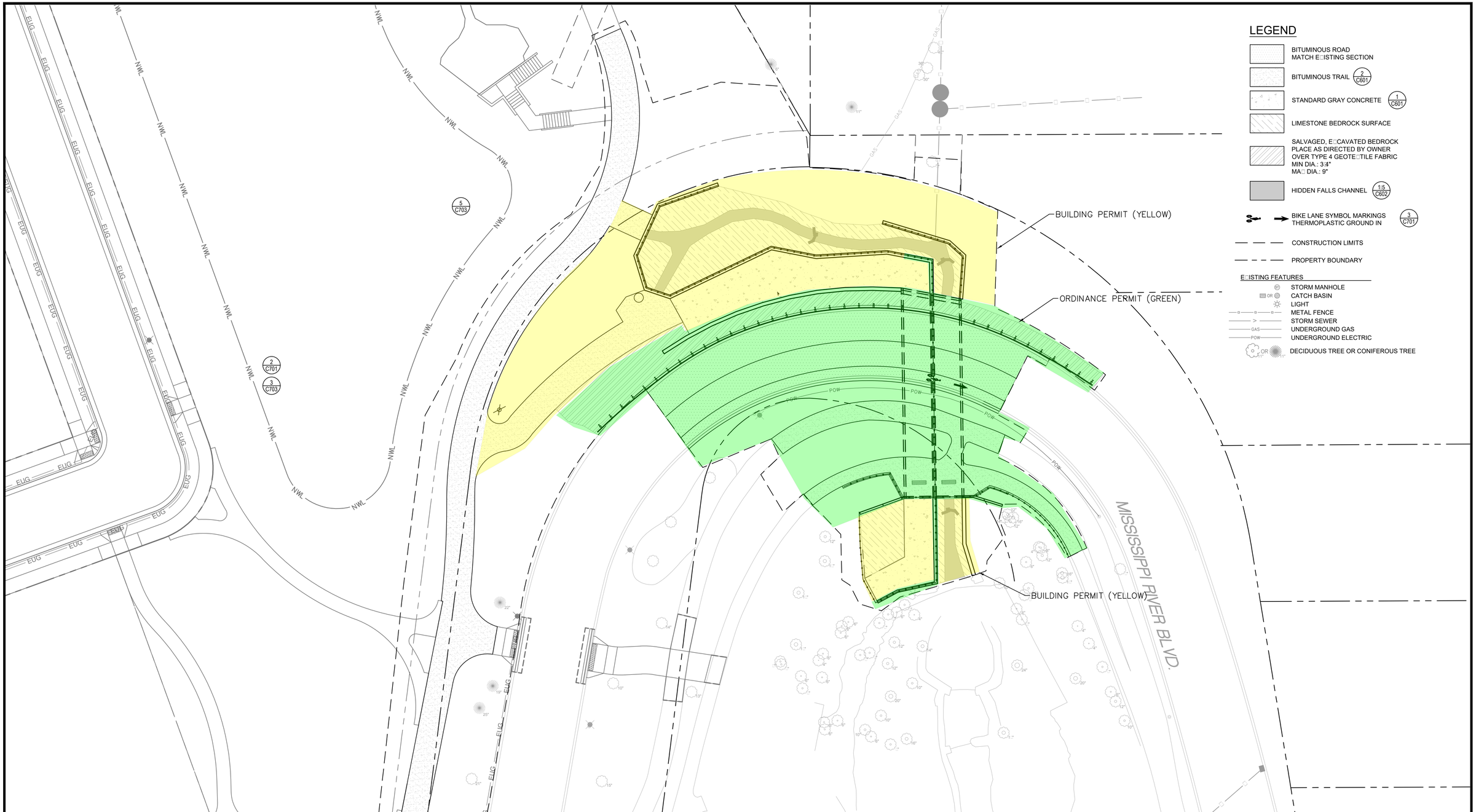

1/C304 SITE □ E□ MIT BOUN□ A□ IES

1"□ 20□

0 10 20 40

SCALE IN FEET

NORTH

NO.	DATE	BY	DESCRIPTION OF REVISIONS
1	4/2/2021	JNL	100% SUBMITTAL

DESIGNED AMK
DRAWN NJL
CHECKED JNL

FINAL DESIGN
100% SUBMITTAL

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Engineer under the laws of the State of Minnesota.
Printed Name: JONATHAN N. LIBBY
Signature:
Date: 4/2/21 License #: 51276

TKDA
444 Cedar Street, Suite 1500
Saint Paul, MN 55101
651.292.4400
tkda.com

CITY OF SAINT PAUL DEPARTMENT OF PARKS AND RECREATION

HIGHLAND BRIDGE MRB CROSSING

SAINT PAUL, MINNESOTA RAMSEY COUNTY

SITE PERMIT BOUNDARIES

PROJ. NO. 17921.002

DRAWING NO. C304

PLOT DATE: Mar 30, 2021 - 10:54am
FILENAME: K:\n-z\StPaul-ParksRec\17921002\04_Production\01_CAD\02_Sheets\C301 - Site Plan.dwg

CITY OF ST PAUL
Department of Public Works
25 West 4th Street
1500 City Hall Annex
Saint Paul, MN 55102

ORDINANCE PERMIT

OFFICE USE ONLY
Application No. ROW 4
Application Date 4/6/21
SPR File #
Permit No. 20210010001

Type of Permit (select one only):

■ Base Roadway	■ Roadway Sidewalks	☐ Sanitary Sewer Collection System
■ Bridge	■ Roadway Traffic	■ Storm Sewer Collection System
■ Retaining Wall	☐ Sanitary Drop Shaft	☐ Storm Sewer Treatment System

Phase:	**Location** (*Street On, From/To, and Adjacent Lots/Blocks)*:
1	Mississippi River Blvd south of Park C in Highland Bridge

Description of Work: *[Include the description provided in the permit application and all subsequent amendments or revisions, which are hereby incorporated by reference.]*

The scope of work to be installed under MRB Crossing Ordinance Permit is the furnishing and installation of all asphalt paving, aggregate base, granular embankment, pedestrian ramps, retaining walls, landscaping, and curb and gutters in the areas identified in the locations section above along with the attached "C304_ SITE PERMIT BOUNDARIES". Estimated quantities of asphalt paving, aggregate base, granular embankment, ramps, and curb and gutter can be seen as an attachment to this application labeled "100-pct Quantities SEQ".

Applicant Contact Person:	**Contact Person Title:**	**Contact Person Telephone:**	**Contact Person Email:**
Mac Begovac	Project Manager	507-272-1268	Mac.Begovac@RyanCompanies.com

Bond Co.:	**Bond Amount:**	**Bond No.:**
Travelers Casualty & Surety Company of America	$73,609,974.00	107185400

Insurance Co.:	**Insurance Certificate No.:**
Zurich American Insurance Company	N/A

Permit Conditions:

This permit is issued with the stipulation that the work of the permittee and related agents, employees and contractors shall conform in all respects to the Redevelopment Agreement (including all Legal Requirements as defined by Article 1), the City of Saint Paul Department of Public Works Ordinance Permit Process Document, and the Department of Public Works List of Applicable Standards & Specifications. The permit shall be available for display at the site referred to herein and shown to any Police Officer or Inspector upon demand and does not authorize or allow for interference with the work of any Contract made or to be made with the City of Saint Paul.

THIS PERMIT MAY BE REVOKED AT ANY TIME BY THE DIRECTOR OF PUBLIC WORKS

A PERMIT FOR THE ABOVE DESCRIBED CONSTRUCTION IS AUTHORIZED BY:

David Kuebler P. E.	Ford Site Technical Lead	April 12, 2021
Signature	Title	Date

David Kuebler
Printed Name

PERMIT NUMBER 20210010001

ITEMS TO BE COMPLETED PRIOR TO ACCEPTANCE OF INFRASTRUCTURE AND RELEASE OF PERMIT

Prior to acceptance of any infrastructure and release of City permits, the following items must be completed to the satisfaction of the City:

☒ Corrective (punch list) work completed;

☒ Original reproducible CAD and PDF as-built plans, signed by the Engineer of Record, provided to Public Works; Submittal of final copies of Metropolitan Council Environmental Services and MN Pollution Control Agency Permits (Sewer Extension, SAC Determination, etc.);

☒ Full compliance with project Quality Management Plan or other document(s) governing quality management and quality assurance;

☒ Documentation of compliance with all applicable City and non-City permit requirements, including, but not limited to: City Public Works Right-of-Way Office, Minnesota Pollution Control Agency, Capitol Region Watershed District, and National Pollution Discharge Elimination System permit requirements;

☒ Documentation of roadway materials at compaction of grading and base, plant mix design report, strength;

NA☐ Video of all sanitary sewer mains and laterals, storm sewer mains and laterals, and any structural BMP's (pipe galleries, draintile, sediment control structures, weir structures, etc.) installed under any permit, provided to the Public Works Sewer Division;

NA☐ Sewer Permit drawings for paving connections or stubs installed to service vertical development provided to Public Works, in addition to Private Service Lateral Permit Drawings;

NA☐ Documentation of Public Works notified for signal and lighting inspection of pole field layouts (staking), conduits and foundations installed, poles and wiring installed, and head positioning and phasing/detection verification (signals only);

☒ For infrastructure within parks: Documentation that Parks Department has been notified of completion status;

☒ All applicable operation and maintenance manuals provided to Public Works; and

☒ Certificate of Compliance signed and submitted to City by Engineer of Record.

RELEASE OF PERMIT:

Permit No._____ Council Res. No. _____ Permit Date _____

Release Authorized by_____ Title_____

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M□DOT□□R□D□□□□O.□□□□□□

PROJECT SURVEY DATUM:
RAMSEY COUNTY COORDINATES
NAD□3 □2007ADJ□US SURVEY FEET
VERTICAL DATUM IS NAVD□□
ZERO CITY DATUM - 694.26
BENCHMARK: TOP OF MNDOT GEODETIC MONUMENT "SNELLING ECC 1 MNDT" GSID □2517□ ELEV □1022.56 □NAVD □□□

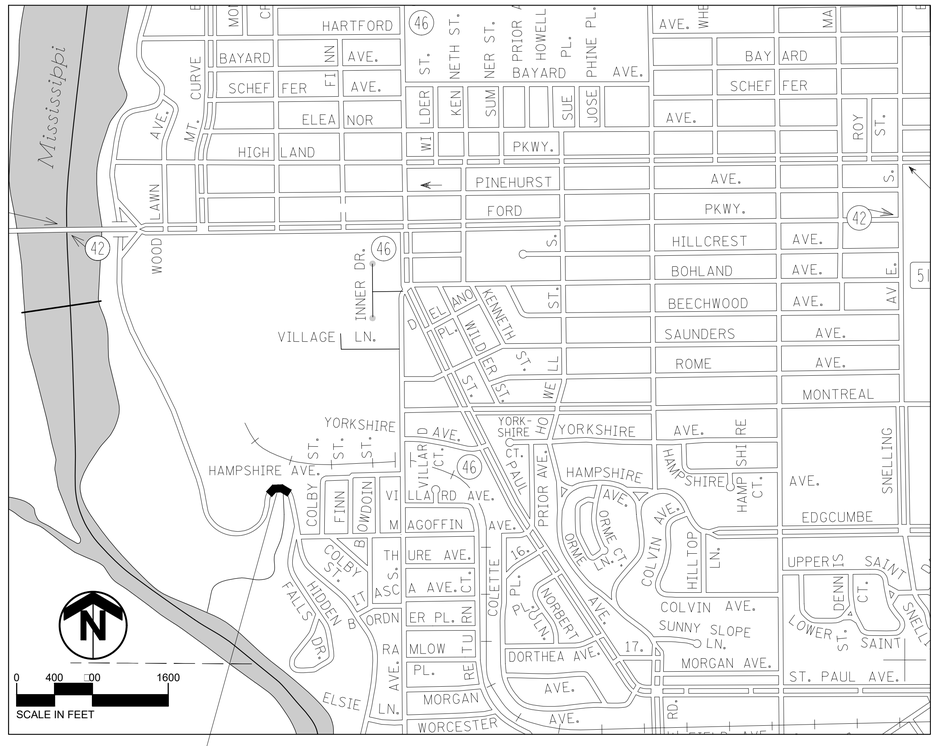
DESIGN DESIGNATION: BIKE PATH
FUNCTIONAL CLASSIFICATION: TRAIL
DESIGN SPEED: 1□ MPH
STOPPING SITE DISTANCE: 4.5□HEIGHT OF EYE
BASED ON: 0□HEIGHT OF OBJECT

NOTE:
THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY □UALITY LEVEL D. THIS □UALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE 3□-2, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF E□ISTING SUBSURFACE UTILITY DATA".

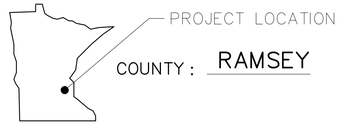
THE E□ACT LOCATION OF UNDERGOUND UTILITIES SHOWN IN THIS PLAN SET ARE UNKNOWN. THE CONTRACTOR SHALL CONTACT GOPHER STATE ONE CALL PRIOR TO STARTING ANY E□CAVATION.

GOVERNING SPECIFICATIONS:

THE 201□ EDITION OF THE MINNESOTA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR CONSTRUCTION" AND THE ST. PAUL DEPARTMENT OF PUBLIC WORKS "CONSTRUCTION OF PUBLIC INFRASTRUCTURE BY PRIVATE DEVELOPERS POLICY" DATED OCTOBER 31, 2019 SHALL GOVERN. SIGNING AND DEVICES SHALL CONFORM TO THE MMUTCD, INCLUDING THE FIELD MANUAL FOR TEMPORARY TRAFFIC CONTROL ZONE LAYOUTS.



VICINITY MAP



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Know what's **below.**
Call before you dig.

SHEET INDE□

THIS PLAN SET CONTAINS □3 SHEETS

NO.	DATE	BY	DESCRIPTION OF REVISIONS
1	4/2/2021	JNL	100% SUBMITTAL

DESIGNED AMK
DRAWN NJL
CHECKED JNL

FINAL DESIGN
100% SUBMITTAL

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Engineer under the laws of the State of Minnesota.
Printed Name: JONATHAN N. LIBBY
Signature: Jonathan N. Libby
Date: 4/2/21 License #: 51276

TKDA
444 Cedar Street, Suite 1500
Saint Paul, MN 55101
651.292.4400
tkda.com

CITY OF SAINT PAUL DEPARTMENT OF PARKS AND RECREATION
HIGHLAND BRIDGE MRB CROSSING
SAINT PAUL, MINNESOTA RAMSEY COUNTY

TITLE SHEET

PROJ. NO. 17921.002
DRAWING NO. G101

PLOT DATE: Apr 01, 2021 - 12:14pm
FILENAME: K:\tn-2\StPaul-ParksRec\17921002\04_Production\01_CAD\02_Sheets\G101 - Title Sheet.dwg

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PUBLIC WORKS STANDARD NOTES:

1. SAFE WORK SITE RE□UIREMENTS: THE CONTRACTOR SHALL PROVIDE A CONTINUOUS, ACCESSIBLE AND SAFE PEDESTRIAN WALKWAY THAT MEETS ADA AND MN MUTCD STANDARDS IF WORKING IN A SIDEWALK AREA, AND TRAFFIC CONTROL PER MN MUTCD RE□UIREMENTS FOR WORK IN THE PUBLIC RIGHT OF WAY.

2. A TEMPORARY TRAFFIC CONTROL □TC□PLAN WILL BE NEEDED AS PART OF THE RIGHT-OF-WAY □ROW□PERMITTING PROCESS FOR WORK BEING CONDUCTED IN THE ROW. SAID PLAN NEEDS TO BE COMPLETED BY A COMPANY THAT SPECIALIZES IN DEVELOPING TEMPORARY TRAFFIC CONTROL PLANS AND MEET THE RE□UIREMENTS OF THE LATEST EDITION THE MINNESOTA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES □MN MUTCD□

3. TEMPORARY USE OF THE RIGHT-OF-WAY FOR CONSTRUCTION PURPOSES SHALL BE LIMITED TO E□UIPMENT, PERSONNEL, DEVICES AND APPURTENANCES THAT ARE REMOVABLE FOLLOWING CONSTRUCTION. ENCROACHMENT PERMITS WILL NOT BE GRANTED FOR DEVICES SUCH AS TIE BACKS, ROCK BOLTS, H-PILES, LAGGING, TIMBERS, SHEET PILING, ETC. THAT THE OWNER IS SEEKING TO ABANDON IN THE ROW. SECTION 3201.3 OF THE MINNESOTA BUILDING CODE DEFERS FINAL AUTHORITY OF ENCROACHMENTS INTO PUBLIC RIGHTS-OF-WAY□PUBLIC PROPERTY TO THE LOCAL AUTHORITY. CITY LEGISLATIVE CODE GOVERNS MANAGEMENT OF THE PUBLIC RIGHTS-OF-WAY. PROVIDED SUCH INSTALLATIONS ARE APPROVED BY PUBLIC WORKS, FOOTINGS MAY BE ALLOWED TO ENCROACH INTO CITY ROW NO MORE THAN TWELVE □12□ INCHES AT DEPTHS BELOW EIGHT □□FEET AS PROVIDED. FOR IN MINNESOTA BUILDING CODE SECTION 3202.1. SAID ENCROACHMENTS WOULD RE□UIRE AN ENCROACHMENT PERMIT FROM THE CITY PER CHAPTER 134 OF THE LEGISLATIVE CODE.

4. THE CONTRACTOR SHALL CONTACT MIKE LUSIAN, GENERAL FOREMAN, LIGHTING - SIGNAL MAINTENANCE, □651-266-97□0□ IF REMOVAL OR RELOCATION OF E□ISTING FACILITIES IS RE□UIRED OR IN THE EVENT OF DAMAGE TO THE LIGHTING OR SIGNAL UTILITIES. THE CONTRACTOR SHALL ASSUME RESPONSIBILITY □AND RELATED COSTS□FOR ANY DAMAGE OR RELOCATIONS.

5. ACCESS TO SIGNAL CONTROLLER AND LIGHTING CABINETS MUST BE MAINTAINED AT ALL TIMES. IF FENCING IS RE□UIRED FOR A JOB SITE, A KEY OR OTHER MEANS OF ACCESS MUST BE PROVIDED TO THE CITY OF ST. PAUL□S TRAFFIC OPERATIONS DEPARTMENT. CONTACT MIKE LUSIAN, GENERAL FOREMAN SIGNALS AND LIGHTING AT □651-266-97□0□FOR MORE INFORMATION.

6. STREET SWEEPING: STREET SWEEPING IS AN IMPORTANT TEMPORARY EROSION CONTROL BEST MANAGEMENT PRACTICE AND SHALL BE PERFORMED WITH THE USE OF WATER. DRY SWEEPING IS PROHIBITED. ADDITIONALLY, TRUCKS HAULING IN AND OUT OF THE SITE, FOR ANY ACTIVITY INCLUDING BUT NOT NECESSARILY LIMITED TO PAVING, E□CAVATION, ETC., NEEDS TO ENSURE CLEANING OF ALL MUD FLAPS TO AVOID ANY BUILDUP ON THE STREET PAVEMENT.

7. MISCELLANEOUS: ANY PUBLIC INFRASTRUCTURE DAMAGE RESULTING FROM THE CONTRACTORS ACTIVITIES, INCIDENTAL OR OTHERWISE, SHALL BE REPAIRED□REPLACED TO THE SATISFACTION OF THE CITY AT NO COST TO THE CITY.

□. CITY OF ST. PAUL PERMIT RE□UIREMENTS:

A. ORDERING OBSTRUCTION AND E□CAVATION PERMITS: CONTACT PUBLIC WORKS RIGHT-OF-WAY SERVICE DESK AT □651□266-6151. IT IS STRONGLY RECOMMENDED THAT CONTRACTORS CALL FOR COST ESTIMATES PRIOR TO BIDDING TO OBTAIN ACCURATE COST ESTIMATES.

B. OBSTRUCTION PERMITS: THE CONTRACTOR MUST OBTAIN AN OBSTRUCTION PERMIT IF CONSTRUCTION □INCLUDING SILT FENCES□WILL BLOCK CITY STREETS, SIDEWALKS OR ALLEYS, OR IF DRIVING OVER CURBS.

C. E□CAVATION PERMITS: ALL DIGGING IN THE PUBLIC RIGHT OF WAY RE□UIRES AN E□CAVATION PERMIT, IF THE PROPOSED BUILDING IS CLOSE TO THE RIGHT-OF-WAY, AND E□CAVATING INTO THE RIGHT-OF-WAY IS NEEDED TO FACILITATE CONSTRUCTION, CONTACT THE UTILITY INSPECTOR.

D. FAILURE TO SECURE PERMITS: FAILURE TO SECURE OBSTRUCTION PERMITS OR E□CAVATION PERMITS WILL RESULT IN A DOUBLE-PERMIT FEE AND OTHER FEES RE□UIRED UNDER CITY OF ST. PAUL LEGISLATIVE CODES.

PROJECT CONSTRUCTION NOTES:

1. ALL WORK PERFORMED AND ALL MATERIALS FURNISHED SHALL BE IN CONFORMANCE WITH THE LINES, GRADES, CROSS SECTIONS, DIMENSIONS, AND MATERIAL RE□UIREMENTS, INCLUDING TOLERANCE, SHOWN IN THE PLANS OR INDICATED IN THE SPECIFICATIONS.

2. THE PLAN INDICATES THE APPRO□IMATE LOCATION OF THE KNOWN UTILITIES ON THE PROJECT.

3. IF THE CONTRACTOR DISCOVERS UTILITY PROPERTY WHOSE E□ISTENCE WAS NOT KNOWN, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE UTILITY OWNER AND THE ENGINEER.

4. THE CONTRACTOR IS RESPONSIBLE FOR CONTACTING ALL UTILITY OWNERS TO ASCERTAIN THE LOCATION OF ALL E□ISTING UNDERGROUND UTILITIES BEFORE PERFORMING E□CAVATION OPERATIONS. THE CONTRACTOR SHALL CONDUCT OPERATIONS IN THE VICINITY OF E□ISTING UNDERGROUND UTILITIES IN A MANNER THAT WILL PREVENT DAMAGE TO ANY OF THEM.

5. STATE LAW RE□UIRES ANYONE E□CAVATING OR DRILLING IN THE GROUND IN THE STATE OF MINNESOTA WITH POWER EQUIPMENT TO CALL "GOPHER STATE ONE CALL" AT 651-454-0002 FOR UTILITY LOCATIONS AT LEAST 48 HOURS BEFORE STARTING WORK.

6. ALL STREET DIMENSIONS ARE TO FACE OF CURB. ALL CURB ELEVATIONS ARE TO TOP OF CURB UNLESS OTHERWISE NOTED. STRUCTURE LOCATIONS ARE TO CENTER OF STRUCTURE. CASTING ELEVATIONS ARE GIVEN TO FLOW LINE OR SURFACE.

7. HIGH EARLY STRENGTH CONCRETE WILL BE USED IN LOCATIONS WHERE CURING TIME RE□UIRED ON STANDARD STRENGTH CONCRETE WOULD SERIOUSLY INTERFERE WITH TRAFFIC.

□. ALL PRIVATELY OWNED UTILITY MANHOLES TO BE RESET BY CONTRACTOR TO HEIGHT DICTATED BY CITY IN THE FIELD.

9. CURB CONTRACTION JOINTS SHALL MATCH MAINLINE CONCRETE PAVING CONTRACTION JOINT LOCATIONS □AT RAISED PEDESTRIAN CROSSWALKS□ SAWCUT OR TOOLING ACCEPTABLE FOR CURB JOINTS.

10. PREFORMED JOINT MATERIAL SHALL CONFORM TO SPEC. 3702. HOT POURED JOINT MATERIAL SHALL CONFORM TO SPEC. 3723.

11. COMPACTION SHALL BE ACHIEVED BY THE "SPECIFIED DENSITY COMPACTION METHOD" UNLESS OTHERWISE DIRECTED BY ENGINEER.

12. COMPACTION OF AGGREGATE BASE 4 INCHES DEPTH OR LESS SHALL BE IN ACCORDANCE WITH MNDOT SPECIFICATION 2211.3.D.2.B □UALITY COMPACTION METHOD.

13. E□ISTING CONCRETE AND BITUMINOUS MATERIALS ON SITE MAY BE RECYCLED IN ACCORDANCE WITH APPLICABLE MNDOT SPECIFICATIONS. MATERIAL NOT UTILIZED ON THE PROJECT SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND DISPOSED OF OUTSIDE THE RIGHT OF WAY IN ACCORDANCE WITH MNDOT STANDARD SPECIFICATION 2104.3D.

14. ANY DEBRIS ENCOUNTERED DURING GRADING SHALL BE DISPOSED OF BY THE CONTRACTOR OFF THE PROJECT RIGHT OF WAY, STORMWATER FACILITIES, AND PARKLAND IN A SUITABLE DISPOSAL AREA AS APPROVED BY THE ENGINEER.

15. SELECT GRANULAR EMBANKMENT SHALL MEET THE RE□UIREMENTS OF MNDOT STANDARD SPECIFICATION 3149.2B.

16. SELECT GRADING MATERIAL ON THIS PROJECT SHALL CONSIST OF ALL SOILS ENCOUNTERED WITH THE E□CEPTION OF TOPSOIL, DEBRIS, ORGANIC MATERIAL, FAT CLAYS, WEATHERED SHALE, AND OTHER UNSTABLE MATERIAL.

17. PROVIDE A UNIFORM TACK COAT AS DOCUMENTED IN MNDOT STANDARD SPECIFICATION 2357 - BITUMINOUS TACK COAT RE□UIREMENTS.

1□. PIPE SEWERS CONNECTING MANHOLES AND CATCH BASINS SHALL BE IN ACCORDANCE WITH SPEC. 2503. BEDDING AND BACKFILL SHALL CONSIST OF UNIFORM SELECT GRADING MATERIAL MATCHING ADJACENT SOILS UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

19. DISPOSITION OF E□CAVATED MATERIAL SHALL BE IN ACCORDANCE WITH MNDOT STANDARD SPECIFICATION 2105.3D.

20. NO E□TRA PAYMENT WILL BE MADE FOR TEMPORARY STOCKPILING OF E□CAVATION, EMBANKMENT AND□OR BORROW MATERIAL.

21. AGGREGATE BASE FOOTPRINT TO MATCH PROPOSED ROADWAY TAPERS.

22. COMPACTION OF ALL SUBGRADE MATERIALS TO 95% OF STANDARD PROCTOR IS RE□UIRED WITHIN ALL PUBLIC RIGHT-OF-WAY □NOT JUST BENEATH ROADWAY SECTION□ CONTRACTOR SHALL NOT PLACE AGGREGATE BASE MATERIAL UNTIL SUBGRADE COMPACTION IS VERIFIED IN THE FIELD.

23. BEDROCK INCLUDING LIMESTONE, SHALE AND WEATHERED SHALE ENCOUNTERED AT OR ABOVE INVERT ELEVATION OF UTILITIES SHALL BE OVER-E□CAVATED TO A DEPTH OF 4 INCHES BELOW INVERT.

24. FAT CLAY AND BEDROCK INCLUDING LIMESTONE, SHALE AND WEATHERED SHALE ENCOUNTERED AT BOTTOM OF PROPOSED SAND SUBBASE SHALL BE OVER-E□CAVATED TO A DEPTH OF 12 INCHES BELOW PROPOSED SAND SUBBASE AND CAPPED WITH 12 INCHES OF NON-E□PANSIVE CLAYEY SOIL WITH PI BETWEEN □AND 20.

25. CONTRACTOR TO REFER TO GEOTECHNICAL REPORT FOR ADDITIONAL DETAIL REGARDING SITE GRADING AND SUBGRADE PREPARATION.

26. THE CONTRACTOR SHALL CONTACT THE RIGHT-OF-WAY INSPECTOR BRENT GILLEN AT 651.4□5.0419 ONE WEEK PRIOR TO BEGINNING WORK IN THE RIGHT OF WAY TO DISCUSS TRAFFIC CONTROL, PEDESTRIAN SAFETY AND COORDINATION OF ALL WORK IN THE RIGHT-OF-WAY. NOTE: IF ONE WEEK IS NOT PROVIDED TO THE CITY, ANY RESULTING DELAYS SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.

27. THE FORD SITE REDEVELOPMENT AND FORD PARK C PLANS ARE REFERENCED WITHIN THIS PLANSET. THE TIMING OF CONSTRUCTION IS SUBJECT TO VARY. FOR THE PURPOSES OF THIS PROJECT, IMPROVEMENTS ASSOCIATED WITH THOSE PLANS ARE SHOWN AS E□ISTING UNLESS STATED OTHERWISE.

2□. E□ISTING STREET, PARK, AND PARKWAY TREES ARE TO BE PROTECTED AT ALL TIMES. TREES DAMAGED OR REMOVED DURING CONSTRUCTION SHALL BE RESTORED OR REPLACED TO THE SATISFACTION OF, AND AT NO COST TO, THE CITY AS DETERMINED BY THE FORESTRY MANAGER. THE CONTRACTOR IS ADVISED TO DOCUMENT PRE-E□ISTING CONDITIONS OF THE RIGHT OF WAY PRIOR TO BEGINNING CONSTRUCTION.

29. CONTRACTOR SHALL CONTACT THE CITY FORESTER □651-632-2437□PRIOR TO DEMOLITION OR OTHER LAND DISTURBANCE ASSOCIATED WITH SITE CONSTRUCTION TO VERIFY PROTECTION MEASURES.

30. THE REMOVAL, PRUNING, AND□OR PLANTING OR TREES ON THE PUBLIC BLVD, PARK, OR PARKWAY RE□UIRES AN APPROVED PERMIT FROM THE CITY FORESTER. ANY WORK MUST BE COMPLETED BY A LICENSED TREE CONTRACTOR.

31. CONSTRUCTION SUPPLIES, MATERIALS, SPOILS, E□UIPMENT, AND VEHICLES SHALL NOT BE STORED OR OPERATED WITHIN THE DRIP LINE OF ANY PUBLIC STREET OR PARK TREE OR ON TURF BOULEVARDS WITHOUT PRIOR WRITTEN APPROVAL FROM THE CITY FORESTER. IF THE BLVD. OR PARK LAWN MUST BE USED FOR CONSTRUCTION ACTIVITIES, SITE ACCESS ROUTES, MATERIAL STORAGE OR OTHER RELATED ACTIVITIES, PROTECTIVE MEASURED APPROVED BY THE FORESTER SHALL BE TAKEN TO REDUCE SOIL COMPACTION AND PROTECT TREES FROM DAMAGE.

CONTACTS:

GENERAL CONTRACTOR
RYAN COMPANIES US, INC.
NICK KOCH - □612-964-6692□
nick.koch□ r□ancompanies.com

ANTHONY ADAMS - □612-492-4741□
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DESIGN ENGINEER
TKDA
JONATHAN LIBBY - □651-726-7946□
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ANNE GARDNER - □651-266-6421□
anne.gardner□ ci.stpaul.mn.us

FORESTRY

ZACH JORGENSON - □651-632-2437□
zach.□rgensen□ ci.stpaul.mn.us

ENGINEERED FILL MATERIALS:

LOCATIONS TO BE USED	ENGINEERED FILL CLASSIFICATION	POSSIBLE SOIL TYPE CLASSIFICATION □USCS□	MnDOT SPECIFICATION
TRAIL SUBGRADE	GRANULAR FILL	SP, SW, SP-SM, SW-SM, SM	3149.2.D.1
• BEHIND RETAINING WALLS • AROUND OR ABOVE TUNNEL STRUCTURES • BELOW FOUNDATIONS OR STRUCTURES	STRUCTURAL FILL	SP, SW, SP-SM	3149.2.D.2
DRAINAGE LAYER	COARSE AGGREGATE CA-3	GP, GW	3137
BELOW LANDSCAPED SURFACES, WHERE SUBSIDENCE IS NOT A CONCERN	NON-STRUCTURAL GRADING MATERIAL	SP, SP-SM, SM, SC, CL	2105.A.□

IT IS RECOMMENDED TO PLACE AND COMPACT FILL IN ACCORDANCE WITH MNDOT SPECIFICATION 2105.3. COMPACTION SHALL BE EVALUATED USING THE SPECIFIED DENSITY METHOD IN ACCORDANCE WITH MNDOT SPECIFICATION 2105.3.F.1. A GEOTECHNICAL REPRESENTATIVE, UNDER THE DIRECTION OF A PROFESSIONAL GEOTECHNICAL ENGINEER, SHOULD OBSERVE FILL PLACEMENT AND PERFORM DENSITY TESTING.

FOR MORE INFORMATION OR IN THE CASE OF DISCREPANCIES BETWEEN THE ENGINEERED FILL MATERIALS TABLE ABOVE AND THE GEOTECHNICAL REPORT, THE GEOTECHNICAL REPORT SHALL GOVERN. SEE BRAUN INTERTEC GEOTECHNICAL EVALUATION REPORT □PROJECT B1□06527.0□□

NO.	DATE	BY	DESCRIPTION OF REVISIONS
1	4/2/2021	JNL	100% SUBMITTAL

DESIGNED AMK
DRAWN NJL
CHECKED JNL

FINAL DESIGN
100% SUBMITTAL

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Engineer under the laws of the State of Minnesota.
Printed Name: JONATHAN N. LIBBY
Signature: Jonathan N. Libby
Date: 4/2/21 License #: 51276

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CITY OF SAINT PAUL DEPARTMENT OF PARKS AND RECREATION

HIGHLAND BRIDGE MRB CROSSING

SAINT PAUL, MINNESOTA RAMSEY COUNTY

CONSTRUCTION NOTES

PROJ. NO. 17921.002

DRAWING NO. G102

PLOT DATE: Apr 01, 2021 - 12:14pm
FILENAME: K:\n-z\StPaul-ParksRec\17921002\04_Production\01_CAD\02_Sheets\G102 - Construction Notes.dwg

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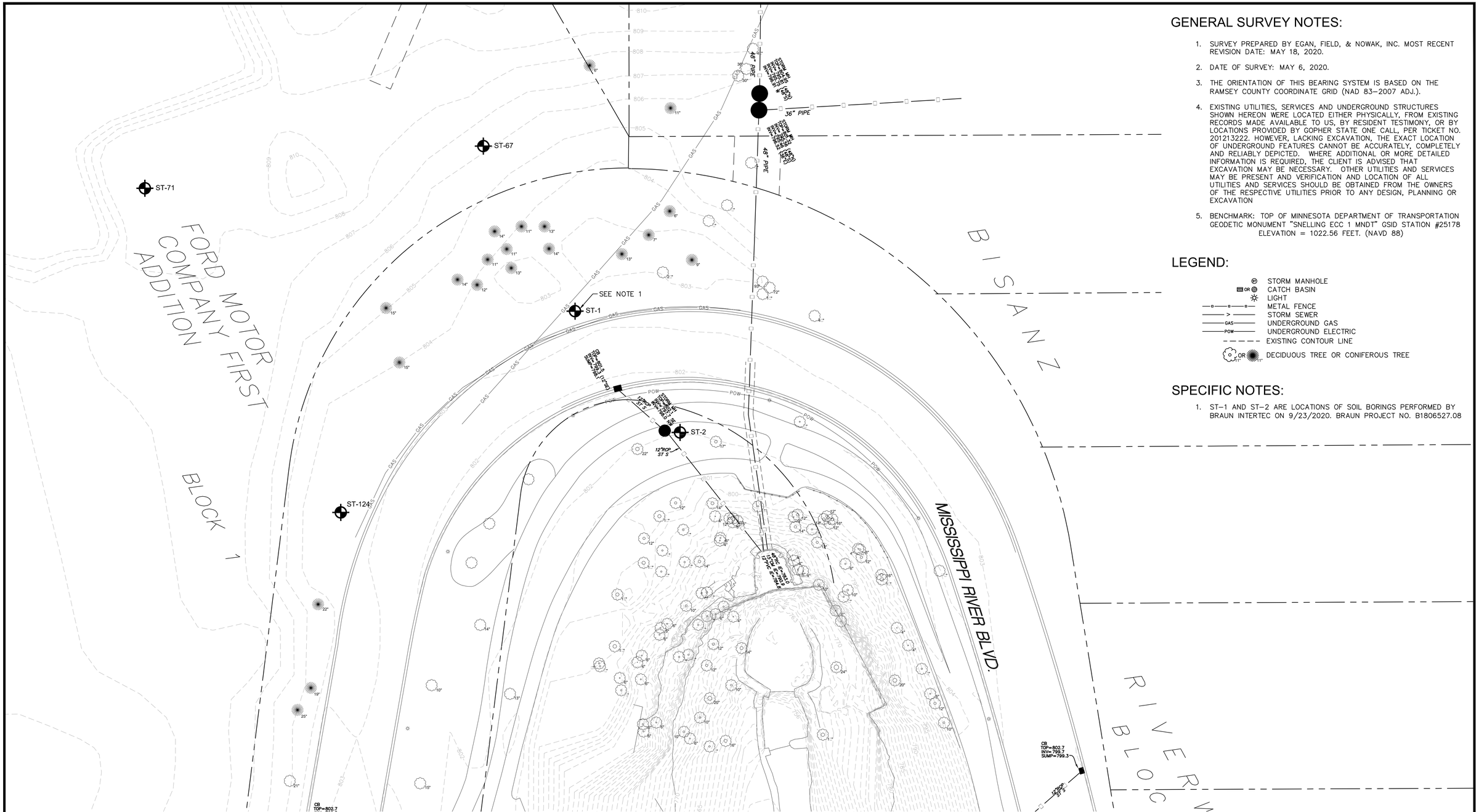

GENERAL SURVEY NOTES:

1. SURVEY PREPARED BY EGAN, FIELD, & NOWAK, INC. MOST RECENT REVISION DATE: MAY 18, 2020.
2. DATE OF SURVEY: MAY 6, 2020.
3. THE ORIENTATION OF THIS BEARING SYSTEM IS BASED ON THE RAMSEY COUNTY COORDINATE GRID (NAD 83–2007 ADJ.).
4. EXISTING UTILITIES, SERVICES AND UNDERGROUND STRUCTURES SHOWN HEREON WERE LOCATED EITHER PHYSICALLY, FROM EXISTING RECORDS MADE AVAILABLE TO US, BY RESIDENT TESTIMONY, OR BY LOCATIONS PROVIDED BY GOPHER STATE ONE CALL, PER TICKET NO. 201213222. HOWEVER, LACKING EXCAVATION, THE EXACT LOCATION OF UNDERGROUND FEATURES CANNOT BE ACCURATELY, COMPLETELY AND RELIABLY DEPICTED. WHERE ADDITIONAL OR MORE DETAILED INFORMATION IS REQUIRED, THE CLIENT IS ADVISED THAT EXCAVATION MAY BE NECESSARY. OTHER UTILITIES AND SERVICES MAY BE PRESENT AND VERIFICATION AND LOCATION OF ALL UTILITIES AND SERVICES SHOULD BE OBTAINED FROM THE OWNERS OF THE RESPECTIVE UTILITIES PRIOR TO ANY DESIGN, PLANNING OR EXCAVATION
5. BENCHMARK: TOP OF MINNESOTA DEPARTMENT OF TRANSPORTATION GEODETIC MONUMENT "SNELLING ECC 1 MNDT" GSID STATION #25178 ELEVATION = 1022.56 FEET. (NAVD 88)

LEGEND:

- STORM MANHOLE
- CATCH BASIN
- LIGHT
- METAL FENCE
- STORM SEWER
- UNDERGROUND GAS
- UNDERGROUND ELECTRIC
- EXISTING CONTOUR LINE
- DECIDUOUS TREE OR CONIFEROUS TREE

SPECIFIC NOTES:

1. ST–1 AND ST–2 ARE LOCATIONS OF SOIL BORINGS PERFORMED BY BRAUN INTERTEC ON 9/23/2020. BRAUN PROJECT NO. B1806527.08

1 / C101 EXISTING CONDITION PLAN
1" = 20'
0 10 20 40
SCALE IN FEET
NORTH

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DESIGNED AMK
DRAWN NJL
CHECKED JNL

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Signature:
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SAINT PAUL

CITY OF SAINT PAUL DEPARTMENT OF PARKS AND RECREATION
HIGHLAND BRIDGE MRB CROSSING
SAINT PAUL, MINNESOTA RAMSEY COUNTY

EXISTING CONDITION PLAN

PROJ. NO. 17921.002
DRAWING NO. C101

PLOT DATE: Apr 01, 2021 - 12:14pm
FILENAME: K:\n-z\StPaul-ParksRec\17921002\04_Production\01_CAD\02_Sheets\C101 - Existing Condition Plan.dwg

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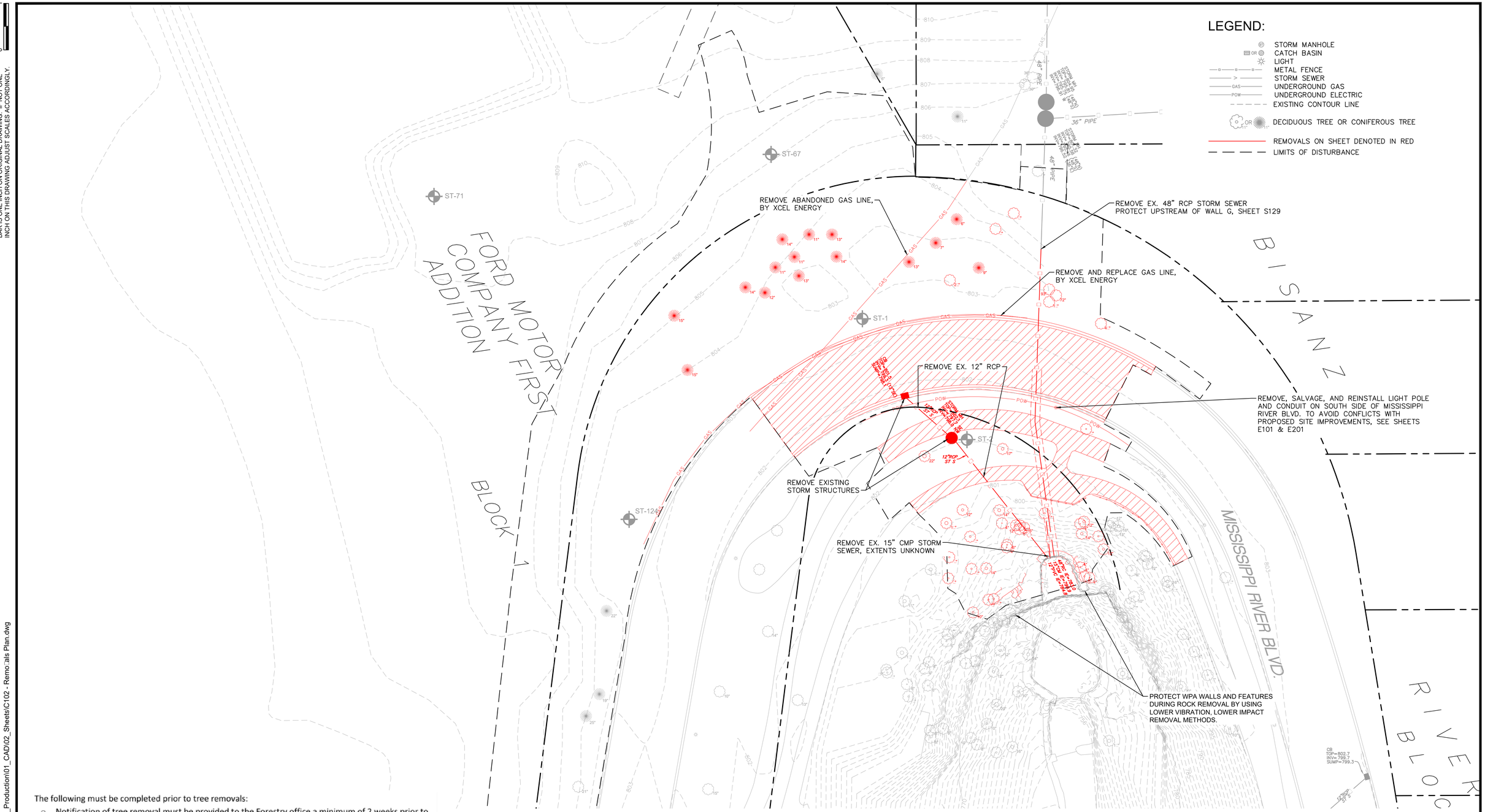

The following must be completed prior to tree removals:

- Notification of tree removal must be provided to the Forestry office a minimum of 2 weeks prior to the start of work. This notification can be sent to Zach Jorgensen at zach.jorgensen@ci.stpaul.mn.us or by phone at 651.632.2437.
- Tree removals must be completed by a St Paul licensed tree company. A list of licensed tree companies is available from the Department of Safety and Inspections.
- The trees must be marked for removal a minimum of 5 business days prior to removal.
- An onsite meeting to review and confirm the tree removal plan must be scheduled with Zach Jorgensen (651.632.2437 or zach.jorgensen@ci.stpaul.mn.us) after the trees have been marked and prior to the start of tree removal.

1 C102 DEMOLITION PLAN
1" = 20'
0 10 20 40
SCALE IN FEET
NORTH

GENERAL NOTES:
1. TREES TO REMAIN ARE TO BE PROTECTED. SEE SHEET C201 FOR PLACEMENT OF TREE PROTECTION FENCING.

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DESIGNED AMK
DRAWN NJL
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FINAL DESIGN
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CITY OF SAINT PAUL DEPARTMENT OF PARKS AND RECREATION
HIGHLAND BRIDGE MRB CROSSING
SAINT PAUL, MINNESOTA RAMSEY COUNTY

REMOVALS PLAN

PROJ. NO. 17921.002
DRAWING NO. C102

PLOT DATE: Apr 01, 2021 - 12:14pm
FILENAME: K:\n-z\StPaul-ParksRec\17921002\04_Production\01_CAD\02_Sheets\C102 - Remo_als Plan.dwg

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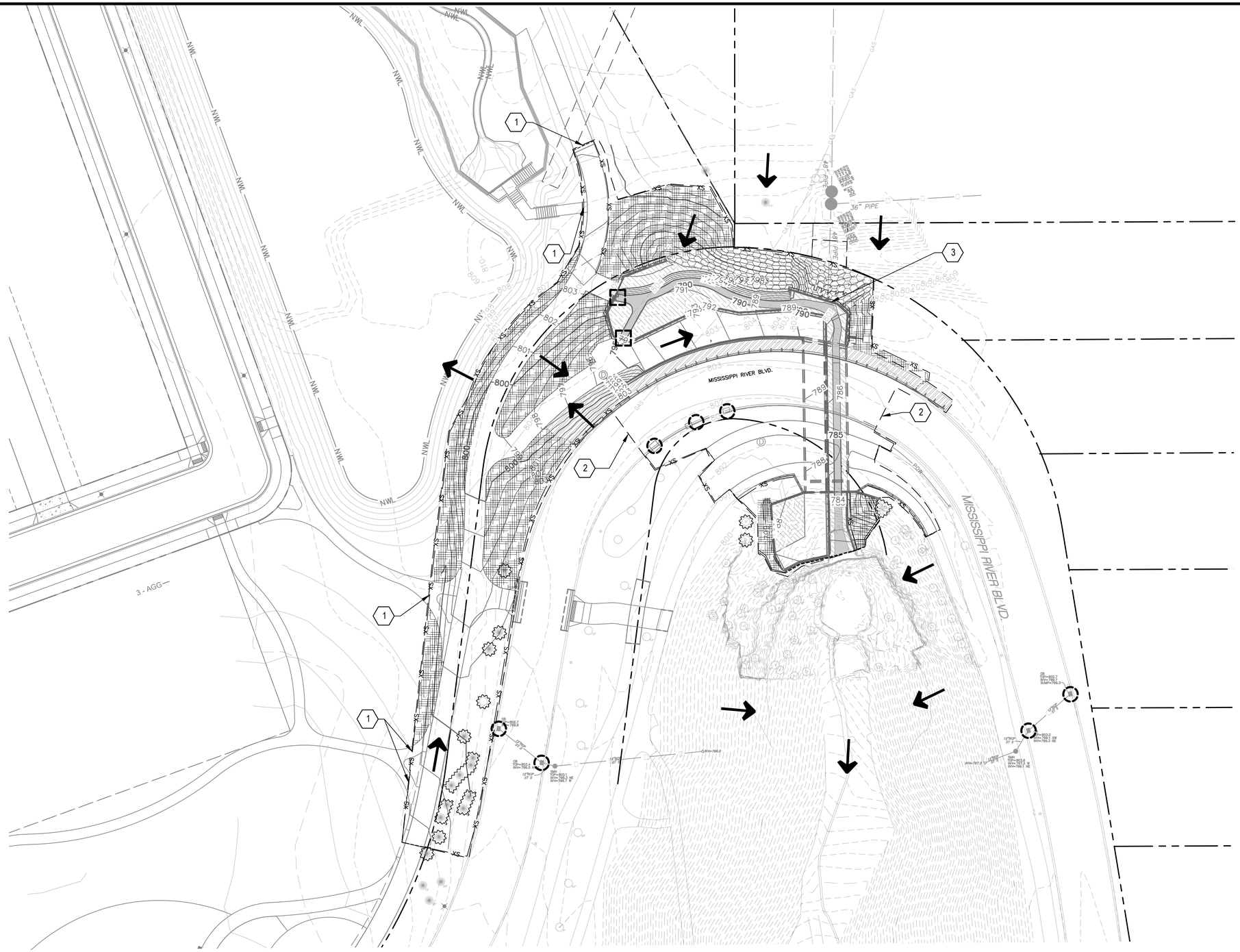

LEGEND

- LIMITS OF DISTURBANCE
- E□ISTING CONTOURS
- PROPOSED HIGHLAND BRIDGE CONTOURS
- PROPOSED CONTOURS
- EROSION CONTROL BLANKET 3□□3 C204 □CAT. 3N - NATURAL NETTING□
- EROSION CONTROL BLANKET 3□□3 C204 □CAT. 4N - NATURAL NETTING□
- LIMESTONE BEDROCK SURFACE
- SALVAGED, E□CAVATED BEDROCK PLACE AS DIRECTED BY OWNER OVER TYPE 4 GEOTE□TILE FABRIC MIN DIA.: 3:4" MA□ DIA.: 9"
- STREAM CHANNEL
- XS SILT FENCE 8□□8 C203
- COMPOST LOGS 2□□8 C203
- INLET PROTECTION 2400A C204
- SEDIMENT CONTROL LOG WEIR 8□□8 C203 □CULVERT END CONTROL□
- TREE PROTECTION 1 C204
- FLOW ARROW

AREA SUMMARY

TOTAL DISTURBED AREA □ 0.94 AC
E□ISTING IMPERVIOUS AREA□ 0.17 AC
PROPOSED IMPERVIOUS AREA□ 0.40 AC

KEYNOTES

1. UTILIZE SILT FENCE OR COMPOST LOG. DEPENDENT ON CONSTRUCTION STATUS OF HIGHLAND BRIDGE WALKS.
2. INSPECTS LIMITS OF DISTURBANCE ON MISSISSIPPI RIVER BOULEVARD DAILY FOR ACCUMULATION OF SEDIMENT OR CONSTRUCTION DEBRIS AND REMOVE SWEEP IF FOUND.
3. INSTALL SALVAGED LIMESTONE BEDROCK AT OUTFALL AS SOON AS PRACTICABLE TO ACT AS OUTLET EROSION CONTROL DEVICE DURING CONSTRUCTION. SEE SHEET C401.

GENERAL NOTES

1. AS NEEDED, TEMPORARY STABILIZATION SHALL USE SEED MI□ 32-241 NATIVE CONSTRUCTION BY TWIN CITY SEED, AN APPROVED MNDOT VENDOR. CONTRACTOR SHALL TEMPORARILY STABILIZE ANY DISTURBED AREAS WHERE WORK WILL NOT OCCUR FOR 7 DAYS.
2. REFER TO LANDSCAPE PLAN FOR PERMANENT SEED MI□, SHEET L101.
3. CONTRACTOR SHALL SUBMIT TO THE CITY LOCATION OF DESIRED STABILIZED CONSTRUCTION E□IT FOR APPROVAL.
4. REFER TO TEMPORARY CONVEYANCE PLAN FOR LOCATIONS OF TEMPORARY PIPING FOR BYPASS PUMPING.

1 C201 STO□ M□ ATE□ □ OLLUTION □ □ E□ ENTION □ LAN □S□ □ □ □ □
1"□ 30□

0 15 30 60
SCALE IN FEET

NORTH

NO.	DATE	BY	DESCRIPTION OF REVISIONS
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DESIGNED AMK
DRAWN NJL
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CITY OF SAINT PAUL DEPARTMENT OF PARKS AND RECREATION
HIGHLAND BRIDGE MRB CROSSING
SAINT PAUL, MINNESOTA RAMSEY COUNTY

SWPPP

PROJ. NO. 17921.002
DRAWING NO. C201

PLOT DATE: Apr 01, 2021 - 12:14pm
FILENAME: K:\n-z\StPaul-ParksRec\17921002\04_Production\01_CAD\02_Sheets\C201 - SWPPP.dwg

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STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

PROJECT DESCRIPTION
HIGHLAND BRIDGE – MISSISSIPPI RIVER BOULEVARD CROSSING
1200 MISSISSIPPI RIVER BLVD, SAINT PAUL, MN

THE PROJECT PURPOSE IS TO CONSTRUCT PAVED TRAILS, REMOVE BITUMINOUS PAVEMENT AND CURB AND GUTTER, SELECTIVELY REMOVE EXISTING WPA WALLS, DAYLIGHT FLOWS WITHIN AN EXISTING 48" RCP INTO A CONSTRUCTED BEDROCK CHANNEL, AND CONSTRUCT A CONSPAN BRIDGE STRUCTURE FOR PEDESTRIAN/BIKE AND DAYLIGHTED FLOWS TO CROSS UNDER MISSISSIPPI RIVER BOULEVARD WITHOUT CONFLICT TO HIDDEN FALLS REGIONAL PARK.

PROJECT SEQUENCING DATES:
PROJECT START DATE: APRIL 2021
FINAL COMPLETION DATE: NOVEMBER 2021

LAND FEATURE CHANGES:

TOTAL DISTURBED AREA:	0.94 ACR
PRE–CONSTRUCTION IMPERVIOUS AREA:	0.17 ACR
POST–CONSTRUCTION IMPERVIOUS AREA:	0.40 ACR
NET CHANGE IN IMPERVIOUS AREA:	0.23 ACR

RECEIVING WATERS
MISSISSIPPI RIVER IS THE RECEIVING WATER FOR THE PROJECT. STORMWATER RUNOFF FROM THIS PROJECT WILL GENERALLY FOLLOW IT'S ORIGINAL ROUTING, EXCEPT THE FLOW CAPTURED IN MISSISSIPPI RIVER BOULEVARD WILL BE DISCHARGED TO THE NORTH INTO THE DAYLIGHTED STREAM WHERE IT ULTIMATELY FLOWS TO THE SAME POINT. THIS PROJECT DOES NOT REQUIRE ADDITIONAL STORMWATER TREATMENT.

SPECIAL OR IMPAIRED WATERS (APPENDIX A)
MISSISSIPPI RIVER IS AN IMPAIRED STREAM PER THE DRAFT 2020 MN IMPAIRED WATERS LIST. APPENDIX A REQUIREMENTS APPLY TO THIS PROJECT.

AREAS OF ENVIRONMENTAL SENSITIVITY (AES)
EXISTING STORMWATER FACILITIES WITHIN AND NEAR THE PROJECT BOUNDARY ARE SHOWN ON THE EXISTING CONDITION AND DRAINAGE PLANS.

RESPONSIBLE PARTIES:
THE CITY OF SAINT PAUL (PERMITTED OWNER), AND THE CONTRACTOR (SITE OPERATOR), ARE RESPONSIBLE FOR THE IMPLEMENTATION OF THE SWPPP AND ALL REQUIREMENTS OF THE NPDES PERMIT CONSTRUCTION STORMWATER GENERAL PERMIT. THE CONTRACTOR IS RESPONSIBLE FOR INSTALLATIONS, INSPECTIONS, MAINTENANCE AND REPAIRS OF ALL EROSION PREVENTION AND SEDIMENT CONTROL BMP'S BEFORE, DURING, AND AFTER ACTIVE CONSTRUCTION. THE CITY OF SAINT PAUL IS RESPONSIBLE FOR THE LONG–TERM OPERATION AND MAINTENANCE OF PROPOSED STORMWATER MANAGEMENT SYSTEM(S). THE CONTRACTOR IS RESPONSIBLE UNTIL FINAL STABILIZATION OF ALL DISTURBED AREAS HAS BEEN ACHIEVED, ALL TEMPORARY BMP'S HAVE BEEN REMOVED, AND THE PERMIT NOTICE OF TERMINATION (NOT) FORM HAS BEEN SUBMITTED TO THE MPCA.

PROJECT OWNER	LONG TERM MAINTENANCE	PROJECT CONTRACTOR
CITY OF SAINT PAUL	CITY OF SAINT PAUL	RYAN COMPANIES
DEPT. OF PARKS & REC.		
25 W 4TH STREET, CHA 400		
651–266–6400		

WATER RELATED PERMITS

AGENCY	TYPE OF PERMIT
MPCA	NPDES CONSTRUCTION PERMIT (MODIFY EXISTING PERMIT FOR FORD SITE)
CRWD	PERMIT FOR EROSION CONTROL, STORMWATER

READ AND REVIEW ALL PERMITS FOR SPECIAL CONDITIONS THAT WILL AFFECT CONSTRUCTION OF THE PROJECT.

INSPECTION AND RECORD KEEPING
THE CONTRACTOR MUST ASSIGN A TRAINED INDIVIDUAL(S) (PURSUANT TO PART III.A.1–2) TO OVERSEE THE IMPLEMENTATION, AMENDMENT, INSPECTION, AND MAINTENANCE OF THE SWPPP AND BMP'S. THIS INDIVIDUAL(S) MUST BE AVAILABLE FOR SITE INSPECTIONS WITHIN 72 HOURS UPON REQUEST BY THE PERMITTED OWNER, LGU, OR THE MPCA. AMENDMENTS TO THE SWPPP WILL BE MADE BY THE PROJECT ENGINEER OR THE CONTRACTOR AFTER WRITTEN APPROVAL BY THE PROJECT ENGINEER.

INSPECT THE ENTIRE CONSTRUCTION SITE A MINIMUM OF ONCE EVERY SEVEN DAYS DURING ACTIVE CONSTRUCTION AND WITHIN 24 HOURS AFTER A RAINFALL EVENT GREATER THAN 0.5 INCHES IN 24 HOURS. INSPECT ALL TEMPORARY AND PERMANENT WATER QUALITY MANAGEMENT, EROSION PREVENTION AND SEDIMENT CONTROL BMPS, SURFACE WATERS AND CONSTRUCTION SITE EXITS UNTIL ALL CONSTRUCTION IS COMPLETE AND THE SITE HAS UNDERGONE FINAL STABILIZATION. RECORD ALL INSPECTIONS AND MAINTENANCE ACTIVITIES IN WRITING WITHIN 24 HOURS. SUBMIT INSPECTION REPORTS IN A FORMAT THAT IS ACCEPTABLE TO THE PROJECT ENGINEER.

SOILS
SOIL TYPES FOUND ON THIS PROJECT CONSISTED OF SILTY SAND (SM) SITTING ON PLATTEVILLE FORMATION LIMESTONE. SOILS ARE GENERALLY HYDROLOGIC SOIL GROUPS (HSG) A OR B. BASED ON THE TWO SOIL BORINGS PERFORMED BY BRAUN INTERTEC, FRACTURED BEDROCK IS EXPECTED AT 795.0, AND COMPETENT UNFRACTURED BEDROCK AT 788.0.

GROUNDWATER
GROUNDWATER WAS NOT OBSERVED IN THE BORINGS COMPLETED FOR THIS PROJECT AND IS EXPECTED TO EXIST BELOW THE DEPTHS EXPLORED FOR THIS PROJECT.

ENVIRONMENTAL REVIEW
THIS PROJECT IS NOT LOCATED IN A WELL HEAD PROTECTION AREA.
THIS PROJECT IS NOT LOCATED IN A DRINKING WATER SUPPLY MANAGEMENT AREA (DWSMA).
THIS PROJECT IS NOT LOCATED IN A KARST AREA.
THIS PROJECT IS NOT LOCATED IN AN EMERGENCY RESPONSE AREA (ERA) PER DEPARTMENT OF HEALTH.

MISCELLANEOUS EROSION CONTROL NOTES:
CONSTRUCTION SHALL BE GOVERNED BY THE MNDOT SPEC. BOOK, SPECIAL PROVISIONS, AMENDMENTS, PROJECT SPECIFICATIONS, AND DETAIL PLATES. THE CONTRACTOR SHALL KEEP THE INSPECTION AND MAINTENANCE LOG ON–SITE AT ALL TIMES DURING ACTIVE CONSTRUCTION. PERMITS AND MAPS RELATING TO THIS PROJECT SWPPP CAN BE FOUND IN THE PROJECT MANUAL.

BMP NOTES:
1. BMP'S MUST BE ADEQUATELY DESIGNED, INSTALLED, AND MAINTAINED TO PREVENT EROSION AND SEDIMENT FROM A MINIMUM 0.5 INCH RAINFALL.
2. SILT FENCE IS NOT AN ACCEPTABLE CATCH BASIN INLET PROTECTION BMP.
3. CONTRACTOR SHALL SUBMIT A LOCATION MAP AND NARRATIVE FOR PROPOSED (IF ANY) ROCK CONSTRUCTION ENTRANCES (OR EQUIVALENT), CONCRETE WASHOUT LOCATIONS, AND HAZARDOUS MATERIAL STORAGE TO THE PROJECT ENGINEER PRIOR TO LAND DISTURBANCE.
4. CONTRACTOR SHALL SUBMIT LOCATION MAP AND BMP PLAN FOR ANY STOCK PILES PROPOSED ON–SITE (MORE THAN 24 HOURS) FOR THE PROJECT ENGINEER'S APPROVAL.
5. MULTIPLE STREET SWEEPINGS MAY BE REQUIRED AT ALL POINTS OF ENTRANCE OR EXIT TO THE SITE AT THE DISCRETION OF THE PROJECT ENGINEER.

TIMING OF BMP INSTALLATION:
NO CONSTRUCTION OPERATIONS, INCLUDING REMOVALS, THAT REQUIRE EROSION & SEDIMENT CONTROL PER SWPPP CAN COMMENCE UNTIL THE EROSION CONTROL SUPERVISOR CERTIFIES THE PROPER INSTALLATION OF BMP'S. THE EROSION PREVENTION AND SEDIMENT CONTROL BMP'S SHALL BE INSTALLED AS NECESSARY TO MINIMIZE EROSION FROM DISTURBED SURFACES AND TO CAPTURE SEDIMENT ON SITE. PERIMETER CONTROLS (SILT FENCE, CONSTRUCTION ENTRANCES, ETC.) SHALL BE INSTALLED PRIOR TO THE START OF CONSTRUCTION. CONTRACTOR SHALL IMPLEMENT THE NECESSARY ON SITE BMP'S IN ACCORDANCE WITH THE NPDES PERMIT REQUIREMENTS TO PREVENT NUISANCE CONDITIONS (MN RULES 7050.2010) FROM ANY DISCHARGES UNDER COVERAGE OF THE NPDES PERMIT. IN SOME CASES MULTIPLE APPLICATIONS OF SOME BMP'S MAY BE NEEDED TO MEET THESE REQUIREMENTS.

CONSTRUCTION SEQUENCING
1. CONTRACTOR TO VERIFY THAT ALL APPLICABLE PERMITS HAVE BEEN OBTAINED AND NPDES PERMIT MODIFICATION FORM HAS BEEN SUBMITTED TO MPCA PRIOR TO THE START OF CONSTRUCTION.
2. CONTRACTOR SHALL DEVELOP A CHAIN OF COMMAND WITH ALL OPERATORS ON THE SITE TO ENSURE THE SWPPP WILL BE IMPLEMENTED AND STAY IN EFFECT UNTIL THE PROJECT IN COMPLETE.
3. PERMITTEE(S) MUST PLAN FOR AND IMPLEMENT APPROPRIATE CONSTRUCTION PHASING, VEGETATIVE BUFFER STRIPS, HORIZONTAL SLOPE GRADING, AND OTHER CONSTRUCITON PRACTICES THAT MINIMIZE EROSION, SO THAT THE INSPECTION AND MAINTENANCE REQUIREMENTS OF THE NPDES CONSTRUCTION PERMIT ARE COMPLIED WITH. THE LOCATION OF AREAS NOT TO BE DISTURBED (INCLUDING TREE PROTECTION FENCING) MUST BE DELINEATED (E.G. WITH FLAGS, STAKES, SIGNS, SILT FENCE, ORANGE TREE PROTECTION FENCE, ETC.) ON THE PROJECT SITE BEFORE WORK BEGINS.
4. SEDIMENT CONTROL PRACTICES MUST BE ESTABLISHED ON ALL DOWN GRADIENT PERIMETERS BEFORE ANY UP GRADIENT LAND DISTURBING ACTIVITIES BEGIN. THESE PRACTICES SHALL REMAIN IN PLACE UNTIL FINAL STABILIZATION IS ACHIEVED.
5. CONTRACTOR TO ROUGH GRADE SITE AND INSTALL UTILITIES, THEN INSTALL AND MAINTAIN ALL TEMPORARY/PERMANENT EROSION CONTROL BMPS AS SHOWN ON PLANS AND IN CONFORMANCE WITH THE NPDES CONSTRUCTION PERMIT.
6. SEEDING IS TO TAKE PLACE IMMEDIATELY FOLLOWING FINAL GRADING AND SOIL PLACEMENT TO PREVENT EROSION AND COMPACTION.
7. TEMPORARY SOIL STOCKPILES MUST HAVE EFFECTIVE SEDIMENT CONTROL AND CANNOT BE PLACED IN SURFACE WATERS OR STORMWATER CONVEYANCE SYSTEMS. STOCKPILES AND ALL BARE SOILS TO BE SEEDED WITH MNDOT SEED MIX 36–211, REFER TO MNDOT SPECIFICATION 3876. ALL SEEDING AREAS TO BE COVERED WITH HYDROMULCH. TEMPORARY STOCKPILES WITHOUT SIGNIFICANT AMOUNT OF SILT, CLAY, OR ORGANIC COMPOUNDS ARE EXEMPT EX: CLEAN AGGREGATE STOCKPILES, DEMOLITION CONCRETE STOCKPILES, SAND STOCKPILES.
8. CONTRACTOR TO ACHIEVE FINAL STABILIZATION PRIOR TO SUBMISSION OF THE NOTICE OF TERMINATION TO THE MPCA. FINAL STABILIZATION REQUIRES THAT ALL SOIL DISTURBING ACTIVITIES HAVE BEEN COMPLETED AND THAT DISTURBED AREAS AREA STABILIZED BY A UNIFORM PERENNIAL VEGETATIVE COVER WITH 70% OF THE EXPECTED FINAL DENSITY. ALL TEMPORARY BMP'S SHALL BE REMOVED, DITCHES STABILIZED, AND UNUSED SEDIMENTS SHALL BE REMOVED FROM SITE AFTER FINAL COMPLETION OF PROJECT.
9. PRIOR TO SUBMISSION OF THE NOTICE OF TERMINATION, CONTRACTOR SHALL INSPECT HIDDEN FALLS CREEK FROM THE LIMITS OF DISTURBANCE FOR THE SUBJECT PROJECT TO ITS CONFLUENCE WITH THE MISSISSIPPI RIVER. ANY CONSTRUCTION DEBRIS OF ACCUMULATION OF SEDIMENT MUST BE REMOVED FROM HIDDEN FALLS CREEK. NO HEAVY EQUIPMENT IS ALLOWED IN OR ADJACENT TO HIDDEN FALLS CREEK TO REMOVE CONSTRUCTION DEBRIS OR SEDIMENT.

DEWATERING AND BASIN DRAINING
IN THE EVENT DEWATERING OR BASIN DRAINING IS REQUIRED, THE CONTRACTOR SHALL SUBMIT A DEWATERING PLAN TO THE PROJECT ENGINEER FOR APPROVAL PRIOR TO UNDERTAKING THESE ACTIVITIES. DEWATERING PLAN MUST INCLUDE BMPS TO PREVENT SEDIMENT TRANSPORT, EROSION, AND ADVERSE IMPACTS TO DOWNSTREAM WATERS. IF AN APPROVED TMDL WASTE LOAD ALLOCATION IS ESTABLISHED FOR CONSTRUCTION ACTIVITIES ON A RECEIVING WATERBODY, THE CONTRACTOR MUST IMPLEMENT ALL NECESSARY BMPS TO MEET THE ASSIGNED WASTE LOAD ALLOCATION. THE DEWATERING PLAN AND DNR APPROPRIATIONS PERMIT WILL BECOME PART OF THE SWPPP.

POLLUTION PREVENTION MANAGEMENT MEASURES
1. SOLID WASTE (COLLECTED SEDIMENT, ASPHALT, CONCRETE MILLINGS, CONSTRUCTION AND DEMOLITION DEBRIS) AND OTHER WASTES MUST BE DISPOSED OF PROPERLY AND MUST COMPLY WITH MPCA DISPOSAL REQUIREMENTS.
2. TRUCK AND CONSTRUCTION VEHICLE WASHING IS PROHIBITED ON SITE.
3. CONCRETE WASHOUT ONSITE: CONTRACTORS AND SITE OPERATORS MUST SUBMIT A CONCRETE WASHOUT PLAN TO THE PROJECT ENGINEER FOR APPROVAL. SLURRY MUST BE CONTAINED IN A LEAK–PROOF CONTAINMENT FACILITY OR IMPERMEABLE LINER. THE APPROVED PLAN WILL BE INCORPORATED INTO THE SWPPP.
4. HAZARDOUS MATERIALS (OIL, GAS, PAINTS, LUBRICANTS, ETC.) MUST BE PROPERLY STORED, INCLUDING SECONDARY CONTAINMENT AND RESTRICTED ACCESS. STORAGE AND DISPOSAL OF HAZARDOUS WASTE MUST BE INCOMPLIANCE WITH MPCA REGULATIONS. TEMPORARY ON–SITE STORAGE DEVICES, SPECIFICATIONS, AND LOCATIONS MUST BE SUBMITTED BY THE CONTRACTOR FOR REVIEW AND APPROVAL BY THE PROJECT ENGINEER.
5. NO BURNING OF TREES, BRUSH, OR OTHER VEGETATIVE MATERIAL IS ALLOWED WITHIN THE PROJECT AREA.

LANDSCAPING NOTES
1. FILTER LOGS SHALL BE PLACED, AS NEEDED, TO TRAP SEDIMENT ON THE LOWER EDGE OF BEDS OR TREE HOLES. FILTER LOGS WILL BE CUT AND MATERIALS LEFT TO ACT AS SEDIMENT TRAPS.
2. TILLING FOR BEDS OR TREE HOLES MUST BE PLANTED AND MULCHED WITH WOOD CHIP WITHIN 7 DAYS OR STABILIZED UNTIL PLANTING OPERATIONS CAN BE COMPLETED.

SWPPP SHEET DESCRIPTIONS AND LOCATIONS:

TEMPORARY EROSION CONTROL MEASURES	SHEET C201
PERMANENT EROSION CONTROL MEASURES	SHEET C201
DIRECTION OF FLOW	SHEET C201
TEMPORARY STABILIZATION	SHEET C201
FINAL STABILIZATION	LANDSCAPE PLANS
DRAINAGE STRUCTURES, STORM SEWER	SHEET C401
EROSION AND SEDIMENT CONTROL DETAILS	SHEET C203 TO C204

EROSION CONTROL ITEM	ESTIMATED QUANTITY
STABILIZED CONSTRUCTION ENTRANCE	1 EA
INLET PROTECTION	7 EA
SILT FENCE / SEDIMENT CONTROL LOG	1510 LF
SEDIMENT CONTROL LOG WEIR (CULVERT END CONTROL)	2 EA
EROSION CONTROL BLANKET – CATEGORY 4N	225 SY
EROSION CONTROL BLANKET – CATEGORY 3N	1225 SY
TREE PROTECTION (TEMPORARY FENCE)	400 LF

NO.	DATE	BY	DESCRIPTION OF REVISIONS
1	4/2/2021	JNL	100% SUBMITTAL

DESIGNED AMK
DRAWN NJL
CHECKED JNL

FINAL DESIGN
100% SUBMITTAL

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Engineer under the laws of the State of Minnesota.
Printed Name: JONATHAN L. LISSOY
Signature:
Date: 4/2/21 License #: 51276

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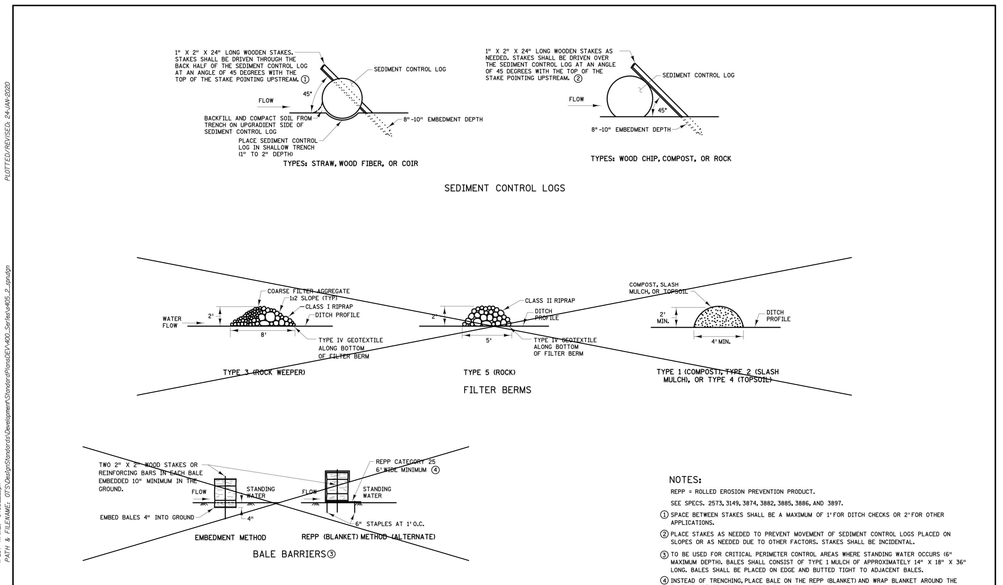
CITY OF SAINT PAUL DEPARTMENT OF PARKS AND RECREATION
HIGHLAND BRIDGE MRB CROSSING
SAINT PAUL, MINNESOTA RAMSEY COUNTY

SWPPP NOTES

PROJ. NO. 17921.002
DRAWING NO. C202

PLOT DATE: Apr 01, 2021 - 12:14pm
FILENAME: K:\n-z\StPaul-ParksRec\17921002\04_Production\01_CAD\02_Sheets\C202 - SWPPP DETAILS.dwg



NOTES:

REPP = ROLLED EROSION PREVENTION PRODUCT.

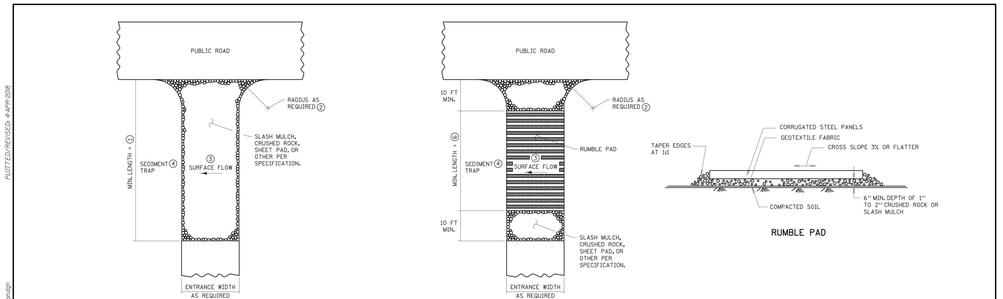
SEE SPECS. 2573, 3149, 3874, 3882, 3885, 3886, AND 3897.

1. SPACE BETWEEN STAKES SHALL BE A MAXIMUM OF 1'FOR DITCH CHECKS OR 2'FOR OTHER APPLICATIONS.
2. PLACE STAKES AS NEEDED TO PREVENT MOVEMENT OF SEDIMENT CONTROL LOGS PLACED ON SLOPES OR AS NEEDED DUE TO OTHER FACTORS. STAKES SHALL BE INCIDENTAL.
3. TO BE USED FOR CRITICAL PERIMETER CONTROL AREAS WHERE STANDING WATER OCCURS 16" MAXIMUM DEPTH. BALES SHALL CONSIST OF TYPE I MULCH OF APPROXIMATELY 14" X 18" X 36" LONG. BALES SHALL BE PLACED ON EDGE AND BUTTED TIGHT TO ADJACENT BALES.
4. INSTEAD OF TRENCHING, PLACE BALE ON THE REPP (BLANKET) AND WRAP BLANKET AROUND THE BALE. PLACE STAKE THROUGH BALE AND BLANKET.

REVISIONS
APPROVED: JANUARY 8, 2020
MARC KAMONSKI
CHIEF ENVIRONMENTAL OFFICER

STANDARD PLAN 5-297.405	2 OF 8	TEMPORARY SEDIMENT CONTROL
APPROVED: 1-8-2020 REVISED:		FILTER BERMS, SEDIMENT CONTROL LOGS, AND BALE BARRIERS
STATE PROJ. NO.	(T.H.)	SHEET NO. OF SHEETS

MINNESOTA DEPARTMENT OF TRANSPORTATION — TOM SOLUM, STATE DESIGN ENGINEER



NOTES:

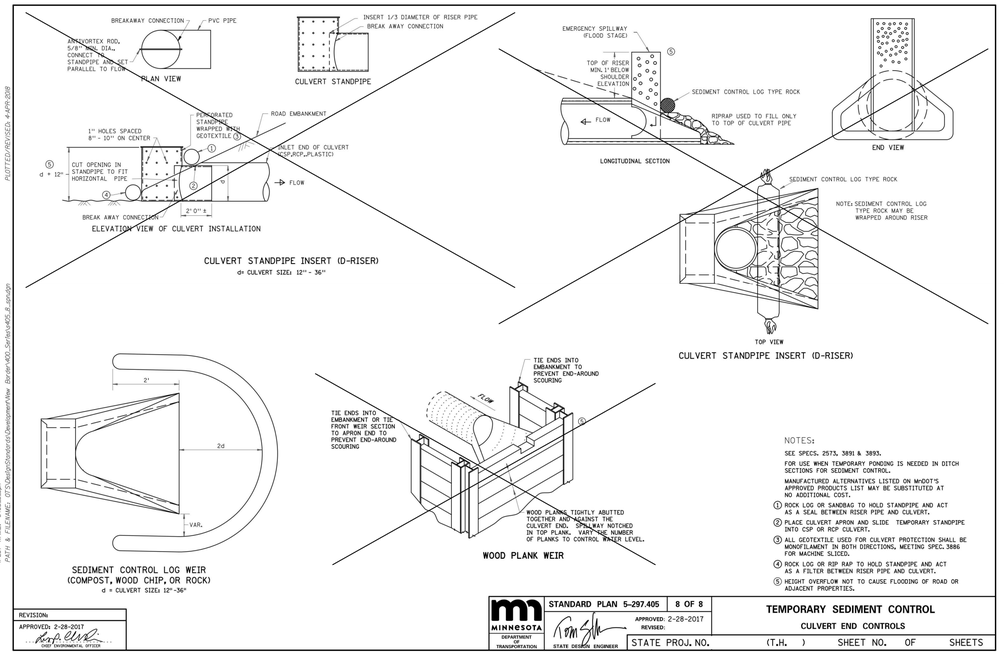
SEE SPECS. 2573 & 3882.

1. MINIMUM LENGTH SHALL BE THE GREATER OF 50 FEET OR A LENGTH SUFFICIENT TO ALLOW A MINIMUM OF 5 TIRE ROTATIONS ON THE PROVIDED PAD. MINIMUM LENGTH SHALL BE CALCULATED USING THE LARGEST TIRE WHICH WILL BE USED IN TYPICAL OPERATIONS.
2. PROVIDE RADIUS OR WIDEN PAD SUFFICIENTLY TO PREVENT VEHICLE TIRES FROM TRACKING OFF OF PAD WHEN LEAVING SITE.
3. IF RUNOFF FROM DISTURBED AREAS FLOWS TOWARD CONSTRUCTION EXITS, PREVENT RUNOFF FROM DRAINING DIRECTLY TO PUBLIC ROAD OVER CONSTRUCTION EXIT BY CROWNING THE EXIT OR SLOPING TO ONE SIDE. IF SURFACE GRADING IS INSUFFICIENT, PROVIDE OTHER MEANS OF INTERCEPTING RUNOFF.
4. IF RUNOFF FROM CONSTRUCTION EXITS WILL DRAIN OFF OF PROJECT SITE, PROVIDE SEDIMENT TRAP WITH STABILIZED OVERFLOW.
5. IF A TIRE WASH OFF IS REQUIRED THE CONSTRUCTION EXITS SHALL BE GRADED TO DRAIN THE WASH WATER TO A SEDIMENT TRAP.
6. MINIMUM LENGTH OF RUMBLE PAD SHALL BE 20 FEET, OR AS REQUIRED TO REMOVE SEDIMENT FROM TIRES. IF SIGNIFICANT SEDIMENT IS TRACKED FROM THE SITE, THE RUMBLE PAD SHALL BE LENGTHENED OR THE DESIGN MODIFIED TO PROVIDE ADDITIONAL VIBRATION. WASH-OFF LENGTH SHALL BE AS REQUIRED TO EFFECTIVELY REMOVE CONSTRUCTION SEDIMENT FROM VEHICLE TIRES.
7. MAINTENANCE OF CONSTRUCTION EXITS SHALL OCCUR WHEN THE EFFECTIVENESS OF SEDIMENT REMOVAL HAS BEEN REDUCED. MAINTENANCE SHALL CONSIST OF REMOVING SEDIMENT AND CLEANING THE MATERIALS OR PLACING ADDITIONAL MATERIAL (SLASH MULCH OR CRUSHED ROCK) OVER SEDIMENT FILLED MATERIAL TO RESTORE EFFECTIVENESS.

REVISIONS
APPROVED: 2-28-2017
CHIEF ENVIRONMENTAL OFFICER

STANDARD PLAN 5-297.405	5 OF 8	TEMPORARY SEDIMENT CONTROL
APPROVED: 2-28-2017 REVISED:		STABILIZED CONSTRUCTION EXIT
STATE PROJ. NO.	(T.H.)	SHEET NO. OF SHEETS

MINNESOTA DEPARTMENT OF TRANSPORTATION — TOM SOLUM, STATE DESIGN ENGINEER



NOTES:

SEE SPECS. 2573, 3891 & 3893.

FOR USE WHEN TEMPORARY PONDING IS NEEDED IN DITCH SECTIONS FOR SEDIMENT CONTROL.

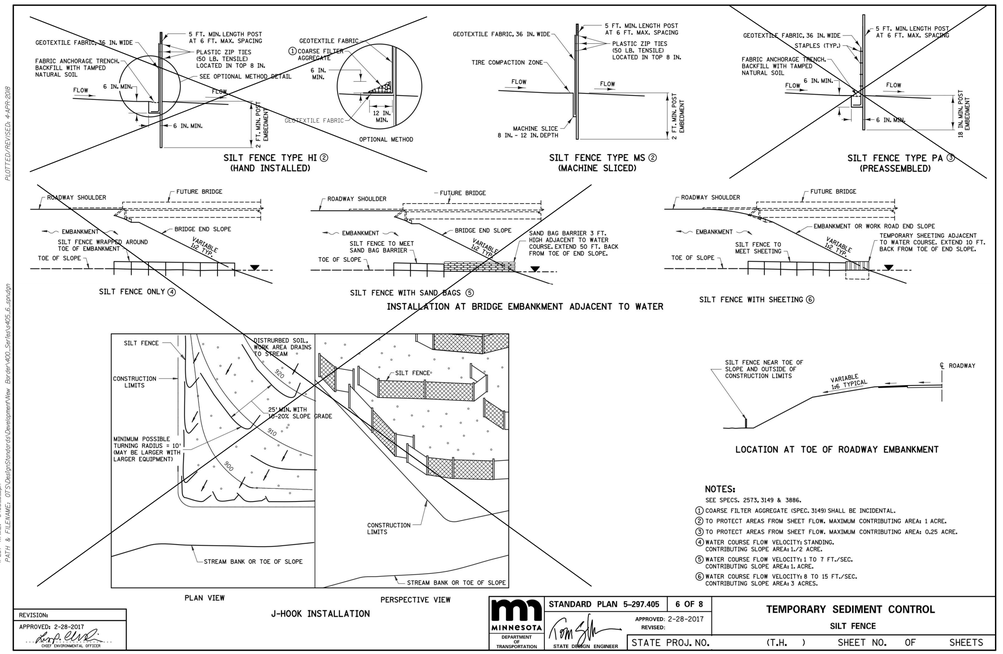
MANUFACTURED ALTERNATIVES LISTED ON MnDOT'S APPROVED PRODUCTS LIST MAY BE SUBSTITUTED AT NO ADDITIONAL COST.

1. ROCK LOG OR SANDBAG TO HOLD STANDPIPE AND ACT AS A SEAL BETWEEN RISER PIPE AND CULVERT.
2. PLACE CULVERT APRON AND SLIDE TEMPORARY STANDPIPE INTO CSP OR RCP CULVERT.
3. ALL GEOTEXTILE USED FOR CULVERT PROTECTION SHALL BE MONOFILAMENT IN BOTH DIRECTIONS, MEETING SPEC. 3886 FOR MACHINE SLICED.
4. ROCK LOG OR RIP RAP TO HOLD STANDPIPE AND ACT AS A FILTER BETWEEN RISER PIPE AND CULVERT.
5. HEIGHT OVERFLOW NOT TO CAUSE FLOODING OF ROAD OR ADJACENT PROPERTIES.

REVISIONS
APPROVED: 2-28-2017
CHIEF ENVIRONMENTAL OFFICER

STANDARD PLAN 5-297.405	8 OF 8	TEMPORARY SEDIMENT CONTROL
APPROVED: 2-28-2017 REVISED:		CULVERT END CONTROLS
STATE PROJ. NO.	(T.H.)	SHEET NO. OF SHEETS

MINNESOTA DEPARTMENT OF TRANSPORTATION — TOM SOLUM, STATE DESIGN ENGINEER



NOTES:

SEE SPECS. 2573, 3149 & 3886.

1. COARSE FILTER AGGREGATE (SPEC. 3149) SHALL BE INCIDENTAL.
2. TO PROTECT AREAS FROM SHEET FLOW, MAXIMUM CONTRIBUTING AREA: 1 ACRE.
3. TO PROTECT AREAS FROM SHEET FLOW, MAXIMUM CONTRIBUTING AREA: 0.25 ACRE.
4. WATER COURSE FLOW VELOCITY: STANDING. CONTRIBUTING SLOPE AREA: 1/2 ACRE.
5. WATER COURSE FLOW VELOCITY: 1 TO 7 FT./SEC. CONTRIBUTING SLOPE AREA: 1 ACRE.
6. WATER COURSE FLOW VELOCITY: 8 TO 15 FT./SEC. CONTRIBUTING SLOPE AREA: 3 ACRES.

REVISIONS
APPROVED: 2-28-2017
CHIEF ENVIRONMENTAL OFFICER

STANDARD PLAN 5-297.405	6 OF 8	TEMPORARY SEDIMENT CONTROL
APPROVED: 2-28-2017 REVISED:		SILT FENCE
STATE PROJ. NO.	(T.H.)	SHEET NO. OF SHEETS

MINNESOTA DEPARTMENT OF TRANSPORTATION — TOM SOLUM, STATE DESIGN ENGINEER

PLOT DATE: Apr 01, 2021 - 12:14pm
FILENAME: K:\tn-z\StPaul-ParksRec\17921002\04_Production\01_CAD\02_Sheets\C202 - SWPPP DETAILS.dwg

NO.	DATE	BY	DESCRIPTION OF REVISIONS
1	4/2/2021	JNL	100% SUBMITTAL

DESIGNED AMK
DRAWN NJL
CHECKED JNL

FINAL DESIGN
100% SUBMITTAL

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Engineer under the laws of the State of Minnesota.
Printed Name: JONATHAN N. LIBBY
Signature: Jonathan N. Libby
Date: 4.2.21 License #: 51276

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SAINT PAUL

CITY OF SAINT PAUL DEPARTMENT OF PARKS AND RECREATION
HIGHLAND BRIDGE MRB CROSSING
SAINT PAUL, MINNESOTA RAMSEY COUNTY

SWPPP DETAILS

PROJ. NO. 17921.002
DRAWING NO. C203

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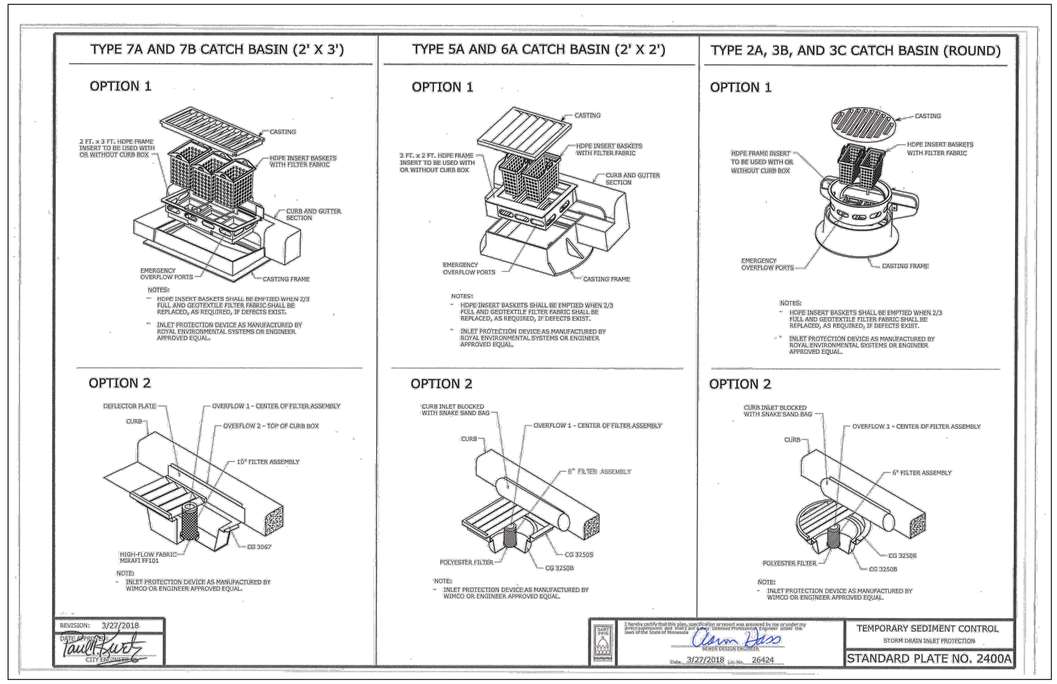
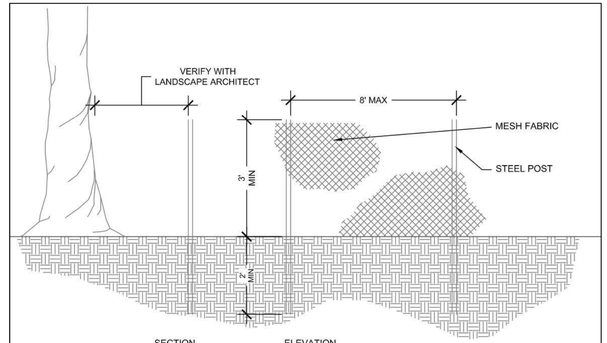
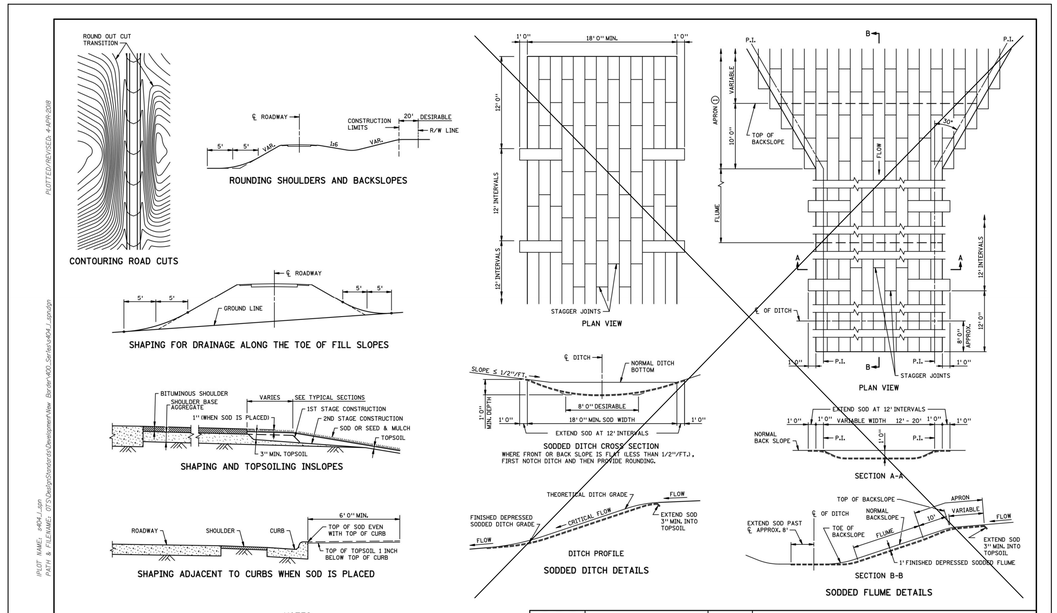




NOTES:
1. TREE PROTECTION FENCING SHALL BE INSTALLED ACCORDING TO PLAN PRIOR TO DEMOLITION OR OTHER SITE WORK. ANY RELOCATION OF THE TREE PROTECTION FENCING TO BE APPROVED BY CITY FORESTER (651.632.5129). TREE PROTECTION FENCING SHALL BE MAINTAINED FOR THE DURATION OF THE CONSTRUCTION PROCESS.
2. CONSTRUCTION MATERIALS, STOCKPILES, EQUIPMENT, VEHICLES, AND TEMPORARY FACILITIES SHALL NOT BE STORED OR OPERATED WITHIN THE TREE PROTECTION ZONE.
3. ROOTS OUTSIDE OF THE TREE PROTECTION ZONE EXPOSED OR DAMAGED DURING EXCAVATION OR OTHER CONSTRUCTION ACTIVITY SHALL BE CLEANLY CUT AS DIRECTED BY THE CITY FORESTER.
4. SUPPLEMENTAL WATERING IS TO BE PROVIDED DURING PERIODS OF DRY WEATHER.
5. ADDITONAL TREE PROTECTION MEASURES MAY BE REQUIRED.

1 / C204 ETAIL T EE OTECTION
NOT TO SCALE

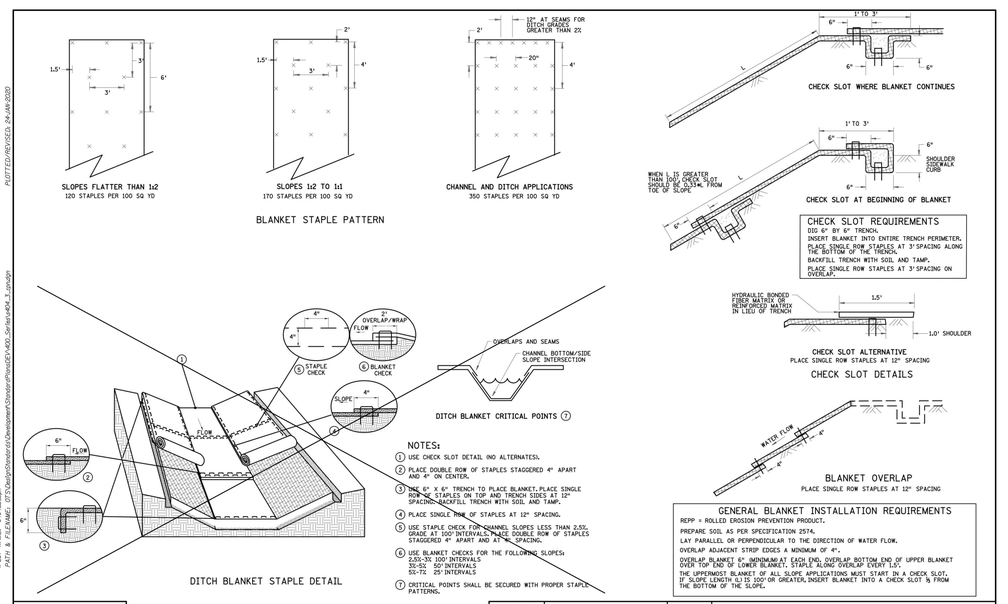


NOTES:
SEE SPEC: 2575.3 FOR ADDITIONAL INFORMATION.
① CONSTRUCT TAPER AS DIRECTED BY THE ENGINEER.

REVISIONS
APPROVED: 2-28-2017
CHIEF ENVIRONMENTAL OFFICER

MINNESOTA DEPARTMENT OF TRANSPORTATION — STATE DESIGN ENGINEER

STANDARD PLAN 5-297.404 | 1 OF 3
APPROVED: 2-28-2017
REVISED:
PERMANENT EROSION CONTROL
ALONG ROADWAYS, DITCHES AND FLUMES
STATE PROJ. NO. (T.H.) SHEET NO. OF SHEETS



NOTES:
① USE CHECK SLOT DETAIL (NO ALTERNATES).
② PLACE DOUBLE ROW OF STAPLES STAGGERED 4" APART AND 4" ON CENTER.
③ USE 6" X 6" TRENCH TO PLACE BLANKET. PLACE SINGLE ROW OF STAPLES ON TOP AND TRENCH SIDES AT 12" SPACING. BACKFILL TRENCH WITH SOIL AND TAMP.
④ PLACE SINGLE ROW OF STAPLES AT 12" SPACING.
⑤ USE STAPLE CHECK FOR CHANNEL SLOPES LESS THAN 2.5% GRADE AT 100' INTERVALS. PLACE DOUBLE ROW OF STAPLES STAGGERED 4" APART AND AT 4" SPACING.
⑥ USE BLANKET CHECKS FOR THE FOLLOWING SLOPES:
2.5%-3% 100' INTERVALS
3%-5% 50' INTERVALS
5%-7% 25' INTERVALS
⑦ CRITICAL POINTS SHALL BE SECURED WITH PROPER STAPLE PATTERNS.

GENERAL BLANKET INSTALLATION REQUIREMENTS
REPP = ROLLED EROSION PREVENTION PRODUCT.
PREPARE SOIL AS PER SPECIFICATION 2574.
LAY PARALLEL OR PERPENDICULAR TO THE DIRECTION OF WATER FLOW.
OVERLAP ADJACENT STRIP EDGES A MINIMUM OF 4".
OVERLAP BLANKET 6" MINIMUM AT EACH END. OVERLAP BOTTOM END OF UPPER BLANKET OVER TOP END OF LOWER BLANKET, STAPLE ALONG OVERLAP EVERY 1.5'.
THE UPPERMOST BLANKET OF ALL SLOPE APPLICATIONS MUST START IN A CHECK SLOT. IF SLOPE LENGTH (L) IS 100' OR GREATER, INSERT BLANKET INTO A CHECK SLOT ½ FROM THE BOTTOM OF THE SLOPE.

REVISIONS
APPROVED: JANUARY 6, 2020
CHIEF ENVIRONMENTAL OFFICER

MINNESOTA DEPARTMENT OF TRANSPORTATION — STATE DESIGN ENGINEER

STANDARD PLAN 5-297.404 | 3 OF 3
APPROVED: 1-8-2020
REVISED:
PERMANENT EROSION CONTROL
REPP (BLANKET) STAPLE PATTERN FOR SLOPES
STATE PROJ. NO. (T.H.) SHEET NO. OF SHEETS

PLOTTED/REVISED: 24-JAN-2020
PLOT NAME: ePS4_3.cpn
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PLOT DATE: Apr 01, 2021 - 12:15pm
FILENAME: K:\tn-z\StPaul-ParksRec\17921002\04_Production\01_CAD\02_Sheets\C202 - SWPPP DETAILS.dwg

NO.	DATE	BY	DESCRIPTION OF REVISIONS
1	4/2/2021	JNL	100% SUBMITTAL

DESIGNED AMK
DRAWN NJL
CHECKED JNL

FINAL DESIGN
100% SUBMITTAL

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Engineer under the laws of the State of Minnesota.
Printed Name: JONATHAN N. LIBBY
Signature:
Date: 4.2.21 License #: 51276

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CITY OF SAINT PAUL DEPARTMENT OF PARKS AND RECREATION
HIGHLAND BRIDGE MRB CROSSING
SAINT PAUL, MINNESOTA RAMSEY COUNTY

SWPPP DETAILS

PROJ. NO. 17921.002
DRAWING NO. C204

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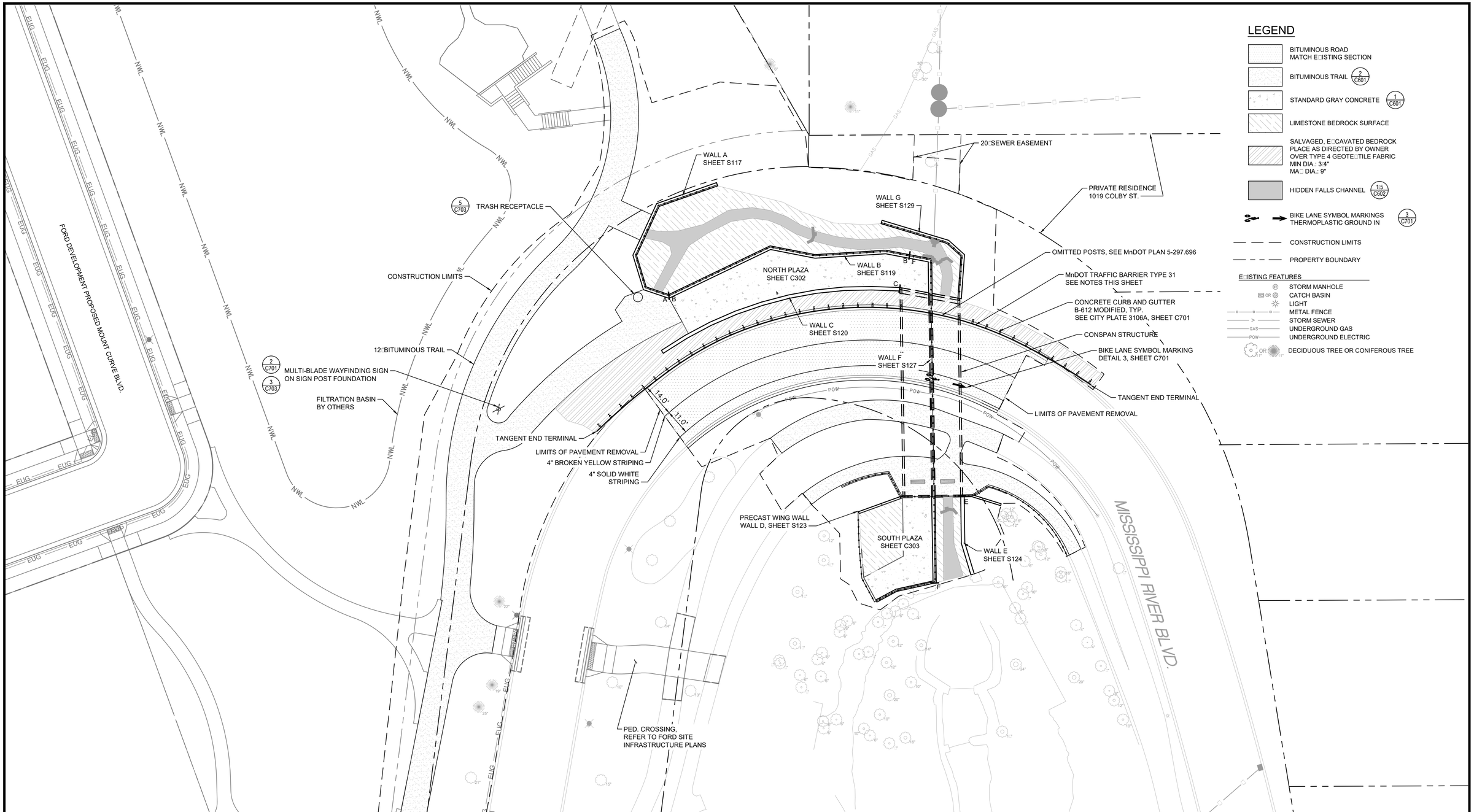

LEGEND

- BITUMINOUS ROAD MATCH E□ISTING SECTION
- BITUMINOUS TRAIL (2 / C601)
- STANDARD GRAY CONCRETE (1 / C601)
- LIMESTONE BEDROCK SURFACE
- SALVAGED, E□CAVATED BEDROCK PLACE AS DIRECTED BY OWNER OVER TYPE 4 GEOTE□TILE FABRIC MIN DIA.: 3□4" MA□ DIA.: 9"
- HIDDEN FALLS CHANNEL (1/5 / C602)
- BIKE LANE SYMBOL MARKINGS THERMOPLASTIC GROUND IN (3 / C701)
- CONSTRUCTION LIMITS
- PROPERTY BOUNDARY

E□ISTING FEATURES

- STORM MANHOLE
- CATCH BASIN
- LIGHT
- METAL FENCE
- STORM SEWER
- UNDERGROUND GAS
- UNDERGROUND ELECTRIC
- DECIDUOUS TREE OR CONIFEROUS TREE

1 / C301 SITE □ LAN
1" □ 20□

0 10 20 40
SCALE IN FEET

NORTH

TRAFFIC BARRIER NOTES

TRAFFIC BARRIER TYPE 31 SHALL BE CONSTRUCTED IN ACCORDANCE WITH MNDOT STANDARD PLANS AND PLATES.

STANDARD PLANS:

- 5–297.601 – GUARDRAIL END TREATMENTS, MISCELLANEOUS DETAILS
- 5–297.612 – PROPRIETARY END TERMINAL – TANGENT FOR TYPE 31 GUARDRAIL
- 5–297.690 – TRAFFIC BARRIER TYPE 31
- 5–297.696 – TRAFFIC BARRIER TYPE 31 LOW FILL/LONG SPAN OMITTED POST DETAILS

NO.	DATE	BY	DESCRIPTION OF REVISIONS
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DESIGNED AMK
DRAWN NJL
CHECKED JNL

FINAL DESIGN
100% SUBMITTAL

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Signature: Jonathan L. Lisow
Date: 4/2/21 License #: 51276

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CITY OF SAINT PAUL DEPARTMENT OF PARKS AND RECREATION

HIGHLAND BRIDGE MRB CROSSING

SAINT PAUL, MINNESOTA RAMSEY COUNTY

SITE PLAN

PROJ. NO. 17921.002
DRAWING NO. C301

PLOT DATE: Apr 01, 2021 - 12:15pm
FILENAME: K:\n-zt\StPaul-ParksRec\179210002\04_Production\01_CAD\02_Sheets\C301 - Site Plan.dwg

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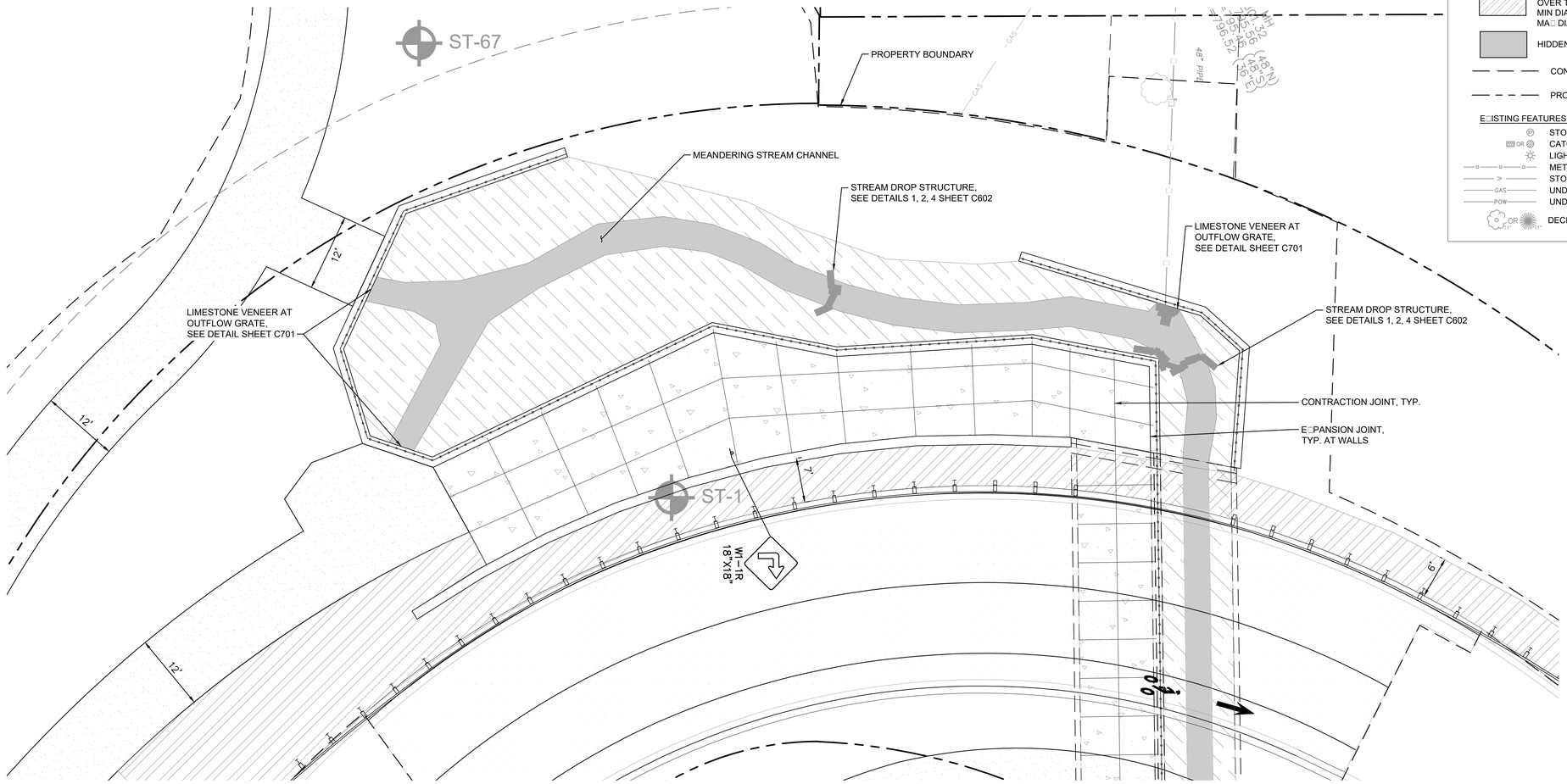

LEGEND

- BITUMINOUS ROAD MATCH EXISTING SECTION
- BITUMINOUS TRAIL (2/C601)
- STANDARD GRAY CONCRETE (1/C601)
- LIMESTONE BEDROCK SURFACE
- SALVAGED, EXCAVATED BEDROCK PLACE AS DIRECTED BY OWNER OVER TYPE 4 GEOTEXTILE FABRIC MIN DIA.: 3'4" MAX DIA.: 9"
- HIDDEN FALLS CHANNEL (1:5/C602)
- CONSTRUCTION LIMITS
- PROPERTY BOUNDARY

EXISTING FEATURES

- STORM MANHOLE
- CATCH BASIN
- LIGHT
- METAL FENCE
- STORM SEWER
- GAS — UNDERGROUND GAS
- POW — UNDERGROUND ELECTRIC
- DECIDUOUS TREE OR CONIFEROUS TREE

1 / C302 SITE PLAN - NORTH PLAZA

1" = 10'

0 5 10 20

SCALE IN FEET

NORTH

PLOT DATE: Apr 02, 2021 - 9:55am
FILENAME: K:\n-z\StPaul-ParksRec\17921002\04_Production\01_CAD\02_Sheets\C302_303 - Plaza Site Plans.dwg

NO.	DATE	BY	DESCRIPTION OF REVISIONS
1	4/2/2021	JNL	100% SUBMITTAL

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CHECKED JNL

FINAL DESIGN
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Signature: Jonathan N. Libby
Date: 4.2.21 License #: 51278

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SAINT PAUL

CITY OF SAINT PAUL DEPARTMENT OF PARKS AND RECREATION

HIGHLAND BRIDGE MRB CROSSING

SAINT PAUL, MINNESOTA RAMSEY COUNTY

SITE PLAN - NORTH PLAZA

PROJ. NO. 17921.002

DRAWING NO. C302

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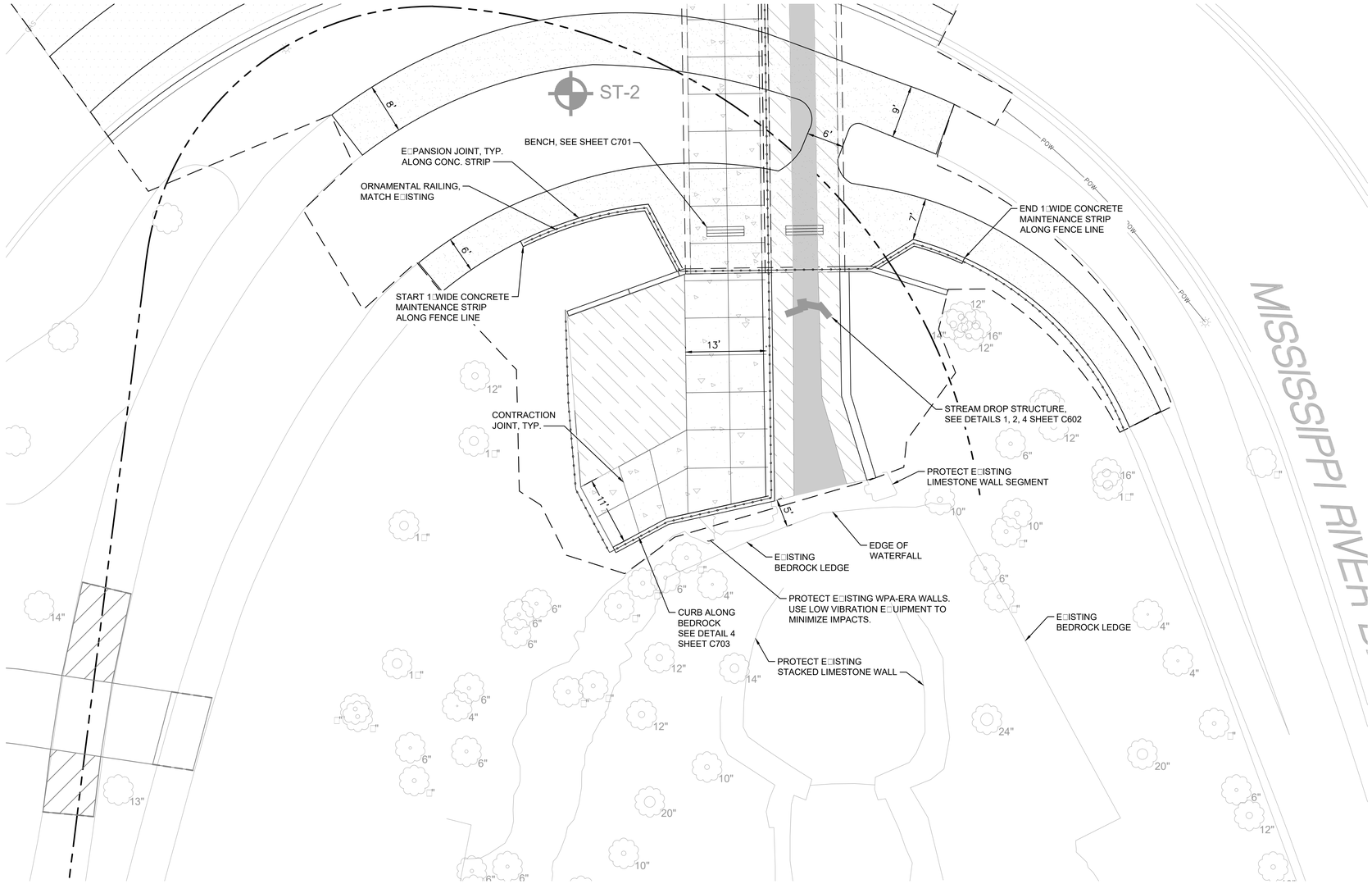


LEGEND

- BITUMINOUS ROAD MATCH EXISTING SECTION
- BITUMINOUS TRAIL (2 / C601)
- STANDARD GRAY CONCRETE (1 / C601)
- LIMESTONE BEDROCK SURFACE
- HIDDEN FALLS CHANNEL (1:5 / C602)
- CONSTRUCTION LIMITS
- PROPERTY BOUNDARY

EXISTING FEATURES

- STORM MANHOLE
- CATCH BASIN OR
- LIGHT
- METAL FENCE
- STORM SEWER
- GAS UNDERGROUND GAS
- POW UNDERGROUND ELECTRIC
- DECIDUOUS TREE OR CONIFEROUS TREE

1 / C303 SITE PLAN - SOUTH PLAZA

1" = 10'

0 5 10 20

SCALE IN FEET

NORTH

NO.	DATE	BY	DESCRIPTION OF REVISIONS
1	4/2/2021	JNL	100% SUBMITTAL

DESIGNED AMK
DRAWN NJL
CHECKED JNL

FINAL DESIGN
100% SUBMITTAL

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Engineer under the laws of the State of Minnesota.
Printed Name: JONATHAN N. LIBBY
Signature: Jonathan N. Libby
Date: 4.2.21 License #: 51276

TKDA
444 Cedar Street, Suite 1500
Saint Paul, MN 55101
651.292.4400
tkda.com

SAINT PAUL

CITY OF SAINT PAUL DEPARTMENT OF PARKS AND RECREATION

HIGHLAND BRIDGE MRB CROSSING

SAINT PAUL, MINNESOTA RAMSEY COUNTY

SITE PLAN - SOUTH PLAZA

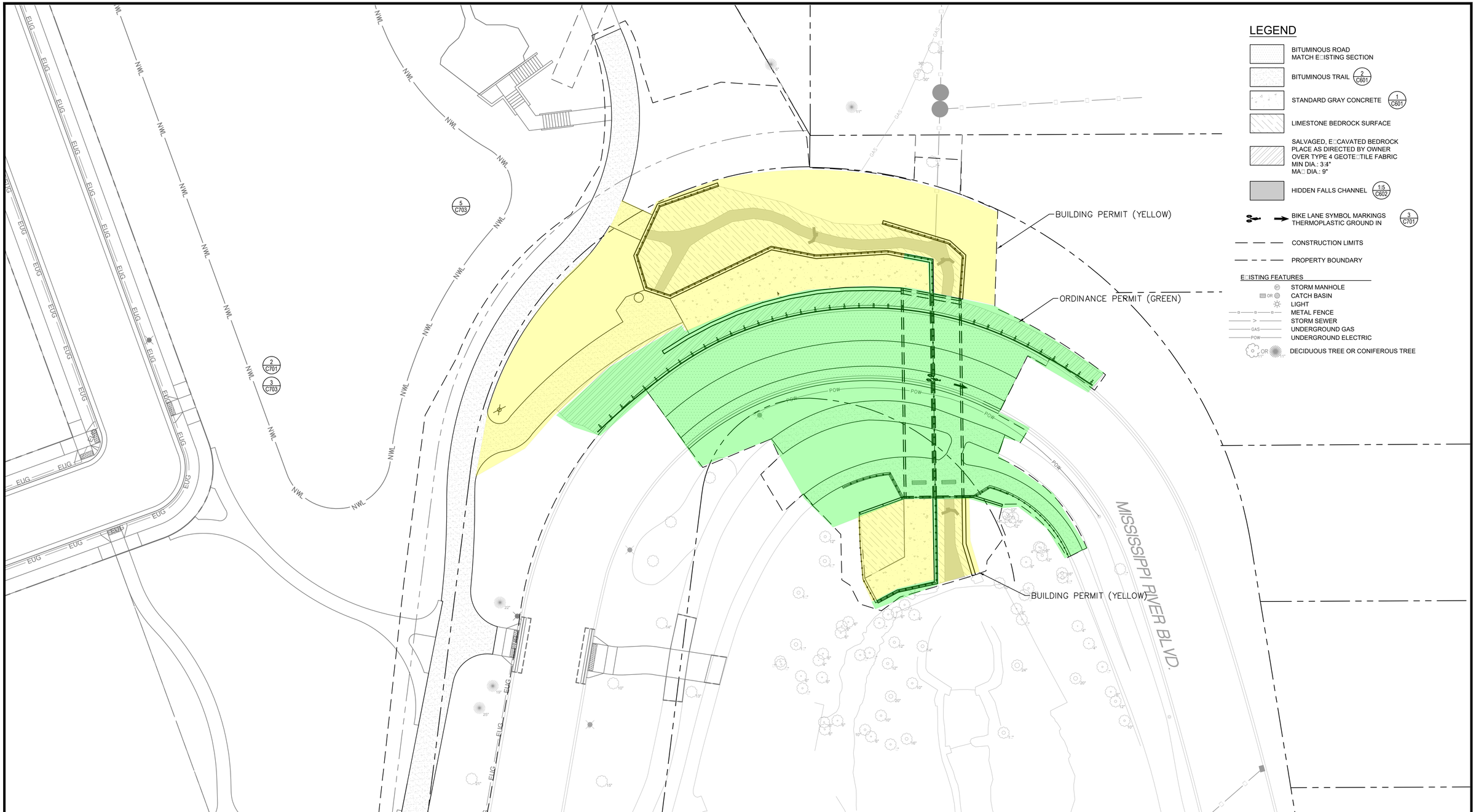
PROJ. NO. 17921.002

DRAWING NO. C303

PLOT DATE: Apr 02, 2021 - 9:55am
FILENAME: K:\n-z\StPaul-ParksRec\17921002\04_Production\01_CAD\02_Sheets\C302□303 - Plaza Site Plans.dwg

BAR IS ONE INCH ON ORIGINAL DRAWING. IF NOT ONE INCH ON THIS DRAWING ADJUST SCALES ACCORDINGLY.

0 1



1/C304 SITE □ E□ MIT BOUN□ A□ IES

1"□ 20□

0 10 20 40

SCALE IN FEET

NORTH

NO.	DATE	BY	DESCRIPTION OF REVISIONS
1	4/2/2021	JNL	100% SUBMITTAL

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DRAWN NJL
CHECKED JNL

FINAL DESIGN
100% SUBMITTAL

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Signature:
Date: 4/2/21 License #: 51276

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CITY OF SAINT PAUL DEPARTMENT OF PARKS AND RECREATION

HIGHLAND BRIDGE MRB CROSSING

SAINT PAUL, MINNESOTA RAMSEY COUNTY

SITE PERMIT BOUNDARIES

PROJ. NO. 17921.002

DRAWING NO. C304

PLOT DATE: Mar 30, 2021 - 10:54am
FILENAME: K:\n-z\StPaul-ParksRec\17921002\04_Production\01_CAD\02_Sheets\C301 - Site Plan.dwg

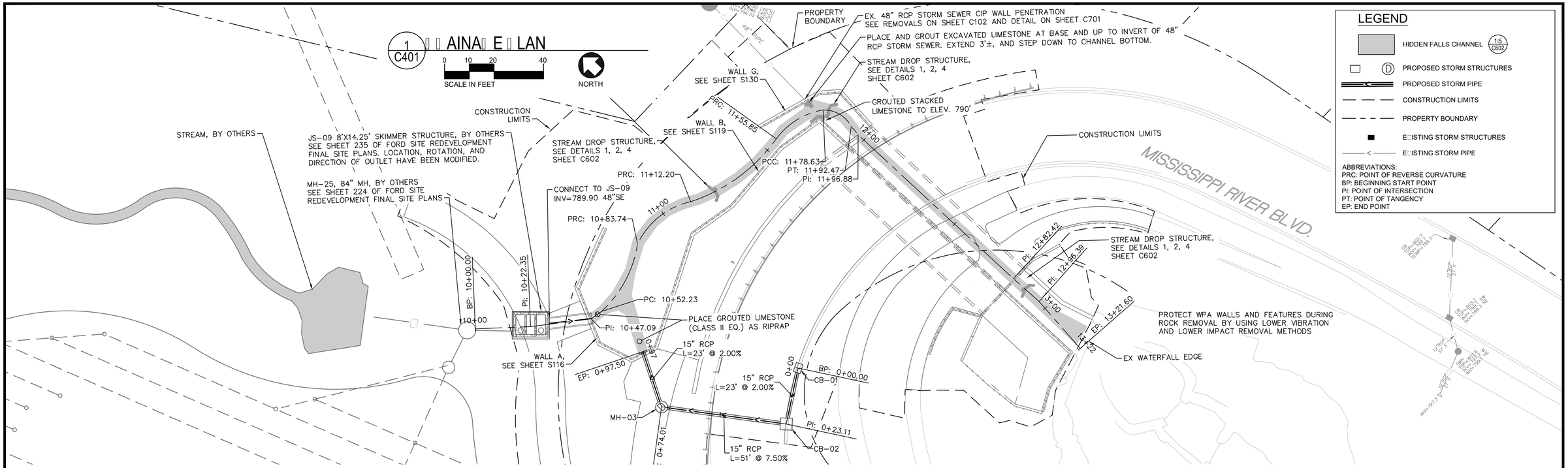
BAR IS ONE INCH ON ORIGINAL DRAWING. IF NOT ONE INCH ON THIS DRAWING ADJUST SCALES ACCORDINGLY.

0 1

1 C401 PLAN

0 10 20 40
SCALE IN FEET

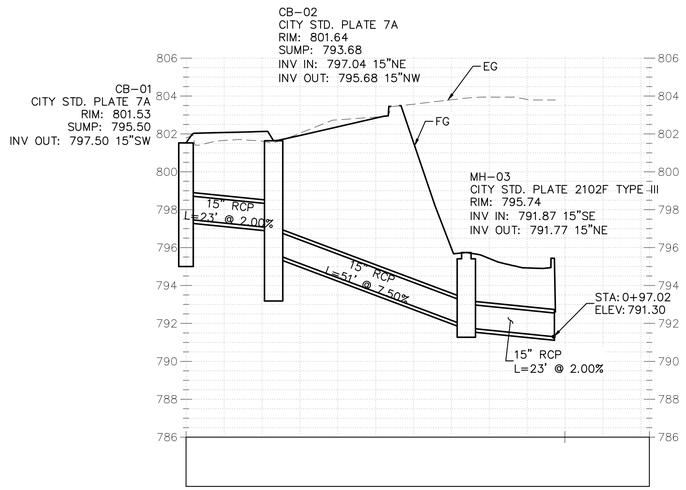
NORTH



LEGEND

- HIDDEN FALLS CHANNEL (1:5 C602)
- PROPOSED STORM STRUCTURES
- PROPOSED STORM PIPE
- CONSTRUCTION LIMITS
- PROPERTY BOUNDARY
- EXISTING STORM STRUCTURES
- EXISTING STORM PIPE

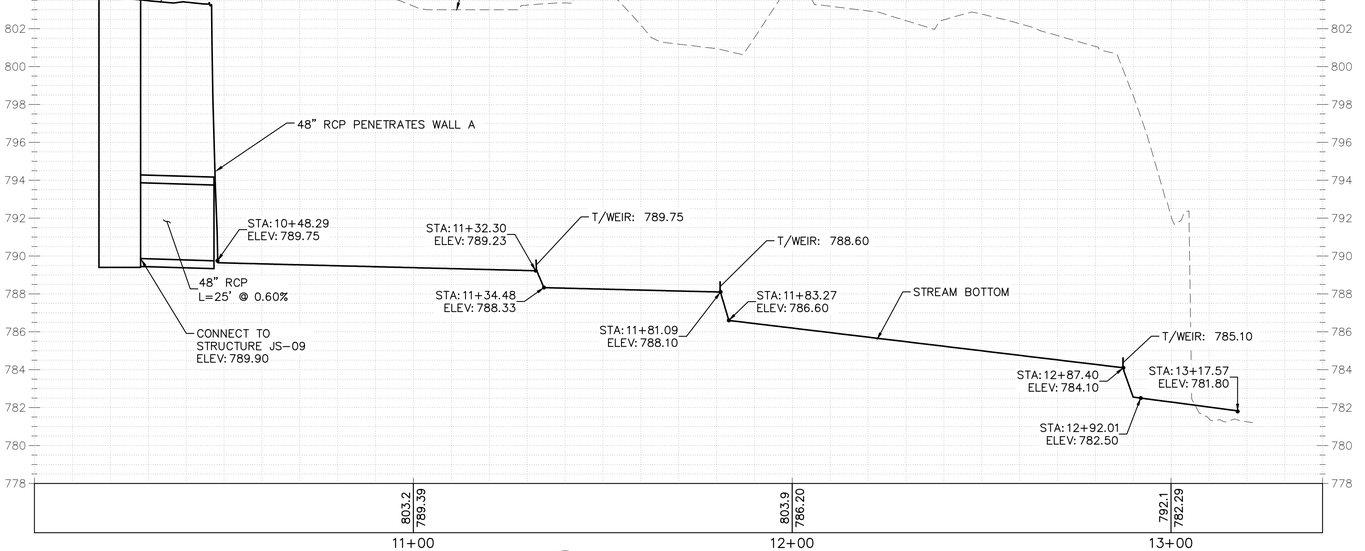
ABBREVIATIONS:
PRC: POINT OF REVERSE CURVATURE
BP: BEGINNING START POINT
PI: POINT OF INTERSECTION
PT: POINT OF TANGENCY
EP: END POINT



2 C401 STORM SEWER PROFILE
CB-01 CB-2 MH-03

HORIZONTAL SCALE
0 10 20 40
SCALE IN FEET

VERTICAL SCALE
0 2 4
SCALE IN FEET



3 C401 STREAM BED PROFILE

NO.	DATE	BY	DESCRIPTION OF REVISIONS
1	4/2/2021	JNL	100% SUBMITTAL

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DRAWN NJL
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FINAL DESIGN
100% SUBMITTAL

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Printed Name: JONATHAN N. LIBBY
Signature: Jonathan N. Libby
Date: 4/2/21 License #: 51276

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tkda.com

CITY OF SAINT PAUL DEPARTMENT OF PARKS AND RECREATION

HIGHLAND BRIDGE MRB CROSSING

SAINT PAUL, MINNESOTA RAMSEY COUNTY

DRAINAGE PLAN AND PROFILE

PROJ. NO. 17921.002
DRAWING NO. C401

PLOT DATE: Apr 01, 2021 - 12:15pm
FILENAME: K:\n-z\StPaul-ParksRec\17921002\04_Production\01_CAD\02_Sheets\C401 - Drainage Plan and Profile.dwg

BAR IS ONE INCH ON ORIGINAL DRAWING. IF NOT ONE INCH ON THIS DRAWING ADJUST SCALES ACCORDINGLY.

0 1

PROPERTY BOUNDARY
CONSTRUCTION LIMITS

UTILITY EASEMENT

ST-67

ST-1

ST-124

MISSISSIPPI RIVER BLVD.

0.50%

2.07%

2.42%

2.42%

4:1

3:1

803.54
803.36 BW
803.80 TW
803.37 BW
796.12 TW
795.95 BW
803.80 TW
795.64 BW
803.11
803
802.53
802.93 BW
791.18 BW
803.80 TW
801.01 TW
791.43 BW
800.53 BW
802
801
795.91
795.95
795.87
800.92 BW
796
797
798
799
800
801
802
803
804.00 TW
791.33 BW
795.04 TW
791.42 BW
795.67 TW
795.24 BW
794.98 BW
793.30 BW
804.00 TW
791.12 BW
792.70 TW
792.70 BW
790.86 BW
791.96 TW
791.97 BW
789.74 BW
790.54 TW
790.55 BW
789.64 BW
790.08 TW
790.08 BW
791.72 BW
804.00 TW
789.87 BW
804.00 TW
796.31 TW
795.87 BW
804.00 TW
789.74 BW
804.14 TW
789.68 BW
788.44 BW
804.00 TW
787.86 BW
803.53 TW
790.02 BW
790.02 TW
787.74 BW

LEGEND

- CONSTRUCTION LIMITS
- 710 — EXISTING CONTOURS
- 710 — PROPOSED HIGHLAND BRIDGE CONTOURS
- 710 — PROPOSED CONTOURS
- 804.00 — SPOT ELEVATION
  - BW - BOTTOM OF WALL
  - TW - TOP OF WALL
- ST–67 SOIL BORING

SPECIFIC NOTES:

1. ST-1 AND ST-2 ARE LOCATIONS OF SOIL BORINGS PERFORMED BY BRAUN INTERTEC ON 9:23:2020. BRAUN PROJECT NO. B1□06527.0□
2. BENCHMARK: TOP OF MINNESOTA DEPARTMENT OF TRANSPORTATION GEODETIC MONUMENT "SNELLING ECC 1 MNDT" GSID STATION □2517□ELEVATION □ 1022.56 FEET. □NAVD □□□

1 / C501 — □ □ A□ IN□ □ LAN □ NO□ TH □ LA□ A
1"□ 10□
0 5 10 20
SCALE IN FEET
NORTH

NO.	DATE	BY	DESCRIPTION OF REVISIONS
1	4/2/2021	JNL	100% SUBMITTAL

DESIGNED AMK
DRAWN NJL
CHECKED JNL

FINAL DESIGN
100% SUBMITTAL

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Printed Name: JONATHAN L. SIEGEL
Signature: Jonathan L. Siegel
Date: 4/2/21 License #: 51270

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CITY OF SAINT PAUL DEPARTMENT OF PARKS AND RECREATION

HIGHLAND BRIDGE MRB CROSSING

SAINT PAUL, MINNESOTA RAMSEY COUNTY

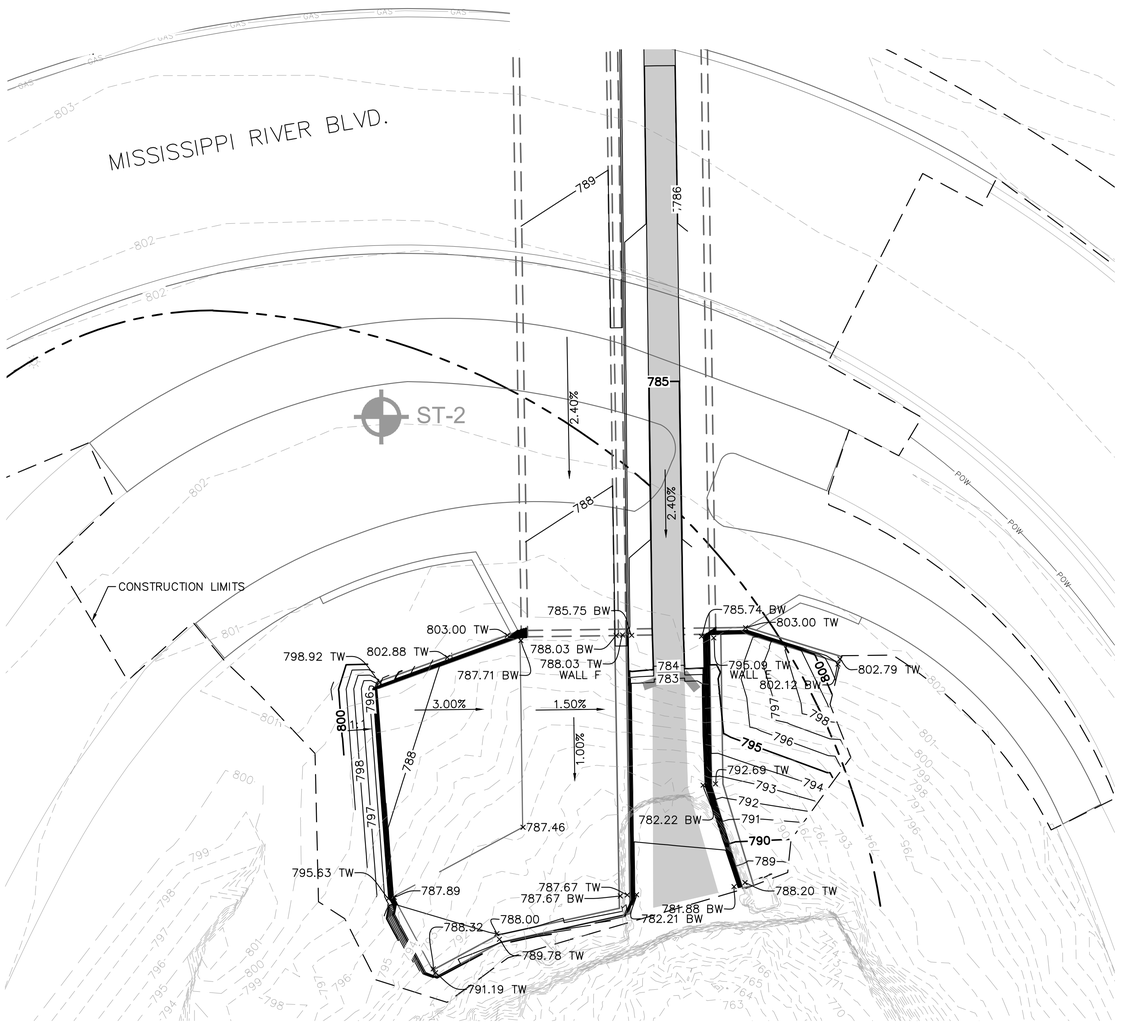
GRADING PLAN - NORTH PLAZA

PROJ. NO. 17921.002
DRAWING NO. C501

PLOT DATE: Apr 01, 2021 - 12:15pm
FILENAME: K:\n-z\StPaul-ParksRec\17921002\04_Production\01_CAD\02_Sheets\C501□C502 - Plaza Grading Plans.dwg

BAR IS ONE INCH ON ORIGINAL DRAWING. IF NOT ONE INCH ON THIS DRAWING ADJUST SCALES ACCORDINGLY.

0 1



1 / C502 PLAN SOUTH PLAZA
1" = 10'

SCALE IN FEET: 0 5 10 20

NORTH

LEGEND

- CONSTRUCTION LIMITS
- 710 EXISTING CONTOURS
- 710 PROPOSED HIGHLAND BRIDGE CONTOURS
- 710 PROPOSED CONTOURS
- 804.00 SPOT ELEVATION
  - BW - BOTTOM OF WALL
  - TW - TOP OF WALL
- ST-67 SOIL BORING

SPECIFIC NOTES:

1. ST-1 AND ST-2 ARE LOCATIONS OF SOIL BORINGS PERFORMED BY BRAUN INTERTEC ON 9.23.2020. BRAUN PROJECT NO. B1 06527.0
2. BENCHMARK: TOP OF MINNESOTA DEPARTMENT OF TRANSPORTATION GEODETIC MONUMENT "SNELLING ECC 1 MNDT" GSID STATION 2517 ELEVATION 1022.56 FEET. NAVD

NO.	DATE	BY	DESCRIPTION OF REVISIONS
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DRAWN NJL
CHECKED JNL

FINAL DESIGN
100% SUBMITTAL

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Printed Name: JONATHAN N. LIBBY
Signature:
Date: 4.2.21 License #: 51078

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tkda.com

SAINT PAUL

CITY OF SAINT PAUL DEPARTMENT OF PARKS AND RECREATION

HIGHLAND BRIDGE MRB CROSSING

SAINT PAUL, MINNESOTA RAMSEY COUNTY

GRADING PLAN - SOUTH PLAZA

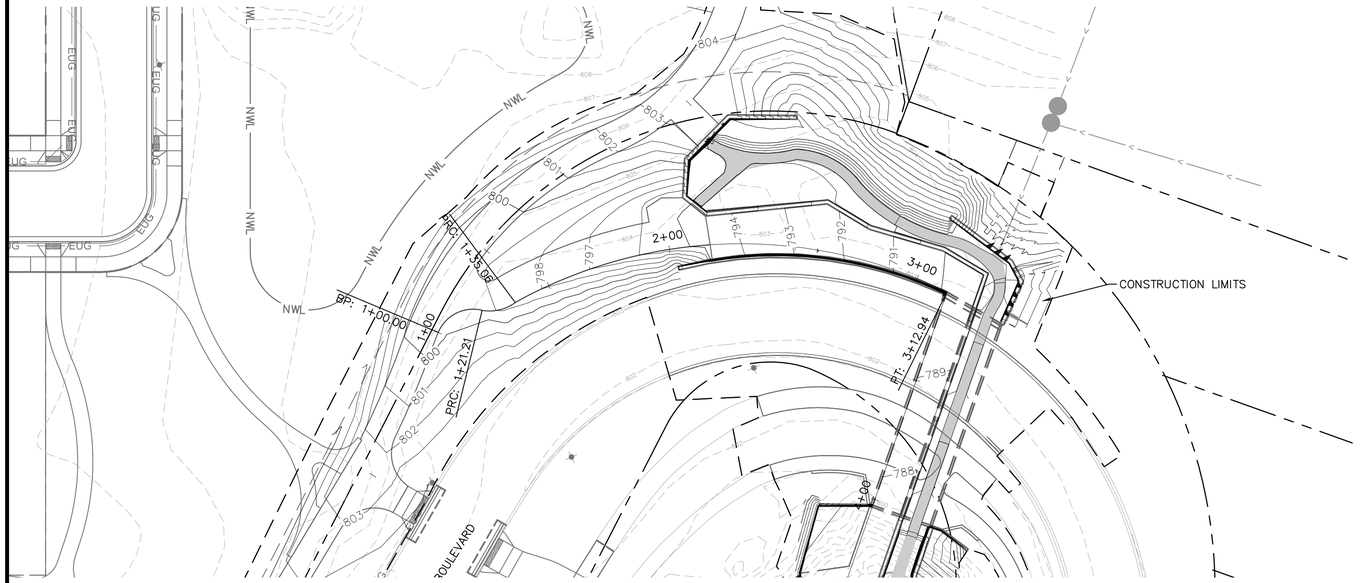
PROJ. NO. 17921.002

DRAWING NO. C502

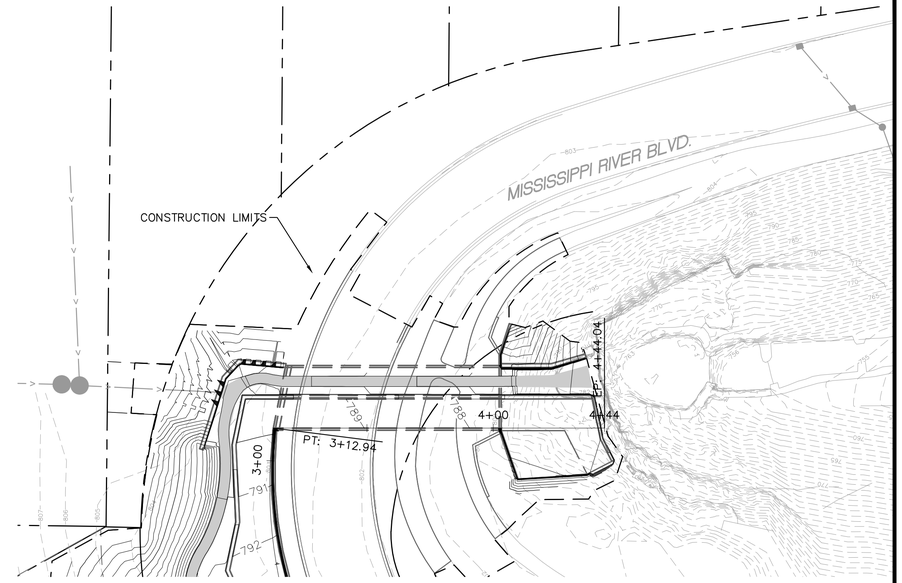
PLOT DATE: Apr 01, 2021 - 12:16pm
FILENAME: K:\n-z\StPaul-ParksRec\17921002\04_Production\01_CAD\02_Sheets\C501_C502 - Plaza Grading Plans.dwg

BAR IS ONE INCH ON ORIGINAL DRAWING. IF NOT ONE INCH ON THIS DRAWING ADJUST SCALES ACCORDINGLY.

0 1



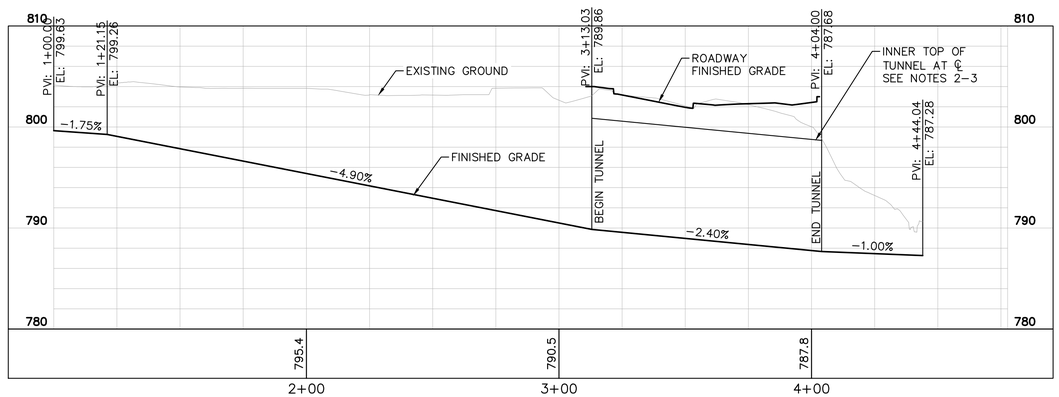
1 C503 MRB TRAIL STA 1+00 TO 3+00
1" = 30'



2 C503 MRB TRAIL STA 3+00 TO 4+60
1" = 30'

HORIZONTAL SCALE:
0 15 30 60
SCALE IN FEET

VERTICAL SCALE:
0 5 10
SCALE IN FEET



3 C503 MRB TRAIL PROFILE

LEGEND

- CONSTRUCTION LIMITS
- 710 EXISTING CONTOURS
- 710 PROPOSED HIGHLAND BRIDGE CONTOURS
- 710 PROPOSED CONTOURS

ABBREVIATIONS:
PRC: POINT OF REVERSE CURVATURE
BP: BEGINNING/START POINT
PI: POINT OF INTERSECTION
PT: POINT OF TANGENCY
EP: END POINT

SPECIFIC NOTES:

1. BENCHMARK: TOP OF MINNESOTA DEPARTMENT OF TRANSPORTATION GEODETIC MONUMENT "SNELLING ECC 1 MNDT" GSID STATION 2517 ELEVATION 1022.56 FEET. NAVD 88.
2. REFER TO TUNNEL SECTIONS, SHEET C604 FOR MIN. AND MAX. FILL HEIGHTS, AND MIN. AND MAX. VERTICAL CLEARANCES INSIDE TUNNEL.
3. REFER TO CONTECH PLANS (CT SHEETS) FOR ADDITIONAL INFORMATION ON TUNNEL LENGTH AND SLOPE.

PLOT DATE: Apr 02, 2021 - 10:09am
FILENAME: K:\n-z\StPaul-ParksRec\17921002\04_Production\01_CAD\02_Sheets\C503 C504 - Trail Plan and Profile.dwg

NO.	DATE	BY	DESCRIPTION OF REVISIONS
1	4/2/2021	JNL	100% SUBMITTAL

DESIGNED AMK
DRAWN NJL
CHECKED JNL

FINAL DESIGN
100% SUBMITTAL

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Engineer under the laws of the State of Minnesota.
Printed Name: JONATHAN L. ISRAEL
Signature: Jonathan L. Israel
Date: 4/2/21 License #: 51276

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Saint Paul, MN 55101
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CITY OF SAINT PAUL DEPARTMENT OF PARKS AND RECREATION

HIGHLAND BRIDGE MRB CROSSING

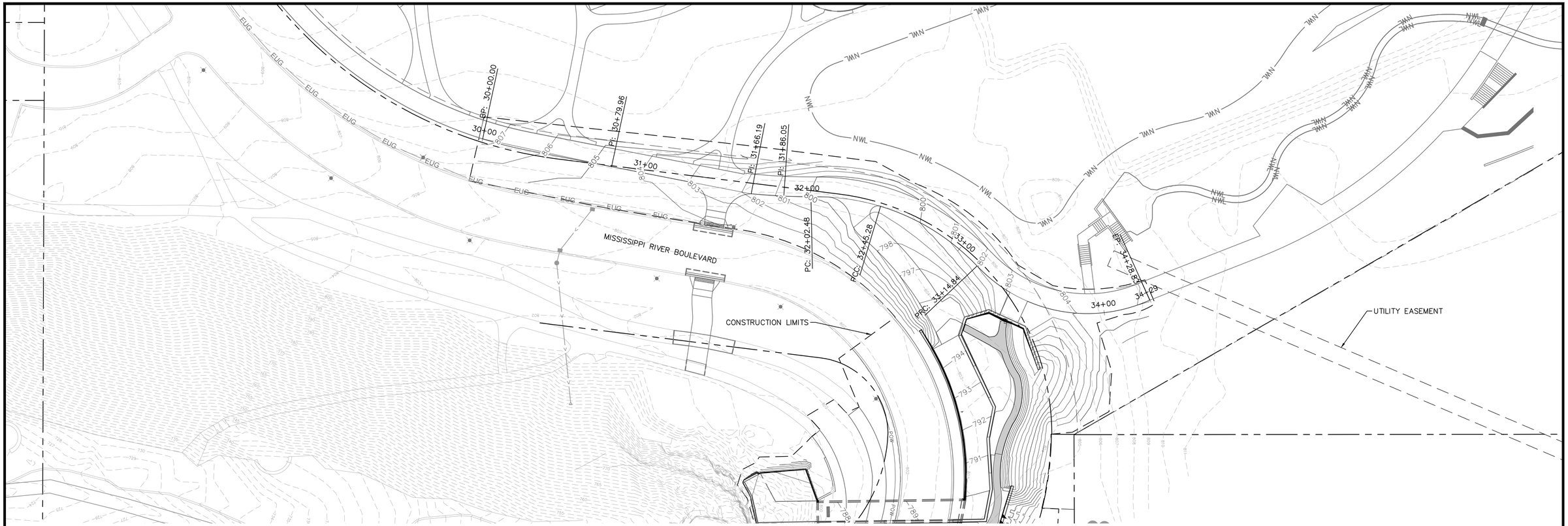
SAINT PAUL, MINNESOTA RAMSEY COUNTY

TRAIL PLAN AND PROFILE - MRB

PROJ. NO. 17921.002
DRAWING NO. C503

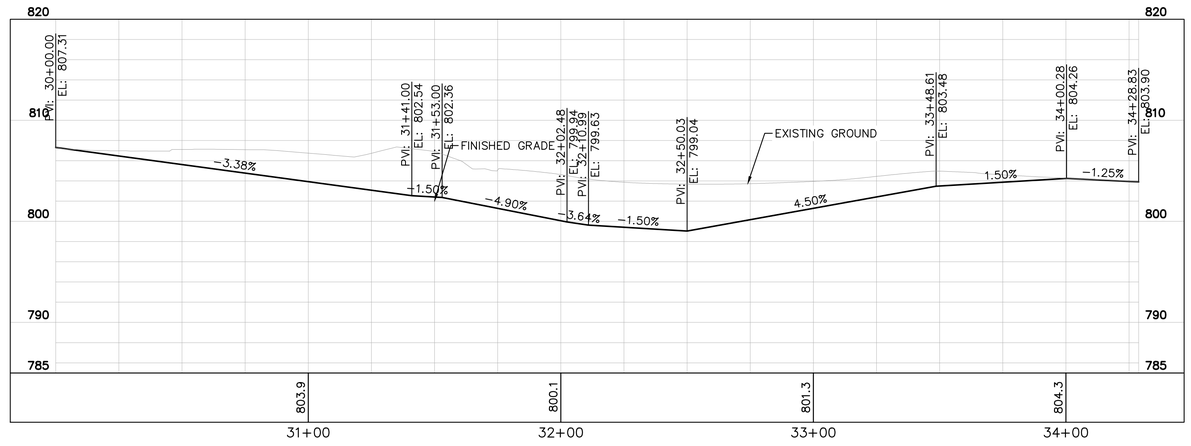
BAR IS ONE INCH ON ORIGINAL DRAWING. IF NOT ONE INCH ON THIS DRAWING ADJUST SCALES ACCORDINGLY.

0 1



1 C504 HIGHLAND BRIDGE TRAIL STA 30+00 TO 34+29

1" = 30'



2 C504 HIGHLAND BRIDGE TRAIL PROFILE

HORIZONTAL SCALE:
0 15 30 60
SCALE IN FEET

VERTICAL SCALE:
0 5 10
SCALE IN FEET

LEGEND

- CONSTRUCTION LIMITS
- 710 EXISTING CONTOURS
- 710 PROPOSED HIGHLAND BRIDGE CONTOURS
- 710 PROPOSED CONTOURS

ABBREVIATIONS:
PRC: POINT OF REVERSE CURVATURE
BP: BEGINNING/START POINT
PI: POINT OF INTERSECTION
PT: POINT OF TANGENCY
EP: END POINT

SPECIFIC NOTES:

1. BENCHMARK: TOP OF MINNESOTA DEPARTMENT OF TRANSPORTATION GEODETIC MONUMENT "SNELLING ECC 1 MNDT" GSID STATION 2517. ELEVATION 1022.56 FEET. NAVD 88.

NO.	DATE	BY	DESCRIPTION OF REVISIONS
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SAINT PAUL

CITY OF SAINT PAUL DEPARTMENT OF PARKS AND RECREATION

HIGHLAND BRIDGE MRB CROSSING

SAINT PAUL, MINNESOTA RAMSEY COUNTY

TRAIL PLAN AND PROFILE
HIGHLAND BRIDGE

PROJ. NO. 17921.002

DRAWING NO. C504

PLOT DATE: Apr 01, 2021 - 12:16pm
FILENAME: K:\n-z\StPaul-ParksRec\17921002\04_Production\01_CAD\02_Sheets\C503 C504 - Trail Plan and Profile.dwg

BAR IS ONE INCH ON ORIGINAL DRAWING. IF NOT ONE INCH ON THIS DRAWING ADJUST SCALES ACCORDINGLY.

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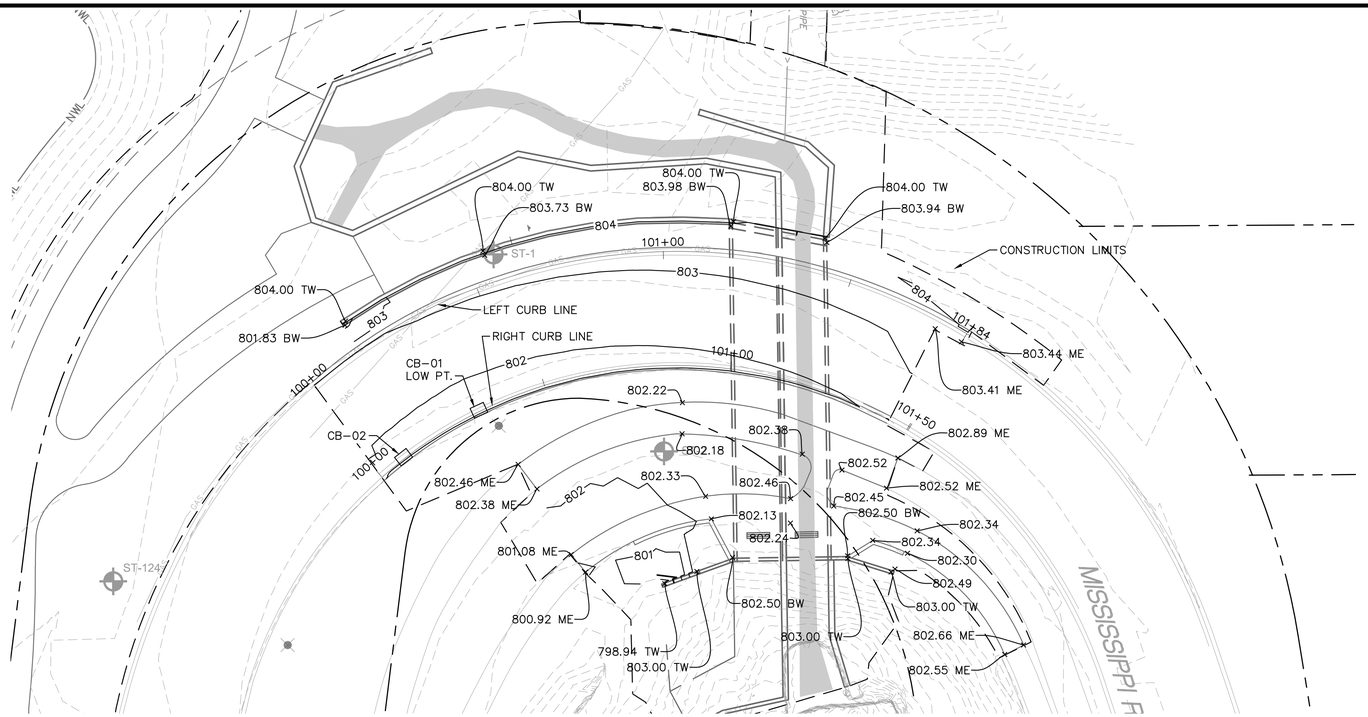


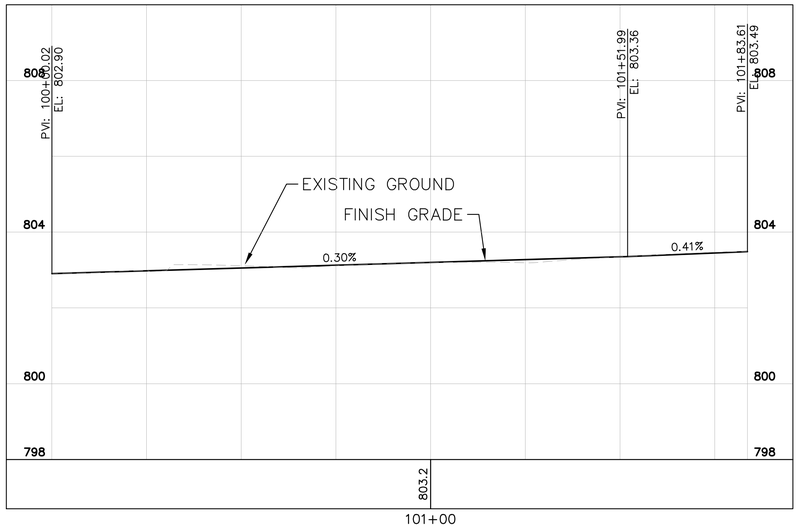
LEGEND

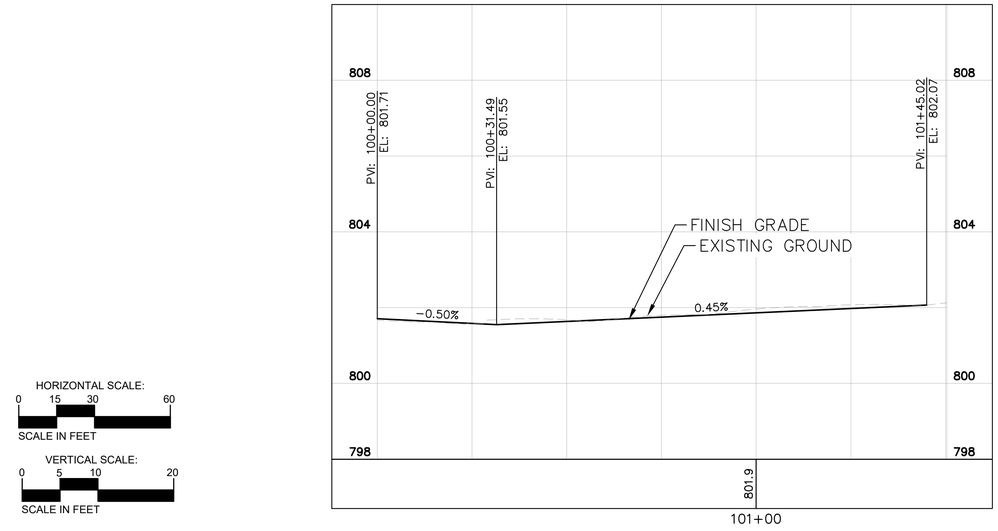
- CONSTRUCTION LIMITS
- 710 EXISTING CONTOURS
- 710 PROPOSED HIGHLAND BRIDGE CONTOURS
- 710 PROPOSED CONTOURS
- 804.00 SPOT ELEVATION
  - BW - BOTTOM OF WALL
  - TW - TOP OF WALL
  - ME - MATCH EXISTING

SPECIFIC NOTES:

1. ST-1 AND ST-2 ARE LOCATIONS OF SOIL BORINGS PERFORMED BY BRAUN INTERTEC ON 9:23:2020. BRAUN PROJECT NO. B1□06527.0□
2. BENCHMARK: TOP OF MINNESOTA DEPARTMENT OF TRANSPORTATION GEODETIC MONUMENT "SNELLING ECC 1 MNDT" GSID STATION □2517□ELEVATION □ 1022.56 FEET. □NAVD □□□

1 / C505 — M□ B□ OA□ □ AY □ □ A□ IN□
SCALE□ 1"□ 20□





HORIZONTAL SCALE:
0 15 30 60
SCALE IN FEET

VERTICAL SCALE:
0 5 10 20
SCALE IN FEET

2 / C505 — LE□ T CU□ B LINE

3 / C505 — □ I□ HT CU□ B LINE

NO.	DATE	BY	DESCRIPTION OF REVISIONS
1	4/2/2021	JNL	100% SUBMITTAL

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CHECKED JNL

FINAL DESIGN
100% SUBMITTAL

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Signature:
Date: 4-2-21 License #: 51276

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CITY OF SAINT PAUL DEPARTMENT OF PARKS AND RECREATION

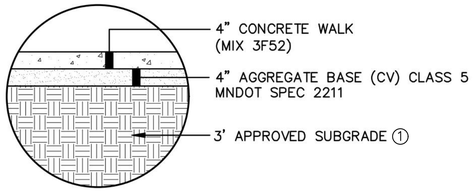
HIGHLAND BRIDGE MRB CROSSING

SAINT PAUL, MINNESOTA RAMSEY COUNTY

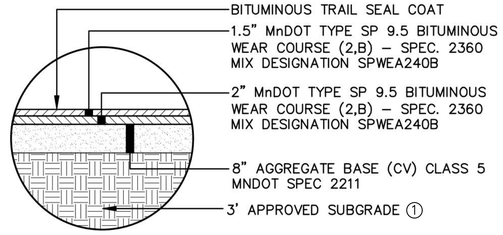
ROADWAY PLAN AND PROFILE
MRB

PROJ. NO. 17921.002
DRAWING NO. C505

PLOT DATE: Apr 01, 2021 - 12:16pm
FILENAME: K:\tn-z\StPaul-ParksRec\17921002\04_Production\01_CAD\02_Sheets\C505 Roadway - Plan and Profile.dwg

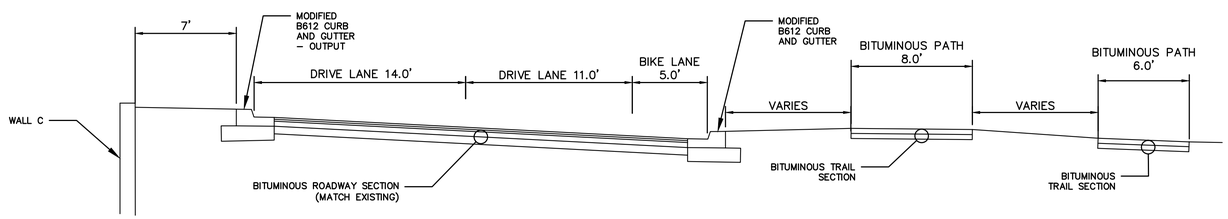


1 C601 CONCRETE TRAIL SECTION
NOT TO SCALE

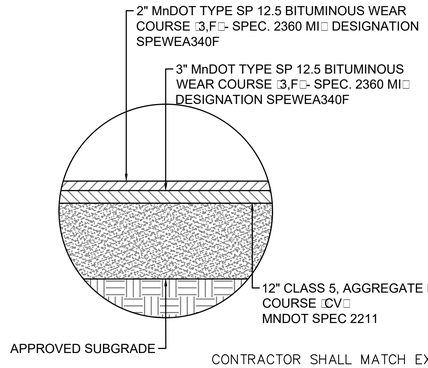


2 C601 BITUMINOUS TRAIL SECTION
NOT TO SCALE

(1) IF BEDROCK IS PRESENT AT THE PAVEMENT SUBGRADE (BOTTOM OF AGGREGATE BASE), IT SHOULD BE SUBCUT A MINIMUM OF 12 INCHES TO REDUCE POINT LOADING AND REFLECTIVE CRACKING. REFERENCE BRAUN–INTERTEC GEOTECHNICAL EVALUATION REPORT B1806527.08 FOR MORE INFORMATION.



3 C601 MISSISSIPPI RIVER BLVD.
TYPICAL SECTION NOT TO SCALE



CONTRACTOR SHALL MATCH EXISTING PAVEMENT SECTION FOR MRB OR USE ABOVE SECTION IF EXISTING SECTION CANNOT BE VERIFIED.

4 C601 BITUMINOUS ROAD SECTION
NOT TO SCALE

DETAILS 1, 2, AND 4 ON THIS SHEET WERE PROVIDED BY RYAN COMPANIES US, INC. EXTRACTED FROM FORD SITE REDEVELOPMENT FINAL SITE PLANS, BULLETIN #3, DATED 8/10/2020

PLOT DATE: Apr 01, 2021 - 12:16pm
FILENAME: K:\n-z\StPaul-ParksRec\17921002\04_Production\01_CAD\02_Sheets\C601 - Typical Sections.dwg

NO.	DATE	BY	DESCRIPTION OF REVISIONS
1	4/2/2021	JNL	100% SUBMITTAL

DESIGNED AMK
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CHECKED JNL

FINAL DESIGN
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Signature: Jonathan N. Libby
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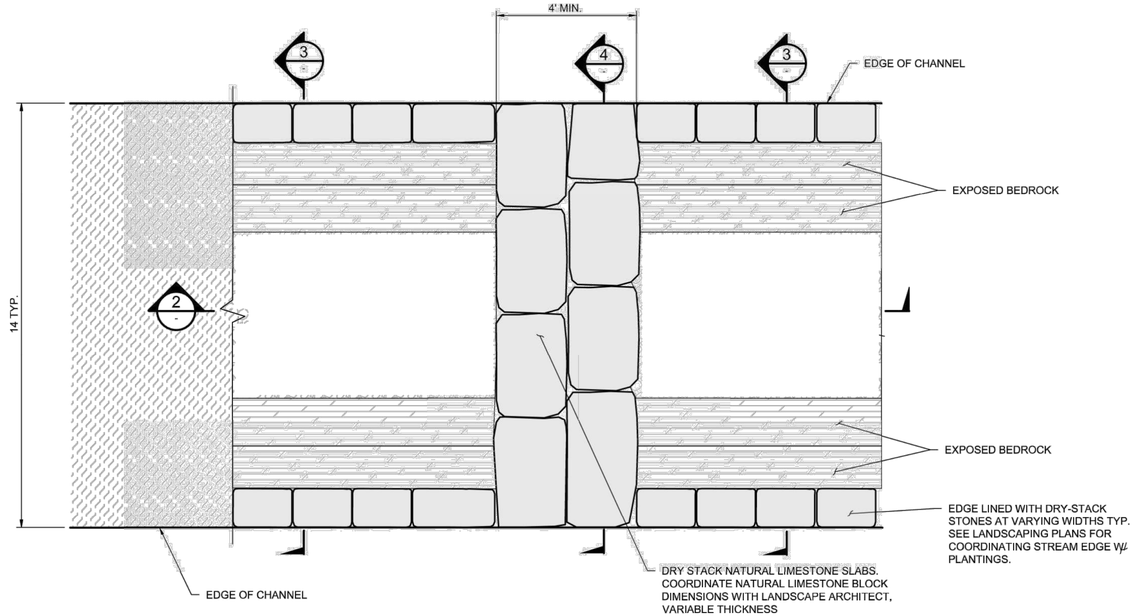
SAINT PAUL

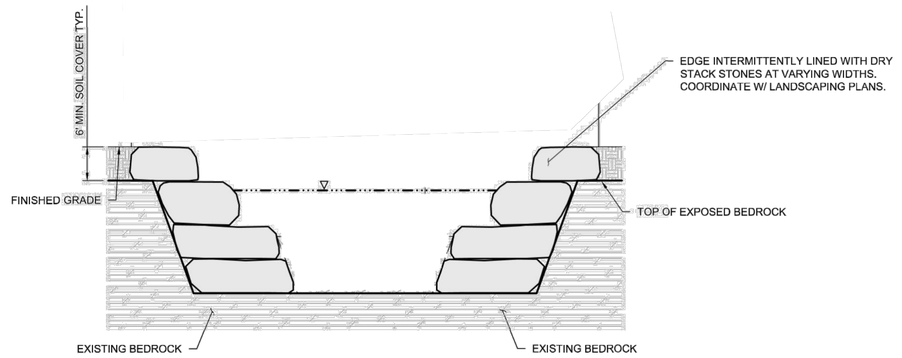
CITY OF SAINT PAUL DEPARTMENT OF PARKS AND RECREATION
HIGHLAND BRIDGE MRB CROSSING
SAINT PAUL, MINNESOTA RAMSEY COUNTY

TYPICAL SECTIONS - ROADWAY

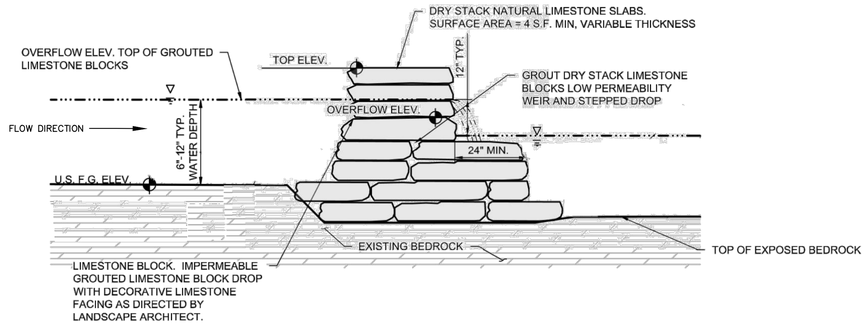
PROJ. NO. 17921.002
DRAWING NO. C601



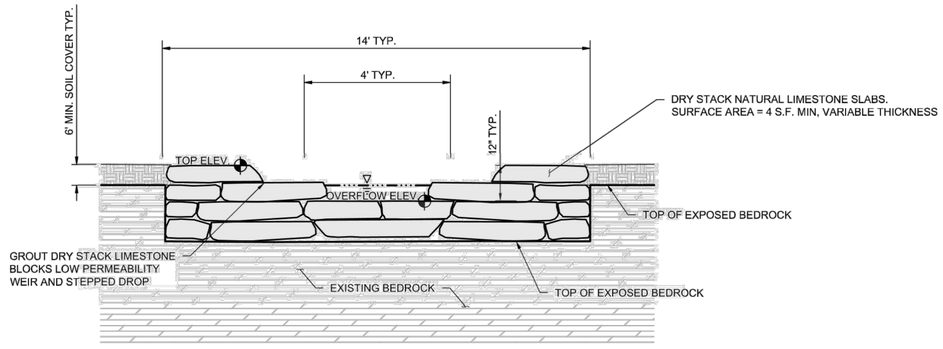
1 C602 PLAN STREAM AT OUTSTRUCTURE TYP.
NOT TO SCALE



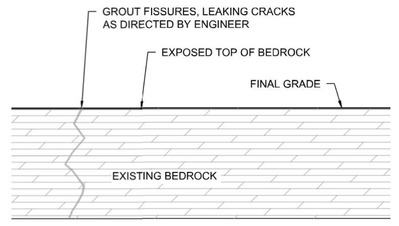
3 C602 SECTION TYPICAL STREAM SECTION
NOT TO SCALE



2 C602 SECTION STREAM AT OUTSTRUCTURE TYP.
NOT TO SCALE



4 C602 SECTION STREAM AT OUTSTRUCTURE TYP.
NOT TO SCALE



5 C602 DETAIL HIGH BANK CREEK LINE SYSTEM
NOT TO SCALE

DETAILS 1–5 ON THIS SHEET WERE PROVIDED BY RYAN COMPANIES US, INC., AND MODIFIED BY TKDA. EXTRACTED FROM FORD SITE REDEVELOPMENT FINAL SITE PLANS, BULLETIN #3, DATED 8/10/2020

NO.	DATE	BY	DESCRIPTION OF REVISIONS
1	4/2/2021	JNL	100% SUBMITTAL

DESIGNED AMK
DRAWN NJL
CHECKED JNL

FINAL DESIGN
100% SUBMITTAL

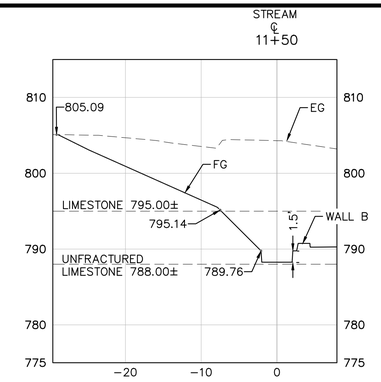
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Engineer under the laws of the State of Minnesota.
Printed Name: JONATHAN N. LIBBY
Signature: Jonathan N. Libby
Date: 4.2.21 License #: 51276

TKDA
444 Cedar Street, Suite 1500
Saint Paul, MN 55101
651.292.4400
tkda.com

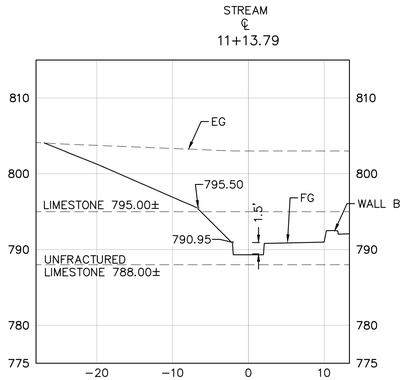
CITY OF SAINT PAUL DEPARTMENT OF PARKS AND RECREATION
HIGHLAND BRIDGE MRB CROSSING
SAINT PAUL, MINNESOTA RAMSEY COUNTY

TYPICAL SECTIONS - STREAM

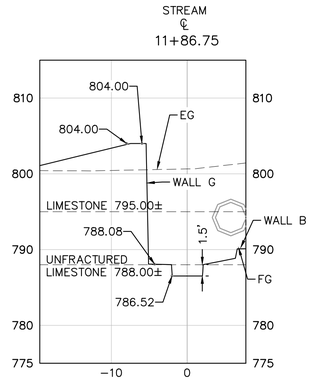
PROJ. NO. 17921.002
DRAWING NO. C602



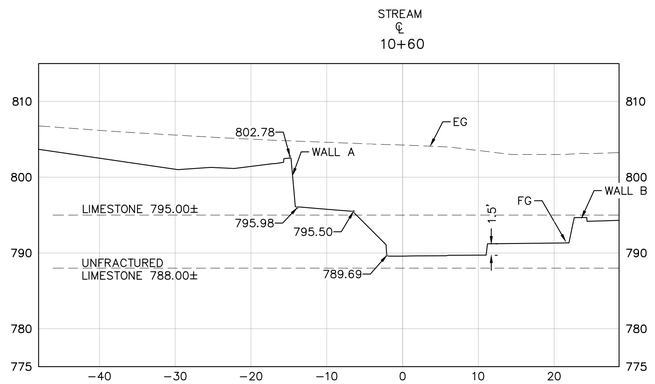
3 C603 STREAM SECTION
STATION 11+50



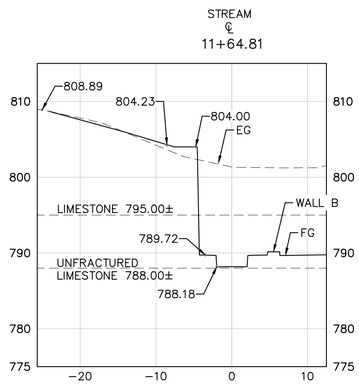
2 C603 STREAM SECTION
STATION 11+13.79



5 C603 STREAM SECTION
STATION 11+86.75



1 C603 STREAM SECTION
STATION 10+60



4 C603 STREAM SECTION
STATION 11+64.81

VERTICAL SCALE:
0 5 10 20
SCALE IN FEET

HORIZONTAL SCALE:
0 5 10 20
SCALE IN FEET

NO.	DATE	BY	DESCRIPTION OF REVISIONS
1	4/2/2021	JNL	100% SUBMITTAL

DESIGNED AMK
DRAWN NJL
CHECKED JNL

FINAL DESIGN
100% SUBMITTAL

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Printed Name: JONATHAN N. LIBBY
Signature: Jonathan N. Libby
Date: 4/2/21 License #: 51276

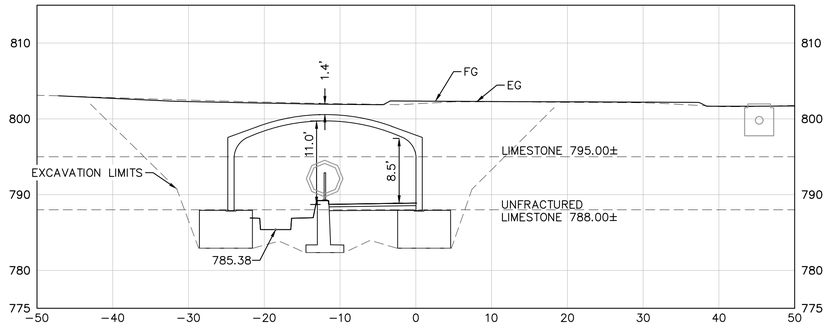
TKDA
444 Cedar Street, Suite 1500
Saint Paul, MN 55101
651.292.4400
tkda.com

CITY OF SAINT PAUL DEPARTMENT OF PARKS AND RECREATION
HIGHLAND BRIDGE MRB CROSSING
SAINT PAUL, MINNESOTA RAMSEY COUNTY

STREAM SECTIONS

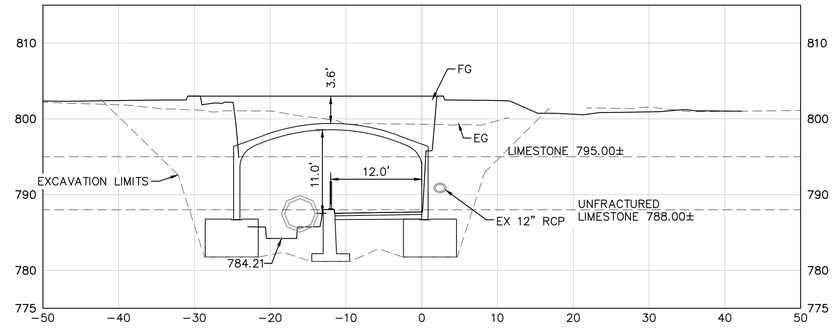
PROJ. NO. 17921.002
DRAWING NO. C603

MRB TRAIL
℄
3+53.82



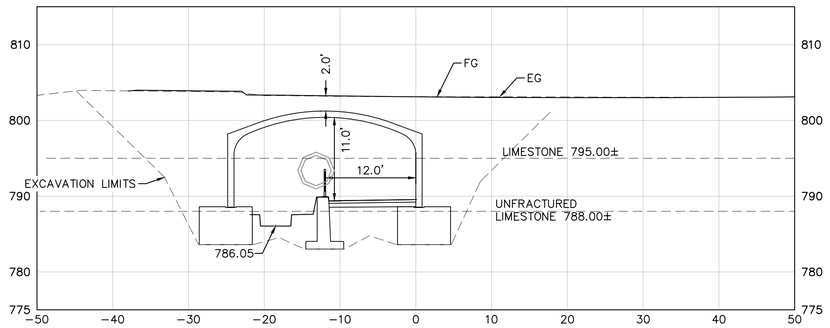
3 C604 TUNNEL SECTION
STATION 3+53.82

MRB TRAIL
℄
4+02.73



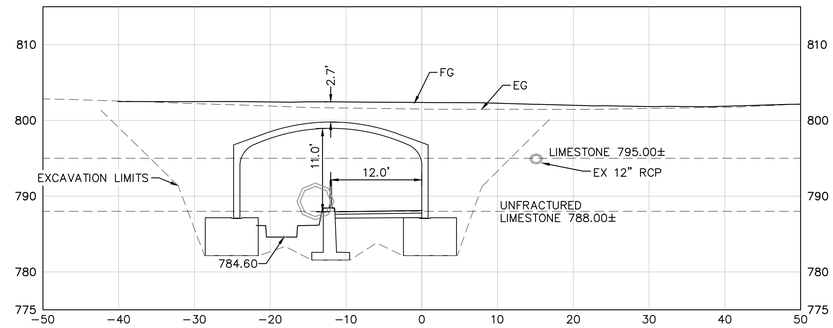
6 C604 TUNNEL SECTION
STATION 4+02.73

MRB TRAIL
℄
3+26.14



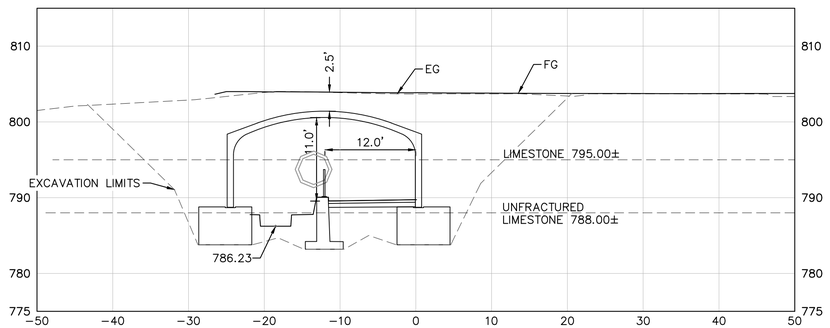
2 C604 TUNNEL SECTION
STATION 3+26.14

MRB TRAIL
℄
3+86.39



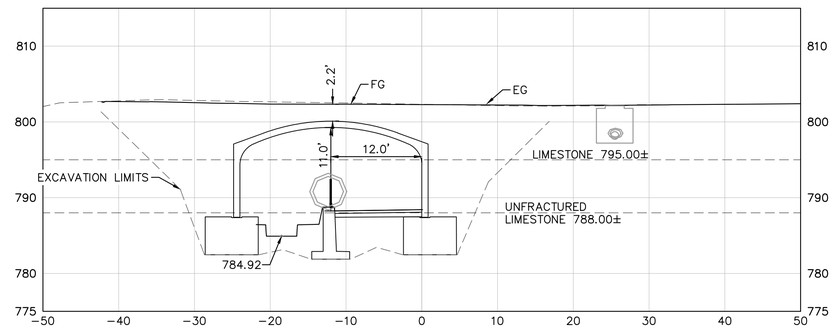
5 C604 TUNNEL SECTION
STATION 3+86.39

MRB TRAIL
℄
3+18.40



1 C604 TUNNEL SECTION
STATION 3+18.40

MRB TRAIL
℄
3+72.97



4 C604 TUNNEL SECTION
STATION 3+72.97

VERTICAL SCALE:
0 5 10 20
SCALE IN FEET

HORIZONTAL SCALE:
0 5 10 20
SCALE IN FEET

NO.	DATE	BY	DESCRIPTION OF REVISIONS
1	4/2/2021	JNL	100% SUBMITTAL

DESIGNED AMK
DRAWN NJL
CHECKED JNL

FINAL DESIGN
100% SUBMITTAL

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Engineer under the laws of the State of Minnesota.
Printed Name: JONATHAN L. LISOY
Signature: Jonathan L. Lisoy
Date: 4.2.21 License #: 51276

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444 Cedar Street, Suite 1500
Saint Paul, MN 55101
651.292.4400
tkda.com

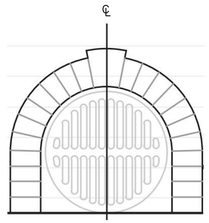
CITY OF SAINT PAUL DEPARTMENT OF PARKS AND RECREATION
HIGHLAND BRIDGE MRB CROSSING
SAINT PAUL, MINNESOTA RAMSEY COUNTY

TUNNEL SECTIONS

PROJ. NO. 17921.002
DRAWING NO. C604

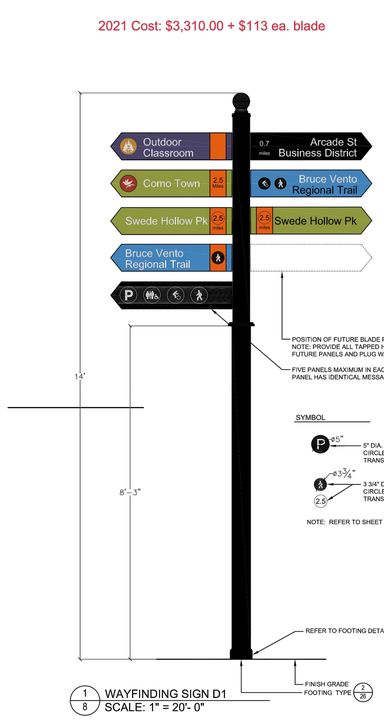
BAR IS ONE INCH ON ORIGINAL DRAWING. IF NOT ONE INCH ON THIS DRAWING ADJUST SCALES ACCORDINGLY.

0 1

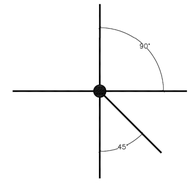


1 / C701 LIMESTONE ENEE AT OUT LO ATE
NOT TO SCALE

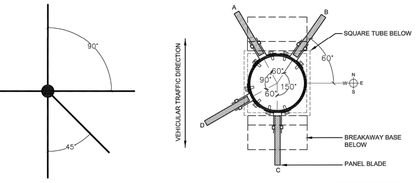
2021 Cost: $3,310.00 + $113 ea. blade

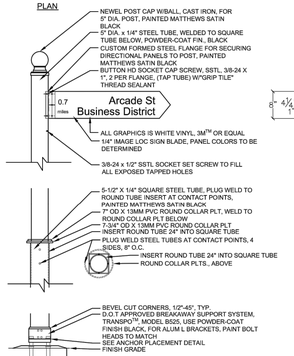


1 / 8 WAYFINDING SIGN D1
SCALE: 1" = 20'- 0"



PLAN

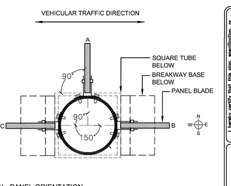




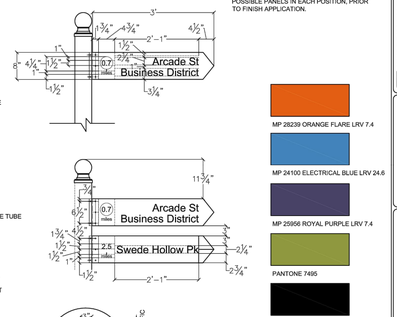
NOTE: 1. PRE-DRILL HOLES FOR FLANGE MOUNTING AT THE POSITION SHOWN AVOBE FOR ALL POSSIBLE PANELS IN EACH POSITION, PRIOR TO FINISH APPLICATION.

ATTACHMENT DETAIL
N.T.S.

SECTION DIRECTIONAL SIGN - PANEL ORIENTATION
N.T.S.



NOTE: 1. PRE-DRILL HOLES FOR FLANGE MOUNTING AT THE POSITION SHOWN AVOBE FOR ALL POSSIBLE PANELS IN EACH POSITION, PRIOR TO FINISH APPLICATION.



ANCHOR PLACEMENT (BRACKETS NOT SHOWN)

NOTE:
1. EACH PANEL BLADE HAS IDENTICAL GRAPHICS ON BOTH SIDES.
2. TYPE OF PANEL BLADE AND ASSOCIATED COLOR, TEXT, AND SYMBOL WILL BE IDENTIFIED.
3. GRAPHICS TO BE PROVIDED BY THE OWNER.
4. ALL STEEL & ALUMINUM FINISHES TO BE MATTHEWS ACRYLIC POLYURETHANE W/10 YEAR WARRANTEE OR AKZO-NOBEL W/10 YEAR WARRANTEE.
5. FONT IS REPRESENTATIVE IN DETAIL. IN SHOP DRAWINGS FONT SHALL BE MYRIAD PRO REGULAR AND TO BE VERIFIED BY LANDSCAPE ARCHITECT OR PROJECT MANAGER.
6. SUBMIT SHOP DRAWINGS FOR APPROVAL AT TIME OF FABRICATION.

MP 28239 ORANGE FLARE LRV 7.4
MP 24100 ELECTRICAL BLUE LRV 24.6
MP 25956 ROYAL PURPLE LRV 7.4
PANTONE 7495
PANTONE BLACK

BLADE PANEL COLOR PALETTE

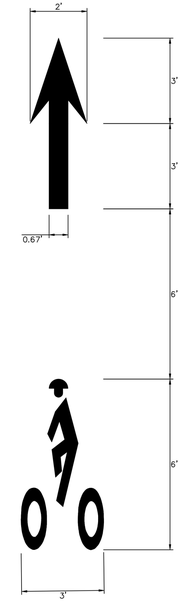
CITYWIDE SIGN FAMILY
WAYFINDING SIGN
FINAL CONSTRUCTION SET
SAINT PAUL, MN
REVISIONS

ZIEGFIELD PARKS DESIGN
ARCHITECTURE + PLANNING
25 WEST FOURTH STREET
ST. PAUL, MINNESOTA 55102

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly licensed Landscape Architect under the laws of the State of Minnesota.
Signed/Typed Name: Jane Ziegfield
Date: 8/10/2020 Reg. No. 41442

8
OF29SHEETS

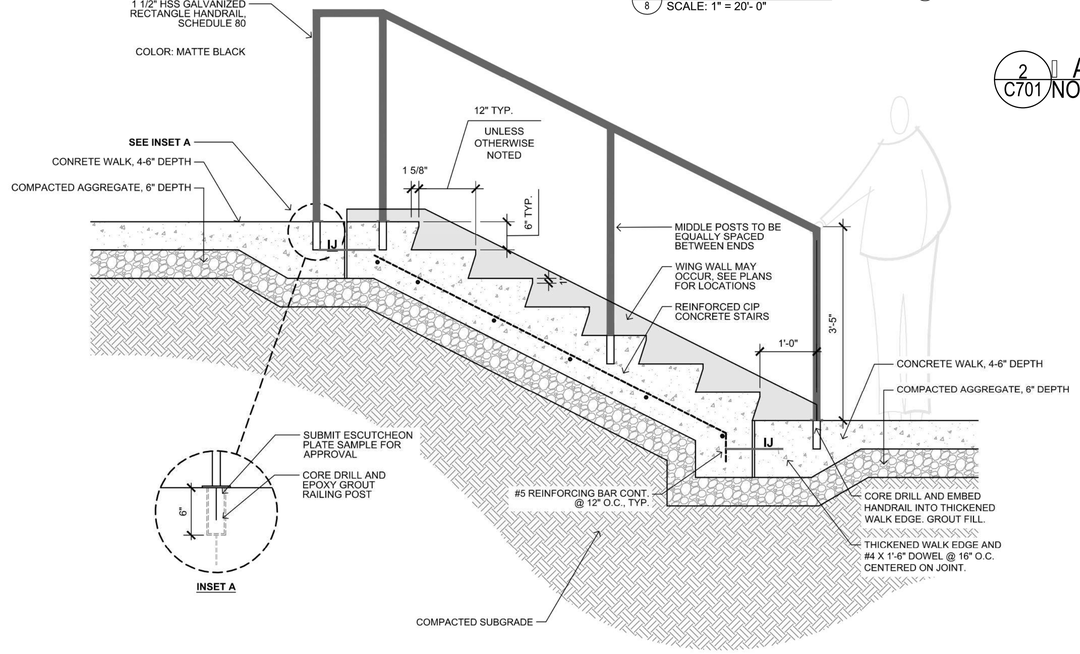
BIKE LANE SYMBOL MARKINGS



3 / C701 BI E LANE SYMBOL MA IN S
NOT TO SCALE

1 1/2" HSS GALVANIZED RECTANGLE HANDRAIL, SCHEDULE 80

COLOR: MATTE BLACK



4 / C701 TY ICAL CI STE SECTION ITH HAN AIL
NOT TO SCALE

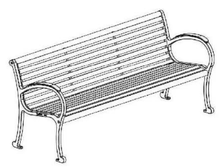
2 / C701 AY IN IN SI N E AM LE ETAIL
NOT TO SCALE

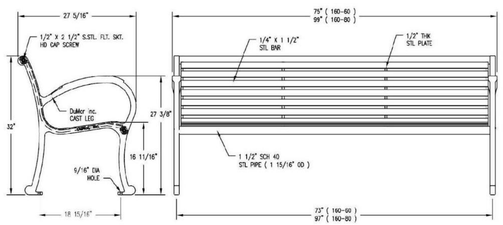
BENCH NOTES:

DUMOR SITE FURNISHINGS
CONTACT:
E:
P:

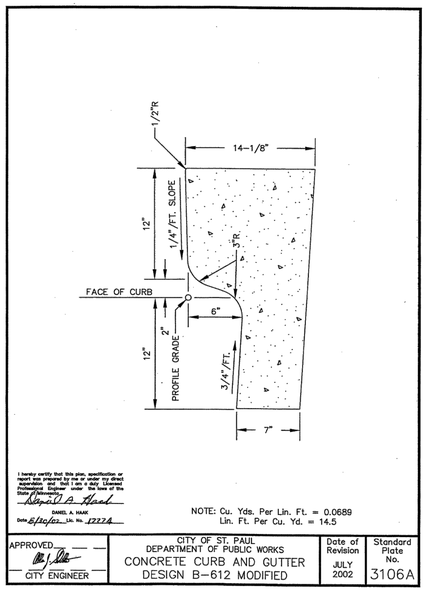
MODEL: 160

COLOR: TEXTURED BLACK
QTY: TBD





5 / C701 ETAIL BENCH
NOT TO SCALE



DETAILS 1, 2, 4, AND 5 ON THIS SHEET WERE PROVIDED BY RYAN COMPANIES US, INC. EXTRACTED FROM FORD SITE REDEVELOPMENT PARK C FINAL PARK PLANS, DATED 8/10/2020

PLOT DATE: Apr 01, 2021 - 12:17pm
FILENAME: K:\n-zt\StPaul-ParksRec\17921002\04_Production\01_CAD\02_Sheets\C70 - C.ill Details.dwg

NO.	DATE	BY	DESCRIPTION OF REVISIONS
1	4/2/2021	JNL	100% SUBMITTAL

DESIGNED AMK
DRAWN NJL
CHECKED JNL

FINAL DESIGN
100% SUBMITTAL

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Engineer under the laws of the State of Minnesota.
Printed Name: JONATHAN LISSY
Signature:
Date: 4/2/21 License #: 51276

TKDA
444 Cedar Street, Suite 1500
Saint Paul, MN 55101
651.292.4400
tkda.com

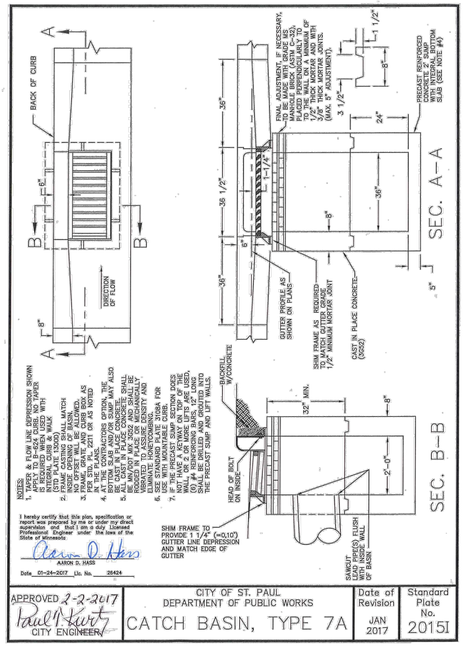
CITY OF SAINT PAUL DEPARTMENT OF PARKS AND RECREATION
HIGHLAND BRIDGE MRB CROSSING
SAINT PAUL, MINNESOTA RAMSEY COUNTY

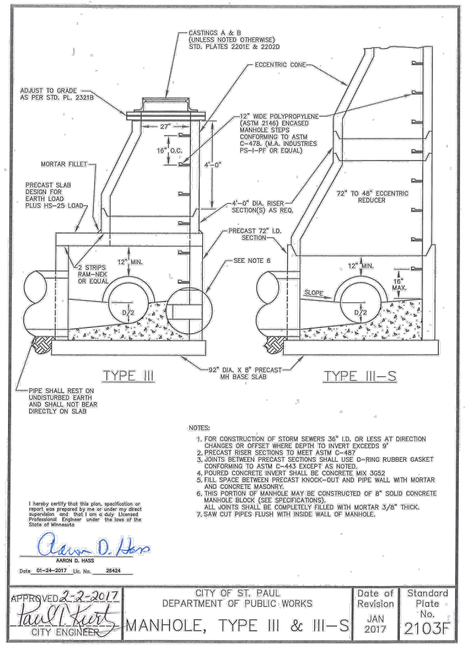
CIVIL DETAILS

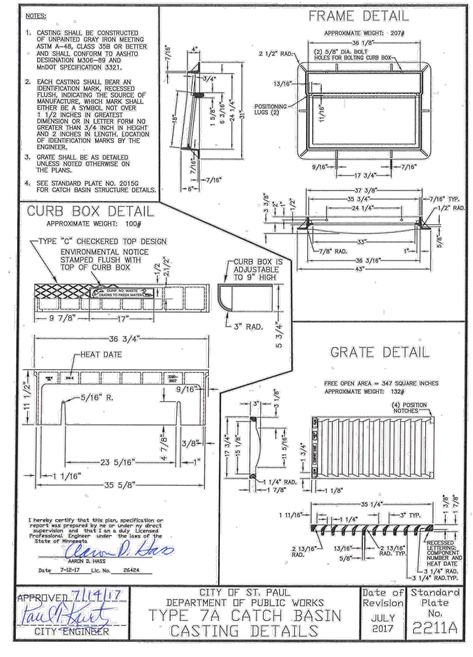
PROJ. NO. 17921.002
DRAWING NO. C701

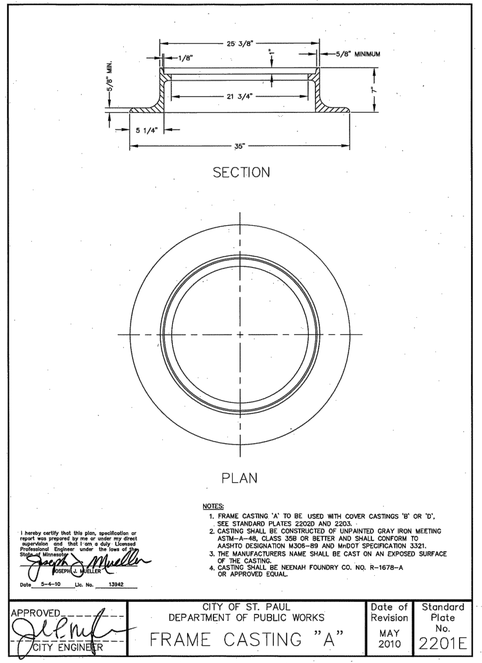
BAR IS ONE INCH ON ORIGINAL DRAWING. IF NOT ONE INCH ON THIS DRAWING ADJUST SCALES ACCORDINGLY.

0 1









PLOT DATE: Apr 01, 2021 - 12:17pm
FILENAME: K:\n-z\StPaul-ParksRec\17921002\04_Production\01_CAD\02_Sheets\C70□ - C□ll Details.dwg

NO.	DATE	BY	DESCRIPTION OF REVISIONS
1	4/2/2021	JNL	100% SUBMITTAL

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FINAL DESIGN
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Signature:
Date: 4-2-21 License #: 51276

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Saint Paul, MN 55101
651.292.4400
tkda.com

CITY OF SAINT PAUL DEPARTMENT OF PARKS AND RECREATION

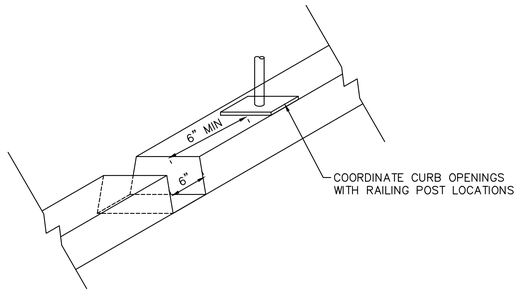
HIGHLAND BRIDGE MRB CROSSING

SAINT PAUL, MINNESOTA RAMSEY COUNTY

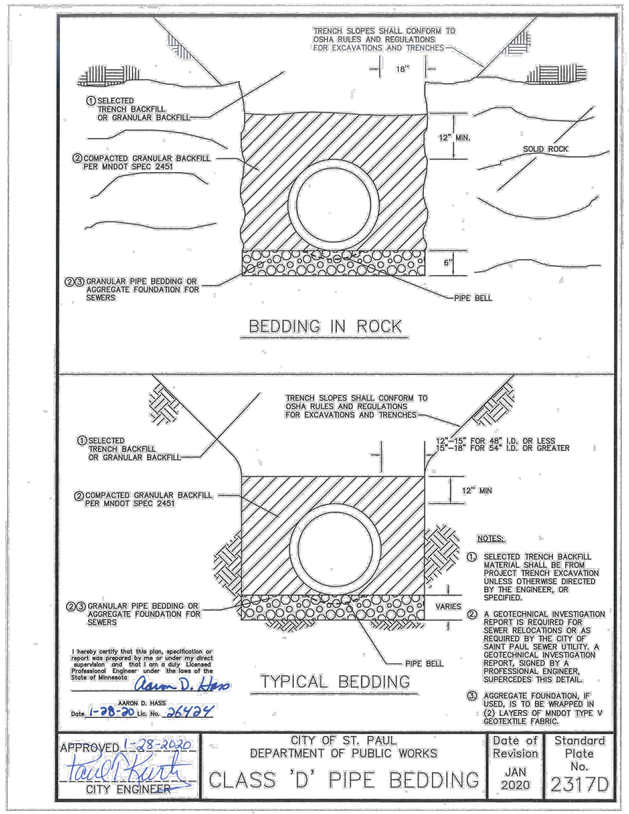
CIVIL DETAILS - STORM

PROJ. NO. 17921.002

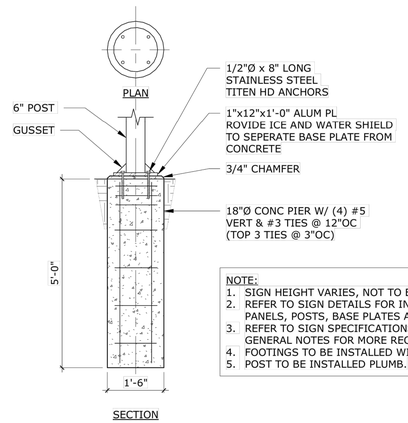
DRAWING NO. C702



1 C703 CURB OPENING
NOT TO SCALE



2 C703 TRENCH BEDDING DETAIL



I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.
SIGNATURE:
NAME: DANIEL A. JAEGER
DATE: 3/1/2021 LICENSE NUMBER: 56706

NOTE:
1. SIGN HEIGHT VARIES, NOT TO EXCEED 8'-0"
2. REFER TO SIGN DETAILS FOR INFORMATION ON SIGN PANELS, POSTS, BASE PLATES AND ANCHORS PLACEMENT.
3. REFER TO SIGN SPECIFICATIONS FOR STRUCTURAL GENERAL NOTES FOR MORE REQUIREMENTS.
4. FOOTINGS TO BE INSTALLED WITH SONOTUBE.
5. POST TO BE INSTALLED PLUMB.

1 SINGULAR SIGN POST TYPE H2
1/2" = 1'-0"

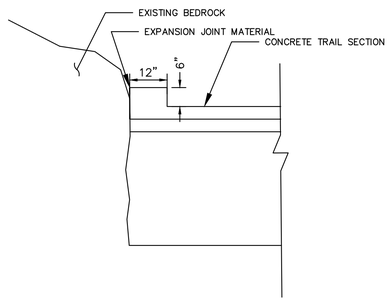
KOMA ARCHITECTS | DESIGNERS | ENGINEERS
2051 KILLEBREW DRIVE, SUITE 680, BLOOMINGTON, MN 55425 | P. 651.451.4605 | KOMAINC.COM

ST PAUL PARK SIGN FOUNDATIONS

PROJECT | 21038
03/01/21

SINGULAR SIGN POST TYPE H2 | S6

3 C703 SIGN POST FOUNDATION DETAIL
NOT TO SCALE



4 C703 CURB ALONG BEDROCK
NOT TO SCALE

TRASH RECEPTACLES SHALL BE CITY OF ST. PAUL STANDARD CONTAINER TOTER MODEL.

TOTER LITTER CONTAINERS WEBSITE:
WWW.TOTER.COM/MUNICIPALITIES/PRODUCT/DECORATIVE-LITTER-CONTAINERS

BODY AND LID COLOR: 279 BROWNSTONE
MODEL NUMBER: 860A
SIZE: 60 GALLON
MOUNTING: FREE STANDING

5 C703 TRASH RECEPTACLE SPECIFICATION
NOT TO SCALE

NO.	DATE	BY	DESCRIPTION OF REVISIONS
1	4/2/2021	JNL	100% SUBMITTAL

DESIGNED AMK
DRAWN NJL
CHECKED JNL

FINAL DESIGN
100% SUBMITTAL

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Engineer under the laws of the State of Minnesota.
Printed Name: JONATHAN N. LIBBY
Signature:
Date: 4.2.21 License #: 51078

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Saint Paul, MN 55101
651.292.4400
tkda.com

SAINT PAUL

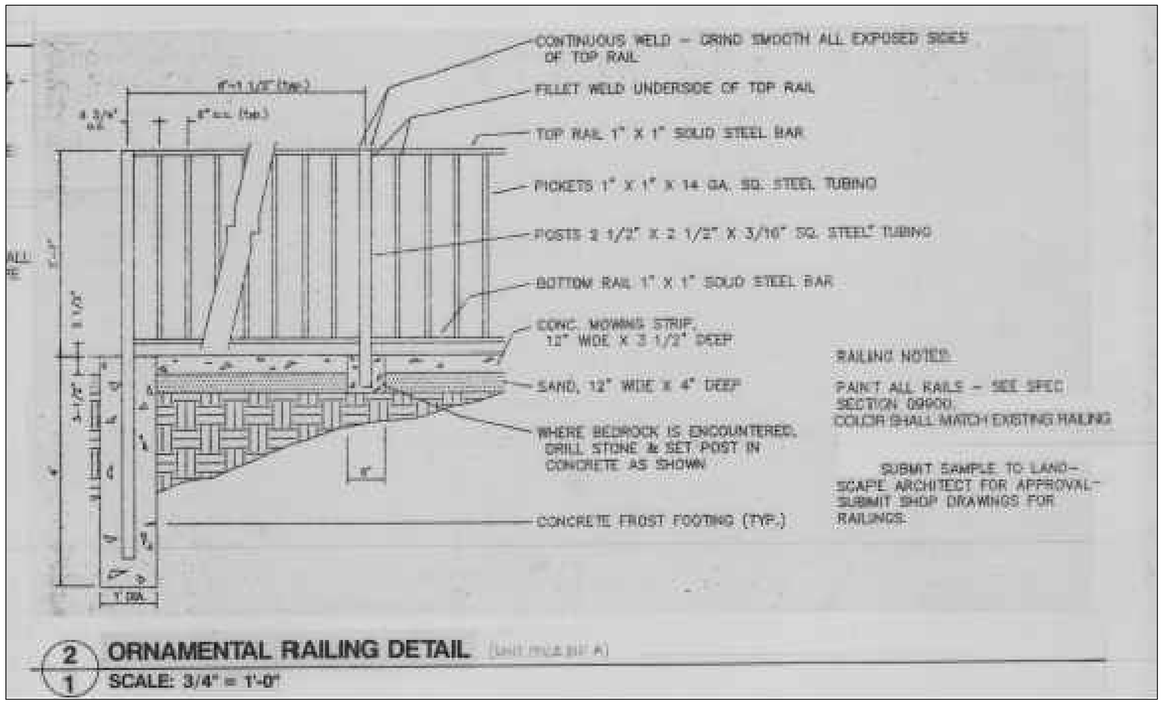
CITY OF SAINT PAUL DEPARTMENT OF PARKS AND RECREATION
HIGHLAND BRIDGE MRB CROSSING
SAINT PAUL, MINNESOTA RAMSEY COUNTY

CIVIL DETAILS

PROJ. NO. 17921.002
DRAWING NO. C703

BAR IS ONE INCH ON ORIGINAL DRAWING. IF NOT ONE INCH ON THIS DRAWING ADJUST SCALES ACCORDINGLY.

0 1



2/1 **ORNAMENTAL RAILING DETAIL** (UNIT PRICE BID AT A)
SCALE: 3/4" = 1'-0"

1/C704 O NAMENTAL AILIN

PLOT DATE: Apr 01, 2021 - 12:17pm
FILENAME: K:\n-z\StPaul-ParksRec\17921002\04_Production\01_CAD\02_Sheets\C70 - Civil Details.dwg

NO.	DATE	BY	DESCRIPTION OF REVISIONS
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Printed Name: JONATHAN N. LIBBY
Signature: Jonathan N. Libby
Date: 4.2.21 License #: 51276

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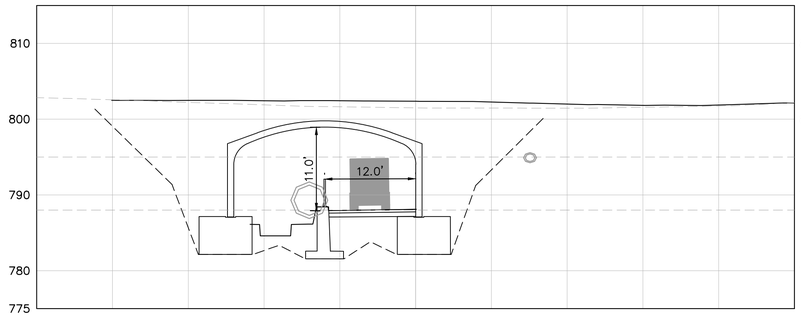
0 1

Bobcat Toolcat 5600

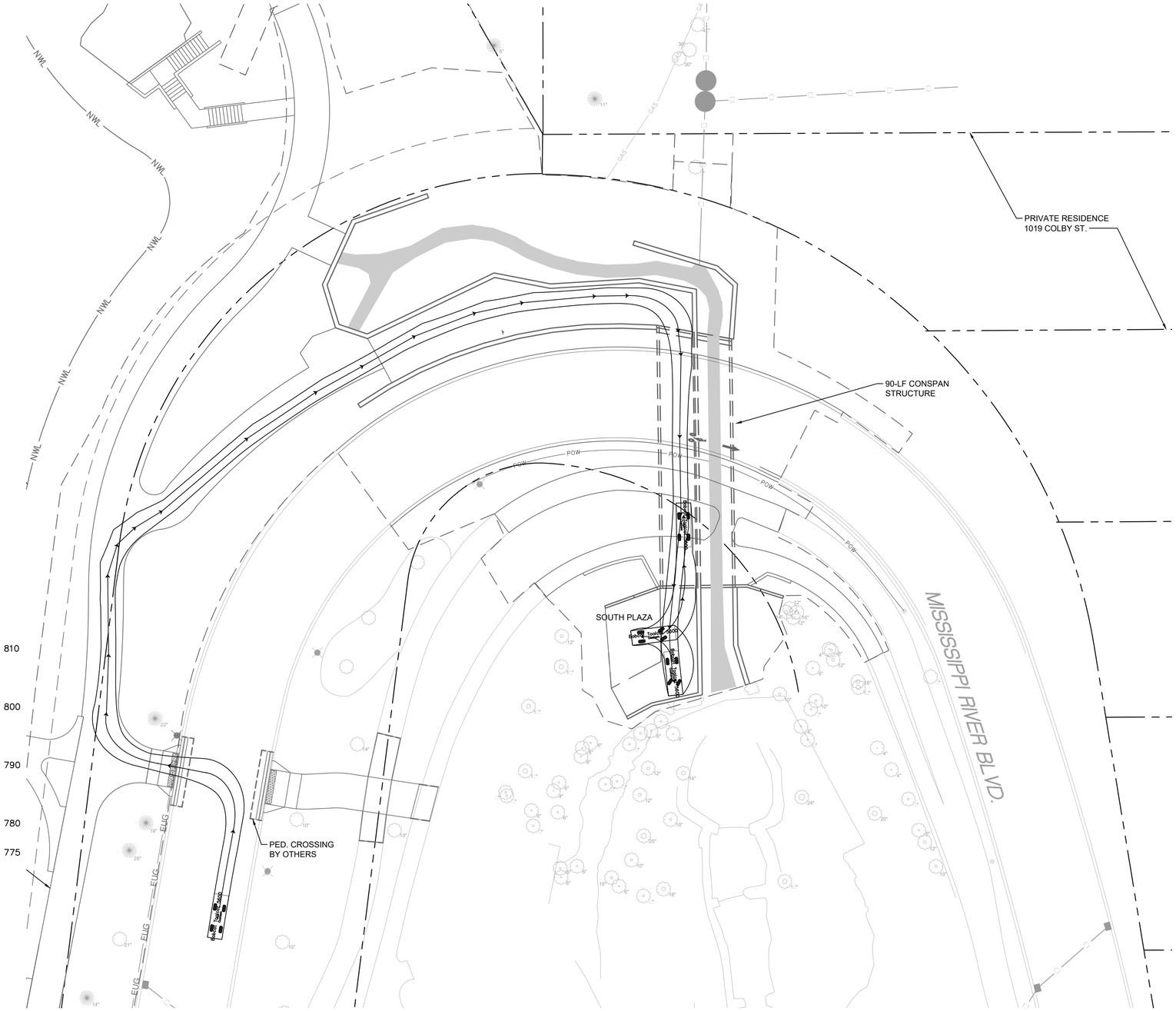
	feet
Width	: 5.00
Track	: 4.13
Lock to Lock Time	: 6.0
Steering Angle	: 38.0

DIMENSIONS □FEET□

LENGTH: 15.13
LEGNTH WITHOUT ATTACHMENT: 12.11
WIDTH: 5
WIDTH □WITH BUCKET□ 5.17
HEIGHT: 6.75
HEIGHT WITH OPERATOR CAB: 6.75
BED HEIGHT FROM GROUND: 3.1□
GROUND CLEARANCE: 0.77
TURNING RADIUS: 4.20 □AUTOTURN MIN IS 7.33, WHICH WAS DEFAULT USED□
□ASSUMES STANDARD TIRES AND BUCKET ATTACHMENT



2 C801 □ EHICLE TUNNEL SECTION
1"□ 10□



1 C801 MAINTENANCE □ ECHICLE TU□ NIN□ □ LAN
1"□ 20□

0 10 20 40
SCALE IN FEET

NORTH

NO.	DATE	BY	DESCRIPTION OF REVISIONS
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DRAWN NJL
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SAINT PAUL

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HIGHLAND BRIDGE MRB CROSSING
SAINT PAUL, MINNESOTA RAMSEY COUNTY

MAINTENANCE VECHICLE TURNING PLAN

PROJ. NO. 17921.002
DRAWING NO. C□01

PLOT DATE: Apr 01, 2021 - 12:1□pm
FILENAME: K:\n-z\StPaul-ParksRec\17921002\04_Production\01_CAD\02_Sheets\C□01 - Maintenance Vehicle Turning Plan.dwg

BAR IS ONE INCH ON ORIGINAL DRAWING. IF NOT ONE INCH ON THIS DRAWING ADJUST SCALES ACCORDINGLY.

0 1

PARK C PLANS COMPLETED BY OTHERS. REFER TO FORD PARK C PLANS, PREPARED BY CONFLUENCE FOR SPECIFIC DESIGN INFORMATION

NATURAL EDGE

NORTH PLAZA

SOUTH PLAZA

20□SEWER EASEMENT

PRIVATE RESIDENCE
1019 COLBY ST.

BEE LAWN □TYP□

NATIVE WOODLAND MI□ □TYP□

PED. CROSSING
BY OTHERS

MISSISSIPPI RIVER BLVD.

NWL

POW

ELEC

PT 3

PS 1

AG 3

GD 3

□B 2

GENERAL NOTES

1. SEE CIVIL DRAWINGS FOR SITE LAYOUT
2. ALL DISTURBED AREAS NOT DENOTED WITH SEED MI□ TO BE RESTORED WITH NATIVE WOODLAND MI□

PLANTING NOTES

1. STRIP AND STOCKPILE TOPSOIL FOR RE-USE.
2. PROVIDE 6" TOPSOIL ON ALL AREAS TO RECEIVE SEED.
3. ALL DISTURBED AREAS SHOULD BE SEEDED.
4. WHERE SEED ABUTS PAVED SURFACE, FINISHED GRADE OF SEED SHALL BE 1" BELOW SURFACE OF PAVEMENT.
5. PLANTINGS TO BE LOCATED AND STAKED AS SHOWN ON PLAN. LANDSCAPE ARCHITECT MUST APPROVE LOCATION PRIOR TO DIGGING.
6. ADJUSTMENT OF PLANT LOCATION IN THE FIELD MUST BE APPROVED BY LANDSCAPE ARCHITECT.

LEGEND

- CONSTRUCTION LIMITS
- NATIVE WOODLAND MI□
- BEE LAWN

PLANT SCHEDULE

TREES	CODE	BOTANICAL NAME	COMMON NAME	SIZE	□TY
	AG	Amelanchier □grandi□lora □Autumn Brilliance□	Autumn Brilliance Apple Ser□ice□erry□	1.5" Cal.	3
	GD	G□mnocladus dioica □Espresso□	Kentuck□ Co□□eetree	2.5" Cal.	3
	PS	Pinus stro□us	White Pine	□□Ht.	2
	PT	Populus tremuloides	□uaking Aspen	1.5" Cal.	9
	□B	□uercus □icolor	Swamp White Oak	2.5" Cal.	2

1 L101 LAN□ SCA□ E □ LAN
1"□ 20□

0 10 20 40
SCALE IN FEET

NORTH

NO.	DATE	BY	DESCRIPTION OF REVISIONS
1	4/2/2021	SJM	100% SUBMITTAL

DESIGNED KWA
DRAWN SJM
CHECKED KWA

FINAL DESIGN
100% SUBMITTAL

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Landscape Architect under the laws of the State of Minnesota.
Printed Name: SAMANTHA J. MCINNEY
Signature:
Date: License #: 57344

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SAINT PAUL

CITY OF SAINT PAUL DEPARTMENT OF PARKS AND RECREATION

HIGHLAND BRIDGE MRB CROSSING

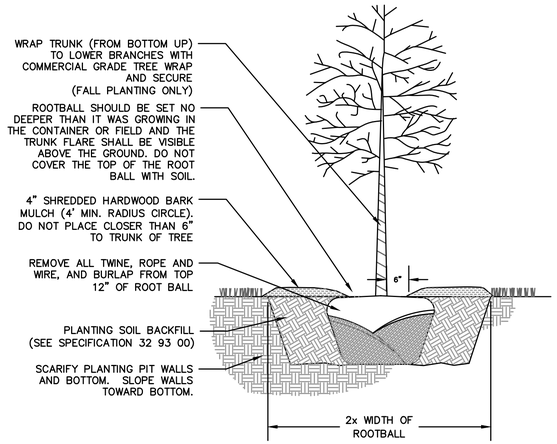
SAINT PAUL, MINNESOTA RAMSEY COUNTY

LANDSCAPE PLAN

PROJ. NO. 17921.002

DRAWING NO. L101

PLOT DATE: Apr 01, 2021 - 12:1□pm
FILENAME: K:\In-z\StPaul-ParksRec\17921002\04_Production\01_CAD\02_Sheets\LL101 - Landscape Plan.dwg

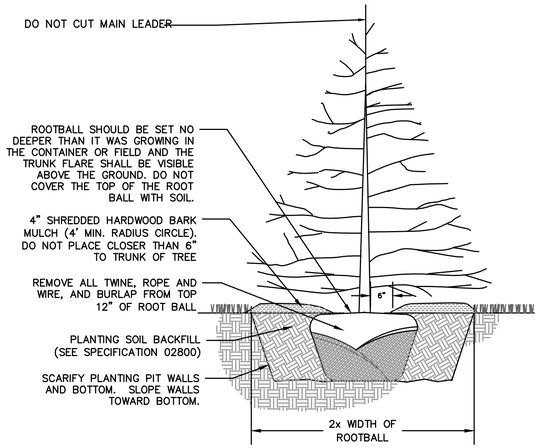


TREE SHALL BE PRUNED IMMEDIATELY AFTER PLANTING TO REMOVE DEAD, BROKEN, DISEASED, DYING OR RUBBING BRANCHES. CO-DOMINANT STEMS LESS THAN 4" IN DIA. AT THE FORK SHALL BE PRUNED OFF AND ONE MAIN STEM SHOULD REMAIN. TREE TOPPING OR HEADING IS NOT PERMITTED AT ANY TIME. STAKING IS NOT REQUIRED, BUT IF INSTALLED IT SHALL BE REMOVED NO LATER THAN ONE YEAR AFTER PLANTING

MARK THE NORTH SIDE OF THE TREE IN THE NURSERY AND ROTATE TREE TO FACE NORTH AT THE SITE WHENEVER POSSIBLE

SET TREE PLUMB

1 L102 DECIDUOUS TREE PLANTING DETAIL
NO SCALE



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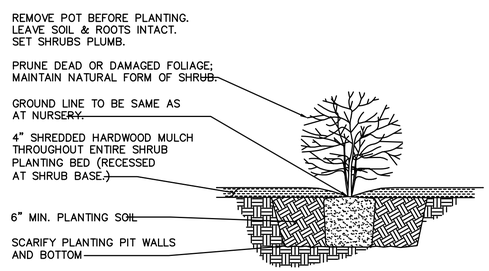
SET TREE PLUMB, STAKING AND GUYING AS NECESSARY

2 L102 EVERGREEN TREE PLANTING DETAIL
NO SCALE



3 L102 SHRUB DETAIL
NO SCALE

NO.	DATE	BY	DESCRIPTION OF REVISIONS
1	4/2/2021	SJM	100% SUBMITTAL

DESIGNED KWA
DRAWN SJM
CHECKED KWA

FINAL DESIGN
100% SUBMITTAL

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Landscape Architect under the laws of the State of Minnesota.
Printed Name: SAMANTHA J. MCINNEY
Signature:
Date: License #: 57344

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CITY OF SAINT PAUL DEPARTMENT OF PARKS AND RECREATION
HIGHLAND BRIDGE MRB CROSSING
SAINT PAUL, MINNESOTA RAMSEY COUNTY

LANDSCAPE DETAILS

PROJ. NO. 17921.002
DRAWING NO. L201

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0 1

LEGEND:

- WALL MOUNTED LIGHT FIXTURE
- SALVAGED LIGHT (SEE CITY PLATE 5056)
- LIGHTING UNIT TYPE SPECIAL 1, (SEE CITY PLATE 5056)
- EUG — 1.5" NON–METALLIC CONDUIT
- POW — UNDERGROUND ELECTRIC (SALVAGE AND REINSTALL)

SPECIFIC NOTES:

1. CONDUIT TO BE WALL MOUNTED ALONG LENGTH OF CONSPAN TUNNEL SYSTEM.
2. REMOVE, SALVAGE AND REINSTALL EXISTING CONDUIT AND LIGHT POLE ALONG MISSISSIPPI RIVER BOULEVARD TO AVOID CONFLICTS WITH THE PROPOSED CONSPAN TUNNEL STRUCTURE.
3. SEE SHEET E201 DETAIL 1 FOR WALL MOUNTED TUNNEL LIGHT FIXTURE DETAILS.

GENERAL NOTES:

1. LIGHTING SHALL COMPLY WITH CITY ZONING CODE STANDARDS SEC. 63.116 – EXTERIOR LIGHTING.

FORD DEVELOPMENT PROPOSED MOUNT CURVE BLVD.

20' SEWER EASEMENT

NORTH PLAZA

90-LF CONSPAN TUNNEL (1)

(2)

(3)

SOUTH PLAZA

MISSISSIPPI RIVER BLVD.

TIE-IN TO PROPOSED LIGHT SYSTEM. REFERENCE FORD SITE REDEVELOPMENT FINAL SITE PLANS, BULLETIN 3, DATED 10/2020

1 / E101 LIGHTING PLAN

1" = 20'

0 10 20 40

SCALE IN FEET

NORTH

PLOT DATE: Apr 01, 2021 - 12:1:1pm
FILENAME: K:\n-z\StPaul-ParksRec\17921002\04_Production\01_CAD\02_Sheets\E101 - Lighting Plan.dwg

NO.	DATE	BY	DESCRIPTION OF REVISIONS
1	4/2/2021	JNL	100% SUBMITTAL

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CITY OF SAINT PAUL DEPARTMENT OF PARKS AND RECREATION

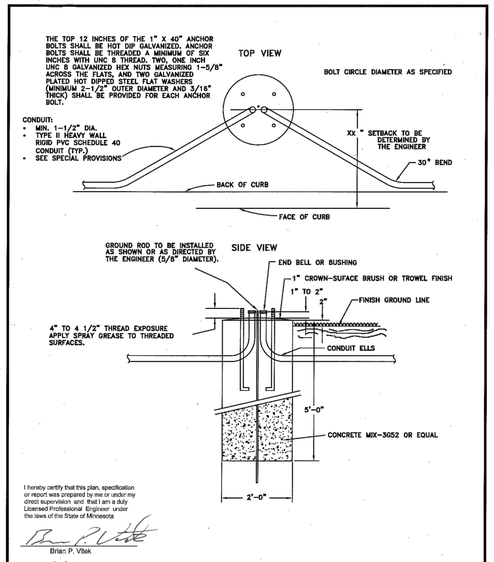
HIGHLAND BRIDGE MRB CROSSING

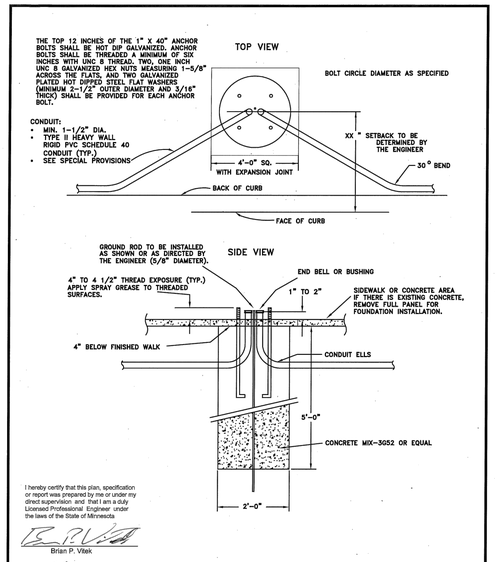
SAINT PAUL, MINNESOTA RAMSEY COUNTY

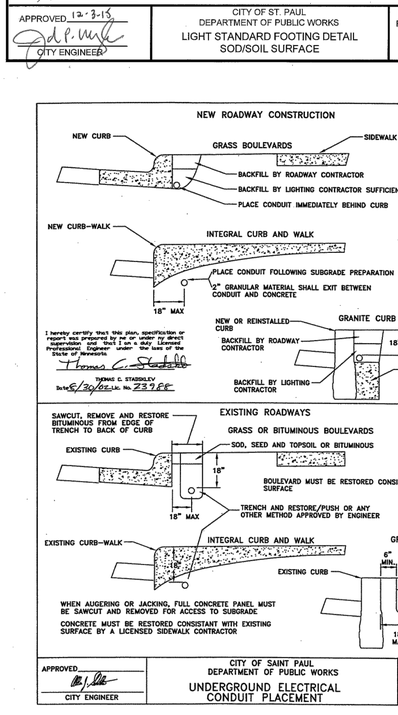
LIGHTING PLAN

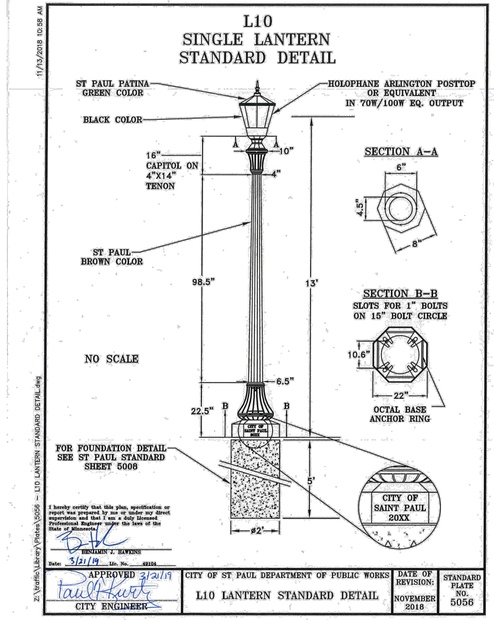
PROJ. NO. 17921.002

DRAWING NO. E101









1 E201 ALL MOUNTED TUNNEL LIGHT FIXTURES
NOT TO SCALE

NO.	DATE	BY	DESCRIPTION OF REVISIONS
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Printed Name: JONATHAN N. LIBBEY
Signature:
Date: 4.2.21 License #: 51276

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SAINT PAUL, MINNESOTA RAMSEY COUNTY

LIGHTING DETAILS

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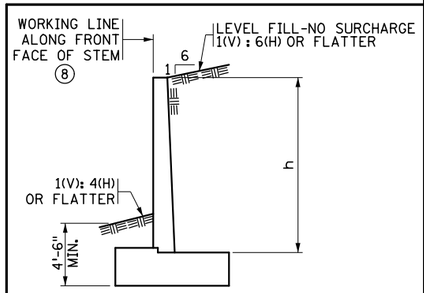
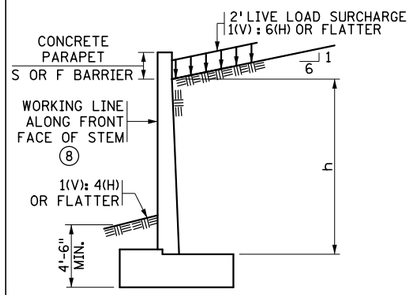
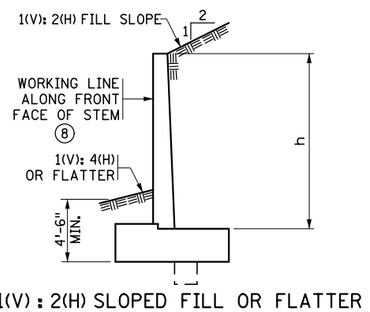


LEVEL FILL
1(V) : 6(H) OR FLATTER



LIVE LOAD SURCHARGE



1(V) : 2(H) SLOPED FILL OR FLATTER

h = STEM HEIGHT. DEFINED AS DISTANCE BETWEEN TOP OF FOOTING TO TOP OF WALL, NOT INCLUDING PARAPET OR BARRIER.

LOAD CASES

DESIGN CRITERIA

THESE LRFD CIP RETAINING WALL STANDARDS HAVE BEEN DEVELOPED BASED ON THE FIFTH EDITION WITH 2010 INTERIMS OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, AND MnDOT DESIGN POLICIES AS STATED IN THE MnDOT LRFD BRIDGE DESIGN MANUAL.

ALL SPECIAL DESIGN RETAINING WALLS HAVE BEEN DEVELOPED BASED ON THE 2017 EIGHTH EDITION OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, AND MnDOT DESIGN POLICIES AS STATED IN THE MnDOT LRFD BRIDGE DESIGN MANUAL.

f'c = 4 ksi
fy = 60 ksi
n = 8

REFER TO STANDARD FIGURE 5-297.639 FOR ADDITIONAL DESIGN CRITERIA.

BAR LAP

BAR SIZE	PLAIN	EPOXY
5	2'-5"	2'-1"
6	2'-11"	3'-1"
7	3'-7"	3'-10"
8	4'-9"	5'-1"
9	6'-0"	6'-5"
10	7'-7"	8'-2"
11	9'-4"	10'-0"

SUMMARY OF QUANTITIES FOR RETAINING WALLS *

	ITEM	UNIT	CIP WALLS A	C	E	F	G	TOTAL
	PIPE RAILING	LF	78	108	34	148	58	426
	STRUCTURAL CONCRETE (1G52)	CU YD	45	57	14	40	39	195
	STRUCTURAL CONCRETE (3G52)	CU YD	64	105	30	73	71	343
	AGGREGATE BACKFILL (CV)	CU YD				74		74
	REINFORCEMENT BAR	POUND	6150	5600	1710	4140	5870	23470
(5)	REINFORCEMENT BAR (EPOXY)	POUND	9040	12700	3930	7310	8990	41970
	DRAINAGE SYSTEM	LUMP SUM	PART.	PART.	PART.	PART.	PART.	1
	STONE MASONRY VENEER 4.0" THICK	SQ YD			52	43		95
	STONE MASONRY VENEER 6.0" THICK	SQ YD			4	6		10
	ARCHITECTURAL SURFACE FINISH (SINGLE COLOR)	SQ FT	942	1342			1015	3299
	ARCHITECTURAL CONCRETE TEXTURE (SPLIT STONE)	SQ FT	942	1342			1015	3299
	ANTI-GRAFFITI COATING	SQ FT	942	1342	504	441	1015	4244

GENERAL NOTES:

UTILITIES:
EXISTING AND PROPOSED UTILITIES ARE SHOWN IN THE GRADING PLANS. PRIOR TO EXCAVATION VERIFY THE LOCATION OF EXISTING FACILITIES AND EXERCISE CARE IN ADJACENT CONSTRUCTION.

EXCAVATION AND EARTHWORK:
ALL EXCAVATION AND EMBANKMENT WORK SHALL CONFORM TO SPEC. 2451.

CONCRETE:
ALL CONCRETE SHALL CONFORM TO SPEC. 2461.

TRANSVERSE CONSTRUCTION JOINTS IN FOOTING ARE PERMISSIBLE. KEYWAYS AND CONTINUOUS REINFORCEMENT ARE REQUIRED THROUGH THESE JOINTS.

THE THICKNESS OF THE ARCHITECTURAL CONCRETE TEXTURE VARIES WITH THE TEXTURE RELIEF PATTERN. THE STRUCTURAL CONCRETE 3G52 * QUANTITIES DO NOT INCLUDE THE MATERIAL WITHIN THE ARCHITECTURAL CONCRETE TEXTURE. CONCRETE NEEDED FOR THE TEXTURING IS INCIDENTAL.

MATERIALS AND PLACEMENT OF JOINT MATERIAL ARE INCIDENTAL TO CONCRETE. *

POURING SEQUENCE:
THE POURING SEQUENCE SHALL BE AT THE CONTRACTOR'S OPTION. SUBMIT SEQUENCE (WITHIN 7 CALENDAR DAYS) TO THE ENGINEER FOR APPROVAL PRIOR TO BEGINNING THE FIRST POUR.

CONSTRUCTION:
CONSTRUCT IN ACCORDANCE WITH SPEC. 2411, EXCEPT AS NOTED.

REFER TO STANDARD PLAN 5-297.624 (2 OF 6) FOR WALL CORNER DETAILS AND STEPPED FOOTING DETAILS.

REFER TO STANDARD PLAN 5-297.625 FOR WALL SHEAR LUG DETAILS.

APPLY MEMBRANE WATERPROOFING SYSTEM PER SPEC. 2481 TO BACK SIDE OF WALL TO COVER ALL THRU-BOLT FORM HOLES.

FOR WALLS WITH CONDUIT INSIDE THE STEM, PLACE CONDUIT EXPANSION FITTINGS AT 200' MAX. SPACING, AT CORK AND DOWEL JOINT LOCATION.

REINFORCING STEEL:
USE REINFORCEMENT BARS CONFORMING TO SPEC. 3301, GRADE 60.

BARS MARKED WITH THE SUFFIX "E" TO BE EPOXY COATED. ALL BARS WHICH EXTEND OUT OF THE FOOTING AND ALL BARS WHICH ARE ABOVE THE FOOTING TO BE EPOXY COATED.

ALL BENT BAR DIMENSIONS ARE GIVEN OUT-TO-OUT.

MAINTAIN CLEAR DISTANCE BETWEEN REINFORCEMENT BARS AND FACE OF CONCRETE OF 3 INCHES IN FOOTINGS, 5 INCHES IN BOTTOM OF SPREAD FOOTINGS, AND 2 INCHES ELSEWHERE UNLESS OTHERWISE NOTED. REFER TO STANDARD PLAN 5-297.624 (1 OF 6) DETAIL "C" FOR COVER REQUIREMENTS ON WALLS WITH ARCHITECTURAL CONCRETE TEXTURE OR RUSTICATION.

THE CONTRACTOR HAS THE OPTION OF SUBSTITUTING 60'-0" LONG BARS FOR THE LONGITUDINAL FOOTING STEEL SHOWN. CHANGES IN THE BILL OF REINFORCEMENT ARE THE RESPONSIBILITY OF THE CONTRACTOR. PAYMENT WILL BE BASED ON QUANTITIES SHOWN.

THE CONSTRUCTION JOINT FOR CONCRETE PARAPET OR BARRIER MAY BE LOCATED AT TOP OR BOTTOM OF COPING, AT THE CONTRACTOR'S OPTION. PAYMENT WILL BE BASED ON QUANTITIES SHOWN, WHICH IS BASED ON CONSTRUCTION JOINT ABOVE COPING.

FOR VARIABLE STEM HEIGHTS, VARY THE LAP LENGTH OF THE VERTICAL REINFORCEMENT. MINIMUM LAP LENGTHS ARE GIVEN IN THE TABLE ON THIS SHEET. SMALLER BAR GOVERNS LAP LENGTH.

DOWEL BAR ASSEMBLIES:
DOWELED JOINTS/CONSTRUCTION JOINTS ARE SHOWN ON STANDARD PLAN 5-297.624 (3 OF 6). THESE JOINTS ARE INCIDENTAL.

AT THE CONTRACTOR'S OPTION, CONSTRUCTION JOINTS MAY BE SUBSTITUTED IN LIEU OF CORK AND DOWEL JOINTS. REINFORCEMENT QUANTITIES WERE COMPUTED ASSUMING A CORK AND DOWEL JOINT BETWEEN EVERY PANEL. CHANGES IN THE BILL OF REINFORCEMENT ARE THE RESPONSIBILITY OF THE CONTRACTOR, AND NO ADDITIONAL PAYMENT WILL BE MADE. AT A MINIMUM, PLACE CORK AND DOWEL JOINTS EVERY 91'-6". PLACE A CORK AND DOWEL JOINT AT ALL VERTICAL FOOTING STEPS.

GEOMETRICS AND GRADES:
DATA FOR BASELINE GEOMETRY IS TABULATED FOR WALL ALIGNMENT, SEE LAYOUT SHEETS. WALL ALIGNMENT REFERENCE IS ALONG FRONT FACE OF WALL. (8)

ON UP TO 10% SLOPES, THE CONTRACTOR HAS THE OPTION OF POURING FOOTINGS SLOPED OR STEPPED. ADDITIONAL CONCRETE VOLUMES AND CHANGES TO THE BILL OF REINFORCEMENT WHICH MAY RESULT FROM CONTRACTOR REQUESTED OPTIONS ARE THE RESPONSIBILITY OF THE CONTRACTOR. NO ADDITIONAL PAYMENT WILL BE MADE.

QUANTITIES ARE BASED ON ASSUMED TOP OF ROCK ELEVATION. ACTUAL TOP OF ROCK TO BE DETERMINED BY ENGINEER. SEE SHEET 5-297.624 (4 OF 6) FOR PAY LIMITS.

PILE LOADS:
THE PILE LOADS SHOWN IN THE PLANS AND THE CORRESPONDING NOMINAL PILE BEARING RESISTANCES (Rn) WERE COMPUTED USING LRFD METHODOLOGY.

NOTES:

~~(1) STRUCTURAL BACKFILL SPEC. 3149.2.D.2.~~

~~(2) COMPACT TO 100% DENSITY IN ACCORDANCE WITH SPEC. 2105.3.F.1 UNLESS RECOMMENDED OTHERWISE BY THE SOILS ENGINEER.~~

(3) LIMITING CRITERIA.

(4) CURVED FORMS MAY BE USED FOR ANY WALL WITH A RADIUS, BUT MUST BE USED ON WALLS WITH RADIUS LESS THAN 23 FEET.

(5) DOES NOT INCLUDE DOWELED JOINT/CONSTRUCTION JOINT QUANTITIES, WHICH ARE INCIDENTAL. DOWELED JOINT/CONSTRUCTION JOINT DETAILS ARE SHOWN ON STANDARD PLAN 5-297.624 (3 OF 6).

~~(6) QUANTITIES FOR THE FOUNDATION WITH AGGREGATE BACKFILL OPTION ONLY.~~

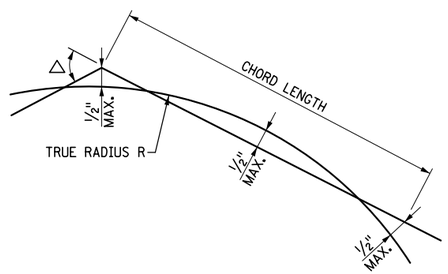
~~(7) DOES NOT INCLUDE ADDITIONAL REINFORCING BARS AND STRUCTURAL CONCRETE (1G52) REQUIRED FOR STEPPED FOOTINGS, WHICH IS INCIDENTAL.~~

(8) FOR RETAINING WALLS THAT ABUT A STRUCTURE, NOTE THAT THE DESIGNATION OF "FRONT FACE" MAY VARY FROM THE STRUCTURE PLANS TO THE RETAINING WALL PLANS. *

CURVED RETAINING WALLS ALLOWABLE CHORD LENGTH (4)

MAXIMUM DEGREE OF CURVE	RADIUS	ALLOWABLE CHORD LENGTH	DEVIATION FROM TRUE RADIUS	MAXIMUM DEFLECTION ANGLE △
4°-00'	1432'	30'-6"	± 1/2" (3)	1°-15'
8°-00'	716'	21'-10"	± 1/2" (3)	1°-45'
16°-30'	347'	15'-3"	± 1/2" (3)	2°-30'
23°-00'	249'	12'-11"	± 1/2" (3)	2°-57'
65°-30'	87'	7'-7 1/2"	± 1/2"	5°-00' (3)
114°-30'	50'	4'-4 5/16"	± 1/4"	5°-00' (3)
250°-00'	23'	2'-0"	± 1/8"	5°-00' (3)

SHEET INDEX



MODIFIED

REVISION: SEPTEMBER 1, 2016
APPROVED: AUGUST 27, 2014
Nancy Daubenberger
STATE BRIDGE ENGINEER

* DENOTES MODIFICATION FROM STANDARD PLAN

I HEREBY CERTIFY THAT THIS SHEET WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA
CERTIFIED BY Lindsey J. Lawrence LIC. NO. 48298 DATE 4/2/2021
LINDSEY J. LAWRENCE

REVISION DATE 9-1-16
STANDARD SHEET NO. 5-297.620
STANDARD APPROVED: AUGUST 27, 2014
TITLE: RETAINING WALL GENERAL NOTES AND SUMMARY OF QUANTITIES

MISSISSIPPI RIVER BOULEVARD CROSSING SHEET NO. S101 OF S131 SHEETS

DATE: 4/1/2021 TIME: 3:30:10 PM
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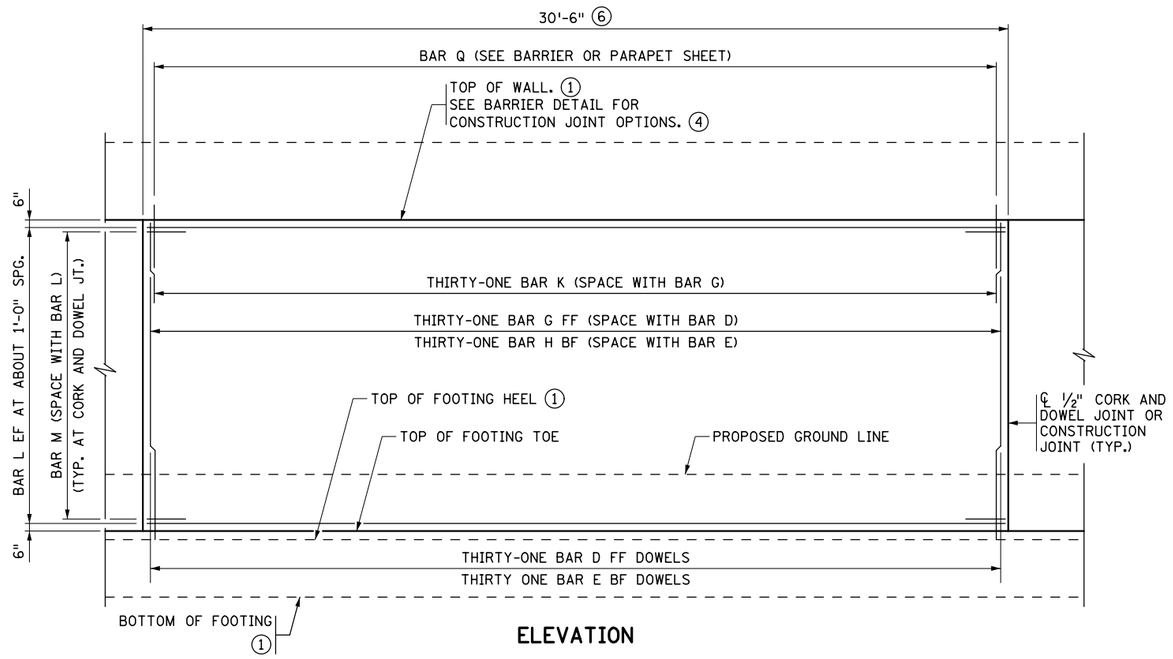
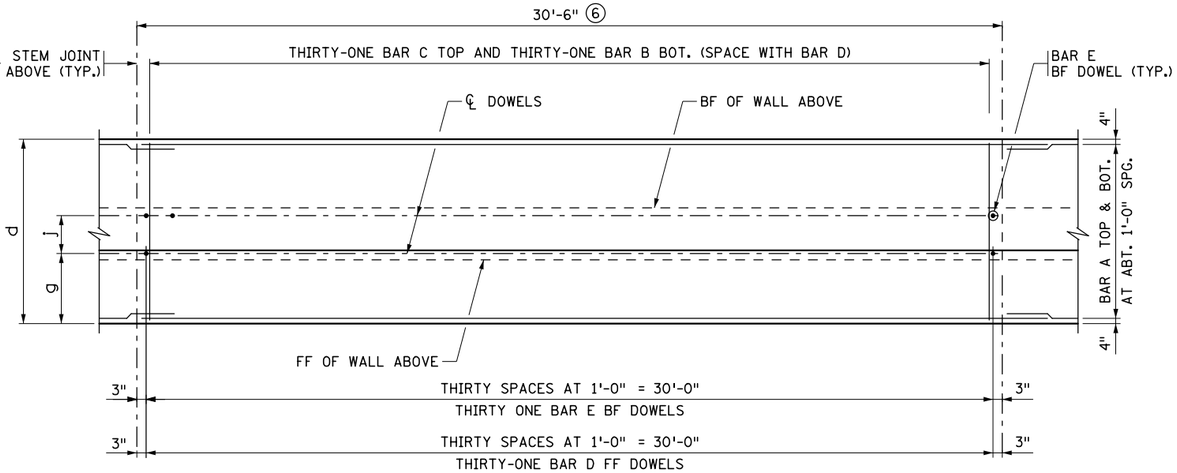
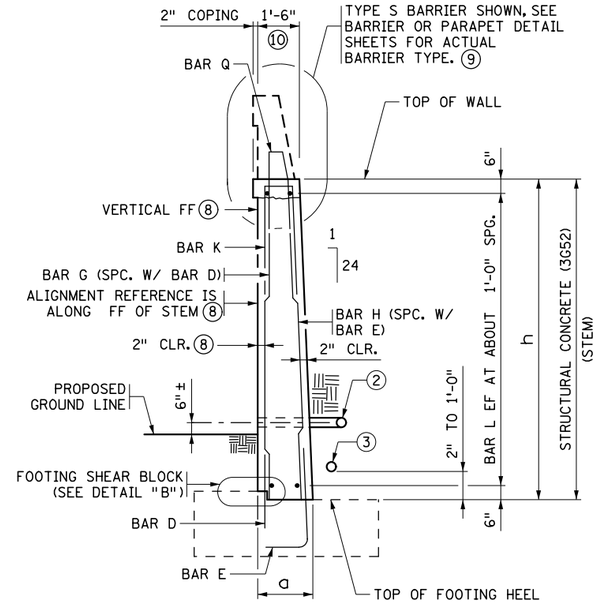


ELEVATION

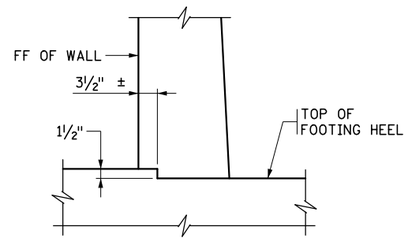


FOOTING PLAN ~ REINFORCEMENT

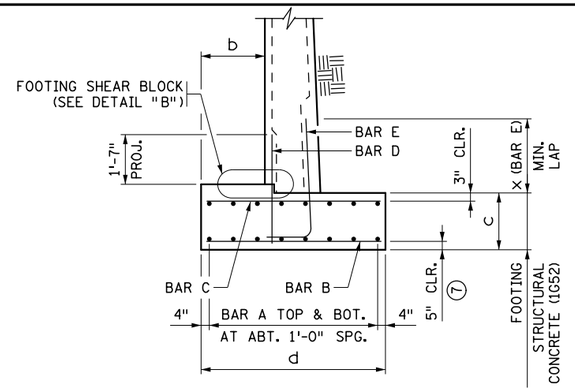


WALL SECTION

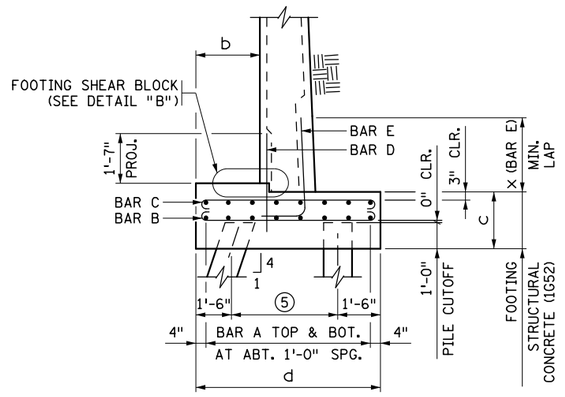
(F BARRIER AND 2" COPING OPTION SHOWN)



DETAIL "B"



TYPICAL SECTION THROUGH SPREAD FOOTING



TYPICAL SECTION THROUGH PILE FOOTING

NOTES:

REFER TO RETAINING WALL PANEL TABULATIONS FOR DIMENSIONS "a" THROUGH "x".

STEM REINFORCEMENT IS TO BE SYMMETRICALLY/EQUALLY SPACED BETWEEN STEM JOINTS.

FOOTING REINFORCEMENT SYMMETRICAL ABOUT STEM JOINT ABOVE UNLESS OTHERWISE NOTED. SEE RETAINING WALL TABLES FOR PILE SPACING AND LAYOUT.

BF DENOTES BACK FACE.
FF DENOTES FRONT FACE.
EF DENOTES EACH FACE.

(1) STRAIGHT LINE BETWEEN ELEVATIONS SHOWN ON WALL ELEVATION (EXCEPT FOR STEPPED CONDITIONS). IF A BARRIER OR PARAPET IS NOT USED, TOPS OF RETAINING WALL COULD BE USED.

(2) TYPE I DRAINAGE. SEE SECTION A-A ON STANDARD PLAN 5-297.624 (5 OF 6).

(3) TYPE II DRAINAGE. SEE SECTION B-B ON STANDARD PLAN 5-297.624 (5 OF 6).

(4) SEE STANDARD PLAN 5-297.624 (1 OF 6).

(5) SEE GENERAL PLAN FOR PILE SPACING.

(6) AT THE CONTRACTOR'S OPTION, PANEL LENGTH MAY VARY UP TO ± 1'-0". BAR CUTTING LISTS SHALL BE REVISED ACCORDINGLY BY THE CONTRACTOR.

(7) 5" BOTTOM OF FOOTING CLEARANCE FOR ALL BARS EXCEPT BAR D. BAR D BOTTOM OF FOOTING CLEARANCE VARIES.

(8) REFER TO DETAIL "C" AND NOTES ON STANDARD PLAN 5-297.624 (1 OF 6).

(9) REBAR AND CONCRETE ARE INCLUDED IN THE PAY ITEM BY LINEAR FEET FOR THE BARRIER OR PARAPET.

(10) WALL THICKNESS AT TOP OF STEM, NOT INCLUDING COPING. REFER TO STANDARD FIGURE 5-297.624 (1 OF 6) FOR MODIFIED TOP OF WALL THICKNESS WHEN USING TYPE S BARRIER.

REVISION: SEPTEMBER 1, 2016

APPROVED: AUGUST 27, 2014

Nancy Daubenberger
STATE BRIDGE ENGINEER

MINNESOTA DEPARTMENT OF TRANSPORTATION

STANDARD PLAN 5-297.621 | 1 OF 1

APPROVED: 8-27-2014
REVISED: 9-1-2016

STATE DESIGN ENGINEER

RETAINING WALL REINFORCEMENT DETAILS (SHORT WALLS)

MISSISSIPPI RIVER BOULEVARD CROSSING SHEET NO. S102 OF S131 SHEETS

DATE: 4/1/2021 TIME: 3:30:19 PM
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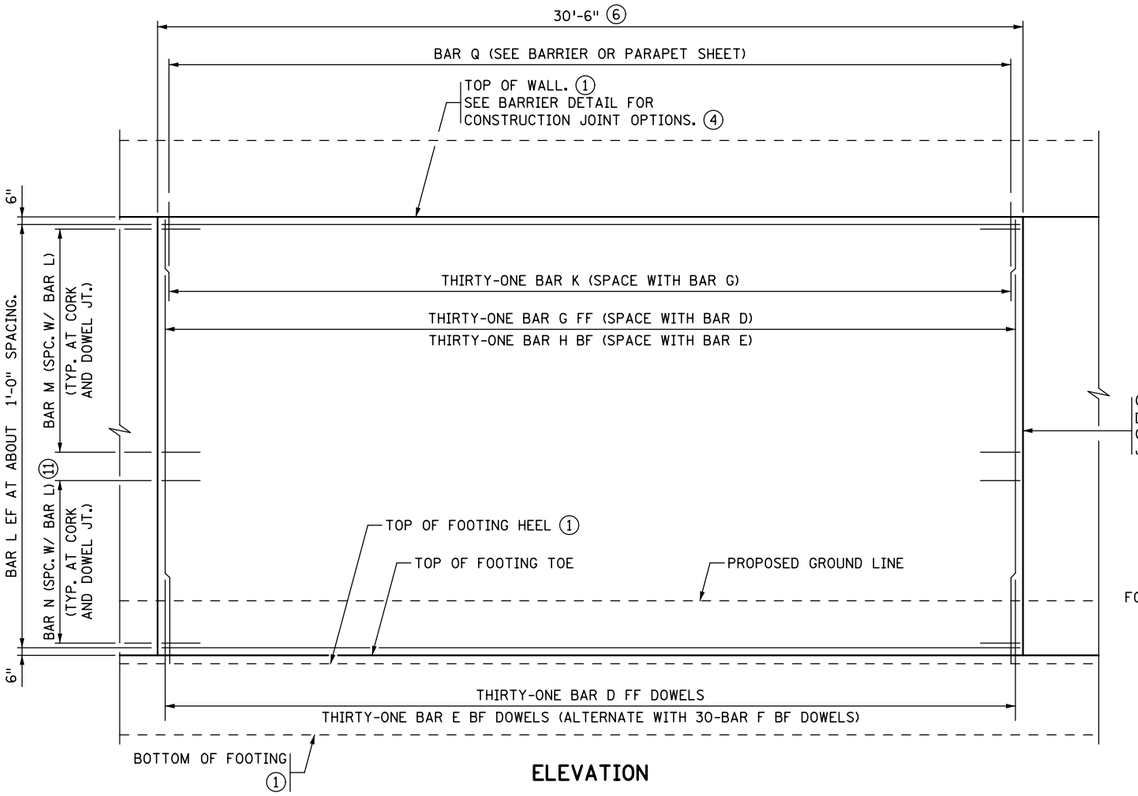
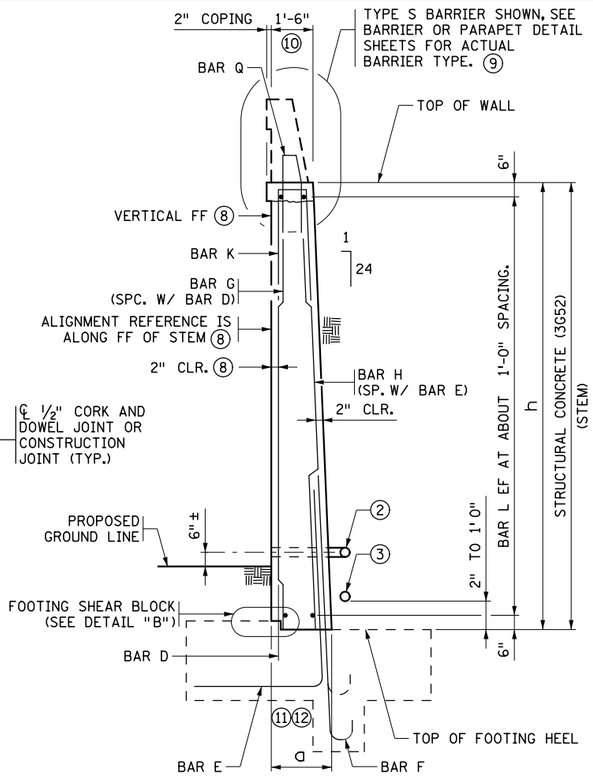
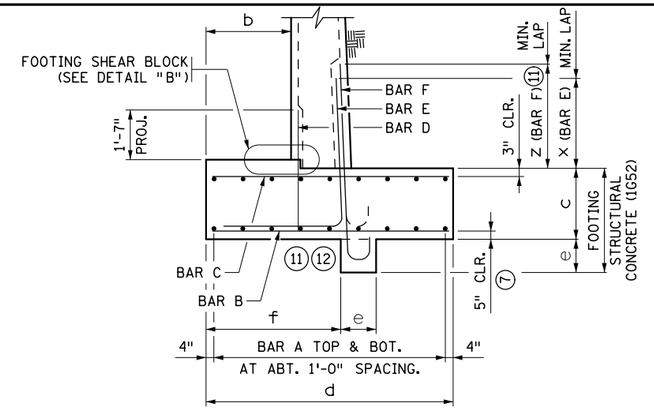


ELEVATION

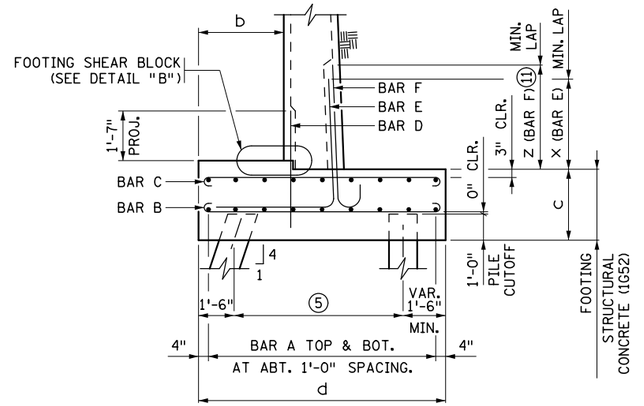


WALL SECTION

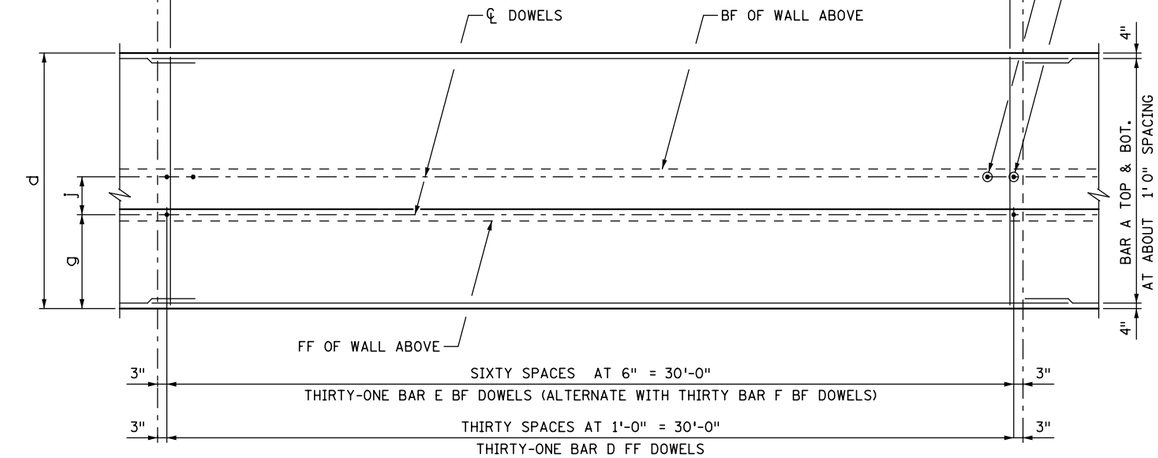
(F BARRIER AND 2" COPING OPTION SHOWN)



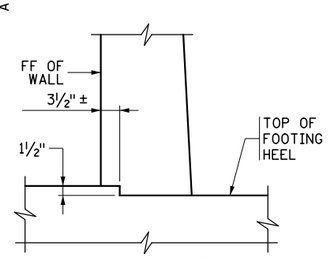
TYPICAL SECTION THROUGH SPREAD FOOTING



TYPICAL SECTION THROUGH PILE FOOTING



FOOTING PLAN ~ REINFORCEMENT



DETAIL "B"

NOTES:

REFER TO RETAINING WALL PANEL TABULATIONS FOR DIMENSIONS "a" THROUGH "x".

STEM REINFORCEMENT IS TO BE SYMMETRICALLY/EQUALLY SPACED BETWEEN STEM JOINTS.

FOOTING REINFORCEMENT SYMMETRICAL ABOUT STEM JOINT ABOVE UNLESS OTHERWISE NOTED. SEE RETAINING WALL TABLES FOR PILE SPACING AND LAYOUT.

BF DENOTES BACK FACE.
FF DENOTES FRONT FACE.
EF DENOTES EACH FACE.

(1) STRAIGHT LINE BETWEEN ELEVATIONS SHOWN ON WALL ELEVATION (EXCEPT FOR STEPPED CONDITIONS). IF A BARRIER OR PARAPET IS NOT USED, TOPS OF RETAINING WALL COULD BE USED.

(2) TYPE I DRAINAGE. SEE SECTION A-A ON STANDARD PLAN 5-297.624 (5 OF 6).

(3) TYPE II DRAINAGE. SEE SECTION B-B ON STANDARD PLAN 5-297.624 (5 OF 6).

(4) SEE STANDARD PLAN 5-297.624 (1 OF 6).

(5) SEE GENERAL PLAN FOR PILE SPACING.

(6) AT THE CONTRACTOR'S OPTION, PANEL LENGTH MAY VARY UP TO ± 1'-0". BAR CUTTING LISTS SHALL BE REVISED ACCORDINGLY BY THE CONTRACTOR.

(7) 5" BOTTOM OF FOOTING CLEARANCE FOR ALL BARS EXCEPT BAR D. BAR D BOTTOM OF FOOTING CLEARANCE VARIES.

(8) REFER TO DETAIL "C" AND NOTES ON STANDARD PLAN 5-297.624 (1 OF 6).

(9) REBAR AND CONCRETE ARE INCLUDED IN THE PAY ITEM BY LINEAR FEET FOR THE BARRIER OR PARAPET.

(10) WALL THICKNESS AT TOP OF STEM, NOT INCLUDING COPING. REFER TO STANDARD FIGURE 5-297.624 (1 OF 6) FOR MODIFIED TOP OF WALL THICKNESS WHEN USING TYPE S BARRIER.

(11) THIS FEATURE MAY NOT BE PRESENT ON ALL MEDIUM HEIGHT WALLS.

(12) CONTRACTOR MAY CONSTRUCT KEYWAY WITHOUT FORMS, AS APPROVED BY THE ENGINEER.

REVISION: SEPTEMBER 1, 2016

APPROVED: AUGUST 27, 2014
Nancy Daubenberger
STATE BRIDGE ENGINEER

MINNESOTA DEPARTMENT OF TRANSPORTATION

STANDARD PLAN 5-297.622 | 1 OF 1

APPROVED: 8-27-2014
REVISED: 9-1-2016

STATE DESIGN ENGINEER

RETAINING WALL REINFORCEMENT DETAILS (MEDIUM WALLS)

MISSISSIPPI RIVER BOULEVARD CROSSING SHEET NO. S103 OF S131 SHEETS

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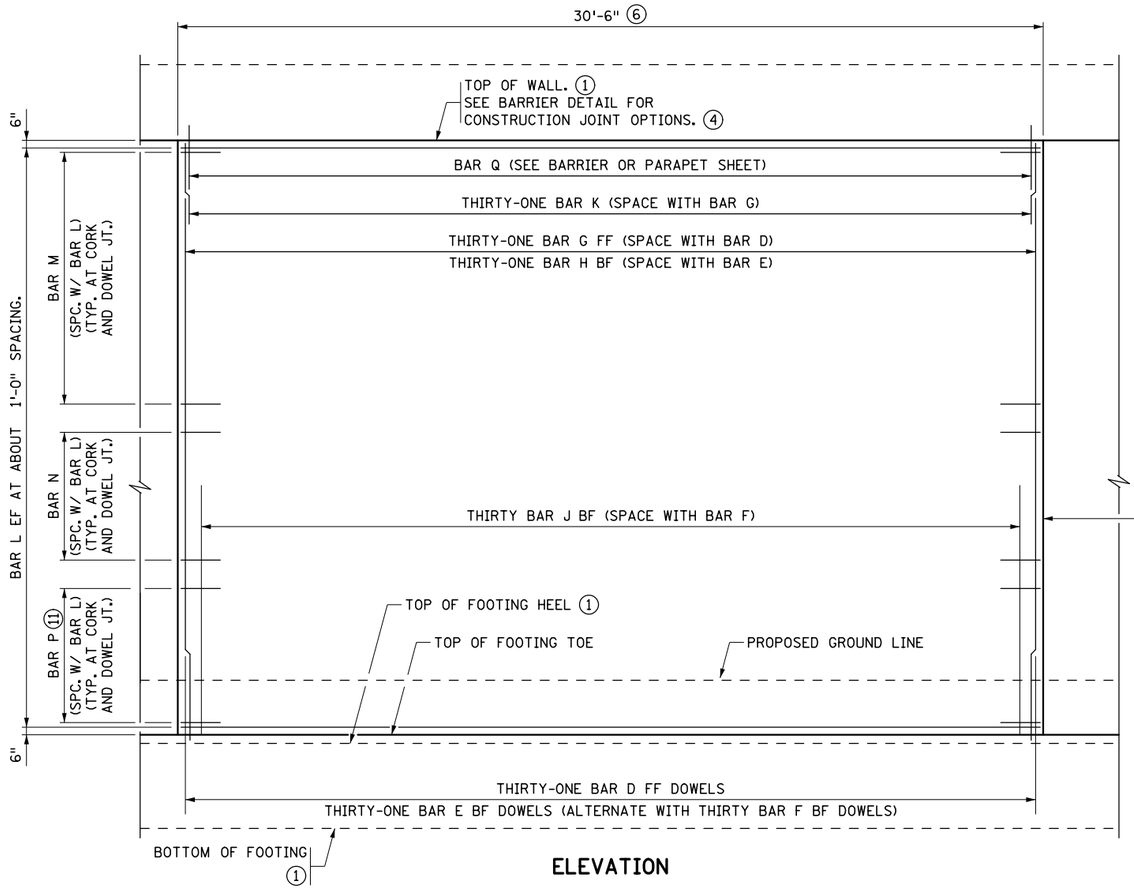
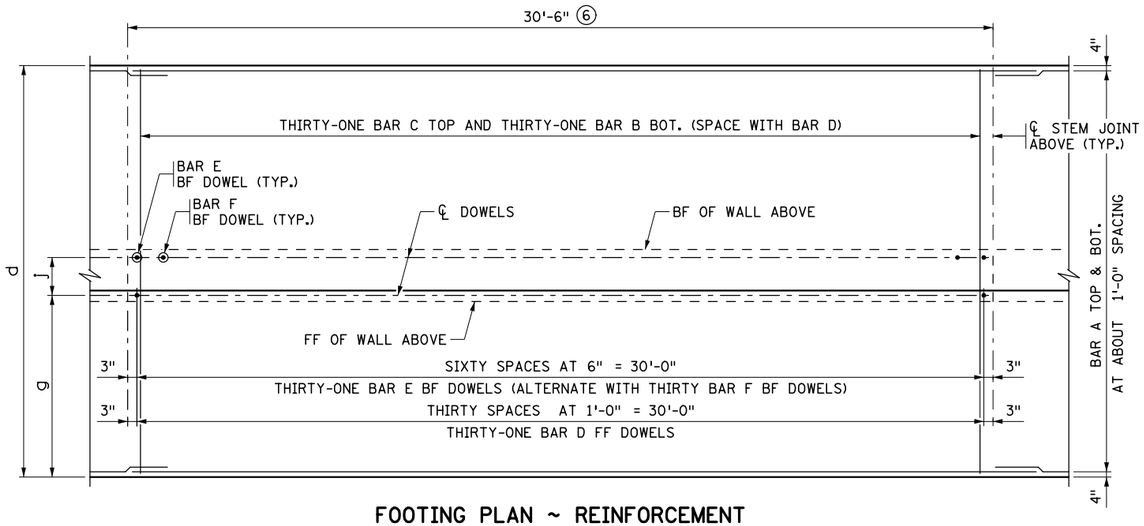
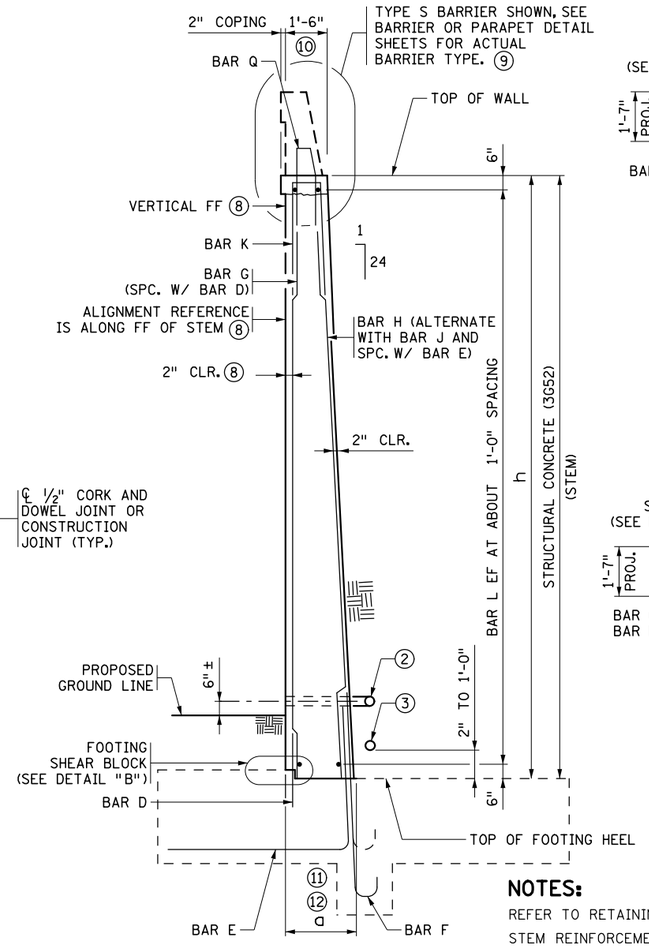


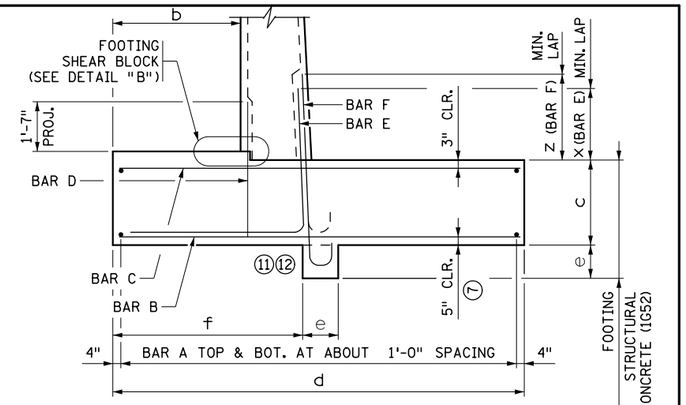
ELEVATION



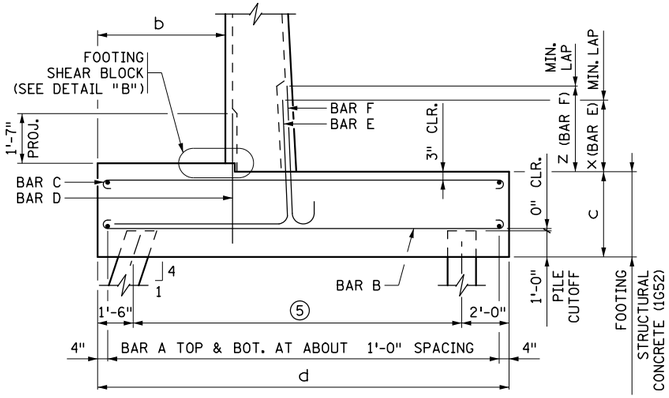
FOOTING PLAN ~ REINFORCEMENT



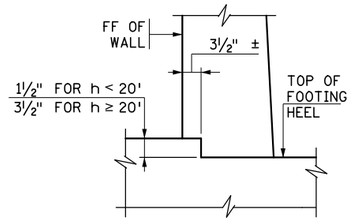
WALL SECTION
(F BARRIER AND 2" COPING OPTION SHOWN)



TYPICAL SECTION THROUGH SPREAD FOOTING



TYPICAL SECTION THROUGH PILE FOOTING



DETAIL "B"

NOTES:

REFER TO RETAINING WALL PANEL TABULATIONS FOR DIMENSIONS "a" THROUGH "x".

STEM REINFORCEMENT IS TO BE SYMMETRICALLY/EQUALLY SPACED BETWEEN STEM JOINTS.

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BF DENOTES BACK FACE.
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(1) STRAIGHT LINE BETWEEN ELEVATIONS SHOWN ON WALL ELEVATION (EXCEPT FOR STEPPED CONDITIONS). IF A BARRIER OR PARAPET IS NOT USED, TOPS OF RETAINING WALL COULD BE USED.

(2) TYPE I DRAINAGE. SEE SECTION A-A ON STANDARD PLAN 5-297.624 (5 OF 6).

(3) TYPE II DRAINAGE. SEE SECTION B-B ON STANDARD PLAN 5-297.624 (5 OF 6).

(4) SEE STANDARD PLAN 5-297.624 (1 OF 6).

(5) SEE GENERAL PLAN FOR PILE SPACING.

(6) AT THE CONTRACTOR'S OPTION, PANEL LENGTH MAY VARY UP TO ± 1'-0". BAR CUTTING LISTS SHALL BE REVISED ACCORDINGLY BY THE CONTRACTOR.

(7) 5" BOTTOM OF FOOTING CLEARANCE FOR ALL BARS EXCEPT BAR D. BAR D BOTTOM OF FOOTING CLEARANCE VARIES.

(8) REFER TO DETAIL "C" AND NOTES ON STANDARD PLAN 5-297.624 (1 OF 6).

(9) REBAR AND CONCRETE ARE INCLUDED IN THE PAY ITEM BY LINEAR FEET FOR THE BARRIER OR PARAPET.

(10) WALL THICKNESS AT TOP OF STEM, NOT INCLUDING COPING. REFER TO STANDARD FIGURE 5-297.624 (1 OF 6) FOR MODIFIED TOP OF WALL THICKNESS WHEN USING TYPE S BARRIER.

(11) THIS FEATURE MAY NOT BE PRESENT ON ALL TALL HEIGHT WALLS.

(12) CONTRACTOR MAY CONSTRUCT KEYWAY WITHOUT FORMS, AS APPROVED BY THE ENGINEER.

REVISION: SEPTEMBER 1, 2016

APPROVED: AUGUST 27, 2014
Nancy Daubenberger
STATE BRIDGE ENGINEER

MINNESOTA DEPARTMENT OF TRANSPORTATION

STANDARD PLAN 5-297.623 | 1 OF 1

APPROVED: 8-27-2014
REVISED: 9-1-2016

STATE DESIGN ENGINEER

RETAINING WALL REINFORCEMENT DETAILS (TALL WALLS)

MISSISSIPPI RIVER BOULEVARD CROSSING SHEET NO. S104 OF S131 SHEETS

DATE: 4/1/2021 TIME: 3:30:36 PM
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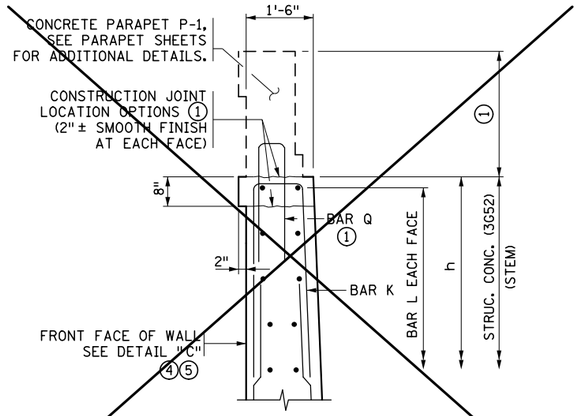
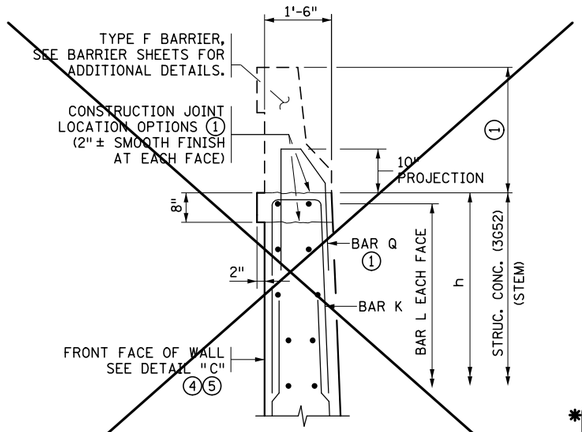


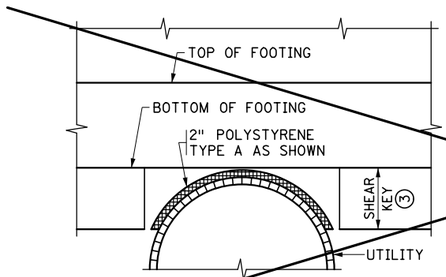
CONCRETE PARAPET P-1 DETAIL

2" COPING OPTION SHOWN

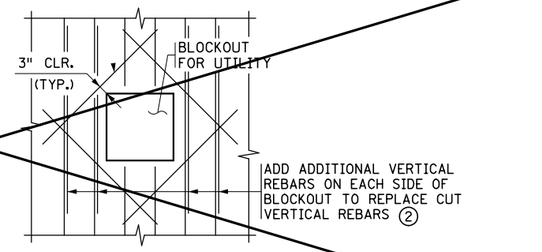


TYPE F BARRIER DETAIL

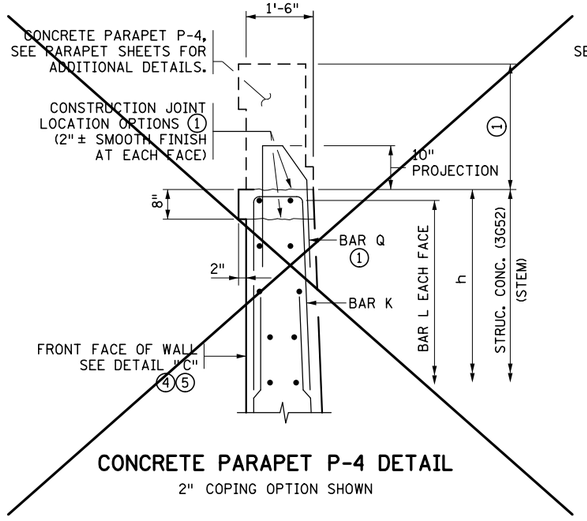
2" COPING OPTION SHOWN



PIPE UNDER SPREAD FOOTING (THROUGH SHEAR KEY)



UTILITY BLOCKOUT DETAIL



CONCRETE PARAPET P-4 DETAIL

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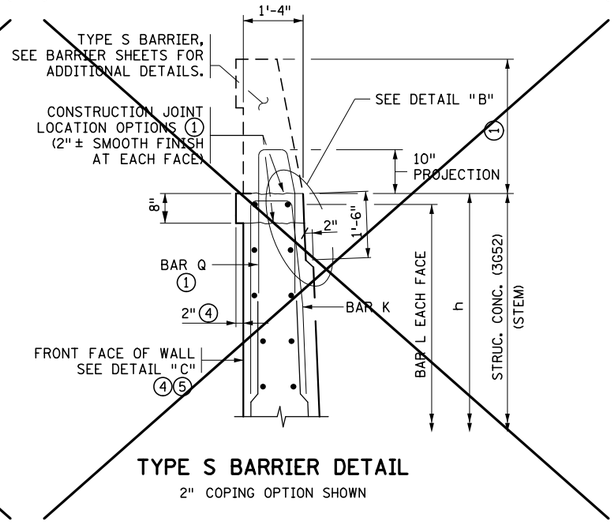

TYPE S BARRIER DETAIL

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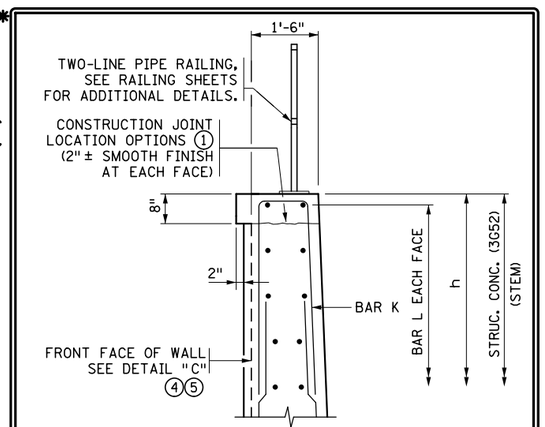
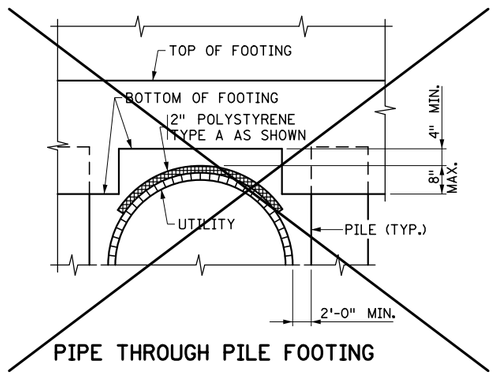
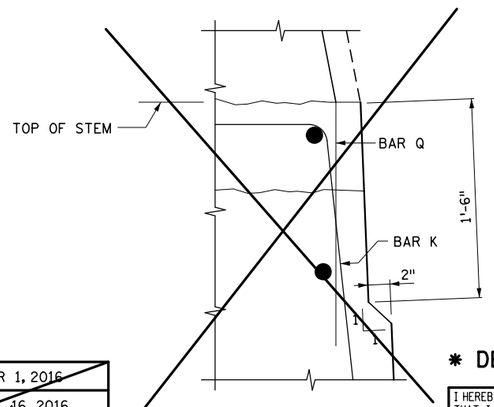


TWO-LINE PIPE RAILING DETAIL

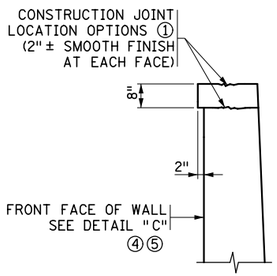
2" COPING OPTION SHOWN



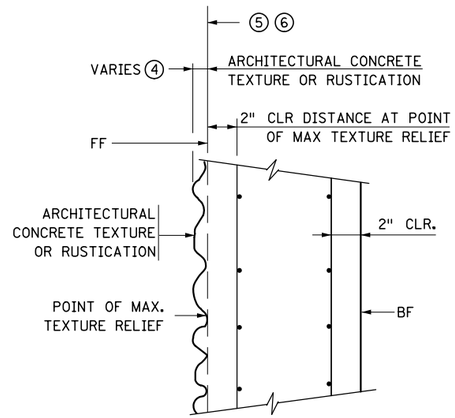
PIPE THROUGH PILE FOOTING



DETAIL "B"



COPING DETAIL



DETAIL "C"

NOTES:

* ARCHITECTURAL TREATMENT OPTION ON FRONT FACE OF RETAINING WALL, INCLUDING COPING OR HORIZONTAL REVEL OPTION TO BE DETERMINED BY CITY.

(1) REFER TO PARAPET OR BARRIER SHEETS FOR ADDITIONAL INFORMATION INCLUDING Q BAR PLACEMENT DETAILS, AND PAYMENT.

~~(2) FIELD CUT/ADJUST VERTICAL AND HORIZONTAL REINFORCEMENT AS NECESSARY TO CLEAR BLOCKOUT. PLACE REINFORCEMENT AS SHOWN.~~

~~(3) MODIFY AS NEEDED FOR INTERRUPTION.~~

(4) THE THICKNESS OF THE ARCHITECTURAL CONCRETE TEXTURE VARIES WITH THE TEXTURE RELIEF. THE STRUCTURAL CONCRETE QUANTITIES DO NOT INCLUDE THE MATERIAL WITHIN THE ARCHITECTURAL CONCRETE TEXTURE. MATERIAL NEEDED FOR THE TEXTURING SHALL BE INCIDENTAL. SEE SPECIAL PROVISIONS 2411. TEXTURE RELIEF TO ADHERE TO NCHRP REPORT 554 CRASH BARRIER GUIDANCE WHENEVER THE WALL FACE IS INSIDE OR NEAR THE CLEAR ZONE.

* (5) FOR RETAINING WALLS THAT ABUT A STRUCTURE, NOTE THAT THE DESIGNATION OF "FRONT FACE" MAY VARY FROM THE STRUCTURE PLANS TO THE RETAINING WALL PLANS.

(6) DATA FOR BASELINE GEOMETRY IS TABULATED FOR WALL ALIGNMENT, SEE LAYOUT SHEETS. WALL ALIGNMENT REFERENCE IS ALONG FRONT FACE OF WALL.

MODIFIED

* DENOTES MODIFICATION FROM STANDARD PLAN

REVISION: SEPTEMBER 1, 2016

APPROVED: FEBRUARY 16, 2016

STATE BRIDGE ENGINEER

I HEREBY CERTIFY THAT THIS SHEET WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA

CERTIFIED BY Lindsey J. Lawrence LIC. NO. 48298 DATE 4/2/2021

LINDSEY J. LAWRENCE

~~STANDARD SHEET NO. 5-297.624 (1 OF 6)~~

~~STANDARD APPROVED: FEBRUARY 16, 2016~~

~~REVISION DATE 9-1-16~~

TITLE: RETAINING WALL MISCELLANEOUS DETAILS

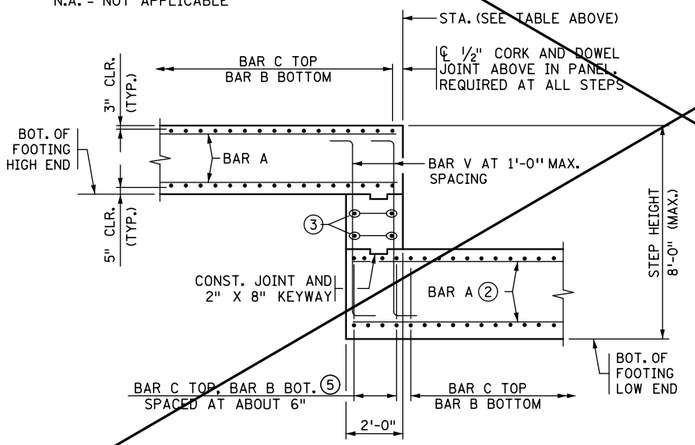
MISSISSIPPI RIVER BOULEVARD CROSSING SHEET NO. S105 OF S131 SHEETS

DATE: 4/1/2021 TIME: 3:30:44 PM
FILENAME: K:\nr-z\StPaul-Parks\RecV792\002\04_Production\01_CAD\08_MicroStation\Bridge\General\wr_general05.dgn

BILL OF REINFORCEMENT FOR STEPPED FOOTING DETAILS ①②

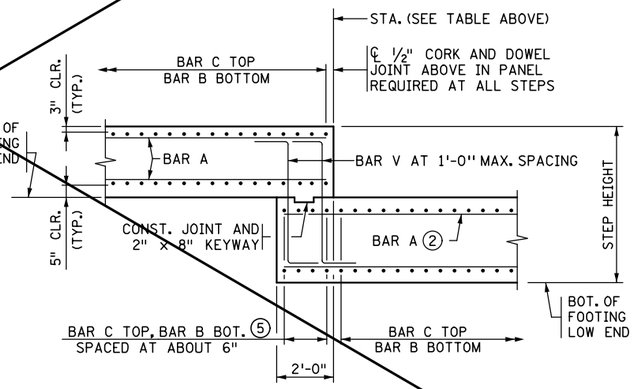
STATION	STEP TYPE (VAR. OR MIN.)	JOINT	BOT. OF FOOTING EL. LOW END	BOT. OF FOOTING EL. HIGH END	BAR (B, C, V)	MARK	NO.	LENGTH	A- DIMENSION
					B (8)				N.A.
					C (8)		4		N.A.
					V (7)				
					B (8)				N.A.
					C (8)		4		N.A.
					V (7)				
					B (8)				N.A.
					C (8)		4		N.A.
					V (7)				

N.A. = NOT APPLICABLE



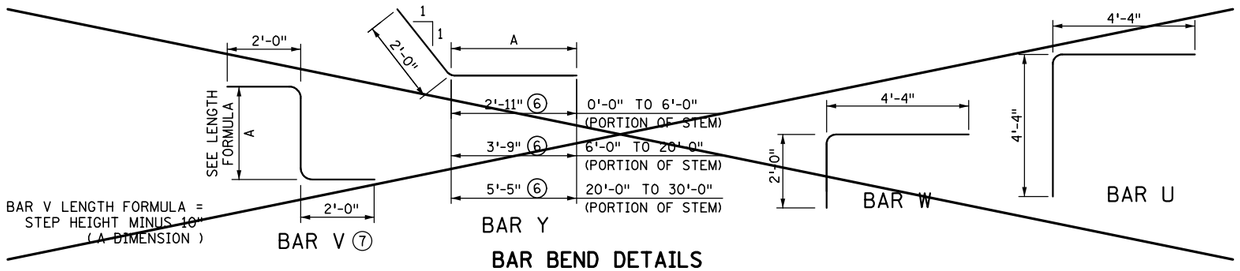
STEPPED FOOTING DETAIL - LONGIT. SECTION ①②

VARIABLE STEP TYPE
(SPREAD FOOTING SHOWN)



STEPPED FOOTING DETAIL - LONGIT. SECTION ①②

MINIMUM STEP TYPE
(SPREAD FOOTING SHOWN)



BAR BEND DETAILS

NOTES:

~~ADDITIONAL REINFORCING BARS, STRUCTURAL CONCRETE, AND OTHER COMPONENTS REQUIRED TO CONSTRUCT CORNERS AND STEPPED FOOTINGS ARE INCIDENTAL.~~

* ① SEE PANEL TABULATIONS FOR REINFORCEMENT INFORMATION.

~~② FOR THE LOWER OF THE TWO FOOTINGS AT A STEP, THE CONTRACTOR IS RESPONSIBLE FOR MODIFYING THE LENGTH OF FOOTING BAR A TO EXTEND BENEATH THE STEP OR USE SPLICED BARS.~~

~~③ 6 INCH MAX. SPACING. BARS TO BE SAME SIZE AND LENGTH AS BAR B OF THE LOWER FOOTING.~~

④ REFER TO DETAIL "C" AND NOTES ON STANDARD PLAN 5-297.624 (1 OF 6).

~~⑤ REFER TO TABLE LABELED "BILL OF REINFORCEMENT FOR STEPPED FOOTING DETAILS" FOR ADDITIONAL B AND C BARS IN LOWER FOOTING.~~

~~⑥ USE THE BAR Y LEG DIMENSION FOR THE PORTION OF STEM LOCATION INDICATED IN THE BAR BEND IN DETAIL. (0'-0" REPRESENTS TOP OF THE STEM).~~

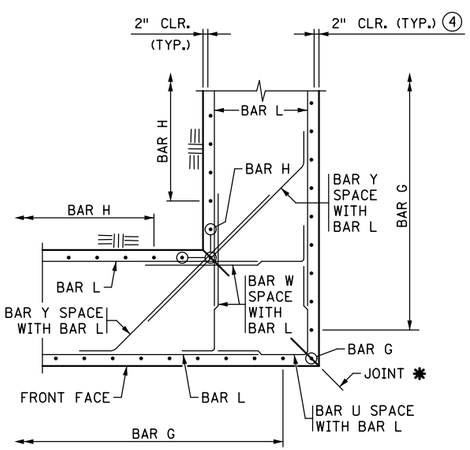
~~⑦ BAR V SIZE TO MATCH BAR B. SEE PANEL TABULATIONS FOR SIZE.~~

~~⑧ SEE PANEL TABULATIONS FOR BAR SIZE AND LENGTH.~~

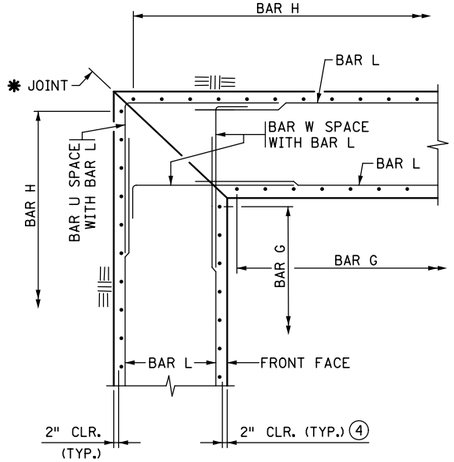
BILL OF REINFORCEMENT FOR CORNER DETAILS ①

STATION	JOINT	INSIDE OR OUTSIDE CORNER	BAR	MARK	NO.	LENGTH	SHAPE	A- DIMENSION
100+10.23	A02	INSIDE	U	C4 E		8'-8"	⌐	N.A.
			W	C4 E		6'-4"	⌐	N.A.
			Y	C4 E		4'-11"	⌞	2'-11"
			Y	C4 E		5'-9"	⌞	3'-9"
			Y	C4 E		7'-5"	⌞	5'-5"
100+24.39	A03	INSIDE	U	C4 E		8'-8"	⌐	N.A.
			W	C4 E		6'-4"	⌐	N.A.
			Y	C4 E		4'-11"	⌞	2'-11"
			Y	C4 E		5'-9"	⌞	3'-9"
			Y	C4 E		7'-5"	⌞	5'-5"
100+47.59	A04	INSIDE	U	C4 E		8'-8"	⌐	N.A.
			W	C4 E		6'-4"	⌐	N.A.
			Y	C4 E		4'-11"	⌞	2'-11"
			Y	C4 E		5'-9"	⌞	3'-9"
			Y	C4 E		7'-5"	⌞	5'-5"
31+18.60	F02	OUTSIDE	U	C4 E		8'-8"	⌐	N.A.
			W	C4 E		6'-4"	⌐	N.A.
			Y	C4 E		4'-11"	⌞	2'-11"
			Y	C4 E		5'-9"	⌞	3'-9"
			Y	C4 E		7'-5"	⌞	5'-5"
20+29.53	G03	INSIDE	U	C4 E		8'-8"	⌐	N.A.
			W	C4 E		6'-4"	⌐	N.A.
			Y	C4 E		4'-11"	⌞	2'-11"
			Y	C4 E		5'-9"	⌞	3'-9"
			Y	C4 E		7'-5"	⌞	5'-5"
20+37.68	G04	INSIDE	U	C4 E		8'-8"	⌐	N.A.
			W	C4 E		6'-4"	⌐	N.A.
			Y	C4 E		4'-11"	⌞	2'-11"
			Y	C4 E		5'-9"	⌞	3'-9"
			Y	C4 E		7'-5"	⌞	5'-5"

N.A. = NOT APPLICABLE



OUTSIDE ANGLED ✱ CORNER DETAIL - PLAN VIEW ①



INSIDE ANGLED ✱ CORNER DETAIL - PLAN VIEW ①

MODIFIED

REVISION: SEPTEMBER 1, 2016

APPROVED: AUGUST 27, 2014

Nancy Daubenberger
STATE BRIDGE ENGINEER

* DENOTES MODIFICATION FROM STANDARD PLAN

I HEREBY CERTIFY THAT THIS SHEET WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA

CERTIFIED BY Lindsey J. Lawrence LIC. NO. 48298 DATE 4/2/2021
LINDSEY J. LAWRENCE

STANDARD SHEET NO. 5-297.624 (2 OF 6)

STANDARD APPROVED: AUGUST 27, 2014

TITLE: RETAINING WALL MISCELLANEOUS DETAILS

REVISION DATE 9-1-16

MISSISSIPPI RIVER BOULEVARD CROSSING SHEET NO. S106 OF S131 SHEETS

DATE: 4/1/2021 TIME: 3:30:53 PM
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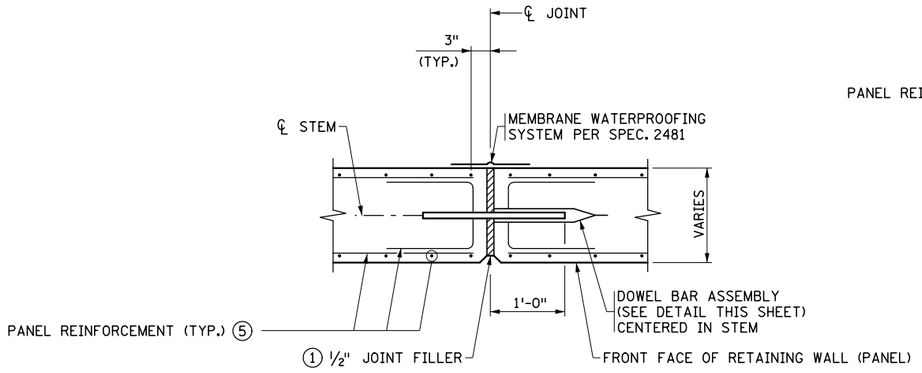
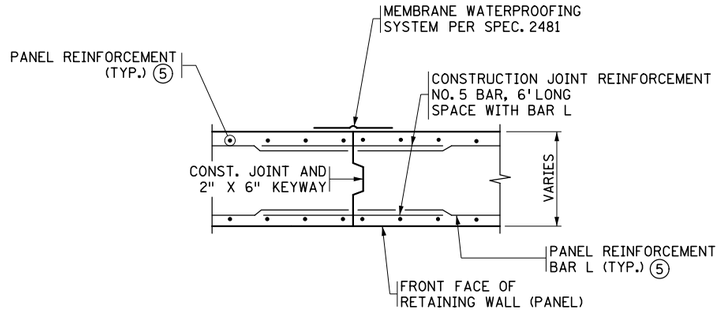


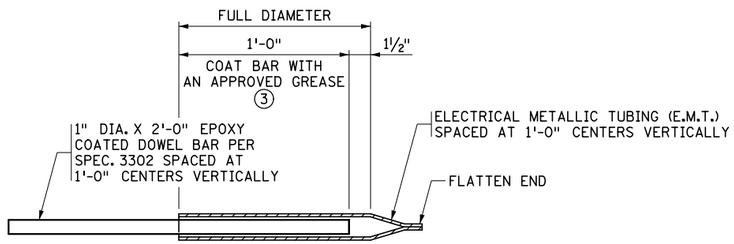
CORK AND DOWELED JOINT DETAIL

(TYPICAL SECTION THROUGH JOINT)
②④

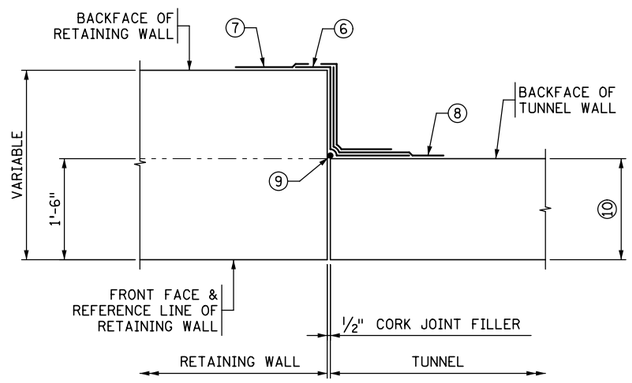


CONSTRUCTION JOINT DETAIL

(TYPICAL SECTION THROUGH JOINT)
②④



DOWEL BAR ASSEMBLY

* 

SPECIAL RETAINING WALL JOINT WATERPROOFING DETAIL

(APPLIES TO CAST-IN-PLACE RETAINING WALL TO TUNNEL JOINTS)
(WALLS C, E & G)

NOTES:

⑥ MEMBRANE WATERPROOFING SYSTEM PER SPEC. 2481.3.B EXCEPT STRIP SHALL BE 24" WIDE TO ALLOW MOVEMENT. PLACE FULL HEIGHT OF JOINT. INCIDENTAL.

⑦ GEOTEXTILE FILTER TYPE II ATTACHED TO RETAINING WALL. DO NOT ATTACH TO TUNNEL. MIN. LAP 2'-0". PLACE FULL HEIGHT OF JOINT. INCIDENTAL.

⑧ GEOTEXTILE FILTER TYPE II ATTACHED TO TUNNEL. DO NOT ATTACH TO RETAINING WALL. MIN. LAP 2'-0". PLACE FULL HEIGHT OF JOINT. INCIDENTAL.

⑨ 1" BACKER ROD. INCIDENTAL.

⑩ SEE TUNNEL PLANS FOR TUNNEL GEOMETRY.

NOTES:

THE MATERIALS AND PLACEMENT OF THE CORK AND DOWEL JOINT/ CONSTRUCTION JOINT (DOWEL BAR ASSEMBLIES, NO. 5 REINFORCING BARS, JOINT FILLER, AND JOINT WATERPROOFING) ARE INCIDENTAL.

THE CONTRACTOR SHALL ASSIGN TO THE REINFORCING BAR SUPPLIER THE RESPONSIBILITY OF SUPPLYING THE NECESSARY MATERIALS ASSOCIATED WITH THE DETAILS SHOWN ON THIS SHEET.

① JOINT FILLER SHALL BE CORK SPEC. 2401.3.E.3.

② AT THE CONTRACTOR'S OPTION, CONSTRUCTION JOINTS MAY BE SUBSTITUTED IN LIEU OF CORK AND DOWEL JOINTS. REINFORCEMENT QUANTITIES WERE COMPUTED ASSUMING A CORK AND DOWEL JOINT BETWEEN EVERY PANEL. CHANGES IN THE BILL OF REINFORCEMENT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR, AND NO ADDITIONAL PAYMENT WILL BE MADE. AT A MINIMUM, PLACE CORK AND DOWEL JOINTS EVERY 91'-6". A CORK AND DOWEL JOINT IS REQUIRED AT ALL VERTICAL FOOTING STEPS.

③ GREASE SHALL BE AN APPROVED HIGH PRESSURE TYPE THAT IS EFFECTIVE OVER THE FULL RANGE OF EXPECTED TEMPERATURES AND RESISTANT TO CHEMICAL ACTION.

④ DOWEL BAR ASSEMBLY MUST BE PLACED PERPENDICULAR TO JOINT AND PARALLEL TO THE WALL FACE, AND TO EACH OTHER.

⑤ SEE PANEL SHEETS FOR REINFORCING DETAILS.

MODIFIED

REVISION: SEPTEMBER 1, 2016
APPROVED: AUGUST 27, 2014
Nancy Daubenberger
STATE BRIDGE ENGINEER

* DENOTES MODIFICATION FROM STANDARD PLAN

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CERTIFIED BY Lindsey J. Lawrence LIC. NO. 48298 DATE 4/2/2021
LINDSEY J. LAWRENCE

REVISION DATE 9-1-16

STANDARD SHEET NO. 5-297.624 (3 OF 6)
STANDARD APPROVED: AUGUST 27, 2014
TITLE: RETAINING WALL MISCELLANEOUS DETAILS

MISSISSIPPI RIVER BOULEVARD CROSSING SHEET NO. S107 OF S131 SHEETS

DATE: 4/1/2021 TIME: 3:31:01 PM
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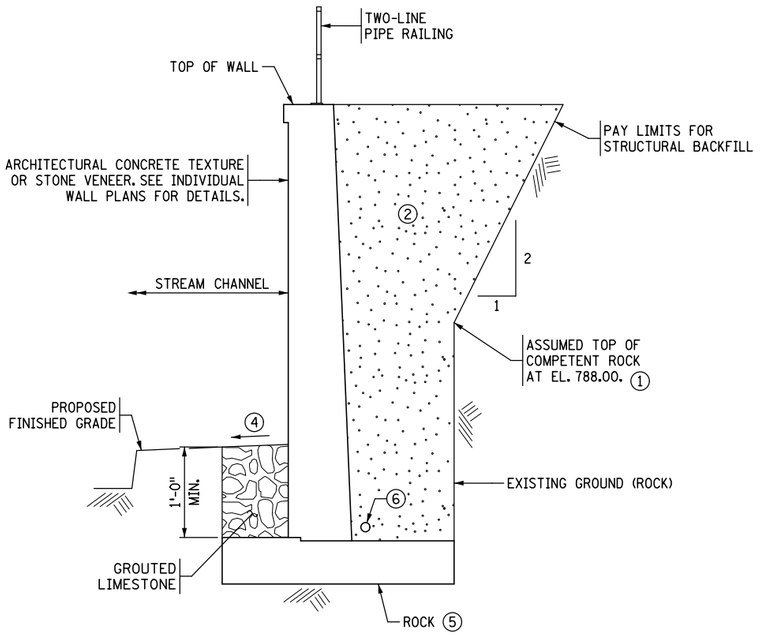
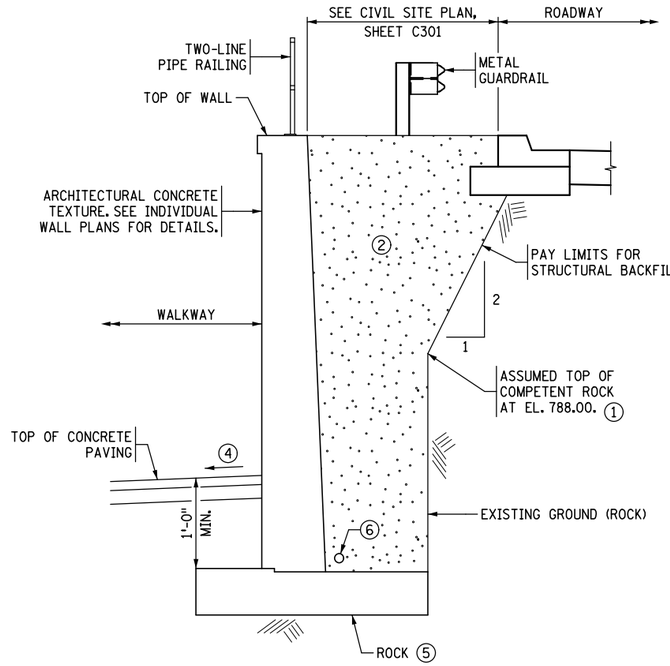


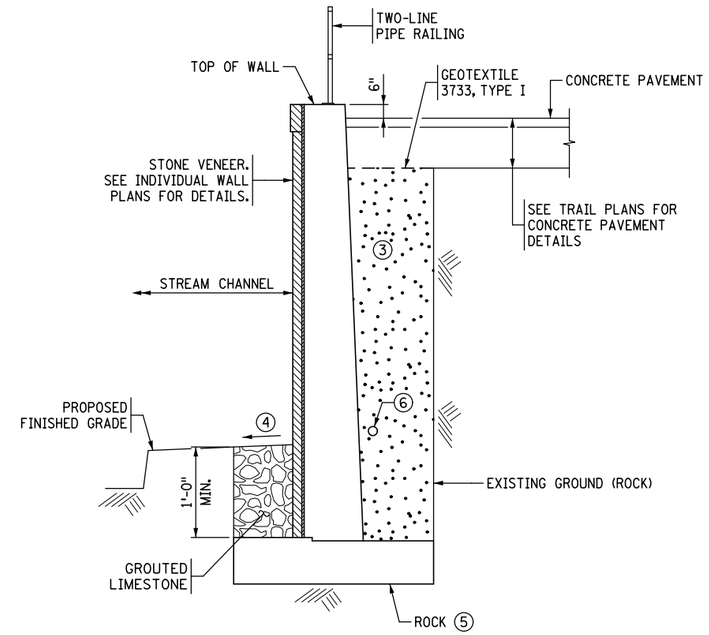
SPREAD FOOTING ON ROCK - WALLS A, E & G

NOT DRAWN TO SCALE



SPREAD FOOTING ON ROCK - WALL C

NOT DRAWN TO SCALE



SPREAD FOOTING ON ROCK - WALL F

NOT DRAWN TO SCALE

NOTES:

(1) TOP OF COMPETENT ROCK TO BE DETERMINED BY GEOTECHNICAL REPRESENTATIVE ON SITE DURING CONSTRUCTION.

(2) STRUCTURAL BACKFILL (SPEC. 3149.2.D.2) COMPACT BACKFILL TO SPECIFIED DENSITY METHOD SPEC. 2105.3.F.1.

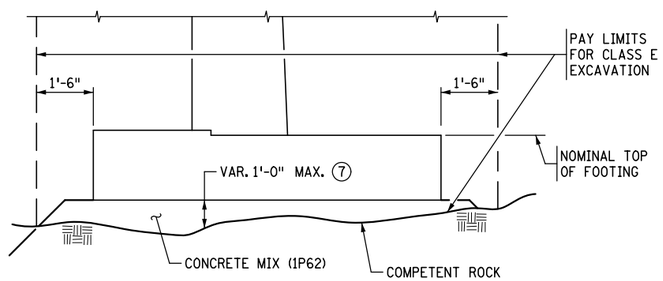
(3) BACKFILL WITH COARSE AGGREGATE BEDDING. SEE SPECIAL PROVISIONS.

(4) PROVIDE SLOPE OF 1V:24H TO 1V:4H FOR PROPER DRAINAGE.

(5) EXCAVATE TO COMPETENT ROCK. IF COMPETENT ROCK IS LOWER THAN PROPOSED BOTTOM OF FOOTING ELEVATION A LEAN CONCRETE MIX SHALL BE PLACED TO PROVIDE A LEVEL BOTTOM SURFACE ELEVATION. CONCRETE FILL IS INCIDENTAL TO FOOTING CONCRETE. SEE "LEAN CONCRETE BACKFILL OPTION" DETAIL ON THIS SHEET. LEVEL FOUNDATION SURFACE AND CLEAR SURFACE OF LOOSE DEBRIS BEFORE PLACING FOUNDATION DIRECTLY ON ROCK.

(6) SEE WALL DRAINAGE SHEET FOR DETAILS.

(7) CONTACT ENGINEER IF DISTANCE TO COMPETENT ROCK EXCEEDS 1'-0".



LEAN CONCRETE BACKFILL OPTION

NO.	DATE	BY	DESCRIPTION OF REVISIONS

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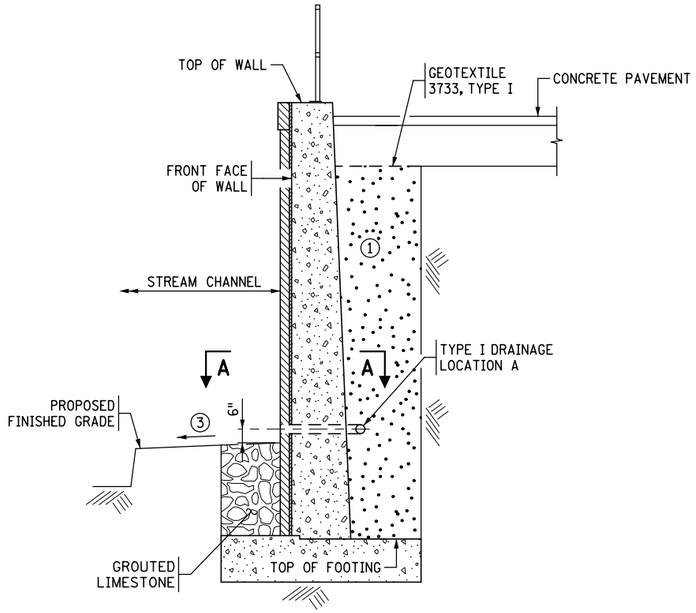
SIGNATURE: Lindsey J. Lawrence
PRINTED NAME: LINDSEY J. LAWRENCE
DATE: 4/2/2021 LIC. NO. 48298

TKDA
444 Cedar Street, Suite 1500
Saint Paul, MN 55101
651.292.4400
tkda.com

RETAINING WALL PLANS
GEOTECHNICAL DETAILS

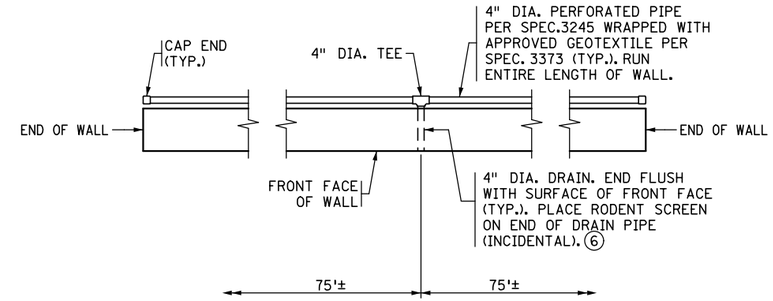
MISSISSIPPI RIVER BOULEVARD CROSSING

Sheet No. S108 of S131 Sheets



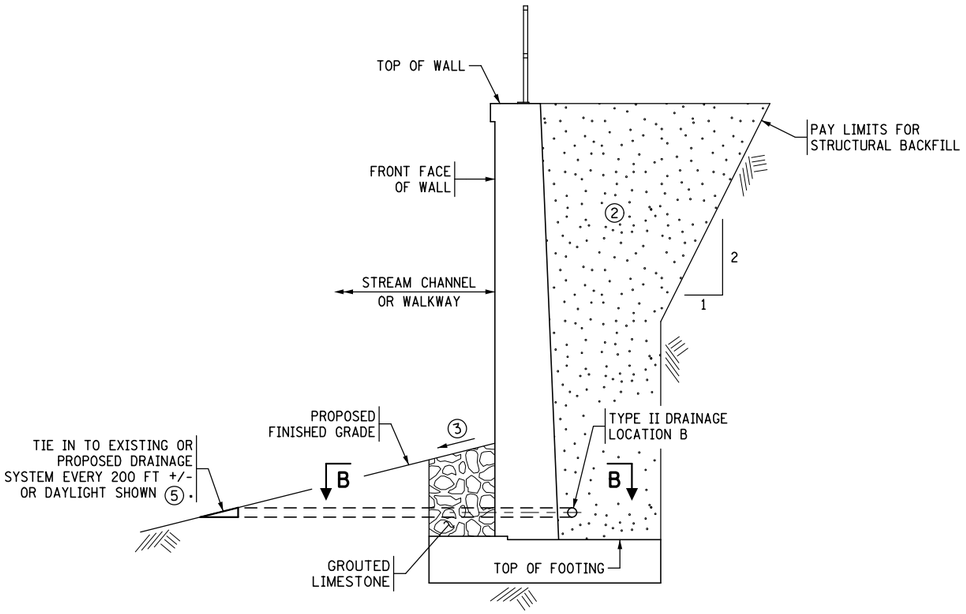
TYPICAL DRAINAGE SYSTEM DETAILS (TYPE I DRAINAGE) ④

(REFER TO SECTION A-A)
(WALL F)



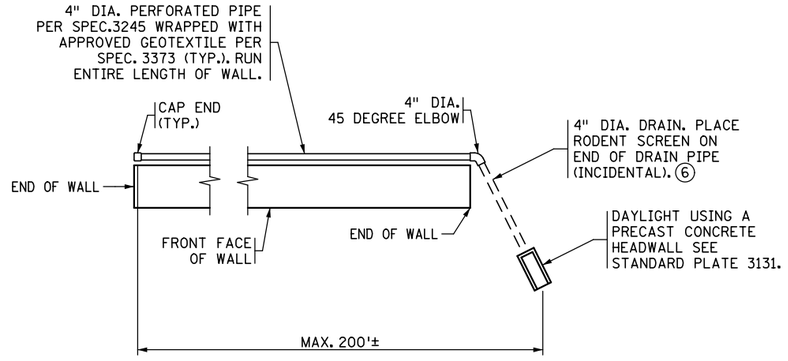
SECTION A-A

TYPE I DRAINAGE DETAIL, LOCATION A



TYPICAL DRAINAGE SYSTEM DETAILS (TYPE II DRAINAGE)

(REFER TO SECTION B-B)
(WALLS A, C, E & G)



SECTION B-B

TYPE II DRAINAGE DETAIL, LOCATION B

NOTES:

BACKFILL MATERIAL SHALL COMPLETELY SURROUND PIPE AT ALL TIMES.

SLOPE PIPE TO ENSURE PROPER DRAINAGE AT ALL TIMES.

DRAINAGE SYSTEM PAID BY LUMP SUM PER SPEC. 2502.

① BACKFILL WITH COARSE AGGREGATE BEDDING. SEE SPECIAL PROVISIONS.

② STRUCTURAL BACKFILL. SEE SHEET 5-297.620. COMPACT BACKFILL TO SPECIFIED DENSITY METHOD SPEC. 2105.3.F.1.

③ PROVIDE SLOPE OF 1V:24H TO 1V:4H FOR PROPER DRAINAGE.

④ DRAINAGE SYSTEMS INSTALLED AT LOCATION A SHALL NOT BE USED WHEN A SIDEWALK, TRAIL, OR ROADWAY IS LOCATED ADJACENT TO THE FRONT FACE OF THE WALL TO PREVENT PONDING OR ICE ACCUMULATION.

⑤ TYPE II LOCATION B DRAINAGE MAY DAYLIGHT DIRECTLY USING PRECAST CONCRETE HEADWALLS OR BE TIED INTO DRAINAGE SYSTEM.

⑥ THE RODENT SCREEN SHALL BE FABRICATED FROM CARBON STEEL FLATTENED EXPANDED METAL, STYLE ½" NO. 4F. IT SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION.

DATE: 4/1/2021 TIME: 3:53:13 PM
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NO.	DATE	BY	DESCRIPTION OF REVISIONS

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DATE: 4/2/2021 LIC. NO. 48298

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RETAINING WALL PLANS
DRAINAGE DETAILS

MISSISSIPPI RIVER BOULEVARD CROSSING

Sheet No. S109 of S131 Sheets

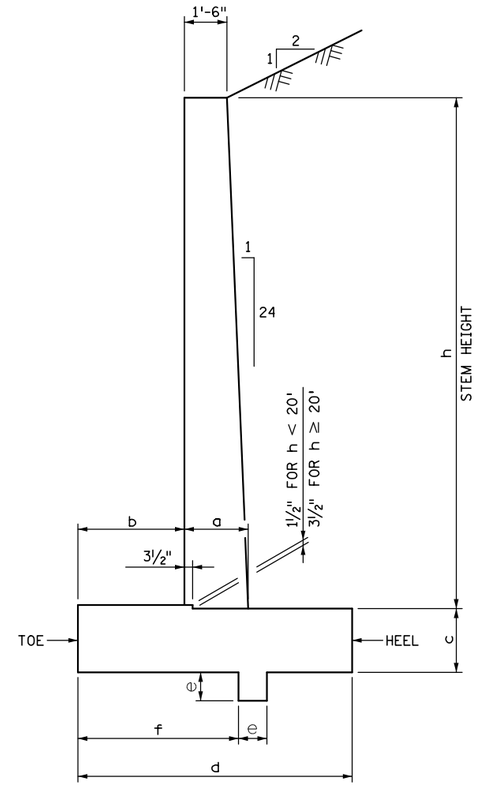
SPREAD FOOTING DIMENSIONS AND SOIL STRESSES
1(V) : 2(H) SLOPED FILL

SHORT WALL (5'-10")
MEDIUM WALL (11'-18")
TALL WALL (19'-27")

WALL GEOMETRICS AND DATA - SPREAD FOOTING							QUANTITIES PER FOOT - SPREAD FOOTING					EQUIVALENT UNIFORM BEARING STRESS				EQUIVALENT VARIABLE (TRAPEZOIDAL) BEARING STRESS	
							STRUCTURAL CONCRETE		REINFORCEMENT			SERVICE		STRENGTH 1		STRENGTH	
STEM HEIGHT DIM. h	STEM WIDTH DIM. a	TOE WIDTH DIM. b	FOOTING THICKNESS DIM. c	FOOTING WIDTH DIM. d	SHEAR KEY SIZE DIM. e	SHEAR KEY LOCATION DIM. f	1G52 FOOTING (CU. YD.)	3G52 STEM (CU. YD.)	PLAIN (POUND)	EPOXY (POUND)	WALL DETAILING SCHEME	EFFECTIVE WIDTH B'	EFFECTIVE STRESS KSF	EFFECTIVE WIDTH B'	EFFECTIVE STRESS KSF	STRESS AT TOE KSF	STRESS AT HEEL KSF
5	1'-8½"	9"	1'-5"	3'-3"	N.A.	N.A.	0.18	0.30	14.9	31.1	SHORT	2'-4⅝"	1.33	1'-10¾"	1.85	2.46	0.10
6	1'-9"	11"	1'-5"	3'-8"	N.A.	N.A.	0.20	0.36	15.7	34.7	SHORT	2'-7⅝"	1.53	2'-0½"	2.14	2.86	0.03
7	1'-9½"	1'-1"	1'-5"	4'-5"	N.A.	N.A.	0.24	0.43	19.6	39.0	SHORT	3'-3½"	1.63	2'-7½"	2.28	3.03	0.19
8	1'-10"	1'-3"	1'-5"	5'-2"	N.A.	N.A.	0.28	0.49	23.4	42.5	SHORT	3'-11½"	1.75	3'-2⅝"	2.43	3.21	0.34
9	1'-10½"	1'-5"	1'-5"	5'-11"	N.A.	N.A.	0.32	0.56	27.2	46.1	SHORT	4'-7¾"	1.86	3'-9⅞"	2.59	3.40	0.49
10	1'-11"	1'-7"	1'-5"	6'-8"	N.A.	N.A.	0.36	0.63	28.8	52.2	SHORT	5'-3⅞"	1.99	4'-5⅛"	2.76	3.59	0.64
11	1'-11½"	1'-9"	1'-5"	7'-5"	N.A.	N.A.	0.40	0.70	35.9	61.5	MEDIUM	6'-0⅛"	2.11	5'-0½"	2.93	3.79	0.78
12	2'-0"	1'-11"	1'-5"	8'-2"	N.A.	N.A.	0.44	0.78	44.3	65.2	MEDIUM	6'-8½"	2.24	5'-7⅞"	3.11	4.00	0.92
13	2'-0½"	2'-1"	1'-5"	8'-11"	N.A.	N.A.	0.48	0.85	54.3	69.5	MEDIUM	7'-4⅞"	2.36	6'-3¼"	3.29	4.20	1.07
14	2'-1"	2'-3"	1'-5"	8'-11"	1'-4"	3'-7½"	0.55	0.93	54.3	75.7	MEDIUM	7'-1⅞"	2.61	5'-10½"	3.65	4.76	0.86
15	2'-1½"	2'-6"	1'-5"	8'-11"	1'-4"	3'-11"	0.55	1.01	54.3	85.7	MEDIUM	6'-10⅝"	2.81	5'-5¼"	3.98	5.26	0.58
16	2'-2"	2'-9"	1'-5"	8'-11"	1'-4"	4'-2½"	0.55	1.09	54.3	95.7	MEDIUM	6'-7⅛"	3.05	4'-11⅜"	4.36	5.81	0.24
17	2'-2½"	3'-0"	1'-7"	9'-2"	1'-6"	4'-6"	0.64	1.17	61.6	108.0	MEDIUM	6'-6¾"	3.30	4'-8⅞"	4.83	6.44	0.00
18	2'-3"	3'-6"	1'-7"	9'-6"	2'-0"	5'-0½"	0.72	1.25	67.4	118.5	MEDIUM	6'-10⅜"	3.35	4'-10½"	4.98	6.65	0.00
19	2'-3½"	3'-9"	1'-9"	10'-1"	2'-2"	5'-4"	0.85	1.33	68.0	136.3	TALL	7'-3⅝"	3.51	5'-2¼"	5.24	6.99	0.00
20	2'-4"	4'-0"	1'-9"	10'-7"	2'-6"	5'-7½"	0.96	1.42	75.0	151.7	TALL	7'-8¾"	3.63	5'-6"	5.42	7.23	0.00
21	2'-4½"	4'-4"	1'-9"	11'-1"	2'-6"	6'-0"	1.00	1.50	79.7	160.8	TALL	8'-1½"	3.71	5'-9"	5.57	7.43	0.00
22	2'-5"	4'-8"	1'-11"	11'-8"	2'-6"	6'-4½"	1.11	1.59	82.7	180.0	TALL	8'-6¾"	3.84	6'-0½"	5.78	7.71	0.00
23	2'-5½"	5'-0"	2'-0"	12'-4"	2'-6"	6'-9"	1.20	1.68	99.1	210.3	TALL	9'-2"	3.91	6'-6¼"	5.85	7.80	0.00
24	2'-6"	5'-4"	2'-2"	12'-10"	2'-6"	7'-1½"	1.32	1.77	111.0	233.9	TALL	9'-5⅝"	4.06	6'-8"	6.14	8.19	0.00
25	2'-6½"	5'-8"	2'-3"	13'-4"	2'-6"	7'-6"	1.41	1.87	114.3	266.3	TALL	9'-9¾"	4.17	6'-10⅜"	6.37	8.50	0.00
26	2'-7"	6'-0"	2'-5"	13'-11"	2'-6"	7'-10½"	1.55	1.96	120.3	302.3	TALL	10'-3"	4.30	7'-1¾"	6.59	8.79	0.00
27	2'-7½"	6'-4"	2'-6"	14'-6"	2'-6"	8'-3"	1.65	2.06	109.9	371.1	TALL	10'-8¾"	4.39	7'-5⅞"	6.74	8.98	0.00

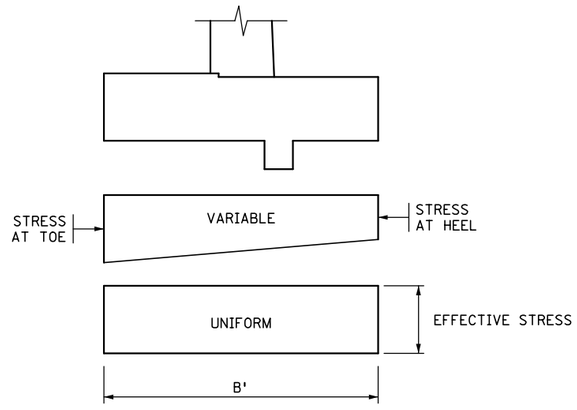
N.A. = NOT APPLICABLE

NOTE:
EPOXY REINFORCEMENT QUANTITY ASSUMES A CORK AND DOWEL JOINT IS USED ON BOTH PANEL ENDS.
THE QUANTITY MUST BE ADJUSTED WHEN CONSTRUCTION JOINTS ARE USED.



TYPICAL SECTION

REINFORCEMENT - SPREAD FOOTING				
	STEM	FOOTING		
STEM HEIGHT h	DOWEL SIZE AND SPACING	TOE (BOTTOM TRANSVERSE)	HEEL (TOP TRANSVERSE)	LONGITUDINAL (TOP AND BOT.)
		BAR SIZE & SPA.	BAR SIZE & SPA.	BAR SIZE & SPA.
5	5 @ 12"	5 @ 12"	5 @ 12"	5 @ 12"
6	5 @ 12"	5 @ 12"	5 @ 12"	5 @ 12"
7	5 @ 12"	5 @ 12"	5 @ 12"	5 @ 12"
8	5 @ 12"	5 @ 12"	5 @ 12"	5 @ 12"
9	5 @ 12"	5 @ 12"	5 @ 12"	5 @ 12"
10	5 @ 12"	5 @ 12"	5 @ 12"	5 @ 12"
11	5 @ 12"	5 @ 12"	6 @ 12"	5 @ 12"
12	5 @ 12"	5 @ 12"	7 @ 12"	5 @ 12"
13	5 @ 12"	5 @ 12"	8 @ 12"	5 @ 12"
14	5 @ 12"	5 @ 12"	8 @ 12"	5 @ 12"
15	5 @ 12"	5 @ 12"	8 @ 12"	5 @ 12"
16	5 @ 12"	5 @ 12"	8 @ 12"	5 @ 12"
17	6 @ 12"	5 @ 12"	9 @ 12"	5 @ 12"
18	6 @ 12"	6 @ 12"	9 @ 12"	5 @ 12"
19	7 @ 12"	6 @ 12"	9 @ 12"	5 @ 12"
20	7 @ 12"	6 @ 12"	9 @ 12"	5 @ 12"
21	7 @ 12"	6 @ 12"	9 @ 12"	5 @ 12"
22	8 @ 12"	6 @ 12"	9 @ 12"	5 @ 12"
23	8 @ 12"	6 @ 12"	10 @ 12"	5 @ 12"
24	8 @ 12"	7 @ 12"	10 @ 12"	5 @ 12"
25	9 @ 12"	7 @ 12"	10 @ 12"	5 @ 12"
26	10 @ 12"	7 @ 12"	10 @ 12"	5 @ 12"
27	11 @ 12"	5 @ 12"	10 @ 12"	5 @ 12"



BEARING STRESS
(SEE TABLE ABOVE)

REVISION: SEPTEMBER 1, 2016
APPROVED: AUGUST 27, 2014
Nancy Daubenberger
STATE BRIDGE ENGINEER

MINNESOTA DEPARTMENT OF TRANSPORTATION

STANDARD PLAN 5-297.631 | 1 OF 2

APPROVED: 8-27-2014
REVISED: 9-1-2016

STATE DESIGN ENGINEER

RETAINING WALL 1(V) : 2(H) SLOPED FILL
SPREAD FOOTING GEOMETRY AND DATA

MISSISSIPPI RIVER BOULEVARD CROSSING SHEET NO. S110 OF S131 SHEETS

DATE: 4/1/2021 TIME: 3:31:29 PM
FILENAME: K:\Pr-2\StPaul-ParksRec\792\002\04_Production\01_CAD\08_MicroStation\Bridge\General\wr_generall.dgn

WALL LOADING CASE:
LIVE LOAD SURCHARGE

SHORT WALL (5'-9')
MEDIUM WALL (10'-16')
TALL WALL (17'-27')

WALL GEOMETRICS AND DATA - SPREAD FOOTING					QUANTITIES PER FOOT - SPREAD FOOTING					EQUIVALENT UNIFORM BEARING STRESS				EQUIVALENT VARIABLE (TRAPEZOIDAL) BEARING STRESS	
					STRUCTURAL CONCRETE		REINFORCEMENT			SERVICE		STRENGTH 1		STRENGTH	
STEM HEIGHT DIM. h	STEM WIDTH DIM. a	TOE WIDTH DIM. b	FOOTING THICKNESS DIM. c	FOOTING WIDTH DIM. d	1G52 FOOTING (CU. YD.)	3G52 STEM (CU. YD.)	PLAIN (POUND)	EPOXY (POUND)	WALL DETAILING SCHEME	EFFECTIVE WIDTH B'	EFFECTIVE STRESS KSF	EFFECTIVE WIDTH B'	EFFECTIVE STRESS KSF	STRESS AT TOE KSF	STRESS AT HEEL KSF
5	1'-8½"	2'-7"	1'-5"	8'-6"	0.46	0.30	37	40	SHORT	7'-10⅞"	1.10	7'-9⅝"	1.53	1.06	1.75
6	1'-9"	2'-7"	1'-5"	8'-6"	0.46	0.36	37	43	SHORT	7'-11⅜"	1.21	7'-10⅝"	1.67	1.21	1.88
7	1'-9½"	2'-7"	1'-5"	8'-6"	0.46	0.43	37	48	SHORT	8'-0⅜"	1.31	8'-0"	1.79	1.39	1.98
8	1'-10"	2'-7"	1'-5"	8'-6"	0.46	0.49	37	51	SHORT	8'-1⅞"	1.40	8'-2"	1.91	1.61	2.05
9	1'-10½"	2'-7"	1'-5"	8'-6"	0.46	0.56	37	58	SHORT	8'-3⅝"	1.48	8'-4¼"	2.01	1.88	2.08
10	1'-11"	2'-7"	1'-5"	8'-6"	0.46	0.63	37	66	MEDIUM	8'-5⅞"	1.56	8'-5"	2.14	2.18	2.06
11	1'-11½"	2'-7"	1'-5"	8'-6"	0.46	0.70	37	70	MEDIUM	8'-3⅝"	1.71	8'-2"	2.37	2.54	2.01
12	2'-0"	2'-7"	1'-5"	8'-6"	0.46	0.78	41	74	MEDIUM	8'-0¾"	1.88	7'-10⅝"	2.62	2.96	1.90
13	2'-0½"	2'-7"	1'-5"	8'-6"	0.46	0.85	41	78	MEDIUM	7'-9⅝"	2.07	7'-6⅞"	2.90	3.43	1.74
14	2'-1"	2'-7"	1'-7"	8'-6"	0.51	0.93	41	86	MEDIUM	7'-5¾"	2.32	7'-2¼"	3.28	4.05	1.49
15	2'-1½"	2'-7"	1'-7"	8'-6"	0.51	1.01	45	96	MEDIUM	7'-2"	2.56	6'-10"	3.65	4.66	1.21
16	2'-2"	2'-7"	1'-9"	8'-6"	0.57	1.09	45	109	MEDIUM	6'-9⅜"	2.88	6'-4⅝"	4.16	5.46	0.80
17	2'-2½"	2'-9"	1'-9"	9'-0"	0.60	1.17	55	120	TALL	7'-2⅞"	2.98	6'-10"	4.30	5.62	0.90
18	2'-3"	3'-0"	1'-9"	9'-6"	0.63	1.25	56	128	TALL	7'-8⅝"	3.05	7'-3½"	4.39	5.72	1.02
19	2'-3½"	3'-2"	1'-9"	10'-0"	0.67	1.33	68	141	TALL	8'-2⅛"	3.15	7'-8¾"	4.53	5.89	1.12
20	2'-4"	3'-4"	1'-11"	10'-7"	0.79	1.42	70	156	TALL	8'-8½"	3.28	8'-3"	4.72	6.11	1.24
21	2'-4½"	3'-6"	1'-11"	11'-0"	0.82	1.50	74	176	TALL	9'-0½"	3.40	8'-6⅝"	4.89	6.34	1.27
22	2'-5"	3'-8"	2'-1"	11'-7"	0.94	1.59	77	195	TALL	9'-7"	3.53	9'-0⅞"	5.07	6.55	1.39
23	2'-5½"	3'-10"	2'-1"	12'-1"	0.98	1.68	82	223	TALL	10'-0½"	3.63	9'-6¼"	5.21	6.72	1.49
24	2'-6"	4'-0"	2'-3"	12'-7"	1.10	1.77	95	253	TALL	10'-5⅜"	3.78	9'-10⅞"	5.43	7.00	1.54
25	2'-6½"	4'-2"	2'-3"	13'-1"	1.14	1.87	100	264	TALL	10'-11"	3.88	10'-4¼"	5.57	7.16	1.64
26	2'-7"	4'-4"	2'-3"	13'-7"	1.18	1.96	103	300	TALL	11'-4⅝"	3.98	10'-9⅝"	5.71	7.33	1.75
27	2'-7½"	4'-6"	2'-5"	14'-1"	1.31	2.06	122	333	TALL	11'-9½"	4.13	11'-2⅛"	5.92	7.61	1.80
② 10	1'-11"	1'-1"	1'-5"	5'-0"	0.27	0.63	26	54	MEDIUM	N/A	N/A	N/A	N/A	4.57	2.49 ✱

REINFORCEMENT - SPREAD FOOTING				
STEM HEIGHT h	STEM	FOOTING		
	DOWEL SIZE AND SPACING	TOE (BOTTOM TRANSVERSE)	HEEL (TOP TRANSVERSE)	LONGITUDINAL (TOP AND BOT.)
		BAR SIZE & SPA.	BAR SIZE & SPA.	BAR SIZE & SPA.
5	5 @ 12"	5 @ 12"	5 @ 12"	5 @ 12"
6	5 @ 12"	5 @ 12"	5 @ 12"	5 @ 12"
7	5 @ 12"	5 @ 12"	5 @ 12"	5 @ 12"
8	5 @ 12"	5 @ 12"	5 @ 12"	5 @ 12"
9	5 @ 12"	5 @ 12"	5 @ 12"	5 @ 12"
10	5 @ 12"	5 @ 12"	5 @ 12"	5 @ 12"
11	5 @ 12"	5 @ 12"	5 @ 12"	5 @ 12"
12	5 @ 12"	5 @ 12"	6 @ 12"	5 @ 12"
13	5 @ 12"	5 @ 12"	6 @ 12"	5 @ 12"
14	5 @ 12"	5 @ 12"	6 @ 12"	5 @ 12"
15	6 @ 12"	5 @ 12"	7 @ 12"	5 @ 12"
16	6 @ 12"	5 @ 12"	7 @ 12"	5 @ 12"
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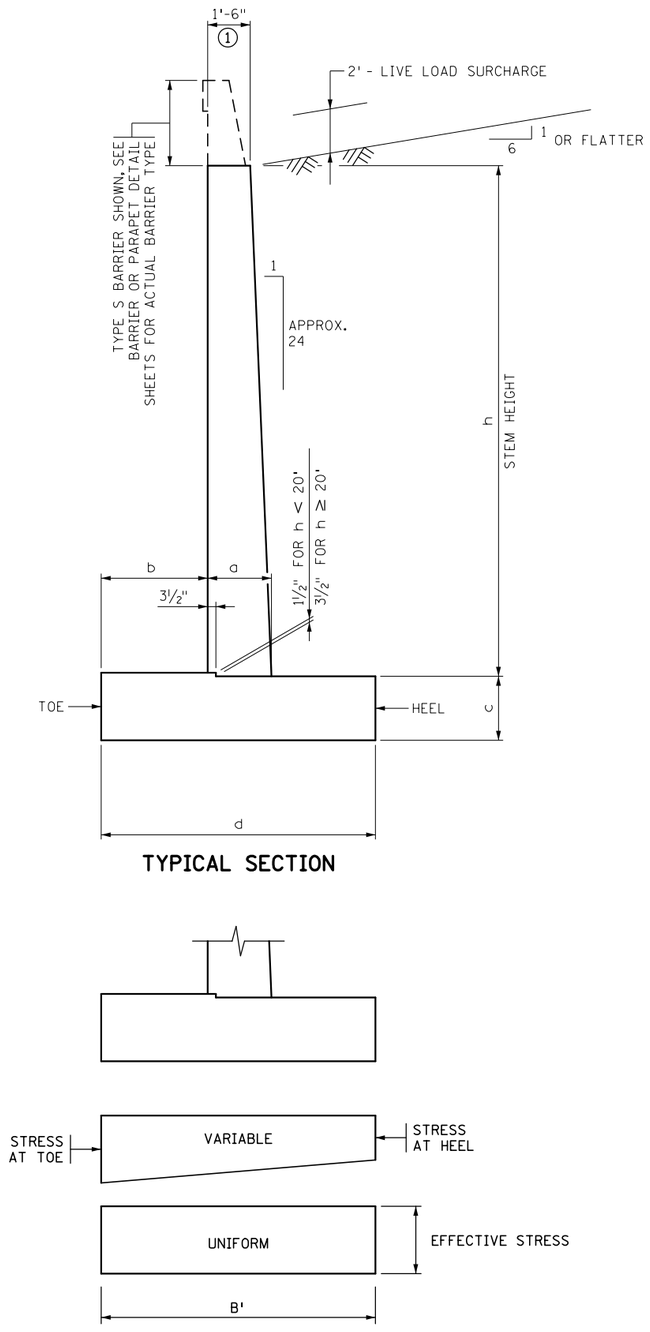
22	8 @ 12"	5 @ 12"	9 @ 12"	5 @ 12"
23	9 @ 12"	5 @ 12"	9 @ 12"	5 @ 12"
24	9 @ 12"	5 @ 12"	10 @ 12"	5 @ 12"
25	9 @ 12"	5 @ 12"	10 @ 12"	5 @ 12"
26	10 @ 12"	5 @ 12"	10 @ 12"	5 @ 12"
27	10 @ 12"	5 @ 12"	11 @ 12"	5 @ 12"

NOTES:

EPOXY REINFORCEMENT QUANTITY ASSUMES A CORK AND DOWEL JOINT IS USED ON BOTH PANEL ENDS. THE QUANTITY MUST BE ADJUSTED WHEN CONSTRUCTION JOINTS ARE USED. QUANTITIES ON THIS SHEET DO NOT INCLUDE BARRIER OR PARAPET. SEE BARRIER OR PARAPET SHEETS FOR REINFORCEMENT (EPOXY) AND BARRIER/PARAPET CONCRETE.

① WALL THICKNESS AT TOP OF STEM, NOT INCLUDING COPING. REFER TO STANDARD FIGURE 5-297.624 (1 OF 6) FOR MODIFIED TOP OF WALL THICKNESS WHEN USING TYPE S BARRIER.

✱② GEOMETRY AND DATA TO BE USED FOR WALL F.



TYPICAL SECTION

BEARING STRESS
(SEE TABLE ABOVE)

MODIFIED

✱ DENOTES MODIFICATION FROM STANDARD PLAN

REVISION: SEPTEMBER 1, 2016
APPROVED: AUGUST 27, 2014
NANCY DAUBENBERGER
STATE BRIDGE ENGINEER

I HEREBY CERTIFY THAT THIS SHEET WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA
CERTIFIED BY Lindsey J. Lawrence LIC. NO. 48298 DATE 4/2/2021
LINDSEY J. LAWRENCE

MINNESOTA DEPARTMENT OF TRANSPORTATION
STATE DESIGN ENGINEER

STANDARD PLAN ~~5-297.632~~ | 1 OF 2
APPROVED: ~~8-27-2014~~
REVISED: ~~9-1-2016~~

RETAINING WALL (LIVE LOAD SURCHARGE)
SPREAD FOOTING GEOMETRY AND DATA

MISSISSIPPI RIVER BOULEVARD CROSSING SHEET NO. S111 OF S131 SHEETS

DATE: 4/1/2021 TIME: 3:31:36 PM
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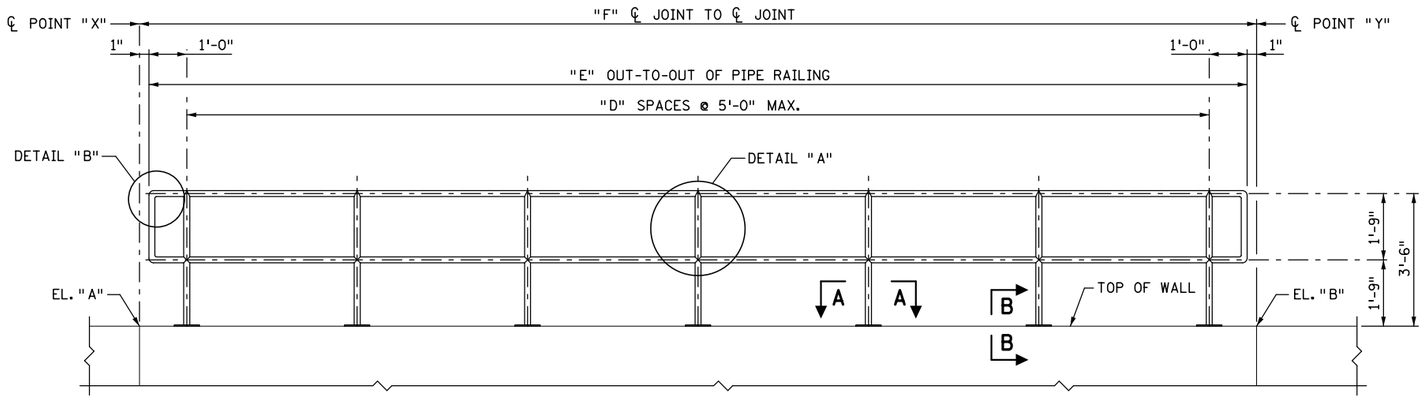
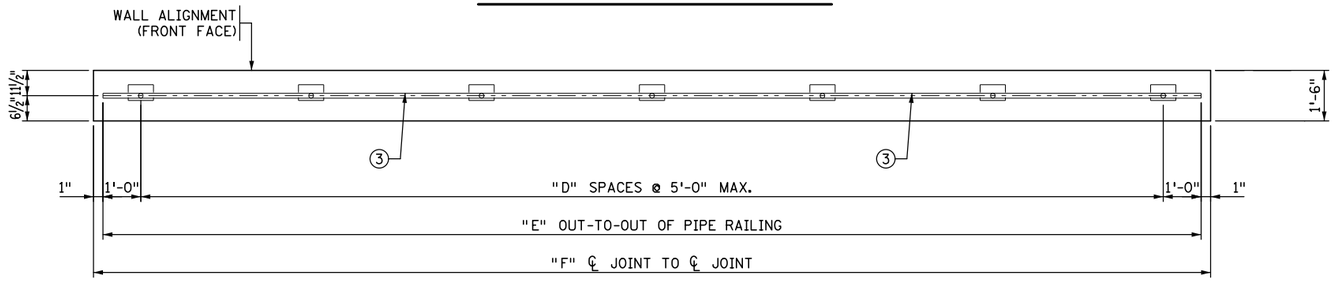


PIPE RAILING PANEL ELEVATION



PIPE RAILING PANEL PLAN

DIMENSIONS ARE MEASURED ALONG CENTERLINE RAILING.
SEE "PIPE RAILING TABULATIONS" SHEET FOR
INDIVIDUAL PIPE RAILING INFORMATION.

NOTES:

SEE "PIPE RAILING TABULATIONS" SHEET FOR POINT, ELEVATION AND DIMENSION INFORMATION.

FURNISH AND INSTALL POSTS AND RAILS WITH 1-1/2" NOM. DIA. STANDARD PIPE AT 2.72 LBS. PER LIN. FT., PER SPEC. 3362.

PROVIDE STRUCTURAL STEEL PER SPEC. 3306.

FABRICATE PER SPEC. 2471.

GALVANIZE BOLTS, NUTS, WASHERS, AND ANCHORS PER SPEC. 3392. GALVANIZE PLATES, SOLID BARS, PIPE RAILING, AND ALL OTHER STRUCTURAL STEEL PER SPEC. 3394, AFTER FABRICATION. PROVIDE VENT HOLES AS NECESSARY FOR GALVANIZING.

MITER ALL CONNECTIONS, FULL BUTT WELDED AND GROUND SMOOTH.

~~NOTIFY MNDOT TO SHOP INSPECT RAILING BEFORE AND AFTER GALVANIZING.~~

THIS RAILING IS NOT SUITABLE FOR OSHA FALL PROTECTION.

PROVIDE RAILING EXPANSION JOINT SLEEVES AT INTERMEDIATE LOCATIONS BETWEEN THE RAIL POST AT 15'-0" MAX. SPACING.

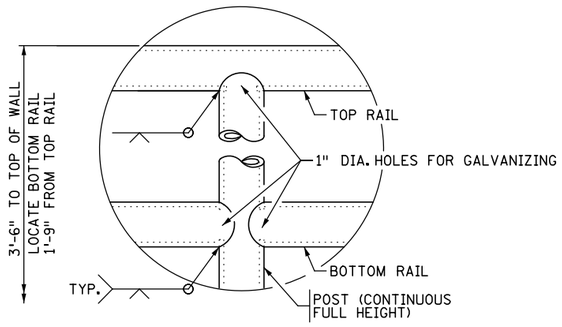
ADHESIVE ANCHORAGE WITH 1/2" DIA. ANCHOR ROD PER SPEC. 3385, TYPE A WITH HEX NUT AND WASHER. PROVIDE AN ADHESIVE WITH A MINIMUM CHARACTERISTIC BOND STRENGTH IN UNCRACKED CONCRETE OF 1.5 KSI. EMBED THE ANCHORAGE NO LESS THAN 5" REGARDLESS OF CHARACTERISTIC BOND STRENGTH. DRILL THROUGH REINFORCEMENT (IF ENCOUNTERED) TO ACHIEVE MINIMUM EMBEDMENT. ENSURE HEX NUT IS IN CONTACT WITH THE ADJACENT SURFACE AND TORQUE TO 30 FT-LBS UNLESS A HIGHER TORQUE IS RECOMMENDED BY THE MANUFACTURER. PROOF LOAD TO 2.8 KIPS.

PIPE RAILING DOES NOT MEET MASH TESTING STANDARDS.

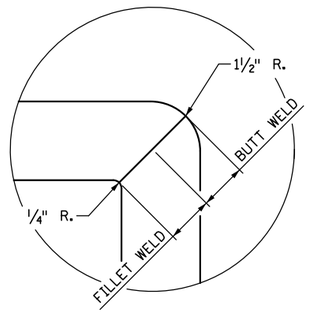
① SET POSTS VERTICAL, UNLESS OTHERWISE NOTED. SHIM AS REQUIRED TO PREVENT WOBBLE.

② DRILL 5/16" DIA. HOLE THRU POST AND POST ANCHOR AFTER ASSEMBLY. PROVIDE 1/4" DIA. BOLT AND NUT PER SPEC. 3391, TYPE A. BEND END OF BOLT AFTER SECURING NUT TO PREVENT BOLT FROM BEING REMOVED.

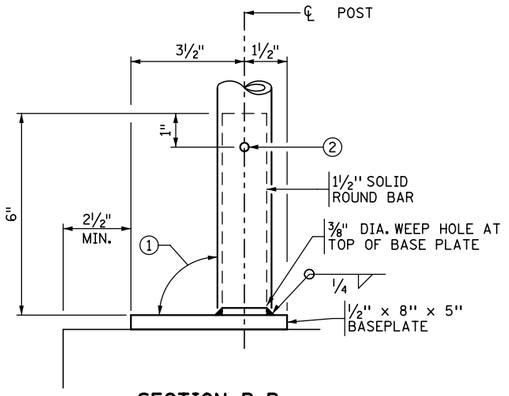
③ EXPANSION JOINT, SEE PIPE SLEEVE DETAIL.



DETAIL "A"

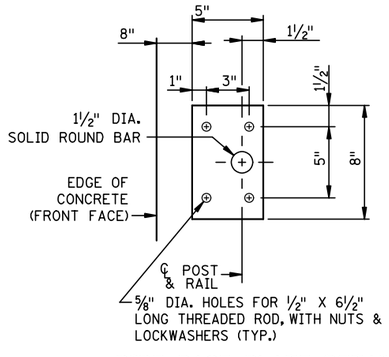


DETAIL "B"

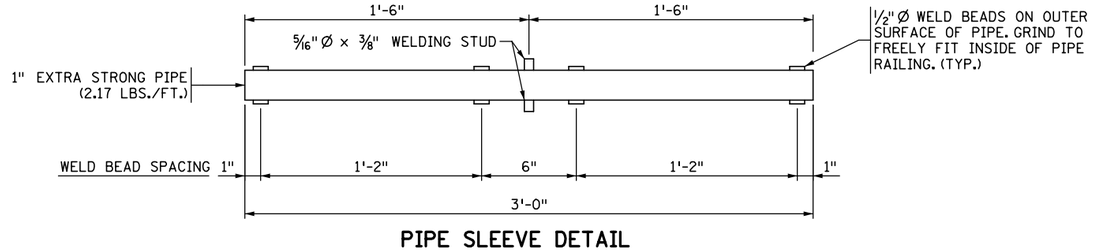


SECTION B-B

PIPE AND POST ELEVATION



PIPE BASE PLATE DETAIL



PIPE SLEEVE DETAIL

NO.	DATE	BY	DESCRIPTION OF REVISIONS

I HEREBY CERTIFY THAT THIS SHEET WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

SIGNATURE: Lindsey J. Lawrence
PRINTED NAME: LINDSEY J. LAWRENCE
DATE: 4/2/2021 LIC. NO. 48298

TKDA
444 Cedar Street, Suite 1500
Saint Paul, MN 55101
651.292.4400
tkda.com

RETAINING WALL PLANS
TWO-LINE PIPE RAILING DETAIL

MISSISSIPPI RIVER BOULEVARD CROSSING

Sheet No. S112 of S131 Sheets

DATE: 4/1/2021 TIME: 3:31:47 PM
FILENAME: K:\n-z\StPaul-ParksRec\792\002\04_Production\01_CAD\08_MicroStation\Bridge\General\wr_general13.dgn

WALL A PIPE RAILING

POINT "X"	STATION	POINT "Y"	STATION	ELEVATION "A"	ELEVATION "B"	SPACING "D"	DIMENSION "E"	DIMENSION "F"
A01	100+00.00	A02	100+10.23	795.23	795.64	2	10'-10 3/4"	11'-0 3/4"
A02	100+10.23	A03	100+24.39	795.64	800.95	3	14'-10 1/4"	15'-0 1/4"
A03	100+24.39	A04	100+47.59	800.95	803.80	5	23'-9 5/8"	23'-11 5/8"
A04	100+47.59	A05	100+74.27	803.80	796.06	5	26'-11"	27'-1"

WALL C PIPE RAILING

POINT "X"	STATION	POINT "Y"	STATION	ELEVATION "A"	ELEVATION "B"	SPACING "D"	DIMENSION "E"	DIMENSION "F"
C01	40+00.00	C04	40+26.33	804.00	804.00	5	26'-0 1/2"	26'-2 1/2"
C04	40+26.33	C07	40+55.83	804.00	804.00	6	29'-1 7/8"	29'-3 7/8"
C07	40+55.83	C10	40+85.33	804.00	804.00	6	29'-1 7/8"	29'-3 7/8"
C10	40+85.33	C13	41+08.03	804.00	804.00	5	22'-7 3/8"	22'-9 3/8"

WALL E PIPE RAILING

POINT "X"	STATION	POINT "Y"	STATION	ELEVATION "A"	ELEVATION "B"	SPACING "D"	DIMENSION "E"	DIMENSION "F"
E01	60+00.00	E02	60+20.00	795.10	792.61	4	19'-8 3/8"	19'-10 3/8"
E02	60+20.00	E03	60+34.14	792.61	788.00	3	13'-10 1/8"	14'-0 1/8"

WALL F PIPE RAILING

POINT "X"	STATION	POINT "Y"	STATION	ELEVATION "A"	ELEVATION "B"	SPACING "D"	DIMENSION "E"	DIMENSION "F"
F01	31+09.00	F02	31+18.60	790.20	790.41	2	8'-7 3/4"	8'-9 3/4"
F02	31+18.60	F03	31+49.09	790.41	789.75	6	29'-6 5/8"	29'-8 5/8"
F03	31+49.09	F04	31+79.59	789.75	789.02	6	30'-4"	30'-6"
F04	31+79.59	F05	32+10.09	789.02	788.29	6	30'-4"	30'-6"
F05	32+10.09	F06	32+40.59	788.29	787.58	6	30'-4"	30'-6"
F06	32+40.59	F07	32+57.81	787.58	787.50	4	17'-0 5/8"	17'-2 5/8"

WALL G PIPE RAILING

POINT "X"	STATION	POINT "Y"	STATION	ELEVATION "A"	ELEVATION "B"	SPACING "D"	DIMENSION "E"	DIMENSION "F"
G01	20+00.00	G02	20+11.38	795.68	804.00	2	11'-2 1/2"	11'-4 1/2"
G02	20+11.38	G03	20+29.53	804.00	804.00	4	18'-2 3/8"	18'-4 3/8"
G03	20+29.53	G04	20+37.68	804.00	804.00	2	8'-8"	8'-10"
G04	20+37.68	G05	20+55.86	804.00	804.00	4	18'-6 1/2"	18'-8 1/2"

NOTE: SPACING IDENTIFIED IN THESE TABULATIONS APPLIES TO BOTH TWO-LINE PIPE RAILING AND ORNAMENTAL RAILING.

NO.	DATE	BY	DESCRIPTION OF REVISIONS

I HEREBY CERTIFY THAT THIS SHEET WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

SIGNATURE: Lindsey J. Lawrence
PRINTED NAME: LINDSEY J. LAWRENCE
DATE: 4/2/2021 LIC. NO. 48298

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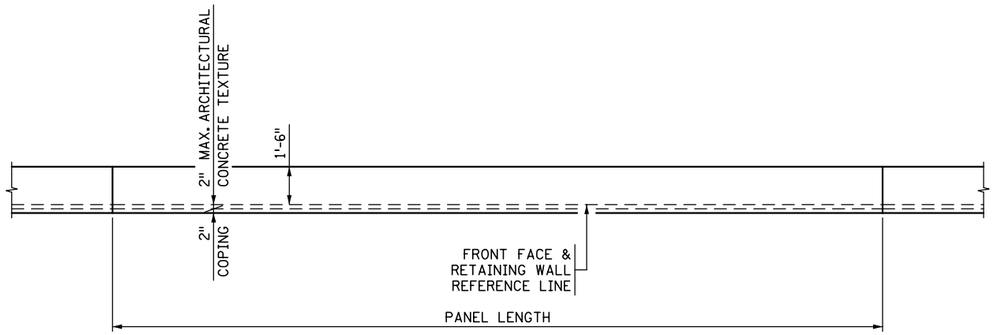
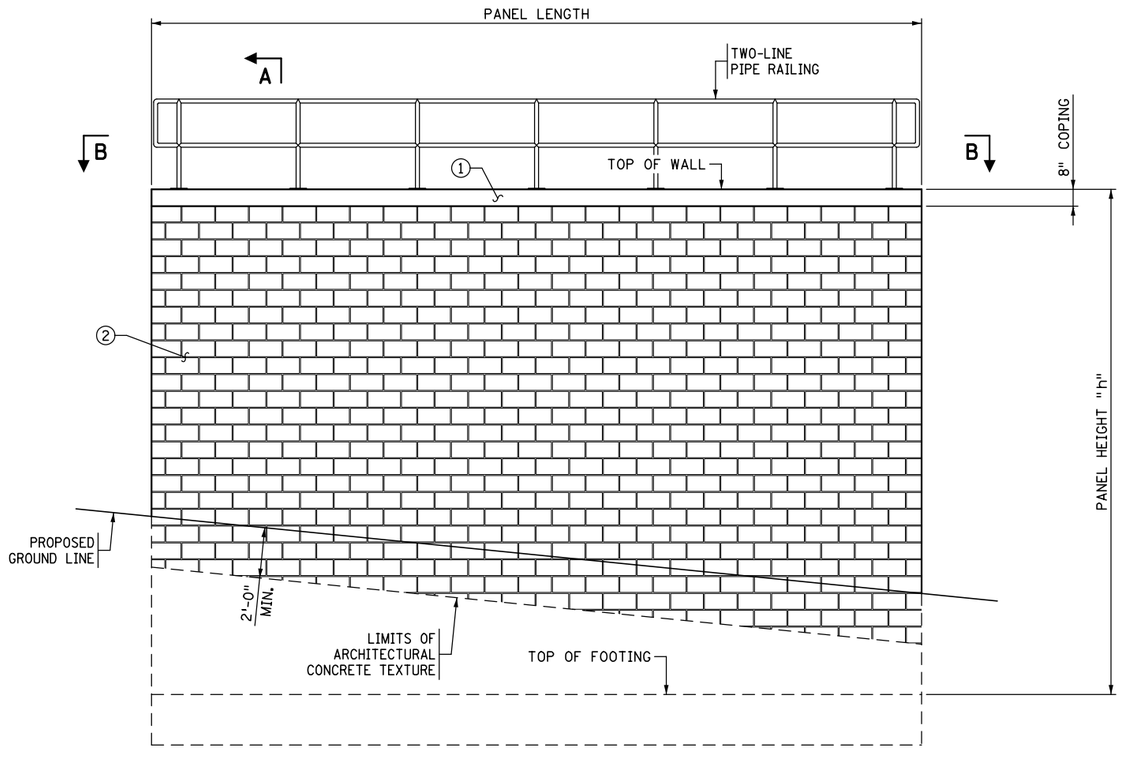
Saint Paul, MN 55101
651.292.4400
tkda.com

RETAINING WALL PLANS
PIPE RAILING TABULATIONS

MISSISSIPPI RIVER BOULEVARD CROSSING

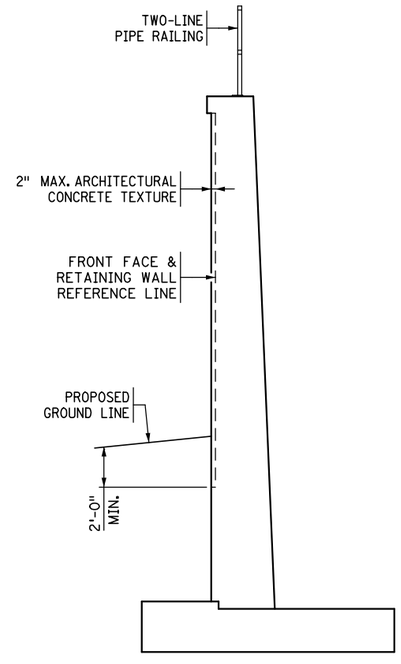


VIEW B-B



CIP RETAINING WALL PANEL

(WALLS A, C & G)



SECTION A-A

NOTES:

1. SMOOTH CONCRETE. ARCHITECTURAL SURFACE FINISH (SINGLE COLOR). SEE SPECIAL PROVISIONS.
2. ARCHITECTURAL CONCRETE TEXTURE (SPLIT STONE). ARCHITECTURAL SURFACE FINISH (SINGLE COLOR) AND ANTI-GRAFFITI COATING. SEE SPECIAL PROVISIONS.

DATE: 4/1/2021 TIME: 3:32:03 PM
FILENAME: K:\nr-z\StPaul-ParksRec\792\002\04_Production\01_CAD\08_MicroStation\Bridge\General\wr_general15.dgn

NO.	DATE	BY	DESCRIPTION OF REVISIONS

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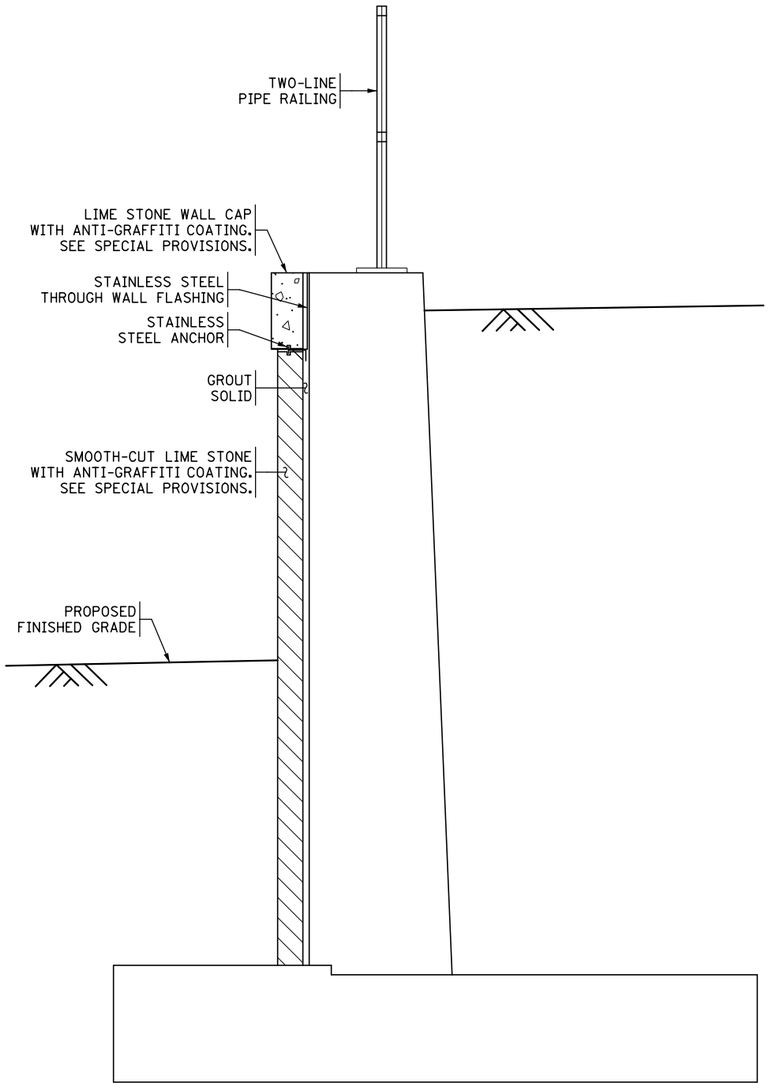
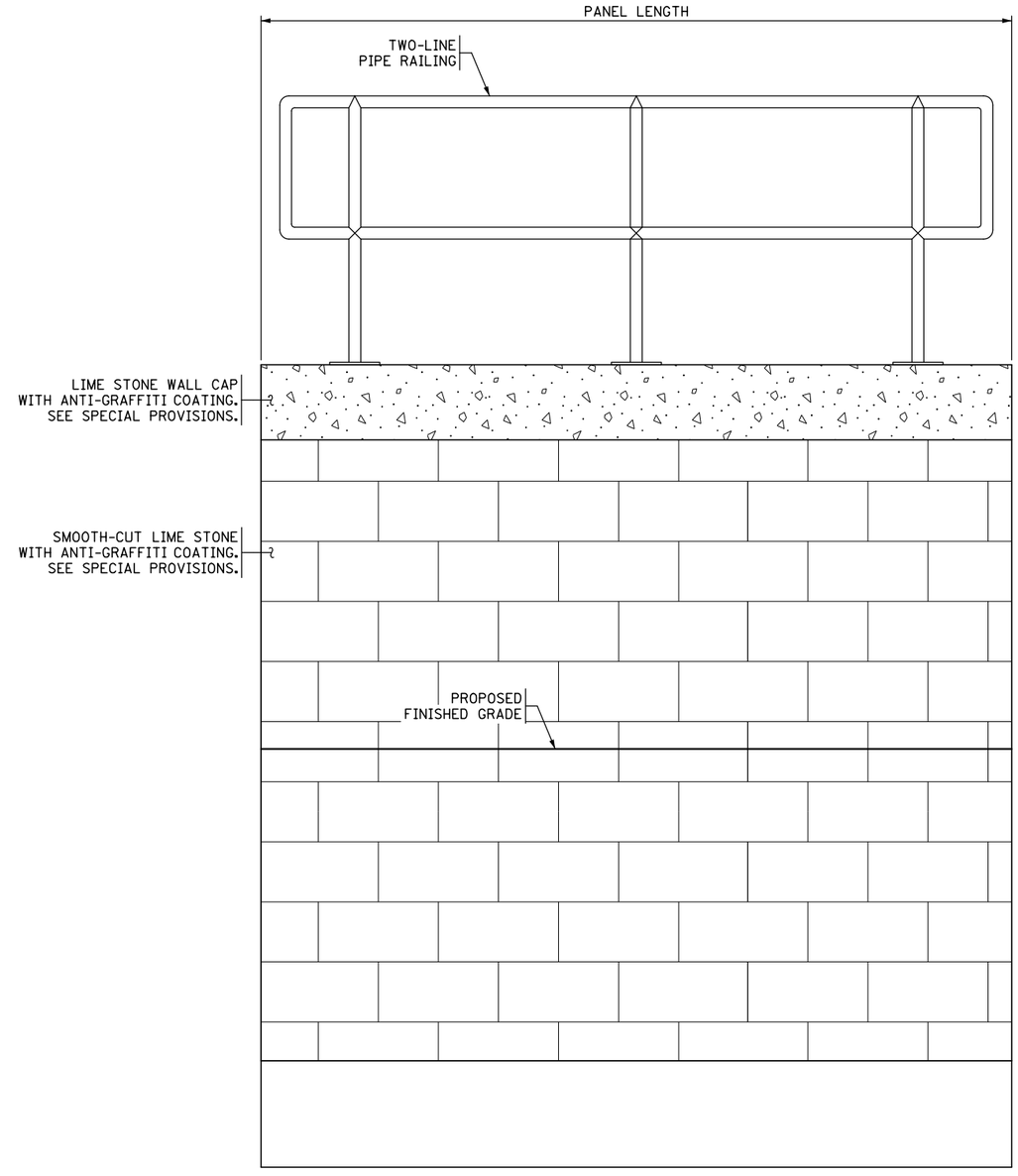
RETAINING WALL PLANS
CIP WALL AESTHETIC DETAILS (1 OF 2)

MISSISSIPPI RIVER BOULEVARD CROSSING



TYPICAL STONE VENEER AESTHETIC SECTION

(WALL E & F)



TYPICAL STONE VENEER AESTHETIC PANEL ELEVATION

(WALL E & F)

DATE: 4/1/2021 TIME: 3:32:12 PM
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NO.	DATE	BY	DESCRIPTION OF REVISIONS

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DATE: 4/2/2021 LIC. NO. 48298

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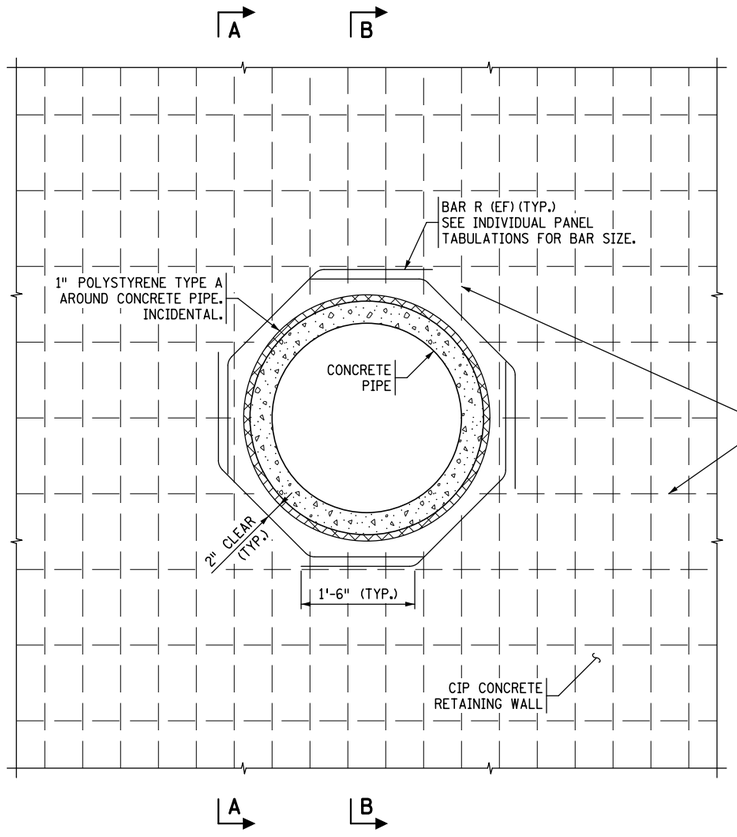
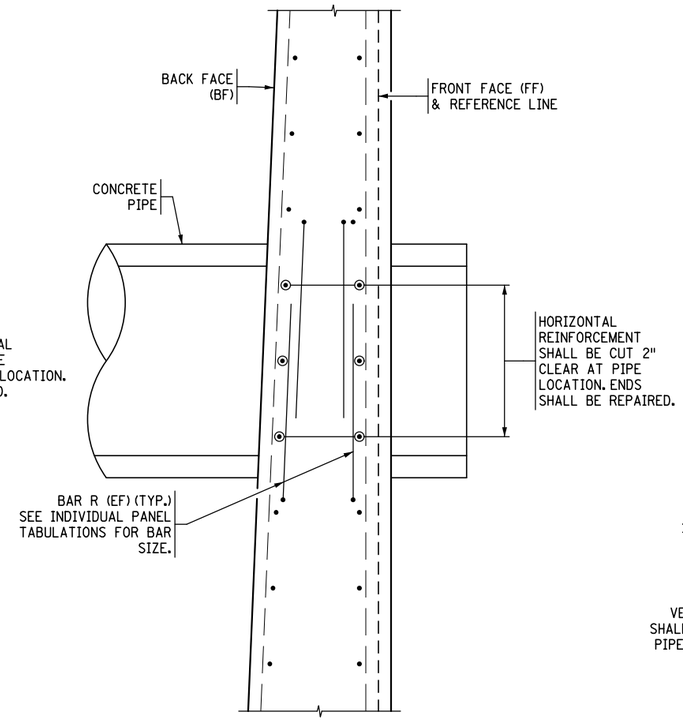
RETAINING WALL PLANS
CIP WALL AESTHETIC DETAILS (2 OF 2)

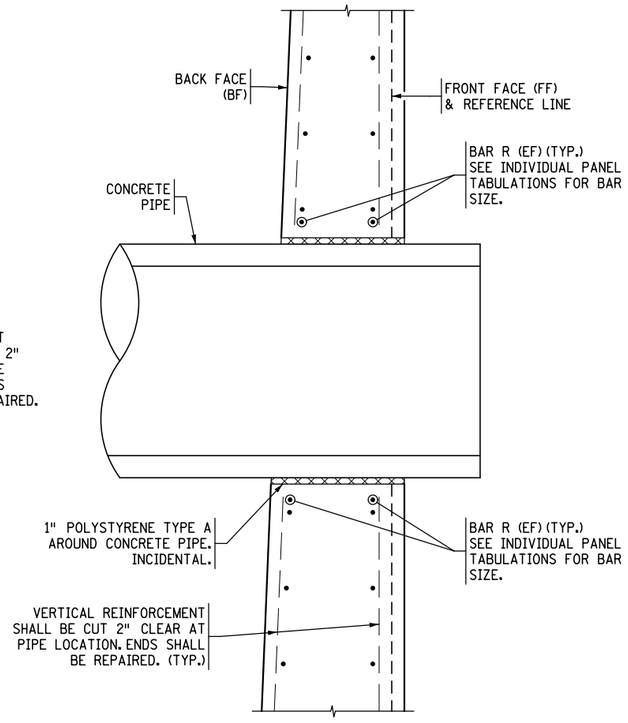
MISSISSIPPI RIVER BOULEVARD CROSSING



PIPE PENETRATION ELEVATION VIEW



SECTION A-A



SECTION B-B

NO.	DATE	BY	DESCRIPTION OF REVISIONS

I HEREBY CERTIFY THAT THIS SHEET WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

SIGNATURE: Lindsey J. Lawrence
PRINTED NAME: LINDSEY J. LAWRENCE
DATE: 4/2/2021 LIC. NO. 48298

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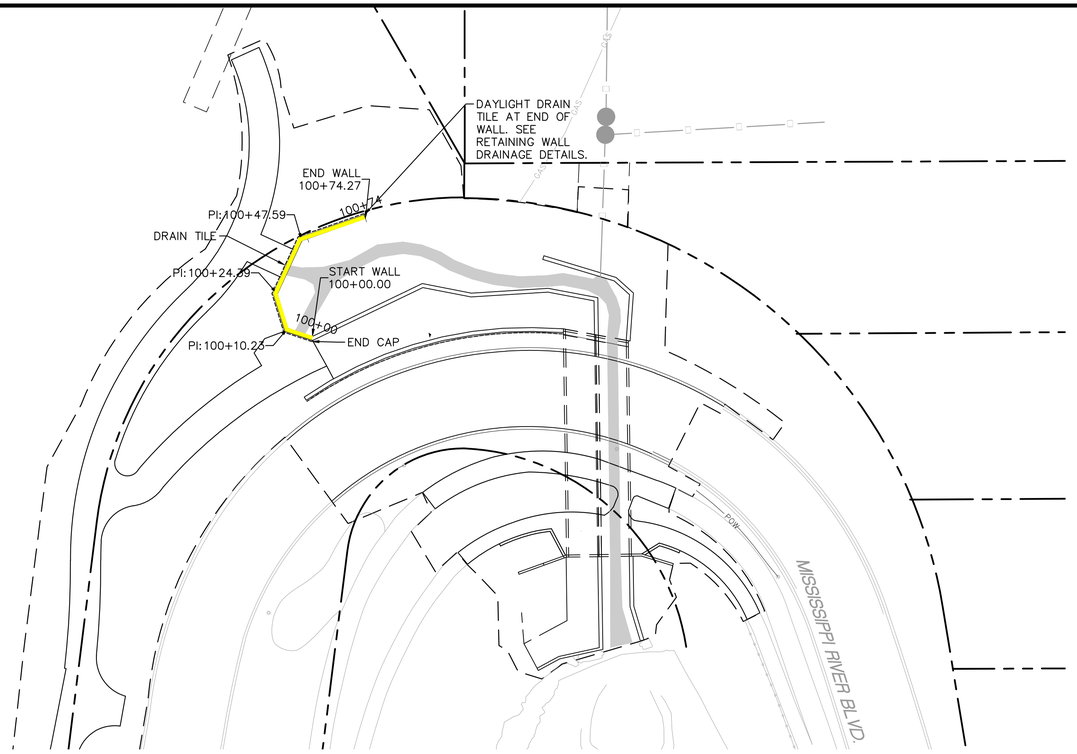
RETAINING WALL PLANS
PIPE PENETRATION DETAILS

MISSISSIPPI RIVER BOULEVARD CROSSING

BAR IS ONE INCH ON ORIGINAL DRAWING. IF NOT ONE INCH ON THIS DRAWING ADJUST SCALES ACCORDINGLY.

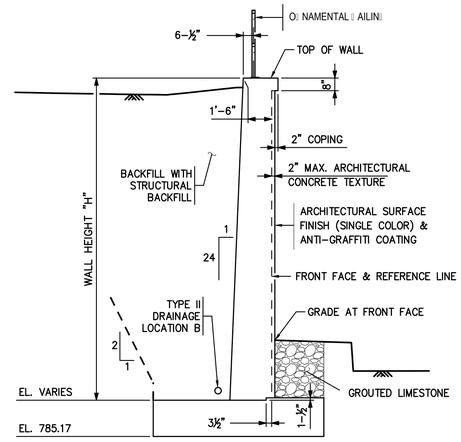
0 1



1 S117 RETAINING WALL A PLAN

0 15 30 60
SCALE IN FEET

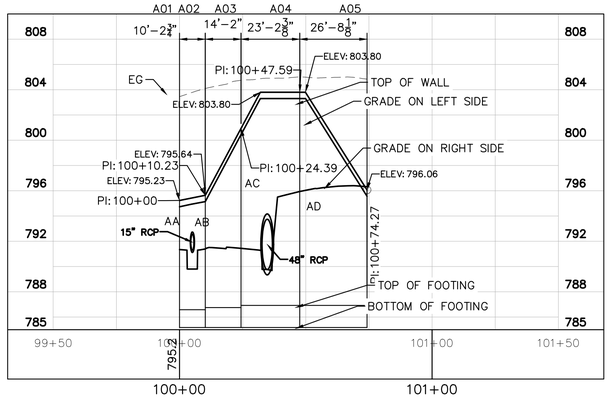
NORTH



3 S117 RETAINING WALL A TYPICAL SECTION
CIP WALL

HORIZONTAL SCALE
0 15 30 60
SCALE IN FEET

VERTICAL SCALE
0 5 10
SCALE IN FEET



2 S117 RETAINING WALL A PROFILE

RETAINING WALL DATA - WALL A

JOINT NO.	STATION	COORDINATES		FINISHED GRADE (FRONT FACE)	FINISHED GRADE (BACK FACE)	TOP OF WALL	TOP OF FOOTING	HEIGHT	BOTTOM OF FOOTING	LENGTH	ID	JOINT TYPE
		X	Y									
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] NSTEP [illegible] N
						[illegible]	[illegible]	[illegible]	[illegible]			
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] NSTEP [illegible] N
						[illegible]	[illegible]	[illegible]	[illegible]			
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] NSTEP [illegible] N
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		ID	

PLOT DATE: Apr 01, 2021 - 12:24pm
FILENAME: K:\n-z\StPaul-ParksRec\17921002\04_Production\01_CAD\02_Sheets\S[illegible] - Retaining Wall Plan Profiles.dwg

NO.	DATE	BY	DESCRIPTION OF REVISIONS
1	4/2/2021	LJL	100% SUBMITTAL

DESIGNED HAP
DRAWN HAP
CHECKED LJL

FINAL DESIGN
100% SUBMITTAL

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Engineer under the laws of the State of Minnesota.
Printed Name: LIN SEY J LA ENCE
Signature: [signature]
Date: 4.2.2021 License #: 48298

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Saint Paul, MN 55101
651.292.4400
tkda.com

CITY OF SAINT PAUL DEPARTMENT OF PARKS AND RECREATION
HIGHLAND BRIDGE MRB CROSSING
SAINT PAUL, MINNESOTA RAMSEY COUNTY

WALL A PLAN PROFILE

PROJ. NO. 17921.002
DRAWING NO. S117

BAR	MARK	NO.	LENGTH	A	LOCATION	WT-LBS	DIMENSIONS AND QUANTITIES
h = 10.00	PANEL:	AA	(1 THUS)	-	MEDIUM WALL		PANEL LENGTH = 10'-2 3/4"
SPREAD FOOTING REINFORCEMENT							DIMENSIONS
A	F501	18	SER. 1	STR.	LONG T & B	204	SPREAD FOOTING
(1) B	F502	28	6'-0"	STR.	TRANS BOT	175	b 2'-7" e ----
(1) C	F503	28	6'-0"	STR.	TRANS TOP	175	c 1'-5" f ----
							d 8'-6" g 2'-9 1/4"
S	F504	18	5'-0"	2'-6"	JOINT TIE	94	STEM
							a 1'-11" x 2'-1"
							j 1'-6 3/8" z 2'-1"
FOOTING DOWELS & STEM REINFORCEMENT							QUANTITIES
D	F505E	12	3'-0"	STR.	DOWEL FF	38	STRUCTURAL CONCRETE (1G52)
E	F506E	12	7'-9"	4'-1"	DOWEL BF	97	(FOOTING)
F	F507E	11	4'-1"	3'-0"	DOWEL BF	47	SPREAD 5.1 CU YD
G	S401E	12	7'-2"	STR.	VERT FF	57	
H	S502E	12	7'-2"	STR.	VERT BF	90	STRUCTURAL CONCRETE (3G52)
K	S504E	12	10'-8"	4'-9"	TOP TIE	134	(STEM)
L	S405E	20	9'-9"	STR.	HORIZ EF	130	5.7 CU YD
M	S506E	20	8'-4"	1'-4"	EXP JT TIE	174	
							REINFORCEMENT BAR
R	S415E	8	3'-11"	11"	PIPE TIE	21	SPREAD 648 LB
							REINFORCEMENT BAR (EPOXY)
							788 LB

SER. 1 = 2 SERIES OF 9 BARS (8'-10" TO 12'-10")

BAR	MARK	NO.	LENGTH	A	LOCATION	WT-LBS	DIMENSIONS AND QUANTITIES
h = 15.00	PANEL:	AB	(1 THUS)	-	MEDIUM WALL		PANEL LENGTH = 14'-2"
SPREAD FOOTING REINFORCEMENT							DIMENSIONS
A	F501	18	SER. 1	STR.	LONG T & B	288	SPREAD FOOTING
(1) B	F502	40	5'-10"	STR.	TRANS BOT	244	b 2'-7" e ----
(1) C	F703	40	6'-8"	STR.	TRANS TOP	545	c 1'-7" f ----
							d 8'-6" g 2'-9 1/4"
S	F504	18	5'-0"	2'-6"	JOINT TIE	94	STEM
							a 2'-1 1/2" x 2'-4"
							j 1'-8 3/4" z 5'-10"
FOOTING DOWELS & STEM REINFORCEMENT							QUANTITIES
D	F505E	15	3'-0"	STR.	DOWEL FF	47	STRUCTURAL CONCRETE (1G52)
E	F606E	17	8'-5"	4'-3"	DOWEL BF	215	(FOOTING)
F	F607E	16	8'-1"	6'-11"	DOWEL BF	194	SPREAD 8.0 CU YD
G	S401E	15	12'-2"	STR.	VERT FF	122	
H	S502E	17	12'-2"	STR.	VERT BF	216	STRUCTURAL CONCRETE (3G52)
K	S504E	17	10'-8"	4'-9"	TOP TIE	189	(STEM)
L	S405E	30	13'-8"	STR.	HORIZ EF	274	10.8 CU YD
M	S506E	20	8'-4"	1'-4"	EXP JT TIE	174	
N	S507E	10	8'-9"	1'-9"	EXP JT TIE	91	REINFORCEMENT BAR
U	C401E	15	8'-8"	4'-4"	CORNER TIE	87	SPREAD 1171 LB
W	C402E	30	6'-4"	2'-0"	CORNER TIE	127	
							REINFORCEMENT BAR (EPOXY)
							1736 LB

SER. 1 = 2 SERIES OF 9 BARS (11'-10" TO 18'-10")

BAR	MARK	NO.	LENGTH	A	LOCATION	WT-LBS	DIMENSIONS AND QUANTITIES
h = 17.00	PANEL:	AC	(1 THUS)	-	TALL WALL		PANEL LENGTH = 23'-2 3/8"
SPREAD FOOTING REINFORCEMENT							DIMENSIONS
A	F501	20	SER. 1	STR.	LONG T & B	506	SPREAD FOOTING
(1) B	F502	58	6'-0"	STR.	TRANS BOT	363	b 2'-9" e ----
(1) C	F803	58	7'-4"	STR.	TRANS TOP	1136	c 1'-9" f ----
							d 9'-0" g 2'-11 1/4"
S	F504	20	5'-0"	2'-6"	JOINT TIE	104	STEM
							a 2'-2 1/2" x 3'-1"
							j 1'-9 7/8" z 5'-2"
FOOTING DOWELS & STEM REINFORCEMENT							QUANTITIES
D	F505E	24	3'-0"	STR.	DOWEL FF	75	STRUCTURAL CONCRETE (1G52)
E	F606E	26	10'-9"	4'-6"	DOWEL BF	420	(FOOTING)
F	F707E	25	7'-9"	6'-5"	DOWEL BF	396	SPREAD 14.7 CU YD
G	S401E	24	14'-2"	STR.	VERT FF	227	
H	S502E	26	14'-2"	STR.	VERT BF	384	STRUCTURAL CONCRETE (3G52)
J	S503E	25	8'-9"	STR.	VERT BF	228	(STEM)
K	S504E	26	10'-8"	4'-9"	TOP TIE	289	24.3 CU YD
L	S405E	34	22'-8"	STR.	HORIZ EF	515	
M	S506E	20	8'-4"	1'-4"	EXP JT TIE	174	REINFORCEMENT BAR
N	S507E	14	8'-9"	1'-9"	EXP JT TIE	128	SPREAD 2109 LB
R	S415E	8	4'-11"	1'-11"	PIPE TIE	26	REINFORCEMENT BAR (EPOXY)
U	C401E	17	8'-8"	4'-4"	CORNER TIE	99	3105 LB
W	C402E	34	6'-4"	2'-0"	CORNER TIE	144	

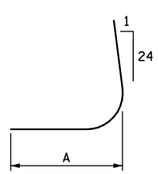
SER. 1 = 2 SERIES OF 10 BARS (20'-11" TO 27'-7")

BAR	MARK	NO.	LENGTH	A	LOCATION	WT-LBS	DIMENSIONS AND QUANTITIES
h = 17.00	PANEL:	AD	(1 THUS)	-	TALL WALL		PANEL LENGTH = 26'-8 1/8"
SPREAD FOOTING REINFORCEMENT							DIMENSIONS
A	F501	20	SER. 1	STR.	LONG T & B	564	SPREAD FOOTING
(1) B	F502	60	6'-0"	STR.	TRANS BOT	376	b 2'-9" e ----
(1) C	F803	60	7'-4"	STR.	TRANS TOP	1175	c 1'-9" f ----
							d 9'-0" g 2'-11 1/4"
S	F504	20	5'-0"	2'-6"	JOINT TIE	104	STEM
							a 2'-2 1/2" x 3'-1"
							j 1'-9 7/8" z 5'-2"
FOOTING DOWELS & STEM REINFORCEMENT							QUANTITIES
D	F505E	28	3'-0"	STR.	DOWEL FF	88	STRUCTURAL CONCRETE (1G52)
E	F606E	29	10'-9"	4'-6"	DOWEL BF	468	(FOOTING)
F	F707E	28	7'-9"	6'-5"	DOWEL BF	444	SPREAD 16.4 CU YD
G	S401E	28	14'-2"	STR.	VERT FF	265	
H	S502E	29	14'-2"	STR.	VERT BF	428	STRUCTURAL CONCRETE (3G52)
J	S503E	28	8'-9"	STR.	VERT BF	256	(STEM)
K	S504E	29	10'-8"	4'-9"	TOP TIE	323	22.9 CU YD
L	S405E	34	26'-2"	STR.	HORIZ EF	594	
M	S506E	20	8'-4"	1'-4"	EXP JT TIE	174	REINFORCEMENT BAR
N	S507E	14	8'-9"	1'-9"	EXP JT TIE	128	SPREAD 2219 LB
U	C401E	17	8'-8"	4'-4"	CORNER TIE	99	
W	C402E	34	6'-4"	2'-0"	CORNER TIE	144	REINFORCEMENT BAR (EPOXY)
							3411 LB

SER. 1 = 2 SERIES OF 10 BARS (25'-3" TO 28'-10")

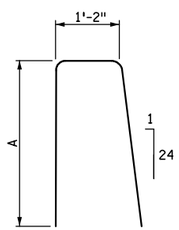
SLOPE FOR BARS M & N		
PANEL	JOINT	DIM. "B"
AA/AB/ AC/AD	A01/A02/ A03/A04	0.4
AD	A05	0

SLOPE FOR BARS S, U, & W		
PANEL	JOINT	DIM. "C"
AA	A02	0.7
AB/AC	A03/A04	1

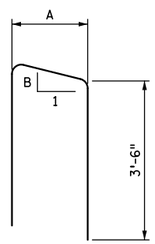


BAR E

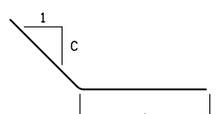
BAR F



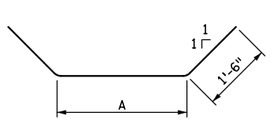
BAR K



BARS M,N



BARS S, U, W



BAR R

* DENOTES MODIFICATION FROM STANDARD PLAN

* THIS DRAWING HAS BEEN MODIFIED TO MATCH THE PROJECT CONDITIONS.

NOTES:

L = DENOTES PANEL LENGTH.
FF = DENOTES FRONT FACE.
BF = DENOTES BACK FACE.
EF = DENOTES EACH FACE.
DWL = DENOTES DOWEL.
BOT. = DENOTES BOTTOM.
T&B = DENOTES TOP & BOTTOM.
x = PROJECTION OF BAR E INTO STEM.
z = PROJECTION OF BAR F INTO STEM.
BARS MARKED WITH THE SUFFIX "E" ARE EPOXY COATED

MODIFIED

NOTES:

BAR LISTS HAVE BEEN MODIFIED TO MATCH THE PROJECT CONDITIONS.

THE DESIGN HEIGHTS h SHOWN IN THE TABULATIONS ON THIS SHEET ARE NOT IDENTICAL WITH THE ACTUAL WALL HEIGHTS. REFER TO THE WALL A PLAN AND PROFILE SHEET.

STEM CONCRETE VOLUMES WERE COMPUTED USING THE ACTUAL STEM HEIGHTS. THE VOLUME IS THE AVERAGE FOR ANY GIVEN PANEL SERIES.

STEM DIMENSIONS a & j WERE CALCULATED USING THE WALL HEIGHT LISTED IN THE PANEL TABULATIONS. ADJUST DIMENSIONS ACCORDING TO THE ACTUAL WALL HEIGHT.

SEE RETAINING WALL REINFORCEMENT DETAILS SHEETS FOR LOCATION OF DIMENSIONS.

SEE "RETAINING WALL MISCELLANEOUS DETAILS 5-297.624 (2 OF 6)" SHEET FOR PLACEMENT OF BARS U AND W.

(1) PLACE BARS IN PAIRS AND PROVIDE MINIMUM LAP. PAIRED BARS TO BE FLARED WITH 12" MAX. AND 3" MIN. SPACING.

REVISION:
APPROVED: SEPTEMBER 1, 2016
STATE BRIDGE ENGINEER

MINNESOTA DEPARTMENT OF TRANSPORTATION

STANDARD PLAN 5-297.628 | 1 OF 3
APPROVED: 9-1-2016
REVISED:
STATE DESIGN ENGINEER

RETAINING WALL PANEL TABULATIONS
(LIVE LOAD SURCHARGE)

NO.	DATE	BY	DESCRIPTION OF REVISIONS

I HEREBY CERTIFY THAT THIS SHEET WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.
SIGNATURE: Lindsey J. Lawrence
PRINTED NAME: LINDSEY J. LAWRENCE
DATE: 4/2/2021 LIC. NO. 48298

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RETAINING WALL PLANS
WALL A PANEL TABULATION

MISSISSIPPI RIVER BOULEVARD CROSSING

Sheet No. S118 of S131 Sheets

DATE: 4/1/2021 TIME: 3:32:33 PM
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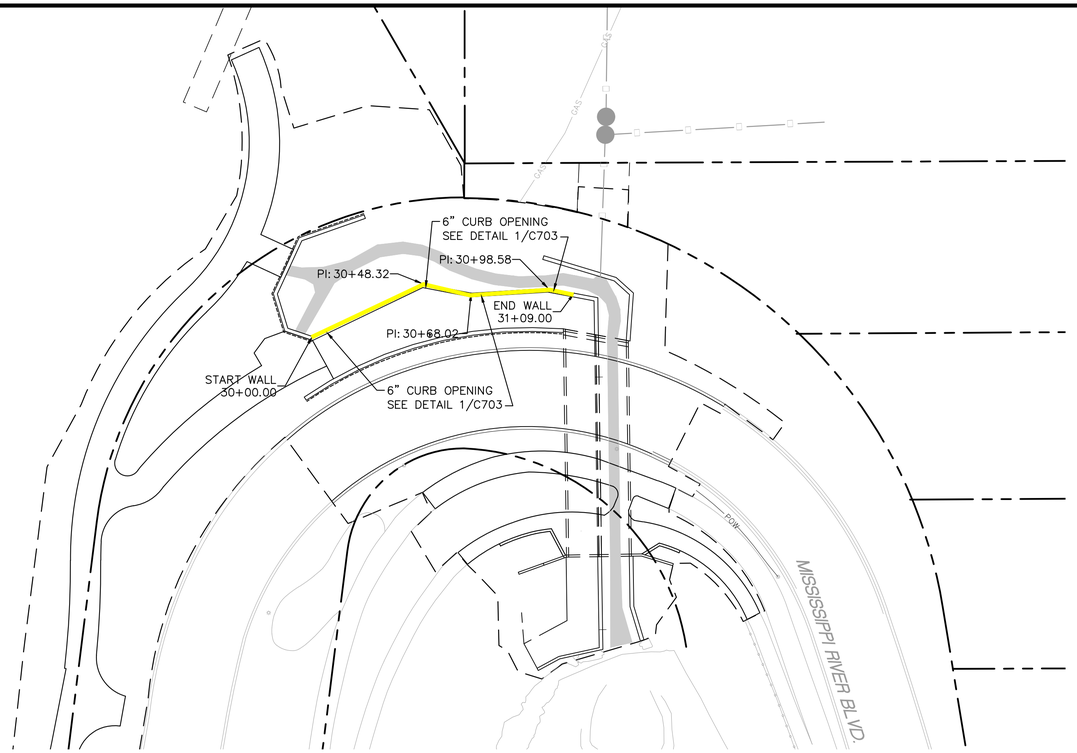
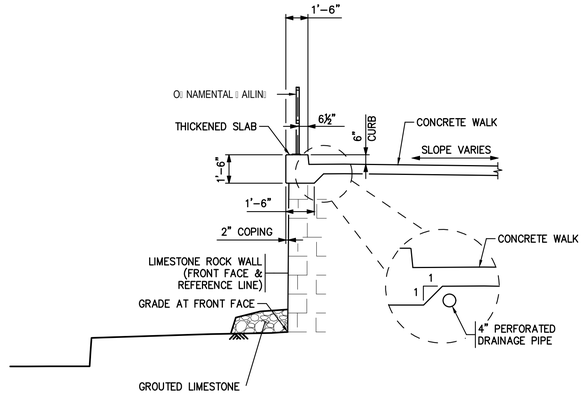


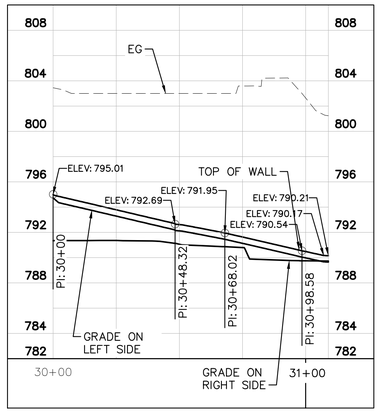
1 / S119 — PLAN



3 / S119 — TYPICAL SECTION
LIMESTONE ROCK WALL WITH THICKENED SLAB

HORIZONTAL SCALE
0 15 30 60
SCALE IN FEET

VERTICAL SCALE
0 5 10
SCALE IN FEET



2 / S119 — PROFILE

NO.	DATE	BY	DESCRIPTION OF REVISIONS
1	4/2/2021	LJL	100% SUBMITTAL

DESIGNED HAP
DRAWN HAP
CHECKED LJL

FINAL DESIGN
100% SUBMITTAL

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Engineer under the laws of the State of Minnesota.
Printed Name: LINDSEY J. LOSINGER
Signature:
Date: 4.2.2021 License ID #: 48298

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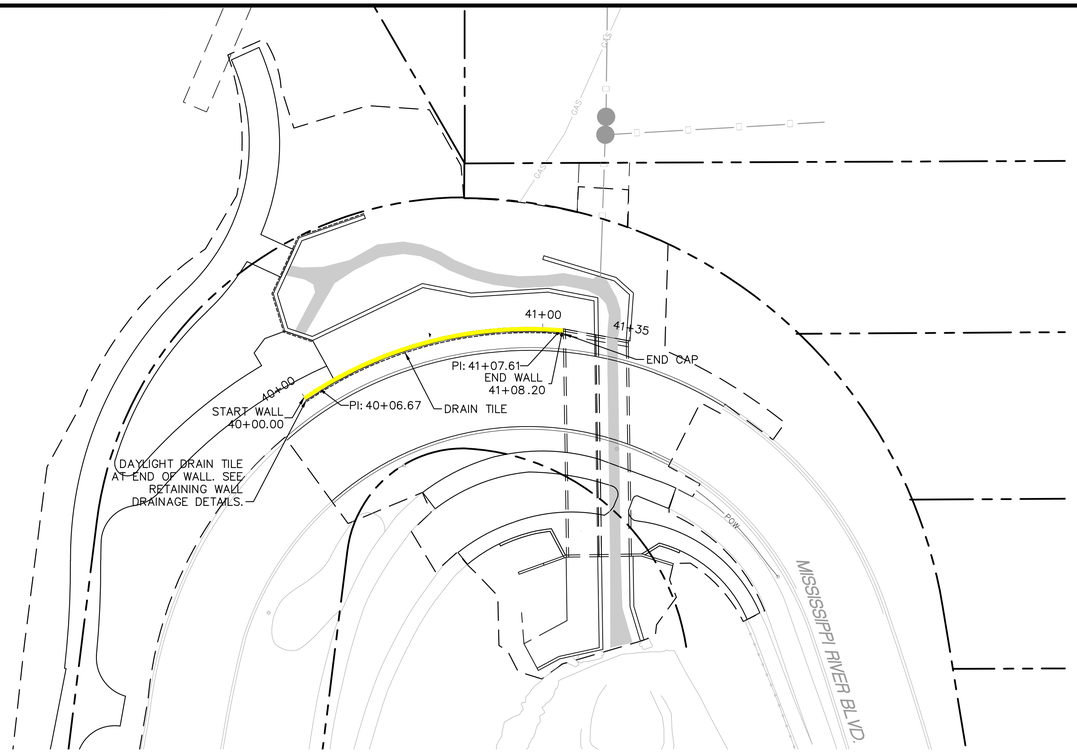
CITY OF SAINT PAUL DEPARTMENT OF PARKS AND RECREATION
HIGHLAND BRIDGE MRB CROSSING
SAINT PAUL, MINNESOTA RAMSEY COUNTY

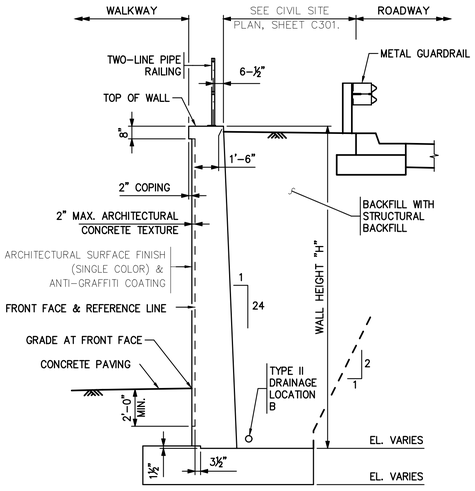
WALL B PLAN PROFILE

PROJ. NO. 17921.002
DRAWING NO. S119

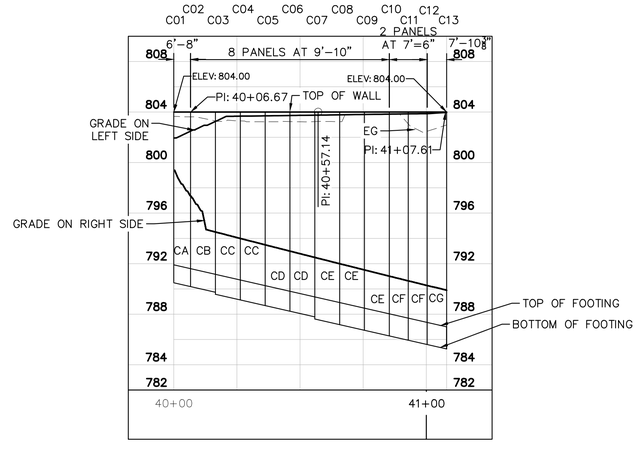
PLOT DATE: Apr 01, 2021 - 12:24pm
FILENAME: K:\tn-z\StPaul-ParksRec\17921002\04_Production\01_CAD\02_Sheets\S - Retaining Wall Plan Profiles.dwg



1 / S120 — RETAINING WALL C PLAN



3 / S120 — RETAINING WALL C TYPICAL SECTION
CIP WALL



2 / S120 — RETAINING WALL C PROFILE

HORIZONTAL SCALE
0 15 30 60
SCALE IN FEET

VERTICAL SCALE
0 5 10
SCALE IN FEET

RETAINING WALL DATA - WALL C

JOINT NO.	STATION	COORDINATES X	COORDINATES Y	FINISHED GRADE (FRONT FACE)	FINISHED GRADE (BACK FACE)	TOP OF WALL	TOP OF FOOTING	HEIGHT	BOTTOM OF FOOTING	LENGTH	ID	JOINT TYPE
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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NO.	DATE	BY	DESCRIPTION OF REVISIONS
1	4/2/2021	LJL	100% SUBMITTAL

DESIGNED HAP
DRAWN HAP
CHECKED LJL

FINAL DESIGN
100% SUBMITTAL

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Engineer under the laws of the State of Minnesota.
Printed Name: LIN SEY J. LA ENCE
Signature: [signature]
Date: 4.2.2021 License #: 48298

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CITY OF SAINT PAUL DEPARTMENT OF PARKS AND RECREATION
HIGHLAND BRIDGE MRB CROSSING
SAINT PAUL, MINNESOTA RAMSEY COUNTY

WALL C PLAN PROFILE

PROJ. NO. 17921.002
DRAWING NO. S120

BAR	MARK	NO.	LENGTH	A	LOCATION	WT-LBS
h = 13.00	PANEL:	CA	(1 THUS)	-	MEDIUM WALL	
A	F501	18	9'-1"	STR.	LONG T & B	171
B	F502	8	8'-0"	STR.	TRANS BOT	67
C	F603	8	8'-0"	STR.	TRANS TOP	96
D	F504E	8	3'-0"	STR.	DOWEL FF	25
E	F505E	8	8'-1"	4'-2"	DOWEL BF	68
F	F506E	7	5'-3"	4'-2"	DOWEL BF	38
G	S401E	8	10'-2"	STR.	VERT FF	54
H	S502E	8	10'-2"	STR.	VERT BF	85
K	S504E	8	10'-8"	4'-9"	TOP TIE	89
L	S405E	26	6'-2"	STR.	HORIZ EF	107
M	S506E	20	7'-4"	1'-4"	EXP JT TIE	153
N	S507E	6	7'-9"	1'-9"	EXP JT TIE	49

DIMENSIONS AND QUANTITIES				
PANEL LENGTH =				6'-8"
SPREAD FOOTING				
b	2'-7"	e	----	
c	1'-5"	f	----	
d	8'-6"	g	2'-9 1/4"	
STEM				
a	2'-0 1/2"	x	2'-1"	
j	1'-7 7/8"	z	3'-3"	
QUANTITIES				
STRUCTURAL CONCRETE (1G52)				
(FOOTING)				
SPREAD	3.1	CU YD		
STRUCTURAL CONCRETE (3G52)				
(STEM)				
5.4	CU YD			
REINFORCEMENT BAR				
SPREAD	334	LB		
REINFORCEMENT BAR (EPOXY)				
668	LB			

BAR	MARK	NO.	LENGTH	A	LOCATION	WT-LBS
h = 13.00	PANEL:	CB	(1 THUS)	-	MEDIUM WALL	
A	F501	18	12'-5"	STR.	LONG T & B	233
B	F502	11	8'-0"	STR.	TRANS BOT	92
C	F603	11	8'-0"	STR.	TRANS TOP	133
D	F504E	11	3'-0"	STR.	DOWEL FF	34
E	F505E	11	8'-1"	4'-2"	DOWEL BF	93
F	F506E	10	5'-3"	4'-2"	DOWEL BF	55
G	S401E	11	10'-2"	STR.	VERT FF	75
H	S502E	11	10'-2"	STR.	VERT BF	117
K	S504E	11	10'-8"	4'-9"	TOP TIE	122
L	S405E	26	9'-4"	STR.	HORIZ EF	162
M	S506E	20	7'-4"	1'-4"	EXP JT TIE	153
N	S507E	6	7'-9"	1'-9"	EXP JT TIE	49

DIMENSIONS AND QUANTITIES				
PANEL LENGTH =				9'-10"
SPREAD FOOTING				
b	2'-7"	e	----	
c	1'-5"	f	----	
d	8'-6"	g	2'-9 1/4"	
STEM				
a	2'-0 1/2"	x	2'-1"	
j	1'-7 7/8"	z	3'-3"	
QUANTITIES				
STRUCTURAL CONCRETE (1G52)				
(FOOTING)				
SPREAD	4.5	CU YD		
STRUCTURAL CONCRETE (3G52)				
(STEM)				
8.2	CU YD			
REINFORCEMENT BAR				
SPREAD	458	LB		
REINFORCEMENT BAR (EPOXY)				
860	LB			

BAR	MARK	NO.	LENGTH	A	LOCATION	WT-LBS
h = 14.00	PANEL:	CC	(2 THUS)	-	MEDIUM WALL	
A	F501	11	12'-5"	STR.	LONG T & B	233
B	F502	11	8'-0"	STR.	TRANS BOT	92
C	F603	11	8'-0"	STR.	TRANS TOP	133
D	F504E	11	3'-0"	STR.	DOWEL FF	34
E	F505E	11	8'-2"	4'-3"	DOWEL BF	94
F	F606E	10	6'-7"	5'-5"	DOWEL BF	99
G	S401E	11	11'-2"	STR.	VERT FF	82
H	S502E	11	11'-2"	STR.	VERT BF	128
K	S504E	11	10'-8"	4'-9"	TOP TIE	122
L	S405E	28	9'-4"	STR.	HORIZ EF	175
M	S506E	20	7'-4"	1'-4"	EXP JT TIE	153
N	S507E	8	7'-9"	1'-9"	EXP JT TIE	65

DIMENSIONS AND QUANTITIES				
PANEL LENGTH =				9'-10"
SPREAD FOOTING				
b	2'-7"	e	----	
c	1'-7"	f	----	
d	8'-6"	g	2'-9 1/4"	
STEM				
a	2'-1"	x	2'-1"	
j	1'-8 3/8"	z	4'-4"	
QUANTITIES				
STRUCTURAL CONCRETE (1G52)				
(FOOTING)				
SPREAD	5.0	CU YD		
STRUCTURAL CONCRETE (3G52)				
(STEM)				
8.5	CU YD			
REINFORCEMENT BAR				
SPREAD	458	LB		
REINFORCEMENT BAR (EPOXY)				
952	LB			

BAR	MARK	NO.	LENGTH	A	LOCATION	WT-LBS
h = 15.00	PANEL:	CD	(2 THUS)	-	MEDIUM WALL	
A	F501	18	12'-5"	STR.	LONG T & B	233
B	F502	11	8'-0"	STR.	TRANS BOT	92
C	F703	11	8'-0"	STR.	TRANS TOP	180
D	F504E	11	3'-0"	STR.	DOWEL FF	34
E	F605E	11	8'-5"	4'-3"	DOWEL BF	139
F	F606E	10	8'-1"	6'-11"	DOWEL BF	122
G	S401E	11	12'-2"	STR.	VERT FF	90
H	S502E	11	12'-2"	STR.	VERT BF	140
K	S504E	11	10'-8"	4'-9"	TOP TIE	122
L	S405E	30	9'-4"	STR.	HORIZ EF	187
M	S506E	20	7'-4"	1'-4"	EXP JT TIE	153
N	S507E	10	7'-9"	1'-9"	EXP JT TIE	81

DIMENSIONS AND QUANTITIES				
PANEL LENGTH =				9'-10"
SPREAD FOOTING				
b	2'-7"	e	----	
c	1'-7"	f	----	
d	8'-6"	g	2'-9 1/4"	
STEM				
a	2'-1 1/2"	x	2'-4"	
j	1'-8 3/4"	z	5'-10"	
QUANTITIES				
STRUCTURAL CONCRETE (1G52)				
(FOOTING)				
SPREAD	5.0	CU YD		
STRUCTURAL CONCRETE (3G52)				
(STEM)				
9.2	CU YD			
REINFORCEMENT BAR				
SPREAD	505	LB		
REINFORCEMENT BAR (EPOXY)				
1068	LB			

BAR	MARK	NO.	LENGTH	A	LOCATION	WT-LBS
h = 16.00	PANEL:	CE	(3 THUS)	-	MEDIUM WALL	
A	F501	18	12'-5"	STR.	LONG T & B	233
B	F502	11	8'-0"	STR.	TRANS BOT	92
C	F703	11	8'-0"	STR.	TRANS TOP	180
D	F504E	11	3'-0"	STR.	DOWEL FF	34
E	F605E	11	9'-9"	4'-4"	DOWEL BF	161
F	F706E	10	9'-4"	8'-0"	DOWEL BF	191
G	S401E	11	13'-2"	STR.	VERT FF	97
H	S502E	11	13'-2"	STR.	VERT BF	151
K	S504E	11	10'-8"	4'-9"	TOP TIE	122
L	S405E	32	9'-4"	STR.	HORIZ EF	200
M	S506E	20	7'-4"	1'-4"	EXP JT TIE	153
N	S507E	12	7'-9"	1'-9"	EXP JT TIE	97

DIMENSIONS AND QUANTITIES				
PANEL LENGTH =				9'-10"
SPREAD FOOTING				
b	2'-7"	e	----	
c	1'-9"	f	----	
d	8'-6"	g	2'-9 1/4"	
STEM				
a	2'-2"	x	2'-1"	
j	1'-9 1/4"	z	6'-9"	
QUANTITIES				
STRUCTURAL CONCRETE (1G52)				
(FOOTING)				
SPREAD	5.5	CU YD		
STRUCTURAL CONCRETE (3G52)				
(STEM)				
9.9	CU YD			
REINFORCEMENT BAR				
SPREAD	505	LB		
REINFORCEMENT BAR (EPOXY)				
1206	LB			

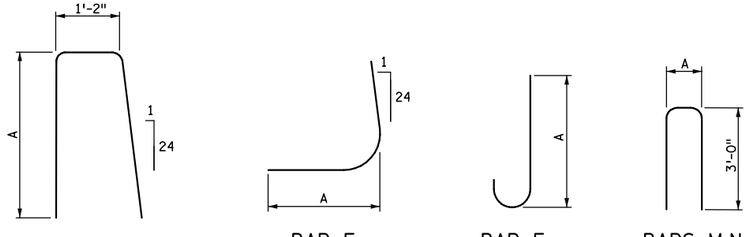
BAR	MARK	NO.	LENGTH	A	LOCATION	WT-LBS
h = 17.00	PANEL:	CF	(2 THUS)	-	TALL WALL	
A	F501	20	10'-1"	STR.	LONG T & B	210
B	F502	8	8'-6"	STR.	TRANS BOT	71
C	F803	8	8'-6"	STR.	TRANS TOP	182
D	F504E	8	3'-0"	STR.	DOWEL FF	25
E	F605E	8	10'-9"	4'-6"	DOWEL BF	129
F	F706E	7	7'-9"	6'-5"	DOWEL BF	111
G	S401E	8	14'-2"	STR.	VERT FF	76
H	S502E	8	14'-2"	STR.	VERT BF	119
J	S503E	7	8'-9"	STR.	TOP TIE	64
K	S504E	8	10'-8"	4'-9"	TOP TIE	89
L	S405E	34	7'-0"	STR.	HORIZ EF	159
M	S506E	20	7'-4"	1'-4"	EXP JT TIE	153
N	S507E	14	7'-9"	1'-9"	EXP JT TIE	113

DIMENSIONS AND QUANTITIES				
PANEL LENGTH =				7'-6"
SPREAD FOOTING				
b	2'-9"	e	----	
c	1'-9"	f	----	
d	9'-0"	g	2'-11 1/4"	
STEM				
a	2'-2 1/2"	x	3'-1"	
j	1'-9 7/8"	z	5'-2"	
QUANTITIES				
STRUCTURAL CONCRETE (1G52)				
(FOOTING)				
SPREAD	4.5	CU YD		
STRUCTURAL CONCRETE (3G52)				
(STEM)				
8.3	CU YD			
REINFORCEMENT BAR				
SPREAD	463	LB		
REINFORCEMENT BAR (EPOXY)				
1038	LB			

BAR	MARK	NO.	LENGTH	A	LOCATION	WT-LBS
h = 17.00	PANEL:	CG	(1 THUS)	-	TALL WALL	
A	F501	20	9'-0"	STR.	LONG T & B	188
B	F502	8	8'-6"	STR.	TRANS BOT	71
C	F803	8	8'-6"	STR.	TRANS TOP	182
D	F504E	7	3'-0"	STR.	DOWEL FF	22
E	F705E	13	9'-9"	4'-6"	DOWEL BF	260
G	S401E	7	14'-2"	STR.	VERT FF	66
G	S402E	2	12'-9"	STR.	VERT FF	17
H	S603E	13	14'-2"	STR.	VERT BF	277
H	S604E	3	12'-9"	STR.	VERT BF	57
K	S505E	9	10'-8"	4'-9"	TOP TIE	100
L	S606E	4	5'-11"	STR.	HORIZ EF	36
L	S607E	30	7'-4"	STR.	HORIZ EF	330
M	S508E	20	7'-4"	1'-4"	EXP JT TIE	153
N	S509E	14	7'-9"	1'-9"	EXP JT TIE	113

DIMENSIONS AND QUANTITIES				
PANEL LENGTH =				7'-10 3/8"
SPREAD FOOTING				
b	2'-9"	e	----	
c	1'-9"	f	----	
d	9'-0"	g	2'-11 1/4"	
STEM				
a	2'-2 1/2"	x	3'-7"	
j	1'-9 7/8"	z	----	
QUANTITIES				
STRUCTURAL CONCRETE (1G52)				
(FOOTING)				
SPREAD	3.9	CU YD		
STRUCTURAL CONCRETE (3G52)				
(STEM)				
8.8	CU YD			
REINFORCEMENT BAR				
SPREAD	441	LB		
REINFORCEMENT BAR (EPOXY)				
1431	LB			

* THIS DRAWING HAS BEEN MODIFIED TO MATCH THE PROJECT CONDITIONS.



BAR K BAR E BAR F BARS M,N,P

* DENOTES MODIFICATION FROM STANDARD PLAN

NOTES:

L = DENOTES PANEL LENGTH.
FF = DENOTES FRONT FACE.
BF = DENOTES BACK FACE.
EF = DENOTES EACH FACE.
DWL = DENOTES DOWEL.
BOT. = DENOTES BOTTOM.
T&B = DENOTES TOP & BOTTOM.
x = PROJECTION OF BAR E INTO STEM.
z = PROJECTION OF BAR F INTO STEM.
BARS MARKED WITH THE SUFFIX "E" ARE EPOXY COATED

MODIFIED

NOTES:

BAR LISTS HAVE BEEN MODIFIED TO MATCH THE PROJECT CONDITIONS.

THE DESIGN HEIGHTS h SHOWN IN THE TABULATIONS ON THIS SHEET ARE NOT IDENTICAL WITH THE ACTUAL WALL HEIGHTS. REFER TO THE WALL C PLAN AND PROFILE SHEET.

STEM CONCRETE VOLUMES WERE COMPUTED USING THE ACTUAL STEM HEIGHTS. THE VOLUME IS THE AVERAGE FOR ANY GIVEN PANEL SERIES.

STEM DIMENSIONS a & j WERE CALCULATED USING THE WALL HEIGHT LISTED IN THE PANEL TABULATIONS. ADJUST DIMENSIONS ACCORDING TO THE ACTUAL WALL HEIGHT.

SEE RETAINING WALL REINFORCEMENT DETAILS SHEETS FOR LOCATION OF DIMENSIONS.

REVISION:
APPROVED: SEPTEMBER 1, 2016
STATE BRIDGE ENGINEER

MINNESOTA DEPARTMENT OF TRANSPORTATION

STANDARD PLAN 5-297.628 | 1 OF 3
APPROVED: 9-1-2016
REVISED:
STATE DESIGN ENGINEER

RETAINING WALL PANEL TABULATIONS
(LIVE LOAD SURCHARGE)

NO.	DATE	BY	DESCRIPTION OF REVISIONS

I HEREBY CERTIFY THAT THIS SHEET WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.
SIGNATURE: Lindsey J. Lawrence
PRINTED NAME: LINDSEY J. LAWRENCE
DATE: 4/2/2021 LIC. NO. 48298

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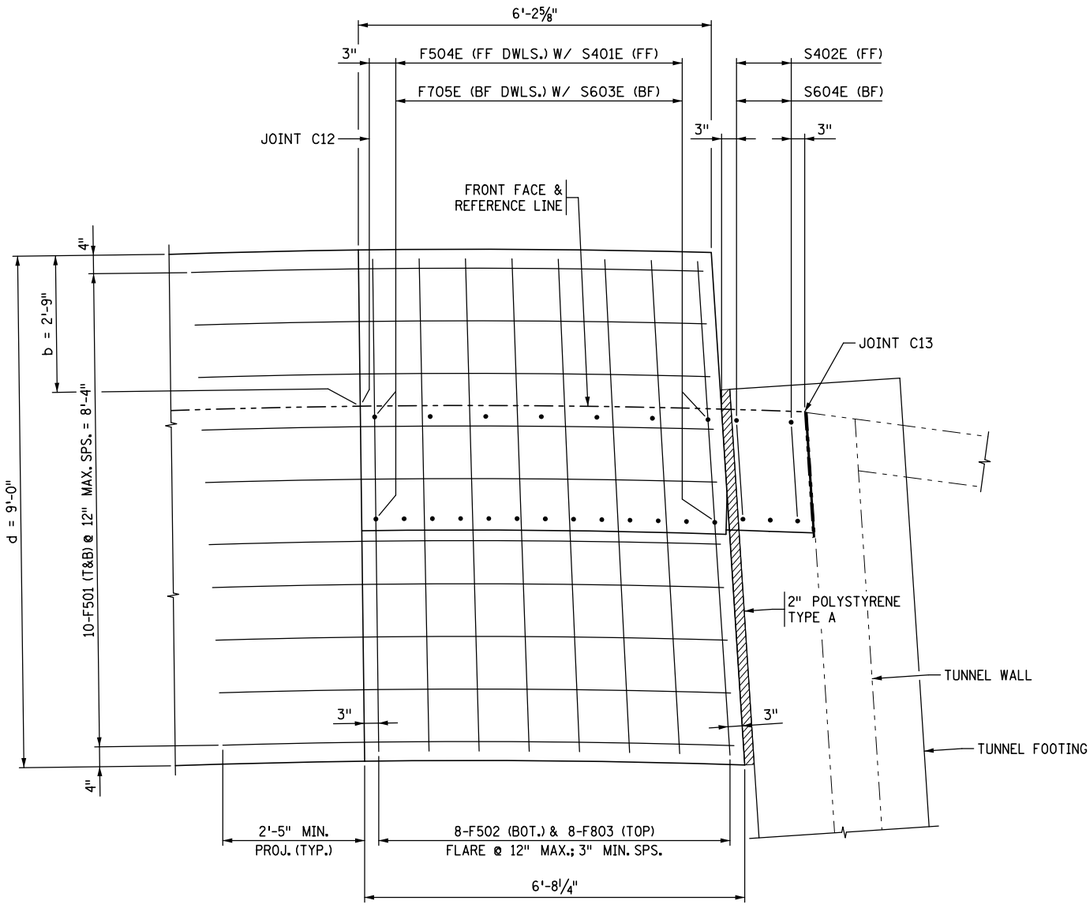
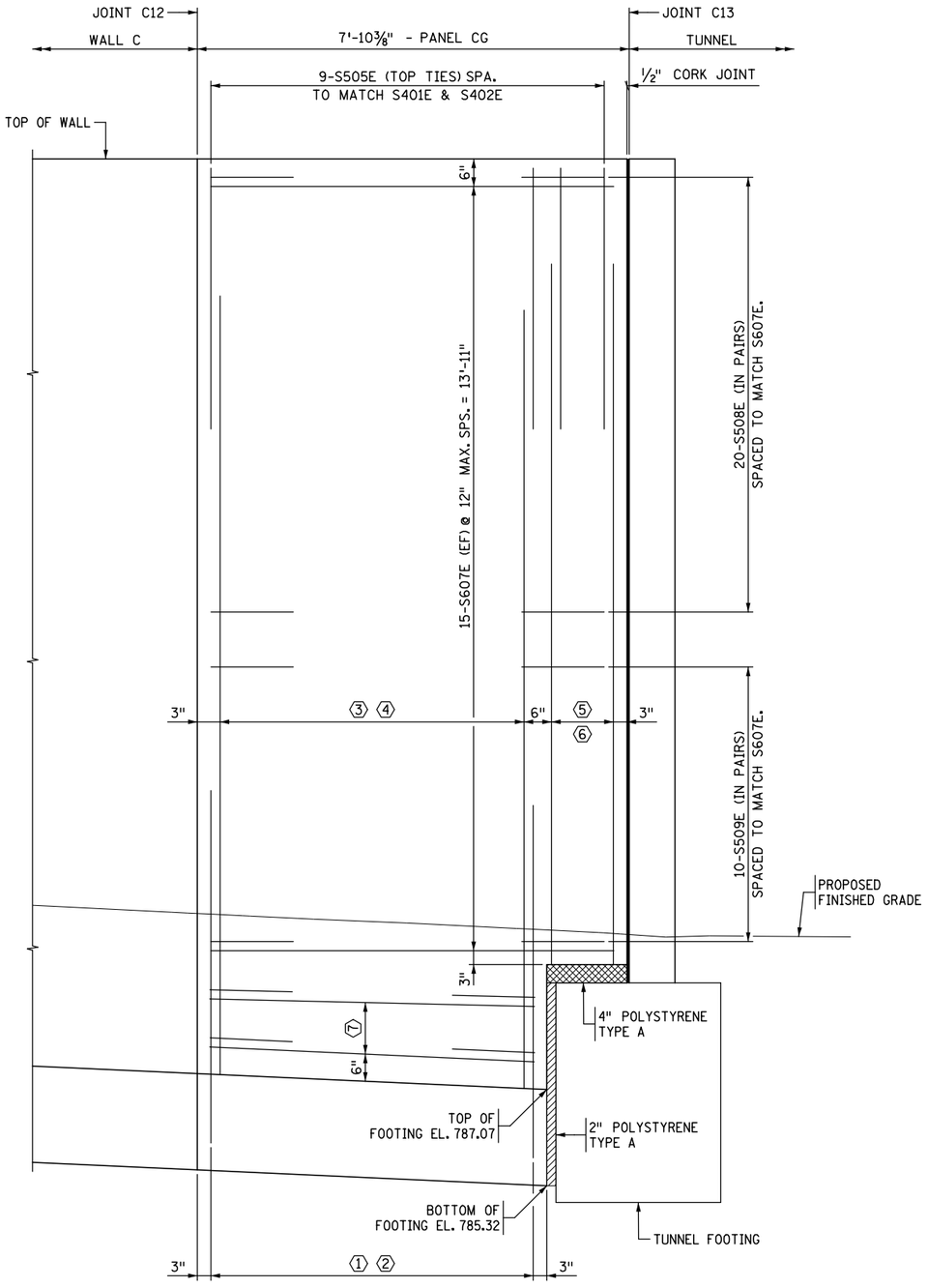
RETAINING WALL PLANS
WALL C PANEL TABULATION

MISSISSIPPI RIVER BOULEVARD CROSSING
Sheet No. S121 of S131 Sheets

DATE: 4/1/2021 TIME: 3:32:43 PM
FILENAME: K:\Vr-2\StPaul-ParksRec\792\002\04_Production\01_CAD\08_MicroStation\Bridge\General\wr_C02.dgn



PANEL CG - PLAN VIEW



PANEL CG - ELEVATION VIEW

BAR CALL-OUTS:

① 7-F504E (FF DWLS.) @ 12" MAX. SPS. = 5'-10⅜".

② 13-F705E (BF DWLS.) @ 6" MAX. SPS. = 5'-11⅝".

③ 7-S401E (FF) SPACED TO MATCH FF DWLS.

④ 13-S603E (BF) SPACED TO MATCH BF DWLS.

⑤ 2-S402E (FF) @ 11½" SPS.

⑥ 3-S604E (BF) @ 6" MAX. SPS. = 11½".

⑦ 2-S606E (EF) @ 12" MAX. SPS.
4-S509E (IN PAIRS) SPACED TO MATCH S606E.

NOTES:

SEE WALL C PANEL TABULATION FOR BILL OF REINFORCEMENT AND PANEL GEOMETRY.

NO.	DATE	BY	DESCRIPTION OF REVISIONS

I HEREBY CERTIFY THAT THIS SHEET WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

SIGNATURE: Lindsey J. Lawrence
PRINTED NAME: LINDSEY J. LAWRENCE
DATE: 4/2/2021 LIC. NO. 48298

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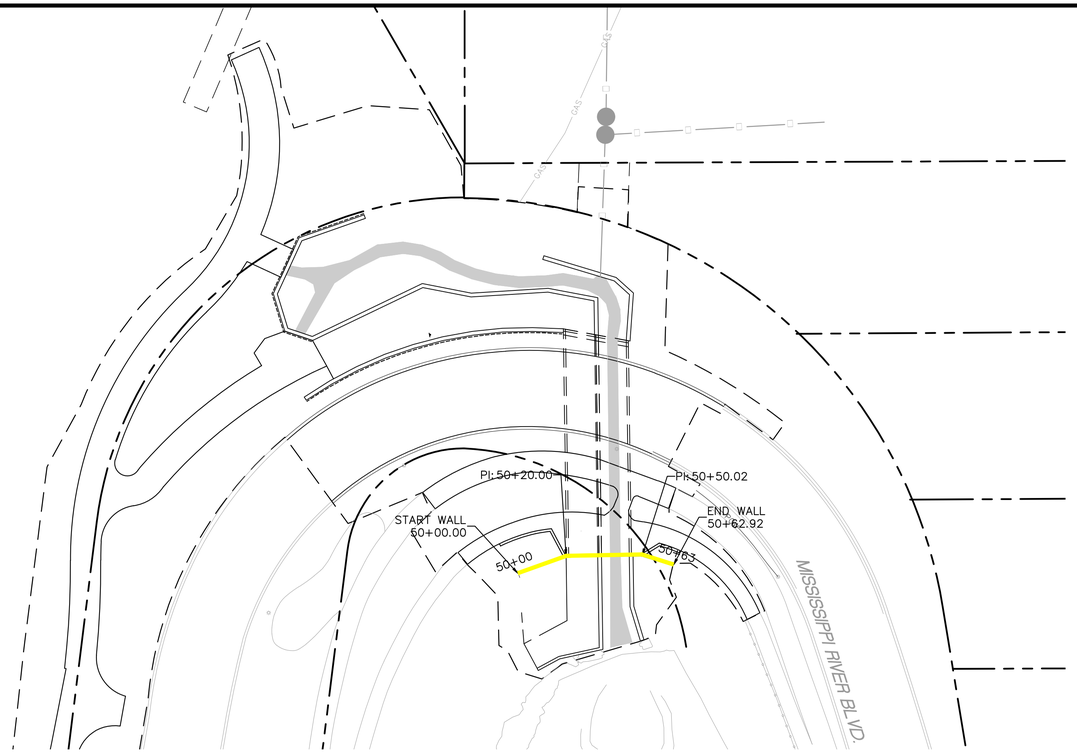
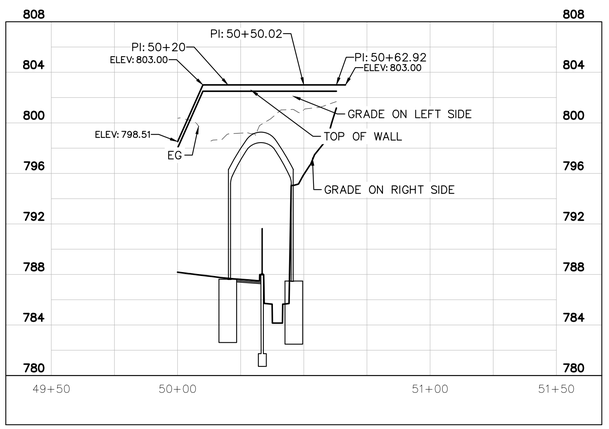
RETAINING WALL PLANS
WALL C PANEL CG DETAILS

MISSISSIPPI RIVER BOULEVARD CROSSING

Sheet No. S122 of S131 Sheets



1 S123 RETAINING WALL PLAN



2 S123 RETAINING WALL PROFILE

HORIZONTAL SCALE
0 15 30 60
SCALE IN FEET

VERTICAL SCALE
0 5 10
SCALE IN FEET

NO.	DATE	BY	DESCRIPTION OF REVISIONS
1	4/2/2021	LJL	100% SUBMITTAL

DESIGNED HAP
DRAWN HAP
CHECKED LJL

FINAL DESIGN
100% SUBMITTAL

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Engineer under the laws of the State of Minnesota.
Printed Name: LIN SEY J. [illegible] ENCE
Signature: [signature]
Date: 4.2.2021 License # 46258

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Saint Paul, MN 55101
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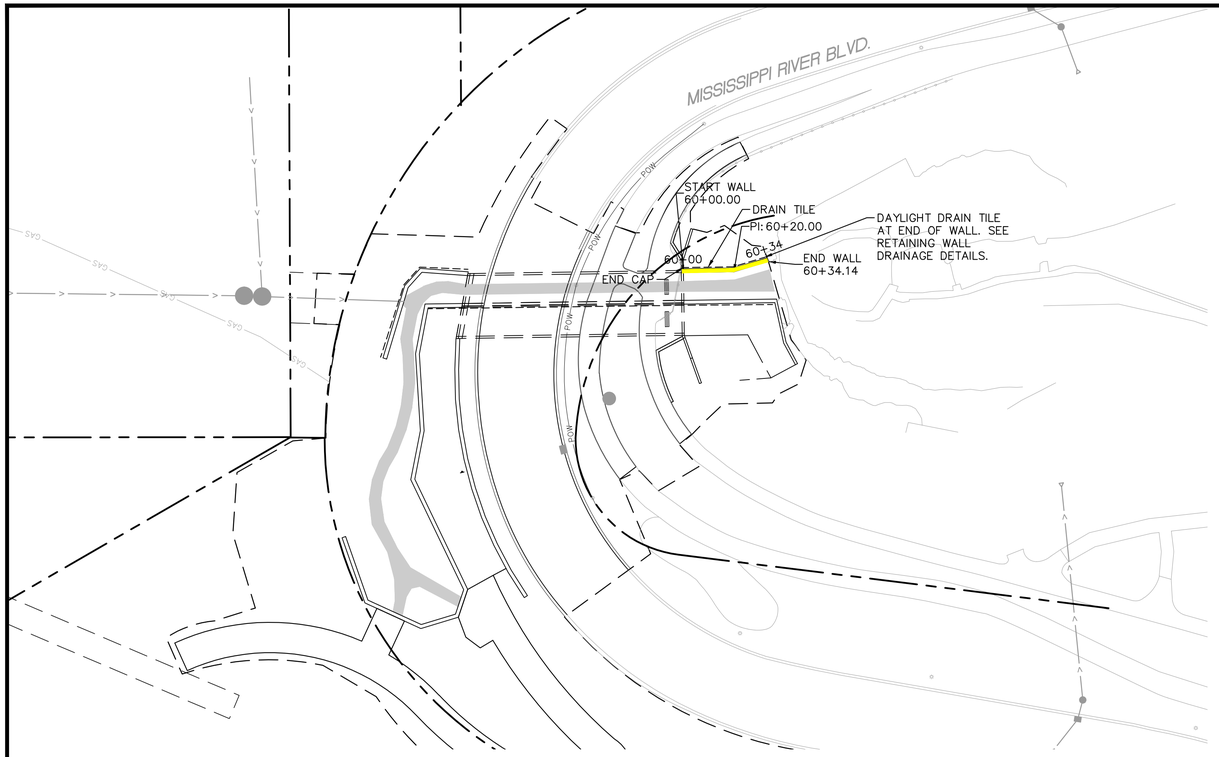
CITY OF SAINT PAUL DEPARTMENT OF PARKS AND RECREATION
HIGHLAND BRIDGE MRB CROSSING
SAINT PAUL, MINNESOTA RAMSEY COUNTY

WALL D PLAN PROFILE

PROJ. NO. 17921.002
DRAWING NO. S123

BAR IS ONE INCH ON ORIGINAL DRAWING. IF NOT ONE INCH ON THIS DRAWING ADJUST SCALES ACCORDINGLY.

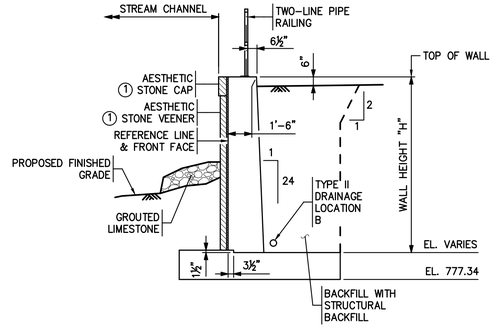
0 1



1 / S124 RETAINING WALL E PLAN

0 15 30 60
SCALE IN FEET

NORTH



NOTES:

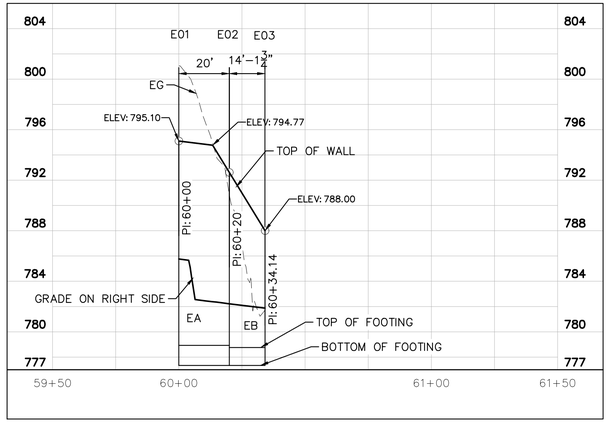
(1) TO BE GROUTED TO FRONT FACE OF RETAINING WALL AND STONES ANCHORED TOGETHER. ANTI-GRAFFITI COATING.

3 / S124 RETAINING WALL E TYPICAL SECTION

CIP WALL WITH AESTHETIC STONE VENEER

HORIZONTAL SCALE
0 15 30 60
SCALE IN FEET

VERTICLE SCALE
0 5 10
SCALE IN FEET



2 / S124 RETAINING WALL E PROFILE

RETAINING WALL DATA - WALL E

JOINT NO.	STATION	COORDINATES		FINISHED GRADE (FRONT FACE)	FINISHED GRADE (BACK FACE)	TOP OF WALL	TOP OF FOOTING	HEIGHT	BOTTOM OF FOOTING	LENGTH	ID	JOINT TYPE
		X	Y									
E□□	□□□□□.□□	□□□,□□□.□□□	□□□,□□□.□□□	□□□.□□	□□□.□□	□□□.□□	□□□.□□	□□.□□	□□□.□□			□□ □□
E□□	□□□□□.□□	□□□,□□□.□□□	□□□,□□□.□□□	□□□.□□	□□□.□□	□□□.□□	□□□.□□	□□.□□	□□□.□□	□□.□□	E□	□□ NS/□□□ □□□ N
						□□□.□□	□□□.□□	□□.□□	□□□.□□			
E□□	□□□□□.□□	□□□,□□□.□□□	□□□,□□□.□□□	□□□.□□	□□□.□□	□□□.□□	□□□.□□	□.□□	□□□.□□	□□.□□	E□	

NO.	DATE	BY	DESCRIPTION OF REVISIONS
1	4/2/2021	LJL	100% SUBMITTAL

DESIGNED HAP
DRAWN HAP
CHECKED LJL

FINAL DESIGN
100% SUBMITTAL

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Engineer under the laws of the State of Minnesota.
Printed Name: LIN SEY J. LA□ ENCE
Signature:
Date: 4.2.2021 License #: 48298

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Saint Paul, MN 55101
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CITY OF SAINT PAUL DEPARTMENT OF PARKS AND RECREATION

HIGHLAND BRIDGE MRB CROSSING

SAINT PAUL, MINNESOTA RAMSEY COUNTY

WALL E PLAN □ PROFILE

PROJ. NO. 17921.002

DRAWING NO. S124

PLOT DATE: Apr 01, 2021 - 12:2 pm
FILENAME: K:\n-z\StPaul-ParksRec\17921002\04_Production\01_CAD\02_Sheets\S□□□ - Retaining Wall Plan Pro IlseE,F,G.dwg

BAR	MARK	NO.	LENGTH	A	LOCATION	WT-LBS	DIMENSIONS AND QUANTITIES
h = 17.00	PANEL:	EA	(1 THUS)	-	MEDIUM WALL		PANEL LENGTH = 20'-0"
SPREAD FOOTING REINFORCEMENT							DIMENSIONS
A	F501	20	SER. 1	STR.	LONG T & B	272	SPREAD FOOTING
B	F502	15	8'-8"	STR.	TRANS BOT	136	b 3'-0" e 1'-6"
C	F903	15	8'-8"	STR.	TRANS TOP	442	c 1'-7" f 4'-6"
S	F507	20	5'-0"	2'-6"	JOINT TIE	104	d 9'-2" g 3'-2 1/4"
							STEM
							a 2'-2 1/2" x 4'-9"
							j 1'-9 7/8" z 4'-2"
FOOTING DOWELS & STEM REINFORCEMENT							QUANTITIES
D	F504E	14	3'-0"	STR.	DOWEL FF	43	STRUCTURAL CONCRETE (1G52)
E	F805E	14	5'-10"	4'-10"	DOWEL BF	218	(FOOTING)
F	F706E	13	8'-3"	7'-1"	DOWEL BF	219	SPREAD 7.4 CU YD
G	S401E	21	14'-2"	STR.	VERT FF	199	
H	S602E	21	14'-2"	STR.	VERT BF	447	STRUCTURAL CONCRETE (3G52)
K	S504E	21	10'-8"	4'-9"	TIE	234	(STEM)
L	S605E	34	19'-6"	STR.	HORIZ EF	996	19.5 CU YD
M	S506E	10	7'-4"	1'-4"	EXP JT TIE	76	
N	S507E	7	7'-9"	1'-9"	EXP JT TIE	57	REINFORCEMENT BAR
L	S408E	8	6'-6"	STR.	HORIZ EF	35	SPREAD 954 LB
U	S509E	30	6'-0"	3'-0"	TIE	188	REINFORCEMENT BAR (EPOXY)
							2712 LB

SER. 1 = 2 SERIES OF 10 BARS (12'-5" TO 13'-7")

BAR	MARK	NO.	LENGTH	A	LOCATION	WT-LBS	DIMENSIONS AND QUANTITIES
h = 14.00	PANEL:	EB	(1 THUS)	-	MEDIUM WALL		PANEL LENGTH = 14'-1 3/4"
SPREAD FOOTING REINFORCEMENT							DIMENSIONS
A	F501	20	SER. 1	STR.	LONG T & B	281	SPREAD FOOTING
B	F502	15	8'-5"	STR.	TRANS BOT	132	b 2'-3" e 1'-4"
C	F803	15	8'-5"	STR.	TRANS TOP	337	c 1'-5" f 3'-7 1/2
							d 8'-11" g 2'-5 1/4"
							STEM
							a 2'-1" x 2'-1"
							j 1'-8 3/8" z 3'-9"
FOOTING DOWELS & STEM REINFORCEMENT							QUANTITIES
D	F504E	15	3'-0"	STR.	DOWEL FF	47	STRUCTURAL CONCRETE (1G52)
E	F505E	15	8'-5"	3'-11"	DOWEL BF	131	(FOOTING)
F	F506E	14	7'-3"	6'-1"	DOWEL BF	106	SPREAD 6.6 CU YD
G	S401E	15	11'-2"	STR.	VERT FF	112	
H	S502E	15	11'-2"	STR.	VERT BF	175	STRUCTURAL CONCRETE (3G52)
K	S504E	15	10'-8"	4'-9"	TIE	167	(STEM)
L	S405E	28	13'-7"	STR.	HORIZ EF	254	10.5 CU YD
M	S506E	20	7'-4"	1'-4"	EXP JT TIE	153	
N	S507E	8	7'-9"	1'-9"	EXP JT TIE	65	REINFORCEMENT BAR
							SPREAD 750 LB
							REINFORCEMENT BAR (EPOXY)
							1210 LB

SER. 1 = 2 SERIES OF 10 BARS (12'-11" TO 14'-0")

* THIS DRAWING HAS BEEN MODIFIED TO MATCH THE PROJECT CONDITIONS.

NOTES:

L = DENOTES PANEL LENGTH.
FF = DENOTES FRONT FACE.
BF = DENOTES BACK FACE.
EF = DENOTES EACH FACE.
DWL = DENOTES DOWEL.
BOT. = DENOTES BOTTOM.
T&B = DENOTES TOP & BOTTOM.
x = PROJECTION OF BAR E INTO STEM.
z = PROJECTION OF BAR F INTO STEM.
BARS MARKED WITH THE SUFFIX "E" ARE EPOXY COATED

NOTES:

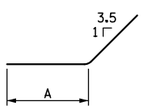
BAR LISTS HAVE BEEN MODIFIED TO MATCH THE PROJECT CONDITIONS.

THE DESIGN HEIGHTS h SHOWN IN THE TABULATIONS ON THIS SHEET ARE NOT IDENTICAL WITH THE ACTUAL WALL HEIGHTS. REFER TO THE WALL E PLAN & PROFILE.

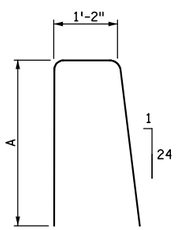
STEM CONCRETE VOLUMES WERE COMPUTED USING THE ACTUAL STEM HEIGHTS. THE VOLUME IS THE AVERAGE FOR ANY GIVEN PANEL SERIES.

STEM DIMENSIONS a & j WERE CALCULATED USING THE WALL HEIGHT LISTED IN THE PANEL TABULATIONS. ADJUST DIMENSIONS ACCORDING TO THE ACTUAL WALL HEIGHT.

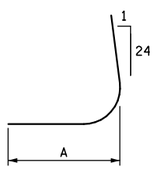
SEE RETAINING WALL REINFORCEMENT DETAILS SHEETS FOR LOCATION OF DIMENSIONS.



BARS S, U

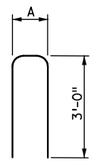


BAR K



BAR E

BAR F



BARS M & N

* DENOTES MODIFICATION FROM STANDARD PLAN

MODIFIED

REVISION: SEPTEMBER 1, 2016
APPROVED: AUGUST 27, 2014
STATE BRIDGE ENGINEER

MINNESOTA DEPARTMENT OF TRANSPORTATION

STANDARD PLAN 5-297.627 | 2 OF 3
APPROVED: 8-27-2014
REVISED: 9-1-2016
STATE DESIGN ENGINEER

RETAINING WALL PANEL TABULATIONS
(1V:2H SLOPED FILL)

NO.	DATE	BY	DESCRIPTION OF REVISIONS

I HEREBY CERTIFY THAT THIS SHEET WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.
SIGNATURE: Lindsey J. Lawrence
PRINTED NAME: LINDSEY J. LAWRENCE
DATE: 4/2/2021 LIC. NO. 48298

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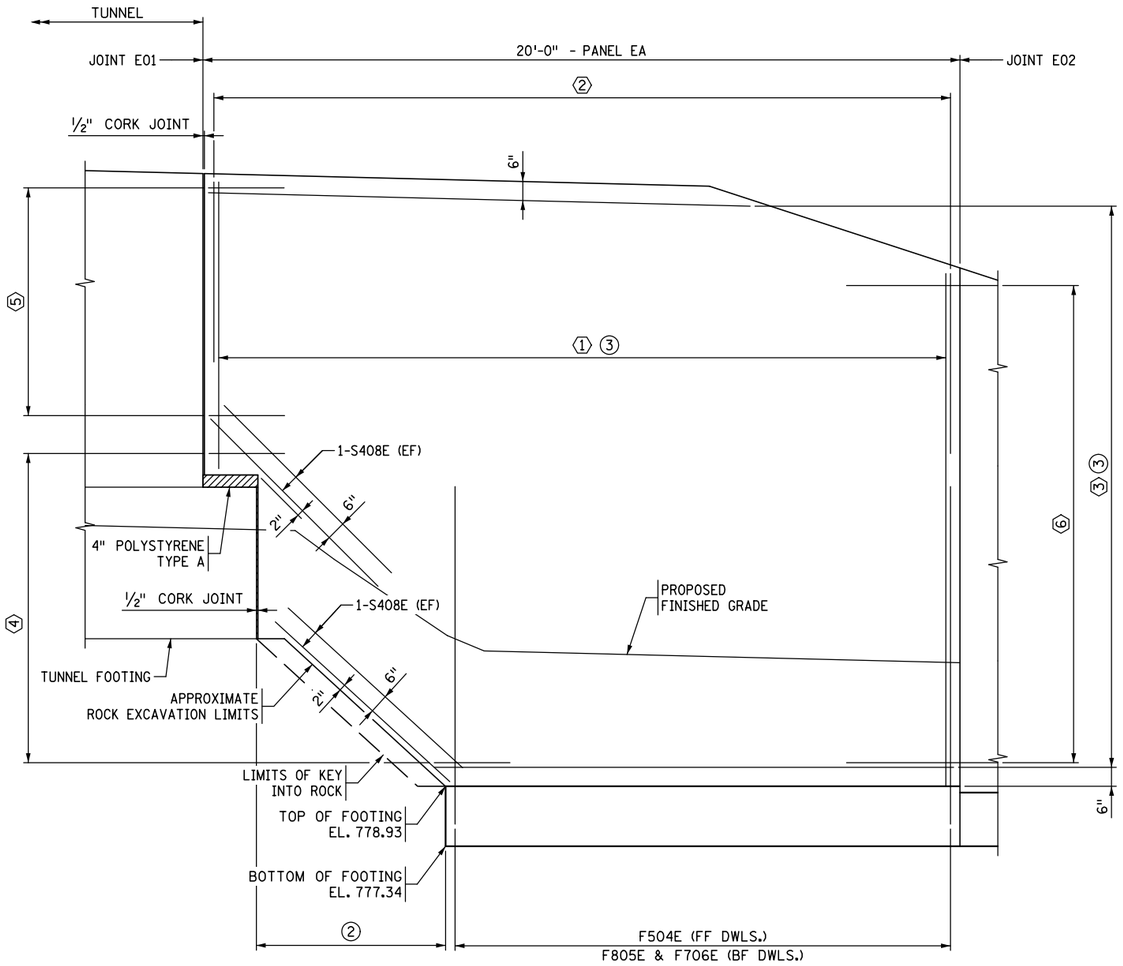
444 Cedar Street, Suite 1500
Saint Paul, MN 55101
651.292.4400
tkda.com

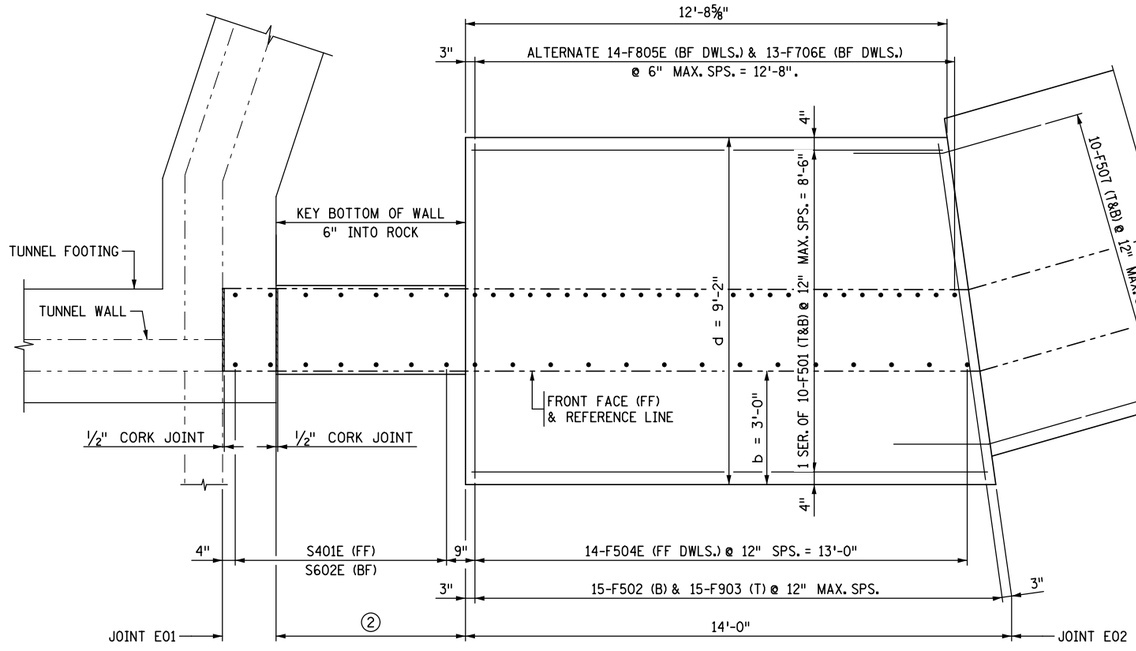
RETAINING WALL PLANS
WALL E PANEL TABULATION

MISSISSIPPI RIVER BOULEVARD CROSSING
Sheet No. S125 of S131 Sheets

DATE: 4/1/2021 TIME: 3:33:01 PM
FILENAME: K:\Pr-2\StPaul-ParksRec\792\002\04_Production\01_CAD\08_MicroStation\Bridge\General\wr_E02.dgn



PANEL EA - ELEVATION VIEW ①



PANEL EA - PLAN VIEW ①

BAR CALL-OUTS:

① 21-S401E (FF) SPACED TO MATCH F504E (FF DWLS.) OR @ 12" MAX. SPS.
21-S602E (BF) SPACED TO MATCH F805E (BF DWLS.) OR @ 12" MAX. SPS.

② 21-S504E TOP TIES SPACED TO MATCH S602E (BF).

③ 17-S605E (EF) @ 12" MAX. SPS.

④ 10-S506E TO MATCH S605E.

⑤ 7-S507E TO MATCH S605E.

⑥ 15-S509E CONSTRUCTION JOINT TIES (EF) SPACED TO MATCH S605E (EF).

NOTES:

SEE WALL E PANEL TABULATION FOR BILL OF REINFORCEMENT AND PANEL GEOMETRY.

① FOOTING REINFORCEMENT AND FOOTING LIMITS HAVE BEEN DEVELOPED BASED ON APPROXIMATE ROCK EXCAVATION LIMITS. CONTRACTOR TO CONTACT ENGINEER IF FIELD CONDITIONS DIFFER.

② ENGINEER TO REVIEW AND APPROVE ANY LENGTH OVER 5'-0".

③ FIELD CUT AND REPAIR REINFORCEMENT AS necessary.

DATE: 4/1/2021 TIME: 3:33:09 PM
FILENAME: K:\Nr-z\StPaul-ParksRec\1792\002\04_Production\01_CAD\08_MicroStation\Bridge\General\wr_E03.dgn

NO.	DATE	BY	DESCRIPTION OF REVISIONS

I HEREBY CERTIFY THAT THIS SHEET WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.
SIGNATURE: Lindsey J. Lawrence
PRINTED NAME: LINDSEY J. LAWRENCE
DATE: 4/2/2021 LIC. NO. 48298

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Saint Paul, MN 55101
651.292.4400
tkda.com

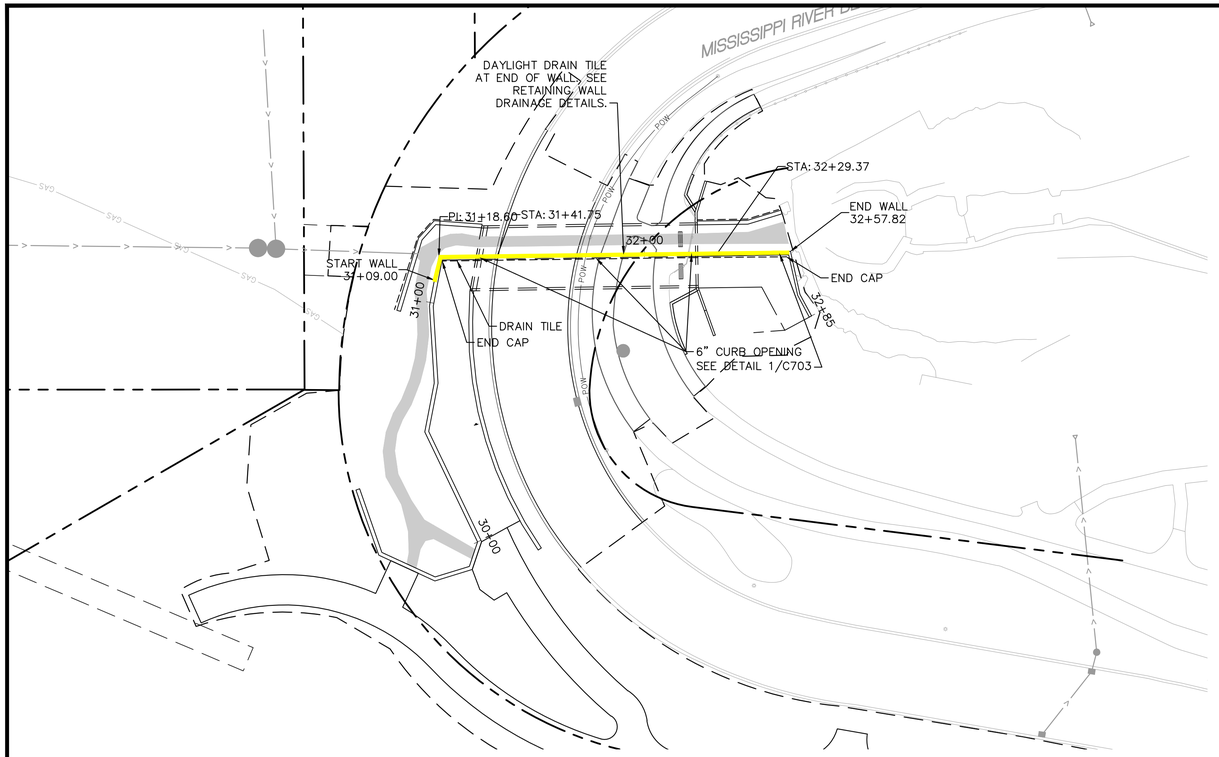
RETAINING WALL PLANS
WALL E PANEL EA DETAILS

MISSISSIPPI RIVER BOULEVARD CROSSING

Sheet No. S126 of S131 Sheets

BAR IS ONE INCH ON ORIGINAL DRAWING. IF NOT ONE INCH ON THIS DRAWING ADJUST SCALES ACCORDINGLY.

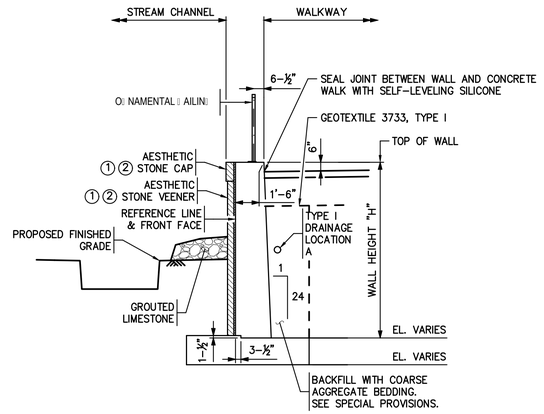
0 1



1 / S127 RETAINING WALL PLAN

0 15 30 60
SCALE IN FEET

NORTH



NOTES:

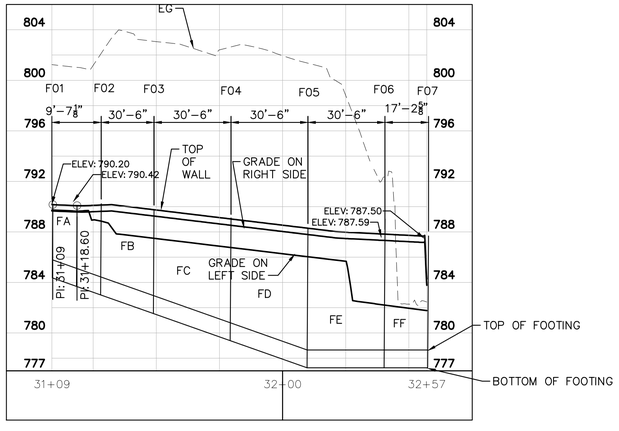
① TO BE GROUTED TO FRONT FACE OF RETAINING WALL AND STONES ANCHORED TOGETHER. ANTI-GRAFFITI COATING.

② USE ON PANELS FE & FF ONLY.

3 / S127 RETAINING WALL TYPICAL SECTION
CIP WALL WITH AESTHETIC STONE VENEER

HORIZONTAL SCALE
0 15 30 60
SCALE IN FEET

VERTICLE SCALE
0 5 10
SCALE IN FEET



2 / S127 RETAINING WALL PROFILE

RETAINING WALL DATA - WALL F

JOINT NO.	STATION	COORDINATES		FINISHED GRADE (FRONT FACE)	FINISHED GRADE (BACK FACE)	TOP OF WALL	TOP OF FOOTING	HEIGHT	BOTTOM OF FOOTING	LENGTH	ID	JOINT TYPE
		X	Y									
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] NS/[illegible] N
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] NS/[illegible] N
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] NS/[illegible] N
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] NS/[illegible] N
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PLOT DATE: Apr 01, 2021 - 12:2 pm
FILENAME: K:\n-z\StPaul-ParksRec\17921002\04_Production\01_CAD\02_Sheets\S[illegible] - Retaining Wall Plan Profiles E, F, G.dwg

NO.	DATE	BY	DESCRIPTION OF REVISIONS
1	4/2/2021	LJL	100% SUBMITTAL

DESIGNED HAP
DRAWN HAP
CHECKED LJL

FINAL DESIGN
100% SUBMITTAL

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Engineer under the laws of the State of Minnesota.
Printed Name: LINDSEY J. LA[illegible]ENCE
Signature: Lindsey J. Lawrence
Date: 4.2.2021 License #: 48298

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Saint Paul, MN 55101
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tkda.com

CITY OF SAINT PAUL DEPARTMENT OF PARKS AND RECREATION

HIGHLAND BRIDGE MRB CROSSING

SAINT PAUL, MINNESOTA RAMSEY COUNTY

WALL F PLAN [illegible] PROFILE

PROJ. NO. 17921.002

DRAWING NO. S127

BAR	MARK	NO.	LENGTH	A	LOCATION	WT-LBS
h = 6.00	PANEL:	FA	(1 THUS) -	SHORT WALL		
A	F501	14	SER. 1	STR.	LONG T & B	117
1 B	F502	22	4'-2"	STR.	TRANS BOT	96
1 C	F503	22	4'-2"	STR.	TRANS TOP	96
S	F507	14	5'-0"	2'-6"	JOINT TIE	73
D	F504E	11	3'-0"	STR.	DOWEL FF	35
E	F505E	11	4'-4"	10"	DOWEL BF	50
G	S401E	11	4'-11"	STR.	VERT FF	36
H	S502E	11	4'-11"	STR.	VERT BF	56
K	S504E	11	7'-2"	3'-0"	TIE	82
L	S405E	12	9'-1"	STR.	HORIZ EF	73
M	S506E	12	7'-4"	1'-4"	EXP JT TIE	92
U	C401E	6	8'-8"	4'-4"	CORNER TIE	35
W	C402E	12	6'-4"	2'-0"	CORNER TIE	51
Y	C403E	12	5'-0"	2'-0"	CORNER TIE	40

DIMENSIONS AND QUANTITIES				
PANEL LENGTH =	9'-7 1/8"			
SPREAD FOOTING REINFORCEMENT				
DIMENSIONS				
SPREAD FOOTING				
b	1'-1"	e	----	
c	1'-5"	f	----	
d	5'-0"	g	1'-3 1/4"	
STEM				
a	1'-9"	x	2'-1"	
j	1'-4 3/8"	z	----	
FOOTING DOWELS & STEM REINFORCEMENT				
QUANTITIES				
STRUCTURAL CONCRETE (1G52)				
(FOOTING)				
SPREAD	2.3	CU YD		
STRUCTURAL CONCRETE (3G52)				
(STEM)				
2.8	CU YD			
REINFORCEMENT BAR				
SPREAD	382	LB		
REINFORCEMENT BAR (EPOXY)				
550	LB			

SER. 1 = 2 SERIES OF 7 BARS (6'-3" TO 9'-10")

BAR	MARK	NO.	LENGTH	A	LOCATION	WT-LBS
h = 7.00	PANEL:	FB	(1 THUS) -	SHORT WALL		
A	F501	14	SER. 1	STR.	LONG T & B	423
1 B	F502	64	4'-2"	STR.	TRANS BOT	279
1 C	F503	64	4'-2"	STR.	TRANS TOP	279
D	F504E	31	3'-0"	STR.	DOWEL FF	97
E	F505E	31	4'-4"	10"	DOWEL BF	140
G	S401E	31	4'-2"	STR.	VERT FF	86
H	S502E	31	4'-2"	STR.	VERT BF	135
K	S504E	31	10'-8"	4'-9"	TIE	345
L	S405E	14	30'-0"	STR.	HORIZ EF	281
M	S506E	14	7'-4"	1'-4"	EXP JT TIE	107

DIMENSIONS AND QUANTITIES				
PANEL LENGTH =	30'-6"			
SPREAD FOOTING REINFORCEMENT				
DIMENSIONS				
SPREAD FOOTING				
b	1'-1"	e	----	
c	1'-5"	f	----	
d	5'-0"	g	1'-3 1/4"	
STEM				
a	1'-9 1/2"	x	2'-1"	
j	1'-4 7/8"	z	----	
FOOTING DOWELS & STEM REINFORCEMENT				
QUANTITIES				
STRUCTURAL CONCRETE (1G52)				
(FOOTING)				
SPREAD	7.9	CU YD		
STRUCTURAL CONCRETE (3G52)				
(STEM)				
11.1	CU YD			
REINFORCEMENT BAR				
SPREAD	981	LB		
REINFORCEMENT BAR (EPOXY)				
1191	LB			

SER. 1 = 2 SERIES OF 7 BARS (27'-2" TO 30'-9")

BAR	MARK	NO.	LENGTH	A	LOCATION	WT-LBS
h = 9.00	PANEL:	FC	(1 THUS) -	SHORT WALL		
A	F501	14	32'-11"	STR.	LONG T & B	481
B	F502	31	4'-6"	STR.	TRANS BOT	146
C	F503	31	4'-6"	STR.	TRANS TOP	146
D	F504E	31	3'-0"	STR.	DOWEL FF	97
E	F505E	31	4'-4"	10"	DOWEL BF	140
G	S401E	31	6'-2"	STR.	VERT FF	128
H	S502E	31	6'-2"	STR.	VERT BF	199
K	S504E	31	10'-8"	4'-9"	TIE	345
L	S405E	18	30'-0"	STR.	HORIZ EF	361
M	S506E	18	7'-4"	1'-4"	EXP JT TIE	138

DIMENSIONS AND QUANTITIES				
PANEL LENGTH =	30'-6"			
SPREAD FOOTING REINFORCEMENT				
DIMENSIONS				
SPREAD FOOTING				
b	1'-1"	e	----	
c	1'-5"	f	----	
d	5'-0"	g	1'-3 1/4"	
STEM				
a	1'-10 1/2"	x	2'-1"	
j	1'-5 7/8"	z	----	
FOOTING DOWELS & STEM REINFORCEMENT				
QUANTITIES				
STRUCTURAL CONCRETE (1G52)				
(FOOTING)				
SPREAD	8.2	CU YD		
STRUCTURAL CONCRETE (3G52)				
(STEM)				
14.1	CU YD			
REINFORCEMENT BAR				
SPREAD	773	LB		
REINFORCEMENT BAR (EPOXY)				
1408	LB			

BAR	MARK	NO.	LENGTH	A	LOCATION	WT-LBS
h = 10.00	PANEL:	FD	(1 THUS) -	MEDIUM WALL		
A	F501	14	32'-11"	STR.	LONG T & B	481
B	F502	31	4'-6"	STR.	TRANS BOT	146
C	F503	31	4'-6"	STR.	TRANS TOP	146
D	F504E	31	3'-0"	STR.	DOWEL FF	97
E	F505E	31	4'-4"	10"	DOWEL BF	140
F	F506E	30	4'-1"	3'-0"	DOWEL BF	128
G	S401E	31	7'-2"	STR.	VERT FF	148
H	S502E	31	7'-2"	STR.	VERT BF	232
K	S504E	31	10'-8"	4'-9"	TIE	345
L	S405E	20	30'-0"	STR.	HORIZ EF	401
M	S506E	20	7'-4"	1'-4"	EXP JT TIE	153

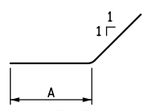
DIMENSIONS AND QUANTITIES				
PANEL LENGTH =	30'-6"			
SPREAD FOOTING REINFORCEMENT				
DIMENSIONS				
SPREAD FOOTING				
b	1'-1"	e	----	
c	1'-5"	f	----	
d	5'-0"	g	1'-3 1/4"	
STEM				
a	1'-11"	x	2'-1"	
j	1'-6 3/8"	z	2'-1"	
FOOTING DOWELS & STEM REINFORCEMENT				
QUANTITIES				
STRUCTURAL CONCRETE (1G52)				
(FOOTING)				
SPREAD	8.2	CU YD		
STRUCTURAL CONCRETE (3G52)				
(STEM)				
17.0	CU YD			
REINFORCEMENT BAR				
SPREAD	773	LB		
REINFORCEMENT BAR (EPOXY)				
1644	LB			

BAR	MARK	NO.	LENGTH	A	LOCATION	WT-LBS
h = 10.00	PANEL:	FE	(1 THUS) -	MEDIUM WALL		
A	F501	14	32'-11"	STR.	LONG T & B	481
B	F502	31	4'-6"	STR.	TRANS BOT	146
C	F503	31	4'-6"	STR.	TRANS TOP	146
D	F504E	31	3'-0"	STR.	DOWEL FF	97
E	F505E	31	4'-4"	10"	DOWEL BF	140
F	F506E	30	4'-1"	3'-0"	DOWEL BF	128
G	S401E	31	7'-2"	STR.	VERT FF	148
H	S502E	31	7'-2"	STR.	VERT BF	232
K	S504E	31	10'-8"	4'-9"	TIE	345
L	S405E	20	30'-0"	STR.	HORIZ EF	401
M	S506E	20	7'-4"	1'-4"	EXP JT TIE	153

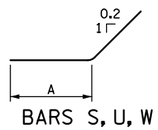
DIMENSIONS AND QUANTITIES				
PANEL LENGTH =	30'-6"			
SPREAD FOOTING REINFORCEMENT				
DIMENSIONS				
SPREAD FOOTING				
b	1'-1"	e	----	
c	1'-5"	f	----	
d	5'-0"	g	1'-3 1/4"	
STEM				
a	1'-11"	x	2'-1"	
j	1'-6 3/8"	z	2'-1"	
FOOTING DOWELS & STEM REINFORCEMENT				
QUANTITIES				
STRUCTURAL CONCRETE (1G52)				
(FOOTING)				
SPREAD	8.2	CU YD		
STRUCTURAL CONCRETE (3G52)				
(STEM)				
17.8	CU YD			
REINFORCEMENT BAR				
SPREAD	773	LB		
REINFORCEMENT BAR (EPOXY)				
1644	LB			

BAR	MARK	NO.	LENGTH	A	LOCATION	WT-LBS
h = 9.00	PANEL:	FF	(1 THUS) -	SHORT WALL		
A	F501	14	19'-8"	STR.	LONG T & B	287
B	F502	18	4'-6"	STR.	TRANS BOT	85
C	F503	18	4'-6"	STR.	TRANS TOP	85
D	F504E	18	3'-0"	STR.	DOWEL FF	56
E	F505E	18	4'-4"	10"	DOWEL BF	81
G	S401E	18	6'-2"	STR.	VERT FF	74
H	S502E	18	6'-2"	STR.	VERT BF	116
K	S504E	18	10'-8"	4'-9"	TIE	200
L	S405E	18	16'-9"	STR.	HORIZ EF	202
M	S506E	18	7'-4"	1'-4"	EXP JT TIE	138

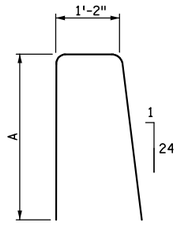
DIMENSIONS AND QUANTITIES				
PANEL LENGTH =	17'-2 5/8"			
SPREAD FOOTING REINFORCEMENT				
DIMENSIONS				
SPREAD FOOTING				
b	1'-1"	e	----	
c	1'-5"	f	----	
d	5'-0"	g	1'-3 1/4"	
STEM				
a	1'-10 1/2"	x	2'-1"	
j	1'-5 7/8"	z	----	
FOOTING DOWELS & STEM REINFORCEMENT				
QUANTITIES				
STRUCTURAL CONCRETE (1G52)				
(FOOTING)				
SPREAD	4.6	CU YD		
STRUCTURAL CONCRETE (3G52)				
(STEM)				
9.6	CU YD			
REINFORCEMENT BAR				
SPREAD	457	LB		
REINFORCEMENT BAR (EPOXY)				
867	LB			



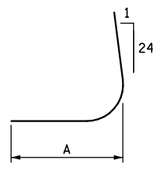
BAR Y



BARS S, U, W

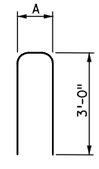


BAR K



BAR E

BAR F



BAR M

* THIS DRAWING HAS BEEN MODIFIED TO MATCH THE PROJECT CONDITIONS.

* DENOTES MODIFICATION FROM STANDARD PLAN

NOTES:

L = DENOTES PANEL LENGTH.
FF = DENOTES FRONT FACE.
BF = DENOTES BACK FACE.
EF = DENOTES EACH FACE.
DWL = DENOTES DOWEL.
BOT. = DENOTES BOTTOM.
T&B = DENOTES TOP & BOTTOM.
x = PROJECTION OF BAR E INTO STEM.
z = PROJECTION OF BAR F INTO STEM.
BARS MARKED WITH THE SUFFIX "E" ARE EPOXY COATED

MODIFIED

NOTES:

BAR LISTS HAVE BEEN MODIFIED TO MATCH THE PROJECT CONDITIONS.

THE DESIGN HEIGHTS h SHOWN IN THE TABULATIONS ON THIS SHEET ARE NOT IDENTICAL WITH THE ACTUAL WALL HEIGHTS. REFER TO THE WALL F PLAN AND PROFILE SHEET.

STEM CONCRETE VOLUMES WERE COMPUTED USING THE ACTUAL STEM HEIGHTS. THE VOLUME IS THE AVERAGE FOR ANY GIVEN PANEL SERIES.

STEM DIMENSIONS a & J WERE CALCULATED USING THE WALL HEIGHT LISTED IN THE PANEL TABULATIONS. ADJUST DIMENSIONS ACCORDING TO THE ACTUAL WALL HEIGHT.

SEE RETAINING WALL REINFORCEMENT DETAILS SHEETS FOR LOCATION OF DIMENSIONS.

SEE "RETAINING WALL MISCELLANEOUS DETAILS 5-297.624 (2 OF 6)" SHEET FOR PLACEMENT OF BARS U, W, AND Y.

(1) PLACE BARS IN PAIRS AND PROVIDE MINIMUM LAP. PAIRED BARS TO BE FLARED, PROVIDING 12" MAX. SPACING AND 3" MIN. SPACING.

REVISION:
APPROVED: SEPTEMBER 1, 2016
STATE BRIDGE ENGINEER

NO.	DATE	BY	DESCRIPTION OF REVISIONS

I HEREBY CERTIFY THAT THIS SHEET WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.
SIGNATURE: Lindsey J. Lawrence
PRINTED NAME: LINDSEY J. LAWRENCE
DATE: 4/2/2021 LIC. NO. 48298

MINNESOTA DEPARTMENT OF TRANSPORTATION

STANDARD PLAN 5-297.628 | 1 OF 3
APPROVED: 9-1-2016
REVISED:
STATE DESIGN ENGINEER

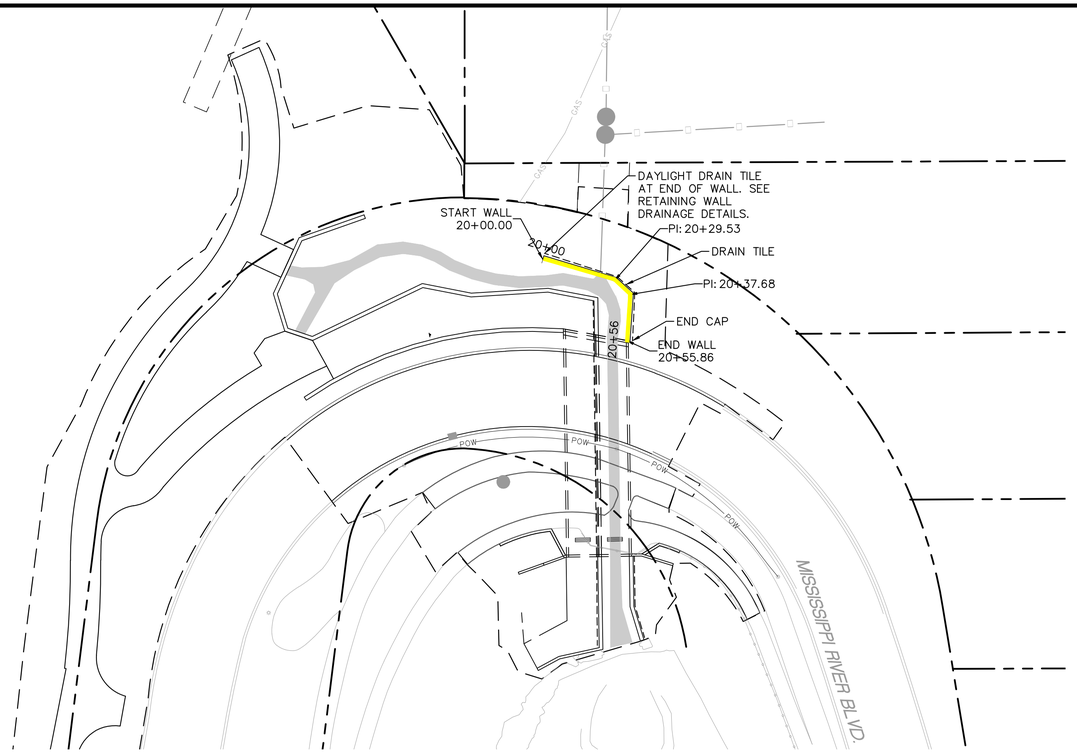
RETAINING WALL PANEL TABULATIONS
(LIVE LOAD SURCHARGE)

TKDA
444 Cedar Street, Suite 1500
Saint Paul, MN 55101
651.292.4400
tkda.com

RETAINING WALL PLANS
WALL F PANEL TABULATION

MISSISSIPPI RIVER BOULEVARD CROSSING
Sheet No. S128 of S131 Sheets

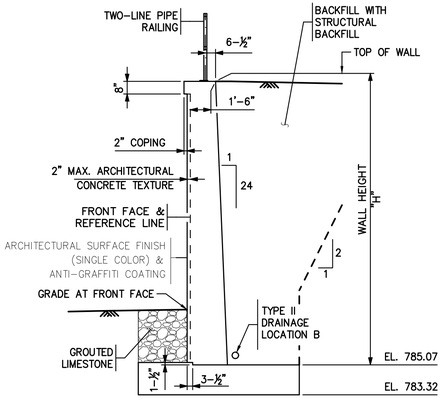
DATE: 4/1/2021 TIME: 3:33:18 PM
FILENAME: K:\n-z\StPaul-ParksRec\792\002\04_Production\01_CAD\08_MicroStation\Br1dge\General\wr_F02.dgn



1 S129 RETAINING WALL PLAN

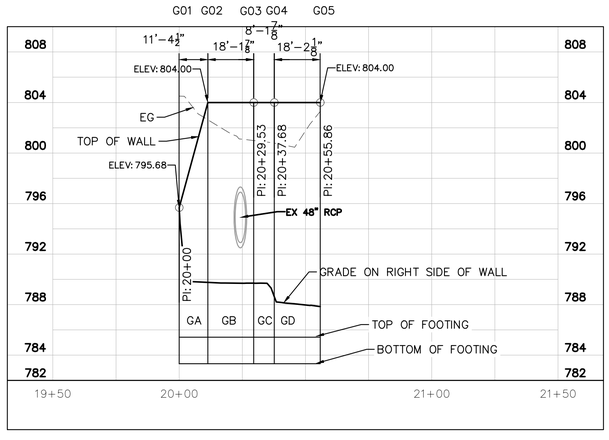
SCALE IN FEET: 0 15 30 60

NORTH



3 S129 RETAINING WALL TYPICAL SECTION

CIP WALL



2 S129 RETAINING WALL PROFILE

HORIZONTAL SCALE

0 15 30 60

SCALE IN FEET

VERTICLE SCALE

0 5 10

SCALE IN FEET

RETAINING WALL DATA - WALL G

JOINT NO.	STATION	COORDINATES		FINISHED GRADE (FRONT FACE)	TOP OF WALL	TOP OF FOOTING	HEIGHT	BOTTOM OF FOOTING	LENGTH	ID	JOINT TYPE
		X	Y								
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] NSI[illegible] [illegible] N
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] NSI[illegible] [illegible] N
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] NSI[illegible] [illegible] N
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] NSI[illegible] [illegible] N

NO.	DATE	BY	DESCRIPTION OF REVISIONS
1	4/2/2021	LJL	100% SUBMITTAL

DESIGNED HAP

DRAWN HAP

CHECKED LJL

FINAL DESIGN
100% SUBMITTAL

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Engineer under the laws of the State of Minnesota.
Printed Name: LIN SEY J LA ENCE
Signature:
Date: 4.2.2021 License #: 48298

TKDA

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Saint Paul, MN 55101
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CITY OF SAINT PAUL DEPARTMENT OF PARKS AND RECREATION

HIGHLAND BRIDGE MRB CROSSING

SAINT PAUL, MINNESOTA RAMSEY COUNTY

WALL G PLAN PROFILE

PROJ. NO. 17921.002

DRAWING NO. S129

PLOT DATE: Apr 01, 2021 - 12:2 pm
FILENAME: K:\n-z\StPaul-ParksRec\17921002\04_Production\01_CAD\02_Sheets\S[illegible] - Retaining Wall Plan ProfileE,F,G.dwg

BAR	MARK	NO.	LENGTH	A	LOCATION	WT-LBS	DIMENSIONS AND QUANTITIES
h = 19.00	PANEL:	GA	(1 THUS)	-	TALL WALL		PANEL LENGTH = 11'-4 1/2"
SPREAD FOOTING REINFORCEMENT							DIMENSIONS
A	F501	22	13'-10"	STR.	LONG T & B	318	SPREAD FOOTING
B	F502	12	9'-7"	STR.	TRANS BOT	120	b 3'-9" e 2'-2"
C	F903	12	9'-7"	STR.	TRANS TOP	391	c 1'-9" f 5'-4"
							d 10'-1" g 3'-11 1/4"
							STEM
							a 2'-3 1/2" x 4'-9"
							J 1'-10 3/4" z 6'-3"
FOOTING DOWELS & STEM REINFORCEMENT							QUANTITIES
D	F504E	12	3'-0"	STR.	DOWEL FF	38	STRUCTURAL CONCRETE (1G52)
E	F705E	12	13'-3"	5'-8"	DOWEL BF	325	(FOOTING)
F	F706E	11	11'-2"	9'-9"	DOWEL BF	251	SPREAD 7.7 CU YD
G	S401E	12	16'-2"	STR.	VERT FF	130	
H	S502E	12	16'-2"	STR.	VERT BF	202	STRUCTURAL CONCRETE (3G52)
J	S503E	11	8'-9"	STR.	VERT BF	100	(STEM)
K	S504E	12	10'-8"	4'-9"	TIE	134	11.3 CU YD
L	S405E	38	10'-10"	STR.	HORIZ EF	275	
M	S506E	20	7'-4"	1'-4"	EXP JT TIE	153	REINFORCEMENT BAR
N	S507E	18	7'-9"	1'-9"	EXP JT TIE	145	SPREAD 829 LB
							REINFORCEMENT BAR (EPOXY)
							1753 LB

BAR	MARK	NO.	LENGTH	A	LOCATION	WT-LBS	DIMENSIONS AND QUANTITIES
h = 19.00	PANEL:	GB	(1 THUS)	-	TALL WALL		PANEL LENGTH = 18'-1 7/8"
SPREAD FOOTING REINFORCEMENT							DIMENSIONS
A	F501	22	SER. 1	STR.	LONG T & B	416	SPREAD FOOTING
(1) B	F502	40	6'-3"	STR.	TRANS BOT	261	b 3'-9" e 2'-2"
(1) C	F903	40	8'-0"	STR.	TRANS TOP	1088	c 1'-9" f 5'-4"
							d 10'-1" g 3'-11 1/4"
							STEM
							a 2'-3 1/2" x 4'-9"
							J 1'-10 3/4" z 6'-3"
FOOTING DOWELS & STEM REINFORCEMENT							QUANTITIES
D	F504E	19	3'-0"	STR.	DOWEL FF	60	STRUCTURAL CONCRETE (1G52)
E	F705E	19	13'-3"	5'-8"	DOWEL BF	515	(FOOTING)
F	F706E	18	11'-2"	9'-9"	DOWEL BF	411	SPREAD 12.4 CU YD
G	S401E	19	16'-2"	STR.	VERT FF	205	
H	S502E	19	16'-2"	STR.	VERT BF	320	STRUCTURAL CONCRETE (3G52)
J	S503E	18	8'-9"	STR.	VERT BF	164	(STEM)
K	S504E	19	10'-8"	4'-9"	TIE	211	24.2 CU YD
L	S405E	38	17'-8"	STR.	HORIZ EF	449	
M	S506E	20	7'-4"	1'-4"	EXP JT TIE	153	REINFORCEMENT BAR
N	S507E	18	7'-9"	1'-9"	EXP JT TIE	145	SPREAD 1765 LB
R	S415E	8	6'-3"	3'-3"	PIPE TIE	34	
							REINFORCEMENT BAR (EPOXY)
							2667 LB

SER. 1 = 2 SERIES OF 11 BARS (17'-0" TO 19'-2")

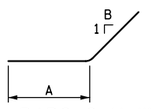
BAR	MARK	NO.	LENGTH	A	LOCATION	WT-LBS	DIMENSIONS AND QUANTITIES
h = 19.00	PANEL:	GC	(1 THUS)	-	TALL WALL		PANEL LENGTH = 8'-1 7/8"
SPREAD FOOTING REINFORCEMENT							DIMENSIONS
A	F501	22	SER. 1	STR.	LONG T & B	199	SPREAD FOOTING
(1) B	F502	26	6'-9"	STR.	TRANS BOT	183	b 3'-9" e 2'-2"
(1) C	F903	26	8'-6"	STR.	TRANS TOP	751	c 1'-9" f 5'-4"
S	F507	22	5'-0"	2'-6"	JOINT TIE	115	d 10'-1" g 3'-11 1/4"
							STEM
							a 2'-3 1/2" x 4'-9"
							J 1'-10 3/4" z 6'-3"
FOOTING DOWELS & STEM REINFORCEMENT							QUANTITIES
D	F504E	9	3'-0"	STR.	DOWEL FF	28	STRUCTURAL CONCRETE (1G52)
E	F705E	11	13'-3"	5'-8"	DOWEL BF	298	(FOOTING)
F	F706E	10	11'-2"	9'-9"	DOWEL BF	228	SPREAD 6.1 CU YD
G	S401E	9	16'-2"	STR.	VERT FF	97	
H	S502E	11	16'-2"	STR.	VERT BF	185	STRUCTURAL CONCRETE (3G52)
J	S503E	10	8'-9"	STR.	VERT BF	91	(STEM)
K	S504E	9	10'-8"	4'-9"	TIE	100	10.9 CU YD
L	S405E	38	7'-7"	STR.	HORIZ EF	193	
M	S506E	20	7'-4"	1'-4"	EXP JT TIE	153	REINFORCEMENT BAR
N	S507E	18	7'-9"	1'-9"	EXP JT TIE	145	SPREAD 1248 LB
U	C401E	19	8'-8"	4'-4"	HORIZ EF	110	REINFORCEMENT BAR (EPOXY)
W	C402E	38	6'-4"	2'-0"	HORIZ EF	161	1791 LB

SER. 1 = 2 SERIES OF 11 BARS (5'-4" TO 12'-0")

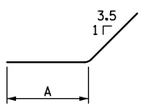
BAR	MARK	NO.	LENGTH	A	LOCATION	WT-LBS	DIMENSIONS AND QUANTITIES
h = 19.00	PANEL:	GD	(1 THUS)	-	TALL WALL		PANEL LENGTH = 18'-2 1/8"
SPREAD FOOTING REINFORCEMENT							DIMENSIONS
A	F501	22	SER. 1	STR.	LONG T & B	401	SPREAD FOOTING
(1) B	F502	42	6'-8"	STR.	TRANS BOT	293	b 3'-9" e 2'-2"
(1) C	F903	42	8'-6"	STR.	TRANS TOP	1214	c 1'-9" f 5'-4"
S	F507	22	5'-0"	2'-6"	JOINT TIE	115	d 10'-1" g 3'-11 1/4"
							STEM
							a 2'-3 1/2" x 4'-9"
							J 1'-10 3/4" z 6'-3"
FOOTING DOWELS & STEM REINFORCEMENT							QUANTITIES
D	F504E	18	3'-0"	STR.	DOWEL FF	56	STRUCTURAL CONCRETE (1G52)
E	F705E	19	13'-3"	5'-8"	DOWEL BF	515	(FOOTING)
F	F706E	18	11'-2"	9'-9"	DOWEL BF	411	SPREAD 11.9 CU YD
G	S401E	18	16'-2"	STR.	VERT FF	194	
H	S502E	19	16'-2"	STR.	VERT BF	320	STRUCTURAL CONCRETE (3G52)
J	S503E	18	8'-9"	STR.	VERT BF	164	(STEM)
K	S504E	19	10'-8"	4'-9"	TIE	211	24.2 CU YD
L	S405E	30	17'-8"	STR.	HORIZ EF	354	
M	S506E	10	7'-4"	1'-4"	EXP JT TIE	77	REINFORCEMENT BAR
N	S507E	9	7'-9"	1'-9"	EXP JT TIE	73	SPREAD 2022 LB
G	S408E	1	14'-4"	STR.	VERT FF	10	
H	S509E	2	14'-4"	STR.	VERT BF	30	REINFORCEMENT BAR (EPOXY)
L	S410E	8	16'-10"	STR.	HORIZ EF	90	2776 LB
U	C401E	19	8'-8"	4'-4"	HORIZ EF	110	
W	C402E	38	6'-4"	2'-0"	HORIZ EF	161	

SER. 1 = 2 SERIES OF 11 BARS (15'-2" TO 19'-9")

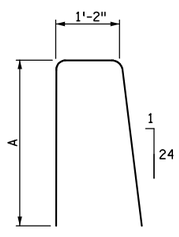
SLOPE FOR BARS S, U, W		
PANEL	JOINT	DIM. "B"
GC	G03	2.1
GD	G04	0.8



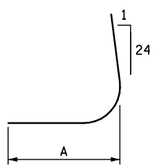
BARS S, U, W



BAR S

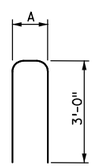


BAR K



BAR E

BAR F



BARS M & N

* THIS DRAWING HAS BEEN MODIFIED TO MATCH THE PROJECT CONDITIONS.

* DENOTES MODIFICATION FROM STANDARD PLAN

NOTES:

L = DENOTES PANEL LENGTH.
FF = DENOTES FRONT FACE.
BF = DENOTES BACK FACE.
EF = DENOTES EACH FACE.
DWL = DENOTES DOWEL.
BOT. = DENOTES BOTTOM.
T&B = DENOTES TOP & BOTTOM.
x = PROJECTION OF BAR E INTO STEM.
z = PROJECTION OF BAR F INTO STEM.
BARS MARKED WITH THE SUFFIX "E" ARE EPOXY COATED

MODIFIED

NOTES:

BAR LISTS HAVE BEEN MODIFIED TO MATCH THE PROJECT CONDITIONS.

THE DESIGN HEIGHTS h SHOWN IN THE TABULATIONS ON THIS SHEET ARE NOT IDENTICAL WITH THE ACTUAL WALL HEIGHTS. REFER TO THE WALL G PLAN & PROFILE SHEET.

STEM CONCRETE VOLUMES WERE COMPUTED USING THE ACTUAL STEM HEIGHTS. THE VOLUME IS THE AVERAGE FOR ANY GIVEN PANEL SERIES.

STEM DIMENSIONS a & J WERE CALCULATED USING THE WALL HEIGHT LISTED IN THE PANEL TABULATIONS. ADJUST DIMENSIONS ACCORDING TO THE ACTUAL WALL HEIGHT.

SEE RETAINING WALL REINFORCEMENT DETAILS SHEETS FOR LOCATION OF DIMENSIONS.

SEE "RETAINING WALL MISCELLANEOUS DETAILS 5-297.624 (2 OF 6)" SHEET FOR PLACEMENT OF BARS U AND W.

(1) PLACE BARS IN PAIRS AND PROVIDE MINIMUM LAP. PAIRED BARS TO BE FLARED, PROVIDING 12" MAX. SPACING AND 3" MIN. SPACING.

REVISION: SEPTEMBER 1, 2016
APPROVED: AUGUST 27, 2014
STATE BRIDGE ENGINEER

MINNESOTA DEPARTMENT OF TRANSPORTATION

STANDARD PLAN 5-297.627 | 2 OF 3
APPROVED: 8-27-2014
REVISED: 9-1-2016
STATE DESIGN ENGINEER

RETAINING WALL PANEL TABULATIONS

(1V:2H SLOPED FILL)

NO.	DATE	BY	DESCRIPTION OF REVISIONS

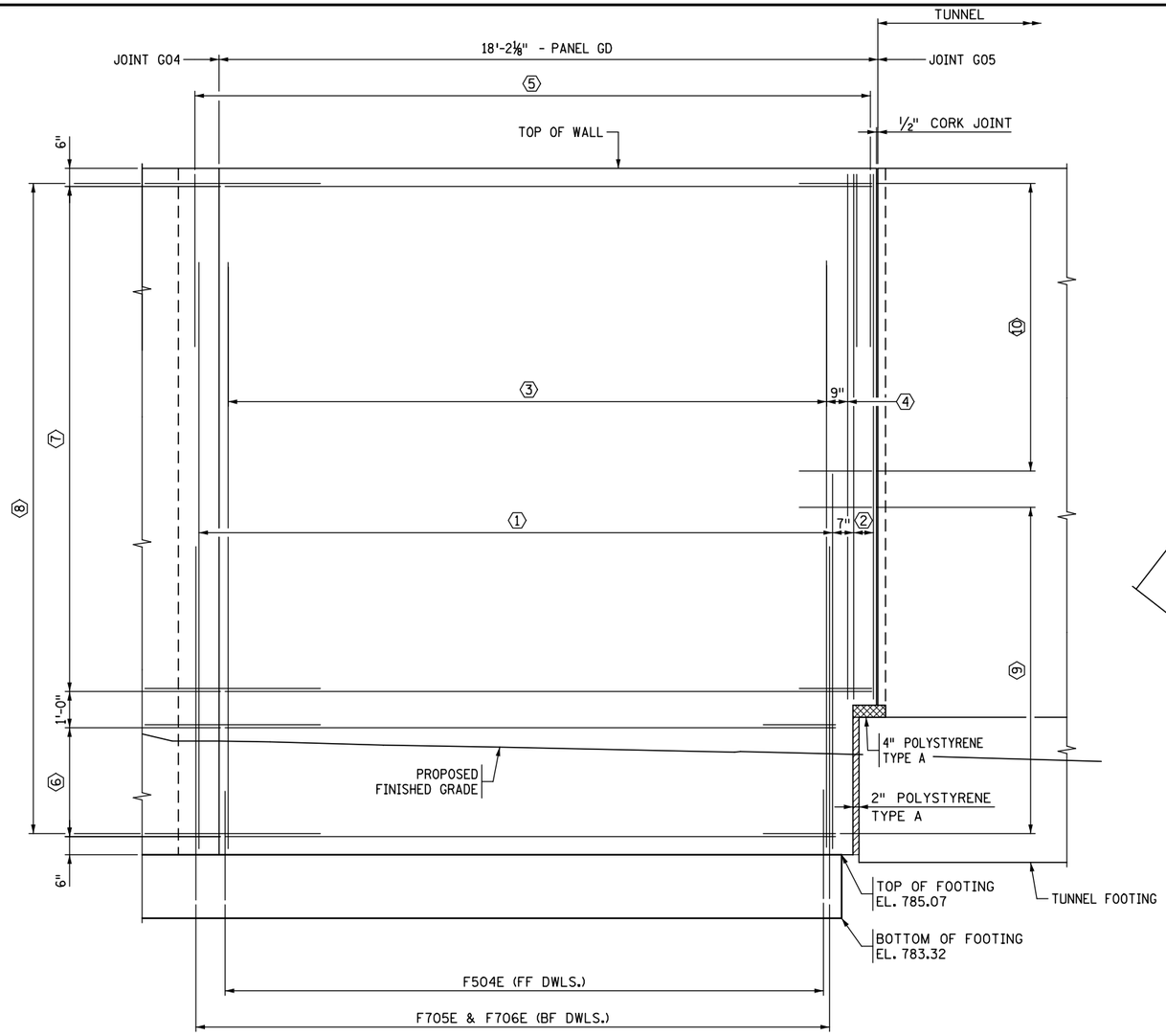
I HEREBY CERTIFY THAT THIS SHEET WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.
SIGNATURE: Lindsey J. Lawrence
PRINTED NAME: LINDSEY J. LAWRENCE
DATE: 4/2/2021 LIC. NO. 48298

TKDA
444 Cedar Street, Suite 1500
Saint Paul, MN 55101
651.292.4400
tkda.com

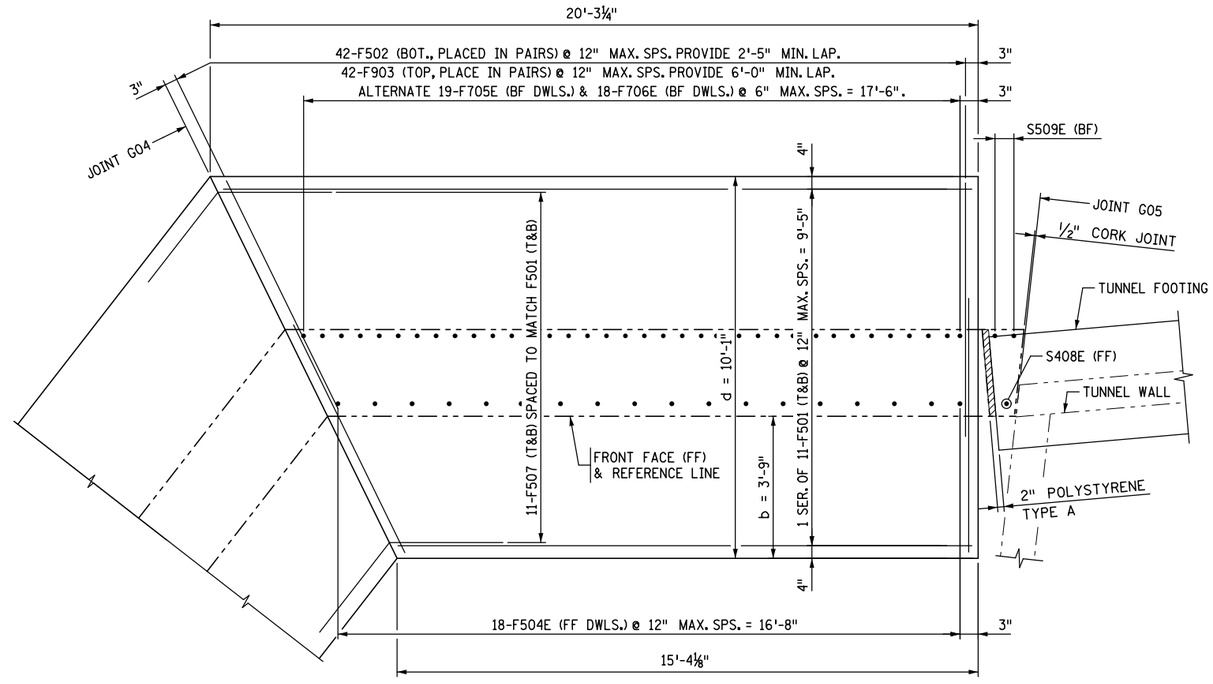
RETAINING WALL PLANS
WALL G PANEL TABULATION

MISSISSIPPI RIVER BOULEVARD CROSSING
Sheet No. S130 of S131 Sheets

DATE: 4/1/2021 TIME: 3:33:26 PM
FILENAME: K:\Pr-2\StPaul-Parks\Rec\792\002\04_Production\01_CAD\08_MicroStation\Bridge\General\wr_G02.dgn



PANEL GD - ELEVATION VIEW



PANEL GD - PLAN VIEW

BAR CALL-OUTS:

① 19-S502E (BF) SPACED TO MATCH F705E (BF DWLS.) & 18-S503E (BF) SPACED TO MATCH F706E (BF DWLS.).

② 2-S509E (BF) @ 7" SPS.

③ 18-S401E (FF) SPACED TO MATCH F504E (FF DWLS.).

④ 1-S408E (FF) SPACED AS SHOWN.

⑤ 19-S504E TOP TIES SPACED TO MATCH S401E (FF) & S408E (FF).

⑥ 4-S410E (EF) @ 12" SPS. = 3'-0".

⑦ 15-S405E (EF) @ 12" MAX. SPS. = 13'-11⅛".

⑧ 19-C401E CORNER TIES WITH 38-C402E (PLACED IN PAIRS) SPACED TO MATCH S405E (EF) & S410E (EF).

⑨ 9-S507E SPACED TO MATCH S405E (BF) & S410E (BF).

⑩ 10-S506E SPACED TO MATCH S405E (BF).

NOTES:

SEE WALL G PANEL TABULATION FOR BILL OF REINFORCEMENT AND PANEL GEOMETRY.

DATE: 4/1/2021 TIME: 3:33:36 PM
FILENAME: K:\r-z\StPaul-ParksRec\792\002\04_Production\01_CAD\08_MicroStation\Bridge\General\wr_G03.dgn

NO.	DATE	BY	DESCRIPTION OF REVISIONS

I HEREBY CERTIFY THAT THIS SHEET WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

SIGNATURE: Lindsey J. Lawrence
PRINTED NAME: LINDSEY J. LAWRENCE
DATE: 4/2/2021 LIC. NO. 48298

TKDA
444 Cedar Street, Suite 1500
Saint Paul, MN 55101
651.292.4400
tkda.com

RETAINING WALL PLANS
WALL G PANEL GD DETAILS

MISSISSIPPI RIVER BOULEVARD CROSSING

Sheet No. S131 of S131 Sheets

HIGHLAND BRIDGE MRB CROSSING
CITY OF SAINT PAUL DEPARTMENT OF PARKS AND RECREATION
SAINT PAUL, MINNESOTA

NOTES

GENERAL NOTES:

1. THIS BRIDGE HAS BEEN DESIGNED FOR GENERAL SITE CONDITIONS. THE PROJECT ENGINEER SHALL BE RESPONSIBLE FOR THE STRUCTURE'S SUITABILITY TO THE EXISTING SITE CONDITIONS AND FOR THE HYDRAULIC EVALUATION -- INCLUDING SCOUR AND CONFIRMATION OF SOIL CONDITIONS.
2. PRIOR TO CONSTRUCTION, CONTRACTOR MUST VERIFY ALL ELEVATIONS SHOWN THROUGH THE ENGINEER.
3. ONLY CONTECH ENGINEERED SOLUTIONS LLC, THE CON/SPAN® APPROVED PRECASTER IN MINNESOTA MAY PROVIDE THE STRUCTURE DESIGNED IN ACCORDANCE WITH THESE PLANS.
4. THE USE OF ANOTHER PRECAST STRUCTURE WITH THE DESIGN ASSUMPTIONS USED FOR THE CON/SPAN® STRUCTURE MAY LEAD TO SERIOUS DESIGN ERRORS. USE OF ANY OTHER PRECAST STRUCTURE WITH THIS DESIGN AND DRAWINGS VOIDS ANY CERTIFICATION OF THIS DESIGN AND WARRANTY. CONTECH ENGINEERED SOLUTIONS LLC ASSUMES NO LIABILITY FOR DESIGN OF ANY ALTERNATE OR SIMILAR TYPE STRUCTURES.
5. ALTERNATE STRUCTURES MAY BE CONSIDERED, PROVIDED THAT DRAWINGS AND CALCULATIONS SIGNED AND SEALED BY A PROFESSIONAL ENGINEER, REGISTERED IN THE STATE OF MINNESOTA, EMPLOYED BY THE PRECAST CONCRETE BRIDGE SUPPLIER, ARE SUBMITTED TO THE ENGINEER 2 WEEKS PRIOR TO THE BID DATE FOR REVIEW AND APPROVAL.
6. ALTERNATE STRUCTURES MAY BE CONSIDERED, PROVIDED THAT THE ALTERNATE DESIGN DOES NOT REDUCE THE HYDRAULIC OPENING OF THE STRUCTURE AS SHOWN ON THE DRAWINGS. AT A MINIMUM THE ALTERNATE STRUCTURE MUST PROVIDE THE SAME OR LARGER SPAN AND RISE AS THE STRUCTURE SHOWN ON THE DRAWINGS.
7. THE PRECAST ARCH SUPPLIER MUST ATTEND THE PRE-BID MEETING, IF ONE IS HELD.
8. SUPPLIER OF PROPOSED ALTERNATES TO A CON/SPAN® BRIDGE SYSTEM MUST SUBMIT AT LEAST TWO (2) INDEPENDENTLY VERIFIED FULL SCALE LOAD TESTS THAT CONFIRM THE PROPOSED DESIGN METHODOLOGY OF THE THREE SIDED/ARCH STRUCTURE(S). THE PROPOSED ALTERNATE, UPON SATISFACTORY CONFIRMATION OF DESIGN METHODOLOGY, MAY BE CONSIDERED AN ACCEPTABLE ALTERNATE.
9. PROPOSED ALTERNATE STRUCTURES MAY BE CONSIDERED, PROVIDED THAT THE PRECAST CONCRETE BRIDGE STRUCTURES ARE PROVIDED BY A SUPPLIER THAT HAS A MINIMUM OF TWO (2) REGISTERED PROFESSIONAL ENGINEERS ON STAFF THAT ARE DEDICATED TO THE DESIGN OF THESE TYPES OF STRUCTURES. SUPPLIER MUST PROVIDE THESE NAMES, P.E. LICENSE NUMBERS AND DATES OF HIRE AT TIME OF ALTERNATE SUBMITTAL.

DESIGN DATA

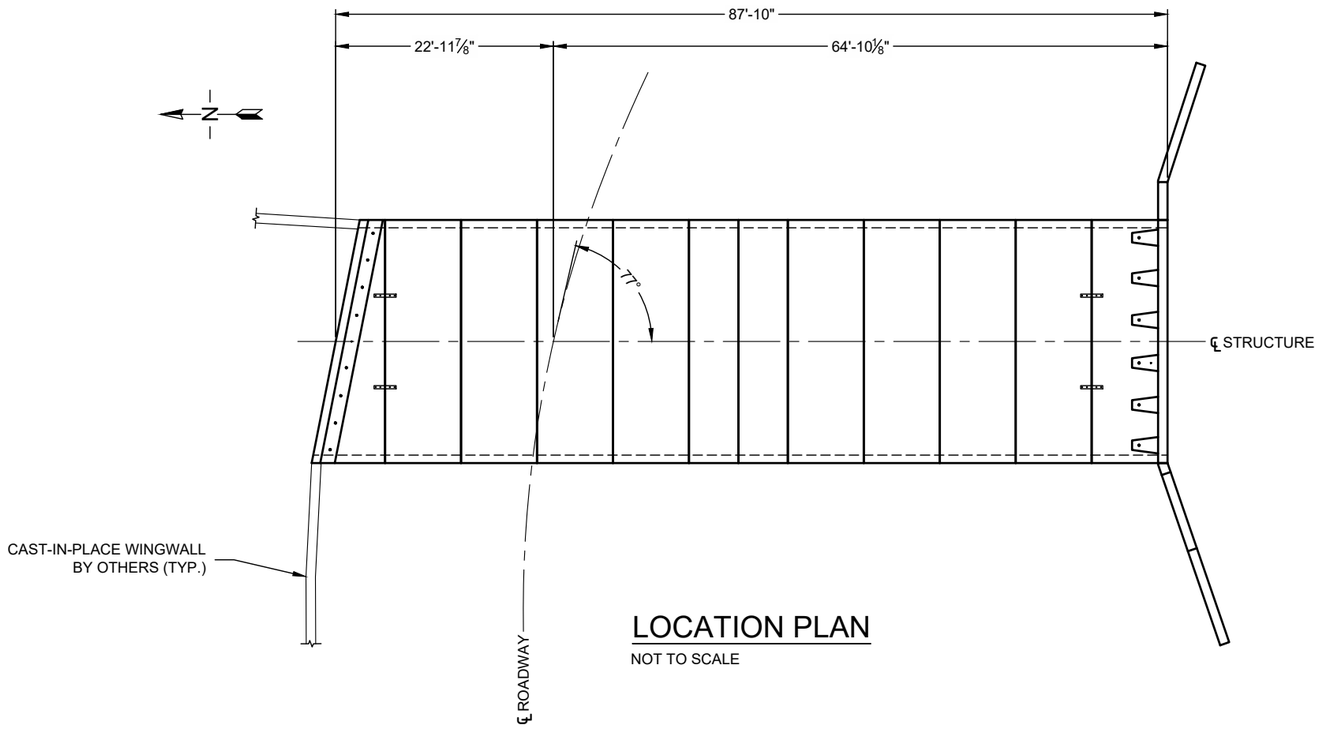
DESIGN LOADING:
- BRIDGE UNITS: HL-93
- HEADWALLS: EARTH PRESSURE + LIVE LOAD SURCHARGE
- WINGWALLS: EARTH PRESSURE + LIVE LOAD SURCHARGE

DESIGN FILL HEIGHT: 1'-0" MIN. TO 2'-0" MAX.
FROM TOP OF CROWN TO TOP OF PAVEMENT.
DESIGN METHOD: LOAD AND RESISTANCE FACTOR DESIGN PER AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 8TH EDITION, 2017.
FACTORED BEARING RESISTANCE: 10,000 PSF*
BEARING RESISTANCE FACTOR: 0.45

*FOUNDATION EXCAVATION AND SUBGRADE PREPARATION SHALL BE IN ACCORDANCE WITH THE GEOTECHNICAL REPORT FOR THIS PROJECT PREPARED BY BRAUN INTERTEC CORPORATION DATED 1/25/2021.

MATERIALS

PRECAST UNITS SHALL BE CONSTRUCTED AND INSTALLED IN ACCORDANCE WITH CON/SPAN® SPECIFICATIONS. CONCRETE FOR FOOTINGS SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI. REINFORCING STEEL FOR FOOTINGS SHALL CONFORM TO ASTM A615 OR A996-GRADE 60.



LOCATION PLAN
NOT TO SCALE

PRELIMINARY
NOT FOR CONSTRUCTION

MARK	DATE	REVISION DESCRIPTION	BY

CONTECH ENGINEERED SOLUTIONS
ENGINEERING, PROFESSIONAL CORPORATION
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CON/SPAN BRIDGE SYSTEMS

CONTRACT DRAWING

HIGHLAND BRIDGE MRB CROSSING
CITY OF SAINT PAUL DEPARTMENT OF PARKS AND RECREATION
SAINT PAUL, MINNESOTA

PROJECT No.:	SEQ. No.:	DATE:
645922	010	3/30/2021
DESIGNED: KDK	DRAWN: TRL	
CHECKED:	APPROVED: MGC	
SHEET NO.: CT1 OF CT10		

85'-3½"
9 - 24'-0" SPAN x 11'-0" RISE x 8'-0" LONG
2 - 24'-0" SPAN x 11'-0" RISE x 5'-2⅜" LONG
1 - 24'-0" SPAN x 11'-0" RISE SKEWED
(2'-8" SHORT LEG x 7'-9" LONG LEG)
PRECAST CONCRETE BRIDGE UNITS
PLUS 11 JOINTS @ ¼"± PER JOINT

N

2'-8" | 5'-2⅜" | 5'-2⅜"

A CT4

DETAIL 8 CT8

8'-0" (TYP.)

12'-0"

12'-0"

C CT5

10¾" DETACHED HEADWALL

7'-9"

CAST-IN-PLACE WINGWALL BY OTHERS (TYP.)

℄ STRUCTURE

1'-0" DETACHED HEADWALL

B CT4

DETAIL 7 CT8

1'-0" | 1'-5" | 3'-0" | 5'-0" | 2'-6" (TYP.) | TYPE D | TYPE E

2'-0" | TYPE E | 7° | 12'-11" WINGWALL WW4

DETAIL 5A CT7 5B CT7

4'-0" WINGWALL WW4

COVER ALL CORNERS WITH 2'-0" WIDE STRIP OF FILTER FABRIC

DETAIL 4A CT7 4B CT7

COVER ALL WINGWALL JOINTS WITH 2'-0" WIDE STRIP OF FILTER FABRIC

DETAIL 6 CT7

4"Ø PERFORATED BACKFILL DRAIN SUPPLIED WITH WINGWALL (TYP.)

TYPE E | 1'-0" | 7° | 5'-0" | TYPE D | WINGWALL WW3 20'-0" | ℄ JOINT | 10'-6" | 5'-0" | TYPE D | 5'-0" | TYPE D | 3'-0" | 1'-5" | 1'-0"

BRIDGE PLAN

0 2' 4' 8'

MEMBRANE WATERPROOFING (BY OTHERS)
PRIMER COMPATIBLE WITH JOINT WRAP
FILL LIFTING INSERT POCKET WITH GROUT, FINISHING FLUSH
TOP OF PRECAST BRIDGE UNIT
9" SQUARE PIECE OF JOINT WRAP
LIFTING INSERT
PRECAST BRIDGE UNIT, HEADWALL OR WINGWALL

TYPICAL LIFT INSERT SEALING DETAIL

NOT TO SCALE

PRELIMINARY
NOT FOR CONSTRUCTION

MARK	DATE	REVISION DESCRIPTION	BY

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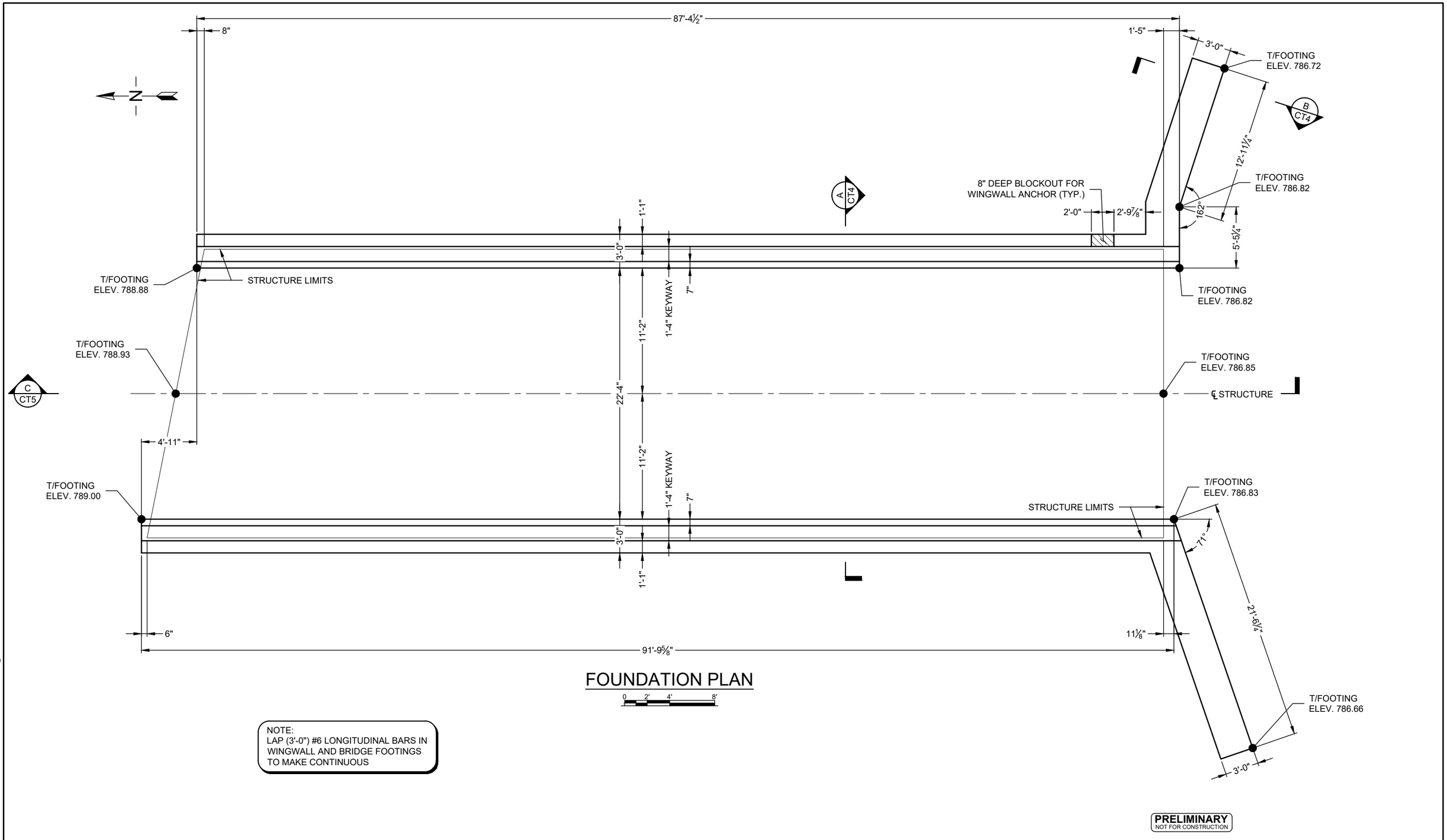
CONSPAN BRIDGE SYSTEMS

CONTRACT DRAWING

HIGHLAND BRIDGE MRB CROSSING
CITY OF SAINT PAUL DEPARTMENT OF PARKS AND RECREATION
SAINT PAUL, MINNESOTA

PROJECT No.:	SEQ. No.:	DATE:
645922	010	3/30/2021
DESIGNED: KDK		DRAWN: TRL
CHECKED:		APPROVED: MGC
SHEET NO.: CT2 OF CT10		



FOUNDATION PLAN

0 2' 4' 8'

NOTE:
LAP (3'-0") #6 LONGITUDINAL BARS IN WINGWALL AND BRIDGE FOOTINGS TO MAKE CONTINUOUS

PRELIMINARY
NOT FOR CONSTRUCTION

MARK	DATE	REVISION DESCRIPTION	BY

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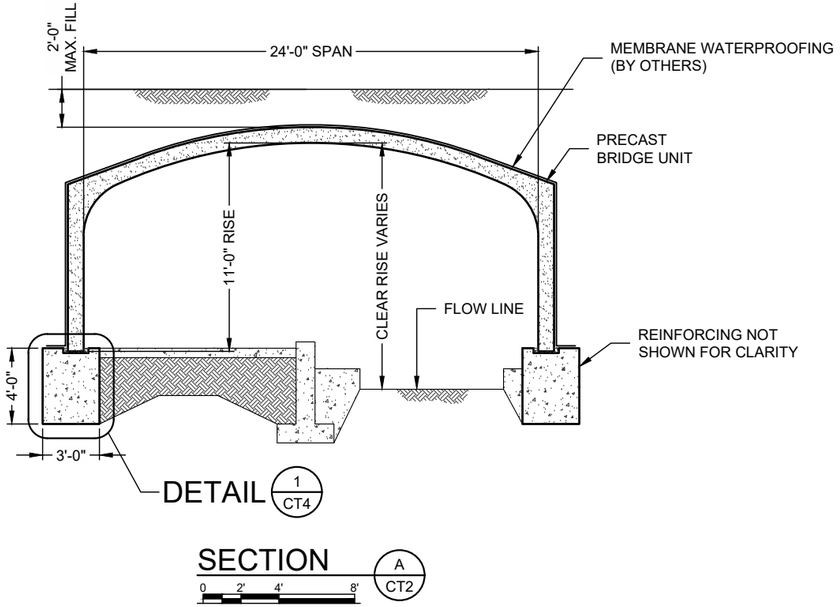
CONSPAN BRIDGE SYSTEMS

CONTRACT DRAWING

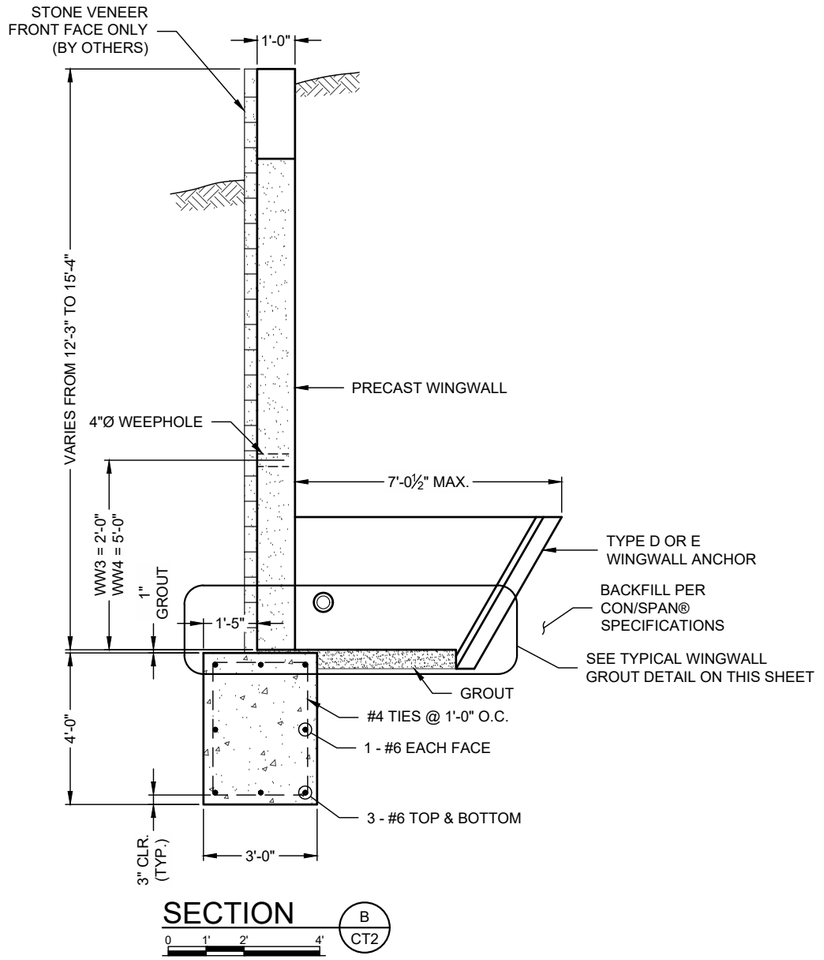
HIGHLAND BRIDGE MRB CROSSING
CITY OF SAINT PAUL DEPARTMENT OF PARKS AND RECREATION
SAINT PAUL, MINNESOTA

PROJECT No.:	SEQ. No.:	DATE:
645922	010	3/30/2021
DESIGNED: KDK		DRAWN: TRL
CHECKED:		APPROVED: MGC
SHEET NO.: CT3 OF CT10		



SECTION A CT2

0 2' 4' 8'

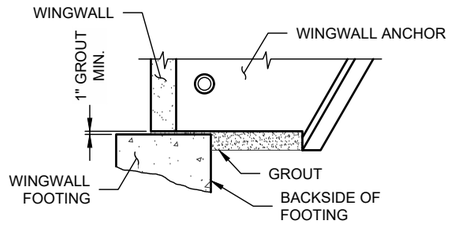


SECTION B CT2

0 1' 2' 4'

DETAIL 1 CT4

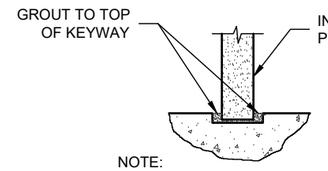
0 1' 2' 4'



NOTES:
- MINIMUM 1" GROUT UNDER WINGWALL LEG & ANCHOR STEM.
- AREA BETWEEN WINGWALL FOOTING AND WINGWALL ANCHOR SHALL BE GROUTED SOLID BEFORE BACKFILL.
- FORM BACKSIDE OF FOOTING TO DIMENSIONS SHOWN ON FOUNDATION PLAN.

TYPICAL WINGWALL GROUT DETAIL

NOT TO SCALE



NOTE:
FILL ENTIRE KEYWAY INCLUDING NOMINAL 1" VOID BETWEEN BOTTOM OF KEYWAY AND BOTTOM OF PRECAST BRIDGE UNIT LEG WITH GROUT.

TYPICAL BRIDGE UNIT GROUT DETAIL

NOT TO SCALE

PRELIMINARY
NOT FOR CONSTRUCTION

MARK	DATE	REVISION DESCRIPTION	BY

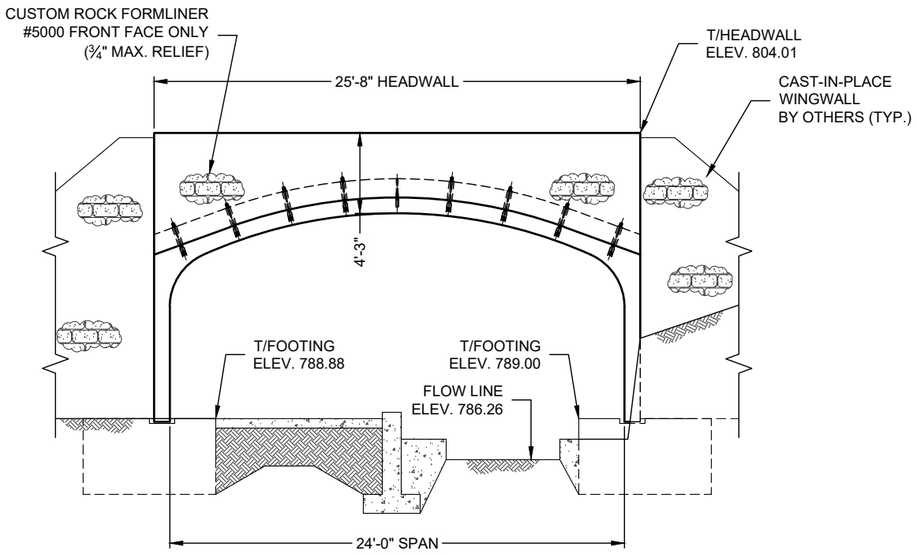
CONTECH ENGINEERING, PROFESSIONAL CORPORATION
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CON/SPAN BRIDGE SYSTEMS

CONTRACT DRAWING

HIGHLAND BRIDGE MRB CROSSING
CITY OF SAINT PAUL DEPARTMENT OF PARKS AND RECREATION
SAINT PAUL, MINNESOTA

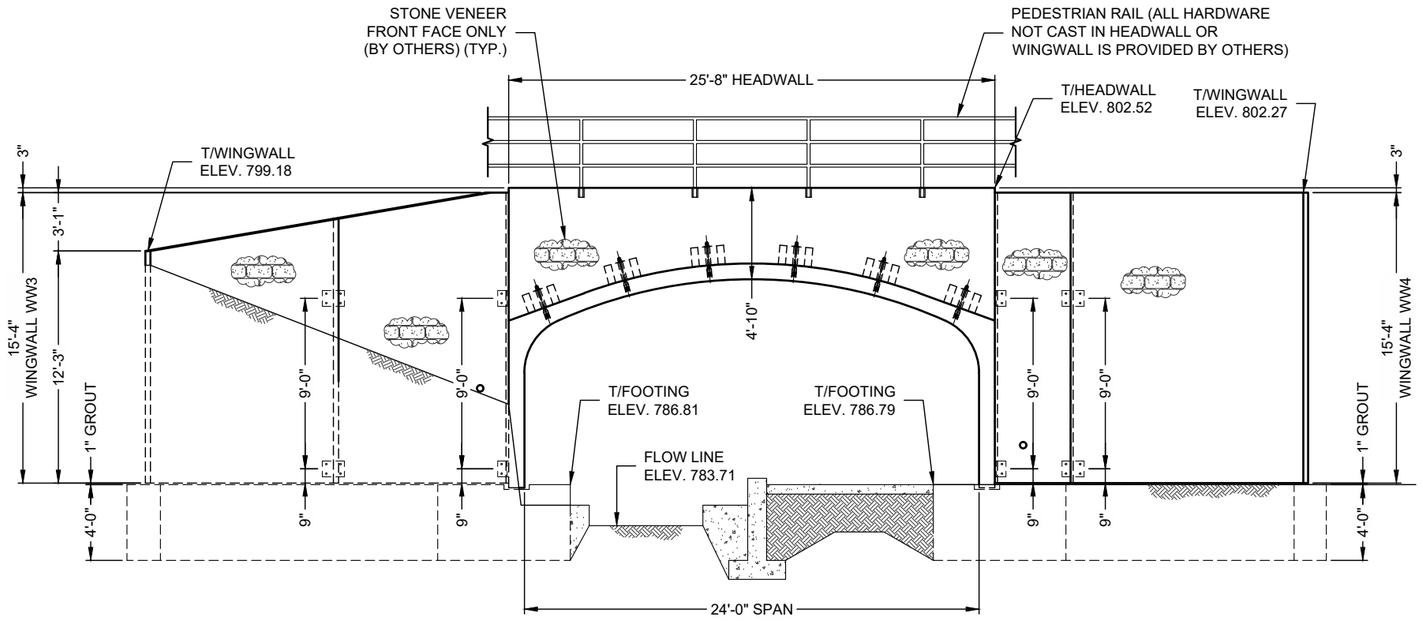
PROJECT No.:	SEQ. No.:	DATE:
645922	010	3/30/2021
DESIGNED: KDK		DRAWN: TRL
CHECKED:		APPROVED: MGC
SHEET NO.: CT4 OF CT10		



NORTH END ELEVATION

0 2' 4' 8'

FOR STREAM SECTION IN TUNNEL,
REFER TO TUNNEL SECTIONS, SHEET C604



SOUTH END ELEVATION

0 2' 4' 8'

PRELIMINARY
NOT FOR CONSTRUCTION

MARK	DATE	REVISION DESCRIPTION	BY

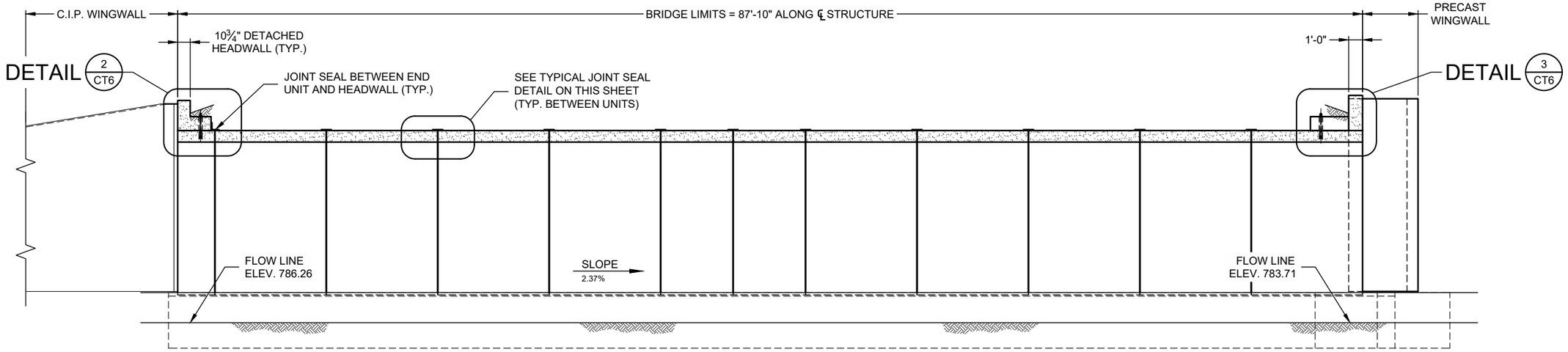
CONTECH
ENGINEERING, PROFESSIONAL CORPORATION
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CONSPAN BRIDGE SYSTEMS

CONTRACT
DRAWING

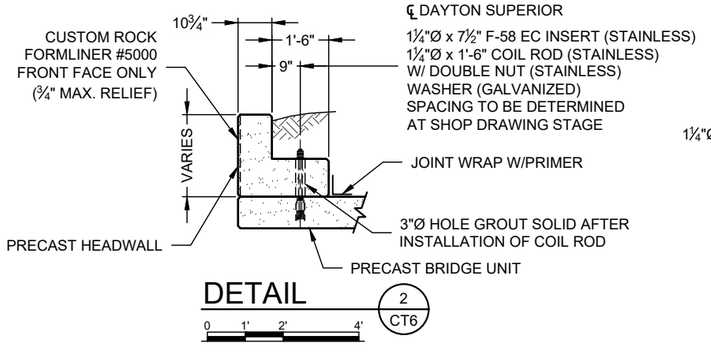
HIGHLAND BRIDGE MRB CROSSING
CITY OF SAINT PAUL DEPARTMENT OF PARKS AND RECREATION
SAINT PAUL, MINNESOTA

PROJECT No.:	SEQ. No.:	DATE:
645922	010	3/30/2021
DESIGNED: KDK		DRAWN: TRL
CHECKED:		APPROVED: MGC
SHEET NO.: CT5 OF CT10		



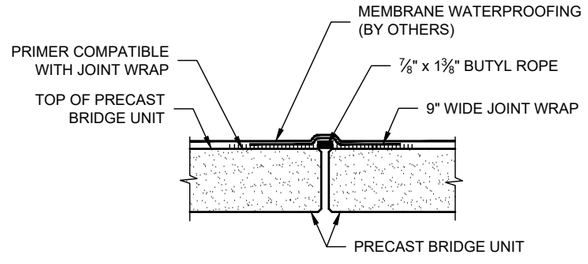
SECTION C CT2

0 2' 4' 8'



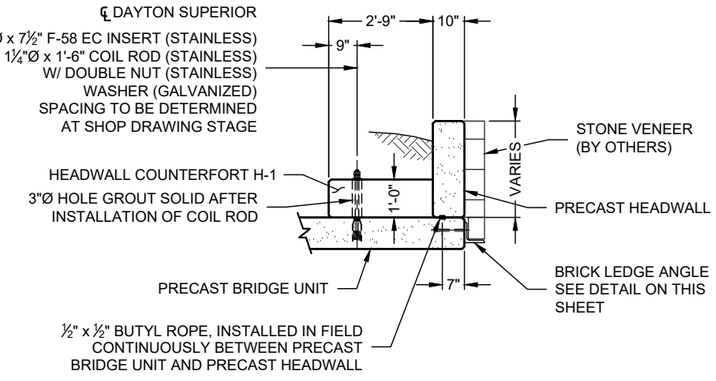
DETAIL 2 CT6

0 1' 2' 4'



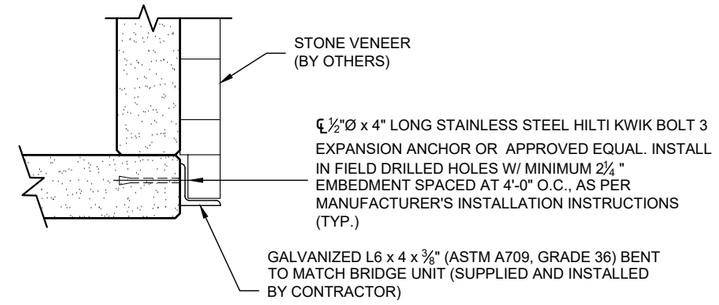
TYPICAL JOINT SEAL DETAIL

NOT TO SCALE



DETAIL 3 CT6

0 1' 2' 4'



BRICK LEDGE DETAIL

0 1' 2'

PRELIMINARY
NOT FOR CONSTRUCTION

MARK	DATE	REVISION DESCRIPTION	BY

CONTECH ENGINEERING, PROFESSIONAL CORPORATION
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

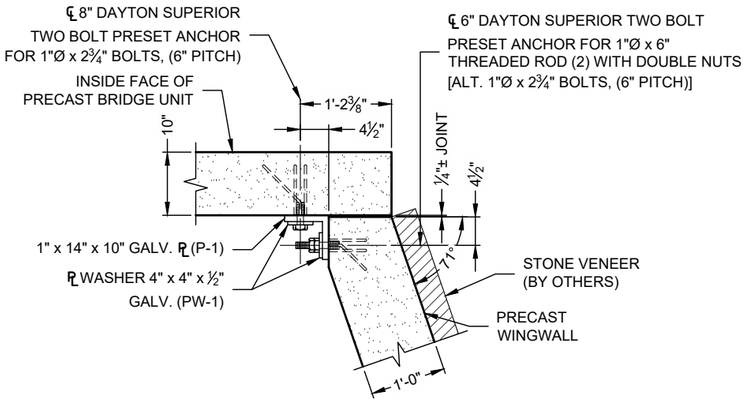
CONSPAN BRIDGE SYSTEMS

CONTRACT DRAWING

HIGHLAND BRIDGE MRB CROSSING
CITY OF SAINT PAUL DEPARTMENT OF PARKS AND RECREATION
SAINT PAUL, MINNESOTA

PROJECT No.:	SEQ. No.:	DATE:
645922	010	3/30/2021
DESIGNED: KDK		DRAWN: TRL
CHECKED:		APPROVED: MGC
SHEET NO.: CT6 OF CT10		

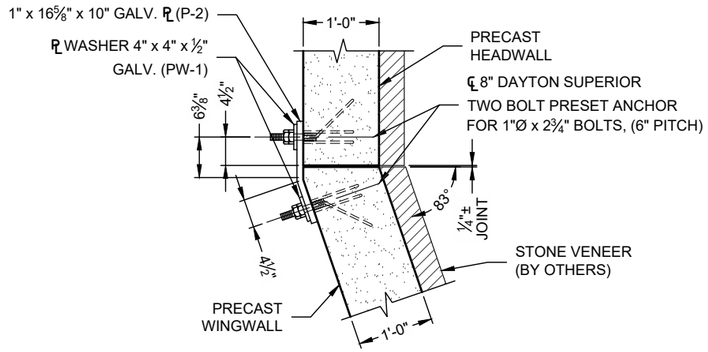
NOTE:
CONNECTION ℄'S (P-1) MUST BE POSITIONED WITH SMALL Ø HOLES TOWARD PRECAST BRIDGE UNIT



DETAIL @ UNIT LEG 4A CT2

0 1' 2'

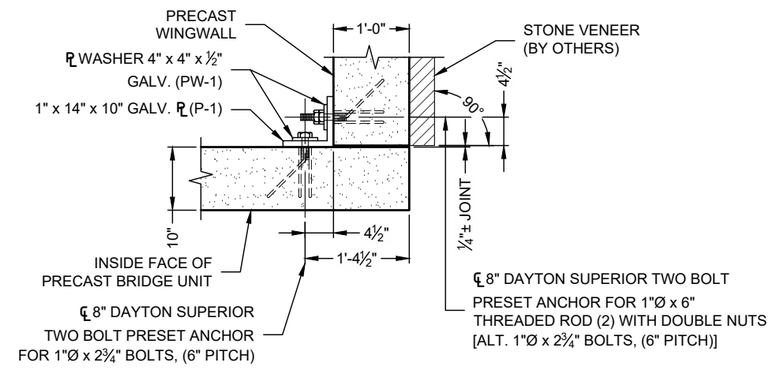
NOTE:
CONNECTION ℄'S (P-2) MUST BE POSITIONED WITH SMALL Ø HOLES TOWARD PRECAST HEADWALL



DETAIL @ HEADWALL 4B CT2

0 1' 2'

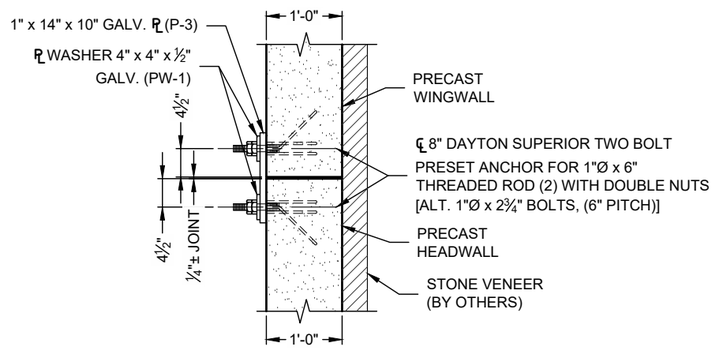
NOTE:
CONNECTION ℄'S (P-1) MUST BE POSITIONED WITH SMALL Ø HOLES TOWARD PRECAST BRIDGE UNIT



DETAIL @ UNIT LEG 5A CT2

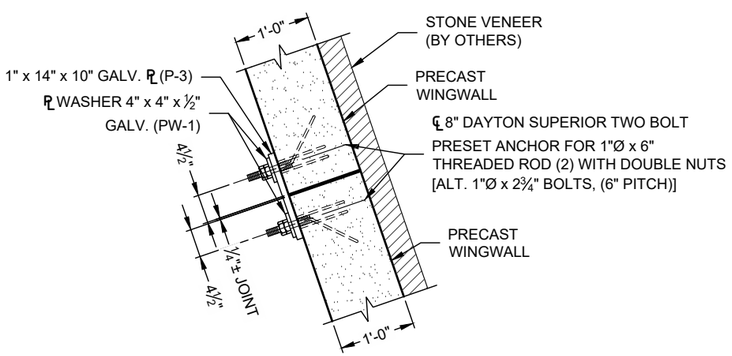
0 1' 2'

NOTE:
CONNECTION ℄'S (P-3) MUST BE POSITIONED WITH SMALL Ø HOLES TOWARD PRECAST HEADWALL



DETAIL 5B CT2

0 1' 2'



DETAIL 6 CT2

0 1' 2'

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CITY OF SAINT PAUL DEPARTMENT OF PARKS AND RECREATION
SAINT PAUL, MINNESOTA

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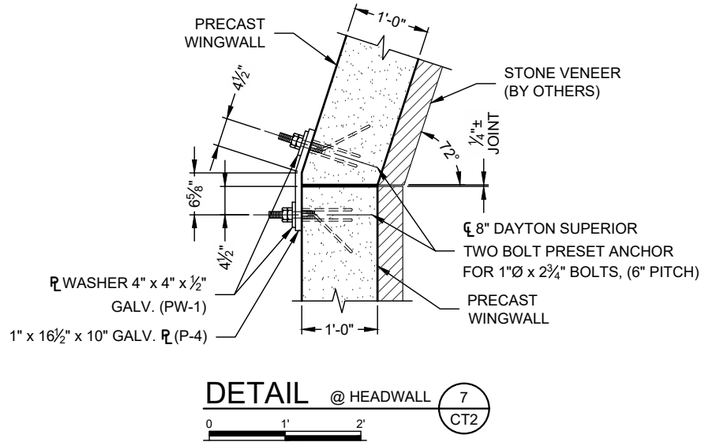
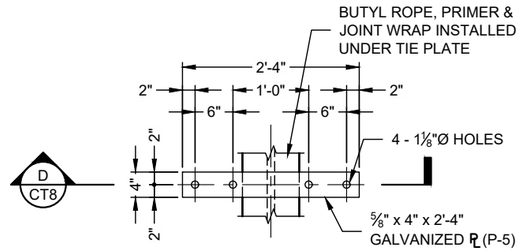


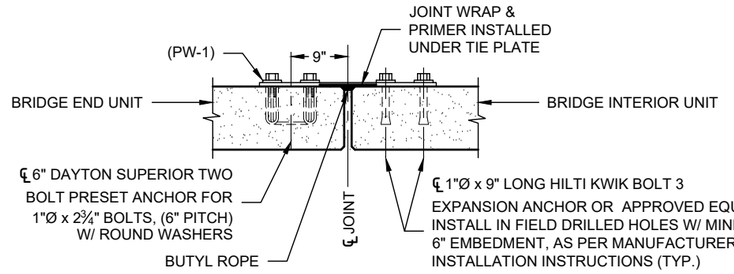
DETAIL @ HEADWALL 7 CT2

0 1' 2'



DETAIL 8 CT2

NOT TO SCALE



SECTION D CT8

NOT TO SCALE

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CITY OF SAINT PAUL DEPARTMENT OF PARKS AND RECREATION
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SHEET NO.: CT8 OF CT10

SPECIFICATIONS FOR MANUFACTURE AND INSTALLATION OF CON/SPAN® BRIDGE SYSTEMS

1. DESCRIPTION
   1.1. TYPE - THIS WORK SHALL CONSIST OF FURNISHING AND CONSTRUCTING A CON/SPAN® BRIDGE SYSTEM IN ACCORDANCE WITH THESE SPECIFICATIONS AND IN REASONABLY CLOSE CONFORMITY WITH THE LINES, GRADES, DESIGN AND DIMENSIONS SHOWN ON THE PLANS OR AS ESTABLISHED BY THE ENGINEER. IN SITUATIONS WHERE TWO OR MORE SPECIFICATIONS APPLY TO THIS WORK, THE MOST STRINGENT REQUIREMENTS SHALL GOVERN.
   1.2. DESIGNATION - PRECAST REINFORCED CONCRETE CON/SPAN® BRIDGE UNITS MANUFACTURED IN ACCORDANCE WITH THIS SPECIFICATION SHALL BE DESIGNATED BY SPAN AND RISE. PRECAST REINFORCED CONCRETE WINGWALLS AND HEADWALLS MANUFACTURED IN ACCORDANCE WITH THIS SPECIFICATION SHALL BE DESIGNATED BY LENGTH, HEIGHT, AND DEFLECTION ANGLE. PRECAST REINFORCED CONCRETE EXPRESS™ FOUNDATION UNITS MANUFACTURED IN ACCORDANCE WITH THIS SPECIFICATION SHALL BE DESIGNATED BY LENGTH, HEIGHT AND WIDTH.

2. DESIGN
   2.1. SPECIFICATIONS - THE PRECAST ELEMENTS ARE DESIGNED IN ACCORDANCE WITH THE "AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS" 8TH EDITION, ADOPTED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS, 2017. A MINIMUM OF ONE FOOT OF COVER ABOVE THE CROWN OF THE BRIDGE UNITS IS REQUIRED IN THE INSTALLED CONDITION. (UNLESS NOTED OTHERWISE ON THE SHOP DRAWINGS AND DESIGNED ACCORDINGLY.)

3. MATERIALS
   3.1. CONCRETE - THE CONCRETE FOR THE PRECAST ELEMENTS SHALL BE AIR-ENTRAINED WHEN INSTALLED IN AREAS SUBJECT TO FREEZE-THAW CONDITIONS, COMPOSED OF PORTLAND CEMENT, FINE AND COARSE AGGREGATES, ADMIXTURES AND WATER. AIR-ENTRAINED CONCRETE SHALL CONTAIN 6 ± 2 PERCENT AIR. THE AIR- ENTRAINING ADMIXTURE SHALL CONFORM TO AASHT0 M154. THE MINIMUM CONCRETE COMPRESSIVE STRENGTH SHALL BE AS SHOWN ON THE SHOP DRAWINGS.
      3.1.1. PORTLAND CEMENT - SHALL CONFORM TO THE REQUIREMENTS OF ASTM SPECIFICATIONS C150-TYPE I, TYPE II, OR TYPE III CEMENT.
      3.1.2. COARSE AGGREGATE - SHALL CONSIST OF STONE HAVING A MAXIMUM SIZE OF 1 INCH. AGGREGATE SHALL MEET REQUIREMENTS FOR ASTM C33.
      3.1.3. WATER REDUCING ADMIXTURE - THE MANUFACTURER MAY SUBMIT, FOR APPROVAL BY THE ENGINEER, A WATER-REDUCING ADMIXTURE FOR THE PURPOSE OF INCREASING WORKABILITY AND REDUCING THE WATER REQUIREMENT FOR THE CONCRETE.
      3.1.4. CALCIUM CHLORIDE - THE ADDITION TO THE MIX OF CALCIUM CHLORIDE OR ADMIXTURES CONTAINING CALCIUM CHLORIDE WILL NOT BE PERMITTED.
      3.1.5. MIXTURE - THE AGGREGATES, CEMENT AND WATER SHALL BE PROPORTIONED AND MIXED IN A BATCH MIXER TO PRODUCE A HOMOGENEOUS CONCRETE MEETING THE STRENGTH REQUIREMENTS OF THIS SPECIFICATION. THE PROPORTION OF PORTLAND CEMENT IN THE MIXTURE SHALL NOT BE LESS THAN 564 POUNDS (6 SACKS) PER CUBIC YARD OF CONCRETE.
   3.2. STEEL REINFORCEMENT
      3.2.1. THE MINIMUM STEEL YIELD STRENGTH SHALL BE 60,000 PSI, UNLESS OTHERWISE NOTED ON THE SHOP DRAWINGS.
      3.2.2. ALL REINFORCING STEEL FOR THE PRECAST ELEMENTS SHALL BE FABRICATED AND PLACED IN ACCORDANCE WITH THE DETAILED SHOP DRAWINGS SUBMITTED BY THE MANUFACTURER.
      3.2.3. REINFORCEMENT SHALL CONSIST OF WELDED WIRE REINFORCING CONFORMING TO ASTM SPECIFICATION A 1064, OR DEFORMED STEEL BARS CONFORMING TO ASTM SPECIFICATION A 615, GRADE 60. LONGITUDINAL DISTRIBUTION REINFORCEMENT MAY CONSIST OF WELDED WIRE FABRIC OR DEFORMED BILLET-STEEL BARS.
   3.3. STEEL HARDWARE
      3.3.1. BOLTS AND THREADED RODS FOR WINGWALL CONNECTIONS SHALL CONFORM TO ASTM A 307. NUTS SHALL CONFORM TO AASHTO M292 (ASTM A194) GRADE 2H. ALL BOLTS, THREADED RODS AND NUTS USED IN WINGWALL CONNECTIONS SHALL BE MECHANICALLY ZINC COATED IN ACCORDANCE WITH ASTM B695 CLASS 50.
      3.3.2. STRUCTURAL STEEL FOR WINGWALL CONNECTION PLATES AND PLATE WASHERS SHALL CONFORM TO AASHTO M 270 (ASTM A 709) GRADE 36 AND SHALL BE HOT DIP GALVANIZED AS PER AASHTO M111 (ASTM A123).
      3.3.3. INSERTS FOR WINGWALLS SHALL BE 1" DIAMETER TWO-BOLT PRESET WINGWALL ANCHORS AS MANUFACTURED BY DAYTON SUPERIOR CONCRETE ACCESSORIES, MIAMISBURG, OHIO, (800) 745-3700 AND SHALL BE ELECTRO GALVANIZED IN ACCORDANCE WITH ASTM B633 SC-1.
      3.3.4. FERRULE LOOP INSERTS SHALL BE F-64 FERRULE LOOP INSERTS AS MANUFACTURED BY DAYTON SUPERIOR CONCRETE ACCESSORIES, MIAMISBURG, OHIO, (800) 745-3700.
      3.3.5. HOOK BOLTS USED IN ATTACHED HEADWALL CONNECTIONS SHALL BE ASTM A307 AND SHALL BE ELECTRO GALVANIZED.
      3.3.6. INSERTS FOR DETACHED HEADWALL CONNECTIONS SHALL BE AISI TYPE 304 STAINLESS STEEL, EXPANDED COIL INSERTS AS MANUFACTURED BY DAYTON SUPERIOR CONCRETE ACCESSORIES, MIAMISBURG, OHIO, (800) 745-3700. COIL RODS AND NUTS USED IN HEADWALL CONNECTIONS SHALL BE AISI TYPE 304 STAINLESS STEEL. WASHERS USED IN HEADWALL CONNECTIONS SHALL BE EITHER AISI TYPE 304 STAINLESS STEEL PLATE WASHERS OR AASHTO M270 (ASTM A709) GRADE 36 PLATE WASHERS HOT DIP GALVANIZED AS PER AASHTO M111 (ASTM A123).
      3.3.7. MECHANICAL SPLICES OF REINFORCING BARS SHALL BE MADE USING THE DOWEL BAR SPLICER SYSTEM AS MANUFACTURED BY DAYTON SUPERIOR CONCRETE ACCESSORIES, MIAMISBURG, OHIO, (800) 745-3700, AND SHALL CONSIST OF THE DOWEL BAR SPLICER (DB-SAE) AND DOWEL-IN (DI).

4. MANUFACTURE OF PRECAST ELEMENTS - SUBJECT TO THE PROVISIONS OF SECTION 5, BELOW, THE PRECAST ELEMENT DIMENSION AND REINFORCEMENT DETAILS SHALL BE AS PRESCRIBED IN THE PLAN AND SHOP DRAWINGS PROVIDED BY THE MANUFACTURER.
   4.1. FORMS - THE FORMS USED IN MANUFACTURE SHALL BE SUFFICIENTLY RIGID AND ACCURATE TO MAINTAIN THE REQUIRED PRECAST ELEMENT DIMENSIONS WITHIN THE PERMISSIBLE VARIATIONS GIVEN IN SECTION 5 OF THESE SPECIFICATIONS. ALL CASTING SURFACES SHALL BE OF A SMOOTH MATERIAL.
   4.2. PLACEMENT OF REINFORCEMENT
      4.2.1. PLACEMENT OF REINFORCEMENT IN PRECAST BRIDGE UNITS - THE COVER OF CONCRETE OVER THE OUTSIDE CIRCUMFERENTIAL REINFORCEMENT SHALL BE 2" MINIMUM. THE COVER OF CONCRETE OVER THE INSIDE CIRCUMFERENTIAL REINFORCEMENT SHALL BE 1½" MINIMUM, UNLESS OTHERWISE NOTED ON THE SHOP DRAWINGS. THE CLEAR DISTANCE OF THE END CIRCUMFERENTIAL WIRES SHALL NOT BE LESS THAN 1" NOR MORE THAN 2" FROM THE ENDS OF EACH SECTION. REINFORCEMENT SHALL BE ASSEMBLED UTILIZING SINGLE OR MULTIPLE LAYERS OF WELDED WIRE FABRIC (NOT TO EXCEED 3 LAYERS), SUPPLEMENTED WITH A SINGLE LAYER OF DEFORMED BILLET-STEEL BARS, WHEN NECESSARY. WELDED WIRE FABRIC SHALL BE COMPOSED OF CIRCUMFERENTIAL AND LONGITUDINAL WIRES MEETING THE SPACING REQUIREMENTS OF 4.3, BELOW, AND SHALL CONTAIN SUFFICIENT LONGITUDINAL WIRES EXTENDING THROUGH THE BRIDGE UNIT TO MAINTAIN THE SHAPE AND POSITION OF THE REINFORCEMENT. LONGITUDINAL DISTRIBUTION REINFORCEMENT MAY BE WELDED WIRE FABRIC OR DEFORMED BILLET-STEEL BARS AND SHALL MEET THE SPACING REQUIREMENTS OF 4.3, BELOW. THE ENDS OF THE LONGITUDINAL DISTRIBUTION REINFORCEMENT SHALL BE NOT MORE THAN 3" AND NOT LESS THAN 1½" FROM THE ENDS OF THE BRIDGE UNIT.
      4.2.2. BENDING OF REINFORCEMENT FOR PRECAST BRIDGE UNITS - THE OUTSIDE AND INSIDE CIRCUMFERENTIAL REINFORCING STEEL FOR THE CORNERS OF THE BRIDGE SHALL BE BENT TO SUCH AN ANGLE THAT IS APPROXIMATELY EQUAL TO THE CONFIGURATION OF THE BRIDGE'S OUTSIDE CORNER.
      4.2.3. PLACEMENT OF REINFORCEMENT FOR PRECAST WINGWALLS AND HEADWALLS - THE COVER OF CONCRETE OVER THE LONGITUDINAL AND TRANSVERSE REINFORCEMENT SHALL BE 2" MINIMUM. THE CLEAR DISTANCE FROM THE END OF EACH PRECAST ELEMENT TO THE END OF REINFORCING STEEL SHALL NOT BE LESS THAN 1½" NOR MORE THAN 3". REINFORCEMENT SHALL BE ASSEMBLED UTILIZING A SINGLE LAYER OF WELDED WIRE FABRIC, OR A SINGLE LAYER OF DEFORMED BILLET-STEEL BARS. WELDED WIRE FABRIC SHALL BE COMPOSED OF TRANSVERSE AND LONGITUDINAL WIRES MEETING THE SPACING REQUIREMENTS OF 4.3, BELOW, AND SHALL CONTAIN SUFFICIENT LONGITUDINAL WIRES EXTENDING THROUGH THE ELEMENT TO MAINTAIN THE SHAPE AND POSITION OF THE REINFORCEMENT. LONGITUDINAL REINFORCEMENT MAY BE WELDED WIRE FABRIC OR DEFORMED BILLET-STEEL BARS AND SHALL MEET THE SPACING REQUIREMENTS OF 4.3, BELOW.
      4.2.4. PLACEMENT OF REINFORCMENT FOR PRECAST FOUNDATION UNITS - THE COVER OF CONCRETE OVER THE BOTTOM REINFORCEMENT SHALL BE 3 INCHES MINIMUM. THE COVER OF CONCRETE FOR ALL OTHER REINFORCEMENT SHALL BE 2 INCHES MINIMUM. THE CLEAR DISTANCE FROM THE END OF EACH PRECAST ELEMENT TO THE END OF REINFORCING STEEL SHALL NOT BE LESS THAN 2 INCHES NOR MORE THAN 3 INCHES. REINFORCEMENT SHALL BE ASSEMBLED UTILIZING A SINGLE LAYER OF WELDED WIRE FABRIC OR A SINGLE LAYER OF DEFORMED BILLET-STEEL BARS. WELDED WIRE FABRIC SHALL BE COMPOSED OF TRANSVERSE AND LONGITUDINAL WIRES MEETING THE SPACING REQUIREMENTS OF 4.3, BELOW, AND SHALL CONTAIN SUFFICIENT LONGITUDINAL WIRES EXTENDING THROUGH THE ELEMENT TO MAINTAIN THE SHAPE AND POSITION OF THE REINFORCEMENT. LONGITUDINAL REINFORCEMENT MAY BE WELDED WIRE FABRIC OR DEFORMED BILLET-STEEL BARS AND SHALL MEET THE SPACING REQUIREMENTS OF 4.3, BELOW.
   4.3. LAPS, WELDS, SPACING
      4.3.1. LAPS, WELDS, AND SPACING FOR PRECAST BRIDGE UNITS - TENSION SPLICES IN THE CIRCUMFERENTIAL REINFORCEMENT SHALL BE MADE BY LAPPING. LAPS MAY BE TACK WELDED TOGETHER FOR ASSEMBLY PURPOSES. FOR SMOOTH WELDED WIRE FABRIC, THE OVERLAP SHALL MEET THE REQUIREMENTS OF AASHTO 5.11.2.5.2 AND 5.11.6.2. FOR DEFORMED WELDED WIRE FABRIC, THE OVERLAP SHALL MEET THE REQUIREMENTS OF AASHTO 5.11.2.5.1 AND 5.11.6.1. THE OVERLAP OF WELDED WIRE FABRIC SHALL BE MEASURED BETWEEN THE OUTER-MOST LONGITUDINAL WIRES OF EACH FABRIC SHEET. FOR DEFORMED BILLET-STEEL BARS, THE OVERLAP SHALL MEET THE REQUIREMENTS OF AASHTO 5.11.2.1 FOR SPLICES OTHER THAN TENSION SPLICES, THE OVERLAP SHALL BE A MINIMUM OF 1'-0" FOR WELDED WIRE FABRIC OR DEFORMED BILLET-STEEL BARS. THE SPACING CENTER TO CENTER OF THE CIRCUMFERENTIAL WIRES IN A WIRE FABRIC SHEET SHALL BE NOT LESS THAN 2" NOR MORE THAN 4". THE SPACING CENTER TO CENTER OF THE LONGITUDINAL WIRES SHALL NOT BE MORE THAN 8". THE SPACING CENTER TO CENTER OF THE LONGITUDINAL DISTRIBUTION STEEL FOR EITHER LINE OF REINFORCING IN THE TOP SLAB SHALL BE NOT MORE THAN 1'-4".
      4.3.2. LAPS, WELDS, AND SPACING FOR PRECAST WINGWALLS, HEADWALLS AND FOUNDATIONS - SPLICES IN THE REINFORCEMENT SHALL BE MADE BY LAPPING. LAPS MAY BE TACK WELDED TOGETHER FOR ASSEMBLY PURPOSES. FOR SMOOTH WELDED WIRE FABRIC, THE OVERLAP SHALL MEET THE REQUIREMENTS OF AASHTO 5.11.2.5.2 AND 5.11.6.2. FOR DEFORMED WELDED WIRE FABRIC, THE OVERLAP SHALL MEET THE REQUIREMENTS OF AASHTO 5.11.2.5.1 AND 5.11.6.1. FOR DEFORMED BILLET-STEEL BARS, THE OVERLAP SHALL MEET THE REQUIREMENTS OF AASHTO 5.11.2.1. THE SPACING CENTER-TO-CENTER OF THE WIRES IN A WIRE FABRIC SHEET SHALL BE NOT LESS THAN 2" NOR MORE THAN 8".
   4.4. CURING - THE PRECAST CONCRETE ELEMENTS SHALL BE CURED FOR A SUFFICIENT LENGTH OF TIME SO THAT THE CONCRETE WILL DEVELOP THE SPECIFIED COMPRESSIVE STRENGTH IN 28 DAYS OR LESS. ANY ONE OF THE FOLLOWING METHODS OF CURING OR COMBINATIONS THEREOF SHALL BE USED:
      4.4.1. STEAM CURING - THE PRECAST ELEMENTS MAY BE LOW-PRESSURE STEAM CURED BY A SYSTEM THAT WILL MAINTAIN A MOIST ATMOSPHERE.
      4.4.2. WATER CURING - THE PRECAST ELEMENTS MAY BE WATER CURED BY ANY METHOD THAT WILL KEEP THE SECTIONS MOIST.
      4.4.3. MEMBRANE CURING - A SEALING MEMBRANE CONFORMING TO THE REQUIREMENTS OF ASTM SPECIFICATION C309 MAY BE APPLIED AND SHALL BE LEFT INTACT UNTIL THE REQUIRED CONCRETE COMPRESSIVE STRENGTH IS ATTAINED. THE CONCRETE TEMPERATURE AT THE TIME OF APPLICATION SHALL BE WITHIN +/- 10 DEGREES F OF THE ATMOSPHERIC TEMPERATURE. ALL SURFACES SHALL BE KEPT MOIST PRIOR TO THE APPLICATION OF THE COMPOUNDS AND SHALL BE DAMP WHEN THE COMPOUND IS APPLIED.
   4.5. STORAGE, HANDLING & DELIVERY
      4.5.1. STORAGE - PRECAST CONCRETE BRIDGE ELEMENTS SHALL BE LIFTED AND STORED IN "AS-CAST" POSITION. PRECAST CONCRETE HEADWALL AND WINGWALL UNITS ARE CAST, STORED AND SHIPPED IN A FLAT POSITION. THE PRECAST ELEMENTS SHALL BE STORED IN SUCH A MANNER TO PREVENT CRACKING OR DAMAGE. STORE ELEMENTS USING TIMBER SUPPORTS AS APPROPRIATE. THE UNITS SHALL NOT BE MOVED UNTIL THE CONCRETE COMPRESSIVE STRENGTH HAS REACHED A MINIMUM OF 2500 PSI (3000 PSI FOR SPANS >48 FEET), AND THEY SHALL NOT BE STORED IN AN UPRIGHT POSITION.
      4.5.2. HANDLING - HANDLING DEVICES SHALL BE PERMITTED IN EACH PRECAST ELEMENT FOR THE PURPOSE OF HANDLING AND SETTING. SPREADER BEAMS MAY BE REQUIRED FOR THE LIFTING OF PRECAST CONCRETE BRIDGE ELEMENTS TO PRECLUDE DAMAGE FROM BENDING OR TORSION FORCES.
      4.5.3. DELIVERY - PRECAST CONCRETE ELEMENTS MUST NOT BE SHIPPED UNTIL THE CONCRETE HAS ATTAINED THE SPECIFIED DESIGN COMPRESSIVE STRENGTH, OR AS DIRECTED BY THE DESIGN ENGINEER. PRECAST CONCRETE ELEMENTS MAY BE UNLOADED AND PLACED ON THE GROUND AT THE SITE UNTIL INSTALLED. STORE ELEMENTS USING TIMBER SUPPORTS AS APPROPRIATE.
   4.6. QUALITY ASSURANCE - THE PRECASTER SHALL DEMONSTRATE ADHERENCE TO THE STANDARDS SET FORTH IN THE NPCA QUALITY CONTROL MANUAL. THE PRECASTER SHALL MEET EITHER SECTION 4.6.1 OR 4.6.2
      4.6.1. CERTIFICATION - THE PRECASTER SHALL BE CERTIFIED BY THE PRECAST/PRESTRESSED CONCRETE INSTITUTE PLANT CERTIFICATION PROGRAM OR THE NATIONAL PRECAST CONCRETE ASSOCIATION'S PLANT CERTIFICATION PROGRAM PRIOR TO AND DURING PRODUCTION OF THE PRODUCTS COVERED BY THIS SPECIFICATION.
      4.6.2. QUALIFICATIONS, TESTING AND INSPECTION
         4.6.2.1. THE PRECASTER SHALL HAVE BEEN IN THE BUSINESS OF PRODUCING PRECAST CONCRETE PRODUCTS SIMILAR TO THOSE SPECIFIED FOR A MINIMUM OF THREE YEARS. HE SHALL MAINTAIN A PERMANENT QUALITY CONTROL DEPARTMENT OR RETAIN AN INDEPENDENT TESTING AGENCY ON A CONTINUING BASIS. THE AGENCY SHALL ISSUE A REPORT, CERTIFIED BY A LICENSED ENGINEER, DETAILING THE ABILITY OF THE PRECASTER TO PRODUCE QUALITY PRODUCTS CONSISTENT WITH INDUSTRY STANDARDS.
         4.6.2.2. THE PRECASTER SHALL SHOW THAT THE FOLLOWING TESTS ARE PERFORMED IN ACCORDANCE WITH THE ASTM STANDARDS INDICATED. TESTS SHALL BE PERFORMED AS INDICATED IN SECTION 6 OF THESE SPECIFICATIONS.
            4.6.2.2.1. AIR CONTENT: C231 OR C173
            4.6.2.2.2. COMPRESSIVE STRENGTH: C31,C39,C497
         4.6.2.3. THE PRECASTER SHALL PROVIDE DOCUMENTATION DEMONSTRATING COMPLIANCE WITH THIS SECTION TO CONTECH® ENGINEERED SOLUTIONS AT REGULAR INTERVALS OR UPON REQUEST.
         4.6.2.4. THE OWNER MAY PLACE AN INSPECTOR IN THE PLANT WHEN THE PRODUCTS COVERED BY THIS SPECIFICATION ARE BEING MANUFACTURED.
      4.6.3. DOCUMENTATION - THE PRECASTER SHALL SUBMIT PRECAST PRODUCTION REPORTS TO CONTECH® ENGINEERED SOLUTIONS AS REQUIRED.

5. PERMISSIBLE VARIATIONS
   5.1. BRIDGE UNITS
      5.1.1. INTERNAL DIMENSIONS - THE INTERNAL DIMENSION SHALL VARY NOT MORE THAN 1% FROM THE DESIGN DIMENSIONS NOR MORE THAN 1½" WHICHEVER IS LESS.
      5.1.2. SLAB AND WALL THICKNESS - THE SLAB AND WALL THICKNESS SHALL NOT BE LESS THAN THAT SHOWN IN THE DESIGN BY MORE THAN ½". A THICKNESS MORE THAN THAT REQUIRED IN THE DESIGN SHALL NOT BE CAUSE FOR REJECTION.
      5.1.3. LENGTH OF OPPOSITE SURFACES - VARIATIONS IN LAYING LENGTHS OF TWO OPPOSITE SURFACES OF THE BRIDGE UNIT SHALL NOT BE MORE THAN ½" IN ANY SECTION, EXCEPT WHERE BEVELED ENDS FOR LAYING OF CURVES ARE SPECIFIED BY THE PURCHASER.
      5.1.4. LENGTH OF SECTION - THE UNDERRUN IN LENGTH OF A SECTION SHALL NOT BE MORE THAN ½" IN ANY BRIDGE UNIT.
      5.1.5. POSITION OF REINFORCEMENT - THE MAXIMUM VARIATION IN POSITION OF THE REINFORCEMENT SHALL BE ± ½". IN NO CASE SHALL THE COVER OVER THE REINFORCEMENT BE LESS THAN 1½" FOR THE OUTSIDE CIRCUMFERENTIAL STEEL OR BE LESS THAN 1" FOR THE INSIDE CIRCUMFERENTIAL STEEL AS MEASURED TO THE EXTERNAL OR INTERNAL SURFACE OF THE BRIDGE. THESE TOLERANCES OR COVER REQUIREMENTS DO NOT APPLY TO MATING SURFACES OF THE JOINTS.
      5.1.6. AREA OF REINFORCEMENT - THE AREAS OF STEEL REINFORCEMENT SHALL BE THE DESIGN STEEL AREAS AS SHOWN IN THE MANUFACTURER'S SHOP DRAWINGS. STEEL AREAS GREATER THAN THOSE REQUIRED SHALL NOT BE CAUSE FOR REJECTION. THE PERMISSIBLE VARIATION IN DIAMETER OF ANY REINFORCEMENT SHALL CONFORM TO THE TOLERANCES PRESCRIBED IN THE ASTM SPECIFICATION FOR THAT TYPE OF REINFORCEMENT.
   5.2. WINGWALLS & HEADWALLS
      5.2.1. WALL THICKNESS - THE WALL THICKNESS SHALL NOT VARY FROM THAT SHOWN IN THE DESIGN BY MORE THAN ½".
      5.2.2. LENGTH/HEIGHT OF WALL SECTIONS - THE LENGTH AND HEIGHT OF THE WALL SHALL NOT VARY FROM THAT SHOWN IN THE DESIGN BY MORE THAN ½".
      5.2.3. POSITION OF REINFORCEMENT - THE MAXIMUM VARIATION IN THE POSITION OF THE REINFORCEMENT SHALL BE ± ½". IN NO CASE SHALL THE COVER OVER THE REINFORCEMENT BE LESS THAN 1½".
      5.2.4. SIZE OF REINFORCEMENT - THE PERMISSIBLE VARIATION IN DIAMETER OF ANY REINFORCING SHALL CONFORM TO THE TOLERANCES PRESCRIBED IN THE ASTM SPECIFICATION FOR THAT TYPE OF REINFORCING. STEEL AREA GREATER THAN THAT REQUIRED SHALL NOT BE CAUSE FOR REJECTION.
   5.3. FOUNDATION UNITS
      5.3.1. WALL THICKNESS - THE WALL THICKNESS SHALL NOT VARY FROM THAT SHOWN IN THE DESIGN BY MORE THAN ½".
      5.3.2. LENGTH/ HEIGHT/WIDTH OF FOUNDATION SECTIONS - THE LENGTH, HEIGHT AND WIDTH OF THE FOUNDATION UNITS SHALL NOT VARY FROM THAT SHOWN IN THE DESIGN BY MORE THAN ½".
      5.3.3. POSITION OF REINFORCEMENT - THE MAXIMUM VARIATION IN THE POSITION OF THE REINFORCEMENT SHALL BE ± ½". IN NO CASE SHALL THE COVER OVER THE REINFORCEMENT BE LESS THAN 1½".
      5.3.4. SIZE OF REINFORCEMENT - THE PERMISSIBLE VARIATION IN DIAMETER OF ANY REINFORCING SHALL CONFORM TO THE TOLERANCES PRESCRIBED IN THE ASTM SPECIFICATION FOR THAT TYPE OF REINFORCING. STEEL AREA GREATER THAN THAT REQUIRED SHALL NOT BE CAUSE FOR REJECTION.

6. TESTING/ INSPECTION
   6.1. TESTING
      6.1.1. TYPE OF TEST SPECIMEN - CONCRETE COMPRESSIVE STRENGTH SHALL BE DETERMINED FROM COMPRESSION TESTS MADE ON CYLINDERS OR CORES. FOR CYLINDER TESTING, A MINIMUM OF 4 CYLINDERS SHALL BE TAKEN FOR EACH BRIDGE ELEMENT. EACH ELEMENT SHALL BE CONSIDERED SEPARATELY FOR THE PURPOSE OF TESTING AND ACCEPTANCE.
      6.1.2. COMPRESSION TESTING - CYLINDERS SHALL BE MADE AND TESTED AS PRESCRIBED BY THE ASTM C39 SPECIFICATION. CYLINDERS SHALL BE CURED IN THE SAME ENVIRONMENT AS THE BRIDGE ELEMENTS. CORES SHALL BE OBTAINED AND TESTED FOR COMPRESSIVE STRENGTH IN ACCORDANCE WITH THE PROVISIONS OF THE ASTM C42 SPECIFICATION.
      6.1.3. ACCEPTABILITY OF CYLINDER TESTS - WHEN THE AVERAGE COMPRESSIVE STRENGTH OF ALL CYLINDERS TESTED IS EQUAL TO OR GREATER THAN THE DESIGN COMPRESSIVE STRENGTH, AND NOT MORE THAN 10% OF THE CYLINDERS TESTED HAVE A COMPRESSIVE STRENGTH LESS THAN THE DESIGN CONCRETE STRENGTH, AND NO CYLINDER TESTED HAS A COMPRESSIVE STRENGTH LESS THAN 80% OF THE DESIGN COMPRESSIVE STRENGTH, THEN THE ELEMENT SHALL BE ACCEPTED. WHEN THE COMPRESSIVE STRENGTH OF THE CYLINDERS TESTED DOES NOT CONFORM TO THESE ACCEPTANCE CRITERIA, THE ACCEPTABILITY OF THE ELEMENT MAY BE DETERMINED AS DESCRIBED IN SECTION 6.1.4, BELOW.
      6.1.4. ACCEPTABILITY OF CORE TESTS - THE COMPRESSIVE STRENGTH OF THE CONCRETE IN A BRIDGE ELEMENT IS ACCEPTABLE WHEN THE AVERAGE CORE TEST STRENGTH IS EQUAL TO OR GREATER THAN THE DESIGN CONCRETE STRENGTH. WHEN THE COMPRESSIVE STRENGTH OF A CORE TESTED IS LESS THAN THE DESIGN CONCRETE STRENGTH, THE PRECAST ELEMENT FROM WHICH THAT CORE WAS TAKEN MAY BE RE-CORED. WHEN THE COMPRESSIVE STRENGTH OF THE RE-CORE IS EQUAL TO OR GREATER THAN THE DESIGN CONCRETE STRENGTH, THE COMPRESSIVE STRENGTH OF THE CONCRETE IN THAT BRIDGE ELEMENT IS ACCEPTABLE.
         6.1.4.1. WHEN THE COMPRESSIVE STRENGTH OF ANY RECORE IS LESS THAN THE DESIGN CONCRETE STRENGTH, THE PRECAST ELEMENT FROM WHICH THAT CORE WAS TAKEN SHALL BE REJECTED.
         6.1.4.2. PLUGGING CORE HOLES - THE CORE HOLES SHALL BE PLUGGED AND SEALED BY THE MANUFACTURER IN A MANNER SUCH THAT THE ELEMENTS WILL MEET ALL OF THE TEST REQUIREMENTS OF THIS SPECIFICATION. PRECAST ELEMENTS SO SEALED SHALL BE CONSIDERED SATISFACTORY FOR USE.
         6.1.4.3. TEST EQUIPMENT - EVERY MANUFACTURER FURNISHING PRECAST ELEMENTS UNDER THIS SPECIFICATION SHALL FURNISH ALL FACILITIES AND PERSONNEL NECESSARY TO CARRY OUT THE TEST REQUIRED.
   6.2. INSPECTION - THE QUALITY OF MATERIALS, THE PROCESS OF MANUFACTURE, AND THE FINISHED PRECAST ELEMENTS SHALL BE SUBJECT TO INSPECTION BY THE PURCHASER.

7. JOINTS
   THE BRIDGE UNITS SHALL BE PRODUCED WITH FLAT BUTT ENDS. THE ENDS OF THE BRIDGE UNITS SHALL BE SUCH THAT WHEN THE SECTIONS ARE LAID TOGETHER THEY WILL MAKE A CONTINUOUS LINE WITH A SMOOTH INTERIOR FREE OF APPRECIABLE IRREGULARITIES, ALL COMPATIBLE WITH THE PERMISSIBLE VARIATIONS IN SECTION 5, ABOVE. THE JOINT WIDTH BETWEEN ADJACENT PRECAST UNITS SHALL NOT EXCEED ¾".

8. WORKMANSHIP/ FINISH
   THE BRIDGE UNITS, WINGWALLS, HEADWALLS AND FOUNDATION UNITS SHALL BE SUBSTANTIALLY FREE OF FRACTURES. THE ENDS OF THE BRIDGE UNITS SHALL BE NORMAL TO THE WALLS AND CENTERLINE OF THE BRIDGE SECTION, WITHIN THE LIMITS OF THE VARIATIONS GIVEN IN SECTION 5, ABOVE, EXCEPT WHERE BEVELED ENDS ARE SPECIFIED. THE FACES OF THE WINGWALLS AND HEADWALLS SHALL BE PARALLEL TO EACH OTHER, WITHIN THE LIMITS OF VARIATIONS GIVEN IN SECTION 5, ABOVE. THE SURFACE OF THE PRECAST ELEMENTS SHALL BE A SMOOTH STEEL FORM OR TROWELED SURFACE. TRAPPED AIR POCKETS CAUSING SURFACE DEFECTS SHALL BE CONSIDERED AS PART OF A SMOOTH, STEEL FORM FINISH.

9. REPAIRS
   PRECAST ELEMENTS MAY BE REPAIRED, IF NECESSARY, BECAUSE OF IMPERFECTIONS IN MANUFACTURE OR HANDLING DAMAGE AND WILL BE ACCEPTABLE IF, IN THE OPINION OF THE PURCHASER, THE REPAIRS ARE SOUND, PROPERLY FINISHED AND CURED, AND THE REPAIRED SECTION CONFORMS TO THE REQUIREMENTS OF THIS SPECIFICATION.

10. REJECTION
   THE PRECAST ELEMENTS SHALL BE SUBJECT TO REJECTION ON ACCOUNT OF ANY OF THE SPECIFICATION REQUIREMENTS. INDIVIDUAL PRECAST ELEMENTS MAY BE REJECTED BECAUSE OF ANY OF THE FOLLOWING:
   10.1. FRACTURES OR CRACKS PASSING THROUGH THE WALL, EXCEPT FOR A SINGLE END CRACK THAT DOES NOT EXCEED ONE HALF THE THICKNESS OF THE WALL.
   10.2. DEFECTS THAT INDICATE PROPORTIONING, MIXING, AND MOLDING NOT IN COMPLIANCE WITH SECTION 4 OF THESE SPECIFICATIONS.
   10.3. HONEYCOMBED OR OPEN TEXTURE.
   10.4. DAMAGED ENDS, WHERE SUCH DAMAGE WOULD PREVENT MAKING A SATISFACTORY JOINT.

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MARK	DATE	REVISION DESCRIPTION	BY

CONTECH ENGINEERING, PROFESSIONAL CORPORATION
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CONSPAN BRIDGE SYSTEMS

CONTRACT DRAWING

HIGHLAND BRIDGE MRB CROSSING
CITY OF SAINT PAUL DEPARTMENT OF PARKS AND RECREATION
SAINT PAUL, MINNESOTA

PROJECT No.:	SEQ. No.:	DATE:
645922	010	3/30/2021
DESIGNED: KDK	DRAWN: TRL	
CHECKED:	APPROVED: MGC	
SHEET NO.: CT9 OF CT10		

SPECIFICATIONS FOR MANUFACTURE AND INSTALLATION OF CON/SPAN® BRIDGE SYSTEMS (CONT'D)

11. MARKING
EACH BRIDGE UNIT SHALL BE CLEARLY MARKED BY WATERPROOF PAINT. THE FOLLOWING SHALL BE SHOWN ON THE INSIDE OF THE VERTICAL LEG OF THE BRIDGE SECTION:
BRIDGE SPAN x BRIDGE RISE
DATE OF MANUFACTURE
NAME OR TRADEMARK OF THE MANUFACTURER

12. INSTALLATION PREPARATION
TO ENSURE CORRECT INSTALLATION OF THE PRECAST CONCRETE BRIDGE SYSTEM, CARE AND CAUTION MUST BE EXERCISED IN FORMING THE SUPPORT AREAS FOR BRIDGE UNITS, HEADWALL, AND WINGWALL ELEMENTS. EXERCISING SPECIAL CARE WILL FACILITATE THE RAPID INSTALLATION OF THE PRECAST COMPONENTS.

12.1. FOOTINGS
DO NOT OVER EXCAVATE FOUNDATIONS UNLESS DIRECTED BY SITE SOIL ENGINEER TO REMOVE UNSUITABLE SOIL.

THE SITE SOILS ENGINEER SHALL CERTIFY THAT THE BEARING CAPACITY MEETS OR EXCEEDS THE FOOTING DESIGN REQUIREMENTS, PRIOR TO THE CONTRACTOR POURING OF THE FOOTINGS.

THE BRIDGE UNITS AND WINGWALLS SHALL BE INSTALLED ON EITHER PRECAST OR CAST-IN-PLACE CONCRETE FOOTINGS. THE SIZE AND ELEVATION OF THE FOOTINGS SHALL BE AS DESIGNED BY THE ENGINEER. A KEYWAY SHALL BE FORMED IN THE TOP SURFACE OF THE BRIDGE FOOTING AS SPECIFIED ON THE PLANS. NO KEYWAY IS REQUIRED IN THE WINGWALL FOOTINGS, UNLESS OTHERWISE SPECIFIED ON THE PLANS.

THE FOOTINGS SHALL BE GIVEN A SMOOTH FLOAT FINISH AND SHALL REACH A COMPRESSIVE STRENGTH OF 2,000 PSI BEFORE PLACEMENT OF THE BRIDGE AND WINGWALL ELEMENTS. BACKFILLING SHALL NOT BEGIN UNTIL THE FOOTING HAS REACHED THE FULL DESIGN COMPRESSIVE STRENGTH.

THE FOOTING SURFACE SHALL BE CONSTRUCTED IN ACCORDANCE WITH GRADES SHOWN ON THE PLANS. WHEN TESTED WITH A 10'-0" STRAIGHT EDGE, THE SURFACE SHALL NOT VARY MORE THAN ¼" IN 10'-0".

IF A PRECAST CONCRETE FOOTING IS USED, THE CONTRACTOR SHALL PREPARE A 4" THICK BASE LAYER OF COMPACTED GRANULAR MATERIAL THE FULL WIDTH OF THE FOOTING PRIOR TO PLACING THE PRECAST FOOTING.

THE FOUNDATIONS FOR PRECAST CONCRETE BRIDGE ELEMENTS AND WINGWALLS MUST BE CONNECTED BY REINFORCEMENT TO FORM ONE MONOLITHIC BODY. EXPANSION JOINTS SHALL NOT BE USED.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CONSTRUCTION OF THE FOUNDATIONS PER THE PLANS AND SPECIFICATIONS.

13. INSTALLATION
13.1. GENERAL - THE INSTALLATION OF THE PRECAST CONCRETE ELEMENTS SHALL BE AS EXPLAINED IN THE PUBLICATION CON/SPAN BRIDGE SYSTEMS INSTALLATION HANDBOOK.
13.1.1. LIFTING - IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE THAT A CRANE OF THE CORRECT LIFTING CAPACITY IS AVAILABLE TO HANDLE THE PRECAST CONCRETE UNITS. THIS CAN BE ACCOMPLISHED BY USING THE WEIGHTS GIVEN FOR THE PRECAST CONCRETE COMPONENTS AND BY DETERMINING THE LIFTING REACH FOR EACH CRANE UNIT. SITE CONDITIONS MUST BE CHECKED WELL IN ADVANCE OF SHIPPING TO ENSURE PROPER CRANE LOCATION AND TO AVOID ANY LIFTING RESTRICTIONS. THE LIFT ANCHORS OR HOLES PROVIDED IN EACH UNIT ARE THE ONLY MEANS TO BE USED TO LIFT THE ELEMENTS. THE PRECAST CONCRETE ELEMENTS MUST NOT BE SUPPORTED OR RAISED BY OTHER MEANS THAN THOSE GIVEN IN THE MANUALS AND DRAWINGS WITHOUT WRITTEN APPROVAL FROM CONTECH® ENGINEERED SOLUTIONS.
13.1.2. CONSTRUCTION EQUIPMENT WEIGHT RESTRICTIONS - IN NO CASE SHALL EQUIPMENT OPERATING IN EXCESS OF THE DESIGN LOAD (HL-93) BE PERMITTED OVER THE BRIDGE UNITS UNLESS APPROVED BY CONTECH® ENGINEERED SOLUTIONS.
13.1.2.1. IN THE IMMEDIATE AREA OF THE BRIDGE UNITS, THE FOLLOWING RESTRICTIONS FOR THE USE OF HEAVY CONSTRUCTION MACHINERY DURING BACKFILLING OPERATIONS APPLY:
- NO CONSTRUCTION EQUIPMENT SHALL CROSS THE BARE PRECAST CONCRETE BRIDGE UNIT.
- AFTER THE COMPACTED FILL LEVEL HAS REACHED A MINIMUM OF 4" OVER THE CROWN OF THE BRIDGE, CONSTRUCTION EQUIPMENT WITH A WEIGHT OF LESS THAN 10 TONS MAY CROSS THE BRIDGE.
- AFTER THE COMPACTED FILL LEVEL HAS REACHED A MINIMUM OF 1'-0" OVER THE CROWN OF THE BRIDGE, CONSTRUCTION EQUIPMENT WITH A WEIGHT OF LESS THAN 30 TONS MAY CROSS THE BRIDGE. AFTER THE COMPACTED FILL LEVEL HAS REACHED THE DESIGN
- COVER, OR 2'-0" MINIMUM, OVER THE CROWN OF THE PRECAST CONCRETE BRIDGE, CONSTRUCTION EQUIPMENT WITHIN THE DESIGN LOAD LIMITS FOR THE ROAD MAY CROSS THE PRECAST CONCRETE BRIDGE.

13.2. LEVELING PAD/SHIMS - THE BRIDGE UNITS AND WINGWALLS SHALL BE SET ON HARDBOARD SHIMS CONFORMING TO ASTM D1037 OR PLASTIC SHIMS (DAYTON SUPERIOR P-80, P-81 OR APPROVED EQUAL) MEASURING 5" x 5", MINIMUM, UNLESS SHOWN OTHERWISE ON THE PLANS. A MINIMUM GAP OF ½" SHALL BE PROVIDED BETWEEN THE FOOTING AND THE BOTTOM OF THE BRIDGE'S VERTICAL LEGS OR THE BOTTOM OF THE WINGWALL. ALSO, A SUPPLY OF ¼", ½" AND ¼" THICK HARDBOARD OR PLASTIC SHIMS FOR VARIOUS SHIMMING PURPOSES SHALL BE ON SITE.

13.3. PLACEMENT OF BRIDGE UNITS - THE BRIDGE UNITS SHALL BE PLACED AS SHOWN ON THE ENGINEER'S PLAN DRAWINGS. SPECIAL CARE SHALL BE TAKEN IN SETTING THE ELEMENTS TO THE TRUE LINE AND GRADE. THE JOINT WIDTH BETWEEN ADJACENT PRECAST UNITS SHALL NOT EXCEED ¾".

13.4. IT IS THE CONTRACTOR'S RESPONSIBILITY TO MAINTAIN THE STRUCTURE SPAN DURING ALL PHASES OF INSTALLATION. DUE TO THE ARCH SHAPE, BRIDGE ELEMENTS WILL TEND TO SPREAD UNDER SELF-WEIGHT. IT IS IMPERATIVE THAT ANY LATERAL SPREADING OF THE BRIDGE ELEMENTS BE AVOIDED DURING AND AFTER THEIR PLACEMENT. GENERALLY, HORIZONTAL CABLE TIES OR TIE RODS ARE SHIPPED IN THE LARGER BRIDGE ELEMENTS TO ASSIST IN PREVENTING THIS SPREADING. CABLE TIES/TIE RODS SHALL NOT BE REMOVED UNTILL BRIDGE UNITS ARE GROUTED AND GROUT HAS CURED. IT IS RECOMMENDED THAT TEMPORARY HARDWOOD BLOCKS BE USED IN CONJUNCTION WITH THE CABLE TIES/TIE RODS TO MAINTAIN SPAN. IF, HOWEVER, DUE TO SITE RESTRICTIONS, THESE CABLE TIES/TIE RODS MUST BE REMOVED PRIOR TO PLACEMENT OF THE BRIDGE ELEMANTS, THE CONTRACTOR MUST NOTIFY CONTECH (MANUFACTURER) AND REQUEST A SUGGESTED INSTALLATION PROCEDURE.

IN ADDITION, IF THE CABLE TIES/TIE RODS MUST BE REMOVED PRIOR TO SETTING ARCH UNITS, THE FOLLOWING QUALITY CONTROL PROCEDURE MUST BE FOLLOWED:
1) FIND "MEASURED SPAN" UPON ARCH UNIT'S DELIVERY TO SITE, PRIOR TO LIFTING FROM TRUCK AND REMOVING CABLE TIES/TIE RODS. "MEASURED SPAN" SHALL BE THE AVERAGE OF (3) SPAN MEASUREMENTS ALONG THE LAY LENGTH OF THE ARCH UNIT.
2) AFTER SETTING OF BRIDGE UNIT ON THE FOUNDATION, VERIFY THE SPAN. THIS "INSTALLED SPAN MEASUREMENT" SHALL NOT EXCEED THE MAXIMUM OF:
A) THE NOMINAL SPAN +¾" OR
B) THE "MEASURED SPAN"
IF THE "INSTALLED SPAN MEASUREMENT" EXCEEDS THIS AMOUNT, THE ARCH UNIT SHALL BE LIFTED AND RE-SET UNTIL THE "INSTALLED SPAN MEASUREMENT" MEETS THE LIMITS.

13.5. PLACEMENT OF WINGWALLS, HEADWALLS AND FOUNDATION UNITS - THE WINGWALLS, HEADWALLS AND FOUNDATIONS SHALL BE PLACED AS SHOWN ON THE PLAN DRAWINGS. SPECIAL CARE SHALL BE TAKEN IN SETTING THE ELEMENTS TO THE TRUE LINE AND GRADE.

13.6. JOINT PROTECTION AND SUBSURFACE DRAINAGE
13.6.1. EXTERNAL PROTECTION OF JOINTS - THE BUTT JOINT MADE BY TWO ADJOINING BRIDGE UNITS SHALL BE COVERED WITH A 7½" x 1½" PREFORMED BITUMINOUS JOINT SEALANT AND A MINIMUM OF A 9" WIDE JOINT WRAP. THE SURFACE SHALL BE FREE OF DIRT BEFORE APPLYING THE JOINT MATERIAL. A PRIMER COMPATIBLE WITH THE JOINT WRAP TO BE USED SHALL BE APPLIED FOR A MINIMUM WIDTH OF 9" ON EACH SIDE OF THE JOINT. THE EXTERNAL WRAP SHALL BE CS212 BY CONCRETE SEALANTS INC., EZ-WRAP RUBBER BY PRESS-SEAL GASKET CORPORATION, SEAL WRAP BY MAR MAC MANUFACTURING CO. INC. OR APPROVED EQUAL. THE JOINT SHALL BE COVERED CONTINUOUSLY FROM THE BOTTOM OF ONE BRIDGE SECTION LEG, ACROSS THE TOP OF THE BRIDGE AND TO THE OPPOSITE BRIDGE SECTION LEG. ANY LAPS THAT RESULT IN THE JOINT WRAP SHALL BE A MINIMUM OF 6" LONG WITH THE OVERLAP RUNNING DOWNHILL.
13.6.2. IN ADDITION TO THE JOINTS BETWEEN BRIDGE UNITS, THE JOINT BETWEEN THE END BRIDGE UNIT AND THE HEADWALL SHALL ALSO BE SEALED AS DESCRIBED ABOVE. IF PRECAST WINGWALLS ARE USED, THE JOINT BETWEEN THE END BRIDGE UNIT AND THE WINGWALL SHALL BE SEALED WITH A 2'-0" STRIP OF FILTER FABRIC. ALSO, IF LIFT HOLES ARE FORMED IN THE BRIDGE UNITS, THEY SHALL BE PRIMED AND COVERED WITH A 9" x 9" SQUARE OF JOINT WRAP.
13.6.3. DURING THE BACKFILLING OPERATION, CARE SHALL BE TAKEN TO KEEP THE JOINT WRAP IN ITS PROPER LOCATION OVER THE JOINT.
13.6.4. SUBSOIL DRAINAGE SHALL BE AS DIRECTED BY THE ENGINEER.

13.7. GROUTING
13.7.1. GROUTING SHALL NOT BE PERFORMED WHEN TEMPERATURES ARE EXPECTED TO GO BELOW 35° FOR A PERIOD OF 72 HOURS. GROUTING SHOULD BE COMPLETED AS SOON AS PRACTICAL AFTER PRECAST ARCHES HAVE BEEN INSTALLED. FILL THE BRIDGE-FOUNDATION KEYWAY WITH CEMENT GROUT (PORTLAND CEMENT AND WATER OR CEMENT MORTAR COMPOSED OF PORTLAND CEMENT, SAND AND WATER) WITH A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 3000 PSI. VIBRATE AS REQUIRED TO ENSURE THAT THE ENTIRE KEY AROUND THE BRIDGE ELEMENT IS COMPLETELY FILLED. IF BRIDGE ELEMENTS HAVE BEEN SET WITH TEMPORARY TIES (CABLES, BARS, ETC.) GROUT MUST ATTAIN A MINIMUM COMPRESSIVE STRENGTH OF 1500 PSI BEFORE TIES MAY BE REMOVED.
13.7.2. ALL GROUT SHALL HAVE A MAXIMUM AGGREGATE SIZE OF ¼".
13.7.3. LIFTING AND ERECTION ANCHOR RECESSES SHALL BE FILLED WITH GROUT.
13.7.4. AFTER GROUT HAS REACHED ITS DESIGN STRENGTH THE TEMPORARY HARDWOOD WEDGES SHALL BE REMOVED AND THEIR HOLES FILLED WITH GROUT.

13.8. BACKFILL
13.8.1. DO NOT PERFORM BACKFILLING DURING WET OR FREEZING WEATHER.
13.8.2. NO BACKFILL SHALL BE PLACED AGAINST ANY STRUCTURAL ELEMENTS UNTIL THEY HAVE BEEN APPROVED BY THE ENGINEER.
13.8.3. BACKFILL SHALL BE CONSIDERED AS ALL REPLACED EXCAVATION AND NEW EMBANKMENT ADJACENT TO THE PRECAST CONCRETE ELEMENTS. THE PROJECT CONSTRUCTION AND MATERIAL SPECIFICATIONS, WHICH INCLUDE THE SPECIFICATIONS FOR EXCAVATION FOR STRUCTURES AND ROADWAY EXCAVATION AND EMBANKMENT CONSTRUCTION, SHALL APPLY EXCEPT AS MODIFIED IN THIS SECTION.
13.8.4. BACKFILL ZONES:
- IN-SITU SOIL
- ZONE A: CONSTRUCTED EMBANKMENT OR OVERFILL.
- ZONE B: FILL THAT IS DIRECTLY ASSOCIATED WITH PRECAST CONCRETE BRIDGE INSTALLATION.
- ZONE C: ROAD STRUCTURE.

13.8.5. REQUIRED BACKFILL PROPERTIES
13.8.5.1. IN-SITU SOIL - NATURAL GROUND IS TO BE SUFFICIENTLY STABLE TO ALLOW EFFECTIVE SUPPORT TO THE PRECAST CONCRETE BRIDGE UNITS. AS A GUIDE, THE EXISTING NATURAL GROUND SHOULD BE OF SIMILAR QUALITY AND DENSITY TO ZONE B MATERIAL FOR MINIMUM LATERAL DIMENSION OF ONE BRIDGE SPAN OUTSIDE OF THE BRIDGE FOOTING.
13.8.5.2. ZONE A - ZONE A REQUIRES FILL MATERIAL WITH SPECIFICATIONS AND COMPACTING PROCEDURES EQUAL TO THAT FOR NORMAL ROAD EMBANKMENTS.
13.8.5.3. ZONE B - GENERALLY, SOILS SHALL BE REASONABLY FREE OF ORGANIC MATTER, AND, NEAR CONCRETE SURFACES, FREE OF STONES LARGER THAN 3" IN DIAMETER. SEE CHARTS FOR DETAILED DESCRIPTIONS OF ACCEPTABLE SOILS.
13.8.5.4. ZONE C - ZONE C IS THE ROAD SECTION OF GRAVEL, ASPHALT OR CONCRETE BUILT IN COMPLIANCE WITH LOCAL ENGINEERING PRACTICES.
13.8.5.5. GEOTECHNICAL ENGINEER SHALL REVIEW GRADATIONS OF ALL INTERFACING MATERIALS AND, IF NECESSARY, RECOMMEND GEOTEXTILE FILTER FABRIC (PROVIDED BY CONTRACTOR)

13.8.6. PLACING AND COMPACTING BACKFILL
DUMPING FOR BACKFILLING IS NOT ALLOWED ANY NEARER THAN 3'-0" FROM THE BRIDGE LEG.

THE FILL MUST BE PLACED AND COMPACTED IN LAYERS NOT EXCEEDING 8". THE MAXIMUM DIFFERENCE IN THE SURFACE LEVELS OF THE FILL ON OPPOSITE SIDES OF THE BRIDGE MUST NOT EXCEED 2'-0".

THE FILL BEHIND WINGWALLS MUST BE PLACED AT THE SAME TIME AS THAT OF THE BRIDGE FILL. IT MUST BE PLACED IN PROGRESSIVELY PLACED HORIZONTAL LAYERS NOT EXCEEDING 8" PER LAYER.

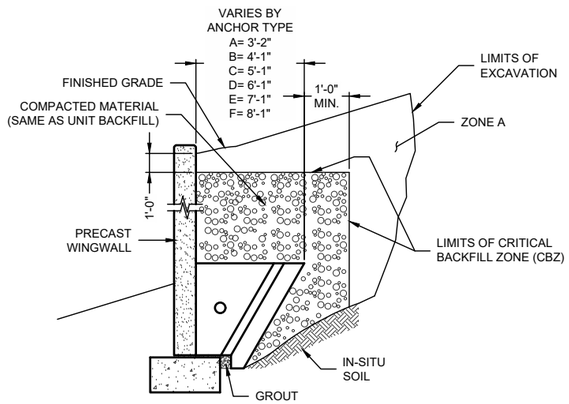
THE BACKFILL OF ZONE B SHALL BE COMPACTED TO A MINIMUM DENSITY OF 95% OF THE STANDARD PROCTOR, AS REQUIRED BY AASHTO T-99.

SOIL WITHIN 1'-0" OF CONCRETE SURFACES SHALL BE HAND-COMPACTED. ELSEWHERE, USE OF ROLLERS IS ACCEPTABLE. IF VIBRATING ROLLER-COMPACTORS ARE USED, THEY SHALL NOT BE STARTED OR STOPPED WITHIN ZONE B AND THE VIBRATION FREQUENCY SHOULD BE AT LEAST 30 REVOLUTIONS PER SECOND.

THE BACKFILL MATERIAL AND COMPACTING BEHIND WINGWALLS SHALL SATISFY THE CRITERIA FOR THE BRIDGE BACKFILL, ZONE B.

BACKFILL AGAINST A WATERPROOFED SURFACE SHALL BE PLACED CAREFULLY TO AVOID DAMAGE TO THE WATERPROOFING MATERIAL.
13.8.7. BRIDGE UNITS
FOR FILL HEIGHTS OVER 12 FEET (AS MEASURED FROM TOP CROWN OF BRIDGE TO FINISHED GRADE), NO BACKFILLING MAY BEGIN UNTIL A BACKFILL COMPACTION TESTING PLAN HAS BEEN COORDINATED WITH AND APPROVED BY CONTECH® ENGINEERED SOLUTIONS.
13.8.8. WINGWALLS
BACKFILL IN FRONT OF WINGWALLS SHALL BE CARRIED TO GROUND LINES SHOWN IN THE PLANS.
13.8.9. MONITORING
THE CONTRACTOR SHALL CHECK SETTLEMENTS AND HORIZONTAL DISPLACEMENT OF FOUNDATION TO ENSURE THAT THEY ARE WITHIN THE ALLOWABLE LIMIT PROVIDED BY THE ENGINEER. THESE MEASUREMENTS SHOULD GIVE AN INDICATION OF THE SETTLEMENTS AND DEFORMATIONS ALONG THE LENGTH OF THE FOUNDATIONS.

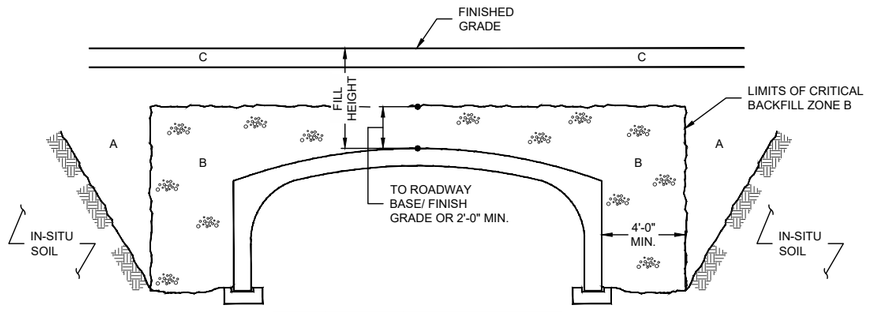
THE FIRST MEASUREMENT SHOULD TAKE PLACE AFTER THE ERECTION OF ALL PRECAST BRIDGE SYSTEM ELEMENTS, A SECOND AFTER COMPLETION OF BACKFILLING, AND A THIRD BEFORE OPENING OF THE BRIDGE TO TRAFFIC. FURTHER MEASUREMENTS MAY BE MADE ACCORDING TO LOCAL CONDITIONS.



WALL BACKFILL REQUIREMENTS

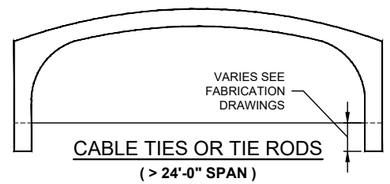
ACCEPTABLE SOILS FOR USE IN ZONE B BACKFILL

TYPICAL USCS MATERIALS	AASHTO GROUP	AASHTO SUBGROUP	PERCENT PASSING US SIEVE NO.			CHARACTER OF FRACTION PASSING NO. 40 SIEVE		SOIL DESRIPTION
			#10	#40	#200	LIQUID LIMIT	PLASTICITY INDEX	
GW, GP, SP	A1	A-1a	50 MAX	30 MAX	15 MAX		6 MAX	LARGELY GRAVEL BUT CAN INCLUDE SAND AND FINES
GM, SW, SP, SM		A-1b		50 MAX	25 MAX		6 MAX	GRAVELLY SAND OR GRADED SAND, MAY INCLUDE FINES
GM, SM, ML, SP, GP	A2	A-2-4			35 MAX	40 MAX	10 MAX	SANDS, GRAVELS WITH LOW-PLASTICITY SILT FINES
SC, GC, GM		A-2-5			35 MAX	41 MIN	10 MAX	SANDS, GRAVELS WITH PLASTIC SILT FINES
SP, SM, SW	A3			51 MIN	10 MAX		NON-PLASTIC	FINE SANDS
ML, SM, SC	A4				36 MIN	40 MAX	10 MAX	LOW-COMPRESSIBILTY SILTS



SPAN	FILL HEIGHT	ACCEPTABLE MATERIAL INSIDE ZONE B
≤ 24'-0"	≥ 12'-0"	A1, A3
≤ 24'-0"	< 12'-0"	A1, A2, A3, A4
> 24'-0"	ALL	A1, A3

BACKFILL REQUIREMENTS



CABLE TIES OR TIE RODS
(> 24'-0" SPAN)

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CONSPAN BRIDGE SYSTEMS
CONTRACT DRAWING

HIGHLAND BRIDGE MRB CROSSING
CITY OF SAINT PAUL DEPARTMENT OF PARKS AND RECREATION
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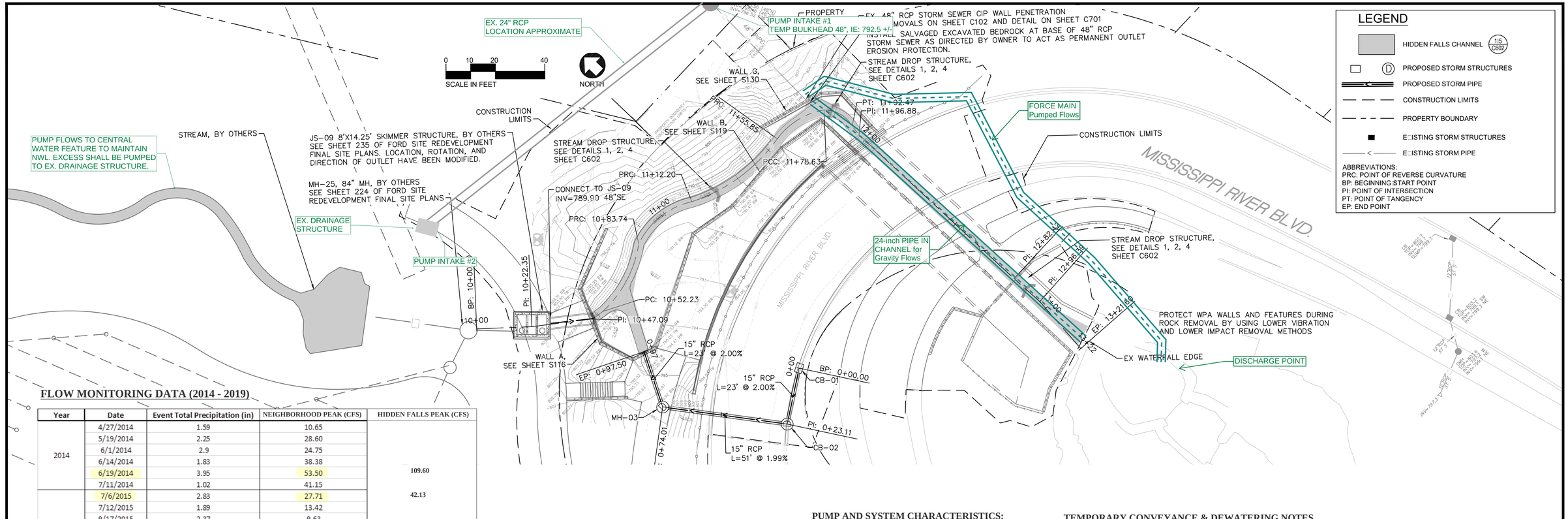

FLOW MONITORING DATA (2014 - 2019)

Year	Date	Event Total Precipitation (in)	NEIGHBORHOOD PEAK (CFS)	HIDDEN FALLS PEAK (CFS)
2014	4/27/2014	1.59	10.65	
	5/19/2014	2.25	28.60	
	6/1/2014	2.9	24.75	
	6/14/2014	1.83	38.38	
	6/19/2014	3.95	53.50	109.60
	7/11/2014	1.02	41.15	
2015	7/6/2015	2.83	27.71	42.13
	7/12/2015	1.89	13.42	
	9/17/2015	2.37	9.63	
	10/24/2015	1.18	5.02	
	11/11/2015	2.1	17.81	
	11/17/2015	1.57	2.71	
2016	6/14/2016	1.18	26.26	
	7/5/2016	1.21	9.29	
	7/23/2016	2.17	19.94	
	8/4/2016	1.13	29.54	
	8/11/2016	2.64	29.54	31.90
	8/30/2016	1.61	21.14	
	9/22/2016	1.96	16.20	
	10/7/2016	1.01	7.72	
2017	4/15/2017	1.11	14.41	
	5/17/2017	1.67	33.38	
	5/20/2017	1.47	6.54	
	6/11/2017	1.68	33.06	
	8/13/2017	1.01	14.37	
	8/16/2017	1.52	19.59	
	8/26/2017	1.58	17.14	
	10/2/2017	1.85	38.03	
2018	6/26/2018	1.1	34.18	
	7/1/2018	1.16	16.30	
	7/12/2018	2.13	44.26	47.38
	8/24/2018	1.05	9.00	
	9/4/2018	1.16	3.32	
	9/20/2018	3.27	37.66	
	10/10/2018	1.12	6.46	
2019	5/9/2019	1.47	4.70	
	5/27/2019	1.79	7.65	
	6/30/2019	1.04	1.87	
	7/2/2019	1.7	9.00	
	7/20/2019	1.01	23.74	
	8/16/2019	1.22	33.62	
	8/18/2019	1.74	39.49	
	9/11/2019	1.21	6.98	
	9/12/2019	1.06	22.15	

NOTES:
1. PEAK EVENTS FOR EACH YEAR ARE HIGHLIGHTED.
2. AVERAGE ANNUAL PEAK (2014-2019): 51.4 CFS (23,130 GPM)
3. MEDIAN ANNUAL PEAK (2014-2019): 38.8 CFS (17,460 GPM)

PUMP AND SYSTEM CHARACTERISTICS:

PUMP INTAKE #1
Capacity: 10 CFS
4,500 GPM

Minimum Solids Passage: 3 FT

Maximum Discharge towards Hidden Falls (cfs)*			
Storm Event	Existing Conditions	Bulletin 2	MRB Crossing
2-year	511.8 (221.6)	96.3	97.2
10-year	821.7 (233.6)	174.7	176.8
100-year	1559.2 (272.0)	365.3 (234.8)	426.6

* Discharge includes pipe flow and overland flow. Value in parentheses is pipe discharge only in cases where there is both pipe flow and overland flow. Cells without a value in parentheses represent pipe flow only.

TEMPORARY CONVEYANCE & DEWATERING NOTES

1. Obtain permits required by MnDNR if total discharge from dewatering is anticipated to exceed, or actually exceeds 10,000 gallons per day, or 1,000,000 gallons per year.

2. Maintain site, excavations, and construction area free of water.

3. Dispose of water in a lawful manner which will not result in flooding the project area or adjoining properties, nor endanger either permanent work or temporary facilities.

4. Submit a schedule that indicates timing of dewatering stages at least 15 calendar days prior to starting temporary conveyance activities.

5. Minimize the amount of turbidity or silty water entering Hidden Falls.

6. Suggested methods to minimize sediment from entering a surface water are:
(a) Use of a portable treatment basin or upland sumps (MnDOT 3875)
(b) Pump turbid water away from surface waters and streams.
(c) Floating head skimmers (MnDOT 3875)
(d) Flocculant socks (MnDOT 3898)

7. Pumped discharges for drainage related to the work that may have turbid or sediment laden discharge water must be discharged to a temporary or permanent sedimentation basin on the Project site whenever possible. If the water cannot be discharged to a sedimentation basin prior to entering the surface water, it must be treated with the appropriate BMPs, such that the discharge does not adversely affect the receiving water or downstream landowners (MnDOT 3875 and 3898). The Contractor must ensure that discharge points are adequately protected from erosion and scour. The discharge must be dispersed over natural rock riprap, sand bags, plastic sheeting or other accepted energy dissipation measures. Adequate sedimentation control measures are required for discharge water that contain suspended solids.

8. TEMPORARY CONVEYANCE SYSTEM shall be construed to mean preparation and implementation of a storm sewer bypass for the removed 48□RCP from CP Rail property, and the 48□storm sewer from the private Highland Bridge development. The system shall be capable of conveying the equivalent preconstruction storm flow as conveyed within the existing system. Payment shall be LUMP SUM and shall be compensation in full for all labor, materials, and equipment necessary to prepare and implement the TEMPORARY CONVEYANCE SYSTEM complete in place.

NO.	DATE	BY	DESCRIPTION OF REVISIONS

DESIGNED AMK
DRAWN NJL
CHECKED JNL

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Engineer under the laws of the State of Minnesota.
Printed Name: JONATHAN N. LIBBY
Signature:
Date: 3/3121 License #: 51276

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CITY OF SAINT PAUL DEPARTMENT OF PARKS AND RECREATION
HIGHLAND BRIDGE MRB CROSSING
SAINT PAUL, MINNESOTA RAMSEY COUNTY

TEMPORARY STORMWATER CONVEYANCE PLAN

PROJ. NO. 17921.002
DRAWING NO. TC100

NOTES & GUIDELINES

GENERAL INFORMATION:

1. ALL DISTANCES ARE APPROXIMATE.

SIGNING:

1. ALL TEMPORARY SIGNS ARE REQUIRED TO BE CRASHWORTHY PER THE AASHTO MANUAL FOR ASSESSING SAFETY HARDWARE 2016 (MASH-2016). TEMPORARY SIGN STRUCTURES THAT ARE CRASHWORTHY UNDER THE NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM REPORT 350 (NCHRP-350) MAY BE USED PROVIDED THE DEVICES WERE ACQUIRED BY THE CONTRACTOR PRIOR TO DECEMBER 31ST, 2019. THE MINNESOTA TYPE "C" AND "D" BRACED LEG U-CHANNEL (KNEE BRACE) SIGN SUPPORT IS NOT ALLOWED.
2. **THE CONTRACTOR SHALL COORDINATE THE INSTALLATION OF THE FINAL SIGNS TO ASSURE THAT THE FINAL SIGNS ARE PLACED AS NEEDED, OR PROVIDE TEMPORARY SIGNING UNTIL THE FINAL SIGNING IS PLACED.**
3. WHEN MULTIPLE GROUND MOUNTED SIGN STRUCTURES ARE PLACED ADJACENT TO EACH OTHER THERE SHOULD BE NO MORE THAN 2 POSTS WITHIN 84" OF EACH OTHER. WHEN THIS SPACING CAN NOT BE MAINTAINED, THEN SIGN STRUCTURES SHALL BE OFFSET, AND STAGGERED WITH A MINIMUM OF 4' BETWEEN SIGN STRUCTURES BOTH LATERALLY AND LONGITUDINALLY. EXAMPLE SHOWS DETOUR SIGNAGE, BUT THIS REQUIREMENT APPLIES TO ALL SIGNAGE.
4. **WHEN A SIGN OR BARRICADE IS ORIENTED SUCH THAT VISIBILITY TO ROAD USERS INCLUDING BIKES AND PEDESTRIANS IS REDUCED ENOUGH TO CAUSE A HAZARD, DELINEATE THE SIGN/BARRICADE WITH APPROPRIATE DEVICES.**
5. TEMPORARY SIGNS SHALL BE PLACED SUCH THAT OBSTACLES DO NOT BLOCK THEM FROM BEING VIEWED BY APPROACHING ROAD USERS. OBSTACLES MAY INCLUDE, BUT ARE NOT LIMITED TO, LIGHT POLES, TREES, SIGNS, AND BUILDINGS.
6. TEMPORARY SIGNS SHALL BE PLACED AND ORIENTED APPROXIMATELY AS SHOWN IN THE PLAN, AT RIGHT ANGLES TO DIRECTION OF AND FACING THE TRAFFIC THEY ARE INTENDED TO SERVE, UNLESS OTHERWISE SPECIFIED.
7. LONGITUDINAL DROPOFFS SHALL BE SIGNED AS SHOWN IN THE "MINNESOTA TEMPORARY TRAFFIC CONTROL FIELD MANUAL" PAGES (6K-aj) THRU (6K-al) UNLESS OTHERWISE SPECIFIED IN THESE PLANS.
8. AFTER REMOVAL OF SIGN AND/OR SIGN BASE, BACK FILL, COMPACT, AND LEVEL SOIL TO MATCH SURROUNDING SOIL.

PAVEMENT MARKING:

1. MASK OR REMOVE ANY CONFLICTING PAVEMENT MARKINGS AS DIRECTED BY THE ENGINEER.
2. ALL TEMPORARY PAVEMENT MARKINGS SHALL BE WET REFLECTIVE. ALL PAVEMENT MARKINGS IN TAPERS AND TRANSITIONS SHALL BE 6" IN WIDTH.
3. SEE 2582 IN THE SPECIAL PROVISIONS FOR PAVEMENT MARKING SPOTTING RESPONSIBILITIES.

BARRIER & DELINEATION:

1. PLACE AND MAINTAIN TEMPORARY BARRIER DELINEATORS ANY TIME TRAFFIC IS WITHIN 10' OF BARRIER. DELINEATORS WILL EACH HAVE A MINIMUM OF 24 SQ IN. OF RETROREFLECTIVE SURFACE ON BOTH SIDES PLACED AT 25' SPACING ON TOP OF THE BARRIER. IF THE ENGINEER OR PLAN REQUIRES SIDE MOUNTED TEMPORARY BARRIER DELINEATORS, THEY WILL HAVE A MINIMUM OF 12 SQ. IN. OF RETROREFLECTIVE SURFACE AREA AND BE PLACED AT 12.5' SPACING. IF A SMALLER APPROVED BARRIER DELINEATOR IS USED IT SHALL BE A MINIMUM OF 6 SQ IN. OF RETROREFLECTIVE SURFACE AREA AND BE PLACED ON BOTH SIDES AT 6.25' SPACING. TEMPORARY BARRIER DELINEATOR COLOR SHALL MATCH APPLICABLE PAVEMENT MARKING.

CONSTRUCTION INFORMATION SIGNING:

1. THE CONTRACTOR SHALL USE CONSTRUCTION INFORMATION SIGNING AS SHOWN IN THE PLAN WHICH ARE TO BE USED AS FOLLOWS:

   PLACE THE G20-X1 ADVANCE CLOSURE NOTICE SIGN(S) X DAYS PRIOR TO THE PLANNED CLOSURE DATE.

   PLACE G20-X2 ADVANCE NOTICE SIGNS X DAYS PRIOR TO THE WORK STARTING DATE. ONCE WORK BEGINS, COVER THE START DATE LEGEND WITH SUGGESTED PLAQUE CONTAINED IN THIS PLAN. IF NO ALTERNATE MESSAGE IS SUGGESTED OR IF DIRECTED BY THE ENGINEER, DISPLAY THE CORRECT ESTIMATED FINISH DATE, MONTH, OR SEASON

   IF CONSTRUCTION INFORMATION SIGNING IS NO LONGER VISIBLE TO THE MOTORING PUBLIC ONCE WORK BEGINS, MOVE SAID SIGNING TO A SITE IN ADVANCE OF THE WORK ZONE OR CLOSURE AS DIRECTED BY THE PLAN OR ENGINEER.

UPDATED 04/24/2020

TRAFFIC CONTROL DEVICES & SYMBOLS LEGEND

SYMBOL	DESCRIPTION
	AREA CLOSED TO TRAFFIC / WORK AREA
⊢	TRAFFIC CONTROL SIGN
⌊	TYPE III BARRICADE =
Ⓕ	TYPE A FLASHING WARNING LIGHT
	PEDESTRIAN CHANNELIZER DEVICE USING TEMPORARY BARRIER
●	DRUM-LIKE CHANNELIZER (TYPE B) =

INDEX

NO.	DATE	BY	DESCRIPTION OF REVISIONS

I HEREBY CERTIFY THAT THIS SHEET WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

SIGNATURE: Jeffrey A. Hilden
PRINTED NAME: JEFFREY A. HILDEN
DATE: 3/31/2021 LIC. NO. 20781

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TRAFFIC CONTROL PLAN
NOTES AND LEGEND

MISSISSIPPI RIVER BOULEVARD CROSSING

Sheet No. TCP100 of TCP109 Sheets

TRAFFIC CONTROL TABULATION SHEET

"M" SERIES			
SIGN OR DEVICE	SIGN NO.	COLOR	SIZE (INCH)
NORTH	M3-1	BLACK ON ORANGE	24 X 12
SOUTH	M3-3	BLACK ON ORANGE	24 X 12
DETOUR	M3-8	BLACK ON ORANGE	24 X 12
END DETOUR	M4-8a	BLACK ON ORANGE	24 X 18
DETOUR	M4-9MATL	BLACK ON ORANGE	30 X 24
DETOUR	M4-9MATR	BLACK ON ORANGE	30 X 24
DETOUR	M4-9ML	BLACK ON ORANGE	30 X 24
DETOUR	M4-9MR	BLACK ON ORANGE	30 X 24
DETOUR	M4-9MT	BLACK ON ORANGE	30 X 24
DETOUR	M4-9MATR45	BLACK ON ORANGE	30 X 24
DETOUR	M4-9MR45	BLACK ON ORANGE	30 X 24
DETOUR	M4-9ML45	BLACK ON ORANGE	30 X 24
DETOUR	M4-9aML	BLACK ON ORANGE	30 X 24
DETOUR	M4-9aMR	BLACK ON ORANGE	30 X 24
DETOUR	M4-9aMT	BLACK ON ORANGE	30 X 24

"M" SERIES			
SIGN OR DEVICE	SIGN NO.	COLOR	SIZE (INCH)
DETOUR	M4-9bML	BLACK ON ORANGE	18 X 12
DETOUR	M4-9bMR	BLACK ON ORANGE	18 X 12
DETOUR	M4-9bMT	BLACK ON ORANGE	18 X 12
DETOUR	M4-9cML	BLACK ON ORANGE	18 X 12
DETOUR	M4-9cMR	BLACK ON ORANGE	18 X 12
DETOUR	M4-9cMT	BLACK ON ORANGE	18 X 12

"G" SERIES			
SIGN OR DEVICE	SIGN NO.	COLOR	SIZE (INCH)
ROAD DETOURED BEGINNING MONTH DY	G20-X1	BLACK ON ORANGE	72 X 60

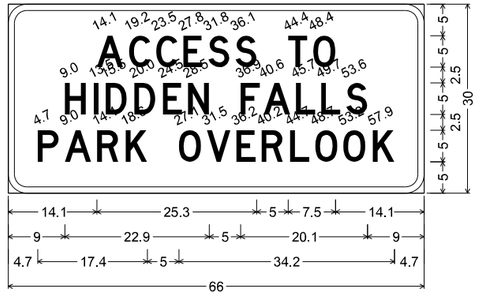
TRAFFIC CONTROL DEVICES			
SIGN OR DEVICE	SIGN NO.	COLOR	SIZE (INCH)
	TYPE III BARRICADE	ORANGE ON WHITE	
	FLASHING WARNING LIGHT	YELLOW	TYPE A
	REFLECTORIZED PLASTIC DRUM	WHITE ON ORANGE	

"R" SERIES			
SIGN OR DEVICE	SIGN NO.	COLOR	SIZE (INCH)
	R8-3	BLACK & RED ON WHITE	24 X 24
TRAIL CLOSED	R9-9	BLACK ON WHITE	24 X 18
SIDEWALK CLOSED AHEAD CROSS HERE	R9-11L	BLACK ON WHITE	48 X 18
SIDEWALK CLOSED AHEAD CROSS HERE	R9-11R	BLACK ON WHITE	48 X 18
ROAD CLOSED	R11-2M	BLACK ON WHITE	48 X 30
ROAD CLOSED TO THRU TRAFFIC	R11-4	BLACK ON WHITE	60 X 30

"W" SERIES			
SIGN OR DEVICE	SIGN NO.	COLOR	SIZE (INCH)
FEET	W16-2P	BLACK ON ORANGE	42 X 24
ROAD WORK AHEAD	W20-1	BLACK ON ORANGE	48 X 48
DETOUR AHEAD	W20-2	BLACK ON ORANGE	48 X 48
ROAD CLOSED AHEAD	W20-3	BLACK ON ORANGE	48 X 48
TRAIL CLOSED AHEAD	W20-3M	BLACK ON ORANGE	18 X 18
	W21-X3P	BLACK ON ORANGE	18 X 18

SP-1;
3.0" Radius, 1.0" Border, Black on, Orange;
"ACCESS TO", D; "HIDDEN FALLS", D;
"REGIONAL PARK", D;

SP-2;
No border, Black on, Orange;
"MISSISSIPPI", D;
"RIVER BLVD", D;



SP-3;
3.0" Radius, 1.0" Border, Black on, Orange;
"ACCESS TO", D; "HIDDEN FALLS", D;
"PARK OVERLOOK", D;

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TRAFFIC CONTROL PLAN
TABULATION

MISSISSIPPI RIVER BOULEVARD CROSSING
Sheet No. TCP101 of TCP109 Sheets

CHANNELIZERS, SIDEWALK BARRICADES, AND PORTABLE STANDS

GENERAL NOTES;

1. RAILINGS OR OTHER OBJECTS MAY PROTRUDE A MAXIMUM OF 4" INTO THE WALKWAY CLEAR SPACE WHEN LOCATED A MINIMUM OF 27" ABOVE THE WALKWAY SURFACE.
2. WHEN TEMPORARY BARRIER IS USED AS A PEDESTRIAN CHANNELIZER IT SHALL MEET CRASHWORTHY REQUIREMENTS.
3. WHEN USED, SIDEWALK BARRICADES SHALL BE PLACED ACROSS THE ENTIRE WIDTH OF THE WALKWAY SURFACE.
4. ALL DEVICES USED TO CHANNELIZE PEDESTRIAN FLOW SHOULD INTERLOCK SUCH THAT GAPS DO NOT ALLOW PEDESTRIANS TO STRAY FROM THE CHANNELIZED PATH.

SPECIFIC NOTES;

(1) ANY TRIPPING HAZARD IN THE WALKWAY NEEDS A DETECTABLE EDGE. BALLAST SHALL BE LOCATED BEHIND THE DETECTABLE EDGE OR INTERNAL TO THE DEVICE. ANY SUPPORT ON THE FRONT OF THE DEVICE SHOULD NOT EXTEND INTO THE 48" MINIMUM WALKWAY CLEAR SPACE. ANY SUPPORT THAT EXTENDS INTO THE WALKWAY SHALL NOT EXCEED 0.5"" HEIGHT ABOVE THE WALKWAY SURFACE; IF GREATER THAN 0.25", BEVEL AS SHOWN IN THE EDGE TREATMENT DETAIL.

(2) DETECTABLE EDGES SHALL BE CONTINUOUS AND 6" MINIMUM ABOVE THE WALKWAY SURFACE AND HAVE COLOR MARKINGS CONTRASTING WITH THE WALKWAY SURFACE. THE DETECTABLE EDGE AROUND A PORTABLE SIGN STAND SHOULD BE PLACED IN THE WALKWAY AREA IN WHICH THE SIGN POSES A HAZARD TO A VISUALLY IMPAIRED PEDESTRIAN.

(3) DEVICES AND DETECTABLE EDGES SHALL NOT BLOCK WATER DRAINAGE FROM THE WALKWAY. A GAP HEIGHT OR OPENING FROM THE WALKWAY SURFACE UP TO A MAXIMUM OF 2" IS ALLOWED FOR DRAINAGE PURPOSES.

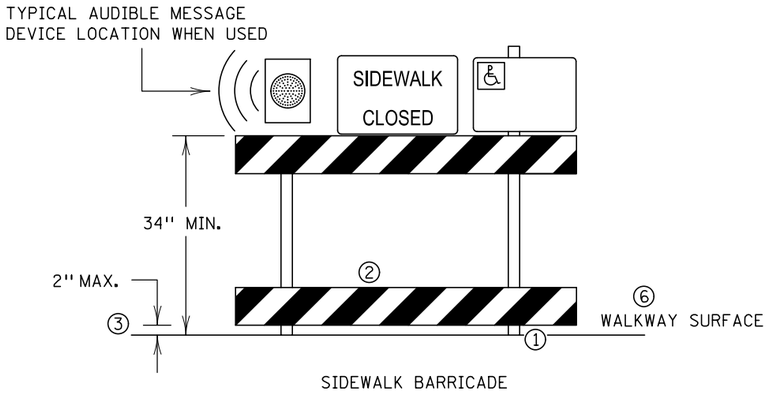
(4) WHEN HAND GUIDANCE IS REQUIRED, THE TOP RAIL OR TOP SURFACE SHALL:
- BE IN A VERTICAL PLANE PERPENDICULAR TO THE WALKWAY ABOVE THE DETECTABLE EDGE,
- BE CONTINUOUS AT A HEIGHT OF 34 TO 38" ABOVE THE WALKWAY SURFACE, AND
- BE SUPPORTED WITH MINIMAL INTERFERENCE TO THE PEDESTRIAN'S HANDS OR FINGERS.

(5) ALL DEVICES SHALL BE FREE OF SHARP OR ROUGH EDGES, AND FASTENERS (BOLTS) SHALL BE ROUNDED TO PREVENT HARM TO HANDS, ARMS OR CLOTHING OF PEDESTRIANS.

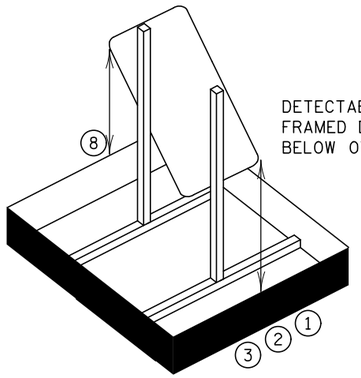
(6) TEMPORARY WALKWAY SURFACES SHALL BE FIRM, STABLE, FREE-DRAINING AND NON-SLIP REGARDLESS OF WEATHER CONDITIONS. TEMPORARY WALKWAY SURFACES SHALL ALLOW NORMAL USAGE OF WHEELCHAIRS, WALKERS, STROLLERS, OR OTHER MOBILITY DEVICES. CONCRETE, BITUMINOUS, STEEL, RUBBER, WOOD (3/4" OR THICKER), AND PLASTIC ARE ACCEPTABLE SURFACE MATERIALS FOR A TEMPORARY WALKWAY SURFACE. GRAVEL, MILLINGS, OR OTHER UNEVEN SURFACES ARE NOT ACCEPTABLE SURFACE MATERIALS.

(7) LONGITUDINAL CHANNELIZING DEVICES FOR PEDESTRIANS SHALL BE 32" HIGH OR GREATER.

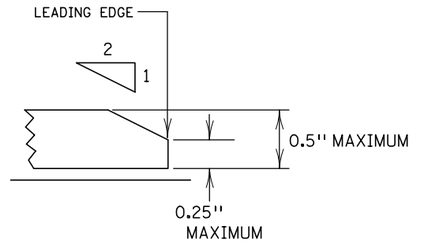
(8) AN EDGE OF THE FRAMING MAY BE REMOVED IF IT IS NOT NEEDED FOR PED GUIDANCE. STABILITY OF THE DETECTABLE EDGE SHOULD BE MAINTAINED.



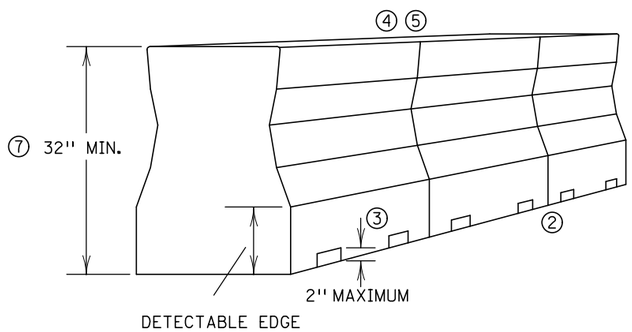
SIDEWALK BARRICADE



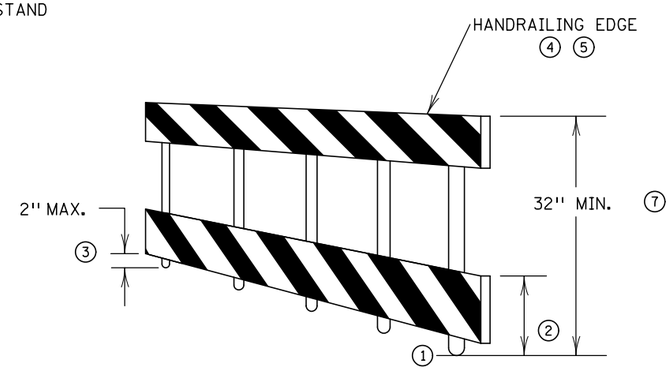
DETECTABLE EDGE FOR SIGN
ON PORTABLE STAND



EDGE TREATMENT



PEDESTRIAN CHANNELIZER DEVICE USING A TEMPORARY BARRIER



PEDESTRIAN CHANNELIZER

PUBLISHED BY OTE 04/24/2020

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TPAR DEVICES
WALKWAY DEVICES

MISSISSIPPI RIVER BOULEVARD CROSSING
Sheet No. TCP102 of TCP109 Sheets

TEMPORARY CURB RAMPS AND WALKWAY SURFACES

SPECIFIC NOTES;

① CURB RAMPS SHALL BE 48'' MIN. WIDTH WITH A FIRM, STABLE AND SLIP RESISTANT SURFACE.

② PROTECTIVE EDGING WITH A 2'' MIN. HEIGHT SHALL BE PLACED WHEN A CURB RAMP OR LANDING PLATFORM HAS A VERTICAL DROP OF 6'' OR GREATER OR HAS A SIDE APRON SLOPE STEEPER THAN 1:3. PROTECTIVE EDGING SHOULD BE CONSIDERED WHEN CURB RAMPS OR LANDING PLATFORMS HAVE A VERTICAL DROP OF 3'' OR MORE.

③ DETECTABLE EDGING WITH 6'' MIN. HEIGHT AND CONTRASTING COLOR SHALL BE PLACED ON ALL CURB RAMP LANDINGS WHERE THE WALKWAY CHANGES DIRECTION (TURNS).

④ CURB RAMPS AND LANDINGS SHALL HAVE A 2% MAX. CROSS SLOPE.

⑤ CLEAR SPACE OF 48'' X 48'' MIN. SHALL BE PROVIDED ABOVE AND BELOW THE CURB RAMP.

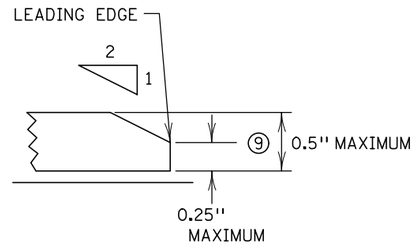
⑥ THE CURB RAMP WALKWAY EDGE SHALL BE MARKED WITH A CONTRASTING COLOR, 2'' TO 4'' WIDE MARKING. THE MARKING IS OPTIONAL WHERE COLOR CONTRASTING EDGING IS USED.

⑦ WATER FLOW IN THE GUTTER SYSTEM SHALL NOT BE IMPEDED.

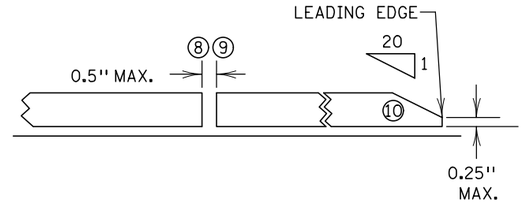
⑧ LATERAL JOINTS OR GAPS BETWEEN SURFACES SHALL BE LESS THAN 1/2'' WIDTH.

⑨ CHANGES BETWEEN SURFACE HEIGHTS SHALL NOT EXCEED 1/2". LATERAL EDGES SHOULD BE VERTICAL UP TO 1/4'' HIGH, AND BEVELED AT 1:2 BETWEEN 1/4'' AND 1/2'' HEIGHT.

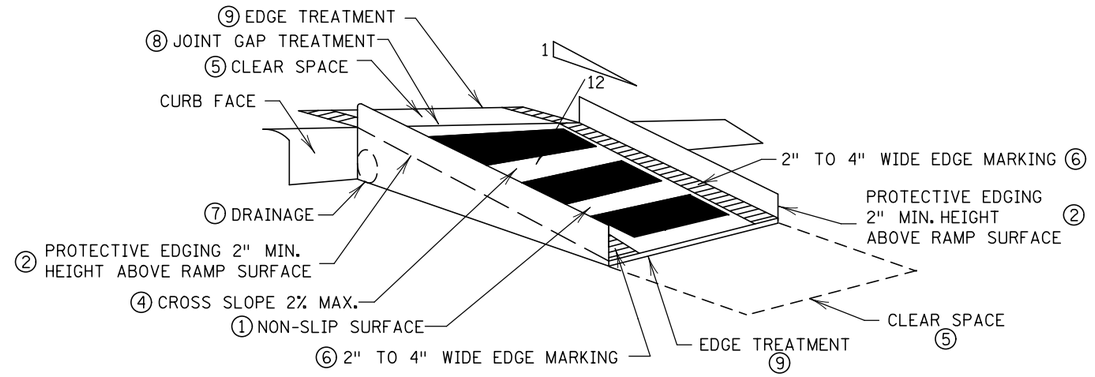
⑩ THE TEMPORARY WALKWAY SURFACE MAY HAVE A THICKNESS GREATER THAN 0.5". IF THE THICKNESS OF THE TEMPORARY WALKWAY SURFACE IS LESS THAN OR EQUAL TO 0.5", THE BEVEL MAY BE 1:2.



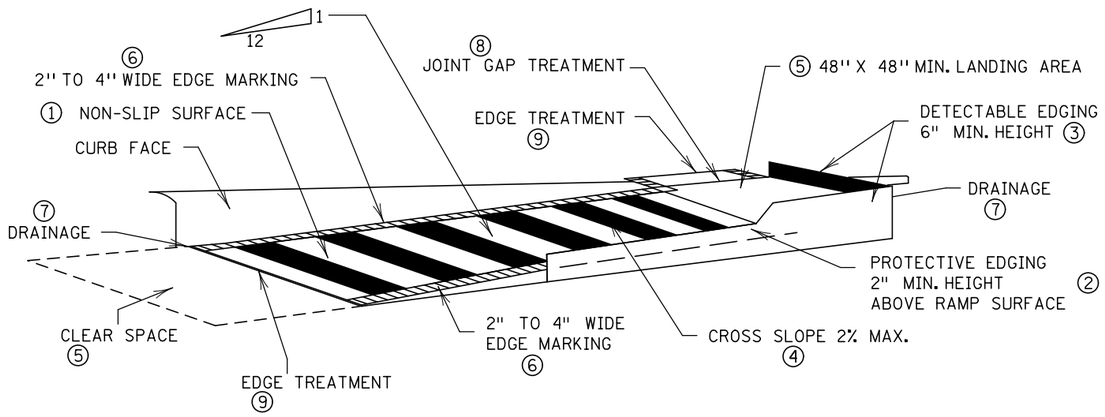
EDGE TREATMENT



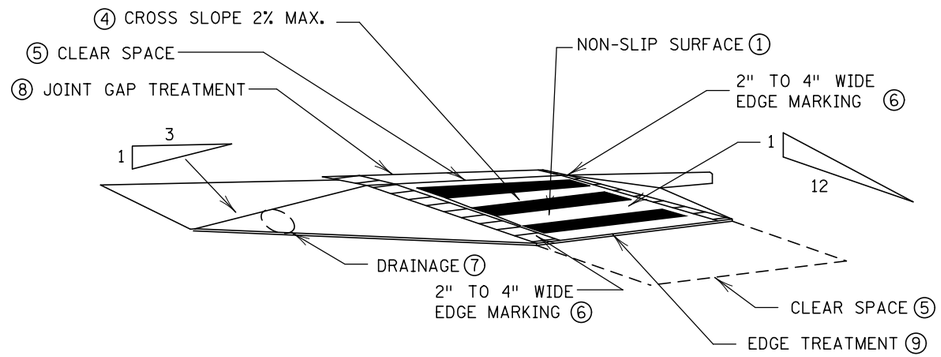
TEMPORARY WALKWAY SURFACE



TEMPORARY CURB RAMP PERPENDICULAR TO CURB
SHOWN WITH PROTECTIVE EDGE



TEMPORARY CURB RAMP
PARALLEL TO CURB



TEMPORARY CURB RAMP PERPENDICULAR TO CURB
SHOWN WITH SIDE APRON

PUBLISHED BY OTE 04/24/2020

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SIGNATURE: Jeffrey A. Hilden
PRINTED NAME: JEFFREY A. HILDEN
DATE: 3/31/2021 LIC. NO. 20781

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TPAR DEVICES
TEMPORARY PEDESTRIAN RAMPS

MISSISSIPPI RIVER BOULEVARD CROSSING

Sheet No. TCP103 of TCP109 Sheets

GENERAL NOTES;

1. GROUND MOUNTED SQUARE TUBE SIGN STRUCTURES PLACED WITHIN 50' OF THE RADIUS END OF AN INTERSECTION SHALL BE PLACED ON ONE 2" OR 2-1/2" POST.
2. FOR 2" SQUARE TUBE RISER POST IN SOIL, USE FIN BASE PLACED PER MANUFACTURER'S SPECIFICATIONS. USE A 2" X 2" PRE-PUNCHED, GALVANIZED STEEL, SQUARE TUBE RISER POST. PLACE 3/8" STAINLESS STEEL BOLT THROUGH THE 5TH HOLE DOWN FROM THE TOP OF THE BASE. RISER POST SHALL REST ON THE BOLT.
3. FOR 2-1/2" SQUARE TUBE RISER POST IN SOIL, USE SLIP BASE PLACED PER MANUFACTURER'S SPECIFICATIONS USING A 10 GAUGE , 2-1/2" X 2-1/2" PRE-PUNCHED, GALVANIZED STEEL, SQUARE TUBE RISER POST WITH A 10 GAUGE 2-3/16" X 2-3/16" PRE-PUNCHED, GALVANIZED STEEL, SQUARE TUBE INTERNAL INSERT.

SPECIFIC NOTES;

① IF ANY PART OF A SIGN OR SIGN ASSEMBLY EXTENDS MORE THAN 4" INTO THE PEDESTRIAN FACILITY, THE MINIMUM HEIGHT TO BOTTOM OF THE SIGN OR SIGN ASSEMBLY SHALL BE 7'.

② 6' - 12' FROM EDGE OF ROADWAY, MUST BE A MINIMUM OF 6' FROM EDGE OF PAVED SHOULDER (WHEN PRESENT).

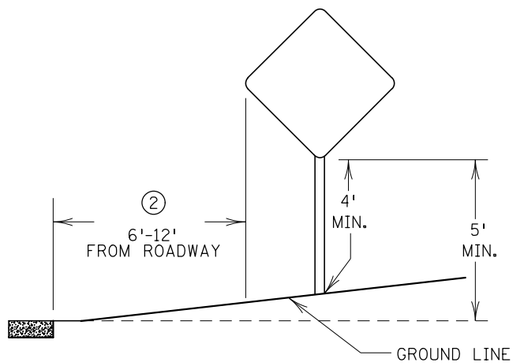
③ IF GROUND MOUNTED TEMPORARY SIGN OR SIGN ASSEMBLY IS PLACED ON 2-1/2" SQUARE TUBE RISER POST(S), THE MINIMUM CLEARANCE FROM THE GROUND LINE TO THE BOTTOM OF THE LOWEST SIGN ON THE ASSEMBLY SHALL BE 7', OR AS SHOWN IN DETAIL, WHICHEVER IS GREATER.

④ 5' MINIMUM IN RURAL. 7' MINIMUM IN BUSINESS, COMMERCIAL, OR RESIDENTIAL AREAS.

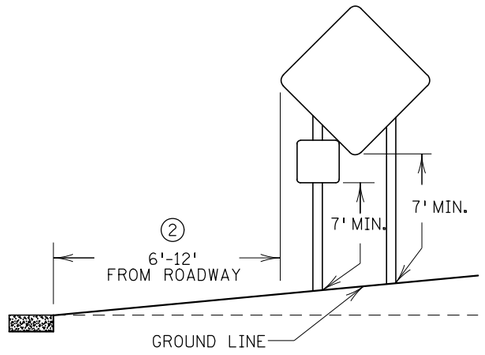
⑤ WHEN MULTIPLE GROUND MOUNTED SIGN STRUCTURES ARE PLACED ADJACENT TO EACH OTHER THERE SHOULD BE NO MORE THAN 2 POSTS WITHIN 84" OF EACH OTHER. WHEN THIS SPACING CAN NOT BE MAINTAINED, THEN SIGN STRUCTURES SHALL BE OFFSET, AND STAGGERED WITH A MINIMUM OF 4' BETWEEN SIGN STRUCTURES BOTH LATERALLY AND LONGITUDINALLY. EXAMPLE SHOWS DETOUR SIGNAGE, BUT THIS REQUIREMENT APPLIES TO ALL SIGNAGE.

⑥ INPLACE AND/OR OTHER CONSTRUCTION SIGNING.

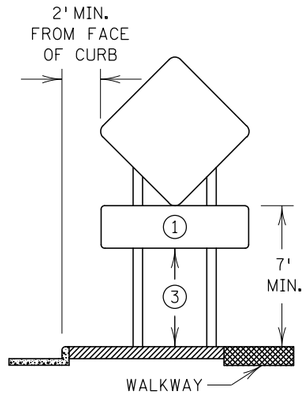
NOT TO SCALE



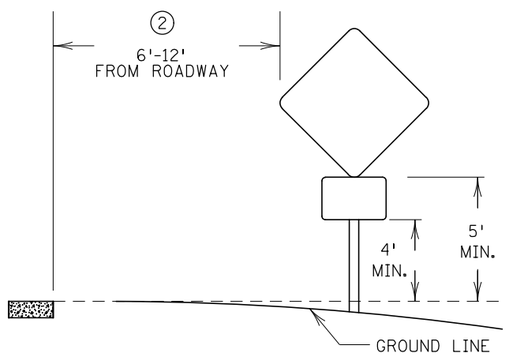
TYPICAL RURAL DESIGN
AND 2" RISER POST



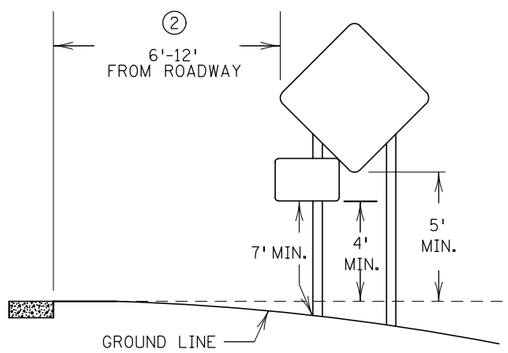
TYPICAL RURAL DESIGN WITH SUPPLEMENTAL
PLAQUE AND 2-1/2" RISER POST



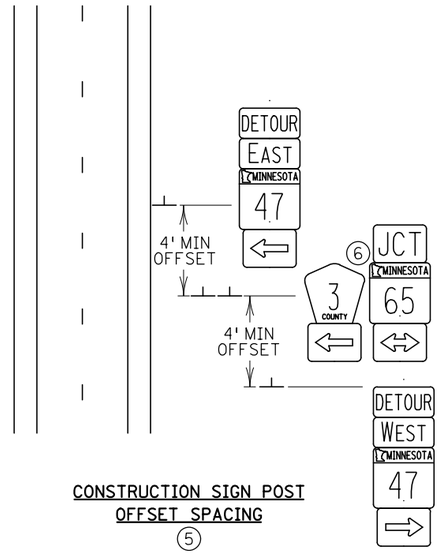
BUSINESS,COMMERCIAL,
OR RESIDENTIAL AREA



TYPICAL RURAL DESIGN WITH SUPPLEMENTAL
PLAQUE AND 2" RISER POST



TYPICAL RURAL DESIGN
2-1/2" RISER POST



CONSTRUCTION SIGN POST
OFFSET SPACING
⑤

TYPICAL G20-X2 DESIGN

TEMPORARY SQUARE TUBE GROUND MOUNTED SIGN PLACEMENT

PUBLISHED BY OTE 03/15/2021

DATE: 3/31/2021 TIME: 2:30:27 PM
FILENAME: K:\n-z\StPaul-Parks\Rec\7921002\03_Manual\01_Basis_of_Design\Traffic Control Plan\Sheets\mrc_tc05.dgn

NO.	DATE	BY	DESCRIPTION OF REVISIONS

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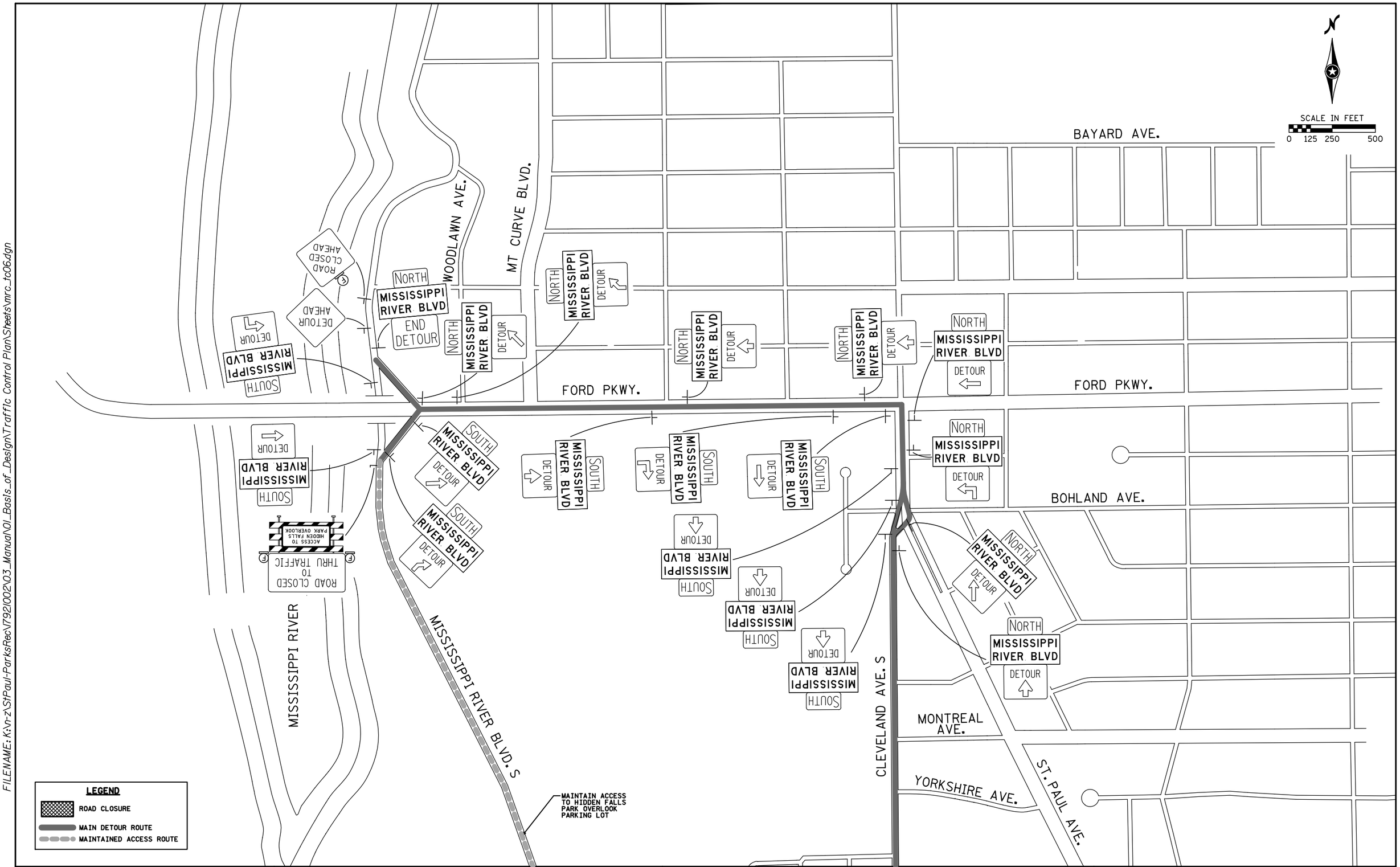
DETAILS
TEMPORARY SIGN INSTALLATION

MISSISSIPPI RIVER BOULEVARD CROSSING



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TRAFFIC CONTROL PLAN
MISSISSIPPI RIVER BLVD. DETOUR

MISSISSIPPI RIVER BOULEVARD CROSSING

Sheet No. TCP105 of TCP109 Sheets

ROAD CLOSED
CLOSE TIGHT
MAINTAIN ACCESS TO HIDDEN FALLS PARK OVERLOOK PARKING LOT
300 FEET
ROAD CLOSED AHEAD
ROAD DETOURED BEGINNING MON/DY ①
ROAD CLOSED
CLOSE TIGHT
HIDDEN FALLS DR.
MINNEHAHA AVE.
HIAWATHA AVE.
MISSISSIPPI RIVER
MN 62
MISSISSIPPI RIVER BLVD. S
MAINTAIN ACCESS TO HIDDEN FALLS DR.
CLEVELAND AVE. S
RETURN CT.
ST. PAUL AVE.
KENNITH ST.
PRIOR AVE.
FIELD AVE.
NORFOLK AVE.
MAGOFFIN AVE.
THURE AVE.
ISASCA AVE.
RAMLOW PL.
WORCESTER AVE.
DETOUR
NORTH
SOUTH
MISSISSIPPI RIVER BLVD
ROAD CLOSED TO THRU TRAFFIC
ACCESS TO HIDDEN FALLS REGIONAL PARK
DETOUR AHEAD
END DETOUR
SCALE IN FEET
0 125 250 500

LEGEND

- ROAD CLOSURE
- MAIN DETOUR ROUTE
- MAINTAINED ACCESS ROUTE

SPECIFIC NOTES:

① PLACE SIGN 7 DAYS IN ADVANCE OF ROAD CLOSURE.

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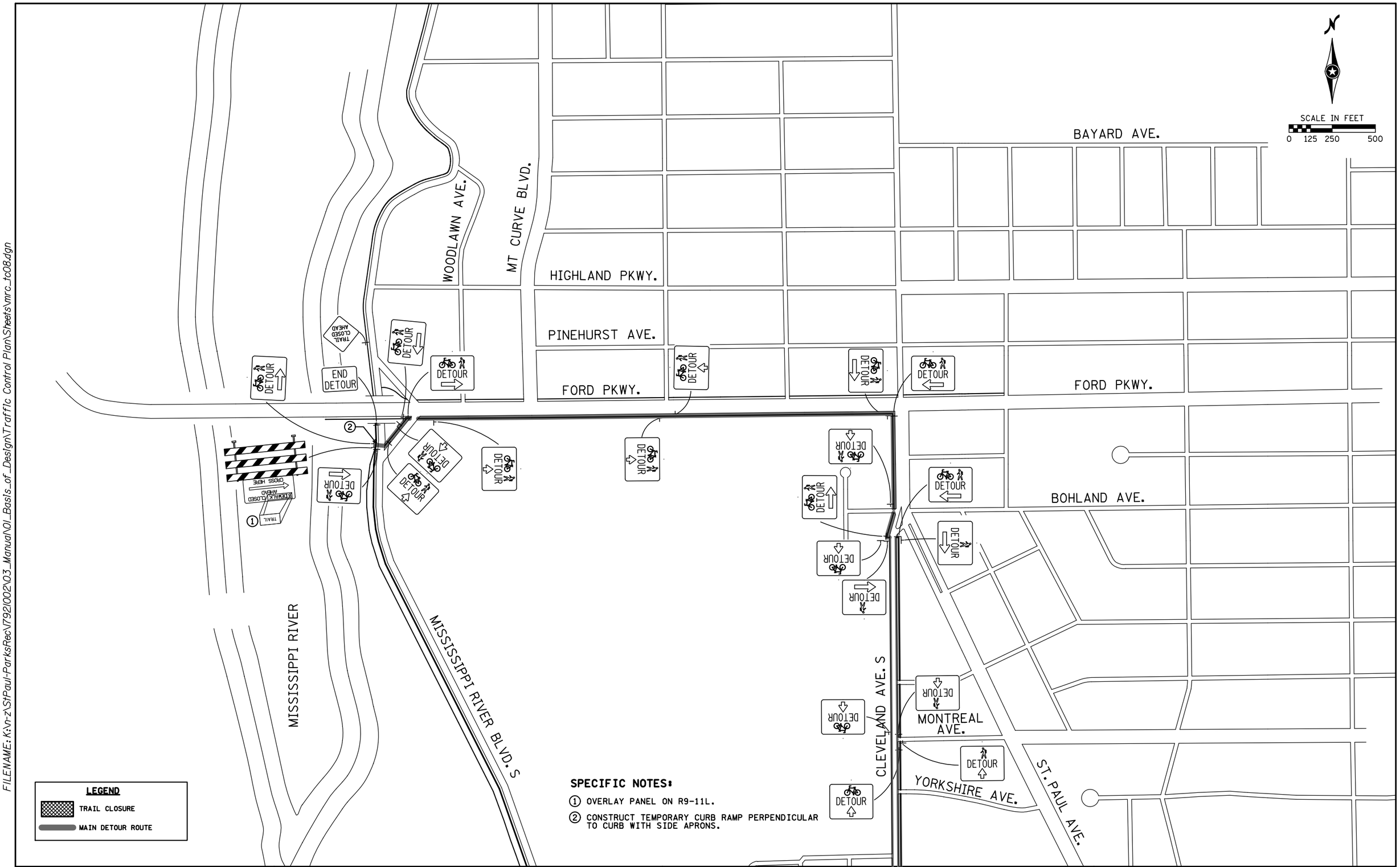
TRAFFIC CONTROL PLAN
MISSISSIPPI RIVER BLVD. DETOUR

MISSISSIPPI RIVER BOULEVARD CROSSING

Sheet No. TCP106 of TCP109 Sheets



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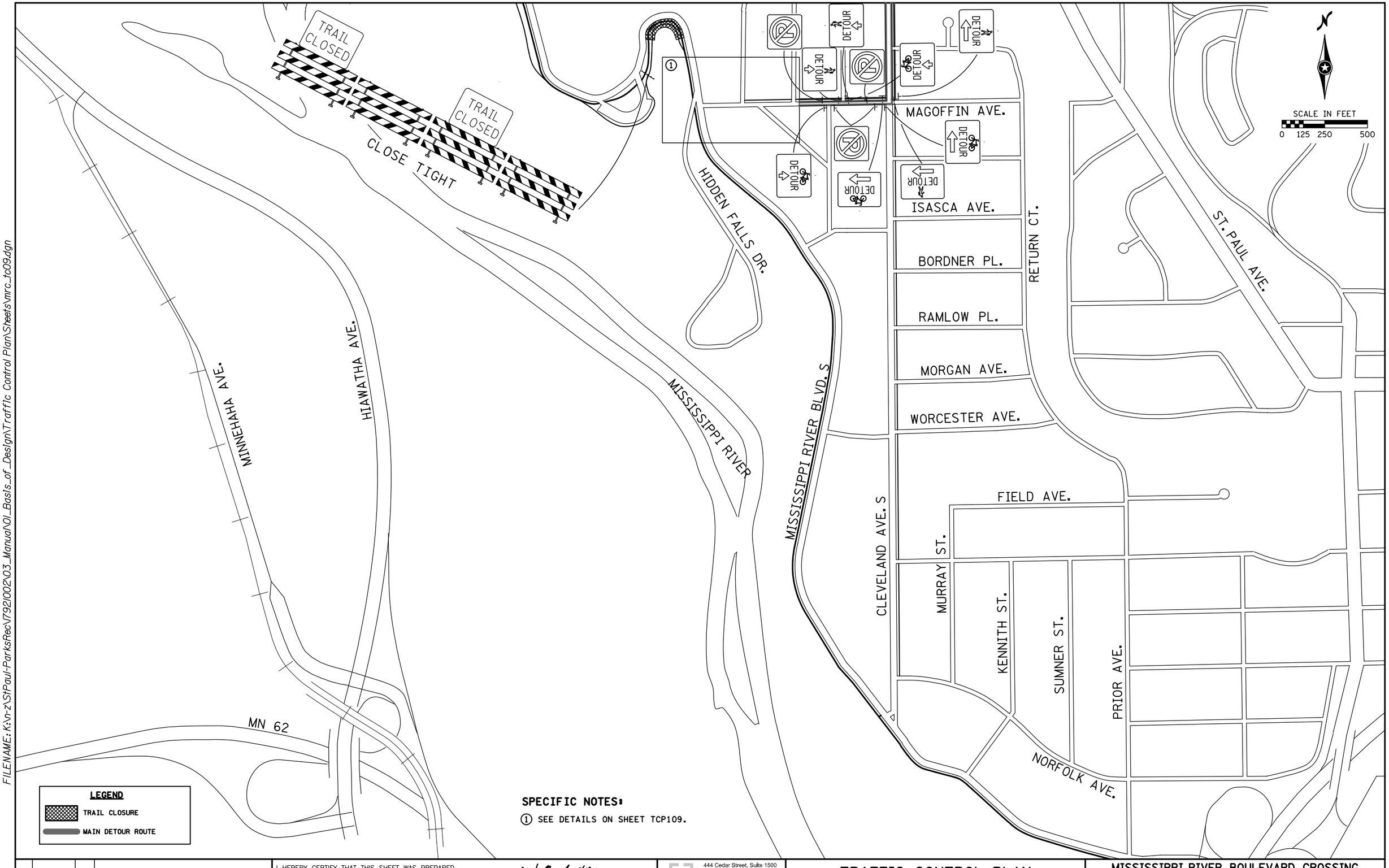
TRAFFIC CONTROL PLAN
TRAIL DETOUR

MISSISSIPPI RIVER BOULEVARD CROSSING

Sheet No. TCP107 of TCP109 Sheets



SPECIFIC NOTES:

① SEE DETAILS ON SHEET TCP109.

DATE: 3/31/2021 TIME: 2:30:29 PM
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TRAFFIC CONTROL PLAN
TRAIL DETOUR

MISSISSIPPI RIVER BOULEVARD CROSSING

MISSISSIPPI RIVER BLVD.

COLBY ST.

MAGOFFIN AVE.

HIDDEN FALLS DR.

COLBY AVE.

SCALE IN FEET
0 12.5 25 50

TRAIL CLOSED
CLOSE TIGHT

TRAIL ③
SIDEWALK CLOSED AHEAD
CROSS HERE

DETOUR

END DETOUR

TRAIL CLOSED AHEAD

A

A

18'-0" ④
5'-0" PED
2'-0"
PEDESTRIAN CHANNELIZER

SECTION A-A

LEGEND

MAIN DETOUR ROUTE

GENERAL NOTES:

- REFER TO SHEET TCP106 FOR SIGN PLACEMENT PERTAINING TO TRAFFIC.
- BICYCLES TO TRAVEL WITH VEHICLE TRAFFIC ON THE APPROPRIATE SIDE OF THE ROADWAY.

SPECIFIC NOTES:

① DETOUR BEGINNING TO UTILIZE EXISTING PEDESTRIAN RAMP.

② LEAVE SPACE IN PEDESTRIAN CHANNELIZER TO ALLOW DRIVEWAY ACCESS TO PRIVATE RESIDENCE.

③ OVERLAY PANEL ON R9-11R.

④ MULTI-DIRECTIONAL TRAVEL FOR BICYCLES AND VEHICLES.

⑤ MOUNT W21-X3P ON DRUM.

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TRAFFIC CONTROL PLAN
TRAIL DETOUR

MISSISSIPPI RIVER BOULEVARD CROSSING

Sheet No. TCP109 of TCP109 Sheets