MEETING MINUTES

Riley-Purgatory-Bluff Creek Watershed District

April 3, 2019, RPBCWD Public Hearings and Board of Managers Monthly Meeting

PRESENT:

Managers:	Jill Crafton, Treasurer	
	Larry Koch	
	Dorothy Pedersen, Vice President	
	Dick Ward, President	
	David Ziegler, Secretary	
Staff:	Zach Dickhausen, RPBCWD Water Resources Technician	
	Terry Jeffery, Watershed Planning Manager	
	Michelle Jordan, Communication and Project Manager	
	Joshua Maxwell, Water Resources Coordinator	
	Louis Smith, Attorney, Smith Partners	
	Scott Sobiech, Engineer, Barr Engineering Company	
Other attendees:	Lawrence Bushnell, Eden Prairie Resident	Tim Olson, Bolton & Menk, Inc.
	Andy Brotzler, City of Chanhassen	Rod Rue, City of Eden Prairie
	Rod Fisher, Eden Prairie Resident	Bill Satterness, Eden Prairie Resident
	Sara Flagstad, City of Chanhassen	Diane Spector, Wenck
	Greg Hawks, Chan. Env. Comm.	Laurie Susla, LLCA
	Elizabeth Henley, Smith Partners	Joann Syverson, Chanhassen Resident; LLCA
	Denny Kopfman, CAC	Marc Syverson, Chanhassen Resident; LLCA
	Mary Krause, City of Eden Prairie	Marilynn Torkelson, CAC
	Sarah Lloyd, Bolton & Menk, Inc.	Lori Tritz, Chair, CAC
	Bryan Maloney, LRIA; Chanhassen Res.	Anne Wilkinson, Wenck

1. Call to Order

Manager Ward called to order the Wednesday, April 3, 2019, Board of Managers Monthly Meeting at 7:00 p.m. at the District Office, 18681 Lake Drive East, Chanhassen, MN 55317.

2. Approval of the Agenda

Manager Koch requested removing from the Consent Agenda all items except item 11h – Approve Permit #2019-008 for the Construction of a Pavilion at Staring Lake in Eden Prairie, with Engineer Recommendations. As a matter of order, these items were removed from the Consent Agenda. President Ward added them in the same sequence to the Agenda's Action Items.

Manager Koch commented that in his review of the minutes he didn't see that the Board ordered any public hearing except for the Hyland Lake Alum Project. He moved to remove the other three public hearings from the agenda: Agenda items 4, 5, and 6. The motion failed due to lack of a second.

Manager Koch moved to table Agenda item 12e – Organizational Changes and set a Board workshop to handle the item or make it part of the Board's next monthly meeting, so the Administrator could take part in the discussion. The motion failed due to lack of a second.

Manager Koch moved to add as Agenda item 12k – AIS Funding for Lotus Lake and City of Eden Prairie. Manager Ziegler seconded the motion. Managers discussed the motion. Manager Koch made a new motion to add to the next monthly meeting agenda a discussion of AIS funding and to include a discussion of AIS funding for Lotus Lake and Eden Prairie. Manager Ziegler seconded the motion. Upon a vote, the motion carried 5-0. Attorney Smith stated that he understands that Manager Koch's second motion supersedes his first motion and no other action by the Board is required on Manager Koch's original motion.

Manager Ziegler moved to approve the agenda as amended. Manager Koch seconded the motion. Upon a vote, the motion carried 5-0.

3. Public Hearing: Hyland Lake Alum Project

President Ward opened the public hearing on the Hyland Lake Alum Project. Ms. Anne Wilkinson of Wenck presented on the project plan for the Hyland Lake Alum Project, including timeline, cost estimates, and next steps. She responded to managers' questions including a question about the rising cost of alum. Manager Koch brought up the subject of the cost of this project per pound of phosphorous removed. President Ward called for public comments. Upon hearing none, Manager Pederson moved to close the public hearing on the Hyland Lake Alum Project. Manager Ziegler seconded the motion. Upon a vote, the motion carried 5-0.

4. Public Hearing: Chanhassen Cost-Share Vacuum Truck

Ms. Jordan introduced Ms. Sara Flagstad from the City of Chanhassen's Public Works and City Engineering team. Ms. Flagstad explained the reasons the City of Chanhassen would like to purchase a Regenerative Air Sweeper in 2019. She talked about the benefits of this type of sweeper compared to a traditional sweeper in terms of water quality benefits. She noted that this new sweeper is just part of the City's larger effort to improve water quality. She described the City's planned use for the sweeper. Ms. Flagstad stated that the City of Chanhassen is requesting a $30,000 cost-share grant from the District to help fund the purchase of the Regenerative Air Sweeper. She said that reporting will happen on an annual basis as part of the City's public works and engineering annual report and the results and metrics will be shared with the District. Ms. Flagstad added that the City would include an article in the City's communication *The Chanhassen Connection* about the partnership between the City and the District to purchase the new sweeper. She responded to questions.

Mr. Bill Satterness, Eden Prairie Resident, brought up the Board's decision-making process about participating in the cost of the Vacuum Truck. He went through a hypothetical scenario as an example of a cost-benefit analysis and said he would like the Board to think in this manner going forward for making decisions.

Ms. Jordan talked about the District's Cost-Share Grant program and the process the District, including the CAC, recently concluded regarding updating its Cost-Share Program.

President Ward called for additional public comments. Upon hearing none, Manager Ziegler moved to close the public hearing on the Chanhassen Cost-Share Vacuum Truck. Manager Pedersen seconded the motion. Upon a vote, the motion carried 4-0 [Manager Koch abstained from the vote.]

5. Public Hearing: Duck Lake Partnership Project

President Ward opened the public hearing on the Duck Lake Partnership Project. Ms. Jordan presented on the project. She provided background on the Duck Lake Subwatershed and the identification in the District's 10-Year Plan of the subwatershed as a candidate for a protection project. Ms. Jordan summarized the District's Task Order 25, which analyzed what kinds of projects could be done in the subwatershed and identified four types of BMPs that would be effective. She went into detail about the District's process to engage residents to participate in the identified BMPs. Ms. Jordan listed project cost estimates and projected water quality benefits. She responded to questions. President Ward called for public comments.

Mr. Rod Fisher, Eden Prairie Resident, said he lives on the south side of Duck Lake and reported that this project has generated a lot of energy with residents about water quality around Duck Lake.

Mr. Bill Satterness, Eden Prairie Resident, commented that rain gardens are nice, but his data shows that they prevent 13.7 pounds of phosphorous from entering the waterbody at a cost of $200,000. He talked about the kind of cost-benefit analysis and questions he would like the Board and District to raise and answer.

Manager Koch raised the topic of the project's cost per pound of phosphorous removed and his concerns on whether the District is using the public's money for the greatest good and parity. The managers discussed project benefits.

President Ward called for additional public comments. Upon hearing none, Manager Ziegler moved to close the public hearing. Manager Crafton seconded the motion. Upon a vote, the motion carried 5-0.

6. Public Hearing: Purchase Properties for Wetland Restoration at Pioneer Trail

President Ward opened the public hearing. Mr. Jeffery summarized the project and talked about the properties proposed to be acquired for this project. He displayed a PowerPoint table "Property Acquisition and Site Preparation Cost Estimate" and went through the estimated project costs, detailed per property. There was brief discussion about the District's interest in owning property. President Ward called for public comments. Upon hearing none, Manager Ziegler moved to close the public hearing. Manager Pedersen seconded the motion. Upon a vote, the motion carried 5-0.

7. Adopt Resolution 2019-009 Adopting Policy on Application of Chloride-Management Plan Requirements to Residential Subdivisions

Mr. Jeffery noted that this item was discussed last month, and staff said it would bring the financial assurance schedule in front of the Board at this meeting. He said that he did not have the opportunity to review the schedule with Administrator Bleser and so he did not include it as part of the item in front of the Board tonight. He said the action in front of the Board tonight is adopting a resolution that, in essence, will exempt single family residential home properties from the District's chloride management requirements. Manager Ziegler moved to adopt Resolution 2019-009 Adopting Policy on Application of Chloride-Management Plan Requirements to Residential Subdivisions. Manager Crafton seconded the motion. Upon a roll call vote, the motion carried 4-1.

Manager	*Aye*	*Nay*	*Absent*	*Abstain*
Crafton	X			
Koch		X		
Pedersen	X			
Ward	X			
Ziegler	X			

8. Matters of General Public Interest

President Ward explained the procedure for raising matters of general public interest and opened the floor.

Ms. JoAann Syverson, Chanhassen Resident, raised her concerns about effects of wake surfing on Lotus Lake, its shoreline, and the effects, broadly, of wake surfing on lakes in the watershed. She provided examples of ordinances she believes should be set in place and asked for the District's endorsement of her efforts with the DNR to encourage the DNR to take action to set wake surfing ordinances.

Mr. Bill Satterness of 8597 Red Oak Drive, Eden Prairie, introduced himself as a member and Director of Friends of Red Rock Lake. He handed out a document "Aquatic Invasive Species – Recommendations – March 2019" and went through his recommendations and his request for District action.

Ms. Laurie Susla of 7008 Dakota Avenue, Chanhassen, commented that more AIS funding equals more inspections, which equals safer lakes. She spoke in favor of the District increase funding for AIS.

Manager Koch stated that he responded in an email to express his own views to Mr. Satterness and handed out a copy of his April 3, 2019, email to become part of the District record.

9. Approval of Minutes

a. March 1, 2019, RPBCWD Board of Managers Monthly Meeting

Manager Ziegler moved to accept the minutes as presented. Manager Crafton seconded the motion. Manager Koch commented that he did not see any action by the Board to direct the public hearings on the Chanhassen Cost-Share Vacuum Truck, Duck Lake Partnership Project, and Purchase Properties for Wetland Restoration at Pioneer Trail. Upon a vote, the motion carried 4-1 [Manager Koch voted against the motion.]

10. Citizen Advisory Committee (CAC)

Ms. Lori Tritz, CAC Chair, reported on the CAC's most recent meeting and its discussions about Prince's former property, the District's cost-share program, and the status of the CAC's subcommittees' charters.

11. Consent Agenda

President Ward noted there is one item on the Consent Agenda: 11h – Approve Permit 2019-008 for the construction of a pavilion at Staring Lake in Eden Prairie with engineer recommendation.

Manager Koch moved to approve Permit 2019-008 based on staff's review and comments and asked that the Engineer's Memo be part of the record of this meeting. Manager Koch seconded the motion. Upon a vote, the motion carried 5-0.

12. Action Items

a. Accept February Treasurer's Report

Treasurer Crafton communicated that the report has been reviewed in accordance with the District's internal controls and procedures. She moved to accept the Treasurer's Report. Manager Ziegler seconded the motion. Manager Koch asked a series of questions about the report. Staff responded. Upon a vote, the motion carried 5-0.

b. Approve Paying of Bills

Manager Ziegler moved to pay the bills. Manager Crafton seconded the motion. Upon a vote, the motion carried 5-0.

c. Consider Approval of Variance Requests Associated with Permit Application 2019-004 Duck Lake Road

Engineer Sobiech gave an overview of the project. He continued by giving a detailed review of the six variances requests from the applicant and the Engineer's review of the variance requests. Manager Ziegler asked if the reviews should take into consideration that the DNR may make changes. Attorney Smith stated he agrees with the District Engineer's action to review the application based on current conditions. Attorney Smith noted that if the DNR goes through proceedings and change happens, it would require the District to change it rules.

Mr. Tim Olson and Ms. Sarah Lloyd of Bolton & Menk, Inc. were present at the meeting and responded to managers' questions.

The Board had a lengthy discussion. Manager Koch moved to lay this agenda item and the next agenda item over until the Board's next monthly meeting in order for staff to gather more information on pollution and water quality and wetland impacts. Manager Ziegler seconded the motion.

Ms. Lloyd talked about the timing of the permitting process. Ms. Pedersen asked about the District's jurisdiction in terms of permitting for this project. Attorney Smith explained what is within the District's jurisdiction and stated that the Board can grant or deny variances and permits based on the District's rules. Upon a vote, the motion carried 5-0.

d. Consider Approval of Permit Application 2019-004 for the Reconstruction of Duck Lake Road in Eden Prairie with Staff Recommendations

[*Item held over until the District's May Monthly Board meeting. See 11c.*]

e. Organizational Changes:
Approve Job Description Changes for Community Outreach Coordinator to Communication and Project Manager and Commensurate Compensation Adjustment; Approve Job Description Change for Office and Outreach Assistant to Education and Outreach Coordinator; Approve Job Description Change for Permit and Project Manager to Watershed Planning Manager
Manager Pedersen summarized the process undertaken to review these jobs and job descriptions. There was discussion about the process and comments about what sources and level of expertise were used in the process. Manager Koch moved to lay this item over until it can be discussed either in a workshop or at the Board's next monthly meeting so Administrator Bleser can be present. He said he did not have enough information. The motion failed due to the lack of a second.

Manager Pedersen moved to adopt the organizational changes and salary adjustments as laid out in the Thursday, March 21, 2019, memo included in the meeting packet. Manager Crafton seconded the motion. Manager Ziegler asked if the AIS issue could be handled separately from this organizational change. He explained that it seems that District needs someone to help with communications about AIS such as communicating with lake associations and agencies. The Board indicated this topic could be handled separately. Manager Pedersen moved to close the debate. Manager Crafton seconded the motion. Upon a vote, the motion carried 4-1 [Manager Koch voted against the motion. Upon a vote, the original motion carried 4-1 [Manager Koch voted against the motion].

f. Adopt Resolution 2019-010 to Support Application to Host a Member of Minnesota GreenCorps, a Program of the Minnesota Pollution Control Agency, for the 2019-2020 Program Year
Ms. Jordan described the Minnesota GreenCorps program, the host application process, and projects within the watershed that could be carried out by Minnesota GreenCorps.

Manager Ziegler moved to adopt Resolution 2019-010 to Support Application to Host a Member of Minnesota GreenCorps, a Program of the Minnesota Pollution Control Agency, for the 2019-2020 Program Year. Manager Pedersen seconded the motion. Manager Koch had questions for Ms. Jordan, and Ms. Jordan responded. Manager Koch moved to amend the motion in order to direct Legal Counsel to review the agreement. Manager Ziegler seconded the motion. Upon a vote, the motion to amend carried 5-0. Upon a roll call vote, the amended motion carried 5-0.

Manager	*Aye*	*Nay*	*Absent*	*Abstain*
Crafton	X			
Koch	X			
Pedersen	X			
Ward	X			
Ziegler	X			

g. Adopt Resolution 2019-011 Ordering Hyland Lake Alum Treatment Project

Manager Ziegler moved to adopt Resolution 2019-011 Ordering Hyland Lake Alum Treatment Project. Manager Pedersen seconded the motion. Upon a roll call vote, the motion carried 5-0.

Manager	*Aye*	*Nay*	*Absent*	*Abstain*
Crafton	X			
Koch	X			
Pedersen	X			
Ward	X			
Ziegler	X			

h. Adopt Resolution 2019-012 Approving Chanhassen Cost-Share Grant for Purchase of Regenerative Air Vacuum Sweeper Truck

Manager Ziegler moved to adopt Resolution 2019-012 Approving Chanhassen Cost-Share Grant for Purchase of Regenerative Air Vacuum Sweeper Truck. Manager Crafton seconded the motion.

Upon a roll call vote, the motion carried 4-0. [Manager Koch abstained from the vote.]

Manager	*Aye*	*Nay*	*Absent*	*Abstain*
Crafton	X			
Koch				X
Pedersen	X			
Ward	X			
Ziegler	X			

Manager Koch reiterated his comment that the Board did not order this public hearing. Attorney Smith explained that this public hearing and the others on this meeting's agenda were noticed and such action meets the requirements of state statute.

i. Adopt Resolution 2019-013 Ordering the Duck Lake Partnership Project

Manager Ziegler moved to adopt Resolution 2019-013 Ordering the Duck Lake Partnership Project. Manager Pedersen seconded the motion. Manager Koch reiterated his position that the money could be better spent.

Upon a roll call vote, the motion carried 4-1.

Manager	*Aye*	*Nay*	*Absent*	*Abstain*
Crafton	X			
Koch		X		
Pedersen	X			
Ward	X			
Ziegler	X			

j. Adopt Resolution 2019-014 Ordering the Wetland Restoration and Flood Mitigation Project at 101 and the Acquisition of 730 and 750 Pioneer Trail

Manager Ziegler moved to adopt Resolution 2019-014 Ordering the Wetland Restoration and Flood Mitigation Project at 101 and the Acquisition of 730 and 750 Pioneer Trail. Manager Crafton seconded the motion. Manager Koch asked for clarification on what this resolution authorizes. Attorney Smith and Mr. Jeffery responded to his question and noted that the DNR grant program works in terms of appraised value meaning there is no negotiating with the property owners.

Upon a roll call vote, the motion carried 5-0.

Manager	*Aye*	*Nay*	*Absent*	*Abstain*
Crafton	X			
Koch	X			
Pedersen	X			
Ward	X			
Ziegler	X			

k. Accept March Staff Report

Manager Koch moved to accept the staff report. Manager Pedersen seconded the motion. Upon a vote, the motion carried 5-0.

l. Accept March Engineer's Report (with the attached Inspection Report)

Manager Koch asked questions to Engineer Sobiech about the report. Engineer Sobiech responded. Manager Ziegler moved to accept the Engineer's Report. Manager Koch seconded the motion. Upon a vote, the motion carried 5-0.

m. Authorize Administrator to Sign Off on Quote from Freshwater Scientific Services for Vegetation Surveys

Attorney Smith stated that the services agreement attached to this item in the meeting packet doesn't meet all the District legal requirements and he recommends adding a condition to the agreement "with the advice of Counsel." Manager Koch introduced the idea of a master services agreement and moved to approve the drafting of a contract between the District and Freshwater Scientific Services with substantive terms typically used by the District for a master services agreement for plant management services as set forth in the March 4th letter to the District from Freshwater Scientific Services. Manager Pedersen seconded the motion. Upon a vote, the motion carried 5-0.

n. Approve 2018 Annual Report

Manager Ziegler moved to approve the 2018 Annual Report. Manager Pedersen seconded the motion. Manager Koch offered suggestions for revisions, including making the zebra mussels section more prominent and making sure data is accurately reflected. Upon a vote, the motion carried 5-0.

o. Approve Permit 2018-074 for the Construction of a Ground Storage Reservoir by the City of Eden Prairie with Staff Recommendations

Manager Koch moved to adopt the proposed board action set forth on page one of the permit application review with the exception that instead of March 1, 2019, it read April 3, 2019, and reads as the following

"Resolved that the application for Permit 2018-074 is approved, subject to the conditions and stipulations set forth in the Recommendations section of the attached report;
Resolved that on determination by the RPBCWD administrator that the conditions of approval have been affirmatively resolved, the RPBCWD president or administrator is authorized and directed to sign and deliver Permit 2018-074 to the applicant on behalf of RPBCWD."

Manager Ziegler seconded the motion. Upon a vote, the motion carried 5-0.

p. Approve Permit 2019-003 for the Stable Path Single-Family Residential Development in Minnetonka with Engineer Recommendations

Manager Koch voiced his concerns about the nomenclature "permit fee." Attorney Smith spoke to Manager Koch's concerns and state statue. Manager Koch moved to adopt the proposed board action set forth on page 1 of the permit application review 2019-003 and the resolutions be set forth in the minutes verbatim.

"Resolved that the application for Permit 2019-003 is approved, subject to the conditions and stipulations set forth in the Recommendations section of the attached report;
Resolved that on determination by the RPBCWD administrator that the conditions of approval have been affirmatively resolved, the RPBCWD president or administrator is authorized and directed to sign and deliver Permit 2019-003 to the applicant on behalf of RPBCWD."

Manager Ziegler seconded the motion. Upon a vote, the motion carried 5-0.

q. Approve Permit 2019-007 for the Beverly Hills Single-Family Residential Development in Eden Prairie with Engineer Recommendations

Manager Koch moved to adopt the proposed board action set forth on page 1of the permit application review for permit 2019-007 and the full resolution be set forth verbatim in the minutes.

"Resolved that the application for Permit 2019-007 is approved, subject to the conditions and stipulations set forth in the Recommendations section of the attached report;
Resolved that on determination by the RPBCWD administrator that the conditions of approval have been affirmatively resolved, the RPBCWD president or administrator is authorized and

directed to sign and deliver Permit 2019-007 to the applicant on behalf of RPBCWD."

Manager Ziegler seconded the motion. Upon a vote, the motion carried 5-0.

13. Discussion Items

a. Lennar Development Galpin Boulevard Update

Mr. Jeffery noted that nothing has changed since the District Board's previous meeting.

b. Upcoming Board Meeting

President Ward announced that the Board's next monthly meeting will be held on May 1. He announced that the Board will be holding its Governance Retreat on April 23 from 1 p.m.- 4:30 p.m. at the Minnesota Landscape Arboretum. Manager Koch reminded staff it needs to notice the workshop as a special meeting.

c. Update on St. Hubert's Opportunity Project

Mr. Jeffery reported that Ms. Jordan has been working with St. Hubert Catholic School in Chanhassen. He said the school approached the District asking for input as the church plans to revamp its playground. Mr. Jeffery explained that Ms. Jordan met with St. Hubert staff on March 25 and talked through a project concept, and now the District will score that project to see how it fits within the District's prioritization schedule. Ms. Jordan highlighted the next steps staff will take to review the project.

d. Update on Internal Efforts to Improve Regulatory Program Watershed Development

Mr. Jeffery said staff hears the concerns voiced by stakeholders, and staff understands the need to minimize the possibility of having arbitrary or capricious rulings and also maximizing protection. He described the discussions staff has had and asked if the Board is comfortable with staff proceeding in this direction. President Ward asked staff to bring it in front of the Board at the next monthly meeting.

14. Upcoming Events

- First Friday Hike with the Watershed, April 5th, noon-1:00 p.m., Purgatory Creek Recreation Area, Eden Prairie
- Meet and Greet, April 10, 2019, 4:00 p.m.-6:30 p.m., District Office, 18681 Lake Drive East, Chanhassen
- Smart Salting for Parking Lots and Sidewalks Course, April 11th, 9:00 a.m.-2:00 p.m., District Office, 18681 Lake Drive East, Chanhassen
- Citizen Advisory Committee Meeting, April 15, 6:00 p.m.-8:00 p.m., District Office, 18681 Lake Drive East, Chanhassen
- Governance Workshop, Tuesday, April 23, 1:00 p.m.-4:30 p.m., University of Minnesota Landscape Arboretum
- RBCWMD Board of Managers Regular Board Meeting, Wednesday, May 1, 2019, 7:00 p.m., District Office, 18681 Lake Drive East, Chanhassen

15. Adjourn

Manager Pedersen moved to adjourn the meeting. Manager Ziegler seconded the motion. Upon a vote, the motion

carried 5-0. The meeting adjourned at 10:39 p.m.

Respectfully submitted,

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David Ziegler, Secretary

Minutes: Monday, April 15, 2019
RPBCWD Citizen's Advisory Committee Monthly Meeting
Location: RPBCWD offices: 18681 Lake Street, Chanhassen

CAC Members

Jim Boettcher	P	Peter Iverson	A	Sharon McCotter	P	Marilynn Torkelson	E
Scott Bryan	P	Daryl Kirt	A	Jan Neville	P	Lori Tritz	P
Anne Deuring	P	Denny Kopfmann	P	Joan Palmquist	P		
Barry Hofer	P	Matt Lindon	P	Samir Penkar	P		

Michelle Jordan	RPBCWD staff	P
Paul Moline	Guest Presenter from Carver County Water Management Organization	P
Dorothy Pedersen	Board of Managers	P

Summary of key actions/motions for the Board of Managers:
1. **Motion:** None

I. Opening

- **A. Call CAC meeting to Order:** President Lori Tritz called the meeting to order at 6:01 p.m. Welcome
- **B. Attendance:** As noted above.
- **C. Matters of general public interest:** None
- **D. Approval of Agenda:** Jim moved and Jan seconded to approve the agenda. Motion carried.
- **E. Approval of March 18, 2019 CAC Meeting Minutes**: Jan moved and Jim seconded to approve the March 18, 2019 CAC minutes. Motion carried.

II. Learning Presentation: Paul Moline from CCWMO presented on the topic of groundwater. A Water Management Organization is slightly different than Watershed District in that it is under the supervision of the County Board. Carver County adopted a groundwater plan in 2016 and is one of only two groundwater plans in the metro area. The shallowest ground water is found in sand layers and is easiest to access but is not predictable in quantity or quality. These sand layers can recharge in weeks, but are vulnerable to contamination. Top two aquifers are next easiest to access. The productivity varies and they are vulnerable to contamination. Old wells that have not been sealed properly can be a source of contamination of aquifers. Mt. Simon aquifer is the deepest and is the source for new wells although a permit is required to access it. Recharge is very slow at 10,000 years. It has very low vulnerability to manmade contamination, but natural arsenic can exist. It contains "vintage water" i.e. water that existed before 1953 that has no traces of tritium from bomb testing.

III. Staff Report

- A. Michelle reported that the staff-of-the-month next month will be Josh Maxwell, Water Resources Coordinator.
- B. There are lots of volunteer opportunities with the Watershed District: Ride-alongs, speakers bureau, data collection on lakes, shadowing wetland assessment.
- C. Duck Lake: The board approved ordering the project at their April meeting. Staff are working on next steps. The rain barrel pick-up is on April 27 and **we need volunteers**.
- D. Water Stewardship grants: The first residential grant application came in – a shoreline restoration on Mitchell Lake. The committee met and it scored in the range that requires adjustments. There were design issues, non-native plants, etc.
- E. Educator Mini Grants: There will be an info session in May promoting these grants as well as the watershed stewardship grants. Spread the word to your teacher friends. This program has been steadily growing. We are looking at possibly creating a water educators support group.
- F. We are looking at the evening of June 11 for a wetland walk. Should we walk first or have a sit down class first?

G. Two turf alternative workshops coming up.
H. Watershed Explorer Book has been successful. We brainstormed on educational kits: microscope cameras, explorer backpacks, paint tray squirt bottles.

IV. Commission Discussion

A. **Board Meeting – April 3, 2019:** Lori reported that the Duck Lake build a road project got tabled because of dissatisfaction with flood levels and drain amendment mismanagement.

AIS discussion: There was much discussion on this topic and residents are eager to help. There was discussion about where the regulatory authority for AIS lies, and the costs associated. Our Lakes and Streams Subcommittee will present on this topic at the next meeting.

We will get an annual report distributed to the CAC and we can comment on it at the next meeting.

Is the Stewardship Grant scoring system working? There was discussion at the Board meeting that the Duck Lake Stormwater project was not economically sound. Street sweeping is an effective way to improve water. The Duck Lake project has additional benefits of groundwater filtration. Dollars per pound of phosphorus is one of many important factors. It all goes back to goals of 10 year plan, but is hard to quantify in dollars.

B. **Metro-Wide Environmental Conservation report and follow up**: Last Saturday 60 participants and 27 cities met to discuss water, landscaping, organics, energy and transportation. There are many resources out there so no one needs to reinvent the wheel. Rain garden maintenance was big issue. MN Conservation Corps was mentioned as being a source for labor.

C. **Adopt-a-Drain** – Michelle reported the website is finally up. Adopt-a-Drain is a project of Metro Watershed Partners (of which RPBCWD is part) and Hamline University. We put $3000 a year into the partnership. Michelle demonstrated how we could adopt a drain on the website. We have up to $7500 in the budget to cover sending packets to adopters containing a sign identifying the local waterway that is being protected. Michelle is currently working on getting contracts signed, so the earliest adopters won't get a packet yet. Michelle would like the drains on major roads removed from adoptability for safety reasons. We will begin promoting the program more actively after the contracts are signed.

V. Subcommittee Reports: Each subcommittee summarized their charter. See attached.

A. Education and Outreach
B. Lakes and Streams
C. Stormwater
D. Landscaping for Water

VI Upcoming Events.

A. RPBCWD Board of Managers meeting May 1, 7:00 pm, 18681 Lake Drive East
B. RPBCWD CAC meeting May 20 at 6:00 pm, 18681 Lake Drive East
C. Nature City Chalet 2019, April 26 – May 5. http://citizenscience.umn.edu/2019-city-nature-challenge
D. Gathering Partners Master Naturalist Conference. http://gatheringpartners.umn.edu

VII. Adjourn CAC meeting: Jim moved and Jan seconded to adjourn the meeting. Motion carried. Meeting adjourned at 8:50.

Items for next month:

- Staff-of-the-month next month will be Josh Maxwell, Water Resource Manager.
- Lakes and Streams Subcommittee presentation on AIS
- Citizen lake monitoring – Sharon

Education & Outreach CAC Sub-Committee Charter Draft 2019

V2.0, April 15, 2019

Background:

- Public education and outreach plays an important role in protecting water resources and is a major component of RPBCWD 10-year plan
- Education and outreach provides opportunities for the District to raise awareness of its role in managing water resources and increase public involvement and confidence in the District's expertise and ability to effectuate change.
- District engagement activities have shown there is public interest in i) raising awareness of our water resources; ii) engaging the public in district activities; iii) increasing water stewardship; and iv) building capacity through volunteer programs and other engagement programs.
- Due to this strong interest, the Citizen's Advisory Committee created the Education & Outreach (E&O) sub-committee to support work in this area.
- This E&O committee has a scope beyond the developing Speaker's Bureau, but it is expected that the E&O Sub-Committee will work closely with and be active participant in the activities of the Bureau.
- Finally, it is acknowledged that District Staff and the Board of Managers are the leaders of outreach efforts in the community today and into the future. The purpose of E&O is not to replace these efforts, but to complement and supplement in such a way that the overall mission of the District is achieved in the most effective manner.
- The purpose of this document is to identify near and longer-term objectives of the committee.

Committee Goals:

1. Develop a growing base of engaged citizens by increasing awareness of water issues and how our communities are impacted by them.
2. Educate stakeholders as to the importance of maintaining and improving water quality, and what they can do to make a difference going forward.
3. Support staff efforts in their responsibilities reaching out and educating District stakeholders.
4. Review this Charter periodically and update as needed.

Committee Framework:

- Near term:
    - Develop materials to be used in E&O efforts during 2019
    - Develop target list of citizen groups for potential presentations and engagement
- Longer term: Support citizen interest in and involvement in water resources in our watershed, working with staff to utilize information learned from near-term efforts to expand E&O reach in the future.

High Level Project Timeline:

- 2019:
  - Develop a small list of vetted presentation in conjunction with the Speaker's Bureau and Staff. Draft proposed list includes
    - What Is Water? Water 101: Understanding Water and Watersheds
    - Beginners Guide to Sustainability: Water
    - Landscaping for Water Quality
    - Wetlands
  - Working with staff, utilize existing lists and develop new lists of groups and organizations to target for engagement
    - Lake Associations (augmenting staff involvement)
    - Community associations (e.g. Rotary, Chamber, Lion's)
    - City Environmental Commissions
    - Known groups of concerned or engageable citizens (e.g. senior centers, community events, church bazaars)
    - Other like-minded organizations, to be determined (e.g. garden clubs, etc)

- 2020:
  - Roll out additional presentations (if deemed necessary) and actively pursue opportunities to educate and involve the public.
  - Work with staff, utilizing feedback from 2019 efforts to determine next steps for CAC. Assess to what extent we should be publishing articles, creating content and leveraging social media.

Landscaping CAC Sub-Committee Charter Draft 2019

V 1.0, March 20, 2019

Background:

The District recognizes that landscaping practices impact water quality and infiltration. The Disctrict encourages and supports cities and developers to seek opportunities to incorporate habitat protection or enhancement into development and redevelopment projects. The District's commitment includes stewardship grant programs to raise citizen awareness and help with establishment of BMPs at a residential, HOA, business and city level.

Goals in the 10-year plan include:

- 3.2.6.1Water Quality Goals
- WQual 1.Protect, manage, and restore water quality of District lakes and creeks to maintainor achieve designated uses.
- WQual 2.Preserve and enhance the quantity, as well as the function and value, of District wetlands.
- WQual 3.Preserve and enhance habitat important to fish, waterfowl, and other wildlife

3.2.6.2Water Quality Strategies

Erosion

- WQual S1.The District seeks to minimize the negative impacts of erosion and sedimentation through the District's regulatory, education and outreach, and incentive programs.
- WQual S2.The District will inventory and address areas within the watershed with existing erosion issues and/or areas at high risk for erosion by implementing the District's capital improvement, incentive and regulatory programs.
- WQual S6.The District will seek opportunities to establish and preserve natural corridors for wildlife habitat and migration.
- WQual S7.The District will promote the use of natural materials and bioengineering for the maintenance and restoration of shorelines and streambanks where appropriate.
- WQual S8.The District will consider opportunities to incorporate habitat protection, restoration, or improvement elements in District water quality, flood control, and other projects.
- WQual S11.The District recognizes the multiple benefits of vegetated buffers and promotes the use of vegetated buffers around all waterbodies.

Habitat

- WQual S3.The District encourages cities and developers to seek opportunities to incorporate habitat protection or enhancement into development and redevelopment projects.

Pollution:

- WQual S13.The District will continue to minimize pollutant loading to water resources through implementation of the District's capital improvement, regulatory, education and outreach, and incentive programs.

- WQual S14.The District will continue to identify opportunities and actions to protect, restore, and enhance District resources

Subcommittee Additions:

- Given the importance of pollinators and insects and the benefit that native plants provide to these threatened populations, the Landscape Subcommittee advocates the use of native plants for landscapes for water quality and conservation, and natural restoration.

CAC Landscape Subcommittee Mission:

Support and promote efforts to make landscaping for water quality and infiltration ubiquitous and culturally normal, moving away from turf lawns.

This mission will be accomplished through the following:

- Review and advise on stewardship grant applications so accepted applications are in compliance with the above charter
- Support and add value to in-process and proposed RPBCWD projects
- Increase public awareness on the importance of landscaping for water quality by contributing to the Speakers Bureau
- Partner with cities and community groups such as Master Water Stewards, garden and naturalist groups, and service groups
- Proactively engage and promote landscape projects with a view to creating a template for future project deployment and partnership with the district
-

2019 Projects:
1. Attend Water Symposium (March)
2. Attend Metro-Wide Environment Commission conference (April)
3. Develop a Landscaping for Water Quality presentation for the Speakers Bureau
4. Add value to the Stewardship Grant project by enabling a cohort of Master Water Stewards to speak with applicants in a 1-hour discovery session
5. Add value to the Stewardship Grant project by offering a series of 2-hour seminars to potential applicants and applicants, including Applying for a Grant, Raingarden Design, Maintaining your Raingarden
6. Add value to the Duck Lake project:
   - Collaborate with the Stormwater subcommittee to encourage adopt-a-drain, storm drain marking, leaf clean up
   - Help develop rain garden maintenance handbook

5. Help guide and template Elim Shores Retirement Community shoreline and landscape project

Storm Drain Sub-Committee Charter – April 2019

Founded: Matt Lindon and Sharon McCotter – May 2017
Rechartered: Anne Deuring, Daryl Kirt, and Sharon McCotter – April 2019

Committee Goals (Focus: Residential curbed stormwater drains and ponds)

1. Grow citizen awareness, involvement, and ownership in stormwater issues
2. Reduce storm water pollutant loading
3. Partner with city and other leaders to ensure storm drain work compliments existing programs/initiatives (such as Adopt-a-Drain)
4. Work toward sustainable programs that have ongoing momentum

Strategies and Framework

1. Create a three year plan; consider short and long term goals
2. Highlight seasonal needs (focus first on drain clean-ups)
    a. Winter – Reduce salt use
    b. Spring – Storm drain clean-out
    c. Summer – Grass clippings
    d. Fall – Leaf clean out
3. Utilize "conquer and divide" approach to projects and locations.
4. Create replicable toolkits/templates focusing on education, prevention and action.

Projects in progress

1. Chanhassen Community Clean-Up for Water Quality
    - Have orchestrated two prior clean-ups - 2017 (1 site) and 2018 (2 sites)
    - 2018 was in partnership with the Environmental Commission
    - Would like to orchestrate the third annual
        - October 2019 with a raindate – clean-up
        - Two sites again this year if there are two site leaders
        - Add the Adopt-a-Drain component (if expanded to include our cities)
        - Should solicitation for Adopt-a-Drain occur the same day as the clean-up?
2. Silver Lake Association Storm Drain Stewardship Program
    - Provided input/resources to the Silver Lake Association on how to conduct a storm stenciling program
    - In 2018, the association stenciled 30 drains closest to Silver Lake
    - In 2019, hoped to implement the Adopt-a-Drain program (if expanded to include our cities) at the same time the remaining 170+ drains were stenciled
        - The association lead on this effort passed away suddenly this winter
        - Manager Dorothy Pederson is a member of this association and can be our primary conduit going forward
3. Creation of a template to use with commercial property owners (or their designee) who are oversalting. The template would make it easier for CAC members, MWS, and engaged citizens who want to influence property owners (or their designee) to utilize BMPs when it comes to salt use.
    - Discussed the idea with Michelle (Michelle would like to extend this congratulating people for doing a good job with salt use)
    - Sent email to SOS (stop over salting) – Louann Waddick – to see what resources already exit (in addition to the SOS website)

4. Study: Stormwater Pond Study and Education/Awareness signage
5. Research and development: Personal Silt Sock

Draft plan for Community Clean-up Kit (March 2019)

First

- Apply for RPBCW Action Grant to create two Community Clean-up Kits
    - Kit would contain written material on how to do a community clean-up including things like who to contact in the city, how to determine roles and responsibilities, how to determine the scope of the event, how to measure success, incentive (turn in the pictures from your clean-up and get a $5 gift card or a cool watershed T-shirt)
    - Kit could also contain gloves, brochures/tip cards – why clean-up, trash grabbers, safety vests, portable hand-held measuring tool (?)
    - Kit could be customizable based on size of the event/number of participants
    - Flesh out the opportunity to partner by including information on the following:
        - Conservation MN – Adopt-a-River (lake, river, pond)
        - Clean Water MN – Adopt-a-Drain
        - Silt Sock - Anne

Second

- Once funds are secured, create the Community Clean-up Kit

Third

- Pilot kit through the first annual RPBC CAC Spring Clean-Up
    - Round Lake – Spring 2019 with a raindate
    - Meet at 9 – Hard stop at noon
    - Work with Leslie S. for trash pick-up
    - Include education component; T-shirts? Take-ones?
    - Post event - modify community clean-up kits and get ready to launch
- Advertise kit
    - School groups and scouts – Go to their meetings
    - RPBC website and Master Water Stewards
    - Cities and Environmental commission

Fourth

- Measure success of the kits – are they being used? If not, why? If so, do we need more?

RPBCWD April staff report

Administration		Staff update	Partners
Accounting and Audit	Coordinate with Accountant for the development of financial reports. Coordinate with the Auditor. Continue to work with the Treasurer to maximize on fund investments.	The Audit will be presented to board at the May meeting.	
Annual Report	Water Quality Fact Sheets are completed.	The Annual Report was distributed to MN DNR and BWSR and published on the website	
Internal Policies	Work with Governance Manual and Personnel Committees to review bylaws and manuals as necessary	The personnel Committee met on April 23rd - minutes are attached at the end of staff report. The Governance Committee met April 18 and 25 to review Governance Manual - minutes are located at the end.	
Advisory Committees	Engage with the Technical Advisory Committee on water conservation, chloride management and emerging topics Engage with the Citizen Advisory Committee on water conservation, annual budget and emerging topics. Facilitate recruitment of CAC members for 2019.	The CAC met for their regular monthly meeting, April 15. Draft minutes are included in the board packet. Paul Moline from Carver County gave an educational presentation about groundwater. The CAC subcommittees have created charters describing their interests and intent. These are including with the minutes.	
Membership			
District-Wide			

Regulatory Program	Review regulatory program to maximize efficiency. Engage Technical Advisory Committee and Citizen Advisory Committee on possible rule changes. Implement regulatory program.	4 permit applications received. 1 permits has been issued administratively. 6 Applications are currently under review. Staff Jeffery has met with potential applicants on 2 pending projects. See table at end of document for more details. Staff Jeffery and Engineer Sobiech hosted a listening session for stakeholders on April 24, 2019. It was attended by 13 people. A full report will be provided at the June board meeting	
Aquatic Invasive Species	Review AIS monitoring program Develop and implement Rapid Response Plan as appropriate Coordinate with LGUs and keep stakeholders aware of AIS management activities. Manage and maintain the aeration system on Rice Marsh Lake as per the Riley Chain of Lakes Carp Management Plan. Review AIS inspection program. Keep abreast in technology and research in AIS.	Please see update in board packet.	City of Chanhassen City of Eden Prairie University of Minnesota MN DNR Carver County
Cost-Share	Review program to determine efficiencies and needs. Recommend modification as necessary. Review applications and recommend implementation.	An info session for the stewardship grants has been scheduled for May 14 at the District office. The review committee met for the second time April 15 and reviewed a residential grant application for a shoreline planting. The application scored 8/14. Per the updated procedure guidelines, the application was recommended for	

		funding provided receipt of minor adjustments. On receipt of those, it will be sent to the District Administrator for final review and approval decision.	
Data Collection	Continue Data Collection in permanent sites. Identify monitoring sites to assess future project sites.	Staff completed first creek monitoring sampling event of the year. Installed lake level sensors (14). Assisting Chanhassen with CAMP program on Lake Susan. Eden Prairie installed carp gate on April 20th to reduce carp movement. Installed auto sampling units on upper Riley Creek under Powers and upper Bluff Creek under Galpin. Stations will assess pollutant loads and evaluate if future creek restoration is needed. WOMP stations: Continued bi-weekly sampling of the station. Coordinating bluegill stocking in Lake Lucy, Rice Marsh, Staring, and the Rec Area. Water quality report was finalized and submitted. Staff completed work on testing different spent lime/sand mixtures to determine filtering efficiencies. Continued purchasing, assembling, and coding ENVIRODIY parts for pond project data stations. Received carp management permits.	Metropolitan Council City of Eden Prairie University of MN City of Chanhassen
District Hydrology and Hydraulics Model	Coordinate maintenance of Hydrology and Hydraulics Model. Coordinate model update with LGUs if additional information is collected.	Engineer is working on converting city models to our models.	City of Bloomington

	Partner and implement with the City of Bloomington on Flood Evaluation and Water Quality Feasibility.		
Education and Outreach	Implement Education & Outreach Plan, review at year end. Manage partnership activities with other organizations. Coordinate Public Engagement with District projects.	Staff Jordan and Swope visited Groveland Elementary School on April 12, and taught lessons on watershed topics for 147 5th graders. Staff visited Prairie View Elementary on April 24 and taught a lesson AIS for 20 kindergarteners. Three additional school visits are scheduled. The District hosted a Smart Salting workshop on April 25th for maintenance professionals and permittees. Staff Jordan tabled at the Animal Open House at the Starting Outdoor Center April 13. With the help of a volunteer they engaged ~200 youth and adults. Six educator mini grants have been reviewed by staff and approved for funding by the administrator. Staff were interviewed by the MN Greencorp review committee about the District's application to host a 2019-2020 member. The District will be notified of the decision soon. Staff are partnering with the Timber Lakes Association to develop a continuing education training for Master Water Stewards and other community members on native plant buffer maintenance. Adopt a Dock plates are being distributed to Volunteers. Administrator Bleser presented about the district to 25 people at the Southwest	School visits: Groveland Elementary, Scenic Heights Elementary, Three Rivers Park District, Prairie View Elementary Smart Salt Parking MPCA (funding), Fortin Consulting

		Metro Chamber of Commerce Nonprofit Luncheon. Staff Jeffery met with student from Chanhassen High School to discuss potential capstone project that would involve a filtration swale.	
Groundwater Conservation	Work with other LGUs to monitor assess and identify gaps. Engage with the Technical Advisory Committee to identify potential projects. Develop a water conservation program (look at Woodbury model)	No new update.	TBD
Lake Vegetation Management	Work with the University of Minnesota or Aquatic Plant Biologist, Cities of Chanhassen and Eden Prairie, lake association, and residents as well the Minnesota Department of Natural Resources on potential treatment. Implement herbicide treatment as needed. Secure DNR permits and contract with herbicide applicator. Lakes the District is monitoring for treatment include: Lake Susan, Lake Riley, Lotus Lake, Mitchell Lake, Red Rock Lake and Staring Lake. Work with Three Rivers Park District for Hyland Lake	In the next month, surveys will be taken to determine the need for curleyleaf pondweed treatments.	City of Eden Prairie City of Chanhassen University of Minnesota MNDNR
Opportunity Projects	Assess potential projects as they are presented to the District	Following the Opportunity Project program guidelines in the 10 Year Plan, staff scored the St. Hubert Opportunity Project	St Hubert Catholic Community

		utilizing the District's project prioritization metric. This information will be presented to the Board at the May meeting for direction on whether to pursue the opportunity.	
Total Maximum Daily Load	Continue working with Minnesota Pollution Control Agency on the Watershed Restoration And Protection Strategies (WRAPS). Engage the Technical Advisory Committee.	No Updates	MPCA
Repair and Maintenance Grant	Develop and formalize grant program.	No Updates	
University of Minnesota	Review and monitor progress on University of Minnesota grant. Support Dr John Gulliver and Dr Ray Newman research and coordinate with local partners. Keep the manager abreast to progress in the research. Identify next management steps.	Lake Vegetation Management Plan reports were submitted to DNR.	Stormwater ponds partners: Bloomington, Chanhassen, Eden Prairie, Minnetonka and Shorewood Plant Management: Chanhassen Eden Prairie
Watershed 50 year Anniversary	Come explore with us! Finalize anniversary program for 2019. Implement anniversary events.	The Junior Watershed Explorer booklets continue to be popular, with an additional print run planned. Staff have now given out more than 150 workbooks at a variety of locations and events throughout the district. Members of the CAC expressed interest in another wetland walk after last year's successful event. Staff have added one to the 50th events on June 11.	Let's Go Fishing

		Registration for the June 22nd boat rides on Lake Riley with Let's Go Fishing is open.	
Watershed Plan	Review and identify needs for amendments.	No new update.	
Wetland Conservation Act (WCA)	Administer WCA within the Cities of Shorewood and Deephaven. Represent the District on Technical Evaluation Panel throughout the District	There has been no WCA activity in Shorewood or Deephaven in 2019. Staff Jeffery met with Chanhassen for a site visit to review potential violation. No violation was observed.	City of Shorewood City of Deephaven City of Chanhassen MCWD BWSR DNR ACOE
Wetland Management	Identify potential restoration/rehabilitate wetlands and wetland requiring protection.	Biological zero has been reached in the soil so staff will begin assessments first week of May.	City of Chanhassen MNDNR
Hennepin County Chloride Initiative	Phase 1: Develop a plan to target commercial and association-based sources or chloride pollution - businesses, malls, HOAs, property management companies and the private applicators that they hire. We will hire a consultant to facilitate focus groups with private applicators, as well as those that execute contracts with private applicators. These focus groups will help identify needs and barriers for our target audience. The consultant will compile information into a plan for implementation.	Karen Galles, Hennepin County and Administrator Bleser are working with a graduate student from the University of Minnesota, Emily Kreiter, who will be performing the qualitative research (interviews, focus groups) with Fortin Consulting serving as technical expert. , Administrator Bleser has been sitting on a new initiative with the MPCA to develop a training for property managers. Pilot of this training will be tested out in June at RPBCWD. At the same time, Administrator Bleser has connected with Brook Asleson with MPCA to keep her apprise of the Hennepin County Chloride initiative.	

Lower Minnesota Chloride Cost-Share Program	The Lower Minnesota River Watersheds are coming together to offer cost-share grants.	Administrator has met with NMCWD, LMRWD and RBWMO to share progress on Hennepin County as well MPCA Property Manager Trainings, as well as time frame in the development of the cost-share program. RBWMO will be sending two staff members to the North American Snow Conference hosted by American Public Works Association and will be reporting back to the group.	
Bluff Creek One Water			
Chanhassen High School Re-use	Continue to work with all partners. Complete site restoration and start system. Finalize and implement E and O for project. Monitor Project.	Start-up, site stabilization and maintenance refresher are being scheduled.	ISD 212 City of Chanhassen Metropolitan Council
Bluff Creek Tributary Restoration	Implement and finalize restoration. Monitor Project.	Archeologists will be conducting surveys for USACE permit the week of April 29. Staff is keeping contractor up to date on the progress of the permit status with USACE and change in timeline.	City of Chanhassen
Wetland Restoration at 101	Remove 3 properties from flood zone, restore a minimum 7 acres and as many as 16 acres of wetlands, connect public with resource, reduce volume, rate, pollution loads to Bluff Creek	Staff Jeffery spoke with DNR 4/29/19 regarding grant. He was informed that the grant for 530 Pioneer Trail could be expedited to assure purchase this summer and that a resolution for 550 Pioneer Trail should be provided ASAP to request additional funding. Will bring resolution to June meeting.	City of Chanhassen MN DNR
Riley Creek One Water			

Lake Riley Alum	Continue to monitor the waters.	No updates	
Lake Susan Improvement Phase 2	Complete final site stabilization and spring start up. Finalize and implement E and O for project. Monitor Project.	Start-up, site stabilization and maintenance refresher are being scheduled.	City of Chanhassen Clean Water Legacy Amendment
Lower Riley Creek Stabilization	Coordinate agreement and acquire easements if needed for the restoration of Lower Riley Creek reach D3 and E. Implement Project. Continue Public Engagement for project and develop signage of restoration.	The cooperative agreement was executed by the City of Eden Prairie and is included in the packet for approval.	City of Eden Prairie Lower Minnesota Watershed District
Rice Marsh Lake Alum Treatment	Monitor Project.	No updates	City of Eden Prairie City of Chanhassen
Rice Marsh Lake Watershed Load Project 1	Conduct feasibility. Develop cooperative agreement with City of Chanhassen	Staff Jeffery will meet with new Water Resources Coordinator and Parks Director for Chanhassen the week of May 5, 2019.	City of Chanhassen
Upper Riley Creek	Work with City to develop scope of work (in addition to stabilizing the creek can we mitigate for climate change) Conduct feasibility Develop cooperative agreement with the City of Chanhassen Order Project Start design	Staff Jeffery met with new Water Resources Coordinator for Chanhassen to discuss this and other potential partnerships. The WRC was going to inform herself as the to City budget and CIP and meet subsequently with Staff Jeffery.	City of Chanhassen
Purgatory Creek One Water			
Duck Lake Raingarden Project	Work with the City to implement neighborhood BMP. Identify neighborhood BMP to help improve water resources to Duck Lake. Implement neighborhood BMPs.	Staff have been working with engineering and legal on next steps for each type of BMP. Community members will be picking up their rain barrels from the City of Eden Prairie, Saturday April 27. The	City of Eden Prairie

		task order for phase II will be brought to the board at the May 1st meeting. Staff are creating a rain garden maintenance book as a part of the project. The CAC subcommittee on landscaping for water quality has expressed interest in helping with this project and staff are including them in the effort.	
Hyland Lake Internal Load control	Implement Hyland Lake Alum application.	Wenck has requested quotes from 3 different entities and is recommending awarding project to HAB. Please see board packet for further information.	Three Rivers Park District City of Bloomington
Lotus Lake – Internal Load Control	Monitor treatment and plant populations.	No updates.	
Scenic Heights	Continue implementing restoration effort. Work with the City of Minnetonka and Minnetonka School District on Public Engagement for project as well as signage.	The volunteer planting date has been set for Saturday, June 8th. Staff are working with the school to plan a related planting day for the students. Growing season work has begun. The contractor has been out raking, seeding, and mulching areas that need to be worked by hand.	Minnetonka Public School District City of Minnetonka Hennepin County
Silver Lake Restoration	Order project Design Project Work with the City of Chanhassen for Design, cooperative agreement and implementation	No Updates.	City of Chanhassen
Professional Development			
First Aid and AED Training	All staff took part in recertification of their First Aid and AED certifications.		

Staff presentations	Staff Bleser presented at the Southwest Chamber of Commerce..
Environmental Law Institute	Staff Bleser will be leading two communication/engagement workshop as part of a two-day training from Wednesday, May 29 to midday Friday, May 31, 2019 at the National Conservation Training Center (NCTC) in Shepherdstown, West Virginia. Staff from all 50 states, DC, all 5 territories, 17 tribes, all 10 EPA regions, and EPA Headquarters will be participating, totaling over 200 people. Travel expenses are covered by the Environmental Law Institute.
Science Talk	Staff Swope attended Science Talk science communication conference in Portland, OR, April 3-5th. Conference sessions included Social Strategies for Climate Communication, Creating Community Through Social Media, Building Science Literacy, using storytelling to share science, and more!

Regulatory Program					
PERMIT #	APPLICANT	PROJECT	DATE SUBMITTED ON-LINE| PAPER| COMPLETE	STATUS	RULES
2018-044	United Properties	(r)Smith Village mixed use - Eden	6/8/18|6/29/18	Incomplete- no borings at proposed location of	C-EPSC J-Stormwater

		Prairie		BMPs. Comments provided 7/9/18 and 12/11/18	
2018-066	Presbyterian Homes	(r) Castle Ridge - Eden Prairie	10/18/18| 10/23/18	Application on-hold per email correspondence w/ engineer 11/9/18 & 11/28/18	C-EPSC D-Buffers J-Stormwater
2018-071	MNTKA Public Schools	LAX Field Construction	12/6/18| Not received	Conditionally approved. Awaiting MA	C - EPSC J-Stormwater
PERMIT #	APPLICANT	PROJECT	DATE SUBMITTED ON-LINE| PAPER| COMPLETE	STATUS	RULES
2018-072	Three Rivers Park District	Parking - Bloomington	12/20/18 | 12/28/18	Conditionally approved. Awaiting agreement.	C-EPSC J-Stormwater
2018-073	Eden Prairie - Streets	Preserve Blvd Reconstruction	12/20/18 |	Approved - conditions met.	B-Floodplain C-EPSC D-Buffers J-Stormwater
2018-074	Eden Prairie - Utilities	Ground Storage Reservoir	12/21/18 | 12/26/18 | 1/28/19	On the 4/3/19 board meeting	C-EPSC J-Stormwater
2019-001	Lennar	(r) Nelson Property - Galpin Ave, Chanhassen	1/11/19 | 1/11/19	Noticed incomplete on 2/5/19. Developer working with City on PUD/	B-Floodplain C-EPSC D-Buffers G-Water X-ing J-Stormwater
2019-002	Shelangoski	Single family residence	1/8/19	Administratively approved	C-EPSC
2019-003	Wooddale Builders	(r) Stable Path	1/16/19 | 1/16/19	Conditionally Approved 4/3/19. Working with City and Developer to resolve maintenance agreement	C-EPSC, J-Stormwater

Not Assigned	City of Chanhassen/ MNDOT	T.H. 101 Reconstruction	No application submitted.	In design and permit application phase. There have been 3 stakeholder meetings held.	B-Floodplain C-EPSC D-Buffers G-Water X-ing J-Stormwater
Not Assigned	Moments of Chanhassen, LLC	(r) Moments Senior Living	No application submitted.	Pre-application meeting with city and development team held on 12/20/18	C-EPSC D-Buffers J-Stormwater
2019-004	Eden Prairie - Engineering	Duck Lake Road	1/16/19 | 1/18/19	Tabled at the request of Eden Prairie until further notice.	B-Floodplain C-EPSC D-Buffers G-Water X-ing J-Stormwater K-Variances
PERMIT #	APPLICANT	PROJECT	DATE SUBMITTED ON-LINE| PAPER| COMPLETE	STATUS	RULES
2019-005	Eden Prairie - Engineering	Single Tree Ln Improvements	1/17/19 | 1/22/19	Administratively approved 2/5/19	C-EPSC
2019-006	Minnetonka - Engineering	2019 Mill & Overlay Project	1/14/19 | 1/14/19	Administratively approved on 1/15/19	C-EPSC
2019-007	Great Oaks 2nd, LLC	Beverly Hills	1/25/19 | 2/28/19 | 3/08/19	Conditionally approved at 4/3/19 meeting. Awaiting FA and MD.	C-EPSC, J-Stormwater
2019-008	Eden Prairie Parks	Staring Lake Pavilion	2/19/19 | 1/21/19	Conditionally approved 4/3/19 meeting. Awaiting signed MA.	C-EPSC, J-Stormwater
2019-009	Marcus Reidel	Reidel Home Addition	2/18/19 | 2/6/19 | 2/19/19	Administratively approved 2/22/19	C-EPSC, J-Stormwater
2019-010	ISD #112	Chan HS Sanitary Service Repair	2/22/19 | 2/25/19	Administratively approved 3/1/19	C-EPSC

2019-011	Bre Retail Residual Owner 6	Chase Bank	3/12/19 | 3/14/19	On the 5/1/19 board meeting	C-EPSC, J-Stormwater
2019-012	Andrew Costigan	Outbuilding	3/21/19 | 3/28/19 | 3/28/19	Administratively approved 4/8/19	C-EPSC, J-Stormwater
2019-013	Adam & Kelly Cozine	Pool	3/22/19 | 3/25/19	Awaiting proof of recordation as of 4/26/19	C-EPSC, J-Stormwater
2019-014	Eden Prairie - Engineering	Hennepin Town Rd Turn Lane	3/7/19 | 3/7/19	Administratively approved on 3/22/19	C-EPSC
PERMIT #	APPLICANT	PROJECT	DATE SUBMITTED ON-LINE| PAPER| COMPLETE	STATUS	RULES
2019-015	Chanhassen - Engineering	Lake Dr. East M & O	3/26/19 | 3/28/19	Administratively approved 3/28/19	C-EPSC
Not Assigned	Hennepin County Library	Minnetonka Library Improvements	No submittal	Pre-submittal meeting w/ BKBM on 3/19/19	C-EPSC, J-Stormwater
Not Assigned	Minnetonka Residential Project	Legacy Homes	No submittal	Pre-submittal meeting w/ Wenck on 3/22/19	C-EPSC, D-Buffers, J-Stormwater
2019-016	Center Point	Minnetonka Boulevard	4/3/19 | 4/10/19	Administratively approved on 4/10/19	C-EPSC
2019-017	ANE Group	6650 Pawnee Dr	NOPV Issued 4/12/19 | 4/17/19 |	On 5/1/19 meeting	C-EPSC, J-Stormwater

Memorandum

To: Riley-Purgatory-Bluff Creek Watershed District Board of Managers and District Administrator
From: Barr Engineering Co.
Subject: Engineer's Report Summarizing April 2019 Activities for May 1, 2019, Board Meeting
Date: April 26, 2019

The purpose of this memorandum is to provide the Riley-Purgatory-Bluff Creek Watershed District (RPBCWD) Board of Managers and the District Administrator with a summary of the activities performed by Barr Engineering Co., serving in the role of District Engineer, during April 2019.

General Services

a. Participated in a April 8th meeting with Permit Coordinator Jeffery and staff Jordon to prepare regulatory program listening session. Discussion at the meeting was about information to present (e.g., extended detention, restricted sites sequencing, soil decompaction, and linear projects), who to invite (i.e., all permit applicants and their consultants), and ways to promote dialogue (e.g., survey to send in advance). Prepared questions for the survey District staff sent to potential attendees.

b. Participated in the Duck Lake subwatershed assessment progress meeting on April 10th with Administrator Bleser and Community Outreach Coordinator Jordon to discuss project timeline, working with District legal to develop quote request forms, the need to split the project into three separate request because of the unique nature and timing of the work (tree planting, planter box prototyping, and rainwater garden design/construction).

c. Continued developing contract documents (i.e., plans, specifications, contract, etc.) for modifications to the Lake Susan spent lime filter.

d. Participated in April 24th regulatory program listening sessions. Also developed presentation about channel protection for the April 24th regulatory listening session. Roughly 15 people (2 consultants, 2 developers, and 11 city staff) attended the session. Most of the discussion was about the District's stormwater rule. Suggestions received include but were not limited to: raising the linear project threshold (most discussion), allowing for treating flows entering the site instead of just site runoff, allow treatment elsewhere in the watershed instead of onsite, prefer large regional BMPs because easier to maintain, simplify rule language, restricted site requires a lot of back and forth (a lot of hoops to show maximum extent practicable), more authority should be delegated to staff for approval (maybe all permits except variances, something similar to MCWD), maintenance agreements are cumbersome, fee in lieu should be discussed with TAC.

e. Meet with Administrator Bleser and Project Manager Jordan on April 25th to discuss the scope of work for Task Order 25b, engineering design and construction administration service for the Duck Lake subwatershed assessment. The discuss include identify ways to maximum staff roles to minimize the need for engineering involvement to only key items.

f. Provided BWSR additional information via Elink to close out Lake Susan Park Pond Clean Water Fund grant

g. Participated in the April 3rd regular Board of Managers meeting.

h. Prepared Engineer's Report for engineering services performed during April 2019.

i. Miscellaneous discussions and coordination with Administrator Bleser about permitting database, permits, closing out BWSR grant, duck lake subwatershed, Bluff Creek restoration, and potential upcoming work as outlined in the District's plan, and upcoming Board meeting agenda.

Permitting Program

a. *Permit* 2018-066: *Castle Ridge:* Castle Ridge is a senior living development in the SW corner of Flying Cloud Drive and Prairie Center Drive in Eden Prairie. Participated in a presubmittal meeting with the applicant and Permit Coordinator Jeffery on April 8th discussing stormwater requirements. Also participated in an April 9th meeting with the Applicant, and City of Eden Prairie to discuss coordinating reviews, timelines, phasing, and stormwater requirements. City is requiring rezone, replatting, and dedication of additional ROW which will disturb more than 50% of existing imperviousness, thus the stormwater rule requires treatment for the entire site.

b. *Permit 2018-028 Oak Point Elementary Parking Lot*: This project involves construction of a new parking lot and walkway in the southwest portion of the Oak Point Elementary School parcel on Staring Lake Parkway in Eden Prairie. The permit was conditionally approved at the September 5, 2018 regular meeting. The applicant submitted a modification request on January 22, 2019. Review comments were provided to the applicant on February 5th. Responded to applicant's memo about restricted site information. Based on the information provided the site fits the restricted site criteria in Rule J, subsection 3.3. Because the application is considered complete but the applicant has not addressed the comments in time for the May 1st meeting, the applicant requested a second 60-day extension for the permit review period.

c. *Permit 2019-003: Stable Path:* The project proposes to create a 17 lot subdivision of detached single-family homes on +/- 5.9 acres of land located along Stable Path in Eden Prairie, MN. This project will trigger RPBCWD Rules for erosion prevention and sediment control (Rule C) and stormwater management (Rule J). Reviewed revised submittal received on March 18, 2018. Notified applicant of Board's conditional approval at the April 3rd meeting. Worked with applicant and Permit Coordinator Jeffery to review draft maintenance declarations and associated exhibits.

d. *Permit 2019-004: Duck Lake Road reconstruction:* The project includes full reconstruction of Duck Lake Road from Duck Lake Trail to Mallard Court in Eden Prairie, MN. The project also includes replacing the culvert under Duck Lake Road, installing a backyard drain behind the homes along pardons Drive, constructing an infiltration basin, and filling a portion of the floodplain of Duck Lake with only partial compensatory storage proposed). This project will trigger RPBCWD Rules B, C, D, F, G, and J. The applicant is requesting a variance from the requirement to provide compensatory storage (Rule B, subsection 3.2), the minimum wetland buffer width requirement (Rule D, subsection 3.2), no net increase in flood stage associated

with a waterbody crossing (Rule G, subsection 3.2a), no increase in peak discharge (Rule J, subsection 3.1a), water quality treatment of all site runoff (Rule J, subsection 3.1c), and wetland protection criteria (Rule J, subsection 3.10bii). The DNR also confirmed that a project specific work in public waters permit is required for the project because the RPBCWD general permit does not apply to fill in public waters. Responded to several questions from the applicant about modeling water quality impacts of the proposed project and potential hydrologic modeling impacts of restoring the outlet to the DNR permitted level. On April 23, 2019, the City of Eden Prairie requested that the review of the Duck Lake Road project be continued until such time that they can present answers to the Board regarding the normal water level of Duck Lake.

e. *Permit 2019-007: Beverly Hill:* The project proposes to construction of a 17 lot single family residential development on approximately 7.1 acres in Eden Prairie. The site is located north of Highway 61, near the intersection of Eden Prairie Road and Beverly Drive. The project includes one pond with infiltration bench on the northwest corner of the site, as well as, a rain garden to the northeast and a rain garden to the south of the site. Notified applicant of Board's conditional approval at the April 3rd meeting.

f. *Permit* 2019-008: *Staring Lake Pavilion*: the project includes the reconstruction of the existing Staring Lake Park building, the surrounding trail and plaza areas, and a small portion of the adjacent parking area. The project includes an underground rock infiltration trench with a pre-treatment sump catch basin located south of the building on the parking lot island. The overflow from the rock infiltration trench will discharge into an infiltration basin that is to be constructed in the greenspace area just to the west of the existing driveway entrance. Notified applicant of Board's conditional approval at the April 3rd meeting and reviewed the draft maintenance agreement.

g. *Permit* 2019-011: *Westwind Plaza:* The project proposes the demolition of a portion of an existing parking lot and construction of a new bank building in the shopping center at the northeast quadrant of the Highway 101 and Highway 7 intersection. The project includes two underground infiltration storage systems. This project will trigger RPBCWD Rules C, and J. A complete submittal was received on March 28th, reviewed, and a permit review report was drafted for consideration at the May 1st Board of Managers meeting.

h. Performed erosion control inspections of active sites on April 17th and 18th. (see attached inspection report).

i. Miscellaneous conversations with Permit Manager Jeffery about technical questions on permit requirements for potential development and redevelopment projects.

Data Management/Sampling/Equipment Assistance

a. Prepared, uploaded and verified 4 RMB laboratory (RMB) reports.

b. Continued testing and correspondence with RMB regarding their Electronic Data Delivery for RMB subcontracted laboratories.

Task Order 6: WOMP Station Monitoring

Purgatory Creek Monitoring Station at Pioneer Trail

a. Download and review data.

b. Install turbidity sensor for 2019 monitoring season.

Purgatory Creek Monitoring Station at Valley View Rd

a. Download and review data.

b. Download 2018 water quality data from MCES website. Review and QA/QC water quality data and prep for entry into EQuIS database.

c. Troubleshoot autosampler power issues and replace controller.

Task Order 13b: Lake Susan Watershed Treatment and Stormwater Reuse Enhancements Design and Construction Administration

a. All punch list items, with the exception of the items noted under the following item (b) have been completed by Peterson. Re-start of the irrigation system and the iron-enhanced sand filter system is planned for the week of May 6th (exact date/time to be determined).

Task Order 14b: Lower Riley Creek Final Design

a. Barr completed a performance specification for the bridge and bridge foundation for inclusion into the final plans and specifications. The performance specification establish the criteria the design needs to meet, and it will be up to the contractor to complete the design for approval by the City.

b. Received the permit from the DNR.

c. Provided final project specifications to the RPBCWD Attorney for review.

d. Continued to work with Administrator Bleser and the city to complete the cooperative agreement.

Task Order 19: Chanhassen High School Stormwater Reuse Design

a. Coordinating with timing of irrigation and reuse system start up between Peterson with ISD 112. Re-start of the irrigation system is planned for the April 29th (exact time to be determined)..

Task Order 21B: Bluff Creek Stabilization Project

a. Continued to prepare for field work to complete the cultural/historical investigation being required by the US Army Corps of Engineers. The field work is scheduled for the week of April 29

b. Worked with Sunram Construction and Administrator in drafting Change Order 1 to adjust the contract time and provide an adjustment to the contract price due to the delay caused by the US Army Corps of Engineers requirement for a field cultural investigation.

Task Order 23: Scenic Heights School Forest Restoration

a. Coordination with the Contractor (Landbridge Ecological) began in preparation for spring weed control and seeding operations. The remaining areas of the school forest that have not been seeded yet and appear to be free of weeds (garlic mustard and buckthorn re-sprouts) will have the seed bed prepared and native seed, cover crop, and straw mulch manually applied in the coming weeks. Live stakes are also set to be installed in the pond buffer and along the vegetated swale.

b. Coordination with an Eagle Scout candidate in order to guide his potential project to the benefit of the restoration as a whole. Project options include walking path rehabilitation and a small bridge structure crossing the vegetated swale.

Task Order 25: Duck Lake Water Quality Improvement Project

a. Provided support for District staff's April 3rd public hearing presentation of Phase 1 (subwatershed assessment) results.

b. Coordinated with District staff to define tasks and timelines for Phase 2 of the project (design and construction).

c. Prepared draft tree planting specifications and request for quote documents and provided them to District staff.

d. Participated in a conference call with District Counsel to review tree planting technical specifications and the need for Counsel to develop the request for quote and contracting documents.

e. Prepared Task Order 25b describing engineering services for Phase 2 of the project.

Task Order 26: Stormwater Model Update and Flood-Risk Area Prioritization Identification for the Bloomington Portion of Purgatory Creek

a. Converted the City's XP-SWMM model for Purgatory Creek from XP-SWMM to PCSWMM.

b. Converted the City's XP-SWMM model for Hyland Lake from XP-SWMM to PCSWMM.

c. Reviewed the City's watershed divides and made minor updates to be consistent with divides that are used in the District's stormwater model.

d. Calculated hydrologic parameters for Hyland Lake to be consistent with parameters used in the rest of the District model.

e. Completed initial model simulations for the 500-year event. The City's stormwater model had not been used to simulate such a large rainfall event, so staff started the process of adding overland drainage to convey higher flows through the stormwater system. The process of updating the model to simulate larger rainfall events will continue over the next several weeks.

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BARR

To: RPBCWD Board of Managers
From: Dave Melmer
Subject: April 17 and 18, 2019—Erosion Inspection
Date: April 25, 2019
Project: 23/27-0053.14 PRMT 9016

Barr staff has inspected construction sites in the Riley Purgatory Bluff Creek Watershed District for conformance to erosion and sediment control policies. Listed below are construction projects and the improvement needed for effective erosion control. The sites were inspected from April 17 and 18, 2019.

Site Inspections

2015-010	**Children's Learning Adventure - Private - Commercial/Industrial** **Northwest Corner of Highway 5 and Galpin Avenue Chanhassen, Minnesota 55317** No change since last monthly inspection. Will monitor vegetation growth and establishment thru spring growing season-2019.	**2019-04-17**
2015-016	**Blossom Hill - Private - Residential** **10841 Blossom Rd Eden Prairie, Minnesota 55347** House construction at last site in development completed. All lots have been sold and have houses on them. BMP's look good. Additional silt fences installed at last house site-east side . Slope to pond has been reworked and soils covered--ditch checks installed. Rock entrance at last home site installed. Landscaping needs to be installed.	**2019-04-17**
2015-036	**Saville West Subdivision - Private - Residential** **5325 County Road 101 Minnetonka, Minnesota 55345** Open CA(s): Silt fence down at pond edge. NW corner of 5320 Spring Lane site. Site representative was notified. Deadline: 5/4/2019	**2019-04-18**
2015-050	**Arbor Glen Chanhassen - Private - Residential** **9170 GREAT PLAINS BLVD Chanhassen, Minnesota 55317** Perimeter control (silt fence). Roadway and detention pond installed. All slopes have been stabilized and covered. Rock entrances refreshed. Tracking to street/sediment at gutter--has been cleaned up. Catch basin protection installed. Bio-rolls installed where needed. BMP's good.	**2019-04-17**
2015-055	**Hampton Inn Eden Prairie - Private - Commercial/Industrial** **11825 Technology Drive Eden Prairie, Minnesota 55344** Open CA(s): Catch basin protection needed on west side-1 basin. Bio-rolls needed on SE side of site near stockpile. CA opened and site representative was notified. Deadline: 5/4/2019	**2019-04-17**

2016-017	**SWLRT - Government - Other** **Varies Eden Prairie, Minnesota 55344** No change since last monthly inspection. SWLRT work continues at Emerson site. BMP's installed. No other activity observed to date.	**2019-04-17**
2016-019	**Powers Ridge Lot 2 - Private - Commercial/Industrial** **1361 Lake Dr. West Chanhassen, Minnesota 55317** No site activity observed to date.	**2019-04-17**
2016-020	**Prairie View Enclave - Private - Commercial/Industrial** **12701 Pioneer Trail Eden Prairie, Minnesota 55347** No activity observed to date.	**2019-04-17**
2016-026	**Foxwood Development - Private - Residential** **9150 and 9250 Great Plains Blvd Chanhassen, Minnesota 55317** Multiple house construction has continues-BMP's look good- silt fences and rock entrances installed/ good perimeter control. Catch basin protection re-installed Silt fences have been installed on unsold lots.	**2019-04-17**
2016-028	**Summit Place Apartments Drainage Improvements - Private - Residential** **8501 Flying Cloud Drive Eden Prairie, Minnesota 55344** No construction activity observed to date.	**2019-04-17**
2016-032	**CSAH 61 Improvements - Government - Linear** **N/A Eden Prairie, Minnesota 55347** No change since last monthly inspection.	**2019-04-17**
2016-033	**Anderson Lakes-Purgatory Trail - Government - Other** **Anderson Lakes PKWY and Purgatory Creek Eden Prairie, Minnesota 55344** No construction observed to date.	**2019-04-17**
2016-041	**Chanhassen West Water Treatment Plant - Government - Other** **2070 Lake Harrison Road Chanhassen, Minnesota 55317** No change since last monthly inspection.	**2019-04-17**
2016-042	**18663 St. Mellion Place--Eden Prairie (Bear Path)** No change since last monthly inspection.	**2019-04-17**

2017-001	**Kopesky 2nd Addition - Private - Residential** **18340 82nd St Eden Prairie, Minnesota 55347** Site grading complete-house construction continues at two sites. Perimeter control installed. BMP's are good. Infiltration basins completed. Basin protection is good.	**2019-04-17**
2017-006	**6687 Horseshoe Curve Chanhassen** No activity observed to date.	**2019-04-17**
2017-007	**Cedarcrest Stables - Private - Residential** **16870 CEDARCREST DR Eden Prairie, Minnesota 55347** No activity observed to date.	**2019-04-17**
2017-022	**Chanhassen High School Stormwater Reuse - Government - Other** **220 Lyman Blvd Chanhassen, Minnesota 55317** No change since last monthly inspection.	**2019-04-17**
2017-024	**Prairie Bluffs Senior Living - Private - Residential** **10280 Hennepin Town Rd Eden Prairie, Minnesota 55347** Construction continues. Silt fence down is some areas/bare soils not covered/stabilized. CA opened for silt fence maintenance and bare soils. (Street tracking added). Bio-rolls have been installed since last inspection. Entrances still need protection. Site representative was notified again after April inspection. CA will remains open.	**2019-04-17**
2017-026	**6135 Ridge Road** No change since last monthly inspection. Rock entrance is good. Silt fence maintenance has been completed. Bare soils on upper half of slope have been covered with straw matting. Will have to inspect for vegetation growth and establishment in spring. Southwest corner has rock retaining landscaping completed.	**2019-04-18**
2017-029	**Tweet Pediatric Dentistry - Private - Commercial/Industrial** **7845 Century Blvd. Chanhassen, Minnesota 55317** No change since last monthly inspection. Will inspect spring --2019- for vegetation growth and establishment.	**2019-04-17**
2017-030	**Elevate - Private - Commercial/Industrial** **12900 Technology Drive Eden Prairie, Minnesota 55344** No change since last monthly inspection. BMP's look good. Site is well maintained.	**2019-04-17**

2017-031	**Lion's Tap - Private - Commercial/Industrial** **16180 Flying Cloud Drive Eden Prairie, Minnesota 55347** No activity observed to date.	**2019-04-17**
2017-032	**11193 Bluestem Lane - Government - Other** **11193 Bluestem Lane Eden Prairie, Minnesota 55347** No change since last monthly inspection.	**2019-04-17**
2017-037	**The Venue - Private - Commercial/Industrial** **525 W 78th St Chanhassen, Minnesota 55317** Construction continues. BMP's installed. Construction continues. Additional BMP's installed--catch basin protection reinstalled. Lower parking area complete.	**2019-04-17**
2017-038	**West Park - Private - Residential** **760& 781 Lake Susan Drive 8601 Great Plains Blvd Chanhassen, Minnesota 55317** Construction continues. Street installation on north and south side completed. Rock entrance installed on south side and to individual house sites continues. Perimeter control installed. Catch basin protection installed. BMP's look good. Additional silt fences have been installed. Bare soils that are not being worked have been stabilized. Landscaping at some sites underway or completed. BMP's look good. CA closed.	**2019-04-17**
2017-039	**Mission Hill Senior Living - Private - Residential** **8600 Grate Plains Boulevard Chanhasen, Minnesota 55317** Open CA(s): CA opened for tracking to street near site entrance and on site roadway. Site representative was notified. Deadline: 5/4/2019 Construction continues. BMP's installed look good. Site perimeter control installed. Catch basin protection installed. Site is in good shape. South swale has been stabilized. Roadway installed.	**2019-04-17**
2017-047	**Fawn Hill - Private - Residential** **7240 Galpin Road Chanhassen, Minnesota 55331** Earthwork completed/roadway installed. Perimeter silt fence installed and additional silt fences installed where needed. Exposed soils blown with straw and hydroseeded-vegetation has sprouted and is growing. BMP's to date look good- West pond overflow installed.	**2019-04-17**
2017-052	**Old Excelsior Senior Living - Private - Residential** **17705 Hutchins Drive Minnetonka , Minnesota 55345** Exterior Construction complete. Perimeter control installed. Biorolls installed at back of curb in some areas-more needed. CA will remain open.	**2019-04-18**

2017-063	**Clear Springs Elementary 2018 Gymnasium Addition - Government - Other** **5621 County Road #101 Minnetonka, Minnesota 55345** No change since last monthly inspection. Construction complete. Site is well contained. Final site grading to be completed after spring snowmelt.	**2019-04-18**
2017-064	**Scenic Heights Elementary School Forest Restoration - Government - Other** **5650 Scenic Heights Drive Minnetonka, Minnesota 55345** No change since last monthly inspection.	**2019-04-18**
2017-069	**Scheels Redevelopment - Private - Commercial/Industrial** **8301 Flying Cloud Dr. Eden Prairie, Minnesota 55344** BMP's installed. Construction continues. No change since March inspection.	**2019-04-17**
2017-072	**O'Reilly Auto Parts Eden Prairie - Private - Commercial/Industrial** **8868 AZTEC DRIVE Eden Prairie, Minnesota 55347** No activity observed to date.	**2019-04-17**
2017-073	**Preserve Village - Private - Residential** **9625 Anderson Lakes Pkwy Eden Prairie, Minnesota 55344** Construction of building complete. BMP's installed. Catch basin protection is adequate. Site is well contained for runoff protection. Additional areas of bare soils observed-not covered to date. . Infiltration basin construction continues. Site representative was notified about graded soils not being covered and lack of bio-rolls back side of curbs. CA opened for uncovered soils. CA remains open. No change since March inspection.	**2019-04-17**
2018-001	**Panera - Private - Commercial/Industrial** **531 W. 79th Street Chanhassen, Minnesota 55317** No change since last monthly inspection.	**2019-04-17**
2018-004	**903 Lake Drive Chanhassen - Government - Other** **903 Lake Drive Chanhassen, Minnesota 55317** No change since last monthly inspection.	**2019-04-17**
2018-011	**Maloney Shoreline Stabilization - Existing Single-Family** **108 Pioneer Trail Chanhassen, Minnesota 55327** No activity observed to date.	**2019-04-17**
2018-014	**Eden Prairie Road Reconstruction** Additional BMP's installed along with rock for tracking control. Construction continues on roadway. Road closed on north end.	**2019-04-17**

2018-015	**Starbucks Coffee House - Private - Commercial/Industrial** **19285 Highway 7 19245 Highway 7 Shorewood, Minnesota 55401** No change since last monthly inspection.	**2019-04-18**
2018-016	**Avienda - Private - Commercial/Industrial** **SW corner of Powers and Lyman Boulevard Chanhassen, Minnesota 55317** No activity observed to date.	**2019-04-17**
2018-020	**9770 Sky Lane - Existing Single-Family** **9770 Sky Lane Eden Prairie, Minnesota 55347** Construction continues. BMP's onsite are installed. Site grading /boulder wall installation completed. Silt fences installed and secured. Bio-rolls at street side adequate--could use more. Landscaping needs to be completed.	**2019-04-17**
2018-021	**9810 Sky Lane - Existing Single-Family** **9810 Sky Lane Eden Prairie, Minnesota 55347** Construction continues. BMP's onsite are installed. Boulder retaining wall installation on west side completed. BMP's adequate. Exposed soils on west side covered where needed. Landscaping needs to be completed.	**2019-04-17**
2018-022	**Sunrise Park Court Improvement - Government - Other** **9401 Bloomington Ferry Road Bloomington, Minnesota 55438** No change since last monthly inspection.	**2019-04-17**
2018-024	**Kittelson Pool - Existing Single-Family** **2165 Wynsong Lane Chanhassen, Minnesota 55317** No change since last monthly inspection.	**2019-04-17**
2018-025	**Magellan Pipeline UCD Dig 8 through 12** Much of site is flooded--Site representative stated that: work has suspended until next winter for access. CA closed.	**2019-04-17**
2018-026	**Culvers of Eden Prairie - Private - Commercial/Industrial** **970 Prairie Center Drive Eden Prairie , Minnesota 55344** Construction completed. All temporary BMP's have been removed. Site is stable.	**2019-04-17**

2018-027	**MAMAC - Private - Commercial/Industrial** **8189 Century Boulevard Chanhassen, Minnesota 55317** Construction resumed. Perimeter control silt fence installed. Temporary BMP's installed. Security fence installed. BMP's are good.	**2019-04-17**
2018-028	**Oak Point Elementary School Parking Lot - Government - Other** **13400 Staring Lake Parkway Eden Prairie, Minnesota 55347** No construction observed to date.	**2019-04-17**
2018-034	**Basin 05-11-A Cleanout - Government - Other** **Corner of Sequioa and Ginger Eden Prairie, Minnesota 55346** No change since last monthly inspection.	**2019-04-18**
2018-038	**Eden Prairie Senior Living - Private - Residential** **8460 Franlo Rd Eden Prairie, Minnesota 55344** Construction continues. Perimeter control installed. BMP's look good. Street tracking observed. Rock entrances adequate. Soils onsite are being worked. CA opened for tracking Site representative was notified.	**2019-04-17**
2018-039	**Emerson Site Improvements - Private - Commercial/Industrial** **12001 Technology Drive Eden Prairie, Minnesota 55344** Open CA(s): Area near garage (west side) needs protection--bare soils on a slope--CA opened and site representative was notified. Deadline: 5/4/2019 BMP's installed. Construction appears to be completed. Storm water detention pond installed and BMP's are good.	**2019-04-17**
2018-040	**Center Point Carver Line Receiver** No change since last monthly inspection.	**2019-04-18**
2018-041	**Abra Auto Body - Private - Commercial/Industrial** **13075 Pioneer Trail Eden Prairie, Minnesota 55347** No activity observed to date.	**2019-04-17**
2018-043	**Control Concepts - Private - Commercial/Industrial** **8077 Century Boulevard Chanhassen, Minnesota 55317** No activity observed to date.	**2019-04-17**
2018-044	**Smith Village - Private - Residential** **16389 Glory Lane Eden Prairie, Minnesota 55344** No site activity observed to date.	**2019-04-18**

2018-047	**Peterson Borrow Site - Private - Commercial/Industrial** **15900 Flying Cloud Drive Eden Prairie, Minnesota 55347** No change since last monthly inspection.	**2019-04-17**
2018-049	**D'Alessandro Home - Existing Single-Family** **18702 Heathcote Dr Deephaven, Minnesota 55391** Construction has continues. Perimeter control installed. Bio-logs installed. Rock entrance is good. Minor tracking to street. CA closed.	**2019-04-18**
2018-050	**Eden Prairie Cemetery - Private - Commercial/Industrial** **8810 Eden Prairie Road Eden Prairie, Minnesota 55437** No change since last monthly inspection.	**2019-04-17**
2018-052	**HCRRA Culvert Replacement - Government - Linear** **Hennepin County Wayzata and Deephaven, Minnesota 55401** No change since last monthly inspection.	**2019-04-18**
2018-053	**Roberts Residence - Existing Single-Family** **5925 Ridge Road Shorewood, Minnesota 55331** BMP's installed. Construction suspended equipment onsite for resumption on construction.	**2019-04-18**
2018-055	**Park Trail Improvement Project - Government - Other** **1700 W. 98th Street Bloomington, Minnesota 55431** No change since last month's inspection.	**2019-04-17**
2018-056	**Bluff Creek Restoration - Government - Other** **Liberty on Bluff Creek, Outlot B Audubon Road Chanhassen, Minnesota 55317** No change since last monthly inspection.	**2019-04-17**
2018-058	**Walker Home - Existing Single-Family** **9108 Stephens Pointe Eden prairie, Minnesota 55347** Open CA(s): Catch basin protection needed downstream of driveway. CA opened. Site representative was notified. Deadline: 5/4/2019 Perimeter control installed. Rock entrance is installed-recently refreshed. Excavation and foundation complete-structure construction continues. BMP's look good to date.	**2019-04-17**
2018-059	**Mason Point Landscaping - Existing Single-Family** **15363 Mason Pointe Eden Prairie, Minnesota 55347** No change since last monthly inspection.	**2019-04-17**

2018-060	**Loichinger Residence** No change since last monthly inspection.	**2019-04-17**
2018-061	**McCoy Lake Inlet Sediment Removal - Government - Other** **Mitchell Road and Cumberland Road Eden Prairie, Minnesota 55347** Access to site completed. No BMP's installed to date. No construction to date. No change since last monthly inspection.	**2019-04-17**
2018-062	**Lower Riley Creek Stabilization Project - Government - Other** **Ridge on Riley Creek, Outlot A Eden Prairie, Minnesota 55344**	**2019-04-17**
2018-067	**Hennepin Co Library - Eden Prairie Branch Refurb - Government - Other** **565 Prairie Center Drive Eden Prairie, Minnesota 55344** No activity observed to date.	**2019-04-17**
2018-068	**DriSteem Warehouse Expansion - Private - Commercial/Industrial** **14949 Technology Drive Eden Prairie, Minnesota 55344** Construction continues. Catch basin protection installed . Bio-rolls in place onsite.	**2019-04-17**
2018-071	**Minnetonka High School Lacrosse Field - Government - Other** **18301 Highway 7 Minnetonka, Minnesota 55422** No activity observed to date.	**2019-04-18**
2018-072	**Hyland Park Parking Lot Improvements - Government - Other** **10145 E Bush Lake Rd Bloomington, Minnesota 55438** No activity observed to date.	**2019-04-17**
2018-073	**Preserve Boulevard Reconstruction- Government - Linear** **Preserve Boulevard Eden Prairie, Minnesota 55344** Open CA(s): CA for no silt fence near wetland--SW of Preserve Blvd. and Anderson Lakes Pkwy. Site representative was notified. Street tracking observed. Deadline: 5/4/2019 Construction has begun. BMP's installed.	**2019-04-17**
2018-074	**Eden Prairie Ground Storage Reservoir - Government - Other** **XXXX Eden Prairie Road Eden Prairie, Minnesota 55344** No site activity observed to date.	**2019-04-18**

2019-003	**Stable Path**	**2019-04-17**
	No activity observed to date.	
2019-007	**Beverly Hill**	**2019-04-17**
	No activity observed to date.	
2019-008	**Staring Lake Pavilion**	**2019-04-17**
	No construction observed to date.	

Please contact me at 952.832-2687 or dmelmer@barr.com if you have questions on the projects listed above or any additional items that need to be addressed for the erosion control inspections.

COOPERATIVE AGREEMENT
AMONG CITY OF EDEN PRAIRIE,
LOWER MINNESOTA RIVER WATERSHED DISTRICT AND
RILEY-PURGATORY-BLUFF CREEK WATERSHED DISTRICT

LOWER RILEY CREEK CORRIDOR ENHANCEMENT PROJECT

This cooperative agreement is made by and among the City of Eden Prairie, a Minnesota municipal corporation (Eden Prairie); the Lower Minnesota River Watershed District, a watershed district created pursuant to Minnesota Statutes chapters 103B and 103D (LMRWD); and the Riley-Purgatory-Bluff Creek Watershed District, a watershed district created pursuant to Minnesota Statutes chapters 103B and 103D (RPBCWD), to implement the Lower Riley Creek Corridor Enhancement Plan in Eden Prairie, Hennepin County, Minnesota, to stabilize reach E and reach D3 of lower Riley Creek to provide an ecologically diverse stream with significantly reduced streambank erosion, diverse habitat layers and enhanced public access and understanding of why stable stream systems are important. (Eden Prairie, LMRWD and RPBCWD are referred to collectively herein as the Partners.)

Recitals

WHEREAS RPBCWD has an approved water resources management plan pursuant to Minnesota Statutes section 103B.231 (the Plan) that has as a primary goal addressing all impairments in water resources in RPBCWD's jurisdiction and removing all RPBCWD waterbodies from the State of Minnesota impaired waters list;

WHEREAS RPBCWD completed the Lake Riley Outlet Improvements and Riley Creek Lower Valley Stabilization Feasibility Study in 2007, which determined that the lower valley of Riley Creek requires stabilization to limit erosion of the stream channel and steep valley bluffs;

WHEREAS Riley Creek is listed on the Minnesota Pollution Control Agency's 303(d) list of impaired waters for excessive turbidity, aquatic macroinvertebrate bioassessments, fishes bioassessments and *E. coli*, and the Minnesota River, into which Riley Creek flows, is impaired for nutrients/eutrophication and turbidity;

WHEREAS a 2015 Creek Restoration Assessment Strategy report produced by RPBCWD evaluated segments of all creeks in the Riley, Purgatory and Bluff Creek watersheds and prioritized reach E in the lower valley of Riley Creek for restoration;

WHEREAS the RPBCWD Board of Managers has determined that reaches E and D3 are the highest-priority locations for stabilization in the lower valley of Riley Creek and that restoration should begin at those sites;

WHEREAS the capital improvements program in the Plan includes the lower Riley Creek Restoration and Stabilization (Reach D3 and E) project (the Project), which was the subject of the duly noticed public hearing on December 7, 2016, after which the RPBCWD Board of Managers ordered the Project (which at the time was referred to as the Riley Creek Water Quality Improvement Project);

WHEREAS in June 2018 the RPBCWD engineer produced the Lower Riley Creek Corridor Enhancement Plan (the Enhancement Plan), attached to and incorporated herein as Exhibit A, which articulates background on and a plan for implementation of the Project that was collaboratively developed by the Partners and will provide greater stream depth variability, more channel bed substructure types and varied channel velocities in lower Riley Creek to reduce erosion and improve water quality while also improving natural stream habitat for aquatic organisms;

WHEREAS the Enhancement Plan states a key expected outcome of the Project as reduction from Riley Creek and, consequently, the Minnesota River, of 2,173,930 pounds of total suspended solids and 1,250 pounds of total phosphorus;

WHEREAS the Partners find that implementing the Enhancement Plan will provide better floodplain connectivity for lower Riley Creek, which will enhance surrounding riparian habitat and, by establishing a stable creek corridor, will also address the identified turbidity impairment within reach E and reach D3 of Riley Creek;

WHEREAS the Project will be constructed entirely on property owned by Eden Prairie in the Riley Creek Conservation Area as depicted in Enhancement Plan (the RCCA), and at Eden Prairie's request in conjunction with and as part of construction of the Project, a new pedestrian bridge will be constructed in the RCCA;

WHEREAS Eden Prairie operates its stormwater-management system under the state Municipal Separate Storm Sewer System general permit, and construction and maintenance of the Project is intended to accrue to the benefit of Eden Prairie's fulfillment of its obligations under the permit; and

WHEREAS Eden Prairie, LMRWD and RPBCWD are authorized by Minnesota Statutes section 471.59 to enter into this cooperative agreement for the Project.

Agreement

NOW, THEREFORE, THE PARTNERS enter into this agreement to document their understanding as to the scope of the Project, reaffirm their commitments as to the general responsibilities for and tasks to be undertaken by the Partners, dedicate the

necessary rights to the use of the RCCA, and facilitate communication and cooperation to successfully complete the Project.

1 **Project**. The Project elements are described in detail in and supported by the Enhancement Plan, which serves as the basis for and provides technical data and analysis supporting the Partners' agreement.

1.1 DESIGN. Design and preparation of all necessary construction documents (plan sheets, drawings, technical specifications) for the Project. The design of the Project will incorporate elements described in section 7.1 of the Enhancement Plan, and will be accompanied by plan sheets, drawings and technical specifications for a new pedestrian bridge in the RCCA (the Bridge), which will be included in the bidding documents for the Project as a bid alternate.

1.2 CONSTRUCTION. The Project and, if selected, the Bridge will be constructed by a contractor under contract to RPBCWD and with construction oversight and management by the RPBCWD engineer. Construction will include advance determination and procurement of permits and other regulatory approvals necessary for the Project. Construction documents will provide for a three-year warranty on vegetation. Construction also will include completion of as-built surveys of outfalls and, if selected by Eden Prairie pursuant to paragraph 4.3 below, the Bridge. Construction will include restoration of portions of the RCCA utilized for the Project, including trails used for access and staging of construction, to a condition materially suitable for the usual public uses thereof, except to the extent the RCCA is improved through construction of the Project and, if selected, the Bridge.

1.3 MAINTENANCE. RPBCWD and Eden Prairie will implement inspection, monitoring and maintenance of the Project as described in section 7.2 of the Enhancement Plan.

2 Costs

2.1 RPBCWD will be responsible for:

a. The costs of design, construction and implementation, as well as construction oversight and management, of the Project, except as will be reimbursed by Eden Prairie and LMRWD in accordance with the agreement;

b. The costs and fees associated with complying with regulatory requirements applicable to the Project, except that Eden Prairie will assess no fee to RPBCWD for city permits required for the Project, if any;

b. The in-kind costs of its participation in post-construction monitoring and inspection of the Project as described in the Enhancement Plan.

2.2 Eden Prairie will:

a. Contribute the land-use rights necessary for implementation of the Project and construction of the Bridge in the RCCA at no out-of-pocket cost to any party;

b. Contribute designs, plans and specifications for the Bridge for integration into the bidding and, if selected, construction documents for the Project;

c. Reimburse RPBCWD $150,000 of documented Project costs;

d. Reimburse RPBCWD 50 percent of documented costs of storm sewer outfalls installed as part of the Project, not to exceed a contribution of $50,000;

e. Reimburse RPBCWD the entirety of the documented construction cost of the Bridge, if selected;

f. Conduct, after the three-year warranty period provided in accordance with subsection 1.2, at its sole discretion and expense, routine post-construction inspection and Routine Maintenance of the Project as defined in section 7.2.2 of the Enhancement Plan.

2.3 LMRWD will:

a. Reimburse RPBCWD $150,000 of documented Project costs.

2.4 Each of the Partners will bear the internal, administrative and incidental costs of fulfilling its responsibilities and obligations under this agreement, as well as the costs incurred in providing and conducting public education, outreach and meetings for the Project. In the event of cancellation in accordance with subsection 3.5 herein, each party will bear its costs incurred prior to RPBCWD's issuance of notice of cancellation.

3 RPBCWD's Specific Rights and Duties

3.1 RPBCWD has contracted with the RPBCWD engineer for the development of the design and plans for the Project, along with the specifications and all other necessary bidding and construction documentation. Notwithstanding the foregoing, RPBCWD makes no warranty to Eden Prairie or LMRWD regarding the RPBCWD engineer's or another third party's performance in design, construction or construction management for the Project or the Bridge, if selected. RPBCWD has submitted to Eden Prairie and LMRWD the 90 percent complete design and plans for the Project (attached hereto and incorporated herein as Exhibit B). Under contract with RPBCWD, the RPBCWD engineer will prepare contract documents for the Project, accompanied by plans, designs and technical specifications for the Bridge provided by Eden Prairie in accordance with paragraph 4.2 below, for solicitation of a contractor in accordance with state procurement

law. The RPBCWD engineer will integrate the plans, designs and technical specifications for the Bridge into the bidding documents for the Project as a bid alternate.

3.2 In its sole discretion and based on bids for construction of the Project without regard to bid price of the Bridge, RPBCWD will select a contractor and contract for the construction of the Project and, if selected, the Bridge in accordance with applicable public-procurement law, as analyzed by RPBCWD, and will ensure that the Project, when constructed, is consistent with the RCCA and this agreement. RPBCWD will award and enter a contract for the construction of the Project that will:

a. Require the contractor to indemnify, defend and hold harmless Eden Prairie and LMRWD, their officers, governing-board members, employees and agents from any and all actions, costs, damages and liabilities of any nature, including reasonable attorney's fees, arising from the contractor's negligent or otherwise wrongful act or omission, or breach of a specific contractual duty, or a subcontractor's negligent or otherwise wrongful act or omission, or breach of a specific contractual duty owed by the contractor to RPBCWD. The contract will require that for any claim subject to indemnification by an employee of selected contractor or a subcontractor, the indemnification obligation is not limited by a limitation on the amount or type of damages, compensation or benefits payable by or for the contractor or a subcontractor under workers' compensation acts, disability acts or other employee benefit acts.

b. Require that the contractor procure general liability insurance and name Eden Prairie and LMRWD as additional insureds with primary coverage for general liability on a noncontributory basis for both ongoing work and completed operations to the extent of RPBCWD's statutory liability limit.

c. Extend all product warranties and workmanship guaranties to Eden Prairie.

3.3 As between the Partners and with the assistance and cooperation of Eden Prairie, RPBCWD will obtain all permits, licenses and other necessary approvals for itself and Eden Prairie from entities with regulatory authority.

3.4 RPBCWD will contract for construction of and will ensure that the Project and, if selected, the Bridge are completed in accordance with applicable law and regulatory standards and criteria.

3.5 RPBCWD or the RPBCWD engineer on RPBCWD's behalf will oversee the construction of the Project, and if selected, the Bridge. RPBCWD may adjust the plans, design and specifications for the Project during construction in consultation with Eden Prairie, as long as the revised plans do not require RPBCWD to exceed the scope of the rights granted under this agreement or create maintenance obligations not anticipated

hereunder. Until completion of construction, if RPBCWD, in its judgment, should decide that the Project is infeasible, RPBCWD, at its option, may declare this agreement rescinded and annulled. If RPBCWD so declares, all obligations herein, performed or not, will be voided; RPBCWD will return the RCCA as nearly as reasonably feasible to its preexisting condition or to a condition agreed on by Eden Prairie and RPBCWD to the extent the RCCA has been physically disturbed by RPBCWD, its contractor, agents or assigns. On completion of construction of the Project, the RPBCWD engineer will certify construction of the Project as substantially complete for the purposes intended.

3.6 RPBCWD will notify Eden Prairie on completion of construction, and thereafter RPBCWD will participate in monitoring the effectiveness of and inspecting the Project and will, in collaboration with Eden Prairie, produce an annual report on the status of the Project, consistent with the Enhancement Plan. At the request of Eden Prairie, RPBCWD will duly consider levying and dedicating funds for maintenance and/or repair of the Project.

4 Eden Prairie's Specific Rights and Duties, and Grant of Access, Construction and Maintenance Rights

4.1 Eden Prairie has reviewed and approves, by its signature hereunder, the 90 percent complete design and plans for the Project provided in Exhibit B.

4.2 Eden Prairie, for itself or by a contractor on its behalf, will submit a design, plans and bidding specifications for the Bridge in a form and format specified by the RPBCWD engineer for inclusion in the solicitation of a contractor for the Project as a bid alternate. In the event Eden Prairie does not submit a design, plans and bidding specifications for the Bridge to the RPBCWD engineer, the Bridge will not be included in the solicitation and RPBCWD will solicit contractors for construction of the Project only. Under any circumstances, solicitation of and selection of a contractor for construction of the Project will be made on the basis of cost of the construction of the Project alone (i.e., the base bid).

4.3 After receipt of responses to the solicitation of contractors for construction, Eden Prairie in its sole discretion will determine whether to direct RPBCWD to include construction of the Bridge in the contract between RPBCWD and the selected contractor for construction of the Project. In the event Eden Prairie elects not to direct RPBCWD to include construction of the Bridge in the contract for construction of the Project, Eden Prairie may separately contract for construction of the Bridge and will be solely responsible for coordination of construction of the Bridge with construction of the Project.

4.4 Eden Prairie will cooperate with RPBCWD's efforts to obtain permits and approvals needed for the Project and act to facilitate proper and efficient processing of applications for city approvals.

4.5 LAND-USE RIGHTS.

a. Eden Prairie hereby grants to RPBCWD, its contractors, agents and assigns a temporary and nonexclusive license through the three-year warranty period provided in accordance with subsection 1.2 herein to access and use the portions of the RCCA shown in the Enhancement Plan and occupying parcels designated in the Hennepin County property records by property identification numbers

29-116-22-32-0004	29-116-22-31-0009
29-116-22-31-0018	29-116-22-24-0015
29-116-22-24-0048	29-116-22-24-0019
29-116-22-21-0030	29-116-22-21-0051

for purposes of construction of the Project and, if selected, the Bridge. RPBCWD, on reasonable notice to Eden Prairie, may temporarily restrict or preclude public access to a portion or portions of the RCCA to ensure safety while construction activities are under way.

b. Eden Prairie will forbear from any activity that unreasonably interferes with the RPBCWD's ability to exercise its rights or meet its obligations under this agreement. Subject to its interest in preserving public safety, Eden Prairie will cooperate with RPBCWD's reasonable exercise of its rights under this agreement with regard to access to and use of the RCCA. Eden Prairie will not take any action within or adjacent to the RCCA that could reasonably be expected to diminish the effectiveness or function of the Project for the purposes intended, and after notice of completion of construction of the Project from RPBCWD, Eden Prairie will continue to maintain the RCCA in a manner that avoids inhibiting the effectiveness of the Project. If Eden Prairie transfers ownership of a fee interest in the RCCA or any portion of the RCCA improved by the Project during the term of this agreement, it will require as a condition of sale and enforce a requirement that the transferee assume in writing Eden Prairie's responsibilities and obligations under this agreement.

c. On completion of construction of the Project, Eden Prairie will retain ownership of the RCCA, and, if selected for construction, the Bridge, provided that if Eden Prairie transfers ownership of a fee interest in the RCCA oor any portion of the RCCA improved by the Project or the Bridge during the term of this agreement, it will require as a condition of sale and enforce a requirement that the transferee assume in writing Eden Prairie's responsibilities and obligations under this agreement.

4.6 Eden Prairie may, at its sole discretion and expense, adjust the plans, design and specifications for the Bridge during construction, as long as the revised plans do not require Eden Prairie to exceed the scope of the rights granted under this agreement and, to the degree the changes affect design or construction of the Project, with concurrence of the RPBCWD engineer.

4.7 On notification from RPBCWD of completion of construction in accordance with paragraph 3.6, Eden Prairie will on its own, or by contract with an engineer licensed in the State of Minnesota, certify construction of the Bridge as substantially complete for the intended purposes, if selected by Eden Prairie for construction in conjunction with the Project in accordance with paragraph 4.3.

4.8 After certification of construction of the Project as substantially complete for the intended purposes, Eden Prairie will participate for the duration of this agreement in inspecting the Project and will, in collaboration with RPBCWD, produce an annual report on the status of the Project, consistent with the Enhancement Plan. Eden Prairie will complete or contract for the completion of, in its sole discretion and at its sole expense, Routine Maintenance as defined in the Enhancement Plan of the Project for 20 years from the date the Project is substantially complete for the intended purposes.

4.9 On receipt of documentation of costs incurred and paid, Eden Prairie will reimburse RPBCWD as described in section 2 of this agreement.

4.10 After completion of construction of the Project, Eden Prairie may solicit contributions from RPBCWD and/or LMRWD for non-routine maintenance and/or repairs of the Project.

4.11 Eden Prairie may conduct data-collection and analysis on the performance of the Project in reducing loading of sediment and other pollutants to Riley Creek, or request and utilize RPBCWD data and analysis for the purpose, and may utilize all credit generated by the Project toward compliance with goals and requirements imposed by state and federal regulatory programs, such as the National Pollutant Discharge Elimination System as applicable to Eden Prairie.

5 LMRWD's Specific Rights and Duties

5.1 LMRWD has reviewed and approves, by its signature hereunder, the 90 percent complete design and plans for the Project provided in Exhibit B.

5.2 On receipt of documentation of costs incurred and paid, LMRWD will reimburse RPBCWD as described in section 2 of this agreement.

6 General Terms

6.1 INDEPENDENT RELATIONSHIP; LIABILITY. This agreement does not create a joint powers board or organization within the meaning of Minnesota Statutes section 471.59, and no party agrees to be responsible for the acts or omissions of another pursuant to subdivision 1(a) of the statute. Only contractual remedies are available for the failure of a party to fulfill the terms of this agreement. Eden Prairie, LMRWD and RPBCWD enter this agreement solely for the purposes of improving the ecological health and condition of lower Riley Creek in Eden Prairie and downstream receiving waters. Accordingly, with respect to any and all activity undertaken pursuant to this agreement, Eden Prairie, LMRWD and RPBCWD (each party as an Indemnitor Party) agree to hold each other harmless, and defend and indemnify the other parties , their officers, employees and agents (individually, an Indemnified Party) from and against any and all liability, loss, claim, damage or expense (including reasonable attorney fees, costs and disbursements) that an Indemnified Party may incur as a result of the Project due to any negligent or willful act or omission by the Indemnitor Party or the Indemnitor Party's breach of any specific contractual duty. Notwithstanding the foregoing or any other provision of this agreement, Eden Prairie's, LMRWD's and RPBCWD's obligations under this paragraph will survive the termination of the agreement.

This agreement creates no right in and waives no immunity, defense or liability limitation with respect to any third party. As between the parties, only contract remedies are available for a breach of this agreement. Notwithstanding the foregoing, RPBCWD will not be deemed to have acquired by entry into or performance under this agreement, any form of interest or ownership in or to any portion of the land that is the site of the construction of the Project or adjacent property. RPBCWD will not by entry into or performance under this agreement be deemed to have exercised any form of control over the use, operation or management of any portion of the property that is the site of the Project or adjacent property so as to render RPBCWD a potentially responsible party for any contamination under state and/or federal law, however this will not relieve the RPBCWD from liability as a potentially responsible party on the basis of categories other than ownership and operation as provided for under state and federal law.

6.2 PUBLICITY AND ENDORSEMENT. Any publicity regarding the Project must identify Eden Prairie, LMRWD and RPBCWD as the sponsoring entities. For purposes of this provision, publicity includes notices, informational pamphlets, press releases, research, reports, signs, and similar public notices prepared by or for Eden Prairie, LMRWD or RPBCWD individually or jointly with others, or any subcontractors, with respect to the Project. RPBCWD, LMRWD and Eden Prairie will collaborate on the development of educational and informational signage and materials pertinent to the Project, and each

party, at its cost, may develop, produce and, after approval of the other parties, distribute educational, outreach and publicity materials related to the Project.

6.3 DATA MANAGEMENT. All designs, written materials, technical data, research or any other work-in-progress will be shared between the parties to this agreement on request, except as prohibited by law. As soon as is practicable, the party preparing plans, specifications, contractual documents, materials for public communication or education will provide them to the other party for recordkeeping and other necessary purposes.

6.4 DATA PRACTICES. All data created, collected, received, maintained or disseminated for any purpose in the course of this agreement is governed by the Data Practices Act, Minnesota Statutes chapter 13, any other applicable state statute, or any state rules adopted to implement the act, as well as federal regulations on data privacy

6.5 ENTIRE AGREEMENT. This agreement contains the complete and entire agreement among the parties relating to the subject matter hereof, and supersedes all prior negotiations, agreements, representations and understandings, if any, between the parties respecting such matters. The recitals stated at the outset are incorporated into and a part of the agreement.

6.6 COMPLETE AGREEMENT. This agreement, as it may be amended in writing, constitutes the entire agreement between the Partners. Any amendment to this agreement must be in writing and will not be effective until it has been executed and approved by the same parties who executed and approved the original agreement or their successors in office.

6.7 WAIVERS. The waiver by Eden Prairie, LMRWD or RPBCWD of any breach or failure to comply with any provision of this agreement by the other party will not be construed as nor will it constitute a continuing waiver of such provision or a waiver of any other breach of or failure to comply with any other provision of this agreement.

6.8 NOTICES, COORDINATION. The Partners designate the following authorized representatives, each to serve as the liaison to the other parties for purposes of coordinating inspection, construction oversight and maintenance of the Project as provided in this agreement. Any written communication required under this agreement will be addressed to the other parties as follows, except that any party may change its address for notice by so notifying the other parties in writing:

Eden Prairie	RPBCWD	LMRWD
Patrick Sejkora	Claire Bleser	Linda Loomis,
Water Resources Engineer	Administrator	Administrator
8080 Mitchell Road	18681 Lake Drive East	112 Fifth St. E.
Eden Prairie MN 55344	Chanhassen MN 55317	Chaska MN 55318
952-949-8360	952-607-6512	763-545-4659
psejkora@edenprairie.org	cbleser@rpbcwd.org	naiadconsulting@gmail.com

6.9 TERM; TERMINATION. This agreement is effective on execution by all three parties and will terminate 20 years from the date of execution or on the written agreement of the Partners. Any responsibility or obligation that has come into being before expiration, specifically including obligations under section 2 and paragraphs 5.2, 6.1 and 6.2 herein, will survive expiration. Further, if Eden Prairie transfers ownership of a fee interest in the RCCA or in any portion of the RCCA improved by the Project subsequent to the term of this agreement, Eden Prairie will require as a condition of sale and enforce that the purchaser agree in writing to refrain from taking any action that could reasonably be expected to diminish the effectiveness or function of the Project for the purposes intended.

IN WITNESS WHEREOF, the parties have caused the agreement to be duly executed intending to be bounded thereby.

(Signature page follows.)

CITY OF EDEN PRAIRIE

By: Ronald K. Case, Mayor

Date: 4/16/2019

By: Rick Getschow, City Manager

Date: 4/16/2019

Approved as to form & execution:

City attorney

LOWER MINNESOTA RIVER WATERSHED DISTRICT

By: _____, President

Date: _____

Approved as to form & execution:

District counsel

RILEY-PURGATORY-BLUFF CREEK WATERSHED DISTRICT

By: _____

By: _____, President

Date: _____

Approved as to form & execution:

District counsel

EXHIBIT A
Lower Riley Creek Corridor (Reach E and D3) Enhancement Plan

EXHIBIT B
90 percent Complete Design and Plans for the Project

resourceful. naturally.
engineering and environmental consultants

BARR

Memorandum

To: Riley-Purgatory-Bluff Creek Watershed District
From: Jeff Weiss, P.E. and Scott Sobiech, P.E., Barr Engineering Co.
Subject: Lower Riley Creek Stabilization Project – Request Board Authorization to Solicit Bids for Construction
Date: April 26, 2019
Project: 23/27-0053.14 014B
c: Claire Bleser – RPBCWD Administrator

RPBCWD has documented erosion along Lower Riley Creek within the Riley Creek Conservation Area in Eden Prairie. Severe erosion was first identified in the Lake Riley Outlet Improvements and Riley Creek Lower Valley Stabilization Feasibility Study in 2007 in which the entire Lower Valley of Riley Creek was assessed. The Creek Restoration Action Strategy (CRAS) was a tool developed by RPBCWD to compare erosion and potential benefits of doing a project along a given reach. The CRAS score for this reach of Riley Creek was tied for the second highest overall score of all reaches within the District. In October 2016, the RPBCWD completed a feasibility study to identify cost effective stabilization options and recommendations. The feasibility study recommended a set of alternatives to raise the channel bed and create a reconnection to the floodplain. At the January 2017, Board meeting the RPBCWD Board of Managers authorized final design and preparation of construction documents for the reach based on findings in the feasibility study, which included installing check dams to raise the channel bed and to install cross vanes to stabilize a tributary ravine to this reach. The city of Eden Prairie and the Lower Minnesota River Watershed District are financial partners on this project.

Construction documents including bidding documents, construction drawings, and technical specifications, have been prepared for the stabilization reach. The design of the proposed system includes, but is not limited to, grading of the channel and stream banks, installation of root wads, cross vanes, riprap, toe wood, constructed riffles, vegetated reinforced soil slopes, log/rock step pools, new manhole structures, and flared end sections along approximately 5,000 feet of Riley Creek and the tributary ravine. The construction drawings also include erosion control, site restoration with native plantings, and establishment of a buffer for the creek.

The timing for construction of this project is critical. Construction will include grading the channel and immediate banks to create a floodplain. Because the construction area will be concentrated in the existing channel, timing the construction during anticipated low flows will minimize the need to control water and reduce the risk of erosion during construction. The best window for completing this work is anticipated to be in late fall and early winter when precipitation may be more snow than rain yet frost is still shallow enough to complete grading without significant adverse impacts. RPBCWD and Barr have been working with the city of Eden Prairie and agencies to complete necessary permitting and agreements. Both Mn DNR and US Army Corps of Engineers permits have been received for the project. The City has already approved the plans, so the final grading permit is a formality. The city has also executed the cooperative agreement. The following table summarizes necessary permits and the approval status:

Table 1 Permitting status

Permitting Agency	Status
City of Eden Prairie	City Council has approved the project; however a formal grading permit must still be approved by staff.
MN DNR	Approved
US Army Corps of Engineers	Approved
RPBCWD	Pending

The Engineer's opinion of probable cost presented in the October 2016 feasibility study and the opinion of cost based on the 100% designed stabilization measures are summarized in Table 2. The overall opinion of probable construction costs for the 100% design configuration are higher than the feasibility study opinion of cost, but within the estimated accuracy range.

Table 2. Engineer's Opinion of Probable Construction Cost

Item	Feasibility Study (Oct 2016)[1,2]	100% Design Configuration (Apr 2019)[2]		
		Base Design[3]	Additional City Items[3]	Total[2,3,4]
ESTIMATED CONSTRUCTION COST	**$1,193,000**	**$1,328,100**	**$106,000**	**$1,434,100**
ESTIMATED ACCURACY RANGE	$1,014,100	$1,261,700	$100,700	$1,362,400
	$1,491,300	$1,460,900	$116,600	$1,577,500

[1]Estimated accuracy range for feasibility study was -15% and +25% of the estimated total project cost.
[2]Estimate does not include cost long-term coordination with city of Eden Prairie for ongoing monitoring and maintenance
[3]Estimated accuracy range for 100% design configuration was -5% and +10% of the estimated total project cost.
[4]100% design configuration opinion of probable cost includes approximately $106,000 of estimated costs to be borne by the city of Eden Prairie for a new walking bridge (alternate bid item), installation of new manhole structures and replacement of flared end sections.

The changes in the opinion of probable costs are attributed to the following items:

- Multiple items have been added to the overall construction project that will be paid for by the city of Eden Prairie. These items include a new walking bridge (included as a bid alternate) and installation of new manhole structures and replacement of flared end sections where storm sewers discharge into the creek. The total amount of these items is approximately $106,000.
- The design was modified from the feasibility study for two reasons:
    - The City has required limiting tree clearing along the project reach because the adjacent forest is part of the "Big Woods" with large, old growth, heritage trees.
    - Additional grading of the banks and floodplain was added to more properly manage peak flows and velocities. The design modifications included additional grading to create a floodplain connection along the entire reach.

    - These two items complimented each other because the staging plan was able to accommodate both items; however the result was an increase in the overall cost due to an increase in the grading quantity
- Access routes had to be modified due to restrictions on access through the Big Woods and because and access license for a private road could not be obtained. As such, the access route will utilize an existing paved trail that will need to be replaced after construction is complete.
- The project timeline was extended to allow additional time for city review/comment of construction drawings, cooperative agreement revisions, and corridor enhancement plan revisions.
- The 100% cost estimate was developed using most recent bid prices from similar projects that have been bid in 2018 and 2019.

The opinion of probable cost provided is made on the basis of Barr Engineering's experience and qualifications and represents our best judgment as experienced and qualified professionals familiar with the project. Because we have no control over the cost of labor, materials, equipment or services furnished by others, or over the contractor's methods of determining prices, or over competitive bidding or market conditions, Barr Engineering cannot and does not guarantee that proposals, bids, or actual costs will not vary from the opinion of probable cost presented.

It is requested that the RPBCWD Board of Managers authorize Barr Engineering Co. to solicit bids from contractors to construct Riley Creek Stabilization Project as designed and shown on the construction documents. If the Board of Managers authorizes solicitation of bids to construct the stabilization measures, the following tasks would be completed. It is recommended that bids not be solicited until the cooperative agreement with the city of Eden Prairie is executed; therefore the tentative schedule below is subject to revision.

- May 1, 2019 – Board of Managers authorizes Barr Engineering Co. to solicit bids
- May 2, 2019 – Advertise in construction bulletin
- May 6, 2019 – Advertise in local papers
- May 16, 2019 – Mandatory pre-bid meeting
- May 24, 2019 – Open bids
- June 5, 2019 – Board approval of bid
- November 4, 2019 (or after) – Construction begins.

Attachments

- Selected sheets from the drawings for the Riley Creek Stabilization Project.

Contract Documents

Lower Riley Creek Project
Eden Prairie, Minnesota

Prepared for
Riley Purgatory Bluff Creek Watershed District

May 2019

4300 MarketPointe Drive, Suite 200
Minneapolis, MN 55435
Phone: 952.832.2600

TECHNICAL SPECIFICATIONS

LOWER RILEY CREEK PROJECT
EDEN PRAIRIE, MINNESOTA
RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

These specifications were prepared by Barr Engineering Company.

Barr Engineering Co.
4300 MarketPointe Drive
Minneapolis, MN 55435

ENGINEER CERTIFICATION

I hereby certify that these Technical Specifications were prepared by me or under my direct supervision and that I am a duly Registered Professional ENGINEER under the laws of the State of Minnesota.

Jeffrey D. Weiss, P.E.

Date:_____Registration No.: 48031_

CONTRACT DOCUMENTS

LOWER RILEY CREEK PROJECT
EDEN PRAIRIE, MINNESOTA
RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

TABLE OF CONTENTS

Division 35 – Waterway and Marine Construction

Drawings

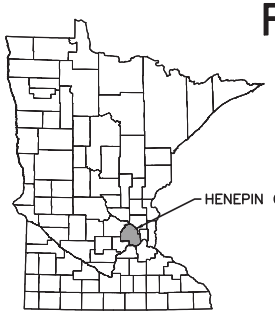
General

Civil

RILEY CREEK STABILIZATION

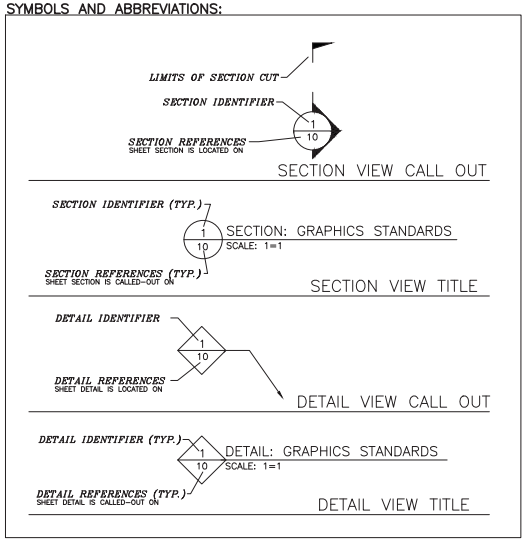
RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

EDEN PRAIRIE, MN



MINNESOTA COUNTY MAP

SYMBOLS AND ABBREVIATIONS:



PROJECT LOCATION MAP

SCALE: 1" = 500'

INDEX OF SHEETS

CONTACTS:

ENGINEER CONTACT:
Jeff Weiss
Barr Engineering Co.
4300 MarketPointe Dr.
Minneapolis, MN 55435
952-832-2706
jweiss@barr.com

OWNER'S REPRESENTATIVE CONTACT:
Claire Blesser
14500 Martin Drive Suite 1500
Eden Prairie, MN 55344
952-687-1348
cblesser@rpbcwd.org

GENERAL NOTES:

1. TOPO AND CONTROL GROUND SURVEY CONDUCTED BY BARR ENGINEERING CO. IN FEBRUARY 2017 IN HENNEPIN COUNTY FEET PROJECTION.
2. IMAGERY; COPYRIGHT PICTOMETRY INTERNATIONAL CORP AND HENNEPIN COUNTY, MINNESOTA, 2015.
3. OVERBANK TOPOGRAPHY FROM MnDNR 2011 LIDAR FOR HENNEPIN COUNTY, MN.
4. ALL HORIZONTAL COORDINATES ARE HENNEPIN COUNTY NAD83. VERTICAL DATUM IS NAVD88.

ISSUED FOR BID
NOT FOR CONSTRUCTION

GOPHER STATE ONE CALL

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION
0	EPF	PJH2	JDW	04/24/2019	ISSUED FOR BID

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.

PRINTED NAME JEFFERY D. WEISS

SIGNATURE

DATE 04/24/2019 LICENSE # 48031

	01/31/18	05/03/18	07/24/18
CLIENT			
BID			04/24/19
CONSTRUCTION			

RELEASED TO/FOR: A B C 0 1 2 3

DATE RELEASED

BARR
Corporate Headquarters: Minneapolis, Minnesota Ph: 1-800-632-2277

Project Office:
BARR ENGINEERING CO.
4300 MARKETPOINTE DRIVE
Suite 200
MINNEAPOLIS, MN 55435
Ph: 1-800-632-2277
Fax: (952) 832-2601
www.barr.com

Scale	AS SHOWN
Date	04/24/2019
Drawn	EPF
Checked	PJH2
Designed	BARR
Approved	JDW

RILEY PURGATORY BLUFF CREEK
WATERSHED DISTRICT

RILEY CREEK STABILIZATION
EDEN PRAIRIE, MN.

TITLE SHEET & INDEX

BARR PROJECT No. 23/27-0053.14
CLIENT PROJECT No.
DWG. No. G-01
REV. No. 0

GENERAL CONSTRUCTION ACTIVITY INFORMATION:
The Stormwater Pollution Prevention Plan (SWPPP) is required for the General Permit Authorization to Discharge Stormwater Associated with Construction Activity (NPDES Permit) as required by the Minnesota Pollution Control Agency (MPCA) under the National Pollutant Discharge Elimination System/State Disposal System (NPDES/SDS).

The project is located in the South central portion of Hennepin County in the City of Eden Prairie, Minnesota. Proposed construction will take place within Section 29 Township 116 North, and Range 22 West, Latitude: 44.831352, Longitude: -93.489593.

The project Work involves the repair of erosion to the existing ravine and banks of Riley Creek and reduce the transport of sediment downstream to the Minnesota River. Construction will consist of clearing and grubbing, construction of access and staging area, earthwork, repairing eroded banks and channel cutting, constructing rock riffles and log/rock step pools, regrading of channel thalweg, construction of storm sewer extension, placement of riprap, installation of rock and log vanes, construction of vegetated reinforced soil slope (VRSS) and toewood, and restoration through seeding and erosion control blankets. The project is not part of a larger common plan of development. The project proposed has a total disturbance area of greater than five (5) acres with no added area of imperviousness. Erosion prevention measures are required to minimize sediment from being transported off site and enter nearby surface waters. Refer to project drawings for further details.

The anticipated total area of disturbance is approximately 12.50 acres.
The total area of pre-construction impervious area is approximately 0 acres.
The total area of post-construction impervious area is approximately 0 acres.

DATES OF CONSTRUCTION:
To be decided.

RESPONSIBLE PERSONS:
Below is a list of people responsible for this project who are knowledgeable and experienced in the application of erosion prevention and sediment control BMPs. They shall oversee the implementation of the SWPPP, inspection, and maintenance of erosion prevention, and sediment control BMPs before and during construction.

RESPONSIBLE PERSONS IS PENDING CONTRACTOR SELECTION

OWNER:	RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT	CONTRACTOR: TBD	
MAILING ADDRESS:	18681 LAKE DRIVE EAST CHANHASSEN, MN 55317	MAILING ADDRESS:	
CONTACT PERSON:	JOSH MAXWELL	CONTACT PERSON:	
PHONE:	(952) 607-6486	PHONE:	
EMAIL:	JMAXWELL@RPBCWD.ORG	MOBILE PHONE:	

TRAINED INDIVIDUAL	RESPONSIBILITY	APPLICABLE TRAINING	TRAINING DOCUMENTATION ATTACHED?
Eric Fitzgerald	Preparation of SWPPP	Construction Stormwater Training University of Minnesota, September 2017	No
TBD	Oversight of SWPPP Implementation, Revision And Amendment	TBD	No
TBD	Performance of SWPPP Inspections	TBD	
TBD	Performance or Supervision of Installation Maintenance, and Repair of BMPs		

RECEIVING WATERS:

Water body ID: 07020012-506 Water Body Name: Minnesota River Water Body Type: River

Special Water? No Impaired Water? Yes DNR Work in Water Restrictions? No

Project Area Soil Type: Residential Land, densely vegetated. Range of soil particle size expected to be present on site and surounding area: clay, sandy clay, sandy silt, silty sand, sand, and gravel. SSURGO soil group numbers shown in Figure 1.

Impaired Waters: This project discharges to the Minnesota River which has EPA-Approved impairments mercury in fish tissue, mercury in water column, PCB in fish tissue, and turbidity that are considered construction related and requires additional Best Management Practices (BMPs) and plan review for compliance with the NPDES/SDS Construction Permit.

Wetland Impacts and Mitigation: N/A

Environmental Review/Endangered or Threatened Species Review/Archeological Site Review: N/A

PROJECT PLANS AND SPECIFICATIONS:

Required Feature	Sheet No.
Project Location	G-01
Stormwater Pollution Prevention Plan (SWPPP)	G-02
Construction Limits	C-03, C-05, C-07, C-09, C-11 & C-13
Existing and Final Grades with Flow Direction	C-03, C-05, C-07, C-09, C-11 & C-13
Impervious Surfaces	N/A
Potential Pollution generating activities	C-03, C-05, C-07, C-09, C-11 & C-13
Areas not to be disturbed	G-03
Areas where construction will be phased	N/A
Temporary and Permanent erosion and sediment control BMPs	G-03
Standard Details for erosion and sediment control	D-09
Estimated Preliminary BMP Quantities	Bid Documents

TEMPORARY EROSION CONTROL PRACTICES

Construction Sequence:
1. Delineate areas of the site not to be disturbed (with flags, stakes, signs, silt fence, etc.) before work begins.
2. Construction phasing will be used when possible to minimize concurrent soil exposure; stabilizing areas as soon as work is completed; and restoring access paths when they are no longer needed.
3. Initiate stabilization immediately whenever any construction activity has permanently or temporarily ceased on any portion of the site and will not resume for a a period exceeding 7 calendar days.
4. Complete stabilization no later than 7 calendar days after the construction activity in that portion of the site has temporarily or permanently ceased.

BMPs:
1. Erosion control and stabilization practices to be installed are depicted on Drawing No. G-03, and include: rock check dam, silt curtain, sediment control logs, erosion control blanket, silt fence, rock construction entrance,and vegetation (through seeding).
2. Soils stockpiles shall be stabilized with fast-growing cover crop and silt fence or sediment control log shall be placed around the perimeter of the stock piles.
3. Erosion control blanket shall be used to cover all disturbed slopes.
4. Direct construction site discharges to vegetated areas where feasible.
5. Install all BMPs in accordance with relevant manufacturer specifications and accepted engineering practices.

TEMPORARY SEDIMENT CONTROL PRACTICES

Timing:
1. Establish sediment control practices on all down-gradient perimeters prior to commencing any up-gradient land-disturbing activities.
2. If sediment control practices must be adjusted or removed to accommodate short-term activities, complete the activity as quickly as possible and re-install immediately after the activity has been completed or before the next precipitation event (even if the activity is not yet complete).
3. Maintain down-gradient sediment control practices until final stabilization has been achieved for up-gradient areas.
4. Place seed and erosion control blanket no later than 7 days after construction activity in that portion of the site has temporarily or permanently ceased. Any dormant seeding shall be placed at twice the normal rate.

BMPs:
1. Minimize soil compaction where feasible.
2. Preserve topsoil where feasible; if topsoil must be removed, store in a segregated stockpile for reuse in site restoration.
3. Sediment control practices to be installed are depicted on drawing G-03 and include: silt fence, silt curtain, sediment control logs, erosion control blanket, rock construction entrance, and vegetation.
4. Install silt fence or sediment control logs around the perimeter of temporary soil stockpiles.
5. Install rock construction entrances as a vehicle tracking BMP to minimize the track out of sediment from the construction site.
6. Monitor adjacent paved surfaces for track out of sediment from construction site and remove sediment via street sweeping if necessary.
7. Install all BMPs in accordance with relevant manufacturer specifications and accepted engineering practices.

BMP DESIGN FACTORS

1. Nature of stormwater runoff and run-on at the site, including factors such as expected flow from impervious surfaces, slopes, and site drainage features: The site accumulates runoff from many off site slopes. Provide all erosion and sedimentation control devices to handle this off site runoff.
2. If any stormwater flow will be channelized at the site, design BMPs to control both peak flow rates and total stormwater volume to minimize erosion at outlets and to minimize downstream channel and streambank erosion: Peak flow rates and total stormwater volume should not be increased during this project. Stormwater channelization is anticipated. Channelized flow will be routed to vegetated areas where appropriate.
3. Range of soil particle sizes expected to be present on the site and surrounding area: clay, sandy clay, sandy silt, silty sand, sand, gravel.

PERMANENT STORMWATER MANAGEMENT SYSTEM

This project will NOT generate greater than one acre of new impervious surface and will NOT require a stormwater management system.

INSPECTION AND MAINTENANCE ACTIVITIES

Inspection Requirements:
1. Inspect the entire construction site at least once every 7 days during active construction and within 24 hours after a rainfall event greater than 0.5 inches in 24 hours.
2. Where parts of the site have permanent cover, but work remains on other parts of the site, inspection frequency may be reduced to once per month in areas with permanent cover.
3. Inspect all erosion prevention and sediment control BMPs and pollution prevention management measures for integrity and effectiveness.
4. Inspect surface waters for evidence of erosion and sediment deposition.
5. Inspect construction site vehicle exit locations for evidence of off-site sediment tracking onto paved surfaces and inspect streets and other areas adjacent to the project for evidence of off-site accumulations of sediment.
6. Inspections must be conducted by an appropriately trained individual in accordance with the CSW Permit.

Maintenance Requirements:
1. Repair, replace, or supplement all nonfunctional BMPs with functional BMPs by the end of the next business day after discovery or as soon as field conditions allow access.
2. Repair, replace or supplement all perimeter control devices when they become nonfunctional or the sediment reaches 1/2 of the height of the device.
3. Remove all deltas and sediment deposited in surface waters and restabilize the areas where sediment removal results in exposed soil within 7 days of discovery.
4. Remove tracked sediment from all paved surfaces both on and off site within 24 hours of discovery.
5. Remove off-site accumulations of sediment in a manner and at a frequency sufficient to minimize off-site impacts.
6. Maintain all BMPs in accordance with relevant manufacturer specifications and accepted engineering practices.

Recordkeeping:
1. All inspections and maintenance must be recorded within 24 hours in writing and records must be retained with the SWPPP.
2. Records of each inspection and maintenance activity shall include:
   a. Date and time of inspections
   b. Name of person(s) conducting inspections
   c. Findings of inspections, including the specific location where corrective actions are needed
   d. Corrective actions taken (including dates, times, and party completing maintenance activities)
   e. Date and amount of all rainfall events greater than 0.5 inches in 24 hours; rainfall amounts will be obtained from a properly maintained rain gauge installed onsite, a weather station that is within 1 mile of the site, or a weather reporting system that provides site specific rainfall data from radar summaries.
   f. If any discharge is observed to be occurring during the inspection, a record must be made of all points of the property from which there is a discharge must be made, and the discharge should be described (i.e., color, odor, floating, settled, or suspended solids, foam, oil sheen, and other obvious indicators of pollutants) and photographed.
   g. Any amendments to the SWPPP proposed as a result of the inspection must be incorporated within 7 calendar days.

RECORD RETENTION

1. This SWPPP including, all changes to it, and inspections and maintenance records must be kept at the site during construction in either the field office or in an on-site vehicle during normal working hours.
2. Upon request, make this SWPPP (including all certificates, reports, records, or other information required by the CSW Permit) available to federal, state, and local officials within 72 hours for the duration of the permit and for 3 years following the NOT.

POLLUTION PREVENTION MANAGEMENT MEASURES

1. Minimize exposure to stormwater of the following products, materials, or wastes:
   - Building products that have potential to leach pollutants are not expected to be present on site, but if present, exposure to stormwater will be minimized through coverage with plastic sheeting.
   - Pesticides, herbicides, insecticides, fertilizers, treatment chemicals, and landscape materials through coverage with plastic sheeting.
   - Hazardous materials and toxic waste (including oil, diesel fuel, gasoline, hydraulic fluids, paint solvents, petroleum-based products, wood preservatives, additives, curing compounds, and acids) through proper storage in sealed containers in restricted access storage areas and in compliance with Minn. R. ch. 7045 including secondary containment as applicable.
   - Solid waste through proper storage, collection, and disposal in compliance with Minn. R. ch. 7035.
2. Position portable toilets so that they are secure and will not be tipped or knocked over.
3. Properly dispose of sanitary waste in accordance with Minn. R. ch. 7041.
4. Spill Prevention and Response:
   - Take reasonable steps to prevent the discharge of spilled or leaked chemicals.
   - Ensure adequate supplies of absorbent and other dry clean-up materials are available at all times to clean up discharged materials and that an appropriate disposal method is available for recovered spilled materials.
   - Report and clean up spills immediately as required by Minn. Stat. §115.061.
5. Washing of vehicles and/or equipment will not occur on-site.
6. Washout of concrete and/or other similar wastes (such as stucco, paint, form release oils, curing compounds and other construction materials) will not occur on-site.

FINAL STABILIZATION

Ensure final stabilization of the site.
1. For final stabilization to be considered complete, the following must occur:
   - Complete all soil disturbing activities at the site.
   - Stabilize all soils with permanent cover.
   - Remove all temporary synthetic and structural erosion prevention and sediment control BMPs.
2. Permanent Cover will consist of seeding, erosion control blanket on slopes and disturbed areas, and seeding in all other disturbed areas.
3. Storm sewer culverts shall have flared sections and riprap to minimize erosion.
4. Within 30 days after all activities for final stabilization have been completed, submit a Notice of Termination (NOT) form to the MPCA.
5. Compacted soil must be decompacted to a soil compaction testing pressure of less than 1,400 kilopascals or 200 pounds per square inch in the upper 12 inches of soil.

SWPPP AMENDEMENTS

Record of SWPPP Amendments

DATE	AMENDMENT	RESPONSIBLE INDIVIDUAL
August 2017	Initial Development of SWPPP	Eric Fitzgerald, Barr Engineering Company

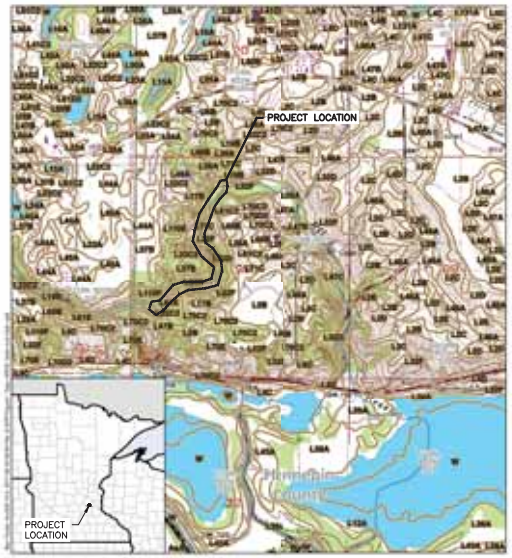


Figure 1
TOPOGRAPHIC MAP WITH SURFACE WATERS AND SOIL TYPES
Stormwater Pollution Prevention Plan
Hennepin County, Minnesota

GOPHER STATE ONE CALL
GOPHER STATE ONE CALL:
CALL BEFORE YOU DIG.
1-800-252-1166

ISSUED FOR BID
NOT FOR CONSTRUCTION

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION
0	EPF	PJH2	JDW	04/24/2019	ISSUED FOR BID

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.
PRINTED NAME JEFFERY D. WEISS
SIGNATURE
DATE 04/24/2019 LICENSE # 48031

	01/31/18	05/03/18	07/24/18				
CLIENT							
BID				04/24/19			
CONSTRUCTION							
RELEASED TO/FOR	A	B	C	0	1	2	3
DATE RELEASED							

BARR
Project Office:
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Scale	AS SHOWN
Date	04/24/2019
Drawn	EPF
Checked	PJH2
Designed	BARR
Approved	JDW

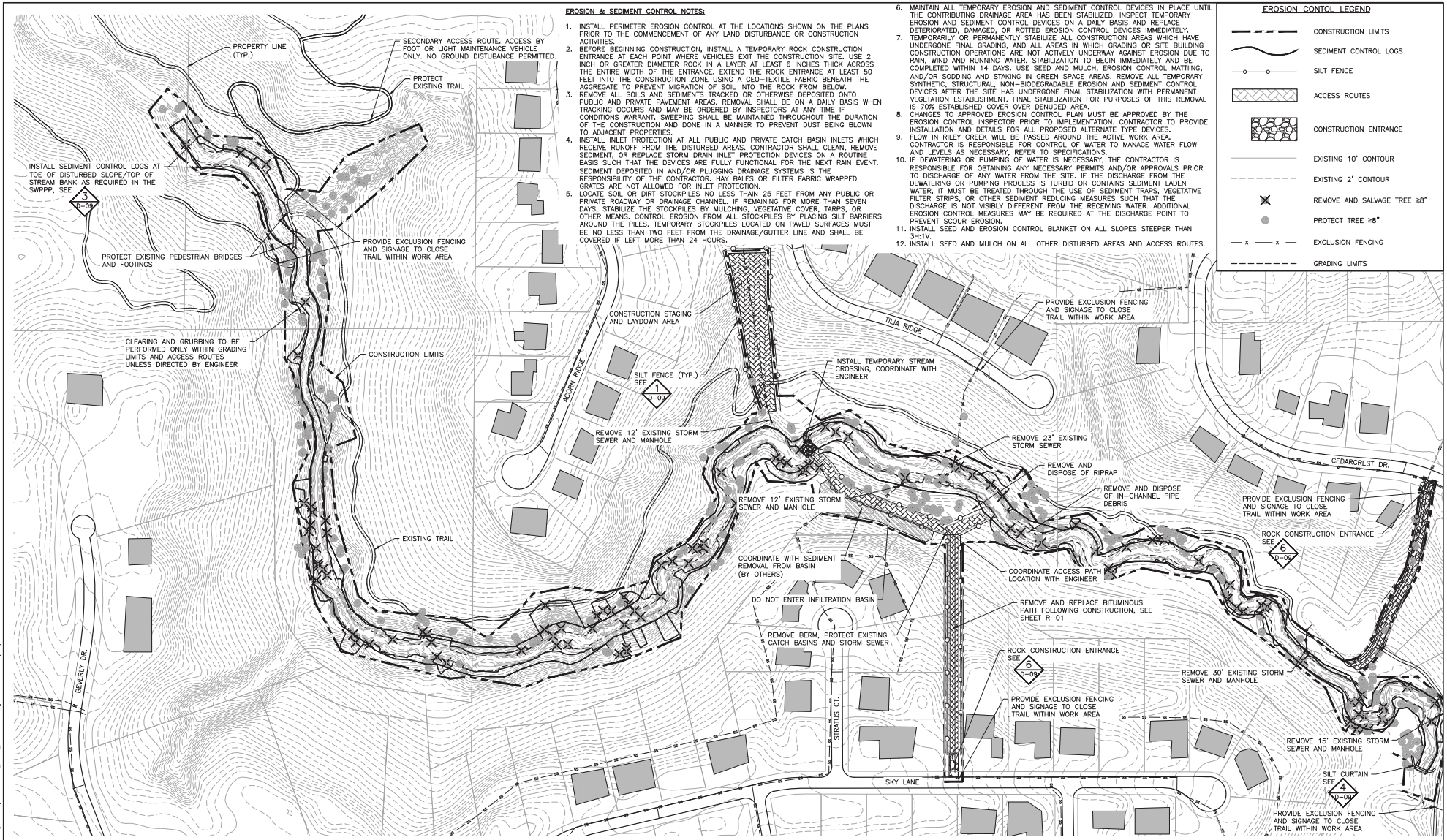
RILEY PURGATORY BLUFF CREEK
WATERSHED DISTRICT

RILEY CREEK STABILIZATION
EDEN PRAIRIE, MN.

STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

BARR PROJECT No. 23/27-0053.14
CLIENT PROJECT No.
DWG. No. G-02
REV. No. 0

CADD USER: Eric P. Fitzgerald FILE: M:\DESIGN\23270053.14\LOWER RILEY CREEK\23270053.14_G-02_SWPPP.DWG PLOT SCALE: 1:2 PLOT DATE: 4/24/2019 8:08 AM



EROSION & SEDIMENT CONTROL NOTES:

1. INSTALL PERIMETER EROSION CONTROL AT THE LOCATIONS SHOWN ON THE PLANS PRIOR TO THE COMMENCEMENT OF ANY LAND DISTURBANCE OR CONSTRUCTION ACTIVITIES.
2. BEFORE BEGINNING CONSTRUCTION, INSTALL A TEMPORARY ROCK CONSTRUCTION ENTRANCE AT EACH POINT WHERE VEHICLES EXIT THE CONSTRUCTION SITE. USE 2 INCH OR GREATER DIAMETER ROCK IN A LAYER AT LEAST 6 INCHES THICK ACROSS THE ENTIRE WIDTH OF THE ENTRANCE. EXTEND THE ROCK ENTRANCE AT LEAST 50 FEET INTO THE CONSTRUCTION ZONE USING A GEO-TEXTILE FABRIC BENEATH THE AGGREGATE TO PREVENT MIGRATION OF SOIL INTO THE ROCK FROM BELOW.
3. REMOVE ALL SOILS AND SEDIMENTS TRACKED OR OTHERWISE DEPOSITED ONTO PUBLIC AND PRIVATE PAVEMENT AREAS. REMOVAL SHALL BE ON A DAILY BASIS WHEN TRACKING OCCURS AND MAY BE ORDERED BY INSPECTORS AT ANY TIME IF CONDITIONS WARRANT. SWEEPING SHALL BE MAINTAINED THROUGHOUT THE DURATION OF THE CONSTRUCTION AND DONE IN A MANNER TO PREVENT DUST BEING BLOWN TO ADJACENT PROPERTIES.
4. INSTALL INLET PROTECTION AT ALL PUBLIC AND PRIVATE CATCH BASIN INLETS WHICH RECEIVE RUNOFF FROM THE DISTURBED AREAS. CONTRACTOR SHALL CLEAN, REMOVE SEDIMENT, OR REPLACE STORM DRAIN INLET PROTECTION DEVICES ON A ROUTINE BASIS SUCH THAT THE DEVICES ARE FULLY FUNCTIONAL FOR THE NEXT RAIN EVENT. SEDIMENT DEPOSITED IN AND/OR PLUGGING DRAINAGE SYSTEMS IS THE RESPONSIBILITY OF THE CONTRACTOR. HAY BALES OR FILTER FABRIC WRAPPED GRATES ARE NOT ALLOWED FOR INLET PROTECTION.
5. LOCATE SOIL OR DIRT STOCKPILES NO LESS THAIN 25 FEET FROM ANY PUBLIC OR PRIVATE ROADWAY OR DRAINAGE CHANNEL. IF REMAINING FOR MORE THAN SEVEN DAYS, STABILIZE THE STOCKPILES BY MULCHING, VEGETATIVE COVER, TARPS, OR OTHER MEANS. CONTROL EROSION FROM ALL STOCKPILES BY PLACING SILT BARRIERS AROUND THE PILES. TEMPORARY STOCKPILES LOCATED ON PAVED SURFACES MUST BE NO LESS THAN TWO FEET FROM THE DRAINAGE/GUTTER LINE AND SHALL BE COVERED IF LEFT MORE THAN 24 HOURS.
6. MAINTAIN ALL TEMPORARY EROSION AND SEDIMENT CONTROL DEVICES IN PLACE UNTIL THE CONTRIBUTING DRAINAGE AREA HAS BEEN STABILIZED. INSPECT TEMPORARY EROSION AND SEDIMENT CONTROL DEVICES ON A DAILY BASIS AND REPLACE DETERIORATED, DAMAGED, OR ROTTED EROSION CONTROL DEVICES IMMEDIATELY.
7. TEMPORARILY OR PERMANENTLY STABILIZE ALL CONSTRUCTION AREAS WHICH HAVE UNDERGONE FINAL GRADING, AND ALL AREAS IN WHICH GRADING OR SITE BUILDING CONSTRUCTION OPERATIONS ARE NOT ACTIVELY UNDERWAY AGAINST EROSION DUE TO RAIN, WIND AND RUNNING WATER. STABILIZATION TO BEGIN IMMEDIATELY AND BE COMPLETED WITHIN 14 DAYS. USE SEED AND MULCH, EROSION CONTROL MATTIING, AND/OR SODDING AND STAKING IN GREEN SPACE AREAS. REMOVE ALL TEMPORARY SYNTHETIC, STRUCTURAL, NON-BIODEGRADABLE EROSION AND SEDIMENT CONTROL DEVICES AFTER THE SITE HAS UNDERGONE FINAL STABILIZATION WITH PERMANENT VEGETATION ESTABLISHMENT. FINAL STABILIZATION FOR PURPOSES OF THIS REMOVAL IS 70% ESTABLISHED COVER OVER DENUDED AREA.
8. CHANGES TO APPROVED EROSION CONTROL PLAN MUST BE APPROVED BY THE EROSION CONTROL INSPECTOR PRIOR TO IMPLEMENTATION. CONTRACTOR TO PROVIDE INSTALLATION AND DETAILS FOR ALL PROPOSED ALTERNATE TYPE DEVICES.
9. FLOW IN RILEY CREEK WILL BE PASSED AROUND THE ACTIVE WORK AREA. CONTRACTOR IS RESPONSIBLE FOR CONTROL OF WATER TO MANAGE WATER FLOW AND LEVELS AS NECESSARY, REFER TO SPECIFICATIONS.
10. IF DEWATERING OR PUMPING OF WATER IS NECESSARY, THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ANY NECESSARY PERMITS AND/OR APPROVALS PRIOR TO DISCHARGE OF ANY WATER FROM THE SITE. IF THE DISCHARGE FROM THE DEWATERING OR PUMPING PROCESS IS TURBID OR CONTAINS SEDIMENT LADEN WATER, IT MUST BE TREATED THROUGH THE USE OF SEDIMENT TRAPS, VEGETATIVE FILTER STRIPS, OR OTHER SEDIMENT REDUCING MEASURES SUCH THAT THE DISCHARGE IS NOT VISIBLY DIFFERENT FROM THE RECEIVING WATER. ADDITIONAL EROSION CONTROL MEASURES MAY BE REQUIRED AT THE DISCHARGE POINT TO PREVENT SCOUR EROSION.
11. INSTALL SEED AND EROSION CONTROL BLANKET ON ALL SLOPES STEEPER THAN 3H:1V.
12. INSTALL SEED AND MULCH ON ALL OTHER DISTURBED AREAS AND ACCESS ROUTES.

EROSION CONTOL LEGEND

- CONSTRUCTION LIMITS
- SEDIMENT CONTROL LOGS
- SILT FENCE
- ACCESS ROUTES
- CONSTRUCTION ENTRANCE
- EXISTING 10' CONTOUR
- EXISTING 2' CONTOUR
- REMOVE AND SALVAGE TREE ≥8"
- PROTECT TREE ≥8"
- EXCLUSION FENCING
- GRADING LIMITS

1 PLAN: EROSION CONTROL AND REMOVALS

0 100 200
SCALE IN FEET

ISSUED FOR BID
NOT FOR CONSTRUCTION

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION
0	EPF	PJH2	JDW	04/24/2019	ISSUED FOR BID

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.
PRINTED NAME JEFFERY D. WEISS
SIGNATURE
DATE 04/24/2019 LICENSE # 48031

CLIENT	01/31/18	05/03/18	07/24/18					
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RELEASED TO/FOR	A	B	C	0	1	2	3	
DATE RELEASED								

BARR
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Ph: 1-800-632-2277

Scale	AS SHOWN
Date	04/24/2019
Drawn	EPF
Checked	PJH2
Designed	BARR
Approved	JDW

RILEY PURGATORY BLUFF CREEK
WATERSHED DISTRICT

RILEY CREEK STABILIZATION
EDEN PRAIRIE, MN.

EROSION CONTROL AND REMOVALS PLAN

BARR PROJECT No. 23/27-0053.14
CLIENT PROJECT No.
DWG. No. G-03
REV. No. 0

CADD USER: Eric P. Fitzgerald FILE: M:\DESIGN\23270053.14\LOWER RILEY CREEK\23270053.14_G-03_EROSION CONTROL PLAN.DWG PLOT SCALE: 1:2 PLOT DATE: 4/24/2019 5:16 PM
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Tree ID Number	Genus	DBH (Inches)	Significant Tree	Tree Health	Num. Stems	Removed?
401	Maple	14	YES	Healthy	1	
402	Maple	11		Healthy	1	YES
403	Ash	20		Dead	1	YES
405	Basswood	17	YES	Healthy	1	
407	Maple	16	YES	Healthy	1	
408	Maple	23		Dead	1	YES
410	Maple	10		Healthy	1	
411	Hackberry	11		Healthy	1	
412	Maple	9		Healthy	1	
413	Maple	25	YES	Healthy	1	
414	Maple	12	YES	Healthy	1	YES
801	Maple	8		Healthy	1	
802	Maple	10		Healthy	1	YES
803	Maple	9		Dying	1	
804	Basswood	15	YES	Dying	1	
805	Maple	15	YES	Healthy	1	
807	Maple	10		Healthy	1	YES
809	Maple	9		Healthy	1	
810	Hackberry	9		Healthy	1	
812	Basswood	14	YES	Healthy	1	
813	Oak	18	YES	Healthy	1	YES
814	Box Elder	18		Healthy	1	
815	Maple	23	YES	Healthy	1	YES
816	Hackberry	8		Healthy	1	YES
817	Maple	19	YES	Healthy	1	
818	Maple	13	YES	Healthy	1	YES
819	Ash	12		Dead	1	YES
820	Cottonwood	40	YES	Healthy	1	
822	Maple	20	YES	Healthy	1	YES
823	Maple	11		Healthy	1	YES
824	Elm	8		Healthy	4	YES
825	Maple	19	YES	Healthy	1	YES
829	Maple	15	YES	Healthy	1	YES
830	Oak	12	YES	Healthy	1	YES
831	Maple	16	YES	Healthy	1	YES
832	Maple	15	YES	Healthy	1	YES
833	Ash	13	YES	Healthy	1	YES
834	Basswood	21	YES	Healthy	1	YES
835	Elm	11		Healthy	1	
836	Maple	19	YES	Healthy	1	YES
837	Maple	15	YES	Healthy	1	YES
1201	Basswood	8		Healthy	1	YES
1202	Basswood	9		Healthy	1	YES
1203	Basswood	21	YES	Healthy	1	

Tree ID Number	Genus	DBH (Inches)	Significant Tree	Tree Health	Num. Stems	Removed?
1204	Maple	15	YES	Healthy	1	
1205	Basswood	17	YES	Healthy	1	
1206	Basswood	16	YES	Healthy	1	YES
1207	Maple	20	YES	Dying	1	YES
1208	Maple	15	YES	Healthy	1	YES
1209	Basswood	14	YES	Healthy	1	
1210	Cottonwood	36	YES	Healthy	1	
1211	Maple	19	YES	Healthy	1	
1212	Maple	15	YES	Healthy	1	YES
1213	Basswood	19	YES	Healthy	1	YES
1214	Maple	23	YES	Healthy	1	
1215	Basswood	17		Dead	1	YES
1216	Basswood	22		Dead	1	YES
1217	Oak	18	YES	Healthy	1	YES
1221	Maple	26	YES	Healthy	1	YES
1222	Maple	19	YES	Healthy	1	
1223	Maple	8		Healthy	1	YES
1224	Maple	14	YES	Healthy	1	YES
1225	Maple	10		Healthy	1	
1226	Maple	15	YES	Healthy	1	YES
1227	Basswood	12	YES	Healthy	1	
2801	Maple	21	YES	Healthy	1	
2802	Maple	16	YES	Healthy	1	
2803	Maple	21	YES	Healthy	1	
2806	Maple	8		Healthy	1	
2807	Maple	8		Healthy	1	
2808	Maple	18	YES	Healthy	1	
2809	Maple	11		Healthy	1	
2810	Maple	8		Healthy	1	
2811	Maple	19	YES	Healthy	1	
2814	Maple	10		Healthy	1	
2815	Maple	18	YES	Healthy	1	
2816	Maple	10		Healthy	1	
2818	Maple	9		Healthy	1	
2819	Maple	22		Dead	1	
2820	Maple	27	YES	Healthy	1	

Tree ID Number	Genus	DBH (Inches)	Significant Tree	Tree Health	Num. Stems	Removed?
2821	Ash	27	YES	Healthy	1	
2822	Maple	15	YES	Healthy	1	
2823	Maple	10		Healthy	1	
2825	Maple	10		Healthy	1	
2827	Maple	13	YES	Healthy	1	
2828	Maple	15	YES	Healthy	1	
2829	Maple	24	YES	Healthy	1	YES
2830	Maple	30	YES	Healthy	1	
2831	Elm	12		Healthy	1	
2834	Hackberry	11		Healthy	1	
2835	Elm	8		Healthy	1	
2836	Ash	18	YES	Healthy	1	YES
2837	Ash	12	YES	Healthy	1	YES
2838	Maple	10		Healthy	1	
2839	Maple	13	YES	Healthy	1	
2840	Maple	10		Healthy	1	
2843	Elm	20		Healthy	1	
2844	Ironwood	9		Healthy	1	
2846	Ash	10		Healthy	1	
2847	Maple	15	YES	Healthy	1	
2848	Maple	15	YES	Healthy	1	
2849	Maple	20	YES	Healthy	1	
2850	Maple	20	YES	Healthy	1	
2851	Maple	10		Healthy	1	
2852	Elm	10		Healthy	1	YES
2853	Elm	18		Healthy	1	YES
2854	Ash	9		Healthy	2	YES
3201	Maple	18	YES	Healthy	1	
3202	Maple	18	YES	Healthy	1	
3203	Ash	22	YES	Healthy	1	
3204	Maple	23	YES	Healthy	1	
3205	Maple	14	YES	Healthy	1	
3206	Maple	26	YES	Healthy	1	
3208	Maple	20		Dead	1	
3209	Maple	20	YES	Healthy	1	
3210	Maple	14	YES	Healthy	1	
3211	Maple	14	YES	Healthy	1	
3212	Maple	12	YES	Healthy	1	YES
3213	Maple	21	YES	Healthy	1	
3214	Maple	12	YES	Healthy	1	
3215	Maple	18	YES	Healthy	2	
3216	Maple	12	YES	Healthy	1	
3217	Maple	13	YES	Healthy	1	
3218	Maple	25	YES	Healthy	1	
3219	Maple	10		Healthy	1	

Tree ID Number	Genus	DBH (Inches)	Significant Tree	Tree Health	Num. Stems	Removed?
3220	Maple	24	YES	Healthy	1	
3221	Maple	14	YES	Healthy	1	
3222	Maple	15	YES	Healthy	1	
3223	Maple	17	YES	Healthy	1	
3224	Elm	21		Healthy	1	YES
3225	Ash	10		Healthy	1	
3227	Hackberry	9		Healthy	1	
3228	Hackberry	8		Healthy	1	
3230	Ash	8		Healthy	1	YES
3231	Hackberry	12	YES	Healthy	1	
3232	Hackberry	13	YES	Healthy	1	
3233	Oak	19	YES	Healthy	1	
3234	Maple	10		Healthy	1	YES
3236	Maple	11		Healthy	1	
3239	Maple	22	YES	Healthy	1	
3240	Maple	28	YES	Healthy	1	
3241	Maple	17	YES	Healthy	1	
3242	Maple	23	YES	Healthy	1	
3243	Maple	15	YES	Healthy	1	
3244	Maple	12	YES	Healthy	1	YES
3246	Ash	13	YES	Healthy	1	YES
3603	Maple	22	YES	Healthy	1	
3604	Basswood	24	YES	Healthy	2	
3606	Maple	14	YES	Healthy	1	
3607	Maple	15	YES	Healthy	1	
3608	Maple	9		Healthy	1	
3609	Maple	12	YES	Healthy	1	
4013	Maple	12	YES	Healthy	1	
4014	Maple	10		Healthy	1	
4015	Maple	10		Healthy	1	
4016	Maple	10		Healthy	1	
4017	Maple	10		Healthy	1	
4018	Basswood	16	YES	Healthy	1	
4019	Maple	12	YES	Healthy	1	
4020	Maple	8		Healthy	1	
4021	Maple	12	YES	Healthy	1	
4022	Basswood	17	YES	Healthy	1	
4023	Maple	13	YES	Healthy	1	

LEGEND

- CONSTRUCTION LIMITS
- EXISTING 10' CONTOUR
- EXISTING 2' CONTOUR
- REMOVE AND SALVAGE TREE ≥8"
- PROTECT TREE ≥8"

CONSTRUCTION LIMITS

PROPERTY LINE (TYP.)

1 PLAN: TREE INVENTORY AND TREE REMOVALS

0 50 100
SCALE IN FEET

ISSUED FOR BID
NOT FOR CONSTRUCTION

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION
0	EPF	PJH2	JDW	04/24/2019	ISSUED FOR BID

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.

PRINTED NAME JEFFERY D. WEISS

SIGNATURE

DATE 04/24/2019 LICENSE # 48031

	01/31/18	05/03/18	07/24/18
CLIENT			
BID			04/24/19
CONSTRUCTION			

RELEASED TO/FOR: A B C 0 1 2 3 — DATE RELEASED

BARR

Corporate Headquarters: Minneapolis, Minnesota Ph: 1-800-632-2277

Project Office:
BARR ENGINEERING CO.
4300 MARKETPOINTE DRIVE
Suite 200
MINNEAPOLIS, MN 55435
Ph: 1-800-632-2277
Fax: (952) 832-2601
www.barr.com

Scale	AS SHOWN
Date	04/24/2019
Drawn	EPF
Checked	PJH2
Designed	BARR
Approved	JDW

RILEY PURGATORY BLUFF CREEK
WATERSHED DISTRICT

RILEY CREEK STABILIZATION
EDEN PRAIRIE, MN.

TREE INVENTORY AND TREE REMOVALS

BARR PROJECT No. 23/27-0053.14
CLIENT PROJECT No.
DWG. No. G-04
REV. No. 0

CADD USER: Eric P. Fitzgerald FILE: M:\DESIGN\23270053.14\LOWER RILEY CREEK\23270053.14_G-04_TREE PROTECTION PLAN.DWG PLOT SCALE: 1:2 PLOT DATE: 4/24/2019 8:58 AM
ref: M:\Design\23270053.14\Lower Riley Creek\23270053.14_G-01_Title Sheet.dwg Plot at 0 02/22/2017 09:28:57

Tree ID Number	Genus	DBH (Inches)	Significant Tree	Tree Health	Num. Stems	Removed?
838	Maple	15	YES	Dying	1	YES
839	Oak	24	YES	Healthy	1	
840	Oak	27	YES	Healthy	1	
841	Maple	21	YES	Healthy	1	YES
842	Maple	18	YES	Healthy	1	YES
1228	Maple	15	YES	Healthy	1	YES
1229	Basswood	9		Healthy	1	
1230	Oak	24	YES	Healthy	1	
1231	Maple	21	YES	Healthy	1	YES
1601	Maple	13	YES	Dying	1	YES
1602	Ash	22	YES	Healthy	1	YES
1603	Maple	18	YES	Healthy	1	
1604	Oak	23	YES	Healthy	1	
1605	Basswood	11		Healthy	3	
1606	Oak	23	YES	Healthy	1	YES
1607	Ironwood	11		Healthy	1	
1608	Hackberry	10		Healthy	1	YES
1609	Oak	11		Healthy	1	YES

Tree ID Number	Genus	DBH (Inches)	Significant Tree	Tree Health	Num. Stems	Removed?
2017	Ash	10		Healthy	2	
2018	Box Elder	9		Healthy	1	
2019	Elm	9		Healthy	1	YES
2039	Basswood	18	YES	Healthy	1	YES
2040	Basswood	22	YES	Healthy	1	
2041	Maple	17	YES	Healthy	1	
2042	Oak	27	YES	Healthy	1	
2043	Oak	14	YES	Healthy	1	
2413	Maple	8		Healthy	1	YES
2414	Maple	8		Healthy	1	YES
2415	Maple	16	YES	Healthy	1	
2416	Maple	25	YES	Healthy	1	
2855	Maple	15	YES	Healthy	1	YES
2857	Elm	9		Healthy	1	
2858	Ash	22	YES	Healthy	1	YES
2859	Elm	20		Healthy	3	YES
2860	Maple	18	YES	Healthy	1	
2861	Maple	13	YES	Healthy	1	
2862	Walnut	10		Healthy	1	YES

Tree ID Number	Genus	DBH (Inches)	Significant Tree	Tree Health	Num. Stems	Removed?
2896	Hackberry	15	YES	Healthy	1	
2897	Ash	10		Healthy	1	
2901	Ash	13	YES	Healthy	1	
2902	Ash	8		Healthy	1	
2903	Oak	13		Dead	1	
2937	Elm	12		Healthy	1	
2938	Ironwood	8		Healthy	1	YES
2939	Maple	24	YES	Healthy	1	
2940	Basswood	10		Healthy	2	
2941	Oak	15	YES	Healthy	1	
2942	Hackberry	8		Healthy	1	YES
2943	Ash	8		Healthy	1	
2945	Cherry	13	YES	Healthy	1	
2946	Ash	8		Healthy	1	
2947	Ash	8		Healthy	1	
2948	Maple	10		Healthy	1	
2951	Oak	11		Healthy	1	
2952	Cherry	10		Healthy	1	
2953	Oak	9		Healthy	1	
2955	Cherry	13	YES	Healthy	1	
2956	Hackberry	9		Healthy	1	
2957	Oak	12	YES	Healthy	1	
2958	Cherry	20	YES	Healthy	2	
2959	Oak	22	YES	Healthy	1	
2964	Ash	8		Healthy	1	
2965	Ash	8		Healthy	1	
2966	Ash	8		Healthy	1	
2967	Oak	16	YES	Healthy	1	YES
2968	Ironwood	8		Healthy	1	YES
2969	Maple	10		Healthy	1	YES
2970	Ash	24	YES	Healthy	1	
2971	Ash	8		Healthy	1	
2973	Ash	18	YES	Healthy	1	YES
2978	Ash	19	YES	Healthy	1	
2979	Ash	19	YES	Healthy	1	
2980	Maple	18	YES	Healthy	1	
2981	Elm	15		Healthy	1	

LEGEND

- CONSTRUCTION LIMITS
- EXISTING 10' CONTOUR
- EXISTING 2' CONTOUR
- REMOVE AND SALVAGE TREE ≥8"
- PROTECT TREE ≥8"

Tree ID Number	Genus	DBH (Inches)	Significant Tree	Tree Health	Num. Stems	Removed?
2982	Basswood	20	YES	Healthy	1	
2983	Elm	10		Healthy	1	
3247	Maple	12	YES	Healthy	1	YES
3248	(Other)	18	YES	Healthy	1	
3249	Maple	15	YES	Healthy	1	YES
3250	Ash	22	YES	Healthy	1	YES
3251	Maple	16	YES	Healthy	1	
3252	Basswood	22	YES	Healthy	1	
3253	Basswood	29	YES	Healthy	1	
3254	Oak	18	YES	Healthy	1	
3255	Hackberry	19	YES	Healthy	1	
3256	Ash	17	YES	Healthy	1	
3257	Basswood	19	YES	Healthy	1	
3258	Elm	11		Healthy	1	YES
3259	Maple	10		Healthy	1	
3260	Elm	12		Healthy	1	
3261	Ash	16	YES	Healthy	1	
3262	Maple	15	YES	Healthy	1	
3263	(Other)	12	YES	Healthy	1	
3265	Oak	18	YES	Healthy	1	
3266	(Other)	8		Healthy	1	
3267	(Other)	8		Healthy	1	
3268	Cherry	11		Healthy	1	
3270	(Other)	10		Healthy	1	
3271	Hackberry	8		Healthy	1	
3275	Elm	8		Healthy	1	YES
3276	Elm	8		Healthy	1	
3277	Ash	13	YES	Healthy	1	
3278	Basswood	27	YES	Healthy	1	
3282	Maple	11		Healthy	1	
3283	Elm	10		Healthy	1	
3284	Maple	19	YES	Healthy	1	
3287	Basswood	10		Healthy	2	
3288	Maple	24		Dead	1	
3319	Basswood	14	YES	Healthy	3	
3320	Elm	12		Healthy	1	
3321	Hackberry	13	YES	Healthy	1	YES
3322	Ash	9		Healthy	1	
3323	Cherry	10		Healthy	2	
3324	Ash	8		Healthy	1	
3325	Ash	8		Healthy	1	
3326	Ash	8		Healthy	1	
3327	Maple	10		Healthy	1	
3328	Oak	16	YES	Healthy	1	
3329	Oak	12	YES	Healthy	2	
3331	Ash	8		Healthy	1	

Tree ID Number	Genus	DBH (Inches)	Significant Tree	Tree Health	Num. Stems	Removed?
1610	Maple	8		Healthy	1	
1611	Basswood	18	YES	Healthy	1	
1612	Maple	23	YES	Healthy	1	
1614	Maple	9		Healthy	1	YES
1615	Ash	10		Healthy	1	
1616	Ironwood	9		Healthy	1	
1617	Ash	12	YES	Healthy	1	
1618	Ash	8		Healthy	1	
1620	Cottonwood	50	YES	Healthy	1	
2001	Basswood	15	YES	Healthy	1	YES
2002	Maple	16	YES	Healthy	1	YES
2003	Basswood	17	YES	Healthy	1	YES
2004	Maple	12	YES	Healthy	1	YES
2005	Basswood	23	YES	Healthy	1	
2006	Maple	21	YES	Healthy	1	YES
2007	Oak	21	YES	Healthy	1	YES
2008	Cherry	9		Healthy	1	YES
2009	Oak	21	YES	Healthy	1	
2010	Hackberry	11		Healthy	1	YES
2011	Basswood	18	YES	Healthy	1	YES
2012	Oak	18	YES	Healthy	1	YES
2013	Basswood	9		Healthy	1	YES
2014	Balsam Poplar	9		Healthy	1	
2015	Ash	12	YES	Healthy	1	
2016	Ironwood	9		Dying	1	

Tree ID Number	Genus	DBH (Inches)	Significant Tree	Tree Health	Num. Stems	Removed?
2864	Maple	12	YES	Healthy	1	
2865	Maple	19	YES	Healthy	1	
2866	Elm	25		Healthy	1	
2868	Elm	30		Healthy	1	
2869	Maple	14	YES	Healthy	1	
2870	Ash	8		Healthy	1	
2871	Maple	8		Healthy	1	
2872	Basswood	13	YES	Healthy	3	
2873	Maple	19	YES	Healthy	1	
2874	Maple	24	YES	Healthy	1	
2875	Maple	10		Healthy	1	
2876	Basswood	19	YES	Healthy	1	
2879	(Other)	9		Healthy	1	
2880	(Other)	11		Healthy	1	
2883	Maple	10		Healthy	1	YES
2886	Hackberry	10		Healthy	1	
2887	Basswood	22	YES	Healthy	2	
2888	Maple	24	YES	Healthy	1	YES
2890	Hackberry	9		Healthy	1	
2891	Maple	12	YES	Healthy	1	
2892	Ash	14	YES	Healthy	1	
2895	Ash	10		Healthy	1	

Tree ID Number	Genus	DBH (Inches)	Significant Tree	Tree Health	Num. Stems	Removed?
3332	Basswood	26	YES	Healthy	1	
3334	Ash	11		Healthy	1	
3335	Ash	8		Healthy	1	
3337	Ash	9		Healthy	1	
3339	Oak	16	YES	Healthy	1	
3340	Ash	8		Healthy	1	
3341	Elm	8		Healthy	1	
3343	Ash	13		Dead	1	YES
3344	Ash	18	YES	Healthy	1	
3345	Ash	14	YES	Healthy	1	YES
3348	Hackberry	18	YES	Healthy	1	
3349	Hackberry	8		Healthy	1	
3350	Ash	11		Healthy	1	
3351	Hackberry	8		Healthy	1	YES
4005	Hackberry	10		Healthy	1	

PROPERTY LINE (TYP.)

CONSTRUCTION LIMITS

1 PLAN: TREE INVENTORY AND TREE REMOVALS

0 50 100 SCALE IN FEET

ISSUED FOR BID
NOT FOR CONSTRUCTION

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION
0	EPF	PJH2	JDW	04/24/2019	ISSUED FOR BID

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.

PRINTED NAME JEFFERY D. WEISS

SIGNATURE

DATE 04/24/2019 LICENSE # 48031

	01/31/18	05/03/18	07/24/18	04/24/19
CLIENT				
BID				
CONSTRUCTION				

RELEASED TO/FOR: A B C 0 1 2 3 — DATE RELEASED

BARR

Corporate Headquarters: Minneapolis, Minnesota Ph: 1-800-632-2277

Project Office: BARR ENGINEERING CO. 4300 MARKETPOINTE DRIVE Suite 200 MINNEAPOLIS, MN 55435 Ph: 1-800-632-2277 Fax: (952) 832-2601 www.barr.com

Scale	AS SHOWN
Date	04/24/2019
Drawn	EPF
Checked	PJH2
Designed	BARR
Approved	JDW

RILEY PURGATORY BLUFF CREEK
WATERSHED DISTRICT

RILEY CREEK STABILIZATION
EDEN PRAIRIE, MN.

TREE INVENTORY AND TREE REMOVALS

BARR PROJECT No. 23/27-0053.14
CLIENT PROJECT No.
DWG. No. G-05
REV. No. 0

CADD USER: Eric P. Fitzgerald FILE: M:\DESIGN\23270053.14\LOWER RILEY CREEK\23270053.14_G-05_TREE PROTECTION PLAN.DWG PLOT SCALE: 1:2 PLOT DATE: 4/24/2019 8:59 AM
ref. M:\Design\23270053.14\Lower Riley Creek\23270053.14_G-01_Title Sheet.dwg Plot at 0 02/22/2017 09:29:57

Tree ID Number	Genus	DBH (Inches)	Significant Tree	Tree Health	Num. Stems	Removed?
1621	Ash	15	YES	Healthy	1	
1622	Ash	8		Healthy	1	YES
1624	Box Elder	8		Healthy	1	YES
1625	Basswood	11		Healthy	1	YES
1626	Cherry	12	YES	Healthy	1	
1629	Ash	9		Healthy	1	YES
2021	Ironwood	8		Healthy	1	YES
2022	Ash	10		Healthy	1	YES
2023	Ash	8		Healthy	1	YES
2024	Ash	20	YES	Healthy	1	YES
2025	Basswood	14	YES	Healthy	1	YES
2026	Ash	15	YES	Healthy	1	
2027	Ash	10		Healthy	1	YES
2028	Ash	11		Healthy	1	YES
2029	Ash	9		Healthy	1	YES
2030	Ash	13	YES	Healthy	1	
2032	Ash	9		Healthy	1	YES
2033	Ash	8		Healthy	1	YES
2034	Ash	9		Healthy	1	
2035	Oak	13	YES	Healthy	1	
2036	Maple	11		Healthy	1	YES
2037	Ash	8		Healthy	1	YES
2038	Ash	10		Healthy	1	YES
2401	Ash	8		Healthy	1	
2402	Ash	10		Healthy	1	YES
2403	Ash	8		Healthy	1	YES
2404	Ash	9		Healthy	1	YES
2405	Ash	23	YES	Healthy	1	
2406	Ash	11		Healthy	1	YES
2407	Ash	10		Healthy	1	YES
2408	Box Elder	12		Healthy	1	YES
2409	Basswood	19	YES	Healthy	1	YES
2410	Ironwood	9		Healthy	2	YES
2411	Ash	8		Healthy	1	YES
2412	Basswood	22	YES	Healthy	1	
2907	Elm	15		Healthy	1	
2908	Maple	10		Healthy	1	
2909	Maple	13	YES	Healthy	1	
2911	Elm	10		Healthy	1	
2912	Ash	8		Healthy	1	

Tree ID Number	Genus	DBH (Inches)	Significant Tree	Tree Health	Num. Stems	Removed?
2913	Basswood	21	YES	Healthy	1	
2915	Oak	18	YES	Healthy	1	
2916	Ironwood	8		Healthy	2	
2917	Basswood	24	YES	Healthy	1	
2918	Basswood	8		Healthy	1	
2919	Basswood	25	YES	Healthy	1	
2922	Basswood	25	YES	Healthy	6	
2924	Ash	13	YES	Healthy	1	
2925	Oak	16	YES	Healthy	1	
2926	Oak	24	YES	Healthy	1	
2930	Basswood	24	YES	Healthy	2	
2931	Ash	10		Healthy	1	
2932	Ash	8		Healthy	1	
2933	Ash	10		Healthy	1	
2934	Ash	8		Healthy	1	
2935	Ash	15	YES	Healthy	1	
2936	Cherry	14	YES	Healthy	1	
3290	Basswood	20	YES	Healthy	2	YES
3291	(Other)	8		Healthy	1	
3294	Oak	16	YES	Healthy	1	
3295	Basswood	25	YES	Healthy	6	
3296	Ash	8		Healthy	1	
3297	Box Elder	11		Healthy	1	
3301	Hackberry	19	YES	Healthy	1	
3302	Maple	15	YES	Healthy	1	
3303	Cottonwood	18	YES	Healthy	1	
3304	Ash	10		Healthy	1	YES
3306	Elm	11		Healthy	1	
3308	Oak	24	YES	Healthy	1	
3309	Basswood	36	YES	Healthy	1	
3311	Ash	10		Healthy	1	
3312	Ash	9		Healthy	1	
3314	Ash	9		Healthy	1	
3315	Ash	10		Healthy	1	
3316	Ash	12	YES	Healthy	1	
3317	Ash	11		Healthy	1	
3611	Ash	8		Healthy	1	
3612	Ash	8		Healthy	1	
4401	Ash	8		Healthy	1	

LEGEND

- CONSTRUCTION LIMITS
- EXISTING 10' CONTOUR
- EXISTING 2' CONTOUR
- REMOVE AND SALVAGE TREE ≥8"
- PROTECT TREE ≥8"

1 PLAN: TREE INVENTORY AND TREE REMOVALS

0 50 100
SCALE IN FEET

ISSUED FOR BID
NOT FOR CONSTRUCTION

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION
0	EPF	PJH2	JDW	04/24/2019	ISSUED FOR BID

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PRINTED NAME JEFFERY D. WEISS

SIGNATURE

DATE 04/24/2019 LICENSE # 48031

	01/31/18	05/03/18	07/24/18	04/24/19
CLIENT				
BID				
CONSTRUCTION				

RELEASED TO/FOR: A B C 0 1 2 3 — DATE RELEASED

BARR

Corporate Headquarters: Minneapolis, Minnesota Ph: 1-800-632-2277

Project Office: BARR ENGINEERING CO. 4300 MARKETPOINTE DRIVE Suite 200 MINNEAPOLIS, MN 55435 Ph: 1-800-632-2277 Fax: (952) 832-2601 www.barr.com

Scale	AS SHOWN
Date	04/24/2019
Drawn	EPF
Checked	PJH2
Designed	BARR
Approved	JDW

RILEY PURGATORY BLUFF CREEK
WATERSHED DISTRICT

RILEY CREEK STABILIZATION
EDEN PRAIRIE, MN.

TREE INVENTORY AND TREE REMOVALS

BARR PROJECT No. 23/27-0053.14
CLIENT PROJECT No.
DWG. No. G-06
REV. No. 0

1 PLAN: SITE LAYOUT
0 200 400
SCALE IN FEET

GENERAL NOTES:

1. TOPO AND CONTROL GROUND SURVEY CONDUCTED BY BARR ENGINEERING IN 2016 IN HENNEPIN COUNTY FEET PROJECTION.
2. IMAGERY; COPYRIGHT PICTOMETRY INTERNATIONAL CORP AND HENNEPIN COUNTY, MINNESOTA, 2015.
3. PARCELS LINE WORK PROVIDED BY THE CITY OF EDEN PRAIRIE. BOUNDARIES ARE APPROXIMATE AND FOR REFERENCE ONLY.
4. CONTRACTOR IS RESPONSIBLE TO LOCATE AND FIELD VERIFY ALL EXISTING UTILITIES PRIOR TO WORK.
5. ALL EXISTING ROADS, PARKING LOTS, TRAILS, FENCES, SIGNS, OR SIMILAR SHALL BE PROTECTED DURING CONSTRUCTION. CONTRACTOR RESPONSIBLE TO COORDINATE SURVEYS WITH THE CITY AND/OR OWNER TO DOCUMENT PRE-CONSTRUCTION EXISTING CONDITION ISSUES.
6. CONTRACTOR SHALL INSTALL AND MAINTAIN ALL EROSION CONTROL BMPS PRIOR TO COMMENCEMENT OF GRADING FOR EACH LOCATION DURING CONSTRUCTION. EROSION CONTROL PLANS ARE PROVIDED INSIDE THE PROJECT STORMWATER POLLUTION PREVENTION PLAN (SWPPP).
7. ALL GROUND DISTURBANCE GENERATED FROM GRADING ACTIVITIES SHALL BE STABILIZED AND RESTORED WITH A MINIMUM OF 6 INCHES OF TOPSOIL, SEED W/COVER CROP AND EROSION CONTROL BLANKET OR STRAW MULCH. THE TOPSOIL USED FOR RESTORATION MAY BE STOCKPILED FROM GRADING AREAS.
8. CONSTRUCTION LIMITS AS SHOWN ARE APPROXIMATE FINAL CONSTRUCTION LIMITS TO BE COORDINATED WITH THE CITY OF EDEN PRAIRIE AND STAKED IN THE FIELD.
9. CLEARING AND GRUBBING TO BE PERFORMED ONLY WITHIN GRADING LIMITS AND ACCESS ROUTES UNLESS DIRECTED BY ENGINEER.
10. TREES TO BE WILL BE MARKED IN THE FIELD BY ENGINEER. ALL TREES >= 8" IN DIAMETER NOT MARKED FOR REMOVAL SHALL BE PROTECTED.
11. TREES IDENTIFIED BY ENGINEER FOR ADDITIONAL PROTECTION SHALL BE PROTECTED AGAINST ROOT COMPACTION, DAMAGE AND DISFIGUREMENT IN ACCORDANCE WITH MnDOT SPEC. 2572. PROTECTION OF TREES NOT IDENTIFIED TO BE REMOVED SHALL BE INCIDENTAL.
12. TREE SURVEY WAS COMPLETED 01/19/2018. "SIGNIFICANT TREES" MEET THE DEFINITION OF THE CITY OF EDEN PRAIRIE TREE REPLACEMENT REQUIREMENTS: ANY LIVING DECIDUOUS TREE (EXCEPT ELM, WILLOW, BOX ELDER, AND ASPEN) MEASURING AT LEAST 12 INCHES AND LESS THAN 32 INCHES IN DIAMETER, ORA LIVING CONIFEROUS TREE MEASURING AT LEAST 8 INCHES AND LESS THAN 24 INCHES IN DIAMETER.
13. CONTRACTOR SHALL TAKE PRECAUTIONS TO MINIMIZE THE TRANSFER OF AQUATIC AND TERRESTRIAL INVASIVE SPECIES TO THE MAXIMUM EXTENT POSSIBLE.
14. COMPACTED SOIL MUST BE DECOMPACTED TO A SOIL COMPACTION TESTING PRESSURE OF LESS THAN 1,400 KILOPASCALS OF 20 POUNDS PER SQUARE INCH IN THE UPPER 12 INCHES OF SOIL.

ISSUED FOR BID
NOT FOR CONSTRUCTION

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION
0	EPF	PJH2	JDW	04/24/2019	ISSUED FOR BID

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.
PRINTED NAME JEFFERY D. WEISS
SIGNATURE
DATE 04/24/2019 LICENSE # 48031

	01/31/18	05/03/18	07/24/18	04/24/19
CLIENT				
BID				
CONSTRUCTION				

RELEASED TO/FOR: A B C 0 1 2 3 — DATE RELEASED

BARR
Project Office:
BARR ENGINEERING CO.
4300 MARKETPOINTE DRIVE
Suite 200
MINNEAPOLIS, MN 55435
Ph: 1-800-632-2277
Fax: (952) 832-2601
www.barr.com
Corporate Headquarters:
Minneapolis, Minnesota
Ph: 1-800-632-2277

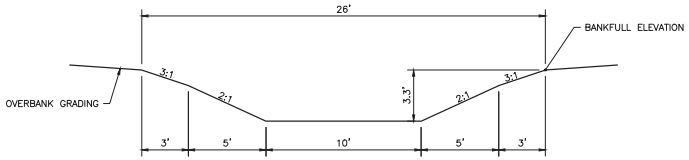
Scale	AS SHOWN
Date	04/24/2019
Drawn	EPF
Checked	PJH2
Designed	BARR
Approved	JDW

RILEY PURGATORY BLUFF CREEK
WATERSHED DISTRICT

RILEY CREEK STABILIZATION
EDEN PRAIRIE, MN.

SITE LAYOUT

BARR PROJECT No. 23/27-0053.14
CLIENT PROJECT No.
DWG. No. C-01
REV. No. 0

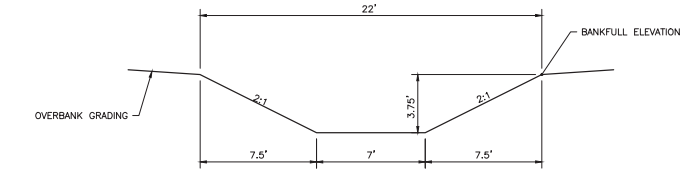


CROSS SECTIONAL AREA = 57.5 SQ. FT.

NOTES:
1. PLACE EROSION CONTROL FABRIC ON ALL CHANNEL BANKS AND ANY OVERBANK GRADING STEEPER THAN 3H:1V.
2. RIFFLE TYPICAL SECTION APPLIES AT UPSTREAM CONTROL POINT OF GRADE CONTROL STRUCTURES. RIFFLE DEPTH INCREASES ALONG EACH STRUCTURE.

1 – TYPICAL SECTION: STANDARD RIFFLE

0 4 8
SCALE IN FEET



CROSS SECTIONAL AREA = 45.8 SQ. FT.

NOTES:
1. PLACE EROSION CONTROL FABRIC ON ALL CHANNEL BANKS AND ANY OVERBANK GRADING STEEPER THAN 3H:1V.
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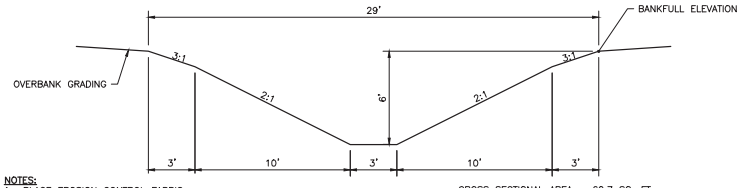
3 – TYPICAL SECTION: NARROW RIFFLE

0 4 8
SCALE IN FEET

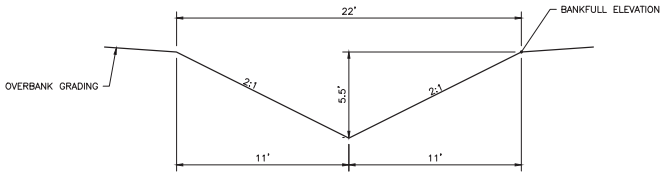


CROSS SECTIONAL AREA = 60.7 SQ. FT.

NOTES:
1. PLACE EROSION CONTROL FABRIC ON ALL CHANNEL BANKS AND ANY OVERBANK GRADING STEEPER THAN 3H:1V.
2. POOL WIDTH AND DEPTH VARIES, MINIMUM DIMENSIONS SHOWN. GRADE POOL TO MINIMIZE FILL VOLUMES AND MAINTAIN SLOPES NO STEEPER THAN 2H:1V.

2 – TYPICAL SECTION: STANDARD POOL

0 4 8
SCALE IN FEET



CROSS SECTIONAL AREA = 47.0 SQ. FT.

NOTES:
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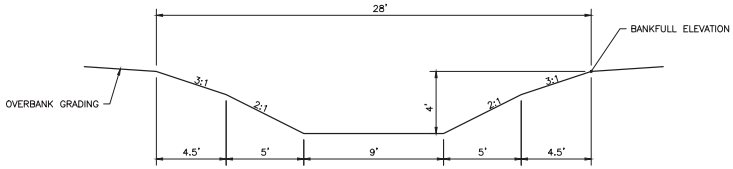
2. POOL WIDTH AND DEPTH VARIES, MINIMUM DIMENSIONS SHOWN. GRADE POOL TO MINIMIZE FILL VOLUMES AND MAINTAIN SLOPES NO STEEPER THAN 2H:1V.

4 – TYPICAL SECTION: NARROW POOL

0 4 8
SCALE IN FEET



CROSS SECTIONAL AREA = 57.7 SQ. FT.

NOTES:
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5 – TYPICAL SECTION: WIDE RIFFLE

0 4 8
SCALE IN FEET

ISSUED FOR BID
NOT FOR CONSTRUCTION

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION
0	EPF	PJH2	JDW	04/24/2019	ISSUED FOR BID

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PRINTED NAME JEFFERY D. WEISS

SIGNATURE

DATE 04/24/2019 LICENSE # 48031

	01/31/18	05/02/18	07/24/18
CLIENT			
BID			04/24/19
CONSTRUCTION			

RELEASED TO/FOR: A B C 0 1 2 3

DATE RELEASED

BARR

Corporate Headquarters: Minneapolis, Minnesota
Ph: 1-800-632-2277

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MINNEAPOLIS, MN 55435
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Fax: (952) 832-2601
www.barr.com

Scale	AS SHOWN
Date	04/24/2019
Drawn	EPF
Checked	PJH2
Designed	BARR
Approved	JDW

RILEY PURGATORY BLUFF CREEK
WATERSHED DISTRICT

RILEY CREEK STABILIZATION
EDEN PRAIRIE, MN.

TYPICAL SECTIONS

BARR PROJECT No. 23/27-0053.14
CLIENT PROJECT No.
DWG. No. C-02
REV. No. 0

Trees ≥ 8" to be Removed				
Tree ID Number	Genus	DBH (Inches)	Significant Tree	Tree Health
402	Maple	11		Healthy
403	Ash	20		Dead
408	Maple	23		Dead
802	Maple	10		Healthy
807	Maple	10		Healthy
3212	Maple	12	YES	Healthy
Total Significant		12	1	

NOTES:

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2. ALL EXISTING ROADS, PARKING LOTS, TRAILS, FENCES, SIGNS, OR SIMILAR SHALL BE PROTECTED DURING CONSTRUCTION. CONTRACTOR RESPONSIBLE TO COORDINATE SURVEYS WITH THE CITY AND/OR OWNER TO DOCUMENT PRE-CONSTRUCTION EXISTING CONDITION ISSUES.
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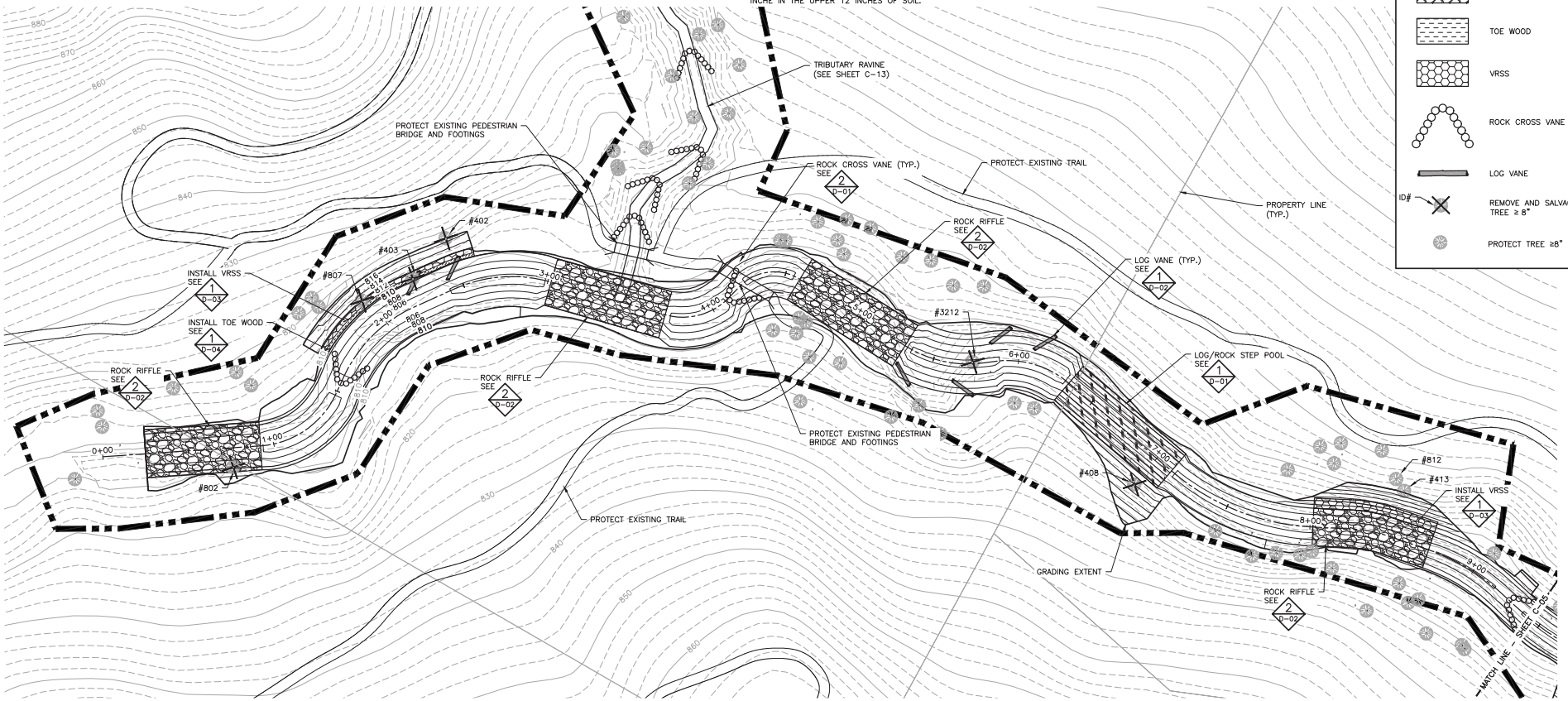
SYMBOL AND PATTERN LEGEND

- EXISTING 10' CONTOUR
- EXISTING 2' CONTOUR
- CONSTRUCTION LIMITS
- SS SS CITY STORM SEWER
- LOG/ROCK STEP POOL
- ROCK RIFFLE
- TOE WOOD
- VRSS
- ROCK CROSS VANE
- LOG VANE
- ID# REMOVE AND SALVAGE TREE ≥ 8"
- PROTECT TREE ≥8"



1 STABILIZATION PLAN: RILEY CREEK (STA. 0+00 TO 9+00)

0 30 60
HORIZONTAL SCALE IN FEET

ISSUED FOR BID
NOT FOR CONSTRUCTION

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION
0	EPF	PJH2	JDW	04/24/2019	ISSUED FOR BID

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PRINTED NAME JEFFERY D. WEISS
SIGNATURE
DATE 04/24/2019 LICENSE # 48031

	01/31/18	05/03/18	07/24/18				
CLIENT							
BID				04/24/19			
CONSTRUCTION							
RELEASED TO/FOR	A	B	C	0	1	2	3
DATE RELEASED							

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www.barr.com

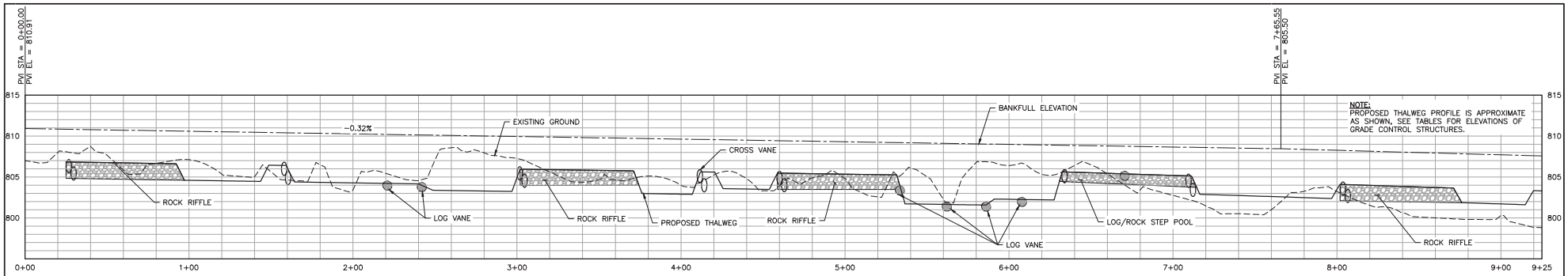
Scale	AS SHOWN
Date	04/24/2019
Drawn	EPF
Checked	PJH2
Designed	BARR
Approved	JDW

RILEY PURGATORY BLUFF CREEK
WATERSHED DISTRICT

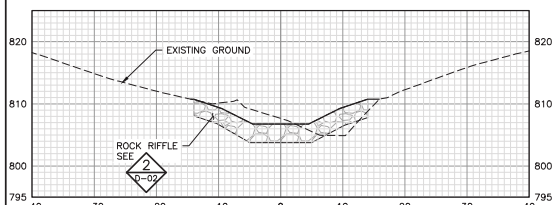
RILEY CREEK STABILIZATION
EDEN PRAIRIE, MN.

STABILIZATION PLAN
(STA. 0+00 TO 9+00)

BARR PROJECT No. 23/27-0053.14
CLIENT PROJECT No.
DWG. No. C-03
REV. No. 0



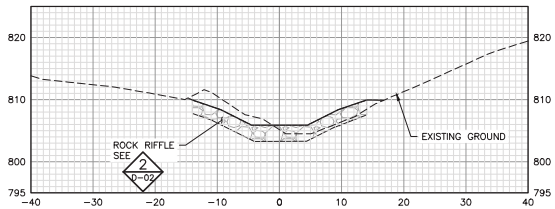
1 PROFILE: RILEY CREEK (STA. 0+00 TO 9+00) 0 30 60 HORIZONTAL SCALE IN FEET 0 6 12 VERTICAL SCALE IN FEET



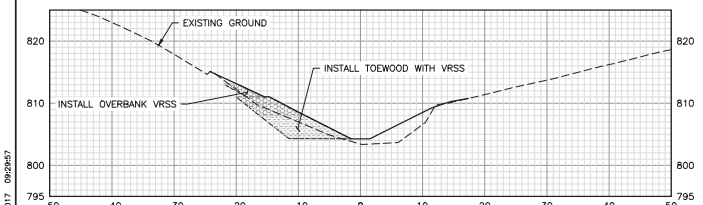
2 SECTION: STA. 0+50 0 10 20 SCALE IN FEET

GRADE CONTROL STRUCTURES

Feature type	X1 Station	X1 Elevation	X1 Bankfull	X2 Station	X2 Elevation	X2 Bankfull	X3 Station	X3 Elevation	Length	Approx. Log/vane Spacing	Typical Section	Notes
Rock riffle	0+25.0	806.83	810.83	0+92.2	806.43	810.61	1+19.6	804.45	67.2	--	Wide riffle	
Cross vane	1+53.2	806.43	810.42	--	--	--	--	--	--	--	Wide riffle	
Rock riffle	3+01.9	805.95	809.94	3+71.2	805.62	809.73	3+91.5	802.86	69.3	--	Wide riffle	
Cross vane	4+11.9	805.62	809.59	--	--	--	--	--	--	--	Wide riffle	Align to protect ex. bridge footings
Rock riffle	4+58.8	805.47	809.45	5+31.6	805.03	809.24	5+88.3	801.57	72.8	--	Wide riffle	
Log/rock step pool	6+32.5	805.03	808.93	7+11.4	804.09	808.43	7+56.7	802.37	78.9	39.4	Standard Riffle	Transition from wide to narrow riffle
Rock riffle	8+01.8	804.09	807.85	8+71.1	803.33	807.40	8+96.0	801.62	69.3	--	Narrow riffle	



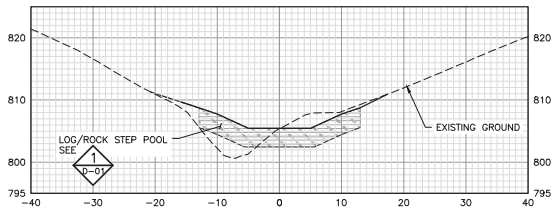
5 SECTION: STA. 3+25 0 10 20 SCALE IN FEET



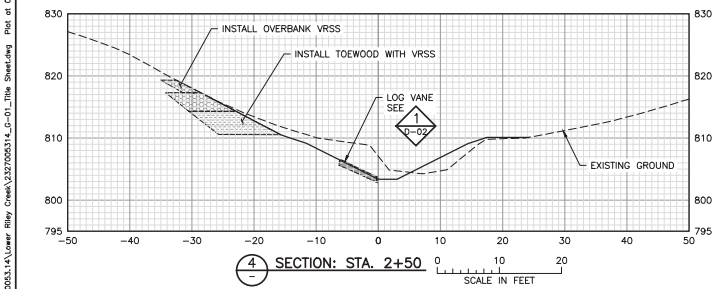
3 SECTION: STA. 2+00 0 10 20 SCALE IN FEET

BANK STRUCTURES

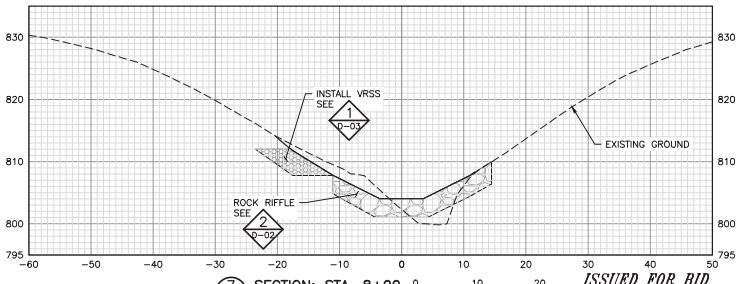
Feature type	Begin (X1) Station	X1 Elevation	Begin (X1) Bankfull	End Station	End Bankfull	Height Above Bankfull	Length	Side	Notes
Toe wood w/ VRSS	1+64.2	805.95	810.38	2+60.0	810.08	--	95.8	Left	2' bankfull bench
Overbank VRSS	1+64.2	--	810.38	2+60.0	810.08	2	95.8	Left	2' bankfull bench
Log vane	2+18.1	804.21	810.21	--	--	--	--	Left	
Log vane	2+43.8	804.13	810.13	--	--	--	--	Left	
Log vane	5+31.6	805.25	809.24	--	--	--	--	Right	Tie in to u/s riffle
Log vane	5+63.8	801.64	809.14	--	--	--	--	Right	
Log vane	5+86.0	801.57	809.07	--	--	--	--	Left	
Log vane	6+08.2	802.25	808.99	--	--	--	--	Left	
Overbank VRSS	8+01.8	--	807.85	8+71.1	807.40	4	69.3	Left	No bankfull bench



6 SECTION: STA. 6+50 0 10 20 SCALE IN FEET



4 SECTION: STA. 2+50 0 10 20 SCALE IN FEET



7 SECTION: STA. 8+00 0 10 20 SCALE IN FEET

ISSUED FOR BID
NOT FOR CONSTRUCTION

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION
0	EPF	PJH2	JDW	04/24/2019	ISSUED FOR BID

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PRINTED NAME JEFFERY D. WEISS
SIGNATURE
DATE 04/24/2019 LICENSE # 48031

	01/31/18	05/03/18	07/24/18	04/24/19
CLIENT				
BID				
CONSTRUCTION				

RELEASED TO/FOR: A B C 0 1 2 3 — DATE RELEASED

BARR
Corporate Headquarters: Minneapolis, Minnesota Ph: 1-800-632-2277
Project Office: BARR ENGINEERING CO. 4300 MARKETPOINTE DRIVE Suite 200 MINNEAPOLIS, MN 55435 Ph: 1-800-632-2277 Fax: (952) 832-2601 www.barr.com

Scale	PJH2
Date	04/24/2019
Drawn	EPF
Checked	AKH
Designed	BARR
Approved	JDW

RILEY PURGATORY BLUFF CREEK
WATERSHED DISTRICT

RILEY CREEK STABILIZATION
EDEN PRAIRIE, MN.

PROFILE & SECTIONS
(STA. 0+00 TO 9+00)

BARR PROJECT No. 23/27-0053.14
CLIENT PROJECT No.
DWG. No. C-04
REV. No. 0

NOTES:

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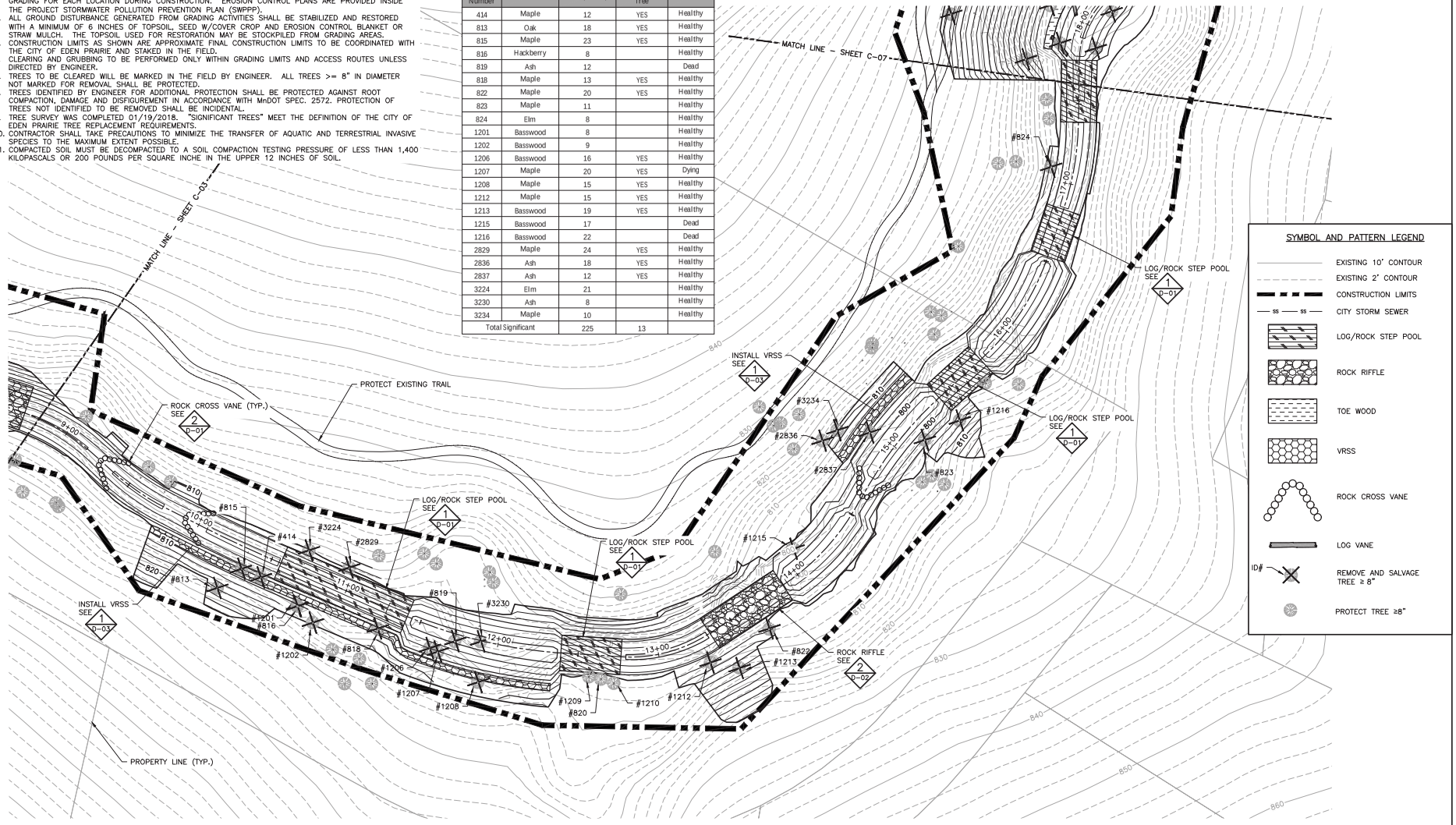
Trees ≥ 8" to be Removed				
Tree ID Number	Genus	DBH (Inches)	Significant Tree	Tree Health
414	Maple	12	YES	Healthy
813	Oak	18	YES	Healthy
815	Maple	23	YES	Healthy
816	Hackberry	8		Healthy
819	Ash	12		Dead
818	Maple	13	YES	Healthy
822	Maple	20	YES	Healthy
823	Maple	11		Healthy
824	Elm	8		Healthy
1201	Basswood	8		Healthy
1202	Basswood	9		Healthy
1206	Basswood	16	YES	Healthy
1207	Maple	20	YES	Dying
1208	Maple	15	YES	Healthy
1212	Maple	15	YES	Healthy
1213	Basswood	19	YES	Healthy
1215	Basswood	17		Dead
1216	Basswood	22		Dead
2829	Maple	24	YES	Healthy
2836	Ash	18	YES	Healthy
2837	Ash	12	YES	Healthy
3224	Elm	21		Healthy
3230	Ash	8		Healthy
3234	Maple	10		Healthy
Total Significant		225	13	



1 STABILIZATION PLAN: RILEY CREEK (STA. 9+00 TO 17+00)

0 30 60
HORIZONTAL SCALE IN FEET

ISSUED FOR BID
NOT FOR CONSTRUCTION

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION
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PRINTED NAME JEFFERY D. WEISS
SIGNATURE
DATE 04/24/2019 LICENSE # 48031

	01/31/18	05/03/18	07/24/18				
CLIENT							
BID				04/24/19			
CONSTRUCTION							
RELEASED TO/FOR	A	B	C	0	1	2	3
DATE RELEASED							

BARR
Corporate Headquarters: Minneapolis, Minnesota Ph: 1-800-632-2277
Project Office: BARR ENGINEERING CO. 4300 MARKETPOINTE DRIVE Suite 200 MINNEAPOLIS, MN 55435 Ph: 1-800-632-2277 Fax: (952) 832-2601 www.barr.com

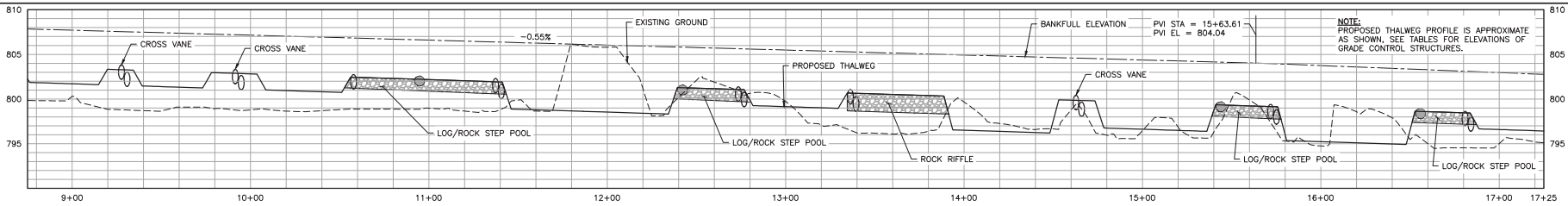
Scale	AS SHOWN
Date	04/24/2019
Drawn	EPF
Checked	PJH2
Designed	BARR
Approved	JDW

RILEY PURGATORY BLUFF CREEK
WATERSHED DISTRICT

RILEY CREEK STABILIZATION
EDEN PRAIRIE, MN.

STABILIZATION PLAN
(STA. 9+00 TO 17+00)

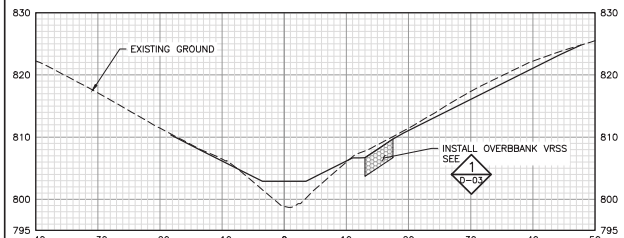
BARR PROJECT No. 23/27-0053.14
CLIENT PROJECT No.
DWG. No. C-05
REV. No. 0



1 – PROFILE: RILEY CREEK (STA. 9+00 TO 17+00)

0 30 60 HORIZONTAL SCALE IN FEET

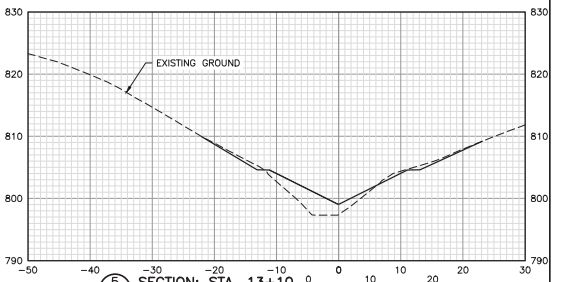
0 6 12 VERTICAL SCALE IN FEET



2 – SECTION: STA. 9+85 0 10 20 SCALE IN FEET

GRADE CONTROL STRUCTURES

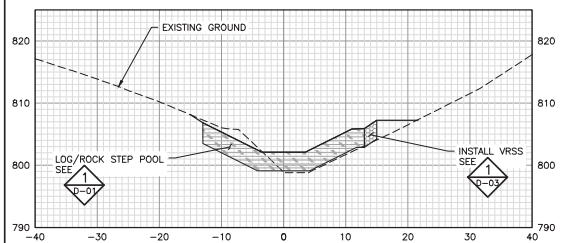
Feature type	X1 Station	X1 Elevation	X1 Bankfull	X2 Station	X2 Elevation	X2 Bankfull	X3 Station	X3 Elevation	Length	Approx. Log/vane Spacing	Typical Section
Cross vane	9+27.0	803.33	807.04	--	--	--	--	--	--	--	Narrow riffle
Cross vane	9+89.9	802.96	806.64	--	--	--	--	--	--	--	Narrow riffle
Log/rock step pool	10+56.2	802.46	806.22	11+41.1	801.29	805.67	11+90.8	798.32	85.0	42.5	Narrow riffle
Log/rock step pool	12+39.3	801.29	805.05	12+76.7	800.68	804.81	13+04.7	798.96	37.4	37.4	Narrow riffle
Rock riffle	13+34.5	800.68	804.44	13+88.7	799.92	804.09	14+21.0	796.2	54.2	--	Narrow riffle
Cross vane	14+62.4	799.92	803.62	--	--	--	--	--	--	--	Narrow riffle
Log/rock step pool	15+41.1	799.35	803.11	15+75.9	798.64	802.89	16+13.1	794.92	34.8	34.8	Narrow riffle
Log/rock step pool	16+52.9	798.64	802.40	16+83.7	798.09	802.20	17+10.7	796.37	30.8	30.8	Narrow riffle



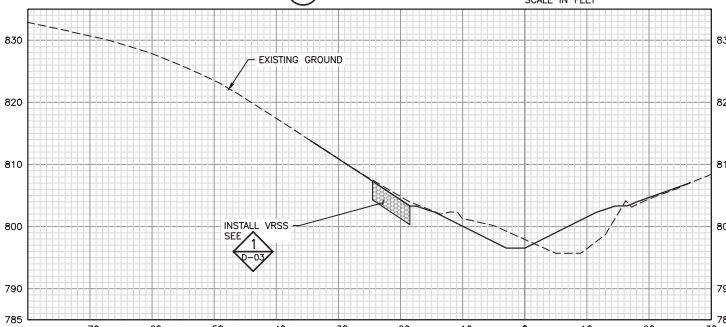
5 – SECTION: STA. 13+10 0 10 20 SCALE IN FEET

BANK STRUCTURES

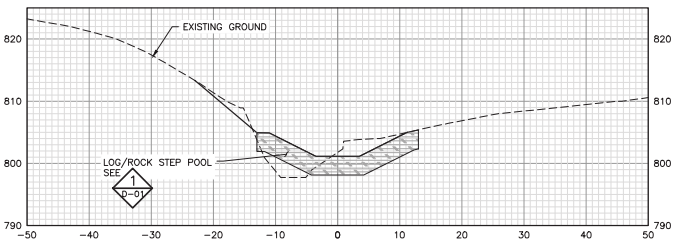
Feature type	Begin (X1) Station	X1 Elevation	Begin (X1) Bankfull	End Station	End Bankfull	Height Above Bankfull	Length	Side	Notes
Overbank VRSS	9+74.8	--	806.74	12+34.3	805.08	3	259.5	Right	2' bankfull bench
Overbank VRSS	14+73.4	--	803.55	15+36.9	803.14	4	63.5	Left	2' bankfull bench



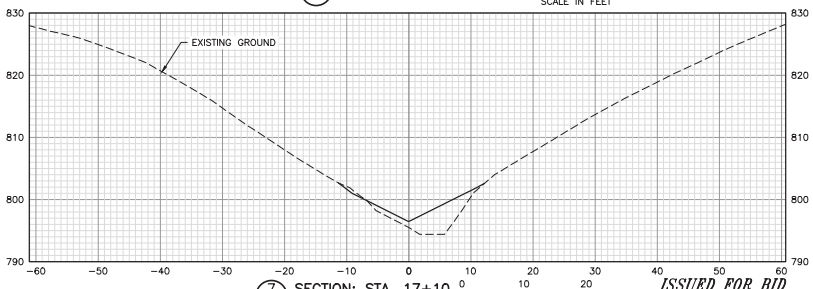
3 – SECTION: STA. 11+10 0 10 20 SCALE IN FEET



6 – SECTION: STA. 15+10 0 10 20 SCALE IN FEET



4 – SECTION: STA. 12+60 0 10 20 SCALE IN FEET



7 – SECTION: STA. 17+10 0 10 20 SCALE IN FEET

ISSUED FOR BID
NOT FOR CONSTRUCTION

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION
0	EPF	PJH2	JDW	04/24/2019	ISSUED FOR BID

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DATE 04/24/2019 LICENSE # 48031

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BID			04/24/19
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Scale	AS SHOWN
Date	04/24/2019
Drawn	EPF
Checked	AKH
Designed	BARR
Approved	JDW

RILEY PURGATORY BLUFF CREEK
WATERSHED DISTRICT

RILEY CREEK STABILIZATION
EDEN PRAIRIE, MN.

PROFILE & SECTIONS
(STA. 9+00 TO 17+00)

BARR PROJECT No. 23/27-0053.14
CLIENT PROJECT No.
DWG. No. C-06
REV. No. 0

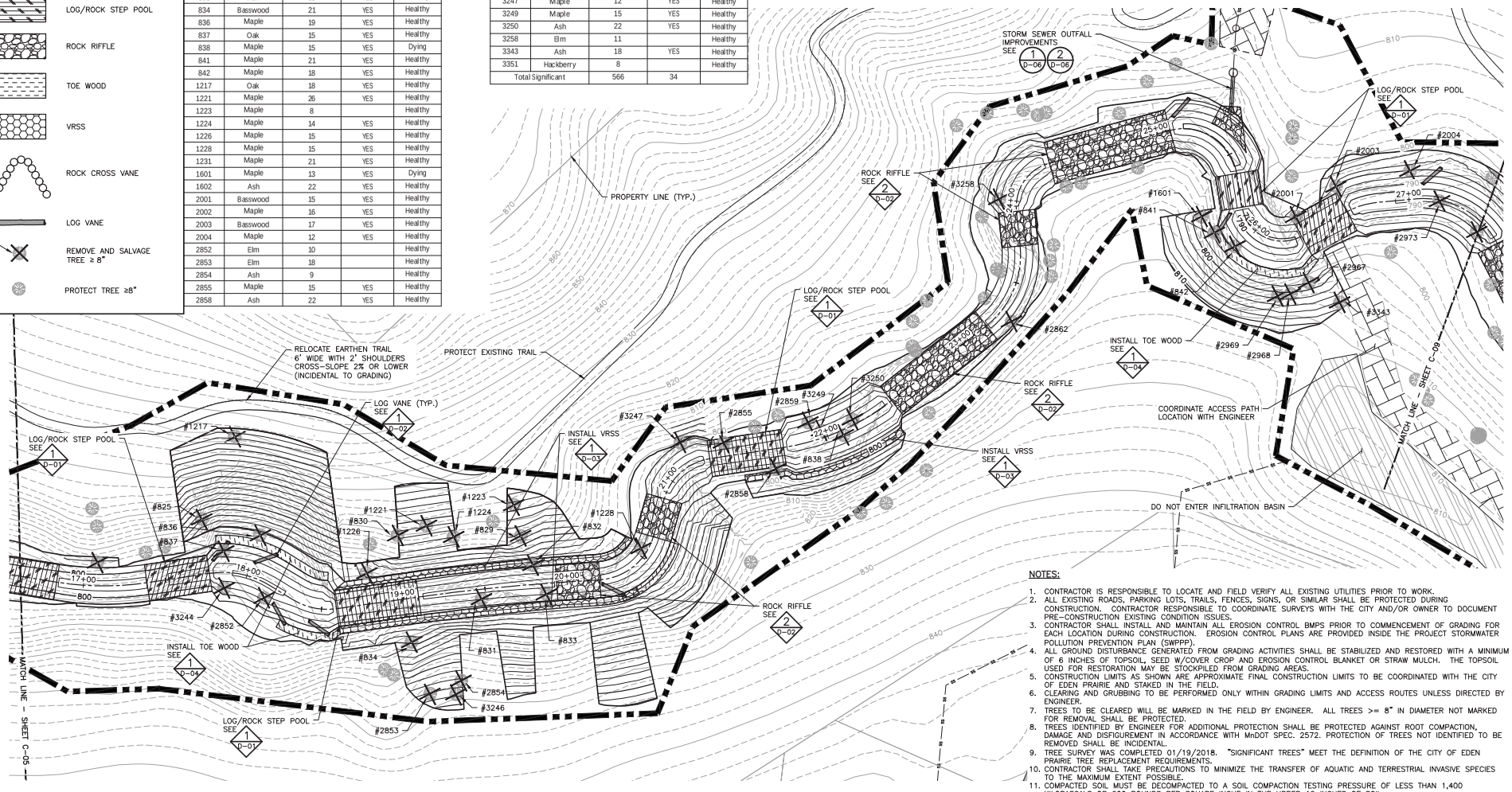
CADD USER: Eric P. Fitzgerald FILE: M:\DESIGN\23270053.14\LOWER RILEY CREEK\23270053.14_C-05_PLAN & PROFILE.DWG PLOT SCALE: 1:2 PLOT DATE: 4/24/2019 10:08 AM
ref. M:\Design\23270053.14\Lower Riley Creek\23270053.14_C-01_Title Sheet.dwg Plot at 0 02/22/2017 09:29:57

SYMBOL AND PATTERN LEGEND

- EXISTING 10' CONTOUR
- EXISTING 2' CONTOUR
- CONSTRUCTION LIMITS
- SS SS CITY STORM SEWER
- LOG/ROCK STEP POOL
- ROCK RIFFLE
- TOE WOOD
- VRSS
- ROCK CROSS VANE
- LOG VANE
- ID# REMOVE AND SALVAGE TREE ≥ 8"
- PROTECT TREE ≥8"

Trees ≥ 8" to be Removed

Tree ID Number	Genus	DBH (Inches)	Significant Tree	Tree Health
825	Maple	19	YES	Healthy
829	Maple	15	YES	Healthy
830	Oak	12	YES	Healthy
831	Maple	16	YES	Healthy
832	Maple	15	YES	Healthy
833	Ash	13	YES	Healthy
834	Basswood	21	YES	Healthy
836	Maple	19	YES	Healthy
837	Oak	15	YES	Healthy
838	Maple	15	YES	Dying
841	Maple	21	YES	Healthy
842	Maple	18	YES	Healthy
1217	Oak	18	YES	Healthy
1221	Maple	26	YES	Healthy
1223	Maple	8		Healthy
1224	Maple	14	YES	Healthy
1226	Maple	15	YES	Healthy
1228	Maple	15	YES	Healthy
1231	Maple	21	YES	Healthy
1601	Maple	13	YES	Dying
1602	Ash	22	YES	Healthy
2001	Basswood	15	YES	Healthy
2002	Maple	16	YES	Healthy
2003	Basswood	17	YES	Healthy
2004	Maple	12	YES	Healthy
2852	Elm	10		Healthy
2853	Elm	18		Healthy
2854	Ash	9		Healthy
2855	Maple	15	YES	Healthy
2858	Ash	22	YES	Healthy
2859	Elm	20		Healthy
2862	Walnut	10		Healthy
2967	Oak	16	YES	Healthy
2968	Ironwood	8		Healthy
2969	Maple	10		Healthy
2973	Ash	18	YES	Healthy
3244	Maple	12	YES	Healthy
3246	Ash	13	YES	Healthy
3247	Maple	12	YES	Healthy
3249	Maple	15	YES	Healthy
3250	Ash	22	YES	Healthy
3258	Elm	11		Healthy
3343	Ash	18	YES	Healthy
3351	Hackberry	8		Healthy
Total Significant		566	34	



1 STABILIZATION PLAN: RILEY CREEK (STA. 17+00 TO 27+00)

0 30 60

HORIZONTAL SCALE IN FEET

NOTES:

1. CONTRACTOR IS RESPONSIBLE TO LOCATE AND FIELD VERIFY ALL EXISTING UTILITIES PRIOR TO WORK.
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4. ALL GROUND DISTURBANCE GENERATED FROM GRADING ACTIVITIES SHALL BE STABILIZED AND RESTORED WITH A MINIMUM OF 6 INCHES OF TOPSOIL, SEED W/COVER CROP AND EROSION CONTROL BLANKET OR STRAW MULCH. THE TOPSOIL USED FOR RESTORATION MAY BE STOCKPILED FROM GRADING AREAS.
5. CONSTRUCTION LIMITS AS SHOWN ARE APPROXIMATE FINAL CONSTRUCTION LIMITS TO BE COORDINATED WITH THE CITY OF EDEN PRAIRIE AND STAKED IN THE FIELD.
6. CLEARING AND GRUBBING TO BE PERFORMED ONLY WITHIN GRADING LIMITS AND ACCESS ROUTES UNLESS DIRECTED BY ENGINEER.
7. TREES TO BE CLEARED WILL BE MARKED IN THE FIELD BY ENGINEER. ALL TREES >= 8" IN DIAMETER NOT MARKED FOR REMOVAL SHALL BE PROTECTED.
8. TREES IDENTIFIED BY ENGINEER FOR ADDITIONAL PROTECTION SHALL BE PROTECTED AGAINST ROOT COMPACTION, DAMAGE AND DISFIGUREMENT IN ACCORDANCE WITH MnDOT SPEC. 2572. PROTECTION OF TREES NOT IDENTIFIED TO BE REMOVED SHALL BE INCIDENTAL.
9. TREE SURVEY WAS COMPLETED 01/19/2018. "SIGNIFICANT TREES" MEET THE DEFINITION OF THE CITY OF EDEN PRAIRIE TREE REPLACEMENT REQUIREMENTS.
10. CONTRACTOR SHALL TAKE PRECAUTIONS TO MINIMIZE THE TRANSFER OF AQUATIC AND TERRESTRIAL INVASIVE SPECIES TO THE MAXIMUM EXTENT POSSIBLE.
11. COMPACTED SOIL MUST BE DECOMPACTED TO A SOIL COMPACTION TESTING PRESSURE OF LESS THAN 1,400 KILOPASCALS OR 200 POUNDS PER SQUARE INCHE IN THE UPPER 12 INCHES OF SOIL.

ISSUED FOR BID
NOT FOR CONSTRUCTION

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION
0	EPF	PJH2	JDW	04/24/2019	ISSUED FOR BID

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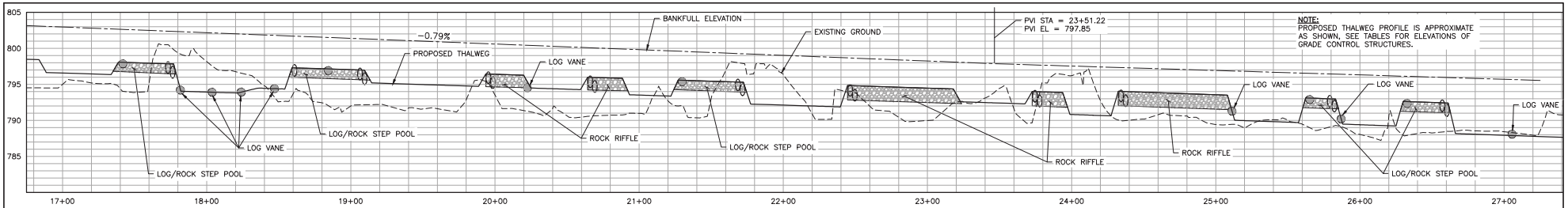
Scale	AS SHOWN
Date	04/24/2019
Drawn	EPF
Checked	PJH2
Designed	BARR
Approved	JDW

RILEY PURGATORY BLUFF CREEK
WATERSHED DISTRICT

RILEY CREEK STABILIZATION
EDEN PRAIRIE, MN.

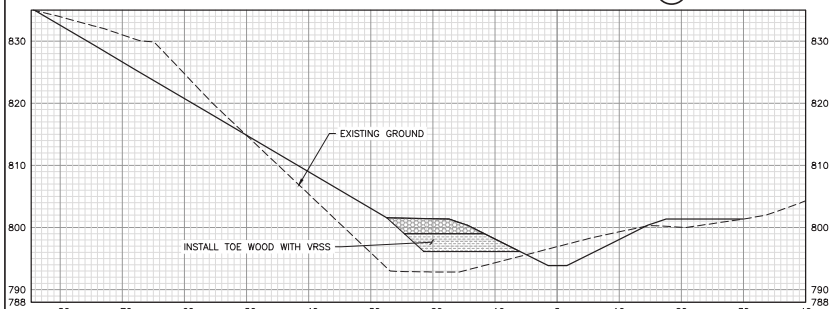
STABILIZATION PLAN
(STA. 17+00 TO 27+00)

BARR PROJECT No. 23/27-0053.14
CLIENT PROJECT No.
DWG. No. C-07
REV. No. 0

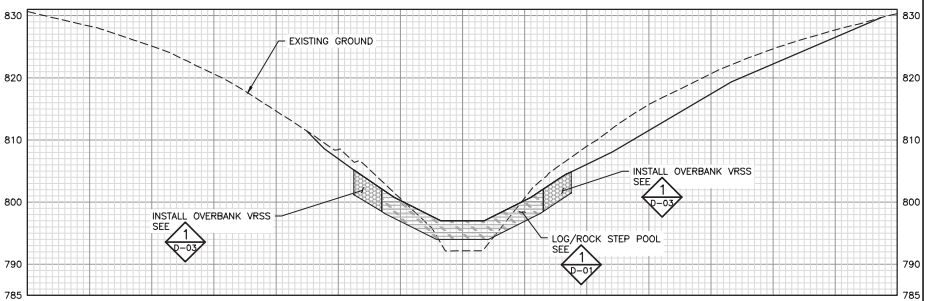


1 PROFILE: RILEY CREEK (STA. 17+00 TO 27+00)

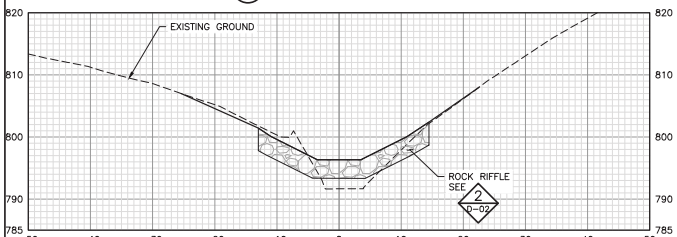
HORIZONTAL SCALE IN FEET 0 30 60
VERTICAL SCALE IN FEET 0 6 12



2 SECTION: STA. 18+10 SCALE IN FEET 0 10 20



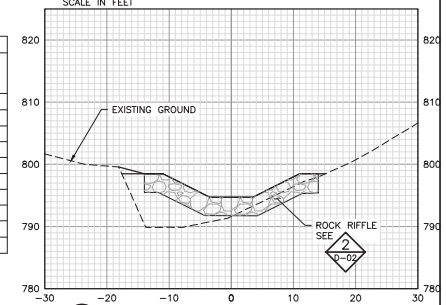
3 SECTION: STA. 19+05 SCALE IN FEET 0 10 20



4 SECTION: STA. 20+10 SCALE IN FEET 0 10 20

GRADE CONTROL STRUCTURES

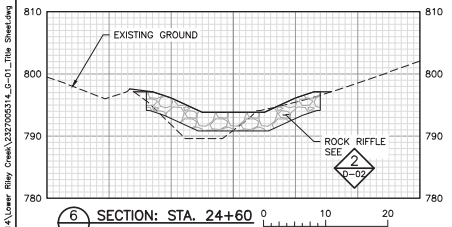
Feature type	X1 Station	X1 Elevation	X1 Bankfull	X2 Station	X2 Elevation	X2 Bankfull	X3 Station	X3 Elevation	Length	Approx. Log/vane Spacing	Typical Section	Notes
Log/rock step pool	17+38.7	798.09	801.85	17+77.0	797.31	801.60	18+20.6	793.81	38.3	38.3	Narrow riffle	
Log/rock step pool	18+59.2	797.31	801.08	19+09.5	796.45	800.76	19+50.4	794.73	50.3	25.1	Narrow riffle	
Rock riffle	19+93.6	796.45	800.22	20+19.9	796	800.05	20+41.5	794.28	26.2	--	Narrow riffle	
Rock riffle	20+64.3	796	799.77	20+88.3	795.58	799.61	21+08.1	793.38	24.1	--	Narrow riffle	
Log/rock step pool	21+29.5	795.58	799.35	21+72.3	794.84	799.08	22+07.9	791.88	42.9	42.9	Narrow riffle	
Rock riffle	22+44.6	794.84	798.61	23+17.9	794.02	798.14	23+44.8	792.3	73.4	--	Narrow riffle	
Rock riffle	23+72.7	794.02	797.77	23+93.8	793.85	797.62	24+13.2	790.63	21.1	--	Narrow riffle	
Rock riffle	24+32.4	793.85	797.35	25+08.2	793.12	796.81	25+35.9	789.71	75.8	--	Standard riffle	Transition from narrow to standard riffle
Log/rock step pool	25+62.4	793.12	796.42	25+83.1	792.64	796.28	26+06.5	789.23	20.7	20.7	Standard riffle	
Log/rock step pool	26+30.0	792.64	795.94	26+61.3	791.69	795.72	27+14.6	787.52	31.3	31.3	Standard riffle	



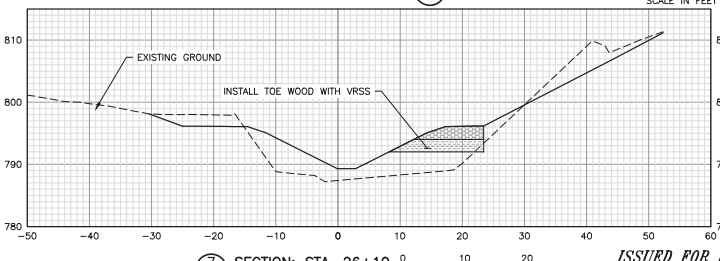
5 SECTION: STA. 22+60 SCALE IN FEET 0 10 20

BANK STRUCTURES

Feature type	Begin (X1) Station	X1 Elevation	Begin (X1) Bankfull	End Station	End Bankfull	Height Above Bankfull	Length	Side	Notes
Log vane	17+79.1	796.31	801.59	--	--	--	--	Left	Tie in to u/s riffle
Toe wood w/ VRSS	17+82.0	797.31	801.57	18+54.2	801.11	--	72.1	Left	10' bankfull bench
Log vane	18+01.3	793.93	801.45	--	--	--	--	Left	
Log vane	18+21.4	793.81	801.32	--	--	--	--	Right	
Toe wood w/ VRSS	18+31.4	797.31	801.26	18+59.2	801.08		27.7	Right	5'+ bankfull bench
Log vane	18+44.5	794.41	801.17	--	--	--	--	Right	
Overbank VRSS	18+59.2	--	801.08	20+36.3	799.95	3	177.1	Right	No bankfull bench
Overbank VRSS	18+59.2	--	801.08	20+56.9	799.81	3	197.7	Left	No bankfull bench
Log vane	20+19.9	795.70	800.05	--	--	--	--	Right	Tie in to u/s riffle
Toe wood w/ VRSS	20+29.5	796.00	799.99	20+64.3	799.77	--	34.8	Right	2' bankfull bench
Overbank VRSS	21+47.0	--	799.24	22+39.6	798.64	3	92.6	Right	2' bankfull bench
Log vane	25+08.2	793.50	796.81	--	--	--	--	Left	Tie in to u/s riffle
Log vane	25+84.5	792.02	796.27	--	--	--	--	Right	Tie in to u/s riffle
Toe wood w/ VRSS	25+88.0	792.64	796.24	26+30.0	795.94	--	42.0	Right	6' bankfull bench
Log vane	27+04.4	787.91	795.41	--	--	--	--	Left	



6 SECTION: STA. 24+60 SCALE IN FEET 0 10 20



7 SECTION: STA. 26+10 SCALE IN FEET 0 10 20

ISSUED FOR BID
NOT FOR CONSTRUCTION

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION
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RILEY PURGATORY BLUFF CREEK
WATERSHED DISTRICT

RILEY CREEK STABILIZATION
EDEN PRAIRIE, MN.

PROFILE & SECTIONS
(STA. 17+00 TO 27+00)

BARR PROJECT No. 23/27-0053.14
CLIENT PROJECT No.
DWG. No. C-08
REV. No. 0

NOTES:

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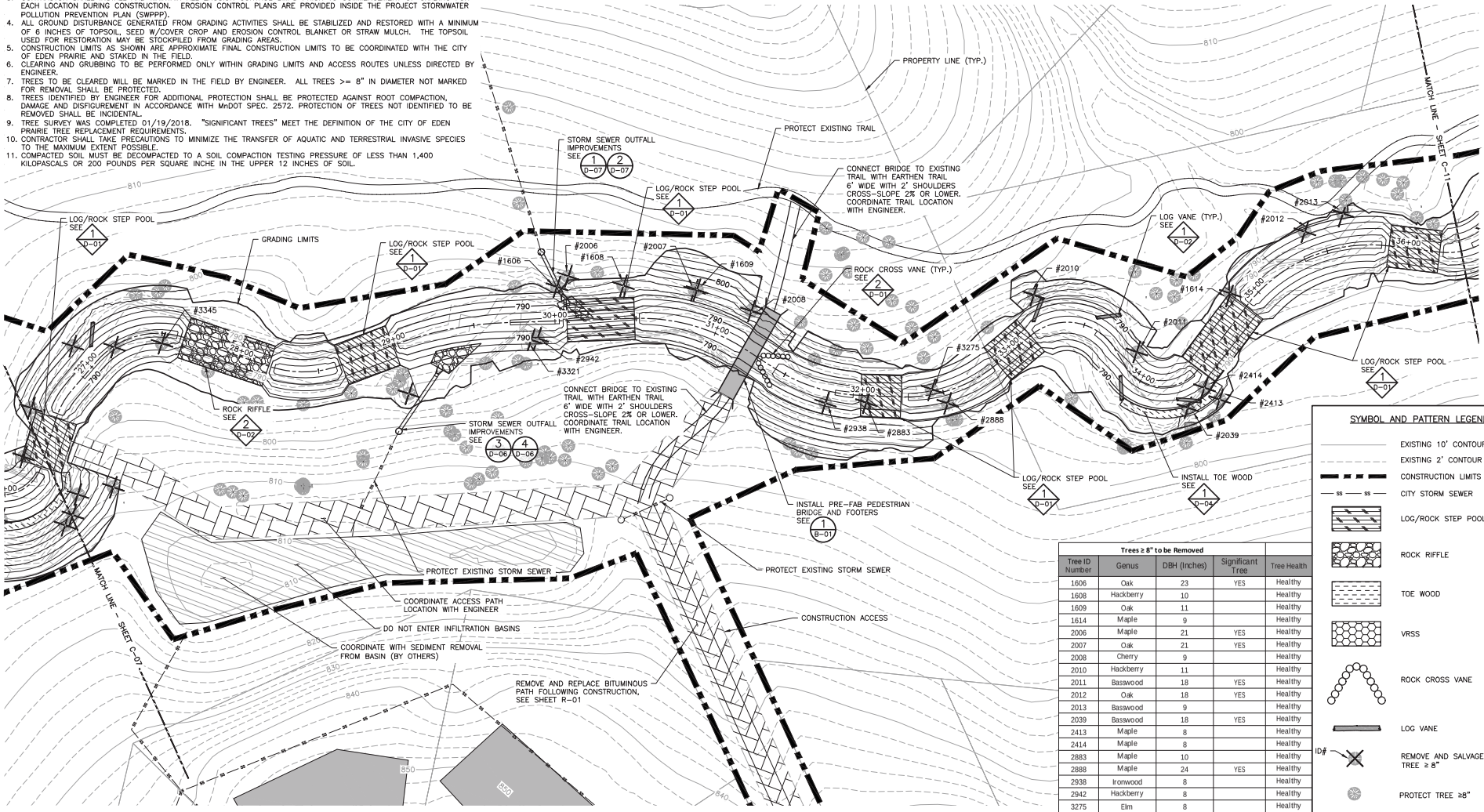
8. TREES IDENTIFIED BY ENGINEER FOR ADDITIONAL PROTECTION SHALL BE PROTECTED AGAINST ROOT COMPACTION, DAMAGE AND DISFIGUREMENT IN ACCORDANCE WITH MnDOT SPEC. 2572. PROTECTION OF TREES NOT IDENTIFIED TO BE REMOVED SHALL BE INCIDENTAL.
9. TREE SURVEY WAS COMPLETED 01/19/2018. "SIGNIFICANT TREES" MEET THE DEFINITION OF THE CITY OF EDEN PRAIRIE TREE REPLACEMENT REQUIREMENTS.
10. CONTRACTOR SHALL TAKE PRECAUTIONS TO MINIMIZE THE TRANSFER OF AQUATIC AND TERRESTRIAL INVASIVE SPECIES TO THE MAXIMUM EXTENT POSSIBLE.
11. COMPACTED SOIL MUST BE DECOMPACTED TO A SOIL COMPACTION TESTING PRESSURE OF LESS THAN 1,400 KILOPASCALS OR 200 POUNDS PER SQUARE INCHE IN THE UPPER 12 INCHES OF SOIL.



1 STABILIZATION PLAN: RILEY CREEK (STA. 27+00 TO 36+00)

0 30 60

HORIZONTAL SCALE IN FEET

Trees ≥ 8" to be Removed

Tree ID Number	Genus	DBH (Inches)	Significant Tree	Tree Health
1606	Oak	23	YES	Healthy
1608	Hackberry	10		Healthy
1609	Oak	11		Healthy
1614	Maple	9		Healthy
2006	Maple	21	YES	Healthy
2007	Oak	21	YES	Healthy
2008	Cherry	9		Healthy
2010	Hackberry	11		Healthy
2011	Basswood	18	YES	Healthy
2012	Oak	18	YES	Healthy
2013	Basswood	9		Healthy
2039	Basswood	18	YES	Healthy
2413	Maple	8		Healthy
2414	Maple	8		Healthy
2883	Maple	10		Healthy
2888	Maple	24	YES	Healthy
2938	Ironwood	8		Healthy
2942	Hackberry	8		Healthy
3275	Elm	8		Healthy
3321	Hackberry	13	YES	Healthy
3345	Ash	14	YES	Healthy
3351	Hackberry	8		Healthy
Total Significant		170	9	

SYMBOL AND PATTERN LEGEND

- EXISTING 10' CONTOUR
- EXISTING 2' CONTOUR
- CONSTRUCTION LIMITS
- ss ss CITY STORM SEWER
- LOG/ROCK STEP POOL
- ROCK RIFFLE
- TOE WOOD
- VRSS
- ROCK CROSS VANE
- LOG VANE
- ID# REMOVE AND SALVAGE TREE ≥ 8"
- PROTECT TREE ≥8"

ISSUED FOR BID
NOT FOR CONSTRUCTION

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION
0	EPF	PJH2	JDW	04/24/2019	ISSUED FOR BID

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.
PRINTED NAME JEFFERY D. WEISS
SIGNATURE
DATE 04/24/2019 LICENSE # 48031

	01/31/18	05/03/18	07/24/18
CLIENT			
BID			04/24/19
CONSTRUCTION			

RELEASED TO/FOR: A B C 0 1 2 3 — DATE RELEASED

BARR
Project Office:
BARR ENGINEERING CO.
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Corporate Headquarters: Minneapolis, Minnesota
Ph: 1-800-632-2277

Scale	AS SHOWN
Date	04/24/2019
Drawn	EPF
Checked	PJH2
Designed	BARR
Approved	JDW

RILEY PURGATORY BLUFF CREEK
WATERSHED DISTRICT

RILEY CREEK STABILIZATION
EDEN PRAIRIE, MN.

STABILIZATION PLAN
(STA. 27+00 TO 36+00)

BARR PROJECT No. 23/27-0053.14
CLIENT PROJECT No.
DWG. No. C-09
REV. No. 0

CADD USER: Eric P. Fitzgerald FILE: M:\DESIGN\23270053.14\LOWER RILEY CREEK\23270053.14_C-09_PLAN & PROFILE.DWG PLOT SCALE: 1:2 PLOT DATE: 4/24/2019 10:26 AM
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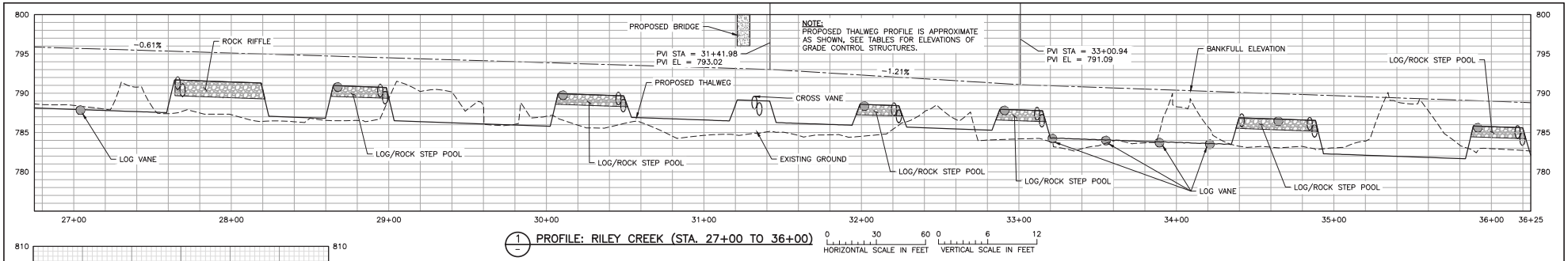
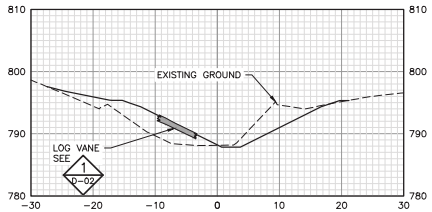


1 – PROFILE: RILEY CREEK (STA. 27+00 TO 36+00)

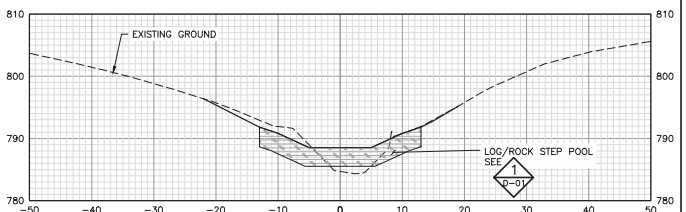
0 30 60 HORIZONTAL SCALE IN FEET 0 6 12 VERTICAL SCALE IN FEET



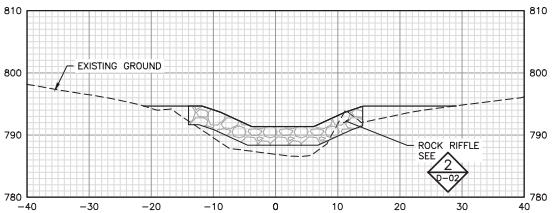
2 – SECTION: STA. 27+10 0 10 20 SCALE IN FEET

GRADE CONTROL STRUCTURES

Feature type	X1 Station	X1 Elevation	X1 Bankfull	X2 Station	X2 Elevation	X2 Bankfull	X3 Station	X3 Elevation	Length	Approx. Log/vane Spacing	Typical Section
Rock riffle	27+63.9	791.69	794.99	28+18.8	790.97	794.60	28+42.0	786.8	54.9	--	Standard riffle
Log/rock step pool	28+64.7	790.97	794.28	28+98.4	789.95	794.04	29+41.6	785.79	33.7	33.7	Standard riffle
Log/rock step pool	30+07.5	789.95	793.26	30+49.1	789.14	792.97	30+85.5	786.48	41.6	41.6	Standard riffle
Cross vane	31+31.8	789.14	792.38	--	--	--	--	--	--	--	Standard riffle
Log/rock step pool	31+99.1	788.59	791.90	32+23.8	787.95	791.73	32+55.0	785.29	24.7	24.7	Standard riffle
Log/rock step pool	32+87.9	787.95	791.27	33+15.1	786.88	791.06	33+79.4	783.46	27.1	27.1	Standard riffle
Log/rock step pool	34+39.8	786.88	790.17	34+88.4	785.82	789.83	35+37.5	781.66	48.6	24.3	Standard riffle
Log/rock step pool	35+88.5	785.82	789.12	36+19.9	785.28	788.893	36+42.0	781.87	31.4	31.4	Standard riffle



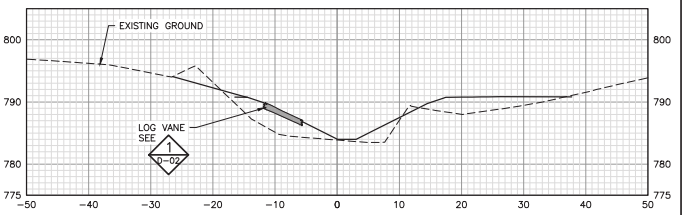
5 – SECTION: STA. 32+10 0 10 20 SCALE IN FEET



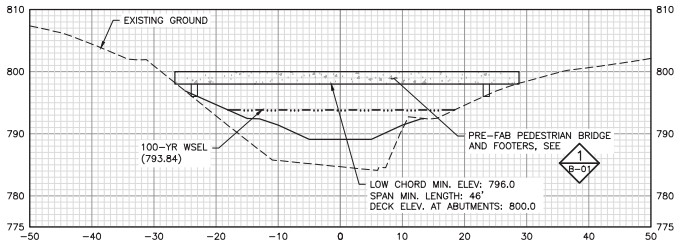
3 – SECTION: STA. 28+10 0 10 20 SCALE IN FEET

BANK STRUCTURES

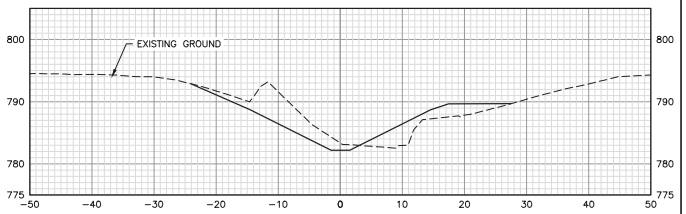
Feature type	Begin (X1) Station	X1 Elevation	Begin (X1) Bankfull	End Station	End Bankfull	Height Above Bankfull	Length	Side	Notes
Log vane	33+20.1	784.27	791.02	--	--	--	--	Left	
Log vane	33+51.4	784.10	790.80	--	--	--	--	Left	
Log vane	33+86.5	783.80	790.55	--	--	--	--	Right	
Toe wood w/ VRSS	33+98.0	786.88	790.47	34+39.8	790.17		41.8	Right	6' bankfull bench
Log vane	34+21.1	783.61	790.30	--	--	--	--	Right	



6 – SECTION: STA. 33+60 0 10 20 SCALE IN FEET



4 – SECTION: STA. 31+25 0 10 20 SCALE IN FEET



7 – SECTION: STA. 35+10 0 10 20 SCALE IN FEET

ISSUED FOR BID
NOT FOR CONSTRUCTION

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION
0	EPF	PJH2	JDW	04/24/2019	ISSUED FOR BID

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PRINTED NAME JEFFERY D. WEISS
SIGNATURE
DATE 04/24/2019 LICENSE # 48031

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CLIENT			
BID			04/24/19
CONSTRUCTION			

RELEASED TO/FOR: A B C 0 1 2 3 — DATE RELEASED

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Scale	AS SHOWN
Date	04/24/2019
Drawn	EPF
Checked	AKH
Designed	BARR
Approved	JDW

RILEY PURGATORY BLUFF CREEK
WATERSHED DISTRICT

RILEY CREEK STABILIZATION
EDEN PRAIRIE, MN.

PROFILE & SECTIONS
(STA. 27+00 TO 36+00)

BARR PROJECT No. 23/27-0053.14
CLIENT PROJECT No.
DWG. No. C-10
REV. No. 0

CADD USER: Eric P. Fitzgerald FILE: M:\DESIGN\23270053.14\LOWER RILEY CREEK\23270053.14_C-09_PLAN & PROFILE.DWG PLOT SCALE: 1:2 PLOT DATE: 4/24/2019 10:38 AM
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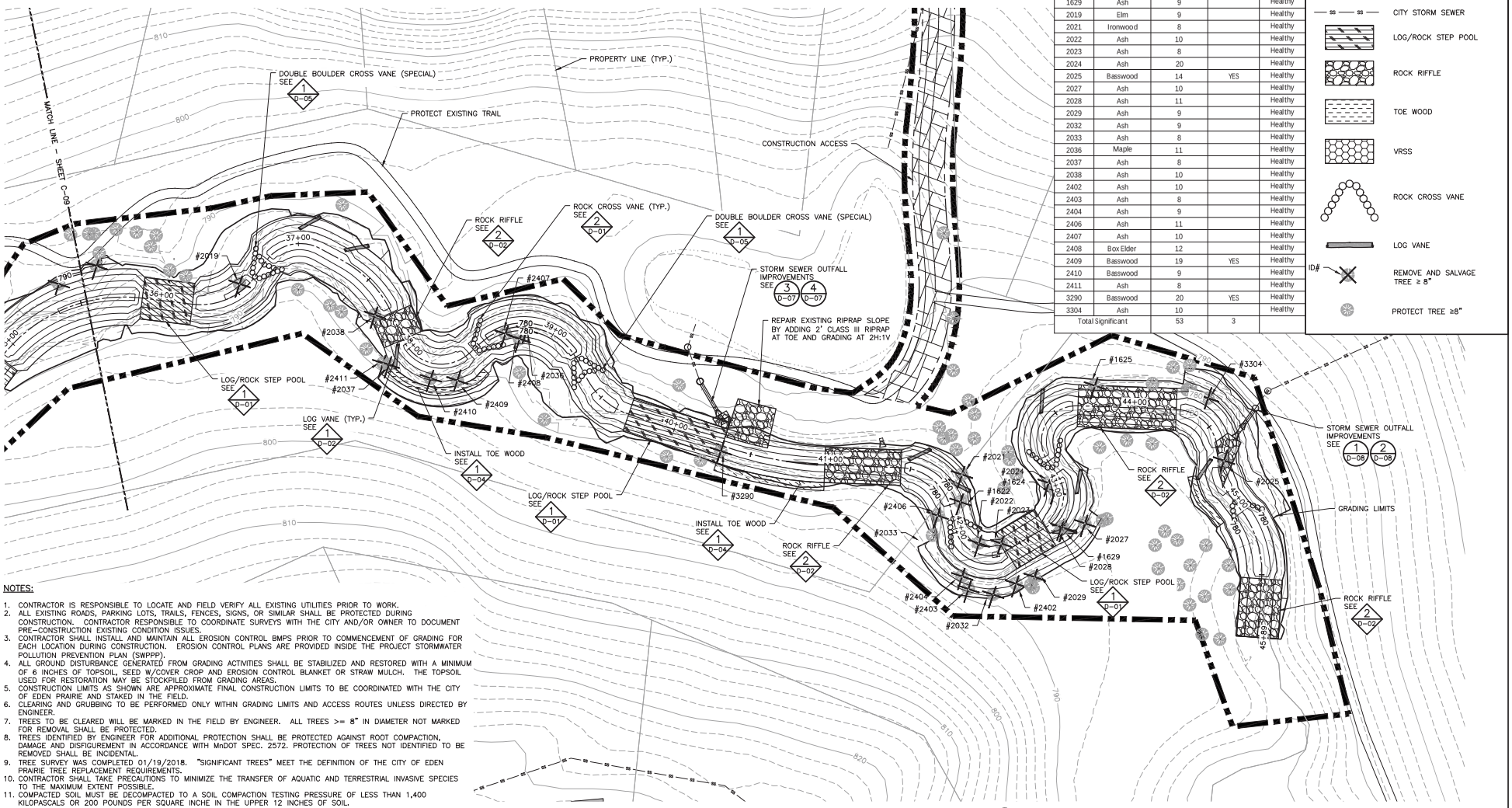

NOTES:

1. CONTRACTOR IS RESPONSIBLE TO LOCATE AND FIELD VERIFY ALL EXISTING UTILITIES PRIOR TO WORK.
2. ALL EXISTING ROADS, PARKING LOTS, TRAILS, FENCES, SIGNS, OR SIMILAR SHALL BE PROTECTED DURING CONSTRUCTION. CONTRACTOR RESPONSIBLE TO COORDINATE SURVEYS WITH THE CITY AND/OR OWNER TO DOCUMENT PRE-CONSTRUCTION EXISTING CONDITION ISSUES.
3. CONTRACTOR SHALL INSTALL AND MAINTAIN ALL EROSION CONTROL BMPS PRIOR TO COMMENCEMENT OF GRADING FOR EACH LOCATION DURING CONSTRUCTION. EROSION CONTROL PLANS ARE PROVIDED INSIDE THE PROJECT STORMWATER POLLUTION PREVENTION PLAN (SWPPP).
4. ALL GROUND DISTURBANCE GENERATED FROM GRADING ACTIVITIES SHALL BE STABILIZED AND RESTORED WITH A MINIMUM OF 6 INCHES OF TOPSOIL, SEED W/COVER CROP AND EROSION CONTROL BLANKET OR STRAW MULCH. THE TOPSOIL USED FOR RESTORATION MAY BE STOCKPILED FROM GRADING AREAS.
5. CONSTRUCTION LIMITS AS SHOWN ARE APPROXIMATE FINAL CONSTRUCTION LIMITS TO BE COORDINATED WITH THE CITY OF EDEN PRAIRIE AND STAKED IN THE FIELD.
6. CLEARING AND GRUBBING TO BE PERFORMED ONLY WITHIN GRADING LIMITS AND ACCESS ROUTES UNLESS DIRECTED BY ENGINEER.
7. TREES TO BE CLEARED WILL BE MARKED IN THE FIELD BY ENGINEER. ALL TREES >= 8" IN DIAMETER NOT MARKED FOR REMOVAL SHALL BE PROTECTED.
8. TREES IDENTIFIED BY ENGINEER FOR ADDITIONAL PROTECTION SHALL BE PROTECTED AGAINST ROOT COMPACTION, DAMAGE AND DISFIGUREMENT IN ACCORDANCE WITH MnDOT SPEC. 2572. PROTECTION OF TREES NOT IDENTIFIED TO BE REMOVED SHALL BE INCIDENTAL.
9. TREE SURVEY WAS COMPLETED 01/19/2018. "SIGNIFICANT TREES" MEET THE DEFINITION OF THE CITY OF EDEN PRAIRIE TREE REPLACEMENT REQUIREMENTS.
10. CONTRACTOR SHALL TAKE PRECAUTIONS TO MINIMIZE THE TRANSFER OF AQUATIC AND TERRESTRIAL INVASIVE SPECIES TO THE MAXIMUM EXTENT POSSIBLE.
11. COMPACTED SOIL MUST BE DECOMPACTED TO A SOIL COMPACTION TESTING PRESSURE OF LESS THAN 1,400 KILOPASCALS OR 200 POUNDS PER SQUARE INCHE IN THE UPPER 12 INCHES OF SOIL.

Trees ≥ 8" to be Removed

Tree ID Number	Genus	DBH (Inches)	Significant Tree	Tree Health
1622	Ash	8		Healthy
1624	Box Elder	8		Healthy
1625	Basswood	11		Healthy
1629	Ash	9		Healthy
2019	Elm	9		Healthy
2021	Ironwood	8		Healthy
2022	Ash	10		Healthy
2023	Ash	8		Healthy
2024	Ash	20		Healthy
2025	Basswood	14	YES	Healthy
2027	Ash	10		Healthy
2028	Ash	11		Healthy
2029	Ash	9		Healthy
2032	Ash	9		Healthy
2033	Ash	8		Healthy
2036	Maple	11		Healthy
2037	Ash	8		Healthy
2038	Ash	10		Healthy
2402	Ash	10		Healthy
2403	Ash	8		Healthy
2404	Ash	9		Healthy
2406	Ash	11		Healthy
2407	Ash	10		Healthy
2408	Box Elder	12		Healthy
2409	Basswood	19	YES	Healthy
2410	Basswood	9		Healthy
2411	Ash	8		Healthy
3290	Basswood	20	YES	Healthy
3304	Ash	10		Healthy
Total Significant		53	3	

SYMBOL AND PATTERN LEGEND

- EXISTING 10' CONTOUR
- EXISTING 2' CONTOUR
- CONSTRUCTION LIMITS
- SS — SS — CITY STORM SEWER
- LOG/ROCK STEP POOL
- ROCK RIFFLE
- TOE WOOD
- VRSS
- ROCK CROSS VANE
- LOG VANE
- ID# REMOVE AND SALVAGE TREE ≥ 8"
- PROTECT TREE ≥8"

1 STABILIZATION PLAN: RILEY CREEK (STA. 36+00 TO 45+89)

0 30 60

HORIZONTAL SCALE IN FEET

ISSUED FOR BID
NOT FOR CONSTRUCTION

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION
0	EPF	PJH2	JDW	04/24/2019	ISSUED FOR BID

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PRINTED NAME JEFFERY D. WEISS

SIGNATURE

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BID			04/24/19
CONSTRUCTION			

RELEASED TO/FOR: A B C 0 1 2 3 — DATE RELEASED

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Minneapolis, Minnesota
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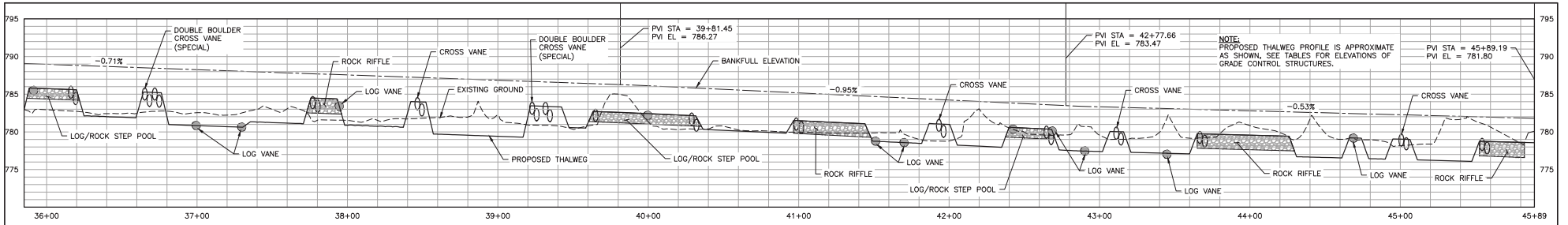
Scale	AS SHOWN
Date	04/24/2019
Drawn	EPF
Checked	PJH2
Designed	BARR
Approved	JDW

RILEY PURGATORY BLUFF CREEK
WATERSHED DISTRICT

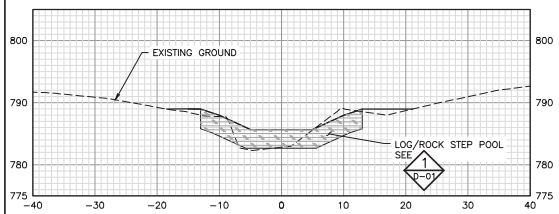
RILEY CREEK STABILIZATION
EDEN PRAIRIE, MN.

STABILIZATION PLAN
(STA. 36+00 TO 45+89)

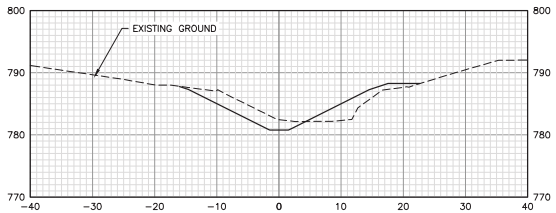
BARR PROJECT No. 23/27-0053.14
CLIENT PROJECT No.
DWG. No. C-11
REV. No. 0



1 PROFILE: RILEY CREEK (STA. 36+00 TO 45+89) 0 30 60 HORIZONTAL SCALE IN FEET 0 6 12 VERTICAL SCALE IN FEET



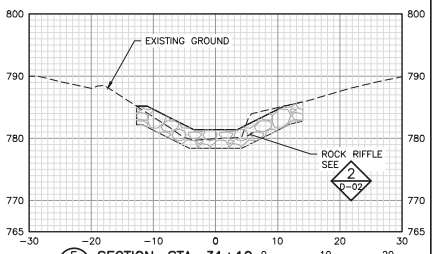
2 SECTION: STA. 36+10 0 10 20 SCALE IN FEET



3 SECTION: STA. 37+10 0 10 20 SCALE IN FEET

GRADE CONTROL STRUCTURES

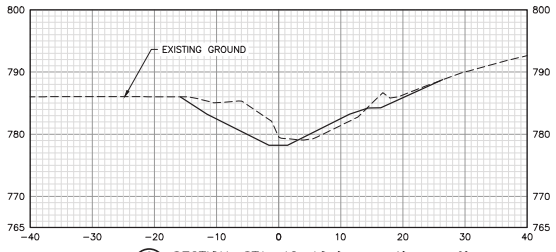
Feature type	X1 Station	X1 Elevation	X1 Bankfull	X2 Station	X2 Elevation	X2 Bankfull	X3 Station	X3 Elevation	Length	Approx. Log/vane Spacing	Typical Section	Notes
Cross vane (double)	36+64.4	785.28	788.58	36+76.2	784.89	788.49	--	--	--	--	Standard riffle	Double vane
Rock riffle	37+75.7	784.5	787.79	37+93.2	784.02	787.66	38+17.3	780.61	17.6	--	Standard riffle	
Cross vane	38+47.0	784.02	787.28	--	--	--	--	--	--	--	Standard riffle	
Cross vane (double)	39+21.8	783.46	786.75	39+35.6	783.07	786.65	--	--	--	--	Standard riffle	Double vane
Log/rock step pool	39+70.1	782.67	786.41	40+31.5	781.52	785.88	40+64.5	779.82	61.3	30.7	Narrow riffle	
Rock riffle	40+96.6	781.52	785.27	41+44.1	781.12	784.81	41+65.4	778.46	47.5	--	Narrow riffle	
Cross vane	41+94.1	781.12	784.34	--	--	--	--	--	--	--	Standard riffle	
Log/rock step pool	42+40.0	780.61	783.90	42+68.2	780.06	783.64	42+87.3	777.39	28.2	28.2	Standard riffle	
Cross vane	43+11.7	780.06	783.34	--	--	--	--	--	--	--	Standard riffle	
Rock riffle	43+64.9	779.75	783.06	44+26.1	779.22	782.73	44+59.6	776.39	61.1	--	Standard riffle	
Cross vane	45+01.3	779.06	782.33	--	--	--	--	--	--	--	Standard riffle	
Rock riffle	45+52.6	778.76	782.06	45+89.0	778.57	781.87			36.4	--	Standard riffle	



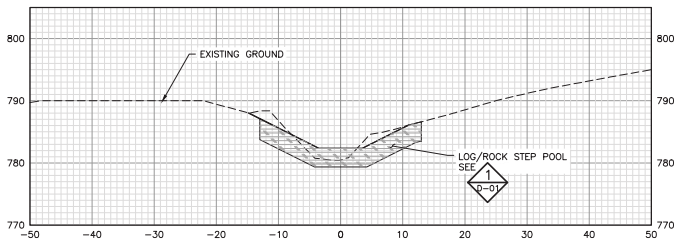
5 SECTION: STA. 31+10 0 10 20 SCALE IN FEET

BANK STRUCTURES

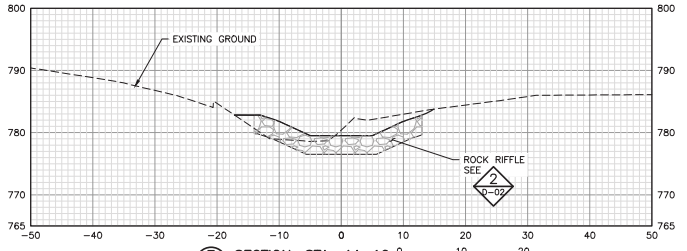
Feature type	Begin (X1) Station	X1 Elevation	Begin (X1) Bankfull	End Station	End Bankfull	Height Above Bankfull	Length	Side	Notes
Log vane	37+00.2	780.83	788.32	--	--	--	--	Left	
Log vane	37+30.4	780.62	788.11	--	--	--	--	Left	
Log vane	37+94.7	783.36	787.65	--	--	--	--	Right	Tie in to u/s riffle
Toe wood w/ VRSS	38+01.9	784.02	787.60	38+40.7	787.32	--	38.9	Right	2' bankfull bench
Toe wood w/ VRSS	40+31.5	781.52	785.88	40+96.6	785.27	--	65.1	Right	No bankfull bench
Log vane	41+52.0	778.75	784.74	--	--	--	--	Left	
Log vane	41+71.0	778.57	784.56	--	--	--	--	Left	
Log vane	42+69.5	779.62	783.62	--	--	--	--	Right	
Log vane	42+92.3	777.44	783.44	--	--	--	--	Right	
Log vane	43+44.5	777.16	783.17	--	--	--	--	Left	
Log vane	44+69.9	779.22	782.50	--	--	--	--	Right	Acts as grade control
Toe wood w/ VRSS	44+78.9	779.06	782.45	44+06.4	782.31	--	27.5	Right	No bankfull bench



6 SECTION: STA. 42+10 0 10 20 SCALE IN FEET



4 SECTION: STA. 40+10 0 10 20 SCALE IN FEET



7 SECTION: STA. 44+10 0 10 20 SCALE IN FEET

ISSUED FOR BID
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NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION
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PRINTED NAME JEFFERY D. WEISS
SIGNATURE
DATE 04/24/2019 LICENSE # 48031

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CLIENT				
BID				04/24/19
CONSTRUCTION				

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BARR ENGINEERING CO.
4300 MARKETPOINTE DRIVE
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Corporate Headquarters: Minneapolis, Minnesota Ph: 1-800-632-2277

Scale	AS SHOWN
Date	04/24/2019
Drawn	EPF
Checked	AKH
Designed	BARR
Approved	JDW

RILEY PURGATORY BLUFF CREEK
WATERSHED DISTRICT

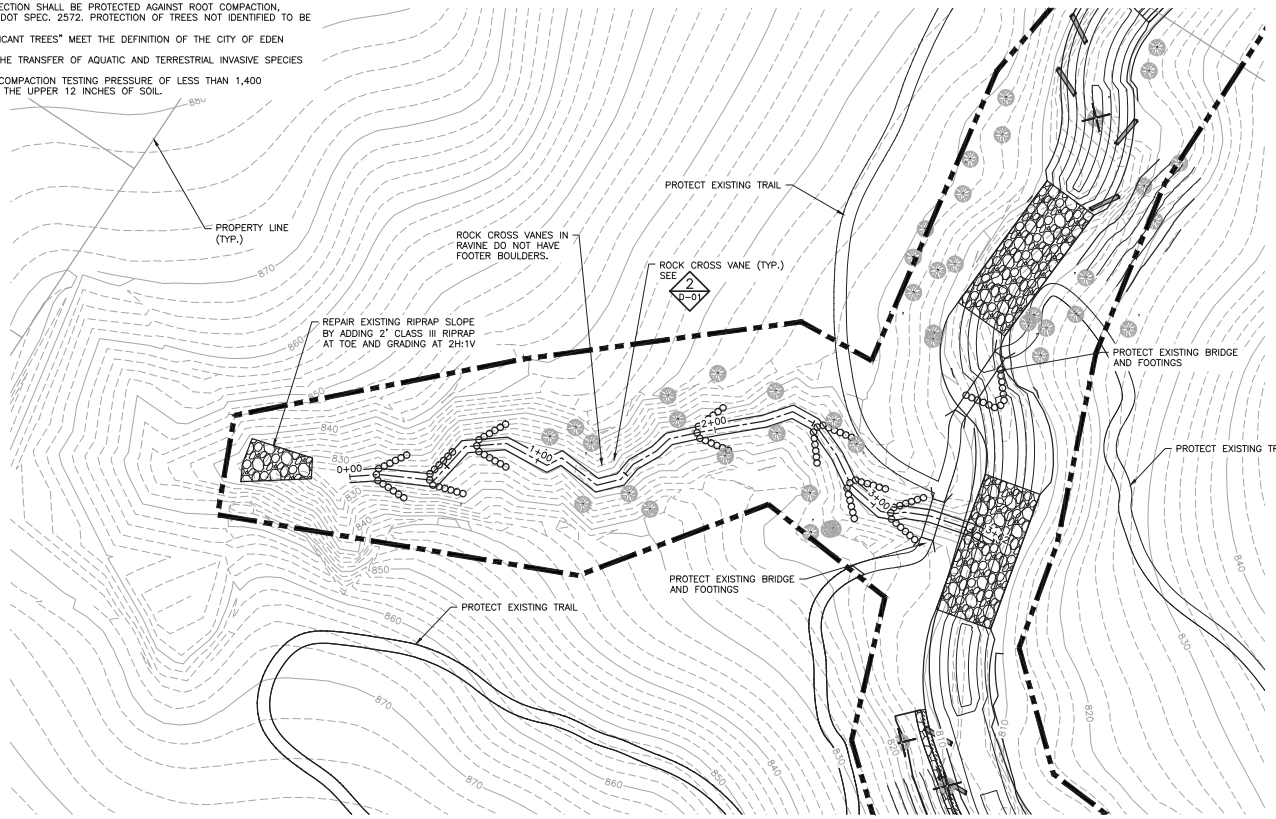
RILEY CREEK STABILIZATION
EDEN PRAIRIE, MN.

PROFILE & SECTIONS
(STA. 36+00 TO 45+89)

BARR PROJECT No. 23/27-0053.14
CLIENT PROJECT No.
DWG. No. C-12
REV. No. 0

NOTES:

1. CONTRACTOR IS RESPONSIBLE TO LOCATE AND FIELD VERIFY ALL EXISTING UTILITIES PRIOR TO WORK.
2. ALL EXISTING ROADS, PARKING LOTS, TRAILS, FENCES, SIGNS, OR SIMILAR SHALL BE PROTECTED DURING CONSTRUCTION. CONTRACTOR RESPONSIBLE TO COORDINATE SURVEYS WITH THE CITY AND/OR OWNER TO DOCUMENT PRE-CONSTRUCTION EXISTING CONDITION ISSUES.
3. CONTRACTOR SHALL INSTALL AND MAINTAIN ALL EROSION CONTROL BMPS PRIOR TO COMMENCEMENT OF GRADING FOR EACH LOCATION DURING CONSTRUCTION. EROSION CONTROL PLANS ARE PROVIDED INSIDE THE PROJECT STORMWATER POLLUTION PREVENTION PLAN (SWPPP).
4. ALL GROUND DISTURBANCE GENERATED FROM GRADING ACTIVITIES SHALL BE STABILIZED AND RESTORED WITH A MINIMUM OF 6 INCHES OF TOPSOIL, SEED W/COVER CROP AND EROSION CONTROL BLANKET OR STRAW MULCH. THE TOPSOIL USED FOR RESTORATION MAY BE STOCKPILED FROM GRADING AREAS.
5. CONSTRUCTION LIMITS AS SHOWN ARE APPROXIMATE FINAL CONSTRUCTION LIMITS TO BE COORDINATED WITH THE CITY OF EDEN PRAIRIE AND STAKED IN THE FIELD.
6. CLEARING AND GRUBBING TO BE PERFORMED ONLY WITHIN GRADING LIMITS AND ACCESS ROUTES UNLESS DIRECTED BY ENGINEER.
7. TREES TO BE CLEARED WILL BE MARKED IN THE FIELD BY ENGINEER. ALL TREES >= 8" IN DIAMETER NOT MARKED FOR REMOVAL SHALL BE PROTECTED.
8. TREES IDENTIFIED BY ENGINEER FOR ADDITIONAL PROTECTION SHALL BE PROTECTED AGAINST ROOT COMPACTION, DAMAGE AND DISFIGUREMENT IN ACCORDANCE WITH MnDOT SPEC. 2572. PROTECTION OF TREES NOT IDENTIFIED TO BE REMOVED SHALL BE INCIDENTAL.
9. TREE SURVEY WAS COMPLETED 01/19/2018. "SIGNIFICANT TREES" MEET THE DEFINITION OF THE CITY OF EDEN PRAIRIE TREE REPLACEMENT REQUIREMENTS.
10. CONTRACTOR SHALL TAKE PRECAUTIONS TO MINIMIZE THE TRANSFER OF AQUATIC AND TERRESTRIAL INVASIVE SPECIES TO THE MAXIMUM EXTENT POSSIBLE.
11. COMPACTED SOIL MUST BE DECOMPACTED TO A SOIL COMPACTION TESTING PRESSURE OF LESS THAN 1,400 KILOPASCALS OR 200 POUNDS PER SQUARE INCHE IN THE UPPER 12 INCHES OF SOIL.



SYMBOL AND PATTERN LEGEND

- EXISTING 10' CONTOUR
- EXISTING 2' CONTOUR
- CONSTRUCTION LIMITS
- SS — SS — CITY STORM SEWER
- LOG/ROCK STEP POOL
- ROCK RIFFLE
- TOE WOOD
- VRSS
- ROCK CROSS VANE
- LOG VANE
- ID# REMOVE AND SALVAGE TREE ≥ 8"
- PROTECT TREE ≥8"

NOTE:

ALL ROCK CROSS VANES ON THE TRIBUTARY RAVINE ARE TO BE FIELD FIT TO EXISTING GROUND.

1 – PLAN: TRIBUTARY RAVINE

0 30 60
HORIZONTAL SCALE IN FEET

ISSUED FOR BID
NOT FOR CONSTRUCTION

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION
0	EPF	PJH2	JDW	04/24/2019	ISSUED FOR BID

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.
PRINTED NAME JEFFERY D. WEISS
SIGNATURE
DATE 04/24/2019 LICENSE # 48031

CLIENT	01/31/18	05/03/18	07/24/18					
BID				04/24/19				
CONSTRUCTION								
RELEASED TO/FOR	A	B	C	0	1	2	3	
	DATE RELEASED							

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Approved	JDW

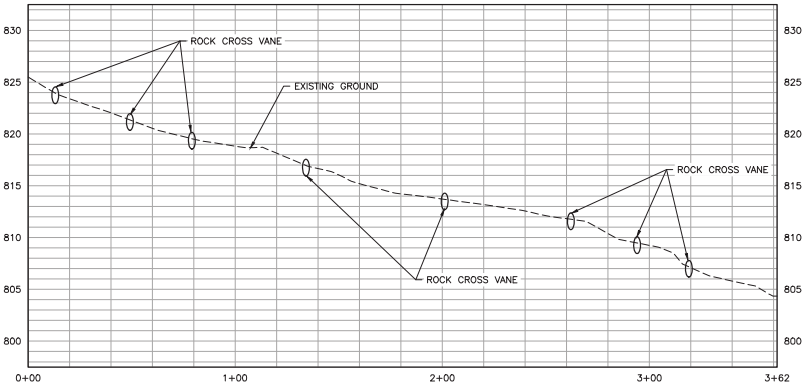
RILEY PURGATORY BLUFF CREEK
WATERSHED DISTRICT

RILEY CREEK STABILIZATION
EDEN PRAIRIE, MN.

DESIGN PLAN
TRIBUTARY RAVINE

BARR PROJECT No. 23/27-0053.14
CLIENT PROJECT No.
DWG. No. C-13
REV. No. 0

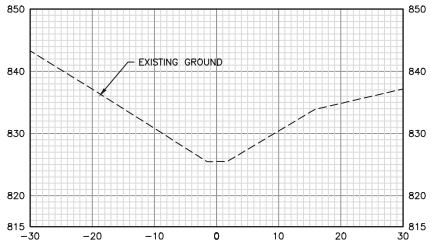
CADD USER: Eric P. Fitzgerald FILE: M:\DESIGN\23270053.14\LOWER RILEY CREEK\23270053.14_C-13_PLAN & PROFILE_SITE DWG PLOT SCALE: 1:2 PLOT DATE: 4/24/2019 10:40 AM
ref. M:\Design\23270053.14\Lower Riley Creek\23270053.14_C-01_Title Sheet.dwg Plot at 0 02/22/2017 09:29:57



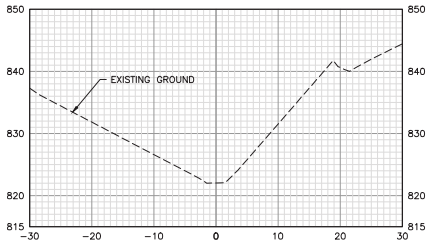
1 PROFILE: TRIBUTARY RAVINE — HORIZONTAL SCALE IN FEET: 0, 30, 60 — VERTICAL SCALE IN FEET: 0, 6, 12

NOTE:

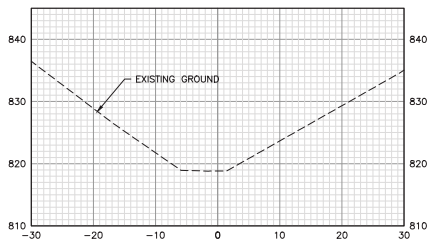
PLACEMENT AND ELEVATIONS OF VANES TO BE CONFIRMED BY ENGINEER IN THE FIELD. BOULDER VANES IN RAVINE DO NOT HAVE FOOTER BOULDERS.



2 SECTION: TRIBUTARY RAVINE (STA. 0+00) — SCALE IN FEET: 0, 10, 20



3 SECTION: TRIBUTARY RAVINE (STA. 0+40) — SCALE IN FEET: 0, 10, 20



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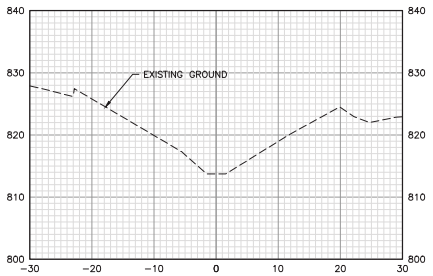
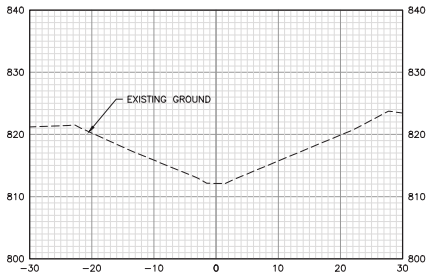
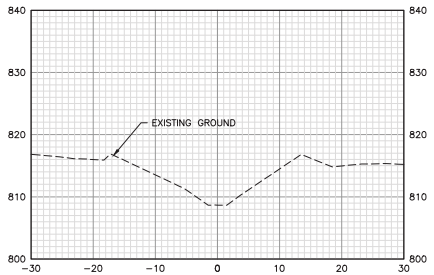


5 SECTION: TRIBUTARY RAVINE (STA. 2+00) — SCALE IN FEET: 0, 10, 20



6 SECTION: TRIBUTARY RAVINE (STA. 2+50) — SCALE IN FEET: 0, 10, 20



7 SECTION: TRIBUTARY RAVINE (STA. 3+00) — SCALE IN FEET: 0, 10, 20

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NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION
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PRINTED NAME JEFFERY D. WEISS

SIGNATURE

DATE 04/24/2019 LICENSE # 48031

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Scale	AS SHOWN
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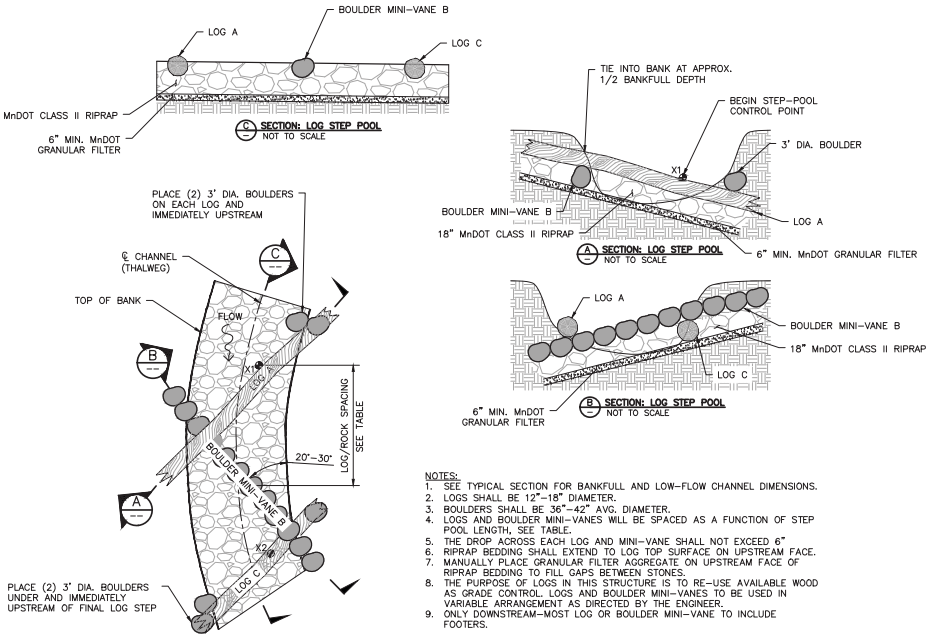
Drawn	EPF
Checked	PJH2
Designed	BARR
Approved	JDW

RILEY PURGATORY BLUFF CREEK
WATERSHED DISTRICT

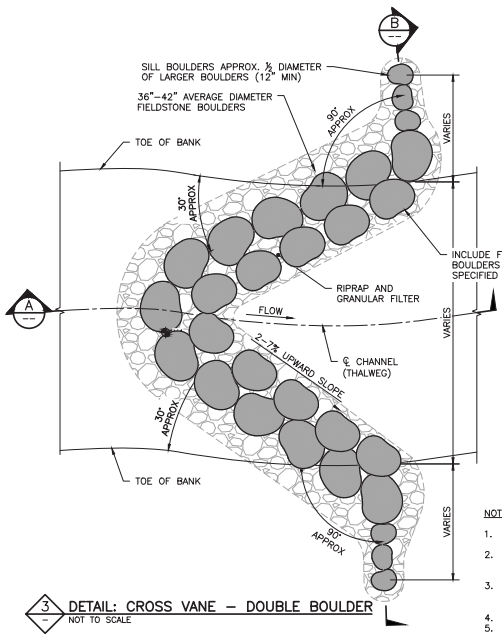
RILEY CREEK STABILIZATION
EDEN PRAIRIE, MN.

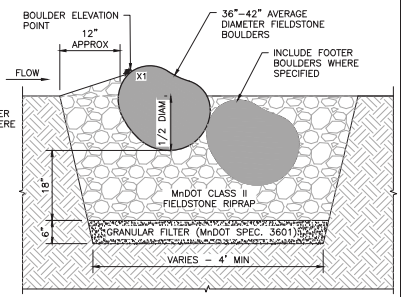
PROFILE & SECTIONS
TRIBUTARY RAVINE

BARR PROJECT No. 23/27-0053.14
CLIENT PROJECT No.
DWG. No. C-14
REV. No. 0

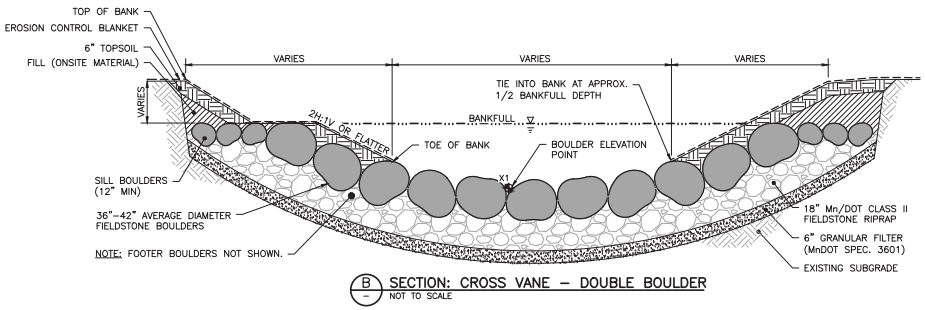


NOTES:
1. SEE TYPICAL SECTION FOR BANKFULL AND LOW-FLOW CHANNEL DIMENSIONS.
2. LOGS SHALL BE 12"-18" DIAMETER.
3. BOULDERS SHALL BE 36"-42" AVG. DIAMETER.
4. LOGS AND BOULDER MINI-VANES WILL BE SPACED AS A FUNCTION OF STEP POOL LENGTH, SEE TABLE.
5. THE DROP ACROSS EACH LOG AND MINI-VANE SHALL NOT EXCEED 6"
6. RIPRAP BEDDING SHALL EXTEND TO LOG TOP SURFACE ON UPSTREAM FACE.
7. MANUALLY PLACE GRANULAR FILTER AGGREGATE ON UPSTREAM FACE OF RIPRAP BEDDING TO FILL GAPS BETWEEN STONES.
8. THE PURPOSE OF LOGS IN THIS STRUCTURE IS TO RE-USE AVAILABLE WOOD AS GRADE CONTROL. LOGS AND BOULDER MINI-VANES TO BE USED IN VARIABLE ARRANGEMENT AS DIRECTED BY THE ENGINEER.
9. ONLY DOWNSTREAM-MOST LOG OR BOULDER MINI-VANE TO INCLUDE FOOTERS.





NOTES:
1. CROSS VANE LOCATIONS AND ELEVATIONS ARE APPROXIMATE AND MAY BE MODIFIED IN THE FIELD BY THE ENGINEER.
2. FINAL BOULDER PLACEMENT TO BE APPROVED BY THE ENGINEER IN THE FIELD. CONTRACTOR MAY BE REQUIRED TO ADJUST BOULDER ELEVATIONS AND ROTATION.
3. THERE SHALL BE NO SIGNIFICANT GAPS BETWEEN BOULDERS. RIPRAP BEDDING SHALL BE PLACED ON THE UPSTREAM SIDE OF THE BOULDERS TO PLUG SMALL GAPS (MAY REQUIRE HAND PLACEMENT).
4. BOULDERS OF AN UNSUITABLE SHAPE MAY BE RE-LOCATED OR REJECTED.
5. INSTALL EROSION CONTROL BLANKET ON DISTURBED BANKS.



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PRINTED NAME JEFFERY D. WEISS
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BID				04/24/19
CONSTRUCTION				

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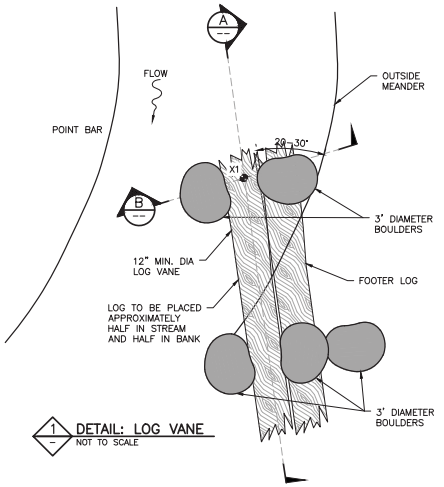
Designed	BARR
Approved	JDW

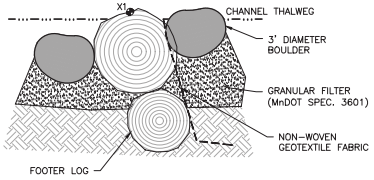
RILEY PURGATORY BLUFF CREEK
WATERSHED DISTRICT

RILEY CREEK STABILIZATION
EDEN PRAIRIE, MN.
DETAILS

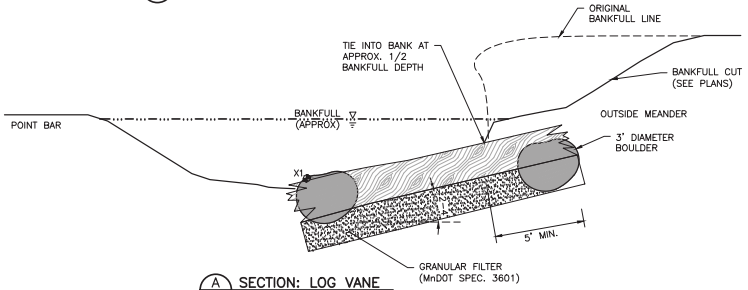
BARR PROJECT No. 23/27-0053.14
CLIENT PROJECT No.
DWG. No. D-01
REV. No. 0



1 DETAIL: LOG VANE
NOT TO SCALE



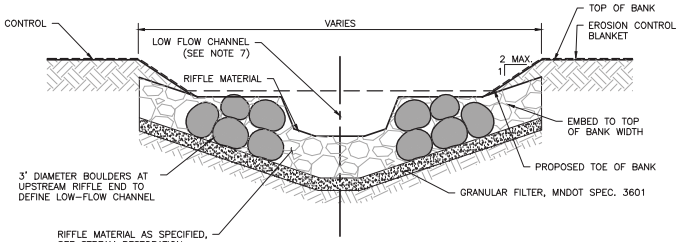
B SECTION: LOG VANE
NOT TO SCALE



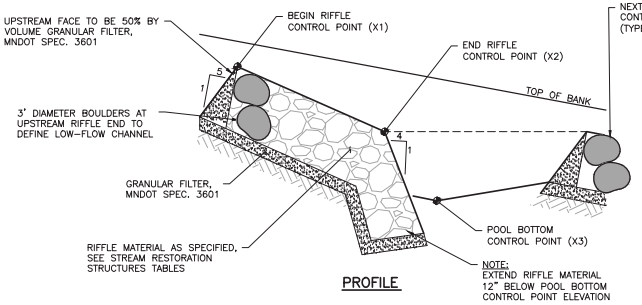
A SECTION: LOG VANE
NOT TO SCALE

GENERAL NOTES:

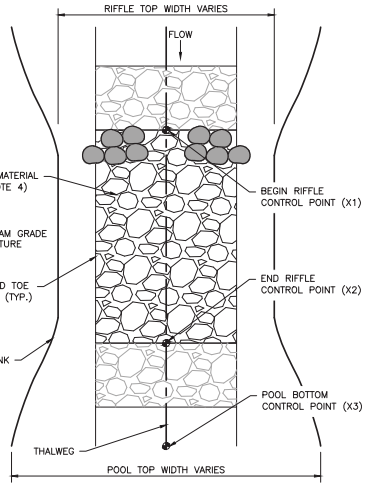
1. THE ENGINEER MUST BE NOTIFIED AT LEAST 3 DAYS PRIOR TO LOG VANE INSTALLATION AND MUST BE ON SITE DURING INSTALLATION.
2. TO THE EXTENT POSSIBLE, LOG VANES SHOULD BE CREATED FROM TREES THAT WILL BE REMOVED FROM THE SITES WITHIN THE PROJECT AREA.
3. EITHER DRIVE THE LOG VANE INTO THE BANK, OR EXCAVATE A TRENCH IN WHICH TO PLACE THE LOG VANE. IF THE LOG VANE IS DRIVEN INTO THE BANK, SHARPEN THE END OF THE LOG VANE TO A POINT.
4. THE LOG VANE MUST BE PLACED AT APPROXIMATELY A 20-30 DEGREE ANGLE, OR AS DIRECTED BY THE ENGINEER.
5. PLACE FOOTER LOG SLIGHTLY UPSTREAM AND UNDER MAIN LOG TO PROVIDE PROTECTION AGAINST SCOUR.
6. NON-WOVEN GEOTEXTILE FABRIC IS ATTACHED WITH ROOFING NAILS TO ENTIRE LENGTH OF LOG ON UPSTREAM SIDE AND EXTENDED OVER FOOTER LOG AND UNDER AGGREGATE BEDDING.
7. THE LOG VANE MUST BE PLACED IN THE BANK SO THAT AT LEAST 1/2 OF THE LOG VANE IS EMBEDDED INTO THE BANK.
8. LARGE BOULDERS ARE PLACED ON BOTH SIDES OF THE LOG VANE AT THE INTERFACE WITH THE BANK TO CREATE A CUT-OFF SILL.
9. LARGE BOULDERS ARE ALSO PLACED AT THE END OF THE LOG VANE IN THE CHANNEL AS DIRECTED BY THE ENGINEER.
10. PLACE GRANULAR FILTER AGGREGATE (MN/DOT STANDARD SPECIFICATION 3601) AS BEDDING FOR BOULDERS IF NECESSARY.
11. MATCH EXISTING GRADE OR PLANNED GRADE AS APPROPRIATE WITH BACKFILL.
12. REVEGETATE AND STABILIZE WITH SEED AND MULCH AS SPECIFIED FOR EACH SITE AS SHOWN IN THE DRAWINGS AND DIRECTED BY THE ENGINEER.
13. EXCAVATE SCOUR HOLE IN STREAM BED ADJACENT TO LOG VANE AS DIRECTED BY THE ENGINEER.



RIFFLE CROSS SECTION



PROFILE



2 DETAIL: ROCK RIFFLE
NOT TO SCALE

NOTES:
1. CONSTRUCTED RIFFLES SHALL BE INSTALLED IN NEWLY GRADED CHANNEL SECTION.
2. ELEVATION CONTROL POINTS SHALL BE DESIGNATED AT THE BEGINNING AND END OF RIFFLE POINTS TO ESTABLISH PART OF THE PROFILE OF THE CHANNEL. SURVEY OF CONTROL POINTS SHALL BE REQUIRED TO ESTABLISH ACCURATE RIFFLE INSTALLATION.
3. RIFFLE MATERIAL SHALL BE OF A TYPE, SIZE, AND GRADATION AS SPECIFIED. (SEE TABLE)
4. THE FACE OF THE RIFFLE UPSTREAM OF THE BEGIN RIFFLE CONTROL POINT SHALL BE 50% BY VOLUME GRANULAR FILTER AGGREGATE (MnDOT SPEC 3601) TO REDUCE VOID SPACES. FILTER AGGREGATE SHALL BE INCIDENTAL TO THE RIFFLE MATERIAL.
5. THE PLACEMENT OF BACKFILL AND/OR RIFFLE MATERIAL SHALL BE DONE IN A MANNER TO CREATE A SMOOTH PROFILE, WITH NO ABRUPT 'JUMP' (TRANSITION) BETWEEN THE UPSTREAM POOL-GLIDE AND THE RIFFLE, AND LIKEWISE NO ABRUPT 'DROP' (TRANSITION) BETWEEN THE RIFFLE AND THE DOWNSTREAM RUN-POOL. ALSO A THALWEG SHALL BE FASHIONED WITHIN THE RIFFLE WIDTH SO THAT THE FINISHED CROSS SECTION OF THE RIFFLE MATERIAL MATCHES THE SHAPE AND DIMENSIONS SHOWN ON THE RIFFLE TYPICAL SECTION.
6. SEE THE STREAM RESTORATION STRUCTURES TABLES FOR STATIONING AND ELEVATIONS.
7. SEE RIFFLE TYPICAL SECTION FOR BANKFULL AND LOW-FLOW CHANNEL DIMENSIONS.

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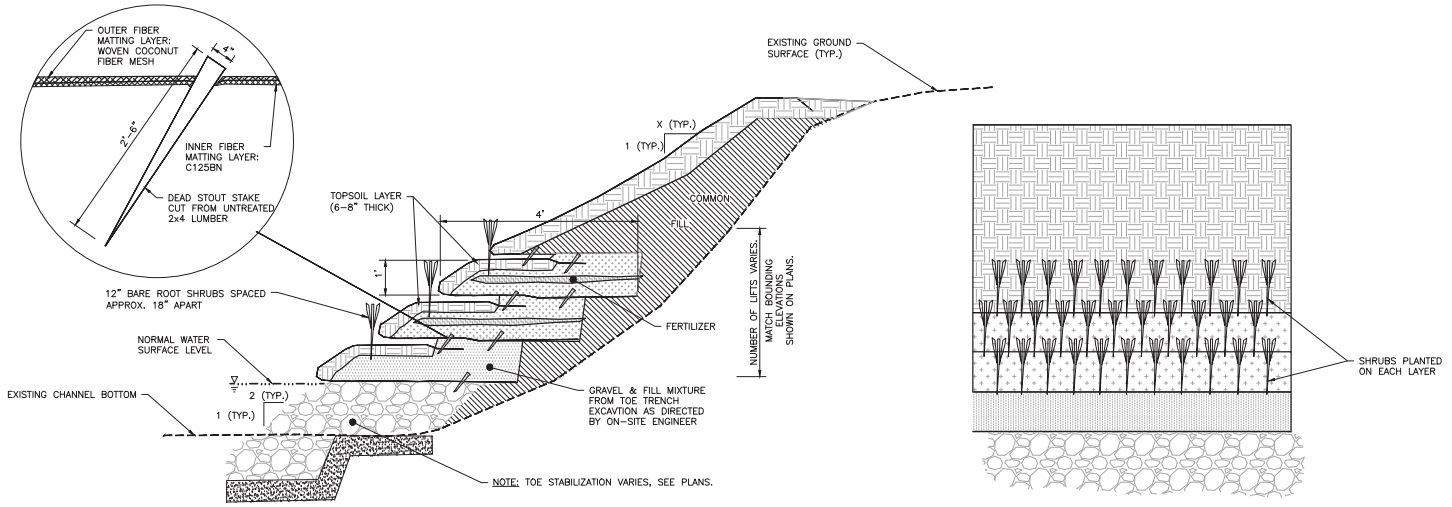
RILEY PURGATORY BLUFF CREEK
WATERSHED DISTRICT

RILEY CREEK STABILIZATION
EDEN PRAIRIE, MN.

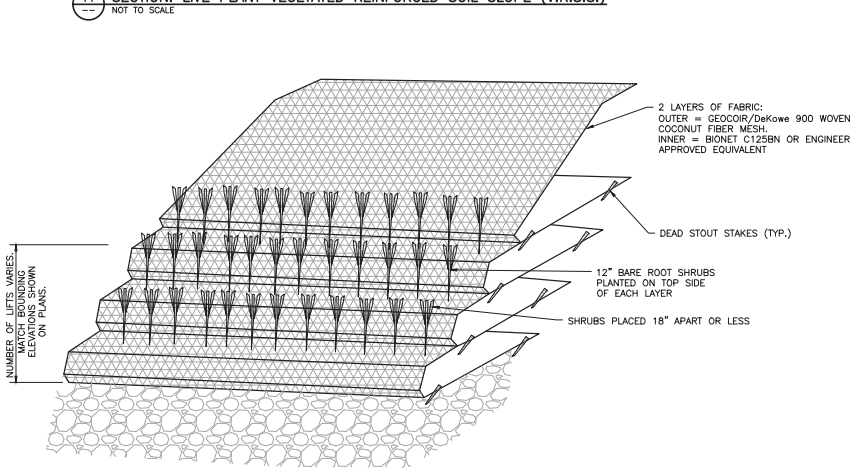
DETAILS

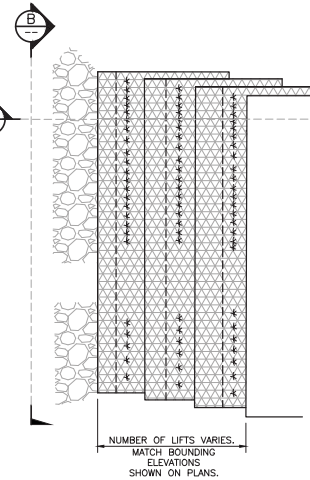
BARR PROJECT No. 23/27-0053.14
CLIENT PROJECT No.
DWG. No. D-02
REV. No. 0



A SECTION: LIVE PLANT VEGETATED REINFORCED SOIL SLOPE (V.R.S.S.)
NOT TO SCALE

B ELEVATION: LIVE PLANT VEGETATED REINFORCED SOIL SLOPE (V.R.S.S.)
NOT TO SCALE





NOTES:

1. THE ENGINEER MUST BE NOTIFIED AT LEAST 3 DAYS PRIOR TO ROOT WAD INSTALLATION AND MUST BE ON SITE DURING INSTALLATION.
2. INSTALL TOE STABILIZATION AS SHOWN ON THE DRAWINGS.
3. EXCAVATE THE EXISTING STREAMBANK SLOPE SHOREWARD FROM AND LEVEL WITH THE TOP OF THE TOE STABILIZATION TO FORM A STABLE, UNDISTURBED SURFACE. A FLAT BENCH SHOULD BE CREATED FROM THE TOE OF THE STABLE CUT SLOPE TO THE TOE OF THE PROPOSED STREAM BANK RIPRAP.
4. LAY NATURAL FIBER MATTING ON BOTTOM OF THE BENCH, OVERLAPPING ADJACENT MATTING BY 1 FOOT. THE OUTER EXPOSED FIBER MATTING LAYER OF EACH SOIL LIFT SHALL BE GEOCOIR/DEKOWE 900 WOVEN COCONUT FIBER MESH, BIOD-MATTM 90, OR AN ENGINEER APPROVED EQUIVALENT.
5. THE INNER LAYER OF EACH SOIL LIFT SHALL BE BIONET C125BN OR AN ENGINEER APPROVED EQUIVALENT. LAY THE INNER LAYER OF BIONET ON TOP OF NATURAL FIBER MATTING OF EACH SOIL LIFT. FABRIC SHOULD BE INSTALLED SMOOTH WITH NO UNNECESSARY FOLDS OR WRINKLES. STAKE THE SHOREWARD END OF THE FIBER MATTING IN PLACE WITH WOODEN STAKES SPACED EVERY THREE FEET AS SHOWN ON THE DRAWINGS.
6. THE FIRST 6 TO 8 INCHES OF THE BOTTOM SOIL LIFT SHALL BE FILLED WITH GRAVEL AND SAND MATERIAL EXCAVATED FROM THE STREAM BED. THE TOP 6 TO 8 INCHES ON THE FRONT OF SURFACE LAYER SHOULD BE COMPRISED OF TOPSOIL MIX AS SHOWN ON THE DRAWINGS.
7. THE TOPSOIL LAYER SHALL BE SEEDED WITH THE VRSS SEED MIX AT 0.7 POUNDS PER 1,000 SQUARE FEET OF LIFT SURFACE AREA AS SHOWN ON THE DRAWINGS.
8. FOLD THE FIBER MATTING OVER THE FILL MATERIAL AND STAKE IN PLACE SO THE FABRIC IS TAUT AND SMOOTH WITH NO UNNECESSARY FOLDS OR WRINKLES. BACKFILL BEHIND THE BOTTOM SOIL LIFT WITH GRANULAR FILTER MATERIAL TO MEET THE EXISTING SLOPE AS SHOWN ON THE DRAWINGS.

1 DETAIL: LIVE PLANT VEGETATED REINFORCED SOIL SLOPE (V.R.S.S.
NOT TO SCALE

ISSUED FOR BID
NOT FOR CONSTRUCTION

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION
0	EPF	PJH2	JDW	04/24/2019	ISSUED FOR BID

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SIGNATURE
DATE 04/24/2019 LICENSE # 48031

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BID				04/24/19
CONSTRUCTION				

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Scale	AS SHOWN
Date	04/24/2019
Drawn	EPF
Checked	PJH2
Designed	BARR
Approved	JDW

RILEY PURGATORY BLUFF CREEK
WATERSHED DISTRICT

RILEY CREEK STABILIZATION
EDEN PRAIRIE, MN.

DETAILS

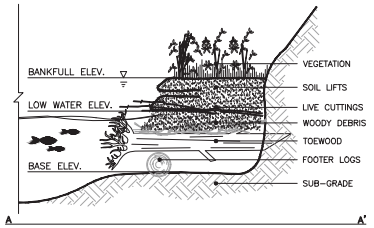
BARR PROJECT No. 23/27-0053.14
CLIENT PROJECT No.
DWG. No. D-03
REV. No. 0

1. INSTALLATION SUMMARY

TOEWOOD BENCH CONSTRUCTION WILL BE DONE IN DRY WEATHER CONDITIONS AFTER STREAM HAS BEEN DIVERTED AND SITE DEWATERED.

ENGINEER OR OWNER'S REPRESENTATIVE MUST BE PRESENT FOR INSTALLATION OF TOEWOOD BENCH.

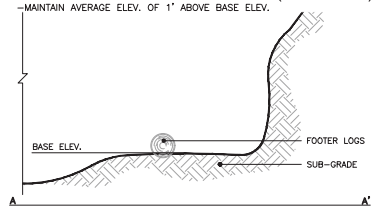
THE DRAWINGS ON THIS PAGE ARE NOT TO SCALE.

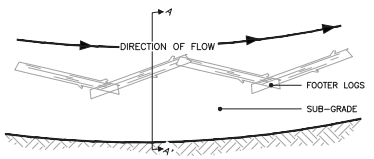


2. SUBGRADE AND FOOTER LOGS

SPECIFICATION:
- –8" TO 1' DIAMETER
- –LIMBS REMOVED
- –APPROX 10' LENGTH

PLACEMENT:
- –EXCAVATE TO BASE ELEVATION – CONTRACTOR SHALL MAKE EFFORT TO SEPARATE GRANULAR AND FINE FILL NATIVE MATERIAL FOR USE IN STEPS 4 AND 6.
- –PLACE FOOTER LOGS 30 DEGREES FROM PARALLEL TO STREAM FLOW WITH ENDS STACKED CREATING A ZIG ZAG PATTERN (PLAN VIEW BELOW)
- –MAINTAIN AVERAGE ELEV. OF 1' ABOVE BASE ELEV.



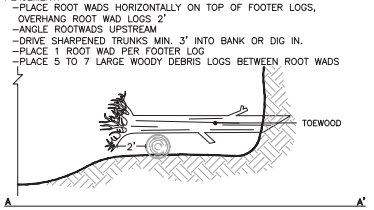


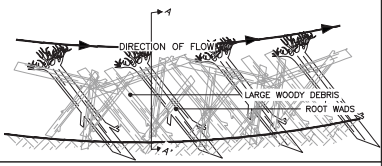
3. ROOT WADS & LRG WOODY DEBRIS

ROOT WAD SPECIFICATION:
- –10" MIN DIAMETER
- –LENGTH INDICATED IN DESIGN CROSS SECTION OR 10' MIN.
- –LIMBS REMOVED
- –ROOT WADS LEFT INTACT
- –ENDS SHARPENED TO A POINT

LARGE WOODY DEBRIS SPECIFICATION:
- –8" MIN DIAMETER

PLACEMENT:
- –PLACE ROOT WADS HORIZONTALLY ON TOP OF FOOTER LOGS, OVERHANG ROOT WAD LOGS 2'
- –ANGLE ROOTWADS UPSTREAM
- –DRIVE SHARPENED TRUNKS MIN. 3' INTO BANK OR DIG IN.
- –PLACE 1 ROOT WAD PER FOOTER LOG
- –PLACE 5 TO 7 LARGE WOODY DEBRIS LOGS BETWEEN ROOT WADS

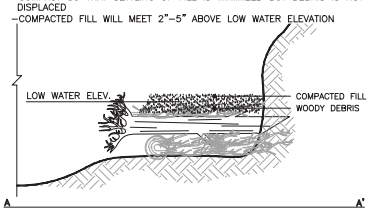


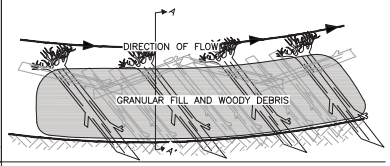


4. WOODY DEBRIS & GRANULAR FILL

SPECIFICATION:
- –WOODY MATERIAL (COMPOSED OF SMALL LIMBS AND BRANCHES, APPROX. 4" MAX DIAMETER AND SMALLER)
- –DO NOT USE ROTTEN WOODY MATERIAL
- –NATIVE GRANULAR FILL

PLACEMENT:
- –FILL BETWEEN FOOTER LOGS AND TOEWOOD WITH WOODY DEBRIS
- –STACK WOODY DEBRIS TO LOW WATER ELEVATION
- –LAYER NATIVE GRANULAR FILL ON TOP OF WOODY DEBRIS
- –COMPACT SO THAT SETTLING OF FILL IS MINIMIZED BUT DEBRIS IS NOT DISPLACED
- –COMPACTED FILL WILL MEET 2"–5" ABOVE LOW WATER ELEVATION

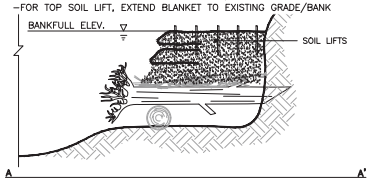


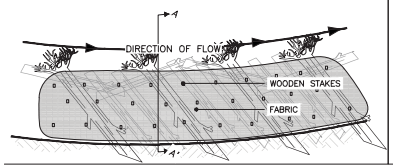


5. SOIL LIFTS

SPECIFICATION:
- –NATIVE FILL (FINE)
- –1' FORMS
- –MIN 6.5' WIDE ROLANKA BIOD–MAT 90, GEOCOIR 900, OR EQUAL, LINED WITH BIONET C125BN, OR EQUAL, WITH NATURAL NETTING
- –18" WOODEN STAKES (2X4 CUT AT ANGLE), PLACED AT 3' SPACING

PLACEMENT:
- –PLACE FORM
- –LAY MIN 2.5' OF FABRIC (COCONUT BLANKET AND LINER) ALONG BENCH
- –PLACE 1' OF FILL ON TOP OF MAT AND COMPACT
- –WRAP FILL WITH REMAINING BLANKET AND SECURE WITH STAKES
- –REPEAT UNTIL BANKFUL ELEVATION IS MET, STEP EACH LIFT BACK 1'
- –FOR TOP SOIL LIFT, EXTEND BLANKET TO EXISTING GRADE/BANK

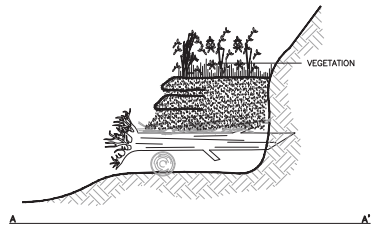


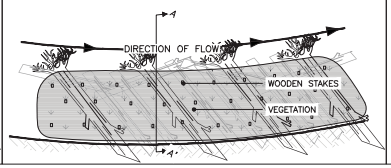


6. VEGETATION

SEE VEGETATION PLAN FOR DETAIL

IF SEED IS CALLED FOR:
- –PLANT SEED INSIDE OF SOIL LIFT PRIOR TO COVERING IN FABRIC
- –PLANT SEED ON THE FACE OF EACH SOIL LIFT AS WELL AS ACROSS THE TOP SOIL LIFT

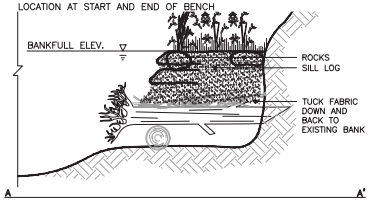


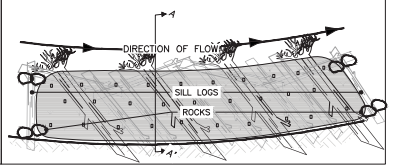


7. SILL LOGS & TERMINATION

SPECIFICATION:
- –10" MIN DIAMETER
- –LIMBS REMOVED
- –LENGTH DETERMINED BY WIDTH OF TOEWOOD BENCH

PLACEMENT:
- –PLACE ONE SILL LOG AT THE START AND END OF THE TOEWOOD BENCH PERPENDICULAR TO THE DIRECTION OF FLOW.
- –PLACE LARGE ROCKS ON TOP OF SILL LOG, TOP OF ROCK WILL MEET BANKFULL ELEVATION
- –TUCK SOIL LIFT BLANKET DOWN AND BACK TOWARDS EXISTING BANK
- –TRANSITION BANKFULL ELEVATION TO EXISTING GRADE AT DETERMINED LOCATION AT START AND END OF BENCH





1 DETAIL: TOE WOOD
NOT TO SCALE

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Date	04/24/2019
Drawn	EPF
Checked	AKH
Designed	BARR
Approved	JDW

RILEY PURGATORY BLUFF CREEK
WATERSHED DISTRICT

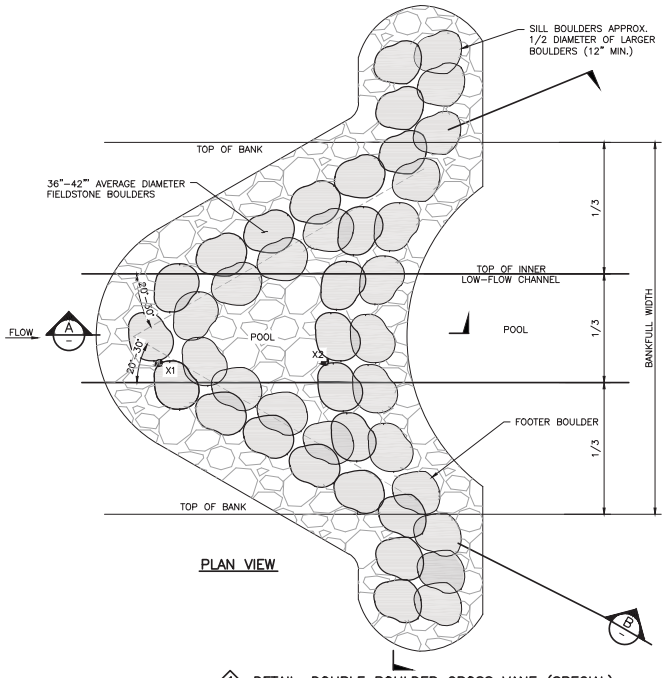
RILEY CREEK STABILIZATION
EDEN PRAIRIE, MN.

DETAILS

BARR PROJECT No. 23/27–0053.14
CLIENT PROJECT No.
DWG. No. D–04
REV. No. 0

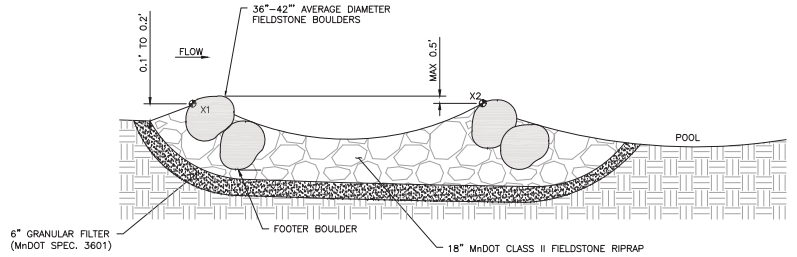
NOTES:

1. CROSS VANE LOCATIONS AND ELEVATIONS ARE APPROXIMATE AND MAY BE MODIFIED IN THE FIELD BY THE ENGINEER.
2. FINAL BOULDER PLACEMENT TO BE APPROVED BY THE ENGINEER IN THE FIELD. CONTRACTOR MAY BE REQUIRED TO ADJUST BOULDER ELEVATIONS AND ROTATION.
3. THERE SHALL BE NO SIGNIFICANT GAPS BETWEEN BOULDERS. RIPRAP BEDDING SHALL BE PLACED ON THE UPSTREAM SIDE OF THE BOULDERS TO PLUG SMALL GAPS (MAY REQUIRE HAND PLACEMENT).
4. BOULDERS OF AN UNSUITABLE SHAPE MAY BE RE-LOCATED OR REJECTED.
5. INSTALL EROSION CONTROL BLANKET ON DISTURBED BANKS.

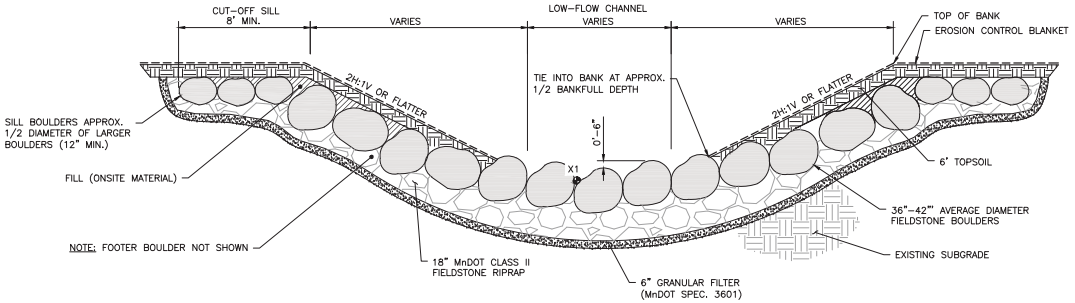


PLAN VIEW

1 DETAIL: DOUBLE BOULDER CROSS VANE (SPECIAL)
NOT TO SCALE



A SECTION: DOUBLE BOULDER CROSS VANE (SPECIAL)
NOT TO SCALE



B SECTION: DOUBLE BOULDER CROSS VANE (SPECIAL)
NOT TO SCALE

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RILEY PURGATORY BLUFF CREEK
WATERSHED DISTRICT

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EDEN PRAIRIE, MN.

DETAILS

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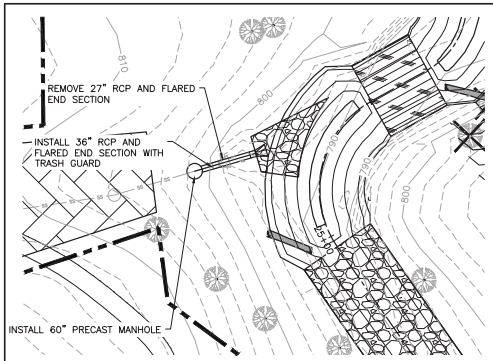
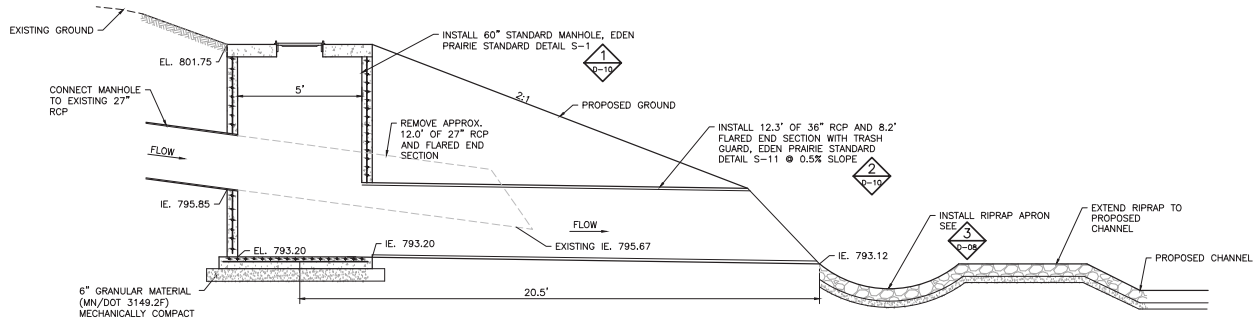
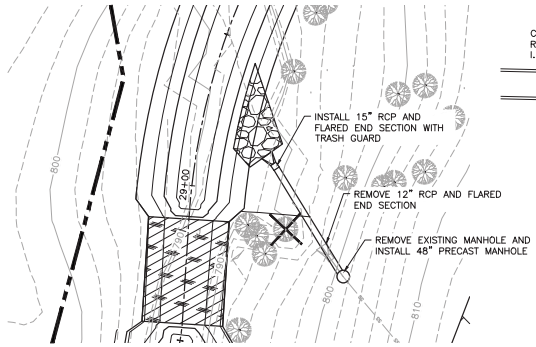
DWG. No. D-05
REV. No. 0



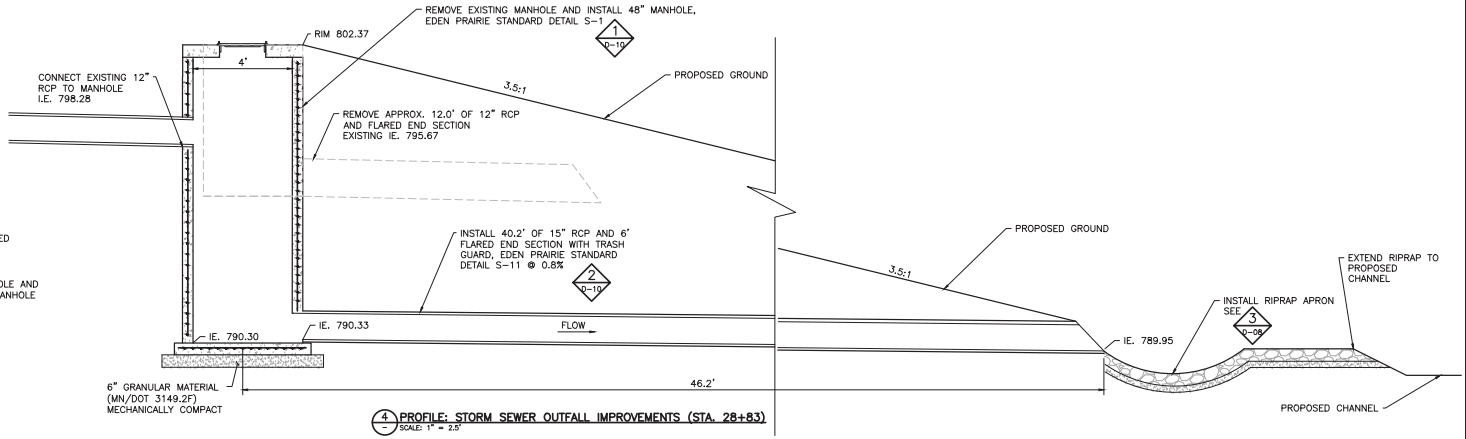
1 PLAN: STORM SEWER OUTFALL IMPROVEMENTS (STA. 25+23)
0 20 40
HORIZONTAL SCALE IN FEET



2 PROFILE: STORM SEWER OUTFALL IMPROVEMENTS (STA. 25+23)
SCALE: 1" = 2.5'



3 PLAN: STORM SEWER OUTFALL IMPROVEMENTS (STA. 28+83)
0 20 40
HORIZONTAL SCALE IN FEET



4 PROFILE: STORM SEWER OUTFALL IMPROVEMENTS (STA. 28+83)
SCALE: 1" = 2.5'

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RILEY PURGATORY BLUFF CREEK
WATERSHED DISTRICT

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DETAILS

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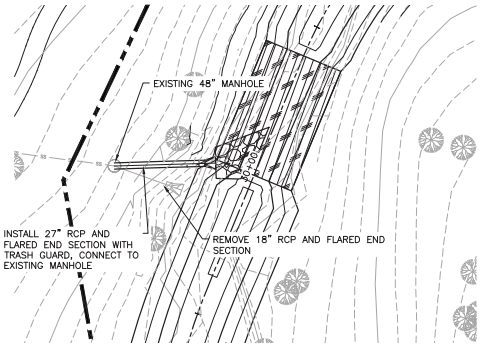
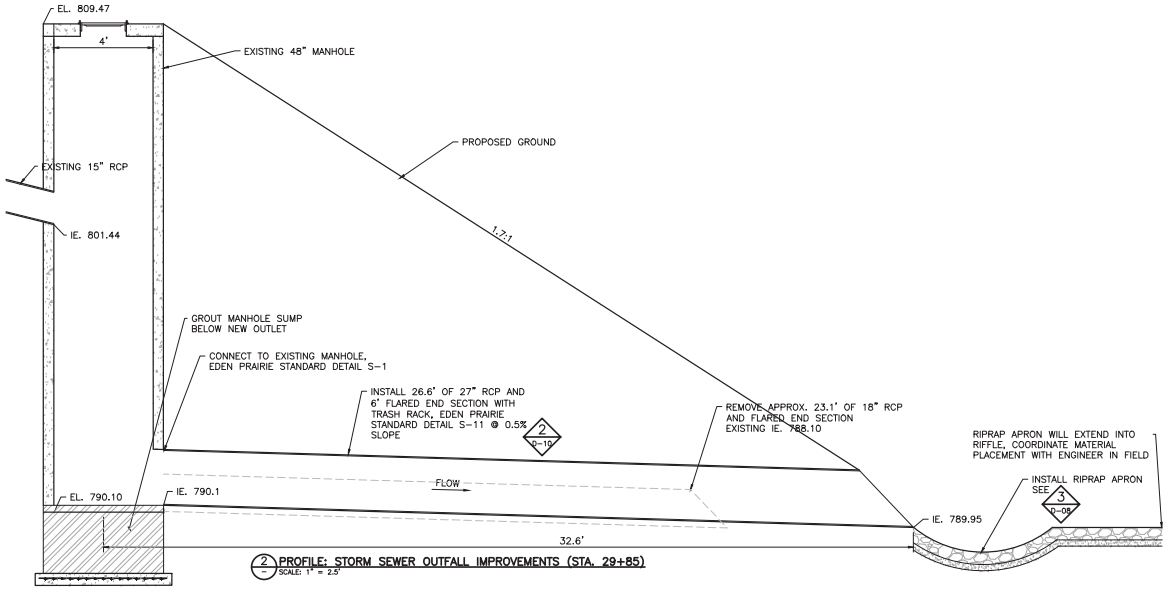
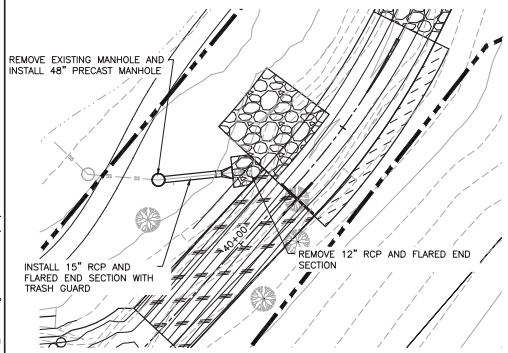
REV. No. 0



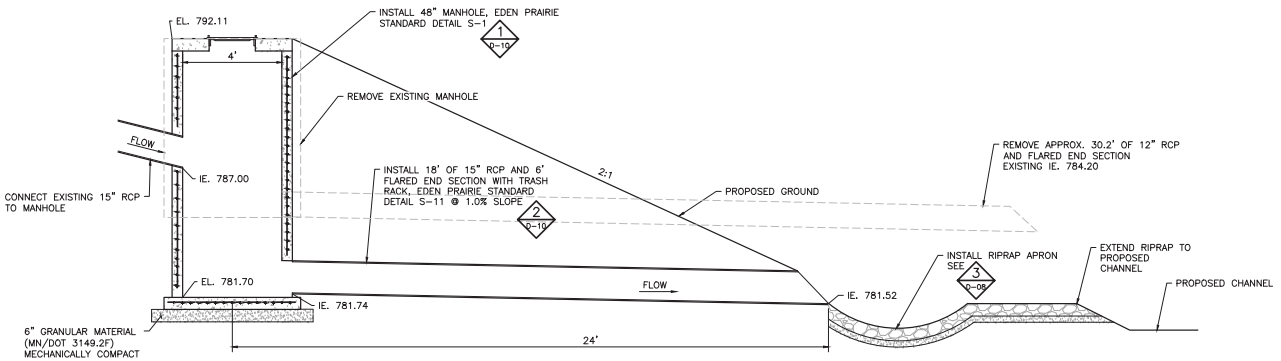
1 PLAN: STORM SEWER OUTFALL IMPROVEMENTS (STA. 29+85)
0 20 40
HORIZONTAL SCALE IN FEET



2 PROFILE: STORM SEWER OUTFALL IMPROVEMENTS (STA. 29+85)
SCALE: 1" = 2.5'



3 PLAN: STORM SEWER OUTFALL IMPROVEMENTS (STA. 40+19)
0 20 40
HORIZONTAL SCALE IN FEET



4 SECTION: STORM SEWER OUTFALL IMPROVEMENTS (STA. 40+19)
1" = 2.5'

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RILEY PURGATORY BLUFF CREEK
WATERSHED DISTRICT

RILEY CREEK STABILIZATION
EDEN PRAIRIE, MN.

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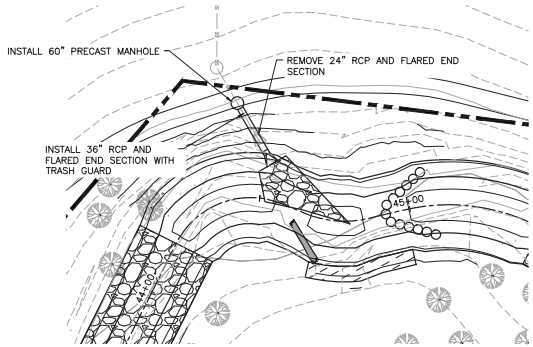
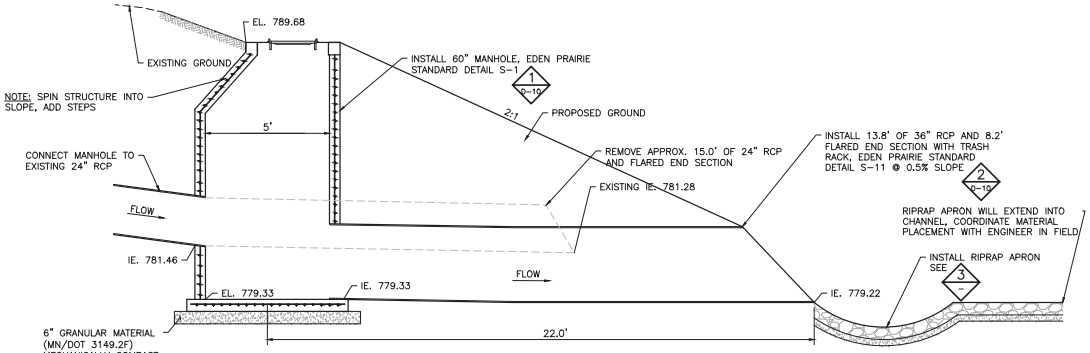
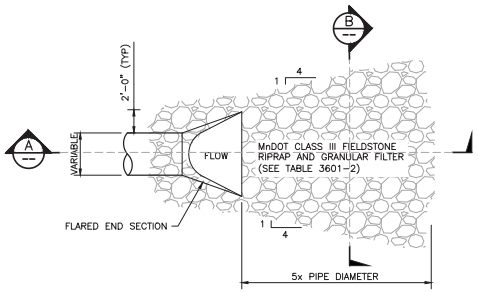
DWG. No. D-07
REV. No. 0

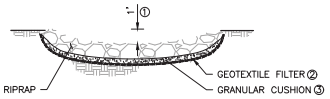


1 PLAN: STORM SEWER OUTFALL IMPROVEMENTS (STA. 44+48)
0 20 40
HORIZONTAL SCALE IN FEET

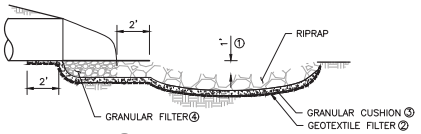


2 PROFILE: STORM SEWER OUTFALL IMPROVEMENTS (STA. 44+48)
1" = 2.5'





B SECTION: RIPRAP APRON
NOT TO SCALE



A SECTION: RIPRAP APRON
NOT TO SCALE

NOTES:

REQUIREMENTS FOR GEOTEXTILE TYPE, RIPRAP SIZE AND THICKNESS SHALL BE DESIGNATED IN THE PLANS.

PIPE SIZES LARGER THAN THOSE SHOWN REQUIRE A SPECIAL DESIGN.

① FOR PIPES GREATER THAN OR EQUAL TO 30", USE 1.5'.

② GEOTEXTILE FILTER, SPEC. 3733, SHALL COVER THE BOTTOM AND SIDES OF THE AREA EXCAVATED FOR THE RIPRAP.

③ GRANULAR FILTER, SPEC. 3601, MAY BE USED AS A CUSHION LAYER. PLACE FILTER PER SPEC. 2511. THE CUSHION LAYER IS INCIDENTAL.

④ GRANULAR FILTER OR RIPRAP, SPEC. 3601, TO EXTEND UNDER ENTIRE OPEN PORTION OF PIPE APRON. DEPTH OF MATERIAL UNDER APRON SHALL MATCH RIPRAP DEPTH. WHEN USING RIPRAP, INCREASE RIPRAP QUANTITY ACCORDINGLY AND PLACE A 3" LAYER OF 1.5" CRUSHED ROCK UNDER THE APRON TO AID IN GRADING FOR APRON PLACEMENT. CRUSHED ROCK IS INCIDENTAL.

3 DETAIL: RIPRAP APRON
NOT TO SCALE

ISSUED FOR BID
NOT FOR CONSTRUCTION

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION
0	EPF	PJH2	JDW	04/24/2019	ISSUED FOR BID

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.
PRINTED NAME JEFFERY D. WEISS
SIGNATURE
DATE 04/24/2019 LICENSE # 48031

RELEASED TO/FOR	A	B	C	0	1	2	3
DATE RELEASED							

	01/31/18	05/03/18	07/24/18				
CLIENT							
BID				04/24/19			
CONSTRUCTION							

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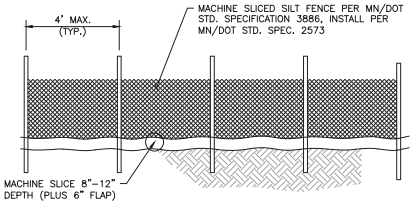
Scale	AS SHOWN
Date	04/24/2019
Drawn	EPF
Checked	PJH2
Designed	BARR
Approved	JDW

RILEY PURGATORY BLUFF CREEK
WATERSHED DISTRICT

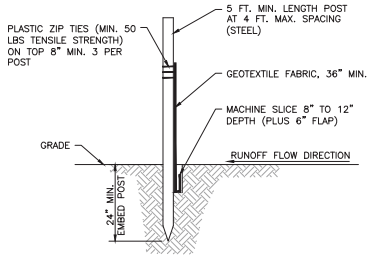
RILEY CREEK STABILIZATION
EDEN PRAIRIE, MN.

DETAILS

BARR PROJECT No. 23/27-0053.14
CLIENT PROJECT No.
DWG. No. D-08
REV. No. 0



DOWNSTREAM VIEW



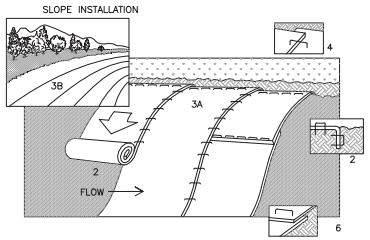
SECTION VIEW

NOTES:

1. INSTALL SILT FENCE PRIOR TO ANY GRADING WORK IN THE AREA TO BE PROTECTED AND MAINTAIN THROUGHOUT THE CONSTRUCTION PERIOD. REMOVE SILT FENCE AND ANY ACCUMULATED SEDIMENT IN CONJUNCTION WITH THE FINAL GRADING AND SITE STABILIZATION.
2. SILT FENCE MATERIALS AND INSTALLATION SHALL MEET THE REQUIREMENTS OF MN/DOT SPECIFICATIONS 2573 AND 3886.
3. NO HOLES OR GAPS SHALL BE PRESENT IN/UNDER SILT FENCE. PREPARE AREA AS NEEDED TO SMOOTH SURFACE OR REMOVE DEBRIS.
4. REMOVE ACCUMULATED SEDIMENT WHEN BUILD UP REACHES 1/3 OF FENCE HEIGHT. OR INSTALL A SECOND SILT FENCE DOWNSTREAM OF THE ORIGINAL FENCE AT A SUITABLE DISTANCE.
5. WHEN SPLICES ARE NECESSARY MAKE SPLICE AT POST ACCORDING TO SPLICE DETAIL. PLACE THE END POST OF THE SECOND FENCE INSIDE THE END POST OF THE FIRST FENCE. ROTATE BOTH POSTS TOGETHER AT LEAST 180 DEGREES TO CREATE A TIGHT SEAL WITH THE FABRIC MATERIAL. CUT THE FABRIC NEAR THE BOTTOM OF THE POSTS TO ACCOMMODATE THE 6 INCH FLAP, THEN DRIVE BOTH POSTS AND BURY THE FLAP AND COMPACT BACKFILL.

1 – DETAIL: SILT FENCE – MACHINE SLICED
NOT TO SCALE

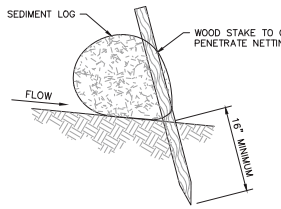
SEE ALSO CITY STD. PLATE NO. 501



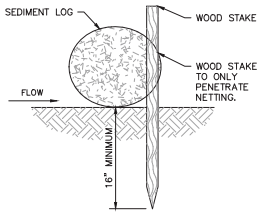
NOTES:

1. REFER TO MANUFACTURER RECOMMENDATIONS FOR STAPLE PATTERNS FOR SLOPE INSTALLATIONS.
2. PREPARE SOIL BY LOOSENING TOP 1–2 INCHES AND APPLY SEED (AND FERTILIZER WHERE REQUIRED) PRIOR TO INSTALLING BLANKETS. GROUND SHOULD BE SMOOTH AND FREE OF DEBRIS.
3. BEGIN (A) AT THE TOP OF THE SLOPE AND ROLL THE BLANKETS DOWN OR (B) AT ONE END OF THE SLOPE AND ROLL THE BLANKETS HORIZONTALLY ACROSS THE SLOPE.
4. THE EDGES OF PARALLEL BLANKETS MUST BE STAPLED WITH APPROXIMATELY 6" OVERLAP, WITH THE UPHILL BLANKET ON TOP.
5. WHEN BLANKETS MUST BE SPLICED DOWN THE SLOPE, PLACE BLANKETS END OVER END (SHINGLE STYLE) WITH APPROXIMATELY 6" OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" APART.
6. BLANKET MATERIALS SHALL BE AS SPECIFIED OR AS APPROVED BY ENGINEER.

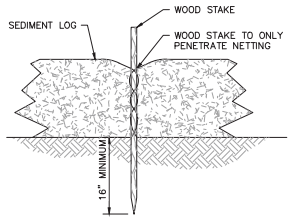
2 – DETAIL: EROSION CONTROL BLANKET – INSTALLATION
NOT TO SCALE



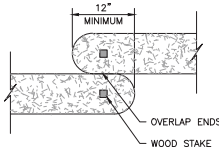
SIDE VIEW ON SLOPE



SIDE VIEW FLAT



FRONT VIEW

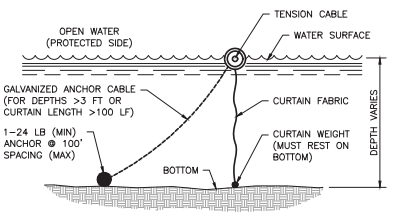


TOP VIEW

NOTES:

1. INSTALL SEDIMENT CONTROL LOG ALONG CONTOURS (CONSTANT ELEVATION).
2. NO GAPS SHALL BE PRESENT UNDER SEDIMENT CONTROL LOG. PREPARE AREA AS NEEDED TO SMOOTH SURFACE OR REMOVE DEBRIS.
3. REMOVE ACCUMULATED SEDIMENT WHEN REACHING 1/3 OF LOG HEIGHT.
4. MAINTAIN SEDIMENT CONTROL LOG THROUGHOUT THE CONSTRUCTION PERIOD AND REPAIR OR REPLACED AS REQUIRED.

3 – DETAIL: SEDIMENT CONTROL LOG – STAKING
NOT TO SCALE

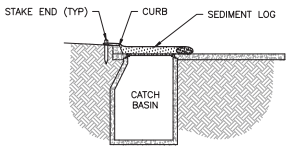


NOTES:

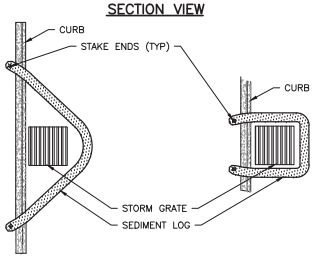
1. INSTALL SILT CURTAIN PRIOR TO ANY CONSTRUCTION ACTIVITIES IN AREAS DRAINING TO OPEN WATER OR WORK IN WATER.
2. ANCHOR TENSION CABLE AT SHORE AT BOTH END WITH STEEL POSTS OF DIAMETER AND LENGTH SUFFICIENT TO PREVENT BENDING AND PULL–OUT.
3. ELIMINATE ANCHOR AND CABLE FOR WATER DEPTHS LESS THAN 3'–0" OR DISTANCE BETWEEN SHORE ANCHORS FOR TENSION CABLE OF LESS THAN 100'
4. CURTAIN WEIGHT SHALL BE HEAVY ENOUGH TO HOLD CURTAIN VERTICAL IN CURRENT AND WAVES TYPICAL FOR THE SITE.
5. SILT CURTAIN MATERIALS SHALL CONFORM TO MN/DOT SPECIFICATION 3887.
6. MAINTAIN SILT CURTAIN AND REPAIR OR REPLACE AS REQUIRED TO PREVENT DISCHARGE OF SEDIMENT TO PROTECTED WATER BODY.
7. REMOVE ANY ACCUMULATED SEDIMENT PRIOR TO REMOVAL OF SILT CURTAIN.
8. REMOVE SILT CURTAIN FOLLOWING SITE STABILIZATION OR AS DIRECTED BY ENGINEER.

4 – DETAIL: FLOTATION SILT CURTAIN
NOT TO SCALE

SEE ALSO CITY STD. PLATE NO. 502



SECTION VIEW

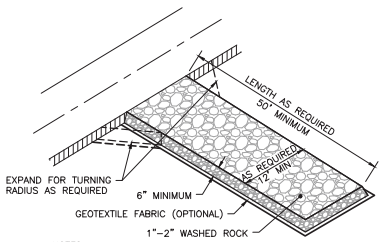


PLAN VIEW

NOTES:

1. INLET PROTECTION SHALL BE INSTALLED PRIOR TO ANY GRADING WORK IN THE AREA TO BE PROTECTED OR IMMEDIATELY FOLLOWING CATCHBASIN INSTALLATION, AND SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD.
2. MATERIALS SHALL BE SUFFICIENT TO ALLOW FLOW WHILE BLOCKING SEDIMENT. NO HOLES OR GAPS SHALL BE PRESENT IN/UNDER SEDIMENT LOG.
3. INLET PROTECTION SHALL BE CLEANED AS REQUIRED.
4. MATERIALS AND ANY ACCUMULATED SEDIMENT SHALL BE REMOVED IN CONJUNCTION WITH THE FINAL GRADING AND SITE STABILIZATION.

5 – DETAIL: INLET PROTECTION – SEDIMENT LOG
NOT TO SCALE



NOTES:

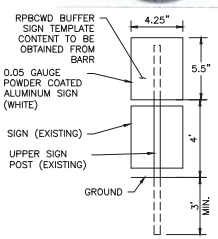
1. MAINTAIN ENTRANCE THROUGHOUT THE CONSTRUCTION PERIOD AND REPAIR OR REPLACE AS REQUIRED TO PREVENT TRACKING OFFSITE.
2. REMOVE ENTRANCE IN CONJUNCTION WITH FINAL GRADING AND SITE STABILIZATION.

6 – DETAIL: CONSTRUCTION ENTRANCE – ROCK
NOT TO SCALE

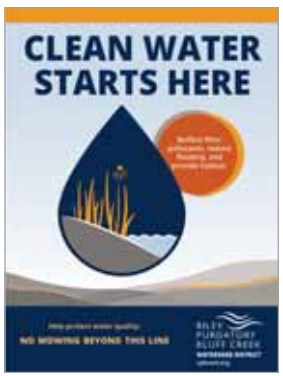
SEE ALSO CITY STD. PLATE NO. 503

NOTES:

1. SIGNS TO BE INSTALLED AT LOCATIONS IN TABLE ON SHEET G–02.
2. SIGNS TO BE ADDED TO EXISTING POSTS. RELOCATE EXISTING SIGN ON POSTS AS NECESSARY TO FIT BOTH SIGNS.
3. CONTRACTOR TO OBTAIN SIGN DESIGN FROM ENGINEER PRIOR TO MAKING SIGNS.
4. LOCATIONS WITHOUT EXISTING SIGN/POST TO USE SURVEY MARKER (FLUSH WITH GROUND), SEE EXAMPLE. SURVEY MARKER CAP TO BE INSTALLED ON 3' STEEL REBAR (1/2" DIA.) DRIVEN INTO GROUND.
5. BOLTS SHALL BE TAMPER PROOF.
6. POSTS SHALL BE PAINTED GREEN, 3 LB/FT



7 – DETAIL: BUFFER SIGN INSTALLATION
NOT TO SCALE



ISSUED FOR BID
NOT FOR CONSTRUCTION

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION
0	EPF	PJH2	JDW	04/24/2019	ISSUED FOR BID

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PRINTED NAME JEFFERY D. WEISS
SIGNATURE
DATE 04/24/2019 LICENSE # 48031

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05/03/18			
07/24/18			
04/24/19			

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Scale	AS SHOWN
Date	04/24/2019
Drawn	EPF
Checked	PJH2
Designed	BARR
Approved	JDW

RILEY PURGATORY BLUFF CREEK
WATERSHED DISTRICT

RILEY CREEK STABILIZATION
EDEN PRAIRIE, MN.

DETAILS

BARR PROJECT No. 23/27–0053.14
CLIENT PROJECT No.
DWG. No. D–09
REV. No. 0

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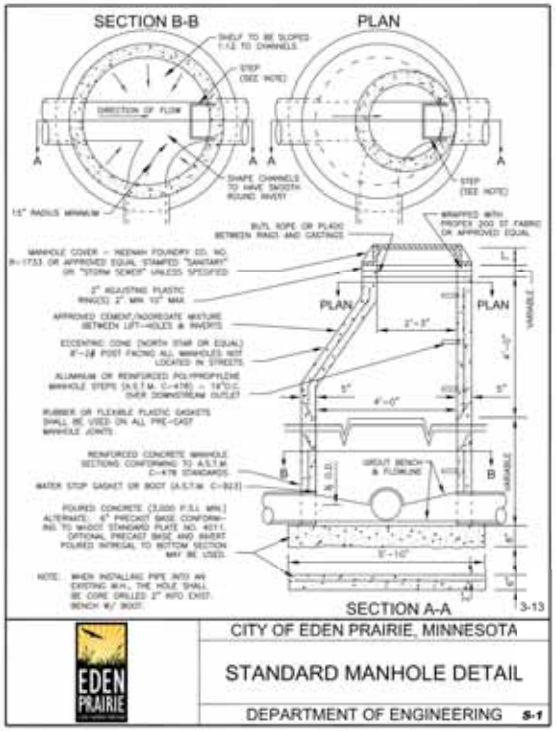
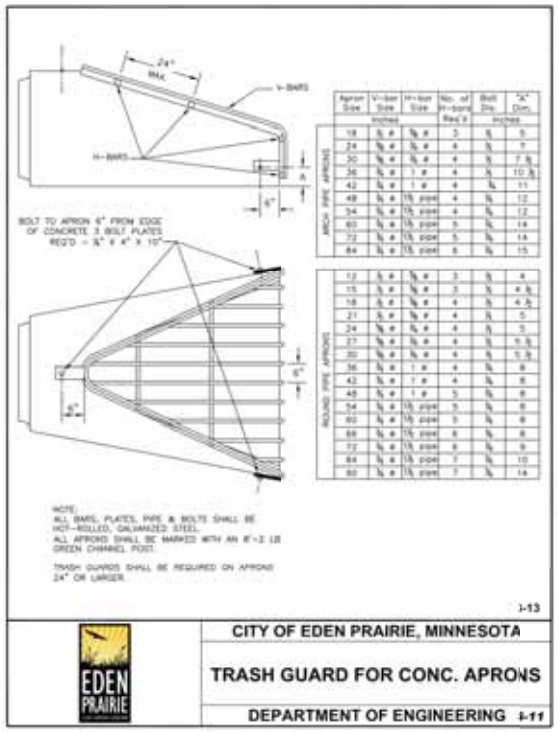
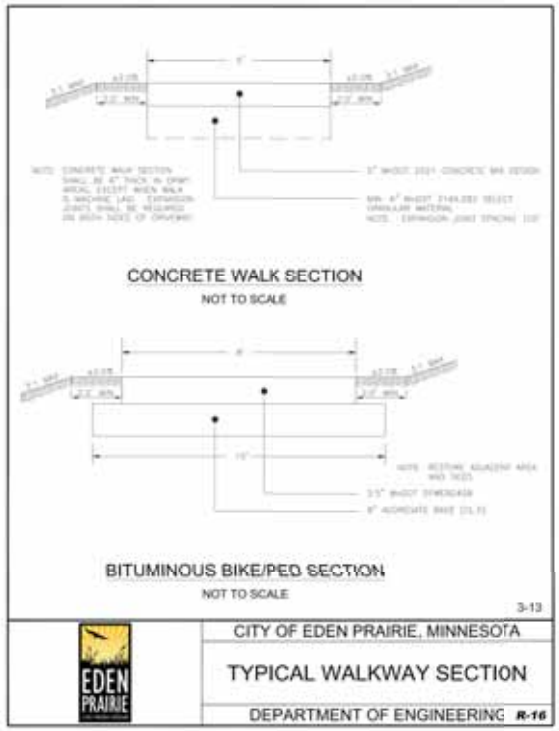


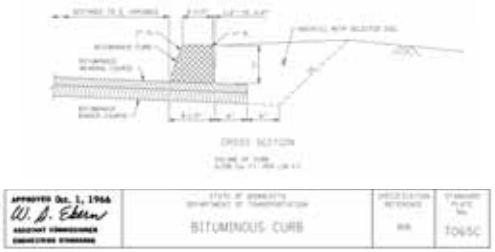
1 DETAIL: STANDARD MANHOLE
NOT TO SCALE



2 DETAIL: TRASH GUARD
NOT TO SCALE



3 DETAIL: TYPICAL WALKWAY
NOT TO SCALE



4 DETAIL: BITUMINOUS CURB
NOT TO SCALE

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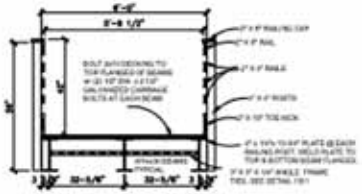
Designed	BARR
Approved	JDW

RILEY PURGATORY BLUFF CREEK
WATERSHED DISTRICT

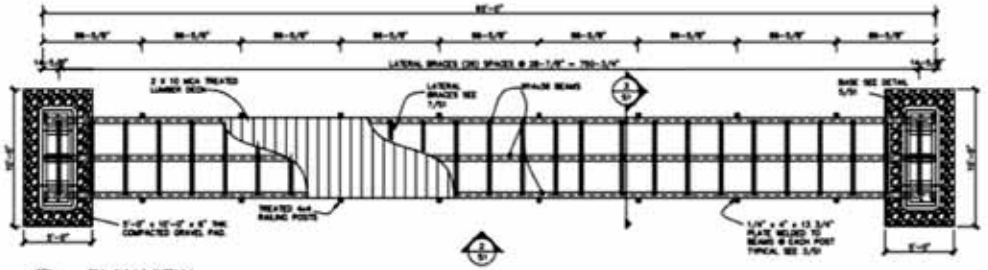
RILEY CREEK STABILIZATION
EDEN PRAIRIE, MN.

EDEN PRAIRIE STANDARD PLATES

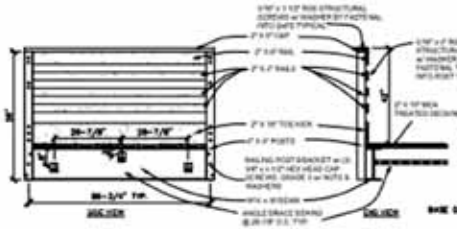
BARR PROJECT No. 23/27-0053.14
CLIENT PROJECT No.
DWG. No. D-10
REV. No. 0



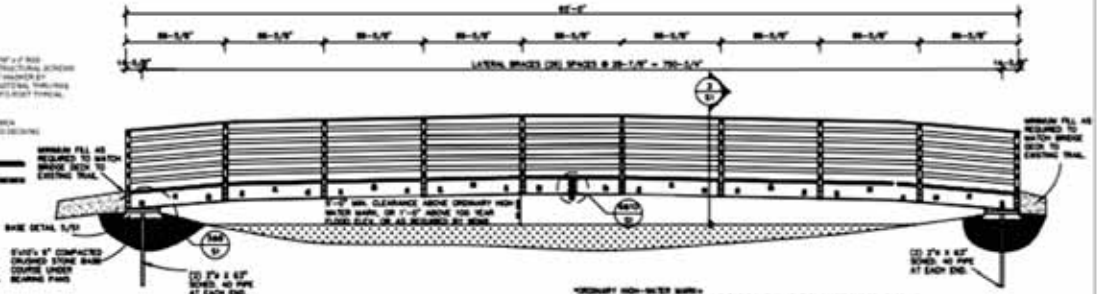
3/S1 SECTION DETAIL
SCALE: 1/2"=1'-0"



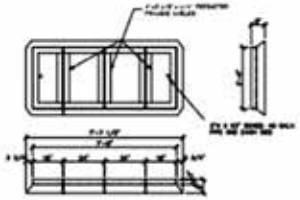
1/S1 PLAN VIEW
SCALE: 1/4"=1'-0"



4/S1 RAILING ELEVATION & SECTION
SCALE: 1/2"=1'-0"

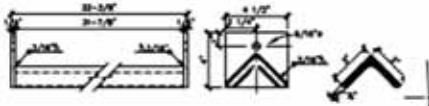


2/S1 ELEVATION
SCALE: 1/4"=1'-0"

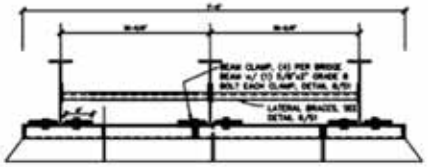


5/S1 36" BEARING PAN PLAN & END VIEWS
SCALE: 3/8"=1'-0"

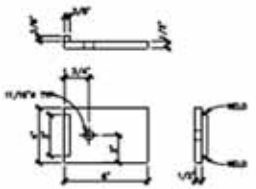
GALVANIZED METAL BEARING PANS COVERED BY U.S. PATENT #6,421,993



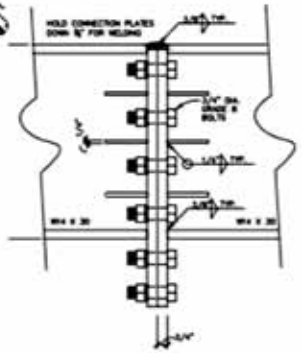
7/S1 LATERAL BRACES / FRAME TIES
SCALE: 3"=1'-0"



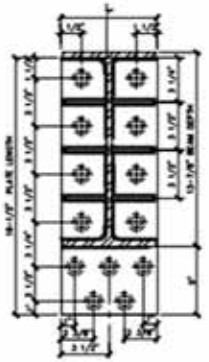
6/S1 END VIEW BEAMS & BEARING PAN
SCALE: 1" = 1'-0"



8/S1 BEAM CLAMP
SCALE: 3"=1'-0"



9/S1 CONNECTION PLATE
SCALE: 3"=1'-0"



10/S1 CONNECTION PLATE
SCALE: 3"=1'-0"

FOR REFERENCE ONLY

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Corporate Headquarters:
Minneapolis, Minnesota
Ph: 1-800-632-2277

Scale	AS SHOWN
Date	04/24/2019
Drawn	EPF
Checked	PJH2
Designed	BARR
Approved	JDW

RILEY PURGATORY BLUFF CREEK
WATERSHED DISTRICT

RILEY CREEK STABILIZATION
EDEN PRAIRIE, MN.

BRIDGE DETAILS

BARR PROJECT No. 23/27-0053.14
CLIENT PROJECT No.
DWG. No. B-01
REV. No. 0

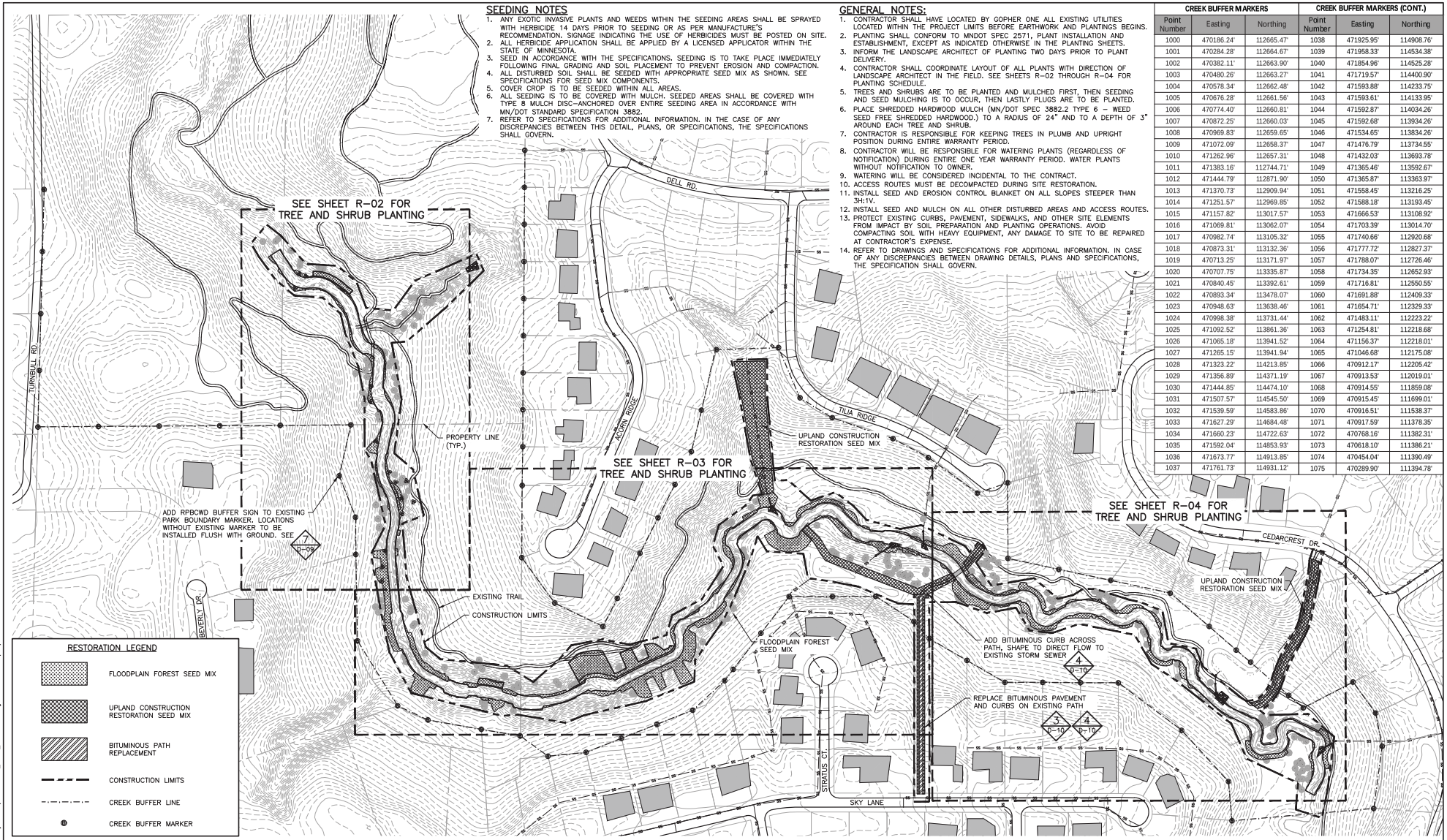
SEEDING NOTES

1. ANY EXOTIC INVASIVE PLANTS AND WEEDS WITHIN THE SEEDING AREAS SHALL BE SPRAYED WITH HERBICIDE 14 DAYS PRIOR TO SEEDING OR AS PER MANUFACTURE'S RECOMMENDATION. SIGNAGE INDICATING THE USE OF HERBICIDES MUST BE POSTED ON SITE.
2. ALL HERBICIDE APPLICATION SHALL BE APPLIED BY A LICENSED APPLICATOR WITHIN THE STATE OF MINNESOTA.
3. SEED IN ACCORDANCE WITH THE SPECIFICATIONS. SEEDING IS TO TAKE PLACE IMMEDIATELY FOLLOWING FINAL GRADING AND SOIL PLACEMENT TO PREVENT EROSION AND COMPACTION.
4. ALL DISTURBED SOIL SHALL BE SEEDED WITH APPROPRIATE SEED MIX AS SHOWN. SEE SPECIFICATIONS FOR SEED MIX COMPONENTS.
5. COVER CROP IS TO BE SEEDED WITHIN ALL AREAS.
6. ALL SEEDING IS TO BE COVERED WITH MULCH. SEEDED AREAS SHALL BE COVERED WITH TYPE 8 MULCH DISC-ANCHORED OVER ENTIRE SEEDING AREA IN ACCORDANCE WITH MN/DOT STANDARD SPECIFICATION 3882.
7. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION. IN THE CASE OF ANY DISCREPANCIES BETWEEN THIS DETAIL, PLANS, OR SPECIFICATIONS, THE SPECIFICATIONS SHALL GOVERN.

GENERAL NOTES:

1. CONTRACTOR SHALL HAVE LOCATED BY GOPHER ONE ALL EXISTING UTILITIES LOCATED WITHIN THE PROJECT LIMITS BEFORE EARTHWORK AND PLANTINGS BEGINS.
2. PLANTING SHALL CONFORM TO MNDOT SPEC 2571, PLANT INSTALLATION AND ESTABLISHMENT, EXCEPT AS INDICATED OTHERWISE IN THE PLANTING SHEETS.
3. INFORM THE LANDSCAPE ARCHITECT OF PLANTING TWO DAYS PRIOR TO PLANT DELIVERY.
4. CONTRACTOR SHALL COORDINATE LAYOUT OF ALL PLANTS WITH DIRECTION OF LANDSCAPE ARCHITECT IN THE FIELD. SEE SHEETS R-02 THROUGH R-04 FOR PLANTING SCHEDULE.
5. TREES AND SHRUBS ARE TO BE PLANTED AND MULCHED FIRST, THEN SEEDING AND SEED MULCHING IS TO OCCUR, THEN LASTLY PLUGS ARE TO BE PLANTED.
6. PLACE SHREDDED HARDWOOD MULCH (MN/DOT SPEC 3882.2 TYPE 6 – WEED SEED FREE SHREDDED HARDWOOD.) TO A RADIUS OF 24" AND TO A DEPTH OF 3" AROUND EACH TREE AND SHRUB.
7. CONTRACTOR IS RESPONSIBLE FOR KEEPING TREES IN PLUMB AND UPRIGHT POSITION DURING ENTIRE WARRANTY PERIOD.
8. CONTRACTOR WILL BE RESPONSIBLE FOR WATERING PLANTS (REGARDLESS OF NOTIFICATION) DURING ENTIRE ONE YEAR WARRANTY PERIOD. WATER PLANTS WITHOUT NOTIFICATION TO OWNER.
9. WATERING WILL BE CONSIDERED INCIDENTAL TO THE CONTRACT.
10. ACCESS ROUTES MUST BE DECOMPACTED DURING SITE RESTORATION.
11. INSTALL SEED AND EROSION CONTROL BLANKET ON ALL SLOPES STEEPER THAN 3H:1V.
12. INSTALL SEED AND MULCH ON ALL OTHER DISTURBED AREAS AND ACCESS ROUTES.
13. PROTECT EXISTING CURBS, PAVEMENT, SIDEWALKS, AND OTHER SITE ELEMENTS FROM IMPACT BY SOIL PREPARATION AND PLANTING OPERATIONS. AVOID COMPACTING SOIL WITH HEAVY EQUIPMENT, ANY DAMAGE TO SITE TO BE REPAIRED AT CONTRACTOR'S EXPENSE.
14. REFER TO DRAWINGS AND SPECIFICATIONS FOR ADDITIONAL INFORMATION. IN CASE OF ANY DISCREPANCIES BETWEEN DRAWING DETAILS, PLANS AND SPECIFICATIONS, THE SPECIFICATION SHALL GOVERN.

CREEK BUFFER MARKERS			CREEK BUFFER MARKERS (CONT.)		
Point Number	Easting	Northing	Point Number	Easting	Northing
1000	470186.24'	112665.47'	1038	471925.95'	114908.76'
1001	470284.28'	112664.67'	1039	471958.33'	114534.38'
1002	470382.11'	112663.90'	1040	471854.96'	114525.28'
1003	470480.26'	112663.27'	1041	471719.57'	114400.90'
1004	470578.34'	112662.48'	1042	471593.88'	114233.75'
1005	470676.28'	112661.56'	1043	471593.61'	114133.95'
1006	470774.40'	112660.81'	1044	471592.87'	114034.26'
1007	470872.25'	112660.03'	1045	471592.68'	113934.26'
1008	470969.83'	112659.65'	1046	471534.65'	113834.26'
1009	471072.09'	112658.37'	1047	471476.79'	113734.55'
1010	471262.96'	112657.31'	1048	471432.03'	113693.78'
1011	471383.16'	112744.71'	1049	471365.46'	113592.67'
1012	471444.79'	112871.90'	1050	471365.87'	113363.97'
1013	471370.73'	112909.94'	1051	471558.45'	113216.25'
1014	471251.57'	112969.85'	1052	471588.18'	113193.45'
1015	471157.82'	113017.57'	1053	471666.53'	113108.92'
1016	471069.81'	113062.07'	1054	471703.39'	113014.70'
1017	470982.74'	113105.32'	1055	471740.66'	112920.68'
1018	470873.31'	113132.36'	1056	471777.72'	112827.37'
1019	470713.25'	113171.97'	1057	471788.07'	112726.46'
1020	470707.75'	113335.87'	1058	471734.35'	112652.93'
1021	470840.45'	113392.61'	1059	471716.81'	112550.55'
1022	470893.34'	113478.07'	1060	471691.88'	112409.33'
1023	470948.63'	113638.46'	1061	471654.71'	112329.33'
1024	470998.38'	113731.44'	1062	471483.11'	112223.22'
1025	471092.52'	113861.36'	1063	471254.81'	112218.68'
1026	471065.18'	113941.52'	1064	471156.37'	112218.01'
1027	471265.15'	113941.94'	1065	471046.68'	112175.08'
1028	471323.22'	114213.85'	1066	470912.17'	112205.42'
1029	471356.89'	114371.19'	1067	470913.53'	112019.01'
1030	471444.85'	114474.10'	1068	470914.55'	111859.08'
1031	471507.57'	114545.50'	1069	470915.45'	111699.01'
1032	471539.59'	114583.86'	1070	470916.51'	111538.37'
1033	471627.29'	114684.48'	1071	470917.59'	111378.35'
1034	471660.23'	114722.63'	1072	470768.16'	111382.31'
1035	471592.04'	114853.93'	1073	470618.10'	111386.21'
1036	471673.77'	114913.85'	1074	470454.04'	111390.49'
1037	471761.73'	114931.12'	1075	470289.90'	111394.78'



1 RESTORATION PLAN: RILEY CREEK

0 125 250
SCALE IN FEET

ISSUED FOR BID
NOT FOR CONSTRUCTION

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION
0	EPF	PJH2	JDW	04/24/2019	ISSUED FOR BID

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.

PRINTED NAME JEFFERY D. WEISS

SIGNATURE

DATE 04/24/2019 LICENSE # 48031

	01/31/18	05/03/18	07/24/18
CLIENT			
BID			04/24/19
CONSTRUCTION			

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BARR

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Designed	BARR
Approved	JDW

RILEY PURGATORY BLUFF CREEK
WATERSHED DISTRICT

RILEY CREEK STABILIZATION
EDEN PRAIRIE, MN.

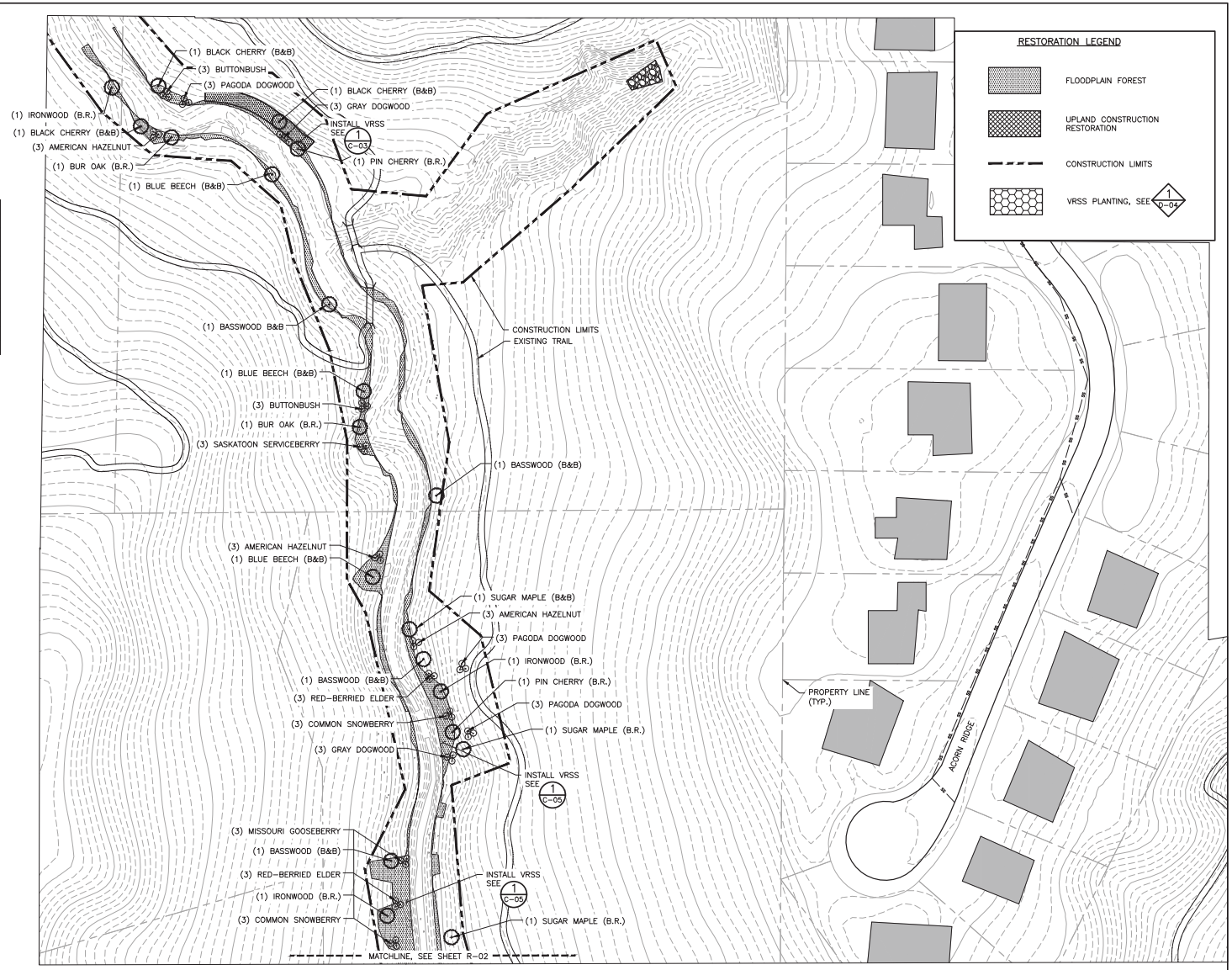
RESTORATION PLAN

BARR PROJECT No. 23/27-0053.14
CLIENT PROJECT No.
DWG. No. R-01
REV. No. 0

PLANTING SCHEDULE:

TREES				
Common Name	**Scientific Name**	**Quantity**	**Spacing**	**Size**
Sugar Maple	*Acer saccharum*	2	PER PLAN	2.5" B&B
Sugar Maple	*Acer saccharum*	2	PER PLAN	Bare Root
Blue beech	*Carpinus caroliniana*	3	PER PLAN	2.5" B&B
Ironwood	*Ostrya virginiana*	3	PER PLAN	Bare Root
Pin Cherry	*Prunus pennsylvanica*	2	PER PLAN	Bare Root
Black Cherry	*Prunus serotina*	3	PER PLAN	2.5" B&B
Bur Oak	*Quercus macrocarpa*	2	PER PLAN	Bare Root
American Basswood	*Tilia americana*	3	PER PLAN	2.5" B&B
	Total	**20**		

SHRUBS				
Common Name	**Scientific Name**	**Quantity**	**Spacing**	**Size**
Saskatoon Serviceberry	*Amelanchier alnifolia*	3	6' O.C.	#2 Cont.
Buttonbush	*Cephalanthus occidentalis*	6	6' O.C.	#2 Cont.
Pagoda Dogwood	*Cornus alternifolia*	9	6' O.C.	#2 Cont.
Gray Dogwood	*Cornus racemosa*	6	6' O.C.	#2 Cont.
American Hazelnut	*Corylus americana*	9	6' O.C.	#2 Cont.
Missouri gooseberry	*Ribes missouriense*	3	4' O.C.	#2 Cont.
Red-Berried Elder	*Sambucus pubens*	6	6' O.C.	#2 Cont.
Common Snowberry	*Symphoricarpos albus*	6	4' O.C.	#2 Cont.
	Total	**48**		



1 RESTORATION PLAN: RILEY CREEK

0 50 100
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PRINTED NAME JEFFERY D. WEISS

SIGNATURE

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CONSTRUCTION									
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Approved	JDW

RILEY PURGATORY BLUFF CREEK
WATERSHED DISTRICT

RILEY CREEK STABILIZATION
EDEN PRAIRIE, MN.

RESTORATION PLAN

BARR PROJECT No. 23/27-0053.14
CLIENT PROJECT No.
DWG. No. R-02
REV. No. 0

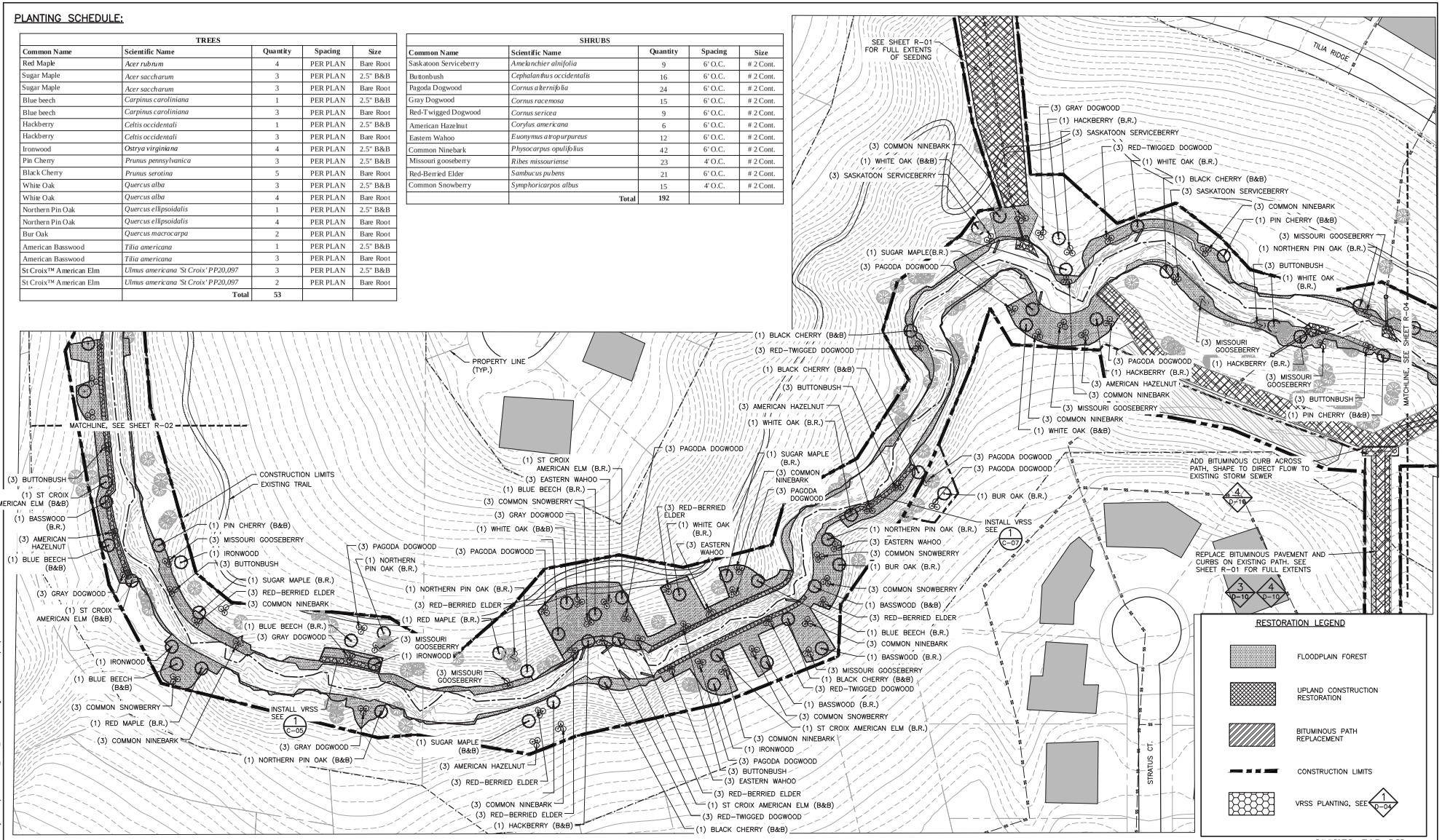
PLANTING SCHEDULE:

TREES

Common Name	Scientific Name	Quantity	Spacing	Size
Red Maple	*Acer rubrum*	4	PER PLAN	Bare Root
Sugar Maple	*Acer saccharum*	3	PER PLAN	2.5" B&B
Sugar Maple	*Acer saccharum*	3	PER PLAN	Bare Root
Blue beech	*Carpinus caroliniana*	1	PER PLAN	2.5" B&B
Blue beech	*Carpinus caroliniana*	3	PER PLAN	Bare Root
Hackberry	*Celtis occidentali*	1	PER PLAN	2.5" B&B
Hackberry	*Celtis occidentali*	3	PER PLAN	Bare Root
Ironwood	*Ostrya virginiana*	4	PER PLAN	2.5" B&B
Pin Cherry	*Prunus pennsylvanica*	3	PER PLAN	2.5" B&B
Black Cherry	*Prunus serotina*	5	PER PLAN	Bare Root
White Oak	*Quercus alba*	3	PER PLAN	2.5" B&B
White Oak	*Quercus alba*	4	PER PLAN	Bare Root
Northern Pin Oak	*Quercus ellipsoidalis*	1	PER PLAN	2.5" B&B
Northern Pin Oak	*Quercus ellipsoidalis*	4	PER PLAN	Bare Root
Bur Oak	*Quercus macrocarpa*	2	PER PLAN	Bare Root
American Basswood	*Tilia americana*	1	PER PLAN	2.5" B&B
American Basswood	*Tilia americana*	3	PER PLAN	Bare Root
St Croix™ American Elm	*Ulmus americana 'St Croix' PP20,097*	3	PER PLAN	2.5" B&B
St Croix™ American Elm	*Ulmus americana 'St Croix' PP20,097*	2	PER PLAN	Bare Root
	Total	**53**		

SHRUBS

Common Name	Scientific Name	Quantity	Spacing	Size
Saskatoon Serviceberry	*Amelanchier alnifolia*	9	6' O.C.	# 2 Cont.
Buttonbush	*Cephalanthus occidentalis*	16	6' O.C.	# 2 Cont.
Pagoda Dogwood	*Cornus alternifolia*	24	6' O.C.	# 2 Cont.
Gray Dogwood	*Cornus racemosa*	15	6' O.C.	# 2 Cont.
Red-Twigged Dogwood	*Cornus sericea*	9	6' O.C.	# 2 Cont.
American Hazelnut	*Corylus americana*	6	6' O.C.	# 2 Cont.
Eastern Wahoo	*Euonymus atropurpureus*	12	6' O.C.	# 2 Cont.
Common Ninebark	*Physocarpus opulifolius*	42	6' O.C.	# 2 Cont.
Missouri gooseberry	*Ribes missouriense*	23	4' O.C.	# 2 Cont.
Red-Berried Elder	*Sambucus pubens*	21	6' O.C.	# 2 Cont.
Common Snowberry	*Symphoricarpos albus*	15	4' O.C.	# 2 Cont.
	Total	**192**		



1 C-- RESTORATION PLAN: RILEY CREEK

0 50 100
SCALE IN FEET

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NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION
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PRINTED NAME JEFFERY D. WEISS
SIGNATURE
DATE 04/24/2019 LICENSE # 48031

CLIENT	01/31/18	05/03/18	07/24/18				
BID			04/24/19				
CONSTRUCTION							
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DATE RELEASED							

BARR
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Scale	AS SHOWN
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Drawn	EPF
Checked	PJH2
Designed	BARR
Approved	JDW

RILEY PURGATORY BLUFF CREEK
WATERSHED DISTRICT

RILEY CREEK STABILIZATION
EDEN PRAIRIE, MN.

RESTORATION PLAN

BARR PROJECT No. 23/27-0053.14
CLIENT PROJECT No.
DWG. No. R-03
REV. No. 0

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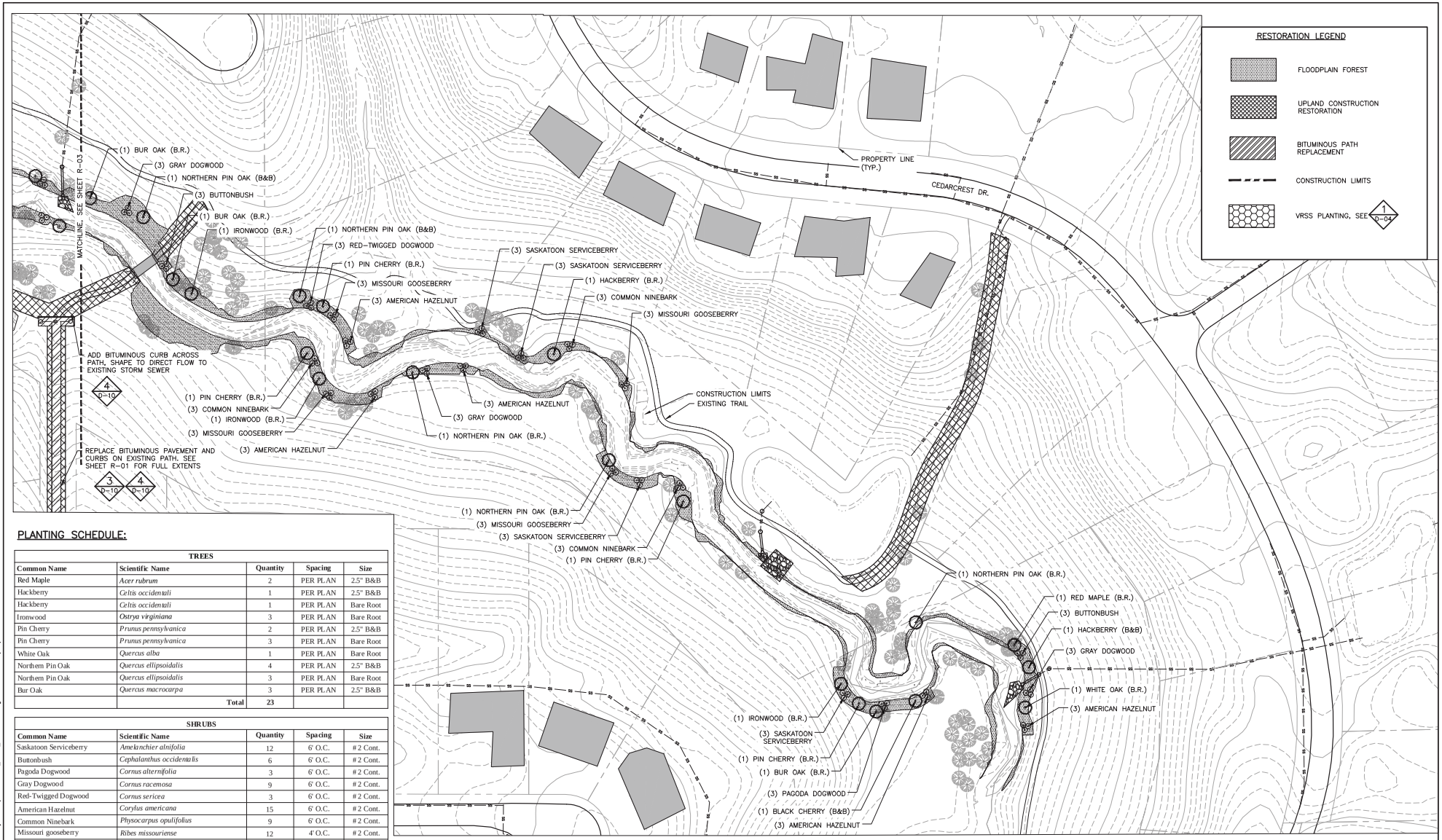

PLANTING SCHEDULE:

TREES

Common Name	Scientific Name	Quantity	Spacing	Size
Red Maple	*Acer rubrum*	2	PER PLAN	2.5" B&B
Hackberry	*Celtis occidentali*	1	PER PLAN	2.5" B&B
Hackberry	*Celtis occidentali*	1	PER PLAN	Bare Root
Ironwood	*Ostrya virginiana*	3	PER PLAN	Bare Root
Pin Cherry	*Prunus pennsylvanica*	2	PER PLAN	2.5" B&B
Pin Cherry	*Prunus pennsylvanica*	3	PER PLAN	Bare Root
White Oak	*Quercus alba*	1	PER PLAN	Bare Root
Northern Pin Oak	*Quercus ellipsoidalis*	4	PER PLAN	2.5" B&B
Northern Pin Oak	*Quercus ellipsoidalis*	3	PER PLAN	Bare Root
Bur Oak	*Quercus macrocarpa*	3	PER PLAN	2.5" B&B
	Total	**23**		

SHRUBS

Common Name	Scientific Name	Quantity	Spacing	Size
Saskatoon Serviceberry	*Amelanchier alnifolia*	12	6' O.C.	# 2 Cont.
Buttonbush	*Cephalanthus occidentalis*	6	6' O.C.	# 2 Cont.
Pagoda Dogwood	*Cornus alternifolia*	3	6' O.C.	# 2 Cont.
Gray Dogwood	*Cornus racemosa*	9	6' O.C.	# 2 Cont.
Red-Twigged Dogwood	*Cornus sericea*	3	6' O.C.	# 2 Cont.
American Hazelnut	*Corylus americana*	15	6' O.C.	# 2 Cont.
Common Ninebark	*Physocarpus opulifolius*	9	6' O.C.	# 2 Cont.
Missouri gooseberry	*Ribes missouriense*	12	4' O.C.	# 2 Cont.
	Total	**69**		

1 RESTORATION PLAN: RILEY CREEK

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CLIENT				
BID				04/24/19
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RILEY PURGATORY BLUFF CREEK
WATERSHED DISTRICT

RILEY CREEK STABILIZATION
EDEN PRAIRIE, MN.

RESTORATION PLAN

BARR PROJECT No. 23/27-0053.14
CLIENT PROJECT No.
DWG. No. R-04
REV. No. 0

CADD USER: Eric P. Fitzgerald FILE: M:\DESIGN\23270053.14\LOWER RILEY CREEK\23270053514_R-04_RESTORATION PLANING PLOT SCALE: 1:2 PLOT DATE: 4/24/2019 9:40 AM
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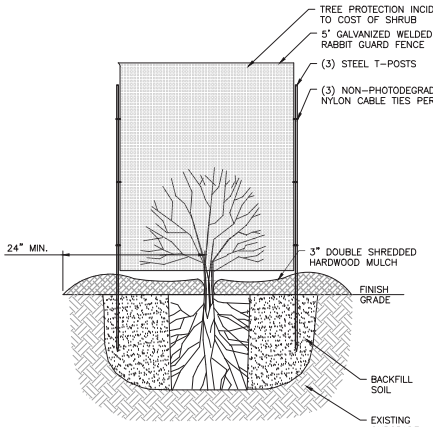
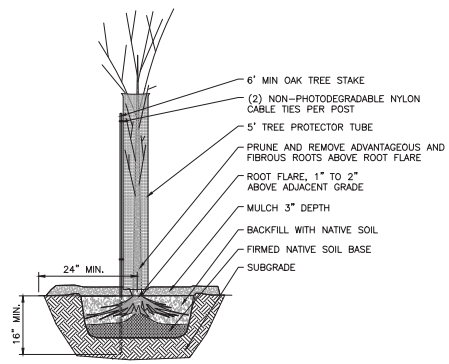


1 DETAIL: SHRUB PLANTING & TREE PROTECTION
NOT TO SCALE

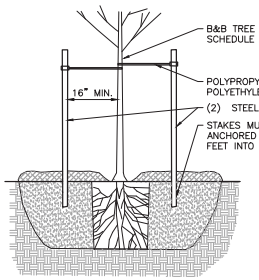
SHRUB PLANTING NOTES:
1. PROVIDE AND INSTALL PLANTS PER SCHEDULE.
2. REMOVE DEAD OR DAMAGED BRANCHES. RETAIN THE NATURAL FORM OF PLANT.
3. IF ROOT FLARE IS NOT EXPOSED WITHIN THE CONTAINER EXCAVATE SURFACE SOIL TO BASE OF ROOT FLARE.
4. DIG PLANT HOLES 6" MIN. LARGER THAN ROOT MASS, ALL SIDES.
5. SET SHRUB ON LIGHTLY FIRMED BACKFILL SOIL SO ROOT FLARE IS EVEN WITH FINISH GRADE.
6. BACKFILL WITH PLANTING SOIL FIRM SOIL AROUND ROOT MASS TO MAINTAIN PLUMB AND ENSURE NO AIR GAPS AROUND ROOT MASS.
7. CONSTRUCT 3" WATERING BASIN. THOROUGHLY WATER WITHIN 3 HOURS OF INSTALLATION.
8. PLACE SHREDDED HARDWOOD MULCH (MN/DOT SPEC 3882.2 TYPE 6 – WEED SEED FREE SHREDDED HARDWOOD.) TO A RADIUS OF 24" AND TO A DEPTH OF 3" AROUND PLANT.
9. NO MULCH TO BE IN CONTACT WITH PLANT.



3 DETAIL: DECIDUOUS BARE ROOT STOCK
NOT TO SCALE

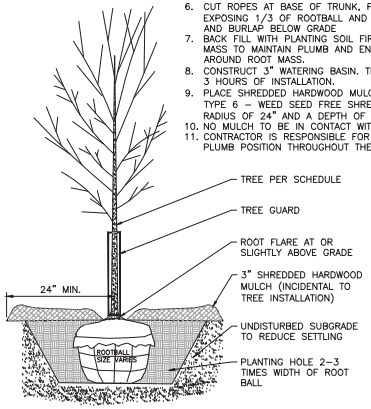
BARE ROOT TREE PLANTING NOTES:
1. PLANTING HOLE DIMENSION SHALL BE THREE TIMES ROOT BALL DIAMETER. SCARIFY SIDES AND BOTTOM OF PLANTING HOLE. WHEN PLANTING WITH AUGER CUT DOWN SIDES WITH SHOVEL TO ELIMINATE GLAZING.
2. REMOVE DEAD OR WITHERED ROOTS AND STEMS. LIVE BRANCHES SHALL NOT BE PRUNED.
3. TRANSFER PLANT DIRECTLY FROM WATER TO HOLE. SET PLANT AT SAME DEPTH AS IT WAS GROWN IN NURSERY.
4. SET PLUMB AND IMMEDIATELY BACKFILL WITH SOIL. DO NOT LEAVE IN PLANTING HOLE UNCOVERED.
5. APPLY WATER TO SETTLE PLANTS AND FILL VOIDS THEN CONSTRUCT 3" DEPTH WATERING BASIN.
6. WATER THOROUGHLY WITHIN TWO HOURS OF PLANTING.
7. PLACE SHREDDED HARDWOOD MULCH WITHIN 48 HOURS OF THE SECOND WATERING. MULCH SHALL HAVE 24" RADIUS (MIN.).
8. DRIVE OAK TREE STAKE 16" INTO GROUND ON WINDWARD SIDE OF TREE. GUIDE TREE PROTECTOR TUBE GENTLY OVER TREE. SET TUBE FIRMLY INTO SOIL AND SECURE TUBE TO STAKE WITH CABLE TIES (2).

TREE STAKING NOTES:
1. ALL B&B TREES SHALL BE STAKED AND TIED TO MAINTAIN VERTICALITY FOLLOWING PLANTING. TREE STAKING SHALL BE CONSIDERED INCIDENTAL TO TREE PLANTING.
2. INSTALL TWO (2) 8' STEEL T-POSTS, ANCHORED 2' INTO THE GROUND ON EITHER SIDE OF THE TRUNK.
3. INSTALL 16" LONG 40 MIL POLYPROPYLENE OR POLYETHYLENE STRAPS AROUND TRUNK AND AFFIX TO TO HOLES IN T-POSTS WITH 10 GAUGE WIRE.
4. REMOVE THE TREE STAKING AFTER TWO (2) YEARS OF MAINTAINED PLUMB POSITION.



4 DETAIL: TREE STAKING
NOT TO SCALE

TREE PLANTING NOTES:
1. PROVIDE AND INSTALL PLANTS PER SCHEDULE.
2. REMOVE DEAD OR DAMAGED BRANCHES. RETAIN THE NATURAL FORM OF PLANT. DO NOT CUT THE LEADER
3. DIG PLANT HOLES WITH A WIDTH 2–3 TIMES LARGER THAN ROOT MASS, ON ALL SIDES.
4. SCARIFY BOTTOM AND SIDES OF HOLE PRIOR TO PLANTING
5. SET TREE ON UNDISTURBED SUBGRADE AT A DEPTH WHERE THE ROOT FLARE IS LOCATED AT OR SLIGHTLY ABOVE GRADE.
6. CUT ROPES AT BASE OF TRUNK, PULL BURLAP DOWN EXPOSING 1/3 OF ROOTBALL AND THOROUGHLY BURY ROPES AND BURLAP BELOW GRADE
7. BACK FILL WITH PLANTING SOIL FIRM SOIL AROUND ROOT MASS TO MAINTAIN PLUMB AND ENSURE NO AIR GAPS AROUND ROOT MASS.
8. CONSTRUCT 3" WATERING BASIN. THOROUGHLY WATER WITHIN 3 HOURS OF INSTALLATION.
9. PLACE SHREDDED HARDWOOD MULCH (MN/DOT SPEC 3882.2 TYPE 6 – WEED SEED FREE SHREDDED HARDWOOD.) TO A RADIUS OF 24" AND A DEPTH OF 3" AROUND PLANT.
10. NO MULCH TO BE IN CONTACT WITH BASE OF PLANT.
11. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING TREES IN A PLUMB POSITION THROUGHOUT THE GUARANTEE PERIOD.



2 DETAIL: B&B TREE PLANTING
NOT TO SCALE

VRSS PLANTING SCHEDULE:

Overbank VRSS - STA. 1+64.2 To 2+60.0 (95.8 LF; 2' Height Above Bankfull)

Common Name	Scientific Name	Quantity	Spacing	Size
Buttonbush	*Cephalanthus occidentalis*	6	18" O.C.	Bare Root
Pagoda Dogwood	*Cornus alternifolia*	6	18" O.C.	Bare Root
Gray Dogwood	*Cornus racemosa*	6	18" O.C.	Bare Root
Red-Twigged Dogwood	*Cornus sericea*	6	18" O.C.	Bare Root
Dwarf Bush Honeysuckle	*Diervilla lonicera*	13	18" O.C.	Bare Root
Eastern Wahoo	*Euonymus atropurpureus*	6	18" O.C.	Bare Root
Common Ninebark	*Physocarpus opulifolius*	13	18" O.C.	Bare Root
Missouri gooseberry	*Ribes missouriense*	19	18" O.C.	Bare Root
Nannyberry	*Viburnum lentago*	13	18" O.C.	Bare Root
Common Elderberry	*Sambucus canadensis*	13	18" O.C.	Bare Root
Red Elderberry	*Sambucus pubens*	26	18" O.C.	Bare Root
	Total	127		

Overbank VRSS - STA. 9+74.8 To 12+34.3 (259.5 LF; 3' Height Above Bankfull)

Common Name	Scientific Name	Quantity	Spacing	Size
Buttonbush	*Cephalanthus occidentalis*	26	18" O.C.	Bare Root
Pagoda Dogwood	*Cornus alternifolia*	26	18" O.C.	Bare Root
Gray Dogwood	*Cornus racemosa*	26	18" O.C.	Bare Root
Red-Twigged Dogwood	*Cornus sericea*	26	18" O.C.	Bare Root
Dwarf Bush Honeysuckle	*Diervilla lonicera*	52	18" O.C.	Bare Root
Eastern Wahoo	*Euonymus atropurpureus*	26	18" O.C.	Bare Root
Common Ninebark	*Physocarpus opulifolius*	52	18" O.C.	Bare Root
Missouri gooseberry	*Ribes missouriense*	78	18" O.C.	Bare Root
Nannyberry	*Viburnum lentago*	52	18" O.C.	Bare Root
Common Elderberry	*Sambucus canadensis*	52	18" O.C.	Bare Root
Red Elderberry	*Sambucus pubens*	104	18" O.C.	Bare Root
	Total	520		

Overbank VRSS - STA. 18+59.2 To 20+36.3 (177.1 LF; 3' Height Above Bankfull)

Common Name	Scientific Name	Quantity	Spacing	Size
Buttonbush	*Cephalanthus occidentalis*	18	18" O.C.	Bare Root
Pagoda Dogwood	*Cornus alternifolia*	18	18" O.C.	Bare Root
Gray Dogwood	*Cornus racemosa*	18	18" O.C.	Bare Root
Red-Twigged Dogwood	*Cornus sericea*	18	18" O.C.	Bare Root
Dwarf Bush Honeysuckle	*Diervilla lonicera*	35	18" O.C.	Bare Root
Eastern Wahoo	*Euonymus atropurpureus*	18	18" O.C.	Bare Root
Common Ninebark	*Physocarpus opulifolius*	35	18" O.C.	Bare Root
Missouri gooseberry	*Ribes missouriense*	53	18" O.C.	Bare Root
Nannyberry	*Viburnum lentago*	35	18" O.C.	Bare Root
Common Elderberry	*Sambucus canadensis*	35	18" O.C.	Bare Root
Red Elderberry	*Sambucus pubens*	71	18" O.C.	Bare Root
	Total	354		

Overbank VRSS - STA. 8+01.8 To 8+71.1 (69.3 LF; 4' Height Above Bankfull)

Common Name	Scientific Name	Quantity	Spacing	Size
Buttonbush	*Cephalanthus occidentalis*	9	18" O.C.	Bare Root
Pagoda Dogwood	*Cornus alternifolia*	9	18" O.C.	Bare Root
Gray Dogwood	*Cornus racemosa*	9	18" O.C.	Bare Root
Red-Twigged Dogwood	*Cornus sericea*	9	18" O.C.	Bare Root
Dwarf Bush Honeysuckle	*Diervilla lonicera*	18	18" O.C.	Bare Root
Eastern Wahoo	*Euonymus atropurpureus*	9	18" O.C.	Bare Root
Common Ninebark	*Physocarpus opulifolius*	18	18" O.C.	Bare Root
Missouri gooseberry	*Ribes missouriense*	28	18" O.C.	Bare Root
Nannyberry	*Viburnum lentago*	18	18" O.C.	Bare Root
Common Elderberry	*Sambucus canadensis*	18	18" O.C.	Bare Root
Red Elderberry	*Sambucus pubens*	37	18" O.C.	Bare Root
	Total	182		

Overbank VRSS - STA. 14+73.4 To 15+36.9 (63.5 LF; 4' Height Above Bankfull)

Common Name	Scientific Name	Quantity	Spacing	Size
Buttonbush	*Cephalanthus occidentalis*	8	18" O.C.	Bare Root
Pagoda Dogwood	*Cornus alternifolia*	8	18" O.C.	Bare Root
Gray Dogwood	*Cornus racemosa*	8	18" O.C.	Bare Root
Red-Twigged Dogwood	*Cornus sericea*	8	18" O.C.	Bare Root
Dwarf Bush Honeysuckle	*Diervilla lonicera*	17	18" O.C.	Bare Root
Eastern Wahoo	*Euonymus atropurpureus*	8	18" O.C.	Bare Root
Common Ninebark	*Physocarpus opulifolius*	17	18" O.C.	Bare Root
Missouri gooseberry	*Ribes missouriense*	25	18" O.C.	Bare Root
Nannyberry	*Viburnum lentago*	17	18" O.C.	Bare Root
Common Elderberry	*Sambucus canadensis*	17	18" O.C.	Bare Root
Red Elderberry	*Sambucus pubens*	34	18" O.C.	Bare Root
	Total	167		

Overbank VRSS - STA. 18+59.2 To 20+56.9 (197.7 LF; 3' Height Above Bankfull)

Common Name	Scientific Name	Quantity	Spacing	Size
Buttonbush	*Cephalanthus occidentalis*	20	18" O.C.	Bare Root
Pagoda Dogwood	*Cornus alternifolia*	20	18" O.C.	Bare Root
Gray Dogwood	*Cornus racemosa*	20	18" O.C.	Bare Root
Red-Twigged Dogwood	*Cornus sericea*	20	18" O.C.	Bare Root
Dwarf Bush Honeysuckle	*Diervilla lonicera*	40	18" O.C.	Bare Root
Eastern Wahoo	*Euonymus atropurpureus*	20	18" O.C.	Bare Root
Common Ninebark	*Physocarpus opulifolius*	40	18" O.C.	Bare Root
Missouri gooseberry	*Ribes missouriense*	59	18" O.C.	Bare Root
Nannyberry	*Viburnum lentago*	40	18" O.C.	Bare Root
Common Elderberry	*Sambucus canadensis*	40	18" O.C.	Bare Root
Red Elderberry	*Sambucus pubens*	79	18" O.C.	Bare Root
	Total	398		

Overbank VRSS - STA. 21+47.0 To 22+39.6 (92.6 LF; 3' Height Above Bankfull)

Common Name	Scientific Name	Quantity	Spacing	Size
Buttonbush	*Cephalanthus occidentalis*	9	18" O.C.	Bare Root
Pagoda Dogwood	*Cornus alternifolia*	9	18" O.C.	Bare Root
Gray Dogwood	*Cornus racemosa*	9	18" O.C.	Bare Root
Red-Twigged Dogwood	*Cornus sericea*	9	18" O.C.	Bare Root
Dwarf Bush Honeysuckle	*Diervilla lonicera*	19	18" O.C.	Bare Root
Eastern Wahoo	*Euonymus atropurpureus*	9	18" O.C.	Bare Root
Common Ninebark	*Physocarpus opulifolius*	19	18" O.C.	Bare Root
Missouri gooseberry	*Ribes missouriense*	28	18" O.C.	Bare Root
Nannyberry	*Viburnum lentago*	19	18" O.C.	Bare Root
Common Elderberry	*Sambucus canadensis*	19	18" O.C.	Bare Root
Red Elderberry	*Sambucus pubens*	37	18" O.C.	Bare Root
	Total	186		

ISSUED FOR BID
NOT FOR CONSTRUCTION

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION
0	EPF	PJH2	JDW	04/24/2019	ISSUED FOR BID

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.
PRINTED NAME JEFFERY D. WEISS
SIGNATURE
DATE 04/24/2019 LICENSE # 48031

	01/31/18	05/03/18	07/24/18	04/24/19
CLIENT				
BID				
CONSTRUCTION				

RELEASED TO/FOR: A B C 0 1 2 3 — DATE RELEASED

BARR
Corporate Headquarters: Minneapolis, Minnesota Ph: 1-800-632-2277
Project Office: BARR ENGINEERING CO. 4300 MARKETPOINTE DRIVE Suite 200 MINNEAPOLIS, MN 55435 Ph: 1-800-632-2277 Fax: (952) 832-2601 www.barr.com

Scale	AS SHOWN
Date	04/24/2019
Drawn	EPF
Checked	PJH2
Designed	BARR
Approved	JDW

RILEY PURGATORY BLUFF CREEK
WATERSHED DISTRICT

RILEY CREEK STABILIZATION
EDEN PRAIRIE, MN.

PLANTING DETAIL

BARR PROJECT No. 23/27-0053.14
CLIENT PROJECT No.
DWG. No. R-05
REV. No. 0

WENCK ASSOCIATES

Responsive partner.
Exceptional outcomes.

April 26, 2019

Claire Bleser
District Administrator
Riley Purgatory Bluff Creek Watershed District
14500 Martin Drive Suite 1500
Eden Prairie, MN 55344

RE: Award Recommendation
Hyland Lake Buffered Alum Treatment
Wenck File #B3057-0011

Dear Dr. Bleser:

Wenck Associates, Inc. (Wenck) has reviewed the response to the request for quotes and contractor qualification information provided by the HAB Aquatic Solutions, Inc. quote on the Hyland Lake Buffered Alum Treatment. Our review consisted of checking the total lump sum price calculations as well as reviewing the submitted quote for the required technical, equipment, experience qualifications outlined in the Request for Quotes and Technical Specifications.

Based on the review described above and our past experience with HAB completing alum treatments, we recommend award of the project to HAB Aquatic Solutions, Inc. in the amount of $114,659.

Please contact me at awilkinson@wenck.com or 763-252-6877 if you need further clarification of this recommendation.

Sincerely,

Wenck Associates, Inc.

Anne Wilkinson, PhD
Water Resource Engineer

HYLAND LAKE BUFFERED ALUM TREATMENT

RESPONSE TO REQUEST FOR QUOTE

HAB
AquaticSolutions

APRIL 25, 2019

April 25, 2019

To: Dr. Claire Bleser, District Administrator
Riley Purgatory Bluff Creek Watershed District
18681 Lake Drive E
Chanhassen, MN 55317

HAB Aquatic Solutions (HAB) is a company completely committed to providing alum application services. In fact, that is our sole service and we are proposing to provide these services to successfully implement the Hyland Lake Buffered Alum Treatment Project. Please accept our response to the Riley Purgatory Bluff Creek Watershed District's Request for Quote. HAB has reviewed all available information and has a solid understanding of the RFQ details and the Hyland project. HAB is aware of the District's desire to select a highly skilled and experienced applicator to meet the challenges of the project. Our submittal focuses on HAB's unmatched ability to execute the application with the highest possible level of precision, effectiveness, safety and professionalism. Specifically, you will find our proposal is focused on HAB's expertise and experience in three areas that are critical for the success of your project:

- ***Project Understanding.*** HAB has been the elite contractor conducting large-scale alum applications in the Minneapolis metropolitan area for over six years. We have a detailed understanding of the unique challenges and needs associated with these regional projects, as well as the specifics of the Hyland project. HAB has the application technology and project experience in similar lakes to fully address these challenges and concerns. Our approach, which is unmatched by any other alum applicator, will ensure an application where the project design and strategy benefits are maximized in a the most cost-effective manner.

- ***Efficient and precise application methods.*** HAB focuses *exclusively* on alum applications and our technically advanced application equipment and techniques are state-of-the-art and unique to the industry. Custom designed, our computer-controlled flow and GPS tracking equipment has a proven track record of performance and the precision of our alum injection method has been well documented in third-party studies. With 82 completed lake applications, 6.8 million gallons of alum and 2.3 million gallons of sodium aluminate applied and 40+ years of combined experience, our application expertise and experience are unparalleled.

- ***Professionalism.*** Alum applications generate much attention from the lake community, the public and the media. HAB's personnel and equipment promote a positive and professional image of the project in general.

HAB not only possesses hands-on experience for the technical needs of this project, but also has a proven history of successfully implementing lake restoration projects. We have proven project managers, experience, and project familiarity: all the ingredients to deliver a successful project.

If you have any questions regarding our proposal, please contact Dr. John Holz, who will serve as the proposed Project Manager for HAB Aquatic Solutions.

Contact Information:
HAB Aquatic Solutions
735 S. 56th St., Suite 2 · Lincoln, NE 68510
jholz@habaquatics.com · 402-430-0352 · www.habaquatics.com

1 Statement of Understanding and Methodology

HAB Aquatic Solutions (HAB) understands that Hyland Lake (84-acres) is a shallow, eutrophic waterbody located in the in the City of Bloomington, MN. Hyland Lake has a mean depth of 7.5, a maximum depth of 12 feet and was listed as impaired for excess nutrients by the Minnesota Pollution Control Agency in 2008. These nutrients (primarily phosphorus) promote summer algal blooms, reduced water clarity and limited recreational opportunities of this high-use lake. A review of common water quality metrics shows that Hyland has frequently exceeded the State shallow lake standards for total phosphorus (> 60 µg/L), chlorophyll a (> 20 µg/L) and water transparency (< 1 m) in recent years.

An alum dose and application strategy were developed for the Riley Purgatory Bluff Creek Watershed District and the Three Rivers Park District. The strategy will deliver a total target dose of approximately 50 g Al/m^2 to an approximately 50-acre zone of the lake. HAB further understands that the total target dose requires a buffered alum application to ensure that no negative ecological impacts related to low pH occur. The Watershed District, in cooperation with TRPD, has requested quotes to conduct this buffered application in June 2019. The objective of this application is to reduce internal loading by inactivating sediment phosphorus and subsequently reduce water column phosphorus and algal biomass.

As detailed in the rigorous project Technical Specifications (Section 02400), HAB also understands that the Watershed District seeks a highly efficient and effective application to meet the project goals. HAB has the project understanding, application technology and project experience in similar lakes to fully address these challenges and concerns. Our approach, which is unmatched by any other alum applicator, will ensure an application where the project design and strategy benefits are maximized. This approach, and detailed strategies to address challenges, are presented in this submittal.

1.1 Safety

HAB understands that there is no higher priority than safety; both in terms of human safety and environmental safety. We are proud to have completed 82 projects to date with an impeccable safety record. This level of safety is a function of detailed project specifications, experienced project oversight, employee training, state-of-the-art equipment, proper storage tanks, safety equipment, water quality monitoring and the execution of a site-specific Spill Prevention and Safety Plan for every project.

1.2 Professionalism

HAB understands that alum applications generate a great deal of interest from the lake community, the public and media, and the professionalism of the applicator is important. HAB owners (Dr. John Holz and Tadd Barrow) have advanced graduate degrees in limnology/lake management and come from a teaching, public outreach and research background. HAB will be available for outreach opportunities during the applications.

1.3 Project Familiarity

HAB is fortunate to have been the premier alum application contractor conducting large-scale alum applications in the Minneapolis metropolitan area for over six years. In addition to our outstanding alum application performance record, we have a detailed understanding of the needs and expectations of the funding agencies, MPCA, watershed districts, municipalities, lake associations and regional engineering firms. We have had the opportunity to work closely and effectively with representatives from these entities on our previous projects in Minnesota. We understand the expectations of the application contractor as presented in the Technical Specification and have a flawless record of meeting similar rigorous expectations on our previous projects.

HAB also has a strong working relationship with the major suppliers of alum (C&S Chemical, Randolph, MN) and sodium aluminate (USALCO, Michigan City, IN) to the Twin Cities. In fact, C&S and USALCO have supplied the alum and sodium aluminate to all of our projects in Minnesota and Wisconsin to date. These are valuable relationships for a variety of reasons. Buffered lake alum applications call for a high supply of alum and sodium aluminate over a short duration. Effective and constant communication between HAB, C&S, USALCO and the trucking companies is critical for a constant alum and sodium aluminate supply, timely delivery, project schedule adjustments (due to unfavorable weather), adhering to project timelines, and obtaining documented high-quality alum and sodium aluminate. These existing relationships ensure the highest level of performance for the Hyland project.

1.4 Alum and Sodium Aluminate Application

1.4.1 Application Overview

HAB understands they will furnish and be responsible for all labor, mobilization, demobilization, materials, equipment and incidentals required to complete the Hyland application; including alum, sodium aluminate, application equipment, sampling equipment, storage equipment and spill containment equipment. HAB will be responsible for transport of the liquid alum and sodium aluminate to the staging area identified in the RFQ and the application to the lake from a custom application vessel. HAB will arrange for portable storage tanks at the staging area and alum will be pumped from the storage tanks to tanks onboard the application vessel. The application vessel uses computerized dosage equipment that maintains a target dose rate for both products by accounting for changes in vessel speed. All application equipment is integrated with GPS tracking to ensure a uniform and verifiable application area and rate. HAB is also responsible for restoring the staging area to pre-project conditions, conducting daily jar test, hourly pH monitoring and submitting daily logs.

1.4.2 Alum and Sodium Aluminate Specifications, Delivery and Security

Alum and sodium aluminate will meet the specifications stated in the project's Technical Specifications (Section 02400, Part 2.01A). Alum and sodium aluminate will be delivered to the site the day of application in 5,000-gallon tankers, following a predetermined access route. Alum and sodium aluminate will be transferred to temporary lakeshore chemical storage tanks from air-pressurized

delivery tankers through enforcer suction discharge hose. Chemical transfer pumps will also be on-site if needed. The lakeshore storage tanks will be secured (locked) when alum and/or sodium aluminate is stored overnight. In addition, a security guard will be present overnight at the project staging area. HAB will be responsible for scheduling the delivery of the alum and security.

- The buffered alum application will be completed between June 10th and 24th, 2019. Once the application commences, it will take a total of approximately 2 calendar days to complete the application. The application will be suspended if unfavorable environmental conditions exist such as the wind conditions described in Section 02400, Part 3.02 of the Technical Specifications or lake pH below 6.5 or above 9.0 S.U.

- The Hyland Lake application entails simultaneously applying 19,772 gallons of alum (395-gal/ac) and 9,886 gallons of sodium aluminate (198-gal/ac) to the 50-acre application zone shown in Figure 2 of the RFQ.

- If HAB is the selected contractor, we will request an electronic shapefile of the application zone map (Figure 2). This map will be uploaded to our guidance and flowrate control software to ensure a precise and accurate application.

1.4.3 Alum and Sodium Aluminate Transfer

Alum and sodium aluminate will be transferred to temporary lakeshore chemical storage tanks from air pressurized delivery tankers through heavy-duty HDPE hoses. Type 316 stainless-steel fittings are used in areas where contact with liquid alum/sodium aluminate is anticipated. All hoses, couplings and connectors meet corrosion resistance standards for alum/sodium aluminate. Alum and sodium aluminate will be transferred from the on-shore storage tanks to the application vessel tanks with centrifugal chemical transfer pumps rated for the safe handling of alum/sodium aluminate.

1.4.4 On-Shore Storage Tanks

Figure 1. HAB Staging Area and Tanks at Cedar Lake, WI

On-shore chemical storage tanks are an important component of all successful buffered alum applications. On-shore storage allows HAB to precisely manage that delivery of the alum and sodium aluminate. The tanks provide a "buffer" to unfavorable application conditions (excessive wind, lightning). Deliveries can still be accepted and stored during a suspension of operations. Stored alum/sodium aluminate can be used to apply alum/sodium aluminate at a rate that exceeds the delivered supply when conditions are optimal. This results in a seamless, consistent and efficient application.

Tanks consist of 6,900-gallon capacity polyethylene tanks rated for alum and sodium aluminate. A one-foot high chemical spill containment guard surround each tank. The onshore storage tanks are located at the staging areas and are secured (locked) when chemical is stored overnight. Two tanks will be used at the Hyland staging area (one for alum, one for sodium aluminate). In addition, a security guard will be present overnight at the project staging area.

1.4.5 Application Protocol

Alum and sodium aluminate will be applied simultaneously from a single 8' x 32' customized barge. The design of the barge has been reviewed and deemed safe by a naval architect (documentation available upon request). This vessel is powered with twin 60 horsepower outboard motors, is equipped with a 39' application boom, and has two thrust balanced, sealless, mag-drive pumps. The vessel has an application rate of 30,000 gallons per day. The minimum application water depth for this vessel is two feet.

Figure 2. HAB's Custom Application Barge

The alum and sodium aluminate will be stored onboard in polyethylene tanks. Onboard pumps supply the alum and

sodium aluminate to separate application ports on the spray bars. All piping is stainless steel or heavy-duty HDPE tubing. Type 316 stainless-steel fittings are used in areas where contact with liquid alum and/or sodium aluminate is anticipated. All couplings and connectors for distribution lines, storage tanks, pump and injector units meet corrosion resistance standards for alum and sodium aluminate.

HAB's subsurface injection technology utilizes injection lines with jet nozzles that are suspended from the application boom and penetrate the water surface. The alum and sodium aluminate are injected under pressure to flash mix the alum with lakewater at depth of 2.0 feet. This method bypasses the lakewater surface tension and allows the floc to form and begin to settle quickly out of the photic zone (documented settling rates of 1 ft every 2 min). Thus, floc contact with algae and potential wind redistribution of floc is minimized. HAB has successfully applied alum to lakes with high algal concentrations (e.g., Grand Lake St. Mary's, OH; Spring Lake, MN) and wind concerns (e.g., Bald Eagle Lake, MN; Cedar Lake, WI).

The pumping system on the application vessel is automatically controlled by computerized GPS systems that vary the flow rate with boat speed and bathymetric measurements to ensure the target dose rate of alum and sodium aluminate is achieved. This system not only documents the barge's coverage of the application zone by recording GPS coordinates, but also measures the real-time flow rate at each GPS datapoint. Water depth is measured from the vessel by sonar. pH is monitored in real time on the vessel with a YSI Model 100A meter (calibrated daily) and the application stops if pH is out of a pre-determined threshold (6.5 – 9.0 S.U.). The computer controlled pumping system has a manual backup system and replacements for all major parts (including pumps) exist on-site.

Duplicate back-up copies of the daily application data are downloaded from the onboard computer at the end of each day. The two storage devices are kept in separate locations overnight. A third copy of the data remains on the hard drive of the on-board computer.

A short video of HAB's application can be viewed at https://vimeo.com/227135763

1.4.6 Equipment & Personnel Redundancy

HAB provides complete redundancy for equipment and personnel during all applications to ensure that the project is not only completed, but completed on time. In fact, HAB has finished every project to date well before the contracted project end date. Downtime is minimized or eliminated by having replacement equipment and parts onsite for all components of the application process (e.g., pumps, hoses, fittings, valves, computerized flow control system components, etc.). The application barge is equipped with two outboard motors and the application could continue with one motor in the event one fails. HAB also has a backup barge that could be transported the project site within 1-2 days. We also have trained on-call personnel that could also be to the project site within 1-2 days to replace onsite staff if needed. In sum, this complete redundancy in equipment and personnel eliminates our clients concerns that HAB will not complete the application.

1.4.7 Jar Tests & pH Monitoring

Jar tests will be conducted every morning prior to the application of alum and sodium aluminate to evaluate the effects of the application to the lake water at the time of application. Tests will be conducted on 20 gallons of lake water, which will be dosed with planed rates of alum and sodium aluminate application. The effects of the dose on lake water pH will be monitored (YSI Model 100A meter, calibrated daily) and results will be used to adjust the application rate if needed.

The lake pH will be monitored in surface water samples at hourly intervals during the application. A YSI Model 100A will be calibrated daily and used to measure pH. Application will be suspended if pH falls below 6.5 or rises above 9.0 S.U.

1.4.8 Daily Application Log

- Date of work
- Hours of application
- Quantity of alum and sodium aluminate applied
- Approximate acreage treated
- Approximate location (on a map) of area treated
- Summary of truck deliveries
- Explanation of any downtime

2 Selected Project Experience

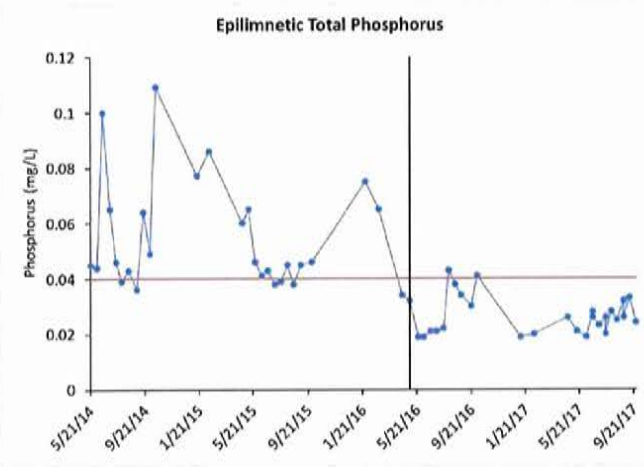
2.1 Lake Riley, MN

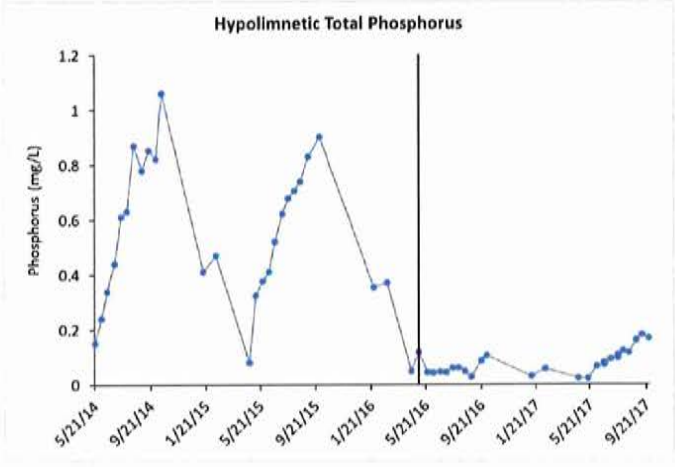
Figure 3. Alum Floc Trails at Lake Riley, 2016.

Lake Riley is 297 acres in size and bordered by the cities of Chanhassen and Eden Prairie, MN in the Minneapolis metropolitan area. Lake Riley's total phosphorus (P) concentrations were historically above the Minnesota Pollution Control Agency's standard of 40 µg/L and was classified as impaired for excess nutrients. Nuisance algal blooms, poor water clarity and reduced recreational opportunities were common for this high-use lake. Supported by Wenck Associates, the Riley Purgatory Bluff Creek Watershed District contracted with HAB Aquatic Solutions to conduct the first of multiple liquid alum applications. In May 2016, the first required dose of 108,061 gallons was applied in 3 days. The timing of the remaining dose will be determined by ongoing analyses of the alum floc binding characteristics.

Water quality improvements following the first application have been dramatic. Since the alum application, summer epilimentic total phosphorus dropped below the standard to approximately 26

µg/L and hypolimnetic phosphorus fell from 600 µg/L in 2015 to an average of 110 µg/L in 2016-17 (indicating significantly less internal P loading). Chlorophyll (a measure of algae) dropped by 55% and water clarity increased by over 3 feet (1 meter). The graphs below show the changes in epilimnetic and hypolimnetic total phosphorus (Source: www.rpbcwd.org/files/1015/3314/8995/Appendix_F_-2017_FINAL_WATER_RESOURCES_REPORT_22118.pdf).





2.2 Bald Eagle Lake, MN

Bald Eagle Lake is 1071 acres in size and is located just north of the Twin Cities near the town of White Bear Lake, MN. The Rice Creek Watershed District partnered with Wenck Engineering to complete a Total Maximum Daily Load (TMDL) study and determined Bald Eagle Lake was impaired/threatened by an excess of phosphorus. The watershed district contracted with HAB Aquatic Solutions to conduct two liquid alum applications. In April 2014, half of the required dose was applied (248,000 gallons) in 8 days. The remaining dose (248,000 gallons) was applied in April 2016.

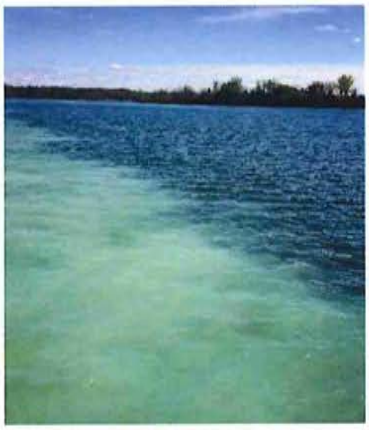
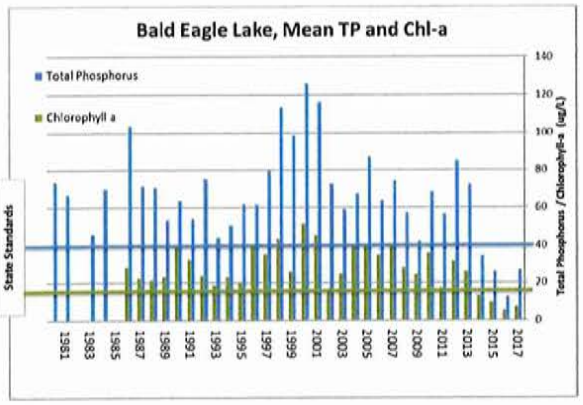
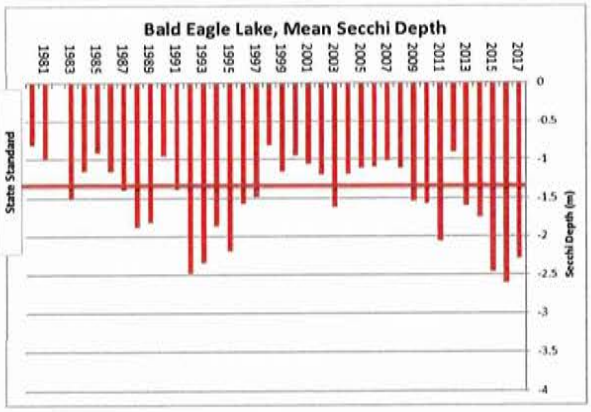


Figure 4. Subsurface Formation of Floc

Prior to HAB's aluminum sulfate application, the 30-year water clarity summer average was 3.9 feet at Bald Eagle Lake. Post alum lake treatment, water quality has been averaging 8.0 feet. The current quality of Bald Eagle Lake is the best it has been in the 30-year sampling record and is now greatly exceeding the project goals for total phosphorus, chlorophyll (a measure of the amount of algae in the lake) and water clarity (Secchi disk depth). The graphs below show the changes in total phosphorus, chlorophyll and water clarity and how the current conditions relate to the project goals.





2.3 Spring Lake, MN

Figure 5. Spring Lake Before (left) & After (right) the 2013 Application

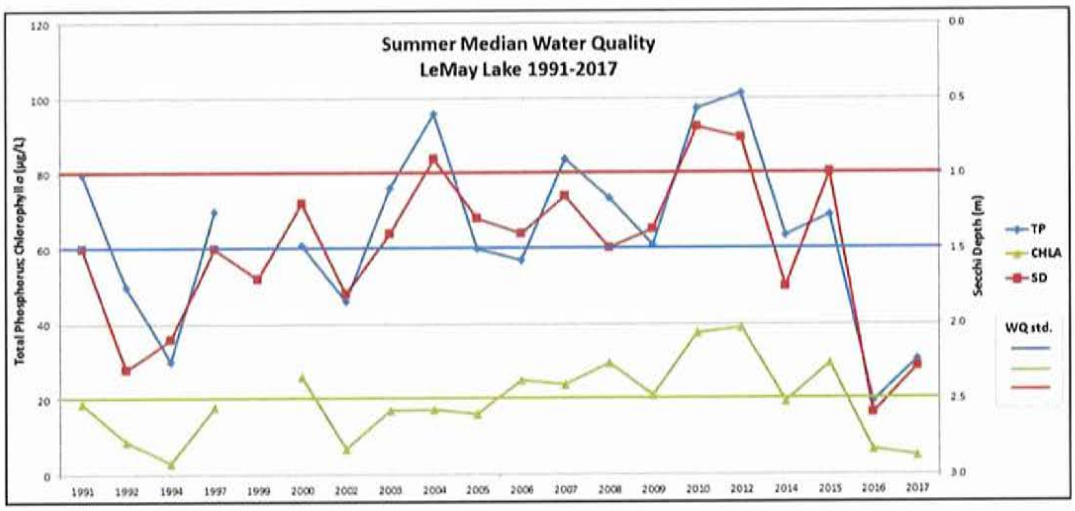
Spring Lake is 600 acres in size, located in central Minnesota near the town of Prior Lake. In 2011 the Prior Lake-Spring Lake Watershed District completed a Total Maximum Daily Load (TMDL) study and determined Spring Lake was impaired/threatened by an excess of phosphorus. With support from Barr Engineering, the watershed district contracted with HAB Aquatic Solutions to apply the first of dose of 292,000 gallons of liquid aluminum sulfate in 11 days in the fall of 2013.

Prior to the aluminum sulfate treatment Barr recorded 220 ppb phosphorus and 45 µg/L chlorophyll *a* (algae density). Following the alum treatment Barr Engineering measured 59 µg/L phosphorus and 4 µg/L chlorophyll *a*.

In May of 2018, HAB applied the second of three planned doses to Spring Lake. This second dose of 146,189 gallons of alum (25% of the total planned dose) was completed in 6 days and studies to document improved water quality are currently ongoing.

2.4 LeMay Lake, MN

LeMay Lake is a 32-acre lake located in central Minnesota in the town of Eagan. Wenck Engineering conducted a water quality study and found the lake was degraded by high rates of internal phosphorus loading. The City of Eagan contracted with HAB Aquatic Solutions to apply 9,853 gallons of liquid aluminum sulfate and 4,927 gallons of sodium aluminate over a day in the fall of 2015. Post application, average summer total phosphorus fell 68% to 24 µg/L, chlorophyll dropped 75% to 6.5 µg/L and water clarity increase 3.25 feet to 8.5 feet. Le May now meets and exceeds meets water quality standards and TMDL goals (see graph below).



2.5 Pinto Lake, CA

Figure 4. Educational Opportunity at Pinto Lake

Pinto Lake is a 120-acre recreational lake in Watsonville, CA. The lake developed massive algal blooms every late summer and fall and algal toxin levels typically exceeded the State health criteria. As a result, the lake was classified as "impaired" and was closed for contact recreation during the bloom periods. Of particular interest, the death of 31 endangered southern sea otters have been traced to algal toxins which have accumulated in shellfish eaten by the otters. Pinto Lake is the likely source of the toxins in the shellfish and the cause of the otter deaths. An excessive amount of the nutrient phosphorus was the main cause of the toxic algal blooms. Internal phosphorus loading (leaching from the lakebed sediments) and watershed runoff both contribute phosphorus to Pinto, but a study in 2011 showed that the majority (85%) was coming from the lakebed.

Samples from the bottom of the lake confirmed that phosphorus was very high in the sediments and available to be released into the overlying water column. HAB Aquatic Solutions conducting a buffered alum application (79,000 gallons of alum and 39,500 gallons of sodium aluminate) over a ten-day period in April 2017. The application was highly successful with a dramatic reduction in water column

phosphorus and algal biomass, an elimination of algal toxins and the lifting of recreational use restrictions. For more information visit HAB's project website at www.pintolakealum.com.

Figure 5. Alum and Sodium Aluminate Being Applied at Pinto Lake

2.6 Green Lake, WA

Figure 8. Final Green Lake Coverage Map

Green Lake is 259-acre, poorly buffered lake (total alkalinity of below 25 mg $CaCO_3$/L) located in Seattle, WA. This urban lake has an average depth of 13 feet, a maximum depth of 30 feet and has had a long history of cyanobacteria blooms dating back to at least 1916. The City of Seattle contracted with HAB to successfully apply 81,744 gallons of alum and 40,905 gallons of sodium aluminate over a six-day period in April 2016. The buffered alum application increased water clarity from 9 to 19 feet and had no effect on lake pH or dissolved oxygen concentrations. The image above shows the Green Lake Coverage Map, with each individual application path represented by a single green line. HAB provides a coverage map to their clients on all projects.

3 Project References

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4 Selected Past Projects (2013-19)

- Cove Lake, IL (www.covelakealum.com)
- Victoria Springs, NE
- Crystal Lake, NE
- Kirkpatrick Lake, NE
- Wood Pond, MN
- Moody Lake, MN (www.moodylakelaum.com)
- Rice Marsh Lake, MN (www.ricemarshalum.com)
- Lotus Lake, MN (www.lotuslakealum.com)
- Long Lake, WI (www.longlakewialum.com)
- Spring Lake, MN (www.springlakealum.com)
- Moswansicut Reservoir, RI (www.moswansicutalum.com)
- Heart Lake, WA (www.heartlakealum.com)
- Fish Lake, MN (www.fishlakealum.com)
- Cedar Lake, WI (www.cedarlakealum.com)
- Half Moon Lake, WI
- Moses Lake, WA

- Riverside Boating Lake, NE
- Riverside Fishing Lake, NE
- Wapato Lake, WA (www.wapatoalum.com)
- Sunfish Lake, MN (www.sunfishalum.com)
- Augusta Lake, MN (www.augustaalum.com)
- Pinto Lake, CA (www.pintolakealum.com)
- Fort McMurray Lake, AB
- Cranberry Lake, MN
- Lake Riley, MN
- Bald Eagle Lake, MN
- Black Lake, WA
- Green Lake, WA
- Lake Machado, CA
- Lake Helen, NE
- LeMay Lake, MN
- Twin Lake, MN
- Lake Barrington, IL
- Wister Lake, OK
- Ginger Cove, NE
- Spring Lake, MN
- Blackhawk Lake, MN
- Turner Lake, NE
- Candlewick Lake, IL

5 Project Personnel

5.1 Firm Description: HAB Aquatic Solutions

HAB Aquatic Solutions, Inc. is a corporation that was established in 2010 and specializes exclusively on improving surface water quality using aluminum-based products (e.g., alum and sodium aluminate). Our research and development efforts improved upon traditional alum application approaches by developing strategies to address the unique challenges of today's water resource management projects. HAB's cofounders (Dr. John Holz and Tadd Barrow) are two of only a handful of scientists qualified to provide complete alum treatment services: from dose calculation, to application, to project evaluation. Our fleet of vessels of various sizes is tailored to meet the application needs of small ponds to large lakes and reservoirs. HAB, or any individual working on an HAB project, has ever been fined or incurred a penalty concerning permit and/or regulatory violations associated with lake management activities.

With 82 completed lake applications, 9.1 million gallons of alum and sodium aluminate applied and 40+ years of combined experience, our application expertise and experience are unmatched. We provide the most comprehensive alum services available, including:

- Pre-project water quality monitoring
- Algae identification

- Lake sediment core collection and analysis
- Alum dose determination
- Project coordination
- Precise, GPS-guided alum application
- Alum injection systems for the treatment of storm water/stream water
- Post-project water quality monitoring and evaluation

5.1.1 Key Personnel: HAB Aquatic Solutions

JOHN HOLZ, PHD | PROJECT MANAGER/LIMNOLOGIST

Dr. Holz is a co-founder of HAB Aquatic Solutions and has over 25 years of experience in surface water quality/aquatic habitat management and research. Dr. Holz has performed the role of project manager on 82 lake phosphorus inactivation projects.

While earning his PhD from the University of Nebraska-Lincoln (UNL), Dr. Holz's research advanced our understanding of water resource issues and developed improved management tools for lakes, streams and watersheds, including assessing/interpreting/predicting the response of water bodies to pollutants and the effectiveness of restoration techniques. Dr. Holz conducted research that advanced our ability to address numerous unique water quality challenges and pollutant effects. Specific areas of expertise include lake restoration and management, watershed management, biological indicators of water quality, phytoplankton ecology and management, nutrient inactivation (alum), determination of appropriate water quality goals, nutrient criteria development, water quality monitoring, water quality modeling, internal phosphorus loading, and determining effectiveness of TMDL's using water quality and biological information. Dr. Holz was honored for his alum research advancements by the North American Lake Management Society in 1999 when he received their Technical Excellence Award in recognition for Outstanding Research in Lake Restoration, Protection and Management.

As a faculty member at UNL, Dr. Holz obtained $7.95 million in funding to support water quality research, authored over 20 publications, taught courses in Limnology (the study of lakes and streams) and Lake and Reservoir Restoration, and served as a technical advisor to the U.S. Environmental Protection Agency (EPA) on water quality management issues in the U.S. Dr. Holz is a recognized leader in water quality/aquatic habitat management.

TADD BARROW, MS | APPLICATION SPECIALIST/WATER QUALITY SPECIALIST

Mr. Barrow is a co-founder of HAB Aquatic Solutions and has over 20 years of experience in fisheries, surface water quality/aquatic habitat management and research. He has performed the role of a phosphorus inactivation application specialist on 82 lake restoration projects.

While earning his M.S. from the University of Nebraska-Lincoln (UNL), Mr. Barrow's research led to insights on the management of sensitive fish species related to unique water quality stressors, including assessing/interpreting/predicting the response of fishes to pollutants and the available aquatic biota. Mr. Barrow conducted research that advanced our ability to address numerous unique water quality challenges and pollutant effects. Specific areas of expertise include communication with public, private agencies and businesses discussing lake ecology and restoration and management, watershed management, biological indicators of water quality, phytoplankton ecology and management, nutrient inactivation (alum), determination of appropriate water quality goals, water quality monitoring, internal

phosphorus loading, and determining impacts of toxic algae using water quality and biological information.

As a faculty member at UNL, Mr. Barrow obtained $5.96 million in funding to support water quality research, authored over 15 publications, and guest lectured courses in Limnology and Lake and Reservoir Restoration. Mr. Barrow established a nationally unique lake water quality volunteer monitoring program. Mr. Barrow is also a graduate of the National Extension Leadership and Development and is a leader in water quality/aquatic habitat management and toxic algae assessment.

BERNIE RUPPERT | PRODUCT TRANSFER SPECIALIST

Mr. Ruppert has 9 years of experience with lake phosphorus inactivation projects. He has performed the role of a product transfer specialist on 63 of HAB's lake restoration projects. His specific project tasks include equipment mobilization/demobilization, supervision of deliver truck off-loading, on-shore product storage management, product transfer to application barge, equipment maintenance/repair and the enforcement of numerous safety plan tasks.

6 Cost Proposal

6.1.1 Total Project Cost

The **total lump sum cost** to conduct the project as described in the RFQ and Technical Specifications is **$114,659.00** for the Hyland Lake buffered alum application.

TASK ORDER No. 25b – Duck Lake Water Quality Improvement Project Design and Construction Administration
Pursuant to Agreement for Engineering Services
Riley Purgatory Bluff Creek Watershed District and BARR Engineering Company.
April 26, 2019

This Task Order is issued pursuant to Section 1 of the above-cited engineering services agreement between the Riley Purgatory Bluff Creek Watershed District (RPBCWD) and BARR Engineering Company (Engineer) and incorporated as a part thereof.

A. Description of Services:

The RPBCWD's 2018 Watershed Management Plan (Planning for the Next 10 Years 2018-2027; Plan) and 2018 budget identified the Duck Lake DL_3 phosphorus load reduction project for implementation in 2018. RPBCWD staff attempted to coordinate this potential project with the city of Eden Prairie's planned reconstruction of Duck Lake Road. The City's current plan is to construct stormwater management facilities that are sufficient solely for their road reconstruction project needs rather than coordinating with the potential RPBCWD load reduction project. Therefore, RPBCWD staff identified a need for a subwatershed assessment and project implementation to identify and construct effective projects within the Duck Lake watershed to achieve the goals outlined in the 10-year plan.

Following the capital improvement process in the 10-year plan, Barr developed a phased approach to implement this project. Phase 1, watershed assessment, was described in detail in Task Order 25, and included five major tasks that were intended to identify opportunities for alternative stormwater management best management practices (BMPs) within the Duck Lake Watershed. Phase 1 was authorized by the RPBCWD Board of Managers on October 3, 2018, and RPBCWD staff presented the results of Phase 1 at a public hearing on April 3, 2019. Following the public hearing, the RPBCWD Board of Managers ordered the project.

During Phase 1, four types of stormwater BMPs were identified for implementation:

- Rainwater gardens (10 to be constructed on private property)
- Trees (50 to be planted on private property)
- Planter Boxes (10 to be constructed and installed on private property)
- Rain barrels (60 to be distributed for installation by homeowners)

During Phase 2, Engineer will provide final design plans, specifications, and construction observation for the rainwater garden BMPs identified in Phase 1. Engineer will also provide specifications, request-for-quote support, and public outreach support for tree installation.

District staff have expressed a desire to have three contractors each provide a prototype design and planter box based on the 'Philadelphia' example selected by District staff. Once the District selects the prototype best suited for installation, it is assumed that staff will work with legal counsel to develop the necessary contract documents to retain the contractor to construct and install the planter boxes on private property. Because there appears to be no need for construction drawing or specifications, this scope of work has allocated a minimal amount of time to assist District staff (up to 4 hours.) It is assumed that staff will handle all aspects of rain barrel acquisition and distribution.

B. Scope of Services:

Design and Construction Administration

Task 1. Regular Project Meetings

a. Conduct up to three (3) project meetings at the RPBCWD office of up to one hour each to coordinate with and inform RPBCWD staff regarding project progress.

Task 2. Property Owner Outreach and Education

a. Create high level, simplistic, hand-drawn conceptual sketches of proposed rainwater garden BMPs to help property owners visualize where the BMP would be located and its general extents. This sketch would be overlaid on available aerial imagery.
b. Landscape architect will participate in up to three (3) homeowner meetings to present the conceptual sketches, discuss the homeowner's planting palette preferences, and answer homeowner questions about the design and construction process. Barr has allocated 4 hours of time for the conceptual sketch stage meetings.
c. Landscape architect will participate in up to ten (10) homeowner meetings to present preliminary CAD drawings and solicit homeowner comments for plan revisions. Barr has allocated 8 hours of time for the preliminary CAD drawing stage meetings.

Task 3. Tree Planting Support

a. Provide technical specifications to support request for quote document preparation by District staff and legal counsel.
b. Perform pre-planting inspection to ensure flagging placement at appropriate planting location.
c. Perform post-planting inspection to ensure that trees were planted at the correct locations and according to specifications.

Task 4. Preliminary (60%) Design and Opinion of Probable Cost

a. Engineer will contact Gopher One Call for utility locates and perform infiltration testing at no more than ten (10) proposed rainwater garden locations.
b. Engineer will coordinate site surveys by an approved contractor from the RPBCWD engineering pool. It is assumed that the surveying contractor with contract directly with RPBCWD for those services.
c. Engineer will create preliminary BMP plans in CAD for up to ten (10) BMPs with willing property owners identified in Phase 1 and confirmed during meetings with RPBCWD staff. Engineer will provide the preliminary plans to RPBCWD staff for comment and approval.
d. Engineer will perform one revision of the preliminary plans in response to RPBCWD staff and property owner comments. (Revisions that affect functionality of the BMP will be presented to RPBCWD staff for review and comment.)
e. Engineer will create 60% construction drawings, incorporating property owner comments where necessary and appropriate.
f. Engineer will provide construction opinions of probable cost based on the 60% construction drawings.
g. Engineer will create preliminary technical specifications to accompany the request for quotes form. It is assumed that the request for quotes form and associated contract

document will be drafted by District legal counsel. Barr has allocated 2 hours of time to provide input to District staff and legal counsel on the request for quotes form.

Task 5. Final Design, Quote Assistance, and Construction Observation

a. Engineer will provide final construction drawings and specifications. Engineer will provide technical specifications and a project bid form for the project. Engineer will develop technical specification sections using Construction Specifications Institute (CSI) format including all "upfront" sections such as general conditions, supplementary conditions, summary of work and those related to bidding and contracting. Engineer assumes specifications will be in CSI format with Engineers Joint Contract Documents Committee (EJCDC) general conditions. Engineer reserves the right to modify budget if technical specification format is other than stated in this paragraph. It is assumed that RPBCWD Counsel will provide one round of edits and review comments.
b. Assuming the engineer's opinion of probable construction cost is less than $175,000, Engineer will assist the RPBCWD in requesting quotes from up to three qualified contractors in lieu of the public bidding project as allowed for by the recent change in threshold in Minnesota law for required bidding for contracts for public capital projects.
c. This scope of work assumes the Engineer to provide no more than 50 hours of construction observation and administration (requests for information, change orders, payment applications, etc.) to oversee implementation of plans and specifications.
d. Engineer will provide monthly construction updates including progress reports and construction photos to RPBCWD staff.

Task 6. Develop Stakeholder Agreements

RPBCWD staff will coordinate with the individual property owner and/or city of Eden Prairie to assist RPBCWD legal counsel in developing the needed access and maintenance agreements regarding the Project design, construction and maintenance. RPBCWD staff and counsel will lead this task. Engineer will provide up to 2 hours of technical support during the development of the agreement.

Assumptions

a. RPBCWD staff will be responsible for all coordination of meetings with property owners.
b. RPBCWD staff will be responsible for coordination with the city of Eden Prairie.
c. RPBCWD staff or legal counsel will be responsible for the development of property owner agreements and that these agreements do not require legal descriptions by the Engineer. If legal descriptions are needed those services would be provided on a time and expense basis beyond the anticipated budget for Task Order 25b.
d. Construction will not trigger RPBCWD or City permitting requirements.
e. Post-construction survey, record drawings and construction documentation report are excluded from this scope of work.
f. Soil borings are not included in this proposal. If needed, borings will be contracted separately and billed to the RPBCWD. Engineer will assist in the selection of a soil testing contractor and direct their work.
g. The opinion of probable construction cost for the project will be less than $175,000, thus allowing quote solicitation rather than public bidding.

h. Engineer will provide up to 2 hours of technical support for stakeholder agreements.
i. Total time required to complete construction administration (field observation, payment application processing, response to questions, etc.) will not exceed 50 hours.
j. Property access and/or easement services are not included. If property acquisition/easements are needed, those services will be coordinated with the RPBCWD Administrator on a time and expense basis.
k. The proposed budget includes mileage reimbursement expenses for site visits and site observation.
l. RPBCWD staff will provide all available and applicable GIS and CAD files to Engineer in an electronic format.
m. Preparation of a phase 1 environmental assessment is not included.
n. Preparation of an Environmental Assessment Worksheet (EAW) or Environmental Impact Statement is not included.
o. RPBCWD staff will be responsible for all efforts associated with rain barrels.
p. Engineering involvement in planter box design, prototyping, contracting, and implementation is limited to no more than 4 hours.

C. Deliverables:
The following Phase 2 deliverables will be prepared and provided by Engineer to the RPBCWD:

a. Simple rainwater garden concept sketches to support landowner outreach
b. 60% design plans and opinion of probable cost
c. Final design plans, opinion of probable cost, specifications, and request for quote documents

D. Budget:
Services under Task Order 25b will be compensated for in accordance with the engineering services agreement and will not exceed $46,800 without written authorization by the Administrator or Board of Managers. The following table provides a breakdown of the anticipated cost for major tasks associated with scope of services describe above.

Table 1. Phase 2 Engineering Services Budget Summary

Task	Task Description	Anticipated Budget	Anticipated Completion Date
1	Project Meetings with District (no more than 3)	$ 3,500	--
2	Outreach Assistance	$ 3,100	June 2019
3	Tree Planting Support	$ 3,100	July 2019
4	Preliminary Design	$ 18,400	July 2019
5	Final Design, Bidding Assistance, and Construction Observation	$ 18,700	November 2019
Total		**$ 46,800**	

E. Schedule and Assumptions Upon Which Schedule is Based
The proposed schedule (above) assumes authorization of Phase 2 will occur on May 1, 2019. The schedule may be modified depending on actual initiation of project work, permit approvals, and stakeholder coordination efforts. Engineer will work with RPBCWD staff to refine the schedule as information-gathering and property owner meetings progress.

IN WITNESS WHEREOF, intending to be legally bound, the parties hereto execute and deliver Phase 2 of this Agreement.

CONSULTANT	**RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT**
By_____	By_____
Its Vice President	Its_____
Date:	Date:
	APPROVED AS TO FORM & EXECUTION
	_____

resourceful. naturally.
engineering and environmental consultants

BARR

April 26, 2019

President Dick Ward and Board of Managers
Riley-Purgatory-Bluff Creek Watershed District
18681 Lake Drive East
Chanhassen, MN 55317

Re: Bluff Creek Tributary Restoration Project – Change Order #1
Barr Project # 23/27-0053.14-021

Dear President Ward and Board of Managers:

Enclosed is the Change Order #1 from Sunram Construction Inc. for compensation for the unexpected delay in the project schedule due to US Army Corps of Engineers requirements for additional investigation prior to issuing a permit. Upon your review and approval, please sign three copies and return one copy to me, one copy to the contractor and retain the remaining copy for your files.

Items included in by this change order include a 5% increase in the project price to account for wage increases and increased cost of materials. A lump sum pay item will be added to the contract to account for the increase.

Barr Engineering has reviewed the application, and is recommending approval of Change Order 1 in the amount of **$10,679.95**. This will be included on a future payment application, so payment may be completed at that time.

Please call me at 952-832-2706 if you have any questions or concerns about the change order, or about any other related matters.

Sincerely,

Jeff Weiss, P.E.
Barr Engineering Co.

c: Claire Bleser, RPBCWD
Ryan Sunram, Sunram Construction, Inc.

Enclosure #1 – Change Order 1

Change Order

No. 1

Date of Issuance: 4-26-19 Effective Date: 5-1-19

Project: Bluff Creek Tributary Restoration Project	Owner: RPBCWD	Owner's Contract No.:
Contract: Bluff Creek Southwest Branch Stabilization and Restoration Project Chanhassen, MN Contract Documents		Date of Contract: November 8, 2018
Contractor: Sunram Construction, Inc.		Engineer's Project No.:23/27-0053.14-021

The Contract Documents are modified as follows upon execution of this Change Order:

Description:

The Contractor is hereby directed to make the following changes in the Contract Documents for the Bluff Creek Southwest Branch Stabilization and Restoration Project in Chanhassen, MN. The following items are included in this change order:

1. Change in Contract Time and Price

Description: The Contract Time and Price is being adjusted to account for an unexpected delay in the project.

Reason for Change: There was an unexpected project delay in obtaining the project permit from the US Army Corps of Engineers (USACE). At approximately the time when construction was set to begin, the USACE provided a notification that an additional cultural investigation would be required prior to issuing a permit for the project. The investigation requires non-frozen conditions, so the investigation cannot be completed until after spring thaw. As a result of the delay the contractor requested a 5% increase in contract price to cover all labor and material increases.

Change in Contract Price: A lump sum pay item (Item II) equal to 5% percent of the contract price will be added to the contract to account for the delay. The total contract price will increase by $10,679.95 to $224,278.95 to cover.

Change in Contract Time: The dates in Section 7 of the Instructions to Bidders shall be changed as follows:

Section 7.02 of the Instructions to Bidders shall be modified to read "The Work shall commence on or about October 1, 2019 or within 10 calendar days after the date stated in the Notice to Proceed, whichever is later."

Section 7.04 of the Instructions to Bidders shall be modified to read "Final planting shall be completed in the spring and Work shall be complete and ready for final payment in accordance with paragraph 14.07 of the General Conditions not later than June 15, 2020, at which point the vegetation warranty period will commence. The warranty period will end and warranty work must be complete and ready for final payment in accordance with paragraph 14.07 of the General Conditions not later than June 15, 2023."

Attachments (list documents supporting change):

CHANGE IN CONTRACT PRICE:	CHANGE IN CONTRACT TIMES:
Original Contract Price: $ 213,599.00	Original Contract Times: ☐ Working days ☒ Calendar days Substantial completion (days or date): 6/15/19 Ready for final payment (days or date): 6/15/22
[Increase] [Decrease] from previously approved Change Orders No. 0 to No. 0: $ N/A	[Increase] [Decrease] from previously approved Change Orders No. 0 to No. 0: Substantial completion (days): N/A Ready for final payment (days): N/A
Contract Price prior to this Change Order: $ 213,599.00	Contract Times prior to this Change Order: Substantial completion (days or date): 6/15/19 Ready for final payment (days or date): 6/15/22
Increase of this Change Order: $ 10,679.95	Increase of this Change Order: Substantial completion (days or date): 6/15/20 Ready for final payment (days or date): 6/15/23
Contract Price incorporating this Change Order: $ 224,278.95	Contract Times with all approved Change Orders: Substantial completion (days or date): 6/15/20 Ready for final payment (days or date): 6/15/23

RECOMMENDED:	ACCEPTED:	ACCEPTED:
By: _____	By: _____	By: Lee Swaim
Engineer (Authorized Signature)	Owner (Authorized Signature)	Contractor (Authorized Signature)
Date: 4/26/19	Date: _____	Date: 4-26-2019

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

18681 Lake Drive East
Chanhassen, MN 55317
952-607-6512
www.rpbcwd.org

Riley Purgatory Bluff Creek Watershed District Permit Application Review

Permit No: 2019-011

Considered at Board of Managers Meeting: May 1, 2019

Received complete: March 28, 2019

Applicant:	Bre Retail Residual Owner 6
Consultant:	Brian Mundstock, Sunde Engineering
Project:	Westwind Plaza: Chase Bank – demolition of a portion of the existing parking lot and construction of a new bank building. The site consists of a shopping plaza and parking lot. Underground infiltration systems will provide stormwater runoff volume, rate, and water quality control.
Location:	4795 County Rd 101, Minnetonka, MN
Reviewer:	Heather Hlavaty, E.I.T. and Scott Sobiech, P.E., Barr Engineering

Proposed Board Action

Manager _____ moved and Manager _____ seconded adoption of the following resolutions based on the permit report that follows and the presentation of the matter at the May 1, 2019 meeting of the managers:

Resolved that the modification to the application for Permit 2019-011 is approved, subject to the conditions and stipulations set forth in the Recommendations section of the attached report;

Resolved that on determination by the RPBCWD administrator that the conditions of approval have been affirmatively resolved, the RPBCWD president or administrator is authorized and directed to sign and deliver Permit 2019-011 to the applicant on behalf of RPBCWD.

Upon vote, the resolutions were adopted, _____ [VOTE TALLY].

Applicable Rule Conformance Summary

Rule	Issue		Conforms to RBPCWD Rules?	Comments
C	**Erosion Control Plan**		See comment.	See rule-specific permit condition C1.
J	**Stormwater Management**	Rate	Yes.	
		Volume	See comment.	See stipulation 1.
		Water Quality	Yes.	
		Low Floor Elev.	Yes.	
		Maintenance	See comment.	See rule-specific permit condition J1.
		Chloride Management	See comment.	See stipulation 2.
		Wetland Protection	Yes.	
L	**Permit Fee**		Yes.	$1,500 received March 14, 2019
M	**Financial Assurance**		See comment.	The financial assurance is calculated at $88,895

Background

The applicant is demolishing a portion of an existing parking lot and constructing a new bank building within the shopping plaza at the intersection of Highway 101 and Highway 7 in Minnetonka, MN. The project includes two subsurface infiltration systems with pre-treatment sump manholes before entering the systems. The two subsurface infiltration systems are located on the east and west edges of the disturbed area beneath the parking lot. The overflow from the systems will discharge into the existing stormsewer to the north of the site. The combination of these best management practices provides stormwater quantity, volume and quality control.

There is an onsite wetland and Purgatory Creek located to the north and adjacent to the site. Because the creek and wetland are not downgradient from the proposed land disturbing activities, wetland buffer requirements do not apply to the proposed project.

The project site information is summarized below:

Project Site Information	Area (acres)
Total Site Area	10.2
Existing Site Impervious	7.6

Project Site Information	Area (acres)
Disturbed Site Impervious Area	0.85 (11.2%)
Change in Site Impervious Area	-0.13 (1.7% decrease)
Total Disturbed Area	0.87

The following materials were reviewed in support of the permit request:

1. Signed Application dated March 14, 2019
2. Civil Construction Plan Sheets (9 sheets) dated February 28, 2019 (Revised on March 27, 2019)
3. Survey conducted by Sunde Land Surveying, LLC. dated September 20, 2018
4. Proposed drainage map received on March 25, 2019
5. Stormwater Management Narrative dated February 28, 2019 (revised March 27, 2019)
6. Electronic HydroCAD models received on March 12, 2019 (revised March 28, 2019)
7. Electronic P8 model received on March 28, 2019
8. P8 and HydroCAD model output dated February 28, 2019 (revised March 27, 2019)

Rule C: Erosion and Sediment Control

Because the project will involve 0.87 acres of land-disturbing activity, the project must conform to the requirements in the RPBCWD Erosion and Sediment Control rule (Rule C, Subsection 2.1). The erosion control plan prepared by Sunde Engineering, LLC. includes installation of silt fence, inlet silt sacs to protect storm sewer catch basins, biologs, a rock construction entrance, decompaction of areas compacted during construction, and retention of native topsoil onsite. To conform to the RPBCWD Rule C the following revisions are needed:

C1. The name and contact information of the general contractor responsible for the site must be provided.

Rule J: Stormwater Management

Because the project will disturb 0.87 acres of land-surface area, the project must meet the criteria of RPBCWD's Stormwater Management rule (Rule J, Subsection 2.1). The criteria listed in Subsection 3.1 will apply to only to the disturbed area because the project will disturb less than 50% of the existing impervious surface on the parcel (Rule J, Subsection 2.3).

The developer is proposing construction of two subsurface infiltration systems to provide the rate control, volume abstraction and water quality management on the site. Sump manholes with weirs will serve as pretreament for runoff into the infiltration basins.

Rate Control

In order to meet the rate control criteria listed in Subsection 3.1.a, the 2-, 10-, and 100-year post development peak runoff rates must be equal to or less than the existing discharge rates at all locations where stormwater leaves the site. The applicant used a HydroCAD hydrologic model to simulate runoff rates for pre- and post-development conditions for the 2-, 10-, and 100-year frequency storm events using a nested rainfall distribution, and a 100-year frequency, 10-day snowmelt event. The existing and proposed 2-, 10-, and 100-year frequency discharges from the disturbed site area are summarized in the table below. The proposed project is in conformance with RPBCWD Rule J, Subsection 3.1.a.

2-Year Discharge (cfs)		10-Year Discharge (cfs)		100-Year Discharge (cfs)		10-Day Snowmelt (cfs)	
Ex	Prop	Ex	Prop	Ex	Prop	Ex	Prop
3.4	0.7	5.2	2.7	8.5	6.8	0.17	0.14

Volume Abstraction

Subsection 3.1.b of Rule J requires the abstraction onsite of 1.1 inches of runoff from all new or disturbed impervious surface of the parcel. An abstraction volume of 2,874 cubic feet is required from the 0.72 acres (31,349 square feet) of disturbed impervious area on the site for volume retention.

Soil borings performed by Braun Intertec on February 23, 2013 show that soils in the project area are primarily silty sand. Groundwater was encountered in the soil borings at a depth of 17 feet. At this depth, the subsurface infiltration systems will achieve the required 3-foot separation between the groundwater elevation and bottom of the infiltration practice. Based on the design infiltration rate of 0.2 inches per hour for silty sand, the subsurface basins will drawdown within 48 hours (Rule J, subsection 3.1biii). The table below summarizes the volume abstraction for the site. The engineer concurs with the modeling, and finds that the proposed project conforms with Rule J, Subsection 3.1.b.

	Abstraction Depth (inches)	Abstraction Volume (cubic feet)
Requirement	1.1	2,874
Provided	1.2	3,088

Water Quality Management

Subsection 3.1.c of Rule J requires the Applicant provide for at least 60 percent annual removal efficiency for total phosphorus (TP), and at least 90 percent annual removal efficiency for total suspended solids (TSS) from site runoff, and no net increase in TSS or TP loading leaving the site from existing conditions. The Applicant is proposing two subsurface infiltration systems to achieve the

required TP and TSS removals and submitted a P8 model to estimate the TP and TSS removals. The results of this modeling are summarized in Tables below showing the annual TSS and TP removal requirements are achieved and that there is no net increase in TSS and TP leaving the site. The engineer concurs with the modeling, and finds that the proposed project is in conformance with Rule J, Subsection 3.1.c.

Annual TSS and TP removal summary:

Pollutant of Interest	Regulated Site Loading (lbs/yr)	Required Load Removal (lbs/yr)	Provided Load Reduction (lbs/yr)
Total Suspended Solids (TSS)	495.1	445.6 (90%)	472.7 (95%)
Total Phosphorus (TP)	1.6	1.0 (60%)	1.4 (88%)

Summary of net change in TSS and TP leaving the site

Pollutant of Interest	Existing Site Loading (lbs/yr)	Proposed Site Load after Treatment (lbs/yr)	Change (lbs/yr)
Total Suspended Solids (TSS)	566.6	22.4	-544.2
Total Phosphorus (TP)	1.9	0.2	-1.7

Low floor Elevation

No structure may be constructed or reconstructed such that its lowest floor elevation is less than 2 feet above the 100-year event flood elevation or less than 1 foot above the emergency overflow according to Rule J, Subsection 3.6. The low floor elevation of the homes and the adjacent stormwater management feature is summarized below and shows proposed project is in conformance with Rule J, subsection 3.6.

Location Riparian to Stormwater Facility	Low Floor Elevation of Building (feet)	100-year Event Flood Elevation of Adjacent Stormwater Facility (feet)	Freeboard to 100-year Event (feet)
Chase Bank Building	890.5	886.7	3.8

Maintenance

Subsection 3.7 of Rule J requires the submission of a maintenance plan. All stormwater management structures and facilities must be designed for maintenance access and properly maintained in perpetuity to assure that they continue to function as designed.

J1. Permit applicant must provide a maintenance and inspection declaration. A maintenance declaration template is available on the permits page of the RPBCWD website. (http://www.rpbcwd.org/permits/). A draft declaration must be provided for District review prior to recording.

Wetland Protection

Because the applicant has demonstrated, and the engineer concurs, that the proposed flow rate and volumes flowing towards the wetland is less than the existing flows, the project meets the Bounce and Inundation criterion and is in conformance with Rule J, subsection 3.10a. In addition, the project does not propose to use the existing wetland for stormwater treatment, and the proposed subsurface infiltration systems treat the runoff from the disturbed areas to 95% TSS removal and 88% TP removal, thus conforming to Rule J, subsection 3.10b

Chloride Management

Subsection 3.8 of Rule J requires the submission of chloride management plan that designates the individual authorized to implement the chloride management plan and the MPCA-certified salt applicator engaged in implementing the plan. To close out the permit and release the $5,000 in financial assurance held for the purpose, Permit applicant must provide a chloride management plan that designates the individual authorized to implement the chloride management plan and the MPCA-certified salt applicator engaged in implementing the plan at the site.

Rule L: Permit Fee:

Fees for the project are:

Rule C & J $1,500

Rule M: Financial Assurance:

Rules C: Silt fence and bio-logs: 897 L.F. x $2.50/L.F. = ...$2,240

Inlet protection: 5 x $100 =.....$500

Rock Entrance: 1.0 x $900 =.....$900

Restoration: 0.87 acres x $2,500/acre =.....$2,175

Rules J: Subsurface Infiltration systems: $60,000 x 125% of engineer's opinion of cost= $75,000

Contingency (10%) $8,080

Total Financial Assurance.....$88,895

Applicable General Requirements:

1. The RPBCWD Administrator and Engineer shall be notified at least three days prior to commencement of work.
2. Construction shall be consistent with the plans and specifications approved by the District as a part of the permitting process. The date of the approved plans and specifications is listed on the permit.
3. Return or allowed expiration of any remaining surety and permit close out is dependent on the permit holder providing proof that all required documents have been recorded and providing

as-built drawings that show that the project was constructed as approved by the Managers and in conformance with the RPBCWD rules and regulations.

Findings

1. The proposed project includes the information necessary, plan sheets and erosion control plan for review.
2. The proposed project will conform to Rules C and J if the Rule Specific Permit Conditions listed above are met.

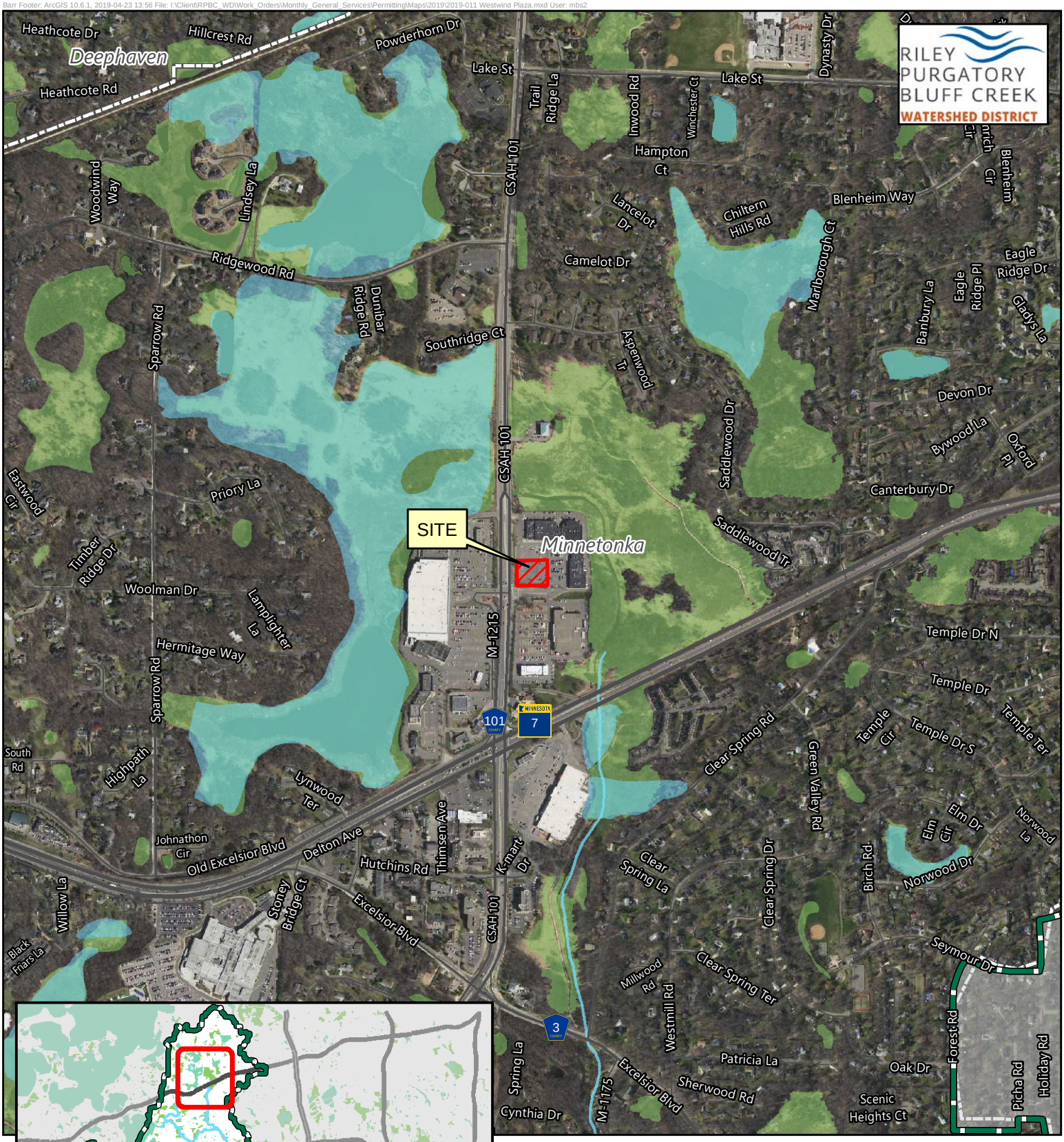
Recommendation:

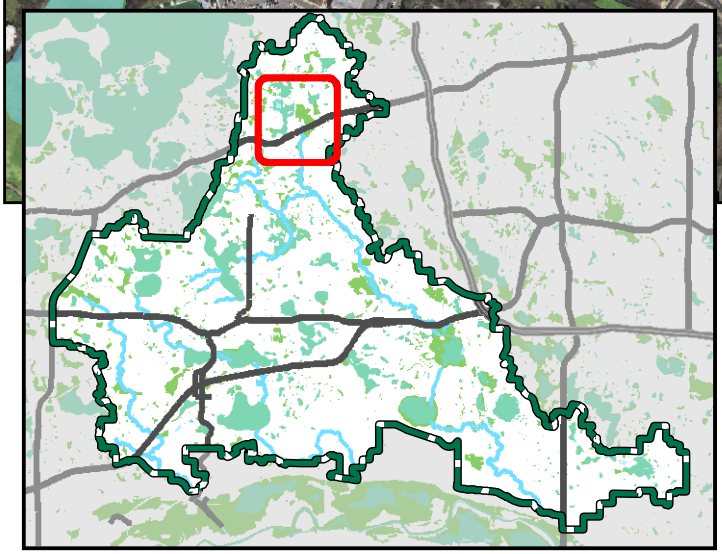
Approval of the permit issuance contingent upon:

1. Continued compliance with General Requirements.
2. Financial Assurance in the amount of $88,895.
3. The applicant providing the name and contact information of the general contractor responsible for the site.
4. Receipt in recordation a maintenance declaration for the stormwater management facilities. Drafts of any and all documents to be recorded must be approved by the District prior to recordation.

By accepting the permit, when issued, the applicant agrees to the following stipulations:

1. Per Rule J, Subsection 3.1.b.ii measured infiltration capacity of the soils at the bottom of the infiltration systems must be provided. The applicant must submit documentation verifying the infiltration capacity of the soils and that the volume control capacity is calculated using the measured infiltration rate divided by 2. If infiltration capacity is less than needed to conform with the volume abstraction requirement in subsection 3.1b, design modifications to achieve compliance with RPBCWD requirements will need to be submitted (in the form of an application for a permit modification or new permit).
2. Per Rule J Subsection 4.5, upon completion of the site work, the permittee must submit as-built drawings demonstrating that at the time of final stabilization, stormwater facilities conform to design specifications as approved by the District.
3. The work on the Westwind Plaza parcel under the terms of permit 2019-011, if issued, must have an impervious surface area and configuration materially consistent with the approved plans. Design that differs materially from the approved plans (e.g., in terms of total impervious area) will need to be the subject of a request for a permit modification or new permit, which will be subject to review for compliance with all applicable regulatory requirements.





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Feet

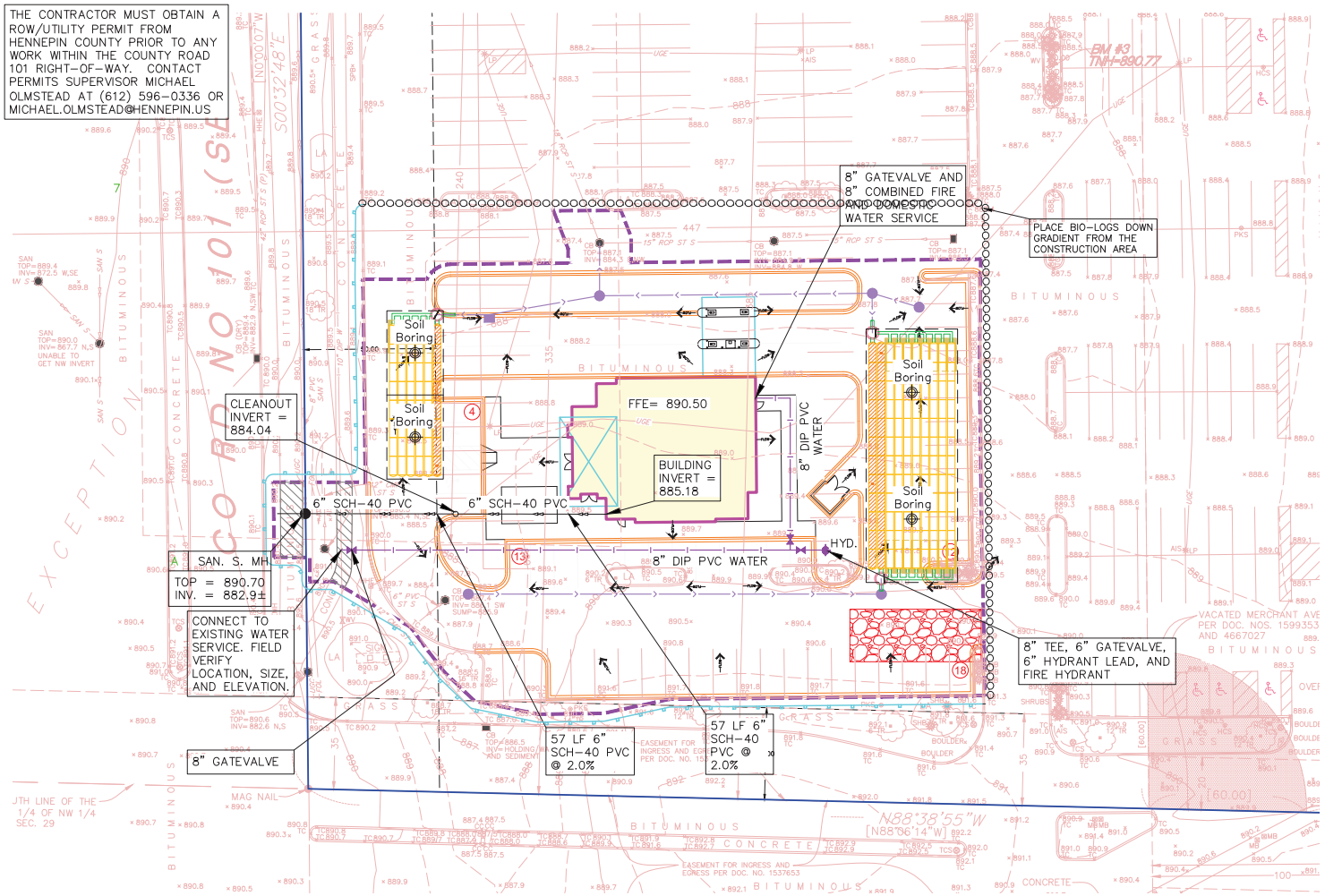
0 1,000

Permit Location Map

WESTWIND PLAZA

Permit 2019-011

Riley Purgatory Bluff Creek Watershed District

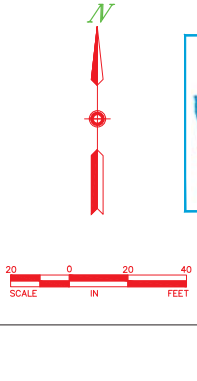


WATER DISTRIBUTION SYSTEM:

1. Separation of Water and Sewer: Construct sewer and water services in accordance with Minnesota Rules, part 4714.0721 and Uniform Plumbing Code (UPC) parts 720.0 and 721.0. Provide a minimum horizontal separation of 10 feet between all water and sewer lines, including manholes, catch basins, storm sewer, sanitary sewer, draintile, or other potential sources for contamination. Measure the separation distance from the outer edge of the pipe to the outer edge of the contamination source (outer edge of structures, piping, etc.) At water and sewer crossings, the bottom of the water pipe located within ten feet of the point of crossing must be at least 12-inches above the top of the sewer. When this is not feasible, the sewer pipe material must be approved for use inside of or within a building in accordance with the requirements of Minnesota Rules part 4714.0701 and UPC part 701.0. No joints or connections are allowed on the water line within 10-feet of the crossing.
2. Watermain Depth: Maintain 8-feet of cover over the top of the water lines to the finished grade. Verify elevation of proposed and existing water lines at all utility crossings. Install the water lines at greater depths in order to clear storm sewers, sanitary sewers, or other utilities as required. Include costs to lower water lines in the base bid.
3. Disinfection: Disinfect all completed watermains in accordance with AWWA Standard C651. If the tablet or continuous feed methods are used, disinfect using with water that contains at least 50 ppm of available chlorine in accordance with Minnesota Rules, part 4714.0609 and UPC part 609.9. Do not use the tablet method on solvent-welded plastic or on screwed-joint steel pipe because of the danger of fire or explosion from the reaction of the joint compounds with the calcium hypochlorite. Retain the treated water in the pipeline for at least 24 hours. Measure the chlorine residual at the end of the 24 hour period. The free chlorine residual must be at least 10 mg/l measured at any point in the line. Measurement of the chlorine concentration at regular intervals shall be in accordance with Standard Methods, AWWA M-12, or using appropriate chlorine test kits.
4. Testing: Pressure test and perform bacteriological tests on all water lines under the supervision of the City Public Works Department. Notify the City at least 24 working hours prior to any testing. Pressure test the water system in accordance with the UPC part 609.4. Pressurize the waterline to a water pressure of 1034-kPa (150-psi) gauge pressure (measured at the point of lowest elevation) by means of a pump connected to the pipe in a satisfactory manner. Do not add water to the watermain in order to maintain the required pressure during the water main pressure testing. The test section of pipe shall withstand the test without leaking for a period of not less than 15 minutes.
5. All water supply piping connected to municipal water main must have a 150 psi minimum pressure rating.
6. Ductile iron pipe (DIP) water services must comply with AWWA C151/ANSI A21.51 or AWWA C115/ANSI A21.15 (See Minnesota Rules part 4714.0604 and UPC part 604.0.). Use Thickness Class 52 DIP with push-on joints. Use only ANSI 304 stainless steel bolts and nuts on all watermain fittings, valves, and hydrants. Polyethylene encasement is required on all ductile iron pipe.
7. Use mechanical joint restraint devices for joint restraint on all watermain bends having a vertical or horizontal deflection of 22-1/2 degrees or greater, all valves, stubs, extensions, tees, crosses, plugs, all hydrant valves, and all hydrants in accordance with City requirements. Use "Series 1100 Megalug" manufactured by EBAA Iron Inc., Eastland, Texas, or approved equal, installed in accordance with manufacturer's recommendations for restraint on Ductile Iron Pipe. Restraining devices are to have epoxy coating or approved equivalent. Restraining device hardware shall be ANSI 304 stainless steel, or approved equivalent.
8. At all valve locations which require a 12" or smaller valve, install gate valves which are of the compression resilient seated (CRS) type. Use American Flow Control's Series 2500 Ductile Iron Resilient Wedge Gate Valve, or approved equal. Gate valves shall conform to AWWA C509. Install cast iron valve boxes conforming to ASTM A48 at each valve location. Valve boxes shall be the three-piece type with 5-1/4" shafts. Use Tyler 6860-G with No. 6 base, or equivalent. Valve boxes shall have at least 6" of adjustment above and below finished grade. Drop covers on valve boxes shall be round and bear the word "WATER" cast on the top. Use Tyler 6860-G "Stayput" covers with extended skirt, or equivalent. All valve hardware shall be ANSI 304 stainless steel, or approved equivalent.
9. Fire hydrants shall be in accordance with the requirements of the local municipality. Do not connect hydrant drains to sanitary sewers or storm sewers. Do not locate hydrants within 10 feet of sanitary sewers or storm sewers. When placing fire hydrants in locations where the groundwater table is less than 8 feet below the ground surface, plug the hydrant drain holes and equip the hydrants with a tag stating the need for pumping after use. Maintain a 3-foot clear space around the circumference of all fire hydrants. All hydrant hardware shall be ANSI 304 stainless steel, or approved equivalent.
10. Do not connect new watermain to existing until the new water main is pressure tested and disinfected.
11. Install detectable underground marking tape directly above all pvc, polyethylene, and other nonconductive underground utilities at a depth of 457 mm (18 inches) below finished grade, unless otherwise indicated. Bring the tape to the surface at various locations in order to provide connection points for locating underground utilities. Install blue Rhino TriView Flex Test Stations, or approved equal, with black caps at each surface location.
12. Threaded hose connections including hose bibbs and hydrants must include a back flow preventer device in accordance with Minnesota Rules, part 4714.0603 and UPC part 603.0. Wall hydrants must meet ASSE Standard 1019 (see Table 603.2). Where permitted by the administrative authority, wall hydrants may utilize non-removable ASSE 1052 backflow preventers or non-removable ASSE 1011 vacuum breakers and provision is made to protect from freezing (see Minnesota Rules, Chapter 4714, Sections 605.5.7, 312.6, and 301.12).
13. All newly installed or replacement pipes, pipe fittings, plumbing fittings and fixtures, including backflow preventers, that are installed on potable water systems or systems that are designed to distribute water for potable use, are required to meet the Reduction of Lead in Drinking Water Act, which establishes a maximum lead content of 0.25 percent by weighted average of the wetted surfaces. Solder and flux for potable water systems shall contain less than 0.2 percent lead. Joints must include non-corrosive non-toxic paste-type flux complying with ASTM B813 (see Minnesota Rules, Chapter 4714, Section 605.3.4). See Minnesota Rules, part 4714.0604 and UPC part 604.11.
14. Bring all site utilities to 2' outside of the building line with the exception of the water service. Extend water service into the building and up to the flange for the water meter.
15. Do not exceed the manufacturer's specifications for curvature of pipe and deflection at pipe joints. Securely close all open ends of pipe and fittings with watertight plugs when work is not in progress. Keep the interior of all pipes clean and remove any dirt or debris from joint surfaces after the pipes have been lowered into the trench. Install all valves plumb and located according to the plans.

SANITARY SEWER:

1. Unless otherwise indicated, use reinforced, precast, concrete maintenance holes conforming to ASTM C478, furnished with precast bases. Sanitary sewer maintenance holes shall be supplied with pre-formed inverts and flexible neoprene sleeve connections for all lateral lines 375 mm (15 inches) in diameter or less, unless otherwise indicated. Joints for all precast maintenance hole sections shall have confined, rubber "O"-ring gaskets in accordance with ASTM C923. The inside barrel diameter shall not be less than 48 inches.
2. All joints and connections in the sewer system shall be gastight or watertight. Use flexible compression joints to make watertight connections to manholes in accordance with Minnesota Rules part 4714.0719.6. Where permitted by the administrative authority, approved resilient rubber joints or waterstop gaskets must be used in order to make watertight connections to manholes and other structures. Use Fernco "Concrete Manhole Adaptors" or "Large Diameter Watertite", Press-Seal "Watertight Grouting Rings", or approved equal. Cement mortar joints are permitted only for repairs or connections to existing lines having such joints.
3. The building sewer starts 2 feet outside of the building. See Uniform Plumbing Code (UPC) part 715.1. Material installed within 2 feet of the building must be of materials approved for use inside of or within the building.
4. The exterior sanitary sewer piping must comply with the following requirements: (A) Double wyes may not be used for drainage fittings in the horizontal position (see Minnesota Rules, Chapter 4714, Section 310.5), because proper pipe slope cannot be maintained on both of the lateral branches. (B) Changes in direction in drainage piping must be made by appropriate use of wyes and bends (see Minnesota Rules, Chapter 4714, Section 708.0). When connecting any vertical drop to a horizontal run, use a wye and a 1/8 bend (45 deg), or a sanitary combo. A sanitary combo is a combination wye and a 1/8 bend combined in a single fitting. The reason is to form a long radius bend in order to insure that the waste is directed in the downstream direction as it enters the horizontal run. Tees are not allowed where the direction of flow changes from either vertical to horizontal or horizontal to horizontal.
5. Pipe: Use solid-core, Schedule 40, ASTM D2665 Polyvinyl Chloride (PVC) Plastic Pipe for all designated PVC sanitary sewer services outside of the building. Fittings must comply with ASTM D1866, D2665, or F794. Joints must be approved mechanical or push-on utilizing an elastomeric seal. Use of solvent cement joints is allowed for building services. Solvent cement joints in PVC pipe must include use of ASTM F656 purple primer and cement in accordance with Uniform Plumbing Code (UPC), part 605.13.2. Pipe with solvent cement joints shall be joined with PVC cement conforming to ASTM D2564. The installation must comply with ASTM D2321, which requires open-trench installation on a continuous granular bed.
6. Cleanouts: Install cleanouts on all sanitary sewer services in accordance with UPC part 719.0 and 1101.12. The distance between cleanouts in horizontal piping shall not exceed 100 feet for pipes 4-inch and over in size. Cleanouts shall be of the same nominal size as the pipes they serve. Include frost sleeves and concrete frame and pipe support. Install a meter box frame and solid lid (Neenah R-1914-A, or approved equal) over all cleanouts.
7. Testing: Pressure test all sanitary sewer lines in accordance with the Minnesota Rules parts 4714.0712 and 4714.0723 and UPC parts 712.0 and 723.0. Test all flexible sanitary sewer lines for deflection after the sewer line has been installed and backfill has been in place for at least 30 days. No pipe shall exceed a deflection of 5%. If the test fails, make necessary repairs and retest.
8. Install flexible watertight frame/chimney seals on all sanitary sewer maintenance holes. Use either Manufactured Maintenance Hole Frame/Chimney Seals or Elastomeric Waterproofing Frame/Chimney Seals.
9. Use Neenah Foundry Co. R-1642 casting with self-sealing, solid, type B lid, or approved equal, on all sanitary sewer maintenance holes. Covers shall bear the "Sanitary Sewer" label.
10. Unless otherwise indicated, use 4 ft. diameter (i.d.) pre-cast reinforced concrete structures on all sanitary sewer manholes.
11. Install a meter box and cover (Neenah R-1914-A, or approved equal) over all PVC cleanouts.
12. Install detectable underground marking tape directly above all pvc, polyethylene, and other nonconductive underground utilities at a depth of 457 mm (18 inches) below finished grade, unless otherwise indicated. Bring the tape to the surface at various locations in order to provide connection points for locating underground utilities. Install green Rhino TriView Flex Test Stations, or approved equal, with black caps at each surface location.
13. The minimum depth of cover for sanitary sewer without insulation is 6 feet. Insulate sanitary sewer services at locations where the depth of cover is less than 6 feet. Provide a minimum insulation thickness of 4 inches. The insulation must be at least 4 feet wide and centered on the pipe. Install the insulation boards 6 inches above the tops of the pipes on mechanically compacted and leveled pipe bedding material. Use high density, closed cell, rigid board material equivalent to DOW Styrofoam Highload 40 Polystyrene Insulation. Individual insulation board dimensions typically measure 4' wide by 8' long by 2" thk.
14. Install all pipe with the ASTM identification numbers on the top for inspection. Commence pipe laying at the lowest point in the proposed sewer line. Lay the pipe with the bell end or receiving groove end of the pipe pointing upgrade. When connecting to an existing pipe, uncover the existing pipe in order to allow any adjustments in the proposed line and grade before laying any pipe. Do not lay pipes in water or when the trench conditions are unsuitable for such work.



GOPHER STATE ONE CALL
WWW.GOPHERSTATEONECALL.ORG
(800) 252-1166 TOLL FREE
(651) 454-0002 LOCAL

The subsurface utility information shown on this plan is utility Quality Level D. This quality level was determined according to the guidelines of CI/ASCE 38-02, entitled "Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data."

Sunde Engineering, PLLC.
CIVIL AND ENVIRONMENTAL ENGINEERING SERVICES
16930 NESBITT AVENUE SOUTH
BLOOMINGTON, MINNESOTA 55437
(952) 881-3344 TELEPHONE
(952) 881-1913 FAX
www.sundecivil.com

WESTWIND PLAZA

MINNETONKA, MN

DATE	REVISION
03-12-2019	Watershed District Submittal
03-27-2019	Revisions per Watershed District comment

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.

P.E. NAME
DATE: 03-27-2019 REG. NO.: 23468

INFORMATION:

PROJECT NO.:	16-509
DRAWN BY:	KSD
CHECKED BY:	BHM
APPROVED BY:	BHM
SCALE:	1" = 20'
DATE:	02-28-2019

DESCRIPTION:

UTILITY PLAN

SHEET NO:

C3

3 of 9

#16-509 T. . R. . S. DRAWING: P:\2016\#16-509 Westwind Plaza Minnetonka\2019-03-27\16509C10.dwg LAYOUT: C3-Utility Plan XREF: Site Plan; XREF: Survey

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

18681 Lake Drive East
Chanhassen, MN 55317
952-607-6512
www.rpbcwd.org

Riley Purgatory Bluff Creek Watershed District Permit Application Review

Permit No: 2019-017
Received complete: April 25, 2019
Board Meeting: May 1, 2019
Applicant: ANE Group, Inc - Attention Andrei Osinsky
Consultant: Advanced Survey & Engineering Co.
Project: 6650 Pawnee Drive – The applicant is constructing a single-family home at this address. The applicant proposes a rain garden to comply with rule J.
Location: 6650 Pawnee Drive, Chanhassen 55317
Reviewer: Terry Jeffery, Watershed Planning Manager

Rule Conformance Summary

Rule	Issue		Conforms to RBPCWD Rules?	Comments
C	**Erosion Control Plan**		See Comment	See rule specific permit condition C1
J	**Stormwater Management**	Rate	Yes	
		Volume	Yes	
		Water Quality	Yes	
		Low Floor Elev.	Yes	
		Maintenance	See Comment	See rule specific permit condition J1
L	**Permit Fee**		Yes	
M	**Financial Assurance**		See Comment	The financial assurance has been calculated at $3,820.

Proposed Action

Manager _____ moved and Manager _____ seconded adoption of the following actions based on the permit report that follows and the presentation of the matter at the May 1, 2019 meeting of the managers:

Resolved that the application for Permit 2019-017 is approved, subject to the conditions and stipulations set forth in the Recommendations section of the attached report;

Resolved that on determination by the RPBCWD administrator that the conditions of approval of the variances and permit have been affirmatively resolved, the RPBCWD president or administrator is authorized and directed to sign and deliver to the applicant, Permit 2019-017 on behalf of RPBCWD. Upon vote, the resolutions were adopted, _____ [VOTE TALLY].

Project Description

On April 12, 2019, staff Jeffery was contacted by the City of Chanhassen asking if the RPBCWD had been inspecting this property as the sediment control measures were inadequate. Staff Jeffery noted at this time that no permit was issued for this property. A Notice of Probable Violation was sent to the land owner at the address found on the Carver County tax records and via email. On April 12, 2019 the builder forwarded plans to Staff Jeffery. The applicant responded on April 15, 2019 via phone. A signed application and application fee were received on April 17, 2019. Redlines were provided to the builder and the applicant on April 18, 2019.

The applicant is requesting an after the fact permit for the construction of a single-family home and appurtenances. The applicant is proposing two filtration swales to meet the requirements of Rule J – Stormwater Management.

The project site information is summarized below:

1. Total Site Area: 0.42 acre (18,138 square feet)
2. Existing Site Impervious Area: 0 square feet
3. New in Site Impervious Area: 2,892 square feet
4. Disturbed Site Impervious Area: 3,189 square feet
5. Total Disturbed Area: 13,138 square feet

Submittals:

1. Permit Application dated April 17, 2019.
2. Design Plan Sheet prepared by Advanced Survey & Engineering (ASE), dated October 30, 2017 (revised April 23, 2019)
3. Notice of Probable Violation dated April 12, 2019

Rule Specific Permit Conditions

Rule C: Erosion and Sediment Control

Because the project will alter 13,138 square feet of land-surface area the project must conform to the requirements in the RPBCWD Erosion and Sediment Control rule (Rule C, Subsection 2.1).

The erosion control plan prepared by ASE includes installation of silt fence and inlet protection for storm sewer catch basins, the retention of native soils, soil decompaction and placement of six (6) inches of topsoil. To conform to the RPBCWD Rule C requirements the following revisions are needed:

C1. The Applicant must provide the name and contact information of the individual responsible for erosion and sediment control at the site. RPBCWD must be notified if the responsible party changes during the permit term.

Rule J: Stormwater Management

Because the project will alter 13,138 square feet of land-surface area, approval under the RPBCWD Stormwater Management Rule is required (Rule J, Subsection 2.1). Because it is an existing lot of record, he criteria listed in Subsection 3.1 to 3.3 will not apply. (Rule J, Subsection 3.4) The applicant is required to provide for the construction, installation, or implementation for a stormwater-management BMP consistent with guidance provided by the state of Minnesota.

The applicant is proposing to install two filtration swales on the site to comply with Rule J, Subsection 3.4. Though calculations are not required, the location and grading plan indicate that the BMP will capture a reasonable quantity of runoff from the site as to offer water quality benefits. The provided cross section detail is consistent with guidance provided in the MN Stormwater Manual.

Maintenance

Subsection 3.7 of Rule J requires the submission of maintenance plan. All stormwater management structures and facilities must be designed for maintenance access and properly maintained in perpetuity to assure that they continue to function as designed.

J1. The applicant must provide a maintenance and inspection plan on a form acceptable to the RPBCWD. This plan must, after approval by RPBCWD staff be recorded against the property and proof of recordation must be provided to RPBCWD.

Rule L: Permit Fee:

Fees for the project are:

Rule C & J $300

Rule M: Financial Assurance:

Rules C: Silt fence: 300 L.F. x $2.50/L.F. =.....$750

Restoration: 0.3 acres x $2,500/acre =.....$675

Rock Construction Entrance $900/ea =.....$900

Inlet Protection $100/ea = ...$100

Rules J: Infiltration Basin = ...$1,050

Contingency (10%) $345

Total Financial Assurance.....$3,820

Applicable General Requirements:

1. The RPBCWD Administrator shall be notified at least three days prior to commencement of work.
2. Construction shall be consistent with the plans and specifications approved by the District as a part of the permitting process. The date of the approved plans and specifications is listed on the permit.
3. The applicant must provide the name and contact information of general contractor responsible for the site.
4. The applicant must provide a financial assurance in the amount of $3,820.00.

Findings

1. The proposed project includes the information necessary, plan sheets, and erosion control plan for review.
2. The proposed project will conform to Rule C if the Rule Specific Permit Conditions listed above are met.

Recommendation:

Approval, contingent upon:

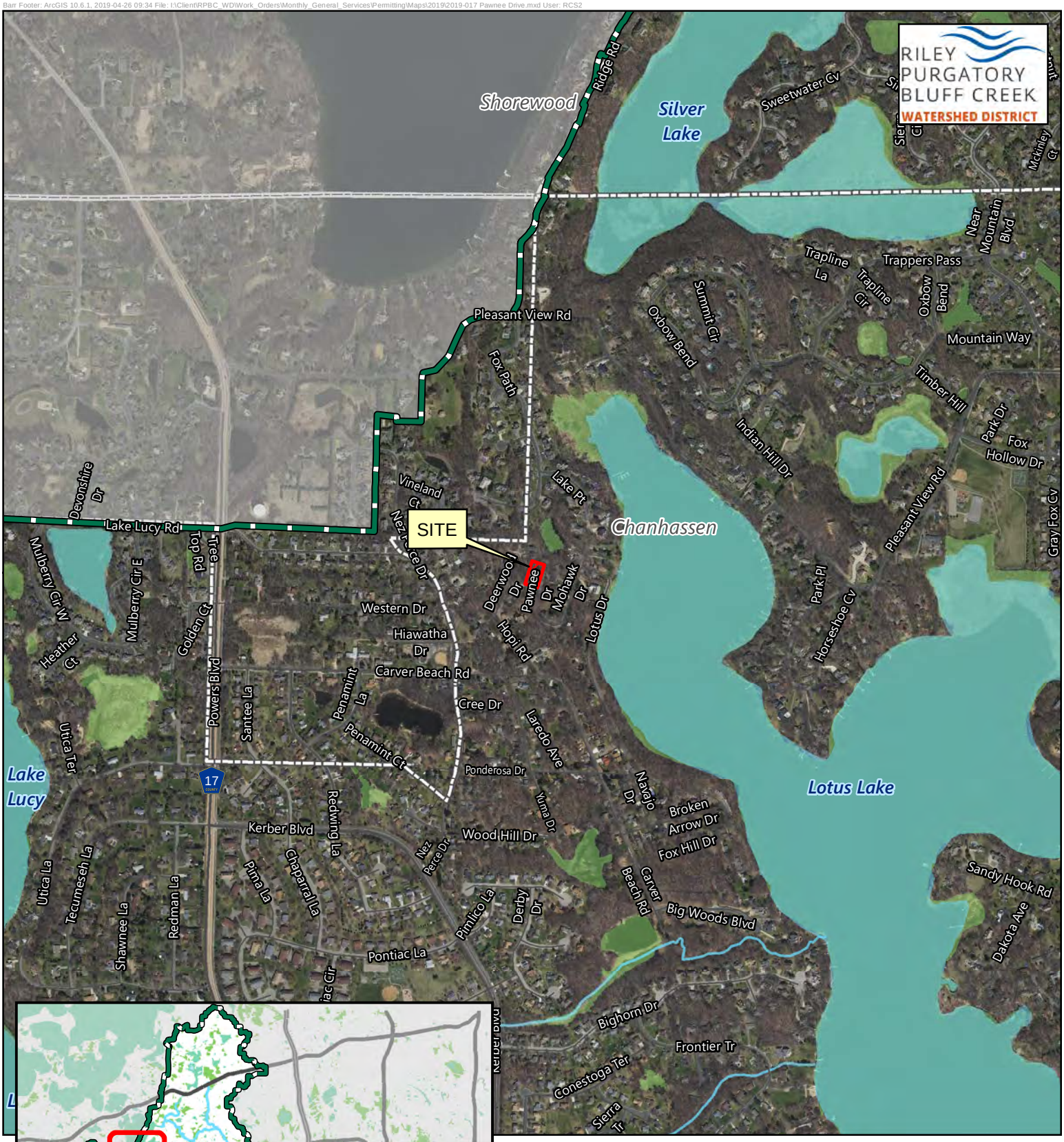
1. Continued compliance with General Requirements.

By accepting the permit, when issued, the applicant agrees to the following stipulations:

1. Per Rule J Subsection 4.5, upon completion of the site work, the permittee must submit as-built drawings demonstrating that at the time of final stabilization, stormwater facilities conform to design specifications as approved by the District.

Board Action

It was moved by Manager _____, seconded by Manager _____ to approve permit application No. 2019-017 with the conditions recommended by staff.



N

Feet

0 1,000

Permit Location Map

PAWNEE DRIVE

Permit 2019-017

Riley Purgatory Bluff Creek Watershed District

LEGAL DESCRIPTION:
Lots 546 - 554, Carver Beach, Carver County, Minnesota.

SCOPE OF WORK & LIMITATIONS:
1. Showing the length and direction of boundary lines of the legal description listed above. The scope of our services does not include determining what you own, which is a legal matter. Please check the legal description with your records or consult with competent legal counsel, if necessary, to make sure that it is correct and that any matters of record, such as easements, that you wish to be included on the survey have been shown.
2. Showing the location of observed existing improvements we deem necessary for the survey.
3. Setting survey markers or verifying existing survey markers to establish the corners of the property.
4. Existing building dimensions and setbacks measured to outside of siding or stucco.
5. Showing and tabulating impervious surface coverage of the lot for your review and for the review of such governmental agencies that may have jurisdiction over these requirements to verify they are correctly shown before proceeding with construction.
6. Showing elevations on the site at selected locations to give some indication of the topography of the site. We have also provided a benchmark for your use in determining elevations for construction on this site. The elevations shown relate only to the benchmark provided on this survey. Use that benchmark and check at least one other feature shown on the survey when determining other elevations for use on this site or before beginning construction. Datum per Alliant Engineering survey provided to us, dated December 12, 2016.
7. This survey has been completed without the benefit of a current title commitment. There may be existing easements or other encumbrances that would be revealed by a current title commitment. Therefore, this survey does not purport to show any easements or encumbrances other than the ones shown hereon.
8. The utilities shown are based on source information from the provided Alliant Engineering survey, dated December 12, 2016 and combined with observed evidence to develop a view of those underground utilities. However, lacking excavation, the exact location of underground features cannot be accurately, completely and reliably depicted. Where additional or more detailed information is required, the client is advised that excavation may be necessary. State law requires underground utilities to be located 48 hours prior to any excavation.
9. While we show a proposed location for this home or addition, we are not as familiar with your proposed plans as you, your architect, or the builder are. Review our proposed location of the improvements and proposed yard grades carefully to verify that they match your plans before construction begins. Also, we are not as familiar with local codes and minimum requirements as the local building and zoning officials in this community are. Be sure to show this survey to said officials, or any other officials that may have jurisdiction over the proposed improvements and obtain their approvals before beginning construction or planning improvements to the property.
10. While we show the building setback lines per the City of Chanhassen web site, we suggest you show this survey to the appropriate city officials to be sure that the setback lines are shown correctly. Do this BEFORE you use this survey to design anything for this site.

STANDARD SYMBOLS & CONVENTIONS:
"●" Denotes iron survey marker, found, unless otherwise noted.

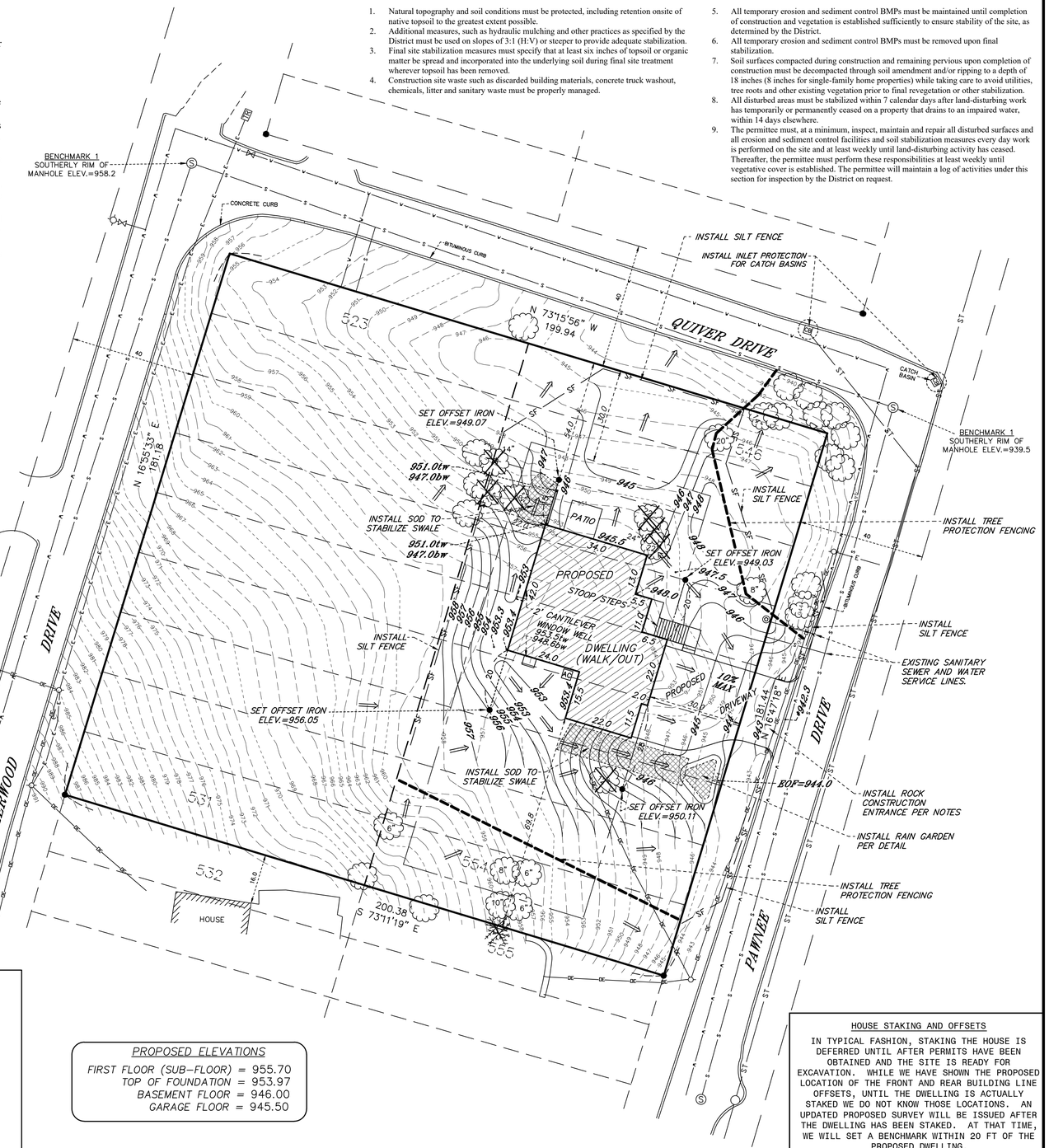
GRADING & EROSION CONTROL NOTES:

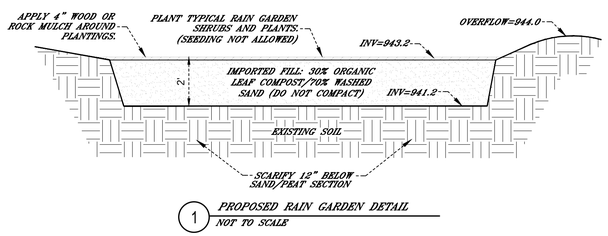
BEFORE DEMOLITION AND GRADING BEGIN
- Install silt fence/bio roll around the perimeter of the construction area.
- Sediment control measures must remain in place until final stabilization has been established and then shall be removed. Sediment controls may be removed to accommodate short term construction activity but must be replaced before the next rain.
- A temporary rock construction entrance shall be established at each access point to the site and a 6 inch layer of 1 to 2 inch rock extending at least 50 feet from the street into the site and shall be underlain with permeable geotextile fabric. The entrance shall be maintained during construction by top dressing or washing to prevent tracking or flow of sediments onto public streets, walks or alleys. Potential entrances that are not so protected shall be closed by fencing to prevent unprotected exit from the site.
- Contractor shall install inlet protection on all existing storm sewer inlets in accordance with the city standard details. Inlet protection shall also be provided on all proposed storm sewer inlets immediately following construction of the inlet. Inlet protection must be installed in a manner that will not impound water for extended periods of time or in a manner that presents a hazard to vehicular or pedestrian traffic.

DURING CONSTRUCTION:
- When dirt stockpiles have been created, a double row of silt fence shall be placed to prevent escape of sediment laden runoff and if the piles or other disturbed areas are to remain in place for more than 14 days, they shall be seeded with Minnesota Department of Transportation Seed Mixture 22-111 at 100 lb/acre followed by covering with spray mulch.
- A dumpster shall be placed on the site for prompt disposal of construction debris. These dumpsters shall be serviced regularly to prevent overflowing and blowing onto adjacent properties. Disposal of solid wastes from the site shall in accordance with Minnesota Pollution Control Agency requirements.
- A separate container shall be placed for disposal of hazardous waste. Hazardous wastes shall be disposed of in accordance with MPCA requirements.
- Concrete truck washout shall be in the plastic lined ditch and dispose of washings as solid waste.
- Sediment control devices shall be regularly inspected and after major rainfall events and shall be cleaned and repaired as necessary to provide downstream protection.
- Streets and other public ways shall be inspected daily and if litter or soils has been deposited it shall promptly be removed.
- If necessary, vehicles, that have mud on their wheels, shall be cleaned before exiting the site in the rock entrance areas.
- Moisture shall be applied to disturbed areas to control dust as needed.
- Portable toilet facilities shall be placed on site for use by workers and shall be properly maintained.
- If it becomes necessary to pump the excavation during construction, pump discharge shall be into the stockpile areas so that the double silt fence around these areas can filter the water before it leaves the site.
- Temporary erosion control shall be installed no later than 14 days after the site is first disturbed and shall consist of broadcast seeding with Minnesota Department of Transportation Seed Mixture 22-111 at 100 lb/acre followed by covering with spray mulch.
- Erosion control measures shown on the erosion control plan are the absolute minimum. The contractor shall install temporary earth dikes, sediment traps or basins and additional silt fencing as deemed necessary to control erosion.

SITE WORK COMPLETION:
- When final grading has been completed but before placement of sod an "as built" survey shall be done per City of Chanhassen requirements to insure that grading was properly done.
- Install sod for final stabilization of site disturbed areas.
- When any remedial grading has been completed, sod shall be completed including any erosion control blankets for steep areas and swales.
- When turf is established, silt fence and inlet protection and other erosion control devices shall be disposed of and adjacent streets, alleys and walks shall be cleaned as needed to deliver a site that is erosion resistant and clean.
- Contractor shall maintain positive drainage of a minimum 2% slope away from proposed building.

1. Natural topography and soil conditions must be protected, including retention onsite of native topsoil to the greatest extent possible.
2. Additional measures, such as hydraulic mulching and other practices as specified by the District must be used on slopes of 3:1 (H:V) or steeper to provide adequate stabilization.
3. Final site stabilization measures must specify that at least six inches of topsoil or organic matter be spread and incorporated into the underlying soil during final site treatment wherever topsoil has been removed.
4. Construction site waste such as discarded building materials, concrete truck washout, chemicals, litter and sanitary waste must be properly managed.
5. All temporary erosion and sediment control BMPs must be maintained until completion of construction and vegetation is established sufficiently to ensure stability of the site, as determined by the District.
6. All temporary erosion and sediment control BMPs must be removed upon final stabilization.
7. Soil surfaces compacted during construction and remaining pervious upon completion of construction must be decompacted through soil amendment and/or ripping to a depth of 18 inches (8 inches for single-family home properties) while taking care to avoid utilities, tree roots and other existing vegetation prior to final revegetation or other stabilization.
8. All disturbed areas must be stabilized within 7 calendar days after land-disturbing work has temporarily or permanently ceased on a property that drains to an impaired water, within 14 days elsewhere.
9. The permittee must, at a minimum, inspect, maintain and repair all disturbed surfaces and all erosion and sediment control facilities and soil stabilization measures every day work is performed on the site and at least weekly until land-disturbing activity has ceased. Thereafter, the permittee must perform these responsibilities at least weekly until vegetative cover is established. The permittee will maintain a log of activities under this section for inspection by the District on request.





1 PROPOSED RAIN GARDEN DETAIL
NOT TO SCALE

LEGEND

EXISTING CONTOUR	835
EXISTING SPOT ELEVATION	X 835.5
PROPOSED CONTOUR	835
PROPOSED SPOT ELEVATION	835.5
DRAINAGE ARROW - FLOW	⟹
PROP. SILT FENCE/BIO ROLL	SF
EXISTING MANHOLE	Ⓢ
EXISTING CATCH BASIN	CB
EXISTING STORM SEWER MAIN	ST
EXISTING SANITARY SEWER MAIN	S
EXISTING WATER MAIN	W
EXISTING FIRE HYDRANT	
EXISTING UTILITY POLE	
EXISTING GAS METER	GM
EXISTING ELECTRIC METER	EM
EXISTING ELEC. TRANSFORMER	TR
EXIST. OVERHEAD UTILITY LINE	OE
EXISTING ELECTRIC LINE	E
TREE REMOVAL	

EXISTING HARDCOVER

HOUSE	1,354 SQ. FT.
GARAGE	853 SQ. FT.
SHED	194 SQ. FT.
WALK/STEPS	236 SQ. FT.
GRAVEL DRIVEWAY	468 SQ. FT.
RETAINING WALLS	84 SQ. FT.
TOTAL EXISTING HARDCOVER	3,189 SQ. FT.
AREA OF LOT	18,152 SQ. FT.
LOT COVERAGE	17.6%

PROPOSED HARDCOVER

HOUSE	2,090 SQ. FT.
WALK/STEPS/PORCH	136 SQ. FT.
DRIVEWAY	882 SQ. FT.
RETAINING WALLS	8 SQ. FT.
PATIO	100 SQ. FT.
AC PAD	9 SQ. FT.
TOTAL PROPOSED HARDCOVER	3,225 SQ. FT.
AREA OF LOT	18,152 SQ. FT.
LOT COVERAGE	17.8%

PROPOSED ELEVATIONS
FIRST FLOOR (SUB-FLOOR) = 955.70
TOP OF FOUNDATION = 953.97
BASEMENT FLOOR = 946.00
GARAGE FLOOR = 945.50

HOUSE STAKING AND OFFSETS
IN TYPICAL FASHION, STAKING THE HOUSE IS DEFERRED UNTIL AFTER PERMITS HAVE BEEN OBTAINED AND THE SITE IS READY FOR EXCAVATION. WHILE WE HAVE SHOWN THE PROPOSED LOCATION OF THE FRONT AND REAR BUILDING LINE OFFSETS, UNTIL THE DWELLING IS ACTUALLY STAKED WE DO NOT KNOW THOSE LOCATIONS. AN UPDATED PROPOSED SURVEY WILL BE ISSUED AFTER THE DWELLING HAS BEEN STAKED. AT THAT TIME, WE WILL SET A BENCHMARK WITHIN 20 FT OF THE PROPOSED DWELLING.

DATE	REVISION DESCRIPTION
12/11/17	UPDATE PER CITY COMMENTS
12/21/17	UPDATE PER CITY COMMENTS
2/14/18	REVISED PROPOSED GRADES PER OWNER REQUEST
3/1/18	PER CITY COMMENTS
3/12/18	PER CITY COMMENTS
4/23/19	PER WATERSHED COMMENTS

DRAWING ORIENTATION & SCALE
N
0 20' 40'

CLIENT/JOB ADDRESS
ANE GROUP INC.
6650 PAWNEE DRIVE
CHANHASSEN, MN

Advance
Surveying & Engineering, Co.
17917 Highway No. 7
Minnetonka, Minnesota 55345
Phone (952) 474-7964
Web: www.advsur.com

I HEREBY CERTIFY THAT THIS PLAN, SURVEY OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED LAND SURVEYOR UNDER THE LAWS OF THE STATE OF MINNESOTA.
Wayne W. Preuhs
#43503
LICENSE NO.
FEBRUARY 14, 2018
DATE

DATE SURVEYED: JUNE 23, 2017
SURVEYED BY
ADVANCED SURVEYING. & ENG., CO.
DATE DRAFTED: OCTOBER 30, 2017

SHEET TITLE
PROPOSED SURVEY
SHEET SIZE: 22 X 34
DRAWING NUMBER
170633 JR

SHEET NO.
S1
SHEET 1 OF 1

REDPATH AND COMPANY

April 25, 2019

Claire Bleser
District Administrator
Riley Purgatory Bluff Creek Watershed District
18681 Lake Drive E.
Chanhassen, Minnesota 55317

Dear Claire:

Enclosed please find the checks and Treasurer's Report for Riley Purgatory Bluff Creek Watershed District for the one month and three months ending March 31, 2019.

Please examine these statements and if you have any questions or need additional copies, please call me.

Sincerely,

REDPATH AND COMPANY, LTD.

Mark C. Gibbs, CPA
Enclosure

REDPATH AND COMPANY

To The Board of Managers
Riley Purgatory Bluff Creek Watershed District
Chanhassen, Minnesota

Accountant's Opinion

The Riley Purgatory Bluff Creek Watershed District is responsible for the accompanying March 31, 2019 Treasurer's Report in the prescribed form. We have performed a compilation engagement in accordance with the Statements on Standards for Accounting and Review promulgated by the Accounting and Review Services Committee of AICPA. We did not audit or review the Treasurer's Report nor were we required to perform any procedures to verify the accuracy or completeness of the information provided by the Riley Purgatory Bluff Creek Watershed District. Accordingly, we do not express an opinion, a conclusion, nor provide any form of assurance on the Treasurer's Report.

Reporting Process

The Treasurer's Report is presented in a prescribed form mandated by the Board of Managers and is not intended to be a presentation in accordance with accounting principles generally accepted in the United States of America. The reason the Board of Managers mandates a prescribed form instead of GAAP (Generally Accepted Accounting Principles) is this format gives the Board of Managers the financial information they need to make informed decisions as to the finances of the watershed.

GAAP basis reports would require certain reporting formats, adjustments to accrual basis and supplementary schedules to give the Board of Managers information they need, making GAAP reporting on a monthly basis extremely cost prohibitive. An independent auditing firm is retained each year to perform a full audit and issue an audited GAAP basis report. This annual report is submitted to the Minnesota State Auditor, as required by Statute, and to the Board of Water and Soil Resources.

The Treasurer's Report is presented on a modified accrual basis of accounting. Expenditures are accounted for when incurred. For example, payments listed on the Cash Disbursements report are included as expenses in the Treasurer's Report even though the actual payment is made subsequently. Revenues are accounted for on a cash basis and only reflected in the month received.

Redpath and Company, Ltd.

REDPATH AND COMPANY, LTD.
St. Paul, Minnesota
April 25, 2019

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

Treasurers Report

March 31, 2019

REPORT INDEX

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT
Cash Disbursements
March 31, 2019

Accounts Payable:

Check #	Payee	Amount
4776	CenturyLink	277.37
4777	City of Chanhassen	16.13
4778	Coverall of the Twin Cities	159.99
4779	ECM Publishers, Inc.	1,380.40
4780	Amy Herbert, LLC	1,021.00
4781	Houston Engineering, Inc.	1,480.75
4782	Iron Mountain	89.95
4783	Limnotech	2,800.00
4784	Lincoln National Life Insurance	448.21
4785	Metro Sales, Inc.	561.37
4786	Redpath & Company	3,975.31
4787	RMB Environmental Laboratories	2,260.00
4788	Smith Partners	12,295.00
4789	Southwest News Media	2,133.24
4790	Southwest Metro Chamber of Commerce	40.00
4791	SRF	1,899.47
4792	Xcel Energy	621.50
4793	Barr Engineering	35,645.54
4794	HealthPartners	4,686.56
4795	CSM Financial, LLC	7,508.96
4796	HDR Engineering, Inc.	723.50
4797	University of Minnesota	8,295.85
	Total Accounts Payable:	**$88,320.10**

Payroll Disbursements:

Payroll Processing Fee	196.50
Employee Salaries	32,795.18
Employer Payroll Taxes	2,131.25
Employer Benefits (H.S.A. Match)	525.00
Employee Benefit Deductions	(396.26)
Staff Expense Reimbursements	1,003.44
PERA Match	2,459.62
Total Payroll Disbursements:	**$38,714.73**
Void Check #4770	(1,679.93)
Void Check #4741	(135.95)
Klein Bank-VISA	5,245.13
TOTAL DISBURSEMENTS:	**$130,464.08**

Memos

The 2019 mileage rate is .58 per mile. The 2018 rate was .54.5
Klein Bank VISA will be paid on-line.

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT
Fund Performance Analysis - Table 1
March 31, 2019

	2019 Budget	Fund Transfers	Revised 2019 Budget	Current Month	Year-to-Date	Year-to Date Percent of Budget
REVENUES						
Plan Implementation Levy	$3,602,500.00	-	$3,602,500.00	-	-	0.00%
Permit	50,000.00	-	50,000.00	-	6,550.00	13.10%
Grant Income	708,079.00	-	708,079.00	-	205,440.00	29.01%
Investment Income	35,000.00	-	35,000.00	5,500.08	31,884.92	91.10%
Past Levies	2,511,789.00	-	2,511,789.00	-	-	0.00%
Partner Funds	432,000.00	-	432,000.00	-	-	0.00%
TOTAL REVENUE	**$7,339,368.00**	**$0.00**	**$7,339,368.00**	**$5,500.08**	**$243,874.92**	**3.32%**
EXPENDITURES						
Administration						
Accounting and Audit	42,000.00	-	42,000.00	4,171.81	9,726.02	23.16%
Advisory Committees	5,000.00	-	5,000.00	229.40	229.40	4.59%
Insurance and bonds	20,000.00	-	20,000.00	-	-	0.00%
Engineering Services	106,000.00	-	106,000.00	7,908.00	24,572.50	23.18%
Legal Services	78,000.00	-	78,000.00	4,665.22	24,615.72	31.56%
Manager Per Diem/Expense	20,000.00	-	20,000.00	428.58	1,931.53	9.66%
Dues and Publications	12,000.00	-	12,000.00	(1,179.93)	11,319.50	94.33%
Office Cost	144,000.00	-	144,000.00	9,528.40	39,061.15	27.13%
Permit Review and Inspection	135,000.00	(25,000.00)	110,000.00	17,772.96	53,441.48	48.58%
Permit and Grant Database	-	39,900.00	39,900.00	1,480.75	1,480.75	3.71%
Recording Services	10,000.00	-	10,000.00	1,021.00	3,865.57	38.66%
Staff Cost	550,000.00	-	550,000.00	44,937.57	137,356.32	24.97%
Subtotal	**$1,122,000.00**	**$14,900.00**	**$1,136,900.00**	**$90,963.76**	**$307,599.94**	**27.06%**
Programs and Projects						
District Wide						
10-year Management Plan	5,000.00	-	5,000.00	-	1,825.40	36.51%
AIS Inspection and early response	75,000.00	-	75,000.00	(135.95)	324.78	0.43%
Cost-share	267,193.00	(14,900.00)	252,293.00	1,117.19	1,117.19	0.44%
Creek Restoration Action Strategies Phase	-	-	-	-	-	---
Data Collection and Monitoring	186,000.00	-	186,000.00	9,167.60	27,231.32	14.64%
District Wide Floodplain Evaluation - Atlas 14/SMM model	30,000.00	18,000.00	48,000.00	1,193.00	1,193.00	2.49%
Education and Outreach	119,000.00	-	119,000.00	2,911.66	11,711.06	9.84%
Plant Restoration - U of M	42,000.00	-	42,000.00	8,295.85	8,295.85	19.75%
Repair and Maintenance Fund *	177,005.00	-	177,005.00	4,086.50	4,086.50	2.31%
Wetland Management*	145,272.00	-	145,272.00	51.54	51.54	0.04%
District Groundwater Assessment	-	-	-	-	-	---
Groundwater Conservation*	130,000.00	-	130,000.00	-	-	0.00%
Lake Vegetation Implementation	75,000.00	-	75,000.00	-	-	0.00%
Opportunity Project*	200,000.00	-	200,000.00	1,899.47	8,522.42	4.26%
TMDL - MPCA	10,000.00	-	10,000.00	-	-	0.00%
Stormwater Ponds - U of M	86,092.00	-	86,092.00	-	-	0.00%
Hennepin County Chloride Initiative	120,800.00	-	120,800.00	40.95	1,040.95	0.86%
Lower Minnesota Chloride Cost-Share	217,209.00	-	217,209.00	-	-	0.00%
Subtotal	**$1,885,571.00**	**$3,100.00**	**$1,888,671.00**	**$28,627.81**	**$65,400.01**	**3.46%**
Bluff Creek						
Bluff Creek Tributary*	291,091.00	-	291,091.00	473.00	869.50	0.30%
Chanhassen High School *	41,905.00	-	41,905.00	-	26.00	0.06%
Wetland Restoration at Pioneer	561,870.00	-	561,870.00	2,343.52	2,343.52	0.42%
Subtotal	**$894,866.00**	**$0.00**	**$894,866.00**	**$2,816.52**	**$3,239.02**	**0.36%**
Riley Creek						
Lake Riley - Alum Treatment*	5,000.00	-	5,000.00	-	-	0.00%
Lake Susan Water Quality Improvement Phase 2 *	13,420.00	-	13,420.00	-	-	0.00%
Rice Marsh Lake in-lake phosphorus load	73,983.00	-	73,983.00	-	-	0.00%
Rice Marsh Lake Water Quality Improvement Phase 1	150,000.00	-	150,000.00	-	-	0.00%
Riley Creek Restoration (Reach E and D3)	1,680,562.00	-	1,680,562.00	450.00	1,247.34	0.07%
Lake Riley & Rice Marsh Lake Subwatershed Assessment	72,500.00	-	72,500.00	-	-	0.00%
Upper Riley Creek Stabilization	425,000.00	-	425,000.00	-	-	0.00%
Subtotal	**$2,420,465.00**	**$0.00**	**$2,420,465.00**	**$450.00**	**$1,247.34**	**0.05%**
Purgatory Creek						
Purgatory Creek Rec Area- Berm/retention area - feasibility/design	50,000.00	-	50,000.00	-	-	0.00%
Lotus Lake in-lake phosphorus load control	105,772.00	-	105,772.00	-	90.30	0.09%
Silver Lake Restoration - Feasibility Phase 1	168,013.00	-	168,013.00	-	-	0.00%
Scenic Heights	111,226.00	-	111,226.00	72.00	72.00	0.06%
Hyland Lake in-lake phosphorus load control	120,000.00	-	120,000.00	1,708.03	1,708.03	1.42%
Mitchell Lake Subwatershed Assessment	87,500.00	-	87,500.00	-	-	0.00%
Duck Lake watershed load	213,955.00	-	213,955.00	5,825.96	9,572.96	4.47%
Subtotal	**$856,466.00**	**$0.00**	**$856,466.00**	**$7,605.99**	**$11,443.29**	**1.34%**
Reserve	**$160,000.00**	**($18,000.00)**	**142,000.00**	-	-	0.00%
TOTAL EXPENDITURE	**$7,339,368.00**	**$0.00**	**$7,339,368.00**	**$130,464.08**	**$388,929.60**	**5.30%**
EXCESS REVENUES OVER (UNDER) EXPENDITURES	**$0.00**	**$0.00**	**$0.00**	**($124,964.00)**	**($145,054.68)**	

***Denotes Multi-Year Project - See Table 2 for details**

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT
Muti-Year Project Performance Analysis - Table 2
March 31, 2019

		FUNDING SOURCE			Month Ended	Year	Lifetime	
	Total Project	District funds	Partner Fund	Grants	03/31/19	To-Date	Costs	Remaining
Programs and Projects								
District Wide								
District Wide Floodplain Evaluation - Atlas 14/SMM model	**48,000.00**	48,000.00	-	-	1,193.00	1,193.00	1,193.00	46,807.00
Repair and Maintenance Fund	**202,005.00**	177,005.00	-	-	4,086.50	4,086.50	29,086.50	172,918.50
Wetland Management	**150,000.00**	150,000.00	-	-	51.54	51.54	29,779.85	120,220.15
Groundwater Conservation	**130,000.00**	130,000.00	-	-	-	-	-	130,000.00
Opportunity Project*	**200,000.00**	200,000.00	-	-	1,899.47	8,522.42	8,522.42	191,477.58
Hennepin County Chloride Initiative	**120,800.00**	19,000.00	-	101,800.00	40.95	1,040.95	1,040.95	119,759.05
Lower Minnesota Chloride Cost-Share	**217,209.00**	20,000.00	-	197,209.00	-	-	-	217,209.00
Stormwater Ponds - U of M	**86,092.00**	44,092.00	42,000.00	-	-	-	-	86,092.00
Subtotal	**$1,154,106.00**	**$788,097.00**	**$42,000.00**	**$299,009.00**	**$7,271.46**	**$14,894.41**	**$69,622.72**	**1,084,483.28**
Bluff Creek								
Bluff Creek Tributary*	**292,362.00**	242,362.00	50,000.00	-	473.00	869.50	96,529.04	195,832.96
Chanhassen High School *	**508,000.00**	208,000.00	100,000.00	200,000.00	-	26.00	451,121.10	56,878.90
Wetland Restoration at Pioneer	**561,870.00**	450,000.00	0.00	111,870.00	2,343.52	2,343.52	2,343.52	559,526.48
Subtotal	**$1,362,232.00**	**$900,362.00**	**$150,000.00**	**$311,870.00**	**$2,816.52**	**$3,239.02**	**$549,993.66**	**$812,238.34**
Riley Creek								
Lake Riley - Alum Treatment 1st dose *	**260,000.00**	260,000.00	-	-	-	-	254,999.83	5,000.17
Lake Susan Water Quality Improvement Phase 2 *	**662,491.00**	330,000.00	99,091.00	233,400.00	-	-	649,070.80	13,420.20
Rice Marsh Lake in-lake phosphorus load	**150,000.00**	150,000.00	-	-	-	-	76,017.94	73,982.06
Riley Creek Restoration (Reach E and D3) *	**1,565,000.00**	1,265,000.00	300,000.00	-	450.00	1,247.34	181,742.49	1,383,257.51
Lake Riley & Rice Marsh Lake Subwatershed Assessment	**72,500.00**	12,500.00	5,000.00	55,000.00		-	-	72,500.00
Upper Riley Creek Stabilization	**450,000.00**	450,000.00	0.00	-	-	-	-	450,000.00
Subtotal	**$3,159,991.00**	**$2,467,500.00**	**$404,091.00**	**$288,400.00**	**$450.00**	**$1,247.34**	**$1,161,831.06**	**$1,998,159.94**
Purgatory Creek								
Purgatory Creek Rec Area- Berm/retention area - feasibility/design	**50,000.00**	50,000.00	-	-	-	-	-	50,000.00
Lotus Lake in-lake phosphorus load control	**345,000.00**	345,000.00	-	-	-	90.30	239,317.34	105,682.66
Scenic Heights	**260,000.00**	165,000.00	45,000.00	50,000.00	72.00	72.00	148,845.76	111,154.24
Mitchell Lake Subwatershed Assessment	**87,500.00**	12,500.00	5,000.00	70,000.00	-	-	-	87,500.00
Duck Lake watershed load	**220,000.00**	220,000.00	-	-	5,825.96	9,572.96	15,617.46	204,382.54
Subtotal	**$962,500.00**	**$792,500.00**	**$50,000.00**	**$120,000.00**	**$5,897.96**	**$9,735.26**	**$403,780.56**	**$558,719.44**
Total Multi-Year Project Costs	**$6,638,829.00**	**$4,948,459.00**	**$646,091.00**	**$1,019,279.00**	**$16,435.94**	**$29,116.03**	**$2,185,228.00**	**$4,453,601.00**

Riley Purgatory Bluff Creek Watershed District
Balance Sheet
As of March 31, 2019

ASSETS

Current Assets

General Checking-Klein	$656,078.31	
Checking-Klein/BMW	1,021,302.69	
Investments-Standing Cash	8,275.27	
Investments-Wells Fargo	4,115,525.86	
Accrued Investment Interest	8,670.64	
Due From Other Governments	130,547.73	
Taxes Receivable-Delinquent	20,556.16	
Pre-Paid Expense	27,361.36	
Security Deposits	7,244.00	
Total Current Assets:		**$5,995,562.02**

LIABILITIES AND CAPITAL

Current Liabilities

Accounts Payable	$175,414.18	
Retainage Payable	13,469.38	
Salaries Payable	17,878.75	
Permits & Sureties Payable	761,416.00	
Deferred Revenue	20,556.16	
Unavailable Revenue	6,666.16	
Total Current Liabilities:		**$995,400.63**

Capital

Fund Balance-General	$4,183,185.70	
Fund Balance	$816,975.69	
Total Capital		**$5,000,161.39**
Total Liabilities & Capital		**$5,995,562.02**

RILEY PURGTORY BLUFF CREEK WATERSHED DISTRICT
Klein Bank VISA Activity
March 31, 2019

DATE	PURCHASED FROM	AMOUNT	DESCRIPTION	ACCOUNT #	RECEIPT
03/18/19	Kowalski's	62.02	CAC Committee Meeting	10-00-4800	Y
03/19/19	Randy's Sanitation	66.50	Trash Collection	10-00-4215	Y
03/22/19	Target	49.30	Office Supplies	10-00-4260	Y
03/23/19	Verizon	350.49	Telecommunications	10-00-4240	Y
04/02/19	Chanhassen Villager	40.00	Office Supplies	10-00-4260	Y
04/04/19	Adobe	16.10	Office Software	10-00-4203	Y
04/12/19	Minnesota Landscape Arboretum	151.18	Board/Staff Workshop	10-00-4010	Y
04/12/19	USPS PO	8.10	Postage	10-00-4280	Y
04/15/19	Detello's	59.61	First Aid & AED Training	10-00-4265	Y
		$803.30	**General Administration Total**		
03/15/19	Amazon	266.70	Pond Study	40-07-4201	Y
03/15/19	Amazon	213.30	Pond Study	50-09-4201	Y
03/15/19	Adafruit	(179.55)	Data Collection Equipment	20-05-4635	Y
03/18/19	Adafruit	158.60	Pond Study	40-07-4201	Y
03/18/19	Adafruit	126.88	Pond Study	50-09-4201	Y
03/20/19	Amazon	42.05	Pond Study	40-07-4201	Y
03/20/19	Amazon	33.64	Pond Study	50-09-4201	Y
03/21/19	MAVA	25.00	Volunteer Training	20-08-4265	Y
03/21/19	AWRA	(50.00)	Conference Fee	20-08-4265	Y
03/22/19	Amazon	15.98	Data Collection Equipment	20-05-4260	N
03/22/19	Cub	59.35	Parking Lot & Sidewalk Workshop	20-08-4345	Y
03/22/19	USPS PO	417.20	Postage	20-08-4280	Y
03/22/19	Digi-Key	4.50	Pond Study	40-07-4201	Y
03/22/19	Digi-Key	3.60	Pond Study	50-09-4201	Y
03/22/19	Buca Catering	622.34	Parking Lot & Sidewalk Workshop	20-08-4345	Y
03/25/19	Road Runner Express	63.25	Parking Lot & Sidewalk Workshop	20-08-4345	Y
03/25/19	Bruegger's Bagel	51.47	Parking Lot & Sidewalk Workshop	20-08-4345	Y
03/25/19	Speedway	9.98	Ice for Data Collection	20-05-4260	Y
03/25/19	Embassy Suites	257.60	Conference	20-08-4265	Y
03/25/19	Yard House	29.70	DC Conference	20-05-4265	Y
03/26/19	Russell's	19.60	DC Conference	20-05-4265	Y
03/26/19	Russell's	19.60	DC Conference	20-05-4265	Y
03/26/19	Sheraton	14.58	DC Conference	20-05-4265	Y
03/27/19	Facebook	25.00	Event Promotion	20-08-4260	Y
03/27/19	Einstein Bros. Bagels	17.57	DC Conference	20-05-4265	Y
03/27/19	Hard Rock	50.04	DC Conference	20-05-4265	Y
03/28/19	Domo	55.00	DC Conference	20-05-4265	Y
03/28/19	Detectable Egg	33.50	DC Conference	20-05-4265	Y
03/29/19	Quizno's	14.61	DC Conference	20-05-4265	Y
03/29/19	Sheraton	838.04	DC Conference	20-05-4265	Y
03/29/19	Sheraton	838.04	DC Conference	20-05-4265	Y
04/02/19	Amazon	43.61	Data Collection Equipment	20-05-4260	Y
04/02/19	Amazon	13.41	Data Collection Equipment	20-05-4260	Y
04/02/19	Amazon	8.65	Data Collection Equipment	20-05-4260	Y
04/03/19	Ace Hardware	49.56	Data Collection Equipment	20-05-4635	Y
04/05/19	Cub	19.36	Anniversary Walk	20-08-4345	Y
04/07/19	Kowalski's	326.55	Meet & Greet	20-08-4345	Y
04/07/19	Amazon	111.34	Office Supplies	20-05-4635	y
04/10/19	Teledyne Isco	1,146.85	Data Collection Equipment	20-05-4635	Y
		$5,816.50	**District-Wide Total**		
		$6,619.80	**GRAND TOTAL**		

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

18681 Lake Drive East
Chanhassen, MN 55317
952-607-6512
www.rpbcwd.org

Riley Purgatory Bluff Creek Watershed District Permit Application Review

Permit No: 2019-018
Received complete: April 25, 2019
Board Meeting: May 1, 2019
Applicant: ANE Group, Inc - Attention Andrei Osinsky
Consultant: Advanced Survey & Engineering Co.
Project: 6657 Deerwood Drive – The applicant is constructing a single-family home at this address. The applicant proposes a rain garden to comply with rule J.
Location: 6657 Deerwood Drive, Chanhassen 55317
Reviewer: Terry Jeffery, Watershed Planning Manager

Rule Conformance Summary

Rule	Issue		Conforms to RBPCWD Rules?	Comments
C	**Erosion Control Plan**		See Comment	See rule specific permit condition C1
J	**Stormwater Management**	Rate	Yes	
		Volume	Yes	
		Water Quality	Yes	
		Low Floor Elev.	Yes	
		Maintenance	See Comment	See rule specific permit condition J1
L	**Permit Fee**		Yes	
M	**Financial Assurance**		NA	Governmental Agency

Proposed Action

Manager _____ moved and Manager _____ seconded adoption of the following actions based on the permit report that follows and the presentation of the matter at the May 1, 2019 meeting of the managers:

Resolved that the application for Permit 2019-018 is approved, subject to the conditions and stipulations set forth in the Recommendations section of the attached report;

Resolved that on determination by the RPBCWD administrator that the conditions of approval of the variances and permit have been affirmatively resolved, the RPBCWD president or administrator is authorized and directed to sign and deliver to the applicant, Permit 2019-018 on behalf of RPBCWD. Upon vote, the resolutions were adopted, _____ [VOTE TALLY].

Project Description

On April 12, 2019, staff Jeffery was contacted by the City of Chanhassen asking if the RPBCWD had been inspecting this property as the sediment control measures were inadequate. Staff Jeffery noted at this time that no permit was issued for this property. A Notice of Probable Violation was sent to the land owner at the address found on the Carver County tax records and via email. On April 12, 2019 the builder forwarded plans to Staff Jeffery. The applicant responded on April 15, 2019 via phone. A signed application and application fee were received on April 17, 2019. Redlines were provided to the builder and the applicant on April 18, 2019.

The applicant is requesting an after the fact permit for the demolition of an existing single-family home and out buildings and the construction of a single-family home and appurtenances. The applicant is proposing a rain garden to meet the requirements of Rule J – Stormwater Management.

The project site information is summarized below:

1. Total Site Area: 0.42 acre (18,152 square feet)
2. Existing Site Impervious Area: 3,189 square feet
3. New (Increase) in Site Impervious Area: 3,225 square feet (±1.1% increase)
4. Disturbed Site Impervious Area: 3,189 square feet
5. Total Disturbed Area: 14,850 square feet

Submittals:

1. Permit Application dated April 17, 2019.
2. Design Plan Sheet prepared by Advanced Survey & Engineering (ASE), dated October 30, 2017 (revised April 23, 2019)
3. Notice of Probable Violation dated April 12, 2019

Rule Specific Permit Conditions

Rule C: Erosion and Sediment Control

Because the project will alter 14,850 square feet of land-surface area the project must conform to the requirements in the RPBCWD Erosion and Sediment Control rule (Rule C, Subsection 2.1).

The erosion control plan prepared by ASE includes installation of silt fence and inlet protection for storm sewer catch basins, the retention of native soils, soil decompaction and placement of six (6) inches of topsoil. To conform to the RPBCWD Rule C requirements the following revisions are needed:

C1. The Applicant must provide the name and contact information of the individual responsible for erosion and sediment control at the site. RPBCWD must be notified if the responsible party changes during the permit term.

Rule J: Stormwater Management

Because the project will alter 14,850 square feet of land-surface area, approval under the RPBCWD Stormwater Management Rule is required (Rule J, Subsection 2.1). Because it is an existing lot of record, he criteria listed in Subsection 3.1 to 3.3 will not apply. (Rule J, Subsection 3.4) The applicant is required to provide for the construction, installation, or implementation for a stormwater-management BMP consistent with guidance provided by the state of Minnesota.

The applicant is proposing to install a rainwater garden on the site to comply with Rule J, Subsection 3.4. Though calculations are not required, the location and grading plan indicate that the BMP will capture a reasonable quantity of runoff from the site as to offer water quality benefits. The provided cross section detail is consistent with guidance provided in the MN Stormwater Manual.

Maintenance

Subsection 3.7 of Rule J requires the submission of maintenance plan. All stormwater management structures and facilities must be designed for maintenance access and properly maintained in perpetuity to assure that they continue to function as designed.

J1. The applicant must provide a maintenance and inspection plan on a form acceptable to the RPBCWD. This plan must, after approval by RPBCWD staff be recorded against the property and proof of recordation must be provided to RPBCWD.

Rule L: Permit Fee:

Fees for the project are:

Rule C & J $300

Rule M: Financial Assurance:

Rules C: Silt fence: 270 L.F. x $2.50/L.F. =.....$675

Restoration: 0.34 acres x $2,500/acre =.....$850

Rock Construction Entrance $900/ea =.....$900

Inlet Protection $100/ea = ...$100

Rules J: Filtration Swale = ...$750

Contingency (10%) $325

Total Financial Assurance.....$3,600

Applicable General Requirements:

1. The RPBCWD Administrator shall be notified at least three days prior to commencement of work.
2. Construction shall be consistent with the plans and specifications approved by the District as a part of the permitting process. The date of the approved plans and specifications is listed on the permit.
3. The applicant must provide the name and contact information of general contractor responsible for the site.

Findings

1. The proposed project includes the information necessary, plan sheets, and erosion control plan for review.
2. The proposed project will conform to Rule C if the Rule Specific Permit Conditions listed above are met.

Recommendation:

Approval, contingent upon:

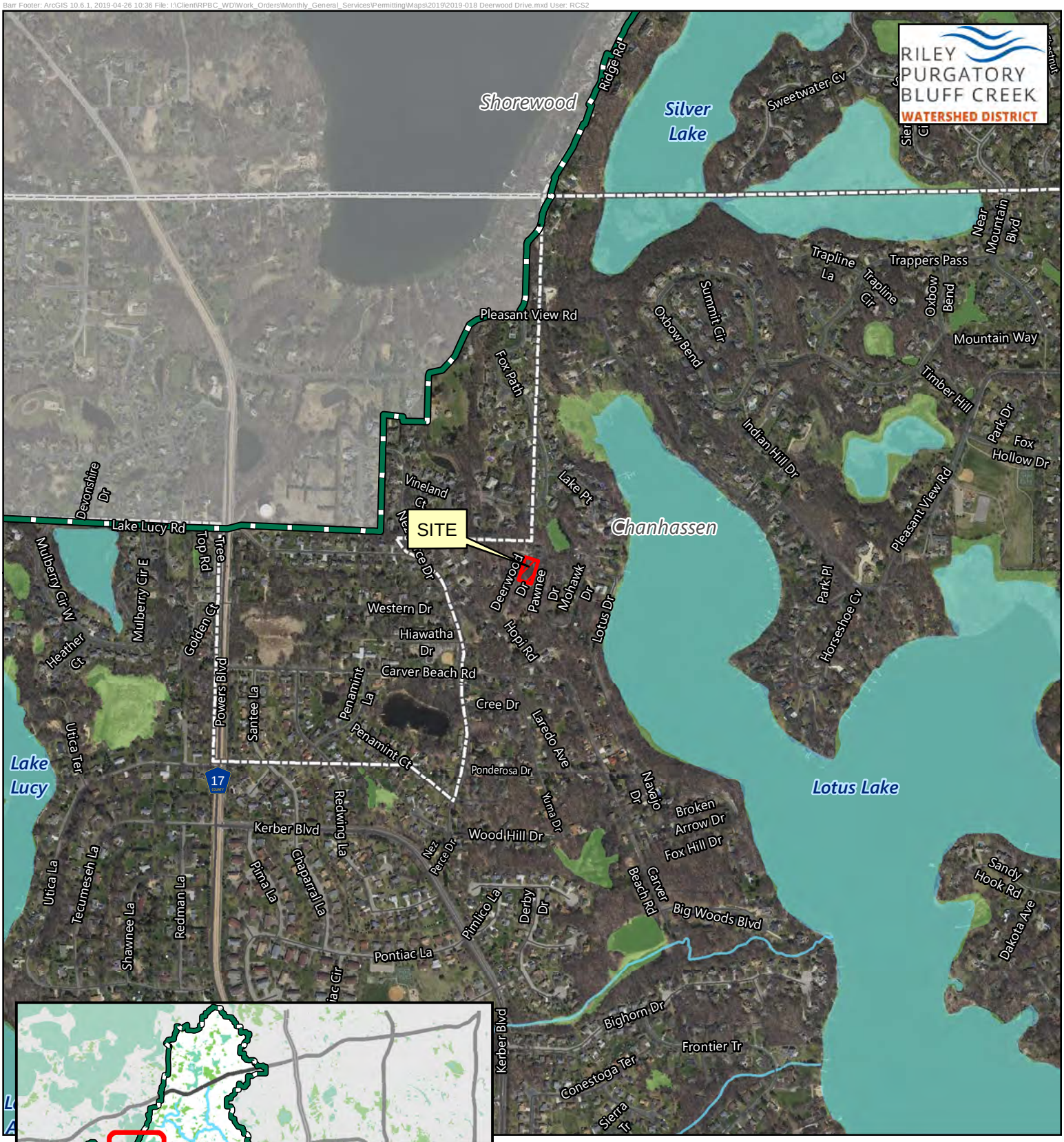
1. Continued compliance with General Requirements.

By accepting the permit, when issued, the applicant agrees to the following stipulations:

1. Per Rule J Subsection 4.5, upon completion of the site work, the permittee must submit as-built drawings demonstrating that at the time of final stabilization, stormwater facilities conform to design specifications as approved by the District.

Board Action

It was moved by Manager _____, seconded by Manager _____ to approve permit application No. 2019-018 with the conditions recommended by staff.



N

Feet

0 1,000

Permit Location Map

DEERWOOD DRIVE

Permit 2019-018

Riley Purgatory Bluff Creek Watershed District

LEGAL DESCRIPTION:
Lots 523 - 531, Carver Beach, Carver County, Minnesota.

SCOPE OF WORK & LIMITATIONS:

1. Showing the length and direction of boundary lines of the legal description listed above. The scope of our services does not include determining what you own, which is a legal matter. Please check the legal description with your records or consult with competent legal counsel, if necessary, to make sure that it is correct and that any matters of record, such as easements, that you wish to be included on the survey have been shown.
2. Showing the location of observed existing improvements we deem necessary for the survey.
3. Setting survey markers or verifying existing survey markers to establish the corners of the property.
4. Building dimensions and setbacks measured to outside of siding or stucco.
5. Showing and tabulating impervious surface coverage of the lot for your review and for the review of such governmental agencies that may have jurisdiction over these requirements to verify they are correctly shown before proceeding with construction.
6. Showing elevations on the site at selected locations to give some indication of the topography of the site. We have also provided a benchmark for your use in determining elevations for construction on this site. The elevations shown relate only to the benchmark provided on this survey. Use that benchmark and check at least one other feature shown on the survey when determining other elevations for use on this site or before beginning construction. Datum per Alliant Engineering survey provided to us, dated December 12, 2016.
7. This survey has been completed without the benefit of a current title commitment. There may be existing easements or other encumbrances that would be revealed by a current title commitment. Therefore, this survey does not purport to show any easements or encumbrances other than the ones shown hereon.
8. The utilities shown are based on source information from the provided Alliant Engineering survey, dated December 12, 2016 and combined with observed evidence to develop a view of those underground utilities. However, lacking excavation, the exact location of underground features cannot be accurately, completely and reliably depicted. Where additional or more detailed information is required, the client is advised that excavation may be necessary. State law requires underground utilities to be located 48 hours prior to any excavation.
9. While we show a proposed location for this home or addition, we are not as familiar with your proposed plans as you, your architect, or the builder are. Review our proposed location of the improvements and proposed yard grades carefully to verify that they match your plans before construction begins. Also, we are not as familiar with local codes and minimum requirements as the local building and zoning officials in this community are. Be sure to show this survey to said officials, or any other officials that may have jurisdiction over the proposed improvements and obtain their approvals before beginning construction or planning improvements to the property.
10. While we show the building setback lines per the City of Chanhassen web site, we suggest you show this survey to the appropriate city officials to be sure that the setback lines are shown correctly. Do this BEFORE you use this survey to design anything for this site.

STANDARD SYMBOLS & CONVENTIONS:
"●" Denotes iron survey marker, found, unless otherwise noted.

GRADING & EROSION CONTROL NOTES:

BEFORE DEMOLITION AND GRADING BEGIN

- Install silt fence/bio roll around the perimeter of the construction area.
- Sediment control measures must remain in place until final stabilization has been established and then shall be removed. Sediment controls may be removed to accommodate short term construction activity but must be replaced before the next rain.
- A temporary rock construction entrance shall be established at each access point to the site and a 6 inch layer of 1 to 2 inch rock extending at least 50 feet from the street into the site and shall be underlain with permeable geotextile fabric. The entrance shall be maintained during construction by top dressing or washing to prevent tracking or flow of sediments onto public streets, walks or alleys. Potential entrances that are not so protected shall be closed by fencing to prevent unprotected exit from the site.
- Contractor shall install inlet protection on all existing storm sewer inlets in accordance with the city standard details. Inlet protection shall also be provided on all proposed storm sewer inlets immediately following construction of the inlet. Inlet protection must be installed in a manner that will not impound water for extended periods of time or in a manner that presents a hazard to vehicular or pedestrian traffic.

DURING CONSTRUCTION:

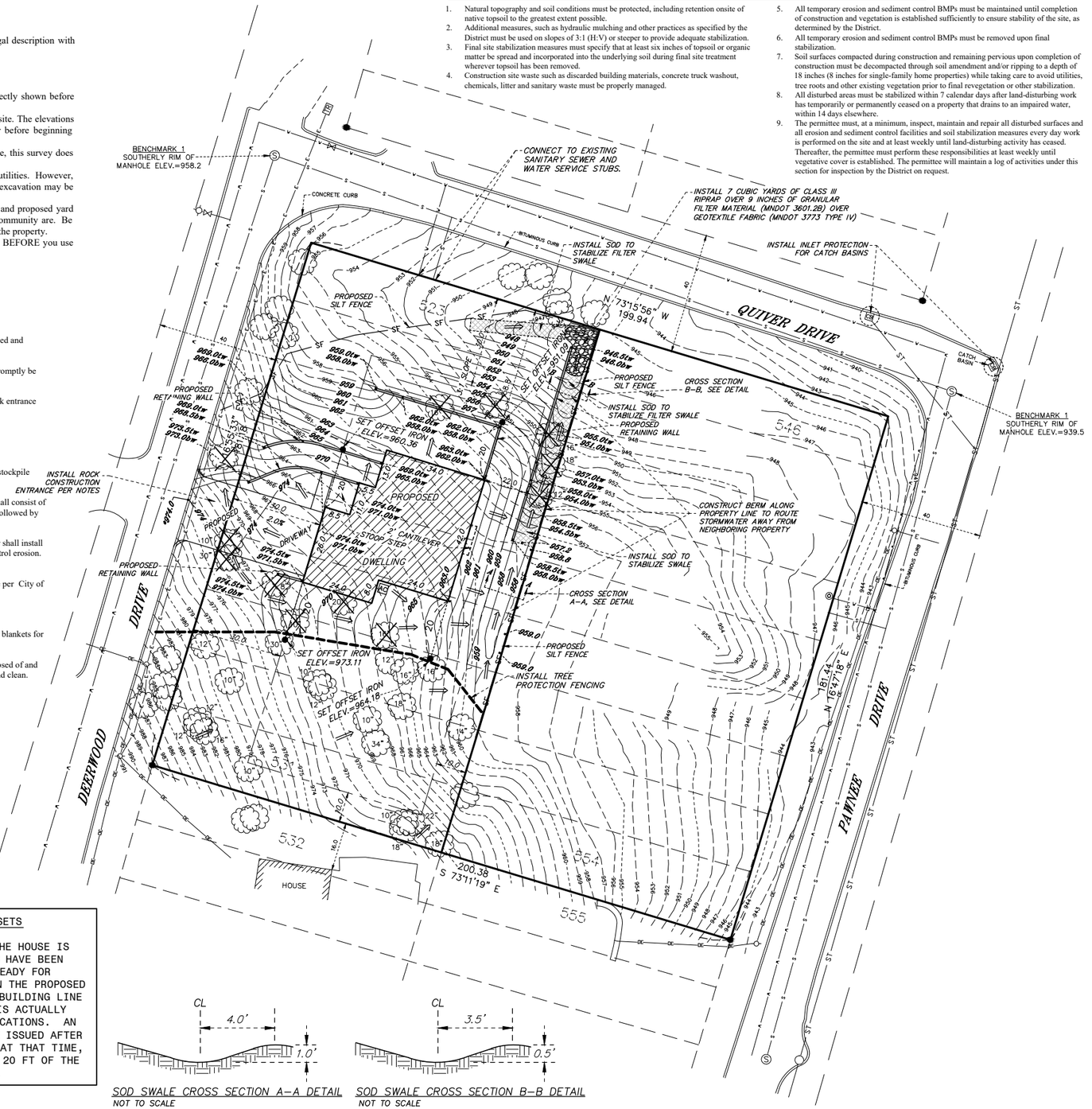
- When dirt stockpiles have been created, a double row of silt fence shall be placed to prevent escape of sediment laden runoff and if the piles or other disturbed areas are to remain in place for more than 14 days, they shall be seeded with Minnesota Department of Transportation Seed Mixture 22-111 at 100 lb/acre followed by covering with spray mulch.
- A dumpster shall be placed on the site for prompt disposal of construction debris. These dumpsters shall be serviced regularly to prevent overflowing and blowing onto adjacent properties. Disposal of solid wastes from the site shall in accordance with Minnesota Pollution Control Agency requirements.
- A separate container shall be placed for disposal of hazardous waste. Hazardous wastes shall be disposed of in accordance with MPCA requirements.
- Concrete truck washout shall be in the plastic lined ditch and dispose of washings as solid waste.
- Sediment control devices shall be regularly inspected and after major rainfall events and shall be cleaned and repaired as necessary to provide downstream protection.
- Streets and other public ways shall be inspected daily and if litter or soils has been deposited it shall promptly be removed.
- If necessary, vehicles, that have mud on their wheels, shall be cleaned before exiting the site in the rock entrance areas.
- Moisture shall be applied to disturbed areas to control dust as needed.
- Portable toilet facilities shall be placed on site for use by workers and shall be properly maintained.
- If it becomes necessary to pump the excavation during construction, pump discharge shall be into the stockpile areas so that the double silt fence around these areas can filter the water before it leaves the site.
- Temporary erosion control shall be installed no later than 14 days after the site is first disturbed and shall consist of broadcast seeding with Minnesota Department of Transportation Seed Mixture 22-111 at 100 lb/acre followed by covering with spray mulch.
- Erosion control measures shown on the erosion control plan are the absolute minimum. The contractor shall install temporary earth dikes, sediment traps or basins and additional silt fencing as deemed necessary to control erosion.

SITE WORK COMPLETION:

- When final grading has been completed but before placement of sod an "as built" survey shall be done per City of Chanhassen requirements to insure that grading was properly done.
- Install sod for final stabilization of site disturbed areas.
- When any remedial grading has been completed, sod shall be completed including any erosion control blankets for steep areas and identified swales.
- When turf is established, silt fence and inlet protection and other erosion control devices shall be disposed of and adjacent streets, alleys and walks shall be cleaned as needed to deliver a site that is erosion resistant and clean.
- Contractor shall maintain positive drainage of a minimum 2% slope away from proposed building.

STANDARD EROSION CONTROL NOTES FOR RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT:

1. Natural topography and soil conditions must be protected, including retention onsite of native topsoil to the greatest extent possible.
2. Additional measures, such as hydraulic mulching and other practices as specified by the District must be used on slopes of 3:1 (H:V) or steeper to provide adequate stabilization.
3. Final site stabilization measures must specify that at least six inches of topsoil or organic matter be spread and incorporated into the underlying soil during final site treatment wherever topsoil has been removed.
4. Construction site waste such as discarded building materials, concrete truck washout, chemicals, litter and sanitary waste must be properly managed.
5. All temporary erosion and sediment control BMPs must be maintained until completion of construction and vegetation is established sufficiently to ensure stability of the site, as determined by the District.
6. All temporary erosion and sediment control BMPs must be removed upon final stabilization.
7. Soil surfaces compacted during construction and remaining pervious upon completion of construction must be decompacted through soil amendment and/or ripping to a depth of 18 inches (8 inches for single-family home properties) while taking care to avoid utilities, tree roots and other existing vegetation prior to final revegetation or other stabilization.
8. All disturbed areas must be stabilized within 7 calendar days after land-disturbing work has temporarily or permanently ceased on a property that drains to an impaired water, within 14 days elsewhere.
9. The permittee must, at a minimum, inspect, maintain and repair all disturbed surfaces and all erosion and sediment control facilities and soil stabilization measures every day work is performed on the site and at least weekly until land-disturbing activity has ceased. Thereafter, the permittee must perform these responsibilities at least weekly until vegetative cover is established. The permittee will maintain a log of activities under this section for inspection by the District on request.



SOD SWALE CROSS SECTION A–A DETAIL
NOT TO SCALE

SOD SWALE CROSS SECTION B–B DETAIL
NOT TO SCALE

LEGEND

EXISTING CONTOUR	– – – 835 – – –
EXISTING SPOT ELEVATION	X 835.5
PROPOSED CONTOUR	835
PROPOSED SPOT ELEVATION	835.5
DRAINAGE ARROW – FLOW	⟹
PROP. SILT FENCE/BIO ROLL	SF
EXISTING MANHOLE	Ⓢ
EXISTING CATCH BASIN	CB
EXISTING STORM SEWER MAIN	ST
EXISTING SANITARY SEWER MAIN	S
EXISTING WATER MAIN	W
EXISTING FIRE HYDRANT	
EXISTING UTILITY POLE	
EXISTING GAS METER	GM
EXISTING ELECTRIC METER	EM
EXISTING ELEC. TRANSFORMER	TR
EXIST. OVERHEAD UTILITY LINE	OE
EXISTING ELECTRIC LINE	E
TREE REMOVAL	

PROPOSED ELEVATIONS

FIRST FLOOR (SUB–FLOOR)	= 974.50
TOP OF FOUNDATION	= 972.80
BASEMENT FLOOR	= 963.50
GARAGE FLOOR	= 974.50

PROPOSED HARDCOVER

HOUSE	1,933 SQ. FT.
WALK/STEPS/PORCH	152 SQ. FT.
DRIVEWAY	660 SQ. FT.
RETAINING WALLS	138 SQ. FT.
AC PAD	9 SQ. FT.
TOTAL PROPOSED HARDCOVER	2,892 SQ. FT.
AREA OF LOT	18,138 SQ. FT.
LOT COVERAGE	15.9%

NOTE: EXISTING HARDCOVER WAS 0% (VACANT LOT)

HOUSE STAKING AND OFFSETS

IN TYPICAL FASHION, STAKING THE HOUSE IS DEFERRED UNTIL AFTER PERMITS HAVE BEEN OBTAINED AND THE SITE IS READY FOR EXCAVATION. WHILE WE HAVE SHOWN THE PROPOSED LOCATION OF THE FRONT AND REAR BUILDING LINE OFFSETS, UNTIL THE DWELLING IS ACTUALLY STAKED WE DO NOT KNOW THOSE LOCATIONS. AN UPDATED PROPOSED SURVEY WILL BE ISSUED AFTER THE DWELLING HAS BEEN STAKED. AT THAT TIME, WE WILL SET A BENCHMARK WITHIN 20 FT OF THE PROPOSED DWELLING.

DATE	REVISION DESCRIPTION
2/14/18	REVISED PROPOSED GRADES PER OWNER REQUEST
3/1/18	PER CITY COMMENTS
3/12/18	PER CITY COMMENTS
3/22/18	PER CITY & CLIENT COMMENTS
9/12/18	PER CITY COMMENTS
9/25/18	PER CITY COMMENTS
4/23/19	PER WATERSHED COMMENTS

DRAWING ORIENTATION & SCALE

N

0 20' 40'

CLIENT/JOB ADDRESS

ANE GROUP INC.

6657 DEERWOOD DRIVE
CHANHASSEN, MN

Advance
Surveying & Engineering, Co.
17917 Highway No. 7
Minnetonka, Minnesota 55345
Phone (952) 474-7964
Web: www.advsur.com

I HEREBY CERTIFY THAT THIS PLAN, SURVEY OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED LAND SURVEYOR UNDER THE LAWS OF THE STATE OF MINNESOTA.

Wayne W. Preuhs
#43503
LICENSE NO.
FEBRUARY 14, 2018
DATE

DATE SURVEYED: JUNE 23, 2017

SURVEYED BY
ADVANCED SURVEYING. & ENG., CO.

DATE DRAFTED: OCTOBER 30, 2017

SHEET TITLE
PROPOSED SURVEY

SHEET SIZE: 22 X 34

DRAWING NUMBER
170633 JR

SHEET NO.
S1
SHEET 1 OF 1

RILEY PURGATORY BLUFF CREEK
WATERSHED DISTRICT

ANNUAL FINANCIAL REPORT

December 31, 2018

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RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT
TABLE OF CONTENTS

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INTRODUCTORY SECTION

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RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT
ORGANIZATION
December 31, 2018

Name	Position 2018
District Officers:	
Appointed:	
Board of Managers:	
Dick Ward	President
Dorothy Pedersen	Vice-President
Jill Crafton	Treasurer
David Zeigler	Secretary
Larry Koch	Manager
District Administrator:	
Claire Bleser	
District Council:	
Smith Partners PLLP	
District Engineer:	
Barr Engineering	

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FINANCIAL SECTION

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INDEPENDENT AUDITOR'S REPORT

To the Honorable Managers of the
Riley Purgatory Bluff Creek Watershed District
Chanhassen, Minnesota

We have audited the accompanying financial statements of the governmental activities and each major fund of Riley Purgatory Bluff Creek Watershed District, as of and for the year ended December 31, 2018, and the related notes to the financial statements, which collectively comprise Riley Purgatory Bluff Creek Watershed District's basic financial statements as listed in the table of contents.

Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with accounting principles generally accepted in the United States of America; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditor's Responsibility

Our responsibility is to express opinions on these financial statements based on our audit. We conducted our audit in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinions.

Opinions

In our opinion, the financial statements referred to in the first paragraph present fairly, in all material respects, the respective financial position of the governmental activities and each major fund of Riley Purgatory Bluff Creek Watershed District, as of December 31, 2018, and the respective changes in financial position for the year then ended in accordance with accounting principles generally accepted in the United States of America.

Report on Summarized Comparative Information

We have previously audited Riley Purgatory Bluff Creek Watershed District's 2017 financial statements, and we expressed an unmodified audit opinion on the respective financial statements of the governmental activities and each major fund in our report dated March 14, 2018. In our opinion, the summarized comparative information presented herein as of and for the year ended December 31, 2017 is consistent, in all material respects, with the audited financial statements from which it has been derived.

Other Matters

Required Supplementary Information

Management has omitted the management's discussion and analysis that accounting principles generally accepted in the United States of America require to be presented to supplement the basic financial statements. Such missing information, although not a part of the basic financial statements, is required by the Governmental Accounting Standards Board, who considers it to be an essential part of financial reporting for placing the basic financial statements in an appropriate operational, economic, or historical context. Our opinion on the basic financial statements is not affected by this missing information.

Accounting principles generally accepted in the United States of America require that the budgetary comparison information and pension information on pages 36 through 39 be presented to supplement the basic financial statements. Such information, although not a part of the basic financial statements, is required by the Governmental Accounting Standards Board, who considers it to be an essential part of financial reporting for placing the basic financial statements in an appropriate operational, economic, or historical context. We have applied certain limited procedures to the required supplementary information in accordance with auditing standards generally accepted in the United States of America, which consisted of inquiries of management about the methods of preparing the information and comparing the information for consistency with management's responses to our inquiries, the basic financial statements, and other knowledge we obtained during our audit of the basic financial statements. We do not express an opinion or provide any assurance on the information because the limited procedures do not provide us with sufficient evidence to express an opinion or provide any assurance.

Other Information

Our audit was conducted for the purpose of forming opinions on the financial statements that collectively comprise Riley Purgatory Bluff Creek Watershed District's basic financial statements. The introductory and other information sections are presented for purposes of additional analysis and are not a required part of the basic financial statements.

The introductory and other information sections have not been subjected to the auditing procedures applied in the audit of the basic financial statements and, accordingly, we do not express an opinion or provide any assurance on them.

REDPATH AND COMPANY, LTD.
St. Paul, Minnesota

_____, 2019

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BASIC FINANCIAL STATEMENTS

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT
STATEMENT OF NET POSITION **Statement 1**
December 31, 2018
With Comparative Totals For December 31, 2017

	Primary Government	
	Governmental Activities	
	2018	2017
Assets:		
Cash and cash equivalents	$5,870,296	$5,013,661
Accounts receivable	337	-
Due from other governments	455,813	154,436
Accrued interest receivable	22,487	8,671
Property taxes receivable:		
Delinquent	29,411	20,556
Due from county	21,693	26,218
Security deposit	7,244	7,244
Prepaid expenses	27,361	17,509
Capital assets - net:		
Nondepreciable	78,034	78,034
Depreciable	138,811	169,603
Total assets	6,651,487	5,495,932
Deferred outflows of resources:		
Related to pensions	120,039	90,554
Liabilities:		
Accounts payable	189,569	269,851
Contracts payable	23,657	13,469
Due to other governments	30,324	32,650
Deposits payable	976,826	704,352
Accrued payroll	18,168	17,564
Unearned revenue	-	6,666
Compensated absences payable:		
Due within one year	18,946	11,895
Due in more than one year	21,555	20,346
Net pension liability:		
Due in more than one year	260,737	217,054
Total liabilities	1,539,782	1,293,847
Deferred inflows of resources:		
Related to pensions	60,215	35,985
Net position:		
Investment in capital assets	216,845	247,637
Unrestricted	4,954,684	4,009,017
Total net position	$5,171,529	$4,256,654

The accompanying notes are an integral part of these financial statements.

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT
STATEMENT OF ACTIVITIES **Statement 2**
For The Year Ended December 31, 2018
With Comparative Totals For The Year Ended December 31, 2017

Functions/Programs	Expenses	Program Revenues: Charges For Services	Program Revenues: Operating Grants and Contributions	Program Revenues: Capital Grants and Contributions	Net (Expense) Revenue and Changes in Net Position Primary Government Totals: 2018	2017
Primary government:						
Governmental activities:						
General government	$1,036,721	$57,002	$2,013	$ -	($977,706)	($967,763)
Programs	515,921	-	4,500	-	(511,421)	(856,944)
Projects	1,622,775	-	532,218	-	(1,090,557)	-
Total governmental activities	$3,175,417	$57,002	$538,731	$0	(2,579,684)	(1,824,707)
General revenues:						
Property taxes					3,417,668	2,841,853
Unrestricted investment earnings					46,180	15,240
Other income					30,711	29,450
Total general revenues					3,494,559	2,886,543
Change in net position					914,875	1,061,836
Net position - January 1					4,256,654	3,194,818
Net position - December 31					$5,171,529	$4,256,654

The accompanying notes are an integral part of these financial statements.

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT
BALANCE SHEET
GOVERNMENTAL FUNDS
December 31, 2018
With Comparative Totals For December 31, 2017

Statement 3

	509 Plan Implementation	
Assets	2018	2017
Cash and cash equivalents	$5,870,296	$5,013,661
Accounts receivable	337	-
Due from other governments	455,813	154,436
Accrued interest receivable	22,487	8,671
Taxes receivable:		
Delinquent	29,411	20,556
Due from county	21,693	26,218
Security deposit	7,244	7,244
Prepaid expense	27,361	17,509
Total assets	$6,434,642	$5,248,295
Liabilities, deferred inflow of resources, and fund balance		
Liabilities:		
Accounts payable	$189,569	$269,851
Contracts payable	23,657	13,469
Due to other governments	30,324	32,650
Deposits payable	976,826	704,352
Accrued payroll	18,168	17,564
Unearned revenue	-	6,666
Total liabilities	1,238,544	1,044,552
Deferred inflow of resources:		
Unavailable revenues	29,411	20,556
Fund balance:		
Nonspendable	34,605	24,753
Committed	5,052,901	4,115,581
Assigned	79,181	42,853
Total fund balance	5,166,687	4,183,187
Total liabilities, deferred inflow of resources, and fund balance	$6,434,642	$5,248,295
Fund balance reported above	$5,166,687	$4,183,187
Amounts reported for governmental activities in the statement of net position are different because:		
Capital assets used in governmental activities are not financial resources and, therefore, are not reported in the funds.	216,845	247,637
Deferred outflow of resources-pension related are not current financial resources and, therefore, are not reported in the funds.	120,039	90,554
Deferred inflow of resources-pension related are associated with long-term liabilities that are not due and payable in the current period and, therefore, are not reported in the funds.	(60,215)	(35,985)
Long-term liabilities, including compensated absences payable, are not due and payable in the current period and, therefore, are not reported in the funds.		
Compensated absences payable	(40,501)	(32,241)
Net pension liability	(260,737)	(217,054)
Other long-term assets are not available to pay for current period expenditures and, therefore, are reported as unavailable revenue in the funds.	29,411	20,556
Net position of governmental activities	$5,171,529	$4,256,654

The accompanying notes are an integral part of these financial statements.

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT
STATEMENT OF REVENUES, EXPENDITURES AND CHANGES IN FUND BALANCE
GOVERNMENTAL FUNDS
For The Year Ended December 31, 2018
With Comparative Totals For The Year Ended December 31, 2017

Statement 4

	509 Plan Implementation	
	2018	2017
Revenues:		
General property taxes	$3,408,813	$2,842,119
Permit income	57,002	47,400
Intergovernmental	536,778	257,695
Investment income	46,180	15,240
Other income	30,651	29,450
Total revenues	4,079,424	3,191,904
Expenditures:		
Current:		
General government	980,469	968,455
Programs	453,603	610,097
Projects:		
Bluff Creek	383,611	154,062
Riley Creek	763,435	192,048
Purgatory Creek	475,729	141,870
Capital outlay:		
General government	-	20,470
Programs	39,077	8,569
Total expenditures	3,095,924	2,095,571
Revenues over expenditures	983,500	1,096,333
Fund balance - January 1	4,183,187	3,086,854
Fund balance - December 31	$5,166,687	$4,183,187

The accompanying notes are an integral part of these financial statements.

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT
RECONCILIATION OF THE STATEMENT OF REVENUES, EXPENDITURES AND CHANGES IN FUND BALANCE OF GOVERNMENTAL FUNDS
For The Year Ended December 31, 2018
With Comparative Totals For The Year Ended December 31, 2017

Statement 5

		2018	2017
Amounts reported for governmental activities in the statement of activities (Statement 2) are different because:			
Net changes in fund balance - total governmental funds (Statement 4)		$983,500	$1,096,333
Governmental funds report capital outlays as expenditures. However, in the Statement of Net Position the costs of those assets is allocated over their estimated useful lives and reported as depreciation expense. This is the amount by which capital outlays exceeded depreciation in the curent period.			
Capital outlay		39,077	29,039
Depreciation		(24,804)	(22,748)
In the Statement of Activities, the gain or loss on the disposal of capital assets is reported. However, in the governmental funds, only the proceeds of a sale increase financial resources. Thus, the change in net position differs from the change in fund balance by the book value of the disposed capital assets.		(45,065)	-
Some expenses reported in the Statement of Activities do not require the use of current financial resources and, therefore, are not reported as expenditures in governmental funds:			
Compensated absences		(8,260)	(12,491)
Governmental funds report pension contributions as expenditures, however, pension expense is reported in the Statement of Activities. This is the amount by which pension expense differs from pension contributions:			
Pension contributions	$23,959		
Pension expense	(62,387)	(38,428)	(28,031)
Revenues in the statement of activities that do not provide current financial resources are not reported as revenues in the funds:			
Unavailable general property taxes revenue		8,855	(266)
Change in net position of governmental activities (Statement 2)		$914,875	$1,061,836

Note 1 SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

The accounting policies of Riley Purgatory Bluff Creek Watershed District (the District) conform to generally accepted accounting principles applicable to governmental units. The following is a summary of significant accounting policies.

A. FINANCIAL REPORTING ENTITY

The District was created under the provisions of Minnesota Statutes. The District is operated by a five member Board of Managers appointed by the Hennepin and Carver County Boards of Commissioners for three year terms.

The District's policy is to include in the financial statements all funds, account groups, departments, agencies, boards, commissions, and other component units for which the District is considered to be financially accountable.

Component units are legally separate entities for which the District (primary government) is financially accountable, or for which the exclusion of the component unit would render the financial statements of the primary government misleading. The criteria used to determine if the primary government is financially accountable for a component unit include whether or not the primary government appoints the voting majority of the potential component unit's governing body, is able to impose its will on the potential component unit, is in a relationship of financial benefit or burden with the potential component unit, or is fiscally dependent upon by the potential component unit.

Based on these criteria, there are no organizations considered to be component units of the District.

B. GOVERNMENT-WIDE AND FUND FINANCIAL STATEMENTS

The government-wide financial statements (i.e., the statement of net position and the statement of activities) report information on all of the nonfiduciary activities of the primary government. For the most part, the effect of interfund activity has been removed from these statements. *Governmental activities*, which normally are supported by taxes and intergovernmental revenues, are reported separately from *business-type activities*. There are no *business-type activities*, which rely to a significant extent on fees and charges for support.

The statement of activities demonstrates the degree to which the direct expenses of a given function are offset by program revenues. *Direct expenses* are those that are clearly identifiable with a specific function. *Program revenues* include: 1) charges to customers or applicants who purchase, use, or directly benefit from goods, services, or privileges provided by a given function; and, 2) grants and contributions that are restricted to meeting the operational or capital requirements of a particular function. Taxes and other items not included among program revenues are reported instead as *general revenues*.

Separate financial statements are provided for governmental funds. Major individual governmental funds are reported as separate columns in the fund financial statements.

C. MEASUREMENT FOCUS, BASIS OF ACCOUNTING AND FINANCIAL STATEMENT PRESENTATION

The government-wide financial statements are reported using the *economic resources measurement focus* and the *accrual basis of accounting*. Revenues are recorded when earned and expenses are recorded when a liability is incurred, regardless of the timing of related cash flows. Property taxes are recognized as revenues in the year for which they are levied. Grants and similar items are recognized as revenue as soon as all eligibility requirements imposed by the provider have been met.

Governmental fund financial statements are reported using the *current financial resources measurement focus* and the *modified accrual basis of accounting*. Revenues are recognized as soon as they are both measurable and available. Revenues are considered to be *available* when they are collectible within the current period or soon enough thereafter to pay liabilities of the current period. For this purpose, the District considers all revenues, except reimbursement grants, to be available if they are collected within 60 days of the end of the current fiscal period. Reimbursement grants are considered available if they are collected within one year of the end of the current fiscal period. Expenditures generally are recorded when a liability is incurred, as under accrual accounting. However, debt service expenditures are recorded only when payment is due.

Property taxes, intergovernmental revenues and interest associated with the current fiscal period are all considered to be susceptible to accrual and have been recognized as revenues of the current fiscal period. All other revenue items are considered to be measurable and available only when cash is received by the District.

The District reports the following major governmental fund:

509 Plan Implementation (special revenue fund) – Notwithstanding chapter 103D, a local government unit or watershed management organization may levy a tax to pay the increased costs of preparing a plan under sections 103B.231 and 103B.235 or for projects identified in an approved and adopted plan necessary to implement the purposes of section 103B.201. The proceeds of any tax levied under this section shall be deposited in a separate fund and expended only for the purposes authorized by this section. Watershed management organizations and local government units may accumulate the proceeds of levies as an alternative to issuing bonds to finance improvements.

D. BUDGETARY DATA

The Board of Managers adopts an annual budget for the 509 Plan Implementation Special Revenue Fund. During the budget year, supplemental appropriations and deletions are or may be authorized by the Board. The modified accrual basis of accounting is used by the District for budgeting data. All appropriations end with the fiscal year for which they were made.

The Board of Managers annually adopts a tax levy for collection during the calendar year. The District's records are maintained on a calendar year ending December 31.

The District monitors budget performance on the fund basis. All amounts over budget have been approved by the Board through the disbursement approval process.

The District prepares a revenue and expenditure budget for the 509 Plan Implementation Special Revenue Fund. Encumbrance accounting, under which purchase orders, contracts, and other commitments of

monies are recorded in order to reserve that portion of the applicable appropriation, is not employed by the District.

E. CASH AND INVESTMENTS

Investments are stated at fair value, based upon quoted market prices. Investment income is accrued at the balance sheet date.

F. PROPERTY TAX REVENUE RECOGNITION

The Board of Managers annually adopts a tax levy and certifies it to the Counties on September 15 (levy/assessment date) of each year for collection in the following year. The Counties are responsible for billing and collecting all property taxes for itself, the District, the local School District and other taxing authorities. Such taxes become a lien on January 1 and are recorded as receivables by the District at that date. Real property taxes are payable (by property owners) on May 15 and October 15 of each calendar year. Personal property taxes are payable by taxpayers on February 28 and June 30 of each year. These taxes are collected by the Counties and remitted to the District on or before July 7 and December 2 of the same year. Delinquent collections for November and December are received the following January. The District has no ability to enforce payment of property taxes by property owners. The Counties possess this authority.

GOVERNMENT-WIDE FINANCIAL STATEMENTS
The District recognizes property tax revenue in the period for which the taxes were levied. Uncollectible property taxes are not material and have not been reported.

GOVERNMENTAL FUND FINANCIAL STATEMENTS
The District recognizes property tax revenue when it becomes both measurable and available to finance expenditures of the current period. In practice, current and delinquent taxes and State credits received by the District in July, December and January are recognized as revenue for the current year. Taxes collected by the Counties by December 31 (remitted to the District the following January) and taxes and credits not received at year end are classified as delinquent and due from County taxes receivable. The portion of delinquent taxes not collected by the District in January is fully offset by deferred inflow of resources because they are not available to finance current expenditures.

G. INVENTORIES

The original cost of materials and supplies has been recorded as expenditures at the time of purchase. The District does not maintain material amounts of inventories of goods and supplies.

H. PREPAIDS

Certain payments to vendors reflect costs applicable to future accounting periods and are recorded as prepaid items in both government-wide and fund financial statements. Prepaid items are reported using the consumption method and recorded as expenditures/expenses at the time of consumption.

I. CAPITAL ASSETS

Capital assets, which include property, plant, equipment, intangibles, and infrastructure assets (e.g., storm sewers, manholes, control structures and similar items), are reported in the governmental activities columns in the government-wide financial statements. Capital assets (including intangible assets) are defined by the District as assets with an initial, individual cost of more than $5,000 (amount not rounded) and an estimated useful life in excess of one year. Such assets are recorded at historical cost or estimated historical cost if purchased or constructed. Donated capital assets are recorded at acquisition value at the date of donation.

The costs of normal maintenance and repairs that do not add to the value of the asset or materially extend asset lives are not capitalized.

GASB Statement No. 34 required the District to report and depreciate new infrastructure assets effective in 2004. Infrastructure assets include lake improvements, dams and drainage systems. Neither their historical cost nor related depreciation has historically been reported in the financial statements. For governmental entities with total annual revenues of less than $10 million for the fiscal year ended December 31, 1999, the retroactive reporting of infrastructure is not required under the provisions of GASB Statement No. 34. The District has elected to implement the general provisions of GASB Statement No. 34 in the current year and has elected not to report infrastructure assets acquired in years prior to 2004. The District did not acquire any infrastructure assets from 2004 through 2018.

The District implemented GASB Statement No. 51, *Accounting and Financial Reporting for Intangible Assets* effective January 1, 2010. GASB Statement No. 51 required the District to capitalize and amortize intangible assets. Intangible assets include easements and computer software. For governmental entities with total annual revenues of less than $10 million for the fiscal year ended December 31, 1999, the retroactive reporting of intangible assets in not required under the provision of GASB Statement No. 51. The District has elected not to report intangible assets acquired in years prior to 2010.

Property, plant and equipment of the District, is depreciated using the straight-line method over the following estimated useful lives:

Building	30 years
Equipment, boats and vehicles	7-10 years
Intangibles	10 years

J. COMPENSATED ABSENCES

It is the District's policy to permit employees to accumulate earned but unused vacation and personal leave benefits. All vacation pay and personal leave that is payable at termination is accrued when incurred in the government-wide financial statements. A liability for these amounts is reported in governmental funds only if they have matured, for example, as a result of employee resignations and retirements. In accordance with the

provisions of Statement of Government Accounting Standards No. 16, *Accounting for Compensated Absences,* no liability is recorded for nonvesting accumulating rights to receive sick pay benefits.

K. FUND EQUITY

In the fund financial statements, governmental funds report fund balance in classifications that disclose constraints for which amounts in those funds can be spent. These classifications are as follows:

Nonspendable - consists of amounts that are not in spendable form, such as prepaid items.

Restricted - consists of amounts related to externally imposed constraints established by creditors, grantors or contributors; or constraints imposed by state statutory provisions.

Committed - consists of internally imposed constraints. These constraints are established by Resolution of the District's Board.

Assigned - consists of internally imposed constraints. These constraints reflect the specific purpose for which it is the District's intended use. These constraints are established by the District's Board and/or management.

Unassigned – consists of negative residual amounts in the fund.

When both restricted and unrestricted resources are available for use, it is the District's policy to first use restricted resources, then use unrestricted resources as they are needed.

When committed, assigned or unassigned resources are available for use, it is the District's policy to use resources in the following order; 1) assigned 2) committed, and 3) unassigned.

L. USE OF ESTIMATES

The preparation of financial statements in accordance with generally accepted accounting principles (GAAP) requires management to make estimates that affect amounts reported in the financial statements during the reporting period. Actual results could differ from such estimates.

M. COMPARATIVE TOTALS

The basic financial statements and individual fund financial statements include certain prior-year summarized comparative information in total but not at the level of detail required for a presentation in conformity with GAAP. Accordingly, such information should be read in conjunction with the District's financial statements for the year ended December 31, 2017, from which the summarized information was derived.

N. RECLASSIFICATIONS

Certain reclassifications were made to prior year amounts to conform to current year presentation.

O. DEFERRED OUTFLOWS/INFLOWS OF RESOURCES

In addition to assets, the statement of financial position will sometimes report a separate section for deferred outflows of resources. This separate financial statement element, *deferred outflows of resources*, represents a consumption of net position that applies to a future period(s) and so will *not* be recognized as an outflow of resources (expense/expenditure) until then. The government has one item that qualifies for reporting in this category. It is the pension related deferred outflows reported in the government-wide Statement of Net Position.

In addition to liabilities, the statement of financial position will sometimes report a separate section for deferred inflows of resources. This separate financial statement element, *deferred inflows of resources*, represents an acquisition of net position that applies to a future period(s) and so will *not* be recognized as an inflow of resources (revenue) until that time. The government has pension related deferred inflows of related deferred inflows of sources reported in the government-wide Statement of Net Position. The government also has an item, which arises only under a modified accrual basis of accounting, that qualifies for reporting in this category. Accordingly, the item, unavailable revenue, is reported only in the governmental fund balance sheet. The governmental funds report unavailable revenues from property taxes.

P. DEFINED BENEFIT PENSION PLANS

Pensions. For purposes of measuring the net pension liability, deferred outflows/inflows of resources, and pension expense, information about the fiduciary net position of the Public Employees Retirement Association (PERA) and additions to/deductions from PERA's fiduciary net position have been determined on the same basis as they are reported by PERA except that PERA's fiscal year end is June 30. For this purpose, plan contributions are recognized as of employer payroll paid dates and benefit payments and refunds are recognized when due and payable in accordance with the benefit terms. Investments are reported at fair value.

Note 2 DEPOSITS AND INVESTMENTS

A. DEPOSITS

In accordance with Minnesota Statutes, the District maintains deposits at those depository banks authorized by the District Board, all of which are members of the Federal Reserve System.

Minnesota Statutes require that all District deposits be protected by insurance, surety bond, or collateral. The market value of collateral pledged must equal 110% of the deposits not covered by insurance or bonds.

Minnesota Statutes require that securities pledged as collateral be held in safekeeping by the District Treasurer or in a financial institution other than that furnishing the collateral. Authorized collateral includes the following:

a) United States government treasury bills, treasury notes and treasury bonds;

b) Issues of United States government agencies and instrumentalities as quoted by a recognized industry quotation service available to the government entity;

c) General obligation securities of any state or local government with taxing powers which is rated "A" or better by a national bond rating service, or revenue obligation securities of any state or local

government with taxing powers which is rated "AA" or better by a national bond rating service;

d) General obligation securities of a local government with taxing powers may be pledged as collateral against funds deposited by that same local government entity;

e) Irrevocable standby letters of credit issued by Federal Home Loan Banks to a municipality accompanied by written evidence that the bank's public debt is rated "AA" or better by Moody's Investors Service, Inc. or Standard & Poor's Corporation; and

f) Time deposits that are fully insured by any federal agency.

Custodial Credit Risk - Deposits. Custodial credit risk is the risk that in the event of a bank failure, the District's deposits may not be returned to it. State Statutes require that insurance, surety bonds or collateral protect all District deposits. The market value of collateral pledged must equal 110% of deposits not covered by insurance or bonds.

At December 31, 2018 the carrying amount of the District's deposits were $2,458,379 and the bank balance was $2,459,652. The entire bank balance was covered by federal depository insurance or perfected collateral provided by the financial institution and held in the District's name.

B. INVESTMENTS

Minnesota Statutes authorize the District to invest in the following:

a) Direct obligations or obligations guaranteed by the United States or its agencies, its instrumentalities or organizations created by an act of congress, excluding mortgage-backed securities defined as high risk.

b) Shares of investment companies registered under the Federal Investment Company Act of 1940 and whose only investments are in securities described in (a) above, general obligation tax-exempt securities, or repurchase or reverse repurchase agreements.

c) Obligations of the State of Minnesota or any of its municipalities as follows:
   1) any security which is a general obligation of any state or local government with taxing powers which is rated "A" or better by a national bond rating service;
   2) any security which is a revenue obligation of any state or local government with taxing powers which is rated "AA" or better by a national bond rating service; and
   3) a general obligation of the Minnesota Housing Finance Agency which is a moral obligation of the State of Minnesota and is rated "A" or better by a national bond rating agency.

d) Bankers acceptances of United States banks.

e) Commercial paper issued by United States corporations or their Canadian subsidiaries, of the highest quality, and maturing in 270 days or less.

f) Repurchase or reverse repurchase agreements with banks that are members of the Federal Reserve System with capitalization exceeding $10,000,000; a primary reporting dealer in U.S. government securities to the Federal Reserve Bank of New York; certain Minnesota securities broker-dealers; or, a bank qualified as a depositor.

g) General obligation temporary bonds of the same governmental entity issued under section 429.091, subdivision 7; 469.178, subdivision 5; or 475.61, subdivision 6.

As of December 31, 2018, the District had the following investments and maturities:

			Investment Maturities	
Investment Type	Rating	Fair Value	Less Than 1 Year	1 - 5 Years
Brokered certificate of deposits	NR	$3,390,184	$1,952,925	$1,437,259
Money market funds	NR	21,266	21,266	-
Total investments		3,411,450	$1,974,191	$1,437,259
Deposits		2,458,379		
Cash with broker-dealer		467		
Total cash and investments		$5,870,296		

NR- Not Rated

The District categorizes its fair value measurements within the fair value hierarchy established by generally accepted accounting principles. The hierarchy is based on the valuation inputs used to measure the fair value of the asset. The hierarchy has three levels. Level 1 investments are valued using inputs that are based on quoted prices in active markets for identical assets; Level 2 investments are valued using inputs that are based on quoted prices for similar assets or inputs that are observable, either directly or indirectly; level 3 investments are valued using inputs that are unobservable.

The District has the following recurring fair value measurements as of December 31, 2018:

		Fair Value Measurement Using		
Investment Type	12/31/2018	Level 1	Level 2	Level 3
Investments at fair value:				
Brokered Certificates of Deposit	$3,390,184	$ -	$3,390,184	$ -
Investments not categorized:				
Money market fund	21,266			
Total	$3,411,450			

Custodial Credit Risk – Investments. For investments in securities, custodial credit risk is the risk that in the event of failure of the counterparty, the District will not be able to recover the value of its investment securities that are in the possession of an outside party. Investments in securities that are held by the District's broker-dealer include $500,000 that is insured through the securities investor protection corporation (SIPC). The broker-dealer has provided additional protection by providing additional insurance. This insurance is subject to aggregate limits to all of the broker-dealer's accounts.

Credit Risk. Credit risk is the risk that an issuer or other counterparty to an investment will be unable to fulfill its obligation to the holder of the investment. The District follows State Statutes in regards to credit risk of investments. The District does not have an investment policy which further limits its investment choices.

Interest Rate Risk. Interest rate risk is the risk that changes in the interest rates of debt investments could adversely affect the fair value of an investment. The District does not have an investment policy which limits investment maturities as a means of managing its exposure to fair value losses arising from increasing interest rates.

Concentration of Credit Risk. Concentration of credit risk is the risk of loss that may be attributed to the magnitude of the District's investment in a single issuer. The District does not have an investment policy which addresses the concentration of credit risk.

Note 3 UNAVAILABLE REVENUES

Governmental funds report deferred inflows of resources in connection with receivables for revenues that are not considered to be available to liquidate liabilities of the current period. At the end of the current fiscal year, the various components of unavailable revenue reported in the governmental funds were as follows:

Major Fund	Property Taxes
509 Plan Implementation Fund	$29,411

Note 4 CAPITAL ASSETS

Capital asset activity for the year ended December 31, 2018 was as follows:

	Beginning Balance	Increases	Decreases	Ending Balance
Governmental activities:				
Capital assets, not being depreciated:				
Land	$78,034	$ -	$ -	$78,034
Capital assets, being depreciated:				
Building	50,856	-	50,856	-
Equipment, boats and vehicles	139,163	39,077	-	178,240
Intangibles	34,571	-	-	34,571
Total capital assets, being depreciated	224,590	39,077	50,856	212,811
Less accumulated depreciation for:				
Building	5,791	-	5,791	-
Equipment, boats and vehicles	44,010	21,347	-	65,357
Intangibles	5,186	3,457	-	8,643
Total accumulated depreciation	54,987	24,804	5,791	74,000
Total capital assets being depreciated - net	169,603	14,273	45,065	138,811
Governmental activities capital assets - net	$247,637	$14,273	$45,065	$216,845

Depreciation expense was charged to function/programs of the District as follows:

Governmental activities:	
General government	$7,551
Programs	17,253
	$24,804

Note 5 COMMITMENTS AND CONTINGENCIES

The District had $107,021 of committed contracts at December 31, 2018.

The District's management has indicated that there are no existing or pending lawsuits or other actions in which the District is a defendant.

Note 6 LONG-TERM DEBT

Changes in general long-term liabilities for the year ended December 31, 2018 is as follows:

	Balance 12/31/17	Additions	Deletions	Balance 12/31/18	Due Within One Year
Governmental activities:					
Compensated payable	$32,241	$33,083	($24,823)	$40,501	$18,946

It is not practicable to determine specific year of payment of long-term accrued compensated absences.

Note 7 FUND BALANCE

At December 31, 2018, the District had the following fund balance:

	509 Plan Implementation
Nonspendable	$34,605
Committed to:	
509 plan implementation	5,052,901
Assigned to:	
509 plan implementation	79,181
Total	$5,166,687

Note 8 RISK MANAGEMENT

The District is exposed to various risks of loss related to torts; theft of, damage to, and destruction of assets; errors and omissions; and natural disasters. Property and casualty liabilities are insured. The District retains risk for the deductible portions of the insurance. The amounts of these deductibles are considered immaterial to the financial statements.

There were no significant reductions in insurance from the previous year or settlements in excess of insurance coverage for any of the past three fiscal years.

Note 9 DEFINED BENEFIT PENSION PLANS

A. PLAN DESCRIPTION

The District participates in the following cost-sharing multiple-employer defined benefit pension plans administered by the Public Employees Retirement Association of Minnesota (PERA). PERA's defined benefit pension plans are established and administered in accordance with Minnesota Statutes, Chapters 353 and 356. PERA's defined benefit pension plans are tax qualified plans under Section 401 (a) of the Internal Revenue Code.

General Employees Retirement Fund

All full-time and certain part-time employees of the District are covered by the General Employees Retirement Fund (GERF). GERF members belong to the Coordinated Plan. Coordinated Plan members are covered by Social Security.

B. BENEFITS PROVIDED

PERA provides retirement, disability, and death benefits. Benefit provisions are established by state statute and can only be modified by the state legislature. Vested terminated employees who are entitled to benefits, but are not receiving them yet, are bound by the provisions in effect at the time they last terminated their public service.

GERF Benefits

Benefits are based on a member's highest average salary for any five successive years of allowable service, age, and years of credit at termination of service. Two methods are used to compute benefits for PERA's Coordinated Plan members. Members hired prior to July 1, 1989, receive the higher of Method 1 or Method 2 formulas. Only Method 2 is used for members hired after June 30, 1989. Under Method 1, the accrual rate for Coordinated Plan members is 1.2 percent for each of the first ten years of service and 1.7% for each additional year. Under Method 2, the accrual rate for Coordinated Plan members is 1.7% for all years of service. The accural rates for former Minneapolis Employees Retirement Fund (MERF) members is 2.0% for each of the first 10 years of service and 2.5% for each additional year. For members hired prior to July 1, 1989 a full annuity is available when age plus years of service equal 90 and normal retirement age is 65. For members hired on or after July 1, 1989 normal retirement age is the age for unreduced Social Security benefits capped at 66.

Beginning January 1, 2019, benefit recipients will receive a future annual increase equal to 50 percent of the Social Security Cost of Living Adjustment, not less than 1.0 percent and not more than 1.5 percent. For retirements on or after January 1, 2024, the first benefit increase is delayed until the retiree reaches

Normal Retirement Age (not applicable to Rule of 90 retirees, disability benefit recipients, or survivors). A benefit recipient who has been receiving a benefit for at least 12 full months as of June 30 will receive a full increase. Members receiving benefits for at least one month but less than 12 full months as of June 30 will receive a pro rata increase.

C. CONTRIBUTIONS

Minnesota Statutes Chapter 353 sets the rates for employer and employee contributions. Contribution rates can only be modified by the state legislature.

GERF Contributions

Coordinated Plan members were required to contribute 6.50% of their annual covered salary in fiscal year 2018; the District was required to contribute 7.50% for Coordinated Plan members. The District's contributions to the GERF for the year ended December 31, 2018, were $23,959. The District's contributions were equal to the required contributions as set by state statute.

D. PENSION COSTS

GERF Pension Costs

At December 31, 2018, the District reported a liability of $260,737 for its proportionate share of the GERF's net pension liability. The District's net pension liability reflected a reduction due to the State of Minnesota's contribution of $16 million to the fund in 2018. The State of Minnesota is considered a non-employer contributing entity and the state's contribution meets the definition of a special funding situation. The State of Minnesota's proportionate share of the net pension liability associated with the District totaled $8,633. The net pension liability was measured as of June 30, 2018, and the total pension liability used to calculate the net pension liability was determined by an actuarial valuation as of that date. The District's proportion of the net pension liability was based on the District's contributions received by PERA during the measurement period for employer payroll paid dates from July 1, 2017, through June 30, 2018, relative to the total employer contributions received from all of PERA's participating employers. At June 30, 2018, the District's proportion was .0047% which was an increase of .0013% from its proportion measured as of June 30, 2017.

Post-retirement benefit increases were changed from 1.0% per year with a provision to increase to 2.5% upon attainment of 90% funding ratio to 50% of the Social Security Cost of Living Adjustment, not less than 1.0% and not more than 1.5%, beginning January 1, 2019.

For the year ended December 31, 2018, the District recognized pension expense of $62,387 for its proportionate share of the GERF's pension expense. In addition, the District recognized an additional $2,013 as pension expense (and grant revenue) for its proportionate share of the State of Minnesota's contribution of $16 million to the General Employees Fund.

At December 31, 2018, the District reported its proportionate share of the GERF's deferred outflows of resources and deferred inflows of resources related to pensions from the following sources:

	Deferred Outflows of Resources	Deferred Inflows of Resources
Differences between expected and actual economic experience	$6,902	$8,657
Changes in actuarial assumptions	28,353	29,298
Difference between projected and actual investment earnings	-	22,260
Changes in proportion	72,839	-
Contributions paid to PERA subsequent to the measurement date	11,945	-
Total	$120,039	$60,215

$11,945 reported as deferred outflows of resources related to pensions resulting from District contributions subsequent to the measurement date will be recognized as a reduction of the net pension liability in the year ended December 31, 2019. Other amounts reported as deferred outflows and inflows of resources related to pensions will be recognized in pension expense as follows:

Year Ended December 31,	Pension Expense Amount
2019	$37,081
2020	11,729
2021	4,511
2022	(5,442)
2023	-
Thereafter	-

E. ACTUARIAL ASSUMPTIONS

The total pension liability in the June 30, 2018, actuarial valuation was determined using the following actuarial assumptions:

Inflation	2.50% per year
Salary Growth	3.25% per year after 26 years of service
Investment Rate of Return	7.50%

The total pension liability for each of the defined benefit cost-sharing plans was determined by an actuarial valuation as of June 30, 2018, using the entry age normal actuarial cost method. Inflation is assumed to be 2.50 percent for the General Employees Plan. Salary growth assumptions in the General Employees Plan decrease in annual increments from 11.25 percent after one year of service, to 3.25 percent after 26 years of service.

Mortality rates for all plans are based on RP-2014 mortality tables. The tables are adjusted slightly to fit PERA's experience. Actuarial assumptions for the General Employees Plan are reviewed every four to six years. The most recent six-year experience study for the General Employees Plan was completed in 2015.

The following changes in actuarial assumptions occurred in 2018:

General Employees Fund
- The mortality projection scale was changed from MP-2015 to MP-2017.
- The assumed benefit increase was changed from 1.0 percent per year through 2044 and 2.50 percent per year thereafter to 1.25 percent per year.

The State Board of Investment, which manages the investments of PERA, prepares an analysis of the reasonableness of the long-term expected rate of return on a regular basis using a building-block method in which best-estimate ranges of expected future rates of return are developed for each major asset class. These ranges are combined to produce an expected long-term rate of return by weighting the expected future rates of return by the target asset allocation percentages. The target allocation and best estimates of geometric real rates of return for each major asset class are summarized in the following table:

Asset Class	Target Allocation	Long-Term Expected Real Rate of Return
Domestic Stocks	36%	5.10%
International Stocks	17%	5.30%
Bonds (Fixed Income)	20%	0.75%
Alternative Assets (Private Markets)	25%	5.90%
Cash	2%	0.00%
Total	100%	

F. DISCOUNT RATE

The discount rate used to measure the total pension liability in 2018 was 7.5%. The projection of cash flows used to determine the discount rate assumed that contributions from the plan members and employers will be made at rates set in Minnesota Statutes. Based on that assumption, the plan's fiduciary net position was projected to be available to make all projected future benefit payments of current plan members. Therefore, the long-term expected rate of return on pension plan investments was applied to all periods of projected benefit payments to determine the total pension liability.

G. PENSION LIABILITY SENSITIVITY

The following presents the District's proportionate share of the net pension liability for all plans it participates in, calculated using the discount rate disclosed in the preceding paragraph, as well as what the District's proportionate share of the net pension liability would be if it were calculated using a discount rate 1 percentage point lower or 1 percentage point higher than the current discount rate:

	1% Decrease in Discount Rate (6.5%)	Discount Rate (7.5%)	1% Increase in Discount Rate (8.5%)
District's proportionate share of the GERF net pension liability	$423,731	$260,737	$126,190

H. PENSION PLAN FIDUCIARY NET POSITION

Detailed information about each pension plan's fiduciary net position is available in a separately-issued PERA financial report that includes financial statements and required supplementary information. That report may be obtained on the Internet at www.mnpera.org.

Note 10 OPERATING LEASE

On January 10, 2017, the District entered into an operating lease agreement for building space. The agreement has an initial term of 122 calendar months beginning March 1, 2017. The lease has required base monthly payments that vary from year to year. Total rent expense for this lease for the year ended December 31, 2018 was $58,185.

Future minimum lease payments are as follows:

	Payment
2019	$59,333
2020	60,533
2021	61,744
2022	62,955
2023	64,219
2024-2027	223,489
Total	$532,273

The District will have the option to extend the lease an additional 5 years when the current lease expires on April 30, 2027.

Note 11 RECENTLY ISSUED ACCOUNTING STANDARDS

The Governmental Accounting Standards Boards (GASB) recently approved the following statements which were not implemented for these financial statements:

Statement No. 83 *Certain Asset Retirement Obligations.* The provisions of this Statement are effective for reporting periods beginning after June 15, 2018.

Statement No. 84 *Fiduciary Activities.* The provisions of this Statement are effective for reporting periods beginning after December 15, 2018.

Statement No. 87 *Leases.* The provisions of this Statement are effective for reporting periods beginning after December 15, 2019.

Statement No. 88 *Certain Disclosures Related to Debt, including Direct Borrowings and Direct Placements.* The provisions of this Statement are effective for reporting periods beginning after June 15, 2018.

Statement No. 89 *Accounting for Interest Cost Incurred before the End of a Construction PeriodN.* The provisions of this Statement are effective for reporting periods beginning after December 15, 2019.

Statement No. 90 *Majority Equity Interests.* The provisions of this Statement are effective for reporting periods beginning after December 15, 2018.

The effect these standards may have on future financial statements is not determinable at this time.

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REQUIRED SUPPLEMENTARY INFORMATION

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT
REQUIRED SUPPLEMENTARY INFORMATION
BUDGETARY COMPARISON SCHEDULE - 509 PLAN IMPLEMENTATION
For The Year Ended December 31, 2018
With Comparative Actual Amounts For The Year Ended December 31, 2017

Statement 6

	Budgeted Amounts		2018 Actual Amounts	Variance with Final Budget - Positive (Negative)	2017 Actual Amounts
	Original	Final			
Revenues:					
General property taxes	$3,420,000	$3,420,000	$3,408,813	($11,187)	$2,842,119
Permit income	20,000	20,000	57,002	37,002	47,400
Intergovernmental	818,175	818,175	536,778	(281,397)	257,695
Investment income	-	-	46,180	46,180	15,240
Other income	-	-	30,651	30,651	29,450
Total revenues	4,258,175	4,258,175	4,079,424	(178,751)	3,191,904
Expenditures:					
Current:					
General government	900,000	900,000	980,469	(80,469)	968,455
Programs	1,325,131	1,333,759	453,603	880,156	610,097
Projects:					
Bluff Creek	519,219	569,219	383,611	185,608	154,062
Riley Creek	1,960,882	2,060,882	763,435	1,297,447	192,048
Purgatory Creek	1,220,283	1,120,283	475,729	644,554	141,870
Capital outlay:					
General government	-	-	-	-	20,470
Programs	-	-	39,077	(39,077)	8,569
Total expenditures	5,925,515	5,984,143	3,095,924	2,888,219	2,095,571
Revenues over (under) expenditures	($1,667,340)	($1,725,968)	983,500	$2,709,468	1,096,333
Fund balance - January 1			4,183,187		3,086,854
Fund balance - December 31			$5,166,687		$4,183,187

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT
REQUIRED SUPPLEMENTARY INFORMATION
SCHEDULE OF PROPORTIONATE SHARE OF NET PENSION LIABILITY* -
GENERAL EMPLOYEES RETIREMENT FUND
For The Year Ended December 31, 2018

Statement 7

Measurement Date June 30	Fiscal Year Ending December 31	District's Proportionate Share (Percentage) of the Net Pension Liability	District's Proportionate Share (Amount) of the Net Pension Liability (a)	State's Proportionate Share (Amount) of the Net Pension Liability Associated with District (b)	District's Proportionate Share of the Net Net Pension Liability and the State's Proportionate Share of the Net Pension Liability Associated with District (a+b)	Covered Payroll (c)	District's Proportionate Share of the Net Pension Liability as a Percentage of its Covered Payroll ((a+b)/c)	Fiduciary Net Position as a Percentage of the Total Pension Liability
2015	2015	0.0028%	$145,111	$ -	$145,111	$177,271	81.9%	78.2%
2016	2016	0.0028%	227,346	2,931	230,277	174,027	132.3%	68.9%
2017	2017	0.0034%	217,054	2,731	219,785	220,453	99.7%	75.9%
2018	2018	0.0047%	260,737	8,633	269,370	331,266	81.3%	79.5%

* The schedule is provided prospectively beginning with the District's fiscal year ended December 31, 2015 and is intended to show a ten year trend. Additional years will be reported as they become available.

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT
REQUIRED SUPPLEMENTARY INFORMATION **Statement 8**
SCHEDULE OF PENSION CONTRIBUTIONS* - GENERAL EMPLOYEES RETIREMENT FUND
For The Year Ended December 31, 2018

Fiscal Year Ending	Statutorily Required Contribution (a)	Contributions in Relation to the Statutorily Required Contribution (b)	Contribution Deficiency (Excess) (a-b)	Covered Payroll (c)	Contributions as a Percentage of Covered Payroll (b/c)
December 31, 2015	$12,742	$12,742	$0	$170,252	7.5%
December 31, 2016	13,813	13,813	0	184,173	7.5%
December 31, 2017	21,160	21,160	0	282,133	7.5%
December 31, 2018	23,959	23,959	0	319,453	7.5%

* The schedule is provided prospectively beginning with the District's fiscal year ended December 31, 2015 and is intended to show a ten year trend. Additional years will be reported as they become available.

Note A BUDGETS

The 509 Plan Implementation Fund budget is legally adopted on a basis consistent with accounting principles generally accepted in the United States of America. The legal level of budgetary control is at the fund level.

Note B PENSION INFORMATION

PERA – General Employees Retirement Fund

2018 Changes
Changes in Actuarial Assumptions:
- The mortality projection scale was changed from MP-2015 to MP-2017.

- The assumed benefit increase was changed from 1.00% per year through 2044 and 2.50% per year thereafter to 1.25% per year.

2017 Changes
Changes in Actuarial Assumptions:
- The Combined Service Annuity (CSA) loads were changed from 0.8% for active members and 60% for vested and non-vested deferred members. The revised CSA loads are now 0.0% for active member liability, 15.0% for vested deferred member liability and 3.0% for non-vested deferred member liability.

- The assumed post-retirement benefit increase rate was changed from 1.0% per year for all years to 1.0% per year through 2044 and 2.5% per year thereafter.

2016 Changes
Changes in Actuarial Assumptions:
- The assumed post-retirement benefit increase rate was changed from 1.0% per year through 2035 and 2.5% per year thereafter to 1.0% per year for all future years.

- The assumed investment return was changed from 7.9% to 7.5%. The single discount rate was changed from 7.9% to 7.5%.

- Other assumptions were changed pursuant to the experience study dated June 30, 2015. The assumed future salary increases, payroll growth, and inflation were decreased by 0.25% to 3.25% for payroll growth and 2.50% for inflation.

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OTHER INFORMATION - UNAUDITED

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT
MARKET VALUES BY WATERSHED - UNAUDITED **Exhibit 1**

	For Taxes Payable in 2018	Proposed For Taxes Payable in 2019
Estimate market value:		
Personal	$70,328,100	$104,548,600
Real	10,689,229,300	11,384,283,800
Total	$10,759,557,400	$11,488,832,400
Taxable market value:		
Personal	$70,328,100	$104,548,600
Real	10,468,308,533	11,184,435,647
Total	$10,538,636,633	$11,288,984,247
Referendum market value:		
Personal	$70,328,100	$104,548,600
Real	10,629,015,175	11,320,565,025
Total	$10,699,343,275	$11,425,113,625

Source: Hennepin County Taxpayer Services - Property Tax - Tax Accounting
Carver County information is not available.

OTHER REPORTS

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REPORT ON INTERNAL CONTROL

To the Honorable Managers of the
Riley Purgatory Bluff Creek Watershed District and Management
Chanhassen, Minnesota

In planning and performing our audit of the financial statements of the governmental activities and each major fund of Riley Purgatory Bluff Creek Watershed District as of and for the year ended December 31, 2018, in accordance with auditing standards generally accepted in the United States of America, we considered Riley Purgatory Bluff Creek Watershed District's internal control over financial reporting (internal control) as a basis for designing audit procedures that are appropriate in the circumstances for the purpose of expressing our opinions on the financial statements, but not for the purpose of expressing an opinion on the effectiveness of Riley Purgatory Bluff Creek Watershed District's internal control. Accordingly, we do not express an opinion on the effectiveness of Riley Purgatory Bluff Creek Watershed District's internal control.

A deficiency in internal control exists when the design or operation of a control does not allow management or employees, in the normal course of performing their assigned functions, to prevent, or detect and correct, misstatements on a timely basis. A material weakness is a deficiency, or combination of deficiencies, in internal control, such that there is a reasonable possibility that a material misstatement of the entity's financial statements will not be prevented, or detected and corrected, on a timely basis.

Our consideration of internal control was for the limited purpose described in the first paragraph and was not designed to identify all deficiencies in internal control that might be material weaknesses. Given these limitations during our audit, we did not identify any deficiencies in internal control that we consider to be material weaknesses. However, material weaknesses may exist that have not been identified.

This communication is intended solely for the information and use of management, Riley Purgatory Bluff Creek Watershed District's Board and others within the organization, and is not intended to be, and should not be, used by anyone other than these specified parties.

REDPATH AND COMPANY, LTD.
St. Paul, Minnesota

_____, 2019

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MINNESOTA LEGAL COMPLIANCE REPORT

To the Honorable Managers of the
Riley Purgatory Bluff Creek Watershed District
Chanhassen, Minnesota

We have audited, in accordance with auditing standards generally accepted in the United States of America, the financial statements of the governmental activities and each major fund of Riley Purgatory Bluff Creek Watershed District as of and for the year ended December 31, 2018, and the related notes to the financial statements which collectively comprise the Riley Purgatory Bluff Creek Watershed District's basic financial statements, and have issued our report thereon dated _____, 2019.

The *Minnesota Legal Compliance Audit Guide for Other Political Subdivisions,* promulgated by the State Auditor pursuant to Minn. Stat. § 6.65, contains six categories of compliance to be tested: contracting and bidding, deposits and investments, conflicts of interest, claims and disbursements, miscellaneous provisions, and tax increment financing. Our audit considered all of the listed categories, except that we did not test for compliance with the provisions for tax increment financing because it is not applicable to Riley Purgatory Bluff Creek Watershed District.

In connection with our audit, nothing came to our attention that caused us to believe that Riley Purgatory Bluff Creek Watershed District failed to comply with the provisions of the *Minnesota Legal Compliance Audit Guide for Other Political Subdivisions,* except as described in the Schedule of Findings and Responses as item 2018-001. However, our audit was not directed primarily toward obtaining knowledge of such noncompliance. Accordingly, had we performed additional procedures, other matters may have come to our attention regarding the Riley Purgatory Bluff Creek Watershed District's noncompliance with the above referenced provisions.

This report is intended solely for the information and use of those charged with governance and management of Riley Purgatory Bluff Creek Watershed District and the State Auditor and is not intended to be and should not be used by anyone other than these specified parties.

REDPATH AND COMPANY, LTD.
St. Paul, Minnesota

_____, 2019

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Finding 2018-001 Board Meetings

Criteria: Minnesota Statute 13D.04 requires public notice of meetings. Minnesota Statute 13D.04 reads in part as follows:

> 13D.04, Subdivision 1.**Regular meetings.** A schedule of the regular meetings of a public body shall be kept on file at its primary offices. If a public body decides to hold a regular meeting at a time or place different from the time or place stated in its schedule of regular meetings, it shall give the same notice of the meeting that is provided in this section for a special meeting.
> 13D.04, Subdivision. 2. **Special meetings.** (a) For a special meeting, except an emergency meeting or a special meeting for which a notice requirement is otherwise expressly established by statute, the public body shall post written notice of the date, time, place, and purpose of the meeting on the principal bulletin board of the public body, or if the public body has no principal bulletin board, on the door of its usual meeting room.
> (b) The notice shall also be mailed or otherwise delivered to each person who has filed a written request for notice of special meetings with the public body. This notice shall be posted and mailed or delivered at least three days before the date of the meeting.
> (c) As an alternative to mailing or otherwise delivering notice to persons who have filed a written request for notice of special meetings, the public body may publish the notice once, at least three days before the meeting, in the official newspaper of the public body or, if there is none, in a qualified newspaper of general circulation within the area of the public body's authority.
> (d) A person filing a request for notice of special meetings may limit the request to notification of meetings concerning particular subjects, in which case the public body is required to send notice to that person only concerning special meetings involving those subjects.
> (e) A public body may establish an expiration date for requests for notices of special meetings pursuant to this subdivision and require refiling of the request once each year.
> (f) Not more than 60 days before the expiration date of a request for notice, the public body shall send notice of the refiling requirement to each person who filed during the preceding year.

Condition: During the course of our audit, it came to our attention, that on August 6, 2018 the District personnel committee met at the District office, without public notice being given.

Cause: Unknown.

Effect: The District was not in compliance with State Statutes.

Recommendation: We recommend the District Managers review and adhere to the statutes relating to public notice of meetings and consult with the District's attorney, as necessary.

Views of Responsible Officials and Corrective Action Plan: The District's legal counsel reviewed Open Meeting Law requirements with the Board of Managers on September 5, 2018, including the requirement that committee meetings must be noticed. The Board of Managers and the Administrator are committed to compliance with the Open Meeting Law, including the noticing of committee meetings. Open Meeting Law compliance is a regular topic of new manager orientation.

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COMMUNICATION WITH THOSE CHARGED WITH GOVERNANCE

To the Honorable Managers of the
Riley Purgatory Bluff Creek Watershed District
Chanhassen, Minnesota

We have audited the financial statements of the governmental activities and each major fund of Riley Purgatory Bluff Creek Watershed District (the District) for the year ended December 31, 2018. Professional standards require that we provide you with information about our responsibilities under generally accepted auditing standards, as well as certain information related to the planned scope and timing of our audit. We have communicated such information in our letter to you dated January 17, 2019. Professional standards also require that we communicate to you the following information related to our audit.

Significant Audit Matters

Qualitative Aspects of Accounting Practices

Management is responsible for the selection and use of appropriate accounting policies. The significant accounting policies used by the District are described in Note 1 to the financial statements. No new accounting policies were adopted and the application of existing policies was not changed during 2018. We noted no transactions entered into by the District during the year for which there is a lack of authoritative guidance or consensus. All significant transactions have been recognized in the financial statements in the proper period.

Accounting estimates are an integral part of the financial statements prepared by management and are based on management's knowledge and experience about past and current events and assumptions about future events. Certain accounting estimates are particularly sensitive because of their significance to the financial statements and because of the possibility that future events affecting them may differ significantly from those expected.

The most sensitive estimates affecting the governmental activities financial statements were management's estimate of the net pension liability, the pension related deferred outflows and inflows of resources, and pension expense. Management's estimates relating to the net pension liability, pension related deferred outflows and inflows of resources, and pension expense are based on actuarial studies. We evaluated the key factors and assumptions used to develop the estimates in determining that they are reasonable in relation to the financial statements taken as a whole.

Certain financial statement disclosures are particularly sensitive because of their significance to financial statement users. Determining sensitivity is subjective, however, we believe the disclosure most likely to be considered sensitive is Note 9 – Defined Benefit Pension Plans.

The financial statement disclosures are neutral, consistent, and clear.

Difficulties Encountered in Performing the Audit

We encountered no significant difficulties in dealing with management in performing and completing our audit.

Corrected and Uncorrected Misstatements

Professional standards require us to accumulate all known and likely misstatements identified during the audit, other than those that are clearly trivial, and communicate them to the appropriate level of management. There were no uncorrected misstatements that have an effect on our opinion on the financial statements. There were no corrected misstatements identified during the audit.

Disagreements with Management

For purposes of this letter, a disagreement with management is a financial accounting, reporting or auditing matter, whether or not resolved to our satisfaction, that could be significant to the financial statements or the auditor's report. We are pleased to report that no such disagreements arose during the course of our audit.

Management Representations

We have requested certain representations from management that are included in the management representation letter dated _____, 2019.

Management Consultations with Other Independent Accountants

In some cases, management may decide to consult with other accountants about auditing and accounting matters, similar to obtaining a "second opinion" on certain situations. If a consultation involves application of an accounting principle to the District's financial statements or a determination of the type of auditor's opinion that may be expressed on those statements, our professional standards require the consulting accountant to check with us to determine that the consultant has all the relevant facts. To our knowledge, there were no such consultations with other accountants.

Other Audit Findings or Issues

We generally discuss a variety of matters, including the application of accounting principles and auditing standards, with management each year prior to retention as the District's auditors. However, these discussions occurred in the normal course of our professional relationship and our responses were not a condition to our retention.

Other Matters

We applied certain limited procedures to the budgetary comparison schedule and pension information, which are required supplementary information (RSI) that supplements the basic financial statements. Our procedures consisted of inquiries of management regarding the methods of preparing the information and comparing the information for consistency with management's responses to our inquiries, the basic financial statements, and other knowledge we obtained during our audit of the basic financial statements. We did not audit the RSI and do not express an opinion or provide any assurance on the RSI.

We were not engaged to report on the introductory and other information sections, which accompany the financial statements but are not RSI. Such information has not been subjected to the auditing procedures applied in the audit of the basic financial statements, and accordingly, we do not express an opinion or provide any assurance on it.

Other Reports

Various reports on compliance and internal controls are contained in the Other Reports section of the audited financial statement document.

Restriction on Use

This information is intended solely for the information and use of the Board of Managers and management of Riley Purgatory Bluff Creek Watershed District and is not intended to be, and should not be, used by anyone other than these specified parties.

REDPATH AND COMPANY, LTD.
St. Paul, Minnesota

_____, 2019

Redpath and Company, Ltd.
St. Paul, Minnesota

This representation letter is provided in connection with your audit of the financial statements of Riley Purgatory Bluff Creek Watershed District, which comprise the respective financial position of the governmental activities and each major fund as of December 31, 2018, and the respective changes in financial position for the year then ended, and the related notes to the financial statements, for the purpose of expressing opinions as to whether the financial statements are presented fairly, in all material respects, in accordance with accounting principles generally accepted in the United States of America (U.S. GAAP).

Certain representations in this letter are described as being limited to matters that are material. Items are considered material, regardless of size, if they involve an omission or misstatement of accounting information that, in light of surrounding circumstances, makes it probable that the judgment of a reasonable person relying on the information would be changed or influenced by the omission or misstatement. An omission or misstatement that is monetarily small in amount could be considered material as a result of qualitative factors.

We confirm, to the best of our knowledge and belief, as of the date listed below, the following representations made to you during your audit.

Financial Statements

1) We have fulfilled our responsibilities, as set out in the terms of the audit engagement letter dated June 20, 2018, including our responsibility for the preparation and fair presentation of the financial statements in accordance with U.S. GAAP.

2) The financial statements referred to above are fairly presented in conformity with U.S. GAAP and include all properly classified funds and other financial information of the primary government and all component units required by generally accepted accounting principles to be included in the financial reporting entity.

3) We acknowledge our responsibility for the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

4) We acknowledge our responsibility for the design, implementation, and maintenance of internal control to prevent and detect fraud.

5) Significant assumptions we used in making accounting estimates, including those measured at fair value, are reasonable.

6) Related party relationships and transactions, including revenues, expenditures/expenses, loans, transfers, leasing arrangements, and guarantees, and amounts receivable from or payable to related parties have been appropriately accounted for and disclosed in accordance with U.S. GAAP.

7) Adjustments or disclosures have been made for all events, including instances of noncompliance, subsequent to the date of the financial statements that would require adjustment to or disclosure in the financial statements.

8) The effects of uncorrected misstatements are immaterial, both individually and in the aggregate, to the financial statements as a whole for each opinion unit. A list of the uncorrected misstatements is attached to the representation letter.

9) The effects of all known actual or possible litigation, claims, and assessments have been accounted for and disclosed in accordance with U.S. GAAP.

10) Guarantees, whether written or oral, under which Riley Purgatory Bluff Creek Watershed District is contingently liable, if any, have been properly recorded or disclosed.

Information Provided

11) We have provided you with:

    a) Access to all information, of which we are aware, that is relevant to the preparation and fair presentation of the financial statements, such as records, documentation, and other matters.

    b) Additional information that you have requested from us for the purpose of the audit.

    c) Unrestricted access to persons within the District from whom you determined it necessary to obtain audit evidence.

    d) Minutes of the meetings of Riley Purgatory Bluff Creek Watershed District or summaries of actions of recent meetings for which minutes have not yet been prepared.

12) All material transactions have been recorded in the accounting records and are reflected in the financial statements.

13) We have disclosed to you the results of our assessment of the risk that the financial statements may be materially misstated as a result of fraud.

14) We have no knowledge of any fraud or suspected fraud that affects the District and involves:

    a) Management,

    b) Employees who have significant roles in internal control, or

    c) Others where the fraud could have a material effect on the financial statements.

15) We have no knowledge of any allegations of fraud or suspected fraud affecting the District's financial statements communicated by employees, former employees, regulators, or others.

16) We have no knowledge of instances of noncompliance or suspected noncompliance with provisions of laws, regulations, contracts, or grant agreements, or abuse, whose effects should be considered when preparing financial statements.

17) We have disclosed to you all known actual or possible litigation, claims, and assessments whose effects should be considered when preparing the financial statements.

18) We have disclosed to you the identity of the District's related parties and all the related party relationships and transactions of which we are aware.

Government—specific

19) There have been no communications from regulatory agencies concerning noncompliance with, or deficiencies in, financial reporting practices.

20) We have taken timely and appropriate steps to remedy fraud, noncompliance with provisions of laws, regulations, contracts, and grant agreements, or abuse that you have reported to us.

21) We have a process to track the status of audit findings and recommendations.

22) We have identified to you any previous audits, attestation engagements, and other studies related to the audit objectives and whether related recommendations have been implemented.

23) We have provided our views on reported findings, conclusions, and recommendations, as well as our planned corrective actions, for the report.

24) Riley Purgatory Bluff Creek Watershed District has no plans or intentions that may materially affect the carrying value or classification of assets, deferred outflows of resources, liabilities, deferred inflows of resources, and fund balance or net position.

25) We are responsible for compliance with the laws, regulations, and provisions of contracts and grant agreements applicable to us, including tax or debt limits and debt contracts, and legal and contractual provisions for reporting specific activities in separate funds.

26) We have identified and disclosed to you all instances that have occurred or are likely to have occurred, of fraud and noncompliance with provisions of laws and regulations that we believe have a material effect on the financial statements or other financial data significant to the audit objectives, and any other instances that warrant the attention of those charged with governance.

27) We have identified and disclosed to you all instances that have occurred or are likely to have occurred, of noncompliance with provisions of contracts and grant agreements that we believe have a material effect on the determination of financial statement amounts or other financial data significant to the audit objectives.

28) We have identified and disclosed to you all instances that have occurred or are likely to have occurred, of abuse that could be quantitatively or qualitatively material to the financial statements or other financial data significant to the audit objectives.

29) There are no violations or possible violations of budget ordinances, laws and regulations (including those pertaining to adopting, approving, and amending budgets), provisions of contracts and grant agreements, tax or debt limits, and any related debt covenants whose effects should be considered for disclosure in the financial statements, or as a basis for recording a loss contingency, or for reporting on noncompliance.

30) As part of your audit, you assisted with preparation of the financial statements and related notes. You also assisted with the preparation of GASB 68 (pensions), property taxes, fund balance and net position, capital assets, and intergovernmental revenue workpapers. We acknowledge our responsibility as it relates to those nonaudit services, including that we assume all management responsibilities; oversee the services by designating an individual, preferably within senior management, who possesses suitable skill, knowledge, or experience; evaluate the adequacy and results of the services performed; and accept responsibility for the results of the services. We have reviewed, approved, and accepted responsibility for those financial statements and related notes, and the GASB 68, fund balance and net position, property taxes, capital assets, and intergovernmental revenue amounts.

31) Riley Purgatory Bluff Creek Watershed District has satisfactory title to all owned assets, and there are no liens or encumbrances on such assets nor has any asset been pledged as collateral.

32) Riley Purgatory Bluff Creek Watershed District has complied with all aspects of contractual agreements that would have a material effect on the financial statements in the event of noncompliance.

33) The financial statements include all component units as well as joint ventures with an equity interest, and properly disclose all other joint ventures and other related organizations.

34) The financial statements properly classify all funds and activities in accordance with GASB Statement No. 34.

35) All funds that meet the quantitative criteria in GASB Statement Nos. 34 and 37 for presentation as major are identified and presented as such and all other funds that are presented as major are particularly important to financial statement users.

36) Components of net position (net investment in capital assets; restricted; and unrestricted) and classifications of fund balance (nonspendable, restricted, committed, assigned, and unassigned) are properly classified and, if applicable, approved.

37) Investments, derivative instruments, and land and other real estate held by endowments are properly valued.

38) Provisions for uncollectible receivables have been properly identified and recorded.

39) Expenses have been appropriately classified in or allocated to functions and programs in the statement of activities, and allocations have been made on a reasonable basis.

40) Revenues are appropriately classified in the statement of activities within program revenues, general revenues, contributions to term or permanent endowments, or contributions to permanent fund principal.

41) Deposits and investment securities and derivative instruments are properly classified as to risk and are properly disclosed.

42) Capital assets, including infrastructure and intangible assets, are properly capitalized, reported, and, if applicable, depreciated.

43) We have appropriately disclosed the Riley Purgatory Bluff Creek Watershed District's policy regarding whether to first apply restricted or unrestricted resources when an expense is incurred for purposes for which both restricted and unrestricted net position is available and have determined that net position is properly recognized under the policy.

44) We are following our established accounting policy regarding which resources (that is, restricted, committed, assigned, or unassigned) are considered to be spent first for expenditures for which more than one resource classification is available. That policy determines the fund balance classifications for financial reporting purposes.

45) We acknowledge our responsibility for the required supplementary information (RSI). The RSI is measured and presented within prescribed guidelines and the methods of measurement and presentation have not changed from those used in the prior period. We have disclosed to you any significant assumptions and interpretations underlying the measurement and presentation of the RSI.

Signed: _____

Title: _____

Date: _____

Riley-Purgatory-Bluff Creek Watershed District Rules
Financial Assurance Rate Schedule
Effective May 1, 2019

RPBCWD requires a financial assurance to ensure the performance and completion of work in accordance with a permit issued by RPBCWD. A financial assurance, when required, is pursuant to Minnesota Statutes section 103D.345 and RPBCWD Rule M – Financial Assurances, and rates are as follows:

Rule	**Financial Assurance Amount**
Rule C – Erosion and Sediment Control	\$2,500/acre disturbed, plus \$2.50/foot of erosion control, \$100/ea inlet, and \$250/ea rock construction entrance
Rule D – Wetland and Creek Buffers	\$5,000 + \$1,000/acre over 10 acres
Rule E – Dredging and Sediment Removal	125 percent of design engineer's opinion of cost
Rule F – Shoreline or Streambank Stabilization	Total number of feet of shoreline or streambank affected times \$100
Rule G – Waterbody Crossings and Structures	125 percent of design engineer's opinion of cost of installation and restoration
Rule J – Stormwater Management	125 percent of design engineer's opinion of costs of construction of stormwater management facilities/practices, and \$1,000 chloride management plan

Minimum financial assurance amount (when required) for projects other than those on a single-family home property: \$5,000

No financial assurance is required for a permit under Rule H or Rule I.

Financial assurances must include 10 percent administrative costs in addition amounts calculated according to schedule above.

Item 8f – Direct staff to move forward in engaging with St. Hubert Leadership for Opportunity Project.

Summary

In 2018, District staff were contacted by St. Hubert Catholic School in Chanhassen about the possibility of partnering on a rain garden at the school. Initial consultation identified the potential for multiple best management practices on the site. With the adoption of the District's 10 Year Plan (the Plan) in July of 2018, the Opportunity Projects program was created, and a stormwater retrofit of the school campus was identified as a potential project for this program. SRF consulting was engaged to work with staff and school stakeholders to determine possible practices on the site to a level that they could be assessed for Opportunity Project suitability.

Following the evaluation and implementation process outlined for Opportunity Projects in the Plan, staff scored the campus retrofit project (including all bmps described in the attached memo from SRF) following the project prioritization scheme detailed in the Plan. The project scored a 31, comparable to other projects in the Plan implementation table for the Riley Creek Watershed. (Of note, if one of the project partners were to commit to financial partnership, the score would increase an additional two points to a 33) High-level construction cost estimates for the complete project range from $196,000 (low) to $277,000 (high).

Opportunity projects dollars are levied each year and can be adjusted pending board approval.

Next steps

Staff are seeking board direction as to whether the project should be pursued further.

If given such direction, staff would engage with St. Hubert leadership to gage/obtain commitment to the project. From there, the board would initiate a major plan amendment, including a public hearing, which would add the Opportunity Project to the implementation table.

It was motioned by Manager _____ and seconded by Manager _____ to direct District staff to move forward with engaging St. Hubert leadership in determining their interest and commitment to implementing an Opportunity Project.

Resolution no. 2019-015

Riley-Purgatory-Bluff Creek Watershed District
Board of Managers

Financial assurance schedule update

Manager _____ offered the following resolution and moved its adoption, seconded by Manager _____:

WHEREAS the Riley-Purgatory-Bluff Creek Watershed District has rules and permitting requirements duly adopted pursuant to Minnesota Statutes sections 103D.335, 103D.341 and 103D.345;

WHEREAS under Minnesota Statutes section 103D.345, subdivision 4, RPBCWD may require an applicant to provide a financial assurance in an amount set by the RPBCWD Board of Managers to ensure conformance with the terms of a permit;

WHEREAS RPBCWD's rules require applicants other than governmental agencies and subdivisions to provide a financial assurance to ensure adequate performance of the authorized activities and compliance with RPBCWD rules;

WHEREAS RPBCWD Rule M – Financial Assurances allows RPBCWD to require a performance bond, letter of credit or other financial assurance in a form approved by RPBCWD and at rate in accordance with a written schedule maintained and revised from time to time by resolution of the board of managers for activity regulated under RPBCWD rules; and

WHEREAS, through an oversight, the updated Financial Assurance Rate Schedule adopted in January 2019 did not include a specified amount to secure receipt of a chloride-management plan under subsection 3.8 of RPBCWD Rule J – Stormwater Management, and the managers wish to correct the schedule.

THEREFORE BE IT RESOLVED that the RPBCWD Board of Managers:

1. Adopts the attached updated Financial Assurance Rate Schedule, effective May 1, 2019;
2. Directs the RPBCWD administrator to ensure that RPBCWD's permit application instructions and associated materials advise applicants of the financial assurance

requirement, to maintain the Financial Assurance Rate Schedule on the RPBCWD web site, and to make this resolution and the Financial Assurance Rate Schedule available on request to any party at RPBCWD's principal place of business; and

3. Will continue to periodically review and, if necessary and warranted, revise the Financial Assurance Rate Schedule based on a review and analysis of cost of services of consultants, analysis of activities, current construction costs and compliance assurance.

The question was on the adoption of the resolution and there were __ yeas and __ nays as follows:

	Yea	**Nay**	**Abstain**	**Absent**
CRAFTON				
KOCH				
PEDERSON				
WARD				
ZIEGLER				

Upon vote, the chair declared the resolution adopted.

* * * * * * * * * * * *

I, _____, secretary of the Riley-Purgatory-Bluff Creek Watershed District, do hereby certify that I have compared the above resolution with the original thereof as the same appears of record and on file with RPBCWD and find the same to be a true and correct transcription thereof.

IN TESTIMONY WHEREOF, I set my hand this ___ day of _____, 2019.

_____

_____, Secretary

HR Committee April 23, 2019

8:35 am

Attendees: Jill, Claire Bleser and Dorothy

Members of the public attending: Manager Larry Koch

District Administrator's performance review process was discussed. DA Bleser covered the process from Washington Conservation District, Prior Lake-Spring Lake, 9-Mile, MWMO, Ramsey Washington, Cap Region WD and Brown's Creek. Dorothy contacted Sara Noah of Noah and Associates, as well as Sharon Klumpp of Baker/Tilly (referred by Louis of Smith Partners) seeking further input on the performance review processes done for other LGUs. Basically, our past process is was is used at most other watershed districts, and was what both HR consultants said was the preferred/most used method of performance reviews for LGUs here in the Twin Cities. Some add input from staff through the performance review questionnaire; some add an additional step with the Board meeting together first without the DA to reach consensus on the actual performance, with the review being given by the Board, an outside consultant, or in a couple of cases, the Board President/Chair or the HR Committee privately. Sara Noah recommended a very general, short questionnaire vs. lengthy/detailed.

Claire's review is due August 1; discussion ensued about what would process would work fairly to help RPBCWD and the DA in the long run. The consultants both stated the review should not have every manager giving verbal input, but instead having one individual represent the Board as a whole. Claire's review has been based on her job description in the past; the job description itself has been added to several years since she began with the watershed. It was agreed an updated job description would be a good place to begin; Dorothy will reach out to Sharon at Baker/Tilly for a bid to review/create a new job description. The bid will be presented to the Board at the May meeting.

Claire will share updated salary survey info from a survey she participated in when she receives it from Cap Region; Dorothy also recommended the Personnel Handbook be updated to reflect the new hands-free/no texting law passed by the state legislature; it was also agreed to include performance review forms in the handbook as well.

Next HR Committee meeting was set for Friday, May 17 at 1:00 pm at the RPBCWD offices.

Appendix A

Lotus Lake Program Breakdown				
Who	***County***		CC Hrs	
Day:	**Hours to Cover**		Per Day	14
Mon	6am - 8pm		Per Week	98
Tues	6am - 8pm		Total Inspection days	115
Wed	6am - 8pm		Total Inspection hours	1610
Thur	6am - 8pm		Total Inspection $ at 16.28/hr	$ 26,210.80
Fri	6am - 8pm			
Sat	6am - 8pm			
Sun	6am - 8pm			
	May 11- Sept 2 ↑			
Who	***County***		CC Hrs	
Day:	**Hours to Cover**		Per Day	13
Mon	6: 30am - 7:30pm		Per Week	91
Tues	6: 30am - 7:30pm		Total Inspection days	28
Wed	6: 30am - 7:30pm		Total Inspection hours	364
Thur	6: 30am - 7:30pm		Total Inspection $ at 16.28/hr	$ 5,925.92
Fri	6: 30am - 7:30pm			
Sat	6: 30am - 7:30pm			
Sun	6: 30am - 7:30pm			
	Sept 3 - Sept 30 ↑			
Who	***County***		CC Hrs	
Day:	**Hours to Cover**		Per Day	12
Mon	7am - 7pm		Per Week	84
Tues	7am - 7pm		Total Inspection days	15
Wed	7am - 7pm		Total Inspection hours	180
Thur	7am - 7pm		Total Inspection $ at 16.28/hr	$ 2,930.40
Fri	7am - 7pm			
Sat	7am - 7pm			
Sun	7am - 7pm			
	Oct 1- Oct 15 ↑			
Who	***County***		CC Hrs	
Day:	**Hours to Cover**		Per Day	11
Mon	7:30am - 6:30pm		Per Week	77
Tues	7:30am - 6:30pm		Total Inspection days	18
Wed	7:30am - 6:30pm		Total Inspection hours	198
Thur	7:30am - 6:30pm		Total Inspection $ at 16.28/hr	$ 3,223.44
Fri	7:30am - 6:30pm			
Sat	7:30am - 6:30pm			
Sun	7:30am - 6:30pm			
	Oct 16- Nov 2 ↑			
Who	***County***		CC Hrs	
Day:	**Hours to Cover**		Per Day	9
Mon	7:00 am - 4pm		Per Week	63
Tues	7:00 am - 4pm		Total Inspection days	13
Wed	7:00 am - 4pm		Total Inspection hours	117
Thur	7:00 am - 4pm		Total Inspection $ at 16.28/hr	$ 1,904.76
Fri	7:00 am - 4pm			
Sat	7:00 am - 4pm			
Sun	7:00 am - 4pm			
	Nov 3- Nov 15			

Lake Ann Program Breakdown				
Who	***County***		CC Hrs	
Day:	**Hours to Cover**		Per Day	
Mon			Per Week	40
Tues			Total Inspection days	46
Wed			Total Inspection hours	615
Thur			Total Inspection $ at 15.02/hr avg.	$ 9,237.30
Fri	7am - 8pm			
Sat	6am - 8pm		Including Mem. Day, July 4, and Labor Day	
Sun	7am - 8pm			
	May 28- Sept 3			

Lake Susan Program Breakdown				
Who	***County***		CC Hrs	
Day:	**Hours to Cover**		Per Day	
Mon			Per Week	40
Tues			Total Inspection days	46
Wed			Total Inspection hours	615
Thur			Total Inspection $ at 15.02/hr avg.	$ 9,237.30
Fri	7am - 8pm			
Sat	6am - 8pm		Including Mem. Day, July 4, and Labor Day	
Sun	7am - 8pm			
	May 28- Sept 3			

Appendix B

2019 Program Details

Duration of Inspections:

Lake Ann and Lake Susan	46 Days (5/28/19 - 9/2/19)
Lotus Lake	189 days (5/11/19 - 11/15/19)

Coverage Times:

Lake Ann & Lake Susan:

Fridays & Sundays (7 a.m. to 8 p.m.)

Saturdays (6 a.m. to 8 p.m.) and holidays

Lotus Lake:

May 11 to September 2 (6 am to 8 pm)
September 3-30 (6:30 am to 7:30 pm)
October 1-15 (7:00 am to 7:00 pm)
October 16 – Nov 2 (7:30 am to 6:30 pm)
November 3-15 (7:00 am to 4:00 pm)

Total Inspection Hours:

Lake Ann	615	hours
Lake Susan	615	hours
Lotus Lake	2469	hours
	3699	**hours**

Combined Program Budget

Inspections	3699 @ $16.28/hr	$60,219.72

Funding:

Riley Purgatory Bluff Creek Watershed District RPBCWD	$27,275
City of Chanhassen	$20,699.72
Lotus Lake Conservation Alliance/LLCA	$12,275
	$60,219.72

Appendix C

WaterGuards, LLC

March 18, 2019

EXHIBIT A

Proposal for

City of Eden Prairie

Aquatic Invasive Species Prevention Program

AIS Inspection Services

STEPHANIE JOHNSON, PRESIDENT
PO Box 277, St. Joseph MN 56374
320.249.7550 sjohnson@waterguards.net

WaterGuards

I. Executive Summary

WaterGuards is pleased to submit this proposal to the City of Eden Prairie for watercraft inspection and boater education services in the City of Eden Prairie for the summer of 2019. WaterGuards is an experienced provider and will fulfill the requirements outlined in the request for proposal at an hourly rate of $18.75/hour for Level I inspections. Please see detail below.

II. Introduction

WaterGuards provides lake access watercraft inspection and boater education services in order to prevent, limit or slow the introduction, establishment and spread of aquatic invasive species into our lakes and other waters. Our mission is to help counties, government units and lake improvement districts fight against invasive species.

WaterGuards was founded in 2011 by Stephanie Johnson. As a long-time lake resident, she saw the need to help lakeshore owners protect their waters. After helping her own lake association implement a watercraft inspection and boater education program, she decided to help other lake associations and Minnesota counties do the same. Stephanie works regularly as an inspector and educator at area lakes to stay up-to-date and have first-hand knowledge of issues boaters and inspectors face.

III. Our Package/Scope of Work

Our standard watercraft inspection and education package includes:

- **Watercraft Inspectors.**
  - DNR trained Level I and/or II Inspectors to monitor your lake landings for invasive species.
  - Inspectors educate boaters on the laws and best practices to avoid spreading invasive species, improving our long-term odds of limiting the spread of invasive species.
  - Inspectors are dedicated to protecting Minnesota waters from invasive species.
  - Inspectors are uniformed with an official vest and lanyard designating status as an inspector to provide quick recognition by boaters and offer a visual sign of authority.
  - Each inspector has a City-owned or Company-owned electronic device for the DNR survey.
  - WaterGuards Level 1 inspectors are at least 17 years of age.

- **Professional Management.**
  - WaterGuards hires the watercraft Inspectors. This includes advertising for employees, interviewing, and finding the right people to protect your waters.
  - We hire the most reliable and professional inspectors. We do not discriminate and are proud to hire military veterans, seniors and college students alike.
  - We work to ensure our inspectors get the best training and support to do the best work.
  - We schedule the inspectors so your access points are covered when you want them covered. We use an online scheduling app/system to maximize employee utilization and minimize any absences from your lake accesses.
  - We use an electronic attendance app with built-in GPS. Employees "clock in and out" via personal cell phone. Employees may not clock in or out if they are not at their designated site.

- We regularly spot check watercraft Inspectors for quality assurance and immediately address staffing issues if they arise.
- We assign a roving crew manager to coach inspectors.
- We assist our inspectors when they must report findings or submit samples of invasive species to the DNR or make reports to law enforcement.
- We keep inspectors up-to-date on recent invasive species infestations and also provide ongoing reminders of best practices all summer long.
- WaterGuards maintains a good working relationship with the Minnesota DNR.
- We have experience managing Level 2 inspectors with a decontamination unit.

- **Payroll Management.**
  - WaterGuards is an independent contractor. WaterGuards hires the employees, generates the W-2s, checks the I-9s and gathers the W-4s. The inspectors are WaterGuards, LLC employees.
  - WaterGuards includes payroll taxes (FICA, FUTA, worker's compensation and state and federal unemployment) in its hourly rate.
  - WaterGuards maintains its own workers compensation and liability insurance.
  - We pay our employees higher hourly wages to attract and retain the best available talent.

IV. Inspection Schedule/Lakes

WaterGuards will provide inspection services on the following lakes:

Level I Inspections

Mitchell Lake (May 9 to Labor Day)

Red Rock Lake (May 9 to Labor Day)

Riley Lake (May 9 to October 20)

V. Hourly Rate

Hourly Rate for Inspections

- $18.75/hour for Level I Inspectors.
- These rates include employee's hourly pay, all payroll taxes, liability insurance, workers compensation insurance, on-going educational updates, and more.
- Other than limited DNR training and a City of Eden Prairie orientation meeting, WaterGuards only charges for hours inspectors actually spend at the access unless agreed to by the City of Eden Prairie.
- All management oversight and other non-access employee hours are not charged to the City of Eden Prairie, but absorbed by WaterGuards.

Inspection Hourly Rate

Total for 3 City of Eden Prairie access points: approximately 2,426 hours at $18.75/hour= $45,487.50

Reduced Hourly Rate for DNR Training

$15/hour for DNR Training, not expected to exceed 8 hours per inspector.

$15/hour for City of Eden Prairie Orientation, not expected to exceed 2 hours per inspector.

Total for training and orientation: anticipated cost not to exceed $1,200

Bid Total

2,426 (anticipated) inspection hours at $18.75/hour ($45,487.50) + DNR Training ($1,200) = **$46,687.50**

VI. Our Value and Experience

Experience

100% Committed to Watercraft Inspection Services. We are 100% committed to lake access watercraft inspection and boater education services. This is all we do. We do not provide employees/inspectors for any other occupation or industry. This focus allows us to offer the best watercraft inspection services available. Our staff works closely with the Minnesota DNR and other counties and lake improvement districts in Minnesota and remains current on aquatic invasive species issues and best practices for watercraft inspection. All our management and staff are DNR trained and certified.

One Year of Previous Experience in Eden Prairie. WaterGuards knows and understands the waters and lake users in the City of Eden Prairie. We served the City of Eden Prairie in 2018. Our program improves each year with knowledge from the previous season.

Inspecting Watercraft Since 2011. From its start in 2011, WaterGuards has focused on protecting Minnesota lakes. We now have 8 seasons of experience. We learn more and do better every year.

Significant Experience in Other Counties. The following are other examples of past and/or present customers: Isanti County and Isanti County LIDs (2015, 2016, 2017, 2018), Stearns County and Stearns County LIDs (2012, 2013, 2014, 2015), Sherburne County (2016, 2017, 2018), Dakota County (2018), Ramsey County (2017, 2018), Goodhue County (2018), and Todd County (2015, 2016, 2017).

Good Reviews. We consistently receive great reviews from our customers, the DNR, and our employees.

On-Going Learning. Our President attends in-season and out-of-season DNR meetings and trainings to continuously improve knowledge of programs and findings throughout the state.

Professional Management. WaterGuards is led by a seasoned professional with a Master's in Business Administration, a talent for technology, and a dedicated commitment to aquatic invasive species prevention. Our President and our coordinators are always on call throughout the season.

Variety of Experience. We have extensive experience (8+ years) with DNR Level I, Level II and the Ambassador program. We have worked with counties, lake associations, lake improvement districts and on inspection and education programs from 109 hours per season to over 6000 hours per season.

Training, Instruction and Work Standards

High Standards for Recruiting. WaterGuards uses a proprietary set of interview questions designed over many years to recruit and select the best inspectors possible. We also implement recruiting efforts through online employment websites, social media, colleges and universities, and word of mouth. We hire inspectors with good people skills that engage well with the public. We do not over recruit and over promise. We hire the right number of people and work with them to provide their optimum number of work hours per week.

We do not discriminate and are proud to hire military veterans, seniors and college students alike. We will hire local people and will re-hire only the best of our previous City of Eden Prairie inspectors.

DNR Training. We work with our inspectors and the DNR to coordinate Level 1 training opportunities.

Employee Resources. We maintain an Employee Resources page on our website that provides employment policies, DNR resources, and survey instructions to ensure understanding and compliance of our work standards/expectations for our employees. We welcome and encourage feedback from our inspectors on boater responses, activity, scheduling, landing problems, etc.

On-Going Communications. We implement continuous email and in-person communications with inspectors to provide reminders of best practices and updates to DNR materials, resources, and findings.

Good Professional Relationships. WaterGuards maintains good relationships with DNR management and staff.

Active Management: We require an area manager/coach. The manager maintains regular communications with inspectors, with the City of Eden Prairie, and with lake associations. The manager works as an inspector and also serves as a coach to ensure inspectors are up-to-date on most recent AIS related activities, to provide continual training on thorough inspections and engagement with boaters, and to communicate area happenings (i.e. fishing tournaments, special events, etc.). New this year: the manager will spend extra time with new inspectors at the beginning of the season.

Regular Spot Checks. WaterGuards management regularly and randomly spot-checks our inspectors to monitor compliance with DNR inspection processes and procedures. WaterGuards' President will also visit inspectors randomly throughout the season.

Best Value and Unique Services

Robust Scheduling Software. We employ technology to maximize employee utilization and minimize any absences from your lake accesses.

Best Employee Wages. We pay our employees well! Our experience is the following:

a. High wages make it easier to attract and retain the best people for the job.

b. High wages emphasize the importance of the job and of doing it well.

c. High wages incentivize higher output- employees work harder to demonstrate that they deserve the job.

d. Happy well-paid employees show their happiness in good customer service.

GPS Attendance. We utilize GPS for shift "clock in and out" for the best employee accountability.

Excellent Retention. We enjoy consistently high employee retention rates. Many of our employees work for us year after year. Long-term staff provide a knowledgeable workforce. The City of Eden Prairie will

benefit from the return of our best employees that know the lakes, the frequent users, and the public officials.

On-Going Communication. Continuous communications with inspectors provide reminders of best practices and updates to DNR materials, resources, and findings. Regular communication with City of Eden Prairie staff enables us to adapt to changes in schedules, DNR inspections, in landing closures, tournaments, AIS findings etc.

Quality Education. We believe the best defense against AIS is education! We make sure our inspectors are thoroughly educated on AIS so they may educate and effectively inform citizens and City of Eden Prairie lake users.

Flexibility. We have the flexibility to shuffle inspectors around to different landings with little notice to adapt to weather changes, boater activity, landing problems or closures, fishing tournaments, DNR projects, etc. Our scheduling software makes it easy to account for these changes.

Clear Focus. We've been involved in this business, and only this business, since 2011.

VII. Insurance

Please see the following page for certificate of liability insurance.

This proposal will remain valid until April 1, 2019.

Memorandum

To: Interested Bidders
From: Leslie A. Stovring, Water Resources Coordinator
Date: March 4, 2019
Re: Watercraft Inspector Program – Request for Quotes (RFQ)

The City of Eden Prairie (City) is requesting a quote for providing watercraft inspection services to inspect incoming and outgoing watercraft, trailers and other water-oriented equipment at selected public accesses for aquatic invasive species (AIS). The quote must be itemized and include a "not to exceed" amount for completing the work items. No additional work beyond the scope outlined in this RFQ will be reimbursed without prior written authorization by the City. Your quote must be submitted by March 19, 2019.

1.0 Scope of Work

Inspection staff will be required for boat landings at Mitchell, Red Rock and Riley Lakes. Inspections should start May 9, 2018 and continue through October 20, 2019. The following can be used to determine hours required for the proposal:

- Riley Lake
  - Friday, Saturday and Sunday from 6 am to 8pm (2 staff people required between 10 am and 6 pm)
  - Monday through Thursday, one staff person from 6 am to 7 pm (can overlap mid-day if needed)
  - After Labor Day, one staff person on Saturday and Sunday from 6 am to 7 pm.
- Red Rock and Mitchell Lakes
  - Two 4-hour shifts per week at each lake.
  - Two lakes can be combined on one day to provide one 8-hour shift.
  - The days spent at each lake should vary from week to week to prevent establishing a pattern.

2.0 Scope of Work

The following are required for this project.

- Hire, schedule and manage employees sufficient to fulfill the hours required.
- Document completion of all required training and provide to the City for DNR authorization.
- Coordinate watercraft inspections with City and the Riley Purgatory Bluff Creek Watershed District.
- Communicate with the City regarding potential infestations and developments in the field.
- Ensure that all inspection data has been uploaded daily to the DNR database by the end of each week.
- Provide and maintain all equipment required for collecting and uploading data to the DNR database (such as iPads).
- Submit information regarding the results of the inspections to the City at a minimum of weekly.
- Submit monthly written summaries (or memorandums) with each invoice to identify staff days & number of hours spent on inspections as well as a summary of observations recorded. *Each summary must include a statement that it has been verified that the data was uploaded to the DNR from the equipment provided for inspections.*

2.0 Minimum Requirements for Staff

The following tasks must be completed by all staff who conduct watercraft inspections in Eden Prairie.

- Attend Level 1 watercraft inspection training provided by the MN Dept. of Natural Resources (DNR) prior to conducting inspections.
- Attend orientation meeting with the City of Eden Prairie prior to conducting inspections.

- Inspect incoming and outgoing inspections for ecologically harmful AIS and aquatic vegetation.
  - Enter inspection data into the on-line forms developed by the DNR for each inspection event.
  - Upload inspection data daily to the DNR database on a digital device owned and maintained by the Vendor or a City-owned tablet. The use of personal devices to upload the data shall not be permitted.
  - Communicate the issues of AIS with recreational lake users and the public at large during the inspections.
  - Distribute AIS educational materials as needed. The City will provide copies of educational materials as they become available.
  - Follow DNR watercraft inspection policies, responsibilities and procedures.
  - At Riley Lake, provide assistance in routing traffic and managing parking for incoming boaters. A key for the staff booth with instructions will be provided.
  - Arrange to meet with City staff at a minimum of once monthly.

The minimum requirements for staff include the following:

- Possess a high school degree or GED.
- Able to work a flexible working schedule, including early mornings, late evenings, and weekends.
- Capable of bending for vehicle and equipment inspections
- Capable of lifting moderate weight of up to 20 lbs.
- Able to work with and communicate verbally with the general public.
- Able to work independently on assigned tasks, yet work as a team.

3.0 Equipment Requirements

Each contracted employee must have a cellular phone for emergencies or to contact law enforcement if required. In addition, each inspector must be provided with a uniform that has the City or Consultant logo that clearly identifies the employee as a Watercraft Inspector. This can include a safety vest and/or shirt.

The Contractor must provide all equipment required to complete the watercraft inspections, including tablets capable of running and uploading the DNR software. The City can provide four (4) iPads for recording inspections. These iPads must be assigned to an individual and returned at the end of the season. Additional equipment needs must be relayed to the City as needed for consideration.

4.0 Hours / Scheduling

Once the contract is signed, City staff will work with the Contractor to develop a schedule to meet the budget requirements and staff availability. Please submit a proposed schedule by April 30, 2019 to allow time to set up a final summer schedule.

5.0 Acceptance of Proposal Contents

The contents of this RFP and any attached proposal will become contractual obligations, if a contract ensues. Failure of the Contractor to meet these obligations may result in cancellation of the award. All information in the quote is subject to disclosure under the provisions of Minnesota Statutes Chapter 13 – Minnesota Government Data Practices Act.

6.0 Terms and Conditions

The attached Eden Prairie Standard Agreement for Professional Services must be used for this project.

Please contact me at 952-949-8327 or lstovring@edenprairie.org if you have any questions regarding this request.

LOTUS LAKE CONSERVATION ALLIANCE

7008 Dakota Avenue, Chanhassen, MN, 55317
www.LotusLakeCA.org

April 3, 2019

Mr. Dick Ward, President
Ms. Dorothy Pedersen, Vice President
Ms. Jill Crafton, Treasurer
Mr. David Ziegler, Secretary
Mr. Larry Koch, Manager
Ms. Claire Bleser, Administrator
Riley Purgatory Bluff Creek Watershed District
18681 Lake Drive East
Chanhassen, MN 55317

RE: AIS Inspection Costs

Dear Managers and Administrator,

As you may already be aware, yesterday, the Carver County Commission finalized the 2019 AIS Program budget. The 2019 Chanhassen AIS Inspection Program is facing a budget increase of $4,000 over the 2018 budget. Every year, the costs of the program increase due to wage increases for inspectors and other factors. Additionally, in 2019, Carver County has chosen to not renew a longstanding $2,000 grant to support inspections at Lotus Lake, leaving Chanhassen with a $6,000 budget shortfall. The below chart shows budgeted and actual AIS spending from 2016 to 2019:

Chanhassen AIS Inspection Program Funding - 2016 to 2019

Budget

	2016	2017	2018	2019
Carver County	$ 2,000	$ 2,000	$ 2,000	$ -
Chanhassen	$ 12,500	$ 13,500	$ 13,500	$ 16,500
Lotus Lake	$ 12,000	$ 11,000	$ 11,000	$ 13,000
RPBCWD	$ 25,000	$ 27,000	$ 27,000	$ 28,000
Total Budget	**$ 51,500**	**$ 53,500**	**$ 53,500**	**$ 57,500**

Actual Expenditures

	2016	2017	2018	2019
Carver County	$ 2,000	$ 2,000	$ 2,045	
Chanhassen	$ 12,500	$ 13,500	$ 13,500	
Lotus Lake	$ 8,562	$ 9,169	$ 7,804	
RPBCWD	$ 25,000	$ 25,000	$ 25,000	
Total Expenditures	**$ 48,062**	**$ 49,669**	**$ 48,349**	

The budget arrangement that has been proposed by the City of Chanhassen is that each funding partner budget an additional $3,000 for the 2019 program, increasing the RPBCWD budget from $25,000 to $28,000, the City's budget from $13,500 to $16,500, and the LLCA's budget from $10,000 to $13,000.

The LLCA is currently the sole payer for all inspections that occur at Lotus Lake between Fishing Opener and Memorial Day, on summer weekdays between 10:00 a.m. and 4:00 p.m., and from Labor Day to mid-November. In 2018, fall inspections paid for by the LLCA stopped four potential zebra mussel infestations, on September 9, October 13, November 1, and November 8. It is clear from this that late-season inspections are essential.

The LLCA is a small non-profit. We spend nearly our entire annual donations on AIS prevention at Lotus Lake. While coming up with an additional $3,000 is not all that difficult for Chanhassen or the RPBCWD, it is very difficult for us.

We believe the time has come for the District to increase its support of the Chanhassen and Eden Prairie AIS inspection programs. Because we believe that preventing the spread of AIS is critical, the LLCA offered a $2,550 contribution to the AIS Prevention Program when it was started in 2012, and ended up spending $7,050 for late-season inspections. This grew to $12,075 in 2013, $12,548 in 2014, and has varied each year since, averaging $9,700 a year for the past seven years for a total of $67,926 the LLCA has paid for inspection services. This is a tremendous amount for a small non-profit, and a fundraising challenge for us.

People who live on Lotus Lake are no more responsible for maintaining the lake than people who live near a park are responsible for maintaining that park, but we take this challenge on because we care deeply about Lotus Lake. Nobody asks people who live near a park to pay for lawn mowing or garbage removal – that is taken care of by governmental organizations – because the park is there for all of the public to use and enjoy, just like public waters. Why lakes are treated differently is difficult for us to understand, and we believe it is only fair that this assumption be reexamined.

Therefore, the LLCA is requesting that the RPBCWD increase its funding for the 2019 AIS Inspection Program by $20,000, with $10,000 going to the Chanhassen program and $10,000 going to the Eden Prairie program. This funding is nearly the exact amount that was rolled over from the 2018 AIS rapid response budget into reserve funds in early 2019, so the $20,000 is available without a budget impact.

While Chanhassen has increased their AIS budget by 65% over the past seven years, from $10,000 to $16,500, the RPBCWD has not increased their AIS Inspections budget since 2012 when the program began. Since that time, the hours of inspections have increased significantly, along with the inspector costs per hour. The RPBCWD budget should reflect these cost increases, and should allow for increases in the AIS budget for future years, instead of holding the budget figure constant.

The LLCA asks that you consider this request for increased AIS funding at your April 3rd Board Meeting.

Thank you.

Best regards,

Laurie Susla
President, LLCA

JoAnn Syverson
489 Pleasantview Road
Chanhassen, MN 55317
H: 952-996-9932 C: 9520457-8385
syver004@umn.edu

April; 10, 2019

Dear RPBCWD Members:

Thank you to those members who reached out to me with feedback on my wake surfing proposal. I want to update you on some new developments with the issue.

First, I want to differentiate my views and desired actions from those of the LLCA's. Although I had enjoyed serving on the LLCA Board for 5 years, I recently resigned to clearly keep my views separate from the Board's. The Board's goal in this issue is to keep the LLCA a unified and solvent association that enables everyone to enjoy Lotus Lake. They represent ALL homeowners/boaters on the lake. My goal in this issue is to keep Lotus Lake healthy and safe. I advocate for the 2/3 (survey to be discussed) of the homeowners on the lake who would like to see wake surfing regulated because of its inherent dangers to other users of the lake and the ecological damage it causes to bodies of water.

The LLCA held an association-wide meeting on April 9 to discuss the wake surfing survey that was sent to all LLCA members and the Board's proposed recommendations for boating regulations.

In this note, I'd like to discuss the results of the wake surfing survey, the Board's desired goals of the meeting, and the consequential outcomes of that meeting, along with next steps I am asking you to consider.

Wake Surfing Survey Showed Majority of Lake Users Want Surfing Regulations

The LLCA sent out a SurveyMonkey survey asking all LLCA members their opinions on wake surfing on Lotus Lake. Here is the collected data:

- Most water activities done on Lotus Lake are low-wake activities.
- About 25% of the respondents own a wake surfing boat.
- 62% want the LLCA to ask the City of Chanhassen to regulate wake surfing activities.
- 2/3 of the respondents have been negatively affected by wake surfing activities.
- 52% have felt unsafe in the water due to the large wake surfing waves.
- 58% of respondents have seen noticeable changes to their shorelines in the past two years.
- 36% have had damage to their boat or property due to the large wake surfing waves.

Prior Lake Regulations Gave LLCA Guidance for Possible Wake Surfing Rules

Prior Lake went through a “surfing boat battle” in 2014-2015. Laurie Susla spoke with Pete Young, its Water Resources Engineer, about how they successfully worked through the battle by creating a task force focusing on safety and shoreline preservation. With City Council and DNR approval, they implemented the following regulations:

a. All boats must be 150’ from shorelines and other boats.
b. No-wake zones were established for kayaks, canoes, etc.
c. Lakeshore owners can put out buoys at 150’ from shore.
d. Implemented signage to ensure all boaters knew the regulations.

LLCA Board Agreed on a Set of Wake Surfing Regulations

The LLCA board (including me) drew up a set of possible regulations to present to the members of the LLCA. We were scheduled to have an LLCA-wide meeting on April 9. These rules would be implemented for all boaters on Lotus Lake:

- Slow-no wake zones within 150' of shore
- Slow no-wake zones within 150' of other boats and swimmers
- Lakeshore home owners allowed to put out buoys at 150' from their shoreline
- Signage and communication to ensure all boaters know the old and new regulations

These regulations would help make Lotus Lake a safer and cleaner lake. The Board proposed setting up a task force to negotiate a set of rules that both wake surfers and other users of the lake could live with to enable everyone to enjoy the lake.

However, LLCA-wide Meeting Was Swayed by Majority of Wake Surfers

Although only ¼ of the survey respondents own wake surfing boats, the majority of attendees at the LLCA-wide meeting were wake surfers or advocates for wake surfers. They were very vocal and wanted NO regulations placed on wake surfers. They wanted NO task force enacted to discuss possible regulations. They agreed ONLY to educating the boat owners on existing MN and Lotus Lake boating laws and communicating the existing laws to the boat owners.

Meeting Outcome Included No Regulations on Wake Surfing, Just "Etiquette" Guidelines

Unfortunately, the discussion moved to the implementation of a task force which will come up with a set of "Etiquette Guidelines" for boaters. These free-will etiquette guidelines will not be monitored, and their success will be measured by an LLCA-wide wake surfing survey done next year. The task force will also (I assume) come up with ways to communicate the etiquette guidelines to all boaters.

I respect Laurie Susla and the LLCA Board. We are friends and have worked closely together for years. I realize they want everyone on the lake to be able to enjoy the lake. However, they are not enacting concrete, measurable ways to keep Lotus Lake SAFE FOR ALL and ECOLOGICALLY SOUND for upcoming generations. The survey they created and sent out shows that they are not representing the 2/3 majority of the survey respondents, a survey they sent to determine future recommendations on wake surfing.

Unfortunately, the squeaky wheel is this instance is getting the grease. The wake surfing advocates on Lotus Lake do not want any regulations implemented that will impede on their freedom to participate in their sport. However, their attitude is taking away others' freedoms to participate in their low-wake sports and is destroying the ecosystem of our lake.

I will be at the June RPBCWD meeting. PLEASE call me to discuss the issue or meet any time in April. You can call or text me by my cell phone in May. I believe the *minimum* regulations for handling the safety and ecological damages of wake boats on our small lake should be the LLCA Board-approved proposal previously mentioned. I am asking for your support of my proposed regulatory ordinances to the DNR. I am glad to draft a letter of support for you to endorse. If we don't speak beforehand, I will see you in June.

Sincerely,

JoAnn Syverson

86B.313 PERSONAL WATERCRAFT; REGULATIONS.

Subdivision 1. **General requirements.** (a) In addition to requirements of other laws relating to watercraft, a person may not operate or permit the operation of a personal watercraft:

(1) without each person on board the personal watercraft wearing a wearable personal flotation device that is approved by the United States Coast Guard (USCG) and has a USCG label indicating the flotation device either is approved for or does not prohibit use with personal watercraft;

(2) between one hour before sunset and 9:30 a.m.;

(3) at greater than slow-no wake speed within 150 feet of:

(i) a shoreline;

(ii) a dock;

(iii) a swimmer;

(iv) a raft used for swimming or diving; or

(v) a moored, anchored, or nonmotorized watercraft;

(4) while towing a person on water skis, a kneeboard, an inflatable craft, or any other device unless:

(i) an observer is on board; or

(ii) the personal watercraft is equipped with factory-installed or factory-specified accessory mirrors that give the operator a wide field of vision to the rear;

(5) without the lanyard-type engine cutoff switch being attached to the person, clothing, or personal flotation device of the operator, if the personal watercraft is equipped by the manufacturer with such a device;

(6) if any part of the spring-loaded throttle mechanism has been removed, altered, or tampered with so as to interfere with the return-to-idle system;

(7) to chase or harass wildlife;

(8) through emergent or floating vegetation at other than a slow-no wake speed;

(9) in a manner that unreasonably or unnecessarily endangers life, limb, or property, including weaving through congested watercraft traffic, jumping the wake of another watercraft within 150 feet of the other watercraft, or operating the watercraft while facing backward;

(10) in any other manner that is not reasonable and prudent; or

(11) without a personal watercraft rules decal, issued by the commissioner, attached to the personal watercraft so as to be in full view of the operator.

(b) Paragraph (a), clause (3), does not apply to a person operating a personal watercraft to launch or land a person on water skis, a kneeboard, or similar device by the most direct route to open water.

Subd. 2. **Age of operator.** Except in the case of an emergency, a person under the age of 13 years may not operate or be permitted to operate a personal watercraft, regardless of horsepower. It is unlawful for the owner of a personal watercraft to permit the personal watercraft to be operated contrary to this subdivision.

Subd. 3. **Operator's permit; adult supervision.** Except in the case of an emergency, a person 13 years of age or over but less than 18 years of age may not operate a personal watercraft, regardless of horsepower, without possessing a valid watercraft operator's permit as required by section 86B.305, unless there is a person 21 years of age or older on board the craft. In addition to the permit requirement, a person 13 years of age operating a personal watercraft must remain under visual supervision by a person who is 21 years of age or older. An owner of a personal watercraft may not permit the personal watercraft to be operated contrary to this subdivision.

Subd. 4. **Dealers and rental operations.** (a) A dealer of personal watercraft shall distribute a summary of the laws and rules governing the operation of personal watercraft and, upon request, shall provide instruction to a purchaser regarding:

(1) the laws and rules governing personal watercraft; and

(2) the safe operation of personal watercraft.

(b) A person who offers personal watercraft for rent:

(1) shall provide a summary of the laws and rules governing the operation of personal watercraft and provide instruction regarding the laws and rules and the safe operation of personal watercraft to each person renting a personal watercraft;

(2) shall provide a United States Coast Guard (USCG) approved wearable personal flotation device with a USCG label indicating it either is approved for or does not prohibit use with personal watercraft or water-skiing and any other required safety equipment to all persons who rent a personal watercraft at no additional cost; and

(3) shall require that a watercraft operator's permit from this state or from the operator's state of residence be shown each time a personal watercraft is rented to any person younger than age 18 and shall record the permit on the form provided by the commissioner.

(c) Each dealer of personal watercraft or person offering personal watercraft for rent shall have the person who purchases or rents a personal watercraft sign a form provided by the commissioner acknowledging that the purchaser or renter has been provided a copy of the laws and rules regarding personal watercraft operation and has read them. The form must be retained by the dealer or person offering personal watercraft for rent for a period of six months following the date of signature and must be made available for inspection by sheriff's deputies or conservation officers during normal business hours.

History: *1991 c 225 s 3; 1992 c 573 s 4; 1993 c 219 s 1; 1996 c 396 s 4; 1998 c 400 s 2-4; 1Sp2015 c 4 art 5 s 6,7; 2017 c 93 art 2 s 39*

2017

Review of boat wake wave impacts on shoreline erosion and potential solutions for the Chesapeake Bay

Donna M. Bilkovic
Virginia Institute of Marine Science

Molly Mitchell
Virginia Institute of Marine Science

Jenny Davis
NOAA Center for Coastal Fisheries and Habitat Research

Elizabeth Andrews
Virginia Coastal Policy Center (VCPC), College of William & Mary Law School

Angela King
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Recommended Citation

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Authors
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Review of boat wake wave impacts on shoreline erosion and potential solutions for the Chesapeake Bay

STAC Review Report

Fall 2016

STAC Publication 17-002

About the Scientific and Technical Advisory Committee

The Scientific and Technical Advisory Committee (STAC) provides scientific and technical guidance to the Chesapeake Bay Program (CBP) on measures to restore and protect the Chesapeake Bay. Since its creation in December 1984, STAC has worked to enhance scientific communication and outreach throughout the Chesapeake Bay Watershed and beyond. STAC provides scientific and technical advice in various ways, including (1) technical reports and papers, (2) discussion groups, (3) assistance in organizing merit reviews of CBP programs and projects, (4) technical workshops, and (5) interaction between STAC members and the CBP. Through professional and academic contacts and organizational networks of its members, STAC ensures close cooperation among and between the various research institutions and management agencies represented in the Watershed. For additional information about STAC, please visit the STAC website at www.chesapeake.org/stac.

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Executive Summary

The goal of this technical review was to evaluate 1) the potential impacts of boat generated waves on shoreline stability and attendant ecosystem properties, and 2) policy options to minimize any adverse effects. We reviewed available literature, examined relevant data and information from Chesapeake Bay, discussed modeling approaches and highlighted data gaps to further quantify effects on shorelines and ecosystems, and detailed available management and policy actions to minimize potential boat wake impacts. The major findings are:

1) The literature review indicates an unequivocal connection between boat wake energy and shoreline erosion, sediment resuspension and nearshore turbidity.
2) There is not currently enough data to determine the extent (spatially and in magnitude) to which boat wakes are contributing to erosion or turbidity of the Chesapeake Bay.
3) Recommended next steps are to identify highly vulnerable waterways and implement management or policy actions to minimize adverse effects.

The Chesapeake Bay Commission (CBC) requested that the Scientific and Technical Advisory Committee (STAC) of the Chesapeake Bay Program (CBP) conduct a technical review that addresses five focal areas: (i) State of the science of known effects of boat generated waves on shoreline stability and ecosystem structure and function; (ii) Specific implications and concerns for Chesapeake Bay restoration and shoreline management, including an analysis of continuous turbidity data in relation to boating activity; (iii) Modeling approaches and data requirements for assessing boat wake wave effects on shorelines; (iv) Data gaps and research needs to quantify effects on shorelines and ecosystems; and (v) Relevant management and policy actions in Chesapeake Bay that could be adopted to minimize potential boat wake impacts to shorelines and Bay resources.

Boat wakes have been shown to have erosive effects on shorelines (e.g., Castillo et al. 2000, Bauer et al. 2002), scour the bottom of the shoreface, and temporarily decrease water clarity (e.g., U.S. Army Corps of Engineers (USACE) 1994, Asplund 1996). In addition to shoreline erosion, boat wake impacts include vegetative damage and disruption of faunal communities (Parnell and Koefoed-Hansen 2001). Boat wake energy is event-dependent and is influenced by the vessel length, water depth, channel shape, and boat speed (Sorensen 1973, Glamore 2008). Wakes are most destructive in shallow and narrow waterways because wake energy does not have the opportunity to dissipate over distance (FitzGerald et al. 2011). Although boat wakes are periodic disturbances, in comparison to wind waves, they can be a significant source of erosive wave force due to their longer wave period and greater wave height, even when they represent

only a small portion of the total wave energy (Houser 2010). Our review of the literature demonstrated that even small recreational vessels within 150 m (~500 ft.) of the shoreline are capable of producing wakes that can cause shoreline erosion and increased turbidity (e.g., Zabawa and Ostrom 1980). Vegetated shorelines can effectively attenuate waves in certain settings; however, there is a limit to this capacity particularly if there is frequent exposure to boat wakes.

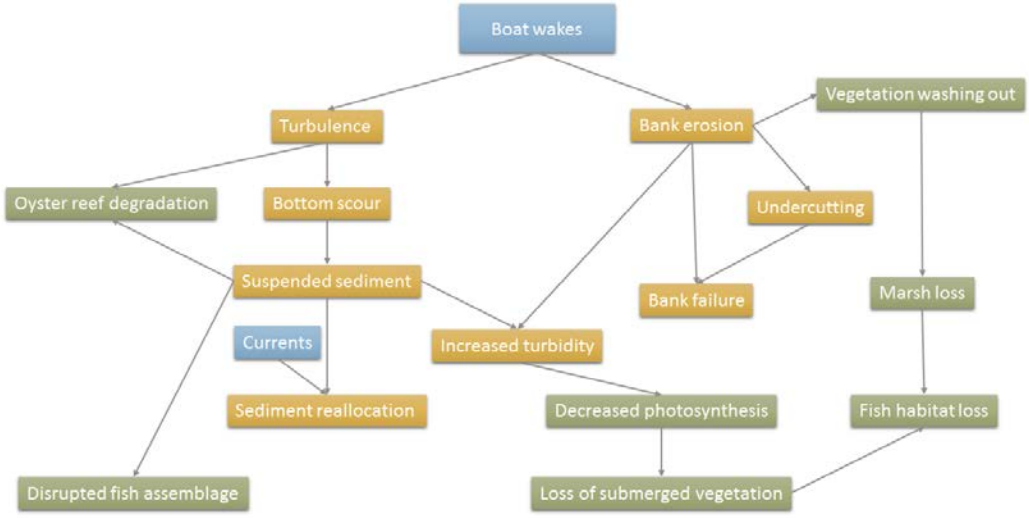

Figure 1. Diagram showing potential impacts from boat wakes to some different aquatic resources. Adapted from Liddle and Scorgie 1980. Blue boxes are drivers of change. Yellow boxes are changes in ecosystem structures and functions. Green boxes are impacts on living resources.

In the Chesapeake Bay, our analysis of long-term (~3 year) turbidity data indicate that there is a likely nexus between turbidity of small waterways, shoreline erosion, and boating activity. However, the relationships between these factors were weak due the lack of direct information and the need to use proxy measures of boating (i.e., number of piers in an area), past erosion experience (i.e., shoreline armoring) and boat wake experience (i.e., distance to the 1-m contour). These results, in combination with past studies that controlled for boat wake activity, are an indication that boat wake activity could significantly contribute to shoreline erosion and poor water clarity in some Bay creeks and tributaries.

In addition, boating activity likely contributes to the desire to armor shorelines (CCRM 2017), reducing and fragmenting the natural Bay habitats. In each of the three tidal creek systems with

relatively high boating activity that were examined for this review (Lafayette River, Sarah Creek, and Lynnhaven River), approximately 25% of the low energy shoreline (i.e., shoreline not expected to have active erosion from wind-waves) has been armored, suggesting another source of erosion - possibly boating. In turn, armored shorelines can also contribute to erosion of adjacent downdrift shorelines. Living shorelines, more beneficial from a habitat perspective than armor (Bilkovic et al. 2016), could be considered a more palatable alternative than hard shoreline armor in cases in which no degree of erosion can be tolerated. Management strategies to minimize adverse impacts by addressing boating behavior (e.g., speed limits) rather than shoreline modifications are preferred to be most protective of the environment.

Policy makers who are concerned about boat wakes may want to use existing models of boat wake erosive potential (e.g., BoMo, Decision Support Tool) to inform decisions on where to put no-wake zones or other boat policies. However, at this time, we do not have sufficient data to run either model for the Chesapeake Bay. Concerns about the impacts of boat wakes on Bay shorelines have been voiced for at least 30 years (e.g., Zabawa and Ostrum 1980), leading to some regulation of boat wakes through reduced speed requirements in certain water bodies. Virginia, Maryland and Delaware localities have demonstrated authority and willingness to establish wake restrictions, but have not done so comprehensively nor with Bay-wide coordination. Evidence suggests that boat wake erosion impacts achievement of three of the CBP Restoration Goals: preservation/restoration of tidal marshes (through enhanced shoreline erosion), preservation/restoration of seagrass beds (through enhanced bottom erosion and increased local turbidity), and water clarity improvements (through increased local turbidity).

We recommend that this issue be addressed by two means:

1) First, because we have enough evidence to suggest an impact of boat wakes, protective policy measures should be adopted in highly vulnerable systems to reduce current boat wake energy.
2) Second, data should be collected that allow a more thorough analysis of the extent of the problem throughout the Bay.

These two processes need not be consecutive, but may need to occur concurrently. In locations where shoreline erosion has been attributed to boating activity with a resultant significant adverse effect on resources and property, policy actions need not wait on new data.

Recommended science, management, and policy actions include:

- Develop predictive models to quantify the relative contribution of boat wake induced erosion to overall shoreline erosion to inform water quality, habitat restoration, and shoreline protection management strategies.

- Collect needed data to identify shores vulnerable to erosion from boating (specific data needs defined below), and to calibrate and validate predictive models. Then, develop a definition for, and classification scheme of, small tidal waterways with the greatest likelihood for significant boat wake wave shoreline erosion.

- Incorporate boat wake induced turbidity and erosion when siting Bay Restoration activities (e.g., wetland/submerged aquatic vegetation (SAV) restoration).

- Investigate the opportunities within the Bay states to implement no-wake zones or other wake reduction strategies (navigation buffers from shore, speed limits, boat size restrictions, boat bans) for addressing shoreline erosion where public safety is not also a concern. In Virginia, current implementation of no-wake zone requires a finding of public safety concern and erosion is a second consideration. Empanel an expert group from the appropriate Bay jurisdictions to develop and recommend a uniform boat wake policy in the Chesapeake Bay.

Recommended data needs include:

- High resolution recreational boating intensity information (the number of vessels that pass by on an average day, vessel types, vessel speeds, vessel traffic patterns).

- Information on recreational boating trends in small waterways.

- Information on the location, extent and level of enforcement of no-wake zones throughout the Bay.

- Data on grain size of bottom sediments in all the Bay tributaries and small creeks; even a simple categorization of sand and fines would be useful.

- Data on wave height (measure for wave energy) and suspended sediment concentration (a

measure for potential erosion).

- High resolution shallow water bathymetry is needed throughout the Bay. If data even exist, most are 50-100 years old in these areas.

This review found that boat generated waves, particularly in shallow and narrow waterways, can increase turbidity, erode shorelines, compromise coastal habitats, and disrupt ecosystems. This has the potential to impede progress towards several Bay restoration goals, particularly habitat restoration and water quality improvement. Not accounting for potential boat wake effects during the planning and implementation of Bay restoration activities may compromise the attainment of Bay Program goals. Further, incorporating the boating effects into the Bay Model may help to reduce uncertainty and ensure that restoration projects are sited in the most favorable settings.

Background and scope of the review

The Chesapeake Bay Commission (CBC) requested that the Scientific and Technical Advisory Committee (STAC) of the Chesapeake Bay Program (CBP) conduct a technical review of the relevant information on the potential impacts of boat generated waves on shoreline stability and attendant ecosystem properties, and provide advice on available policy actions to minimize any adverse effects. This request was made in January 2016; the request was approved by the STAC in March 2016, and the review was initiated in June 2016. The request to the STAC (see Appendix I) from the CBC was that the review be focused on the following topics:

1. Evaluate the state of the science of known effects of boat generated waves on shoreline stability and other ecosystem components (e.g., vegetative habitat, faunal community composition),
2. Identify data requirements to effectively model the potential effect of boat wake waves on shorelines,
3. Identify data gaps and research needs, and
4. Determine existing and potential policy actions to reduce adverse effects of boat wake waves on shorelines. Describe political and legal challenges for designating no-wake zones in Chesapeake Bay. Are there case studies of no-wake zone designation and/or evaluation of response from management action in the Bay that can be learned from?

STAC was also asked to address several questions related to (*i*) erosion and sediment inputs caused by boat wake waves, (*ii*) existing and needed data to develop best management practices to minimize shoreline erosion from boat wake waves, and (*iii*) political and legal challenges associated with policy actions to reduce boat wakes.

Questions of Interest:

1. What is the relative contribution of sediment inputs from boat wake-induced shoreline erosion in Chesapeake Bay?
2. Are these types of sediment inputs currently represented in the Bay Watershed Model?
3. Would expanding no-wake zones be beneficial to the Bay?
4. Are there other policy options besides no-wake zones to consider?

To be responsive to the CBC request, the STAC assembled a team of 9 professionals with backgrounds in sediment dynamics, shoreline erosion, coastal management and policy, environmental engineering, coastal engineering, estuarine shoreline systems, and estuarine ecology to assimilate relevant information in the form of a technical white paper. The document

was then reviewed by additional external reviewers for further input to ensure critical areas of expertise were well-represented.

The body of the review is organized into the following 6 sections:

1. Evaluation of the state of the science of known effects of boat generated waves on shoreline stability and other ecosystem components
2. Specific Chesapeake Bay implications and concerns
    a. Examination of continuous data for evidence of elevated turbidity from boating activity
    b. Case study that describes boat-wake induced erosion implications for city-managed property in the Lafayette River, VA
3. Modeling approaches and data requirements to assess the potential effect of boat wake waves on shorelines
4. Data gaps and research needs
5. Management and policy in Chesapeake Bay
6. Summary and Recommendations

Section 1: State of the Science

Shoreline erosion is a natural process that can be exacerbated by human activities. Natural drivers of shoreline erosion include wind waves, currents, and sea level rise (SLR). Human activities that exacerbate erosion include shoreline hardening (armoring) and boat wake impacts. It is not possible to visually distinguish between the natural and human-induced components of erosion; these must be deduced from measure of human use of an area combined with wind wave erosion models.

This report focused on boat wake-induced erosion, but this should not be interpreted to mean that the other drivers of erosion are unimportant in the Chesapeake Bay. Historic Virginia shoreline erosion rates can be found at the Shoreline Studies, VIMS website (http://vims-wm.maps.arcgis.com/apps/webappviewer/index.html?id=cd5cf9b788d0407fb9ba5ffb494e9bae). Historic Maryland shoreline erosion rates can be found at Maryland Department of Natural Resources (http://www.mgs.md.gov/publications/maps.html).

Boat wake dynamics

As a boat travels through the water, it displaces water, effectively pushing it to the side and creating a pressure gradient that radiates outward in a wave form. Forward movement of the

bow creates a series of symmetrical waves that propagate away from the bow at oblique angles, while the stern generates a single transverse wave that travels in the same direction as the vessel (Sorenson 1973). The point at which bow and stern waves interact (known as the cusp), is the region of maximum wave height (Maynord 2001, Figure 2). Waves that fall between the cusp points are smaller than the maximum height. The cumulative result is that each boat passage generates a complex series of waves known as a wave train, which propagate away from the sailing line at an angle that is dictated by hull shape and vessel speed. The specific characteristics of the waves generated by each passage are dependent on a multitude of factors including water depth, vessel length and speed, displacement (loading), hull shape, and the presence of natural waves and currents, among others (Maynord 2001). Given the complexity of predicting waves in a natural system, it is valuable to understand the basic traits of idealized waves.

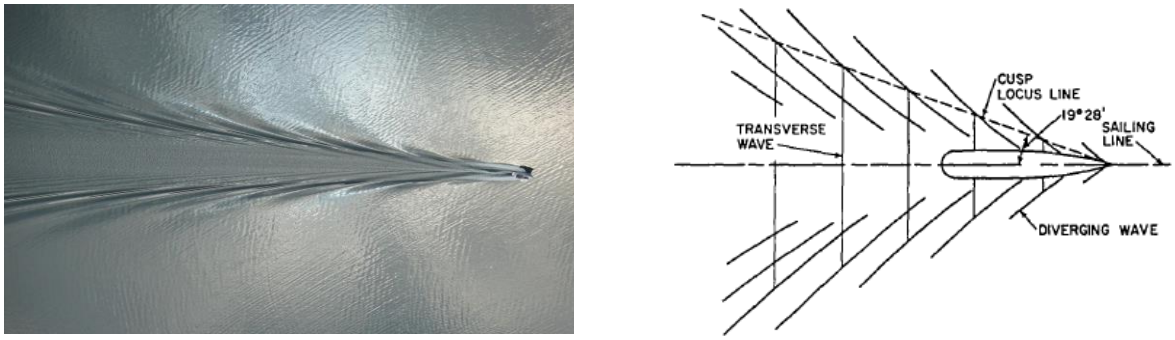

Figure 2. Pattern of vessel-generated waves in deep water. Diagram from Sorenson 1973. Photo by Edmont - Own work, CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=6920796

Waves that travel in water that is deeper than 1/2 of their wavelength (the distance between two successive wave crests) are referred to as deep water waves. The motion of deep water waves do not penetrate the full depth of the water column, thus these waves have little impact on the bottom sediments (Sorenson 1997, Hill et al. 2002). As a deep water wave travels away from the sailing line, wave height will decrease with distance traveled as wave energy spreads out along the wave crest. Given a long enough transit in deep water, much of the wave energy will distribute over a wide area before reaching a shoreline. In deep water, the speed at which a wave moves away from its point of generation is largely a function of wavelength; waves with longer wavelengths travel faster than those with shorter wavelengths. As faster waves overtake slower ones, waves produced by one boat may merge with those produced by a different boat (Figure 3),

or with wind waves. Merging of waves from different sources can be constructive (resulting in higher wave heights) or destructive (resulting in decreased wave heights) depending on whether they merge crest to crest, or crest to trough. In most cases, the interaction of waves from a variety of sources results in a water surface that appears highly disordered.

Figure 3. Boat wakes from different boats interact, changing wake patterns. Photo by Arpingstone, https://commons.wikimedia.org/w/index.php?curid=5957943

Waves that travel through water depths that are less than 1/20 of their wavelength are referred to as 'shallow water waves'. Waves that fall between deep and shallow water wave categories (when water depth is greater than 1/20 but less than 1/2 of wavelength) fall into the "transitional" category. The movement of both transitional and shallow water waves is influenced by water column depth because the energy associated with both types reaches all the way to the sea floor. Deep water waves traveling toward a shoreline will therefore eventually become transitional and shallow water waves due to changes in water column depth. Shallow water waves can influence the seafloor by causing sediment resuspension and, conversely, the friction created by wave motion interacting with the seafloor can influence waveform. As a wave travels into shallow water, interaction with the seafloor causes a decrease in the forward speed of the wave train and a concomitant increase in wave height (shoaling) until the wave eventually breaks (Parnell and Kofoed-Hansen 2001). As a result, waves of low amplitude and long wave-length that seem trivial in deep water, may result in large plunging breakers when they reach the shoreline.

The size and shape of boat wakes are strongly influenced by hull type and speed. Planing hulls are designed to ride on top of the water. Displacement hulls (e.g., sailboats, trawlers and large ships) are not capable of planing but rather, ride in the water, pushing it to the side as they move forward. The amount of water displaced is equivalent to the weight of the vessel, thus very large

displacement hulls like tanker ships displace large volumes of water, resulting in the creation of wakes with large wave heights. The shape of a hull further influences its wake characteristics. A catamaran, a single-hulled vessel, and a jet ski will all produce different wakes. Previous investigators have shown that a boat towing a water skier will produce a wake with greater wave energy than the same boat when not towing (Baldwin 2008). All other factors being equal, a positive correlation exists between the size of a vessel and the size of its wake (Hill et al. 2002, Fonseca and Malhotra 2012).

The single best predictor of the size of the wake that any given boat will produce is the speed at which the vessel is traveling (Sorenson 1973, Zabawa and Ostrom 1980, Fonseca and Malhotra 2012), although this relationship is not linear for planing hulls. When planing vessels are operating in displacement mode (such that the bow of the boat is fully supported by the water), wake size increases with speed. The maximum wake is produced at the point just before a vessel transitions to planing mode (this range of speeds is commonly referred to as transition mode). When speed is increased enough that the vessel is fully "on plane", wake sizes begin to decrease as less of the boat is in the water. This relationship between speed and wake size is illustrated in Figure 4. It is important to note that while all planing vessels will produce a curve with this same general pattern, the curve is slightly different for each boat and each set of operating conditions (Stumbo et al. 1999).

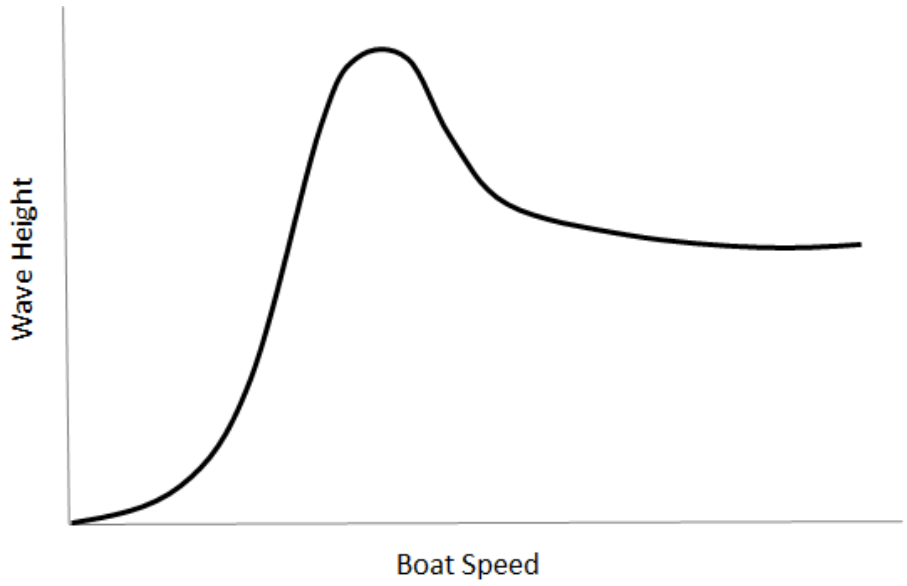

Figure 4. Wave height as a function of speed in planing hull vessels. Adapted from Maynord 2001.

Efforts to quantify the impacts of boat wakes on shorelines are complicated by the fact that each boat passage produces waves with a unique set of characteristics (McConchie and Toleman 2003). As a result, many previous efforts to establish wake management strategies have used wave height, or wave energy based criteria (Stumbo et al. 1999, Glamore 2008).
Wave energy, given as:

$$E = 1/8\ p\ g\ H^2\ L$$

(where p = water density, g = gravity, H = wave height, and L = wavelength) is proportional to both the height and length of a wave. As wave energy increases with wave height squared, wave height provides a reasonable proxy for erosive force. Wave height is also more easily estimated by the casual observer than wave energy (Nanson et al. 1994). Wave energy dissipates with distance from the boat thus, the smaller a wave is at the onset, and the farther from the shoreline it is generated, the less energy it will contain when it reaches the shoreline and the less likely it is to cause erosion.

Site specific factors that control impact of boat wakes on shoreline erosion

Local vessel usage

The amount of boat wake energy impacting a given shoreline is a function of not only the size and speed of vessels passing that shoreline, but also the frequency of vessels (Zabawa and Ostrom 1980, Glamore 2008). Highly traveled waterways are more likely to experience boat wake-induced shoreline erosion than less frequently travelled waterways. Further, because wave energy decays with distance from the boat, narrow waterways in which boats must pass closer to shore are more likely to experience wake-induced erosion from both direct wave impact, and wave energy reflected from the opposite shoreline, than wider channels (Nanson et al. 1994, FitzGerald et al. 2011; Table 1).

It should be noted that shallow draft vessels (like personal watercraft) with the ability to run at high speed in shallow nearshore water may play a disproportionate role in shoreline erosion simply by virtue of their ability to operate close to shore where waves have little chance to dissipate. However, when run in a manner similar to that of a small boat (i.e., in a straight line) personal watercraft were found to generate smaller lower energy waves than boats (McConchie and Toleman 2003).

Table 1. Published values of measured wave heights vs. vessel speed at varying distances from the sailing line: * indicates planing hull, ** indicates displacement hull. These data are excerpts from the larger data sets published by a) Zabawa and Ostrum 1980, Chesapeake Bay and b) Sorenson 1973. For context, waves as small as 10 cm result in erosion of sediments from vegetated shorelines (Coops et al. 1996), and marsh survival is compromised when waves exceed 30 cm, even 5% of the time (Schafer et al. 2003, Roland and Douglas 2005).

Boat	Distance From Sailing Line (m)	Speed of Boat Travel (knots ((km hr^{-1}))	Max wave height (m)
26’ (8 m) Uniflight*	100	10 (19)	0.41
	100	26 (48)	0.29
	150	10 (19)	0.37
	150	27 (50)	0.21
16’ (5 m) Boston Whaler*	50	10 (19)	0.22
	50	24 (44)	0.13
	150	12 (22)	0.14
	150	27 (50)	0.07
45’ (14 m) Tugboat**	30	6 (11)	0.2
	30	10 (19)	0.5
	150	6 (11)	0.1
	150	10 (19)	0.3
263’ (80 m) Barge**	150	10 (19)	0.2
	300	10 (19)	0.1

Wave energy at site

In many instances, the cumulative impact of boat wakes is often small relative to that of wind waves (Laderoute and Bauer 2013). In a study of boat wake versus wind-wave energy at multiple sites within Chesapeake Bay, Zabawa and Ostrom (1980) determined that <5% of total annual shoreline wave energy was attributable to boats. The sites included in this study were along either the mainstem of the South and Severn Rivers, or on smaller creeks and coves near each river. All sites were selected based on being popular areas for boating/water skiing and being relatively sheltered from wind. Several more recent studies have found similar results with respect to the total amount of wave energy attributable to wind vs. boating activity (Knutson et al. 1990, Houser 2010, Fonseca and Malhotra 2012).

While total cumulative wave energy associated with boating impacts is often less than that of wind waves, the height of the largest boat generated waves can substantially exceed that of the largest wind waves. Winds represent an almost constant source of low to moderate wave energy while large boat wakes represent a comparatively rare but high energy event that may be responsible for significant damage to some shorelines. Houser (2010) estimated that while cumulative boat wake energy accounts for less than 5% of total wave energy on the Savannah River, they account for more than 30% of total wave force acting on shorelines. The disproportionately high wave force relative to total wave energy associated with boat wakes in this study was attributed to the fact that the Savannah River is heavily trafficked by large displacement hull vessels that generate large amplitude, long period waves. Further, the relative amount of wave energy attributable to boats vs. wind has been shown to change throughout the year due to seasonal changes in boat usage (Zabawa and Ostrom 1980, Maynord et al. 2008).

Shoreline characteristics

Shoreline profiles influence erosion rates with ramped (gently sloping) and scarped (vertical shore profile) marsh shorelines experiencing greater wave thrust and consequently higher erosion than terraced shorelines (characterized by a step-like profile) under the same wave conditions (Tonelli et al. 2010). In Boston Harbor, the highest rates of shoreline retreat were shown to occur along high elevation shorelines (bluffs of >10 m; FitzGerald et al. 2011). In this case, the high erosion was attributed to wave-induced undercutting of the shoreline that eventually led to slumping of large sections of the bank.

As waves come into contact with a shoreline they may either shoal and break, or be refracted, thus further contributing to the wave energy of nearshore waters. The amount of wave energy

that is reflected along a given stretch is heavily influenced by the amount of shoreline modification. Hard, vertical structures like bulkheads and seawalls are purported to reflect much of the incoming wave energy, thus resulting in an overall increase in nearshore energy (NRC 2007). Shoreline geometry further influences wave energy as headlands are impacted by wave energy from a variety of directions while embayed shorelines may experience greater influences from refracted wave energy (Priestas et al. 2015).

Water Levels

The impact of waves is even more challenging to predict along tidally influenced shores, as water levels and tidal flow interact to determine the effect of incoming wave energy on a shoreline (Tonelli et al. 2010). Along shorelines that are fronted by extensive tidal flats, much of the incoming wave energy will be dissipated over the tidal flats, effectively buffering the shoreline from wave attack. The lower the water level, the more influence a tidal flat exerts on water column dynamics. River stage plays a similar role. In the Kenai River, Alaska, Maynord et al. (2008) demonstrated higher shoreline erosion rates when peak boating conditions corresponded to times of high river flow and decreased erosion, despite high boat activity, during lower flow conditions. They noted that during low flow conditions, much of the wave energy was lost due to contact with gravel sediments near the river margins. Tonelli et al. (2010) have modeled the impacts of waves along salt marsh shorelines and showed that wave thrust on a shoreline increases with rising tide levels until the tide is just above the marsh surface elevation, at which point, wave thrust on the shoreline decreases sharply. Houser (2010) demonstrated this effect with wave sensors in the Savannah River. The importance of tidal stage is further supported by Marani et al. (2011) who demonstrated a strong relationship between wind wave energy and measured marsh edge retreat by considering wind data only from periods when marsh was not flooded.

Tidal flows may further influence the ultimate fate of eroded sediments by providing a mechanism for their dispersal. Bauer et al. (2002) used back-scatter sensors to measure the concentration of suspended solids in the water column after individual boat passages. Their data indicated that suspended solid concentrations (SSC) returned to background values within a few minutes of each boat passage, despite much longer calculated settling times. These data suggest that once suspended, the particles are carried downflow by currents, thus representing a net loss of sediment from the site.

Vegetation

Whether waves of a given size will result in significant levels of sediment resuspension and/or shoreline erosion is further influenced by sediment characteristics and the presence or absence of shoreline vegetation. Soils with a high sand content have been shown to be more easily eroded than finer-grained sediments (Feagin et al. 2009). Shorelines that are vegetated tend to have finer-grained sediments than non-vegetated shorelines due to the incorporation of decaying organic matter (Craft et al. 2002). As a result, the presence of living root material in shoreline soils results in a stronger soil that is less easily eroded (van Eerdt 1985, Francalanci et al. 2013). Additionally, shoreline vegetation like marsh plants combats erosion by attenuating wave energy (Yang et al. 2012, Möller et al. 2014; Figure 5) and this response is proportional to both the height and density of the vegetation (Möller 2006). The presence of even a narrow band (on the order of 1 m wide) of marsh vegetation in front of the shoreline has been shown to result in decreased rates of shoreline erosion (Currin et al. 2015). Vegetated shorelines and marshes in particular are limited to regions of relatively low wave energy, thus their geographic extent limits the opportunity to minimize the impacts of incoming wave energy. Recent wave tank modeling results show that marsh vegetation is adapted to short period, high frequency wind waves, but may not be as resilient to long-period ship-generated waves (Silinksi et al. 2015).

Figure 5. Marsh vegetation helps attenuate wave energy and binds the sediment, reducing erosion. Photo from NOAA/NCCOS.

Boat wakes and shoreline stability

Shoreline change may include shoreline erosion and resuspension in the foreshore environment, although sediment can be transported landward as well. The balance of transport (whether the shoreline erodes or accretes) depends on the size of the wake (Osborne and Boak 1999, Houser 2011). Most studies found the effects of boat wakes on the shoreline are dependent on many factors. Site-specific conditions such as water depth, bank profile, type, size and supply of sediment and bank resistance can control suspended-sediment concentrations (McConchie and Toleman 2003, Hughes et al. 2007). In coastal areas subject to significant wave action, boat wakes may have a negligible effect on shoreline stability. However, in sheltered coastal, estuarine, and river environments, boat wakes may be the leading cause of shoreline erosion

(Gourlay 2011; Figure 6).

Shoreline erosion

There are many anecdotal accounts of boating activity leading to shoreline erosion; however, documenting the role that boat wakes play in the rate of shoreline change is complicated by the fact that any single boat passage (aside from the case of very large displacement vessels) will not produce a measureable change in shoreline position. It is, rather, the cumulative effect of many boat passages that result in shoreline change and these effects can be difficult to discern from those of wind waves. To further complicate matters, in narrow channels boat wakes may reflect off one shore, cross the channel, hit the opposite shore and return to the original shore for a second impact. In suspected cases of boat-wake induced shoreline erosion, often few data exist regarding the shoreline position and natural rate of shoreline change before the impact of boats was suspected. This lack of "control" data makes it challenging to quantify the amount of shoreline change that is attributable to boat wakes alone.

Many studies of boat wake-induced shoreline erosion have focused on the effects of large shipping vessels and high-speed passenger ferries (Kirkegaard et al. 1998, Parnell and Kofoed-Hansen 2001, Soomere et al. 2005, Schroevers et al. 2011). While fewer efforts have focused on the cumulative impacts of recreational boating (Cox and Macfarlane 2004), there is a developing body of literature that demonstrates the negative impacts of small boats on shoreline stability. Among the current published literature relating recreational boat traffic to shoreline erosion, most take the approach of relating boat passages to changes in water column turbidity (Bauer et al. 2002, Cox and Macfarlane 2004, Baldwin 2008, Laderoute and Bauer 2013). While increased turbidity is not a direct measure of erosion (i.e., it is possible for suspended sediments to settle back into their original location) most water bodies experience some level of flow, and settling times for small particles are long, making it likely for suspended sediments to be carried away from their original location. In the Sacramento River, a series of current meters and backscatter profilers were installed on a shallow bank on the river margin in a shoreline-perpendicular transect (Bauer et al. 2002). This instrumentation allowed researchers to evaluate the wave characteristics and amount of sediment suspension associated with individual boat passages. The data were used to model erosion rates on a per-boat basis. The results indicated that each boat passage resulted in 0.01 - 0.22 mm of erosion at a given location on the shoreline. These rates were well-supported by measured rates of cumulative shoreline erosion after multiple (hundreds of) boat passages. The variability in erosion potential of shorelines makes it unlikely that these specific rates will apply to shorelines in other regions; however, they demonstrate that the additive effect of multiple boat passages can lead to measurable erosion.

When boat frequency and/or speed are reduced, measured rates of bank retreat have been shown to decline dramatically (Nanson et al. 1994). On the Gordon River, Tasmania, Nanson et al. (1994) documented an average erosion rate of 1 m yr^{-1} on a stretch of the river without speed restrictions. Erosion rates along that same stretch decreased to 0.3 m yr^{-1} when boat speeds were restricted to 17 km h^{-1}. Erosion rates decreased further (to 0.06 myr^{-1}) when boat passages along that same stretch were limited to 1 per day.

Figure 6. Marsh erosion reportedly induced by boat generated waves on Lynnhaven River, Virginia. Photo by Bill Fleming.

Resuspension

Observation and research regarding the effects of boat wakes on sediment movement have been ongoing for decades (e.g., Nanson et al. 1994, Osborne and Boak 1999, Gourlay, 2011). Resuspension of bottom sediments in shallow water may occur in the foreshore, in shallow waters, and adjacent to channels after boat passage (Figure 7). Increased turbidity varies in its persistence. In river systems, suspension events may be short-lived, even with very fine sediments, because the suspension plumes are carried downstream (Bauer et al. 2002). In other settings, such as Venice Lagoon, Italy, elevated concentrations persisted for nearly an hour (Rapaglia et al. 2011). The popularization of personal watercraft, with their exceptionally

shallow drafts, has brought boating activity to regions of water bodies which have historically seen little boating traffic. Turbulent prop or jet wash have the ability to resuspend bottom sediments. In field studies, boat speed, size, and water depth were the critical factors affecting resuspension on an unnamed lake bed (Beachler and Hill 2003).

Figure 7. Imagery capture of boating-induced resuspended sediment along shoreline (upper left of image).

Boat wake impacts to specific resources

Commercial and recreational boating can have a wide-array of adverse effects on aquatic resources, including direct physical impacts from boat contact with the bottom, noise disturbance, as well as those effects resulting from physical disturbances to the bottom sediments, nearshore habitats and shorelines from boat generated waves. The latter is often understudied and thus less well-understood. Though other boating impacts on a resource may be significant, the primary focus of this report is on boat generated wave impacts.

Oyster reefs

The distribution of intertidal oyster reefs is strongly shaped by wave energy, such that natural intertidal reefs do not occur in high wave energy settings. In Pamlico and Core sounds, North Carolina, Theuerkauf et al. (2016) found that the distribution of intertidal oyster reefs was limited to a fairly narrow range of wave energies, but that wave energy did not limit the occurrence of oysters on hard substrates like rock jetties and seawalls. In Chesapeake Bay, intertidal reefs were once prevalent; for over 100 years oysters supported one of the Bay's most valuable fisheries with tens of millions of bushels of oysters removed each year. This massive shell removal led to the flattening of reefs, with oyster reefs now largely subtidal in the Bay (Hargis and Haven 1999). While there have been many anecdotal accounts of boating-related impacts on oyster reefs, empirical data are limited. In the Indian River Lagoon, Florida, Grizzle et al. (2002) described a pattern of dead margins (evidenced by piles of shells that had apparently originated as living oysters dislodged off of the reef, pushed above high tide line by subsequent wakes, and then perished due to exposure) on the seaward side of oyster reefs that faced navigation channels and hypothesized that boat wakes were responsible. Survival of oyster spat on these same reefs was later found to be significantly lower than on reefs that were not impacted by boat traffic (Wall et al. 2005). Experimental evidence from this same system indicates that waves as small as 2 cm can result in the movement of both individual oysters and small clusters of oysters (Campbell 2015).

Salt marshes and beaches

As previously described, salt marsh vegetation can help to stabilize sediments and dissipate wave energy. Both of these functions can result in decreased erosion rates relative to those of unvegetated shorelines. The benefit of shoreline vegetation does have limits however, as marsh vegetation only exists along relatively low energy shorelines. Efforts to establish the wave energy threshold for marsh survival suggest that marshes will not exist naturally along a coast line where incident wind-generated waves exceed 0.3 m, even 5% of the time (Schafer et al. 2003, Roland and Douglas 2005). Previous efforts to quantify the impact of boat wakes on shorelines suggest that waves of 0.3 m are likely when navigation channels are within 150 m of the shoreline (Table 1, Figure 8). As 0.3 m may represent the threshold of survival, there is likely to be a gradient of wave heights beneath this threshold which span the range from conditions where marshes thrive, to those where chronic erosion occurs. Evidence from wave tank experiments suggests that waves as small as 10 cm result in erosion of sediments from vegetated shorelines (Coops et al. 1996). Furthermore, several researchers have demonstrated positive correlations between wind-wave power along a shoreline and measured rates of

shoreline retreat (Schwimmer 2001, Marani et al. 2011).

Studies have shown a direct impact of boat wakes on tidal marsh stability (e.g., Castillo et al. 2001, Allison 2005, Houser 2010) although not all of the studies concluded that boat wakes were the primary source of annual erosion. Boat wakes seem to contribute significantly to shoreline change where boat activity is regular, concentrated, close to the shore and in small tidal creeks, but may be less important than wind waves in other systems. Although the impacts are generally framed as tidal marsh loss, a study of vegetative community change in San Francisco marshes attributes a shift from intertidal *Schoenoplectus californicus* to submerged aquatic vegetation to shoreline erosion caused by recreational boating (Watson and Byrne 2012). Personal watercraft (Jet skis) have the ability to operate in very shallow water including marsh channels. Within three National Estuarine Research Reserve (NERR) marshes (North Carolina, South Carolina, and New Hampshire), a significant change in turbidity from personal watercraft passages was demonstrated; in addition, the speed and the weight of passengers created higher waves and more turbidity (Anderson 2002). Much less research has been directed to the question of the effects of boat wakes on non-vegetated shores (beaches), but sand entrainment and movement offshore was attributed to jet boat wakes in a controlled experiment on the Snake River (Mussetter et al. 2007).

Figure 8. Waves generated by boat passages along the Atlantic Intracoastal Waterway, NC. Photo from NOAA/NCCOS.

Submerged Aquatic Vegetation

Boat wakes and wash can cause erosion of submerged aquatic plant roots in freshwater and marine waters. The susceptibility of freshwater aquatic plants to erosion can be variable and

may be related to the petiole cross-sectional area (Liddle and Scorgie 1980). Direct damage to seagrasses from contact with propellers, anchors, and moorings has been well-documented (e.g., Williams 1988, Walker et al. 1989, Dawes et al. 1997, Hallac et al. 2012). However, boat wake wave impacts are less understood for seagrasses. Boat generated waves can have indirect impacts on seagrasses through increased suspended sediments that lead to reduced light availability and elevated nutrients (Koch 2002, Koch et al. 2006). Seagrasses have relatively high minimum light requirements (11-20% of surface light) in order to thrive (Durante 1991, Dennison et al. 1993); therefore, wave-induced increases in water turbidity can be detrimental to seagrasses. Unfortunately, there is limited quantitative information regarding this impact. Research from a shallow sandy bay in Massachusetts suggests that turbidity may be sufficiently elevated (reducing light by more than 60%) in areas with heavy boating, particularly at low tide, to be detrimental to eelgrass; however, the sandy sediment resuspended from boating resettled within 1-2 hours, much quicker than wind-driven events (Crawford 2002). A single study from Chesapeake Bay observed a minimal negative impact of boat generated waves on seagrass light availability likely because at the study site (Hopkins Cove, MD) boat waves were very small compared with naturally occurring waves (Koch 2002). Additional study is needed on seagrasses in other systems to more fully estimate the potential effect of boat generated waves.

Estuarine fauna

Boat generated waves can have direct and indirect effects on fish. Direct effects may include temporary increases in water turbidity or wave energy that physically disrupt fish assemblages (Whitfield and Becker 2014). Indirect effects may result because of physical disturbances to the bottom sediments (resuspension) and nearshore habitats (seagrasses, wetlands) from boat generated waves. Frequent and intense boating activity may enhance seagrass blade movement ('flapping') that can cause reduction in the abundance and diversity of invertebrate prey resources (Bishop 2008). Experimental studies in the littoral zone of freshwater have demonstrated that wave velocities corresponding to waves generated by small recreational boats caused ~10% of benthic invertebrates (e.g., amphipods) to dislodge and become more vulnerable to predation as well as a reduction in foraging success for certain littoral fish species (Gabel et al. 2011). Beyond immediate habitat and prey disruptions, long term damage and fragmentation to structural habitat such as seagrasses and salt marshes from regular exposure to elevated turbidity and/or physical stress from waves has the potential to change fish assemblages and productivity (Fagherazzi et al. 2013). Boat generated waves may erode the essential habitats of diamondback terrapin (*Malaclemys terrapin*) – marshes and nesting beaches (Schwimmer 2001).

Birds

There are few studies on the effect of boating on birds and little effort to tease the effect of boat wakes from the suite of possible disturbances (noise, visual, proximity, etc.). Exposure to rapid and repeated movement of personal watercraft significantly increased flushing of least terns (*Sternula antillarum*) on a marsh island in New Jersey. Motorboats prompted a similar, though significantly smaller, response. Terns relocated nesting sites opposite the boating channel and experienced greater rates of nest loss due to flooding (Burger 2003). Of 6 wading birds species (great egret (*Ardea alba*), tri-colored heron (*Egretta tricolor*), snowy egret (*Egretta thula*), great-blue heron (*Ardea herodias*), yellow-crowned night heron (*Nyctanassa violacea*), and green heron (*Butorides virescens*), all but the snowy egret displayed boat-induced flushing response and lower numbers of birds post-disturbance. Environmental factors (weather, wind speed, time of day, air temperature) and prey availability have documented effects of avian habitat use and behavior, potentially masking disturbance effects (Peters and Otis 2006). Colonial nesting grebes construct over-water nests which are subject to both wind and boat generated wave-induced failure (Allen et al 2008). Nests with adequate vegetative protection are three times more likely to hatch eggs than unprotected nests. A loss of endangered California light-footed clapper rail nesting habitat (*Spartina foliosa*, low marsh) is attributed to personal watercraft and boat wake erosion (Dayton and Levin 1996). Anecdotal linkages between boat wakes and a decline in common tern and black skimmer populations have been made by the Maryland Coastal Bays Program and the Program has initiated a "no-wake" sign program (Holloway 2015).

Section 2: Specific Chesapeake Bay implications and concerns

Recreational boating

Recreational boating is a highly prevalent and an economically important water-related activity in Chesapeake Bay (Lipton 2007, Murray et al. 2009). In Virginia, there are nearly 250,000 registered boats (Virginia Department of Game and Inland Fisheries, data from 1997-2012). In Maryland, there are nearly 200,000 registered boats, and an additional 57,000 non-registered vessels (Environmental Finance Center, University of Maryland 2013). The majority of the boats are small, trailered vessels, the trend however is for boat owners to 'trade up' for larger boats (Maryland's Recreational Boating and Infrastructure Plan 2004). According to the US Coast Guard National Recreational Boating Survey (2012), the annual number of days spent boating is 2,547,000 for Marylanders and 5,600,000 for Virginians; these numbers include boat