Riley-Purgatory-Bluff Creek Watershed District

Board of Managers Regular Meeting and Public Hearing

Thursday, March 15, 2018
7:00pm Regular Board Meeting
& Public Hearing
DISTRICT OFFICE
18681 Lake Drive East
Chanhassen

Tentative Agenda

1. **Call to Order**

2. **7:00pm Approval of the Agenda** (Additions/Corrections/Deletion) **Action**

3. **10 Year Management Plan Public Hearing** **Information**

4. **Matters of general public interest** **Information**

   Welcome to the Board Meeting. Anyone may address the Board on any matter of interest in the watershed. Speakers will be acknowledged by the President; please come to the podium, state your name and address for the record. Please limit your comments to no more than three minutes. Additional comments may be submitted in writing. Generally, the Board of Managers will not take official action on items discussed at this time, but may refer the matter to staff for a future report or direct that the matter be scheduled on a future agenda.

5. **Reading and approval of minutes** **Action**
   Board of Manager Meeting, February 7, 2018

6. **Consent Agenda**
   (The consent agenda is considered as one item of business. It consists of routine administrative items or items not requiring discussion. Any manager may remove an item from the consent agenda for action.)
   a. Accept Staff Report
   b. Accept Engineer's Report (with attached Inspection Report)
   c. Approve permit 2018-008 Staring Lake Park Play Court with staff recommendations
   d. Approve permit 2016-013 Reconstruction of Soccer Field #11 at Miller Park with staff recommendations
   e. Approve permit 2017-072 O'Reilly Auto Parts in Eden Prairie with staff recommendations

f. Approve permit 2018-011 Maloney Shoreline Stabilization on Lake Riley with staff recommendations
g. Approve permit 2018-014 Eden Prairie Road Reconstruction with staff recommendations
h. Approve hire of new Outreach & Office Assistant

7. Citizen Advisory Committee **Information**

8. Action Items **Action**
   a. Accept January Treasurer's Report
   b. Approve Paying of the Bills
   c. Adopt resolution assuming WCA LGU administrative responsibility in Deephaven
   d. Authorize president to enter into Cooperative agreement with the City of Chanhassen for the Lake Susan Park Pond
   e. Authorize president to enter into Cooperative agreement with the City of Chanhassen and ISD 112 for the Chanhassen High School Capture and Reuse System

9. Discussion Items **Information**

   a. 50th Anniversary Planning
   b. Channel Protection Update

10. Upcoming Events **Information**

- Citizen Advisory Committee monthly meeting, March 26, 5:30 pm, 18681 Lake Drive East, Chanhassen. Orientation begins at 5:30 pm, regular meeting to follow after.
- Regular Board Meeting, April 4th, 7:00 pm, 18681 Lake Drive East, Chanhassen

MEETING MINUTES

Riley-Purgatory-Bluff Creek Watershed District

February 7, 2018, Board of Managers Workshop and Monthly Meeting

PRESENT:

Managers:	Jill Crafton, Treasurer	
	Dorothy Pedersen, Vice President	
	Dick Ward	
	Leslie Yetka, President	
Staff:	Claire Bleser, District Administrator	
	Terry Jeffery, Project and Permit Coordinator	
	Michelle Jordan, Community Outreach Coordinator	
	Joshua Maxwell, Water Resources Coordinator	
	Louis Smith, Attorney (Smith Partners)	
	Scott Sobiech, Engineer (Barr Engineering Company)	
Other attendees:	Laurie Hable, LRIA	Cheryl Nehl, Mitchell Lake Assoc. *
	Pete Iversen, CAC; Eden Prairie Resident	Joan Palmquist, CAC*
	Curt Kobilarcsik, Chanhassen Resident*	Laurie Susla, LLCA*
	Larry Koch, Chanhassen Resident	Marilynn Torkelson, CAC*
	Ryan Majkrzak, Chanhassen Resident*	Lori Tritz, CAC*
	Sharon McCotter, CAC*	David Ziegler, CAC; Eden Prairie Resident

*Indicates attendance only at Monthly Meeting

1. Workshop: 10-Year Plan:- Review of Comments; Wetlands Program Update

President Yetka called to order the Wednesday, February 7, 2018, Board of Managers Workshop at 5:43 p.m. in the District Office, 18681 Lake Drive East, Chanhassen, MN 55317.

10-Year Plan - Review of Comments

Administrator Bleser stated that the District received comments on its draft 10-year plan during the public comment period, which ended January 15. She pointed out that the managers had received a copy of the comments and of the revised plan with the tracked proposed changes, which are in response to comments. Staff also displayed a PowerPoint of the tracked proposed changes.

Administrator Bleser talked about the format changes made to this final version of the plan, such as adding exhibit numbers. She reviewed with the Board each of the tracked changes. She noted that based on one comment received, staff proposes expanding the District's mission as stated in the plan to include the words "water resources." She talked about different ways the plan could list the District's goals and strategies. The Board agreed that it would list them in alphabetical order and add a footnote to indicate that the goals are not listed by priority but in alphabetical order.

She said that under the water strategy staff has added how the District will address erosion issues. She highlighted the addition of a strategy for water quality: The District will investigate alternatives to infiltration practices to promote volume reduction areas not conducive to standard infiltration BMPs. Engineer Sobiech said that the District could look at more reuse of rainwater, more reforestation with certain types of trees, and more evapotranspiration.

Administrator Bleser noted that the 2018 Impaired Waters list is now available and is published on the District website. She explained that the District's flood elevation updates would be published on the District's website. President Yetka brought up the received comment from Eden Prairie about hoping the District would take the lead in updating all floodplain maps. Engineer Sobiech explained that the City of Eden Prairie noted that some FEMA maps were lacking some information and were not entirely accurate with the topography. He stated that the City of Eden Prairie wants to partner with the District on updating the floodplain maps for the entire district, which is something that would be done through FEMA. Engineer Sobiech reported that staff has reached out to the Department of Natural Resources to find out if there are state funds available to help with that type of effort, but the District has not heard back. There was discussion about the current floodplain profiles and how they are shifted and also based on the old precipitation patterns.

Administrator Bleser continued going through the proposed changes, including that staff added a new paragraph to identify the overarching District-wide outcomes of implementing this 10-year plan. The Board reviewed and agreed to the proposed changes as presented.

Wetlands

Mr. Jeffery reported that as directed by the Board last month, staff sent out a letter to the Local Governmental Units (LGUs) about LGU status regarding the Wetland Conservation Act (WCA). He said that the cities of Deephaven and Shorewood were the only two cities who ds not want to retain their LGU status regarding the WCA. Mr. Jeffery added that Shorewood, which also has area in the Minnehaha Watershed, requested that the District contact the Minnehaha Watershed District to make sure there would be no issues.

Mr. Jeffery talked about cities' responses to the letter the District sent out last month requesting GIS data on wetlands. He said that right now District staff is establishing what data is out there and after that will compile a comprehensive wetland management plan, starting from less developed areas to more developed areas. President Yetka asked him for a timeline. He responded he estimates the timeline to be two years, but first the 10-year plan needs to be approved.

Manager Ward moved to adjourn the workshop. Manager Crafton seconded the motion. Upon a vote, the motion carried 4-0 [Manager Chadwick absent from vote.]

Manager Yetka adjourned the workshop at 6:30 p.m. and opened the meet and greet portion of the evening, which lasted until 7:06 p.m.

2. Regular Monthly Meeting

President Yetka called to order the Wednesday, February 7, 2018, Board of Managers Meeting at 7:07 p.m. in the District Office, 18681 Lake Drive East, Chanhassen, MN 55317.

3. Approval of the Agenda

Manager Crafton moved to approve the agenda as submitted. Manager Pedersen seconded the motion. Upon a vote, the motion carried 4-0 [Manager Chadwick absent from vote.]

4. Annual Report Presentation

District staff, using PowerPoint slides, presented information that will be included in the 2017 Annual Report. Administrator Bleser asked managers to submit comments, particularly on the factsheets and the Education and Outreach Plan.

Administrator Bleser reviewed the report's information about District projects in 2017. Mr. Jeffery talked about the 2017 permit activity, including that there were 73 permit applications received in 2017 compared to 42 applications in 2016.

Mr. Maxwell discussed the District's 2017 monitoring. Administrator Bleser handed out the 2017 Lake Water Quality Report. Mr. Maxwell also noted the District's 2018 next steps for carp management and responded to questions.

Ms. Jordan talked about the District's 2017 Education and Outreach work. Administrator Bleser handed out draft one-page factsheets about the Citizens Advisory Committee (CAC) and the Cost-Share Program. Ms. Jordan highlighted the 2017 volunteer program, which had 40 volunteers and 345 hours of volunteer service. Also she talked about the Local Leaders program, the youth outreach program, the continuing education program, Project WET, and the District's communication programs.

5. Matters of General Public Interest

President Yetka read aloud the procedures for this portion of the meeting and opened the floor for matters of general public interest.

Mr. Larry Koch, Chanhassen Resident, challenged staff to figure out ways to improve the District's website so that all of the great information just presented by staff is readily accessible. He asked if it is possible to have a presentation on the cost to the District for its permitting program. Mr. Koch asked if the District could provide a breakdown of the private versus public permits. He asked if the District is recovering its permitting expenses from the public permits and wondered if the Board should look at that issue. He stated that the financial report shows that $18,000 has been spent for 2017 Aquatic Invasive Species (AIS) inspections and he asked if more is going to be paid out for 2017 AIS. Mr. Koch also asked if more funds will be paid out for 2017 floodplain expenditures. He asked if, in regard to any 2017 budget not spent, any of those dollars will be carried over as reserved/restricted funds to be applied in 2018. Mr. Koch asked for the cost breakdown of the 10-year plan and asked what is left to be billed. Mr. Koch asked if the District has enough funds to fund its multi-year projects. He wanted to know if the 2.5 million dollars is still sitting in the Districts checking account and if so, is it appropriate to have that amount of money in a checking account. He said that he would like to see just a one-page sheet on the lakes and the creeks that indicate in a chart if they got better or worse and what was done with that water body.

Mr. Lori Tritz, CAC member, talked about an education course she plans to lead regarding water, waste, energy, and pollinators/landscaping. She talked about her plans for the course and asked the Board to consider approving staff involvement, noting that the District would have an opportunity to talk to the class for five to ten minutes as well and explain what kinds of things the District is doing. Ms. Tritz said she'd also love the Board's involvement. There was discussion and the Board and staff indicated interest in some type of participation in a volunteer capacity.

Ms. Laurie Susla, a Chanhassen resident, brought up the Minnesota Pollution Control Agency's (MPCA) Watershed Restoration and Protection Strategy that will be out in 2018 and will define the MPCA's TMDLs and

projects it wants accomplished. She asked if the District would address how the District's projects will coordinate with the MPCA's efforts and how projects will be prioritized between the District's 10-year plan and the MPCA's Watershed Restoration and Protection Strategy. She also requested that the Board appoint to the CAC a representative from a recreational lake.

Ms. Sharon McCotter commented that she believes that the CAC members need to be able to represent the watershed more broadly than from the position of representing the interests of a particular lake.

Staff responded to some of the comments.

6. Reading and Approval of Minutes

a. January 3, 2017, RPBCWD Board of Managers Monthly Meeting

Manager Ward requested a change on page 2, item 2, so that the language reads, "…to authorize the Administrator to add associated payroll services." He noted a spelling correction on page 5, item c, fourth line for the word "addressed" and an edit on page 6, second line to replace the word "legislature" with "legislation."

Manager Crafton moved to approve the minutes as amended. Manager Pedersen seconded the motion. Upon a vote, the motion carried 4-0 [Manager Chadwick absent from vote].

7. Consent Agenda

Manager Yetka read aloud the Consent Agenda items: 7a – Accept Staff Report; 7b - Accept Engineer's Report (with Attached Inspection Report); 7c – Approve Permit 2018-004 Lake Susan Park Pond Permit; 7d – Authorize to go out for bids for Chanhassen High School; 7e – Authorize to go out for bids for Lake Susan Park Pond. Manager Crafton moved to approve the Consent Agenda as presented. Manager Pedersen seconded the motion. Upon a vote, the motion carried 4-0 [Manager Chadwick absent from vote]. Manager Ward noted that last month he had requested that in the future staff would include in the inspection report not only a description of what type of property development it is such as residential or commercial but also the site address. He reiterated his request that the address be included.

8. Citizen Advisory Committee (CAC)

Mr. Ziegler reported that the CAC would like to add rules for changing the CAC's bylaws. He said that the CAC would like to add to the CAC's bylaws language that follows the wording of the Board's bylaws' language on this topic. Mr. Ziegler stated that the CAC discussed the education course proposal that CAC member Lori Tritz just spoke about. He said that the CAC is in favor of the Board and staff participating in some manner. The Board discussed Ms. Tritz's request and indicated interest. Mr. Ziegler said that CAC member Sharon McCotter is seeking for 2018 similar help that District staff member Michelle Jordan provided in 2017 for the storm drain work. Ms. Jordan noted that it would take about three to five hours of her time and that the project in 2017 was successful. The Board indicated consent.

9. Action Items

a. Accept December Treasurer's Reports

Manager Crafton discussed the revised version of the December Treasurer's Report that was handed out

tonight. She noted changes made to Table 2 and Table 3 compared to the report originally included in the meeting packet. Manager Crafton summarized her review of the report. Manager Ward moved to accept the December Treasurer's report as handed out by staff. Manager Pedersen seconded the motion. Upon a vote, the motion carried 4-0 [Manager Chadwick absent from vote].

Administrator Bleser reported on the work she, Manager Crafton, and the new accountant have been doing regarding updating the format of the Treasurer's Report. Administrator Bleser particularly noted the changes they are considering regarding reporting on the multi-year projects. She described how the report will reflect expenditures based on the budget rather than the levy. She said that she will email out the information to the Board and she would like comments back from the managers regarding the changes being considered.

b. Approve Paying of Bills

Manager Crafton moved to pay the bills. Manager Pedersen seconded the motion. Upon a vote, the motion carried 4-0 [Manager Chadwick absent from vote].

c. Approval to use CAC Funds to Send a Representative to the Road Salt Symposium

Ms. Jordan said that the CAC is seeking approval from the Board to use CAC funds to send one CAC member to attend the Road Salt Symposium. The Board indicated consent and noted that the Administrator can approve the CAC's fund expenditure requests that fall within her existing spending authority.

d. Review of CAC Applications – Round 2

President Yetka summarized that in January the Board appointed ten CAC members. She reminded the Board that it had left the application process open and said that the District received five new applications for the two open appointments. The managers discussed the applications. Manager Ward moved to appoint Curt Kobilarcsik to the CAC. Manager Pedersen seconded the motion. Upon a vote, the motion carried 4-0 [Manager Chadwick absent from vote].

The Board decided to keep the number of CAC members at 11 and to invite the remaining four applicants to volunteer with the District.

e. Reschedule March Board Meeting

Due to the dates of the Minnesota Association of Watershed District's Legislative Days, the Board changed its March meeting date to March 15.

f. Release Response to Comment for 10-Year Plan and Schedule Public Hearing

The Board agreed that staff could release the District's response to comments for the 10-year plan and that the public hearing on adopting the plan would be held at 7 p.m. on March 15 in conjunction with its monthly meeting. Manager Pedersen moved to direct staff to release the response to comments. Manager Crafton seconded the motion. Upon a vote, the motion carried 4-0 [Manager Chadwick absent from vote]. The Board directed staff to notice the public hearing.

10. Discussion Items

a. Upcoming Meetings

President Yetka read aloud the list of upcoming meetings.

Manager Crafton noted that the Isaac Walton League's Watershed Summit is being held on February 24, and she provided additional details about the event.

b. Granting Access and Authorizing Accountant to Pay District Credit Card

Administrator Bleser noted that the Board would need to take action in order for the new accountant to have viewing access and payment authority for the District's credit card through KleinBank. Manager Crafton moved to grant to accountant Nancy Mortensen from RedPath viewing access and payment authorization for the District's credit card through KleinBank. Manager Pedersen seconded the motion. Upon a vote, the motion carried 4-0 [Manager Chadwick absent from vote].

11. Upcoming Events

- CAC Monthly Meeting and Orientation, Monday, February 26, 5:30 p.m., District Office, 18681 Lake Drive East, Chanhassen. Orientation begins at 5:30 p.m. and regular meeting will follow.
- MAWD Legislative Days, March 7-8, St. Paul
- Board of Managers Public Hearing and Monthly Meeting, Thursday, March 15, 7:00 p.m., District Office, 18681 Lake Drive East, Chanhassen

12. Adjourn

Manager Pedersen moved to adjourn the meeting. Manager Ward seconded the motion. The meeting adjourned at 9:23 p.m. Upon a vote, the motion carried 4-0 [Manager Chadwick absent from vote].

Respectfully submitted,

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Leslie Yetka, Secretary

RPBCWD Staff Report
March 15, 2018

Administrative

10-Year Plan
Timeline
November 15 – release of the plan out for comments done
December 6 – 6:00pm Informational session done
January 15 – end of written comment period
February 7 - response to comments to board for approval (we need 10 days in between response to comments and public hearing)
March 15 – Public Hearing
April 4 – release for 90 day

Administrator Bleser met with the CAC to answer questions they have in regards to the plan.

50th Anniversary Celebration
2019 marks the 50th anniversary of the formation of the Riley Purgatory Bluff Creek Watershed District. District staff have begun formulating ideas for how to mark the occasion. A preliminary plan includes several year-round activities, and a celebration on the date of the district's founding, July 31st.

Theme:
The events and activities of the year would be linked together by the common theme of "Come explore with us." The theme invites the community to explore and connect with their watershed.

Activities:
A "watershed passport" (similar to the State Parks Passport idea) would be rolled out at the beginning of the year. Community members would pick up a passport, visit locations around the district, share their experiences on social media, and potentially earn an incentive or be put into a drawing for completing it (donations from local organizations would be explored for this). Three outdoor events would also be held, one in winter, spring, and fall. Tentatively these would be a snowshoe/ski/hike, a bike ride/race, and an on-the-water event, respectively.

Celebration:
The sub-theme for the event would be "Celebrating our community." The celebration would take place on Wednesday, July 31st, in the evening. Staff have been exploring venues and identified the Chanhassen Dinner Theater as a well-fit alternative. It is centrally located in the district, well-known, and has an attractive, appropriately sized room option. The room fee is $1000, and dinner $35/person. The event would include several activities, potentially including a speaker and community art project.

Community art project:
Staff have been developing the idea of a community art project. At this stage, the idea is to have an outline on a canvas or other media. The piece would travel to each of the four events of the year, and participants would contribute by coloring in a piece. Once completed, the work would be displayed at the district office.

Objectives:
The 50th anniversary invites the district and its community to reflect on the work, change, and accomplishments of the past 50 years, and think ahead to the next. It is an opportunity to increase the watershed's audience reach and engagement, and strengthen existing relationships through celebration and thanks.

Budget:
Staff propose ear-marking $25,000 of the 2019 Education & Outreach (E&O) budget for anniversary-related activities. The proposed activities fit into the existing E&O framework, and utilizing E&O funds would not detract from other programing. Rather, it would form one of the E&O themes for the year.

Administration
We have complete our search for the Outreach and Office Assistant and have included information in the board packet.

Aquatic Invasive Species
Upcoming conferences:

Upper Midwest Invasive Species Conference (Request for abstract are due April 11-2018)
October 15-18 | Mayo Civic Center | Rochester, MN

Riley and Purgatory Creek Summit (Feb 13)
The District hosted a summit with state agencies and local government units to discuss aquatic invasive species, plant and carp management in the Riley and Purgatory Creek Watersheds. In attendance were District staff, Engineer Sobiech, Freshwater Scientific, PLM, DNR, MPCA, City of Eden Prairie and Chanhassen. Staff Maxwell, Dr Ray Newman and Consultant Bischoff presented on current studies.

The following actions were identified:
Berm Area
1. Modify trash barrier to cut out every other rail. The fish barrier is easier to clean then the trash barrier. The thought is to modify the trash barrier so so that some of the blockage is again the fish screen which would be easier to clean.

2. Consider not rebuilding the berm and develop a fish passage through the berm area. The idea is that we would control the carp population through the fisheries located in the upper rec area where the creek is controlled.

Staring Lake
1. Develop updated depth profiles.
2. Survey for filamentous algae possibly through light penetration changes
3. Treat again for CLP
4. Survey and pull eurasian watermilfoil if possible.

Lake Riley
1. Survey the vegetation and look at possibly no treatment so the native vegetation can establish.

Lake Susan
1. Early season plant survey
2. Determine if CLP treatment is needed

Annual Report
Staff will deliver draft of Annual report to board a the Board meeting.

Audit
We are close to finalizing the audit.

Budget
No changes

Data Requests and Research Extensions
Eric Fieldseth (Minnehaha Creek WD) requested and was sent information required for applying for carp management.

Dave Ziegler requested and was sent the latest Duck Lake dissolved oxygen profile.

Andrew Edgcumbe (Carver County WMO) requested and was sent information regarding bluegill control of carp within the RPBCWD.

Nine-mile Creek WD requested information and was given information regarding carp management. Nine-mile also expressed an interest and were exploring the possibility of utilizing RPBCWD staff assist in sampling fish in Normandale Lake in 2018.

Grants
Carver County Soil and Water Conservation District hosted a meeting with LGU to discuss allocation of Carver County targeted watershed-based grant funding.

Carver County WMO, CCSWCD, LMRWD, MCWD and RPBCWD presented on proposed projects that would use the grant fund. The District proposed the wetland restoration and flood mitigation project.

50/50 split	
Carver County Watershed Management Organization	$517,979

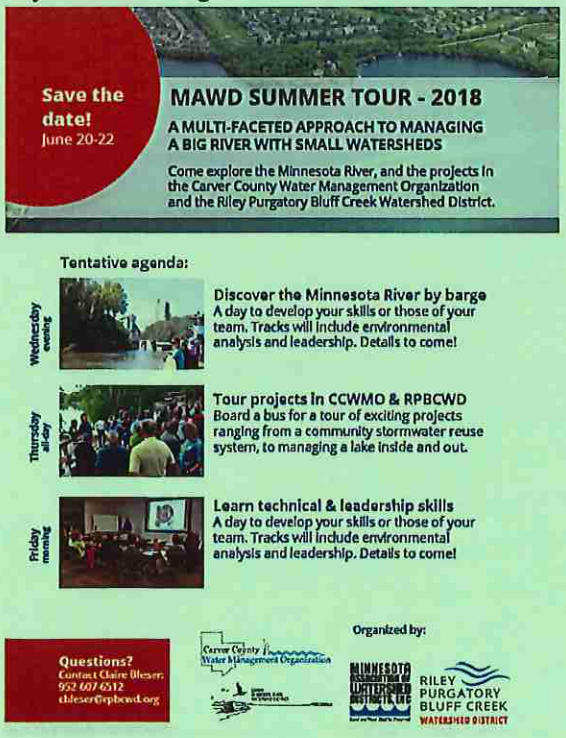
Buffalo Creek Watershed District	Not eligible - do not have a water management plan
Lower Minnesota River Watershed District	$25,472
Minnehaha Creek Watershed District	$93,879
Riley-Purgatory-Bluff Creek Watershed District	$111,870
Total	**$749,200**

The group recognized that this was a pilot project and that they would revisit how the process went for the next round of fundings.

The District met with other watershed organization for Hennepin County. With a 50/50 split similar the Carver County, the District would be allocated $62,170. In discussion with other entities, we talked about an initiative to collaborate to do a Chloride Education program as well as a Chloride cost-share focus. All entities in the Minnesota Basin are interested in pooling money and doing this. Most entities in the Mississippi Basin are interested as well.

MAWD

Planning for the summer tour is underway. Please see attached flyer for updates. Legislative days are coming March 7th and 8th.



Permitting
This past month, there were three (3) permit issued administratively. Permit #2018-006 was issued for the construction of a single family residence at 16200 Pine Street in Minnetonka. Permit #2018-009 was issued to the MN Department of Transportation for landscaping in the interchange at 494 and T.H. 5. Permit #2018-010 was issued for the directional drilling of gas pipeline in Eden Prairie.

There are currently ten (10) additional applications in various stages of review. Staff has also met with two other development teams this month to discuss potential upcoming projects.

Citizens Advisory Committee

February meeting & Annual Orientation
The Citizens Advisory Committee met Monday, February 26th, for their regular monthly meeting and annual orientation. All three new members were in attendance. Officers for 2018 were elected: Chair, David Ziegler; Vice-chair, Sharon McCotter; Recorder, Anne Deuring. Draft minutes are included in the board packet.

Technical Advisory Committee

The TAC met February 28th. At the meeting, Staff Jeffery, Engineer Sobiech, and Legal Attorney Welch presented the changes made to the rules in direct response to the TAC comments from the November meeting. Also presented at the meeting, was an approach to address the protection of channels, bluffs, swales and other natural surface water conveyances increasing erosive forces due to urbanization. Staff will present at tonight's meeting.

Programs and Projects

District-Wide

Cost-share program

Application for 2018 Cost-share grants are open.
On February 14th, the district co-hosted a Lotus Lake watershed best practices community meeting with the Lotus Lake Conservation Alliance (LLCA) and the city of Chanhassen. The cost-share program was promoted at this meeting. 21 people attended the meeting. 11 households (representing 14 people) signed up for cost-share site visits. Several other lake associations have expressed interest in hosting such meetings since.

Lake Vegetation Management

Please see update under Aquatic Invasive Species.

MPCA Community Resiliency Grant

Staff is still working on compiling final report.

Rules Update

Engineer Sobiech completed his assessment of a channel protection rule. This method, which will be discussed with the board, uses a P8 model to look at flow durations and design to limit the 2-year runoff event to within 10% of pre-development conditions. This was presented to the TAC on February 28th where concerns were voiced about the impact on public facilities maintenance and about the ability of designers to perform the necessary modeling.

While these concerns are noteworthy and are being considered, channel protection criteria are recommended by the MPCA's Stormwater Manual, based on sound science, and have been implemented by other governmental entities for over a decade. Based on the on-going erosion throughout the watershed, despite rate control requirement, a channel protection requirement is a feasible and needed modification to the existing stormwater management rule to help protect and restore the water resources throughout the District. Implementation of criteria to match flow durations will help protect the creek and ravines from erosion and the downstream wetlands and lakes from degradation caused by the eroded sediment. Staff recommends advancing a channel protection criteria that considers alternatives to address the reservations raise by the TAC.

Beyond the channel protection consideration, all other rule modifications are at or near completion. Pending the outcome of tonight's meeting, it is likely that staff will be ready to come before the board on April 4th with a rule revision version ready for release for public comment.

Total Maximum Daily Load

No new updates.

Data Collection (J. Maxwell)

Rice Marsh Aeration

Thin ice signs were placed in late December. After functioning extremely well in December and January, one aeration pump went down at the end of January and was replaced. The system is working and a large area is open on RML, however, one pump is not delivering the max amount of air being generated. Barr Engineering is repairing the downed unit.

Winter Field Season

Staff have finalized the water resources report. Winter sampling has occured on the Purgatory Chain of Lakes early this month. The auger went down in February and was repaired. Staff met with a RMB Environmental Labs representative to discuss the new office location in Bloomington. The new location will be able to process water samples for parameters with short holding times and allow District staff to easily access supplies needed for sampling. RMB will also be using a courier service to deliver samples which will give staff longer in-the-field time and prevent scheduling issues that arose with our current delivery services.

Carp Management

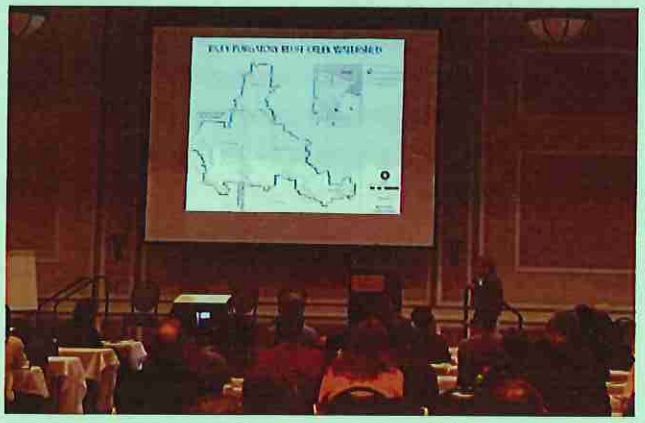
The barrier was pulled in early December. Carp management data was sent to the DNR.

During the end of October, staff tagged 11 common carp in Staring Lake and two common carp were tagged and released in both the Upper and Lower Purgatory Creek Recreational Areas. Staff tracked the fish in mid January and in early March. Due to the lack of fish in Staring, commercial seining would most likely have limited success and therefore is not suggested by staff. Of all the water bodies in the District, the Upper Purgatory Creek Recreational Area had the highest concentration of carp, but is to shallow to effectively conduct winter seining.

Creek Restoration Action Strategy

2018 Upper Midwest Stream Resources Symposium

Staff Maxwell attended and presented the CRAS at the 2018 Upper Midwest Stream Resources Symposium in Dubuque, Iowa (Feb 26th and 27th). The presentation was placed in the session titled Tools and Techniques in Stream Restoration. The presentation went well, and others expressed interest and a need for a prioritization scheme. Many talks highlighted projects the reconnected streams to their floodplain for water quality treatment, storage, and increased aquatic habitat for a variety of species (specifically the endangered Topeka shiner). One talk was about monitoring bluff erosion rates using drones, laser scanning and structure-from-motion photogrammetry on Minnesota's north shore. The technology is relatively new but provided very precise erosion estimates. This was very relevant to the symposium seeing that major stream degradation issues are occuring in Iowa. With that in mind, many talks were about Iowa DNR stream mitigation methods, tools, and projects. John Canyons (Hungry Canons Alliance) presented on utilizing crushed concrete in stream restoration projects due to its availability and low cost. Often deemed unsightly, farmers in western Iowa have been fully funding restoration projects utilizing crushed concrete in areas where they are losing 100 ft of land/year with great success. Bruce Henningsgaard from the MPCA presented on multiple projects that have been completed in MN via pollutant trading. This strategy has allowed companies to expand in size, increasing their pollutant loads to impaired rivers and streams, if they complete and maintain projects addressing nonpoint sources within the same watershed.



Staff will be replacing "lost" bank pins at our regular stream monitoring sites with an additional placement of pins on Purgatory Creek at the southside of Silver Lake to assess erosion rates. Barr Engineering and District staff submitted the CRAS to the Center for Watershed Protection for publication. Additionally, staff have been working on a final creek walk summary book to have on hand to easily reference stream section data.

University of Minnesota Grant
We were approached by the University of Minnesota - Dr. John Gulliver to see if we would be interested in investigating internal phosphorus release in 5 stormwater ponds and implement an iron filing treatment. Staff is reviewing the proposal.

WOMP Station - Metropolitan Council
Staff visited the WOMP stations twice this month. Annual meeting of WOMP cooperators will be held in March.

Education and Outreach (M. Jordan)

Volunteer program
A volunteer newsletter is being created to help connect and encourage volunteers in their work.

Service Learners
Some of the service learners have begun their volunteering.

An Eden Prairie High School student stopped into the office after picking up an Annual Communication calendar at the local library. After several conversations, and submitting a volunteer application, they have begun volunteering with the district. The student is helping to do some of the preliminary planning for the 50th Anniversary Celebration.

Adopt a Dock Program
Plates are being prepared and volunteers solicited for 2018..

Master Water Stewards Program
This year's cohort is nearing the end of their class sessions. They are selecting their projects and partnering up. Previous year's stewards continue to volunteer. Last year's high-school student is preparing to do her rain-garden install this spring.

Citizen Advisory Committee
See CAC section above.

Minnetonka High School Volunteer Fair
Staff attended the Minnetonka High School volunteer fair and spoke with students about volunteer opportunities at the district. 10 students signed up for more information about volunteer opportunities. So far, one has submitted an application to volunteer.

Minnetonka High School Capstone Mentorship
Staff submitted to host a Minnetonka High School student for their capstone project. This is the second year of the program after a one-year pilot. To be accepted into the program, students need to fill out an application, which includes finding and meeting with a mentor. The mentor needs

to meet with the student in Feb/March to agree on goals for the project and decide on a calendar (which can change) signing off on their proposed 60 hours (spread out over 9 days). Once accepted, students will need to supervise students while they are off campus during the last 2 weeks (May 21-June 1). The student does not need to be with their mentor the entire time but needs to serve as the point person for the project. The goal of the Capstone Project is to get seniors off campus engaging in real-life settings. An example of what students did last year can be found here: https://vimeo.com/229400201 A student has reached out with the desire to do their capstone at the district and staff will be following up with them.

Communication program

Annual Communication

This project is completed for 2017. 2018 planning will begin in summer.

Lakes and Creeks Water Quality Report

Upon final board approval, distribution of fact sheets will begin.

Website & Newsletter

Staff continue to work in the website update. The next newsletter will go out in March.

Lotus Lake Community Actions for Clean Water Meeting

In partnership with the city of Chanhassen and the Lotus Lake Conservation Alliance, the District hosted a community meeting for the Lotus Lake watershed. See Cost-Share section for details.

Tabling at community events

Tabling season has begun. Staff partnered with the Carver County Watershed Management Organization to support their "Lake Lab" tent at the Chanhassen February Festival on February 3rd. The festival includes a fishing tournament and is well-attended. Messaging focused on road salt pollution, its impacts and solutions. Staff also attended the Bloomington Home Improvement Fair on February 24th. Messaging for the event focused on turfgrass alternatives, including fine fescues. There was a great deal of interest in this topic. A master water steward volunteer attended the Shorewood Garden Festival on March 10th, and again focused on turfgrass alternatives and simple actions for clean water.

Youth Outreach

Earth Day Mini-Grants

Staff continue to promote the grants and have received applications. The deadline is March 23rd.

Staring Outdoor Center partnership

No new updates.

Volunteering

See the volunteer section for how the district has been engaging high-school students in volunteer opportunities.

Continuing education program

Winter & Turf Maintenance Training

Dates have been set for this year's maintenance trainings: Smart Salting Level 2, April 17th; Turf maintenance, March 22nd; Parking Lots and Sidewalks, August 23rd. Promotions for the March 22nd event are ongoing.

Local leaders program

Summer Tour

The primary local leaders event for 2018 will be a summer tour. Further details can be found under the MAWD heading at the top.

Businesses and professionals program

Professional luncheon series

Planning for the luncheon series continues.

Bluff Creek One Water

Chanhassen High School

Chanhassen High School Cooperative Agreement have been finalized. I will be asking the board to authorize the president to sign and enter into agreements with the City of Chanhassen and ISD 112.

Bluff Creek Tributary Restoration

Staff and engineering will meet in early February to discuss updates on the Bluff Creek Tributary restoration. We discussed permitting needs, easements, scheduling a stakeholder meeting and developing cooperative agreement with Chanhassen.

Riley Creek One Water

Lake Susan Park Pond

Staff has worked with the City of Chanhassen to finalize Cooperative Agreement. We are looking at the board to authorize the President to sign off on the agreement at the next board meeting.

Riley Creek

Design work continues. The District met with the City of Eden Prairie Staff Modrow and Stovring to discuss updates on the projects as well as timeline. We will be hosting a public meeting for residents on April 11th. We also are working with the City in developing a corridor enhancement plan that discusses the purpose of the project, the benefits, the restoration and maintenance. This will be a living document that will be updated by both moving forward.

Purgatory Creek One Water

Fire Station 2
Educational signs have been ordered and will be installed later this spring.

Purgatory Creek at 101
No new updates.

Scenic Heights School Forest
Work has begun on the Scenic Heights School Forest restoration project. Flagging of trees to be removed started on February 16th, and invasive species and tree removal on February 28th. Crews are working to have all the removal done before the weather warms and the ground thaws. This ensures minimal impact to the forest floor. Staff have been working to plan education and outreach activities in conjunction with the school. A school-wide art project, student-inspired signage, and a community volunteer planting day are some of the potential projects.

Photo: a forestry mower chews up invasive buckthorn

Professional Workgroups and Continuing Education

American Water Resources Association
Administrator Bleser was nominated to be on the Board of Directors for the American Water Resources Association.

Science Talk 2018
Staff Jordan attended the 2018 Science Talk conference in Portland Oregon, March 1-2. Science Talk connected scientists, science communicators, journalists, policymakers, students, and others

for two exciting days of learning how to talk science to non-scientists or non-specialists. It featured presentations, workshops, expert panels, and excellent opportunities for networking. Some of the highlights of Jordan's experience included:

- **Workshops.** Staff attended two workshops, one on how to present data in an engaging and understandable way, and another on how to maximize the effectiveness of social media.
- **Presentations.** Several presenters spoke about the usefulness of video in communicating topics, especially in today's digital environment. Staff picked up ideas and contacts for how to start creating and using video in a simple way. Another interesting topic was how to talk/write/educate about challenging topics like climate change. A common theme was the need to build trust in our communities, to decrease barriers between scientists/technical experts/decision makers and the communities we serve.
- **Networking.** There was a diverse mix of scientists, communicators, and educators. Staff met individuals working in stormwater management and education from the west coast, as well as people working on different topics close by. For example, it turns out that until recently, Wisconsin did not have a science museum. Staff met an individual working with the new Wisconsin Science Museum to connect and communicate with its community (https://wisconsinsciencemuseum.org/), and talked about the challenges of increasing public awareness and engagement.

Overall, the conference provided a balanced mix of big-picture ideas and inspiration, and small-scale technical suggestions, and a community of science communicators to tap into.

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BARR

Memorandum

To: Riley-Purgatory-Bluff Creek Watershed District Board of Managers and District Administrator
From: Barr Engineering Co.
Subject: Engineer's Report Summarizing February 2018 Activities for March 15, 2018, Board Meeting
Date: March 3, 2018

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 February 2018.

General Services

a. Participated in a February 6th meeting with Permit Coordinator Jeffery, Staff Jordan, Minnetonka School District, city of Minnetonka and contractor selected to perform the restoration activities for the Scenic Heights Forest Restoration project. Discussion included education opportunities, site access, construction schedule and methods. Also conducted a site walk with contractor to ID trees to protect and discuss alternative restoration methods.

b. Met with Permit Coordinator Jeffery and ISD 112 on February 7th to review draft maintenance declaration, ISD 112 project concerns, building alternatives the school district wanted included in the bidding documents.

c. Met with Administrator Bleser on February 9th develop and corridor enhancement plan for Lower Riley Creek including development of a map based inspection form.

d. Participated in a February 9th meeting with Administrator Bleser and Permit Coordinator Jeffery to discuss the Lower Riley Creek and Bluff Creek streambank restoration projects. The discussions involved access needs, draft environmental assessment worksheet, neighborhood meeting planning, and cooperative agreements.

e. Participated in the February 13th Riley and Purgatory Creek summits with Administrator Bleser, Staff Maxwell, city of Eden Prairie, University of Minnesota, Wenck, PLM, and James Johnson to discuss vegetation and carp management in the Riley and Purgatory watersheds.

f. Met with Administrator Bleser on February 15th to help begin drafting a corridor enhancement plan for the Bluff Creek Reach BT3A restoration project. The corridor plan will help serve as basis for developing a cooperative agreement with the city of Chanhassen.

g. Prepared for and participated in the February 28th Technical Advisory Committee meeting to review potential rule revisions including the stormwater management rule to better address the adverse impacts of development on channel erosion, . While there was general support for the overall concept of improved channel erosion protection, the city expressed concern about impacts to linear project with limited space and potential complexities.

h. Reviewed city of Chanhassen draft local surface water management plan and met with Administrator Bleser, Permit Coordinator Jeffery and Counsel Welch to discuss needed revisions to their plan.

i. Participated in February 7th, 2018 workshop and regular Board meeting.

j. Prepared Engineer's Report for engineering services performed during February 2018.

k. Miscellaneous discussions and coordination with Administrator Bleser about District capital projects, wetland management, 10-year plan update, and upcoming agenda.

l. Project management and overall coordination of active task orders.

Permitting Program

a. *Permit 2015-010: Children's Learning Adventure:* This project involved construction of a children's learning center in the northwest quadrant of Galpin Blvd. and Highway 5 in Chanhassen. The applicant submitted a new permit to reflect site modification needed to demonstrate compliance with the RPBCWD rules because the infiltration BMPs are not functioning as designed.

b. *Permit 2018-008: Staring Lake Play Court Improvements:* This project involves reconstruction and addition of sport courts and trails at Staring Lake Park. The project includes two infiltration basins for the management of runoff from the reconstructed and new impervious surface. The project permit application was considered complete on January 23, 2018. Conducted permitting reviews and compiled comments for the initial submittal and revised materials. Drafted board review memo for Board consideration at the March 15Th regular meeting.

c. *Permit 2016-013: Field 11 at Miller Park*: This project involves the reconstruction of existing soccer field #11 at the City of Eden Prairie's Miller Park. The project includes drainage improvements and restoration of the grass surface. The project permit application was considered complete on January 23, 2018. Conducted permitting reviews and compiled comments for the initial submittal and revised materials. Drafted board review memo for Board consideration at the March 15th regular meeting.

d. *Permit 2016-032: County Road 61:* This project includes improving County State Aid Highway 61 from Highway 101 to Charlson Road. Only a portion of this project is in RPBCWD. The project was conditionally approved at the November 2, 2016 meeting. At the February 1, 2017 RPBCWD Board meeting the Managers conditionally approved a modification to permit 2016-032 . On January 24, 2018 the applicant provided detailed design drawing, engineering computations, soil boring information, groundwater piezometer readings, and modified stormwater narrative requesting that the reconstruction of Eden Prairie Road be amended to Permit 2016-032. During the design process to reconstruct 900 feet of the Eden Prairie road the designers elected to modify the design of the Eden Prairie Road Infiltration Basin for a second time to accommodate the additional runoff from Eden Prairie Road. The design modifications include the enlargement of a wet detention cell, raising the bottom of the infiltration basin to provide the necessary 3 feet separation to groundwater, and enhancing the outlet control structure to meet the RPBCWD stormwater requirements. Reviewed revised

submittal and request for permit modification. Drafted permit modification summary memo for consideration at the Board's March meeting.

e. Performed erosion control inspections of active sites during the week of February 15th (see attached inspection report).

f. Miscellaneous conversations with Permit Coordinator Jeffery about technical questions on permit requirements for potential development and redevelopment projects, including O'Rielly Auto Part in Eden Prairie, Maloney shoreline project, and others.

Data Management/Sampling/Equipment Assistance

a. Uploaded November 2017 SP Inlet and Outlet analytical data into EQuIS

b. Created table of Silver Lake data analytical data

c. Verified 2017 MPCA submitted stream and lake data in conjunction with MPCA

Task Order 6: WOMP Station Monitoring

Purgatory Creek Monitoring Station at Pioneer Trail

a. Data download and review.

b. File management – archive field notes.

c. Equipment maintenance – site visit to check equipment.

Purgatory Creek Monitoring Station at Valley View Rd

a. Data QA/QC and prep for entry into EQuIS database.

b. Download and review data

c. Review MCES lab costs.

d. Equipment maintenance – site visit to check equipment.

Task Order 7b: Purgatory Creek Stabilization near Hwy 101—Construction

a. No work occurred this month. Inspections on plant materials are expected in the spring as part of the vegetation maintenance on the project.

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

a. Prepared final (issued for construction) design plans, technical specifications, and front-end documents. This included coordination of review with District Counsel, incorporation of review from District Counsel, and assembly of the complete contract documents package.

b. Prepared authorization to bid package for RPBCWD monthly meeting on February 7, 2018.

c. Prepared for project bidding, which included preparation of Quest CDN listing, advertisement for bid coordination with local newspapers, posting of complete contract documents package to Quest CDN, and answering questions received from potential bidders.

d. Prepared a draft maintenance document for anticipated ongoing water reuse system and iron enhanced sand filter maintenance at the request of Administrator Bleser.

Task Order 14b: Lower Riley Creek Final Design

a. Continued 60% design, including the iterative process of determining stable channel parameters, modeling, and balancing cut and fill volumes and determining the placement of specific bank protection measures.

b. Completed a Draft EAW and provided to Administrator Bleser for review prior to submittal to regulators.

c. Completed a draft design memorandum to summarize the design parameters.

d. Met with District staff on coordination for permitting, easements and cooperative agreements.

Task Order 16: Watershed Management Plan Refresh

a. Met with Administrator Bleser on February 15th to review and address Counsel comments on the 60-day review draft of the District 10-year plan.

b. Incorporated legal counsel comments into final review draft plan.

c. Developed final review draft PDF for distribution.

Task Order 19: Chanhassen High School Stormwater Reuse Design

a. Met with ISD 112 to discuss building alternatives to include in bidding documents, revised design, and cooperative agreement.

b. Revised (issued for construction) design plans, technical specifications, and front-end documents. This included the addition of bid alternatives for the treatment building design per ISD 112 request, coordination of review with District Counsel, incorporation of review from District Counsel, and assembly of the complete contract documents package. Development of bidding alternatives was an unanticipated design and coordination cost that will be coordinated with Administrator Bleser.

c. Prepared authorization to bid package for RPBCWD monthly meeting on February 7, 2018.

d. Prepared for project bidding, which included preparation of Quest CDN listing, advertisement for bid coordination with local newspapers, posting of complete contract documents package to Quest CDN, and answering questions received from potential bidders.

Task Order 21B: Bluff Creek Stabilization Project

a. Conducted hydraulic modeling of the proposed project features and additional velocity and shear stress analysis of the 90% design

b. Continued development of the design memorandum and RPBCWD permit documentation

c. Met with District staff regarding permitting and other coordination items

Task Order 23: Scenic Heights School Forest Restoration

a. The Notice to Proceed has been issued shortly.

b. Communicated with various stakeholders to identify a preconstruction meeting date and agenda. Attended the preconstruction meeting on for February 6, 2018. Staff from the School District, Three Rivers Parks District, Minnetonka Parks and Recreation, and the DNR School Forest Program discussed timeline for invasive plant clearing is set to begin last week of February and first week of March..

c. Completed site visit with Contractor and City of Minnetonka natural resource staff to discuss staging, site access, and general restoration process. Began marking trees to remove and desirable woody vegetation to protect.

Task Order 24: Preliminary Engineering Study for Silver Lake Water Quality Treatment Project

a. Completed internal review of draft Feasibility Report that documents water quality benefits, site impacts, opinion of probable cost, anticipated regulatory approvals, and next steps.

b. The draft Feasibility Report was provided to Administrator Bleser for review.

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BARR

To: RPBCWD Board of Managers

From: Dave Melmer

Subject: February 15, 2018—Erosion Inspection

Date: March 6, 2018

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 on February 15, 2018.

Site Inspections

2015-008	**3520 Meadow Lane - Existing Single-Family** **3520 Meadow Ln Minnetonka, Minnesota 55345** Site BMP's are adequate. Silt fence is down in some areas on west side--will not affect site runoff. Site cleanup and house painting complete. Some landscaping observed on north side. Deck installation underway. Site activity observed. (February-2018)	**2018-02-15**
2015-010	**Children's Learning Adventure - Private - Commercial/Industrial** **Northwest Coerner of Highway 5 and Galpin Avenue Chanhassen, Minnesota 55317** Building construction complete. November inspection--inlet protection observed at catch basin on Galphin-- SE corner on site side. (February)	**2018-02-15**
2015-014	**12420 Sunnybrook Road - Private - Residential** **12420 SUNNYBROOK ROAD Eden Prarie, Minnesota 55347** Site has been surveyed. No construction has started.	**2018-02-15**
2015-016	**Blossom Hill - Private - Residential** **10841 Blossom Rd Eden Prairie, Minnesota 55347** Open CA(s): Two home sites need rock entrance installed. Slight tracking to street. Deadline: 3/1/2018 Site is snow covered. Visible BMP's look good. Two new home sites under construction--need rock entrance installed. Site representative was notified.	**2018-02-15**
2015-035	**LaMettry's Chanhassen - Private - Commercial/Industrial** **Audubon RD and Motorplex CT Chanhassen, Minnesota 55317**	**2018-02-15**

	Building complete. Parking lot on north lot has been paved. North slope grading and landscaping complete....south area landscaping and sodding complete. Site is stable. Inlet protection still in place.(February-2018)	
2015-036	**Saville West Subdivision - Private - Residential** **5325 County Road 101 Minnetonka, Minnesota 55345** Construction complete at 5320 Spring Ln. House site. Silt fence perimeter control in place. BMP's look good. Landscaping not complete. Site snow covered. Silt fence installed on southwest and west side of development. Lots to south have been brushed/cleared. (February-2018)	**2018-02-15**
2015-050	**Arbor Glen Chanhassen - Private - Residential** **9170 GREAT PLAINS BLVD Chanhassen, Minnesota 55317** Perimeter control (silt fence) installed. Heavy equipment onsite and earthwork/grading complete. Roadway and detention pond installed. All slopes have been stabilized and covered. BMP's look good. No observed activity onsite since last inspection. February-2018	**2018-02-15**
2015-056	**Oster Property - Private - Residential** **9008 & 9010 Riley Lake Road Eden Prairie, Minnesota 55347** Construction complete. Silt fences /bio-logs have been removed. Vegetation mats and wood chips have been installed on all bare soils. All other BMP's look good. Vegetation (grass) still sparse in areas. (November-2017). Homeowner stated they is getting bids for final landscaping. Site is snow covered-will recheck after spring snowmelt. (February-2018)	**2018-02-15**
2015-058	**Prairie Center Clinic Addition - Private - Commercial/Industrial** **8455 Flying Cloud Drive Eden Prairie, Minnesota 55344** Construction complete on building. Some BMP's have been removed for landscaping. Vegetation is established. Parking lot top coat complete. Landscaping complete. Site is stable. BMP's are still in place--silt fence. (February/2018) site is snow covered.	**2018-02-15**
2016-004	**Round Lake Park Improvements - Government - Other** **16700 Valley Road Eden Prairie, Minnesota 55344** BMP's look good. Site construction complete. Vegetation is growing. All temporary BMP's have been removed with exception of BMP's at infiltration areas and silt fence on east side. Infiltration basins have been graded spray-tac'd--vegetation is growing. February-2018 (site is snow covered)	**2018-02-15**
2016-015	**18321 Heathcote Lane - Existing Single-Family** **18321 Heathcote LN Deephaven , Minnesota 55391** Silt fences installed/in good condition. Driveway installed. BMP's look good. House construction complete . (February-	**2018-02-15**

	2018) site is snow covered.	
2016-020	**Prairie View Enclave - Private - Commercial/Industrial** **12701 Pioneer Trail Eden Prairie, Minnesota 55347** No activity observed to date.	2018-02-15
2016-021	**Cedar Hills Park - Government - Other** **9580 Eden Prairie Rd Eden Prairie, Minnesota 55347** Construction complete. BMP's look good-prior to snowfall. Vegetation was sprouted and was growing. Some regrading and seeding had occurred in some areas. Site snow cover-February, 2018.	2018-02-15
2016-026	**Foxwood Development - Private - Residential** **9150 and 9250 Great Plains Blvd Chanhassen, Minnesota 55317** Multiple house construction continues-BMP's look good- silt fences and rock entrances installed/ good perimeter control. Silt fences have been installed on unsold lots. Catch basin protection has been removed in areas. Additional silt fences have been installed across site. Bare soils have been spray-tac'd vegetation sprouting. Some tracking to street/some new house sites need rock entrance. Site representative was notified. Site is snow covered (February)	2018-02-15
2016-030	**IDI Distribution Building Expansion - Private - Commercial/Industrial** **8303 Audubon Road Chanhassen, Minnesota 55317** Parking on north side installed/curb and gutter installed. BMP's look good. Building addition complete. All bare soils have been spray-tac'd. Site is snow covered. (February-2018)	2018-02-15
2016-037	**Prestige Day Care - Private - Commercial/Industrial** **15219 Pioneer Trail Eden Prairie, Minnesota 55347** Construction complete. Sod installed-all landscaping complete. All bare soils have been spray-tac'd. BMP's still in place. Site is snow covered. (February-2018)	2018-02-15
2016-039	**Powers Ridge Senior Apartments - Private - Residential** **1351 Lake Drive West Chanhassen, Minnesota 55317** Construction complete. BMP's are good. Landscaping and sod installation complete. Bare soils covered with matting. Wetland signage installed. Site is snow covered. (February-2018)	2018-02-15
2016-040	**18995 Minnetonka Blvd - Existing Single-Family** **18995 Minnetonka Blvd Deephaven, Minnesota 55391** Construction of house continues. Silt fence in place. Slopes with vegetation mats have growth. Southwest corner has more BMP's to control sediment erosion. BMP's installed are adequate. Earthwork near front has been completed--entire site has been covered with straw and snow covered. Driveway installed. February-2018.	2018-02-15

2016-041	**Chanhassen West Water Treatment Plant - Government - Other** **2070 Lake Harrison Road Chanhassen, Minnesota 55317** Silt fences installed on site. Construction continues. Rock entrance good. BMP's look good. Street cleanup conducted regularly. February -2018.	**2018-02-15**
2016-042	**18663 St. Mellion Place--Eden Prairie (Bear Path) - Existing Single-Family** **2070 Lake Harrison Road Chanhassen, Minnesota 55317** Construction halted for winter. BMP's are good. Silt fence in one small area is at 40% of height. Site grading and sod installation has occurred on a large portion of site. New silt fence installed where needed. Site is snow covered-February, 2018.	**2018-02-15**
2016-043	**Bongards Redevelopment - Private - Commercial/Industrial** **8330 Commerce Drive Chanhassen, Minnesota 55317** BMP's are adequate. Parking lot base installed-- catch basins installed and protected--pavement installation still needs to be completed. (February-2018)	**2018-02-15**
2016-044	**Dell Rd & Riley Creek Repair Project - Government - Other** **9980 Dell Road Eden Prairie, Minnesota 55347** Vegetation was growing appears to have died off. Rip-rap was recently installed at dirt road edge to control erosion from road. Additional erosion prevention from road needs to be addressed. More rock installed along flow path and silt deposit at beehive catch basin removed. Representative was contacted in September (2017) and is aware of site condition. Snow covered-February-2018.	**2018-02-15**
2016-045	**MCES Blue Lake Interceptor Rehab - Government - Linear** **See attached multiple , Minnesota 55354** Construction complete. Silt fences installed/bio-logs in place. Bare soils covered with spray-tac. No vegetation growth observed. Site is snow covered. (February-2018)	**2018-02-15**
2016-047	**9507 Sky Lane Eden Prairie - Existing Single-Family** **9507 Sky Lane Eden Prairie, Minnesota 55347** Vegetation was growing appears to have died off. Rip-rap was recently installed at dirt road edge to control erosion from road. Additional erosion prevention from road needs to be addressed. More rock installed along flow path and silt deposit at beehive catch basin removed. Representative was contacted in September and is aware of site condition. Snow covered-February -2018.	**2018-02-15**
2017-001	**Kopesky 2nd Addition - Private - Residential** **18340 82nd St Eden Prairie, Minnesota 55347** Site has been cleared and perimeter control--silt fence has been installed. No earthwork to date. Rock entrance installed. Heavy equipment onsite. Site is snow covered. January-2018.	**2018-02-15**

2017-002	**7012 Dakota Ave - Existing Single-Family** **7012 Dakota Ave Chanhassen, Minnesota 55317** Construction complete. Majority of landscaping is complete. Sod has been installed. Area near street and city water shut off that needs bare soils covered. Site representative was notified-November. No activity on this area as of February-2018 inspection. Site is snow covered.	**2018-02-15**
2017-003	**18761 Heathcote Dr Building Addition - Existing Single-Family** **18761 Heathcote Dr Wayzata, Minnesota 55391** House construction complete. Pool installation complete. Landscaping continues--sod and shrubs installed. Temporary BMP's have not been removed. February-2018. Site snow covered.	**2018-02-15**
2017-009	**Emerson Chanhassen East Renovation - Private - Commercial/Industrial** **8200 Market Boulevard Chanhassen, Minnesota 55317** Construction continues. BMP's installed. Rock entrance in place. Landscaping earthwork underway. West infiltration basin installed and complete-BMP's are good. Bare soils onsite covered with matting and bio-logged. February-2018	**2018-02-15**
2017-010	**Riley Lake Park Renovations - Government - Other** **9100 Riley Lake Rd Eden Prairie, Minnesota 55347** Construction complete. BMP's installed and look good. Grading and landscaping in is complete. Vegetation growing in some areas. Soils have been spray-tac'd. Vegetation is sparse. Site is snow covered. (February-2018)	**2018-02-15**
2017-011	**Galpin Blvd Watermain Improvements - Government - Linear** **Galpin Blvd & Lake Harrison Road Chanhassen, Minnesota 55317** Construction complete. Soils covered with erosion control mats-some growth observed to date. Silt fences still installed in some areas. Some areas have had additional matting laid down. February-2018.	**2018-02-15**
2017-023	**Eden Prairie Assembly of God - Private - Commercial/Industrial** **16591 Duck Lake Trail Eden Prairie, Minnesota 55346** Construction has begun. Perimeter control silt fence and rock entrance installed. BMP's look good. Site is snow covered. (February-2018)	**2018-02-15**
2017-025	**735 Pleasantview Road - Existing Single-Family** **735 Pleasant View Dr Chanhasssen, Minnesota 55317** Construction complete. Landscaping complete with exception of small infiltration basin. All temporary BMP's have been removed. Site is snow covered. (February-2018)	**2018-02-15**

2017-026	**6135 Ridge Road - Existing Single-Family** **735 Pleasant View Dr Chanhasssen, Minnesota 55317** Construction continues. Foundation in and rock entrance installed. BMP's look good. (February-2018)	2018-02-15
2017-027	**7500 Chanhassen Road - Existing Single-Family** **7500 CHANHASSEN RD Chanhassen, Minnesota 55317-8576** Construction continues. Silt fences and bio-logs installed. Erosion on west side went offsite-- cleaned up and more logs installed. Additional silt fence and bio-logs installed -additional BMP's look good. Some site grading conducted in early November. Site is snow covered. (February-2018)	2018-02-15
2017-029	**Tweet Pediatric Dentistry - Private - Commercial/Industrial** **7845 Century Blvd. Chanhassen, Minnesota 55317** Construction complete . BMP's are installed and good. Catch basin protection installed in this area. Infiltration areas installed. Parking lot grading and curb/gutter installation complete. Site grading and landscaping is continues - bare soils have not been covered-snow covered. (February-2018)	2018-02-15
2017-032	**11193 Bluestem Lane - Government - Other** **11193 Bluestem Lane Eden Prairie, Minnesota 55347** Site is snow covered--will inspect after spring snowmelt. Construction complete. All exposed soils on slope were covered and stabilized. Bio-logs installed at toe of slope.	2018-02-15
2017-034	**Park Road Overlay Chanhassen - Government - Linear** **Park Road Chanhassen, Minnesota 554317** Work complete at creek crossing and Park Rd. Culvert. BMP's installed are good. -inlet protection installed. Road overlay still needs to be completed. Site is snow covered. (February-2018)	2018-02-15
2017-036	**Minnetonka HS Upper Field Access Road - Government - Other** **18301 State Hwy No 7 Minnetonka, Minnesota 55345** Construction complete. Corrective Action items have been addressed. Vegetation has sprouted and is growing--sparse in many areas--will need to be addressed in spring-2018. Snow covered-February.	2018-02-15
2017-038	**West Park - Private - Residential** **760& 781 Lake Susan Drive 8601 Great Plains Blvd Chanhassen, Minnesota 55317** Construction continues. Earthwork/grading underway/street installation complete. Rock entrance installed on south side. Perimeter control installed. Catch basin protection installed but removed for winter. BMP's look good. Minor tracking observed on --onsite streets. Many areas of exposed soils have been blown with straw. Site is snow covered. February -2018	2018-02-15

2017-044	**17064 Weston Bay Road - Private - Residential** **17064 Weston Bay Road Eden Prairie, Minnesota 55427** Construction complete. Landscaping is complete--majority of areas has been hydro-seeded -no growth observed. BMP's in place. Site is snow covered. (February-2018)	2018-02-15
2017-047	**Fawn Hill - Private - Residential** **7240 Galpin Road Chanhassen, Minnesota 55331** Earthwork completed/roadway installed. Perimeter silt fence install. Exposed soils blown with straw. Slight tracking to street . BMP's to date look good.	2018-02-15
2017-052	**Old Excelsior Senior Living - Private - Residential** **17705 Hutchins Drive Minnetonka , Minnesota 55345** Earthwork and construction continues. Perimeter control installed. Rock entrance installed. Large spoils pile is not covered. Site representative stated that they are regularly working it. (February-2018)	2018-02-15
2017-053	**Mastercraft - Private - Commercial/Industrial** **17717 State Hwy 7 Minnetonka, Minnesota 55345** Construction continues. Perimeter control installed. Inlet protection installed. Bio-logs in place. BMP's look good. (February-2018)	2018-02-15
2017-056	**Covington Rd Culvert Replacement - Government - Linear** **Covington Road Minnetonka, Minnesota 55345** Construction complete. Vegetation matting installed. Wetland buffer signage installed on downstream side of Covington. Installed BMP's look good. Site is snow covered. (February-2018)	2018-02-15
2017-064	**Scenic Heights Elementary School Forest Restoration - Government - Other** **5650 Scenic Heights Drive Minnetonka, Minnesota 55345** No activity observed to date.	2018-02-15

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.

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: 2018-008

Received complete: January 23, 2018

Applicant: City of Eden Prairie

Consultant: Adam Pawelk, Hansen Thorp Pellinen Olson, Inc.

Project: Staring Lake Play Court Improvements – Reconstruction and addition of bituminous sport courts and trails at Staring Lake Park. Stormwater features include two infiltration basins for the management of the reconstructed and additional bituminous.

Location: 14800 Pioneer Trail, Eden Prairie

Reviewer: Adam Howard, P.E., Barr Engineering

Rules: Applicable rules checked

	Rule B: Floodplain Management		Rule H: Appropriation of Public Waters
X	Rule C: Erosion and Sediment Control		Rule I: Appropriation of Groundwater
X	Rule D: Wetland and Creek Buffers	X	Rule J: Stormwater Management
	Rule E: Dredging and Sediment Removal		Rule K: Variances and Exceptions
	Rule F: Shoreline/Streambank Stabilization		Rule L: Permit Fees
	Rule G: Waterbody Crossings		Rule M: Financial Assurances

Rule Conformance Summary

Rule	Issue		Conforms to RPBCWD Rules?	Comments
C	**Erosion Control Plan**		See Comment	See Rule Specific Permit Condition C1.
D	**Wetland and Creek Buffers**		Yes	
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 Fees**		Not Applicable	Governmental Entity
M	**Financial Assurances**		Not Applicable	Governmental Entity

Project Description

The proposed replacement of the play court area will disturb and replace 0.48 acres of existing imperious surface and add another 0.28 acres of new impervious surface. The City is proposing construction of two infiltration basins to provide the rate control, volume abstraction and water quality management on the site. Stormwater runoff originating from the project area drains to forested/shrub wetland adjacent to Staring Lake. The City has previously permitted a buffer on the downgradient wetland. This review is based on proposed Alternative 1 as presented in the stormwater narrative submitted with the application. If an alternative other than this is chosen for the project, supporting information will need to be provided and reviewed prior to construction. The project site information is summarized below:

	2016-005	2018-008
Total Site Area (acres)	37.75	37.75
Existing Site Impervious (acres)	4.02	3.91
Existing Impervious Area to be Disturbed and replaced:	0.62 (15% disturbance of site impervious area)	0.48 (12% disturbance of site impervious area)
New (Increase) in Site Impervious Area (acres)	-0.11 (3% decrease in site impervious area)	0.28 (7% increase in site impervious area)
Reconstructed Exempt Impervious Surface	0	0.14
Total Disturbed Area (acres)	2	2

Exhibits:

1. Permit Application dated January 23, 2018.
2. Hydrology Report dated December 22, 2017 (revised February 20, 2018).
3. HydroCAD Modeling (existing and proposed conditions) dated December 19, 2017 (revised February 20, 2018).
4. MIDS Calculator dated December 19, 2017 (revised February 20, 2018).
5. Drainage Area Figures dated December 22, 2017 (revised February 20, 2018).
6. Design Plans Sheets 1 through 20 dated January 12, 2018 (revised February 20, 2018).
7. Geotechnical Exploration Report prepared by Braun Intertec Corporation dated December 7, 2017.
8. Response to Comments email dated February 20, 2018.

Rule Specific Permit Conditions

Rule C: Erosion and Sediment Control

Because the project will alter more than 2 acres (87,120 square feet) of 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 HTPO, Inc. includes installation of sediment control log, street sweeping, rock construction entrance, placement of a minimum of 6 inches of topsoil, decompaction of pervious areas compacted during construction, and retention of native topsoil onsite. 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 general contractor responsible for the site. RPBCWD must be notified if the responsible party changes during the permit term.

Rule D: Wetland and Creek Buffers

Because the proposed work triggers a permit under RPBCWD Rule J (see analysis below) and the wetland is downgradient from the proposed construction activities, Rule D, Subsections 2.1a and 3.1 require buffer on edge of the wetland downgradient from the area to be disturbed.

On April 29, 2016 the applicant provided a wetland delineation report, mapped delineation boundary maps, and MnRAM assessment. According to the MnRAM assessment and RPBCWD, Rule D, Appendix D1, the wetland is rated as a High value wetland rather than the previously assumed exceptional value wetland. Rule D, Subsection 3.1.a.ii requires high value wetland buffer with an average of 60 feet from the delineated edge of the wetland, minimum 30 feet. The applicant provided a 74 foot average, 30 foot minimum buffer as shown on the revised Wetland Buffer Exhibit dated May 23, 2016. The wetland buffer provided under previously approved permit 2016-005 is also located downgradient from the proposed activities under this application, thus conforming to the average and minimum widths identified in Rule D, Subsection 3.1 for high value wetlands. The applicant provided buffer monument locations consistent with criteria in Rule D, Subsection 3.4. The project will be constructed so as to minimize the potential transfer of aquatic invasive species (e.g., zebra mussels, Eurasian watermilfoil, etc.) to the maximum extent possible conforming to Rule D, Subsection 3.5.

The written maintenance agreement was entered into and required buffer markers installed as a part of permit 2016-005. The proposed project conforms to the wetland and creek buffer requirements of Rule D.

Rule J: Stormwater Management

Because the project will alter more than 2 acres (87,120 square feet) of surface area, the project must meet the criteria of RPBCWD's Stormwater Management rule (Rule J, Subsection 2.1). Under paragraph 2.5 of Rule J, Common scheme of development, activities subject to Rule J on a parcel or adjacent parcels under common or related ownership will be considered in the aggregate, and the requirements applicable to the activity under this rule will be determined with respect to all development that has occurred on the site or on adjacent sites under common or related ownership since the date this rule took effect (January 1, 2015). Because a different project was permitted (RPBCWD Permit 2016-005) on the site the current activities proposed must be considered in aggregate with the activities proposed under Permit 2018-008. The criteria listed in Subsection 3.1 will apply to the disturbed areas on the project parcel because the project, when considered in aggregate with other permitted activities, only increases the impervious by 7 percent and only disturbs a combined 27 percent of the existing impervious surface on the parcel (Rule J, Subsection 2.3).

The City is proposing construction of two infiltration basins to provide the rate control, volume abstraction and water quality management on the site. Pre-treatment will be provided by vegetated filter strips prior to entering the infiltration basin.

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 site are summarized in the table below. The proposed project conforms to RPBCWD Rule J, Subsection 3.1.a.

Modeled Discharge Location	2-Year Discharge (cfs)		10-Year Discharge (cfs)		100-Year Discharge (cfs)		10-Day Snowmelt (cfs)	
	Ex	Prop	Ex	Prop	Ex	Prop	Ex	Prop
Staring Lake	1.2	0.6	4.1	2.0	11.2	10.7	0.6	0.6

Volume Abstraction

Subsections 3.1.b and 2.3 of Rule J require the abstraction onsite of 1.1 inches of runoff from all disturbed and additional impervious surface of the parcel. The project will result in a total new

impervious and reconstructed impervious surface of 0.76 acres. A total of 0.14 acres of the reconstructed impervious surface will be sidewalk that is exempt from the requirements of Rule J. because the sidewalk will not exceed 10 feet wide with a downgradient pervious buffer of at least half the trail width as defined in RPBCWD Rule J, Subsection 2.2.d. An abstraction volume of 2,476 cubic feet is required from the 0.62 acres (26,818 square feet) of disturbed and additional impervious area on the project for volume retention. Soil borings performed by Braun Intertet Corporation show that soils in the project area are poorly graded sand with silt; the MN Stormwater Manual indicates an infiltration rate of 0.45 inches per hour for such sandy silt material. The Applicant proposes two infiltration basins with pretreatment of runoff provided by vegetated buffer strip. As shown in the table below, the basins will provide 4,137 cubic feet of abstraction. Soil borings performed by Braun Intertec Corporation show no groundwater to a boring depth of 9.5 feet. This indicates that groundwater is at least 3 feet below the bottom of the proposed infiltration basin (Rule J, Subsection 3.1.b.ii). The proposed project conforms to RPBCWD Rule J, Subsection 3.1.a and 3.1.b.

Required Abstraction Depth (inches)	Required Abstraction Volume (cubic feet)	Provided Abstraction Volume (cubic feet)
1.1	2,476	4,137

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. The Applicant is proposing two infiltration basins to achieve the required TP and TSS removals. The MIDS calculator was used to estimate the TP and TSS removal capacity of the proposed BMP and is summarized in the table below.

Pollutant of Interest	Regulated Site Loading (lbs/yr)	Required Load Removal (lbs/yr)[1]	Provided Load Reduction (lbs/yr)
Total Suspended Solids (TSS)	244	220 (90%)	232 (95%)
Total Phosphorus (TP)	1.34	0.81 (60%)	1.27 (95%)

[1]Required load reduction is calculated based on the removal criteria in Rule J, Subsection 3.1c and the new and reconstructed impervious area site load

The engineer concurs with the modeling, and finds that the proposed project is in conformance with Rule J, Subsection 3.1.c.

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 and no stormwater management system may be constructed or reconstructed in a manner that brings the low floor elevation of an adjacent structure into noncompliance according to Rule J, Subsection 3.6. No structure is located close enough to the proposed basins to present a reasonable possibility of noncompliance with the low-floor requirement. The RPBCWD Engineer concurs that the proposed project is in conformance with Rule J, Subsection 3.6.

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. Permit applicant must provide a draft maintenance and inspection plan for review and approval by RPBCWD.

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. RPBCWD must be notified if the responsible party changes during the permit term.
4. Permit close out is dependent on the permit holder 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 conforms to Rule D.
3. The proposed project will conform to Rules C and J if the Rule Specific Permit Condition listed above are met.

Recommendation:

Approval, contingent upon:

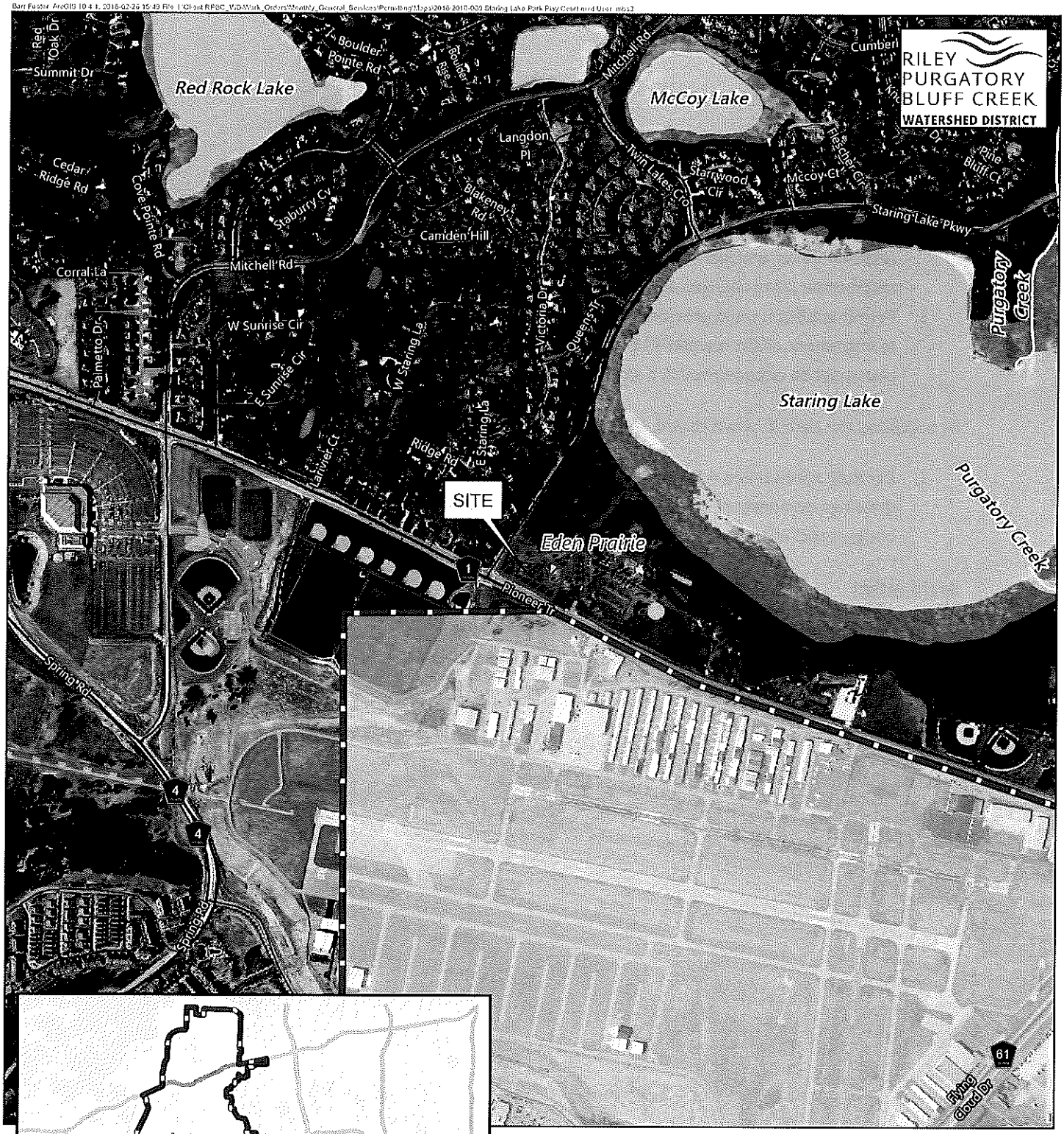
1. Continued compliance with General Requirements.
2. The Applicant must provide the name and contact information of the general contractor responsible for erosion and sediment control for the site. RPBCWD must be notified if the responsible party changes during the permit term.
3. Permit applicant must provide a maintenance declaration and inspection plan for the management of stormwater BMPs and wetland buffer areas. Once approved by RPBCWD, the plan must be documented in a written agreement with the RPBCWD.

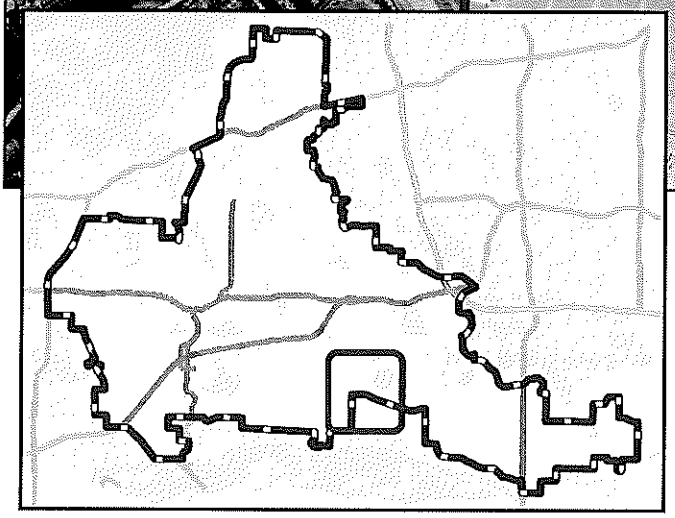
By accepting the permit, when issued, the applicant agrees to the following stipulations:

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. 2018-008 with the conditions recommended by staff.





N

Feet

0 1,000

Permit Location Map

STARING LAKE PARK
PLAY COURT
Permit 2018-008
Riley Purgatory Bluff Creek
Watershed District

RETURN PERMIT APPLICATION TO:	TO BE COMPLETED BY THE DISTRICT:
Riley Purgatory Bluff Creek Watershed District 18681 Lake Drive East Chanhassen, MN 55317 Phone: 952-607-6512 www.RPBCWD.org	PERMIT NUMBER: AMOUNT RECEIVED: $ DATE: RECEIVED FROM: DATE APPROVED: PERMIT EXPIRATION DATE:

1. Name of primary property owner: **Jay Lotthammer**

Mailing Address: **8080 Mitchell Road Eden Prairie, Minnesota 55344 United States**

Email Address: **jlotthammer@edenprairie.org** Phone: **952-949-8440** Fax:

2. Property Owner Representative Information (not required) (licensed contractor, architect, engineer, etc...)

Business Name: **Hansen Thorp Pellinen Olson, Inc.** Representative name: **Adam Pawelk**

Business Address: **7510 Market Place Drive Eden Prairie, Minnesota 55344 United States**

Email Address: **apawelk@htpo.com** Phone: **952-829-0700** Fax:

3. Project Address: **14800 Pioneer Trail Eden Prairie, Minnesota 55344 United States**

PID: **2111622440002**

Project Name: **Staring Lake Park Play Court Improvements**

Project Description: **Reconstruction and addition of bituminous sport courts and site amenities at Staring Lake Park located in Eden Prairie, MN.**

4. Size of project parcel (square feet or acres): **145607**

Area of disturbance (square feet): **88788** Volume of excavation/fill (cubic yards): **2500**

Area of existing impervious surface: **32835** Area of proposed impervious surfaces: **38183**

Length of shoreline effected (feet): **0** Waterbody: **Staring Lake**

5. Type of permit(s) being applied for: **Rule C - Erosion and Sediment Control Rule J - Stormwater Management**

6. NPDES/SDS General Stormwater Permit Number: 7. Waterbody receiving runoff from site: **Staring Lake**

8. Project Timeline: Start Date: **May 1, 2018** Completion Date: **October 31, 2018**

Permits have been applied for: **N/A**

Permits have been received: **None received**

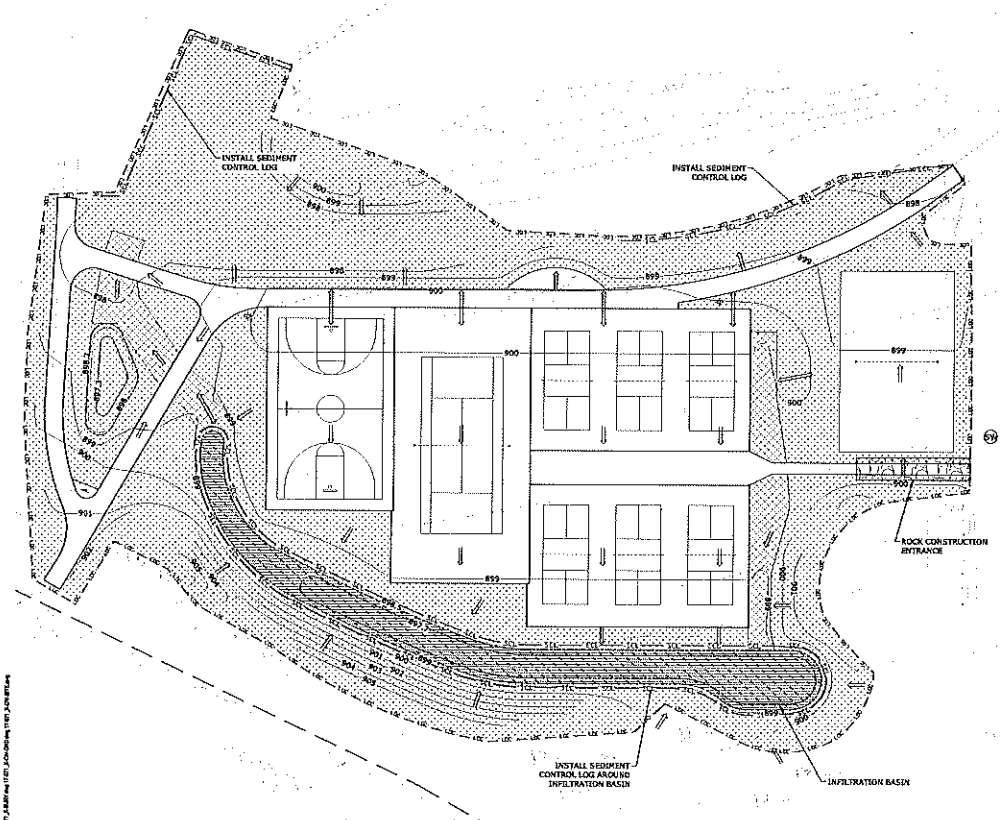
Submittal Requirements
Complete applications must be submitted and received 30 business days prior to the regular Board of Managers meeting, generally the first Wednesday of each month (check website for exact meeting days). Applicants must submit a paper copy and an electronic copy of all required information as specified by District's Rules (see website for complete rules or contact the District office for a copy).

Applicant Signature
"I understand that, as the permittee, I am legally accountable to ensure compliance with the terms and conditions of the permit. I understand that I am not authorized to begin the project until I have received the permit. If the project is modified, I will obtain approval by the Riley Purgatory Bluff Creek Watershed District before I continue with the project. I authorize the District, and its agents, employees, officers, and contractors, to enter the project site to perform any inspections of work authorized by the permit or any applicable law."

"I certify that I have thoroughly read and understand the information in this application."

Jay Lotthammer 1-22-18

Signature of Each Property Owner Date



NOTES

1. CONTRACTOR SHALL INSTALL EROSION AND SEDIMENT CONTROL (ESC) MEASURES PRIOR TO COMMENCING CONSTRUCTION. ESC MEASURES SHALL BE INSPECTED DAILY DURING GRADING OPERATIONS AND WEEKLY UNTIL FINAL STABILIZATION IS COMPLETE. ESC MEASURES SHALL BE REPAIRED AS NEEDED OR AS DIRECTED BY THE ENGINEER. ESC MEASURES SHALL BE REMOVED FOLLOWING FINAL STABILIZATION.
2. EXCAVATION OF NEW INFILTRATION BASIN SHALL NOT OCCUR UNTIL MASS GRADING AND STABILIZATION HAS BEEN COMPLETED.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING EXISTING SURFACE DRAINAGE AT ALL TIMES DURING CONSTRUCTION.
4. CONTRACTOR SHALL TAKE SPECIAL CARE TO MINIMIZE COMPACTION IN GREENSPACE AREA, INCLUDING AREA FOR INFILTRATION BASIN.
5. INSTALL SEDIMENT CONTROL LOGS AROUND INFILTRATION BASIN IMMEDIATELY FOLLOWING EXCAVATION OF BASIN.
6. SCARIFY TOP 18" OF SUBGRADE WHILE TAKING CARE TO AVOID UTILITIES, TREE ROOTS, AND OTHER EXISTING VEGETATION PRIOR TO PLACEMENT OF TOPSOIL AND ROOT ZONE MIX.
7. CONTRACTOR SHALL BE RESPONSIBLE FOR HYDRO-SEEDING ALL DISTURBED GREENSPACE AREAS WITH SEED, FERTILIZER, AND HYDRAULIC SOIL STABILIZER UNLESS NOTED OTHERWISE ON THE PLANS OR AS DIRECTED BY THE ENGINEER.
   - COMMERCIAL TURF SEED MIX SHALL BE MNDOT MIX 25-131 APPLIED AT A RATE OF 440 LBS/AC (MNDOT 3876). FERTILIZER SHALL BE TYPE 1 COMMERCIAL GRADE, NPK 0-10-20 (MNDOT 3881) AND APPLIED AT A RATE OF 60 LBS/AC.
   - NATIVE WETLAND SEED MIX SHALL BE MNDOT MIX 33-262 APPLIED AT A RATE OF 88 LBS/AC (MNDOT 3876) IN THE INFILTRATION BASIN AREA. FERTILIZER SHALL BE TYPE 3 SLOW-RELEASE, NPK 0-10-20 (MNDOT 3881) AND APPLIED AT A RATE OF 60 LBS/AC.
   - HYDRAULIC SOIL STABILIZER SHALL BE TYPE HYDRAULIC MULCH (MNDOT 3884.2 B.2) APPLIED AT A RATE OF 2100 LBS/AC.
8. PLACE MIN. 6" TOPSOIL ON ALL DISTURBED AND NEW GREENSPACE AREAS EXCEPT FOR INFILTRATION BASIN.
9. TURF ESTABLISHMENT FOR ALL DISTURBED AND NEW GREENSPACE AREAS SHALL CONFORM TO MNDOT 2574 AND 2575. ALL DISTURBED AREAS SHALL BE STABILIZED WITHIN 7 CALENDAR DAYS AFTER LAND-DISTURBING WORK HAS TEMPORARILY OR PERMANENTLY CEASED.

LEGEND

- 900 — CONTOUR LINE
- DRAINAGE ARROW
- LOC — LIMITS OF CONSTRUCTION
- SCL — SEDIMENT CONTROL LOG, TYPE STRAW BIOROLL
- SW — STREET SWEEPING
- COMMERCIAL TURF SEED MNDOT MIX 25-131
- NATIVE WETLAND SEED MNDOT MIX 33-262
- SOD
- ROCK CONSTRUCTION ENTRANCE

CALL BEFORE YOU DIG !
MINNESOTA LAW REQUIRES EXCAVATORS TO NOTIFY THE REGIONAL NOTIFICATION CENTER AT LEAST TWO (2) BUSINESS DAYS BUT NOT MORE THAN FOURTEEN (14) CALENDAR DAYS PRIOR TO EXCAVATION
GOPHER STATE ONE CALL
1-800-252-1166

Scale in feet
0 20 40 60

Engineering · Surveying · Landscape Architecture
HANSEN THORP PELLEBON OLSON, Inc.

PROJECT NO.	17-071
DRAWN BY	ADC
DESIGN BY	ANP
CHECKED BY	

DATE	ISSUES / REVISIONS
02-01-18	BID SET
02-20-18	PERMIT RESUBMITTAL

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

LIC. NO. _____ DATE: _____

STATE AID PROJECT NO.	
STATE PROJECT NO.	
COUNTY PROJECT NO.	
CITY PROJECT NO.	1225
CLIENT PROJECT NO.	

EROSION AND SEDIMENT CONTROL PLAN
ALTERNATE #1

STARING LAKE PARK PLAY COURT IMPROVEMENTS
EDEN PRAIRIE, MN

SHEET 8 OF 20 SHEETS

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: 2018-013

Received complete: January 23, 2018

Applicant: City of Eden Prairie

Consultant: Adam Pawelk, Hansen Thorp Pellinen Olson, Inc.

Project: Reconstruction of Soccer Field #11 at Miller Park – This project proposes to reconstruct the existing Soccer Field #11 at the City of Eden Prairie's Miller Park.

Location: 8250 Shoreline Drive, Eden Prairie

Reviewer: Katie Turpin-Nagel and Scott Sobiech P.E., Barr Engineering

Rules: Applicable rules checked

	Rule B: Floodplain Management		Rule H: Appropriation of Public Waters
X	Rule C: Erosion and Sediment Control		Rule I: Appropriation of Groundwater
	Rule D: Wetland and Creek Buffers	X	Rule J: Stormwater Management
	Rule E: Dredging and Sediment Removal		Rule K: Variances and Exceptions
	Rule F: Shoreline/Streambank Stabilization		Rule L: Permit Fees
	Rule G: Waterbody Crossings		Rule M: Financial Assurances

Rule Conformance Summary

Rule	Issue		Conforms to RPBCWD Rules?	Comments
C	**Erosion Control Plan**		See comment	See Rule Specific Permit Condition C1
D	**Wetland and Creek Buffers**		Yes	Wetland buffer established for Permit 2016-006 is applicable for this permit
J	**Stormwater Management**	Rate	Yes	
		Volume	Yes	
		Water Quality	Yes	
		Low Floor Elev.	Yes	
		Maintenance	N/A	
L	**Permit Fees**		Not Applicable	Governmental Entity
M	**Financial Assurances**		Not Applicable	Governmental Entity

Project Description

The proposed replacement of Soccer Field #11 will disturb 2.8 acres of existing surface and construct drainage improvements, including the addition of drain tile and a catch basin. The project plans to disturb 250 square feet of existing impervious surface (bituminous trail) for the installation and tie-in of a new catch basin; however, no additional impervious surface will be created. Since the disturbed impervious surface is a trail that does not exceed 10 feet in width and will discharge downgradient to a pervious area of at least half the trail width, the site is exempt from the criteria of Rule J, Subsection 3.1, which results in no required stormwater management by the applicant. Stormwater runoff originating from the project area drains to a Wetland Conservation Act (WCA) regulated wetland. A MnRAM assessment and wetland buffer was established for this downstream wetland for Permit 2016-006, Reconstruction of Soccer Field #10 at Miller Park. The existing wetland information submitted for Permit 2016-006 was reviewed for this proposed construction. The project site information is summarized below:

	2016-006	2018-013
Total Site Area (acres)	47.2	47.2
Existing Site Impervious (acres)	5.2	5.2
Existing Impervious Area to be Disturbed and replaced:	0 (0% disturbance of site impervious area)	0.006 (0.1% disturbance of site impervious area)
New (Increase) in Site Impervious Area (acres)	0 (0% increase in site impervious area)	0 (0% increase in site impervious area)
Reconstructed Exempt Impervious Surface	0	0.006
Total Disturbed Area (acres)	2.91	2.8

Exhibits:

1. Permit Application dated January 23, 2018
2. Project summary dated January 18, 2018.
3. Design Plans Sheets 1 through 7 dated January 22, 2018 (revised February 16, 2018)
4. Wetland delineation report and boundary maps dated May 9, 2016 (Permit 2016-006)
5. MNRAM assessment memorandum dated May 5, 2016 (Permit 2016-006)
6. Response to Comments' emails dated February 2, 2018

Rule Specific Permit Conditions

Rule C: Erosion and Sediment Control

Because the project will alter 2.8 acres (122,000 square feet) of surface area and require 2,800 cubic yards of excavation/fill 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 Hansen Thorp Pellinen Olson, Inc. includes installation of silt fence, inlet protection for storm sewer catch basins, a rock construction entrance, placement of a minimum of 6 inches of topsoil, decompaction of pervious areas compacted during construction, retention of native topsoil onsite, and using sodding/seeding as permanent erosion and sediment control.

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 general contractor responsible for the site. RPBCWD must be notified if the responsible party changes during the permit term.

Rule D: Wetland and Creek Buffers

Because the proposed work triggers the requirements of Rule J (see below) and is upstream of a Wetland Conservation Act (WCA) regulated wetland, Rule D, Subsections 2.1a and 3.1 require buffer on the wetland edge of this wetland downgradient from the land-disturbing activities.

For Permit 2016-006 (Reconstruction of Soccer Field #10 at Miller Park), the applicant provided a wetland delineation report, including type and boundary determination, based on a field investigation conducted on April 14, 2016. The wetland delineation report identified a shallow, open water community wetland downgradient from the proposed project area based on a field delineation. A MnRAM for the site was been completed and submitted on May 5, 2016, and the wetland value was determined to be low based on the functions and values analysis submitted compared to the information in appendix D1. Rule D, Subsection 3.1.a.vi requires low value wetland buffer with an average of 20 feet from the delineated edge of the wetland, minimum 10 feet; in addition, the proposed buffer area intersects steep slopes, trigger the requirement under subsection 3.1c of the rule that the buffer extend to the top of such slopes. Because the required average buffer width intersects the adjacent steep slope, the applicant provided wetland buffers for the wetland which extends to the top of steep slopes, as required. This conforms to the criteria identified in Rule D, Subsection 3.1a and c for low value wetlands and steep slopes. The applicant installed buffer monument locations consistent with criteria in Rule D, Subsection 3.4 in 2016. The drawings include a note to the contractor to construct the project to minimize the potential transfer of aquatic invasive species (e.g., zebra mussels, Eurasian watermilfoil, etc.) to the maximum extent possible, thus conforming to Rule D, Subsection 3.5. The

buffer areas and maintenance requirements that were documented in a written agreement with RPBCWD in 2016 were determined to achieve compliance for this project. The proposed project conforms to the wetland buffer requirements of Rule D.

Rule J: Stormwater Management

Because the project will alter 2.8 acres (122,000 square feet) of surface area and require 2,800 cubic yards of excavation/fill the project must meet the criteria of RPBCWD's Stormwater Management rule (Rule J, Subsection 2.1). Under paragraph 2.5 of Rule J, Common scheme of development, activities subject to Rule J on a parcel or adjacent parcels under common or related ownership will be considered in the aggregate, and the requirements applicable to the activity under this rule will be determined with respect to all development that has occurred on the site or on adjacent sites under common or related ownership since the date this rule took effect (January 1, 2015). Because the project approved under RPBCWD Permit 2016-006 did not add or disturb impervious surface on the site and required no stormwater management, the past activities proposed do not need to be considered in aggregate with the activities proposed under Permit 2018-013. The project plans to disturb and replace 250 square feet of existing impervious surface (bituminous trail) for the installation and tie-in of a new catch basin; however, no additional impervious surface will be created. Because the disturbed and replaced impervious surface is a trail that does not exceed 10 feet in width and will discharge downgradient to a pervious area of at least half the trail width, the work is exempt from the criteria of Rule J, Subsection 3.1, which results in no required stormwater management by the applicant.

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. RPBCWD must be notified if the responsible party changes during the permit term.

Findings

1. The proposed project includes the information necessary, plan sheets and erosion control plan for review.
2. The proposed project conforms to Rule D, and J
3. The proposed project will conform to Rule C if the Rule Specific Permit Conditions listed above are met.

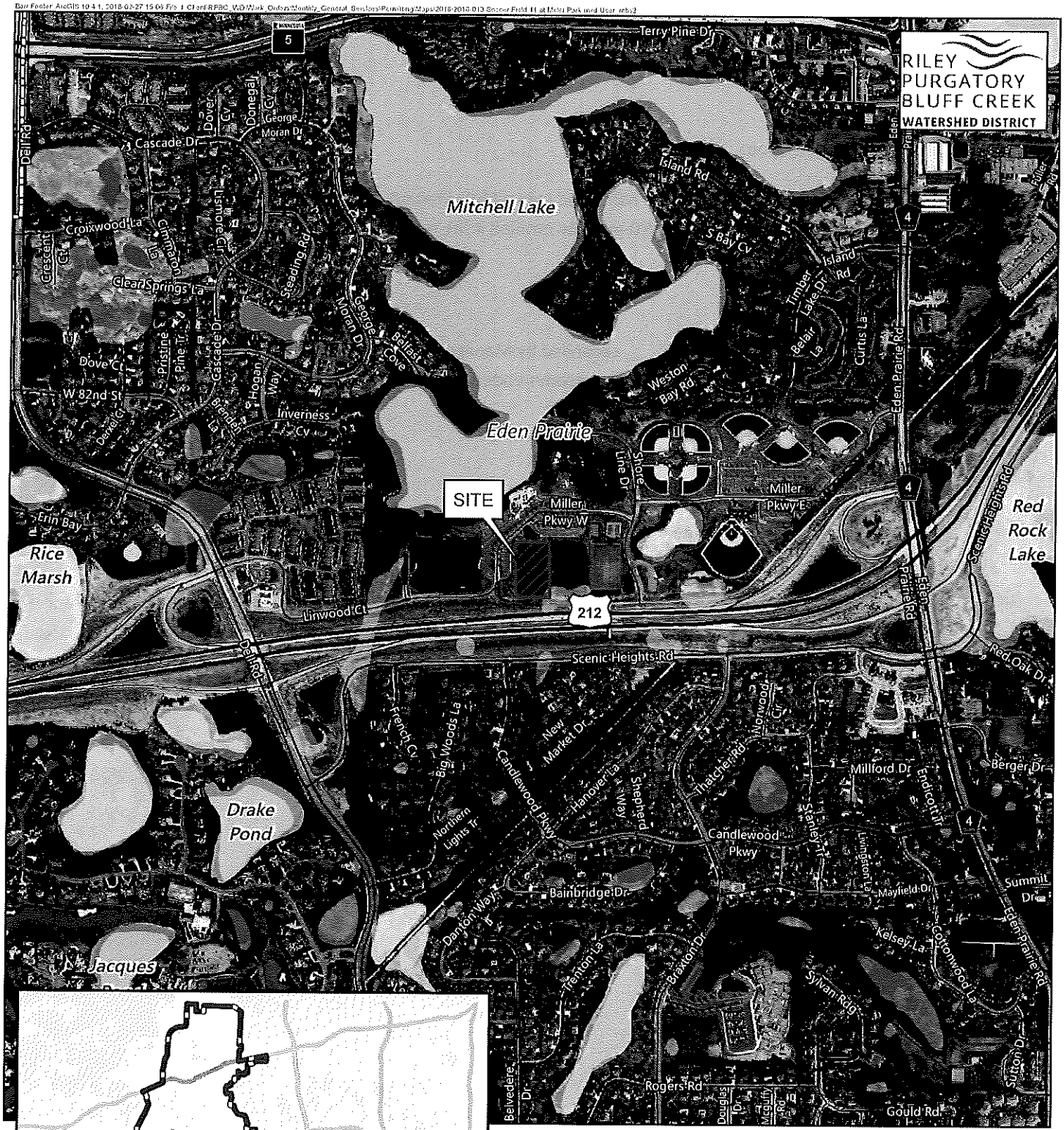
Recommendation:

Approval, contingent upon:

1. The Applicant must provide the name and contact information of the general contractor responsible for the site. RPBCWD must be notified if the responsible party changes during the permit term.

Board Action

It was moved by Manager _____, seconded by Manager _____ to approve permit application No. 2018-013 with the conditions recommended by staff.

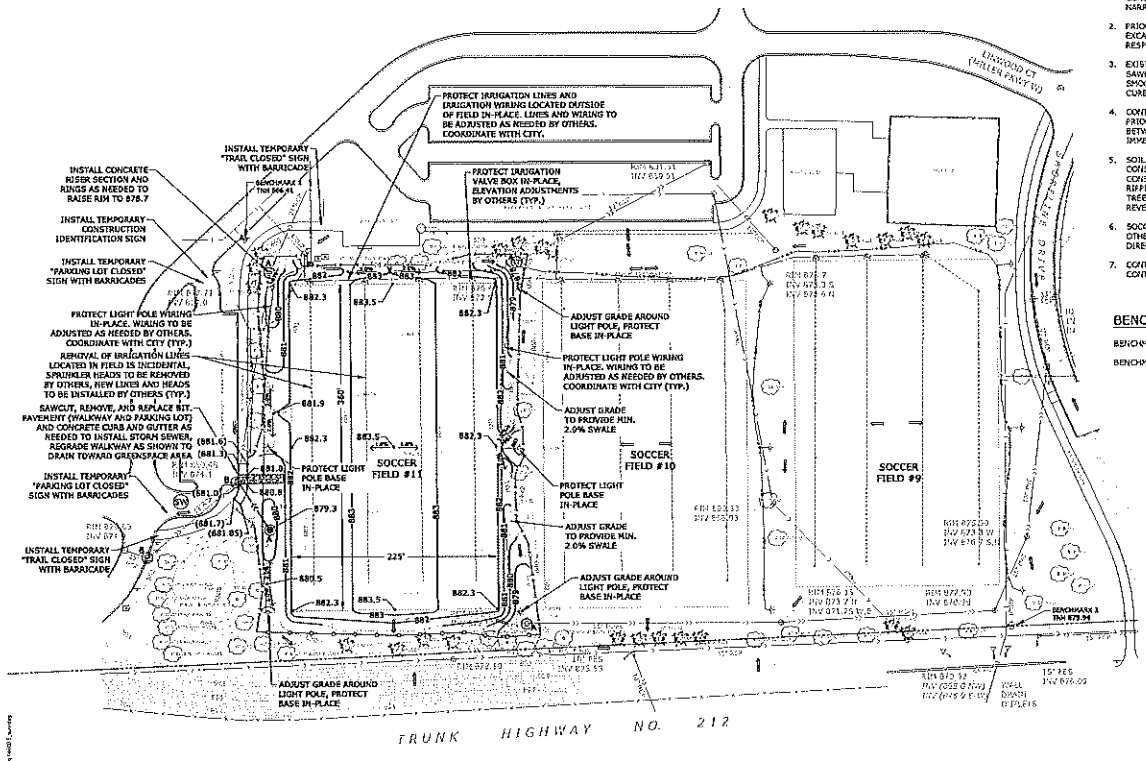


Feet

0 1,000

Permit Location Map

SOCCER FIELD 11 AT
MILLER PARK
Permit 2018-013
Riley Purgatory Bluff Creek
Watershed District



NOTES

1. EROSION CONTROL SHALL BE INSTALLED PRIOR TO COMMENCING CONSTRUCTION AND MAINTAINED THROUGHOUT CONSTRUCTION. SEE SWPPP NARRATIVE SHEETS FOR ADDITIONAL INFORMATION.
2. PRIOR TO EXCAVATION, SEVER TREE ROOTS AS NEEDED WITHIN THE EXCAVATION AREA WITH AN APPROVED ROOT CUTTER. CONTRACTOR SHALL BE RESPONSIBLE FOR TREE PRUNING AS NEEDED.
3. EXISTING PAVEMENT AND CURB SHALL BE PRESERVED WHEREVER POSSIBLE. SAWCUT (NO JACKHAMMERING) ALONG EXISTING PAVEMENT TO CREATE SMOOTH TRANSITIONS BETWEEN EXISTING AND NEW PAVEMENT. CONCRETE CURB SHALL BE REMOVED TO NEAREST EXISTING JOINT.
4. CONTRACTOR SHALL FIELD VERIFY EXISTING ELEVATIONS AND TOPOGRAPHY PRIOR TO COMMENCING GRADING OPERATIONS. IF DISCREPANCIES OCCUR BETWEEN PLAN AND ACTUAL SITE CONDITIONS, NOTIFY ENGINEER IMMEDIATELY.
5. SOIL SURFACES OUTSIDE OF THE SOCCER FIELD AREA 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 WHILE TAKING CARE TO AVOID UTILITIES, TREE ROOTS, AND OTHER EXISTING VEGETATION PRIOR TO FINAL REVEGETATION OR OTHER STABILIZATION.
6. SOCCER FIELD WILL BE SEEDED BY OTHERS. CONTRACTOR SHALL RESTORE ALL OTHER DISTURBED GREENSPACE AREAS WITH SOD AND MIN. 6" TOPSOIL OR AS DIRECTED BY THE ENGINEER.
7. CONTRACTOR SHALL REMOVE ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES UPON FINAL STABILIZATION.

BENCHMARK

BENCHMARK 1: TNH (TOP NUT OF HYDRANT), ELEVATION = 866.41 (NAVD88)

BENCHMARK 2: TNH (TOP NUT OF HYDRANT), ELEVATION = 879.94 (NAVD88)

LEGEND

- TREE PROTECTION FENCE
- SILT FENCE
- SEDIMENT CONTROL INLET - TYPE A OR B
- ROCK CONSTRUCTION ENTRANCE
- STREET SWEEPING (AS REQUIRED OR AS DIRECTED BY ENGINEER)
- 900 — CONTOUR LINE
- E80.3 — SPOT ELEVATION
- (880.3) — SPOT ELEVATION - MATCH EXISTING
- SLOPE GRADE
- DRAINAGE FLOW
- CATCH BASIN
- STORM SEWER
- SOD
- BITUMINOUS WALKWAY

Scale in feet: 0, 50, 100, 150

Engineering · Surveying · Landscape Architecture
HANSEN THORP PELLINEN OLSON, Inc.

PROJECT NO.	14-009.5
DRAWN BY	AMP
DESIGN BY	AMP
CHECKED BY	AKC

DATE	ISSUES / REVISIONS
02-16-18	BID SET

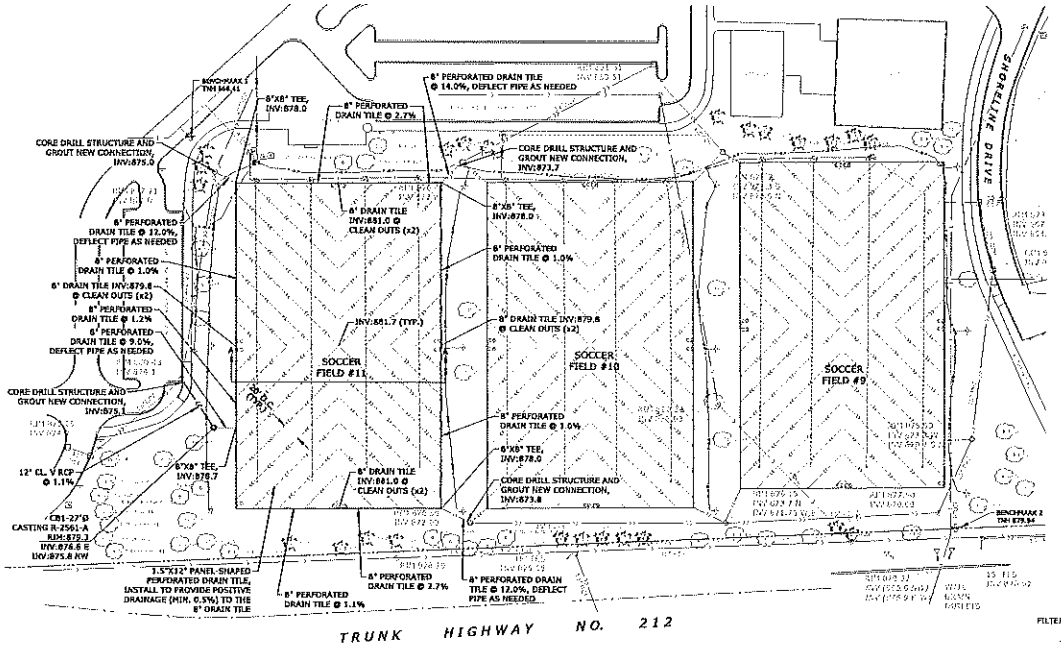
I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
Adam K. Fabeck
ADAM FABECK
LIC. NO. 43330 DATE: 02-16-18

STATE AID PROJECT NO.	
STATE PROJECT NO.	
COUNTY PROJECT NO.	
CITY PROJECT NO.	
CLIENT PROJECT NO.	

REMOVALS, GRADING, EROSION AND SEDIMENT CONTROL, AND TURF ESTABLISHMENT PLAN

RECONSTRUCTION OF SOCCER FIELD #11 AT MILLER PARK
EDEN PRAIRIE, MN

SHEET 5 OF 7 SHEETS



NOTES

1. CONTRACTOR SHALL FIELD VERIFY ELEVATIONS AT THE PROPOSED DRAIN TILE CONNECTIONS AT THE EXISTING CATCH BASINS PRIOR TO COMMENCING CONSTRUCTION. IF DISCREPANCIES OCCUR BETWEEN PLAN AND ACTUAL SITE CONDITIONS, NOTIFY ENGINEER IMMEDIATELY.
2. SEE GRADING PLAN FOR SITE RESTORATION INFORMATION.

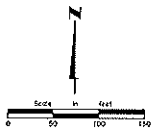
LEGEND

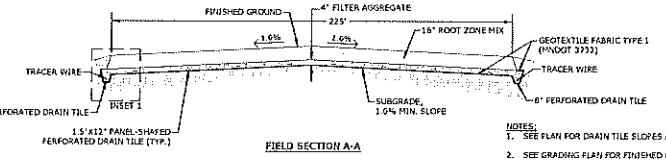
- CATCH BASIN (CB)
- CLEAN OUT
- STORM SEWER
- 1.5"X12" PANEL-SHAPED DRAIN TILE
- 8" DRAIN TILE
- ROOT ZONE AREA

BENCHMARK

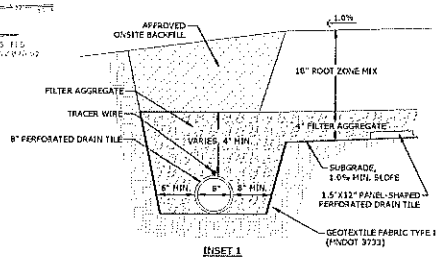
BENCHMARK 1: TNH (TOP NUT OF HYDRANT), ELEVATION = 666.41 (NAVD88)

BENCHMARK 2: TNH (TOP NUT OF HYDRANT), ELEVATION = 879.94 (NAVD88)





FIELD SECTION A-A



INSET 1

NOTES:
1. SEE PLAN FOR DRAIN TILE SLOPES AND INVERTS.
2. SEE GRADING PLAN FOR FINISHED GROUND ELEVATIONS.
3. SEE SPECS FOR RDOT ZONE MIX, FILTER AGGREGATE, AND DRAIN TILE INFORMATION.
4. PANEL-SHAPED DRAIN TILE IS NOT REQUIRED TO BE DIRECTLY CONNECTED TO 6" DRAIN TILE.

HT PO Engineering · Surveying Landscape Architecture
Hansen Thorp Pellinen Olson, Inc.

PROJECT NO.	14-089.5
DRAWN BY	AMP
DESIGN BY	AMP
CHECKED BY	AKC

DATE	ISSUES / REVISIONS
02-16-18	BID SET

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.
Adam Kowalski
ADAM KOWALSKI
LIC. NO. 43930 DATE: 02-16-18

STATE AID PROJECT NO.
STATE PROJECT NO.
COUNTY PROJECT NO.
CITY PROJECT NO.
CLIENT PROJECT NO.

SOCCER FIELD RECONSTRUCTION PLAN

RECONSTRUCTION OF SOCCER FIELD #11 AT MILLER PARK
EDEN PRAIRIE, MN

SHEET 6 OF 7 SHEETS

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: 2017-072

Received complete: January 10, 2018

Applicant: O'Reilly Enterprises, LLC, ATTN: Scott Kraus

Consultant: Anderson Engineering, Inc. ATTN: Dylan Gideon

Project: O'Reilly Auto Parts: Eden Prairie – The applicant is proposing to construct a 7,343 square foot commercial building, parking, and appurtenant utilities on an undeveloped 0.84-acre parcel located. In conjunction with the building and parking lot, an underground infiltration system will be constructed to address water quality, quantity and rate control.

Location: 8868 Aztec Drive, Eden Prairie

Reviewer: Terry Jeffery, Permit Coordinator

Rules: Applicable rules checked

	Rule B: Floodplain Management		Rule H: Appropriation of Public Waters
X	Rule C: Erosion and Sediment Control		Rule I: Appropriation of Groundwater
	Rule D: Wetland and Creek Buffers	X	Rule J: Stormwater Management
	Rule E: Dredging and Sediment Removal		Rule K: Variances and Exceptions
	Rule F: Shoreline/Streambank Stabilization	X	Rule L: Permit Fees
	Rule G: Waterbody Crossings	X	Rule M: Financial Assurances

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	$1,500 was received on October 20, 2017
M	**Financial Assurance**		See Comment	The financial assurance has been calculated at $148,526.

Project Description

The project proposes new development: construction of a single, 7,343 square foot commercial building, along with appurtenant site work, utilities, stormwater management facilities, and landscaping.

An underground Stormtech™ detention facility, a filtration swale, a sump manhole, and a CDS Unit dynamic separator are proposed to provide stormwater quantity, quality, and rate control as well as pre-treatment.

The project site information is summarized below:

1. Total Site Area: 0.84 acres
2. Existing Site Impervious Area: 0.0 acres (0 square feet)
3. Post Construction Site Impervious: 0.61 acre (25,672 square feet)
4. New (Increase) in Site Impervious Area: 0.61 acres (25,672 square feet) (100% increase in site impervious area)
5. Total Disturbed Area: 0.84 acres (116,904 square feet)

Exhibits:

1. Permit Application from O'Reilly Auto Enterprises, LLC dated October 20, 2017[1]
2. Review comments to applicant stating the application is incomplete and the reasons for the determination dated October 27, 2107.
3. Design Plan Sheets T1, C1-C6, L1, SV1, US1 (9 Plan Sheets) dated June 14, 2017 (revised February 2, 2018)
4. Stormwater Management Plan dated December, 2017 (revised February 6, 2018)
5. MIDS Model – Existing Conditions dated December 14, 2017 (revised January 16, 2018)
6. MIDS Model – Proposed Conditions dated December 14, 2017 (revised January 16, 2018)
7. Existing & Proposed Conditions Hydraflow Model dated December 13, 2017 (revised February 6, 2018)
8. Geotechnical Evaluation Report by Terracon Consultants, Inc dated July 28, 2014
9. Memorandum responding to District comments dated January 8, 2018

[1] The original submittal was found to be incomplete. The applicant was notified on October 27, 2017. Updated submittal was received on January 10, 2018 and was noticed as complete at that time. Additional information was requested and received on January 16, 2018. Given the proximity to the February 7, 2018 meeting the item was scheduled for the March meeting.

Rule Specific Permit Conditions

Rule C: Erosion and Sediment Control

Because the project will alter 0.84 acres (36,590 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 Anderson Engineering includes installation of perimeter control where applicable, inlet protection for storm sewer catch basins, a rock construction entrance, placement of a minimum of 6 inches of topsoil, decompaction of areas compacted during construction, and retention of native topsoil onsite. The contractor to be responsible for erosion control at the site needs to be determined. 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 result in 0.84 acre (36,590 square feet) of land disturbing activities, the project must meet the criteria of RPBCWD's Stormwater Management rule (Rule J, Subsection 2.1) The developer is proposing an underground stormwater best management practice, and a CDS Dynamic separator to meet RPBCWD stormwater management requirements for all impervious area to be constructed for the project. A sump manhole and a biofiltration swale will be incorporated into the system to provide pretreatment before surface water runoff enters the underground stormwater management facility. These practices will be used to provide the required rate control, volume abstraction and water quality management on the site.

Rate Control

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. Under existing conditions, a small portion of the site discharges south. Under fully developed conditions, this area will be routed through the stormwater BMPs and discharged into the storm sewer system on Aztec Drive with the remainder of the runoff from the site. As such, rates to the south are decreased to 0.0 cfs under all event scenarios. The existing and proposed 2-, 10-, and 100-year frequency discharges from the site, as well as the 10-day snowmelt event are summarized in the following table.

Modeled Discharge Location	2-Year Discharge (cfs)		10-Year Discharge (cfs)		100-Year Discharge (cfs)		10-Day Snowmelt (cfs)	
	Ex	Prop	Ex	Prop	Ex	Prop	Ex	Prop
Aztec Drive	0.62	0.14	1.48	0.84	3.42	3.17	0.10	0.10

The proposed project conforms to RPBCWD Rule J, Subsection 3.1.a

Volume Abstraction

Subsection 3.1.b of Rule J requires the abstraction onsite of 1.1 inches of runoff from all new and disturbed impervious surface on the parcel. An abstraction volume of 2,436 cubic feet is required from the 0.61 acre (26,572 square feet) of new impervious area on the project for volume retention. The developer is proposing an underground infiltration best management practice to meet this requirement. The table below summarizes the volume abstraction on the site.

Required Abstraction Depth (inches)	Required Abstraction Volume (cubic feet)	Provided Abstraction Volume (cubic feet)[2]
1.1	2436	2436

Soil borings performed by Terracon Consultants, Inc show that soils in the project area below the upper layer of topsoil, in the location of the facility, consist primarily of sandy lean clay and silty sand. These soils are in the hydrologic group "D" and "B" respectively. The design engineer is proposing to model with a design assumption of "C" soils. The MN Stormwater Manual indicates an infiltration rate for C soils of 0.2 inches per hour. The design was made assuming this infiltration rate. Groundwater was not observed in a boring to a depth of 865.0 feet which at least 3 feet below the 869.0-foot elevation of the bottom of the proposed underground infiltration facility (Rule J, Subsection 3.1.b.ii).

Paragraph 4.3c of rule J requires a soil boring at the proposed infiltration sites to demonstrate compliance with subsection 3.1.b.ii and confirm the infiltration capacity of the soils by testing at an appropriate density of locations but no less than recommended by the Minnesota Stormwater Manual. Due to the variability of the soils and depth to groundwater, the applicant must submit documentation verifying the soils present, infiltration capacity of the soils, and the groundwater elevation by testing at an appropriate density of locations within the footprint of the infiltration BMP but no less than recommended by the Minnesota Stormwater Manual. This can be accomplished by soil boring, permeability tests, infiltrometer test, potholing or other methods.

[2] The BMP has a total volume of 2,606 cubic feet.

The provided geotechnical report indicates that, although the exploration within the footprint of the BMP indicates no groundwater to an elevation of at least 865 feet, borings B1 and B5 both indicate water at 876 feet – seven (7) feet above the bottom of the proposed feature and further, it appears that silty sand soils encountered may be isolated to areas where the site was prepared for a building pad in the past. The remainder of the site is consistently lean to fat clays with some modifiers. If the soils, groundwater elevation or infiltration capacity are less than anticipated, design modifications to ensure compliance with RPBCWD requirements will need to be submitted for approval.

To confirm conformance to Rule J, Subsection 3.1.b, the following condition must be addressed:

J1. The applicant must submit documentation verifying the soils present, infiltration capacity of the soil, and the groundwater elevation by testing at an appropriate density of locations within the footprint of the BMP but no less than recommended by the Minnesota Stormwater Manual. If the soils, groundwater elevation or infiltration capacity are less than anticipated, design modifications to ensure compliance with RPBCWD requirements will need to be submitted for approval.

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. The developer is proposing a combination of a Stormtech™ underground stormwater infiltration system and a CDS Unit, inline dynamic separator. The plan calls for the use of a filtration swale and a sump manhole for pretreatment. The table below summarized the water quality treatment provided for the site. Based on information reviewed, the proposed project conforms to Rule J, Subsection 3.1.c.

Pollutant of Interest	Regulated Site Loading (lbs/yr)	Required Load Removal (lbs/yr)[1]	Provided Load Reduction (lbs/yr)
Total Suspended Solids (TSS)	213	191.7 (90%)	194.3 (91%)
Total Phosphorus (TP)	1.173	0.704 (60%)	1.069 (91%)

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 and no stormwater management system may be constructed or reconstructed in a manner that brings the low floor elevation of an adjacent structure into noncompliance according to Rule J, Subsection 3.6.

The low floor elevations of the structure and the adjacent stormwater management feature are summarized below.

Location Riparian to Stormwater Facility	Low Floor Elevation of Building (feet)	100-year Event Flood Elevation of Adjacent Stormwater Facility (feet)	Freeboard (feet)	Provided Distance Between Building and Adjacent Stormwater Feature (feet)	Required Separation to Ground water based on Appndx J, Plot 1 (feet)	Provided Separation to Ground water based on Appndx J, Plot 1 (feet)
Proposed Building	877.0	871.3	5.7	NA	NA	NA

The proposed freeboard separation is compliant with Rule J, subsection 3.6.

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.

J2. The provided draft maintenance and inspection plan, upon approval by RPBCWD, must be recorded by the applicant on the deed to the parcel in a form acceptable to the District.

Rule L: Permit Fee:

Fees for the project are:

Rule C & J $1,500

Rule M: Financial Assurance:

Rules C: Silt fence: 450 L.F. x $2.50/L.F. = ... $1,125

Restoration: 0.84 acres x $2,500/acre = ... $2,100

Rules J: Stormtech= $85,640

Rules J: CDS Unit = ... $15,000

Contingency (10%) $10,386

Administration (30%) $34,275

Total Financial Assurance $148,526

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. 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 Rule C and Rule J if the Rule Specific Permit Conditions listed above are met.

Recommendation:

Approval, contingent upon:

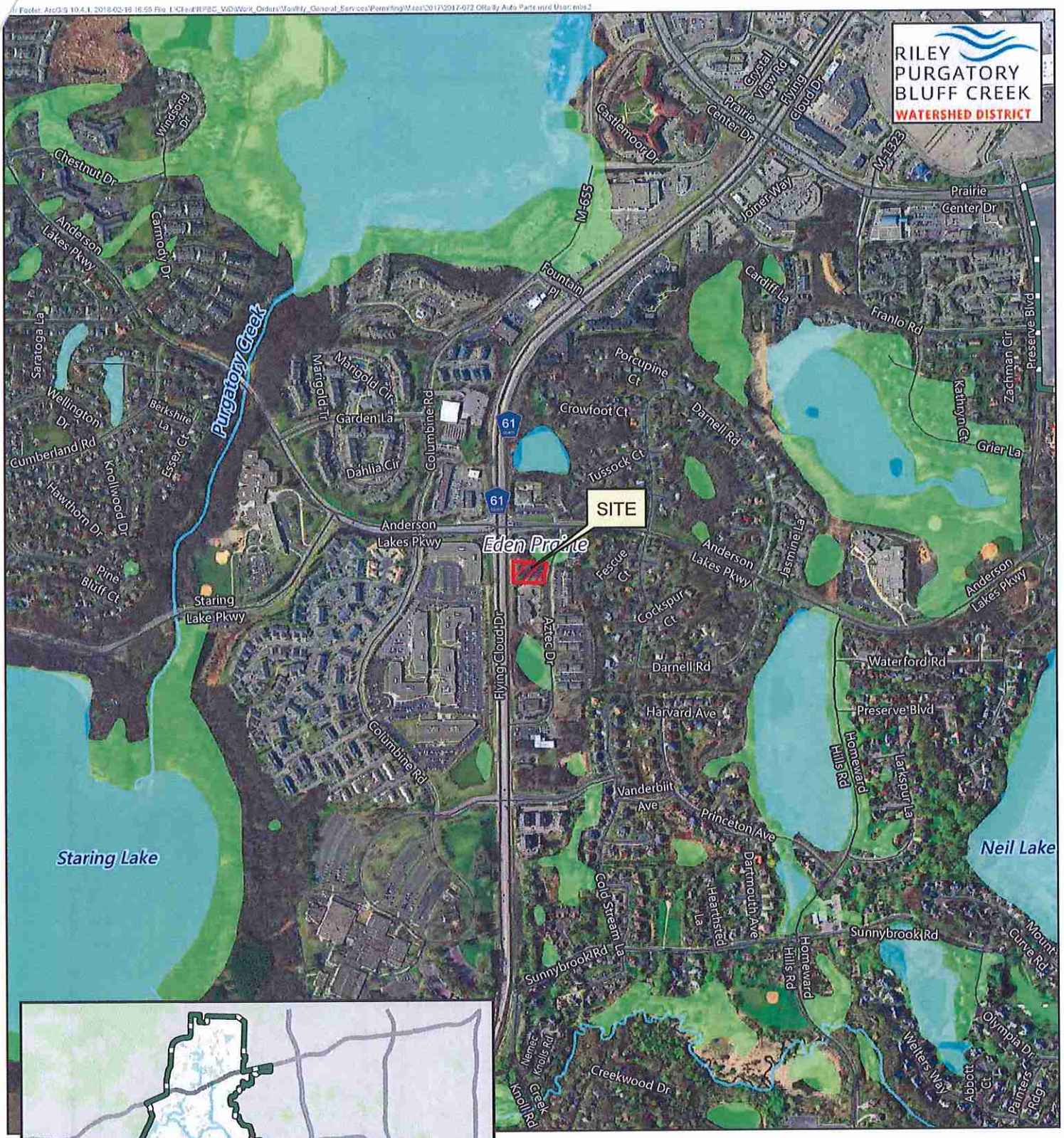
1. Continued compliance with General Requirements.
2. Financial Assurance in the amount of $148,526.
3. Submission of name and contact information of the individual responsible for erosion and sediment control at the site.
4. Submission of documentation verifying the soils present, infiltration capacity of the soil, and the groundwater elevation by testing at an appropriate density of locations within the footprint of the BMP but no less than recommended by the Minnesota Stormwater Manual. If the soils, groundwater elevation or infiltration capacity are less than anticipated, design modifications to ensure compliance with RPBCWD requirements will need to be submitted for approval.
5. Receipt in recordation a maintenance declaration agreement for the stormwater management facilities. A draft 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 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. 2017-072 with the conditions recommended by staff.



Permit Location Map

O'REILLY AUTO PARTS,
EDEN PRAIRIE
Permit 2017-072
Riley Purgatory Bluff Creek
Watershed District

EROSION CONTROL & MAINTENANCE PLAN NOTES:

1. RETAIN FLOATABLE WIND BLOWN MATERIALS ON SITE BY STORING ALL TRASH AND BUILDING MATERIAL WASTE IN ENCLOSURES UNTIL PROPER DISPOSAL AT OFF-SITE FACILITIES. CHECK ADJACENT AREAS DAILY AND PICK UP CONSTRUCTION WASTE MATERIALS AND DEBRIS THAT HAVE BLOWN OR WASHED OFF SITE.
2. PERMANENTLY STABILIZE ALL SURFACE AREA WITHIN AND ADJACENT TO THIS SITE THAT IS DISTURBED BY VEHICLES, GRADING AND OTHER CONSTRUCTION FOR THE PROPOSED FACILITY. STABILIZATION IS OBTAINED WHEN THE DISTURBED SURFACE IS COVERED WITH STRUCTURES, PAVING AND OR PERENNIAL VEGETATION HAVING A UNIFORM COVERAGE DENSITY OF AT LEAST 70%. STABILIZATION OF ALL DISTURBED AREA IS REQUIRED BEFORE TERMINATING MAINTENANCE AND REMOVAL OF EROSION CONTROL MEASURES.
3. CONTRACTORS SHALL INSPECT POLLUTION CONTROL MEASURES AT LEAST ONCE EVERY 14 DAYS AND WITHIN 24 HOURS AFTER A STORM EVENT OF 1/2 INCH OR GREATER. DAMAGED MEASURES THAT PROVE TO BE INEFFECTIVE SHALL BE REPLACED WITH MORE EFFECTIVE MEASURES OR ADDITIONAL MEASURES WITHIN SEVEN DAYS. REPEATED FAILURE OF A CONTROL MEASURE REQUIRES INSTALLATION OF A MORE SUITABLE DEVICE TO PREVENT DISCHARGE OF POLLUTANTS FROM THE CONSTRUCTION SITE.
4. INSTALLATION OF ADDITIONAL EROSION CONTROL MEASURES MAY BE REQUIRED BY THE CITY OR STATE. CONTRACTOR TO VERIFY REQUIREMENTS PRIOR TO BEGINNING ANY WORK ON PROJECT SITE.
5. CARE SHALL BE TAKEN TO MINIMIZE THE ENCROACHMENT OF SEDIMENT INTO ALL STORM DRAIN APPURTENANCES, PUBLIC STREETS, AND ONTO PRIVATE PROPERTY UNTIL IMPERVIOUS MATERIAL (ROAD/PARKING AREA SURFACE) IS APPLIED OR UNTIL PROPOSED LANDSCAPE HAS BEEN ESTABLISHED.
6. REFER TO 10/C3 FOR SILT FENCE CONSTRUCTION.
7. ALL GRASS SLOPES WHICH EXCEED 3:1 (H:V) SHALL UTILIZE CONTECH CONSTRUCTION PRODUCTS PERMANENT TURF REINFORCEMENT MATS C35 OR APPROVED EQUAL. MATS SHALL BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS AND STANDARDS. CONTRACTOR SHALL COORDINATE INSTALLATION INSPECTION WITH MANUFACTURER.

GENERAL NOTES:

A. REFER TO PROJECT MANUAL FOR ADDITIONAL REQUIREMENTS.

B. SITE CONDITIONS BASED UPON SURVEY SUBMITTED BY OWNER. FIELD VERIFY EXISTING CONDITIONS BY DETAILED SITE INSPECTION PRIOR TO SUBMITTING BID AND BEGINNING CONSTRUCTION.

C. FIELD VERIFY SANITARY SEWER SERVICE CONNECTION INVERT PRIOR TO ESTABLISHING FINAL FINISH FLOOR ELEVATION.

D. COORDINATE WORK WITH OTHER SITE RELATED DEVELOPMENT DRAWINGS.

E. PARKING LOT GRADES ADJACENT TO SERVICE DOOR AND EGRESS DOOR LANDINGS SHALL BE FLUSH WITH THESE CONCRETE LANDINGS OUTSIDE OF BUILDING.

SPECIAL NOTE:
FIELD VERIFY SANITARY SEWER CONNECTION INVERT PRIOR TO ESTABLISHING FINAL FINISH FLOOR ELEVATION. REFER TO SITE UTILITIES PLAN.

CONTRACTOR SHALL FIELD VERIFY PROPOSED GRADES MATCH EXISTING PAVEMENT AT DRIVEWAY ENTRANCES. CONTRACTOR SHALL NOTIFY ENGINEER IF DISCREPANCY OCCURS.

AS BUILT REQUIREMENTS

AS BUILTS DRAWINGS DEMONSTRATING THAT AT THE TIME OF FINAL STABILIZATION, STORMWATER FACILITIES CONFORM TO DESIGN SPECIFICATION APPROVED BY THE DISTRICT.

SITE EXCAVATION REQUIREMENTS:

1. A GEOTECHNICAL ANALYSIS HAS BEEN PERFORMED ON THIS SITE. REFER TO PROJECT MANUAL.
2. FOLLOW GEOTECHNICAL ANALYSIS RECOMMENDATION FOR SITE EXCAVATION.
3. REFER TO STRUCTURAL DRAWINGS FOR BUILDING EXCAVATION REQUIREMENTS.

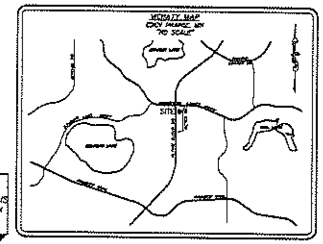
STORM WATER RUNOFF SUMMARY:

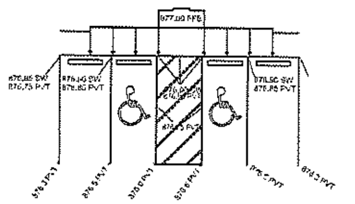
TOTAL PROPERTY AREA= 0.84 ACRES
TOTAL DISTURBED AREA = 0.84 ACRES < 1.0 ACRES THEREFORE NOI IS NOT REQUIRED.
ALL STORMWATER DESIGN TO FOLLOW RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT REGULATIONS. REFER TO STORMWATER REPORT FOR DESIGN

STAGES OF CONSTRUCTION:

1. CONTRACTOR TO PERFORM DETAILED SITE INSPECTION TO LOCATE ALL EXISTING UTILITIES AND VERIFY ANY POSSIBLE CONFLICTS WITH PROPOSED IMPROVEMENTS PRIOR TO BEGINNING ANY CONSTRUCTION. CONTACT OWNER WITH ANY CONFLICTS.
2. INSTALLATION OF CONSTRUCTION ENTRANCE.
3. INSTALLATION OF EROSION CONTROL FENCE.
4. DEMOLITION OF EXISTING SITE IMPROVEMENTS.
5. REMOVAL OF EXISTING PAVEMENT ON THE SITE.
6. INSTALLATION OF ALL STORM WATER DRAINAGE IMPROVEMENTS.
7. ROUGH GRADING.
8. CONSTRUCTION OF NEW SITE IMPROVEMENTS.
9. FINAL GRADING.
10. PLACEMENT OF FINAL LANDSCAPING ITEMS AND SOD.
11. REMOVAL OF EROSION CONTROL FENCE.

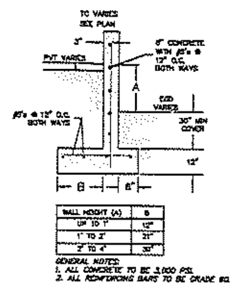
FLOODPLAIN NOTE:
THIS SITE IS INCLUDED ON FLOOD INSURANCE RATE MAP—COMMUNITY PANEL NUMBER 27053C0430E AND IS LOCATED IN FLOOD ZONE X, WHICH IS DEFINED AS AN AREA DETERMINED TO BE OUTSIDE THE 500-YEAR ANNUAL CHANCE FLOODPLAIN.





HANDICAP AREA TO BE ADA COMPLIANT. SLOPES SHALL NOT EXCEED 2.0% IN ANY DIRECTION IN THIS AREA.

2 HANDICAP PARKING DETAIL C1 SCALE: 1" = 10'

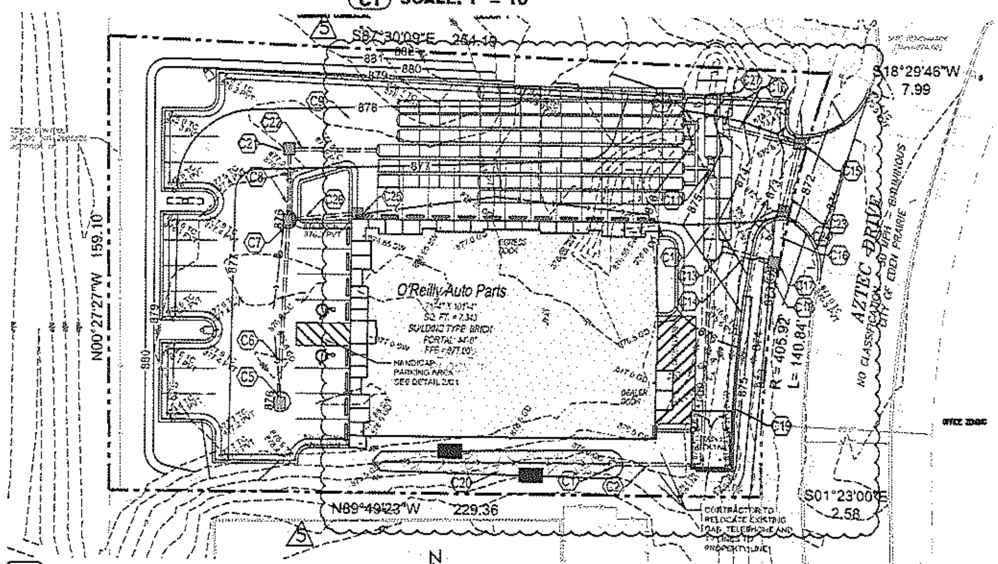


GENERAL NOTES:
1. ALL CONCRETE TO BE 3,000 PSI.
2. ALL REINFORCING BARS TO BE GRADE 60.

3 RETAINING CURB C1 SCALE: NOT TO SCALE

KEY NOTES:

- INSTALL 24" DIAM. NYLOPLAST INLET, RIM = 875.0, INV = 871.0, REFER TO DETAIL 3/C6
- INSTALL 100 LF OF 12" PIPE. CONNECT TO STORMTECH UNITS. REFER TO PIPE NOTES
- INSTALL 24" DIAM. NYLOPLAST INLET, RIM = 876.5, INV = 874.0, REFER TO DETAIL 3/C6
- C4 NOT USED
- INSTALL 4'x4' AREA INLET, RIM = 875.0, INV = 873.4, SUMP=871.4, REFER TO DETAIL 2/C6
- INSTALL 60 LF OF 12" PIPE. REFER TO PIPE NOTES. CONNECT AT AN INVERT OF 872.5' DOWNSTREAM
- INSTALL 4'x4' AREA INLET, RIM = 875.0, INV = 872.0, SUMP=870.0, REFER TO DETAIL 2/C6
- INSTALL 20 LF OF 12" PIPE. REFER TO PIPE NOTES. CONNECT AT AN INVERT OF 865.7' DOWNSTREAM
- INSTALL 121 STORMTECH 740 UNITS. REFER TO SHEET C4 FOR DETAILS. (5)
- INSTALL 31 LF OF 12" PIPE. REFER TO PIPE NOTES. CONNECT AT AN INVERT OF 868.3' DOWNSTREAM
- INSTALL 24" DIAM. NYLOPLAST INLET WITH TRAFFIC RATED TOP, RIM = 874.4, INV = 866.6, REFER TO DETAIL 3/C6
- INSTALL 10 STORMTECH 740 UNITS. REFER TO SHEET C4 FOR DETAILS. (5)
- INSTALL 24" DIAM. NYLOPLAST INLET WITH TRAFFIC RATED TOP, RIM = 874.4, INV = 867.6, REFER TO DETAIL 3/C6
- INSTALL 24 LF OF 15" PIPE. REFER TO PIPE NOTES. CONNECT AT AN INVERT OF 866.0' DOWNSTREAM
- INSTALL 4'x4' AREA INLET, RIM = 872.8, INV (PIPE) = 870.5, SUMP=867.5, REFER TO DETAIL 2/C6
- INSTALL 15 LF OF 12" PIPE. REFER TO PIPE NOTES. CONNECT AT AN INVERT OF 868.5' DOWNSTREAM
- INSTALL 5'x5' DETENTION OUTLET STRUCTURE, RIM = 873.0, INV = 866.0, REFER TO DETAIL 5/C6
- INSTALL OFFLINE CDS/SNOUT OR EQUIVALENT. DESIGN PER CDS REQUIREMENTS. CONTRACTOR TO SUBMIT TO CDS FOR FINAL DESIGN.
- INSTALL 40 LF OF RETAINING WALL. REFER TO DETAIL 3/C1
- INSTALL 720 SQ FEET OF RIDGSWALE. REFER TO DETAIL 6/C6 FOR DEPTH (5)
- INSTALL 4'x4' AREA INLET, RIM = 877.0, INV = 875.7, SUMP=877.7, REFER TO DETAIL 2/C6
- INSTALL 28 LF OF 12" PIPE. REFER TO PIPE NOTES. CONNECT AT AN INVERT OF 872.5' DOWNSTREAM
- INSTALL 23 LF OF 12" PIPE. REFER TO PIPE NOTES
- INSTALL 4'x4' AREA INLET, RIM = 872.6, INV (PIPE) = 870.0, SUMP=868.0, REFER TO DETAIL 2/C6
- INSTALL 4'x4' AREA INLET, RIM = 876.3, INV = 873.8, SUMP=871.8, REFER TO DETAIL 2/C6
- INSTALL 20 LF OF 12" PIPE. REFER TO PIPE NOTES. CONNECT AT AN INVERT OF 872.5' DOWNSTREAM
- INSTALL 24" DIAM. NYLOPLAST INLET WITH TRAFFIC RATED TOP, RIM = 874.2, INV = 867.0, REFER TO DETAIL 3/C6



1 SITE GRADING PLAN C1 SCALE: 1" = 20'

GRAPHIC SCALE – FEET

SYMBOLS LEGEND

REFER TO SURVEY (SV1) FOR EXISTING CONDITION SYMBOLS LEGEND AND SITE CONTROL.

Symbol	Description
— — 877 — —	EXISTING GRADE LINES
——— 877 ———	PROPOSED NEW GRADE LINES
(dotted box)	NEW BUILDING CONSTRUCTION
(box with circle)	NEW POLE SIGN LOCATION
(bar)	NEW CONCRETE PAVING BLOCK
——○——	TEMPORARY EROSION CONTROL FENCE
——›——	SURFACE FLOW ARROW

SPOT ELEVATIONS: ~877.0 PVT

LIST	ABBREVIATION
GRADE	NONE
SIDEWALK	SW
TOP OF WALL	TW
TOP OF CURB	TC
TOP OF PAVEMENT	PVT
NEW GRADE	GD
CONCRETE	CONC
EXISTING TOP OF CURB	ETC
EXISTING GRADE	EGD
EXISTING PAVEMENT	EPVT
EXISTING SIDEWALK	ESW
FLOW LINE	FL
TOP OF BERM	TOP

TEMPORARY BENCHMARK:
TOP NUT OF HYDRANT – EAST SIDE OF AZTEC DRIVE, ACROSS FROM THE NE CORNER OF THE SUBJECT PROPERTY. ELEVATION=874.08 (NAVD 88 DATUM)

MO ANDERSON ENGINEERING, INC
ENGINEERS • SURVEYORS • LABORATORIES • DRILLING

PROJ # 10166-14 | BY: DJG | CKD: PJE | REVISIONS
DRAWING # WB-110-176

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FAX: 417-882-1188

SEAL:

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 ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PAUL J. ENGEL, ENGINEER

SIGNATURE: [signature]

DATE ISSUED: 1-05-18

REG. NO. 44545

O'Reilly AUTO PARTS
8868 AZTEC DRIVE
EDEN PRAIRIE, MN

SHEET TITLE:
SITE GRADING PLAN

REVISIONS:

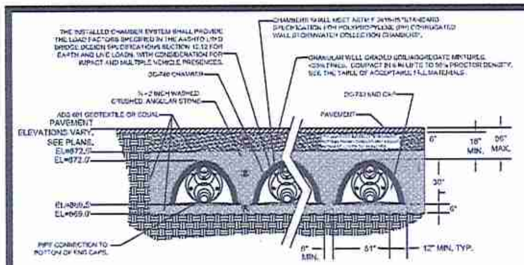
NO.	DATE:	BY:
1	8-23-17	CITY
4	1-05-18	WATERSHED
5	2-02-18	WATERSHED

PROJECT NO: 14145.008

DRAWN BY: DJG

C1

SHEET 1 OF 8



THE INSTALLED CHAMBER SYSTEM SHALL PROVIDE THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS SECTION 12.12 FOR EARTH AND LIVE LOADS, WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
SC-740 CHAMBER
3/4-2 INCH WASHED CRUSHED ANGULAR STONE
ADS 6H GEOTEXTILE OR EQUAL
PAVEMENT
ELEVATIONS VARY, SEE PLANS.
EL=872.0
EL=872.0
EL=869.0
EL=869.0
PIPE CONNECTION TO BOTTOM OF END CAPS.
SC-740 END CAP
6"
18" MIN.
96" MAX.
30"
6"
6" MIN.
51"
12" MIN. TYP.

THIS CROSS SECTION DETAILS THE REQUIREMENTS NECESSARY TO SATISFY THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS SECTION 12.12 FOR EARTH AND LIVE LOADS USING STORMTECH CHAMBERS

FOR STORMTECH INFORMATION CALL 1-888-892-2694

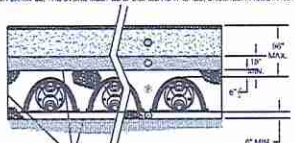
*SEE STORMTECH DESIGN MANUAL

(ST 1.0) SC-740 TYPICAL CROSS SECTION

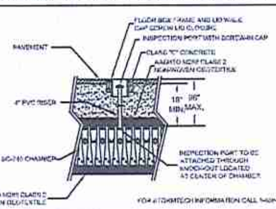
ACCEPTABLE FILL MATERIALS
STORMTECH SC-310 AND SC-740 CHAMBER SYSTEMS

MATERIAL LOCATION	DESCRIPTION	AASHTO M43 DESIGNATION	AASHTO M145 DESIGNATION	COMPACTION/DENSITY REQUIREMENT
(D) FILL MATERIAL FROM 18" TO GRADE ABOVE CHAMBERS	ANY SOIL/ROCK MATERIALS, NATIVE SOILS OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	N/A	PREPARE PER ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
(C) FILL MATERIAL FOR 6" TO 18" ELEVATION ABOVE CHAMBERS (24" FOR UNPAVED INSTALLATIONS)	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES.	[illegible]	A-1 A-2 A-3	COMPACT IN 6" LIFTS TO A MINIMUM 95% STANDARD PROCTOR DENSITY. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED [illegible] DYNAMIC FORCE NOT TO EXCEED [illegible]
(B) EMBEDMENT STONE SURROUNDING AND TO A 6" ELEVATION ABOVE CHAMBERS	WASHED ANGULAR STONE WITH THE MAJORITY OF PARTICLES BETWEEN 3/4-2 INCH	3, 357, 4, 467, 5, 56, 57	N/A	NO COMPACTION REQUIRED
(A) FOUNDATION STONE BELOW CHAMBERS	WASHED ANGULAR STONE WITH THE MAJORITY OF PARTICLES BETWEEN 3/4-2 INCH	3, 357, 4, 467, 5, 56, 57	N/A	PLATE COMPACT OR ROLL TO ACHIEVE A 95% STANDARD PROCTOR DENSITY

PLEASE NOTE: THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE WASHED CRUSHED ANGULAR. FOR EXAMPLE, THE STONE MUST BE SPECIFIED AS WASHED, CRUSHED, ANGULAR NO. 4 STONE.

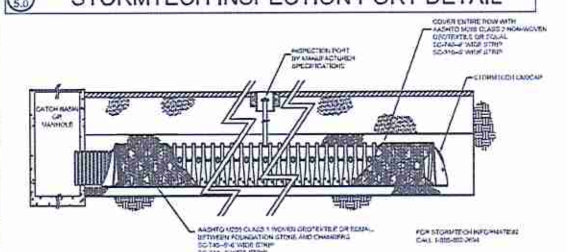


(ST 3.0) STORMTECH ACCEPTABLE FILL MATERIALS



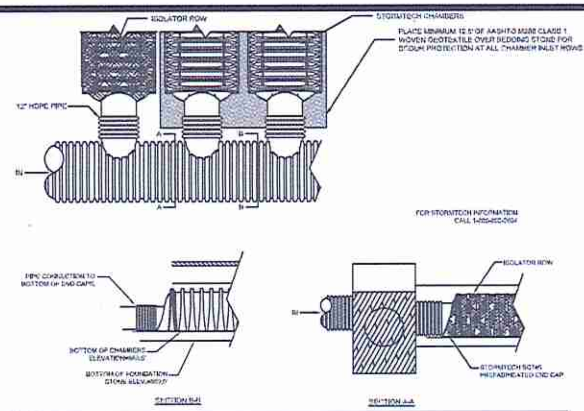
FOR STORMTECH INFORMATION CALL 1-888-892-2694

(ST 5.0) STORMTECH INSPECTION PORT DETAIL



COVER ENTIRE ROW WITH AASHTO M288 CLASS 2 NONWOVEN GEOTEXTILE OR EQUAL
INSPECTION PORT
STORMTECH ENDCAP
CATCH BASIN OR MANHOLE
AASHTO M288 CLASS 1 WOVEN GEOTEXTILE OR EQUAL BETWEEN FOUNDATION STONE AND CHAMBERS
FOR STORMTECH INFORMATION CALL 1-888-892-2694

(ST 6.0) STORMTECH ISOLATOR™ ROW DETAIL



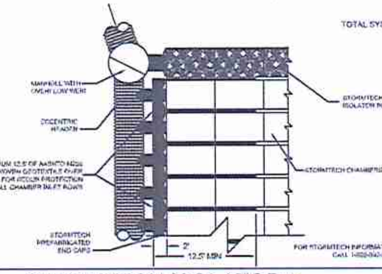
ISOLATOR ROW
STORMTECH CHAMBERS
PLACE MINIMUM 12.5' OF AASHTO M288 CLASS 1 WOVEN GEOTEXTILE OVER BEDDING STONE FOR SCOUR PROTECTION AT ALL CHAMBER INLET ROWS
12" HDPE PIPE
IN
A
B
PIPE CONNECTION TO BOTTOM OF END CAPS.
BOTTOM OF CHAMBER ELEVATIONS
BOTTOM OF FOUNDATION STONE ELEVATION
SECTION B-B
SECTION A-A
ISOLATOR ROW
STORMTECH SC740 PREFABRICATED END CAP
FOR STORMTECH INFORMATION CALL 1-888-892-2694

(ST 8.0) STORMTECH ELEVATIONS

NOTES:
1. ALL DESIGN SPECIFICATIONS FOR STORMTECH CHAMBERS SHALL BE IN ACCORDANCE WITH THE STORMTECH DESIGN MANUAL.
2. THE INSTALLATION OF STORMTECH CHAMBERS SHALL BE IN ACCORDANCE WITH THE LATEST STORMTECH INSTALLATION INSTRUCTIONS.
3. THE CONTRACTOR IS ADVISED TO REVIEW AND UNDERSTAND THE INSTALLATION INSTRUCTIONS PRIOR TO BEGINNING SYSTEM INSTALLATION. CALL 1-888-892-2694 OR VISIT WWW.STORMTECH.COM TO RECEIVE A COPY OF THE LATEST STORMTECH INSTALLATION INSTRUCTIONS.
4. CHAMBERS SHALL MEET THE DESIGN REQUIREMENTS AND LOAD FACTORS SPECIFIED IN SECTION 12.12 OF THE LATEST EDITION OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS LOADS SHALL BE CALCULATED IN ACCORDANCE WITH SECTION 3 AND SHALL INCLUDE H20 DESIGN TRUCK, IMPACT FACTOR, MULTIPLE PRESENCE, AND LANE LOAD.

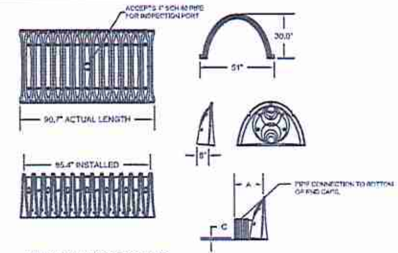
STORMTECH GENERAL NOTES

1. STORMTECH LLC ("STORMTECH") REQUIRES INSTALLING CONTRACTORS TO USE AND UNDERSTAND STORMTECH'S LATEST INSTALLATION INSTRUCTIONS PRIOR TO BEGINNING SYSTEM INSTALLATION.
2. OUR TECHNICAL SERVICES DEPARTMENT OFFERS INSTALLATION CONSULTATIONS TO INSTALLING CONTRACTORS. CONTACT OUR TECHNICAL SERVICES REPRESENTATIVE AT LEAST 30 DAYS PRIOR TO SYSTEM INSTALLATION TO ARRANGE A PRE-INSTALLATION CONSULTATION. OUR REPRESENTATIVES CAN THEN ANSWER QUESTIONS OR ADDRESS COMMENTS ON THE STORMTECH CHAMBER SYSTEM AND INFORM THE INSTALLING CONTRACTOR OF THE MINIMUM INSTALLATION REQUIREMENTS BEFORE BEGINNING THE SYSTEM'S CONSTRUCTION. CALL 1-888-892-2694 TO SPEAK TO A TECHNICAL SERVICE REPRESENTATIVE OR VISIT WWW.STORMTECH.COM TO RECEIVE A COPY OF OUR INSTALLATION INSTRUCTIONS.
3. STORMTECH'S REQUIREMENTS FOR SYSTEMS WITH PAVEMENT DESIGN (ASPHALT, CONCRETE PAVERS, ETC.): MINIMUM COVER IS 18 INCHES NOT INCLUDING PAVEMENT; MAXIMUM COVER IS 96 INCHES INCLUDING PAVEMENT. FOR INSTALLATIONS THAT DO NOT INCLUDE PAVEMENT, WHERE RUTTING FROM VEHICLES MAY OCCUR, MINIMUM REQUIRED COVER IS 24 INCHES, MAXIMUM COVER IS 96 INCHES.
4. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE DESIGN ENGINEER.
5. AASHTO M288 CLASS 2 NONWOVEN GEOTEXTILE (FILTER FABRIC) MUST BE USED AS INDICATED IN THE PROJECT PLANS.
6. STONE PLACEMENT BETWEEN CHAMBERS ROWS AND AROUND PERIMETER MUST FOLLOW INSTRUCTIONS AS INDICATED IN THE MOST CURRENT VERSION OF STORMTECH'S INSTALLATION INSTRUCTIONS.
7. BACKFILLING OVER THE CHAMBERS MUST FOLLOW REQUIREMENTS AS INDICATED IN THE MOST CURRENT VERSION OF STORMTECH'S INSTALLATION INSTRUCTIONS.
8. THE CONTRACTOR MUST REFER TO STORMTECH'S INSTALLATION INSTRUCTIONS FOR A TABLE OF ACCEPTABLE VEHICLE LOADS AT VARIOUS DEPTHS OF COVER. THIS INFORMATION IS ALSO AVAILABLE AT STORMTECH'S WEBSITE: WWW.STORMTECH.COM. THE CONTRACTOR IS RESPONSIBLE FOR PREVENTING VEHICLES THAT EXCEED STORMTECH'S REQUIREMENTS FROM TRAVELING ACROSS OR PARKING OVER THE STORMWATER SYSTEM. TEMPORARY FENCING, WARNING TAPE AND APPROPRIATELY LOCATED SIGNS ARE COMMONLY USED TO PREVENT UNAUTHORIZED VEHICLES FROM ENTERING SENSITIVE CONSTRUCTION AREAS.
9. THE CONTRACTOR MUST APPLY EROSION AND SEDIMENT CONTROL MEASURES TO PROTECT THE STORMWATER SYSTEM DURING ALL PHASES OF SITE CONSTRUCTION PER LOCAL CODES AND DESIGN ENGINEER'S SPECIFICATIONS.
10. STORMTECH PRODUCT WARRANTY IS LIMITED. SEE CURRENT PRODUCT WARRANTY FOR DETAILS. TO ACQUIRE A COPY CALL STORMTECH AT 1-888-892-2694 OR VISIT WWW.STORMTECH.COM.



MANIFOLD WITH OVERFLOW RISER
ECCENTRIC HEADER
12.5' MINIMUM 12.5' OF AASHTO M288 CLASS 1 WOVEN GEOTEXTILE OVER BEDDING STONE FOR SCOUR PROTECTION AT ALL CHAMBER INLET ROWS
STORMTECH ISOLATOR ROW
STORMTECH CHAMBERS
STORMTECH PREFABRICATED END CAPS
2'
12.5' MIN
FOR STORMTECH INFORMATION CALL 1-888-892-2694

(ST 7.0) STORMTECH ISOLATOR™ ROW MANIFOLD DETAIL



NOMINAL CHAMBER SPECIFICATIONS

STORMWATER CHAMBER SPECIFICATIONS

1. Chambers shall be StormTech SC-740 or approved equal.
5. Chambers shall be produced at an ISO 9001 certified manufacturing facility.
6. All design specifications for chambers shall be in accordance with the manufacturer's latest design manual.
7. The installation of chambers shall be in accordance with the manufacturer's latest installation instructions.

(ST 9.0) TECHNICAL DETAILS

STORMTECH PRODUCT SPECIFICATIONS

1.0 GENERAL
1.1 STORMTECH CHAMBERS ARE DESIGNED TO CONTROL STORMWATER RUNOFF. AS A SUBSURFACE RETENTION SYSTEM, STORMTECH CHAMBERS RETAIN AND ALLOW EFFECTIVE INFILTRATION OF WATER INTO THE SOIL. AS A SUBSURFACE DETENTION SYSTEM, STORMTECH CHAMBERS DETAIN AND ALLOW FOR THE METERED FLOW OF WATER TO AN OUTFALL.

2.0 CHAMBER PARAMETERS
2.1 THE CHAMBER SHALL BE INJECTION MOLDED OF POLYPROPYLENE RESIN TO BE INHERENTLY RESISTANT TO ENVIRONMENTAL STRESS CRACKING (ESCR), AND TO MAINTAIN ADEQUATE STIFFNESS THROUGH HIGHER TEMPERATURES EXPERIENCED DURING INSTALLATION AND SERVICE.
2.2 THE NOMINAL CHAMBER DIMENSIONS OF THE STORMTECH SC-740 SHALL BE 30.0 INCHES TALL, 51.0 INCHES WIDE AND 90.7 INCHES LONG. THE NOMINAL CHAMBER DIMENSIONS OF THE STORMTECH SC-310 SHALL BE 16.0 INCHES TALL, 34.0 INCHES WIDE AND 90.7 INCHES LONG. THE INSTALLED LENGTH OF A JOINED CHAMBER SHALL BE 85.4 INCHES.
2.3 THE CHAMBER SHALL HAVE A CONTINUOUSLY CURVED SECTION PROFILE.
2.4 THE CHAMBER SHALL BE OPEN-BOTTOMED.
2.5 THE CHAMBER SHALL INCORPORATE AN OVERLAPPING CORRUGATION JOINT SYSTEM TO ALLOW CHAMBER ROWS OF ALMOST ANY LENGTH TO BE CREATED. THE OVERLAPPING CORRUGATION JOINT SYSTEM SHALL BE EFFECTIVE WHILE ALLOWING A CHAMBER TO BE TRIMMED TO SHORTEN ITS OVERALL LENGTH.
2.6 THE NOMINAL STORAGE VOLUME OF A JOINED STORMTECH SC-740 CHAMBER SHALL BE 74.9 CUBIC FEET PER CHAMBER WHEN INSTALLED PER STORMTECH'S TYPICAL DETAILS (INCLUDES THE VOLUME OF CRUSHED ANGULAR STONE WITH AN ASSUMED 40% POROSITY). THIS EQUATES TO 2.2 CUBIC FEET OF STORAGE/SQUARE FOOT OF BED. THE NOMINAL STORAGE VOLUME OF AN INSTALLED STORMTECH SC-310 CHAMBER SHALL BE 31.0 CUBIC FEET PER CHAMBER WHEN INSTALLED PER STORMTECH'S TYPICAL DETAILS (INCLUDES THE VOLUME OF CRUSHED ANGULAR STONE WITH AN ASSUMED 40% POROSITY). THIS EQUATES TO 1.3 CUBIC FEET OF STORAGE/SQUARE FOOT OF BED.
2.7 THE CHAMBER SHALL HAVE FORTY-EIGHT ORIFICES PENETRATING THE SIDEWALLS TO ALLOW FOR LATERAL CONVEYANCE OF WATER.
2.8 THE CHAMBER SHALL HAVE TWO ORIFICES NEAR ITS TOP TO ALLOW FOR EQUALIZATION OF AIR PRESSURE BETWEEN ITS INTERIOR AND EXTERIOR.
2.9 THE CHAMBER SHALL HAVE BOTH OF IT'S ENDS OPEN TO ALLOW FOR UNIMPEDED HYDRAULIC FLOWS AND VISUAL INSPECTIONS DOWN A ROW'S ENTIRE LENGTH.
2.10 THE CHAMBER SHALL HAVE 14 CORRUGATIONS.
2.11 THE CHAMBER SHALL HAVE A CIRCULAR, INDENTED, FLAT SURFACE ON THE TOP OF THE CHAMBER FOR AN OPTIONAL 4-INCH INSPECTION PORT OR CLEANOUT.
2.12 THE CHAMBER SHALL BE ANALYZED AND DESIGNED USING AASHTO METHODS FOR THERMOPLASTIC CULVERTS CONTAINED IN THE LRFD BRIDGE DESIGN SPECIFICATIONS, 2ND EDITION, INCLUDING INTERIM SPECIFICATIONS THROUGH 2001. DESIGN LIVE LOAD SHALL BE THE AASHTO HS20 TRUCK. DESIGN SHALL CONSIDER EARTH AND LIVE LOADS AS APPROPRIATE FOR THE MINIMUM TO MAXIMUM SPECIFIED DEPTH OF FILL.
2.13 THE CHAMBER SHALL BE MANUFACTURED IN AN ISO 9001:2000 CERTIFIED FACILITY.

3.0 END CAP PARAMETERS
3.1 THE END CAP SHALL BE INJECTION MOLDED OF POLYPROPYLENE RESIN TO BE INHERENTLY RESISTANT TO ENVIRONMENTAL STRESS CRACKING, AND TO MAINTAIN ADEQUATE STIFFNESS THROUGH HIGHER TEMPERATURES EXPERIENCED DURING INSTALLATION AND SERVICE.
3.2 THE END CAP SHALL BE DESIGNED TO FIT INTO ANY CORRUGATION OF A CHAMBER, WHICH ALLOWS: CAPPING A CHAMBER THAT HAS ITS LENGTH TRIMMED; SEGMENTING ROWS INTO STORAGE BASINS OF VARIOUS LENGTHS.
3.3 THE END CAP SHALL HAVE SAW GUIDES TO ALLOW EASY CUTTING FOR VARIOUS DIAMETERS OF PIPE THAT MAY BE USED TO INLET THE SYSTEM.
3.4 THE END CAP SHALL HAVE EXCESS STRUCTURAL ADEQUACY TO ALLOW CUTTING AN ORIFICE OF ANY SIZE AT ANY INVERT ELEVATION.
3.5 THE PRIMARY FACE OF AN END CAP SHALL BE CURVED OUTWARD TO RESIST HORIZONTAL LOADS GENERATED NEAR THE EDGES OF BEDS.
3.6 THE END CAP SHALL BE MANUFACTURED IN AN ISO 9001:2000 CERTIFIED FACILITY.

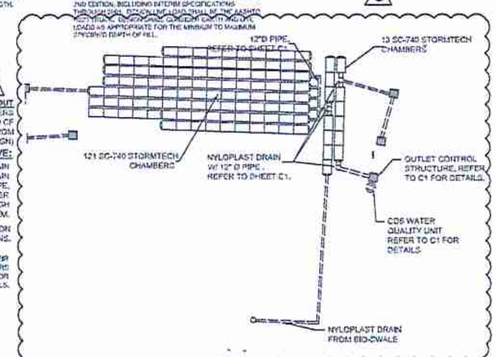
4 PROPOSED LAYOUT
(16) SC-740 END CAPS; (105) SC-740 CHAMBERS
STORAGE PER CHAMBER (6" STONE BASE): 74.9 CF
TOTAL SYSTEM STORAGE (INCLUDES PERIMETER STONE): 8,060 CF (FROM HYDRAFLOW DESIGN)

STORMTECH CHAMBER NARRATIVE:

STORMTECH CHAMBERS ARE DESIGNED TO FULLY CONTAIN THE RUNOFF FROM THE REQUIRED WATER QUALITY RAIN EVENT. CHAMBERS ARE INTENDED TO BE FLAT, NO SLOPE, TO PROMOTE INFILTRATION AND GROUND WATER RECHARGE. LARGER STORM EVENTS PASS THROUGH SYSTEM AND TO EXISTING STORM SYSTEM.

REFER TO STORMWATER REPORT PREPARED BY ANDERSON ENGINEERING FOR DETAILS AND CALCULATIONS.

*NUMBER OF INSPECTION PORTS AND THEIR LOCATIONS TO BE DETERMINED PER MANUFACTURERS RECOMMENDATIONS. CONTACT STORMTECH FOR FURTHER DETAILS.



CHAMBERS SHALL MEET THE DESIGN REQUIREMENTS AND LOAD FACTORS SPECIFIED IN SECTION 12.12 OF THE LATEST EDITION OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS LOADS SHALL BE CALCULATED IN ACCORDANCE WITH SECTION 3 AND SHALL INCLUDE H20 DESIGN TRUCK, IMPACT FACTOR, MULTIPLE PRESENCE, AND LANE LOAD.

(ST 10.0) STORMTECH SC-740 CHAMBER LAYOUT

MO ANDERSON ENGINEERING, INC
ENGINEERS • SURVEYORS • LABORATORIES • DRILLING
PROJ # 10166-14 BY DJG CKD PJE
DRAWING # WB-110-176

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SGC, INC.
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SPRINGFIELD, MO 65807
PHONE: 417-882-2200
FAX: 417-882-1165

SEAL:

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 ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.
PAUL J. ENGEL, ENGINEER
SIGNATURE
DATE ISSUED 1-05-18
REG. NO. 44345

O'Reilly AUTO PARTS
8868 AZTEC DRIVE
EDEN PRAIRIE, MN

SHEET TITLE:
STORMTECH DETAILS

REVISIONS:

NO.	DATE:	BY:
4	8-23-17	CITY
4	1-05-18	WATERSHED
5	2-02-18	WATERSHED

PROJECT NO: 14145.006
DRAWN BY: DJG

C4

SHEET 4 OF 5

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: 2018-011

Received complete: February 14, 2018

Applicant: Bryan Maloney

Consultant: Natural Environments Corp. – Attn: Terry Sanders

Project: Shoreline Stabilization – The applicant is repairing an existing rip-rapped shoreline on Lake Riley. Existing rip-rap will be removed and re-installed with additional rip-rap being added as necessary.

Location: 108 Pioneer Trail, Chanhassen, MN

Reviewer: Terry Jeffery, Permit Coordinator

Rules: Applicable rules checked

	Rule B: Floodplain Management		Rule H: Appropriation of Public Waters
X	Rule C: Erosion and Sediment Control		Rule I: Appropriation of Groundwater
	Rule D: Wetland and Creek Buffers		Rule J: Stormwater Management
	Rule E: Dredging and Sediment Removal		Rule K: Variances and Exceptions
X	Rule F: Shoreline/Streambank Stabilization	X	Rule L: Permit Fees
	Rule G: Waterbody Crossings	X	Rule M: Financial Assurances

Rule Conformance Summary

Rule	Issue	Conforms to RBPCWD Rules?	Comments
C	Erosion Prevention & Sediment Control	Yes	See condition C1.
F	Shoreline/Streambank Stabilization	Yes	See condition F1.
L	Permit Fee	Yes	
M	Financial Assurance	See Comment	The financial assurance has been calculated at $19,160.

Project Description

The applicants propose to remove existing rip-rap along approximately 134 feet of Lake Riley shoreline. This rip-rap will then be reinstalled, and additional rip-rap will be installed as needed to complete the stabilization. The project site information is summarized below:

Exhibits:

1. Permit Application dated February 6, 2018.
2. Site Photographs undated but received February 14, 2018
3. Erosion Intensity Worksheet received February 14, 2018
4. Design Plan Sheets dated January 16, 2018.
    a. L100 – Site Plan
    b. L101 – Erosion Control Plan

Rule Specific Permit Conditions

Rule C: Erosion Prevention and Sediment Control

Because the project proposes to excavate 57 cubic yards of riprap (which will then be placed again), the project must conform to the requirements in the RPBCWD Erosion Prevention and Sediment Control rule (Rule C, Subsection 2.1).

The applicant is proposing to limit the disturbance to only that area to be stabilized by the rip-rap material. The applicant is proposing to complete all work associated with the shoreline stabilization within five (5) days. As the work will take place under frozen conditions (ice-in), will be completed before thaw, and there is no proposed disturbance beyond the limits of the rip-rap placement, the submitted erosion control plan includes the necessary protections required including protection of the natural topography and soil condition, steps to minimize disturbance in intensity and duration, construction site waste management measures, and final stabilization . If the work extends until after ice-out in the project area, the applicant will need to provide floating silt curtain and other temporary sediment control measures to ensure there is no sedimentation of the lake.

The limited scope of the work precludes the need for decompaction or placement of topsoil. (i.e. The only disturbed area will be where the rip rap is to be placed and topsoil is not required in that area.) Access to the site will be across the ice of Lake Riley. Given this ingress/egress, a rock construction entrance is not necessary and would likely pose a greater risk to Lake Riley as it has the potential to introduce sediment to the lake.

The contractor responsible for maintenance of erosion prevention and sediment control is listed on the application. The plans are compliant with Rule C, Section 3.

C1. If work extends beyond ice-out, the applicant will need to provide a floating silt curtain and other temporary sediment-control measures to ensure no sedimentation of the lake.

Rule F: Shoreline and Streambank Stabilization

Because the project proposes to modify and stabilize 134 feet of shoreline of Lake Riley, the project must conform to the requirements in the RPBCWD Shoreline and Streambank Stabilization rule (Rule F, Section 2). The shoreline is at the toe of a bluff area and is experiencing significant sloughing and headcuts along the length of the shore with bank heights up to 30" in places. The presence of the bluff and the substantial tree cover make grading the area to provide a more stable geometry not viable. Some typical photographs are included for reference.

The plans prepared by Natural Environments Corporation – but not yet affirmed (signed) by a registered engineer or surveyor in accordance with Rule F subsection 4.1 – show the area where rip-rap is to be removed, re-installed, and augmented with new rip-rap as necessary to provide for adequate stabilization of the shoreline without leaving exposed soils. The applicant has provided a completed "Erosion Intensity Scoresheet" as developed by the Minnehaha Creek Watershed District, showing a score of 49, which classified the shoreline as having "high" erosion intensity. Staff agrees that the shoreline rates as "High" and that rip-rap is the appropriate method of stabilization although the applicant is encouraged to plant into the rip-rap for ecological and public viewscape reasons.

The riprap will be hand-placed and will extend four (4) feet waterward of the OHW. This is the minimum necessary encroachment as to extend less would result in a slope greater than the 3:1 allowed. (Rule F, §3.3g & h) The rip-rap will extend to the top of the face cut along the shoreline which is 0.2 foot lower than the 100-year high water elevation. (Rule F, §3.3f) The design calls for 12" to 24" rip-rap, a 6"-9" transitional crushed rock layer with geotextile, the toe boulders are to be buried half of their diameter, and the improvements will not cover emergent vegetation. The materials are to be free of foreign materials such as clay or debris. This is compliant with Rule F, §3.3d & e. The rip-rap will conform to the natural shape of the shoreline. (Rule F, §3.3c) There is no plan to incorporate plantings into the rip-rap although the applicant is encouraged to do so. The design is consistent with Rule F, §3.3.

Plans for the project include steps that will be taken to minimization of potential transfer of aquatic invasive species to the greatest extent possible, consistent with subsection 3.6 of Rule F.

F1. Plans must be signed by a registered engineer or surveyor.

Rule L: Permit Fee:

Fees for the project are:

Rule C & F.....$150

Rule M: Financial Assurance:

Rules F: Shoreline Restoration 134 L.F. x $100/L.F.= $13,400

Contingency (10%) $1,340

Administration (30%) $4,420

Total Financial Assurance $19,160

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. Return or allowed expiration of any remaining surety and permit close out is dependent on the permit holder site inspection by District staff verifying 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 project conforms to Rule C and Rule F requirements.
3. Under Minnesota Department of Natural Resources general permit no. 2015-1192, approval of work under RPBCWD rules F constitutes approval under applicable DNR work in waters rules. Compliance with conditions on approval and payment of applicable fees, if any, are necessary to benefit from general permit approval and the responsibility of the applicant.

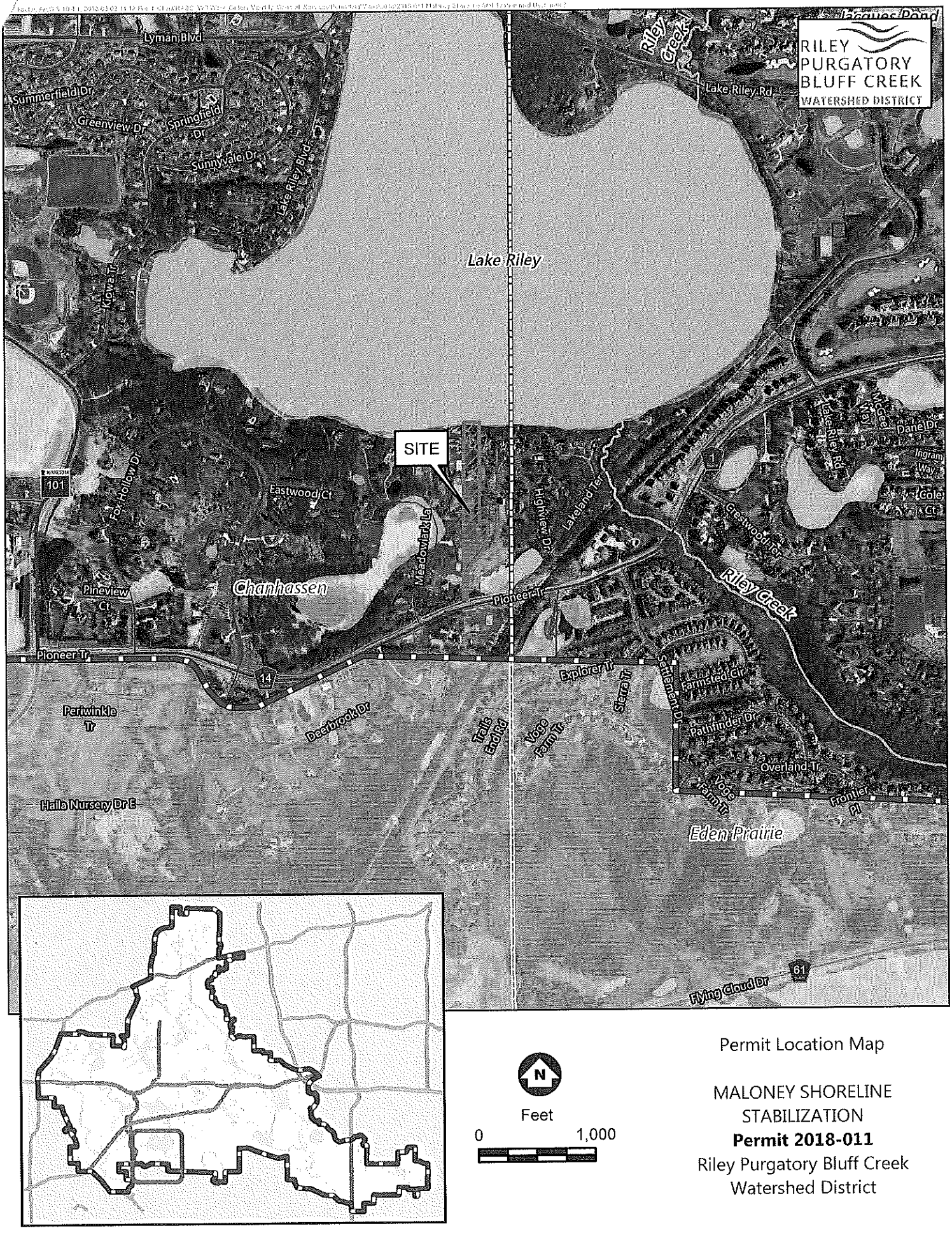
Recommendation:

Approval, contingent upon:

1. Continued compliance with General Requirements.
2. Rule-specific conditions C1 and F1.
3. Financial Assurance in the amount of $19,160.

Board Action

It was moved by Manager _____, seconded by Manager _____ to approve permit application No. 2018-011 with the conditions recommended by staff.



Permit Location Map

MALONEY SHORELINE STABILIZATION

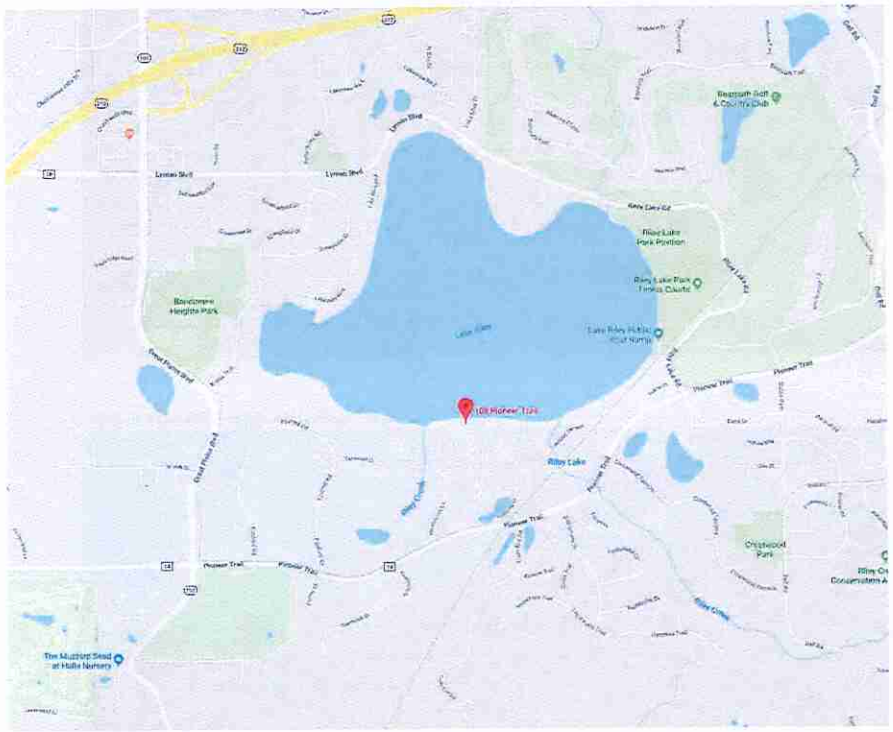
Permit 2018-011

Riley Purgatory Bluff Creek Watershed District

RPBCWD PERMIT: SITE PHOTOS

MALONEY RESIDENCE

108 Pioneer Trail, Chanhassen, MN 55317



LOCATION MAP

OVERVIEW: SOUTH

OVERVIEW: SOUTH-EAST

NATURAL ENVIRONMENTS CORP.
Professional Landscaping Services
tel: 763.544.8002
www.naturalenvironmentscorp.com

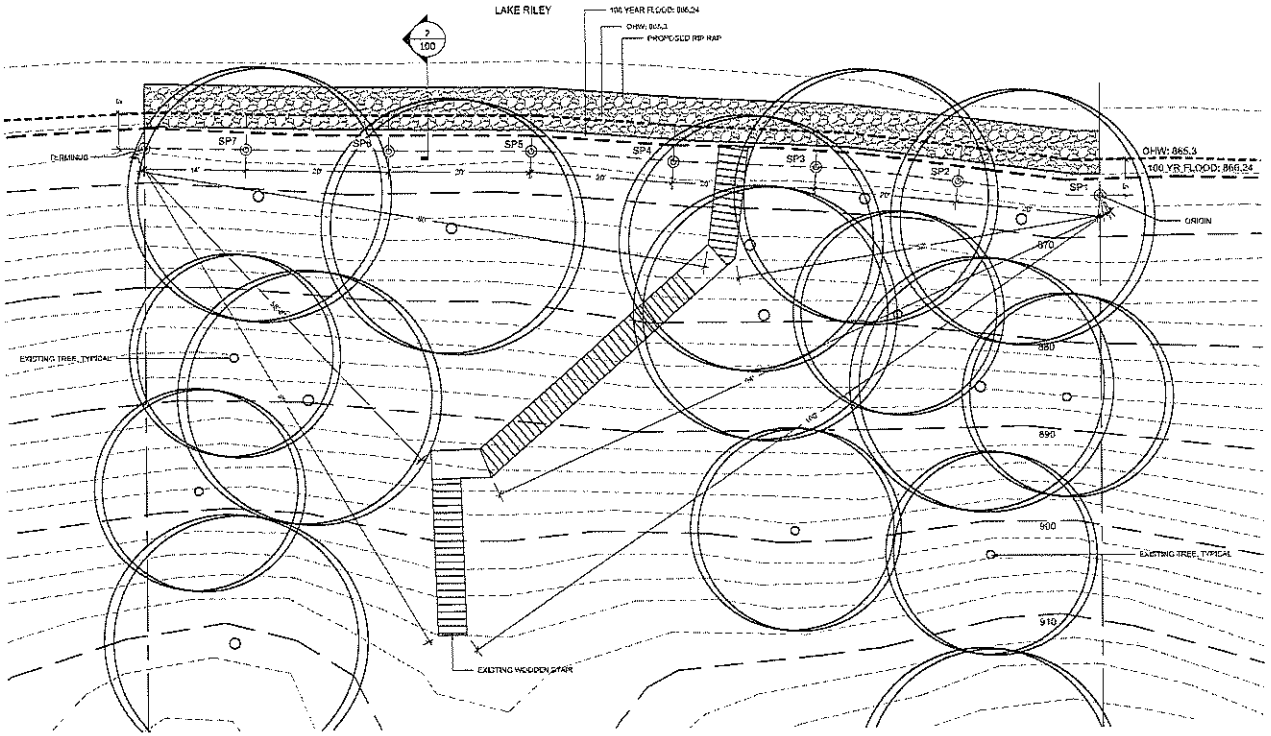
SITE PHOTOS

VIEW SOUTH EAST: EAST PROPERTY LINE

VIEW WEST: WEST PROPERTY LINE

TYPICAL CONDITIONS

TYPICAL CONDITIONS

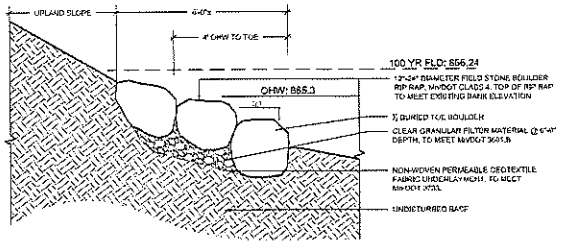


1 RPBC WD OHW STATIONING PLAN

Scale: 1/8"=1'

NOTES

-BASE LINE STAKING TO BE INSTALLED PRIOR TO CONSTRUCTION AND MAINTAINED THROUGH PROJECT COMPLETION
-EXISTING TREE LOCATIONS ARE CONTEXTUAL AND NEED TO BE FIELD VERIFIED



2 TYPICAL RIP RAP SECTION

Scale: 1/2"=1'

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www.naturalenvironmentscorp.com

ISSUANCE

PERMIT

PROJECT NAME

Maloney Residence
108 Pioneer Trail
Chanhassen, MN 55317

REVISION DATE

01/18/2018
Date
Date
Date
Date

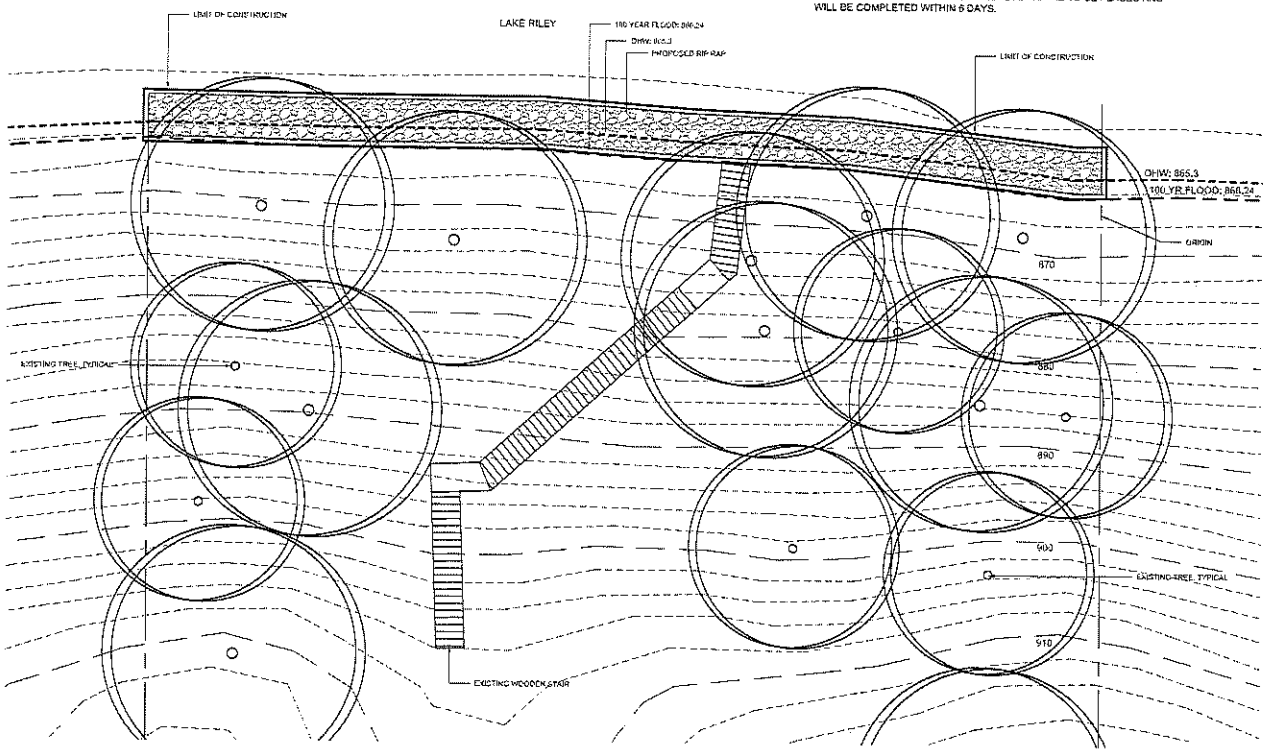
SHEET NAME

RPBC
Stationing Plan

SHEET NUMBER

L100

LIMIT OF CONSTRUCTION NOTES:
NO EXISTING VEGETATION IS TO BE DISTURBED AS THE DISTURBED AREA WILL BE LIMITED TO THAT AREA WHERE RIP RAP IS TO BE PLACED AND WILL BE COMPLETED WITHIN 8 DAYS.



1 RPBC WD OHW STATIONING PLAN

Scale: 1/8"=1'

N

NOTES

- NATURAL TOPOGRAPHY AND SOIL CONDITIONS TO BE PROTECTED, INCLUDING RETENTION ONSITE OF NATIVE TOPSOIL TO THE GREATEST EXTENT POSSIBLE
- HYDRAULIC MULCHING AS SPECIFIED BY THE DISTRICT MUST BE USED ON SLOPES OF 3:1 (H:V) OR STEEPER TO PROVIDE ADEQUATE STABILIZATION
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- ALL DISTURBED AREAS TO 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
- 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
- ACTIVITIES MUST BE CONDUCTED SO AS TO MINIMIZE THE POTENTIAL TRANSFER OF AQUATIC INVASIVE SPECIES (E.G., ZEBRA MUSSELS, EURASIAN MILFOIL, ETC.) TO THE MAXIMUM EXTENT POSSIBLE

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www.naturalenvironmentscorp.com

ISSUANCE

PERMIT

PROJECT NAME

Maloney Residence
108 Pioneer Trail
Chanhassen, MN 55317

REVISION DATE

01/16/2018
Date
Date
Date
Date

SHEET NAME

Erosion Control Plan

SHEET NUMBER

L101

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: 2018-011

Received complete: February 14, 2018

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Consultant: Natural Environments Corp. – Attn: Terry Sanders

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Location: 108 Pioneer Trail, Chanhassen, MN

Reviewer: Terry Jeffery, Permit Coordinator

Rules: Applicable rules checked

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X	Rule C: Erosion and Sediment Control		Rule I: Appropriation of Groundwater
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X	Rule F: Shoreline/Streambank Stabilization	X	Rule L: Permit Fees
	Rule G: Waterbody Crossings	X	Rule M: Financial Assurances

Rule Conformance Summary

Rule	Issue	Conforms to RBPCWD Rules?	Comments
C	**Erosion Prevention & Sediment Control**	Yes	See condition C1.
F	**Shoreline/Streambank Stabilization**	Yes	See condition F1.
L	**Permit Fee**	Yes	
M	**Financial Assurance**	See Comment	The financial assurance has been calculated at $19,160.

Project Description

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F1. Plans must be signed by a registered engineer or surveyor.

Rule L: Permit Fee:

Fees for the project are:

Rule C & F.....$150

Rule M: Financial Assurance:

Rules F: Shoreline Restoration 134 L.F. x $100/L.F.= $13,400

Contingency (10%) $1,340

Administration (30%) $4,420

Total Financial Assurance $19,160

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Findings

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2. The project conforms to Rule C and Rule F requirements.
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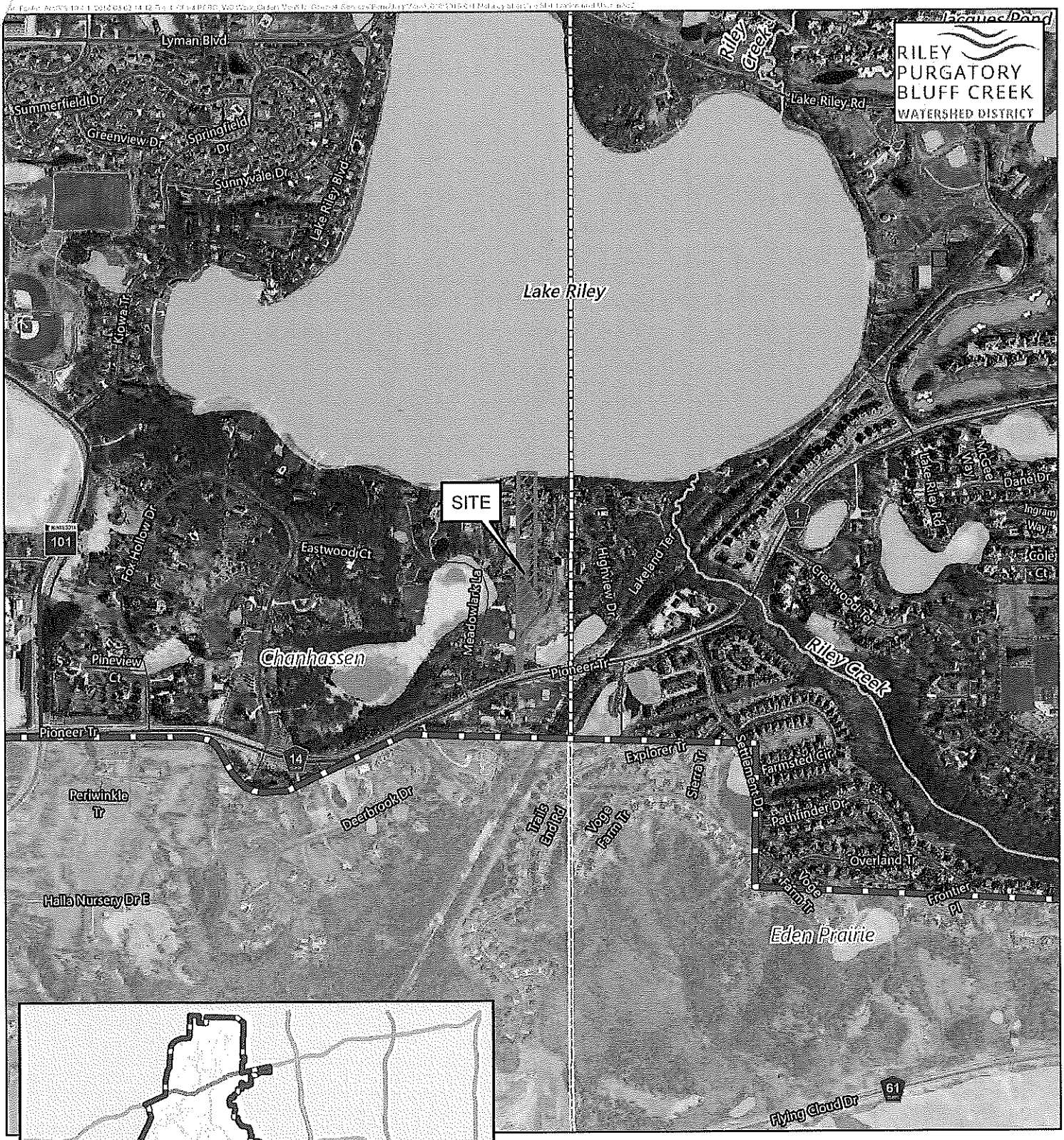
Recommendation:

Approval, contingent upon:

1. Continued compliance with General Requirements.
2. Rule-specific conditions C1 and F1.
3. Financial Assurance in the amount of $19,160.

Board Action

It was moved by Manager _____, seconded by Manager _____ to approve permit application No. 2018-011 with the conditions recommended by staff.



Feet

0 1,000

Permit Location Map

MALONEY SHORELINE STABILIZATION

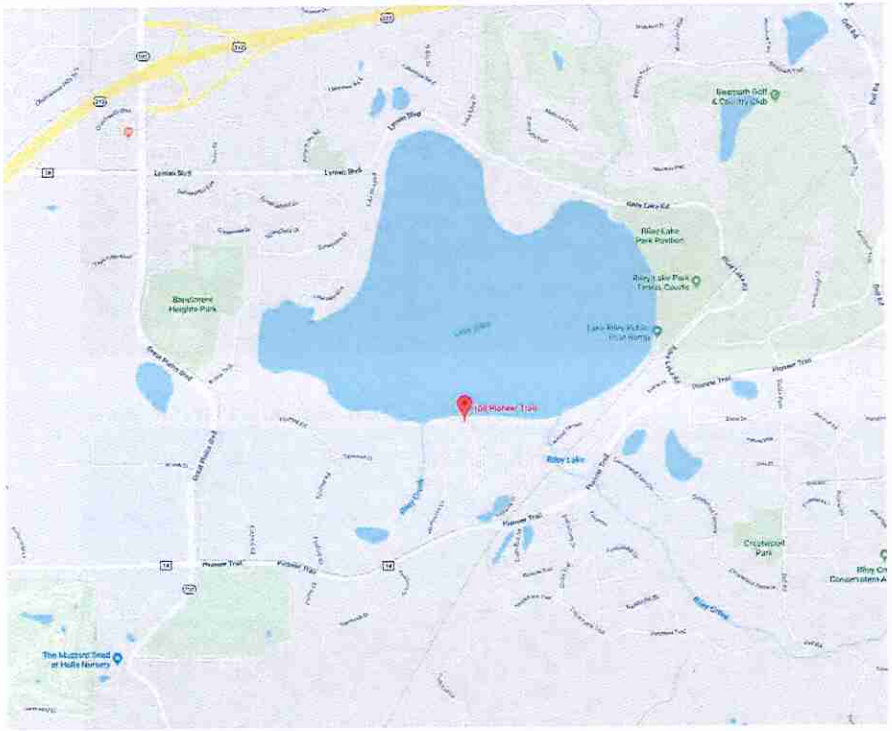
Permit 2018-011

Riley Purgatory Bluff Creek Watershed District

RPBCWD PERMIT: SITE PHOTOS

MALONEY RESIDENCE

108 Pioneer Trail, Chanhassen, MN 55317



LOCATION MAP

OVERVIEW: SOUTH

OVERVIEW: SOUTH-EAST

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Professional Landscaping Services
tel: 763.544.8002
www.naturalenvironmentscorp.com

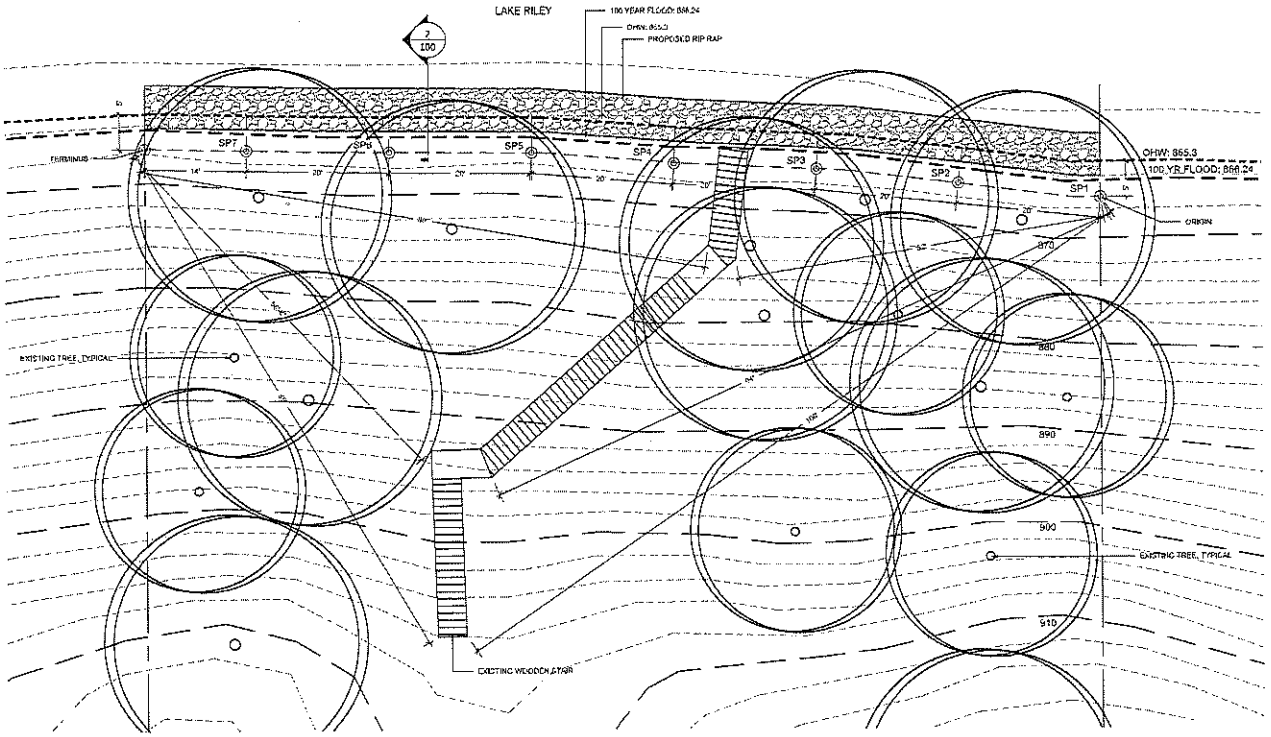
SITE PHOTOS

VIEW SOUTH EAST: EAST PROPERTY LINE

VIEW WEST: WEST PROPERTY LINE

TYPICAL CONDITIONS

TYPICAL CONDITIONS



1 RPBC WD OHW STATIONING PLAN

Scale: 1/8"=1'

NOTES

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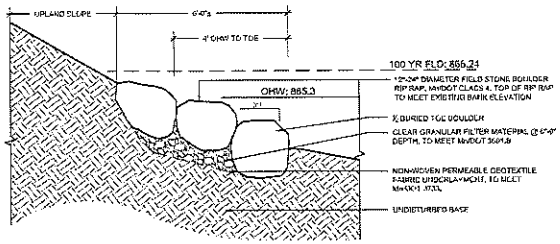
-EXISTING TREE LOCATIONS ARE CONTEXTUAL AND NEED TO BE FIELD VERIFIED



2 TYPICAL RIP RAP SECTION

Scale: 1/2"=1'

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www.naturalenvironmentscorp.com

ISSUANCE

PERMIT

PROJECT NAME

Maloney Residence
108 Pioneer Trail
Chanhassen, MN 55317

REVISION DATE

01/16/2018
Date
Date
Date
Date

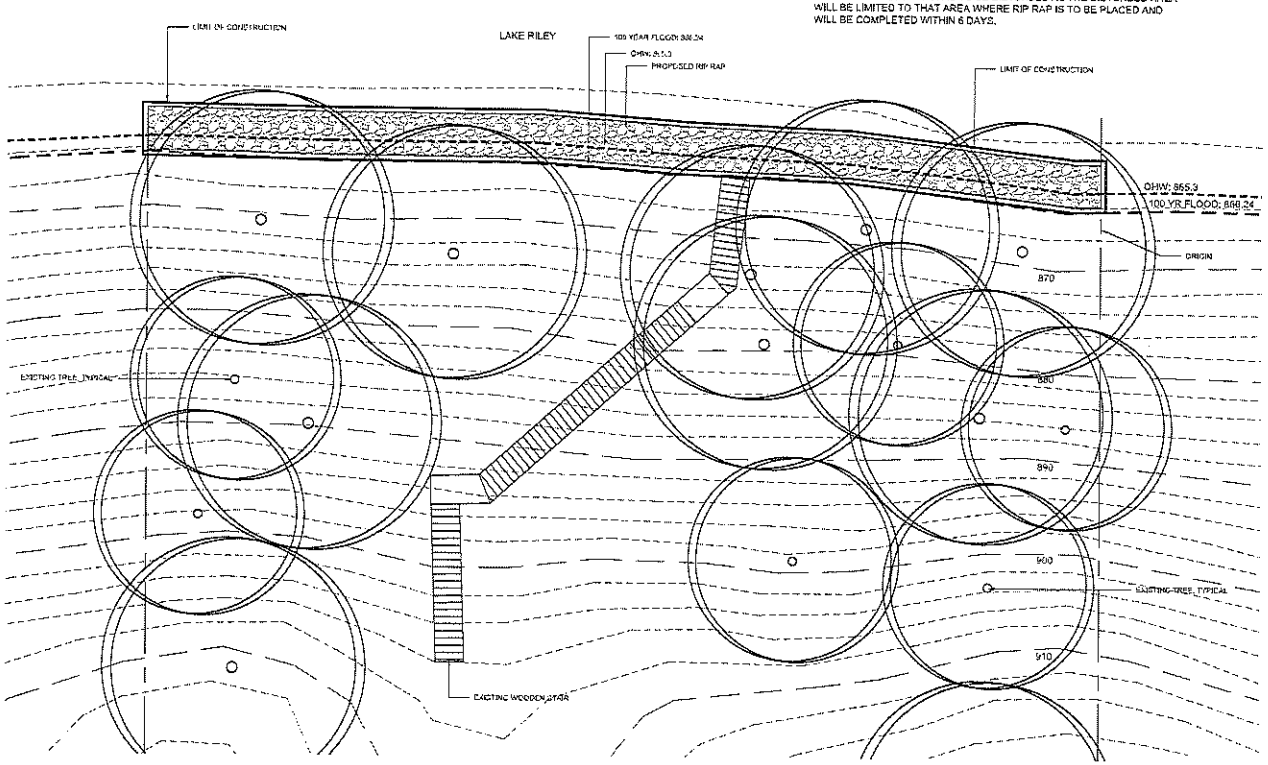
SHEET NAME

RPBC
Stationing Plan

SHEET NUMBER

L100

LIMIT OF CONSTRUCTION NOTES:
NO EXISTING VEGETATION IS TO BE DISTURBED AS THE DISTURBED AREA WILL BE LIMITED TO THAT AREA WHERE RIP RAP IS TO BE PLACED AND WILL BE COMPLETED WITHIN 6 DAYS.



1 RPBC WD OHW STATIONING PLAN

SCALE: 1/8"=1'

NOTES

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- SIX INCHES (+) OF TOP SOIL TO BE SPREAD AND INCORPORATED INTO THE UNDERLYING SOILS DURING FINAL SITE TREATMENT WHEREVER TOPSOIL HAS BEEN REMOVED
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- SOIL SURFACES COMPACTED DURING CONSTRUCTION AND REMAINING PERVIOUS UPON COMPLETION OF CONSTRUCTION TO BE DECOMPACTED THROUGH SOIL AMENDMENT AND/OR RIPPING TO A DEPTH OF 6 INCHES WHILE TAKING CARE TO AVOID UTILITIES, TREE ROOTS AND OTHER EXISTING VEGETATION PRIOR TO FINAL RE-VEGETATION OR OTHER STABILIZATION
- ALL DISTURBED AREAS TO 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
- 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
- ACTIVITIES MUST BE CONDUCTED SO AS TO MINIMIZE THE POTENTIAL TRANSFER OF AQUATIC INVASIVE SPECIES (E.G., ZEBRA MUSSELS, EURASIAN MILFOIL, ETC.) TO THE MAXIMUM EXTENT POSSIBLE

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ISSUANCE

PERMIT

PROJECT NAME

Maloney Residence
108 Pioneer Trail
Chanhassen, MN 55317

REVISION DATE

01/16/2018
Date
Date
Date
Date

SHEET NAME

Erosion Control Plan

SHEET NUMBER

L101

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

Project Description

Permit No: 2018-014

Received complete: January 24, 2018

Applicant: City of Eden Prairie (Rod Rue)
Consultant: SRF Consulting Group, Bob Leba
Project: Eden Prairie Road Reconstruction – Hennepin County is reconstructing and improving existing County State Aid Highway (CSAH) 61 (also known as Flying Cloud Drive) from Highway 101 on the west to Charlson Road on the east including a single span bridge structure over Riley Creek under application permit 2016-032, approved for a three-year term on November 2, 2016. (The approval was modified in 2017.) The City of Eden Prairie now proposes to reconstruct Eden Prairie Road from CSAH 61 (Flying Cloud Dr.) to approximately 900 feet to the north, concurrently with the CSAH 61 reconstruction. Infiltration and wet detention will provide storm water quantity, volume and quality control.
Location: Eden Prairie Road from CSAH 61 (Flying Cloud Dr.) to approximately 900 feet north in Eden Prairie
Reviewer: Scott Sobiech, PE, Barr Engineering

Rules: Applicable rules checked

	Rule B: Floodplain Management		Rule H: Appropriation of Public Waters
X	Rule C: Erosion and Sediment Control		Rule I: Appropriation of Groundwater
	Rule D: Wetland and Creek Buffers	X	Rule J: Stormwater Management
	Rule E: Dredging and Sediment Removal		Rule K: Variances and Exceptions
	Rule F: Shoreline/Streambank Stabilization		Rule L: Permit Fees
	Rule G: Waterbody Crossings		Rule M: Financial Assurances

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.

Project Description and Background

At the November 2, 2016 RPBCWD Board meeting the Managers conditionally approved permit 2016-032 for a three-year term (i.e., through November 2019) for Hennepin County's proposed improvement of County State Aid (CSAH) 61 (also known as Flying Cloud Drive). The Hennepin County project is presently under way. At the request of the city of Eden Prairie, Hennepin County proposed to over-construct a stormwater infiltration basin to provide management of anticipated runoff from the city's intended realignment of Eden Prairie Road from the top of the bluff to the bottom at CSAH 61. The CSAH 61 project proposed an infiltration basin, two wet detention ponds and rock trench for stormwater treatment, rate control and volume reduction. The report for permit 2016-032 included analysis of the capacity of the proposed Hennepin County BMPs to provide stormwater management for the Eden Prairie Road reconstruction work, as it was conceptualized at the time, but explicitly did not authorize the Eden Prairie project.

At the February 1, 2017 RPBCWD Board meeting the Managers conditionally approved a modification to permit 2016-032. The requested modifications was due to high groundwater and involved modifying the design of the Eden Prairie Road Infiltration Basin to be a dry basin with a revised outlet design for water quality treatment and rate control and to increase the rock infiltration trench adjacent to the proposed Spring Road wet pond (one of the two wet detention ponds proposed by Hennepin County for 2016-032) to provide additional abstraction.

On January 24, 2018, Eden Prairie provided detailed design drawing, engineering computations, soil boring information, groundwater piezometer readings, and modified stormwater narrative requesting RPBCWD approval of the reconstruction of Eden Prairie Road. During the design process to reconstruct 900 feet of the Eden Prairie road the designers elected to modify the design of the Eden Prairie Road Infiltration Basin for a second time to accommodate the additional runoff from Eden Prairie Road. The design modifications include the enlargement of a wet detention cell, raising the bottom of the infiltration basin to provide the necessary 3 feet separation to groundwater, and enhancing the outlet control structure to meet the RPBCWD stormwater requirements for the Eden Prairie Road work.

The initial construction of the infiltration basin will be undertaken by Hennepin County under permit 2016-032, as modified; the reports for which, as noted, provided background on the over-construction of the stormwater management facilities for the county project to provide capacity for compliance with the RPBCWD rules for the city road reconstruction.[1] The present request, submitted with the county's

[1] The proposed modification of the infiltration basin will cause it to be extended onto City of Eden Prairie right of way.

consent, is for RPBCWD approval of Eden Prairie's reconstruction of Eden Prairie Road. The city submitted final design details for the Eden Prairie Road portion in support of the requested approval. . This review describes how the best management practices submitted for purposes of the county project's compliance with RPBCWD requirements will be further modified to provide compliance with RPBCWD rules for the reconstruction of Eden Prairie Road. The approval of this permit application 2018-014 does not modify the conditions and terms of the November 2016 conditional approval of the request for permit 2016-032, as modified for the managers' January 2017 approval, except as specifically noted herein. Permit 2016-032 otherwise remains valid.

The project site information is summarized below:

1. Total Site Area: 6.41 acres
2. Existing Site Impervious Area: 0.69 acres (30,056 square feet)
3. Post Construction Site Impervious: 1.62 acres (70,567 square feet)
4. New (Increase) in Site Impervious Area: 0.93 acres (40,511) (>100% increase in site impervious area)
5. Total Disturbed Area: 6.41 acres

Exhibits:

1. Permit Application dated January 26, 2018.
2. Project Narrative and Stormwater Management Report: Eden Prairie Road, City of Eden Prairie Project IC 13-5844 dated January 2018 (includes drainage maps, construction drawings, stormwater computations, and geotechnical information)
3. Concurrence memo from Hennepin County dated January 22, 2018
4. Project Plan sheets (69 sheets) dated January 23, 2018 (revisions received February 21, 2018, sheets 7, 39, 46 and 65 of 84)
5. Response to review comments received February 21, 2018
6. P8 models received February 21, 2018

Rule Specific Permit Conditions

Rule C: Erosion and Sediment Control

Because the Eden Prairie Road project will alter 6.41 acres (279,220 square feet) of surface area, the project must conform to the requirements in the RPBCWD Erosion and Sediment Control rule (Rule C, Subsection 2.1).

The erosion and sediment control plans prepared by SRF consulting Group for the Eden Prairie Road portion of the project include installation of silt fence, sediment control logs, inlet protection for storm sewer catch basins, placement of a minimum of 6 inches of topsoil and culvert end controls.

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 general contractor responsible for the site. RPBCWD must be notified if the responsible party changes during the permit term.

Rule J: Stormwater Management

Conformance with the RPBCWD Stormwater Management rule (Rule J) is required for this project because it is a linear project constructed in right-of-way and stormsewer easements which entails reconstruction creating more than 5,000 square feet of new and/or fully reconstructed impervious surface (Rule J, subsection 2.4).

Rate Control

As noted, Eden Prairie, with concurrence of Hennepin County, is proposing to modify the plans for wet detention cell upstream of the infiltration basin and infiltration basin to provide the rate control, volume abstraction and water quality management for the Eden Prairie Road work while the facilities continue to provide the necessary management of runoff for the CSAH 61 project. (Analysis of and findings on compliance for both projects is provided below; in the case of the Hennepin County work, the analysis is provided to show continued compliance with the conditional approval of permit 2016-032.) Before stormwater runoff enters the infiltration basin on the western end of the project, it first flows through a wet detention cell, thus providing pretreatment.

In order to meet the rate control criteria listed in Subsection 3.1a, 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 site are summarized in the table below. The proposed project modification conforms to RPBCWD Rule J, Subsection 3.1a.

Modeled Discharge Location	2-Year Discharge (cfs)		10-Year Discharge (cfs)		100-Year Discharge (cfs)		10-Day Snowmelt (cfs)	
	Ex	Prop	Ex	Prop	Ex	Prop	Ex	Prop
Riley Creek	73.6	73.1	354.5	353.3	1400.5	1398.1	230.1	229.8
Eden Prairie Road	4.6	0.9	7.7	2.1	20.4	10.3	2.3	2.3

Volume Abstraction

The stormwater volume abstraction criteria in Subsection 3.2.b of Rule J apply because the Eden Prairie Road linear project will create less than 1 acre of new and/or fully reconstructed impervious area. The table below provides a breakdown of the impervious surfaces associated with the Eden Prairie Road reconstruction. Reconstruction of Eden Prairie Road will require the abstraction onsite of 1.1 inches of runoff from the net increase in impervious surface area.

Project Element	New and/or fully reconstructed area (acres)	Net increase in impervious area (acres)	Applicable Rule J subsection	Required Abstraction Volume (acre-feet)
CSAH 61 Reconstruction	4.12	-0.66	3.2ci	0.19
Eden Prairie Road Reconstruction	1.64	0.95	3.2cii	0.087

The total abstraction volume required for the CSAH 61 project and Eden Prairie Road reconstruction is 0.277 acre-feet. The Applicant proposes a rock infiltration trench with pretreatment of runoff provided by wet ponds and SAFL baffles to meet the requirement for the CSAH 61 reconstruction. Soil borings performed by Braun Intertec Corporation show that soils in the vicinity of the rock infiltration trench is poorly graded sand. The MN Stormwater Manual indicates an infiltration rate for poorly graded sand of 0.8 in/hr. The groundwater depth near the rock infiltration trench was observed at elevation 718.9 (boring ST-313), which is 3.0 feet below the proposed bottom of the trench. This indicates that groundwater is at least 3 feet below the bottom of the proposed infiltration basins (Rule J, Subsection 3.1.b.ii).

The Applicant proposes an infiltration basin with pretreatment of runoff provided by wet detention cell to meet the requirements for the Eden Prairie Road reconstruction. Soil borings performed by Braun

Intertec Corporation show that soils at the infiltration basin is poorly graded sand. The MN Stormwater Manual indicates an infiltration rate of 0.8 in/hr for these materials is appropriate. The groundwater depth at the proposed infiltration basin was recorded six times in the temporary standpipe peizometer at elevation 731.8 (boring PP-2A) between May 30, 2017 and July 28, 2017. This observed groundwater elevation is 6.2 feet below the proposed bottom of the infiltration basin (el 738.0). This indicates that groundwater is at least 3 feet below the bottom of the proposed infiltration basin (Rule J, Subsection 3.1.b.ii).

The table below summarizes the volume abstraction on the site.

Project Element	Required Abstraction Volume (acre-feet)	Provided Abstraction Volume (acre-feet)
CSAH 61 Reconstruction	0.19	0.22
Eden Prairie Road Reconstruction	0.087	0.16

The proposed project conforms to the abstraction requirements of Rule J, subsection 3.3, for the proposed reconstruction of CSAH 61 and reconstruction of Eden Prairie Road.

Water Quality Management

Subsection 3.1c 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. The Applicant is proposing a wet detention pond followed by an infiltration basin to achieve the required TP and TSS removals. A P8 water quality model was developed to estimate the TP and TSS loading from the catchment areas and the removal capacity of the proposed BMPs. Because both the Eden Prairie Road reconstruction and CSAH 61 projects rely on the wet detention pond followed by the infiltration basin for water quality treatment, the water quality treatment was considered in aggregate. The results of this modeling are summarized below. The data presented show that the proposed BMPs have sufficient water quality treatment capacity to meet the RPBCWD water quality standard for the combined CSAH 61 and Eden Prairie Road Reconstruction projects. The engineer finds that the proposed project is in conformance with Rule J, Subsection 3.1.c.

Pollutant of Interest	Regulated Site Loading (lbs/yr)	Required Load Removal (lbs/yr)[1]	Provided Load Reduction (lbs/yr)
Total Suspended Solids (TSS)	6,144	5,530 (90%)	5,744 (94.5%)
Total Phosphorus (TP)	20.1	12.1 (60%)	14.4 (71.6%)

[1]Required load reduction is calculated based on the removal criteria in Rule J, Subsection 3.1c and the new and reconstructed impervious area site load

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 and no stormwater management system may be constructed or reconstructed in a manner that brings the low floor elevation of an adjacent structure into noncompliance according to Rule J, Subsection 3.6. No buildings are located adjacent to the stormwater management systems. The lowest elevation of the adjacent roadway and the 100-year event flood elevation of the filtration basin are summarized below. The RPBCWD Engineer concurs that the proposed project modification is in conformance with Rule J, Subsection 3.6.

Waterbody	Low Elevation of Adjacent Structure (feet)	Proposed 100-year Event Flood Elevation (feet)	Freeboard (feet)
Riley Creek	726.66	719.7	6.96
Spring Road Pond	~736	727.81	8.19

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. Because the county and city will be jointly relying on the wet detention cell and infiltration basin on the west end of the combined construction limits for compliance with RPBCWD stormwater-management requirements, the parties will need to enter a joint facility-use and -maintenance agreement.

Findings

1. The proposed project includes the information necessary, plan sheets and erosion control plan for review.
2. The proposed project modifications will conform to Rule C and J if the Rule Specific Permit Conditions listed above are met.

Recommendation:

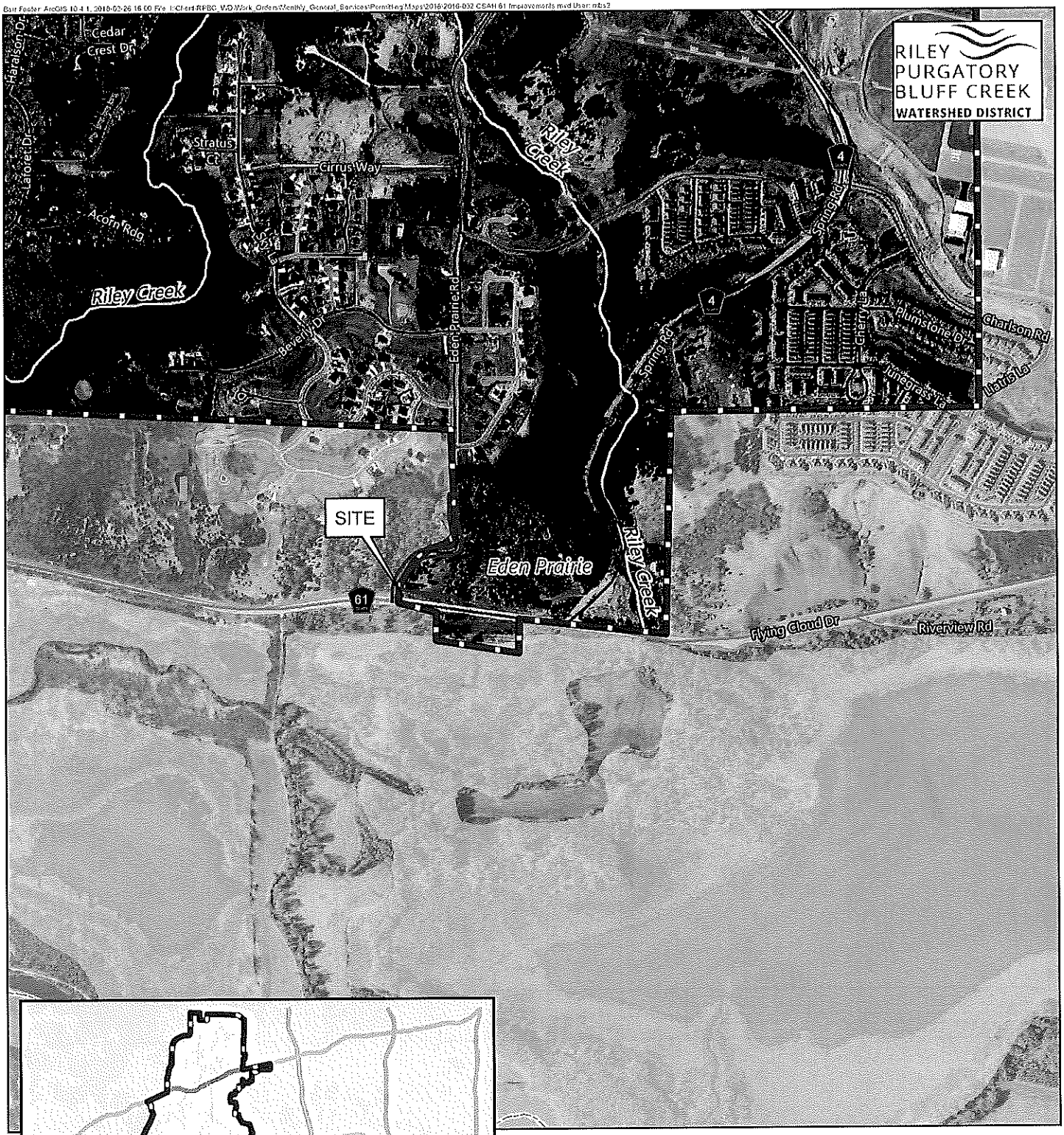
1. Engineer recommends approval of the requested permit 2018-014for the reconstruction of Eden Prairie Road between CSAH 61 and 900 feet to the north.
2. A two-year permit term is recommended since the construction is anticipated to continue through 2020.
3. Approval, contingent upon:
    a. The Applicant must provide the name and contact information of the general contractor responsible for erosion and sediment control at the site. RPBCWD must be notified if the responsible party changes during the permit term.
    b. Because the county and city will be jointly relying on the wet detention cell and infiltration basin on the west end of the combined construction limits for compliance with RPBCWD stormwater-management requirements, the parties will need to enter a joint facility-use and -maintenance agreement. (The agreement will supersede the existing maintenance agreement completed to meet a condition of approval of 2016-032.).

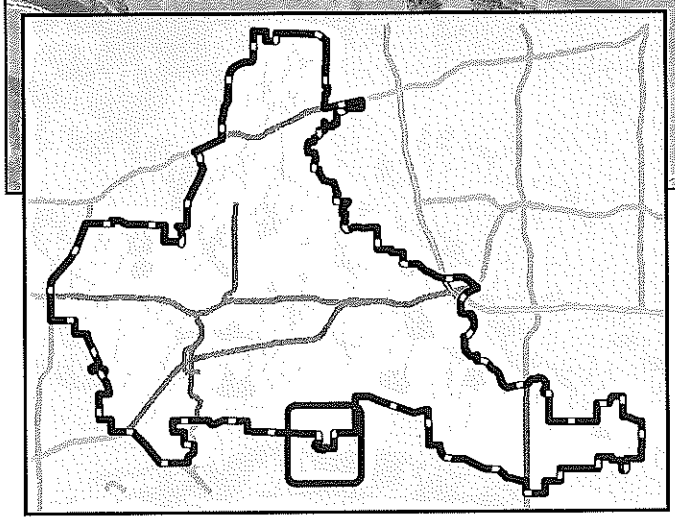
By accepting the permit, when issued, the applicant agrees to the following stipulation:

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. 2018-014 with the conditions recommended by staff.



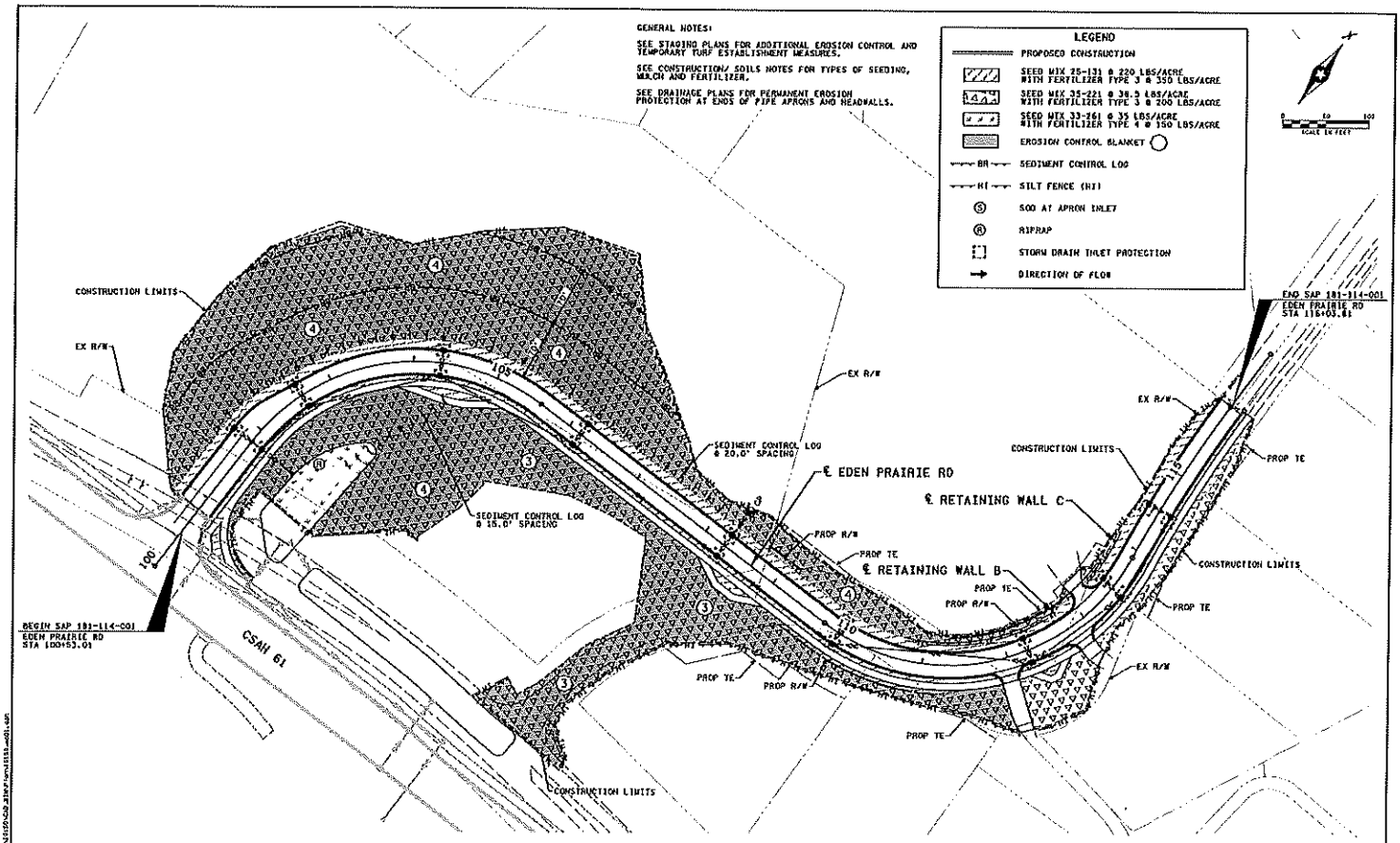


Feet

0 1,000

Permit Location Map

EDEN PRAIRIE ROAD
RECONSTRUCTION
Permit 2018-014
Riley Purgatory Bluff Creek
Watershed District



NO	DATE	BY	EXC APPD	REVISION

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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: STEVEN J. MILLER

Date: License #: 41527

STATE AID PROJECT NO. 162-106-026

STATE PROJECT No. -

COUNTY PROJECT No. -

CITY PROJ. NO. 13-3311

DRAWN BY: S.VAN ALEX

DESIGNED BY: M.JAVIT

CHECKED BY: S.MILLER

CCSMS. NO. 1710159

SRF Consulting Group, Inc.

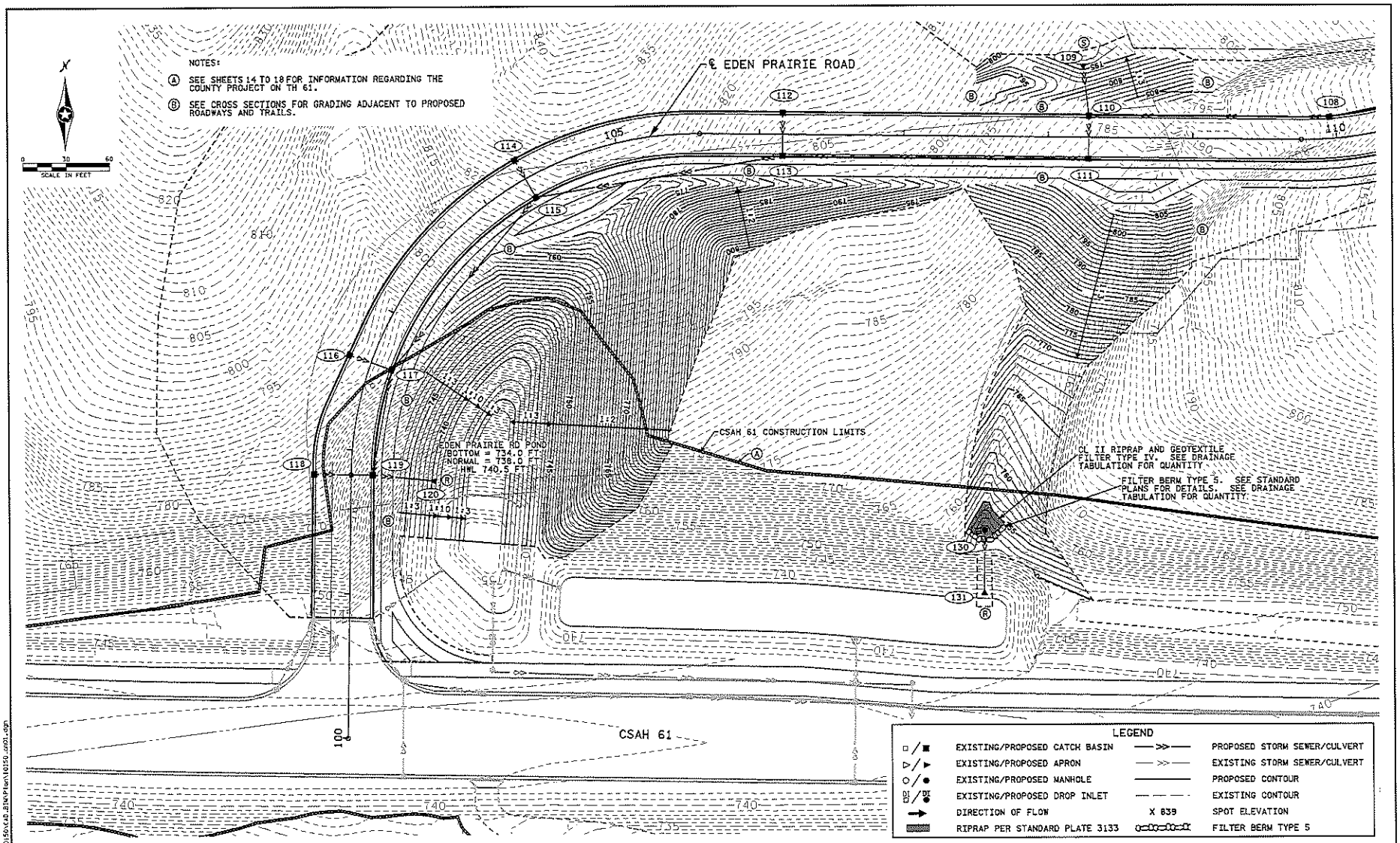
ENGINEERS PLANNERS DESIGNERS

CITY OF EDEN PRAIRIE

EROSION CONTROL AND TURF ESTABLISHMENT PLAN

EDEN PRAIRIE ROAD (CSAH 61)

SHEET 45 OF 69



NO	DATE	BY	CKD	APPR	REVISION

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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.

Print Name: ROBERT J. LEBA

Date: _____ License # 41951

STATE AID PROJECT NO. 181-114-001

STATE PROJECT NO. X

COUNTY PROJECT NO. X

CITY PROJ. NO. 13-5844

DRAWN BY J. VAN BECK

DESIGNED BY D. ANDERSON

CHECKED BY R. LEBA

COMM. NO. 4710150

SRF Consulting Group, Inc. — Engineers Planners Designers

CITY OF EDEN PRAIRIE

CONTOUR PLAN

EDEN PRAIRIE ROAD

SHEET 65 OF 84

RILEY
PURGATORY
BLUFF CREEK
WATERSHED DISTRICT

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

Monday, February 26, 2018

Mr. **Maya Swope**

Re: Proposed Statement of Hire – **Outreach and Office Assistant**

Dear Miss. **Swope**:

I am pleased to propose an offer of employment to you as the Riley Purgatory Bluff Creek Watershed District's **Outreach and Office Assistant**, subject to approval by the Board of Managers at its next meeting on **March 15, 2018**. The District's proposed offer of employment includes the following terms:

1. Compensation. You will be paid a base salary of $**37,500** annually. You will be paid on the first and fifteenth of each month. The District will conduct a performance review following your first six months of employment, and thereafter annually, at which time a cost of living or other appropriate increase will be considered.

2. Fringe Benefits. You will be eligible to participate in the Public Employee Retirement Act (PERA) retirement plan, pursuant to Minnesota law. The District will provide health insurance, short-term disability, long-term disability, term life, and dental insurance benefits pursuant to District plans.

3. Vacation and Sick Leave. You will begin to accrue **1.6** days of vacation/sick leave per month beginning the first day of your employment with the District. In the first twelve months of continuous employment you will be eligible to receive **19** days of paid time off. Accrued vacation or sick leave that is not used at the end of the year may be accumulated in the next year, up to a maximum carryover of 90 days. In the event you voluntarily terminate your employment, the District will pay you for all earned, unused aid time off, so long as you provide a minimum of 30 days advance notice of the termination. No unused paid time off will be paid if you are involuntarily terminated. You may take all federal holidays, plus one floating holiday per year.

4. Expenses. The District will reimburse you for all reasonable and necessary out-of-pocket expenses incurred in the course of performing your duties, provided appropriate receipts or vouchers are presented in accordance with District policy.

5. Employment Term. Your employment with the District will commence on **June 4th**. Your employment with the District is for no specific term. You will serve at the pleasure of the District and may be terminated at any time, with or without cause. You should not construe or interpret anything in this Statement of Hire or stated to you otherwise as a guarantee of employment for a specified term.

6. Entire Agreement. This Statement of Hire constitutes the entire agreement between you and the District. No offers of contract, promises, or representations are being made to you concerning employment with the District other than what is set forth in this Statement of Hire. In the event that there are employment policy issues that arise that are not addressed in this Statement of Hire or the District's Personnel Handbook, the policies of Hennepin County will govern.

Please let us know no later than **March 5, 2018**, whether you accept this proposed offer of employment by signing this letter below and returning the original to me and retaining a copy for your files. If you have any questions concerning this proposed offer, or the District, please feel free to contact me. We are excited about the opportunity to work with you and look forward to working toward common goals for the District.

Sincerely,

Claire Bleser

Claire Bleser, Administrator
Riley Purgatory Bluff Creek Watershed District

* * *

I have read and considered the terms in this Proposed Statement of Hire and accept all such terms and the complete offer presented to me by the District.

Maya Swope

Maya Swope

02/28/2018
Date

Cc: Board of Managers

Minutes: Monday, February 26, 2018

RPBCWD Citizen's Advisory Committee Monthly Meeting
Location: RPBCWD offices: 18681 Lake Street, Chanhassen

CAC Members

Jim Boettcher	P	Curt Kobilarcsik	P	Marilynn Torkelson	P
Paul Bulger	P	Matt Lindon	P	Lori Tritz	P
Anne Deuring	P	Sharon McCotter	P	David Ziegler	P
Peter Iverson	P	Joan Palmquist	P		

Others

Michelle Jordan	District Liaison	P
Claire Bleser	RPBCWD Administrator	P
Dick Ward	RPBCWD Board Member	P
Terry Jeffrey	RPBCWD Permits and Project Management	P

Summary of key actions/motions for the Board of Managers:

1. **Motion:** The CAC approved the direction of the 10-year plan but would like to see more specifics on trending of impairments within given water bodies and how that affects the ratings of the project. The CAC advises that we revisit the ranking tool at a minimum of every 3 years and recalculate the scoring of proposed projects at a minimum of every 3 years.

5:30 pm New member Orientation Workshop

Michelle Jordan explained her purpose as liaison and support to the CAC. Everyone introduced themselves and identified where in the watershed they lived. Michelle presented everyone with the book "Watersheds: A Practical Handbook for Healthy Water" by Clive Dobson and Gregor Gilpin Beck. Michelle gave an overview of origin, purpose, governance, and powers of the RPBCWD. Michelle also covered development of the 10-year plan, current activities of the district (monitoring, projects, permitting, cost share program, and education and outreach), board, staff, volunteers, and advisory committees (TAC and **CAC**), and last year's activities of the CAC (advising on 10-year plan, hosted a 25 by 25 community meeting, subcommittee work). New members were provided with a notebook of relevant information.

We all were invited to share our ideas on:

1. Why are you here?
2. What do you hope to get out of your experience?
3. What are your ideas for what the CAC could accomplish this year?
4.

Michelle will distribute a transcribed copy of our responses.

Closed the workshop.

CAC Meeting

1. **Call CAC Meeting to Order:** Chair Ziegler called the meeting to order at 6:21 pm.
2. **Attendance:** As noted above
3. **Matters of general public interest:** None
4. **Approval of Agenda:** Michelle asked if we could add a rules change proposal to the agenda. We have had a request from a resident to have agendas sent to them before the meeting. Agendas will be posted on website prior to the meeting, but will not be emailed separately. Motion was made and seconded by Palmquist/McCotter to approve agenda inserting rules change item. Carried unanimously.
5. **Approval of January 22, 2018 CAC Meeting Minutes**: Motion and second to approve minutes by McCotter/Iverson carried.

6. **Election of Officers:** We would normally conduct elections in January except we were delayed by weather. Pete Iverson moved and Jim Boetcher seconded to adopt the slate of officers:

Chair: David Ziegler
Vice Chair: Sharon McCotter
Recorder: Anne Deuring

Carried unanimously. Special thanks to Joan Palmquist for the past year of recordings.

7. **Update on public comments on 10-year Plan:** Claire Bleser, District Administrator, explained the next steps in the 10-year plan process. The public hearing will be at 7:00 pm on March 15 at the district offices. The Board of Managers will receive the comments from the public hearing, recommend modifications or not, and send it to BWSR (Board of Water and Soil Resources) for the ultimate approval.

Most comments have been positive. The goals were listed alphabetically, not prioritized, which has elicited many comments. This will be clarified in the final draft.

Several members of the CAC commented that the goals were not SMART (Specific, Measurable, Achievable, Relevant, Time-bound) enough. So the District added the following to Section 9:

> The overarching district-wide outcomes of implementing this plan over the next 10 years will be:
>
> - 41,000 linear feet of streambank, shoreline, ravine and slope stabilization
> - 3,200 pounds of phosphorus reduction per year
> - 11 acres of habitat restored
> - 4.1 million gallons of groundwater conserved per year

Much discussion on the strength of the smart goals, frequency of reevaluations, effectiveness of regulations over projects, appetite for increasing levy, comprehensiveness of assessments, reacting to trends, length of trends, the ability to revise the plan if needs arise. David Ziegler moved and Joan Palmquist seconded to report to board that we approve the direction of the 10-year plan but would like to see more specifics on trending of impairments within given water bodies and how that affects the ratings of the project. Discussion none. Motion Carried. Paul Bulger moved and Sharon McCotter seconded that we revisit the ranking tool at a minimum of every 3 years and recalculate the scoring of proposed projects at a minimum of every 3 years. Manager Dick Ward emphasized it is a working document that can be changed. Motion carried.

8. **Rules Change Proposal:** Terry Jeffrey, Project & Permit Manager, stated that our efforts at restricting rates of water runoff is not creating the effect we want. We still have significant scour effect going on. We need a rule that seeks to prevent further channel erosion and we're trying to find most cost effective way to capture most benefit.

Proposal - Consider enhancing the stormwater management regulation to include a channel protection performance standard, as follows, instead of the existing 2-year rate control criteria: Match pre-settlement flow duration curve within 10%.

After extensive modeling we found extending detention by reducing the size of the primary orifice (outlet) for 2-year rains to be a cost effective. Projects would be exempt if they are improving impervious surface from existing conditions.

The CAC is eager to hear what the TAC thinks about this proposed regulation. A schematic would be helpful.

9. **2018 Priorities:** We will continue to check in on priorities.

10. **Addition of bylaw change procedures:** The Board approved our bylaw change. Legal counsel Louis Smith simplified it as follows: These bylaws may be amended by a two thirds majority vote of the CAC members following 30 days written notice of the proposed amendment. Joan Palmquist moved and

Paul Bulger seconded. Motion carried. Michelle requested an updated copy of the bylaws. Anne will update bylaws and send to Michelle.

11. **Draft 2018 Calendar:** Michelle added O&E events to calendar that David distributed. A turf alternative workshop is yet to be scheduled. Sharon asked to have board workshop topics noted so we know if it will be repeated in a CAC presentation or not. Wetlands Walk is May 19. We should always include a date on the calendar to avoid version control issues. Because it is always changing, the calendar will not be on the website. Michelle will send updated calendar.
12. **Road Salt symposium notes:** Notes were distributed by email. David summarized: Where ever we have snow and roads we have salt pollution. Sweden doesn't salt and has no chloride pollution. We expect roads to be perfect in US. No salt is best. Learn to drive. Rock salt is cheap and the least effective. Salt brine is more effective according to extensive testing conducted by Minnesota State Mankato.
13. **Worthwhile Events:** Claire Bleser and Michelle Jordan have suggested two events CAC members would be encouraged to go to: MAWD Conference and Trade Show, Nov. 28 – Dec. 1, 2018 and the State of the Water Conference hosted by Freshwater Society in Breezy Point on April 12-14. Please respond to Michelle by March 9 to let her know if interested in either of these events. Attenders are encouraged to share notes from these events with the CAC. Jim Boetcher suggested another worthwhile event, a Stormwater Workshop on March 9 from 8:30 am to 11:30 am. You can preregister by sending an e-mail with your name, e-mail address, phone number, and affiliation to mseveland@co.carver.mn.us . Registration begins at 8:00 am at the Carver County Government Center 604 East 4th St. Chaska, MN 55318.
14. **Updates from subcommittees**
    a. **Storm Drain** (Sharon, Matt): Sharon met with Chanhassen's Jill Sinclair, natural resources person, to plan a clean-up on October 27 (rain date 28). Sharon will also be meeting with the Silver Lake Homeowner's association on February 28, interested in doing projects, such as piloting the Freshwater Society clean-up kit, composting, doorknockers, etc.

       Sharon resurfaced a request from Jill Sinclair from 2010 on partnering on a lawn aeration project. We would suggest that we make sure the aerator is effective from a water quality standpoint. If anyone on the CAC is interested in hearing more, they should reach out to Sharon.
    b. **Silt Sock:** Anne met with Terry Jeffrey and is resuming total storm drain efforts with a new product.
    c. **Speaker's Bureau** (Joan) No update. Plan to meet with subcommittee after this meeting.
    d. **Lake Associations** (David) No update
    e. **Update on status of Sustainability Class sponsorship requested by Lori and supported by CAC** The first class will be April 21 at the Eden Prairie Library from 1:00 – 3:00. The RPBC Watershed District will help promote and sponsor. We are invited to be involved to help facilitate the small group hands on focus.
15. **2018 March 19 CAC agenda items**
    a. Input on E&O including how to interface with other CACs
    b. Website Update and how we use it
    c. CAC Priorities for year on website
16. **Upcoming events**
    a. Landscaping for Wildlife & Water Quality, March 10, 10:00 am to 12:00 pm, $25
    b. RPBCWD Board of Managers Workshop and meeting, March 15, at 5:30 pm, 18681 Lake Drive East
    c. 10-year Plan Public Hearing March 15, 7:00 pm, 18681 Lake Drive East
    d. RPBCWD CAC meeting March 19, at 6:00 pm, 18681 Lake Drive East
    e. Turf Maintenance Workshop, March 22; at 9:00 am, at District Office
17. **Adjourn CAC meeting:** Motion and second to adjourn by Joan Palmquist and Jim Boettcher, carried. Meeting adjourned at 8:53 pm.

REDPATH
AND COMPANY

March 8, 2018

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 ending January 31, 2018.

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
18681 Lake Drive E.
Chanhassen, Minnesota 55317

Accountant's Opinion

The Riley Purgatory Bluff Creek Watershed District is responsible for the accompanying January 31, 2018 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
March 8, 2018

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

Treasurers Report

January 31, 2018

REPORT INDEX

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT
Cash Disbursements
January 31, 2018

Accounts Payable:

Check #	Payee	Amount
4384	Barr Engineering	$98,045.75
4385	CenterPoint Energy	1,182.68
4386	Coverall of the Twin Cities	854.72
4387	Dell Five Business Park G-1	7,353.70
4388	Freshwater Society	270.00
4389	HDR Engineering, Inc.	2,355.45
4390	Amy Herbert, LLC	1,476.00
4391	Iron Mountain	39.95
4392	Lincoln National Life Insurance	981.40
4393	LMC Insurance Trust	322.00
4394	MAVA	3,000.00
4395	MAWD	7,500.00
4396	Metro Sales, Inc.	555.80
4397	Metro Watershed Partners	3,000.00
4398	MIPN	90.00
4399	Purchase Power	151.98
4400	Smith Partners	14,485.48
4401	SpeeDee Delivery Service	67.74
4402	Wenck, Inc.	37,393.12
4403	Xcel Energy	1,716.14
4404	David Ziegler	151.20
	Total Accounts Payable:	**$180,993.11**

Payroll Disbursements:

	Payroll Processing Fee	279.62
	Employee Salaries	27,491.94
	Employer Payroll Taxes	2,257.32
	Employee Benefit Deductions	(396.26)
	Staff Expense Reimbursements	161.89
	PERA Match	1,964.70
	Total Payroll Disbursements:	**$31,759.21**
EFT	Banks Fees - Klein Bank	7.90
TOTAL DISBURSEMENTS:		**$212,760.22**

Memos

The 2018 mileage rate is 54.5 per mile. The 2017 rate was .53.5.
Klein Bank VISA will be paid on-line.

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT
Fund Performance Analysis - Table 1
January 31, 2018

	2018 Budget	Current Month	Year-to-Date	Year-to Date Percent of Budget
REVENUES				
Plan Implementation Levy	$3,420,000.00	-	-	0.00%
Permit	20,000.00	1,500.00	1,500.00	7.50%
Grant Income	373,175.00	-	-	0.00%
Data Collection Income	-	-	-	---
Other Income	-	11,645.00	11,645.00	---
Investment Income	-	292.50	292.50	---
Past Levies	1,736,968.00	-	-	0.00%
Partner Funds	445,000.00	-	-	0.00%
TOTAL REVENUE	**$5,995,143.00**	**$13,437.50**	**$13,437.50**	0.22%
EXPENDITURES				
Administration				
Accounting and Audit	40,000.00	601.62	601.62	1.50%
Advisory Committees	4,000.00	151.20	151.20	3.78%
Insurance and bonds	12,000.00	-	-	0.00%
Engineering Services	103,000.00	7,470.00	7,470.00	7.25%
Legal Services	75,000.00	3,822.26	3,822.26	5.10%
Manager Compensation	19,000.00	270.00	270.00	1.42%
Dues and Publications	8,000.00	7,590.00	7,590.00	94.88%
Office Cost	100,000.00	11,420.16	11,420.16	11.42%
Permit Review and Inspection	90,000.00	19,137.19	19,137.19	21.26%
Recording Services	15,000.00	1,476.00	1,476.00	9.84%
Staff Cost	434,000.00	32,460.99	32,460.99	7.48%
Subtotal	**$900,000.00**	**$84,399.42**	**$84,399.42**	9.38%
Programs and Projects				
District Wide				
10-year Management Plan	9,662.00	5,777.10	5,777.10	59.79%
AIS Inspection and early response	75,000.00	-	-	0.00%
Cost-share	200,000.00	-	-	0.00%
Creek Restoration Action Strategies Phase	20,000.00	-	-	0.00%
Data Collection and Monitoring	180,000.00	3,760.49	3,760.49	2.09%
District Wide Floodplain Evaluation - Atlas 14/SMM model	30,000.00	-	-	0.00%
Education and Outreach	115,000.00	6,821.95	6,821.95	5.93%
Plant Restoration - U of M	40,000.00	-	-	0.00%
Repair and Maintenance Fund *	177,005.00	-	-	0.00%
Survey and Analysis Fund *	13,092.00	-	-	0.00%
Wetland Management*	150,000.00	-	-	0.00%
District Groundwater Assessment	-	166.38	166.38	---
Groundwater Conservation*	130,000.00	-	-	0.00%
Lake Vegetation Implementation	75,000.00	-	-	0.00%
Opportunity Project*	100,000.00	-	-	0.00%
TMDL - MPCA	10,000.00	-	-	0.00%
Subtotal	**$1,324,759.00**	**$16,525.92**	**$16,525.92**	1.25%
Bluff Creek				
Bluff Creek Tributary*	236,741.00	7,176.00	7,176.00	3.03%
Chanhassen High School *	282,478.00	5,062.00	5,062.00	1.79%
Subtotal	**$519,219.00**	**$12,238.00**	**$12,238.00**	2.36%
Riley Creek				
Lake Riley - Alum Treatment*	22,424.00	15,579.86	15,579.86	69.48%
Lake Susan Improvement Phase 1 *	7,106.00	-	-	0.00%
Lake Susan Water Quality Improvement Phase 2 *	353,365.00	37,941.68	37,941.68	10.74%
Rice Marsh Lake in-lake phosphorus load	150,000.00	-	-	0.00%
Riley Creek Restoration (Reach E and D3) *	1,427,987.00	21,366.50	21,366.50	1.50%
Subtotal	**$1,960,882.00**	**$74,888.04**	**$74,888.04**	3.82%
Purgatory Creek				
Fire Station 2 (Eden Prairie)	100,262.00	-	-	0.00%
Purgatory Creek Rec Area- Berm/retention area - feasibility/design	50,000.00	-	-	0.00%
Lotus Lake in-lake phosphorus load control	345,000.00	21,813.26	21,813.26	6.32%
Lotus Lake - Feasability Phase 1	18,802.00	-	-	0.00%
Purgatory Creek at 101*	246,259.00	-	-	0.00%
Silver Lake Restoration - Feasibility Phase 1	11,003.00	3,952.00	3,952.00	35.92%
Scenic Heights	208,957.00	(1,056.42)	(1,056.42)	-0.51%
Hyland Lake in-lake phosphorus load control	20,000.00	-	-	0.00%
Duck Lake watershed load	220,000.00	-	-	0.00%
Subtotal	**$1,220,283.00**	**$24,708.84**	**$24,708.84**	2.02%
Reserve	$100,000.00			0.00%
TOTAL EXPENDITURE	**$6,025,143.00**	**$212,760.22**	**$212,760.22**	3.53%
EXCESS REVENUES OVER (UNDER) EXPENDITURES	**($30,000.00)**	**($199,322.72)**	**($199,322.72)**	

*Denotes Multi-Year Project - See Table 2 for details

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT
Muti-Year Project Performance Analysis - Table 2
January 31, 2018

Programs and Projects	Total Project	FUNDING SOURCE District funds	Partner Fund	Grants	Mond Ended 01/31/18	Year To-Date	Lifetime Costs	Remaining
District Wide								
10-year Management Plan	187,000.00	187,000.00	-	-	5,777.10	5,777.10	183,115.19	3,884.81
District Wide Floodplain Evaluation - Atlas 14/SMM model	30,000.00	30,000.00	-	-	-	-	-	30,000.00
Repair and Maintenance Fund	202,005.00	177,005.00	-	-	-	-	25,000.00	177,005.00
Survey and Analysis Fund	13,092.00	13,092.00	-	-	-	-	23,792.63	(10,700.63)
Wetland Management	150,000.00	150,000.00	-	-	-	-	-	150,000.00
Groundwater Conservation	130,000.00	130,000.00	-	-	-	-	-	130,000.00
Opportunity Project*	100,000.00	100,000.00	-	-	-	-	-	100,000.00
Subtotal	$812,097.00	$787,097.00	$0.00	$0.00	$5,777.10	$5,777.10	$231,907.82	580,189.18
Bluff Creek								
Bluff Creek Tributary*	292,362.00	241,362.00	50,000.00	-	7,176.00	7,176.00	61,797.46	230,564.54
Chanhassen High School *	368,000.00	118,000.00	50,000.00	200,000.00	5,062.00	5,062.00	115,583.87	252,416.13
Subtotal	$660,362.00	$359,362.00	$100,000.00	$200,000.00	$12,238.00	$12,238.00	$177,381.33	$482,980.67
Riley Creek								
Lake Riley - Alum Treatment 1st dose *	260,000.00	260,000.00	-	-	15,579.86	15,579.85	253,155.72	6,844.28
Lake Susan Improvement Phase 1 *	275,000.00	275,000.00	-	-	-	-	267,894.28	7,105.72
Lake Susan Water Quality Improvement Phase 2 *	513,400.00	230,000.00	50,000.00	233,400.00	37,941.68	37,941.68	147,976.10	365,423.90
Rice Marsh Lake in-lake phosphorus load	150,000.00	150,000.00	-	-	-	-	-	150,000.00
Riley Creek Restoration (Reach E and D3) *	1,565,000.00	1,265,000.00	300,000.00	-	21,366.50	21,366.50	82,592.10	1,482,407.90
Subtotal	$2,763,400.00	$2,180,000.00	$350,000.00	$233,400.00	$74,888.04	$74,888.03	$751,618.20	$2,011,781.80
Purgatory Creek								
Fire Station 2 (Eden Prairie)	139,287.00	20,000.00	20,000.00	99,287.00	-	-	19,025.36	120,261.64
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	-	-	21,813.26	21,813.26	-	345,000.00
Purgatory Creek at 101*	661,094.00	661,094.00	-	-	-	-	414,835.60	246,258.40
Scenic Heights	260,000.00	165,000.00	45,000.00	50,000.00	(1,056.42)	(1,056.42)	51,042.94	208,957.06
Duck Lake watershed load	220,000.00	220,000.00			-	-	-	220,000.00
Subtotal	$1,675,381.00	$1,461,094.00	$65,000.00	$149,287.00	$20,756.84	$20,756.84	$484,903.90	$1,190,477.10
Total Multi-Year Project Costs	$5,911,240.00	$4,787,553.00	$515,000.00	$582,687.00	$113,659.98	$113,659.97	$1,645,811.25	$4,265,428.75

See Accountants Compilation Report

Riley Purgatory Bluff Creek Watershed District
Balance Sheet
As of January 31, 2018

ASSETS

Current Assets

General Checking-Klein	$841,063.49	
Checking-Klein/BMW	1,383,101.52	
Investments-FMV	(121.06)	
Investments-Standing Cash	995,715.77	
Investments-Wells Fargo	1,480,249.96	
Accrued Investment Interest	8,670.64	
Accounts Receivable	3,250.00	
Taxes Receivable-Delinquent	17,622.16	
Pre-Paid Expense	38,906.63	
Security Deposits	9,744.00	
Total Current Assets:		**$4,778,203.11**

LIABILITIES AND CAPITAL

Current Liabilities

Accounts Payable	$182,750.13	
Retainage Payable	13,469.38	
Salaries Payable	15,129.68	
FICA/Medicare	(240.88)	
PERA Payable	0.06	
HSA Contributions-Employee	525.00	
Permits & Sureties Payable	704,352.00	
Deferred Revenue	17,622.16	
Unavailable Revenue	143,389.16	
Total Current Liabilities:		**$1,076,996.69**

Capital

Fund Balance-General	$3,086,853.86	
Fund Balance-Default	813,675.28	
Net Income	(199,322.72)	
Total Capital		**$3,701,206.42**
Total Liabilities & Capital		**$4,778,203.11**

See Accountants Compilation Report

RILEY PURGTORY BLUFF CREEK WATERSHED DISTRICT
Klein Bank VISA Activity
January 31, 2018

DATE	PURCHASED FROM	AMOUNT	DESCRIPTION	ACCOUNT #	RECEIPT
01/03/18	Lakewinds	13.39	Board Meeting Expense	10-00-4010	Y
01/03/18	Target	18.06	Office Supplies	10-00-4200	Y
01/04/18	Potbelly	175.02	Board Meeting Expense	10-00-4205	Y
01/05/18	SuperAmerica	63.31	Gas for Vehicle	10-00-4322	Y
01/08/18	General Delivery	23.57	Courier Services	10-00-4200	Y
01/09/18	Microsoft	80.64	Software	10-00-4203	Y
01/09/18	IKEA	301.05	Office Furniture	10-00-4200	Y
01/10/18	IKEA	95.70	Office Furniture	10-00-4200	Y
01/12/18	U of M Continued Learning	350.00	Conference Registration	10-00-4265	Y
01/19/18	Randy's Sanitation	125.65	Trash Service	10-00-4215	Y
01/25/18	Office Depot	(44.93)	Returned Item	10-00-4200	Y
01/29/18	Freshwater Society	135.00	Registration/Chloride Symposium	10-00-4265	Y
01/29/18	American Water Resource Assoc.	849.00	Membership	10-00-4245	Y
		$2,185.46	**General Administration Total**		
12/26/17	Amazon	70.25	Wetlands Literature Reference	20-13-4250	Y
01/08/18	Amazon	32.29	E & O Volunteer Sandbox Equip.	20-05-4635	Y
01/08/18	Hach	193.82	Field Equipment	20-05-4635	Y
01/09/18	Office Depot	1,090.83	Office Supplies	20-15-4200	Y
01/11/18	Brueggers	28.98	Data Collection Workshop	20-05-4205	Y
01/16/18	Verizon	1,143.59	iPad and District Phone Chargers	20-08-4635	Y
01/16/18	USPS	238.00	Field Equipment Shipping	20-03-4205	Y
01/17/18	In-Situ, Inc.	235.49	Field Equipment Calibration	20-05-4635	Y
01/17/18	In-Situ, Inc.	235.49	Field Equipment Calibration	20-05-4635	Y
01/17/18	In-Situ, Inc.	235.49	Field Equipment Calibration	20-05-4635	Y
01/17/18	In-Situ, Inc.	235.49	Field Equipment Calibration	20-05-4635	Y
01/17/18	In-Situ, Inc.	149.47	Field Equipment Calibration	20-05-4635	Y
01/17/18	In-Situ, Inc.	235.49	Field Equipment Calibration	20-05-4635	Y
01/17/18	In-Situ, Inc.	235.49	Field Equipment Calibration	20-05-4635	Y
01/17/18	In-Situ, Inc.	235.49	Field Equipment Calibration	20-05-4635	Y
01/17/18	In-Situ, Inc.	235.49	Field Equipment Calibration	20-05-4635	Y
01/17/18	In-Situ, Inc.	235.49	Field Equipment Calibration	20-05-4635	Y
01/17/18	In-Situ, Inc.	235.49	Field Equipment Calibration	20-05-4635	Y
01/17/18	In-Situ, Inc.	235.49	Field Equipment Calibration	20-05-4635	Y
01/17/18	In-Situ, Inc.	270.51	Field Equipment Calibration	20-05-4635	Y
01/17/18	In-Situ, Inc.	162.34	Field Equipment Calibration	20-05-4635	Y
01/17/18	Amazon	39.99	Teaching Chloride Kit	20-08-4201	Y
01/23/18	Target	54.87	E & O Volunteer Workshop Food	20-08-4205	Y
01/24/18	Cub	84.28	E & O Volunteer Workshop Food	20-08-4205	Y
01/25/18	Crumb	120.97	E & O Volunteer Workshop Food	20-08-4205	Y
01/26/18	Davanni's	137.69	E & O Volunteer Workshop Food	20-08-4205	Y
		$6,408.27	**Bluff Creek Total**		
		$8,593.73	**GRAND TOTAL**		

COOPERATIVE AGREEMENT
Between the Riley-Purgatory-Bluff Creek Watershed District and the City of Chanhassen

Lake Susan Park Pond Watershed Treatment and Stormwater Reuse Project

This cooperative agreement is made by and between the Riley-Purgatory-Bluff Creek Watershed District, a watershed district created pursuant to Minnesota Statutes chapters 103B and 103D (RPBCWD), and the City of Chanhassen, a governmental subdivision and body corporate and politic of the State of Minnesota (Chanhassen) for the construction, operation and maintenance of the Lake Susan Park Pond water-quality improvement and stormwater-reuse project.

Recitals

WHEREAS RPBCWD's approved watershed management plan (the Plan) identifies excessive nutrient loading as an ongoing harm to water quality in Lake Susan;

WHEREAS in 2010 the Minnesota Pollution Control Agency designated Lake Susan as impaired for aquatic recreation because of excessive nutrients in the lake, and the lake does not meet its designated-use classification;

WHEREAS the capital improvement program in the Plan includes the Lake Susan Water Quality Improvement Project, which includes measures to manage external phosphorus loading to Lake Susan, including increasing storage in basins that discharge to Lake Susan, installing bench or perimeter filters in such basins for soluble phosphorus removal and installing water reuse systems to use basin water for irrigation;

WHEREAS Chanhassen operates its stormwater management system under the state Municipal Separate Storm Sewer System general permit, and construction and maintenance of the Project will accrue to the benefit of Chanhassen's fulfillment of its MS4 permit obligations;

WHEREAS in 2013 RPBCWD and Chanhassen completed an update of the Use Attainability Analysis for Lake Susan that RPBCWD had prepared in 1999 and the update focused on: (1) assessing the water quality in Lake Susan based on updated physical, chemical and biological data; (2) improving understanding of current water quality concerns in the lake; and (3) identifying best management practices to improve and protect the lake's water quality and increase the likelihood of Lake Susan being removed from the state impaired waters list;

WHEREAS in 2016 RPBCWD completed construction of a spent-lime treatment system that is expected to reduce phosphorus levels in runoff to Lake Susan by 45 pounds per year, contributing substantially to achieving RPBCWD's water-quality goals for the lake but not on its own achieving the necessary reductions;

WHEREAS the RPBCWD engineer prepared a feasibility report in March 2017 to assess options to further reduce phosphorus loading to and improve water quality in Lake Susan, and the engineer determined that construction and operation of a pump, iron-enhanced sand filter

and reuse system would reduce loading of total phosphorus to Lake Susan by 32 pounds per year at an estimated annual cost of between $530 and $830 per pound of phosphorus removed and would conserve 1.9 acre-feet of groundwater per year at a total cost of $480,000;

WHEREAS based on these findings and an assessment of potential site impacts, the RPBCWD engineer recommended construction and operation of a pump, filter and reuse system as the most appropriate and cost-effective conceptual design to address RPBCWD's goals for Lake Susan and established interest in reducing use of groundwater for irrigation;

WHEREAS after a duly noticed public hearing on April 5, 2017, the RPBCWD Board of Managers considered the comments received then ordered the Lake Susan Park Pond project on July 12, 2017;

WHEREAS at the direction of the managers, the RPBCWD engineer has completed designs, plans and specifications for construction of an iron-enhanced sand filter adjacent to Lake Susan Park Pond, along with a pump to remove stormwater collected in the pond and route it to the filter for phosphorus removal prior to discharge back to the pond outlet and Lake Susan (the Project). The Project also includes a retrofit of the existing irrigation system at Lake Susan Park to capture, store and use stormwater for irrigation of the park's baseball field;

WHEREAS the Project will be constructed on multiple parcels owned by the City of Chanhassen that altogether constitute Lake Susan Park, which is operated by Chanhassen, in the area depicted and labeled "Project Area" in Exhibit A;

WHEREAS RPBCWD has secured a $233,400 Clean Water, Land and Legacy grant from the State of Minnesota for the Project, which grant carries with it certain obligations and requirements;

WHEREAS the Project will increase public awareness of stormwater reuse and groundwater conservation and will decrease the draw on the underlying aquifer for irrigation;

WHEREAS Chanhassen and RPBCWD acknowledge that their ability to achieve Project objectives depends on each party satisfactorily and promptly performing individual obligations and working cooperatively with the other party; and

WHEREAS Minnesota Statutes section 471.59 authorizes Chanhassen and RPBCWD to enter this cooperative agreement.

AGREEMENT

NOW, THEREFORE Chanhassen and RPBCWD enter into this agreement to document their understanding as to the scope of the Project, affirm their commitments as to the responsibilities of and tasks to be undertaken by each party, establish procedures for performing these tasks and carrying out these responsibilities, and facilitate communication and cooperation to successfully complete and subsequently operate and maintain the Project.

1 Organization and Relationship of the Parties

1.1 The RPBCWD administrator and the Chanhassen water resources coordinator will serve as project leads and principal contacts for their respective organizations for the Project, charged to conduct the day-to-day activities necessary to ensure that the Project is completed in accordance with the terms of this agreement.

1.2 The project leads will coordinate and communicate informally and formally to timely address any issues of concern to ensure the successful completion of the Project.

2 Project Design, Construction and Maintenance

2.1 The Project is further defined for purposes of this cooperative agreement as the work specified in the designs, plans and specifications attached to and incorporated into this agreement as Exhibit B. The Project will also include, after completion of construction, assessment of the effectiveness of the Project by the parties and, subject to the approval by Chanhassen, development by the RPBCWD engineer of specific written schedules, procedures and protocols for routine and major operation and maintenance of the Project. This agreement also provides terms and conditions for post-construction operation and maintenance of the Project.

2.2 For purposes of the Project as specified in paragraph 2.1 and Exhibit B:

i. Chanhassen's execution of this agreement constitutes approval of the designs, plans and specifications in Exhibit B;

ii. By execution of this agreement, Chanhassen grants to RPBCWD, its contractors, agents and assigns a license to access and use the Project Area for purposes of RPBCWD's successful exercise of rights and completion of its obligations under this agreement. Chanhassen's authorization of property-use rights hereunder is nonexclusive, except that RPBCWD, on 24 hours' notice to Chanhassen, may temporarily restrict or preclude public access to the Project Area to ensure safety while construction activities are under way. Access to the Project Area will be restricted as briefly and infrequently as reasonably possible, and will be imposed only as necessary for Project access, construction and safety purposes. RPBCWD will respond within one business day to any communication from Chanhassen regarding closure of the Project Area.

iii. On completion of construction of the Project, Chanhassen will retain ownership of Lake Susan Park and all installed and constructed elements of the Project as described in paragraph 2.1 and otherwise herein.

iv. Chanhassen will forbear from any activity that interferes with the RPBCWD's ability to exercise its rights or meet its obligations under this agreement, including but not limited to transfer of ownership of Lake Susan Park. Chanhassen will facilitate RPBCWD's reasonable exercise of its rights under this agreement with regard to access to and use of the Project Area. Chanhassen will not take any action on, in or adjacent

to the Project Area 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, Chanhassen will continue to operate and maintenance maintain Lake Susan Park in a manner that avoids inhibiting the operation and effectiveness of the Project.

2.3 As between the parties, RPBCWD will obtain all necessary permits, licenses and approvals for the Project on behalf of itself and Chanhassen, and will ensure that the Project is completed in accordance with applicable law and regulatory requirements. Chanhassen, as owner of Lake Susan Park, will cooperate with RPBCWD's and its contractor's efforts to obtain permits and approvals needed for the Project. Chanhassen, in its regulatory capacity, will facilitate the proper and efficient processing of any permits or approvals needed for the Project.

2.4 RPBCWD will implement the Project as follows:

i. RPBCWD will contract for the construction of the Project as specified in the construction documents in Exhibit B in accordance with state procurement law. RPBCWD will require that the contractor for the Project name Chanhassen as an additional insured with primary and noncontributory coverage for general liability and provide a certificate showing same prior to construction;

ii. RPBCWD or the RPBCWD engineer on RPBCWD's behalf will oversee the construction of the Project. RPBCWD may adjust the designs, plans and specifications for the Project during construction, as long as the revisions do not require RPBCWD to exceed the scope of the rights granted under this agreement;

iii. RPBCWD will submit material changes to Project plans and specifications to Chanhassen for review and approval, such approval not to be unreasonably withheld. Chanhassen's failure to timely act will constitute approval;

iv. On completion of construction of the Project, RPBCWD will restore the Project Area to a safe and functional condition, consistent with its ongoing use for public recreational purposes, except to the extent Lake Susan Park is improved by the Project.

2.5 Until completion of construction of the Project, if RPBCWD, in its judgment, should decide that the Project is infeasible, RPBCWD, at its option, may declare the agreement rescinded and annulled. If RPBCWD so declares, all obligations herein, performed or not, will be voided, except that RPBCWD will return the Project Area materially to its prior condition or to a condition agreed to by Chanhassen and RPBCWD.

2.6 **Maintenance.**

i. RPBCWD will contract with the RPBCWD engineer for and direct the development, in collaboration with Chanhassen, and subject to the approval of Chanhassen, a draft plan for the post-construction maintenance of the Project (the Maintenance

Plan). The Maintenance Plan will delineate and distinguish routine and major maintenance and repair of the Project.

ii. Chanhassen will be requested to approve the Maintenance Plan.. If Chanhassen disapproves the Maintenance Plan, all maintenance necessary to assure that the Project will continue to effectively function as designed will become the sole responsibility of Chanhassen. After approval of the Maintenance Plan, Chanhassen will perform all routine maintenance and monitoring of the Project, along with reporting as may be required by the Maintenance Plan, for 20 years from the date the Project is substantially complete for its intended purposes.

iii. After approval of the Maintenance Plan, Chanhassen will complete or contract for the completion, in its sole discretion, of major maintenance and repairs of the Project, as necessary, for 20 years from the date the Project is substantially complete for the intended purposes. For purposes of this agreement, major maintenance and repair of the Project is defined as work necessary to ensure the continued effective operation of the Project for its intended purposes beyond the routine maintenance and repairs defined and specified in the Maintenance Plan.

iv. RPBCWD may from time to time conduct monitoring of the performance of the Project.

3 Cost- and Credit-Sharing

3.1 **Construction costs.** RPBCWD will be responsible for all costs of design and construction of the Project, except that Chanhassen will reimburse RPBCWD for $50,000 of documented Project costs. RPBCWD will be responsible for the costs and fees associated with complying with regulatory requirements applicable to the Project, except that Chanhassen will assess no fee to RPBCWD for Chanhassen permits required for the Project, if any.

3.2 **Maintenance costs.** Chanhassen will be responsible for costs of operation and routine and major maintenance of the Project in accordance with the Maintenance Plan for a minimum of 20 years from the date of substantial completion, except that RPBCWD will duly consider levying and dedicating maintenance funds for maintenance of the Project.

3.3 **Administrative costs.** Each party will bear its administrative and incidental costs of fulfilling its responsibilities and obligations under this agreement.

3.4 **Compliance credit.** All stormwater-management or nutrient-reduction capacity created by the Project, if any, may be utilized by Chanhassen in accounting for compliance with its MS4 permit or other regulatory obligations. Chanhassen will determine, at its cost, available credit from the Project. RPBCWD makes no representation or warranty as to credit that will be available from or results that will be achieved by the Project.

4 Specific additional duties – RPBCWD

4.1 RPBCWD will provide as-built construction drawings of the Project to Chanhassen within 90 days of certification of the Project as substantially complete for the intended purposes.

4.2 RPBCWD will contract with the RPBCWD engineer for the development of the Maintenance Plan. The contract for the Maintenance Plan will require the RPBCWD engineer to provide the Maintenance Plan for approval by Chanhassen and RPBCWD within one year of certification by a qualified engineer of the as-built construction drawings of the Project, such approval not to be unreasonably withheld.

4.3 RPBCWD makes no warranty to Chanhassen regarding the RPBCWD engineer's or another third party's performance in design, construction or construction management for the Project or completion of the Maintenance Plan.

5 General Terms

5.1 INDEPENDENT RELATIONSHIP; LIABILITY.

i. This agreement does not create a joint powers board or organization within the meaning of Minnesota Statutes section 471.59, and neither party agrees to be responsible for the acts or omissions of the other 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.

ii. Chanhassen and RPBCWD enter this agreement solely for the purposes of improving water quality in Lake Susan. Accordingly, each party is responsible for its own acts, omissions and the results thereof to the extent authorized by law and will not be responsible for the acts and omissions of others or the results thereof. Minn. Stat. chapter 466 and other applicable law govern liability of each of the parties. The limits of liability for the parties may not be added together to determine the maximum amount of liability for either party. Notwithstanding the foregoing or any other provision of this agreement, Chanhassen's and RPBCWD's obligations under this paragraph will survive the termination of the agreement.

iii. This agreement creates no right in and waives no immunity, defense or liability limitation with respect to any third party.

iv. 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 the Project Area. 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 Project Area or adjacent property so as to render RPBCWD a potentially responsible party for any contamination under state and/or federal law.

5.2 PUBLICITY AND ENDORSEMENT. Any publicity regarding the Project must identify Chanhassen and RPBCWD as the sponsoring entities, and must acknowledge the dedication of

Clean Water Land and Legacy funds to the Project. For purposes of this provision, publicity includes notices, informational pamphlets, press releases, research, reports, signs, and similar public notices prepared by or for Chanhassen or RPBCWD individually or jointly with others, or any subcontractors, with respect to the Project. RPBCWD and Chanhassen will collaborate on the development of educational and informational signage pertinent to the Project, and each party, at its cost, may develop, produce and, after approval of the other party, distribute educational, outreach and publicity materials related to the Project.

5.3 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.

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

5.5 ENTIRE AGREEMENT. This agreement, as it may be amended in writing, contains the complete and entire agreement between 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 made a part of the agreement.

5.6 WAIVERS. The waiver by Chanhassen 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.

5.7 NOTICES. Any notice, demand or communication under this agreement by either party to the other will be deemed to be sufficiently given or delivered if it is dispatched by registered or certified mail, postage prepaid to:

Chanhassen
Paul Oehme
7700 Market Blvd
Chanhassen, MN 55317
952-227-1168

RPBCWD
Claire Bleser, PhD, administrator
18681 Lake Drive East
Chanhassen MN 55317
952-607-6512

6.8 TERM; TERMINATION. This agreement is effective on execution by both parties and will terminate three years from the date of execution of this agreement or on the written agreement of both parties.

IN WITNESS WHEREOF, the parties have executed this agreement.

RILEY-PURGATORY-BLUFF CREEK WATERSHED DISTRICT
a watershed district and political subdivision of the State of Minnesota

By _____ Date:_____
Leslie Yetka
President

APPROVED AS TO FORM
AND EXECUTION

By _____
RPBCWD counsel

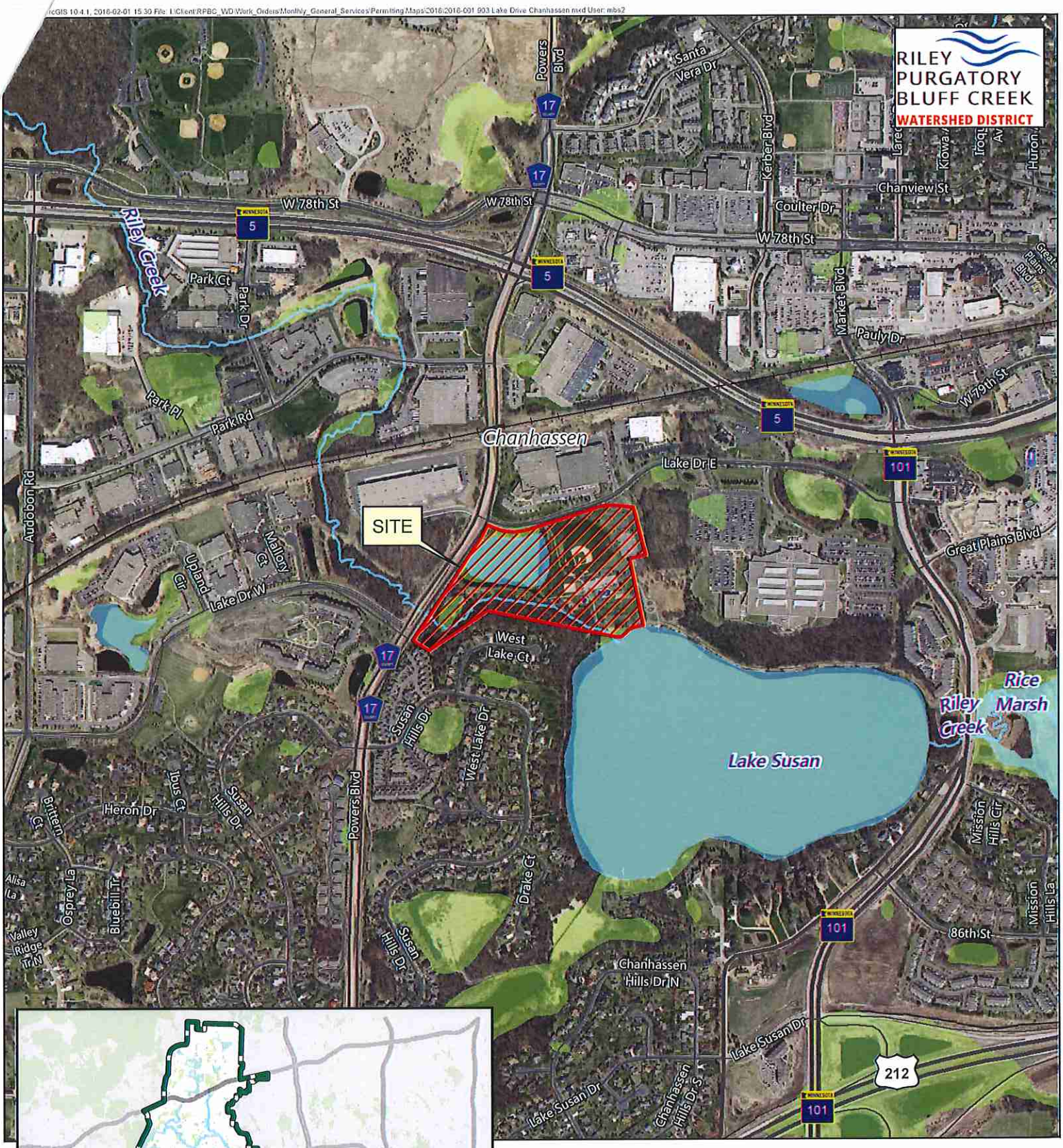
CITY OF CHANHASSEN,
a statutory city and political subdivision of the State of Minnesota

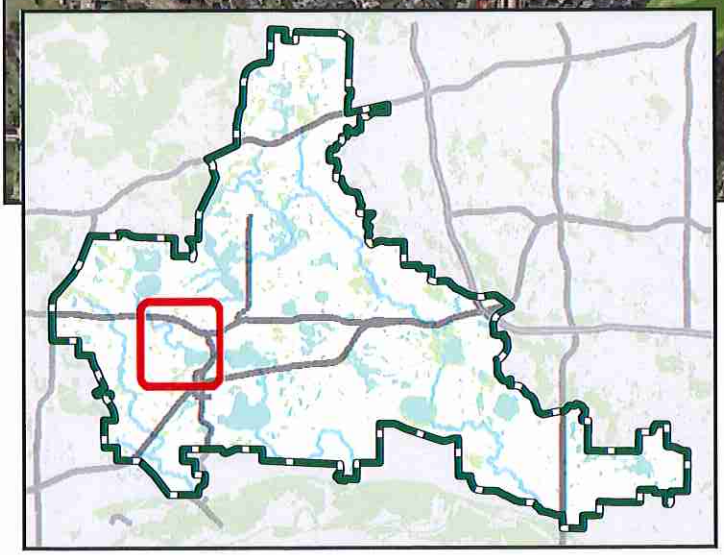
By _____ Date: _____
Denny Laufenburger
Mayor

By _____ Date: _____
Todd Gerhardt
City Manager

Exhibit A
Project Area

Exhibit B
Project Designs, Plans and Specifications





N

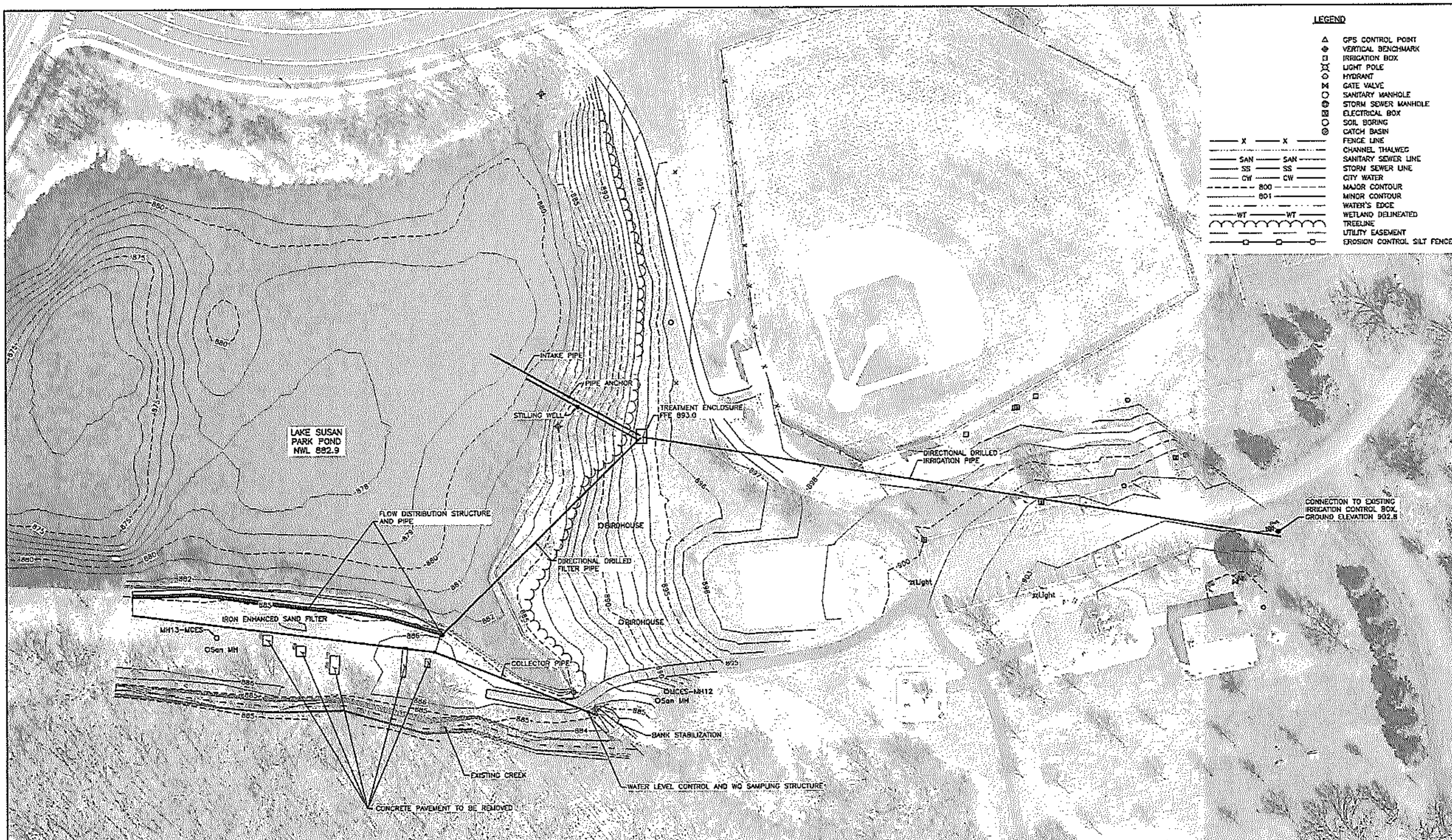
Feet

0 1,000

Site Location Map

LAKE SUSAN PARK POND WATER QUALITY AND REUSE PROJECT

Riley Purgatory Bluff Creek Watershed District



LEGEND

- GPS CONTROL POINT
- VERTICAL BENCHMARK
- IRRIGATION BOX
- LIGHT POLE
- HYDRANT
- GATE VALVE
- SANITARY MANHOLE
- STORM SEWER MANHOLE
- ELECTRICAL BOX
- SOIL BORING
- CATCH BASIN
- FENCE LINE
- CHANNEL THALWEG
- SANITARY SEWER LINE
- STORM SEWER LINE
- CITY WATER
- MAJOR CONTOUR
- MINOR CONTOUR
- WATER'S EDGE
- WETLAND DELINEATED
- TREELINE
- UTILITY EASEMENT
- EROSION CONTROL SILT FENCE

1 PLAN VIEW

0 40 80

SCALE IN FEET

RELEASED FOR 90% DESIGN REVIEW

No.	BY	CHK	APP.	DATE	REVISION DESCRIPTION

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 ____

SIGNATURE ____

DATE ____ LICENSE # ____

RELEASED TO/FOR	A	B	C	0	1	2	3
CLIENT	10/20	12/01	01/12				
BID							
CONSTRUCTION							
	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	10/11/2017
Drawn	CCN
Checked	
Designed	BARR
Approved	

RPBCWD
EDEN PRAIRIE, MINNESOTA

LAKE SUSAN WATERSHED TREATMENT
CHANHASSEN, MINNESOTA

PROPOSED SITE
PLAN OVERALL

BARR PROJECT No. 23/27-0053.14

CLIENT PROJECT No.

DWG. No. C-02

REV. No. C

DRAFT COOPERATIVE AGREEMENT
Among City of Chanhassen, Independent School District 112 and
Riley-Purgatory-Bluff Creek Watershed District

Chanhassen High School
Stormwater Capture and Reuse Project

DRAFT 3-9-18

This cooperative agreement is made by and among the City of Chanhassen, a Minnesota municipal corporation (Chanhassen); Eastern Carver County Schools - Independent School District 112, a statutory body politic defined and bestowed with powers by Minnesota Statutes chapters 123A and 123B *(ISD 112);* and Riley-Purgatory-Bluff Creek Watershed District, a watershed district created pursuant to Minnesota Statutes chapters 103B and 103D (RPBCWD); to achieve shared water-resource protection and improvement goals through design, construction and maintenance of a stormwater-reuse project on the campus of Chanhassen High School (the School Property, the legal description of which is attached to and incorporated into this agreement as Exhibit A), which is owned in fee by ISD 112.

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 the improvement of water quality in Bluff Creek and in the Bluff Creek watershed generally;

WHEREAS in 2002 the Minnesota Pollution Control Agency added Bluff Creek to the list of state waters that are not meeting their designated-use classification because of excessive sediment in the creek;

WHEREAS in 2004 the Minnesota Pollution Control Agency added Bluff Creek to the list of state waters that are not meeting their designated-use classification because of the low number and variety of fish species in the creek;

WHEREAS Chanhassen approached ISD 112 and ISD 112 agreed that there was benefit to reduce Chanhassen High School's dependence on pumped groundwater for irrigation;

WHEREAS at the direction of the RPBCWD board of managers and in collaboration with Chanhassen, the RPBCWD engineer studied the feasibility of retrofitting the existing irrigation system at Chanhassen High School to capture, store and use stormwater for irrigation of athletic fields, greenspace and landscaping on the school grounds (the Project), and the engineer estimated that the Project would reduce groundwater use by an estimated 1.93 million gallons per year, reduce loading of total suspended solids in stormwater flowing from the School Property by roughly 1,345 pounds per year, reduce phosphorus loading by 7.4 pounds and runoff volume leaving the School Property by approximately 9.1 acre-feet per year, and that

the Project would contribute to reducing turbidity in Bluff Creek and generally would help protect Bluff Creek from degradation;

WHEREAS the Project will increase public awareness of stormwater reuse and groundwater conservation; maintain hydrology of wetlands on the School Property; contribute to Carver County groundwater-management efforts by decreasing the draw on the aquifer for irrigation;

WHEREAS on October 5, 2016, the RPBCWD board of managers amended the capital improvements program in the Plan to include the Project;

WHEREAS on December 7, 2016, the RPBCWD board of managers conducted a duly-noticed public hearing on and ordered the Project in accordance with Minnesota Statutes section 103B.251;

WHEREAS RPBCWD has secured a $200,000 grant from the Metropolitan Council for the Project;

WHEREAS the Project will be constructed entirely on the School Property in the area depicted and labeled "Project Area" in Exhibit B, attached to and incorporated into this agreement, utilizing stormwater storage capacity available in Pond 4P, labeled on Exhibit B, under rights contributed or obtained by ISD 112 for the Project;

WHEREAS subsequent to the RPBCWD board of managers' ordering the project, the RPBCWD engineer determined through modeling that the Project can be expected to reduce the draw on groundwater by 3.5 to 4.9 million gallons per year, reduce loading of total suspended solids in stormwater flowing from the School Property by roughly 433 pounds per year, reduce phosphorus loading by 6.7 and reduce runoff volume by 10.7 to 15.0 acre-feet per year;

WHEREAS ISD 112 will own and maintain the Project when it is completed;

WHEREAS Chanhassen operates its municipal stormwater-management system under the state Municipal Separate Storm Sewer System (MS4) general permit, and construction and maintenance of the Project will accrue to the benefit of Chanhassen's fulfillment of its MS4 permit obligations;

WHEREAS Chanhassen, ISD 112 and RPBCWD acknowledge that their ability to achieve Project objectives depends on each party satisfactorily and promptly performing individual obligations and working cooperatively with the other parties; and

WHEREAS Minnesota Statutes section 471.59 authorizes ISD 112, Chanhassen and RPBCWD to enter this cooperative agreement.

Agreement

NOW, THEREFORE Chanhassen, ISD 112 and RPBCWD enter into this agreement to document their understanding as to the scope of the Project, affirm their commitments as to the responsibilities of and tasks to be undertaken by each party, grant and assign the necessary land-use rights, and facilitate communication and cooperation to successfully complete the Project.

1 Organization and Relationship of the Parties

A. The RPBCWD administrator, ISD 112's facilities supervisor and Chanhassen's water resources coordinator will serve as project leads and the principal contacts for their respective organizations for the Project, charged to conduct the day-to-day activities necessary to ensure that the Project is completed in accordance with the terms of this agreement.

B. The project leads will coordinate and communicate informally and formally to timely address any issues of concern to ensure the successful completion of the Project.

C. Chanhassen, ISD 112 and RPBCWD enter this agreement solely for the purposes of improving water quality in Bluff Creek and reducing the impact of irrigation on groundwater resources. Accordingly, 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.

D. Minnesota Statutes chapter 466 and other applicable law govern liability of the parties. The limits of liability for the parties may not be added together to determine the maximum amount of liability of any party. Notwithstanding the foregoing or any other provision of this agreement, ISD 112's, Chanhassen's and RPBCWD's obligations under this section 1 and paragraphs of the agreement will survive the termination of the agreement.

E. This agreement creates no right in and waives no immunity, defense or liability limitation with respect to any non-party.

2 Conduct of the Project

A. **Plans and specifications.** RPBCWD will prepare plans and specifications for the Project and submit complete plans and specifications to Chanhassen and ISD 112 for review and approval in accordance with paragraph 2B of this agreement. The plans and specifications will serve as the primary technical specifications in the contract document package assembled in accordance with paragraph 2C of this agreement for purposes of solicitation of bids for construction. The plans and specifications will provide for the site preparation, construction, installation, operation and maintenance of the Project in a manner compatible with the continued use of the School Property for its intended, established and customary purposes. The drawings, plans and specifications prepared in accordance with the paragraph will provide for construction and implementation of the Project, including performance specifications, for:

i. Erosion- and sediment-control;
ii. Site preparation and construction of a structure to house an ultraviolet disinfection treatment system and installation of components including:
    a. System controls;
    b. An isolation valve;
    c. Package treatment plant providing ultraviolet and filtration;
v. Connecting Project components (pumps, controls, values) to ISD 112 electrical service;
vi. Installation of a backup water-supply option;
vii. Installation of control valves;
viii. Site preparation and installation of a hydropneumatic tank supplying treated irrigation water from Pond 4P to the irrigation system;
ix. Installation of a pump pad and pump to convey water from Pond 4P to treatment building;
x. Installation of a floating supply line and accessories necessary to ensure flow of stormwater stored in Pond 4P to the irrigation system;
xi. Modifications to the existing potable-water irrigation system to serve as a backup irrigation system;
xii. Restoration of the School Property, including seeding/planting and establishment of wetland buffers, if required to meet regulatory requirements.

B. **Design approval.** Design of the project and preparation of all necessary documents for construction (including but not limited to plan sheets, drawings, technical specifications) for the Project has been completed by the RPBCWD engineer under contract to RPBCWD. RPBCWD and their engineer have consulted with, and incorporated suggested changes by ISD112 staff throughout the design process. The design and plans are attached to and incorporated into this agreement as Exhibit C.

C. **Construction contracting.** If the plans and specifications for the Project are approved in accordance with paragraph 2B herein, RPBCWD will timely prepare or have prepared on its behalf construction bidding documents for the Project. When all property-use rights necessary for construction of the Project have been secured as provided in paragraph of 4.A of this agreement and documentation thereof has been provided to RPBCWD and Chanhassen, RPBCWD will solicit bids in accordance with applicable state and federal law, and will contract with the bidder it determines is the lowest-cost responsible and responsive bidder. The contract for construction will:
    i. Require the contractor to indemnify, defend and hold harmless Chanhassen and ISD 112, their officers, council members, employees and agents from any and all actions, costs, damages and liabilities of any nature 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;

ii. Require that the contractor for the Project name ISD 112 as an additional insured for general liability with primary and noncontributory coverage for general liability and provide a certificate showing same prior to construction;

iii. Extend the contractor's warranties under the agreement to ISD 112.

iv. Require the contractor to determine and obtain all permits and other regulatory approvals applicable to the Project on behalf of RPBCWD and ISD 112.

D. **Construction.**

i. RPBCWD, or the RPBCWD engineer on RPBCWD's behalf, will provide construction oversight for and other oversee implementation of the Project. RPBCWD may adjust the plans and specifications for the work during implementation, as long as the revised plans do not require RPBCWD to exceed the scope of the rights granted under this agreement and such changes are made in coordination with ISD 112 to ensure compatibility of the Project with ISD 112's continued use and operation of the School Property for its customary and intended purposes.

ii. RPBCWD will timely engage and consult ISD 112 and Chanhassen on material changes to the Project plans and specifications.

iii. Until substantial completion of construction of the Project for the purposes intended, if RPBCWD, in its judgment, should decide that the Project is infeasible, RPBCWD, at its option, may declare the agreement rescinded and annulled. If RPBCWD so declares, all obligations herein, performed or not, will be voided, except that RPBCWD will return the School Property materially to its prior condition or to a condition agreed to by ISD 112 and RPBCWD.

iv. RPBCWD will notify Chanhassen and ISD 112 within five business days of receipt of a certification of substantial completion from the contractor contracted to construct the Project.

v. Within 90 days of certification of substantial completion or termination of this agreement, RPBCWD will ensure that the Project site is restored to a condition consistent with the use of the School Property for its intended purposes.

E. **Maintenance.**

i. RPBCWD will contract with the RPBCWD engineer for the development in collaboration with ISD 112 of a draft plan for the post-construction maintenance of the Project (the Maintenance Plan). The Maintenance Plan will delineate routine maintenance and repair of the Project.

ii. ISD 112 will approve the Maintenance Plan within 45 days of receipt from RPBCWD, such approval not to be unreasonably withheld. Failure by ISD 112 to timely act on its rights and obligations under this paragraph will constitute approval of the Maintenance Plan. If ISD 112 disapproves the Maintenance Plan, all maintenance necessary to assure that the Project will continue to effectively function as designed will become the sole responsibility of ISD 112. On approval

of the Maintenance Plan, ISD 112 will perform all routine maintenance and monitoring of the Project, along with reporting as may be required by the Maintenance Plan, for 15 years from the date the Project is substantially complete for its intended purposes.

iii. ISD 112 will complete or contract for the completion, in its sole discretion, of major maintenance and repairs of the Project, as necessary, for 15 years from the date the Project is substantially complete for the intended purposes. For purposes of this agreement, major maintenance and repair of the Project is defined as work necessary to ensure the continued effective operation of the Project for its intended purposes beyond the routine maintenance and repairs defined and specified in the Maintenance Plan.

iv. RPBCWD may from time to time conduct monitoring of the performance of the Project.

F. **Grant reporting.** RPBCWD will comply with any grant-reporting requirements related to the Project, except that both ISD 112 and Chanhassen will provide any data on the Project reasonably requested by RPBCWD to meet grant-reporting obligations related to the Project.

3 Costs and Compliance Credit

A. Except for reimbursement as provided in paragraph 3C herein, each party will be responsible for the costs of performance of its obligations and exercise of its rights under this agreement.

B. As provided in paragraph 2.E.ii herein, ISD 112 will be responsible for the costs of routine post-construction maintenance of the Project in conformance with the Maintenance Plan. In addition, ISD 112 will complete or contract for the timely completion of major maintenance and repairs at its expense, except that if ISD 112 approves and effectively implements the Maintenance Plan as provided in paragraph 2.E.ii herein, RPBCWD will reimburse 50 percent of the documented cost of major maintenance and repairs. The reimbursement provisions of this paragraph are effective only if RPBCWD and Chanhassen approve terms for the completion of major maintenance and repairs of the Project.

C. On receipt of documentation of payment as may be reasonably requested, Chanhassen will reimburse RPBCWD $100,000 of documented costs of construction of the Project.

D. Chanhassen will assess no fee for city permits required for the Project, if any.

E. Except as specifically provided otherwise herein, each of the parties will bear the costs of fulfilling its responsibilities and obligations under this agreement and, in the event of cancellation, the parties will bear all costs incurred prior to RPBCWD's issuance of notice to ISD 112 and Chanhassen in accordance with paragraph 2.D.iii herein.

F. Chanhassen may conduct data-collection and analysis on the performance of the Project in reducing loading of sediment and other pollutants to Bluff Creek, and may apply any

and all credit generated by the Project toward its obligations, goals and requirements imposed by state and federal regulatory programs, such as the National Pollutant Discharge Elimination System as applied to Chanhassen.

4 ISD 112's Further Rights and Commitments and Grant of Property-Use Rights

A. **Encroachment agreement.** ISD 112 will obtain – and, where applicable, record with the Carver County property records office – any additional land-use rights or approvals necessary for the Project, including but not limited to the right to access and use the portions of the School Property subject to the encroachment agreement recorded in the Office of the County Recorder, Carver County, on August 28, 2008, as document number A488432. The access and use rights obtained by ISD 112 in accordance with this paragraph 4.A will include the right to assign rights, approvals and responsibilities obtained to RPBCWD and Chanhassen as needed for the Project general and specifically for purposes of effecting the License, as defined in paragraph 4P.

B. **Grant of land-use rights.** For purposes of facilitating RPBCWD's exercise of its rights and performance of its responsibilities under this agreement, ISD 112 hereby grants and conveys to RPBCWD, its contractors, agents and assigns, and to Chanhassen an irrevocable term license over, under, upon and across the School Property to access and to use the Project Area as depicted in Exhibit B for purposes of construction and installation of the Project (the License). The License includes the right of ingress and egress and to pass over and through the School Property on foot and using motorized equipment for staging of construction, construction and implementation of the Project, and the right within the Project Area to implement the Project, which involves the installation of a system utilizing stored stormwater for irrigation of the School Property as detailed in paragraph 3.A herein. The rights granted hereby include the right to lay and maintain temporary and permanent utilities across, under and/or above the surface of the School Property in locations designated by ISD 112 and across, above and/or under the Project Area generally for purposes of implementation of the Project. The agreement may not be amended to vacate RPBCWD's access and use rights for 25 years from the date construction of the Project is certified as substantially complete for the intended purposes, except that after issuance of a certification of substantial completion of the Project, RPBCWD must provide ISD 112 notice in writing at least 24 hours prior to entry on the School Property.
   i. ISD 112 will forbear from any activity that interferes with the RPBCWD's ability to exercise its rights or meet its obligations under this agreement, including but not limited to ISD 112's transfer of ownership of the School Property.
   ii. ISD 112's authorization hereunder is nonexclusive, except that RPBCWD, on reasonable notice to and in collaboration with ISD 112, may temporarily restrict or preclude access to the access and construction areas of the School Property to ensure safety while construction activities are under way.

C. **Ownership and Operation of the Project.** On completion of construction of the Project, ISD 112 will retain ownership of the improved School Property and all installed and constructed elements of the Project, and will operate the Project irrigation system, including but not limited to providing, at its sole expense, the electrical power necessary for operation.

i. After completion of the Project, ISD 112 will not take any action on the School Property that could reasonably be expected to diminish the effectiveness or function of the Project for the purposes intended.

5 RPBCWD's Further Rights and Obligations

A. RPBCWD will not be deemed to have acquired by entry into or performance under this agreement any form of interest or ownership in the School 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 School Property or adjacent property so as to render RPBCWD a potentially responsible party for any contamination or exacerbation of any contamination conditions under state and/or federal law.

B. RPBCWD will provide as-built construction drawings of the Project to ISD 112 within 90 days of certification of the Project as substantially complete for the intended purposes.

C. RPBCWD will contract with the RPBCWD engineer for the development of the plans and specification for the Project, along with all necessary construction documentation and the Maintenance Plan. Notwithstanding the foregoing, RPBCWD makes no warranty to ISD 112 or Chanhassen regarding the RPBCWD engineer's or another non-party's performance in design, construction or construction management for the Project.

6 General Terms

A. **Publicity and endorsement.** RPBCWD, Chanhassen and ISD 112 will collaboratively develop, produce and disseminate public education and outreach materials and conduct at least one public educational and informational meeting about the Project. Each party, at its sole expense, may develop, produce and, after approval of the other parties, distribute educational, outreach and publicity materials related to the Project. Any publicity regarding the Project must identify ISD 112, Chanhassen, RPBCWD and the Metropolitan Council as 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 ISD 112, Chanhassen or RPBCWD individually or jointly with others, or any subcontractors, with respect to the Project.

B. **Data management.** All designs, written materials, technical data, research or any other work in progress will be shared among 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 parties for recordkeeping and other necessary purposes.

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

D. **Entire agreement.** This agreement, as it may be amended in writing, contains the complete and entire agreement between 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 made a part of the agreement.

E. **Force majeure.** RPBCWD will not be liable for failure to complete the Project if the failure results from an act of god (including fire, flood, earthquake, storm, other natural disaster or other weather conditions that make it infeasible or materially more costly to perform the specified work), embargo, labor dispute, strike, lockout or interruption or failure of public utility service. In asserting force majeure, RPBCWD must demonstrate that it took reasonable steps to minimize delay and damage caused by foreseeable events, that it substantially fulfilled all non-excused obligations, and that it timely notified Chanhassen and ISD 112 of the likelihood or actual occurrence of the force majeure event. Delay will be excused only for the duration of the force majeure.

F. **Waivers.** The waiver by Chanhassen, ISD 112 or RPBCWD of any breach or failure to comply with any provision of this agreement by the other parties 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.

G. **Notices.** Any notice, demand or communication under this agreement by any party to the others will be deemed to be sufficiently given or delivered if it is dispatched by registered or certified mail, postage prepaid to:

Chanhassen	RPBCWD	ISD 112
Paul Oehme	Claire Bleser	Mike McLaughlin
Director of Public Works	Administrator	Facilities Supervisor
7700 Market Blvd	18681 Lake Drive East	11 Peavey Road
Chanhassen, MN 55317	Chanhassen, MN 55317	Chaska, MN 55318
poehme@ci.chanhassen.mn.us	cbleser@rpbcwd.org	McLaughlinM@District112.org
952-227-1169	952-607-6512	952-556-6294

H. **Term; termination.** This agreement is effective on execution by each of the parties and will terminate fifteen years from the date of execution of this agreement or on the written agreement of all three parties.

[SIGNATURE PAGE FOLLOWS.]

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

City of Chanhassen

_____

By: Denny Laufenburger, Mayor

Date: _____

and

_____

By: Todd Gerhardt, City Manager

Date: _____

Approved as to form & execution:

_____

City attorney

Independent School District 112

_____

By: [NAME], Its _____

Date: _____

Riley-Purgatory-Bluff Creek Watershed District

_____

By: Leslie Yetka, President

Date: _____

Approved as to form & execution:

_____

RPBCWD counsel

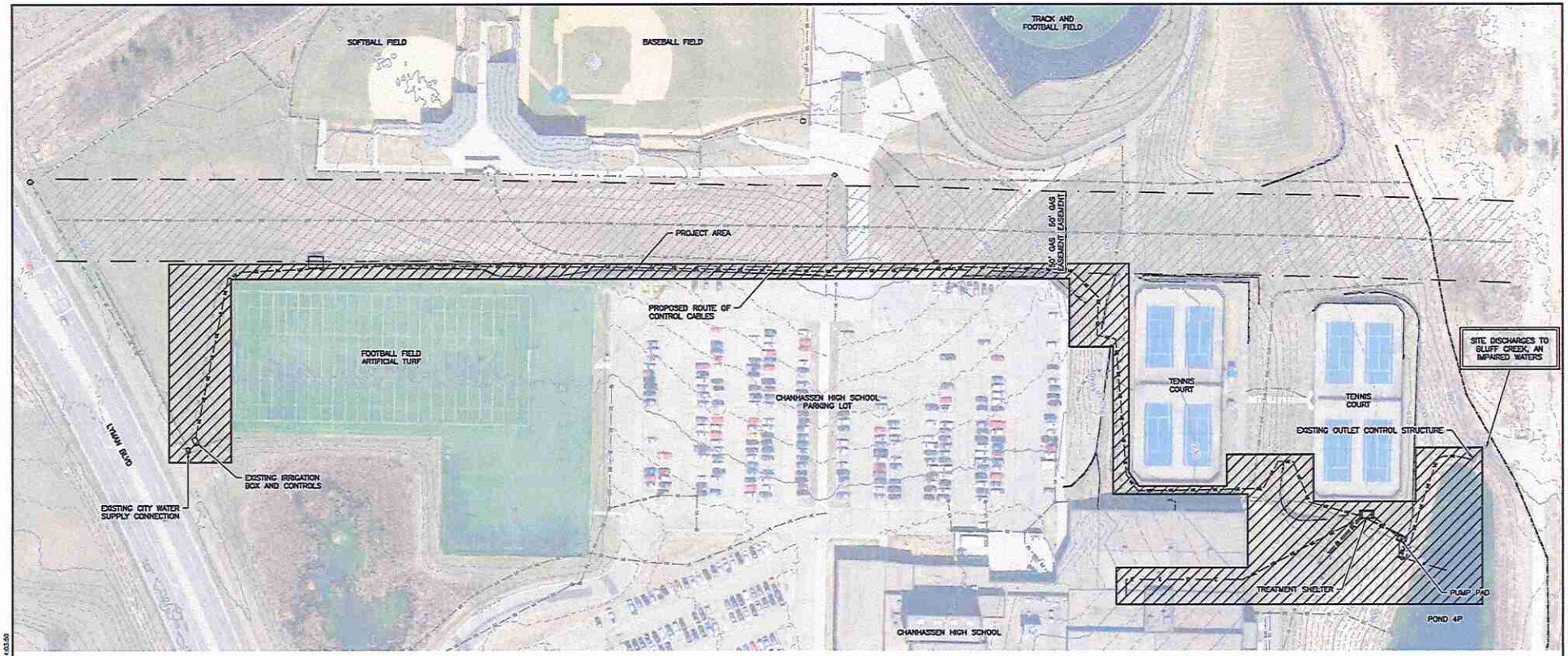
EXHIBIT A
Legal Description of the School Property

[This should come from ISD 112.]

EXHIBIT B
Project Area

[Must show project area for the project as defined in agreement and pond 4P.]

EXHIBIT C
Project Plans



1 PLAN: PROPOSED PROJECT AREA
0 60 120
SCALE IN FEET

N

LEGEND

- CONSTRUCTION LIMITS
- WETLAND BOUNDARY
- EXISTING 10' CONTOUR
- EXISTING 2' CONTOUR
- EXISTING FENCE
- EXISTING SANITARY SEWER
- EXISTING STORM SEWER
- EXISTING IRRIGATION
- EXISTING WATER SUPPLY
- EXISTING NATURAL GAS
- EXISTING TELEVISION CABLE
- EXISTING OVERHEAD ELECTRIC
- EXISTING UNDERGROUND ELECTRIC
- EXISTING WALL
- APPROXIMATE NATURAL GAS EASEMENT
- PROJECT AREA

LEGEND – CONTINUED

- PROPOSED IRRIGATION
- PROPOSED PIPING
- PROPOSED UNDERGROUND ELECTRIC
- PROPOSED ELECTRIC

NOT FOR CONSTRUCTION

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION

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
SIGNATURE
DATE LICENSE #

CLIENT
BID
CONSTRUCTION
RELEASED TO/FOR

BUSINESS UNIT
DATE RELEASED
A B C 0 1 2 3

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	04/07/2017
Drawn	BDP
Checked	JAK2
Designed	BARR
Approved	

RILEY–PURGATORY–BLUFF CREEK WATERSHED DISTRICT

CHAN HIGH SCHOOL STORMWATER REUSE
CHANHASSEN, MINNESOTA

EXHIBIT B
PROPOSED PROJECT AREA

BARR PROJECT No. 23/27–0053.14
CLIENT PROJECT No.
DWG. No. E–B
REV. No. A

resourceful. naturally.
engineering and environmental consultants

BARR

Technical Memorandum

To: RPBCWD
From: Scott Sobiech, PE and Katie Turpin-Nagel
Subject: Assessment of Stormwater Regulation for Channel Protection
Date: February 21, 2018
Project: 23270053.14

1.0 Introduction and Objective

Streams were identified in the 10-year plan public survey as being important to a majority of the citizens within the District. When ranking resource importance within the District, Purgatory Creek was ranked the number one most valuable resource with over 60% of the survey respondents indicating its importance, Riley Creek ranked third, and Bluff Creek ranked seventh. In addition to the public survey, a watershed summit was held within each major watershed (Bluff Creek, Riley Creek and Purgatory Creek). Comments related to erosion provided during the District's public engagement process include:

Measuring severe bank erosion along Bluff Creek

- Understanding the impact of shallow groundwater and development on bluff and steep slope stability
- Stabilizing streambanks and restoring channel meandering
- Reducing sediment loading to creeks, lakes, and wetlands

Concerns were identified for each creek related to water quality and quantity as summarized in Table 1-1 and in Section 6.0, 7.0 and 8.0 of the 60-Day Review Draft Planning for the Next Ten Years, 2018-2027 document. (RPBCWD 2017)

Table 1-1 Stakeholder identified streambank issues

Creek	Water Resource Issue Category	Specific Issues
Riley Creek	Water Quality (Erosion)	Creek erosion from development and human activity
	Water Quantity	Impacts of land development and land use on creek hydrology
Purgatory Creek	Water Quality (Erosion)	Areas of severe streambank erosion on Purgatory Creek
	Water Quantity	Allowable land uses adjacent to creek
Bluff Creek	Water Quality (Erosion)	Areas of severe streambank erosion
	Water Quantity	Impact of development on streamflow in Bluff Creek

The District has several mechanisms to address the concerns presented in Table 1-1, including implementing its cost share program, capital projects, and regulatory program. The District plan specifically seeks to address these and other erosion challenges through its strategies as described in Table 1-2. These strategies will aid the District in achieving its goal to protect water resources from further degradation thus enhancing resources where possible.

Table 1-2 RPBC Watershed District strategies to address Riley Creek, Purgatory Creek, and Bluff Creek water quality and water quantity concerns (RPBCWD 2017)

Classification	Index[1]	District Strategy
Water Quality	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.
	WQual S13	The District will continue to minimize pollutant loading to water resources through implementation of the District's regulatory, education and outreach, and incentive programs.
Water Quantity	WQuan S2	The District will promote strategies that minimize baseflow impacts.
	WQuan S3	The District will continue to promote infiltration, where feasible, as a best management practice to reduce runoff volume, improve water quality, and promote aquifer recharge.
	WQuan S6	The District will seek to alter stormwater hydrographs through practices that reduce peak discharge rates and overall flow volume.
	WQuan S7	The District will promote/encourage cities and developers to implement Low Impact Development (LID) practices and will work with cities to reduce regulatory barriers to LID practices.
	WQuan S8	The District will develop and implement actions to reduce flood risk within the District.
	WQuan S9	The District will work with cities and other stakeholders to encourage conservation practices (e.g., infiltration basins, floodplain storage, water reuse) to protect creeks, lakes and wetlands.

[1]Based on 60-Day Draft Planning for the Next Ten Years, 2018-2027 document (RPBCWD 2017)

The objective of this memo to summarize potential mechanisms to minimize erosion (streambank, ravine, and overland), and enhance water resource protection through revision to site development stormwater performance standards. The reasoning for potential revisions for new development and redevelopment practices is to decrease the frequency of bankfull floods (floods that reach or exceed creek banks) and decrease the power of increased discharges associated with development and redevelopment, in order to preserve stable stream channel morphology and dynamics while also minimizing sediment erosion impacts on the creeks, wetlands, and lakes in the District. Decreasing the flow frequency and power of the

streams will promote stable wetland and stream hydrology, which will reduce disturbances that alter physical characteristics of the resources. In turn, reduced disturbances can increase habitat potential for aquatic communities, produce more resilient natural systems, and improve recreation and aesthetic opportunities.

Decreasing the amount of time a given flow rate is experienced the streams (i.e., flow frequency) would also help combat existing bank erosion along the steep valley walls in the lower reaches of Purgatory, Riley, and Bluff Creek. These frequency and power decreases would permit channel restoration and re-vegetation to improve habitat throughout the creeks as well as protect private property along these creeks and their tributaries from damage and degradation.

2.0 The Problem

2.1 Effects of Urbanization

When land is converted from natural and rural uses to residential and urban uses, the amount of impervious surface, such as streets, roofs, and parking lots, increases. The impervious surfaces prevent water from being absorbed slowly into the ground. Instead, the water runs off the impervious surfaces, enters storm sewers, and is conveyed into the creeks. In addition, development and redevelopment activities typically impact the soil structure because of grading and compaction during construction. These land-disturbing activities significantly impact the natural hydrology as illustrated in Figure 2-1 and summarized below:

- Increased volumetric flow rates of runoff
- Increased volume of runoff
- Decreased time for runoff to reach a natural receiving water
- Reduced ground water recharge
- Increased frequency and duration of discharge and wetlands inundation during wet periods
- Increased frequency of bankfull and near-bank events
- Reduced stream flows and wetlands water levels during the dry season
- Greater runoff and stream velocities
- Increased pollutant loadings
- Increased temperature of runoff

There are multiple ways runoff volume and/or rates can increase, including:

- Rapid changes in land use – natural → agricultural → urban/suburban development
- Increased impervious surface within the watershed
- Modified watershed boundaries due to grading during development/redevelopment and installation of storm sewer systems
- Increased efficiency of runoff delivery to streams due to the use of storm sewers
- Climatological shifts that results in changes in the precipitation depth and intensity of storms.

Increases in the volume and/or rate of runoff contributing to the stream will result in degradation of the stream bed and banks with transport of the eroded sediment downstream to wetlands and lakes.

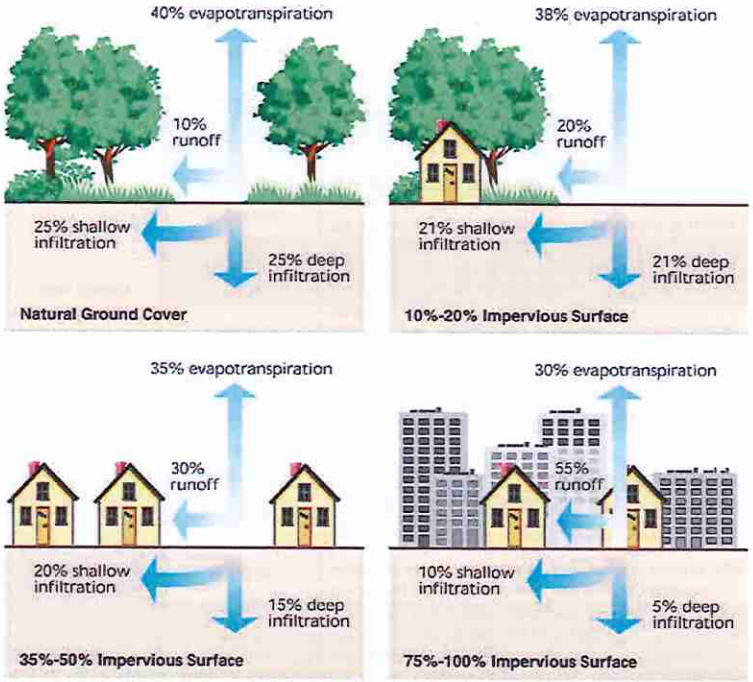


Figure 2-1 Change in runoff due to urbanization (FISRWG 1998)

2.1.1 Urbanization Impact on Stream Morphology

Prior to the introduction of agriculture and grazing practices, the waterways and creeks throughout the District were likely in dynamic equilibrium with their watersheds and able to convey storm runoff without significant change in its shape, pattern, or profile. Transforming the landscape to one dominated by agriculture likely made fundamental changes to the hydrology by changing the dominant vegetation (both in the watersheds and adjacent to the creek), improving the rate of drainage from fields, and

altering the sediment load to the creek. Relatively rapid fundamental changes to the hydrology can disrupt the dynamic equilibrium and result in erosion as the creek gradually moves toward a new balance with the hydrology and sediment supply to the creek in a process that can take years or decades to play out. When the watershed began to urbanize, a similar process likely began again as sediment supply, drainage patterns, and runoff rates and volumes changed again.

The most significant change associated with urbanization within the creek corridor is an increase in runoff from the watershed. With urbanization, the rate and volume of runoff generally increases, as shown in Figure 2-2 assuming mitigation measures (e.g., stormwater best management practices (BMPs)) are not implemented.

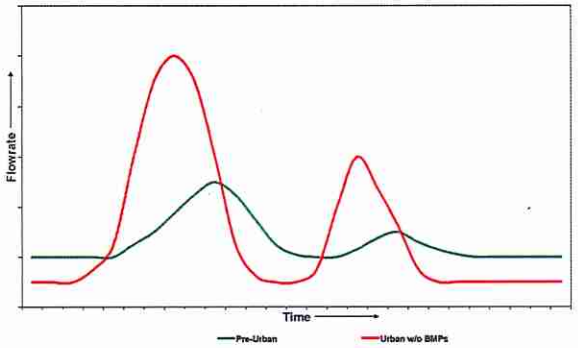


Figure 2-2 Change in streamflow due to urbanization (Center for Watershed Protection 2003)

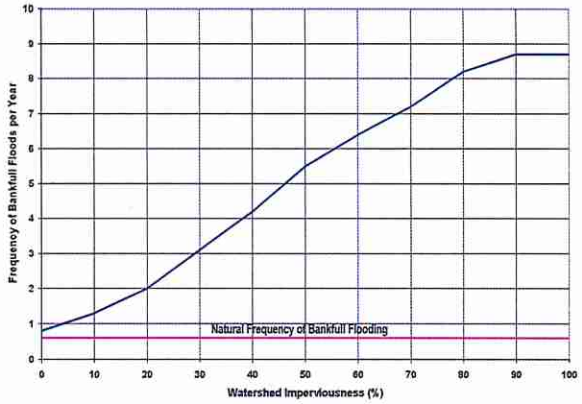


Figure 2-3 Conceptual frequency of bankfull flooding as a function of imperviousness (Center for Watershed Protection 2003)

The shape, pattern, and profile of the creek channel are closely related to the bankfull discharge. When the creek is in equilibrium with its environment, the shape, pattern, and profile are such that the creek can consistently convey the bankfull discharge without significant erosion. With urbanization, an increase in watershed imperviousness typically leads to an increase in the frequency of bankfull discharge as illustrated in Figure 2-3. The increase in the frequency of pre-development bankfull discharge means that there is a different, larger flow rate and volume that occurs at the same frequency as the pre-development bankfull discharge frequency. While increased development and redevelopment causes an increase in the annual volume of runoff, it is the power of the flowing water that affects changes in channel morphology and habitat, which generally degrades the aquatic ecosystem. The MN Stormwater manual summarizes the changes to stream morphology and impacts on aquatic habitat as follows:

- Changes to stream morphology
  - Stream widening and bank erosion
  - Higher flow velocities
  - Stream downcutting
  - Loss of riparian canopy
  - Changes in the channel bed due to sedimentation
  - Increase in the floodplain elevation
- Impacts on aquatic systems
  - Degradation of habitat structure
  - Loss of pool-riffle structure

- Reduced baseflow
- Increase stream temperature
- Decline in abundance and biodiversity

2.2 Erosion Problems

Sediment and associated pollutants are a major contributor to water pollution. Stormwater runoff from streets, parking lots, and other impervious surfaces carries suspended sediment consisting of fine particles of soil, dust, and dirt. Abundant amounts of suspended sediment are carried by stormwater runoff from actively eroding areas, such as steep slopes, ravines, unprotected stormwater outfalls, streambanks, etc. Although erosion and sedimentation are natural processes, they are often accelerated by human activities, especially during construction activities. The increased stormwater runoff rates and volumes cause increased soil erosion, which releases significant amounts of sediment that may enter water resources. Erosion also results in channelization of stormwater flow, increasing the rate of stormwater runoff and further accelerating erosion. Erosion in developed areas may increase risk to structures due to slope failures.

Regardless of its source, erosion and sediment deposition decreases water depth, degrades water quality, smothers fish and wildlife habitat, and degrades aesthetics. Sediment deposition can also wholly or partially block culverts, manholes, storm sewers, etc., causing flooding. Sediment deposition in detention ponds and wetlands also reduces the storage volume capacity, resulting in higher flood levels and/or reducing the amount of water quality treatment provided. As erosion and sedimentation increase, the stormwater management systems (e.g., ponds, pipes) require more frequent maintenance, repair, and/or modification to ensure they will function as designed.

2.2.1 Creek Restoration Action Strategies

The creek corridors are regularly assessed using methodologies identified in the Creek Restoration Action Strategy study (RPBCWD 2017) All three creeks were divided into 88 total sub-reaches whose boundaries were defined in multiple ways, including but not limited to, stream crossings, obvious changes to the characteristics of the stream and surrounding area (channel shape, valley shape, or surrounding vegetation), or observed locations where erosion issues begin or end. Stream reaches were specifically assessed for infrastructure risk, channel erosion and stability (Pfankuch 1975) surrounding and instream habitat (MPCA, Stream Habitat Assessment (MSHA) Protocol for Stream Monitoring Sites 2014) and water quality (review of previous 5 years of data) and combined into a Tier 1 score. Through the CRAS study the District identified low, medium, and high risk sites. Low risk sites require continual monitoring to ensure no degradation is occurring and special emphasis is placed on protecting high-quality areas. The sites deemed high risk undergo more evaluation to determine the root cause of the underlying issue. After being identified, the stream section will undergo a corrective action to solve the identified problem.

The majority of the reaches had overall Tier I scores within the moderate/low and poor/high rating, meaning notable benefits could be derived from stream improvements in these locations.

Table 2-1provides a summary of the number and percentages of sub-reaches rating within each category. The majority of the sub-reaches scored in the poor/high or severe category for erosion and channel stability (49 sub-reaches, equaling 58% of all sub-reaches). The poor/high and severe erosion location were distributed throughout most of watershed (see Figure 2-4), supporting that erosion is a widespread problem.

Table 2-1 CRAS summary of Tier I results by category and total score

Rating	Infrastructure Risk	Erosion and Channel Stability	Ecological Benefit	Water Quality	Tier I Score
Good/Low	64 (70%)	21 (24%)	4 (4%)	1 (1%)	20 (23%)
Moderate/Low	18 (20%)	18 (21%)	18 (21%)	11 (12%)	33 (38%)
Poor/High	6 (6%)	27 (31%)	60 (68%)	40 (44%)	25 (28%)
Severe	4 (4%)	22 (25%)	6 (7%)	38 (42%)	10 (12%)

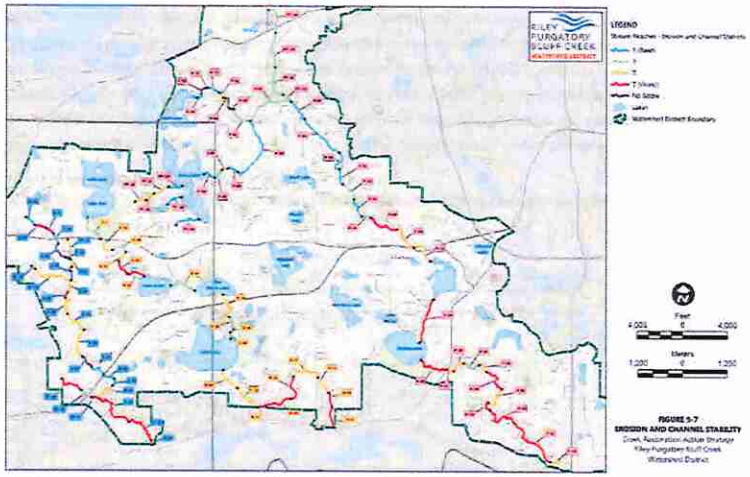


Figure 2-4 Erosion and Channel Stability Assessment (RPBCWD 2017)

2.2.2 Upper Riley Creek Assessment

RPBCWD's *Creek Restoration Action Strategy –Upper Riley Creek Sediment Source Assessment* (Barr 2016) completed in early 2017 also confirms the adverse impacts of development and redevelopment on the creek. The evaluation of hydrologic processes reviewed available data associated with existing hydrologic and hydraulic models, watershed land use, climate studies, and the Total Maximum Daily Load (TMDL)

study with the intent of identifying contributing causes of streambank erosion in Riley Creek and sediment deposition in Lake Susan. The watershed analysis determined the following key items:

- Hydrologic changes in the watershed have led to increased transport of sediments originating from the impervious areas of the watershed.
- The hydrologic changes have also increased the rate and volume of runoff reaching Upper Riley Creek, resulting in bank and channel bed erosion.
- The upstream third of the watershed remains largely pervious with some single family homes while the center of the watershed is industrial with significant impervious area. The downstream third of the watershed is a mix of industrial and single family homes. The watershed is anticipated to continue to develop and add impervious surface in the future.
- The additional impervious area associated primarily with the central industrial area of the Upper Riley Creek Watershed has resulted in increases in the 2-year design storm runoff volume and peak discharge of approximately 52% and 126% for the reach immediately upstream of Lake Susan, respectively.
- For the downstream section of the reach (HWY17), the 2-year peak discharge has increased by 125% as compared to pre-development conditions. The increase in the HWY17 reach is only 14% for the 10-year peak discharge. The 2-year event appears to have been impacted the most by watershed development and is critical when assessing stream erosion impacts.
- Large increases in runoff volume occur at Park Road and immediately upstream of Lake Susan. The increases in runoff volume can be attributed to the installation of storm sewer conveyance systems through the pre-development watershed divides and to the large amount of impervious surfaces without sufficient stormwater detention.
- Future increases in precipitation will result in increased runoff volumes and peak discharges over the next 50 years which should be considered in future regulations and designs (NOAA 2013).
- Streambank erosion can largely be attributed to the increase in impervious area in the watershed and to the revisions of drainage divides/conveyance features causing increased runoff volumes and rates.

2.2.3 MPCA's Draft TMDLs

Several waterbodies within the District have been listed on the MPCA impaired waters (303(d)) list for a variety of impairments. Waterbodies on the impaired waters list are required to have an assessment completed that addresses the causes and sources of the impairment. This process is known as a total maximum daily load (TMDL) analysis. The MPCA completed the Bluff Creek Watershed TDML: Turbidity and Fish Bioassessment Impairments in 2013 and is in the process of completing the Lower Minnesota River Watershed TMDLs: Riley-Purgatory-Bluff Creek Watershed District.

Bluff Creek, Riley Creek, and six lakes within the RPBCWD are included on the MPCA's 2016 impaired waters 303(d) list. The MPCA's draft 2018 impaired waters 303(d) list will include new impairments including Purgatory Creek below Staring Lake and Rice Marsh Lake and additional impairments for Lotus Lake, Lake Riley, and Riley Creek. The Minnesota River, located immediately downstream of the watershed, and which receives all the runoff from the watershed, is also impaired.

Table 2-2 summarizes the impaired waters within the RPBCWD where erosion has been specifically identified as one of the sources of the pollution. While a TMDL must be based on a pollutant, the underlying driver is tied to changes in hydrology (runoff and stream flow) resulting from landscape changes.

Table 2-2 MPCA identified impaired waters within the RPBCWD where erosion has been identified as a source of pollution

Waterbody	Pollutant or Stressor	Erosion Source
Bluff Creek	Turbidity	Watershed, Streambank and Ravines
Riley Creek	Turbidity	Watershed, Streambank and Ravines
Lotus Lake	Nutrients/Eutrophication	Watershed, Steep Slopes and Ravines
Silver Lake	Nutrients/Eutrophication	Watershed and Western Steep Slopes
Lake Susan	Nutrients/Eutrophication	Watershed and Streambank
Staring Lake	Nutrients/Eutrophication	Watershed and Streambank

3.0 Evaluation of Channel Protection Criteria

Stream channel morphology and dynamics can be preserved by managing the water budget of a developed site so that it is as similar as possible to the pre-urban conditions. The following sections discuss several assessments investigating means to mitigate the adverse impacts of development and redevelopment on channel stability.

3.1 Bluff Creek Assessment

In the late-1990's the city of Chanhassen and the District partnered to review potential approaches to managing stormwater in order to minimize the potential adverse impacts of development on Bluff Creek. One of the ways to accomplish this is to implement extended detention and infiltration practices. Extended detention refers to the practice of detaining stormwater and releasing it slowly for frequent storm events.

The results of the Bluff Creek assessment were summarized in the RPBCWD's 1999 *Proposed Statement of Need and Reasonableness*. (Barr 1999) The major findings and recommendations of the study are summarized below:

- Traditional stormwater management using detention basins to limit peak discharge would provide inadequate channel protection because of a net increase in the stream power experienced in Bluff Creek.
- For the Bluff Creek analysis, it was not feasible to return the bankfull frequency (assumed to be the 1.5 year event) to pre-urban conditions using extended detention alone. For a 72-hour detention time, bankfull frequency can be reduced below that which currently exists, but additional measures, such as infiltration, were deemed necessary to achieve further reductions.
- The results show that for fully urbanized conditions, the use of extended detention results in a net reduction of power. The reduction did not meet the goal of existing-conditions stream power, however, and increasing the volume of extended detention volume did not improve the results. Consequently, infiltration measures were recommended to reduce the volume of stormwater runoff which has a greater impact on reducing stream power.

3.2 MPCA's Channel Protection Assessment

The MPCA's Stormwater Manual Wiki (MPCA 2017) also contains information on how to mitigate the impacts of development on streambank stability. The Stormwater Manual states, *"The purpose of channel protection criteria is to prevent habitat degradation and erosion in urban streams caused by an increased frequency of bankfull and sub-bankfull stormwater flows. Channel protection criteria seek to minimize downstream channel enlargement and incision that is a common consequence of urbanization (Schueler and Brown, 2004)."* (https://stormwater.pca.state.mn.us/index.php?title=Channel_protection_criteria_(Vcp)) . According to the manual channel protection measures have been adopted by the States of Georgia, Maryland, New York, Vermont, and Washington. The MPCA's channel protection analysis findings and recommendations are summarized below. In addition, Table 3-1 summarizes the specific sizing criteria recommended in the manual based on waterbody types.

- Many communities require 2-year peak control by seeking to keep the post-development peak discharge rate at or below pre-development rates. While the intention is to limit flows in the creek, research suggests 2-year rate control may lead to bank erosion because of the extended duration of higher than pre-development flows and velocities.
- There are currently no state requirements to provide channel protection for regular waters. However, channel protection is also highly recommended for trout streams and certain discharge situations to lakes and wetlands.
- The recommended channel protection criterion is to use extended detention techniques to store and slowly release the runoff generated from the 1-year, 24-hour design storm over a 24-hour period. This will likely limit the critical erosive velocities in downstream channels so they are not exceeded over the entire storm hydrograph.
- The MPCA's Protecting Water Quality in Urban Areas (MPCA 2000) recommends using ½ of the peak runoff rate from the 2-year, 24-hour pre-development event. The findings suggest this approach results in slightly less erosion potential than the 1-year, 24-hour extended detention. The 1-year extended detention method does appear to result in higher peaks and potentially higher erosion during a modeled wet year, which argues in favor of restricting release of the post-

development 2-year 24-hour event to ½ the pre-development peak discharge from the 2-year 24-hour storm event.
- There are likely some practical limitations of using extended detention alone because orifice diameters or weir sizes could become very small and are prone to plugging.

Table 3-1 MPCA's recommended channel protection criteria by receiving water type

Receiving Water Type	MPCA's Recommended Channel Protection Criteria
Regular Waters	No current state requirement. It is recommended that communities adopt a criterion for either 24-hour extended detention of the 1-year, 24-hour design storm or one-half of the 2-year, 24-hour pre-development peak flow when revising or adopting local stormwater ordinances for peak flow control (and eliminate two-year peak discharge requirements).
Construction General Permit Special Waters	One- and two-year design storm peak discharge and volume control required in four special water categories (wilderness, trout lakes, lake trout lakes, and scientific and natural areas).
Other Sensitive Receiving Waters	12-hour detention of water is recommended as the most for discharge to trout streams (to prevent heating), while other sensitive receiving waters should maintain the 24-hour minimum.

3.3 RPBCWD Analysis of Channel Protection Methods

The evaluation of two innovative channel protection methods to mitigate the impact of development and redevelopment (Flow Duration and Stream Power) are summarized in the following sections. A commercial redevelopment, residential development, and transportation project were used to assess the potential for applying these two approaches in the RPBCWD.

Continuous hydrologic modeling techniques were used to assess the potential effectiveness of applying a flow duration approach or stream power approach to stormwater management at a site scale. According to the MN Stromwater Manual, *"Continuous simulation models are important when assessing the downstream effects of a stormwater discharge. For example channel erosion protection needs to be based more on continuous simulations of more frequent storms to properly represent the duration of erosive periods, particularly if detention used to control peak rate of runoff with limited volume control (WEF, 2012)."* (MPCA, Introduction to Stromwater Modeling 2016) A continuous modeling approach offers the following advantages over typical event based simulations.

- Continuous runoff models are able to simulate continuous long-term rainfall records to estimate runoff
- Are able to account for varying soil moisture conditions, evaporation, evapotranspirations, infiltration and even base flow estimates.

- They simulate situations where wetlands and stormwater management facilities are not empty when the next rain event begins.
- Continuous simulation produces a flow record suitable for developing flow duration curves or estimating cumulative stream power. An event model, whether using a 1-day or a 7-day storm, cannot provide such information.
- A continuous model allows water level analysis for wetlands, lakes, and closed depressions whose water level is often dependent on seasonal runoff rather than on 1-day or 7-day event runoff.
- Continuous models produce flow control facilities that more accurately and effectively achieve desired performance goals

The P8 Urban Catchment Model was used for the continuous simulations for this analysis. The P8 model was selected over other hydrologic/hydraulic continuous models because it is readily available and most engineering consultants have used the software for assessing water quality performance associated with site developments in the past. Thus, if regulations were adjusted to require additional volume control modeling scenarios, developers may be more amiable if a familiar model can be used.

Existing P8 models supplied by permit applicants were used to streamline the evaluation process in this analysis and base the evaluation on actual projects that have been or will be built. The use of existing projects' P8 modeling scenarios also allowed for the efficient use of District resources by avoiding the need to create hypothetical conditions for comparisons. The P8 model used to assess a commercial redevelopment was the model submitted for the Park Nicollet Prairie Center Clinic remodel and expansion. The site used to assess a residential development was the Fawn Hill construction of a 10-lot single family home subdivision. A MnDOT project consisting of the construction of acceleration lanes in Chanhassen was used as the site to assess a transportation redevelopment. Each of these developments included proposed conditions' P8 models in their permit submittals as well as HydroCAD models and/or summaries that could be evaluated for P8 model modifications for this analysis. The following P8 modeling scenarios that were applied to each project site and simulated for climate conditions from January 2004 to August 2014 include:

- Pre-Settlement Conditions – Undeveloped sites with native vegetation (woods)
- Pre-Development Conditions – Existing site impervious areas, stormwater best management practices (BMPs), soil conditions, and vegetation prior to the new development or prior to re-development
- Development + No BMP – Proposed development impervious area, soil conditions, and vegetation with no additional stormwater BMP.
- Development + BMP – Proposed development impervious area, soil conditions, and vegetation with the proposed stormwater BMP to meet existing regulatory rate, volume, and water quality requirements.
- Development + BMP + Extended Detention – Proposed development impervious area, soil conditions, and vegetation with an altered BMP outlet to allow for extended detention (controlled by a 4" orifice) to limit the peak runoff rates to at or below the Pre-Settlement condition.

3.3.1 Flow Duration

An emerging approach to managing the impact of development and redevelopment is to require that post-development flow duration curve match the pre-development or even pre-settlement flow duration curve. A flow duration curve is a plot of flow rate against the percentage of time that the flow rate is exceeded. Flow duration analysis can be used to determine the changes in the duration of all flows regimes and assess the impact on downstream erosion potential. For example, if increased flows occur as a result of development or redevelopment for an extended duration there is an increase potential for channel and bank erosion.

3.3.1.1 Previous Analysis by MPCA

The flow duration curve concept is currently an integral part of the creek TMDL process used by the EPA and MPCA. In the TMDL process the flow duration curve is combined with pollutant loads to investigate how pollutants respond to the various flow regimes. In addition, the MPCA's work to develop the Minimal Impact Design Standards (MIDS) assessed various stormwater management performance goals by comparing the runoff rates and volumes of theoretical developed sites conforming to those performance goals to the runoff rates and volumes of the sites under native soils and vegetation conditions. The goal of the assessment was to answer the question presented by MN Legislature related to stormwater management's ability to mimic natural hydrology. MIDS Legislative Directive to the MPCA stated "(c.) The agency shall develop performance standards, design standards, or other tools to enable and promote the implementation of low-impact development and other stormwater management techniques. For the purposes of this section, "low-impact development" means an approach to storm water management that mimic's a site's natural hydrology as the landscape is developed. Using low-impact development approach, storm water is managed on-site and the rate and volume of pre-development stormwater reaching receiving waters is unchanged. The calculation of pre-development hydrology is based on native soil and vegetation."

One of the comparison tools used for MIDS assessment was flow duration curves. Figure 3-1 shows an example of the comparison of the flow duration curves published in the MIDS report. Analysis of the flow duration curves indicates that implementation of volume and rate control BMPs results in a significant shift of the developed conditions flow duration curves toward the curves representing native conditions. Overall, the runoff from developed conditions with implementation of volume and rate control BMPs closely mimics runoff from native conditions. The rate control BMP and configuration of the multi-stage outlets were adjusted until the rate discharged from the rate control BMP did not exceed the flow rate generated by native conditions (meadow, for Twin Cities region).

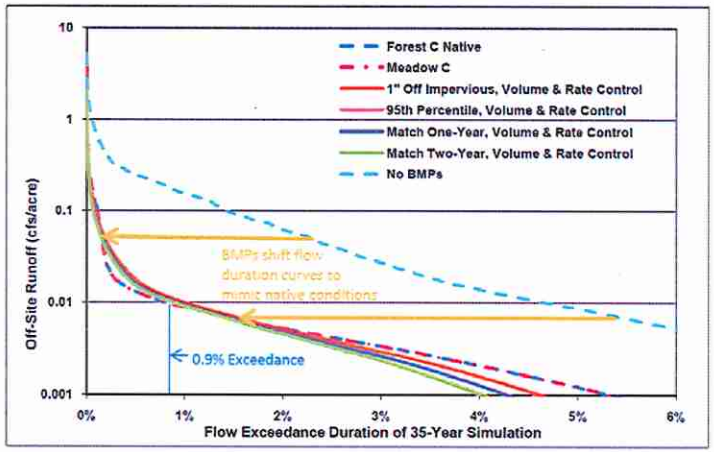


Figure 3-1 **Flow duration curve: Twin Cities Native C Soils and Developed C Soils, 80%** (Graph 3 from (Barr 2011))

3.3.1.2 State of Washington's Application of Flow Duration Methods

The State of Washington (WA Ecology 2014)adopted an approach to channel protection that requires the duration of post-development peak stormwater discharges match pre-development durations for the entire range of storms, allowing for a 10% departure for portions of the flow duration curve. Washington State's goal of the duration matching criteria is to replicate the pre-development frequency of discharge rates for all storm events in order to provide a high level of channel protection. The approach adopted in Washington contains two separate flow control requirements as summarized in Table 3-2. The information summarized in the table does not represent a comprehensive listing of the criteria because of the various nuances, triggering criteria, and exemptions.

Table 3-2 **State of Washington's flow control performance standards**

Washington's Requirement	Summary of Flow Control Criteria
I-2.5.5 Minimum Requirement #5: On-site Stormwater Management	Low Impact Development Performance Standard: Stormwater discharges shall match developed discharge durations to predeveloped durations for the range of pre-developed discharge rates from 8% of the 2-year peak flow to 50% of the 2-year peak flow.
I-2.5.7 Minimum Requirement #7: Flow Control	Stormwater discharges to streams shall match developed discharge durations to predeveloped durations for the range of predeveloped discharge rates from 50% of the 2-year peak flow up to the full 50-year peak flow.
I-2.5.8 Minimum Requirement #8: Wetlands Protection	Total volume of water into a wetland during a single precipitation event should not be more than 20% higher or lower than the pre-project volumes. In addition, the total volume of water into a wetland on a monthly basis should not be more than 15% higher or lower than the pre-project volumes.

3.3.1.3 California's Hydromodification Management

Many counties and municipalities in California are required to develop hydromodification management plan (HMP) as part of their National Pollutant Discharge Elimination System (NPDES) MS4 permit. Hydromodification is the modification of the runoff hydrograph's timing, peak discharge and volume because of land alterations and the resulting impacts on receiving waters, such as erosion, habitat degradation, and sedimentation. The goal of the HMP is to protect the physical, chemical, and biological functions of streams in urbanizing areas. Many of the HMP yield performance standards based on a flow duration approach. In fact, the Santa Clara Valley Urban Runoff Pollution Prevention Program HMP report reviewed three measures for controlling the adverse impacts of hydromodification (flow duration control, volume control, and single event hydrograph matching).The report concluded that volume control or hydrograph matching would not provide adequate protection against stream erosion and a flow duration control design approach was the most effective in controlling erosive flows. (SCVURPPP 2005). Of the HMPs reviewed, they seem to include some form of flow duration matching to mitigate both the duration and magnitude of flows within a prescribed range. To avoid the erosive effects of extended low flows, the maximum rate at which runoff is discharged is set below the erosive threshold, a flow rate (Qcp) that generates critical shear stress on the channel bed and banks. The critical flow is a function of site-specific soil conditions, cross sectional shape, channel slope, bed and bank roughness. Table 3-3 provides a summary of flow duration performance standards for selected permitting agencies in California. The

information summarized in the table does not represent a comprehensive listing of the criteria because of the various nuances, triggering criteria, and exemptions.

Table 3-3 Summary of flow control performance standards by selected California agencies (SCVURPPP 2005)

Agency	Lower Management Threshold (Qcp)	Largest Managed Flow
Santa Clara County	10 percent of the 2-year flow (0.1Q2)	10year flow (Q10)
Alameda County	10 percent of the 2-year flow (0.1Q2)	10year flow (Q10)
San Mateo County	10 percent of the 2-year flow (0.1Q2)	10year flow (Q10)
Contra Costa County	10 percent of the 2-year flow (0.1Q2)	10year flow (Q10)
Fairfield-Suisun Urban Runoff Management Program	20 percent of the 2-year flow (0.2Q2)	10year flow (Q10)
San Diego	10 percent of the 2-year flow (0.1Q2) –high susceptibility to erosion 30 percent of the 2-year flow (0.3Q2) –medium susceptibility to erosion 50 percent of the 2-year flow (0.5Q2) –low susceptibility to erosion	10year flow (Q10)

3.3.1.4 RPBCWD Analysis Summary and Implications

The following sections provide details on the project sites' modeling conditions and explain the flow duration curves that were developed to compare runoff rates under the various P8 modeling conditions (Pre-Settlement, Pre-Development, Development + No BMP, Development + BMP, Development + BMP + Extended Detention) for three distinct development and redevelopment site in RPBCWD.

3.3.1.4.1 Commercial Redevelopment

The selected commercial redevelopment site included the expansion of the existing building and the construction of additional parking. Due to this reconstruction, two underground filtration systems with underlying infiltration were installed to provide stormwater quantity, quality, and volume control. The site exists on clay soils with limited infiltration capacity (D soils) and due to additional site limitations including existing infrastructure, grades, and wetland buffer requirements, the redevelopment was considered a restricted site during the RPBCWD permitting process. Due to the restrictions, the developer was able to support 0.58 inches of runoff abstraction from the imperious surface on the site rather than the 1.1 inches required by the RPBCWD rule (Rule J, subsection 3.1b)..

Figure 3-2 compares the flow duration curves for the five conditions described at the beginning of Section 3.0, and three supplementary modeling scenarios as summarized below:

- Two of the supplementary scenarios analyze conditions between complete extended detention (holding back all stormwater with a 4"-orifice) and the proposed BMP as designed by the developer for the site. The furthest downstream underground storage device was modified to retain the 1-Year or 2-Year, 24-Hour events, allow slow release through a 4"-orifice, and allow larger storm events to overflow over a weir (Development + BMP + Retain 1-Year, 24-Hour and Development + BMP + Retain 2-Year, 24-Hr, respectively).
- The third supplementary modeling scenario (Development + BMP + Infiltration x2) was used to assess the impacts on the flow duration curve if the site was not a restricted site by increasing the infiltration rate to 0.12 in/hr.

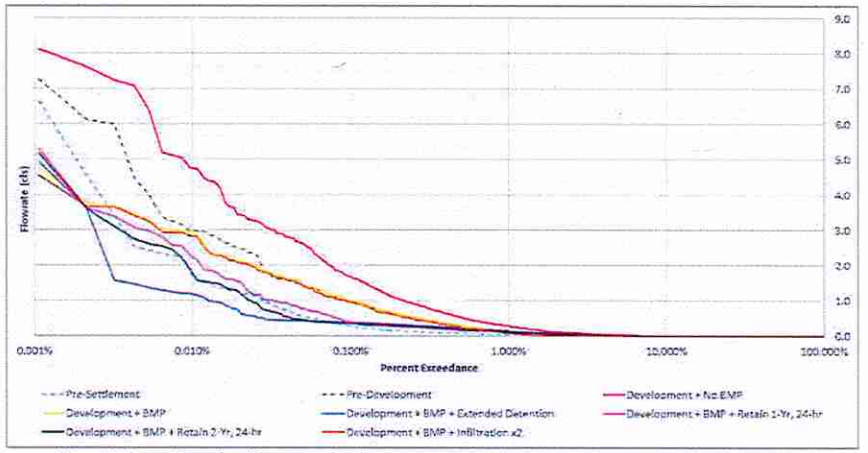


Figure 3-2 Flow duration curve for the commercial redevelopment site to compare runoff rates under eight modeling scenarios

The flow duration curve for this site shows that for a given flow rate, a developed site without BMPs significantly exceeds a given flow rate more frequently than under Pre-Development or Pre-Settlement conditions. For example, runoff from a developed site without BMPs is equal to or greater than 2.0 cfs approximately 0.1% of the 10 years modeled, whereas runoff from Pre-Settlement conditions is equal to or greater than 2.0 cfs only around 0.01% of the time, a 10 fold increase. Naturally, it can be expected that a developed site with higher impervious area and less vegetation will generate greater runoff flow rates if BMPs are not constructed. The flow duration curves in Figure 3-2 also show that stormwater runoff volume retention shifts the flow duration curves toward or past Pre-Settlement conditions. The extended

detention scenario, which holds back all site runoff with a 4"-orifice, brings the flow duration curve well below the Pre-Settlement curve for a percent exceedance of 0.1% for the 10 years modeled. However, due to the larger volumes of water being retained and released slowly through the restrictive outlet, low flow conditions are experienced for a longer duration. Retaining the 2-year, 24-hour storm event brings the flow duration curve to approximately the Pre-Settlement curve for percent exceedances approximately 0.1%. While not as frequent as the Extended Detention scenario, low flows are also experienced for a longer duration under the 2-year, 24-hour storm event detainment scenario. In either case, it can be determined that stormwater volume retention combined with extended detention are effective at reducing flow rates below Pre-Development and Pre-Settlement conditions.

The scenario that modeled a higher infiltration rate indicates that for larger storm events (> 0.001%) enhanced infiltration is effective at reducing the discharge flowrates below the extended detention scenarios. Additionally, for smaller storm events (i.e., frequency > 1.5%) the enhanced infiltration scenario effectively reduces the discharge flowrates below pre-settlement conditions. By introducing an increased percentage of stormwater runoff to the groundwater for smaller storm events, the volume of water released from the site is adequately reduced.

3.3.1.4.2 Transportation Project

The selected transportation project consisted of the addition of acceleration lanes to an existing roadway. The proposed work constituted a linear project that created additional impervious surfaces, which required the construction of a filtration basin to provide rate control, volume abstraction, and water quality management. The site exists on clay soils with limited infiltration capacity (D soils) and due to additional site limitations including existing infrastructure, utilities, and high groundwater, the redevelopment was considered a restricted site. Because of these site restrictions the developer was able to support only 0.11 inches of runoff abstraction, meeting the Rule J, Subsection 3.3.b criteria for restricted site.

Figure 3-3 compares the flow duration curves for the five stormwater modeling scenarios (Pre-Settlement, Pre-Development, Development + No BMP, Development + BMP, Development + BMP + Extended Detention). Similar to the commercial redevelopment site, the flow duration curve for the transportation site shows that for a given flowrate, a developed site without BMPs exceeds that flow rate more frequently than under Pre-Development or Pre-Settlement conditions. For any site, it is logical that when impervious areas are expanded without any BMP implementation for flow rate management, runoff flow rates will notably increase. Figure 3-3Illustrates that for percent exceedances greater than 0.1% the permitted BMP was adequate at bringing site flow rates below Pre-Development, near Pre-Settlement conditions. However, at approximately 0.001% exceedance the flow duration curve of the Development + BMP condition starts to rise above Pre-settlement conditions indicating that for larger storm events the proposed BMP may not be adequate at reducing peak flow rates.

The Development+BMP+ Extended Detention condition illustrates a considerable benefit of a highly restrictive outlet and volume retention where the flow duration curve is shifted well below the Pre-Settlement conditions for larger storm events. Under the Extended Detention condition the flow duration curve does start to rise above the Pre-Settlement curve for events that occur more frequently than 0.1% and above the Pre-Development curve for events with a frequency of occurrence greater than 0.6% due to the volume of water being retained and released slowly over time.

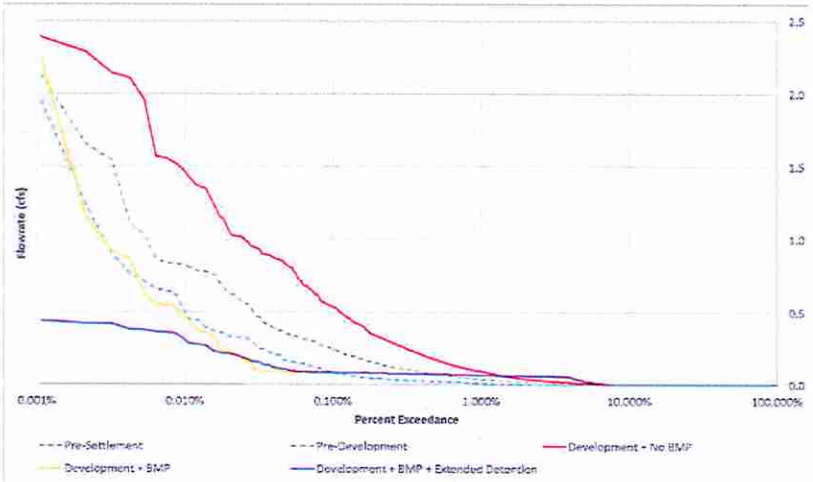


Figure 3-3 Flow duration curve for the transportation project site to compare runoff rates under five modeling scenarios

3.3.1.4.3 Residential Development

The selected residential development project consists of the construction of a single family home subdivision in Chanhassen. The permitted development will increase the area of impervious surfaces requiring BMP implementation. An infiltration basin will be added upstream of an existing stormwater pond and filtration bench providing stormwater quantity, volume, and quality control. The stormwater pond and filtration bench were originally designed for the existing residential development. Infiltrometer testing in the areas of the proposed infiltration basin indicate infiltration rates of 1.93 – 2.13 in/hour are possible for the site. Using a design infiltration rate of 1.0 in/hour, the basin was sized to abstract 1.1 inches of site runoff from the new impervious surface constructed for the development. In addition, the filtration bench and adjacent wet detention basin were designed to force a large portion of runoff from

the site through the filtration bench to enhance stormwater treatment, thus already acting as an extended detention stormwater management facility.

Figure 3-4 compares the flow duration curves for the five major stormwater modeling scenarios (Pre-Settlement, Pre-Development-D, Development + No BMP, Development + BMP, Development + BMP + Rate Control). This project was unique in where it included the addition of an infiltration basin into an already established treatment train. The existing residential development and nearby drainage areas include a treatment train consisting of four ponds and a filtration bench. Therefore, two additional scenarios are also displayed in the figure as summarized below.

- Development + No Infil Basin: A scenario where only the new development infiltration basin was removed, but the existing ponds and filtration bench were included. In contrast, the Development + No BMPs scenario assumes that both residential developments were constructed with no BMPs (no infiltration basins, ponds, or filtration bench).
- Development + BMP + Full Rate Control: A scenario where all BMPs (ponds, infiltration basins, filtration benches) contained extended detention where all BMPs were fitted with a four-inch orifice.
- Development + BMP + Rate Control: The P8 modeling also included a scenario where rate control was only modeled for the infiltration basin.

Similar to the first two sites, the flow duration curve for a site that develops without the incorporation of BMPs results in higher flowrates than Pre-Settlement or Pre-Development-D conditions. When additional impervious area is added to a site, BMPs must be installed to control runoff flowrates and volumes. What sets this site apart from the others is that the flow duration curve for Pre-Settlement lies higher than expected (e.g., lies above the Pre-New Res. Development curve). The flow duration curve for the Pre-New Residential Development condition, which includes the addition of four off-site, upstream ponds, indicates that more volume is retained in this scenario than in Pre-Settlement. This result may simply illustrate a limitation of the P8 model where curve number calculations may not accurately represent time of concentration for a forested watershed with D soils. More advanced hydrologic and hydraulic models (e.g., PCSWMM) would need to be assessed to make further conclusions.

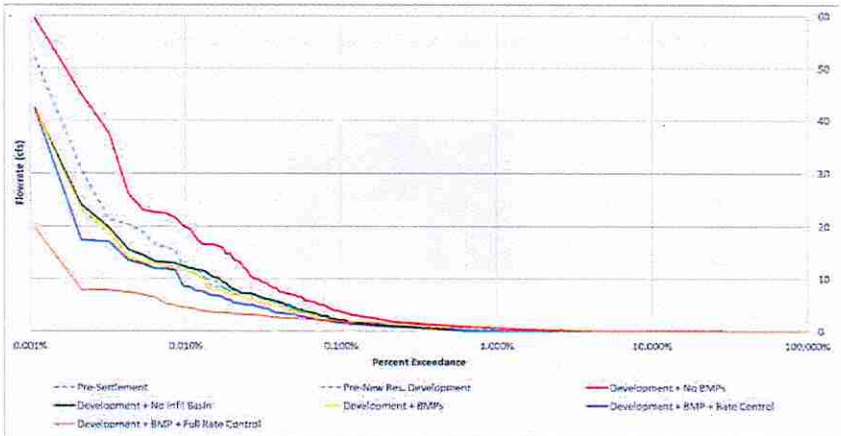


Figure 3-4 Flow duration curve for the residential development site to compare runoff rates under seven modeling scenarios

An additional aspect to note from the residential project's flow duration curves is that when a treatment train is involved developing rate control for all associated BMPs (Full Rate Control scenario) has the greatest benefit in terms of flow rate reduction for larger storm events. When rate control and extended detention was modeled for the infiltration basin, four upstream ponds, and filtration bench, the flow duration curve fell far below Pre-Settlement conditions for percent exceedances that occur less frequent than 0.1% over the 10 year simulation. While rate control of the infiltration basin alone did see a reduction in the flow duration curve, the benefit became unnoticeable at a percent exceedance of 0.001% indicating that for larger storm events volume retention in the infiltration basin alone would have little impact on flow rate reduction from the site as a whole. As with other conditions of extended detention, an increase in the duration of low flow rates would be expected. This is because larger volumes of water are being retained in the BMPs requiring longer drawdown periods.

3.3.1.4.4 Determining a Low-Flow Threshold

The above analysis shows that low flows would likely be experienced for longer durations under the extended detention options that could be implemented to mimic the pre-settlement flow duration curves. Research suggests the more frequent small-to-moderate flows have the largest influence on erosion potential (SCVURPPP 2005). The smaller events have been found to do a significant proportion of the work leading to erosion in urban streams because of how frequently they occur (MacRae 1993). Therefore, increasing the duration of the lower flow rates could potentially have an adverse impact on erosion unless

flows are controlled to some low threshold that will not initiate stream bed or bank erosion. This low-flow threshold depends on the stream channel characteristic and is known as the critical flow (Qc). As long as flows remain less than this threshold erosion is unlikely to occur.

The methodology used to establish a lower threshold critical flow is based on the approach outlined in Santa Clara Valley Urban Pollution Prevention Program's *Hydromodification Management Plan, Final Report* (SCVURPPP 2005) and *Addressing the Urban Stream Disturbance Regime* (Vietz 2015). The critical flow approach builds several simple but well-established river hydraulics concepts. These concepts include shear stress and conveyance hydraulics (Vietz 2015). The shear stress represents the force the water places on the streambed and bank materials. Before the critical flow can be estimated, the shear stress that induces sediment movement must be determined (known as the critical shear stress). Field experiments or published threshold values for various soils can aid in the selection of critical shear stress. Examples of published threshold criteria are presented in Table 3.4.

Table 3.4 Published threshold values for selected stabilization techniques

Stabilization Technique	Allowable Velocity (fps)	Allowable Shear Stress (lbs/ft^2)
Sandy loam soil[a]	1.75–2.25	0.045–0.05
Stiff clay[a]	3–4	0.26

a – (C. Fischenich 2001)

Native soil along portions of lower Bluff, Riley, and Purgatory Creek (assuming sandy loam) can withstand peak velocities of 1.75 to 2.25 feet per second (fps) and maximum shear stresses of 0.045 to 0.05 pounds per square foot (lbs/ft^2). Hydraulic model results for Upper Riley Creek indicate peak velocities and shear stresses during the 2-year event are approximately 2.6 fps and 1.1 lbs/ft^2, respectively. These results indicate velocity and shear stress regularly exceed the threshold values and that erosion will occur under existing conditions.

To estimate the critical flow within the Riley Creek system the hydraulic modeling developed for the Lower Riley Creek Stabilization project was used to estimate the critical flow rate that produces the critical shear stress. Because the critical shear stress varies by soil, two values were assessed. The results of the critical flow assessment are summarized in Figure 3-4 and Figure 3-5. While only a few more cross sections experience a shear stress <0.06 psf between 5 cfs and 10 cfs, there is less variation of the shear stress at 5 cfs than 10 cfs, as shown in Figure 3-5, and at 2 cfs the variation is even less. Therefore, a critical flow threshold of less than 5 cfs appears appropriate.

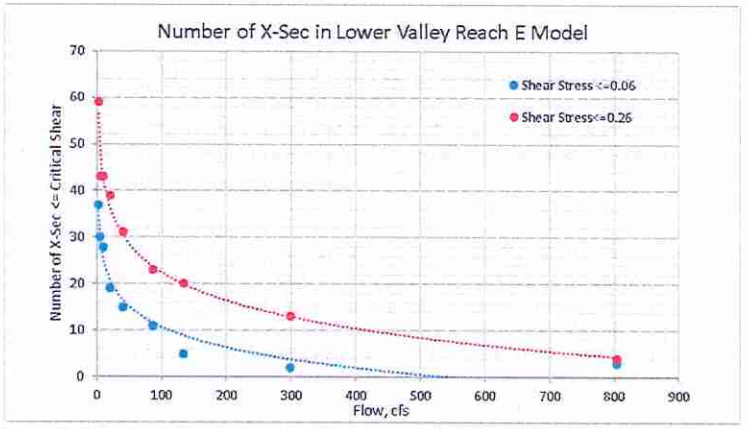


Figure 3-5 Number of cross sections experiencing the threshold shear stress at various flow rates in Lower Riley Creek

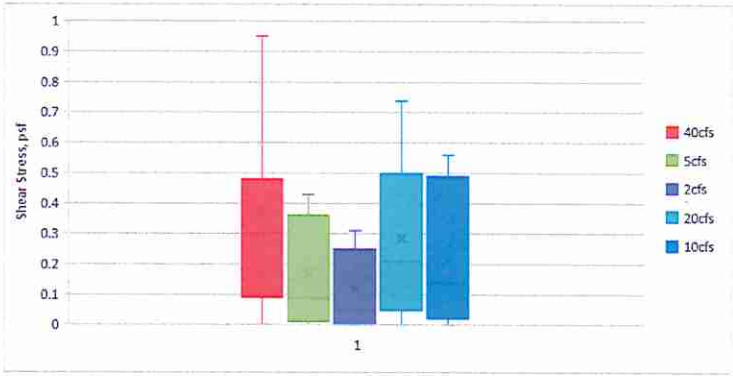


Figure 3-6 Shear stress box and whisker plots for various flow rates in Lower Riley Creek

For the critical flow information to be useful in the site design process, the critical flow in the stream must be related to an on-site project variable (e.g., site design flows). For this analysis, the critical flow was

related to several different site flows as presented in Table 3.5. Using a critical flow of 5 cfs the following three low-flow thresholds (Qcp) could be used , 0.09Qp2, 0.06Q1ex, or 0.04Q2Ex.

Table 3.5 Potential allowable low-flow discharge (Qcp)

Flow Condition	Flow (cfs)	Potential Qcp			
		Qc=2	Qc=5	Qc=10	Qc=20
Pre-urban 2-Year, 24-hour (Qp2)	54	4%	9%	19%	37%
Existing 1-Year, 24-hour (Q1Ex)	86	2%	6%	12%	23%
Existing 2-Year, 24-hour (Q2Ex)	134	1%	4%	7%	15%

Figure 3-12 illustrates the TSS load duration curve for Lower Riley Creek. Based on this information it appears the 90th percentile TSS load exceeds the TSS standard for flow in the mid-, moist-, and high-flow ranges. Looking closer at the mid-range flows, it appears that when the flow duration interval is roughly 50% or less the TSS load begins to exceed the standard. This relates to flows of 2 cfs or greater, thus suggesting that a slightly lower Qcp than presented by the modeling exercise above may be applicable.

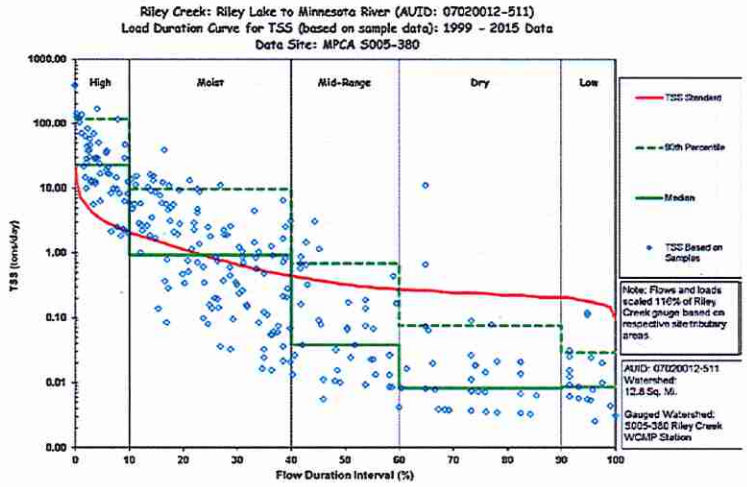


Figure 3-7 TSS load duration curve for Riley Creek (AUID# 07020012-511) (Barr 2016)

Based on the Bluff Creek Turbidity TMDL (Barr 2013) it appears most of the water quality exceedances were observed as summarized in the load duration curve shown on Figure 3-8. Based on this information, is appears that when the flow duration interval is less than 40% the TSS standard is reached by the 90th percentile TSS data. Using Figure 3-9, this equates to a flow rate of about 3.2 cfs. This information suggests that a critical flow rate for Bluff Creek is something less than 3 cfs. With an estimated 2-year natural flow rate in Bluff Creek of 35 cfs, the ratio of Qc to Q2 is about 10%. This would result in potential low-flow thresholds (Qcp) of 0.1Qp2.

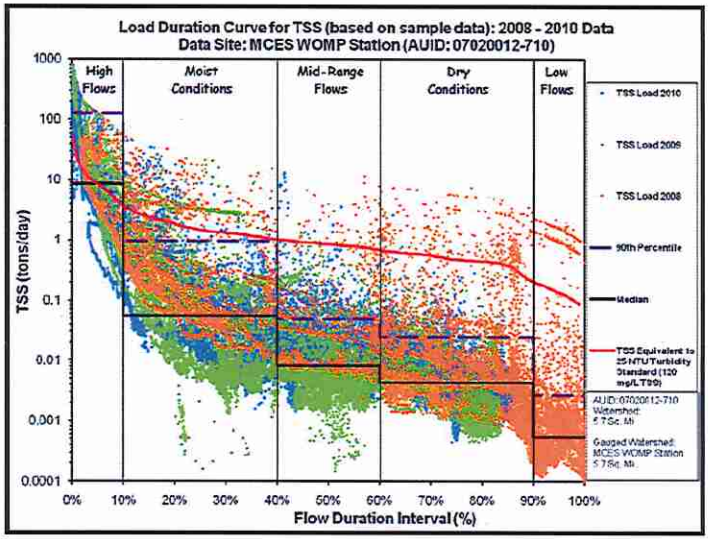


Figure 3-8 Bluff Creek load duration curve (Barr 2013)

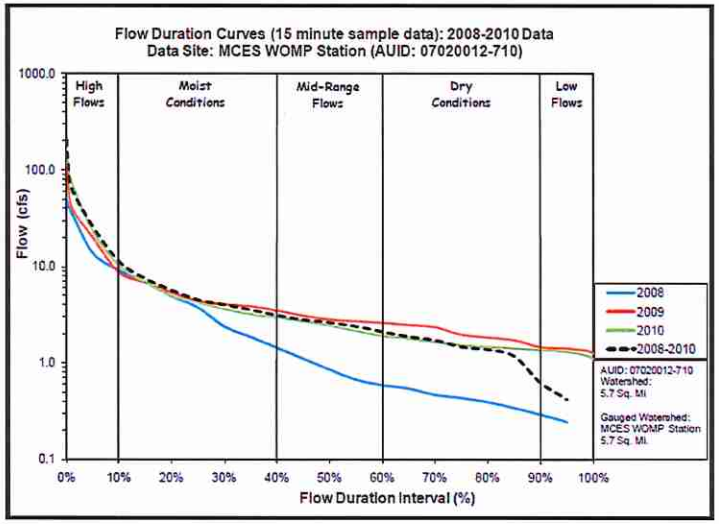


Figure 3-9 Bluff Creek flow duration curve (Barr 2013)

3.4 Stream Power

The stream power approach is very similar to the methods used for the Bluff Creek Assessment completed in the late 1990s. The innovation in the approach for this project is that it was applied to a specific development/redevelopment site rather than the entire Bluff Creek watershed. The stream power analysis consists of plotting cumulative stream power by time. The equation to calculate stream power (Ω) is as follows,

$$\Omega = \rho g Q S \; [=] N/s$$

Where ρ is the density of water (1,000 kg/m^3), g is gravity (9.81 m/s^2), Q is flowrate in m^3/s, and S is the slope of the streambed/channel in m/m. The initial difficulty in applying this equation is that not all of the development/redevelopment sites are located adjacent to a stream or channel. Therefore, a decision had to be made concerning the quantification of S (streambed slope) in the stream power equation. For the commercial redevelopment site the slope of the furthest downstream discharge pipe was used in the stream power equation. For the transportation site the side slopes of the detention pond that the infiltration basin discharges to were used to quantify S. For the residential redevelopment site the side slope of the stream directly downstream of the outlet pipe was used to calculate stream power. Since the

objective of this study was to compare varying BMP rate control scenarios for the same site, selection of the slope was not as critical. However, if stream power is to be applied in the future for regulations, selection of the appropriate S-variable to apply watershed-wide will need further review.

Figure 3-10 through Figure 3-12 show the plots of cumulative stream power versus time for the three sites. Cumulative stream power was calculated over the period of record (January 2004 through August 2014) analyzed in the P8 modeling scenarios. The following observations can be made about the cumulative stream power plots:

- Cumulative stream power analyses are effective at showing the impact of developing a site without the construction of a stormwater BMP to control site discharges. The cumulative stream power curves for the Development + No BMP scenarios notably exceed all other modeled scenarios for all three sites.
- Cumulative stream power analyses are effective at showing the difference in stream power between pre-development and pre-settlement conditions.
- Cumulative stream power is not entirely effective at showing the impact of extended detention on flowrate reductions. The cumulative stream power calculation is impacted considerably by low-flow conditions. For example, refer back to the flow duration curve for the transportation project in Figure 3-3. Comparing the Development+BMP and Development+BMP+Extended detention flow duration curves, it can be seen that for larger storm events the flow duration curve notably drops for the extended detention scenario. It can also be seen that from 0.1% to 100% exceedance probability the two curves start to align. Despite the considerable drop in the flow duration curve for the larger storm events, when extended detention is applied there is an insignificant difference in the cumulative stream power. It appears that changes to the discharge flow rates for smaller, more frequent storm events has the largest impact on the cumulative stream power analyses.
- Enhanced infiltration has a notable impact on the cumulative stream power curves. As more stormwater runoff is infiltrated to the ground water, which considerably reduces the flow rates discharging to the BMPs for smaller, frequent storm events, there is a discernable effect on the cumulative stream power curves (Figure 3-10).

Because of the challenges faced with selecting an appropriate slope to use in applying a stream power approach, it is recommended that stream power not be used as a performance standard on an individual site basis in the RPBCWD stormwater management rule. More advanced hydrologic and hydraulic models (e.g., PCSWMM) would need to be used to improve the assessment before making further conclusions or recommendations.

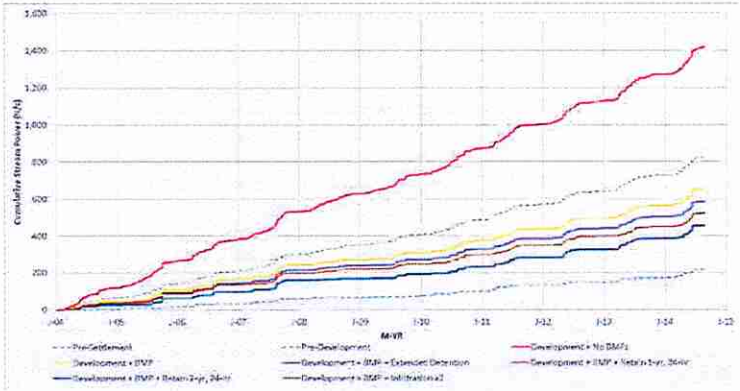


Figure 3-10 **Stream power curve for the commercial redevelopment site to compare cumulative stream power under eight modeling scenarios**

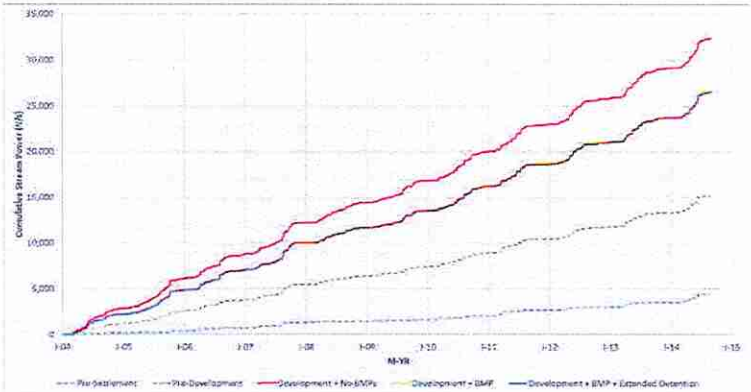


Figure 3-11 **Stream power curve for the transportation project site to compare cumulative stream power under five modeling scenarios**

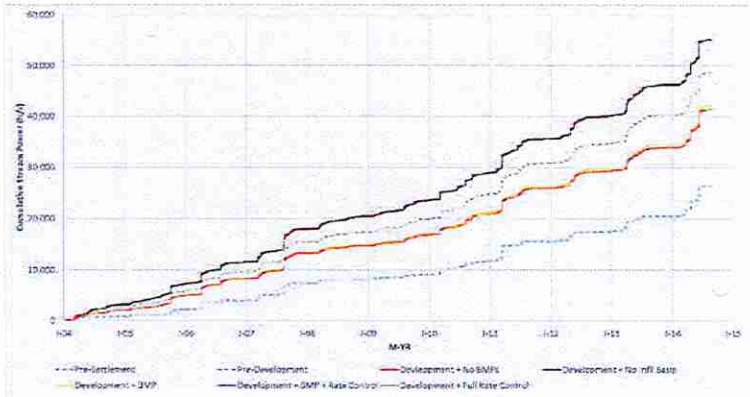


Figure 3-12 **Stream power curve for the residential development site to compare cumulative stream power under seven modeling scenarios**

4.0 Conclusions and Recommendations

Based on the information reviewed it is clear that urbanization impacts stream channel stability unless mitigation measures are implemented. Research and observations within the Riley, Purgatory, and Bluff Creek watersheds also suggest that traditional rate control alone has been inadequate to minimize channel erosion and adequately protect the creeks, ravines, and drainage ways as well as their associated habitats. Table 4-1 provides a high-level summary of alternatives to protect ravines, creeks, and other drainage ways from development-induced erosion and degradation.

Table 4-1 Potential channel protection performance standards

Assessment	Key Findings	Potential Performance Standard
MPCA Stormwater Manual (MPCA 2017)	• 2-year rate control may lead to bank erosion because of the extended duration of higher than pre-development flows and velocities. • Use of extended detention techniques will likely limit the critical erosive velocities in downstream channels so they are not exceeded over the entire storm hydrograph. • The 1-year extended detention method does appear to result in higher peaks and potentially higher erosion during a modeled wet year, which argues in favor of the one-half of the 2-year pre-development peak matching approach.	• 24-hour extended detention of the 1-year, 24-hour design storm or • Limit post-development 2-year, 24-hour discharge to one-half of the 2-year, 24-hour pre-development rate peak flow
Bluff Creek (Barr 1999)	• Traditional stormwater management using detention basins to limit peak discharge would provide inadequate channel protection because of a net increase in the stream power. • It was not feasible to return the bankfull frequency (assumed to be the 1.5-year event) to pre-urban conditions using extended detention alone. For a 72-hour detention time, bankfull frequency can be reduced below that which currently exists, but additional measures, such as infiltration, were deemed necessary to achieve further reductions. • The results show that for fully urbanized conditions, the use of extended detention results in a net reduction of power.	• 72-hour extended detention of the 1.5-year, 24-hour design storm • Abstract 0.75 inches of runoff from the impervious surface

Assessment	Key Findings	Potential Performance Standard
MPCA's MIDS	• Rate and volume control BMPs are needed to mimic native hydrology from developed conditions. • Developed sites without volume control BMPs produce approximately two to four times the average annual runoff volume of native conditions. • All of the volume-control performance goals evaluated do well at matching native conditions on an average annual basis. • All of the performance goals evaluated do worse at matching native conditions during non-frozen ground conditions (some yield up to two times more runoff than runoff from native conditions). • Volume control BMPs controlled the 1-year, 24-hour peak rates to flows less than or equal to native conditions for most scenarios evaluated. • Volume control performance goals result in significant pollutant loading reduction from developed sites.	• Abstract 1.1 inches of runoff from the impervious surface • Flexible treatment options for sites unable to abstract 1.1 inches of runoff
Washington State (WA Ecology 2014)	• To protect stream channels from increased erosion, it is necessary to control the durations over which a stream channel experiences geomorphically significant flows such that the energy imparted to the stream channel does not increase significantly. Geomorphically significant flows are those that are capable of moving sediments. Washington's flow duration standard is based upon a generalization that the threshold of significant bedload movement in western Washington streams occurs at 50% of the 2-year return stream flow. Therefore, one-half of the 2-year flow is considered a good general estimate of the erosion-initiating flow.	• Match developed discharge durations to predeveloped durations for the range of pre-developed discharge rates from 8% of the 2-year peak flow to 50% of the 2-year peak flow • Match developed discharge durations to predeveloped durations for the range of predeveloped discharge rates from 50% of the 2-year peak flow up to the full 50-year peak flow

Assessment	Key Findings	Potential Performance Standard
MPCA's Protecting Water Quality in Urban Areas (MPCA 2000)	• Analysis at most sites clearly shows an increase in runoff volume from pre-development conditions because the duration of discharge is extended proportionately. Since 1.3- to 2-year events are approximately bankfull, and bankfull events are usually the most erosive per unit of flow, this increase in duration can significantly increase erosion problems for the downstream watershed, even for small storm events. • The significance of the large flood events should not be underestimated and needs to be incorporated in the design. But, in addition, the cumulative effects of the smaller but more frequent and cumulatively significant events need to be given sufficient consideration for protection of water quality, property, and habitat.	• Limit post development discharge to half of the peak runoff rate from the 2-year, 24-hour pre-development event • Limit post-development discharge to 10- and 100-year pre-development rates
Santa Clara Valley Urban Runoff Pollution Prevention Program HMP report (SCVURPPP 2005).	• The more frequent small-to-moderate flows have the greatest influence on erosion potential. • Three principles form the framework for implementing hydromodification control (avoid, minimize, and manage). • A flow duration control design approach was the most effective in controlling erosive flows. • A combination of on-site, off-site, and in-stream measures may be considered to meet HMP requirements.	• Match pre-project flow duration curve for discharge rates from 10% of the 2-year peak flow up to the full 10-year peak flow. • Site-specific thresholds can be developed with sufficient geomorphic analysis.

Assessment	Key Findings	Potential Performance Standard
Current RPBCWD	• Flow duration analysis is a viable approach to stream channel protection using tools developers are already familiar with. • Analysis typically only required changes to the stormwater facilities' outlet configuration to approach natural flow duration conditions. • Extended detention of the 2-year, 24-hour runoff volume better mimics natural duration curves. • Flow duration matching or extended detention can increase the duration of very low discharges. • An estimated low-flow threshold (Qcp) can be established as roughly 4–9% of the pre-settlement or natural 2-year, 24-hour flow (0.09Qp2) for Riley Creek. • Review of information presented in the Bluff Creek TMDL suggests a Qcp of roughly 10% of the 2-year natural flow in Bluff Creek. • Abstraction of runoff aids in limiting the impact of extending the flow duration for small, frequent events. • Stream power does not appear to be a suitable metric without additional analysis.	• Match pre-settlement flow duration curve within 10% for discharge rates from 10% of the 2-year peak flow up to the full 10-year peak flow • 24-hour extended detention of the 2-year, 24-hour design storm

5.0 Recommendations

As previously discussed, erosion is a known problem throughout the entire watershed and not just along the main creek channels. Therefore, the channel protection performance standard should be considered for all site development and redevelopment. Alternatively, it could be applied to restricted sites, areas tributary to High Risk Erosion Areas, areas tributary to drainage ways with a stream power index of three or greater, or areas tributary to known erosion problems. While this might limit the scope of applicability, it could also limit the opportunity to protect upstream areas from development/redevelopment-induced degradation. The flow duration approach recommended below has the added benefit of helping off-site resources from further degradation without requiring extensive analysis of areas beyond the proposed development/redevelopment site. This approach should be discussed with the Technical and Citizen Advisory Committees (TAC and CAC) prior to proceeding with implementation.

- Maintain the volume management criterion in the District's existing stormwater management rule.
- Maintain the 10-year, and 100-year rate control criteria for flood control purposes.
- Consider enhancing the stormwater management regulation to include a channel protection performance standard, as follows, instead of the existing 2-year rate control criteria:
    - Match pre-settlement flow duration curve within 10% for discharge rates from 10% of the 2-year peak flow up to the full 10-year peak flow.
    - Allow exceptions where low-flow-orifice diameters or weir sizes could become very small because they are prone to plugging but must consider filtration as an outlet alternative.
    - Apply the channel protection criteria to redevelopment sites that disturb or increase site impervious by more than 50 percent.
    - Because of potential site constraints, it will be important to allow for meeting the performance criteria on site or off site in regional facility with sufficient compliance demonstration or no increase in erosion potential.
- The flow duration method should be applied to locations where discharge leaves the site. The method can also be used to help protect on-site areas that may be prone to erosion, such as ravines, steep slopes, or concentrated discharges.
- If the flow duration standard is implemented it would also allow the District to enhance wetland protection by using a similar approach to require maintenance of the existing hydrology to on-and off-site wetlands, either on an event and/or monthly basis.
- Incorporate an incentive in the stormwater rule to promote reduction in impervious surface from existing conditions.

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