Stantec

Memo

To: Shingle Creek WMO Commissioners

From: Todd Shoemaker PE
Diane Spector

Date: April 9, 2024

Subject: Colorado Avenue Infiltration Trench Grant Application

Recommended Commission Action	Review and comment, and authorize submittal of the grant application.

Attached is a nearly complete grant application to the MPCA Implementation Grants for Stormwater Resilience program for the proposed Colorado Avenue Infiltration Trench. You will recall that this BMP was identified in the Gaulke Pond Subwatershed Assessment and is intended to provide additional infiltration and runoff volume management upstream of Gaulke Pond.

Gaulke Pond is landlocked and has a pumped emergency overflow system that conveys discharge via storm sewer to Middle Twin Lake, then to Lower Twin and Ryan. You may also recall that Crystal Lake is also landlocked and has an emergency pumping system to send high waters to Lower Twin and Ryan Lakes. There is a coordinated emergency pumping plan governed by an agreement between the cities of Crytal and Robbinsdale in accordance with permits from the DNR. AS rainfall increases in intensity and depth, it becomes more critical that additional volume management be retrofitted upstream of these landlocked basins.

The proposed Infiltration Trench on Colorado between 42nd and 41st Avenues North is one of eleven potential BMPs identified in the subwatershed assessment. It has the lowest cost per acre-foot of runoff infiltrated. The total estimated project cost is $390,000. The grant request is for $350,000, with a local match of $40,000.

Note that there a few blanks left on the application where we're waiting for more information. We are also still assembling the attachments. We have enclosed some of those attachments, except for the lengthy subwatershed assessment report.

DRAFT 4/10/24

MINNESOTA POLLUTION CONTROL AGENCY

520 Lafayette Road North
St. Paul, MN 55155-4194

Implementation Grants for Stormwater Resilience

Application

FY 2024

Doc Type: Grant Application

Instructions: Read the complete *Request for Proposal (RFP)* and other associated documents before submitting this application. Section 1, Project information affects project eligibility. Unanswered questions may result in disqualification.

Check the SWIFT Supplier Portal and the Minnesota Pollution Control Agency (MPCA) Implementation Grants for Stormwater Resilience webpage for the most recent updates.

Applications are due no later than 4:00 p.m. Central Standard Time (CST) on Thursday, April 11, 2023.

Submit application, workplan and budget (as Microsoft Word and Excel documents) per the instructions listed in Section 7 and 8 of the RFP.

1. Project information

Organization name: Shingle Creek Watershed Management Commission

Organization address: 3235 Fernbrook Ln N

City: Plymouth State: MN Zip code: 55447 County: Hennepin

Contact name: Judie Anderson Title: Administrator

Phone: 763.553.1144 Email address: judie@jass.biz

Organization type:

☐ Tribal government

☒ Local/Regional government (plus select one below)

- ☐ City
- ☐ County
- ☐ Town/Township
- ☐ Soil and Water Conservation District
- ☒ Water Management Organization
- ☐ Watershed District
- ☐ Regional Development Commission
- ☐ Metropolitan Planning Organization

Grant requested: $ 350,000 + Matching funds: $ 40,000 = Total project cost: $ 390,000

Project Title: Crystal Colorado Avenue Trench			
		Yes	**No**
1.	Is applicant the sole source of matching funds for this project?	☒	☐
	If **no,** explain:		

		Yes	No
2.	Is applicant in compliance with Minnesota's tax and environmental regulatory requirements?	☒	☐
	If **no,** explain:		
3.	Does the proposed project consist of new or upgraded green and/or gray infrastructure intended to address water quantity issues, reduce the risk of localized flooding, and ***increase resilience*** to the impacts of Minnesota's changing climate?	☒	☐
4.	Will project follow all applicable local, state, and federal rules and obtain all necessary permits?	☒	☐
	List permits or other approvals necessary for this project, including wetland permits as applicable, and note whether they have been secured or are anticipated: NPDES Construction Permit – to be secured by contractor		
5.	Is the applicant the current landowner?	☐	☒
	If no, attach a letter that includes permission, interest, and commitment from the property owner for the work being completed on the property. A signature from the individual who has the power to grant permission for the proposed activities is required on the letter. Ultimate project ownership (check one of the following): ☒On public land within applicant boundaries ☐On private property within applicant boundaries ☐Other (explain):		
6.	Will an organization involved in the project be responsible for long-term annual operation and maintenance?	☒	☐
	If yes, what organization/department: City of Crystal Public Works **If no,** explain:		
7.	Has the applicant attached:	**Yes**	**No**
	a. plans and specifications including:	☒	☐
	☒Site plans ☒Technical drawings/cross sections ☐Soil borings and/or soil infiltration testing results (if applicable) ☒Stormwater management calculations and/or model outputs		
	b. budget (including engineer's estimate of cost and non-construction costs)	☒	☐
	c. climate vulnerability assessments (or equivalent planning document) identifying the need for proposed project, and if applicable, feasibility study for proposed project	☒	☐
	d. land use permission letter (if applicable)	☐	☐
	e. map (or maps) showing:	☒	☐
	☒Drainage area (acres) ☐Impervious area (acres) ☒Existing stormwater conveyance system (including green infrastructure) ☒EJ areas- project area and the areas directly benefitting from the project ☐Structures/infrastructure protected (if applicable)		

2. Project details

1. Provide a brief narrative description of the project. Describe the identified need for this project and severity of the problem. Include project goal(s) and final deliverable(s). [limit of 500 words]:

   The proposed project is the construction of a 520 foot, 6 x 6 foot three-sided box culvert beneath the right of way of Colorado Avenue in the City of Crystal to infiltrate stormwater runoff and reduce volume contributed to the regional Gaulke Pond. The land-locked Gaulke Pond receives runoff from 890 acres of developed urban landscape, and during high water events overflow is pumped downstream to Twin Lake in Crystal/Robbinsdale. As climate patterns change and intensity of rain events increase, the Shingle Creek Watershed Commission (Commission) and City of Crystal (City) expect that runoff volumes discharging to the already overloaded regional pond will increase the frequency and duration that this regional pond system needs to be pumped to the receiving lake. Twin outlets to Ryan Lake, which has several low-lying adjacent properties and has limited capacity to absorb additional pumped volume.

   The 890 acre subwatershed to Gaulke Pond, which drains through a series of natural and artificial ponds, the last of which is Gaulke, developed with a limited amount of stormwater management. It has historically experienced street and structural flooding, the most severe of which occurs during spring snowmelt and intense summer storms. The pond outlet pumping system has helped to increase pond storage and mitigate upstream flooding, although low points in the subwatershed continue to experience flooding. The City has studied the pond and its watershed extensively to identify and prioritize efforts to reduce flooding , including potential modifications to the storm sewer system and BMPs to detain and infiltrate runoff prior to reaching Gaulke Pond.

   Meantime, in 2021 following an especially wet year, the adjacent City of Robbinsdale received DNR permission to install a permanent overflow pumping system from the landlocked Crystal Lake to Twin Lake. To limit the negative effects on Twin and downstream Ryan Lake from receiving overflow pumping from these two landlocked systems, the cities and the Commission completed the Gaulke Pond & Crystal Lake Pump Operating Plan to help model pumping scenarios and to establish coordinated overflow pumping policies and procedures, using atlas 14 precipitation. With rainfall depths and intensity expected to increase over the coming decades, the partnership undertook the Gaulke Pond Subwatershed Assessment in 2023 to search for additional opportunities to infiltrate and detain runoff upstream of Gaulke Pond. That study identified the proposed Colorado Avenue infiltration trench as the highest ranked practice to reduce flooding and improve water quality within the Gaulke Pond Subwatershed. This trench will infiltrate an estimated 25.7 acre-feet of volume per year.

2. Identify the following:
   a. type of stormwater management practice: Infiltration trench
   b. expected resilience improvement(s) (include quantitative benefits such as storage volume added, inundation depth reduction, pipe capacity increase, rate control improvements etc): infiltration on average 25.7 acre-feet of runoff per year
   c. acres in drainage area: 890 in total, 43.5 acres direct drainage to BMP
   d. description of the watershed: Typical 1960-70s mixed use suburban development with limited stormwater treatment.
   e. description of current stormwater conveyance system (if existent) in the project area, including relevant existing green infrastructure: The 890 acres are drained by a network of city storm sewers. There are five stormwater ponds serving limited areas of the subwatershed. The overall subwatershed drains through storm sewer to a chain of four ponds, of which Gaulke is the final pond.
   f. project alternatives considered: A subwatershed assessment evaluated numerous options for adding volume control in the subwatershed and narrowed the most feasible to six. The Colorado infiltration trench (Option “A2”) was by far the most cost-effective per acre-foot infiltrated.

3. Is the project intended to provide future climate resilience and reduce existing localized flooding? Or is it designed to address only future climate resilience?
   Both.

4. Number of structures and infrastructure that will be protected (i.e., reduced flood risk) by the proposed project:
   a. Number and type of residential structures (e.g., single family, small multifamily, large multifamily):
   b. Number and type of commercial structures (e.g., small commercial, manufacturing facility, warehouse, etc.):

   c. Number and type of public facilities:
   d. Number and type of critical infrastructure:
   e. In what ways will the project improve public safety (alleviate flooded roads/intersections, protect bridges from failure due to heavy rain events, etc)?
   f. Is there potential for negative downstream impacts? How was this determined? Yes, this regional pond has a pumped outlet which discharges by storm sewer to Twin and Ryan Lakes. There are low-lying properties on those lakes and they have limited capacity to receive this overflow. There is a coordinated pumping plan in place that assumes no additional volume will be created in the upstream subwatershed, thus the need to increase volume management upstream of the regional pond.

5. Describe how resilience to climate change was accounted for in project design. How were projected precipitation events used to size the proposed project (e.g., does the project consider future precipitation, including projected scenarios for climate change at end of estimated project life)? To what extent will the project reduce predicted frequency of localized flooding? Attach any relevant model outputs or vulnerability assessments. [limit of 400 words]: H & H modeling prepared for he previously referenced Pumping Study used Atlas 14 precipitation rates. As part of the engineering analysis being completed to bring the current 30% plans to 90%, this BMP will be added to the Commission's XPSWMM model so that future precipitation scenarios can be more accurately assessed. The Gaulke Pond Subwatershed Assessment used annual precipitation rates and the MIDS calculator to project annual runoff volume infiltrated and load reductions achieved. No event-based calculations have yet been made.
   a. Design storm: 30.5 inches annual precipitation
   b. Climate projection methodology: Asumed current Atlas 14
   c. Proposed infrastructure lifespan: 20+ years

6. Using the MPCA's criteria and interactive mapping tool (recently updated on the MPCA website), will the proposed project or the direct benefit from the project be located in one or more MPCA identified environmental justice (EJ) areas of concern? ☒**Yes** ☐**No**
   If yes:
   a. On a map, show the project location and the area directly benefitting from the project within an EJ area(s).
   b. Were EJ communities consulted during planning? ☐**Yes** ☒**No**
      If yes, describe; if no, explain why not: Project is a below ground stormwater improvement that is not creating a community amenity and is beneficial to the community as a whole. However, communities with higher poverty rates are often less resilient to recovering from impacts such as flooding, to the extent that this project will help reduce localized flooding, this may have a beneficial impact on communities of concern.
   c. Is the project primarily intended to serve EJ communities? ☐**Yes** ☒**No**
      If yes, how will these communities be kept informed of construction progress, etc.?

7. Describe any co-benefits of the project:
   a. storage and reuse/drought protection: na
   b. infiltration: 25. af/year
   c. groundwater recharge: minor
   d. new community amenity: na

e. pollutant treatment: 20.9
f. impervious surface/heat island reduction: na
g. increased tree canopy: na

8. Provide quantitative justification of how the project is cost-effective, as applicable:
   a. Will the project leverage other funding to provide a greater match (e.g., self funding, federal, nonprofit, or philanthropic grant)?: Yes, Watershed Commission cost share funding.
   b. Are future savings anticipated to result from the proposed project (describe how, and how much)? Likely reduced future flood repair costs, but not quantified in this analysis.
   c. Will funding be used for water quantity project costs (e.g., stormwater pipe upsizing) paired with concurrent stormwater/drinking water/ wastewater project(s) receiving SRF funding where climate resiliency costs are ineligible? If applicable, describe: No
   d. Will project be paired with concurrent Capital Improvement Project to include resilient stormwater improvements? If applicable, describe: No, this is a standalone project
   e. Other: na

9. How old is the relevant existing infrastructure that is being repaired, replaced, or supplemented (if applicable)? Is it beyond its expected lifespan? Is the project a necessary upgrade or replacement of outdated and/or failing infrastructure?

10. Describe the estimated timeline for this project and what the applicant has done to ensure the project is viable (e.g., overall— how ready is the project for construction, how complete are the plans, what planning, or site investigation work has been completed already, what else is needed before construction can begin, how long are those things anticipated to take, how much time is needed for completion of construction, etc.). Attach feasibility study if applicable.
    A geotechnical evaluation is currently underway to determine the presence of potential contamination, proximity of the proposed infiltration trench to the adjacent underground drinking water reservoir, key design features, and the potential slope stability concerns during construction excavation of the infiltration trench. Additional tasks include assessing the groundwater regime, soil stratigraphy, and hydraulic conductivity of the soil as it affects the functioning of the infiltration facility, and an evaluation of the geotechnical stability of the facility, such as slope stability, the effect of seepage forces or soil piping at adjacent structures and slopes, and design of fills that control the retention, diversion, or discharge of the collected stormwater. The 30% plans will be revised and advanced based on those results, expected by August 2024. It is anticipated that the design and permitting will be completed in Fall-Winter 2024 for spring 2025 bidding and Summer 2025 construction.

3. Experience and qualifications

1. List the individuals from your organization who will be involved in the proposed project, including their job titles and specific roles and qualifications:
   The Shingle Creek Watershed Management Commission (SCWMC) has an ongoing contract with a consulting engineer to provide technical services as necessary, including serving as the Watershed Engineer as well as other services. Stantec Consulting Services supported the SCWMC and the City of Crystal in completing the subwatershed assessment and 30% design for this preferred alternative. The proposed project manager is Todd Shoemaker, PE, CFM. Todd has over 20 years of experience in water resources and environmental engineering. His water resources expertise includes watershed and stormwater management, hydrologic/hydraulic and water quality computer modeling, ravine and stream bank stabilization, floodplain management and regulation, and wetland restoration and permitting. He brings a wealth of experience on a diverse mix of project types spanning all sectors of water resources and has managed multiple projects for both private and public entities throughout the Midwest Other professionals will assist with the

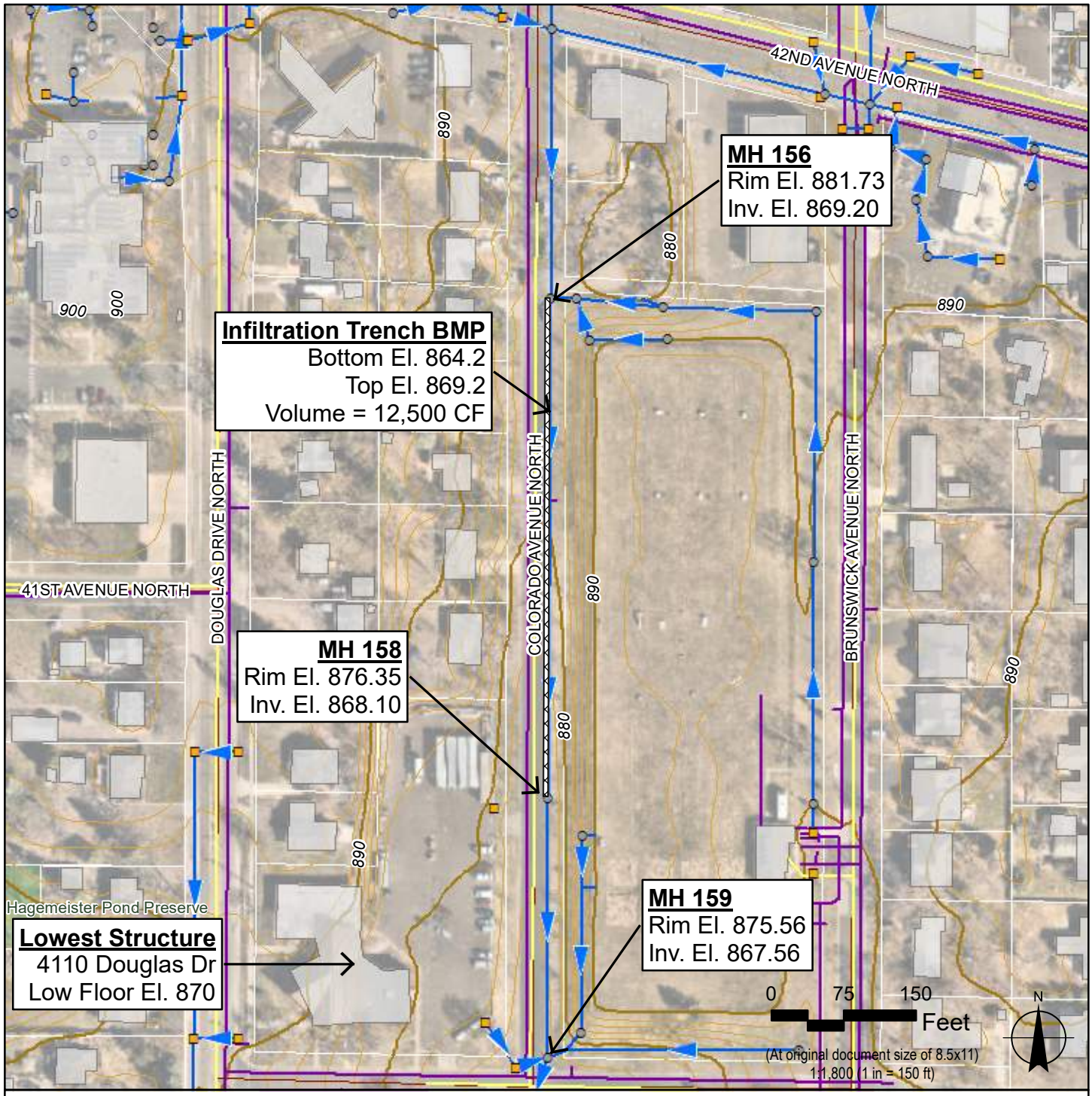
work, drawing from over 50 water resources engineers and professionals locally. The core project team are very familiar with the Shingle Creek watershed and have served that watershed for over 20 years. Will anyone outside your organization be responsible for work performed? ☒**Yes** ☐**No**

If yes, provide name of organization(s) and contact information, brief description of their relevant experience and qualifications related to the proposed project, and describe the role(s) of the outside organization(s) in the project: The City of Crystal City Engineering Project Manager Ben Perkey will serve as the contracting agent, will complete the public bidding process, and administer the construction contract. The City has extensive experience with bidding, contracting, and managing a variety of street and utility construction projects.

MINNESOTA POLLUTION CONTROL AGENCY
520 Lafayette Road North
St. Paul, MN 55155-4194

Implementation Grants for Stormwater Resilience
Budget
Doc Type: Grant Application

Colorado Infiltratoin Trench						I.	II.	III.	IV.	V.
Cost Category	Item No.	Item Description	Unit	Estimated Quantity	Unit Cost	Grant funds	Budgeted cash match	Budgeted in-kind match	Total budgeted match (II + III)	Total budget (I + IV)
1. Engineer's Estimate of Cost	1	Mobilization	LS	1	$ 22,000.00	**$19,800**	**$2,200**		$2,200	$22,000
	2	Sawcut & Remove Concrete Curb	LF	520	$ 12.00	**$5,616**	**$624**		$624	$6,240
	3	Remove & Replace Bituminous Street	LS	1	$ 10,000.00	**$9,000**	**$1,000**		$1,000	$10,000
	4	Remove 36" Storm Sewer Pipe	LF	520	$ 30.00	**$14,040**	**$1,560**		$1,560	$15,600
	5	6X6 RCB	LF	520	150	**$70,200**	**$7,800**		$7,800	$78,000
	6	Common Excavation (CV, offsite)	CY	1560	25	**$35,100**	**$3,900**		$3,900	$39,000
	7	Remove and replace 60" Storm Manhole	EA	2	10500	**$18,900**	**$2,100**		$2,100	$21,000
	8	Concrete Curb & Gutter (match existing)	LF	520	55	**$25,740**	**$2,860**		$2,860	$28,600
	9	Class 5	TON	19.5	55	**$972**	**$108**		$108	$1,080
	10	Sediment Control Log - Type Compost	LF	520	4.5	**$2,106**	**$234**		$234	$2,340
	11	Silt Fence	LF	520	3.5	**$1,638**	**$182**		$182	$1,820
	12	Granular Backfill	CY	190	30	**$5,130**	**$570**		$570	$5,700
	13	Salvage & respread topsoil	LS	2	3500	**$6,300**	**$700**		$700	$7,000
	14	MN State Seed Mix 25-131 (Low Maintena	LB	16	7.5	**$108**	**$12**		$12	$120
									$0	$0
									$0	$0
									$0	$0
									$0	$0
Subtotal- Construction costs						**$214,650**	**$23,850**	**$0.00**	**$23,850**	**$238,500**
2. Non Construction Costs (Engineering/Adminstrative/Other)	Item No.	Position / Item Description	Unit	Estimated Quantity	Unit Cost/Not to exceed	Grant Funds	Budgeted Cash Match	Budgeted In-Kind Match	Total budgeted match (II + III)	Total budget (I + IV)
									$0	$0
		Engineering/Legal/admin (30%)	LS	1	90000	$81,000	$9,000		$9,000	$90,000
									$0	$0
									$0	$0
Subtotal- Non construction costs						**$81,000.00**	**$9,000.00**	**$0.00**	**$9,000**	**$90,000**
3. Contingencies (25% of construction costs)						$53,670	$5,970		$5,970	$59,640
Total Project Costs						**$349,320**	**$38,820**	**$0**	**$38,820**	**$388,140**
Notes (if any)										
	Opinion of Probable Cost, 30% Plans, October 2023									



LEGEND

- BMP Footprint
- Storm Manholes
- Storm Catchbasins
- Outfalls
- Storm Sewer
- Water Main
- Sanitary Sewer

MnDNR 2-ft Contours

- *Index*
- *Intermediate*
- Building Footprints
- Hennepin County Parks

Notes
1. Coordinate System: NAD 1983 Hennepin County
2. Data Sources: Hennepin County, MnDOT, MnDNR, MPCA, City of Crystal, City of New Hope, Stantec
3. Background: Hennepin County 2021 Aerial

Stantec

Project Location — Prepared by KAT on 2023-07-27
City of Crystal, Hennepin Co., MN

Client / Project — 227705751
Shingle Creek Watershed Management Commission
Gaulke Pond Subwatershed Assessment

Figure No.
11

Title
Opportunity A2 - Colorado Avenue

PRELIMINARY PLANS

FOR

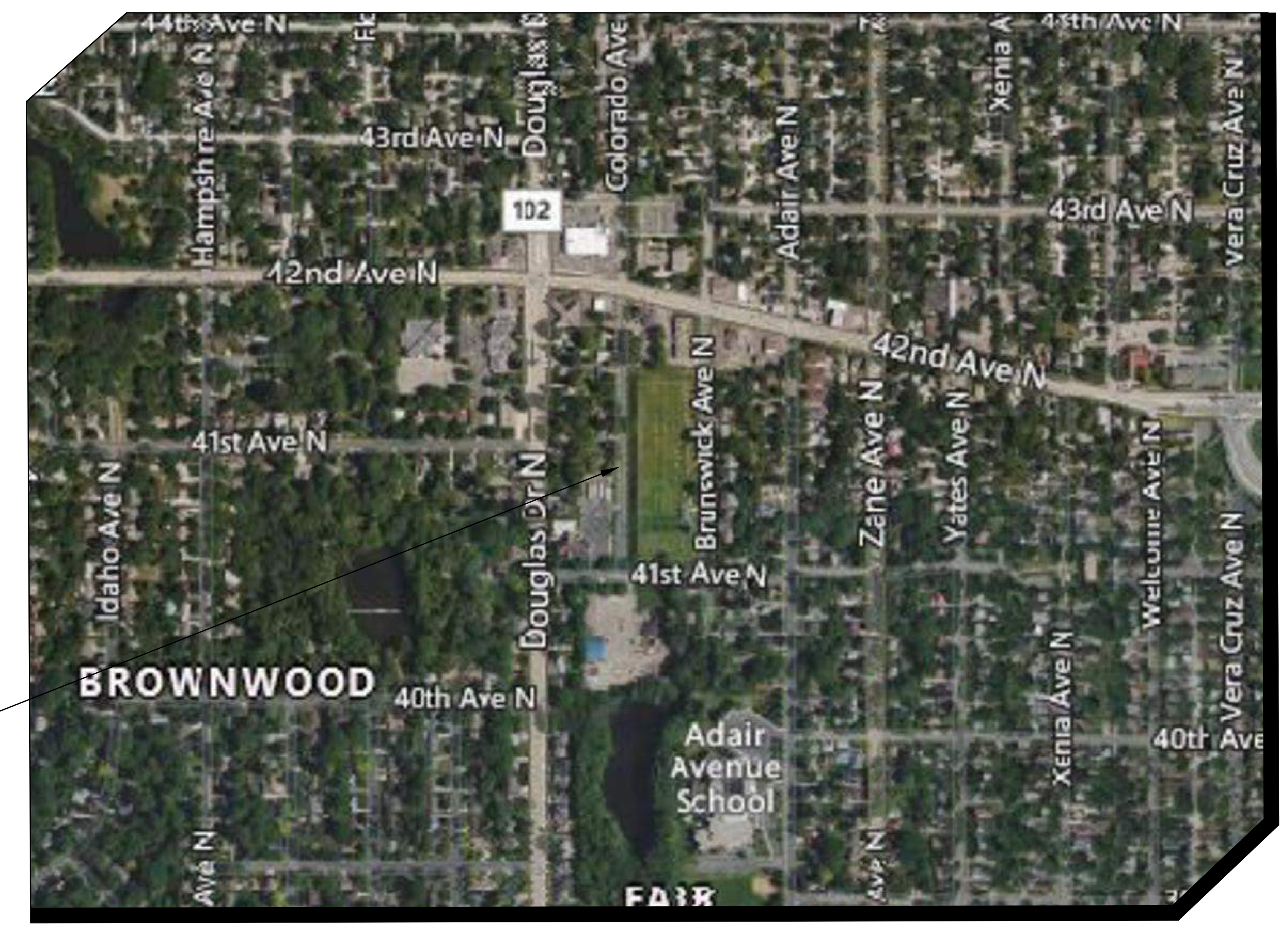
COLORADO AVENUE STORMWATER INFILTRATION TRENCH

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

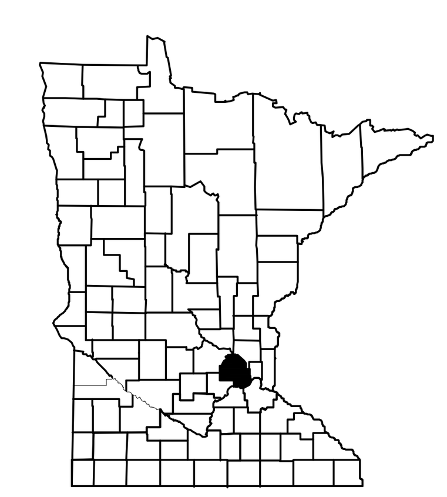


Sheet List Table	
Sheet Number	Sheet Title
C-001	COVER SHEET
C-002	GENERAL NOTES
C-003	LEGEND
C-101	STORM SEWER PLAN AND PROFILE
C-801	DETAILS
C-802	DETAILS (BID ALTERNATE)

N

VICINITY MAP

NOT TO SCALE



GRAPHIC SCALE
60 0 60 120
(IN FEET)
1 inch = 60 ft.

PROJECT LOCATION

CITY: CRYSTAL
COUNTY: HENNEPIN County

Stantec

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

ISSUE NO.	DESCRIPTION:	DATE:
0	30% PLANS	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.

NOT FOR CONSTRUCTION

LICENSE NO.: ____________
DATE: ____________

PROJECT NO.: 227705751

DWN BY:	CHK'D BY:	APP'D BY:
CGG	KT	####

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 CI/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.

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SUITE 100
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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

ISSUE NO.:	DESCRIPTION:	DATE:
0	30% PLANS	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.

NOT FOR CONSTRUCTION

LICENSE NO.: ______
DATE: ______

PROJECT NO.: 227705751

DWN BY:	CHK'D BY:	APP'D BY:
CGG	KT	####

ISSUE DATE: 10/26/2023
ISSUE NO.: 0
SHEET TITLE: GENERAL NOTES
SHEET NO.: C-002

10/31/2023 11:32:33 AM

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

GRADING / TOPOGRAPHY LEGEND

EXISTING	DESCRIPTION	PROPOSED
901	MINOR CONTOUR	901
900	MAJOR CONTOUR	900
	GRADING LIMITS	
	CONSTRUCTION LIMITS	
	SPOT ELEVATION	XXXXX
	SURFACE GRADE & FLOW DIRECTION	1.00%
	SURFACE SLOPE (H:V) & FLOW DIRECTION	3.0:1

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	
FM FM	FORCEMAIN	FM FM
W W	WATERMAIN	W W
IRR	IRRIGATION LINE	
G G	UNDERGROUND GAS LINE	
COM	UNDERGROUND COMMUNICATION LINE	
F/O F/O	UNDERGROUND FIBER OPTIC LINE	
UE UE	UNDERGROUND ELECTRIC LINE	
OU	OVERHEAD UTILITY LINE	
	DRAINTILE	
	PIPE CASING	
S	SANITARY MANHOLE	
CO	CLEANOUT	
ST	STORM SEWER MANHOLE	
	STORM SEWER INLET	
	FLARED END SECTION	
	CURB STOP	
	HYDRANT	
WV	WATER VALVE	
	REDUCER	
	FIRE DEPARTMENT CONNECTION	
W	WATER WELL	
	AUTO SPRINKLER	
PIV	POST INDICATOR VALVE	
WM	WATER METER	
	SPRINKLER HEAD	
	IRRIGATION CONTROL VALVE	
	GAS MARKER	
GV	GAS VALVE	
GM	GAS METER	
C	COMMUNICATIONS PEDESTAL	
T	TELEPHONE MANHOLE	
E	ELECTRICAL PEDESTAL	
EM	ELECTRIC METER	
	TRANSFORMER	
E	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
℄	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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CGG	KT	####

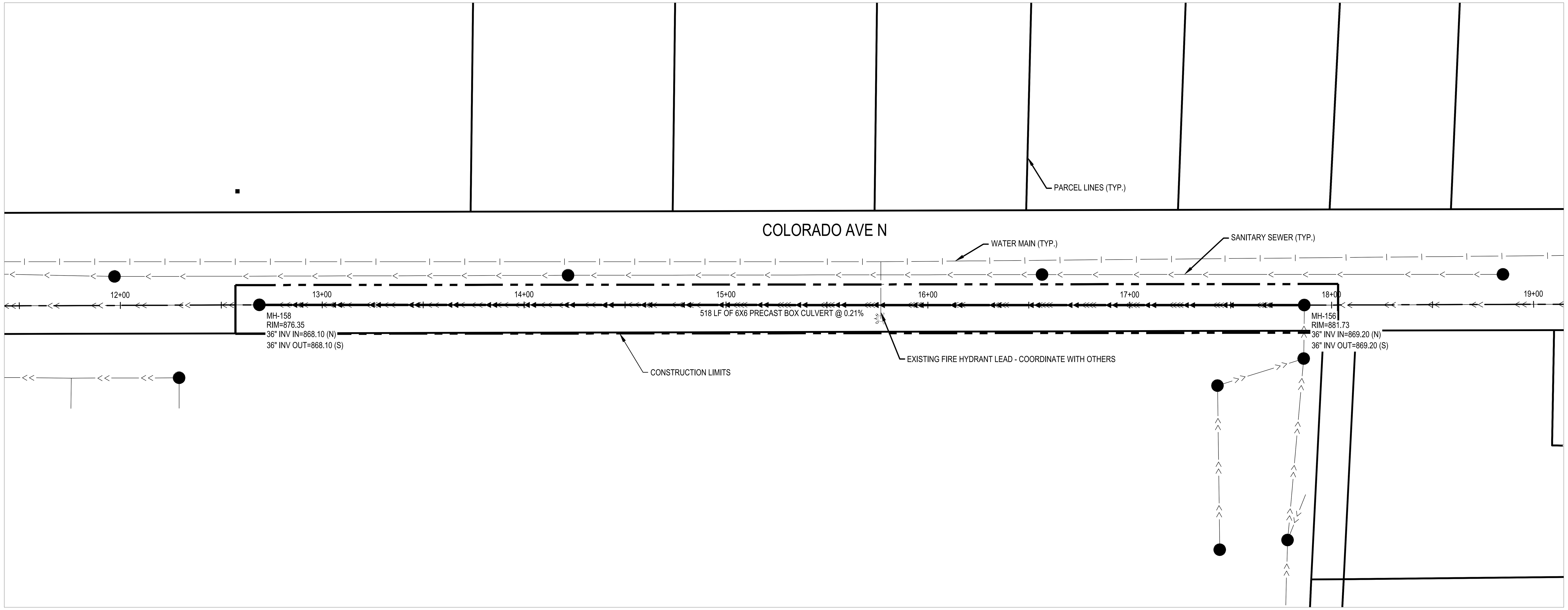
ISSUE DATE: 10/26/2023

ISSUE NO.: 0

SHEET TITLE:
LEGEND

SHEET NO.:
C-003

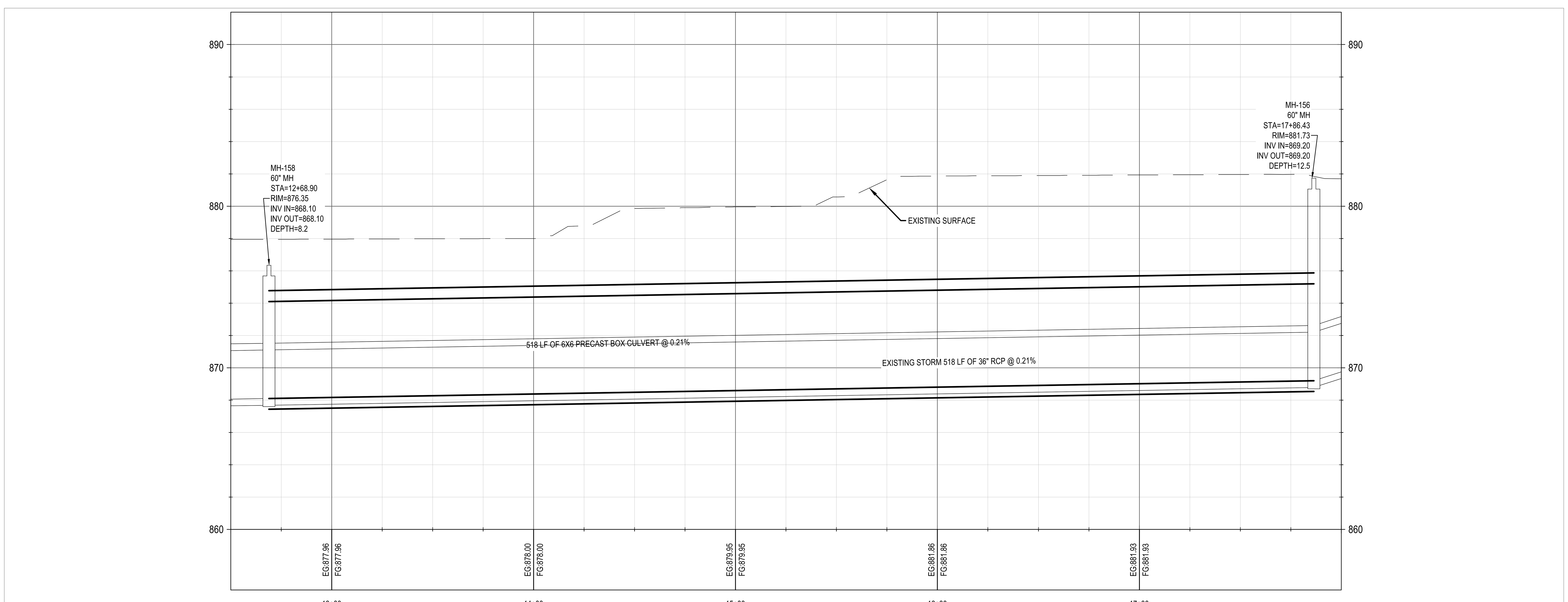
\\cd0286-pshost1\shared_projects\227705751\drafting\project_name\5_DESIGN\1_CAD\3 PLANSHEETS\C-003 GENERAL NOTES AND LEGEND.dwg 10/31/2023 FEISENMAER, MARK



GRAPHIC SCALE

30 0 30 60

(IN FEET)
1 inch = 30 ft.



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DWN BY: CGG | CHK'D BY: KT | APP'D BY: ####

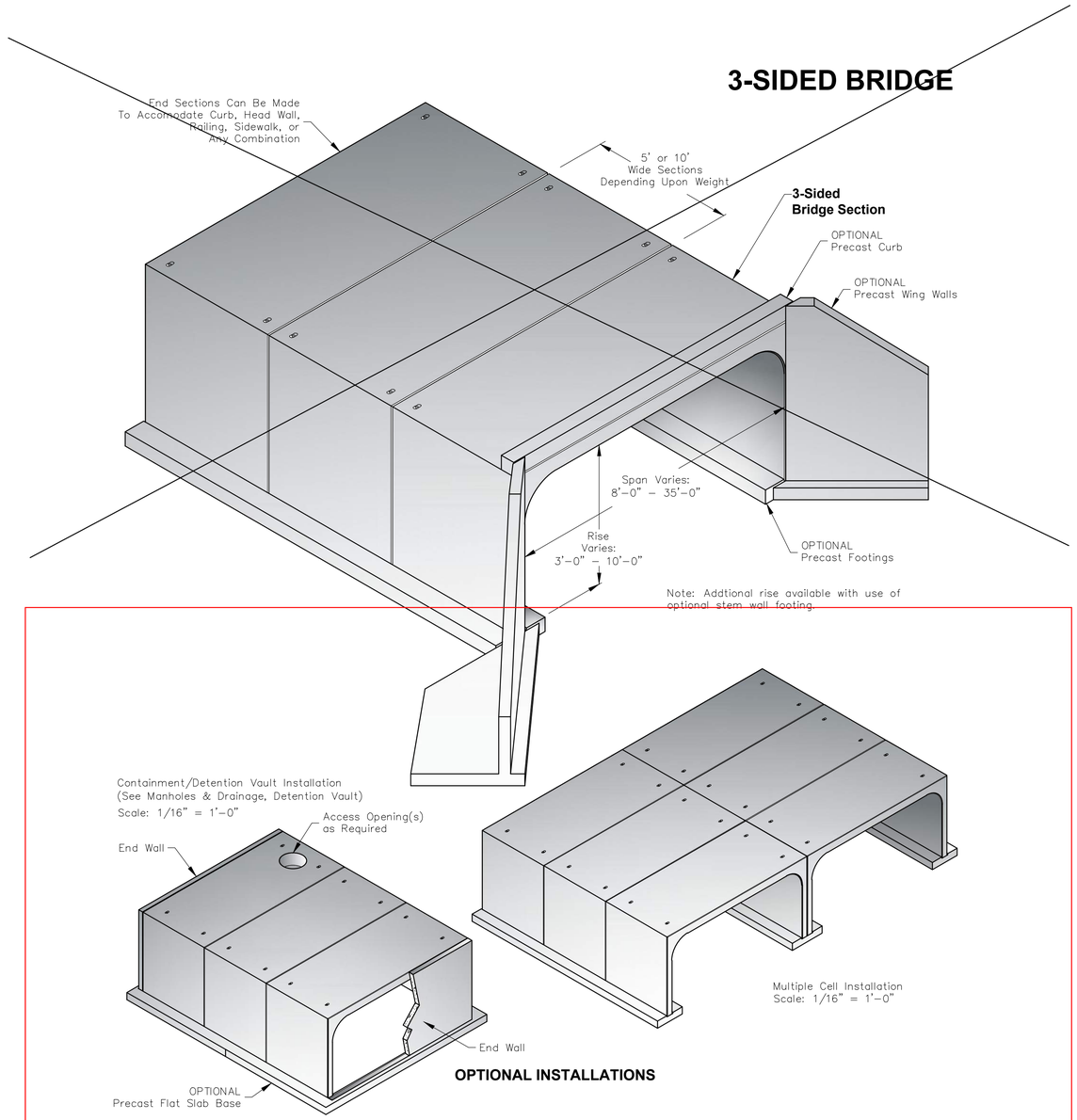
ISSUE DATE: 10/26/2023

ISSUE NO.: 0

SHEET TITLE: STORM SEWER PLAN AND PROFILE

SHEET NO.: C-101

3-SIDED BRIDGE

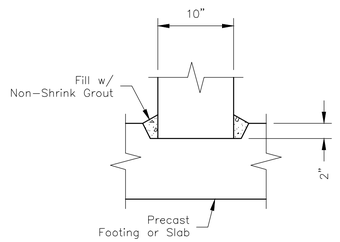


OPTIONAL INSTALLATIONS

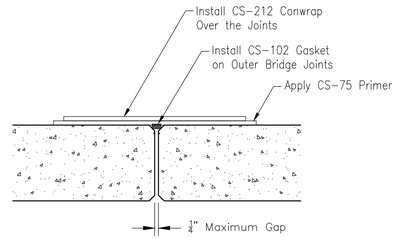
Oldcastle Precast® PO Box 323, Wilsonville, Oregon 97070-0323 Tel: (503) 682-2844 Fax: (503) 682-2657	**3-SIDED BRIDGE** File Name: 020-3-SIDED BRIDGE Issue Date: 2016 **oldcastleprecast.com/wilsonville**	**3-SIDED BRIDGE**

1.0

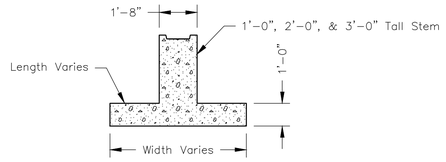
3-SIDED BRIDGE



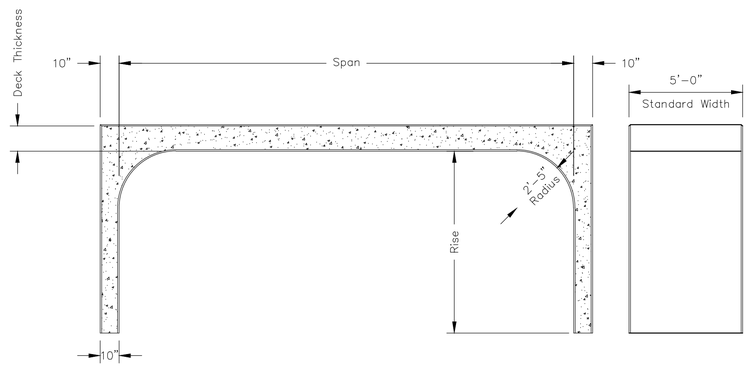
Grout Detail - Bridge to Footing



Joint Detail



Optional Stem Wall Footing Detail



Bridge Section **Side**

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1.1

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CGG	KT	####

ISSUE DATE: 10/26/2023
ISSUE NO.: 0
SHEET TITLE: DETAILS
SHEET NO.: C-801

BID ALTERNATE - POLYPROPYLENE CORRUGATED PIPE CHAMBER

ADS SiteAssist FOR STORMTECH INSTALLATION INSTRUCTIONS VISIT OUR APP

ADS Advanced Drainage Systems, Inc.

DC-780 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH DC-780.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. 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.
6. 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.
7. 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/FT/%. 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.
8. 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.
9. 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

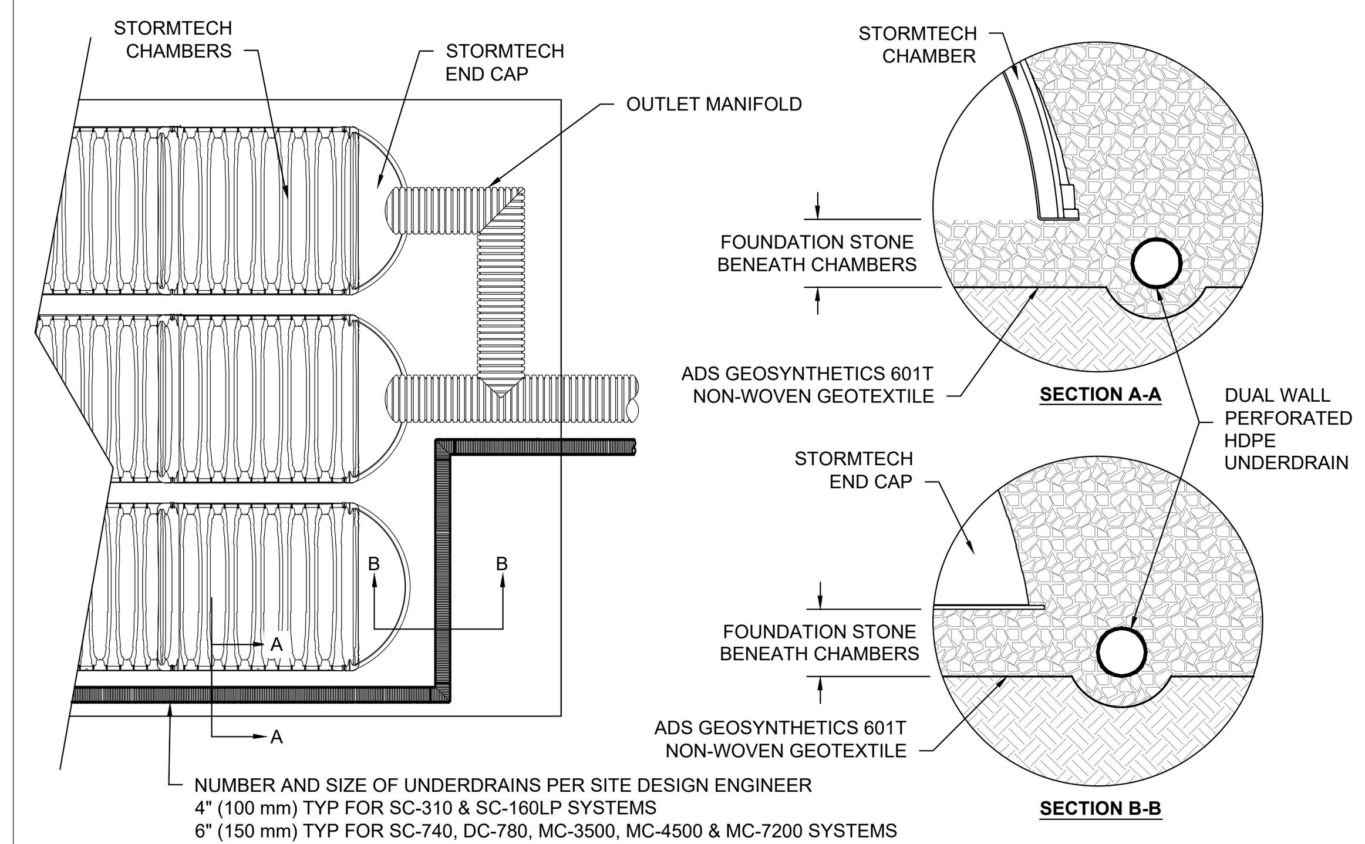
1. STORMTECH DC-780 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH DC-780 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER 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.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 6" (150 mm) SPACING BETWEEN THE CHAMBER ROWS.
7. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE 3/4-2" (20-50 mm).
8. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
9. 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

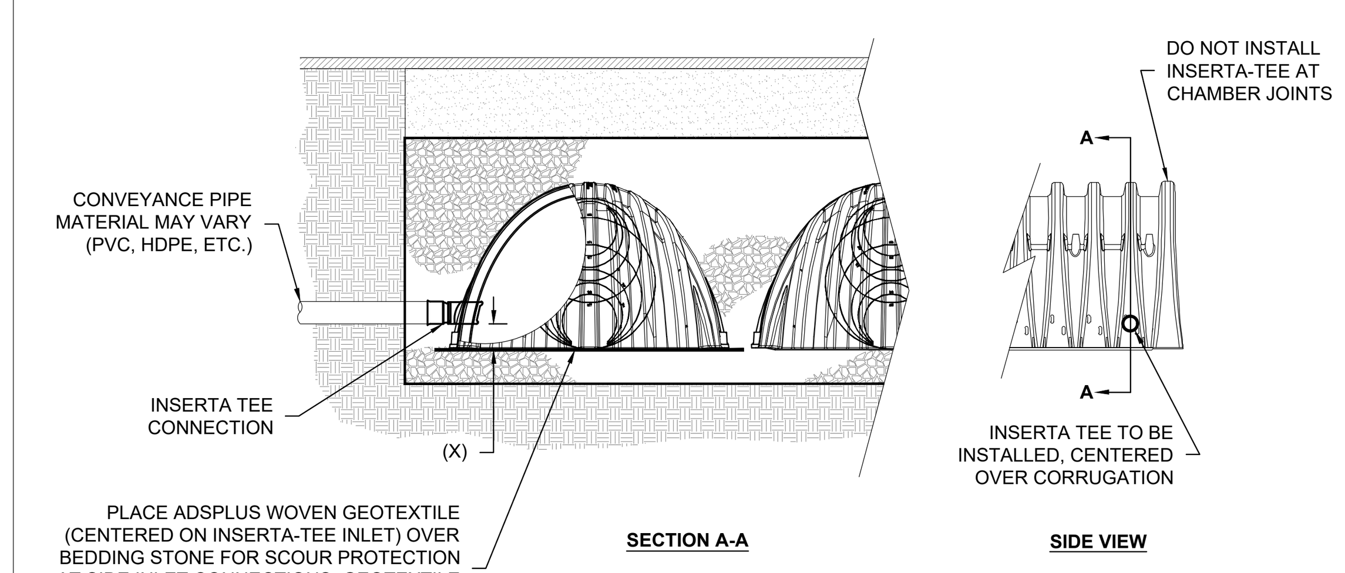
1. STORMTECH DC-780 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
2. THE USE OF CONSTRUCTION EQUIPMENT OVER DC-780 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADERS, DUMP TRUCKS, OR EXCAVATORS ARE 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".
3. 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.



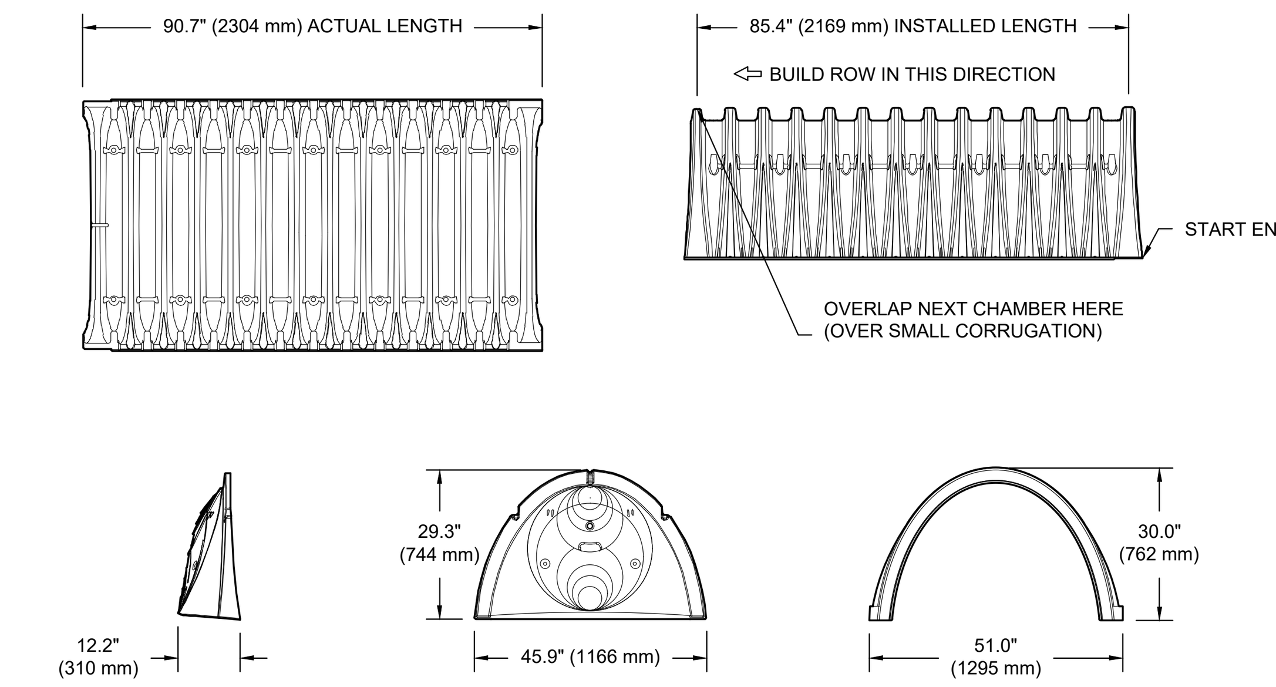
5 UNDERDRAIN DETAIL



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		

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.

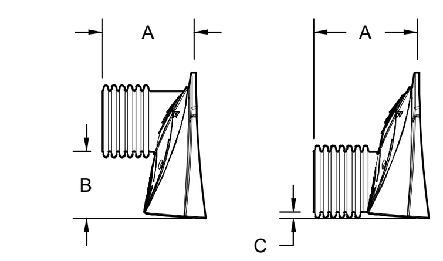
6 INSERTA-TEE SIDE INLET DETAIL



NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	51.0" X 30.0" X 85.4"	(1295 mm X 762 mm X 2169 mm)
CHAMBER STORAGE	46.2 CUBIC FEET	(1.30 m³)
MINIMUM INSTALLED STORAGE*	78.4 CUBIC FEET	(2.20 m³)
WEIGHT	75.0 lbs.	(33.6 kg)

*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"

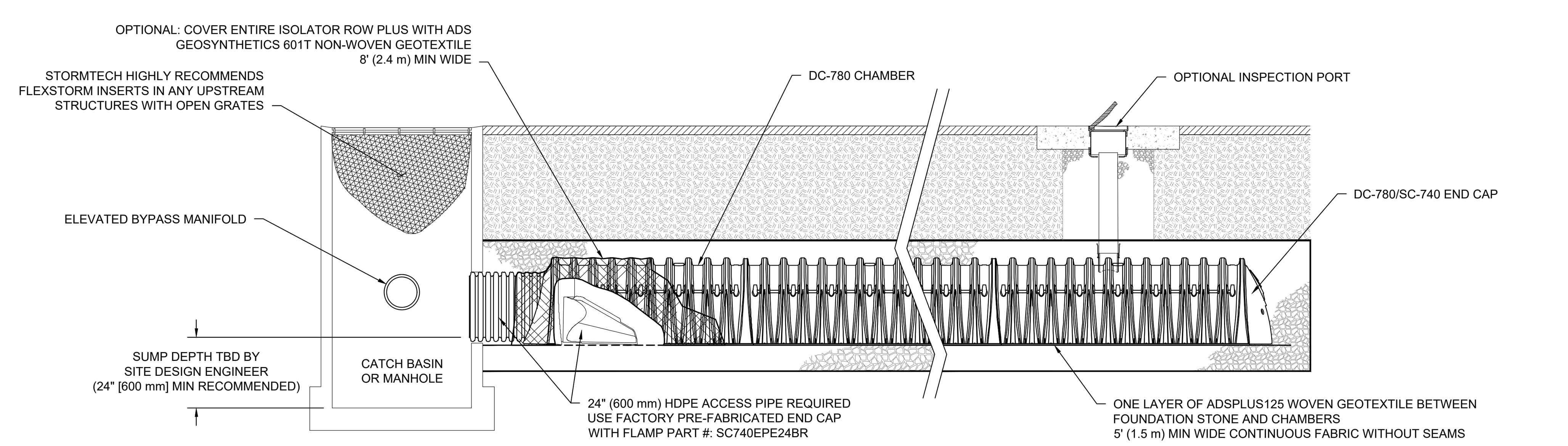
PART #	STUB	A	B	C
SC740EPE06T / SC740EPE06TPC	6" (150 mm)	10.9" (277 mm)	18.5" (470 mm)	---
SC740EPE06B / SC740EPE06BPC			---	0.5" (13 mm)
SC740EPE08T / SC740EPE08TPC	8" (200 mm)	12.2" (310 mm)	16.5" (419 mm)	---
SC740EPE08B / SC740EPE08BPC			---	0.6" (15 mm)
SC740EPE10T / SC740EPE10TPC	10" (250 mm)	13.4" (340 mm)	14.5" (368 mm)	---
SC740EPE10B / SC740EPE10BPC			---	0.7" (18 mm)
SC740EPE12T / SC740EPE12TPC	12" (300 mm)	14.7" (373 mm)	12.5" (318 mm)	---
SC740EPE12B / SC740EPE12BPC			---	1.2" (30 mm)
SC740EPE15T / SC740EPE15TPC	15" (375 mm)	18.4" (467 mm)	9.0" (229 mm)	---
SC740EPE15B / SC740EPE15BPC			---	1.3" (33 mm)
SC740EPE18T/ SC740EPE18TPC	18" (450 mm)	19.7" (500 mm)	5.0" (127 mm)	---
SC740EPE18B / SC740EPE18BPC			---	1.6" (41 mm)
SC740EPE24B*	24" (600 mm)	18.5" (470 mm)	---	0.1" (3 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.

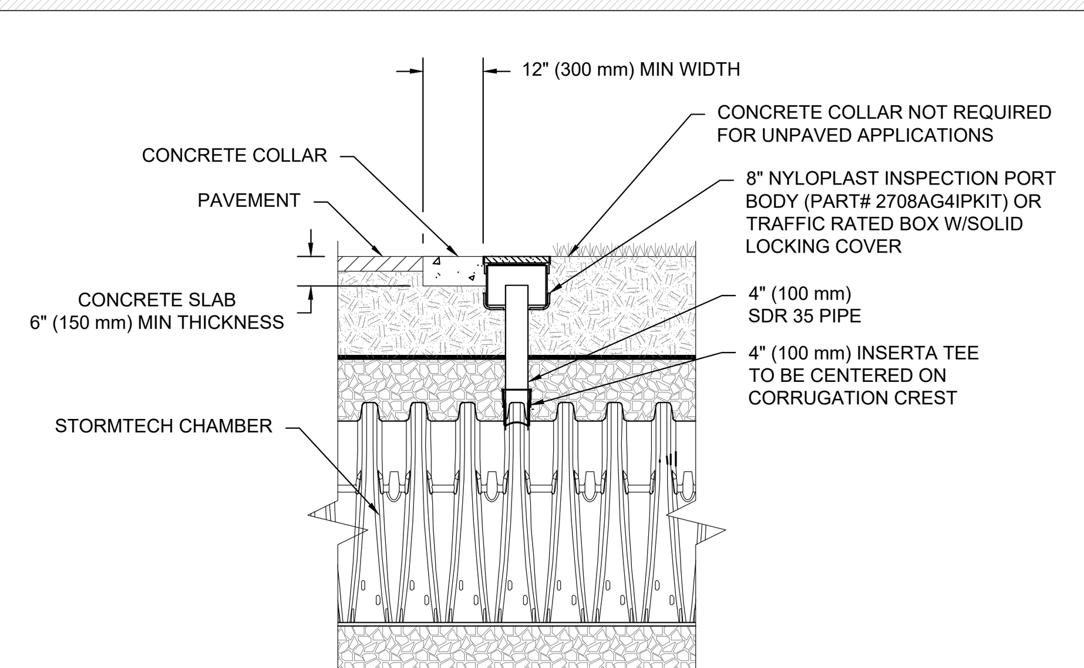
* FOR THE SC740EPE24B/SC740EPE24BR THE 24" (600 mm) STUB LIES BELOW THE BOTTOM OF THE END CAP APPROXIMATELY 1.75" (44 mm). BACKFILL MATERIAL SHOULD BE REMOVED FROM BELOW THE N-12 STUB SO THAT THE FITTING SITS LEVEL.

NOTE: ALL DIMENSIONS ARE NOMINAL

2 DC-780 TECHNICAL SPECIFICATIONS



3 DC-780 ISOLATOR ROW PLUS DETAIL



NOTE:
INSPECTION PORTS MAY BE CONNECTED THROUGH ANY CHAMBER CORRUGATION CREST.

4 4" PVC INSPECTION PORT DETAIL (SC SERIES CHAMBER)

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST 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
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. 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.

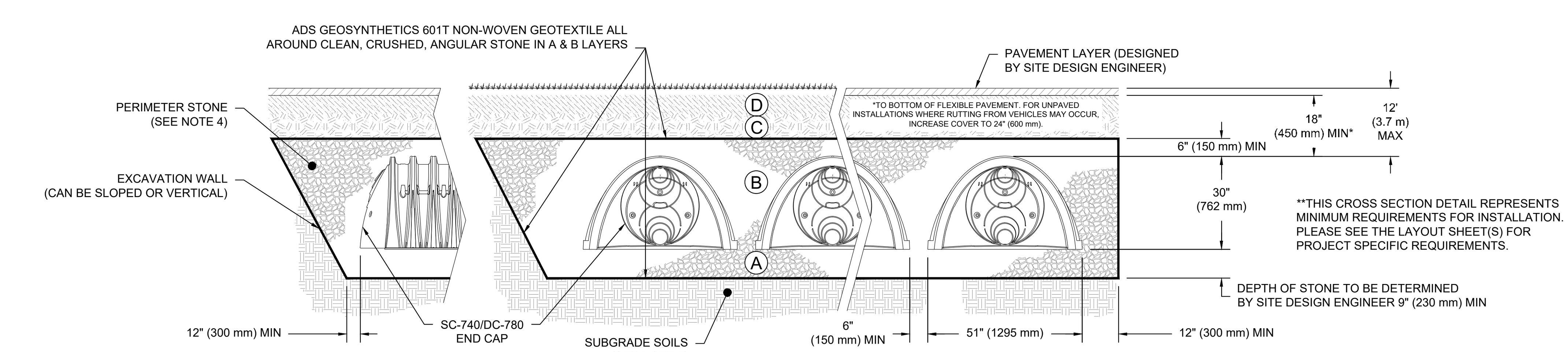
NOTES

1. 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.
2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.

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	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	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. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	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.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

PLEASE NOTE:
1. 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".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. 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.
4. 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:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
2. DC-780 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. 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.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. 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/FT/%. 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.

1 DC-780 CROSS SECTION DETAIL

NOT TO SCALE

DC-780 STANDARD DETAILS

StormTech® Chamber System 888-892-2694 | WWW.STORMTECH.COM

ADS Advanced Drainage Systems, Inc. 4640 TRUEMAN BLVD HILLIARD, OH 43026

Stantec
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

ISSUE NO.:	DESCRIPTION:	DATE:
0	30% PLANS	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.

NOT FOR CONSTRUCTION

LICENSE NO.: ____
DATE: ____

PROJECT NO.: 227705751
DWN BY: CGG | CHK'D BY: KT | APP'D BY: ####
ISSUE DATE: 10/26/2023
ISSUE NO.: 0
SHEET TITLE: BID ALTERNATE DETAILS
SHEET NO.: C-802

Minnesota MIDS Calculator -- Version 4

Notes:
1) Make sure macros are enabled. If not, click Microsoft Office Button in upper left hand corner.
Click "Excel Options". Click "Trust Center", click "Trust Center Settings" and then click "Macro Settings". Set Macro Settings to "Enable All Macros" and restart Excel.

2) Enter Site Information in blue cells below

3) Go to MIDS BMP Calculator tab and follow instruction on top of that page

Project Name:	Colorado Ave Underground Trench
User Name / Company Name:	
Date:	4/8/2024
Project Description:	Colorado Ave underground trench - MIDS updated to match 30% design plans from October 2
Are you using the calculator to determine compliance with a Construction Stormwater permit? (Yes/No)	**No**

Legend

User input cells
Calculation cells
Constant values
Value obtained from another sheet

Site Information

Retention Requirment (inches):	1.1
Site's Zip code:	55428
Annual Rainfall (inches):	30.5
Phosphorus EMC (mg/L):	0.3
TSS EMC (mg/L):	54.5
Fraction of annual rainfall events that produce runoff:	0.9

Total Watershed Area

Land Cover (acres)	**A soils**	**B Soils**	**C Soils**	**D Soils**	**Totals (acres)**
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land					0
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed				26.99	26.99
Impervious Cover (acres)					16.54
				Total:	43.53

Watershed Area Routed to BMPs (Summary of "MIDS BMP Calculator" Tab)

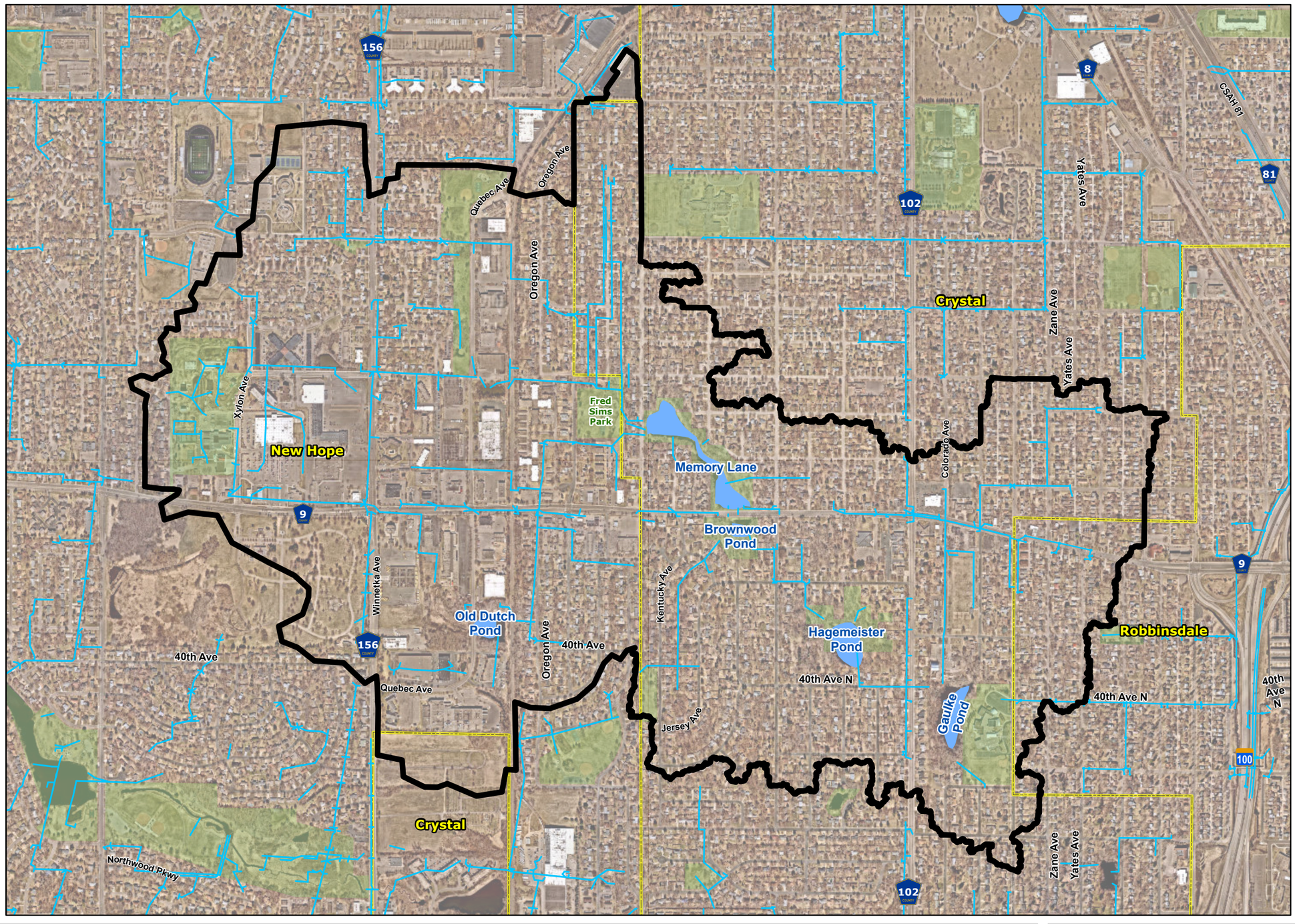
Land Cover (acres)	**A soils**	**B Soils**	**C Soils**	**D Soils**	**Totals (acres)**
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land					0
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed				26.99	26.99
Impervious Cover (acres)					16.54
				Total:	43.53

Summary Information

Total impervious cover (acres)	16.54
Total watershed area (acres)	43.53
Site runoff coefficient, Rv	0.52
% Impervious	38%
Development volume retention requirement (cubic feet)	**66,044**
Volume removed by BMPs (cubic feet)	12,480
Additional volume removal needed to meet requirement (cubic feet)	53,564
Percent volume removed	18.90%
Post-developoment annual volume (acre-ft)	51.38
Annual volume removed by BMPs (acre-ft)	25.66
Percent annual volume removed	49.94%
Post-development annual Particulate P load (lb/yr)	23.06
Annual Particulate load removed by BMPs (lb/yr)	11.51
Post-development annual Dissolved P load (lb/yr)	18.87
Annual Dissolved P load removed by BMPs (lb/yr)	9.42
Percent annual TP removed	49.94%
Post-development annual TSS load (lb/yr)	7,616
Annual TSS load removed by BMPs (lb/yr)	3,803
Percent annual TSS removed	49.94%

Note:
Green cells will fill in when MIDS BMP Calculator tab is complete

Grey Cells are calculated using Site Information entered above



Legend

- Gaulke Pond Subwatershed Boundary
- Municipal Boundary
- Storm Sewer
- Park
- Waterbody

N

1,000 500 0 1,000

Feet

Path: L:\1240\21-503 Ryan Lake Subwatershed\Pro\WatershedFigures\WatershedFigures.aprx
5/26/2021 3:47 PM BerKA1064 Layout: Gaulke Pond Subwatershed

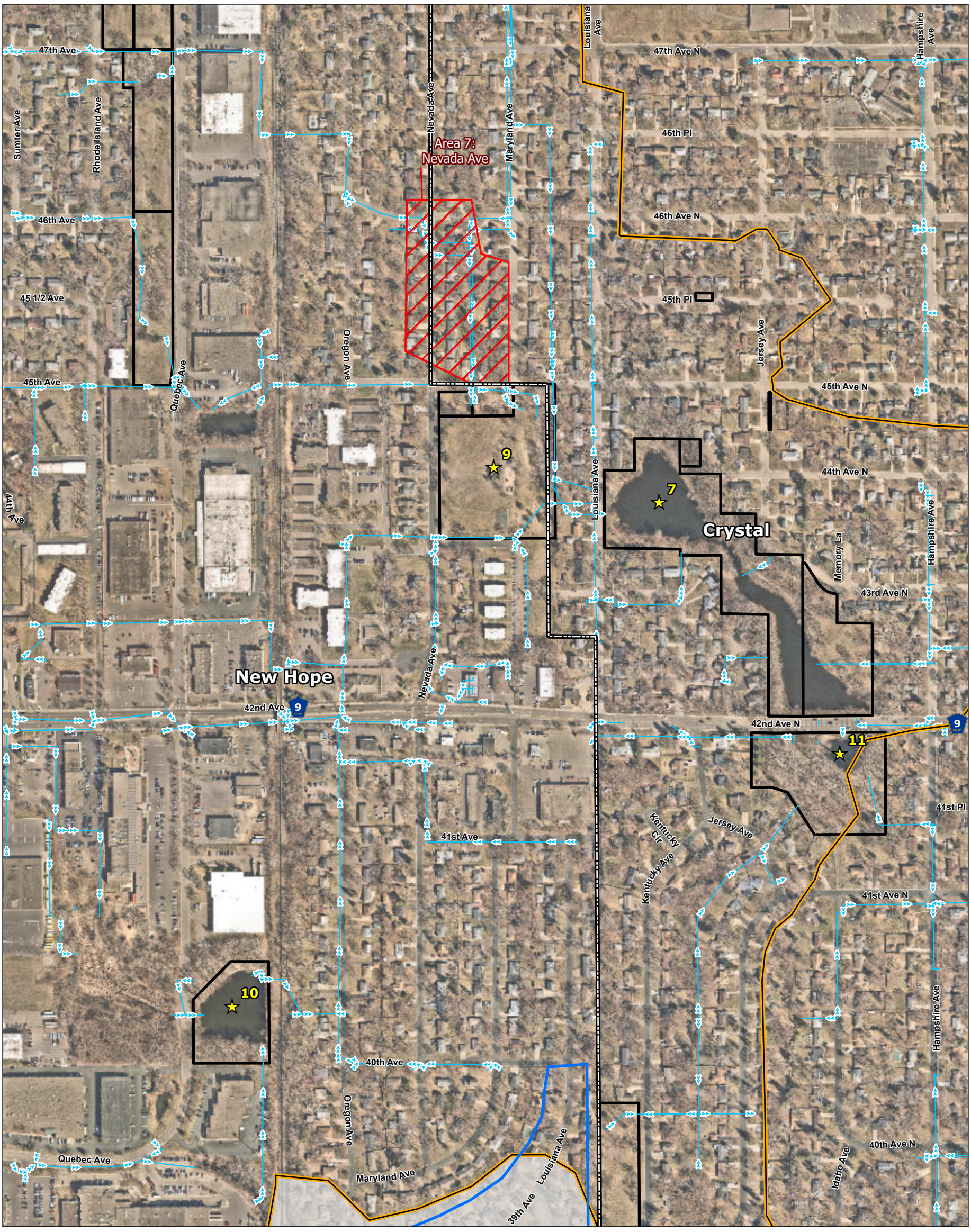
SHINGLE CREEK

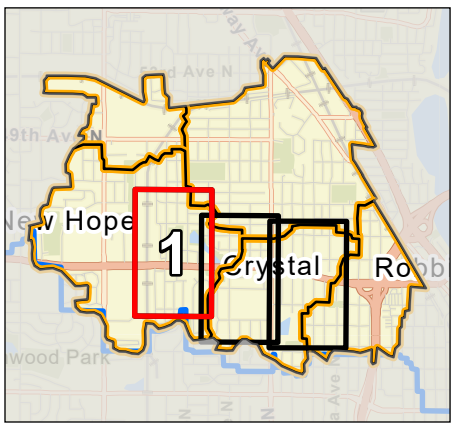
Gaulke Pond Subwatershed

WENCK now part of Stantec

JUN 2021

Figure 1





Legend

- Shingle Creek Legal Boundary
- Twin Lake Subwatershed Areas
- Minor Civil Division
- Public_Parcels
- Gaulke Pond
- Localized Flooding Area
- Storm Sewer
- Opportunity Area

0 200 400 Feet

(At original document size of 11x17)
1:4,800

N

Stantec

Notes

1. Coordinate System: NAD 1983 HARN Adj MN Hennepin Feet
2. Data Sources: MnDOT, MnDNR, Stantec, BARR, Hennepin County, SCWMC, City of Crystal, City of New Hope
3. Background: Hennepin County 2021 Aerial

Project Location
Hennepin Co., MN

Prepared by ARH on 2023-03-23

Client/Project
227705751
Shingle Creek Watershed Management Commission
Gaulke Pond Subwatershed Assessment

Figure No.
1 - 1

Title
Localized Flooding Areas

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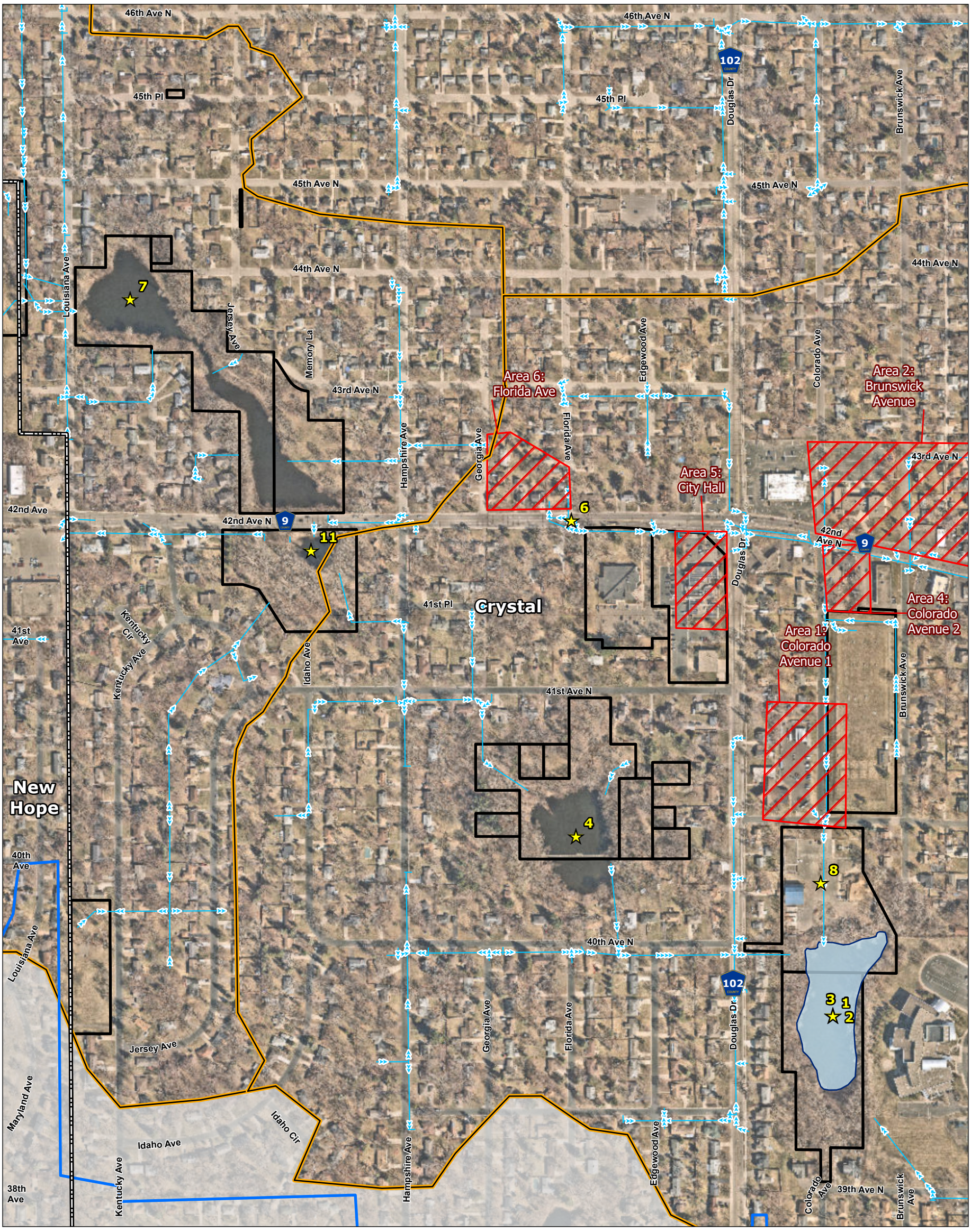

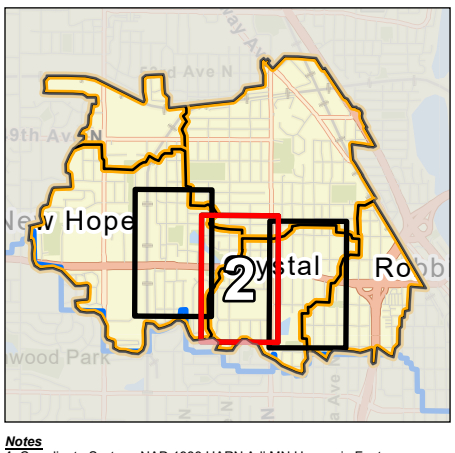

Legend

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0 200 400 Feet

(At original document size of 11x17)
1:4,800

N

Stantec

Project Location
Hennepin Co., MN

Prepared by ARH on 2023-03-23

Client/Project
227705751
Shingle Creek Watershed Management Commission
Gaulke Pond Subwatershed Assessment

Figure No.
1 - 2

Title
Localized Flooding Areas

Notes
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2. Data Sources: MnDOT, MnDNR, Stantec, BARR, Hennepin County, SCWMC, City of Crystal, City of New Hope
3. Background: Hennepin County 2021 Aerial

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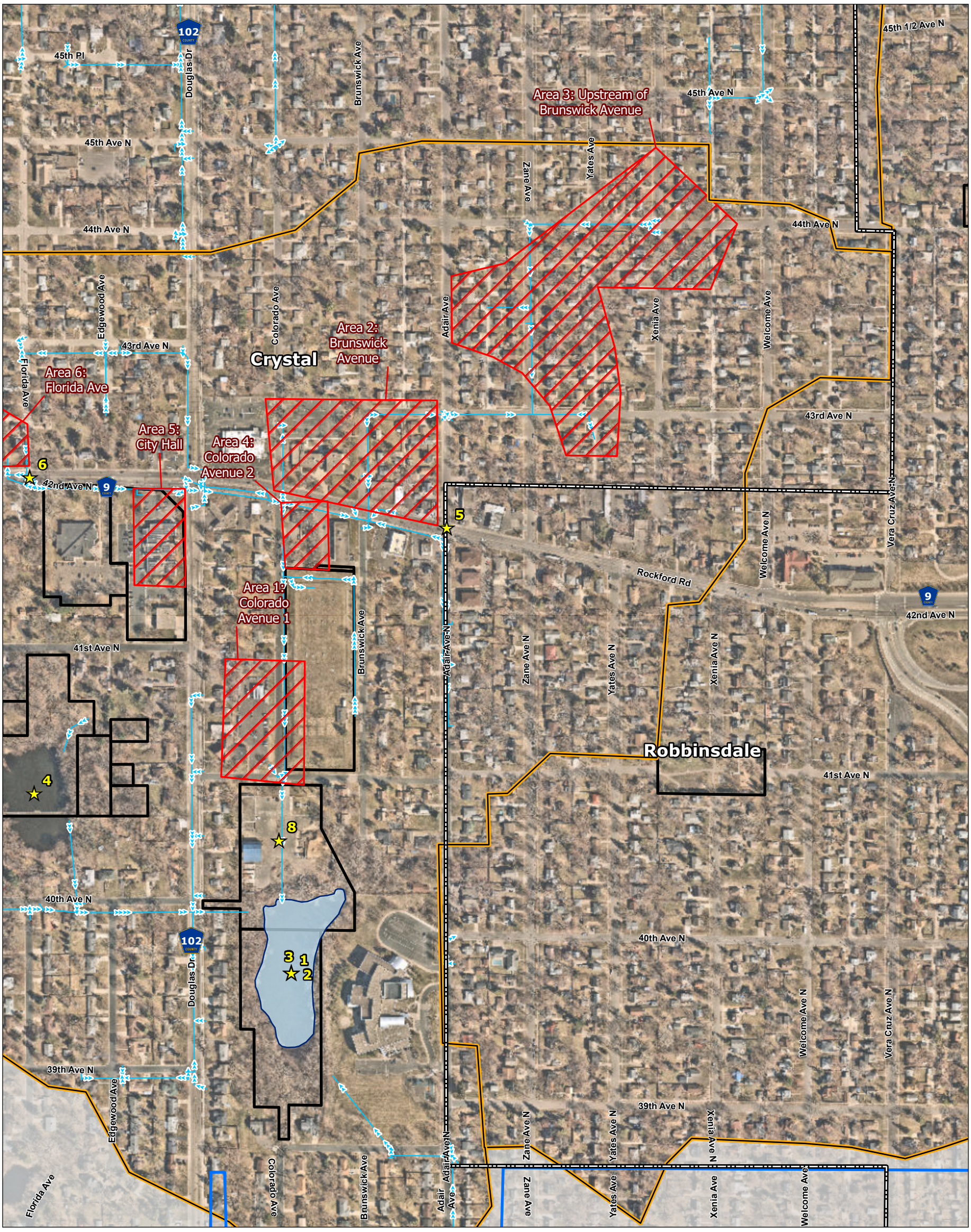

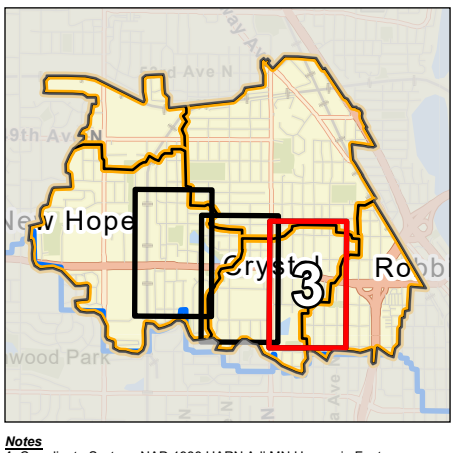

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Legend
- Shingle Creek Legal Boundary
- Twin Lake Subwatershed Areas
- Minor Civil Division
- Public_Parcels
- Gaulke Pond
- Localized Flooding Area
- Storm Sewer
- Opportunity Area

0 200 400 Feet

(At original document size of 11x17)
1:4,800

N

Stantec

Project Location
Hennepin Co., MN

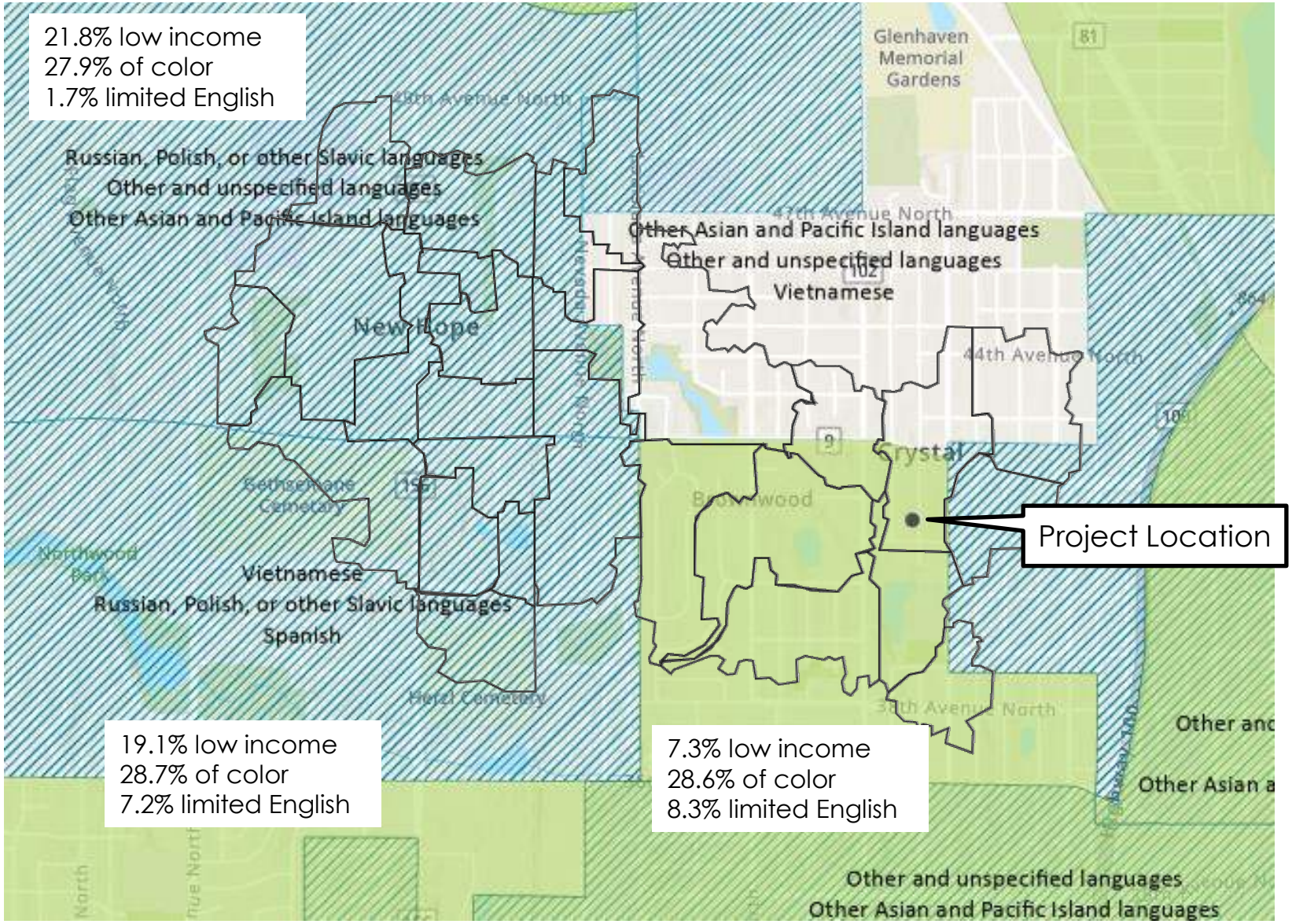
Prepared by ARH on 2023-03-23

Client/Project
227705751
Shingle Creek Watershed Management Commission
Gaulke Pond Subwatershed Assessment

Figure No.
1 - 3

Title
Localized Flooding Areas

V:\2277\active\227705751\03_data\gis_cad\gis\proj\gaulke_pond_swa\gaulke_pond_swa.aprx Revised: 2023-03-23 By: rwels



EJ Areas Impacted by Colorado Avenue Infiltration Trench