

November 2, 2023

Commissioners **and**
Technical Advisory Committee Members
Shingle Creek and West Mississippi
Watershed Management Commissions
Hennepin County, Minnesota

*The agenda and meeting packets are available on
the Commission's web site.*

<http://www.shinglecreek.org/minutes--meeting-packets.html> **and**
<http://www.shinglecreek.org/tac-meetings.html>

Dear Commissioners and Members:

Regular meetings of the Shingle Creek and West Mississippi Watershed Management Commissions will be held Thursday, November 9, 2023, at Plymouth Community Center, 14800 34th Avenue North, Plymouth, MN.

Lunch will be served at 12:00 noon and the meetings will convene concurrently at 12:45.

The Technical Advisory Committee (TAC) will meet prior to the regular meeting, at 11:30.

Please make your meal choice from all of the items below and email me at judie@jass.biz to confirm your attendance and your meal selection by **noon, Tuesday, November 7, 2023.** Thank you.

Regards,

Judie A. Anderson
Administrator

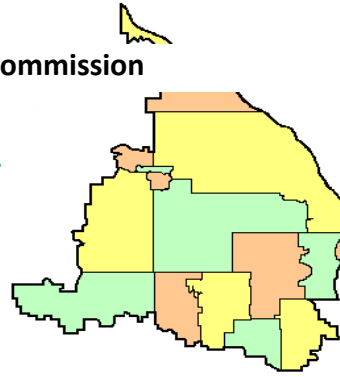
cc: Alternate Commissioners	Member Cites	Troy Gilchrist	TAC Members
Stantec Consulting Services	BWSR	MPCA	HCEE

Z:\Shingle Creek\Meetings\Meetings 2023\11 Meeting Notice.docx

Order your deli sandwich box lunch. Sandwiches come with lettuce, tomato and mayo. As an alternative you may specify your sandwich with **wheat bread or as an **unwich** (lettuce wrapped).**

- | | |
|--|--------------------------------|
| 1 Pepe – Ham and cheese | 2 Big John – Roast beef |
| 3 Totally Tuna – Tuna salad and cucumber | 4 Turkey Tom – Turkey |
| 5 Vito – salami, capocollo, cheese, onion, oil and vinegar, oregano-basil (no mayo) | |
| 6 The Veggie – double cheese, avocado spread, cucumber | |
| 14 Bootlegger Club – Roast beef and turkey | |

**Please also indicate: your cookie preference: Chocolate Chip or Oatmeal Raisin
and your beverage preference: (W) Water (C) Coke (DC) Diet Coke (S) Sprite (N) None**

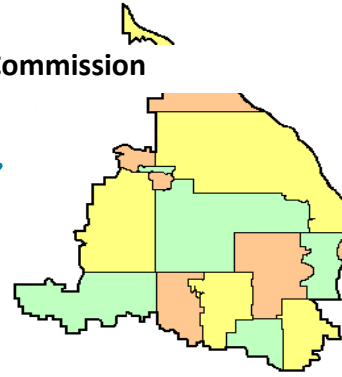


A meeting of the joint Technical Advisory Committee (TAC) of the Shingle Creek and West Mississippi Watershed Management Commissions is scheduled for **11:30 a.m., Thursday, November 9, 2023**, at the Plymouth Community Center.

AGENDA

1. Call to Order.
 - a. Roll Call.
 - b. Approve Agenda.*
 - c. Approve Minutes of Last Meeting.*
2. Staff presentations:
 - a. Eagle Lake SWA.*
 - b. Gaulke Pond.*
3. Grant Opportunities.
4. Other Business.
5. Next TAC meeting is scheduled for _____.
6. Adjournment.

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**Technical Advisory Committee
MINUTES | August 10, 2023**

A meeting of the Technical Advisory Committee (TAC) of the Shingle Creek and West Mississippi Watershed Management Commissions was called to order by Chairman Richard McCoy at 11:06 a.m., Thursday, August 10, 2023, at the Plymouth Community Center, 14800 34th Avenue North, Plymouth, MN.

Present: James Soltis, Brooklyn Center; Mitchell Robinson, Brooklyn Park; Ben Perkey, Crystal; Mark Lahtinen, Maple Grove; Nick Macklem, New Hope; Amy Riegel, Plymouth; Richard McCoy, Robbinsdale; Diane Spector, Todd Shoemaker, and Dendy Lofton, Stantec; and Judie Anderson, JASS.

Not represented: Champlin, Minneapolis and Osseo.

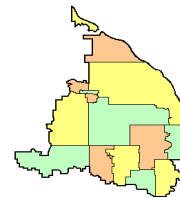
Also present: Andy Polzin, Plymouth, and Mike Sorenson, Robbinsdale.

- I. Motion by Robinson, second by Riegel to **approve the agenda**. *Motion carried unanimously.*
- II. Motion by Robinson, second by Riegel to **approve the minutes*** of the July 13, 2023, meeting. *Motion carried unanimously.*
- III. **GAULKE POND SUBWATERSHED ASSESSMENT.** The Shingle Creek Commission requested Stantec to evaluate opportunities to reduce stormwater runoff volume to Gaulke Pond. As part of this effort, they reviewed the available data, conducted a field reconnaissance visit, and conducted a desktop-based evaluation of potential sites within the Gaulke Pond subwatershed that could be retrofit to include a volume-reduction best management practice (BMP). Staff's August 4, 2023, memo* summarizes the project background, watershed changes, opportunity locations and BMPs considered, and preliminary results for discussion.

The Gaulke Pond watershed is located within the cities of Crystal, New Hope, and Robbinsdale, spanning south to north from 38th Avenue to 49th Avenue; and west to east from Boone Avenue to Welcome Avenue. It is the most downstream in a series of four ponds including Hagemeister, Brownwood, and Memory Lane ponds within the City of Crystal. Gaulke Pond collects runoff from 883 acres of residential, institutional, and commercial properties upstream and discharges via a pump system east into storm sewer, and ultimately to Twin Lake. Staff reviewed a substantial number of reports and sources regarding the Commission and cities of Crystal and New Hope's management of stormwater and floodplains. The goal was to develop a holistic understanding of the watershed, its history, existing issues, and future work.

During a project kickoff meeting with city staff from New Hope and Crystal the group determined that the sites would be selected as a potential opportunity location if they met the following criteria:

1. City-owned land, including street right-of-way.
2. City priorities from previously identified flooding concerns and priority areas from the 2021 Central Core Stormwater Project, as well as upcoming street and utility projects.
3. Suitable soils for infiltration (i.e., hydrologic soil group A or B).



Of the total 1,938 parcels within the Gaulke Pond subwatershed, 47 were public and quasi-public parcels encompassing 159 acres.

At that meeting the cities provided a list of upcoming municipal projects that would result in excavation and/or replacement of existing utilities within the public right-of-way and ranked them for potential political backing and support from councils. Eleven sites/projects were identified and described in Staff's memo. Using the information and feedback provided by the cities as well as the site constraints observed, Stantec narrowed the potential BMPS down to five feasible options and one option in need of more data. Stantec then estimated conceptual-level capital costs for each of the five and ranked them by the cost to infiltrate a single acre-foot of stormwater runoff. The whole-life analysis results indicate that the best option to reduce costs over the lifetime of the project would be Opportunity A2, the Colorado Avenue Infiltration Trench just south of 42nd Avenue. Capital costs would be \$130,326; lifetime maintenance costs over 30 years would be \$36,855.

It was a concurrence of the members to recommend to the Shingle Creek Commission that they proceed to 30% design with Opportunity A2.

IV. CLEAN WATER FUND GRANT.* The Board of Water and Soil Resources (BWSR) opened the annual solicitation for Clean Water Fund Grants on June 29, 2023. Grant applications are due by August 24. This \$8.5 million is funding from the ongoing Legacy Amendment and is one of the primary funding sources for surface water improvements in Minnesota. At the July meeting the Shingle Creek Commission directed Staff to draft a 2024 CWF grant application for internal loading treatments on Eagle and Pike lakes, located in Maple Grove and Plymouth, respectively. The application would also include aquatic invasive species (AIS) management, monitoring, public engagement, and project management.

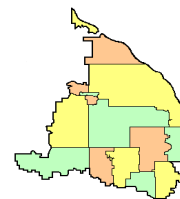
The Commissions' Fourth Generation Watershed Management Plan contains a lake internal load improvement project for Eagle and Pike Lakes. Based on the 5-year TMDL update in 2019, efforts to restore water quality in Eagle Lake will require improvements in loading from the watershed, from upstream lakes, and from in-lake sediment.

The TMDLs specify that sediment and phosphorus loads from Pike and Eagle lakes need to be reduced by approximately 57% and 22%, respectively. Additional load reductions are required from external sources in order to satisfy the overall TMDL requirements to meet water quality standards with the ultimate objective of delisting impairment status on both lakes.

Aluminum sulfate (alum) treatment is a widely implemented in-lake nutrient management technique that reduces internal anoxic sediment P release by up to 90%. Conservatively, assuming a 75% reduction in internal sediment P release, alum treatments would reduce the internal phosphorus load from sediments in Pike and Eagle Lakes by approximately 143 lbs/yr and 164 lbs/yr, respectively. An estimated additional 28 lbs/yr and 164 lbs/yr reduction would be needed from external sources to Pike and Eagle Lakes, respectively, in order to meet the TMDL goals and attain water quality standards.

Two alum treatments are proposed for each lake to seal the sediments and significantly reduce internal phosphorus load. Invasive curly-leaf pondweed will be treated to help restore and enhance the native submerged aquatic vegetation communities. Eagle Lake is a highly popular 290-acre recreational lake with an active lake association and public access. The 58-acre Pike Lake, which is connected to Eagle via a short channel and fringing wetlands, is a natural environment lake, and about two thirds of its shoreline is located within Eagle Lake Regional Park.

Stantec has conservatively estimated aluminum sulfate treatment costs on both lakes, in addition to the other management tasks described above. Total project cost is estimated to be \$680,000, with



\$610,000 being requested from the CWF. The match requirement for the CWF Project and Practices grant fund is 10%. Spector suggested that the TAC consider recommending to the Commission that the proposed match be \$190,000, which is the amount in the CIP set aside for the Eagle Lake part of the project. This would reduce the grant request to an estimated \$490,000.

Motion by Riegel, second by Robinson to recommend this application with a \$190,000 match to the Commission at their meeting today. *Motion carried unanimously.* Any additional feedback should be forwarded to Staff by August 18, 2023.

V. OTHER BUSINESS.

A. Storm Sewer Surcharge.* The Minnesota Plumbing Board has formed an Ad Hoc Committee to discuss the Department of Labor and Industry's recent interpretation of plumbing code. Their first meeting was held August 4, 2023. Shoemaker and Soltis attended the meeting.

Last April, Stantec staff summarized a new plumbing code interpretation by the Department of Labor and Industry at the Commission and TAC meetings. The interpretation states that storm sewer surcharge is not allowed in the design event and, therefore, the Plumbing Board is requiring that any storm sewer inlets into a stormwater basin are set at or above the 100-year High Water Level. This interpretation likely requires additional fill on the site to elevate parking lots and buildings, and, in turn, may then cause the building to be elevated higher than allowed by city ordinance above the adjacent street. There is also greater potential for erosion or the need for more significant erosion protection between the storm sewer outlet and the pond normal water level. Following current design practice, designers usually locate the storm sewer outlet at or just above the pond normal water level, which enables the water in the pond to provide some energy dissipation along with riprap.

Both Shoemaker and Soltis noted that several groups responded negatively to the information that was provided. The Committee, however, gave no indication of immediately revising their interpretation. Therefore, each public or private project impacted by the rule will be subject to applying for a variance.

B. The **next TAC meeting** is scheduled for Thursday, September 14, 2023, at 11:00.

There being no further business, the TAC meeting was adjourned at 11:54 a.m.

Respectfully submitted,



Judie A. Anderson
Recording Secretary
JAA:tim

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To: Shingle Creek WMO Commissioners

From: Lisa Tilman
Todd Shoemaker

Date: October 31, 2023

Subject: Eagle Lake project selection

**Recommended
Commission Action**

Approval of Eagle Woods Park Infiltration Project for 30% Design

Staff will provide an overview of the Eagle Lake Subwatershed Assessment project selection and prioritization process.

The Eagle Lake Subwatershed Assessment process identified locations for potential projects to address watershed load to Eagle Lake. Seven projects were evaluated and prioritized based on estimated TP reduction, initial project cost, and lifecycle cost. City staff reviewed the options and agreed with the recommended project selection. Staff will present an overview of the project identification and selection process and a summary of the project recommended for 30% design.

To: Shingle Creek Watershed
Commissioners

From: Lisa Tilman, PE

Project/File: Eagle Lake Subwatershed Assessment Date: October 26, 2023
227705750

Reference: Project Update and Request for Project Selection to Move to 30% Design

The goal of the Eagle Lake Subwatershed Assessment is to evaluate stormwater management and in-lake management options to address excess phosphorus impacting Eagle Lake's water quality. In this project we're working to:

1. Identify and prioritize potential stormwater management practices to reduce phosphorus and sediment loading in the Eagle Lake subwatershed, and
2. Evaluate sediment phosphorus and aquatic vegetation within Eagle and Pike Lakes to determine appropriate in-lake treatment practices to reduce internal loading.

Based on the 5-year TMDL update in 2019, efforts to restore water quality in Eagle Lake will require improvements in loading from the watershed, from upstream lakes, and from in-lake sediments.

This memo summarizes watershed load reductions to Eagle Lake. Internal phosphorus loads and potential internal load reductions for Eagle Lake and Pike Lake were discussed at the August meeting.

Watershed Phosphorus Load Management

The Eagle Lake TMDL specifies that phosphorus loads need to be reduced by 202 lb/yr total from all sources to Eagle Lake. The internal loading sediment analysis for this project estimated a 164 lb/yr reduction with aluminum sulfate (alum) treatment in Eagle Lake, leaving an additional 38 lbs/yr reduction from external sources in order to meet the TMDL goals and attain water quality standards. The TMDL assumes that upstream lakes already meet water quality goals. Therefore, this would likely require implementation of at least two watershed projects to meet the needed reductions.

For the Eagle Lake Subwatershed Assessment, we evaluated existing total phosphorus loading rates to Eagle Lake and identified 30 locations for potential projects. These initial projects were filtered down to seven sites for prioritization based on location on public land, suitable soils for infiltration (Hydrologic Soil Group A), and feasibility given local conditions and infrastructure. The projects include infiltration, stormwater collection and reuse for irrigation, iron-enhanced sand amendments to existing basins, and manufactured treatment devices.

To identify the most cost-effective projects to reduce watershed phosphorus load to Eagle Lake, we prioritized potential projects through a ranking system using estimated TP reduction, initial project cost, and lifecycle cost.

Reference: 227705750

The resulting project prioritization process identified:

- Estimated total phosphorus reduction per project ranging from 5 lb/yr to 36 lb/yr.
- Estimated total suspended solids reductions ranging per project from 894 lb/yr to 10,080 lb/yr.
- Estimated construction costs ranging from \$218,000 to \$4.0 million.

The two top ranked projects are an infiltration basin in Eagle Woods Park and an iron-enhanced sand filter bench retrofit and pond expansion in an existing stormwater basin at Hemlock Lane and East Fish Lake Road.

- Infiltration Basin in Eagle Woods Park
 - 21.8 lb/yr TP reduction
 - \$470,000 construction cost
 - \$498,000 30-year lifecycle cost
 - \$761 per lb TP annually over lifecycle
- Iron-enhanced sand bench retrofit and pond expansion at Hemlock Ln & East Fish Lake Rd.
 - 9.3 lb/yr TP reduction
 - \$218,000 construction cost
 - \$255,000 30-year lifecycle cost
 - \$886 per lb TP annually over lifecycle

Requested Action

Request that the Commission recommend moving to 30% design for an infiltration facility in Eagle Woods Park. Completion of this infiltration project will leave an additional 16 lb total phosphorus reduction needed to fully address the load reductions outlined in the TMDL.

To: Shingle Creek/West Mississippi WMO TAC and Commissioners

From: Katy Thompson, PE
Todd Shoemaker, PE

Date: November 2, 2023

Subject: Gaulke Pond Subwatershed Assessment Update

Recommended Commission Action	For acceptance
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The Shingle Creek Watershed Management Commission (SCWMC) requested Stantec evaluate opportunities to reduce stormwater runoff volume to Gaulke Pond. At the August 10, 2023, Commission meeting, the final eleven best management practices (BMPs) were presented and Opportunity A2, the Colorado Avenue Infiltration Trench, was selected by the Commission as the preferred alternative. The Commission authorized Stantec to proceed with the development of the 30% design plans.

The attached plans show the potential BMP layout within the Colorado Avenue right-of-way and associated details. The BMP design provided is a three-sided 6- by 6-foot concrete box culvert, however we have also included a bid alternative using corrugated polypropylene (PP) pipe chambers, similar to the ADS StormTech chambers installed on Kentucky Avenue in Crystal. If PP chambers are acceptable to the City of Crystal public works staff, this may offer an opportunity to reduce overall implementation costs.

Additionally, the design to date has relied on Minnesota Department of Natural Resources LiDAR topography, City GIS data, and generalized soils information. If the Commission chooses to proceed with 60% design, while out of scope, we recommend collecting detailed topography and utility information, as well as completing a more-thorough geotechnical evaluation of the underlying soils to confirm stability of the nearby city reservoir.

PRELIMINARY PLANS

FOR

COLORADO AVENUE STORMWATER INFILTRATION TRENCH

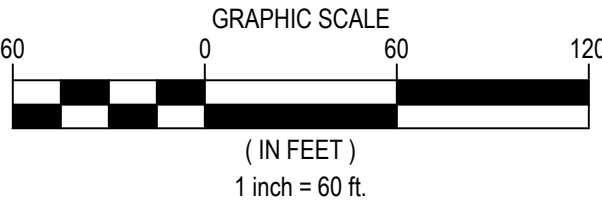
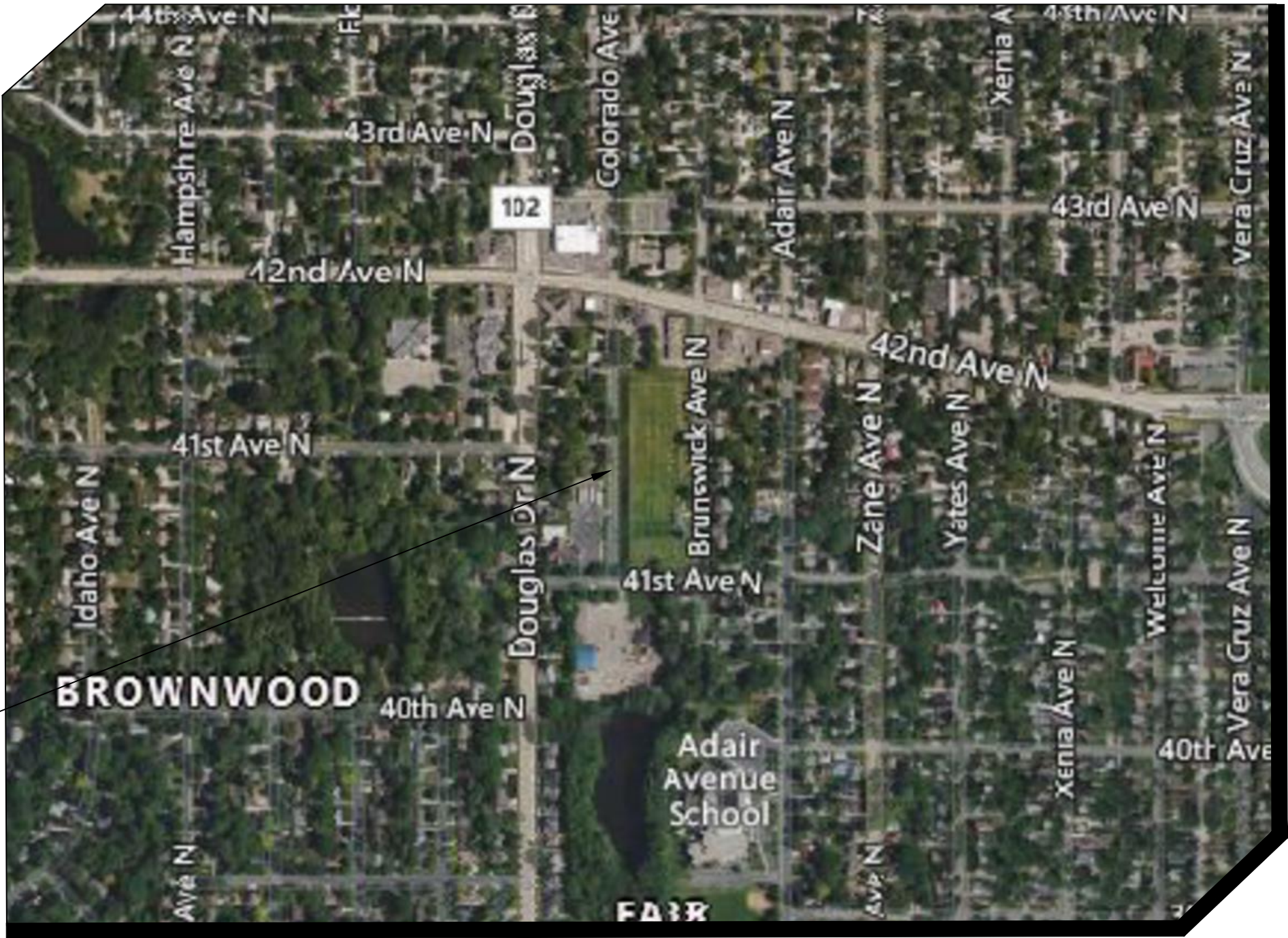
CRYSTAL, MN 55422

ENGINEER



STANTEC
2080 WOODDALE DRIVE, SUITE 100
WOODBURY, MN 55125
(P) - 651-294-4585
CONTACT: TODD SHOEMAKER
TODD.SHOEMAKER@STANTEC.COM

PROJECT LOCATION



VICINITY MAP

NOT TO SCALE

PROJECT LOCATION

CITY: CRYSTAL
COUNTY: HENNEPIN County

Sheet List Table	
Sheet Number	Sheet Title
C-001	COVER SHEET
C-002	GENERAL NOTES
C-003	LEGEND
C-101	STORM SEWER PLAN AND PROFILE
C-801	DETAILS
C-802	DETAILS (BID ALTERNATE)

2080 WOODDALE DRIVE
SUITE 100
WOODBURY, MN 55125
PHONE: 651-294-4580
FAX: 651-228-1969
WWW.STANTEC.COM

SUB CONSULTANT:

CLIENT:
SHINGLE CREEK
WATERSHED
MANAGEMENT
COMMISSION

PROJECT TITLE:
COLORADO AVENUE
STORMWATER IMPROVEMENTS
HENNEPIN COUNTY
CRYSTAL, MN 55422

DATE:	DESCRIPTION:	ISSUE NO.:
10/26/2023	30% PLANS	0

CERTIFICATION:

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.

LIC. NO.: _____
DATE: _____

PROJECT NO.: 227705751

DWN BY: CGG	CHKD BY: KT	APPD BY: ###
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ISSUE DATE: 10/26/2023

ISSUE NO.: 0

SHEET TITLE:
COVER SHEET

SHEET NO.:
C-001

GENERAL NOTES:

1. UNTIL THE REVISION BLOCK STATES "ISSUED FOR BID", THE PLAN SET IS NOT CERTIFIED FOR CONSTRUCTION AND CONTRACTOR IS BUILDING AT THEIR OWN RISK.
2. EXISTING CONDITIONS SHOWN ARE FROM A COMBINATION OF TOPOGRAPHIC SURVEY AND LIDAR DATA COMPLETED BY STANTEC CONSULTING SERVICES, INC., DATED 08/12/2021. EXISTING FEATURES MAY NOT BE EXACT TO THEIR LOCATION. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE CONDITIONS OF THE SITE AND SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES OR VARIATIONS FROM THE DRAWINGS.
3. ALL QUANTITIES ARE APPROXIMATE AND MAY VARY TO ALLOW COMPLETION OF WORK.
4. THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF C/ASCE 38-2 ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA".
5. EXACT LOCATION OF UNDERGROUND UTILITIES SUCH AS GAS, TELEPHONE, FIBER OPTIC, PIPELINES, ELECTRICAL, AND CABLE TV ARE UNKNOWN. CONTRACTOR RESPONSIBLE FOR LOCATING PRIOR TO STARTING WORK.
6. CONTRACTOR SHOULD ANTICIPATE PRIVATE UTILITY CONFLICTS THROUGHOUT THE PROJECT SUB CUT AND TRENCH AREAS AND SHALL COORDINATE WITH PRIVATE UTILITY OWNERS.
7. THE RELOCATION AND OR PROTECTION OF ALL EXISTING UTILITIES MUST BE COORDINATED BY THE CONTRACTOR AND ANY COSTS FOR SUCH WORK SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. NO ADDITIONAL COMPENSATION WILL BE ALLOWED FOR EXTRA TIME AND EFFORT OF PROVISIONS NECESSARY TO WORK AROUND OR UNDER ANY UTILITIES.
8. CONTRACTOR SHALL SALVAGE AND REINSTALL STREET AND TRAFFIC SIGNS, AS DIRECTED BY FIELD ENGINEER. (INCIDENTAL)
9. CONTRACTOR SHALL COMPLY WITH ALL STATE, COUNTY, AND CITY PERMITS.
10. WORK AND MATERIALS MUST COMPLY WITH CITY, COUNTY, STATE, AND FEDERAL (INCLUDING OSHA) REGULATIONS AND CODES.
11. CONTRACTOR SHALL COORDINATE AND MAINTAIN MAIL, GARBAGE, AND RECYCLING SERVICES TO PROPERTIES THROUGHOUT CONSTRUCTION.
12. CONTRACTOR SHALL PRESERVE AND PROTECT EXISTING PAVEMENT, SITE FEATURES, UTILITIES, TREES, ETC., UNLESS NOTED OR SHOWN OTHERWISE.
13. CONSTRUCTION LIMITS ARE TO PROPERTY LINE UNLESS SHOWN OR NOTED OTHERWISE. CONTRACTOR SHALL RESTRICT CONSTRUCTION ACTIVITIES TO AREAS DESIGNATED ON PLANS WITHIN THE CONSTRUCTION LIMITS.
14. CONTRACTOR SHALL COORDINATE AND MAINTAIN ACCESS TO PROPERTIES THROUGHOUT CONSTRUCTION.
15. CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO AVOID PROPERTY DAMAGE TO ADJACENT PROPERTIES DURING CONSTRUCTION AND WILL BE HELD SOLELY RESPONSIBLE FOR ANY DAMAGES.
16. CONTRACTOR MUST IMMEDIATELY NOTIFY THE OWNER AND ENGINEER IN WRITING OF DISCREPANCIES OR CONFLICTS IN THE CONTRACT DOCUMENTS BEFORE COMMENCING WORK. NO FIELD CHANGES OR DEVIATIONS ARE TO BE MADE WITHOUT PRIOR WRITTEN APPROVAL FROM THE ENGINEER. FAILURE TO NOTIFY OWNER AND ENGINEER OF AN IDENTIFIABLE CONFLICT BEFORE PROCEEDING WITH INSTALLATION RELIEVES OWNER AND ENGINEER OF ANY OBLIGATION TO PAY FOR A RELATED CHANGE ORDER.
17. CONTRACTOR SHALL MAINTAIN DRAINAGE CONVEYANCE DURING CONSTRUCTION (BOTH PIPED AND OVERLAND).
18. CONTRACTOR SHALL HAVE ONE COPY OF EACH REQUIRED CONSTRUCTION PERMIT AND ONE COPY OF THE MOST CURRENT AND COMPLETE SET OF CONSTRUCTION DOCUMENTS (INCLUDING PLANS, SPECIFICATIONS, SPECIAL CONDITIONS AND PROVISIONS, ETC.) AVAILABLE AT THE PROJECT SITE AT ALL TIMES.
19. CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR IMPLEMENTATION AND ENFORCEMENT OF SAFE WORK PRACTICES, INCLUDING BUT NOT LIMITED TO PERSONNEL MONITORING, USE OF TRENCHING, SHEETING, AND SHORING, SCAFFOLDING; MATERIALS HANDLING AND DRILLING; OPERATION OF EQUIPMENT; AND SAFETY OF PUBLIC DURING PROGRESS OF WORK.
20. CONTRACTOR SHALL PLAN FOR AND ENSURE PERSONNEL COMPLY WITH PROVISIONS OF OSHA SAFETY AND HEALTH STANDARDS (29 CFR 1910) AND GENERAL CONSTRUCTION STANDARDS (29 CFR 1926) AS APPROPRIATE.
21. CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH WORK. CONTRACTOR SHALL TAKE NECESSARY PRECAUTIONS FOR SAFETY OF EMPLOYEES ON PROJECT SITE AND OTHER PERSONS AND ORGANIZATIONS WHO MAY BE AFFECTED BY THE PROJECT. CONTRACTOR'S DUTIES AND RESPONSIBILITIES FOR SAFETY IN CONNECTION WITH WORK SHALL CONTINUE UNTIL SUCH TIME AS ALL WORK IS COMPLETED, AND ENGINEER HAS ISSUED NOTICE TO CONTRACTOR THAT WORK IS COMPLETE.
22. HAZARDOUS MATERIALS, INCLUDING BUT NOT LIMITED TO OIL, GASOLINE, PAINT AND OTHER HAZARDOUS SUBSTANCES MUST BE PROPERLY STORED, BY THE CONTRACTOR, INCLUDING SECONDARY CONTAINMENTS, TO PREVENT SPILLS, LEAKS, OR OTHER DISCHARGE. RESTRICTED ACCESS TO STORAGE AREAS MUST BE PROVIDED TO PREVENT VANDALISM. STORAGE AND DISPOSAL OF HAZARDOUS WASTE MUST BE IN COMPLIANCE WITH MPCA REGULATIONS. CONTRACTOR SHALL REMOVE SPILL OF FUELS, OILS, OR OTHER CHEMICALS IMMEDIATELY UPON DETECTION.
23. THE EXISTING PAVEMENT CONDITIONS HAVE BEEN DOCUMENTED, AND ANY DAMAGE TO THE EXISTING PAVEMENT, CURBING, AND STRIPING SHALL BE REPLACED BY THE CONTRACTOR, TO THE OWNERS SATISFACTION, AT NO ADDITIONAL COST TO THE OWNER.

REMOVAL NOTES:

1. SEE GENERAL NOTES FOR ADDITIONAL PROJECT AND SITE INFORMATION.
2. CONTRACTOR SHALL REVIEW FEATURES NOT SPECIFICALLY IDENTIFIED ON PLAN FOR SALVAGE OR REMOVAL THAT CONFLICT WITH CONSTRUCTION WITH THE ENGINEER.
3. MATERIALS REMOVED/DEMOLISHED BY CONTRACTOR BECOME PROPERTY OF THE CONTRACTOR, UNLESS OTHERWISE NOTED. CONTRACTOR SHALL LOAD AND HAUL MATERIAL OFF-SITE AND PROPERLY DISPOSE OF MATERIALS IN ACCORDANCE WITH APPLICABLE REGULATIONS. CONTRACTOR MUST LEAVE THE SITE IN A CONDITION TO THE SATISFACTION OF THE OWNER AND ENGINEER.
4. CONTRACTOR SHALL SALVAGE AND REINSTALL STREET AND TRAFFIC SIGNS IN CONFLICT WITH CONSTRUCTION ACTIVITIES AS NOTED OR AS DIRECTED BY THE ENGINEER. IF SIGNS ARE DAMAGED DURING CONSTRUCTION, CONTRACTOR IS REQUIRED TO PROVIDE NEW SIGNS AT NO ADDITIONAL COST TO THE OWNER.
5. CONTRACTOR SHALL SALVAGE AND REINSTALL FENCE IN CONFLICT WITH CONSTRUCTION ACTIVITIES AS NOTED OR AS DIRECTED BY THE ENGINEER. IF FENCE IS DAMAGED DURING CONSTRUCTION, CONTRACTOR IS REQUIRED TO PROVIDE NEW FENCE, TO OWNER'S SATISFACTION, AT NO ADDITIONAL COST TO THE OWNER.
6. CONTRACTOR SHALL REVIEW ALL TREE REMOVALS WITH THE OWNER AND ENGINEER PRIOR TO REMOVAL OPERATIONS.

GOVERNING SPECIFICATIONS:

1. THE MINNESOTA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR CONSTRUCTION" MOST RECENT EDITION & LATEST SUPPLEMENTS.
2. CITY ENGINEERS ASSOCIATION OF MINNESOTA (CEAM) STANDARD UTILITIES SPECIFICATIONS (LATEST EDITION)
3. ALL APPLICABLE FEDERAL, STATE AND LOCAL LAWS AND ORDINANCE WILL BE COMPLETED WITH IN THE CONSTRUCTION OF THIS PROJECT.

TRAFFIC CONTROL NOTES:

1. SEE GENERAL NOTES FOR ADDITIONAL PROJECT AND SITE INFORMATION.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ALL CONSTRUCTION STAGING, ON OR OFFSITE, AS NECESSARY, TO COMPLETE THE WORK AS SPECIFIED IN THE PROJECT DOCUMENTS. IF OFFSITE STAGING AREA IS REQUIRED, CONTRACTOR IS RESPONSIBE TO FIND, OBTAIN, AND PAY FOR NECESSARY STAGING AREA AT NO ADDITIONAL COST TO THE OWNER. A STAGING PLAN SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL PRIOR TO ANY CONSTRUCTION RELATED ACTIVITIES.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TRAFFIC CONTROL. ALL TRAFFIC CONTROL SHALL CONFORM TO THE LATEST EDITION OF THE MMUTCD, INCLUDING THE LATEST FIELD MANUAL FOR TEMPORARY TRAFFIC CONTROL ZONE LAYOUTS. A TRAFFIC CONTROL PLAN SHALL BE SUBMITTED TO THE ENGINEER AND CITIES FOR REVIEW AND APPROVAL PRIOR TO ANY CONSTRUCTION RELATED ACTIVITIES. PLANS SHALL COMPLY WITH ALL APPLICABLE PERMIT REQUIREMENTS.

TREE PRESERVATION NOTES:

1. PROTECT EXISTING TREES THAT ARE NOT TO BE REMOVED. INSTALL ORANGE MESH FENCING, 4' HIGH, WITH STAKES EVERY 10 FEET, 5' OUTSIDE OF THE DRIP LINE OF ALL PRESERVED TREES, OR AT THE CONSTRUCTION LIMITS AS SHOWN ON THE PLAN. DO NOT PERFORM ACTIONS WITHIN THE PROTECTED AREA THAT MAY HARM THE TREE AND COMPACT THE SOIL, INCLUDING, BUT NOT LIMITED TO EXCAVATION, STORING MATERIALS, PARKING AND TRAFFIC DURING CONSTRUCTION. WHERE CONSTRUCTION REQUIRES DISTURBANCE WITHIN THE PROTECTED AREAS, DISTURB THE ROOT ZONE AS LITTLE AS POSSIBLE. TREE PROTECTION MEASURES SHALL BE CONFIRMED BY OWNER AND ENGINEER PRIOR TO STARTING CONSTRUCTION.
2. ALL TREE PROTECTION FENCING MUST BE IN PLACE PRIOR TO BEGINNING CONSTRUCTION.
3. WHEN TREE ROOTS ARE ENCOUNTERED THAT MUST BE REMOVED, CUT ROOTS CLEANLY AS FAR FROM THE TREE AS POSSIBLE AND IMMEDIATELY WATER AND BACKFILL OVER THE ROOTS TO PREVENT DRYING.

EROSION CONTROL NOTES:


1. SEE SHEETS C-003 FOR EROSION CONTROL MEASURES.
2. BEFORE SITE DISTURBANCE AND AS REQUIRED AS CONSTRUCTION PROGRESSES, CONTRACTOR SHALL INSTALL, MAINTAIN, REPAIR, AND REPLACE EROSION PREVENTION MEASURES AND SEDIMENT CONTROL DEVICES (INLET PROTECTION, CONSTRUCTION ENTRANCE, BIOLOG, EROSION CONTROL BLANKET, ETC.) IN ACCORDANCE WITH THE EROSION CONTROL PLAN, AND CITY, STATE, AND WATERSHED DISTRICT PERMITS.
3. ADDITIONAL EROSION CONTROL MEASURES MAY BE REQUIRED DEPENDING ON SITE CONDITIONS DURING CONSTRUCTION. COORDINATE WITH ENGINEER.
4. CONCRETE WASH-OUT SHALL BE COMPLETED OFF-SITE OR CONCRETE READY MIX TRUCKS SHALL BE SELF-CONTAINED.
5. CONTRACTOR SHALL REMOVE TRACKED SEDIMENT FROM ALL PAVED SURFACES BOTH ON AND OFFSITE ON A DAILY BASIS (INCIDENTAL).
6. CONTRACTOR SHALL MINIMIZE DUST FROM CONSTRUCTION OPERATIONS BY PROVIDING WATER OR OTHER APPROVED METHOD ON A DAILY BASIS (INCIDENTAL).
7. CONTRACTOR SHALL REMOVE ALL EROSION CONTROL MEASURES AFTER SITE HAS BEEN STABILIZED AND VEGETATION IS ESTABLISHED AS DIRECTED BY ENGINEER. EROSION CONTROL MEASURES USED FOR CONSTRUCTION MUST NOT BE REMOVED UNTIL AUTHORIZED BY OWNER OR ENGINEER.

REVEGETATION NOTES:

1. REVEGETATE ALL DISTURBED AREAS WITH NATIVE SEED MIX AND EROSION CONTROL BLANKET AS SPECIFIED ON THE EROSION CONTROL DRAWINGS.
2. PRIOR TO SEEDING AND BLANKET INSTALLATION, RIP/SCARIFY ALL SOILS THAT ARE TO BE REVEGETATED TO A 6-INCH DEPTH, AVOIDING SIGNIFICANT TREE ROOT AREAS. (INCIDENTAL)
3. FOR AREAS TO RECEIVE SOD, AFTER INITIAL RIPPING, ADD AND INCORPORATE 3-INCH MINIMUM DEPTH OF MNDOT 3890 GRADE 2 COMPOST INTO TOP 6-INCH DEPTH OF SOIL.

HORIZONTAL AND VERTICAL CONTROL:

1. THE HORIZONTAL CONTROL FOR THIS PLAN IS NAD83 HENNEPIN COUNTY COORDINATES.
2. THE VERTICAL CONTROL FOR THIS PLAN IS NAVD88.



2080 WOODDALE DRIVE
SUITE 100
WOODBURY, MN 55125
PHONE: 651-294-4580
FAX: 651-228-1969
WWW.STANTEC.COM

SUB CONSULTANT:

CLIENT:

SHINGLE CREEK
WATERSHED
MANAGEMENT
COMMISSION

PROJECT TITLE:

COLORADO AVENUE
STORMWATER IMPROVEMENTS

DATE:	DESCRIPTION:	ISSUE NO.:
10/26/2023	30% PLANS	0

CERTIFICATION:
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.

LIC. NO.:
DATE:

PROJECT NO.: 227705751

DWN BY: CGG	CHK'D BY: KT	APP'D BY: ###
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ISSUE DATE: 10/26/2023

ISSUE NO.: 0

SHEET TITLE:

GENERAL NOTES

SHEET NO.:

C-002

LEGAL / BOUNDARY LEGEND

EXISTING	DESCRIPTION	PROPOSED
	PROPERTY BOUNDARY	
	LOT LINE	
	EASEMENT LINE	
	SETBACK LINE	
	RIGHT OF WAY LINE	
	SECTION LINE	
	QUARTER LINE	

SITE / MISC. LEGEND

EXISTING	DESCRIPTION	PROPOSED
	RAILROAD TRACK	
	FENCE LINE	
	GUARD RAIL	
	RETAINING WALL	
	BUILDING	
	DITCH CENTERLINE	
	WETLAND BOUNDARY	
	WETLAND	
	SIGN	
	BOLLARD/POST	
	UTILITY POLE	
	ANCHOR CABLE	
	LIGHT POLE	
	DECORATIVE LIGHT	
	ANTENNA	
	BENCH	
	AIR CONDITIONER	
	SOIL BORING	
	MAILBOX	
	HANDICAP PARKING SPACE	
	RAILROAD CROSSING SIGNAL	
	STOP LIGHT	
	HAND HOLE	
	PARKING COUNT	

GRADING / TOPOGRAPHY LEGEND

EXISTING	DESCRIPTION	PROPOSED
	MINOR CONTOUR	
	MAJOR CONTOUR	
	GRADING LIMITS	
	CONSTRUCTION LIMITS	
	SPOT ELEVATION	
	SURFACE GRADE & FLOW DIRECTION	
	SURFACE SLOPE (H:V) & FLOW DIRECTION	

PAVEMENT LEGEND

EXISTING	DESCRIPTION	PROPOSED
	EDGE OF PAVEMENT / GRAVEL	
	ROAD CENTERLINE	
	CURB AND GUTTER	
	TIP-OUT CURB AND GUTTER	
	CONCRETE PAVEMENT	
	HEAVY DUTY CONCRETE PAVEMENT	
	BITUMINOUS PAVEMENT	
	LIGHT DUTY BITUMINOUS PAVEMENT	
	HEAVY DUTY BITUMINOUS PAVEMENT	
	GRAVEL SURFACE	

UTILITY LEGEND

EXISTING	DESCRIPTION	PROPOSED
	STORM SEWER	
	SANITARY SEWER	
	FORCEMAIN	
	WATERMAIN	
	IRRIGATION LINE	
	UNDERGROUND GAS LINE	
	UNDERGROUND COMMUNICATION LINE	
	UNDERGROUND FIBER OPTIC LINE	
	UNDERGROUND ELECTRIC LINE	
	OVERHEAD UTILITY LINE	
	DRAIN TILE	
	PIPE CASING	
	SANITARY MANHOLE	
	CLEANOUT	
	STORM SEWER MANHOLE	
	STORM SEWER INLET	
	FLARED END SECTION	
	CURB STOP	
	HYDRANT	
	WATER VALVE	
	REDUCER	
	FIRE DEPARTMENT CONNECTION	
	WATER WELL	
	AUTO SPRINKLER	
	POST INDICATOR VALVE	
	WATER METER	
	SPRINKLER HEAD	
	IRRIGATION CONTROL VALVE	
	GAS MARKER	
	GAS VALVE	
	GAS METER	
	COMMUNICATIONS PEDESTAL	
	TELEPHONE MANHOLE	
	ELECTRICAL PEDESTAL	
	ELECTRIC METER	
	TRANSFORMER	
	ELECTRIC MANHOLE	

VEGETATION / LANDSCAPING LEGEND

EXISTING	DESCRIPTION	PROPOSED
	TREE LINE	
	STUMP	
	SHRUB/PERENNIAL PLANT	
	DECIDUOUS TREE	
	CONIFEROUS TREE	
	ORNAMENTAL TREE	
	ROCK MULCH	
	WOOD MULCH	
	SEED	
	SOD	

REMOVALS LEGEND

DESCRIPTION	PROPOSED
REMOVE EXISTING BUILDING	
CLEAR AND GRUB AREA	
REMOVE TREE/SHRUB/STUMP	
REMOVE CURB AND GUTTER	
REMOVE CONCRETE PAVEMENT	
REMOVE BITUMINOUS PAVEMENT	
REMOVE GRAVEL SURFACING	
SAWCUT PAVEMENT	

EROSION CONTROL LEGEND

DESCRIPTION	PROPOSED
ROCK CONSTRUCTION EXIT	
EROSION CONTROL BLANKET	
TURF REINFORCEMENT MAT	
SEED	
SOD	
RIPRAP	
VEGETATED RIPRAP	
SILT FENCE	
FLOTATION SILT CURTAIN	
BIOLOG (OR DITCH CHECK)	
INLET PROTECTION	
HAY BALES	
CULVERT PROTECTION	
TREE PROTECTION	
TEMPORARY DIVERSION DITCH	
TEMPORARY SEDIMENT TRAP DISCHARGE	

ABBREVIATIONS

BV	BUTTERFLY VALVE	OC	ON CENTER
BW	BOTTOM OF WALL (AT GRADE)	OCS	OUTLET CONTROL STRUCTURE
BVC	BEGIN VERTICAL CURVE	MAX	MAXIMUM
BOT	BOTTOM	MH	MANHOLE
CB	CATCH BASIN	ME	MATCH EXISTING
CBMH	CATCH BASIN MANHOLE	MIN	MINIMUM
CO	CLEANOUT	NWL	NORMAL WATER LEVEL
CF	CUBIC FEET	OFF	OFFSET
CFS	CUBIC FEET PER SECOND	PC	POINT OF CURVATURE
CL	CENTERLINE	PI	POINT OF INTERSECTION
CL	CLASS	PL	PROPERTY LINE
CMP	CORRUGATED METAL PIPE	PR	PROPOSED
CY	CUBIC YARDS	PT	POINT OF TANGENCY
DIP	DUCTILE IRON PIPE	PVC	POLYVINYL CHLORIDE
EG	EXISTING GRADE	PVI	POINT OF VERTICAL INTERSECTION
EOF	EMERGENCY OVERFLOW	R	RADIUS
EL	ELEVATION	RCP	REINFORCED CONCRETE PIPE
EP	EDGE OF PAVEMENT	RIM	STRUCTURE TOP OF CASTING/GRATE
EVC	END VERTICAL CURVE	ROW	RIGHT OF WAY
EX	EXISTING	SF	SQUARE FEET
F/F	FACE TO FACE	SS	SANITARY SEWER
FFE	FINISHED FLOOR ELEVATION	SSMH	SANITARY SEWER MANHOLE
FES	FLARED END SECTION	ST	STORM SEWER
FM	FORCEMAIN	STA	STATION
FNH	FRONT NOZZLE OF HYDRANT	STD	STANDARD
FG	FINISHED GRADE	STMH	STORM SEWER MANHOLE
FL	FLOW LINE	SW	SIDEWALK
GV	GATE VALVE	SY	SQUARE YARDS
GPM	GALLONS PER MINUTE	TC	TOP OF CURB
HDPE	HIGH-DENSITY POLYETHYLENE	TNH	TOP NUT OF HYDRANT
HP	HIGH POINT	TOE	TOE OF DITCH
HYD	HYDRANT	TOP	TOP OF DITCH
HWL	HIGH WATER LEVEL	TP	TOP OF PIPE
INV	INVERT	TW	TOP OF WALL
LF	LINEAL FEET	TYP	TYPICAL
LFE	LOW FLOOR ELEVATION	VCP	VITRIFIED CLAY PIPE
LP	LOW POINT	WM	WATERMAIN
LVC	LENGTH OF VERTICAL CURVE		



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PROJECT TITLE:

COLORADO AVENUE
STORMWATER IMPROVEMENTS
HENNEPIN COUNTY
CRYSTAL, MN 55422

ISSUE NO.:

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DESCRIPTION:

30% PLANS

DATE:

10/26/2023

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DATE:

PROJECT NO.:

227705751

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CHKD BY:

APPD BY:

CGG

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ISSUE DATE: 10/26/2023

ISSUE NO.: 0

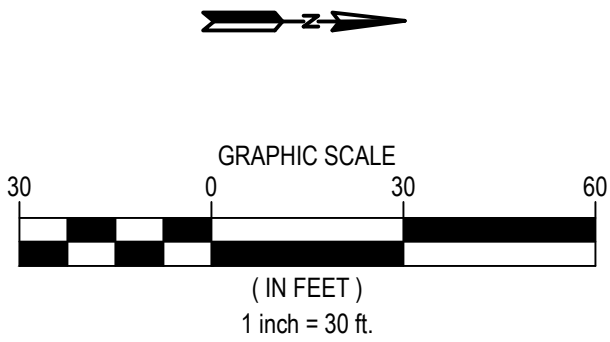
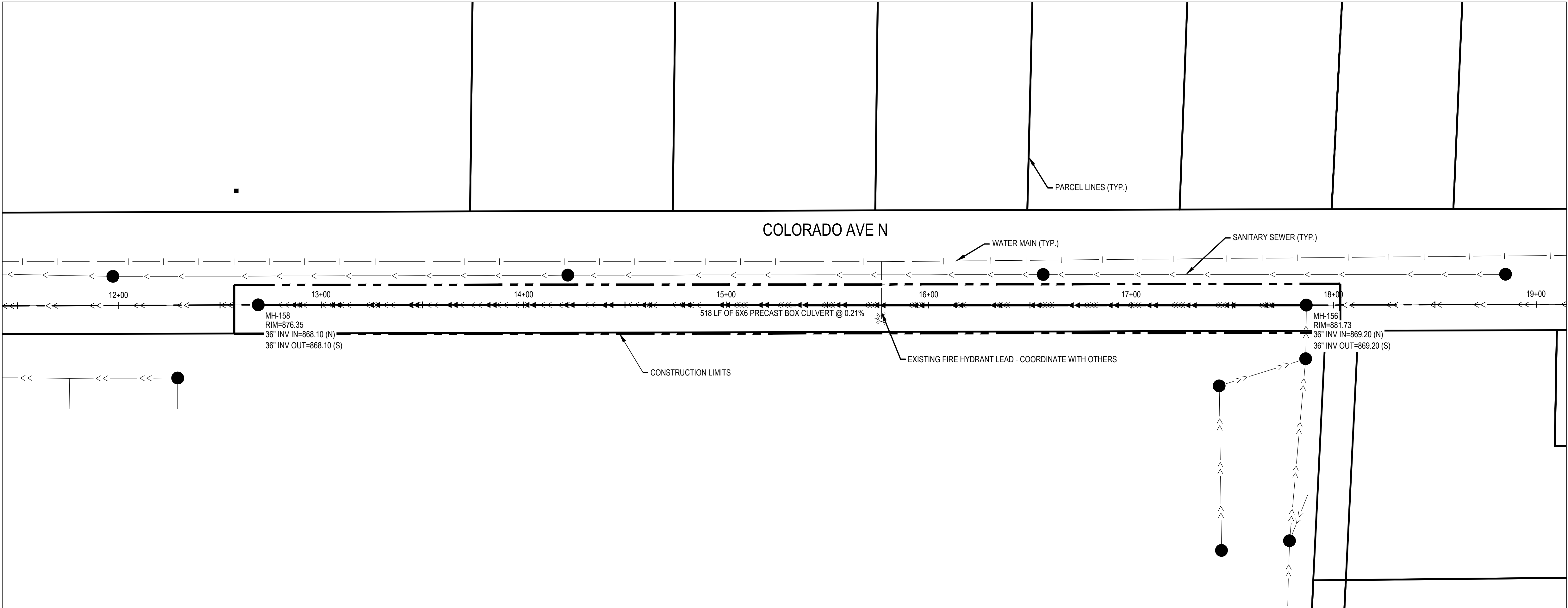
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LEGEND

SHEET NO.:

C-003

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COLORADO AVENUE
STORMWATER IMPROVEMENTS

HENNEPIN COUNTY
CRYSTAL, MN 55422

PROJECT TITLE:

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0	30% PLANS	10/26/2023

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CHKD BY: KT
APPD BY: ###

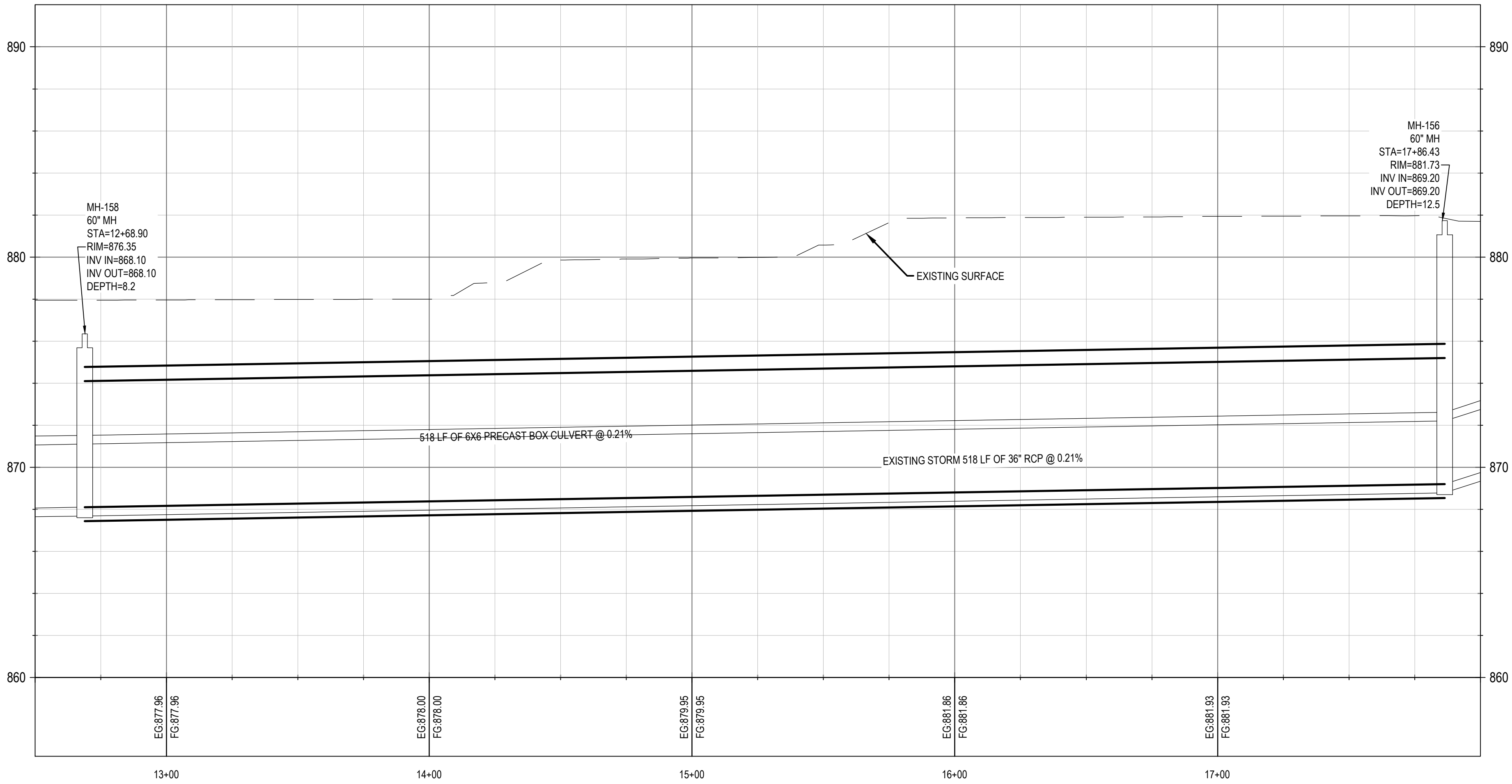
ISSUE DATE: 10/26/2023

ISSUE NO.: 0

SHEET TITLE: STORM
SEWER PLAN
AND PROFILE

SHEET NO.:
C-101

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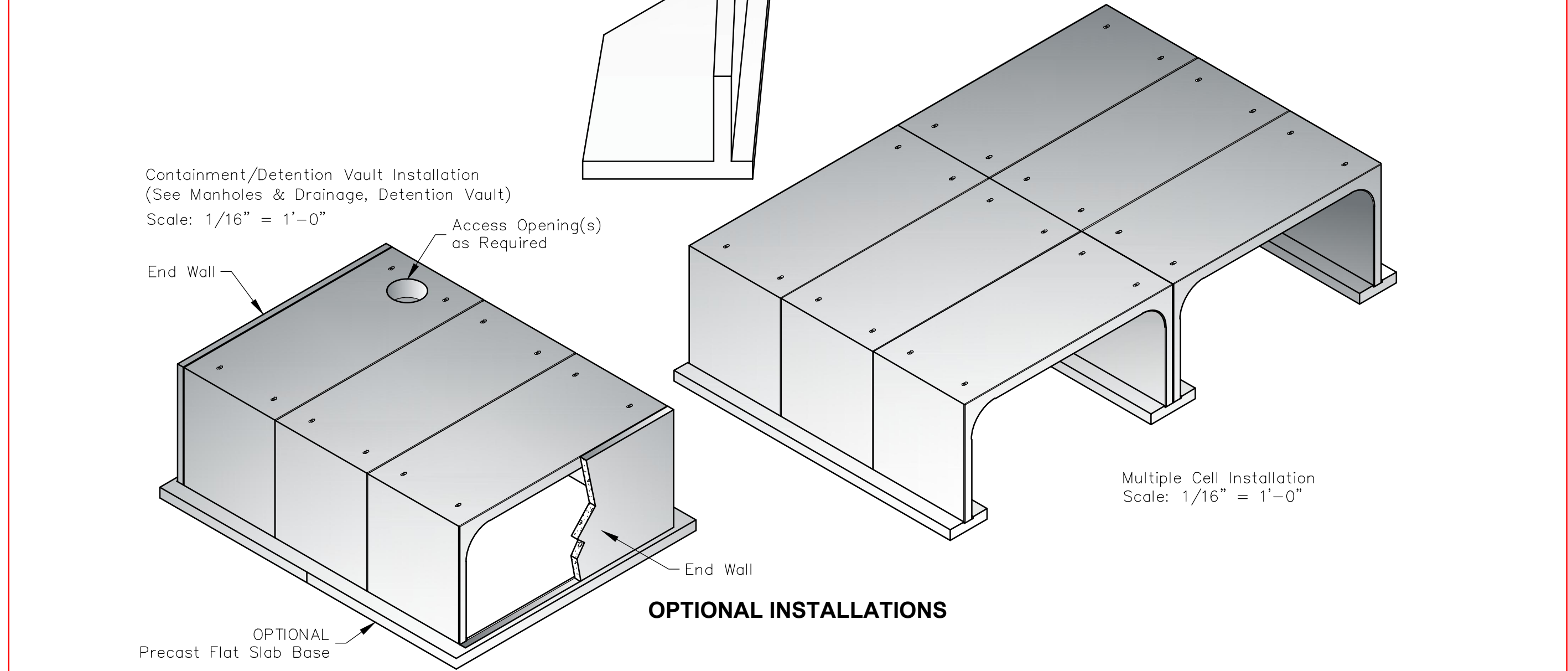
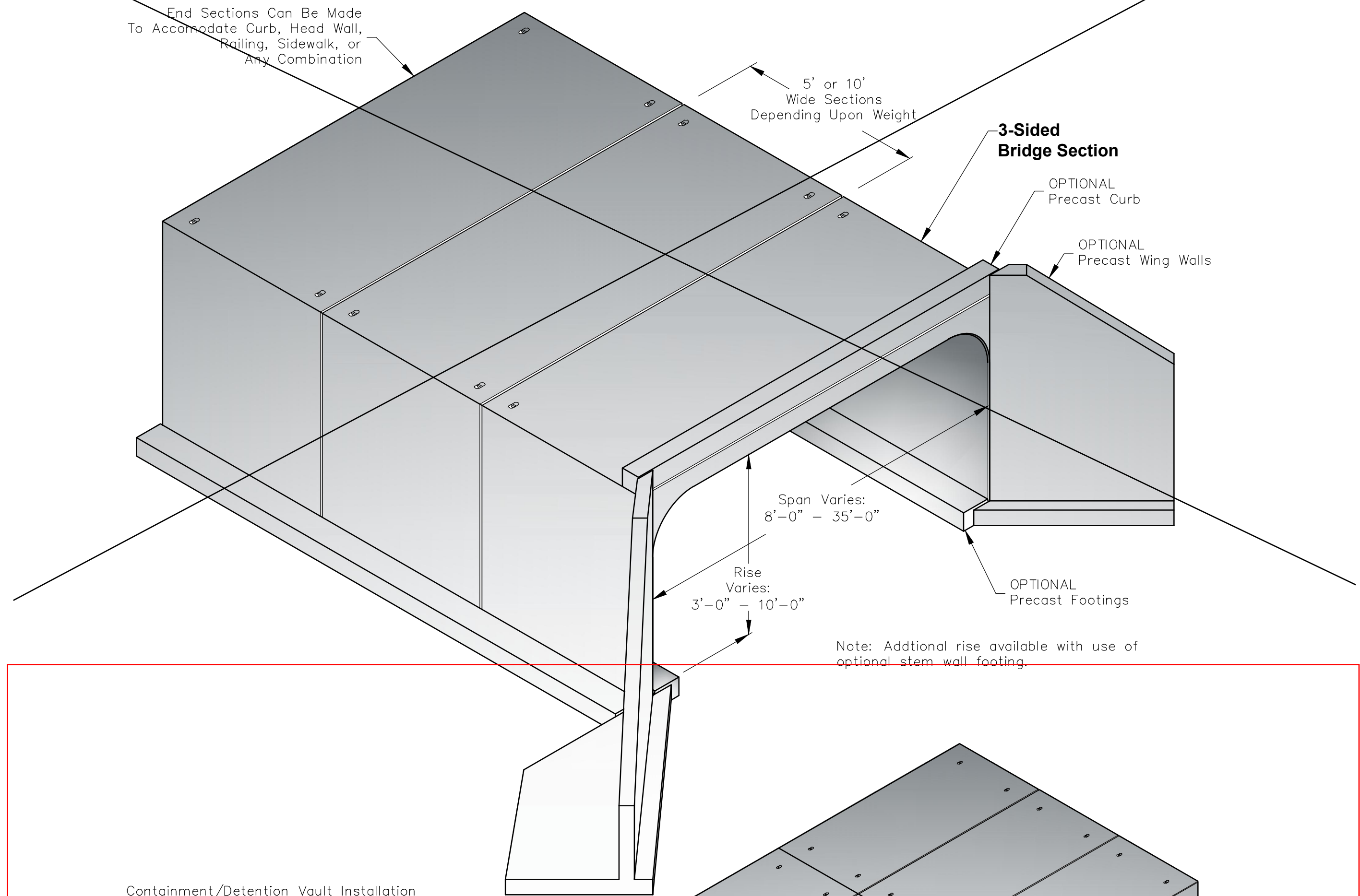
DETAILS

SHEET NO.:

C-801

3-SIDED BRIDGE

3-SIDED BRIDGE



PO Box 323, Wilsonville, Oregon 97070-0323
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3-SIDED BRIDGE

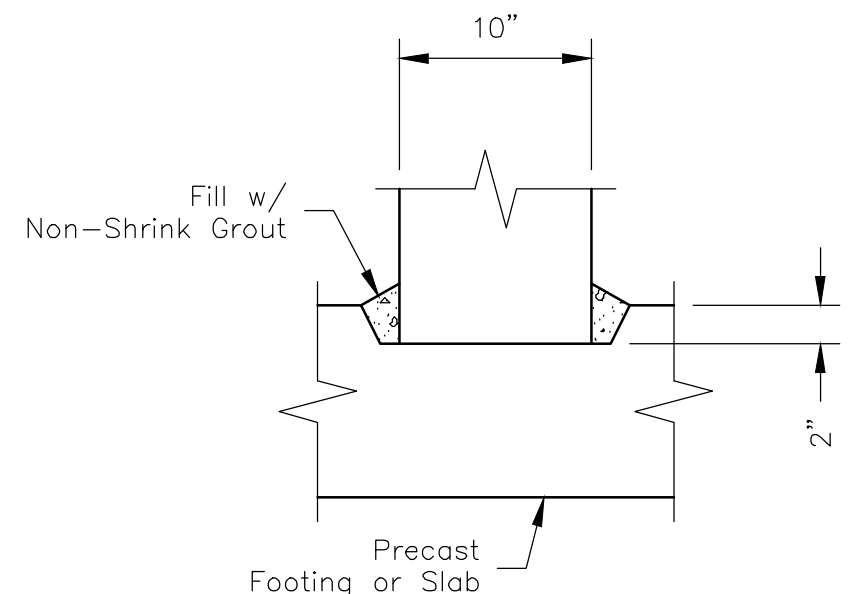
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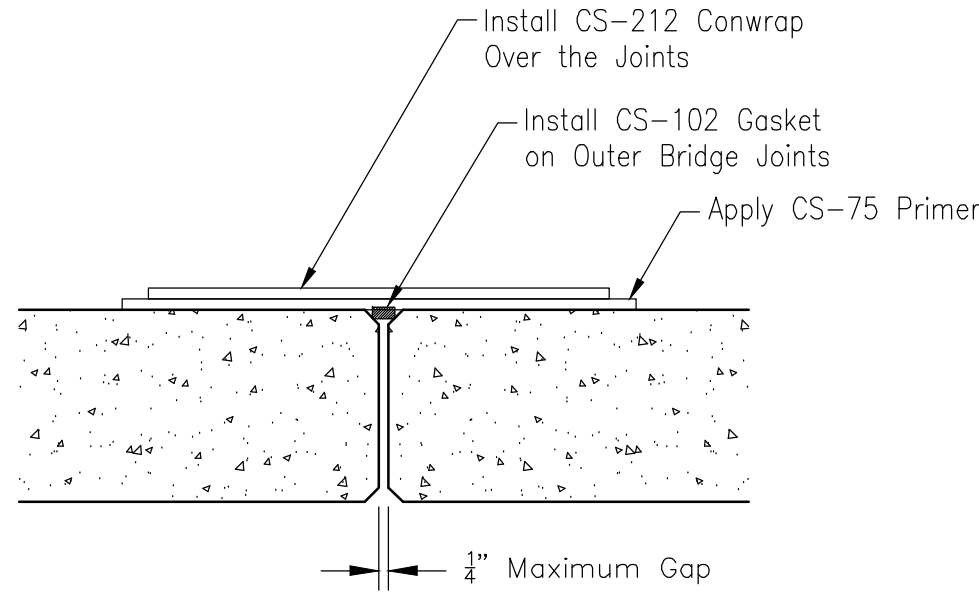
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3-SIDED BRIDGE

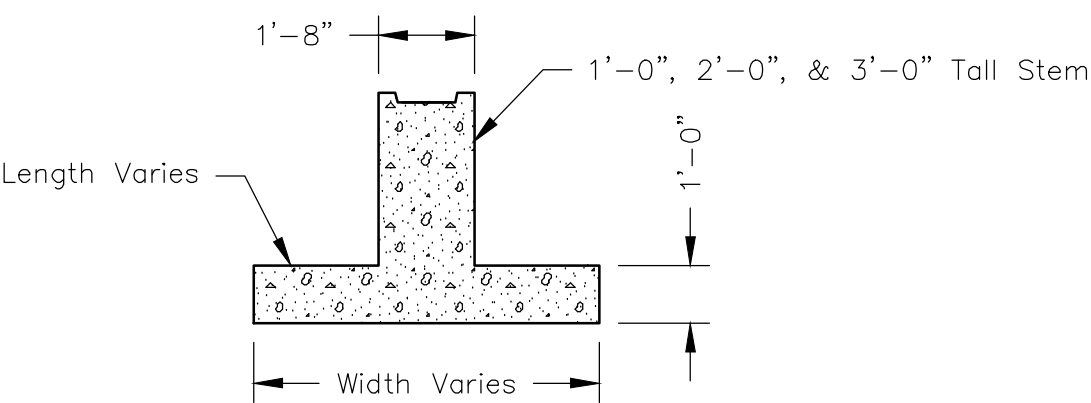
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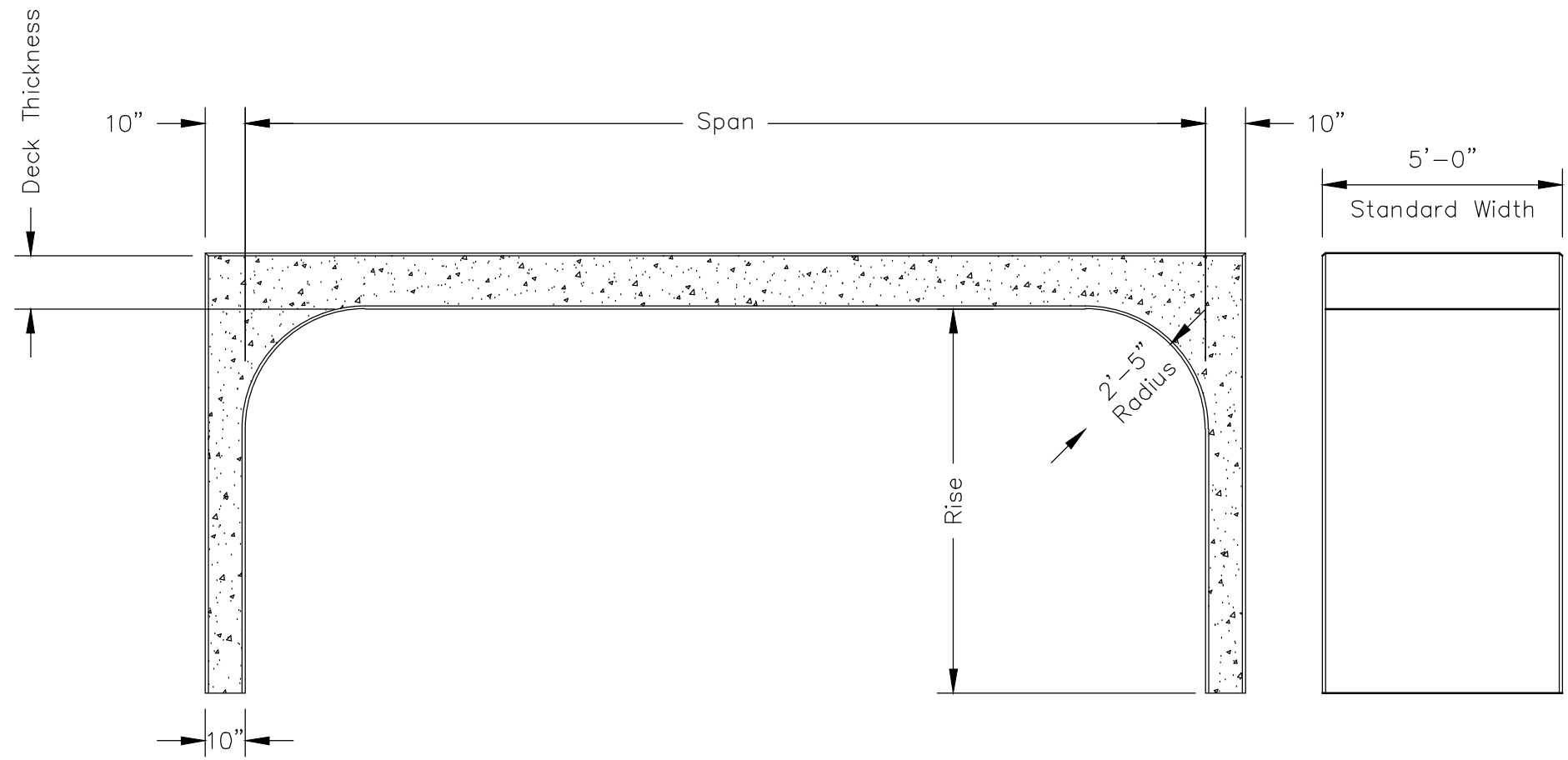
Grout Detail - Bridge to Footing



Joint Detail



Optional Stem Wall Footing Detail



Bridge Section

Side



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3-SIDED BRIDGE

File Name: 020-3-SIDED BRIDGE

Issue Date: 2016

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3-SIDED BRIDGE

1.1

BID ALTERNATE - POLYPROPYLENE CORRUGATED PIPE CHAMBER



DC-780 STORMTECH CHAMBER SPECIFICATIONS

- CHAMBERS SHALL BE STORMTECH DC-780.
- CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
- CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
- CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
- THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
- CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
- REQUIREMENTS FOR HANDLING AND INSTALLATION:
 - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
 - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
 - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 550 LBS/FT². THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
- ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
 - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
 - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
 - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
- CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF THE DC-780 CHAMBER SYSTEM

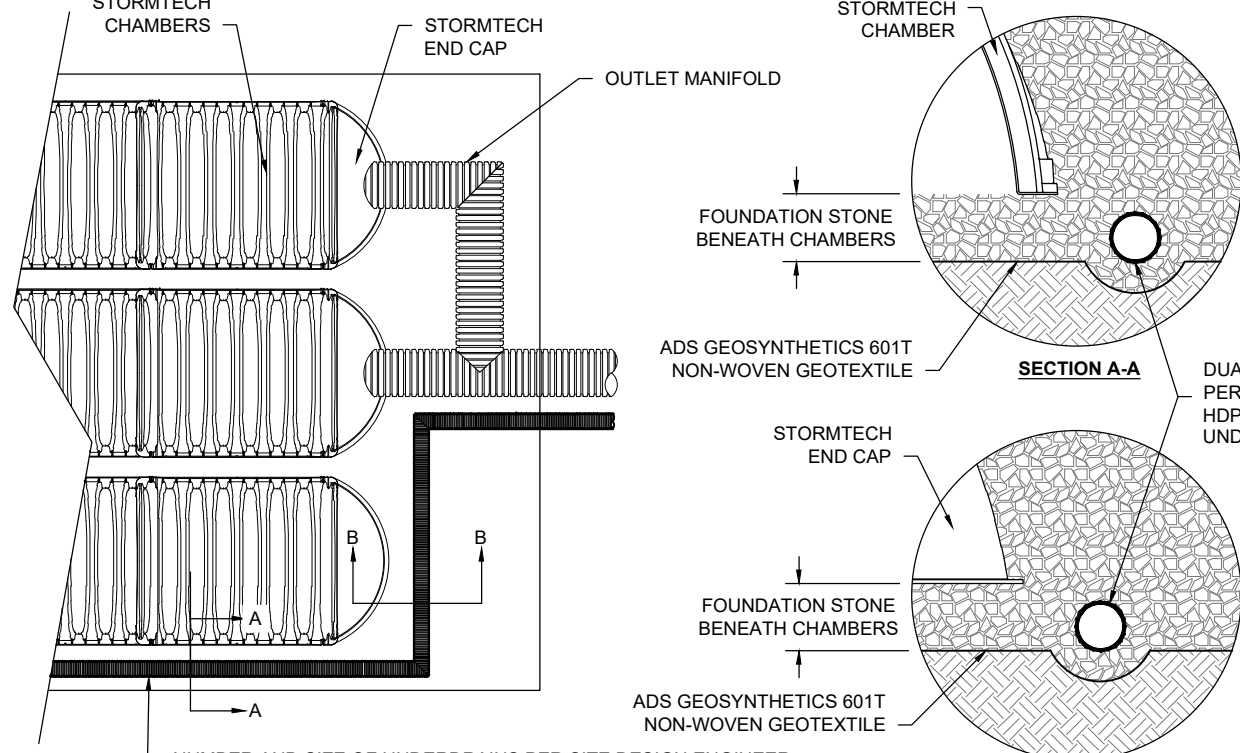
- STORMTECH DC-780 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
- STORMTECH DC-780 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
- CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
 - STONESHOTTER LOCATED OFF THE CHAMBER BED.
 - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
 - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
- THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
- JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
- MAINTAIN MINIMUM - 6" (150 mm) SPACING BETWEEN THE CHAMBER ROWS.
- EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE 3/4-2" (20-50 mm).
- THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
- ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

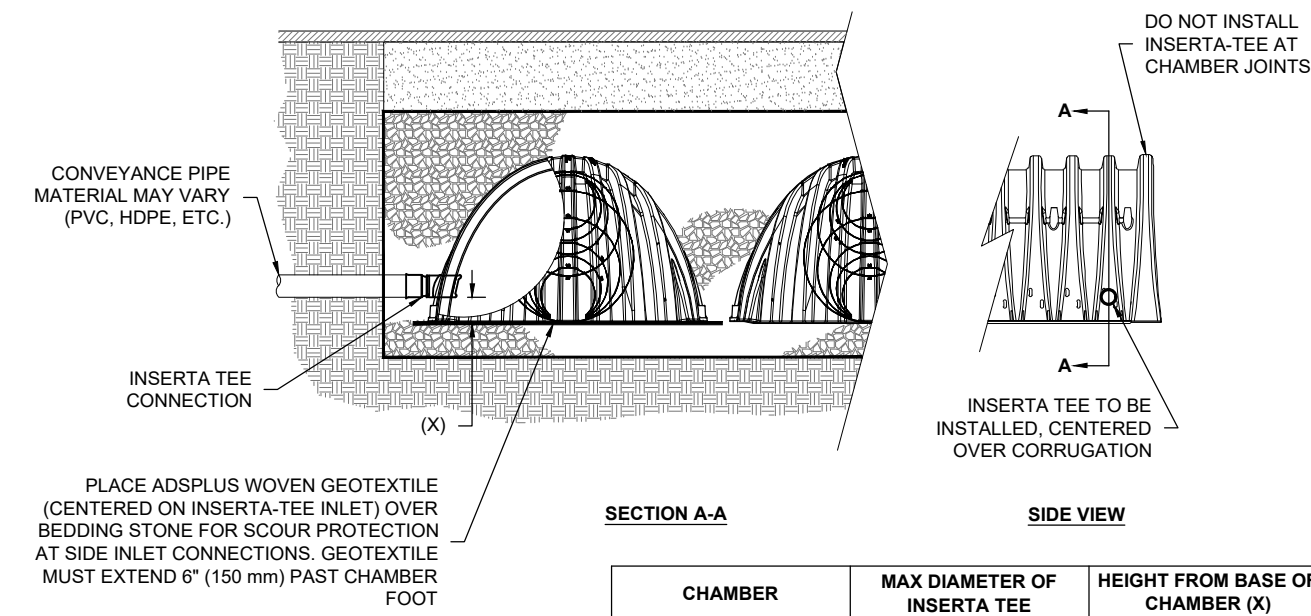
- STORMTECH DC-780 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
- THE USE OF CONSTRUCTION EQUIPMENT OVER DC-780 CHAMBERS IS LIMITED:
 - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
 - NO RUBBER Tired LOADERS, DUMP TRUCKS, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
 - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
- FULL 36" (900 mm) OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO THE CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

CONTACT STORMTECH AT 1-888-892-2694 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.



5 UNDERDRAIN DETAIL

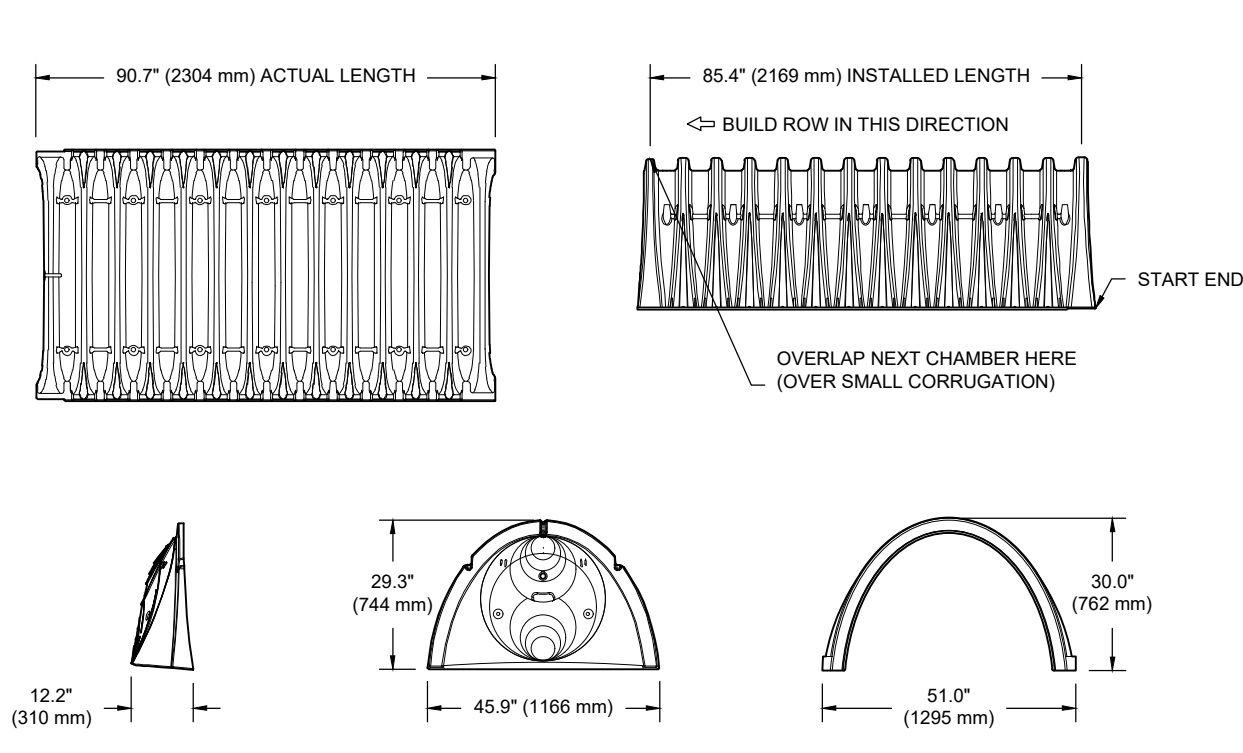


- NOTES:
- PART NUMBERS WILL VARY BASED ON INLET PIPE MATERIALS. CONTACT STORMTECH FOR MORE INFORMATION.
 - CONTACT ADS ENGINEERING SERVICES IF INSERTA TEE INLET MUST BE RAISED AS NOT ALL INVERTS ARE POSSIBLE.

CHAMBER	MAX DIAMETER OF INSERTA TEE	HEIGHT FROM BASE OF CHAMBER (X)
SC-310	6" (150 mm)	4" (100 mm)
SC-740	10" (250 mm)	4" (100 mm)
DC-780	10" (250 mm)	4" (100 mm)
MC-3500	12" (300 mm)	6" (150 mm)
MC-4500	12" (300 mm)	8" (200 mm)
MC-7200	12" (300 mm)	8" (200 mm)

INSERTA TEE FITTINGS AVAILABLE FOR SDR 26, SDR 35, SCH 40 IPS GASKETED & SOLVENT WELD, N-12, HP STORM, C-900 OR DUCTILE IRON

6 INSERTA-TEE SIDE INLET DETAIL



NOMINAL CHAMBER SPECIFICATIONS
SIZE (W X H X INSTALLED LENGTH)
CHAMBER STORAGE
MINIMUM INSTALLED STORAGE*

*ASSUMES 6" (152 mm) STONE ABOVE, 9" (229 mm) BELOW, AND 6" (152 mm) BETWEEN CHAMBERS

PRE-FAB STUB AT BOTTOM OF END CAP WITH FLAMP END WITH "BR"
PRE-FAB STUBS AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
PRE-FAB STUBS AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
PRE-CORED END CAPS END WITH "PC"

PART #	STUB	A	B	C
SC740EPE06T / SC740EPE06TPC	6" (150 mm)	10.5" (277 mm)	18.5" (470 mm)	---
SC740EPE08B / SC740EPE08BPC	---	---	16.5" (419 mm)	0.5" (13 mm)
SC740EPE08T / SC740EPE08TPC	8" (200 mm)	12.2" (310 mm)	---	0.6" (15 mm)
SC740EPE08B / SC740EPE08BPC	---	---	14.5" (368 mm)	---
SC740EPE10T / SC740EPE10TPC	10" (250 mm)	13.4" (340 mm)	---	0.7" (18 mm)
SC740EPE10B / SC740EPE10BPC	---	---	12.5" (318 mm)	---
SC740EPE12T / SC740EPE12TPC	12" (300 mm)	14.7" (373 mm)	---	1.2" (30 mm)
SC740EPE12B / SC740EPE12BPC	---	---	9.0" (229 mm)	---
SC740EPE15T / SC740EPE15TPC	15" (375 mm)	18.4" (467 mm)	---	1.3" (33 mm)
SC740EPE15B / SC740EPE15BPC	---	---	5.0" (127 mm)	---
SC740EPE18T / SC740EPE18TPC	18" (450 mm)	19.7" (500 mm)	---	1.6" (41 mm)
SC740EPE18B / SC740EPE18BPC	---	---	18.5" (470 mm)	0.1" (3 mm)
SC740EPE24B*	24" (600 mm)	18.5" (470 mm)	---	---
SC740EPE24BR*	24" (600 mm)	18.5" (470 mm)	---	0.1" (3 mm)

ALL STUBS, EXCEPT FOR THE SC740EPE24B/SC740EPE24BR ARE PLACED AT BOTTOM OF END CAP SUCH THAT THE OUTSIDE DIAMETER OF THE STUB IS FLUSH WITH THE BOTTOM OF THE END CAP. FOR ADDITIONAL INFORMATION CONTACT STORMTECH AT 1-888-892-2694.

* FOR THE SC740EPE24B/SC740EPE24BR THE 24" (600 mm) STUB LIES BELOW THE BOTTOM OF THE END CAP APPROXIMATELY 1.75" (44 mm). BACKFILL MATERIAL SHOULD BE REMOVED FROM BELOW THE N-12 STUB SO THAT THE FITTING SITS LEVEL.

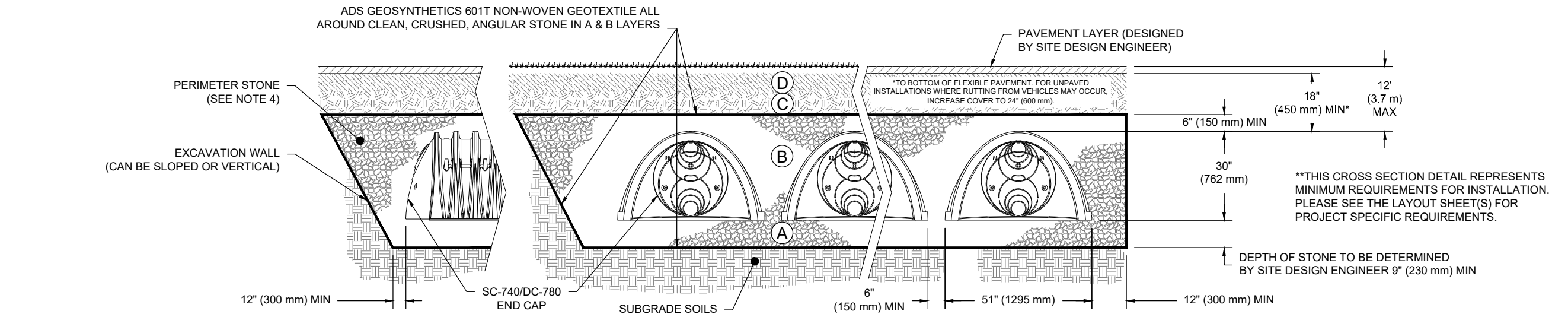
NOTE: ALL DIMENSIONS ARE NOMINAL

2 DC-780 TECHNICAL SPECIFICATIONS

ACCEPTABLE FILL MATERIALS: STORMTECH DC-780 CHAMBER SYSTEMS

MATERIAL LOCATION	DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	FINAL FILL: FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	INITIAL FILL: FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 18" (450 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. AASHTO M145 ¹ A-1, A-2.4, A-3 OR AASHTO M43 ¹ 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 12" (300 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" (150 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs (53 kN). DYNAMIC FORCE NOT TO EXCEED 20,000 lbs (89 kN).
B	EMBEDMENT STONE: FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	AASHTO M43 ¹ 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	FOUNDATION STONE: FILL BETWEEN CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	AASHTO M43 ¹ 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE. ^{2,3}

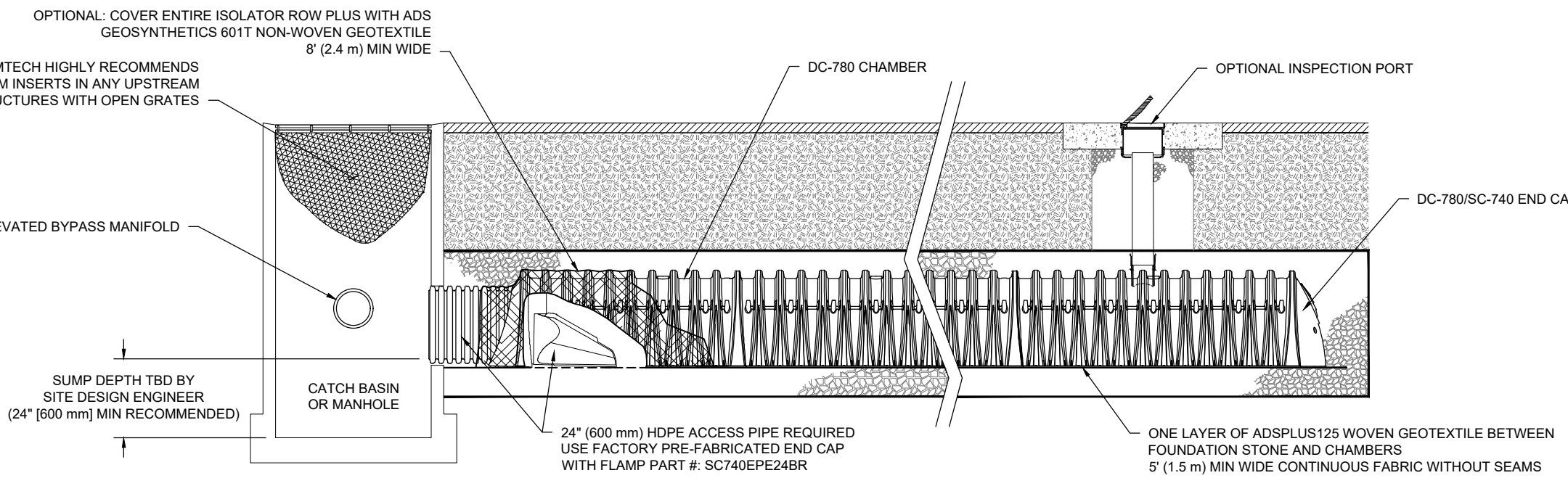
- PLEASE NOTE:
- THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
 - STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'X' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
 - WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
 - ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.



NOTES:

- CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
- DC-780 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
- THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
- PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
- REQUIREMENTS FOR HANDLING AND INSTALLATION:
 - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
 - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
 - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 550 LBS/FT². AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

DC-780 CROSS SECTION DETAIL



DC-780 ISOLATOR ROW PLUS DETAIL

INSPECTION & MAINTENANCE

- STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
- A.1. REMOVE/OPEN LID ON NYLON/PLAST INLINE DRAIN
- A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
- A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
- A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
- A.5. IF SEDIMENT IS AT OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR PLUS ROWS
- B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
- B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
- B.3. MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
- B.4. FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
- B.5. IF SEDIMENT IS AT OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45° (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED
- STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS. RECORD OBSERVATIONS AND ACTIONS.
- STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

- INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.
- CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.

4" PVC INSPECTION PORT DETAIL (SC SERIES CHAMBER)



2080 WOODDALE DRIVE
SUITE 100
WOODBURY, MN 55125
PHONE: 651-294-4580
FAX: 651-228-1969
WWW.STANTEC.COM

SUB CONSULTANT:

CLIENT:

SHINGLE CREEK
WATERSHED
MANAGEMENT
COMMISSION

COLORADO AVENUE
STORMWATER IMPROVEMENTS
HENNEPIN COUNTY
CRYSTAL, MN 55422

PROJECT TITLE:

ISSUE NO.:

0

DESCRIPTION:

30% PLANS

DATE:

10/26/2023

CERTIFICATION:

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.

LIC. NO.:

DATE:

PROJECT NO.:

227705751

DWN BY:

CGG

ISSUE DATE:

10/26/2023

ISSUE NO.:

0

SHEET TITLE:

BID ALTERNATE DETAILS

SHEET NO.:

C-802