

Request for Board Action

Board Meeting Date: May 6, 2020

Agenda Item No.: 7B

Preparer: Tina Carstens, Administrator

Item Description: Beltline Resiliency Study Response to Comment and Finalize Report

Background:

At a December 17, 2019 workshop, staff presented the draft Beltline Resiliency Study to the board. The Beltline Resiliency Study evaluates potential system modifications that could be implemented in the Beltline watershed to reduce flood risk to habitable structures without purchasing structures. System modifications included in the draft study provide one option for mitigating flood-risk, and in many locations additional feasibility studies would be required to optimize system modifications and further evaluate the feasibility of the proposed modifications. Much of the study is centered on evaluating ways to optimize the use of the Beltline to lower flood levels upstream.

At that workshop, the board directed staff to determine a process for soliciting input from various stakeholders. In January 2020, staff held a meeting with city, county and agency stakeholders and also solicited comments from other interested stakeholders like our residents.

Staff have now reviewed all of the comments received on the Beltline Resiliency Study. 64 different comments were received from 8 individuals representing the cities of St. Paul, North St. Paul, and Shoreview, Ramsey County Public Works, one RWMWD Board manager and residents of Shoreview and St. Paul. Comments have been compiled into a spreadsheet, and answered, one by one. Responses included clarifications on parts of the Beltline Resiliency Study report, or an indication that something specific would be changed in the report as a result of the comment. Comments varied widely in terms of topic and geographic location across the District. A pdf of the comments and responses are included in this month's Board packet for the managers to review and consider.

Applicable District Goal and Action Item:

Goal: Manage risk of flooding – The District will reduce the public's risk to life and property from flooding through programs and projects that protect public safety and well-being.

Action Item: Cooperate with appropriate stakeholders to identify, assess, and address potential flooding problems in the District.

Staff Recommendation:

Staff recommends the board accept the staff prepared response to comments to be sent to those that commented. The response to comments could also be appended to the study document and then called final.

Financial Implications:

The response to comments does not include any financial implications.

Board Action Requested:

Accept the Beltline Resiliency Study response to comments and direct staff to append the response to comments to finalize the study report.

Comment #	Commenter	Report Reference	Comment	Response to Comment
1	Bruce Copley	General	Overall we believe that the Beltline study is important to provide RWMWD with an initial roadmap for addressing the many potential flooding problems in the district and support this effort.	Thank you for your comment.
2	Bruce Copley	Atlas 14 Precipitation Assumptions	The inundation maps utilize Atlas 14 data. Are Atlas 14 estimates for the Twin Cities already outdated? How frequently is Atlas 14 updated? Six years of above normal precipitation suggests the norms used to publish Atlas 14 may be under predicting the rainfall resulting in under design of water management. How is the most recent rainfall data taken into account when suggesting system changes? Is it still reasonable to use a model 100-year storm event predicated on historical data given climate change observed thus far? Given the "new" high water level of Grass Lake, will there be a new 100-year flood elevation determined? If no, please comment on why it is reasonable to use old elevations in modeling. What safety factor have you incorporated in the event that Atlas 14 underestimates the precipitation amounts? Can you comment?	<p>Before the Atlas 14 precipitation record was published in 2013, the last time the precipitation record was updated was 1961. There are currently no planned updates to Atlas 14. Atlas 14 is the current industry standard for defining design rainfall depths for a given return frequency and duration. The District currently and historically designed flood-risk reduction projects to provide a 100-year level of protection. However, the District has also been evaluating incorporating resiliency into the design of flood-risk reduction systems by using the 500-year storm event for emergency planning (keeping emergency evacuation routes open, considering pathways to hospitals, grocery stores, etc. and not necessarily protecting homes from flooding). The first step in this process was to develop inundation maps for the 500-year event, which have been created and will soon be distributed to member cities for review. For flood-risk mitigation project design in the Grass Lake area in recent years, staff have been using a starting elevation of 884.1 for water bodies in the Grass Lake area (this is the elevation of Grass Lake's emergency overflow) with a 100-year storm event on top of it. The City of Shoreview's recent planning and design efforts have incorporated this assumption as well. This assumption does incorporate a safety factor implicitly, as there is currently significant storage available below 884.1 north of Grass Lake.</p> <p>Please note that this work has been done, and continues to be done outside of the scope of the Beltline Resiliency Study work and its associated feasibility studies.</p>
3	Bruce Copley	Page 7: Starting Water Level Assumption for Grass Lake	On page 7 it is stated that recent high water levels are not used as the starting point for identifying impacted structures and modeled inundation. Residents in our area are very concerned about a large storm hitting when the area water bodies are much above normal as they have been for several years. We believe the extended periods these water bodies have been above normal significantly increases the probability of an adverse event. Can you comment? We believe inundation maps in the area around Grass, Snail, Wetland A and W. Vadnais should use the higher lakes levels as a starting point for the inundation maps. Would restoring surrounding water bodies to historical norms provide protection from inundation? The inundation maps of Crestview addition on the Barr website show properties touched by projected surface water, well away from Suzanne Pond, yet these properties are not shown as at-risk. Why not?	<p>While the inundation maps and Beltline Resiliency study reflect a starting water level for Grass Lake at the outlet elevation, modeling for specific flood control projects in the Grass Lake area that inform flood management actions and projects assumes a starting elevation of Grass Lake of 884.1 (as described above). With recent flood management projects undertaken by the RWMWD and now the City of Shoreview, No homes would be at risk of flooding during the 100-year storm event even when the water level in Grass Lake begins at 884.1.</p> <p>Please note that this work has been done, and continues to be done outside of the scope of the Beltline Resiliency Study work and its associated feasibility studies.</p>
4	Bruce Copley	Conditional Probability Analysis	It has been acknowledged by Barr that the area north of I694 is very slow draining and as a result goes high and stays high after several concurrent small rain events. The area seems to be in a permanently flooded state. The decision to not use "conditional probability" analysis for this area should be reconsidered. The study seems to acknowledge that the area is unique within the water district. This suggests to us that a unique analysis and set of solutions is appropriate for this area. Can you comment?	<p>For the Beltline Resiliency study, a conditional probability was not considered for use in inundation mapping as a part of the Atlas 14 work for reasons described in the study. However, as stated above, modeling for specific flood control projects in the Grass Lake area has assumed that the lake has been at its emergency overflow elevation (884.1) when the 100-year storm happens.</p> <p>Please note that this work has been done, and continues to be done outside of the scope of the Beltline Resiliency Study work and its associated feasibility studies.</p>
5	Bruce Copley	48-hour Drawdown Question for Grass Lake Area	Also, how does the District square the "48-hour drawdown requirement" for temporary floodwater storage against using the Grass Lake parkland for additional storage, knowing that the drawdown is months or years under current conditions? Why does this requirement apply some places and not others?	<p>The District's rules require 48-hour drawdown for infiltration areas (District Rule C: Stormwater Management 3.c.1.vi). As described in the Minnesota Stormwater manual the 48-hour drawdown requirement was established to provide wet-dry cycling between rainfall events, unsuitable mosquito breeding habitat, suitable habitat for vegetation establishment, aerobic conditions, and storage for back-to-back precipitation events. Many of these considerations do not apply for naturally occurring wetlands, ponds, and lakes. In locations where water levels take more time to draw down, the District evaluates water levels using other methods such as continuous simulations, back-to-back events, or higher starting water levels. For the Grass Lake area, a starting water level of 884.1 has been used to identify whether there are flood-prone habitable structures. The Beltline Resiliency study used the outlet elevation such that the evaluation was applied consistently throughout the study area.</p>
6	Bruce Copley	Snail Lake and Wetland A	We would like to see more included in the study about the ability to control Snail Lake and Wetland A once Grass and W. Vadnais are adjusted to a lower level. This is a significant advantage of any system modification designed to maintain a lower level of Grass and W. Vadnais lakes. The dynamics of interconnectivity for Snail, Wetland A, Wabasso, Owasso, Grass, West Vadnais and Twin Lake are not clearly defined in the study.	<p>Noted. As stated in Section 1 of the Beltline Resiliency Study, this study evaluates potential system modifications that could be implemented in the Beltline watershed to reduce flood risk to habitable structures. As shown in Figure 2-2, there are no flood-prone structures identified as District within the Grass Lake or Wetland A subwatersheds. The Board of Managers may consider additional studies to evaluate the costs and benefits for providing additional connectivity as suggested. However, the Beltline Resiliency study focused on mitigating risk to flood-prone structures, and the additional evaluation in this area is outside the current scope of the study.</p> <p>The first four feasibility studies have already been identified for 2020 (Owasso Basin Bypass Pipeline Feasibility Study, Ames Lake Area Flood Damage Reduction Feasibility Study, Willow Creek Area Flood Damage Reduction Study and West Vadnais Lake to South of I-694 Conveyance Feasibility Study).</p>
7	Bruce Copley	Owasso Basin Bypass Option	It would seem that the most critical bottleneck once the Keller lake and Lake Phalen outlet are modified is flooding around Owasso Basin. Most of the modifications upstream are blocked by this issue, a problem that is mostly solved by adding a large pipe along the west side of I35. This opens numerous possibilities for controlling Owasso, Wabasso, Grass, Snail, Wetland A and W. Vadnais Lakes. We strongly support the addition of a pipe along 35E or alternative that allows for high throughput to Gervais Lake. Are there other options (short of purchasing Owasso Basin) being considered in light of the high cost of the 35E pipe? Given the expected long timeline to study, permit and install a pipe, are there temporary options that can be executed?	<p>The RWMWD is currently working on a feasibility study that further evaluates the potential for a piped "bypass" of high flows around Owasso Basin to protect it from flooding (Owasso Basin Bypass Pipeline Feasibility Study). In the interim, RWMWD staff will be working on an emergency response plan that would protect the homes around Owasso Basin under existing conditions, as well as the feasibility of other options that would affect the water level in West Vadnais Lake over and above lowering the 15' outlet to an elevation of 881.0 (West Vadnais Lake to South of I-694 Conveyance Feasibility Study).</p> <p>Please note that this work has been done, and continues to be done outside of the scope of the Beltline Resiliency Study work and its associated feasibility studies.</p>

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8	Bruce Copley	Owasso Shunt Option	The Owasso shunt operation needs to be considered at "opportunistic" pumping times not just seasonal pumping. By opportunistic pumping we mean that the narrow winter operation window could be expanded to include any time, year round, when flood risk downstream is minimal. Same comments apply for pumping of W. Vadnais. There is minimal detail in the study regarding the "shunt". Can more detail be provided? We would be interested in the impact of the Owasso Shunt on Grass and W. Vadnais. This is not shown as the option and is rejected with minimal discussion.	<p>The Beltline Resiliency study presents one set of system modifications to mitigate risks for habitable structures. In general, the study does not include discussion for other potential modifications. The Study does not "reject" the shunt option. This option is not presented because it is less effective at mitigating flood-risk for habitable structures on Lake Owasso. Similar to any other modification not presented in detail in the study, future evaluation could be included in a feasibility study to identify optimize system modifications at the direction of the Managers.</p> <p>The Resiliency Study does not discuss impacts of the second outlet from Lake Owasso on Grass Lake and West Vadnais Lake because there are no flood-prone habitable structures adjacent to those water bodies.</p>
9	Bruce Copley	Seasonal Pumping of West Vadnais Lake	The analysis of seasonal pumping of W. Vadnais does show three important results. First, the time that Grass/W. Vadnais are at peak levels is minimized, thus the risk of severe flooding from a 100 year storm is proportionately minimized. Second, the peak is below the overflow level for Grass and W. Vadnais lakes. Third, the average level is lower and therefore storage capacity increased. All three results appear to be advantageous to minimize flooding in the Grass/W. Vadnais area. All might look even better if the analysis was coupled with the lowering of the 15" pipe outlet from W. Vadnais. We would like to see the analysis considered with the "opportunistic" vs. seasonal pumping. Please comment on these three issues and a more detailed analysis of inundation for the area if opportunistic pumping were to be implemented and the 15" culvert lowered.	<p>Regarding comment 1, seasonal pumping does reduce the duration of when water levels are above the outlet from West Vadnais. Within the context of the Resiliency Study, system modifications were evaluated to reduce flood-risk to habitable structures. No habitable structures were identified as being flood-prone around Grass Lake or Wetland A. Additional modifications could be evaluated to further reduce water levels in this area, but since they would not address flood-risk to habitable structures they are outside the scope of the Resiliency Study.</p> <p>Regarding comment 2, the benefits of seasonal pumping are highly dependent on the amount of rainfall within a given year. As shown in Figure 3-15, the peak water levels in West Vadnais are very similar whether seasonal pumping was completed or not.</p> <p>Regarding comment 3, the average water level is lower. This is a function of reducing the duration of time the water level is above the outlet. However, as noted in other comments, there are not flood-prone habitable structures within the watershed. Other studies have evaluated a starting water level in Grass Lake at 884.1, and also did not identify flood-prone structures. The Managers may decide to evaluate additional modifications in this area. However, since the Beltline Resiliency Study focused on reducing flood-risk for habitable structures those modifications are outside the scope of this study.</p> <p>Resulting opportunistic pumping, this appears to imply that discharge from West Vadnais should be allowed any time during the year. While the Resiliency study evaluates reducing flood-risk for habitable structures, it does include a general discussion on sequencing of system modifications. In general, the sequencing presented in the Resiliency study notes that downstream improvements should be implemented prior to conveying additional flow into flood-prone areas. If the Managers decide to further evaluate opportunistic pumping, the same sequencing guidelines should apply to pumping as any other system modification to prevent adverse downstream impacts for habitable structures.</p> <p>Other options that could lower the level of West Vadnais Lake are being further evaluated in a RWMWD feasibility study this year- one of the four that came out of the Beltline Feasibility Study (West Vadnais Lake to South of I-694 Conveyance Feasibility Study)</p>
10	Bruce Copley	Seasonal Pumping of West Vadnais Lake	In the Barr presentation there is a set of charts on the seasonal pumping of W. Vadnais Lake. It covers the period from 1/1/15 to 12/31/18. When pumping is modeled, W. Vadnais never exceeds the level of the berm at 5 Star Estates and may not have affected Rice Street. Please include these data for 2019. Would a similar level of reduction have been predicted for the 2 periods when W. Vadnais overtopped the berm and closed Rice Street? Would this have eliminated the pumping of Twin Lake and the sandbagging of the low home?	<p>The model results indicate that the water level in West Vadnais did not overtop the crest elevation of the berm. However, the berm had eroded and in 2019, allowing West Vadnais Lake to discharge towards Twin Lake. Based on the period evaluated, pumping did not prevent West Vadnais Lake elevations from reaching the point in the berm that was eroded. The Beltline Resiliency Study included modeling using available information at the time of the analysis. Additional evaluation outside the scope of the Beltline Resiliency Study is ongoing.</p> <p>The low point of Rice Street was raised to 884.7 by Ramsey County in 2019. The eroded portion of the berm between the "triangle wetland" south of West Vadnais Lake and Five Star Estates had eroded, and was restored by RWMWD this past winter. RWMWD also constructed a bypass system to collect overflow from West Vadnais Lake and divert it around Twin Lake. As such, reducing the potential for impacts to habitable structures.</p> <p>Please note that this work has been done, and continues to be done outside of the scope of the Beltline Resiliency Study work and its associated feasibility studies.</p>
11	Bruce Copley	General Grass Lake question	Would much longer periods with W. Vadnais below the maximum have prevented long spells of Grass Lake overflow and water moving north of Gramsie Rd?	<p>When water is below 884.1 in Grass Lake, it can not flow north of Gramsie Road through the culvert in the road. When water is lower in Grass Lake and West Vadnais Lake, it is less likely that water will flow north of Gramsie Road through the culvert in the road due to storm events.</p> <p>Please, note that since no flood-prone habitable structures are identified north of Gramsie Road, the Resiliency Study did not evaluate system modifications to reduce water conveyed into Wetland A.</p>
12	Bruce Copley	Pumping of West Vadnais Lake	As we have seen from the Twin Lake pumping, opportunistic pumping in periods throughout the year are possible. The cost to do this pumping is tiny compared to the desired installation of a pipe along 35E and may well provide a significant margin of protection from flooding by the Grass/W. Vadnais lake until the 35E pipe could be installed.	<p>This comment implies that the capital cost of pumping is less than the capital cost for installing a pipe along I-35E. However, there are two things that this comment does not consider. First is that if we evaluate the lifecycle cost of a project, then the cost for pumping (maintenance, fuel, staff time, permitting, etc...) over an operational lifespan may be closer to installing a pipe.... Second, is that if the 15-inch pipe out of WWL is flowing full, then there is nowhere to pump the water, so at a minimum pumping would also mean constructing a pipe from WWL to some location south of the highway - which significantly increases the costs.</p> <p>It is important to note that the Twin Lake system is much smaller than the system that drains through Grass and West Vadnais Lakes. As such, Twin Lake could be pumped (opportunisticly) down over a relatively short period of time to protect a home that was at imminent risk of flooding, during a summer when we were fortunate to not experience any extreme storm events that would have caused flooding downstream. With the other flood management actions undertaken over the past 2 years and already planned for 2020, as well as the future Suzanne/ Gramsie Road Stormwater Improvements project that will be implemented by the City of Shoreview in 2020 in Grass Lake area, no homes will be imminent risk of flooding in the Grass Lake area up to the 100-year event. The decision to pursue options that would lower the level of West Vadnais Lake further will be weighed as a part of the West Vadnais Lake to South of I-694 Conveyance feasibility study planned for 2020.</p>

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13	Bruce Copley	Pumping of West Vadnais Lake	We think that RWMWD should commence pumping from W. Vadnais into Waldo Pond immediately, before we get any further into the best time of year to discharge water into Gervais Creek.	<p>Waldo Pond is located south of Twin Lake. It is not feasible to pump West Vadnais Lake into Waldo pond. When discussing pumping from West Vadnais Lake, there are two options:</p> <ol style="list-style-type: none"> 1. Pump from West Vadnais Lake into Stymie Pond. Stymie Pond is a MnDOT stormwater pond, which outlets below I-694. On the south side of I-694, water flows through an open ditch, and then eventually discharges into Jiggs Pond and eventually into Owasso Basin. There are flood-risk concerns near Owasso Basin. In addition, there are concerns with erosion south of the interstate system that must be mitigated following completion of pumping. Pumping from Stymie Pond requires a permit from MnDOT. This is the route that is planned for any bypass pumping to avert overflows from West Vadnais Lake to Twin Lake. 2. Pump from West Vadnais Lake into a new pipe below the highway. RWMWD is evaluating the feasibility of constructing a new pipe below the highway. However, for this option pumping could not start immediately. <p>See comment #12 for additional discussion regarding concerns related to downstream impacts associated with pumping.</p>
14	Bruce Copley	Lowering water levels in West Vadnais Lake, Snail and Wetland A	The addition of a large output pipe from W. Vadnais to Waldo Pond appears to be very effective and should provide excellent control of high water levels in Grass, W. Vadnais, Owasso, and Wetland A. It seems to be adequate to allow a connection between Snail and Grass as a cost effective route to control Snail. We strongly support this addition and also understand the the new pipe along 35E would be required to fully utilize the added outflow capacity.	<p>The Resiliency Study did not evaluate or recommend a piped connection to Waldo Pond. A piped connection to Waldo Pond would have adverse impacts on the MnDOT drainage system and Twin Lake. The Resiliency Study evaluated a piped connection to Porky Pond.</p> <p>The Resiliency Study did not evaluate a piped connection to lower the outlet elevations of Wetland A or Snail Lake, and does not make any assumptions or conclusions regarding the adequacy of the proposed pipe to convey water from these locations. The area around Wetland A was not evaluated because there are no flood-prone habitable structures in this area. The area around Snail Lak was not considered, because there is only one flood-prone structure, and the District completed a detailed feasibility study to identify system modifications, and identified an emergency response plan as the most feasible alternative in this location (see comment #44).</p>
15	Cliff Aichinger, RWMWD Board Manager	Page 18	I find the wording in the bullets may be a bit confusing to readers. The phrase "at the invert of the existing pipe" may be clearer if it read "at the same level as the invert of the existing pipe."	This change will be made to the final draft of the report.
16	Cliff Aichinger, RWMWD Board Manager	Page 18, second bullet	My question is whether this covered section of the creek is needed or whether it could be made into an open channel to add capacity and avoid adding new pipes. A bridge could be added for the trails.	The second bullet includes a note "or equivalent". This implies that a modification to the system that provides equivalent capacity would be sufficient. The suggestion to replace the culverts with a bridge or open channel could be a way to provide additional capacity. The Resiliency Study provides one method for mitigating flood-risk for habitable structures, and further optimization of each modification will be required. In this location, using a bridge could be a way to optimize the modification.
17	Cliff Aichinger, RWMWD Board Manager	Page 26, End of first paragraph under section 3.2.1.	My concern is that we somehow address the potential problem of cities solving "local" flooding issues by adding capacity to their system, which would then add new volume to "District" projects.	This concern will be addressed during the feasibility study phase of each area that is explored further, in close coordination with member cities.
18	Cliff Aichinger, RWMWD Board Manager	Page 31, second to last bullet	I don't see this modification reflected on the figure.	The modification is shown on Figure 3-12. The call out box is pointing to the pipe from the triangle wetland south of West Vadnais Lake and connecting to Porky Pond.
19	Molly Churchich, Ramsey County Public Works Department	Page 18, Increasing culvert capacity on Edgerton Street and Keller Parkway	Edgerton Street was resurfaced in 2019 and Keller Parkway was resurfaced in 2017. Depending on pavement rating conditions, resurfacing is generally on a 10-20 year cycle factoring in Average Daily Traffic and depth of road base, etc. As I understand it, you will be implementing at the south first and then moving north for possibly a 10-year plan. We should discuss as this phase is in the queue and there is potential to coincide with our resurfacing or reconstruction projects.	Thank you for your comment. RWMWD will be sure to coordinate future efforts with Ramsey County Public Works.
20	Molly Churchich, Ramsey County Public Works Department	Page 30, Culvert improvements at County Road C and Victoria	RCPW is planning a pipe lining, apron repair, and slope stabilization in this location in 2020. The catch basin to the east and manhole to the west has deteriorating pipes which will be lined. The large roadway culvert was originally replaced under S.A.P. 62-623-10 in 1972. Between 2008-2012, our crews completed a construction joint throughout the tunnel, as best guessed by our foreman.	Thank you for your comment. RWMWD will be sure to coordinate future efforts with Ramsey County Public Works.
21	Molly Churchich, Ramsey County Public Works Department	Page 30, Lake Owasso outlet	Our lake outlet records say Shoreview holds the JPA for this outlet, as owner and operator.	Thank you for your comment. RWMWD will be sure to coordinate future efforts with Ramsey County Public Works.
22	Molly Churchich, Ramsey County Public Works Department	Page 31, Lake Wabasso outlet modifications	As owners of the outlet, we have been monitoring some slight degradation in the structure. We planned to have it repaired with a structural joint epoxy in 2019, but scheduling and water levels did not cooperate. We plan to have this repair completed in 2020. We could coordinate dredging, if required.	Thank you for your comment. RWMWD will be sure to coordinate future efforts with Ramsey County Public Works.
23	Molly Churchich, Ramsey County Public Works Department	Page 31, Grass Lake outlet pipes and Rice Street pipes	Parks can comment on the impacts to the trail for Grass Lake's outlet. In 2022, RCPW was planning to reconstruct this section of Rice, but the extents seemed to have shifted. Let's keep the conversation going to sync as much as we can. The storm sewer south of the railroad bridge has been on my "wish list" for some years now. No one is brave enough to tackle.	Thank you for your comment. RWMWD will be sure to coordinate future efforts with Ramsey County Public Works and Ramsey County Parks.

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24	Molly Churchich, Ramsey County Public Works Department	Page 31, West Vadnais Lake Vadnais Boulevard pipes	Resurfacing of Vadnais Boulevard between Rice Street and Twin Lake Boulevard was on the schedule for this year, but has since been shifted. It is expected it will land on 2023-2024. We should coordinate projects on this one. Public Works' desire is that pipes be installed at least one year prior to allowing for settling.	Thank you for your comment. RWMWD will be sure to coordinate future efforts with Ramsey County Public Works.
25	Molly Churchich, Ramsey County Public Works Department	Page 42, Seasonal drawdown of West Vadnais	The county is supportive of this, provided dewatering practices don't interfere with traffic on our systems. Depending on the pump setup location, we may require a county ROW permit for hoses and traffic control signs.	Thank you for your comment. RWMWD will be sure to coordinate future efforts with Ramsey County Public Works.
26	Molly Churchich, Ramsey County Public Works Department	Page 44, Casey Lake Outlet, White Bear road control, and Kohlman Basin pipeline	I have been searching for record plans for the Casey Outlet project for a year. We seem to have everything related to the road portion, but as I understand it, RWMWD added on work to the Casey Outlet as an addendum. Is that correct? Does RWMWD consider themselves owners of the outlet? What is the White Bear road control? Has the District considered any improvements to the Kohlman Wetland Treatment System constructed by the county in 1984? Our field staff have inquired if this is something the District wants to pursue but I wasn't confident that it was evaluated to have a positive impact to the watershed.	<p>The District has original plans for the Casey Lake outlet. Following construction of the outlet modifications were made which included a trashrack and weir with a sluice gate. The outlet is identified as a District managed facility in the District's 2017 Management Plan.</p> <p>The White Bear Ave control is a sheet pile weir with a v-notch. The District constructed this structure in 1994 to provide some water quality treatment in the wetland upstream of White Bear Ave.</p> <p>The District hasn't considered improvements to the 7th Street weirs at Horseshoe Park, but the District cleans the timber weirs on a regular basis. RWMWD will be sure to coordinate future maintenance efforts and coordination potential opportunities for system improvements.</p>
27	Molly Churchich, Ramsey County Public Works Department	Page 48, Willow Lake Outlet	We would need adequate time to engage with HB Fuller and Parks.	Noted. Thank you for your comment.
28	Molly Churchich, Ramsey County Public Works Department	Page 51, County Road C culvert capacity	I don't believe this segment is in the current resurfacing plan. We have a new engineer taking over our resurfacing program. We should schedule a meeting with the District to discuss upcoming projects.	Thank you- RWMWD would welcome this discussion to help in planning future efforts.
29	Molly Churchich, Ramsey County Public Works Department	Page 51, County Road D outlet	I don't think this is scheduled for resurfacing.	Noted. Thank you for your comment.
30	Molly Churchich, Ramsey County Public Works Department	Figure 3-21, Storm sewer at 5th Street	This segment is planned for a full width resurfacing as part of the Xcel gas main project in 2020. The resurfacing will be negotiated for Xcel to lead or the county will lead. The storm sewer to the north coming from McKnight discharges into the Urban Ecology Center. Ramsey County holds the easement that runs east-west and North Saint Paul holds the easement that intersects with ours running north-south. There is a sizeable sediment delta at this intersection point blocking flow. It has been too wet in the area for us to access. We've tried to coordinate with North Saint Paul with no success.	Thank you for your comment. RWMWD will be sure to coordinate future efforts with Ramsey County Public Works.
31	Molly Churchich, Ramsey County Public Works Department	Figure 3-23, Modifying storm sewer to Casey Lake	This segment is not in our scheduled resurfacing plan. There is one resident at 2210 17 th Ave, Mr. Terry Noonan, who was open to having a rain garden in his yard, if we ever reconstruct the road. I told him I would keep it in mind. He has already done the pre-calculations, as expected.	Thank you for your comment. RWMWD will be sure to coordinate future efforts with Ramsey County Public Works.
32	Molly Churchich, Ramsey County Public Works Department	Figure 3-24, Additional culverts under White Bear Avenue	The condition of these existing culverts is not known. Water levels are too high to inspect properly. This segment of White Bear Avenue is getting resurfaced this year.	Thank you for your comment. RWMWD will be sure to coordinate future efforts with Ramsey County Public Works.
33	Molly Churchich, Ramsey County Public Works Department	Figure 3-26, County Road C culverts	This segment is not slated for resurfacing.	Noted. Thank you for your comment.
34	Molly Churchich, Ramsey County Public Works Department	Figure 3-42, Stormwater along White Bear Avenue.	Currently, there is no project identified in this location. If this involves substantial storm sewer replacement, we may evaluate adding it to a larger project.	Thank you for your comment. RWMWD will be sure to coordinate future efforts with Ramsey County Public Works.
35	Molly Churchich, Ramsey County Public Works Department	Figure 3-44, Stormwater pond at Phalen Boulevard and Johnson Parkway	According to our Land Survey records, this pond is on county ROW. https://ramseygis.maps.arcgis.com/apps/webappviewer/index.html?id=b78c7d82f13149758bfaf6bbdf77c582 I do not have good records of plans or ownership, though.	Thank you for your comment. RWMWD will be sure to coordinate future efforts with Ramsey County Public Works.
36	Molly Churchich, Ramsey County Public Works Department	General	Let's continue to discuss partnerships as these projects move forward because it could be a good way to optimize our resources, collectively.	Thank you for your comment. We agree, and will keep in touch on these projects going forward.
37	William Zajicek St. Paul Resident	Presentation	That presentation wasn't easy to follow. For one thing I don't understand what the sinks and buckets are supposed to represent.	The sinks and buckets slides were meant to show why lowering the level of water in West Vadnais Lake doesn't necessarily produce a significant effect in lowering the frequency of overflows from Grass Lake, given the large volume of water that is effectively constantly entering the area. Even if lake levels are lowered in the "off season", spring snowmelt and subsequent storm events fill the area right back up under existing outflow conditions.

Comment #	Commenter	Report Reference	Comment	Response to Comment
38	William Zajicek St. Paul Resident	Cost of mitigation projects	Regarding the draft study, given the estimated costs of mitigation projects, the option of purchasing properties at risk didn't seem to be there. One could purchase quite a few homes for 50 million dollars.	As noted in Section 1, one of the assumptions for the Beltline Resiliency study was to present system modifications that would be required if purchasing of flood-prone structures was not an option. Further evaluation of purchasing flood-prone structures should be included in future feasibility studies and optimization of each system modification. However, Appendix B includes a high-level estimate of the cost to purchase flood-prone property.
39	Stuart Knappmiller St. Paul Resident	Partnerships	We wondered if this was the kind of project that Payne Phalen Community Council would be interested in. We both serve on that board. Of course the sewer runs through other groups geography as well.	Thank you for your comment. Gathering input from a diverse group of stakeholders will be a critical component for identifying and evaluating optimizations for system modifications discussed in the study.
40	Stuart Knappmiller St. Paul Resident	Request for presentation	Is there a way to have knowledgeable staff explain this project? We would be happy to facilitate a meeting on the Eastside.	Thank you for your comment. Providing information and gathering input from stakeholders is an important part of this work and could be accomplished as projects are identified and pursued.
41	Stuart Knappmiller St. Paul Resident	Project purpose	Is a significant part of this project the result of contractors and home buyers who apparently didn't walk/run/ride a horse through the Stumptown Creek valley 7 days a week bringing the cows in for the evening milking? Tossing a heavy rock into a raging creek, which washes its a significant part of this project the result of contractors and home buyers who apparently didn't walk/run/ride a horse through the Stumptown Creek valley 7 days a week bringing the downstream before it sinks, knowing the creek was on this side of the valley last year, that the frog pond is now the creek bed, let's one think about what water does. There were 4 foundations of miners cabins from the European expansion of native lead diggings on our 228 acre farm. One had a well and was on the high ground. 2 were on a platform above flood stage. Only one was (possibly)on the flood stage level. So people in the 1800's knew to not build houses (or roads) where they would flood. Are our taxes subsidizing these lakeshore homes?	Homes throughout the RWMWD were built over a wide range of years and are occupied by a wide range of homeowners who have experienced a wide range of hydrologic conditions on their properties. In addition, our climate in recent years has experienced increasing levels of precipitation that stress this infrastructure. It is the RWMWD's goal to assess flood risk to the built environment across the District, assess why the risk exists and to work with partners to figure out what can happen to decrease that risk. We have inherited this built environment, and we strive to decrease the risk to it, balancing both upstream and downstream properties.
42	Mark Maloney, City of Shoreview	Page 1, Concerning Flood Risk to Habitable Structures	The City understands the emphasis of the Study to evaluate potential system modifications to reduce flood risk to habitable structures adjacent to Watershed managed facilities. While higher than normal water levels in Shoreview have had significant impact on public infrastructure (e.g. Gramsie Road) and on Ramsey County Regional Park Property, protecting habitable structures should obviously be the highest priority. It is my understanding that carefully sequenced modifications that serve to reduce flood risk to habitable structures in the District will eventually benefit other lower priority impacts.	Thank you for your comment.
43	Mark Maloney, City of Shoreview	Page 7, Statement "RWMWD is currently evaluating flood risk reduction options for Twin Lake (and Grass Lake) outside of the scope of this Beltline Resiliency Study"	My question would be if the flood risk reduction options being studied here and those outside the scope of the study were interdependent, and if so, how does that impact the proposed sequencing or priority of storm modifications?	The goal of the Resiliency Study was to present one set of system modifications, which if implemented, would mitigate flood-risk to habitable structures. A detailed evaluation of interdependence of each modification was not completed as part of the study. The evaluation was limited to general guidance for project sequencing (i.e., do not increase discharge from one area before making downstream improvements to be able to safely convey the additional discharge)
44	Mark Maloney, City of Shoreview	Page 8 and Figure 2-2, Observation regarding structures classified as "District"	There is only one structure in the City of Shoreview estimated to be at risk due to a 100-year flood from a District-managed water body: the Snail Lake property at 4380 Reiland Lane. The City and RWMWD previously agreed in principle to an emergency response plan for that property (assuming property owner coordination) that would include the City delivering and possibly assisting in the placement of sand bags to protect the habitable structure.	Thank you for your comment.
45	Mark Maloney, City of Shoreview	Page 26, Statement "Increasing this flow rate, without other system modifications, results in increases to downstream water levels"	I understand this to be the biggest barrier to the simple approach of just moving water out of the Grass Lake subwatershed at a faster rate. This limiting factor has been discussed at every public meeting on the topic that I've been involved with and it's safe to assume that the Shoreview City Council understands it as well. It is for that reason that the City expects the RWMWD will adequately study and ultimately implement modifications that do not result in increased flood risk for downstream habitable structures.	Thank you for your comment.
46	Mark Maloney, City of Shoreview	Page 28, Suzanne Pond	I believe that the language in the Study could be updated to reflect that the Suzanne Pond Area Improvements are currently under design and on-schedule for constructing beginning May, 2020. The proposed improvements include pump and control replacements, reconfigured inlets and outlets, and the ability to accommodate the drainage from Gramsie Road to reduce the likelihood of nuisance flooding from smaller rain events. A segment of Gramsie Road itself is being raised to provide an increased level of protection for the Crestview Neighborhood in the event that Grass Lake overtops. The cost of these City of Shoreview improvements is currently estimated at \$850,000.	Thank you for your comment. This change will be made to the final draft of the report.
47	Mark Maloney, City of Shoreview	Page 28, Snail Lake	The City concurs with the statement concerning the most effective flood management strategy for the home at 4380 Reiland Lane.	Thank you for your comment.

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48	Mark Maloney, City of Shoreview	Page 36, Sequencing	The Study states an assumption that improvements downstream of the Grass Lake subwatershed are made before any proposed outlet modifications for Lake Wabasso, Grass Lake and West Vadnais Lake. If there is a high degree of confidence associated with that position, then the City would urge RWMWD to place the highest priority on those downstream improvements.	Thank you for your comment.
49	Mark Maloney, City of Shoreview	Page 42, Seasonal Drawdown for West Vadnais Lake	Given that higher levels of West Vadnais Lake act as a constraint for the draining of the Grass Lake subwatershed, the City would strongly encourage and support RWMWD efforts to implement improvements that would permit the drawdown of West Vadnais Lake during the fall and winter months.	The decision to pursue options that would lower the level of West Vadnais Lake further will be weighed as a part of the West Vadnais Lake to South of I-694 Conveyance Feasibility Study planned for 2020.
50	Mark Maloney, City of Shoreview	General	Thank you for the opportunity to participate in this process. From my perspective, the City and the District are working well together to better understand and hopefully mitigate impacts from unprecedented weather of the past decade.	Thank you for your comment. RWMWD looks forward to working with the City of Shoreview on these efforts in the future.
51	Morgan Dawley and Heather Nelson, City of North St. Paul	Coordination of Flood Risk Modeling	The city of North St. Paul completed a flood study in 2017. The result of the city's study identified 7 focus areas. Only 2 of the 7 focus areas identified in the NSP study correspond to flood issues in the RWMWD study. Would the watershed district consider including the additional detail of the City's study into their study to help identify upstream storage areas? Partnering on the modeling could help resolve some differences and show a shared benefit between the district and local flooding concerns. See the example below showing the subwatershed inputs between the two models.	The District continuously updates their model based on best available information, and is open to working with member Cities to incorporate better definition of the storm sewer system, add detail, and if appropriate address differences.
52	Morgan Dawley and Heather Nelson, City of North St. Paul	Coordination of Flood Risk Modeling	Was additional storage in Southwood Nature Preserve by Cowern Elementary in North St. Paul through dredging the ponds downstream from Southwood considered? This area has been previously studied.	In general, dredging of stormwater ponds was not a system modification that was considered. Dredging increases the permanent pool volume, which does not change the peak water surface elevations in the basin. Future modifications to the ponds to increase the live storage volume could be considered.
53	Morgan Dawley and Heather Nelson, City of North St. Paul	PCU Pond	Was providing more storage in PCU Pond considered?	Increasing the storage volume of the permanent pool was not considered. PCU pond currently takes up most of the parcel, so change to the pond footprint were not considered as part of this study, but should be considered as an option for future optimization as part of a detailed feasibility study for modifications in this area.
54	Morgan Dawley and Heather Nelson, City of North St. Paul	Coordination of Flood Risk Modeling	The focus of the study was on Potential District Flood-Risk Areas near district managed water bodies, facilities, or previous projects. Local flooding issues were not targeted as part of the study which limits opportunities for collaboration with the Cities. The use of a 100-year, 4-day Atlas 14 rainfall event (8.3 inches) as the critical event is disconnected from existing FEMA FIRM mapping assumptions and building code use of the 100-year, 24-hr rainfall event as the basis of establishing flood plain elevations. Initial review of the results in some cases show inundation areas that exceed existing mapped 500-year flood plains. The implications of public release of these inundation maps is concerning see example below (figures provided).	<p>Potentially flood-prone areas designated as "Local" are typically representative of flooding Cities typically address. Mitigation in these areas may not change downstream peak flow rates and water elevations in other municipalities. The Resiliency study notes that Cities typically lead the evaluation of this type of flooding, but that the District may choose to support the City's efforts in a collaborative role.</p> <p>The use of the 4-day duration event is not disconnected from FEMA guidance. FEMA Guidelines and Specification for Flood Hazard Mapping Appendix C indicates that rainfall duration, at a minimum, must exceed the time of concentration for the watershed and must be large enough to capture all excess rainfall as well as provide reasonable runoff and sediment volumes when performing storage analysis. The Mapping Partner may use the critical storm concept to determine the storm duration, or use the duration specified in guidelines developed by state agencies responsible for flood control or flood regulation.</p> <p>RWMWD selected the 4-day event because it is the critical duration event for the District. The stormwater model is run using a nested rainfall distribution. The distribution was developed such that depths from shorter durations (i.e., 24-hours) are nested within the longer 4-day distribution. The hyetograph was developed so that the peak of the storm occurs at the center with decreasing intensities on either end. Following this methodology, critical storm events of lesser duration are nested in the overall 4-day event distribution. Consequently, only one design event is required to obtain critical flows and water surface elevations throughout the watershed (i.e., the drainage area of any subwatershed is irrelevant because the critical duration storm event for each subwatershed is nested within the 4-day event). This is similar to why the 24-hour duration event is used for small sites or individual parcels. The time of concentration for an individual parcel is much less than 24-hours, but because the nested distribution is used, only a single event must be evaluated. In areas where there are more storage, such as large ponds, wetlands, or lakes, the 24-hour duration event may not be sufficient to calculate the critical water surface elevations or flows.</p> <p>Finally, this comment references an example from the FEMA FIRM. The figure showed the area west of McKnight Road from approximately County Road B to 13th Avenue. The comment implied that because the District's model has a larger inundation area than the FEMA maps there is some concern related to the results. First, the FEMA map in the example area shown does not accurately characterize the drainage in this area. The FEMA map simulates an open ditch that drains south to north within the example area - this is an inaccurate representation of the drainage system in this location. Actually, the City storm sewer drains the area east of McKnight south towards the Highway, where it either flows east under McKnight or to the inlet to the large arch pipe connected to the MnDOT system and then into PCU pond. The summary, is that the current FEMA maps do not accurately represent the drainage system.</p> <p>In addition the FEMA FIS indicates that the analysis for this area was not updated when the FIRM was updated. The Engineering analysis for the inundation shown on the FEMA maps are based on drainage areas delineated using 1970s aerial photos, and 1975 City storm sewer.</p>
55	Morgan Dawley and Heather Nelson, City of North St. Paul	Prioritization and Funding	Cost estimates for all the improvements outlined in the study range from \$142M (-50%) to \$568M (+100%) for mitigation of 227 potentially flood-prone structures. No priority or value was assigned to structures protected and it does not appear that critical infrastructure (e.g. utilities, major access routes) were considered in the analysis for protection. It also is not clear the frequency at which the identified structures would be impacted (e.g. 2, 10, 50 year events). Has a funding mechanism been identified?	<p>The Resiliency Study does not include guidance on prioritization of system modifications. As discussed in Section 3, the Resiliency Study includes general guidance for sequencing to avoid adverse downstream impacts. The intent of the Resiliency Study was to provide one set of modifications to remove habitable structures from the floodplain. Prioritization of individual locations will be considered by the Managers.</p> <p>The Resiliency Study also does not present optimized system modifications. Additional feasibility studies will be completed prior to implementation to identify the optimized modification for each area.</p> <p>The study focused on removing habitable structures from the floodplain. Habitable structures are those that are referenced by the District's rules. The District does not set freeboard for roadways or site other infrastructure referenced. The District is open to collaboration with and support of roadway authorities Cities within the District to mitigate flood-risk in these areas.</p>

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56	Morgan Dawley and Heather Nelson, City of North St. Paul	Verification of Flood Prone Structures	Has there been any verification that structures identified as "flood prone" have actually had flooding issues in the past? Has there been any categorizing of the "flood prone" structures to identified critical infrastructure such as schools, public buildings, emergency responders, etc.?	<p>The flood risk of structures identified in the Atlas 14 modeling effort was based on the 100-year, 96-hour storm event peak water surface elevations relative to structural elevations estimated from LIDAR data. The feasibility studies stemming from the Beltline Resiliency Study that are planned for 2020 involve surveying the structures that may be at risk of flooding to verify low elevations and flood risk. Also, RWMWD has developed District-wide flood inundation maps that show estimated inundation footprints for a range of flood frequency events (2, 10, 50 year events, for example). These maps will be distributed to member cities in 2020 for discussion and planning.</p> <p>Past flooding has been documented in many areas shown as flood-prone including North Star Estates, Gervais Lake, Lake Owasso. After the model was updated to Atlas 14 inundation areas were shared with municipalities within the District, and in the summer of 2015 District staff met individually with each City. Comments provided by the Cities indicated that the inundation areas shown generally aligned with areas of known flooding and frequent calls.</p>
57	Morgan Dawley and Heather Nelson, City of North St. Paul	Phasing	Are any of the phases of project stand alone or do they all have to be sequenced in order to observe the identified benefit. What is the risk to the resiliency study if feasibility or permitting road blocks are encountered?	<p>Projects that provide additional floodplain storage or reduce downstream discharge rates could be implemented immediately. The recommendation in the study, is that projects that increase downstream discharge are dependent on first implementing downstream improvements.</p> <p>Future feasibility studies to optimize modifications and verify feasibility when considering additional information such as utilities, permitting, land acquisition, etc. will be required. As part of future feasibility studies additional options that were not considered as part of the Resiliency study should also be considered, including acquisition of flood-prone property and emergency response plans. It is possible that upon further review, some modifications may not be feasible. If this occurs, re-evaluation of modifications will be required to mitigate flood-risk for habitable structures.</p>
58	Morgan Dawley and Heather Nelson, City of North St. Paul	Coordination of Work	Local and county infrastructure improvements are planned in the near future for areas in North St. Paul including McKnight Road and 17th Ave. It should be noted that this work should be coordinated as much as possible with any potential flood improvements.	RWMWD will be sure to involve the City in these efforts, working collaboratively to find solutions.
59	Morgan Dawley and Heather Nelson, City of North St. Paul	Coordination of Work	How will stakeholders be engaged in this process moving forward?	RWMWD encourages Cities to reach out to the District if there are project planned near areas identified as part of the Resiliency Study. As part of a separate effort, the District identified areas of flood-risk within each City, and plans to share those maps with member cities. Finally, when the District completes feasibility studies for specific sites, we plan to work collaboratively with the Cities to find solutions.
60	Morgan Dawley and Heather Nelson, City of North St. Paul	DNR Floodplain Mapping	How was the DNR floodplain remapping that is currently underway (scheduled through April 2020) considered in this process?	<p>The floodplain remapping effort that is lead by the MnDNR is based on Existing conditions. None of the system modifications presented in this document are applicable to the DNR's remapping effort.</p> <p>However, the DNR has requested to use the District's stormwater model for remapping areas shown on the floodmaps. Survey information collected by the DNR has been incorporated into the District's model. As-built plans for water bodies shown on the FEMA floodplain have been incorporated in to the District's model. The District submitted the model, supporting documentation regarding model hydrologic parameters, hydraulic parameters, and model calibration and validation results to the MnDNR. The MnDNR is currently reviewing the submittal and anticipates providing comments later this year. (The DNR extended the anticipated schedule for the remapping effort through the spring of 2021)</p>
61	Wes Saunders-Pierce, City of St. Paul	General	Thank you for seeking stakeholder input on the Beltline Resiliency study. The review meeting on January 17, 2020 was very informative. The breadth of the 2019 draft study is considerable and reflects the importance and complexity involved to increase system resiliency against flooding.	Thank you.
62	Wes Saunders-Pierce, City of St. Paul	Coordination of Work	The City developed a Climate Action & Resilience Plan which was adopted by the City Council in December 2019. We look forward to conversations with how RWMWD activities towards advancing the Beltline Resiliency study over the coming years can mutually support our respective goals.	Thank you for your comment. RWMWD looks forward to working with the City of St. Paul on these efforts in the future.
63	Wes Saunders-Pierce, City of St. Paul	Coordination of Work	In particular we are optimistic about the District's Ames Lake, Hayden Heights Recreation Center, and Prosperity Park/Prosperity Heights Park. Staff proposal for active management of Lake Phalen water levels. Additionally, we recommend engaging with city staff before initiating feasibility studies for strategies involving flood storage on city-managed lands. Key areas in the study include near may have local insight regarding constraints or opportunities that could inform further work.	RWMWD will be sure to involve the City in these efforts, working collaboratively to find solutions.
64	Wes Saunders-Pierce, City of St. Paul	Coordination of Work/Partnering	We appreciate our relationship with your agency and the opportunity to express support for the Beltline Resiliency study. We look forward to partnering with the RWMWD on a variety of initiatives and welcome additional dialogue on potential further work.	Thank you for your comment. RWMWD looks forward to working with the City of St. Paul on these efforts in the future.