



### **2019-2021 The Project Inspection and Maintenance Summary**

The mission of the Clearwater River Watershed District is to promote, preserve, and protect water and natural resources within the boundaries of the district in order to maintain property values and quality of life as authorized by MS 103D.

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### Overview & Program Next Steps

This Project Inspection and Maintenance Summary documents inspection and maintenance activities for District projects between 2019 and 2021 as well as prior and prescribed inspections and maintenance. Inspections are performed to provide recommendations on maintenance and modifications for District projects.

While the District has several legacy and newer projects, it lacks an operations and maintenance manual. To address that, inspection reports will be shifted to inspection and maintenance documentation for future reports. Further, photo documentation will be more broadly incorporated. Site schematics and information will also be included with operational and regular maintenance guidance. The reports going forward will function more like an asset management guidance. These changes are planned to be fully integrated by the 2022 report.

Tables 1 summarizes inspection and maintenance activity status for District projects for 2019-2021.

**Table 1: Summary of Recent Inspection and Maintenance**

Project Name	Fund	Last Inspected	Last Maintained	Note on Maintenance Needed	Upcoming
<b>Clearwater Chain of Lakes (1980): Annandale Wetland Treatment System</b>	210	2017	Minor repairs 2017-2018	See 2017 report, and also data collected on a retrofit	Retrofit study/ Major Maintenance
<b>Clearwater Chain of Lakes (1980): Kingston Wetland Treatment System</b>	210	2017, 2021	Reconstructed in 2014.  Sediment removed from basin 2015  Staff augmented rip rap from beaver dam induced erosion late 2016/ early 2017.	Sediment removal from basin and channel	RFQ in progress for sediment basin cleanout
<b>Clearwater Chain of Lakes (1980): Upper Watkins Wetland Isolation Project (North)</b>	210	2017, 2019	2018	Minor berm repair and woody vegetation removal, inspect again in 2022	Spring 2022 inspection via drone and on foot, post rainfall inspection
<b>Clearwater Chain of Lakes (1980): Watkins Wetland Treatment System</b>	210	2017, 2021	Overflow structures installed pre 2018	2017 report is still valid for observations, see data on retrofit	Retrofit study/ Major Maintenance
<b>Clear Lake South: Nistler-Geislinger Basin</b>		2017, 2019, 2020, 2021	2017 pond survey, 2021 pond	2017 survey showed minor sediment and	2022 regular inspection

## 2019-2021 The Project Inspection and Maintenance Summary

## Overview &amp; Program Next Steps

Project Name	Fund	Last Inspected	Last Maintained	Note on Maintenance Needed	Upcoming
			cleanout in dry condition	scheduled next inspection for 2022	
<b>Clearwater Chain of Lakes (1980): Lake Augusta Erosion Control</b>	210	2018, 2021	Major rebuild of drop structure in 2018	Tree clearing in ravine, pond survey 2022	Inspect in 2022, brush cutting needed. Pond survey in 2022
<b>Kimball Stormwater Projects</b>	210	2017, 2020, 2021	Installed 2013, minor improvements	Minor basin maintenance, forebay in park needs total cleanout.	Basin surveys needed 2022, coordination with city needed on vegetation management.
<b>Pleasant Lake Outlet Control</b>	203	2021 winter	Outlet channel repaired 2019, Outlet Deck planned for repair in 2022	Contractor will build and install deck this winter, \$6,500	Regular inspection, verify landowner tree replacement in channel
<b>School Section Lake Outlet Control</b>	206	2018, 2019, 2020, 2021	2019, 2020	None	Regular inspection
<b>East Swartout Treatment Area</b>	210	2018, 2019, 2020, 2021	2019- beaver dams removed  2021- fish barrier wing walls installed, rip rap augmentation, filter scrape, test and pipe cleanout.	None, watch liner condition and for channel buildup.	Regular inspection and operation
<b>Old Highway 55 Treatment Area</b>	210	2018, 2019, 2020, 2021	2018, 2021	None	Regular inspection
<b>Project #06-1: Fish Barriers</b>	215	2018, 2019, 2020, 2021	2019- Henshaw barrier replaced,  2020- Swarout Boards replaced  2021 - Illsley, Swartout outlet, Swartout Inlet Replaced	Segner Pond structure will need to be replaced <5 years, correspond with channel overflow evaluation/ work	Regular inspection, operation

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Project Name	Fund	Last Inspected	Last Maintained	Note on Maintenance Needed	Upcoming
<b>Project #06-1: Segner Pond</b>	215	2021, Sediment Survey	Staff occasionally augments berm w rip rap – verify date  2020 - Maintenance Staff removed brush that was destabilizing outlet channel and re-arranged rip rap	Sediment removal timing estimate based on sediment survey	Evaluation of sediment depth in progress
<b>Clear Lake North</b>	TBD	2018, 2019 2020, 2021	NA	None	NA
<b>Other Projects: Norton Ave, Eddie Schultz Buffer</b>	100	2017	NA	NA	2022 Inspection

## Detailed Descriptions of Recent Project Inspections

### Kingston Wetland Treatment System

**Table 2: Kingston Wetland Treatment System - Components Inspected**

Inspection Year	Components						
	Low flow channel	Limestone filter berm	Rock riffle structure & plunge pool	Sediment basin w/ forebay	High flow channel & berm	High flow overflow structures	Fencing
2014	I	I	I	I	NI	NI	I
2015	I	NI	NI	I	NI	NI	I
2016-17	I	I	I	I	NLI	NLI	NI
2018	NI	NI	NI	NI	NLI	NLI	NI
2019	Wet year, no inspection						
2020	Covid, no inspection						
2021	I	I	I	I	NLI	NLI	NI
I = inspected, NI = not inspected, NLI = no longer inspected							

**Table 3: Kingston Wetland Treatment System – 2021 Inspection Results by Component**

Components	Inspection results	Recommended future inspection schedule
Low flow channel and diversion	IWO; small beaver dam present downstream from diversion, there is a head differential upstream and downstream of the beaver dam	Visual- A; GPS survey- every 2 years or after a high flow year
Limestone filter berm	NI (underwater)	Visual- A; GPS survey- 2020, 2025
Rock riffle structure	IWO	Visual- A; GPS survey- 2020, 2025
Sediment basin w/ forebay	Requires removal	Visual- A; GPS survey- 2020, 2025
Fencing	NI	ND
A = annually, IWO = in working order, ND = not decided, NI = not inspected, NLI = no longer inspected		

#### Recent Site Inspections:

April 2017. Inspection was conducted via Unmanned Aerial Vehicle as part of a free demonstration by Wenck Associates, Inc. Video and aerial photography was taken and is on file at the CRWD office. Inspection indicated the re-meandered low-flow channel was in good condition; its shape seems to be very stable, and vegetation is established. One smaller beaver dam was noted along the low flow channel a few hundred feet from the high-flow/ low-flow diversion. At this time the dam does not seem to be causing an issue. It is unclear whether beaver remain in the area.

The sediment basin has had significant deposit within the area that was cleaned out in early 2015. This seems to confirm suspicions that a large amount of sediment would deposit in this basin during periods of high flow. Aerial imagery seems to indicate there remains enough room in the basin such that cleanout is not necessary this year.

October 2021. R10 survey unit with canoe. Beaver dam at diversion structure with observed with head differential between upstream and downstream. Downstream of beaver dam water level was ~0.5 ft. Upstream water depth was ~2ft. Sediment basin requires cleanout. Channel in mostly good shape with well established vegetation. Reed canary grass buffer the stream banks dominant with some noticeable undercutting further upstream. Water was present along



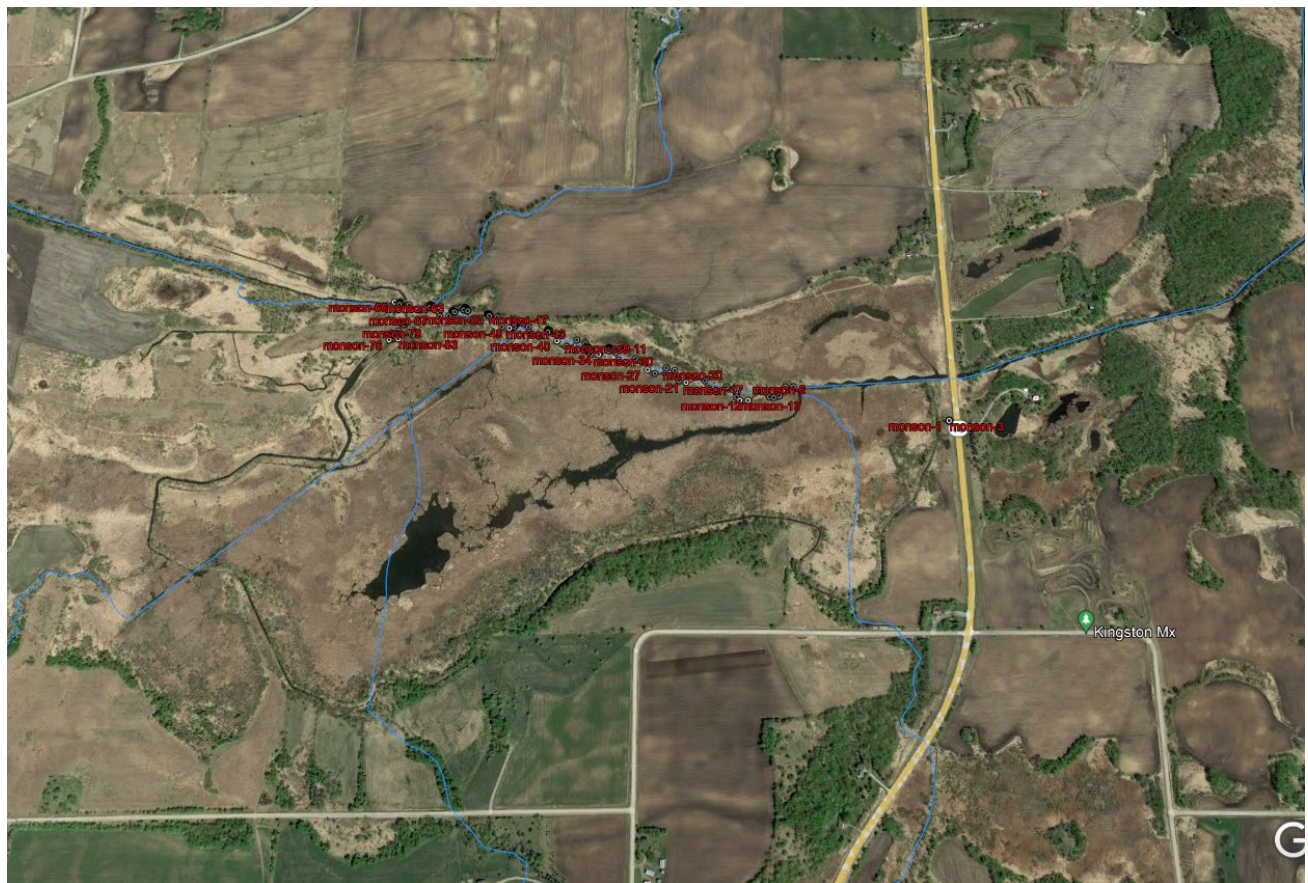
entire stream reach, about 1.8 feet deep for the survey even during dry conditions of 2021. Staff collected cross sections above and below beaver dam. Also cross sectioned the centerline of the beaver dam.

**Recommendations:**

- Obtain drone files from Wenck /Stantec
- Staff coordinated with Mr. Libbesmeier for spoil disposal for 2022. Developing an agreement with the adjacent property owners to provide a disposal site for future sediment removal from this basin may reduce future costs.
- Prior to any work, contact easement holders to inform them of work to be undertaken in order to avoid any potential confusion. Staff has coordinated with DNR so far, but will need to call Almgrens.
- The limestone filter berm and rock riffle structures were underwater. As such, no inspection occurred.



*2021 survey photos*



2021 Survey Locations



## Upper Watkins Wetland Isolation Project (North)

**Table 4: Upper Watkins Wetland Isolation Project (North) - Components Inspected**

Inspection Year	Components				
	<i>Isolation Berm</i>	<i>Diversion Channel</i>	<i>Wooden Weir Structures</i>	<i>Upper Culvert Crossing</i>	<i>Fencing</i>
2014	I	I	I	I	I
2015	I	I	I	I	I
2016-17	I	I	I	DNE	I
2018	NI	NI	NI	DNE	NI
2019	I	I	I	DNE	NI
2020	NI	NI	NI	DNE	NI
2021	NI	NI	NI	DNE	NI

I = inspected, NI = not inspected, DNE = does not exist, NLI = no longer inspected

**Table 5: Upper Watkins Wetland Isolation Project (North) – 2021 Inspection Results by Component**

Components	Inspection results	Future inspection schedule
Isolation Berm	IWO	Visual- A, GPS survey- 2020, 2025
Diversion Channel	IWO	Visual- A, GPS survey- 2020, 2025
Wooden Weir Structures	IWO	Visual- A, GPS survey- 2020, 2025
Upper Culvert Crossing	No longer exists	Visual- A, GPS survey- 2020, 2025
Fencing	NI	ND

A = annually, IWO = in working order, ND = not decided, NI = not inspected, NLI = no longer inspected

### Site Inspections

April 27, 2017. Inspection was conducted via Unmanned Aerial Vehicle as part of a free demonstration by Wenck Associates, Inc. Video and aerial photography was taken and is on file at the CRWD office.

Repair work was recently completed for multiple sections of the project channel. As-built surveying will be completed soon after final site restoration is complete by repair contractor. As part of this repair, the upper culvert crossing was removed due to no longer being needed by landowners.

Work continues with upstream landowners to control sediment runoff from agricultural fields into the noted channels.

April 24, 2019. Visual inspection was conducted on foot. Sediment accumulation in the channel appears minor and seems to be driven in several locations from runoff from adjacent agricultural fields. Options to address these areas to prevent future sedimentation should be evaluated and implemented where possible.

The wooden weir diversion structures are in good condition. The berm and outlet structure do have woody brush growing that should be removed, and evidence of rodent tunneling which can undermine berm function.

Previous inspections showed fencing around the Project is in good condition in most areas; in some, the fencing is broken, missing, or overgrown.

### Recommendations:

Detailed Descriptions of Recent Project Inspections

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- Conduct full survey in 2022 spring with drone and elevation.
- Survey the channel to determine if repair is needed.
- Flush cut brush on the berm and near the outlet structure.
- Investigate adding rat wire to areas of the berm/ outlet structure where rodents have burrowed and repair burrow damage.
- Consider repairing portions of broken fencing, or remove broken portions and replace with signage. The fencing work is a lower priority than other noted work items.
- Prior to any work, the District may wish to contact easement holders to inform them of work to be undertaken in order to avoid any potential confusion.



*2021 site photo. Whole site looking north*





*2019 site photo. Outlet structure on berm, excess brush, structure holding*



*2019 site photos. Outlet structure, rodent activity proximity*



*2019 site photo. On outlet berm, characteristic rodent tunneling (puppy for scale)*





*2019 Site Photos*



*2019 Site Photos. Baffle berm, some burrowing by animals, brush needs to be removed*





*2019 site photos. Outlet brush, remove.*



*2019 site photos. Outlet and diversion channel*



*2019 site photo. Diversion channels*



*2019 site photos. Diversion channels*





*2019 site photos. Channel w/ berm and trees.*



*2019 site photos. Channel w/ berm and trees.*





*2019 site photos. Field inlet*



*2019 site photo. Brush in diversion channel, with additional buildup would require cleanout*



### Watkins Wetland Treatment System (South)

**Table 6: Upper Watkins Wetland Treatment System (South) - Components Inspected**

Inspection Year	Components				
	<i>Diversion Berm</i>	<i>Diversion Channel</i>	<i>Diversion Ports</i>	<i>Diversion Overflow Structures</i>	<i>Fencing</i>
2014-17	I	I	I	I	I
2018	Partial inspection with erosion noted but no other documentation				
2019	NI	I	NI	I	NI
2020	I	I	NI	NI	NI
2021	NI	I	NI	NI	NI
I = inspected, NI = not inspected, NLI = no longer inspected					

**Table 7: Watkins Wetland Treatment System (South) – 2021 Inspection Results by Component**

Components	Inspection results	Future inspection schedule
Diversion Berm	Breach in berm	Visual- A, GPS survey- 2020, 2025
Diversion Channel	IWO, sedimentation present in multiple locations	Visual- A, GPS survey- 2020, 2025
Diversion Ports	Several ports need cleaning	Visual- A, GPS survey- 2020, 2025
Diversion Overflow Structures	IWO	Visual- A, GPS survey- 2020, 2025
Fencing	Broken or missing in large sections	Visual- A
A = annually, IWO = in working order, ND = not decided, NI = not inspected, NLI = no longer inspected		

#### Site inspections

May 8, 2017. Wetland was walked by Dennis Loewen. Last year a detailed survey was conducted of the wetland; please refer to the 2016 Project Inspection Report, appendix A, for further information.

2018. Partial visual inspection w/ no notes.

2019-2021. Overall, channel A and corresponding diversion berm are in good condition, with few channel sections where sedimentation has occurred. Channel B has several sections where sedimentation has occurred. Flow seems to not be significantly restricted; however, capacity of the ditch is affected by this sedimentation. A partial channel survey and cleanout was conducted in the southern portion of the channel as well as the ditch (project outlet) downstream.

#### Recommendations:

- Survey remainder of the channel.
- Cleanout of channel sections where sedimentation has occurred is likely needed to return channel to design capacity and mitigation potential drainage concerns of upstream properties.
- Previous inspections noted most of the diversion ports are in good working order, but there are a couple that need to be cleaned to return to operational effectiveness. It's very difficult to see these with vegetation, recent surveys only uncovered a few of them. The CRWD undertook action a number of years ago to install overflow structures that may negate the need to keep the ports clean. The overflows seem to be in good condition.

- Previous surveys showed several low spots were noted in the diversion berm, principally along channel B. The channel was inspected but not the berms. Survey the berms in 2022. ID vegetation removal spots.
- There is a significant breach located on the far eastern end of the northern diversion channel. The result of the breach is flow circumventing the wetland treatment system. Previous discussions revolved around the repair work here, versus a major project renovation
- Beaver activity was noted on banks of channel B, dams were removed in 2020.
- Treating noxious weeds that may grow on the berm should continue as needed. There are several sections along the berm where woody vegetation should be cleared. Large sections of fencing are either missing, damaged, or overgrown.
- Remove woody vegetation from the diversion berm. Treat noxious weeds that grow on the berm. Consider repairing portions of broken fencing, or remove broken portions and replace with signage. The fencing work is a lower priority than other noted work items.
- Conduct a legal survey to clearly delineate the easements for this project on a drawing and in current geospatial terms.

## Aerator Buildings

**Table 8: Aerator Buildings - Components Inspected**

Inspection Year	Components	
	Lake Augusta Aerator Building	Lake Marie Aerator Building
2014-17	I	I
I = inspected, NI = not inspected, NLI = no longer inspected		

**Table 9: Aerator Buildings - 2017 Inspection Results by Component**

Components	Inspection results	Future inspection schedule
Lake Marie Aerator Building	IWO, small woodpecker holes present and slight trim damage	Visual- A, Compressor oil & turn over- A
Lake Augusta Aerator Building	Damage to soffits, eaves, and perhaps foundation; new coat of paint; remove excess dirt and debris from building	Visual- A, Compressor oil & turn over- A
A = annually, IWO = in working order		

These sites are no longer inspected, as the Board has ordered the buildings be removed. As such, the table from the 2017 report is presented above.

Unclear wither the buildings were ever removed. Determine this year, get a quote for that work.

## Nistler-Geislinger Basin

**Table 10: Nistler-Geislinger Basin - Components Inspected**

Inspection Year	Components	
	<i>Sediment Basin South Cell</i>	<i>Sediment Basin North Cell</i>
2014-16	I	I
2017	I	I
2018	I	I
2019	NI	NI
2020	NI	NI
2021	NI	NI
I = inspected, NI = not inspected, NLI = no longer inspected		

**Table 11: Nistler-Geislinger Basin – 2017 Inspection Results by Component**

Components	Inspection results	Future inspection schedule
Sediment Basin South Cell	IWO	Visual- A; Depth Survey- 2022, 2027
Sediment Basin North Cell	IWO	Visual- A; Depth Survey- 2022, 2027
A = annually, IWO = in working order		

### Site Inspections

2017, sedimentation depth survey work completed by Wenck Associates, Inc. indicated that some sediment had accumulated in the basin; however, the basin appeared to be functioning as designed. Flows were not obstructed, and enough volume for additional sediment accumulation remained.

2018, a visual inspection was completed from the adjacent roadway. Overall, the basin seemed to be in good condition.

**Recommendation:** No further action warranted at this time.

Other items to note: 1) the placement of the notch weir above the inlet to the basin should lead to less sediment entering the basin, increasing the basin's useful life, 2) the source of the delta that formed on the southwestern end of the southern cell has been rectified due to the District's cooperative effort with Forest Prairie Township in improving the road ditching and drainage above that location. This area to be checked periodically to indicate changes in upstream land area.





## Clear Lake South

**Table 12: Clear Lake South - Components Inspected**

Inspection Year	Components	
	<i>Sediment Basin</i>	<i>Outlet box weir + culvert</i>
2014-16		
2017		
2018		
2019	I	I
2020	I	I
2021	I	I
I = inspected, NI = not inspected, NLI = no longer inspected		

**Table 13: Clear Lake South – 2021 Inspection Results by Component- post repair**

Components	Inspection results	Future inspection schedule
Sediment Basin	IWO	Visual- A; Depth Survey- 2023, 2027
Wier Box + Culvert	IWO	Visual- A; Depth Survey- 2023, 2027
A = annually, IWO = in working order		

### Site Inspections

2018, a visual inspection was completed from the adjacent roadway. Overall, the basin seemed to be in good condition.

2019, a visual inspection was completed from the adjacent roadway. Overall, the basin seemed to be in good condition.

2020, a visual inspection was completed from the adjacent roadway. Overall, the basin seemed to be in good condition.

2021, dry conditions this year allowed for determination that about 6 inches of sedimentation occurred over the filter and that the agridrain previously installed by prior staff was inhibiting flow in the low head system. Excess sediment was scraped off the top of the filter (which is wrapped with a geotextile). The geotextile was replace, along with the cleanout at the south end of the basin. The cleanout underdrain was inspected and tested for capacity and found to be working.

**Recommendation:** No further action warranted at this time.

## Lake Augusta Erosion Control Project

**Table 14: Lake Augusta Erosion Control - Components Inspected**

Inspection Year	Components				
	<i>Southern drop structures and ravine</i>	<i>Western drop structures and ravine</i>	<i>Sediment basin and riser</i>	<i>Basin outlet</i>	<i>Fencing</i>
2014-17	I	I	I	I	I
2018	Major repair under way- construction observation only				
2019	I	I	NI	I	NI
2020	I	I	NI	I	NI
2021	I	I	NI	I	NI
I = inspected, NI = not inspected, NLI = no longer inspected					

**Table 15: Lake Augusta Erosion Control - 2021 Inspection Results by Component**

Components	Inspection results	Future inspection schedule
Southern drop structures		Visual- A, depth survey- 2022, 2026, 2031
Western drop structures		Visual- A, depth survey- 2022, 2026, 2031
Sediment basin	IWO, several trees need to be removed	Visual- A, depth survey- 2022, 2026, 2031
Basin outlet	IWO	Visual- A, depth survey- 2022, 2026, 2031
Fencing	IWO	Visual- A
A = annually, IWO = in working order		

### Site Inspections:

Beginning summer 2017, this project underwent major repairs. As of the writing of the 2017 report, those repairs were not yet completed.

2018-2021: visual site inspections were conducted to verify new construction and vegetative establishment.

2017-2018 Repairs included:

The southern drop structure was replaced entirely. Significant erosion that occurred around the bottom of the culvert at the base of the ravine such that the anti-seepage collar was exposed was repaired and a new trash guard set. The erosion was largely caused by a landowner installing a tile outlet right on top of the outlet. The outlet structure (pond inlet) was also cleaned at the close of the project.

A new trash guard was installed at the western drop structure. Woody vegetation was cleared from both ravines to thin tree canopy and promote ground cover. Ground cover in this ravine is essential.

In the area of the basin, several trees need to be cut down within the basin fence in order to protect underground culverts from damage. The southern and western inlets are in good working order in 2017.

Portions of the fence around the basin are bent due to woody vegetation growth.



### Recommendations:

Detailed Descriptions of Recent Project Inspections

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- Cut select trees within the ravines and basin fence to protect infrastructure; treat stumps.
- The outlet into Lake Augusta West Channel is in good condition. However, small planted trees are located in the easement for this outlet.
- Remove trees from easement before they become too large and cause issues with the outlet pipe, including ingress and egress.
- Survey the Augusta sediment basin in 2022.
- Conduct a legal survey to clearly delineate the easements for this project on a drawing and in current geospatial terms.



*2019 Site Inspection. Erosion control channel + drop structure rip rap.*

## Kimball Stormwater Infrastructure

**Table 16: Kimball Stormwater Infrastructure - Components Inspected**

Inspection Year	Components						
	<i>Willow Creek (WC) – Rain Garden and Agri-drain</i>	<i>WC – Reuse Basin and Emergency Overflow</i>	<i>Highway 55 Sediment Basin</i>	<i>Magnus Johnson Stabilization</i>	<i>Hendricks East Basin</i>	<i>Hendricks West Basin</i>	<i>Hendricks Emergency Overflow</i>
2014	I	I	DNE	DNE	DNE	DNE	DNE
2015	I	I	DNE	DNE	I	I	I
2016-17	I	I	I	I	I	I	I
2018	No inspection, but some staff notes						
2019	I	I	I	NI	I	NI	NI
2020	I	I	I	NI	I	NI	NI
2021	I	I	I	NI	I	NI	NI

I = inspected, NI = not inspected, DNE = did not exist

**Table 17: Kimball Stormwater Infrastructure - 2021 Inspection Results by Component**

Components	Inspection results	Future inspection schedule
Willow Creek (WC) – Rain Garden and Agri-drain	IWO, vegetation maintenance under contract	Visual- A
WC – Reuse Basin and Emergency Overflow	IWO, vegetation maintenance under contract	Visual- A
Highway 55 Sediment Basin	Some basin erosion gullies	Visual- A, GPS Survey- 2022, 2025
Magnus Johnson Stabilization	IWO- 2017	Visual- A
Hendricks East Basin	IWO	Visual- A, GPS Survey- 2022, 2025
Hendricks West Basin	IWO- 2017	Visual- A, GPS Survey- 2022, 2025
Hendricks Emergency Overflow	Significantly modified by work in Hendricks' yard, CRWD does not hold easement in this area, so nothing can be done	Visual- A, likely discontinue inspection in future years due to modification

A = annually, IWO = in working order

### Site inspections

May 2, 2017. Raingarden and Agri-drain: Water level in rain garden low due to agri-drain being in fully open position per O&M plan. Agri-drain baffles slide easily after last year's maintenance. Trash removed from rain garden. Minor sediment accumulation in rain garden and corresponding inlet was noted, likely source is flow from contributing watershed. Sediment load is expected to decrease due to recent paving of nearby parking lot.

City of Kimball should be contacted to inspect upstream sump to see if vacuuming is warranted. Native plantings may need additional work; this should be determined by vegetation maintenance vendor. Riprap missing from outlet; after speaking with City staff, determined to be not an issue at this time, but needs to be monitored.

Reuse basin and emergency overflow: The basin is in good condition; lots of native plant growth. There was minimal water present when inspected due to recent rain. Riprap was missing from inlet/ outlet; after speaking with City staff, it was

determined this was not an issue at this time, but needs to be monitored. Additional wood chips around bridge overflow likely needed in the next couple of years; City staff should be contacted about this. Trash removed from basin.

Highway 55 Sediment Basin: Basin was not surveyed with GPS equipment. Noted too early to determine if last year's seeding/ plug planting effort is taking well; check with contracted firm later in the year on this matter. There is some erosion around the riprap on the outlet of basin. Some of this erosion seems to be occurring due to snow melt from neighboring property.

Hendricks East Basin: Basin was not surveyed with GPS equipment. Basin seemed to be in good working order. Vegetation maintenance work is now under contract.

Hendricks West Basin: Basin was not surveyed with GPS equipment. Noted seemed to be in good working order. Vegetation maintenance work is now under contract.

Hendricks Emergency Overflow: Noted that due to expansion of lot at Hendricks' Sand and Gravel Inc. that a significant portion of the overflow has been altered. The alteration will have a constricting effect on flow. However, the CRWD does not hold an easement over this area, as it is in railroad right-of-way.

Fall 2018- Fall 2021. Visual site inspections were conducted on components listed. Sumps and manholes were not inspected. City support is needed for that.

**Recommendations:**

- Acquire from the city its record re: cleaning of the underground sumps that were installed as part of the phase II project, especially the sump with the SAFL baffle at Willow Creek Park.
- Discuss maintenance with the new city public works staff, to ensure they have a good understanding of maintenance needs for the underground infrastructure, what the CRWD is responsible for maintaining (i.e. the components listed on this report) and what they can/ cannot do in relation to these components to ensure maximum efficiency/ useful life (ex. Where to mow and not mow).
- Set agri-drain baffles to winter condition in late fall, grease as needed
- Work with vegetation contractor to see if additional work outside current contract is warranted
- Pre-treatment basin forebay requires excavation. The basin was designed to capture sediment from Kimball non-consolidated bituminous lot. Since that lot was paved, the basin should be cleaned out and require less maintenance going forward
- Vegetation in the capture re-use basin was ½ mowed. Work with City on vegetative maintenance.
- Basin sedimentation surveys for all basins in 2022.



## Ostmark Basin

**Table 18: Ostmark Basin - Components Inspected**

Inspection Year	Components		
	Basin	Diversion Berm	Tile intake / outlet
2014-17	I	I	I
2018	Staff notes indicate inspection was completed but photos were lost for this and several other projects.		
I = inspected, NI = not inspected, NLI = no longer inspected			

**Table 19: Ostmark Basin – 2017 Inspection Results by Component**

Components	Inspection results	Future inspection schedule
Basin	IWO	Visual- A
Diversion Berm	IWO	Visual- A
Tile intake / outlet	IWO	Visual- A
A = annually, IWO = in working order		

Site inspection was conducted April 28, 2017. Visual inspection indicated all three components seemed to be in good working condition. Staff noted the immediate area around the basin has been mowed and cleared by some other party; the CRWD will want to watch this closely to ensure future actions near the basin do not affect the basins operation.

**Recommendation:** No further action warranted at this time.



## Pleasant Lake Outlet Control Structure

**Table 20: Pleasant Lake Outlet Control Structure - Components Inspected**

Inspection Year	Components		
	Outlet Structure	Guillotine Valve and Manhole	
2014-15	I	I	NI
2016	I	NI	NI
2017	I	NI	NI
2018	I	I	I
2019	I	I	I
2020	I	I	I
2021	I	I	I
I = visually inspected, NI = not inspected, NLI = no longer inspected			

**Table 21: Pleasant Lake Outlet Control Structure - 2021 Inspection Results by Component**

Components	Inspection results	Future inspection schedule
Outlet Structure	IWO, rebar trash guards need replacing	Visual- A
Guillotine Valve and Manhole	NI	Visual- A
Outlet Culvert	IWO	Visual- A
Outlet Channel	IWO	Visual- A
A = annually, IWO = in working order, NI = not inspected		

### Site inspections

April 19, 2017. Project components viewed included the lake outlet structure and the outlet of the culvert.

Overall, the outlet control structure is in fair condition. The rebar trash guards on the front of the structure are missing. One board on top of the structure is loose. One hinge on door access is broken, and the door is missing its lock. Last year it was noted the outlet guillotine valve does not completely close so as to make a watertight seal.

Fall 2018. Project components viewed included the lake outlet structure and the outlet of the culvert. The outlet channel was added to inspection list.

Multiple visits spring -fall 2019. Project components viewed included the lake outlet structure and the outlet of the culvert. The outlet channel was added to inspection list. An operation "key" was fabricated to operate the opening.

Spring 2020. Project components viewed included the lake outlet structure and the outlet of the culvert. The outlet channel was added to inspection list. The outlet channel was repaired during this year to reduce erosion in the channel. The outer toe of the channel was stabilized with a keyed in rip rap toe. Some leaning trees were flush cut and treated to prevent regrowth. A replacement tree was required by the DNR and was not completed in 2020.

Multiple visits 2021. Project components viewed included the lake outlet structure and the outlet of the culvert. The outlet channel was added to inspection list. The replacement tree required by DNR was not installed due to dry conditions.

**Recommendations:** The Board of Managers approved at their August 2021 meeting to replace the wooden decking in kind. The rebar was gone on the entire front of the platform. The decking replacement is scheduled for February/ March 2022. In addition, the guillotine valve should be greased by maintenance personnel to promote ease of operation. Staff secured a maintenance contractor who will do this annually as well as operate the valve as indicated by the Grass Lake Dam elevations. Check with landowner to ensure replacement tree is added per DNR for repairing the outlet channel.



*August 2021 site photo*



*August 2021 site photo*

**School Section Lake Outlet Control Structure****Table 22: School Section Lake Outlet Control Structure - Components Inspected**

Inspection Year	Components						
	Outlet Structure	Manhole	Weir	Guillotine Valve	Ice breaker	Outlet ponds (added 2018)	Multiple Conveyance Culverts
2014-15	I	I	I	I	DNE	NI	I
2016-17	I	I	I	I	I	NI	I
2018	I	I	I	I	I	NI	I
2019	I	I	REMOVED	I- Valve re-seated	REMOVED	I	I
2020	I	I	REMOVED	I	REMOVED	NI	NI
2021	I	I	REMOVED	I	REMOVED	NI	NI
I = visually inspected, NI = not inspected, NLI = no longer inspected							

**Table 23: School Section Lake Outlet Control Structure – 2019-2021 Inspection Results by Component**

Components	Inspection results	Future inspection schedule
Outlet Structure	Partially blocked by sand and debris	Visual- A
Guillotine Valve	IWO	Visual- A
Weir	IWO	Visual- A
Manhole	IWO	Visual- A
Outlet channel conveyance and ponds	IWO	Visual- A
Ice barrier	REMOVED	None
Multiple Conveyance Culverts	IWO, trash guards needed	Visual- A
A = annually, IWO = in working order		

## Site inspections

May 2, 2018. The lake outlet pipe has sand and debris in it that has caused a partial blockage to occur. It will need to be cleared to return the outlet to operational effectiveness. The ice barrier is damaged. Both issues will be address as part of outlet control reconstruction.

The remainder of the outlet systems seems to be in good operational order. Several of the culverts are missing trash guards.

Fall 2018- Fall 2021. Regular site inspections occurred during this time due to major outlet rebuild which occurred 2018-2019. High water in 2019 provided an opportunity to evaluate outlet channel and ponds at high capacity.

**Recommendations:**

- The guillotine valve should be greased by maintenance personnel to promote ease of operation. Staff retained operation and maintenance contractor to do this and operate valve.
- Consider the installation of trash guards as part of ice barrier replacement for work on Theil Creek.
- Consider a legal survey to clearly delineate the easements for this project on a drawing and in current geospatial terms.





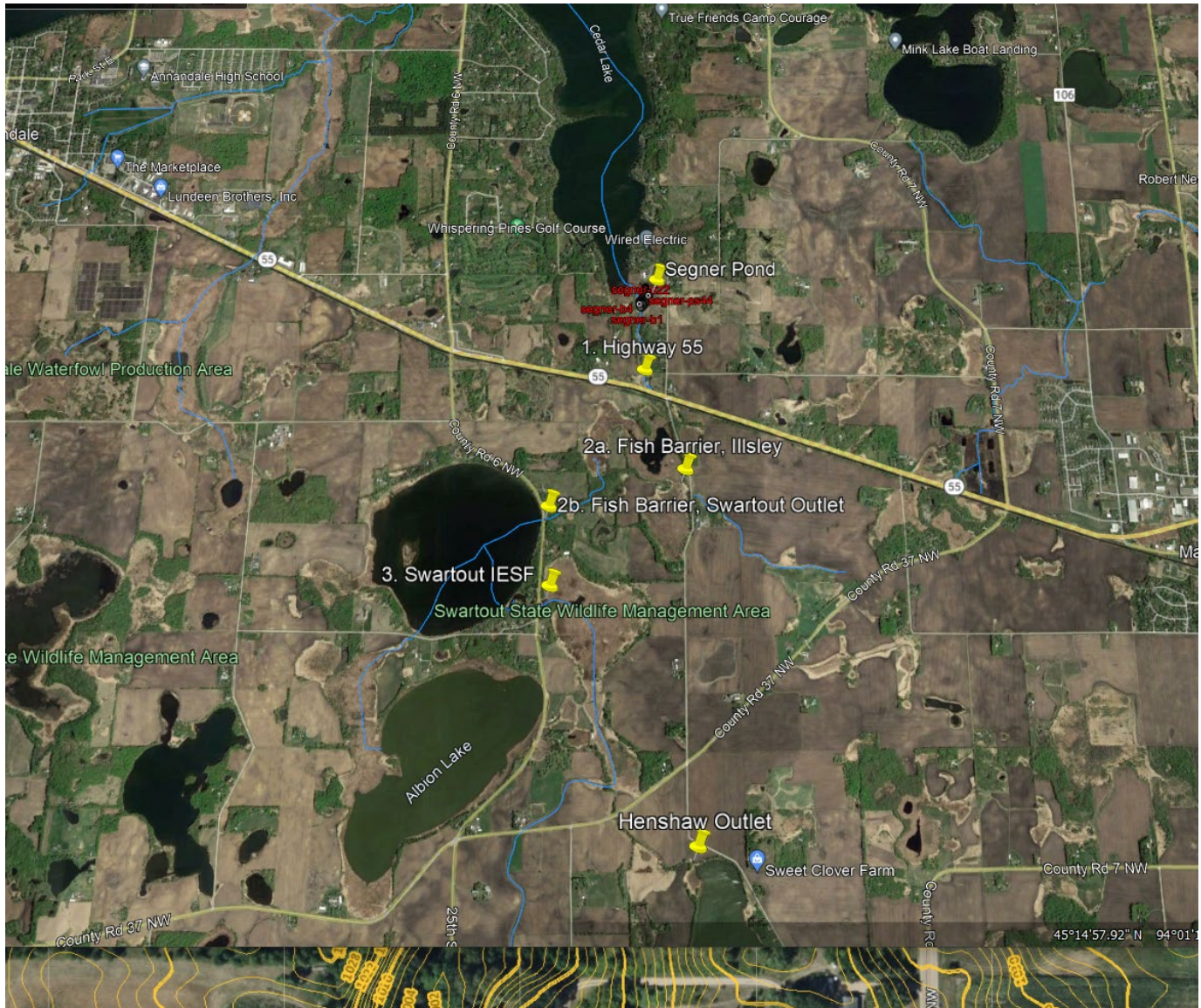
Figure 1: SedimentatFigure 2: Valve and weir in manhole



Figure 3: Example of culvert w/o trash guard

### Cedar Lake 06-01 Project Components

The next several projects are components of the 06-01 Project covered by the 215 fund. The locations of each project element are demarcated in the map below.



### East Swartout Treatment Area (06-01)

**Table 24: East Swartout Treatment Area - Component Inspected**

Inspection Year	Components			
	<i>Limestone Filter</i>	<i>Sheet Pile Weirs</i>	<i>Tile Drain</i>	<i>Channel</i>
2017	I	I	I	I
2018	I	I	I	I

I = visually inspected, NI = not inspected, NLI = no longer inspected

**Table 25: East Swartout Treatment Area – 2018 Inspection Results by Component**

Components	Inspection results	Future inspection schedule
Sand-Iron Filter	Cleanout pipes have detached	Visual- A; filter drawdown in fall
Stream Sheet-Pile Weir	IWO	Visual- A
Filter Sheet-Pile Weir	IWO	Visual- A
Outlet Pipe	IWO	Visual- A
Fish Barrier	Not finished	Visual- A
Overall site	IWO	Visual- A

A = annually, IWO = in working order

Site Inspection 2018, multiple:

Site inspection were conducted multiple times in 2018. Additional inspection will occur in the fall during filter drawdown. During inspections, the sand-iron filter was submerged. Flow was present in outlet pipe. For remainder of site, vegetation is establishing well. No obstructions were noted in the channel. Project sign was in good shape.

#### 2018 Recommendations:

- Cleanout pipes need to be reset in such a manner as to resist freeze-thaw cycle; reflectors need to be reattached.
- Both stream and filter sheet-pile weirs were in good working order. Fish barrier is working well. Wings will be installed now that additional sheet piling work has been completed.
- Complete installation of fish barrier wings.

Site Inspection 2019-2021, multiple:

Site inspection were conducted multiple times between spring 2019 and fall 2021. Vegetation was well established. Scope of work for maintenance was developed to add wings to the fish barrier and repair erosion.

#### 2018 Recommendations:

- Cleanout pipes need to be reset in such a manner as to resist freeze-thaw cycle; reflectors need to be reattached.



Detailed Descriptions of Recent Project Inspections

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- Both stream and filter sheet-pile weirs were in good working order. Fish barrier is working well. Wings will be installed now that additional sheet piling work has been completed.
- Complete installation of fish barrier wings.



East Swartout Sand-Iron Filter



## Old Highway 55 Treatment Area

**Table 26: Old Highway 55 Treatment Area - Component Inspected**

Inspection Year	Components					
	<i>Limestone Filter</i>	<i>Sheet Pile Weir</i>	<i>Tile Drain</i>	<i>Low-flow channel</i>	<i>Rock swale</i>	<i>Overall Site</i>
2016-17	I	I	I	I	I	I
2018	I	I	I	I	I	I
I = visually inspected, NI = not inspected, NLI = no longer inspected						

**Table 27: Old Highway 55 Treatment Area – 2018 Inspection Results by Component**

Components	Inspection results	Future inspection schedule
Limestone Filter	Washout on western bank tie-in	Visual- A; Survey- 2020
Sheet Pile Weir	Minor debris noted	Visual- A; Survey- 2020
Tile Drain	IWO	Visual- A
Low-flow channel	IWO	Visual- A; Survey 2020
Rock swale	Washout within swale	Visual- A
Overall site	Remove silt fence	Visual- A
A = annually, IWO = in working order		

### Site inspections

June 6, 2018. Vegetation on the limestone filter was under control thanks to active management by contractor. Washout on western bank tie-in was noted, resulting in filter out of operation. The sheet pile weir and riprap were in good condition. Minor amount of debris was present and looks to be the work of a muskrat or beaver.

Slight erosion around tile outlet was corrected last year with concrete fill; erosion has not reoccurred. Slight sedimentation where tile discharge meets the channel remains, this may be evidence of sediment from tile water, or may be residual from last year's erosion.

Within the rock swale on the eastern side of the channel (just south of the tile outlet), last year's minor erosion has progressed to where a ~2' gully has formed in the swale. Sedimentation has occurred in channel where the swale ties in.

A repair plan should be developed to address the gully

For remainder of site, vegetation is establishing well along channel. No obstructions were noted at existing bridge or within existing channel above the bridge; the channel below the bridge was not viewed. Vegetation is establishing in spoils pile area; as such, the silt curtain around this area can be removed. Project sign was in good shape. One item to monitoring is the landowner path along the top of channel slope; a couple of bare patches have developed that may turn into erosion issues. Staff is unsure whether path is within the District's easement.

### 2018 Repair Work.

Survey noted that the berm had settled. Contractor mobilized to add limestone to the berm. Contractor removed rip rap dumped into a washout on the east side of the basin, salvaged and re-installed with appropriate bedding material.

### 2021 Repair Work.

December 2021 Recreational rip rap movement had caused erosion on the north side of the weir on the overflow channel. Additional weir length was added in December along with more rip rap.

**Recommendations:**

- Continue vegetation management contract
- Post construction snow melt inspection
- Remove silt curtain around spoils pile area
- Monitor to determine if landowner path is causing erosion



## Cedar Lake Subwatershed Fish Barriers

**Table 28: Cedar Lake Subwatershed Fish Barriers - Component Inspected**

Inspection Year	Components			
	<i>Henshaw Barrier</i>	<i>Swartout Inlet Barrier</i>	<i>Swartout Outlet Barrier</i>	<i>Illsley Avenue Barrier</i>
2014-15	I	I	I	I
2016	I	DNE	I	I
2017-18	I	Part of East Swartout	I	I
2019	REPLACED	I	I	I
2020	I	I	I	I
2021	I	REPLACED	REPLACED	REPLACED
I = visually inspected, NI = not inspected, NLI = no longer inspected				

**Table 29: Cedar Lake Subwatershed Fish Barriers – 2021 Post Construction Inspection**

Components	Inspection results	Future inspection schedule
Henshaw Barrier	IWO	Visual- A
Swartout Outlet Barrier	IWO	Visual- A
Swartout Inlet Barrier	IWO	Visual- A
Illsley Avenue Barrier	IWO	Visual- A
A = annually, IWO = in working order		

These sites were inspected multiple times during 2018, 2019, 2020, 2021. All barriers require cleaning through the season to minimize blockage.

### Recommendations:

- Continue with operations and maintenance contractor to keep barriers clear of debris.
- Conduct early spring site survey at snow melt for post construction validation.

## Segner Pond

**Table 30: Segner Pond - Components Inspected**

Inspection Year	Components			
	<i>Diversion Berm</i>	<i>Inlet Channel</i>	<i>Limestone Filter Berm</i>	<i>Sedimentation Pond and Mitigation Wetland</i>
2014-15	I	I	Survey completed	I
2016	Survey completed	I	Survey completed	Sonar survey completed
2017-18	I	I	NI- Underwater	I
April 2019	I	I	NI- Underwater	NI
April 2020	I	I	NI	NI
September 2021	I	I	I	Sonar survey completed
I = visually inspected, NI = not inspected, NLI = no longer inspected				

**Table 31: Segner Pond - 2018 Inspection Results by Component**

Components	Inspection results	Future inspection schedule
Diversion Berm	Tampering at berm	Visual- A, GPS survey 2022, 2025
Inlet Channel	Washout is occurring beneath bridge	Visual- A, GPS survey 2022, 2025
Limestone Filter Berm	IWO	Visual- A, GPS survey 2019, 2022, 2025
Fish barrier	IWO	Visual- A
Sedimentation Pond and Mitigation Wetland	IWO	Visual- A, depth survey in 2026, 2031
Overall site	IWO	Visual- A
A = annually, IWO = in working order		

Site inspection May 17, 2018.

The diversion berm has been tampered with. Rocks were moved to create a small depression. The set elevation of the berm is likely no longer correct due to this tampering. Staff did not walk the limestone filter berm this year, as it is already known there are low spots in the berm. The sediment pond and mitigation wetland are noted to be performing well considering site conditions. Overall site conditions remain the same; some noxious weeds are present in upland areas, but it is not clear whether the CRWD has rights under the easement to treat these areas. Project signage is in fair condition. Next recommended pond survey from this inspection was 2021.

### Recommendations:

- Have a survey taken of the berm and reset the berm's rocks as needed.
- The inlet channel is experiencing erosion below the bridge on the east side.
- Further investigate the washout to determine if corrective measures are needed.
- Either wait until planned survey in 2019 to determine what actions to take, or survey as part of diversion berm survey recommendation above.
- Fish barrier is in working order.

- Modifying the barrier would result in less maintenance due to buildup of debris.

Site inspection April 2019:

Fish barrier, diversion channel and overall site condition was visually inspected by staff in spring of the year. The fish barrier is tilted but still working. Washout under the bridge over the fish barrier needs to be replaced. Some rip rap was moved and brush was cleared by maintenance contractor to temporarily mitigate the system. Staff and Wes Boll used survey equipment to measure channel elevation of diversion.

Site inspection April 2020:

Fish barrier, diversion channel and overall site condition was visually inspected by staff in spring of the year. The fish barrier is tilted but still operational.

Site inspection September 21, 2021:

Following staff early season visit to visually inspect the site, finding similar results to the last two years, staff used sonar equipment to survey the pond basin and limestone filter berm. Evaluation of that data is in progress. Results will be amended to this report, and also included in a 15-year review memo for the Cedar Lake Project.

#### **Recommendations:**

- Use data collected to assess cleanout schedule. Cleanout of Segner pond will be a significant effort.
- Re-evaluate diversion runoff calculations and elevation of channel. Consider impact of updated rainfall, upstream projects. Summarize recommendation in Cedar Memo
- Survey berm and reset the berm's rocks as needed, annually.
- Repair inlet channel erosion below the bridge on the east side at the time fish barrier is replaced.
- Further investigate the washout to determine if corrective measures are needed.





### Other Projects

The table below summarizes other District projects that are relatively simple and do not warrant a full page to describe their status.

**Table 32: Other Projects - Inspection Results and Potential Actions**

Project	Date of Inspection	Inspection Results	Date of Repair	Future inspection schedule	Potential Actions
Highway 55 Fish Barrier	N/A	N/A		N/A	Removed in 2020
Norton Avenue Sediment Basin	06/15/2018	IWO; any baffles need to be removed due to erosion around culverts		Visual- A	Remove baffles
Eddie Schultz Buffer	06/15/2018	IWO; any baffles need to be removed due to erosion around culverts	NA	Visual- A	Remove baffles
Clear Lake North Notch Weir	May 2018, April 2019, April 2020, April 2021	IWO	NA	Visual- A	None
Clear Lake South Notch Weir & Sand-Iron Filter	April 2018, April 2019, April 2020, April 2021	Dry condition observation of sediment accumulated on filter bed, and staff installed agridrain impeding outlet	Summery 2021	Visual- A	None
A = annually, IWO = in working order					