



REPORT TO COUNCIL

DEPARTMENT: OFFICE OF SAO

Date: June 28, 2022

SUBJECT: Preliminary Flood Damage Assessments with Repair and Mitigation Estimates

RECOMMENDATION:

#22-160

MOVED BY: CLLR WILLOWS

SECONDED BY: CLLR DUFORD

THAT THE COUNCIL OF THE TOWN OF HAY RIVER accepts the Preliminary Flood Damage Assessments with Repair and Mitigation Estimates report as information.

CARRIED

BACKGROUND:

The Town of Hay River incurred major damage to its infrastructure during the flood of 2022. Since the middle of May work has been undertaken to assess damage to these assets, and in some cases, undertake preliminary repair work to resume basic level of restoration.

The attached report provides a preliminary, high level summary of assets that have been damaged as well as potential mitigation work that could be undertaken in conjunction with repair work to reduce future recurrence. Rough order estimates on costs to repair/mitigate are included in the report as well as potential funding sources for the work. Dates for completion of work are suggested assuming access to funding to support.

Assessments, estimates, and funding position will evolve as more information is gathered. A more forward, long term plan is suggested through the completion of a community adaptation plan that considers the impact of climate change on our community and our infrastructure design. This plan would not only consider flooding but other environmental impacts such as wildfires.

Preliminary estimates for Town infrastructure repairs and replacements related to the flood is \$22 million. Mitigation estimates tied to the assets is approximately \$30 million.

The Finance Committee will be meeting by early July to review flood recovery costs incurred to date (and response costs) and to recommend any further spend deemed needed ahead of securing third party funding (ie. Insurance, Disaster Assistance Policy). A recommendation to Council will be brought forward in July and will include approval to submit applications through the Disaster Assistance Policy which is thought to be the major financial source for supporting recovery and mitigation work.

COUNCIL POLICY / STRATEGY OR GOAL:

N/A



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APPLICABLE LEGISLATION, BYLAWS, STUDIES, PLANS:

FINANCIAL IMPLICATIONS:

No financial commitments are made through Council's approval of the recommendation. Preliminary estimates for flood repair and mitigation are:

Repair/Replacement: \$22 Million

Mitigation: \$30 Million

ALTERNATIVES TO RECOMMENDATIONS:

NA

ATTACHMENTS:

Preliminary Flood Damage Assessments with Repair and Mitigation Estimates





Prepared by:

Glenn Smith

SAO

June 24, 2022

Public Works Assets:

1. Affected Area - Industrial	TOHR Affected Asset(s): Roads, culverts, ditches
<p>Roads within the Industrial area of Hay River affected by the 2022 flood includes Industrial Drive, Studney Drive, Lagoon Road & WTP road.</p> <p>Ditches exceeded capacity on Industrial Drive and Studney Drive, causing overflow and damage to the road surface and base. The affected areas are also impacted from the washing away of road granular as accumulation plugs culverts causing obstruction to flow.</p> <p>Similar washouts from watershed overflow at Lagoon Road ensued at two locations, causing segregation of road materials, shoulder erosion, rutting and deep depressions. Increased usage of Lagoon Road during post-flood recovery was necessary as access to the water treatment plant was obstructed. Lagoon Road consists primarily of sand and fine granular materials and is easily impacted by increased use, resulting in significant rutting which presents hazards for unaware motorists.</p> <p>As mentioned, the Water Treatment Plant Road is the main access to the WTP facility. This road was impassable to Town staff and contractors. Damage includes stripping of surface/base material as well as major deformation of large portions of roadway.</p>	
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<h3>Cleanup & Repairs</h3> <p>Internal efforts from PW staff continue on affected areas to return to preflood conditions by utilizing Town equipment and stocked aggregate and culverts. High water in locations continue to impact roads, requiring significant increases in grading in comparison to normal operational activities. Town staff continues</p>	

assessing impact to culverts, cleaning and clearing when required. Three locations along WTP Road and Lagoon Road have been identified for new culvert installation.

Estimated Cost of Repairs: \$130,000

Estimated Repair Completion: Q3 2022

Repair Funding Source: Disaster Assistance Policy

Mitigation Recommendations: Three locations along WTP Road and Lagoon Road have been identified for new culvert installation. Raising and resurfacing of WTP Road between Highway and Don Wright Ballpark.

Estimated Cost of Mitigation: \$630,000

Estimated Mitigation Completion: Q3 2022

Mitigation Funding Source: Disaster Assistance Policy; Disaster Mitigation Adaptation Fund; Donation; GNWT

2. Affected Area – Vale Island/ West Channel

Affected PW Assets: Roads, culverts, ditches

Roads affected by the flood in this section of Town include 101 Street, 102 Avenue, 103 Avenue, 104 Avenue, Lake Shore Drive, Back Road, Alaska Road, Godwin Road, & Kutcher Road. Ditches exceeded capacity in these areas, causing overflow and damage to the road surface and base. The affected areas are also impacted from the washing away of road granular and subsequent accumulation of material, causing obstruction of flow in ditches/culverts.

West Channel roads were damaged not only from high volumes of water & ice, but also from movement of privately owned structures. Road washouts in these areas are widespread, causing segregation of granular material at significant depths. High water levels on Back Road continue to cause erosion of the road's shoulder.



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Cleanup & Repairs: Internal efforts from PW staff continue at affected areas to return to preflood conditions by utilizing Town equipment and stocked aggregate and culverts. High water in locations continue to impact roads, requiring significant increases in grading in comparison to normal operational activities. Town staff continues assessing impact to culverts - cleaning and clearing when required. Culvert replacement is still required in some areas and re-ditching will be required to ensure positive flow. Sections of road in West Channel will require excavation and placement of new granular base and surface.

Estimated Cost of Repairs: \$75,000

Estimated Repair Completion: Q3 2022

Repair Funding Source:
Disaster Assistance Policy

Mitigation Recommendations: Drainage study, installation of culverts, and drainage improvements.

Estimated Cost of Mitigation: \$80,000

Estimate Mitigation Completion: Q3 2023

Mitigation Funding Sources: Disaster Assistance Policy

3. Affected Area – Riverview Drive Area & Ravine		TOHR Affected Asset(s): Roads, ditches	
Riverview Drive, which is currently entering phase two of construction as a capital project for the Town, was breached in two locations, resulting in the stripping away of surface and base aggregate and significant flooding of the ravine			
			
Cleanup & Repairs: Hundreds of hours of labour and pumping from internal and contracted services/ equipment were required to clear water from the ravine and allow access to the lift station (pictured above). Cleanup required will involve removal of debris and road materials from ditches and placement of a new granular base.			
Estimated Cost of Repairs: \$300,000		Estimated Repair Completion: Q3 2022	Repair Funding Source: Disaster Assistance Policy
Mitigation Recommendations: assessments have been initiated to determine implications of raising the road elevation as scheduled construction is beginning for the 2022 season.			
Estimated Cost of Mitigation: \$200,000	Estimate Mitigation Completion: Q3 2023	Identified funding sources: Disaster Assistance Policy	

4. Affected Area – Lift Stations	TOHR Affected Asset(s): LS 1,2,3,6, Beaver LS
<p>Sewage Lift Station #1 located on Riverview Drive is currently the largest capacity lift station in the Town collecting sewage, servicing Mcrorie Rd in the south to the West Channel Bridge in the north. During the spring flooding of 2022 the Lift Station was submerged in 2.3 meters of water and sustained considerable damage to all the equipment in the building. Items include:</p> <ul style="list-style-type: none">-150 KW generator-all electric panels, pump controls, plugs, lighting, and the service connection-two-40hp sewage pumps located in the dry well-HVAC Systems and controls for both the dry well and the wet well	



Preliminary Flood Damage Assessments with Repair and Mitigation Estimates

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-electric/hydraulic macerator system

Extensive assessments of structural, electrical, and process components from external sources were required and are ongoing.

There was not any damage to **sewage lift stations 2,3,6**; however, significant flooding did occur in each of these locations and cleanup activities were needed.


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Cleanup & Repair: Lift Station 1 repairs and assessments are ongoing despite being operational through reduced capacity and redundancy as of June 2022. A detailed engineering assessment through Stantec will provide guidance to the Town in terms of replacement vs repair.

Lift stations 2,3,6, & Beaver LS had been cleaned by Town staff.

Estimated Cost of Repairs: \$4,100,000	Estimated Repair Completion: Q4 2023	Repair Funding Source: Insurance; Disaster Assistance Policy
Mitigation Recommendations: In addition to mitigation achieved through heightening the elevation of Riverview Drive, other engineered controls are suggested to protect the lift station building from potential flooding. Mitigation designs for the building would be explored through consultation with the Town's engineering firm.		
Estimated Cost of Mitigation: \$1,225,000	Estimated Mitigation Completion: 2024	Mitigation Funding Source: Disaster Assistance Policy

5. Affected Area – Alaska Road		TOHR Affected Asset(s): Bank/Berm
Alaska Road is built along the top of the berm in the West Channel area of Town and provides access to a number of residential properties as well as the West Point First Nations band office. During the flooding, this section of the road sustained damage due to high water levels and ice flow in the channel. The 2022 flood caused the bank to slough away and cave into the channel.		
		
Cleanup & Repair: Recommended option for repair includes a sheet pile wall along the river side of the road berm in the area of potential danger with reconstruction of the road to occur afterwards.		
Estimated Cost of Repairs: 1,300,000	Estimated Repair Completion: 2023	Repair Funding Source: Disaster Mitigation and Adaptation Fund
Mitigation Recommendations: Mitigation included in scope of repair work.		
Estimated Cost of Mitigation: N/A	Estimated Mitigation Completion: N/A	Mitigation Funding Source: Disaster

		Mitigation and Adaptation Fund
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6. Affected Area – West Channel Berm		TOHR Affected Asset(s): Berm (excluding Alaska Rd.)
Water and ice levels breached the berm in several locations, causing damage to the structure. Significant fracturing parallel to the berm has been observed and concern for further damage is warranted.		
 		
Cleanup & Repair: TBD. Further observation in the coming months will provide a basis for repair. If the berm continues to worsen, a geotechnical assessment is recommended to assess the cohesion and saturation limits of the berm's material.		
Estimated Cost of Repairs: \$100,000	Estimated Repair Completion: Q1 2023	Repair Funding Source: Disaster Assistance Policy
Mitigation Recommendations: Extension of berm to west area of the West Channel community to protect area from potential flooding through north end of airport paved air strip.		
Estimated Cost of Mitigation: \$100,000	Estimated Mitigation Completion: Q1 2023	Mitigation Funding Source: Disaster Assistance Policy

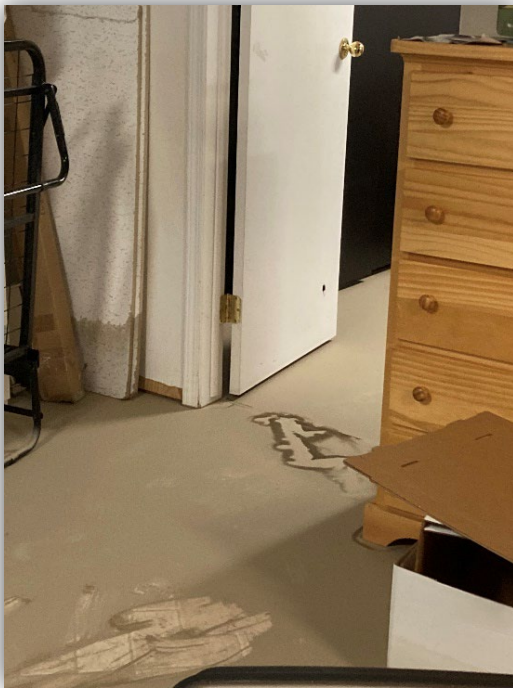
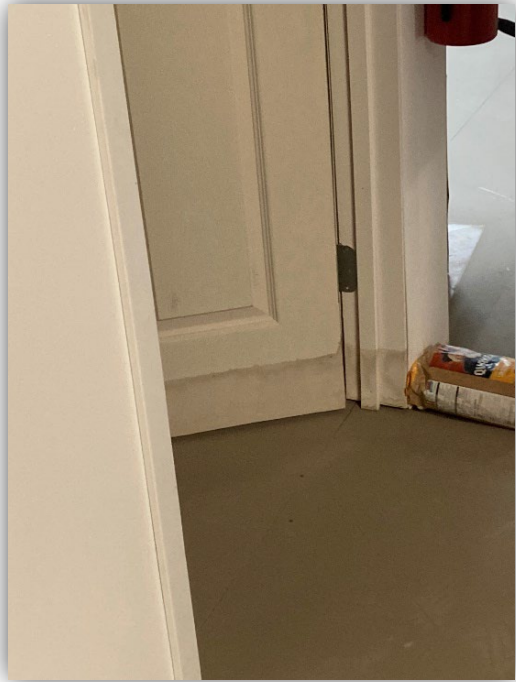
7. Affected Area – New Town	TOHR Affected Asset(s): Storm System
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There are 10 storm outlets in town that empty onto the riverbank. Each outlet was damaged to some extent as ice pushed into the bank stripping away cover/overburden and exposing significant portions of pipe. In addition to the storm outlets, the gate valve for the ravine was damaged. River water flooding into town entered the storm sewers, leaving behind large deposits of silt.



Cleanup & Repair: Further assessment of damage is required; however, repairs will be extensive and will require flushing/camera work, armoring, replacement of headwalls, and replacement portions of storm pipe. Additional maintenance and cleaning of storm sewer was necessary in the aftermath of the 2022 flood.		
Estimated Cost of Repairs: \$670,000.00	Estimated Repair Completion: 2024	Repair Funding Source: DAP
Mitigation Recommendations: setback of outfall; armoring of headwall and bank to provide protection against further erosion and ice damage.	Identified funding sources: TBD, MACA	
Estimated Cost of Mitigation: \$100,000	Estimated Repair Completion: 2024	Repair Funding Source: DAP

8. Affected Area – 99 Woodland Drive		TOHR Affected Asset(s): Town Owned House
Sewer backup resulting from the 2022 flood (~6” – 8”)		
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Cleanup & Repair: cleanup and repair to include removal and replacement of wall panels, shelving, dry wall, insulation, vapor barrier, and doors.		
Estimated Cost of Repairs: \$30,000	Estimated Repair Completion: 2022 Q3	Repair Funding Source: Insurance
Mitigation Recommendations: NA		

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9. Affected Area – Water Treatment Plant		TOHR Affected Asset(s): Water Intake Line	
<p>The water intake line was inspected in 2021 but due to the time of year there was high turbidity, leaving visibility extremely limited. With increases in turbidity in recent years (particularly in 2022), there are reasons to believe that the intake line was compromised to an unknown extent. Boil water advisories have increased in recent years, and although the age of the water treatment plant is indicative of its limitations (i.e., removal of color), the water intake line is the most obvious factor affecting decreases in water quality in recent years.</p>			
<div></div>			
<p>Cleanup & Repair: Options include divers & camera work, sealing the line to perform a pressure test and observing areas that may be compromised.</p>			
<p>Estimated Cost of assessment: \$300,000</p>		<p>Estimated Completion: Q3 2022</p>	<p>Assessment Funding Source: Disaster Assistance Policy</p>
<p>Mitigation Recommendations: NA</p>		<p>Identified funding sources: NA</p>	

10. Affected Area – Vale Island	TOHR Affected Asset(s): Manholes & Catch Basins
Flood water and ice damaged Town manholes and catch basins throughout Vale Island, leaving significant amounts of silt behind and stripping of granular material from the exterior, exposing infrastructure to further damage.	

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Cleanup & Repair: Pumping, flushing, placement of compacted aggregate.

Estimated Cost of Repair: \$35,000

Estimated Completion: 2022 Q3

Mitigation Recommendations: NA

Identified funding sources: NA

11. Affected Area – New Town


TOHR Affected Asset(s): Fraser Place

Fraser place is in the beginning stages of development and although the few lots affected by the flood had already been identified to be in the flood fringe zone, it is recommended that the lowest designed elevations be raised to mitigate future impact.



Cleanup & Repair: No cleanup or repair associated with this project.

Estimated Cost of Repairs: \$0	Estimated Repair Completion: n/a
Mitigation Recommendations: Raise the elevation of lots with costs incurred due to engineering, design, and aggregate.	Identified funding sources: ICIP
Mitigation Cost: \$110,000	Estimated Completion: Q4 2022

12. Affected Area – Corridor		TOHR Affected Asset(s): Solid Waste Facility	
<p>The lifespan of the Hay River landfill has been a concern in recent years and the 2022 flood event has accelerated this decline significantly. An approximate airspace of 4000-4500 m³ is taken up within the landfill each year due to normal operations and a large amount of diverted material from cleanup and abatement is anticipated to increase this number substantially. Associated operational costs at the landfill to accommodate in influx of garbage was and continues to come at a cost. With limited years remaining at the Town's landfill, and in consideration of increased regulatory requirements and access to land for a new facility, solutions are few and far between. Operational requirements to divert material and conform to regulation will be ongoing and costly as the impact on the facility is substantial.</p>			
			
<p>Cleanup & Repair: Diversion, hauling of cover material to site, placement of material, additional sampling of bio pad/retention pond, repairs to access roads, and significant improvement to landfill working face and steep embankment of garbage surrounding.</p>			
Estimated Cost of Repairs: \$310,000		Estimated Repair Completion: Q3 2023	Repair Funding Source: Disaster Assistance Policy
Mitigation Recommendations: permanent scale for more accurate record volume received.		Identified funding sources: Disaster Assistance Policy	
Mitigation Cost: \$60,000		Estimated Completion: 2022	



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13. Affected Area – Vale Island		TOHR Affected Asset(s): Electronic Crosswalk	
An electronic crosswalk sign near the entrance to the Merlyn Carter Airport was damaged by flood waters and ice making it in operable.			
Cleanup & Repair: Replacement of electronic controller is needed.			
Estimated Cost of Repairs: \$10,000		Estimated Repair Completion: Q3 2023	Repair Funding Source: Insurance

14. Affected Area – Vale Island		TOHR Affected Asset(s): West Channel Fire Hall	
Water damages occurred to the West Channel Fire Hall. The building has primarily been used for storage for the West Channel Heritage Society. Contents belonging to the Society are believed to have been damaged.			
Cleanup & Repair: Remove and replace water damaged construction materials and contents.			
Estimated Cost of Repairs: \$40,000		Estimated Repair Completion: Q3 2022	Repair Funding Source: Insurance

15. Affected Area- Corridor	TOHR Affected Asset(s): Paradise Valley Road
Paradise Valley Road is the only access for local residents and was washed out to such an extent that a temporary road was constructed farther inland, away from the unstable and compromised bank.	



Cleanup & Repair: A temporary road was constructed by the GNWT, allowing safe access to residents, support personnel, and cleanup crews.

Estimated Cost of Repairs: \$1,200,000	Estimated Repair Completion: Q3 2022
Mitigation Recommendations: Construction of a permanent road through the center of the road easement.	Identified funding sources: GNWT
Mitigation Cost: \$2,500,000	Estimated Completion: TBD

Recreation Assets:

1. Bob McMeekin Park

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Bob McMeekin is a signature greenspace at the entrance to town, on the banks of the Hay River. The park has some elevation changes and was only impacted by flooding and ice in lower lying areas that are closer to the river. The sliding hill, picnic area, boat launch and low mobility parking area are all situated in lower lying areas.

Initial cleanup has allowed THR staff and a local contractor to reopen most of the greenspace, with minimal safety hazards remaining. Debris and mud have been removed from the boat launch and low mobility parking areas. Gravel was also added and graded in those area to ensure safe accessibility.



Complete list of flood impact:

- 2'-3' feet of mud, driftwood and debris in parking area 2
- erosion of surface aggregate in parking area 2 and boat launch
- 2 picnic tables damaged by ice
- 2 firepits flooded and impacted by ice
- 6 park benches damaged and/or dislodged by ice
- Light pole knocked down
- Power line cut at light pole #2
- Debris, mud and driftwood on sliding hill



Initial Cleanup and Repairs:

A local contractor was hired to address erosion of the parking area and access roads. THR Recreation Maintenance staff will clear and remove remaining debris and silt from the sliding hill and lower lying areas when ground is dry enough to access with equipment. Park furnishings will also be removed as soon as possible.

The Town has secured funding via the Investing in Canada Infrastructure Program (ICIP) and the CANNOR Community Revitalization Fund for \$645,000 improvements to the greenspace. Town Management is postponing some components of the project to 2023 in order to reassess and explore mitigation measures that could protect against future flooding.

Estimated cost of repairs: \$44,000

Estimate Type: Class C

Repair funding sources:

- THR own force labour and equipment
- Trans Canada Trail Infrastructure and Major Repairs Funding
- United Way donations
- Disaster Assistance Policy

Estimated Repair Time: park reopened but full repairs will not be completed until 2023

Additional Mitigation Measures to Explore: 400m berm

Estimated cost of Mitigation: \$746,200

Estimate Type: Class C

Identified funding sources: tbd

Estimated Repair Time: summer 2023

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2. Glenn Smith Field

- 200' of outfield fencing detached and posts leaning
- grass and debris on outfield and left field fence (400' length x 4' vertical)
- parking area - little to no debris but erosion of surface aggregate
- infield standing water and significant erosion
- player benches - flooding, mud and debris (3' vertical water line)
- mud and debris in beer garden area
- equipment shed to be assessed further (not likely impacted)



Initial Cleanup and Repairs:

Sport field reopened and user groups making use of field. Cleanup and brushing of treeline will continue in June. Further work required to repair infield erosion and establish proper drainage – see additional mitigation measures below.

Estimated cost of repairs: \$10,000

Estimate Type: Class C

Repair funding sources:

- THR own force labour and equipment
- MACA Disaster Assistance Program
- United Way donations

Estimated Repair Time: near complete



Additional Mitigation Measures to Explore:

Infield drainage improvements:

- Expose clay subsurface
- Establish proper grade and drainage
- Lay weeping tile or geotextile
- Reestablish sub-surface and surface shale

Estimated cost of mitigation: \$100,000

Estimate Type: Class C

Mitigation funding sources: Disaster Assistance Policy

Estimated Repair Time: September 2022

3. Rotary Trail

- 4 lower lying sections heavily impacted and remain impassable or hazardous
- Approximately 1.3km of trail with 2'-4' feet of mud, driftwood and debris remaining
- Dangerous leaning trees and broken branches to remove
- Erosion of surface aggregate and trail sub-base in several sections
- TCT interpretive sign damaged and displaced by ice



Initial Cleanup and Repairs:

Ice has melted or been removed, and mud has dried up. Silt remains on most of the trail and will need to be removed with use of tractors, ATVs and Town labour. Three sections of the trail remain impassable due to the amount of debris deposited on the trail. Heavy equipment and experienced tree fellers are required to clear those sections.

Gravel resurfacing will be required for several hundred meters of the trail that were washed out by rushing waters. Once initial cleanup is completed, all trail surfaces will be assessed further to determine how much resurfacing is required.

Estimated cost of repairs: \$161,000

Estimate Type: Class C

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Identified funding sources:

- THR own force labour and equipment
- Trans Canada Trail
- United Way donations
- Disaster Assistance Policy

Estimated Repair Time: summer 2023



Additional Mitigation Measures:

- Raise grade of surface
- Improve drainage via additional ditching and repairs to existing
- Include erosion control measures such as weeping tile

Estimated cost of mitigation: \$625,464

Estimate Type: Class C



Identified funding sources: tbd

Estimated Repair Time: tbd

4. Irma Miron Trail



Trail was completely submerged while ravine was flooded.

Trail remains closed due to heavy deposit of silt and environmental waste during closure of lift station 1.

Trail expected to remain closed until further repairs are performed on lift station 1.

Full assessment of trail required prior to assessing cleanup measures and cost.

Estimated Cost: \$10,000

Funding sources: Disaster Assistance Policy
Trans Canada Trail

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Estimated Repair Time: tbd



5. KFN Ice Crossing Day Use Area

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Park bench and picnic table damaged and displaced by flooding and icebergs.

Replacement required at estimated cost :

- Table (\$2,000)
- Bench (\$1,500)
- Install (\$1,500)

Completion of work dependent on Riverview road project and removal of fill at ice crossing.

Estimated cost of repairs: \$5,000

Estimate Type: Class B

Identified funding sources:

- Trans Canada Trail
- United Way donations

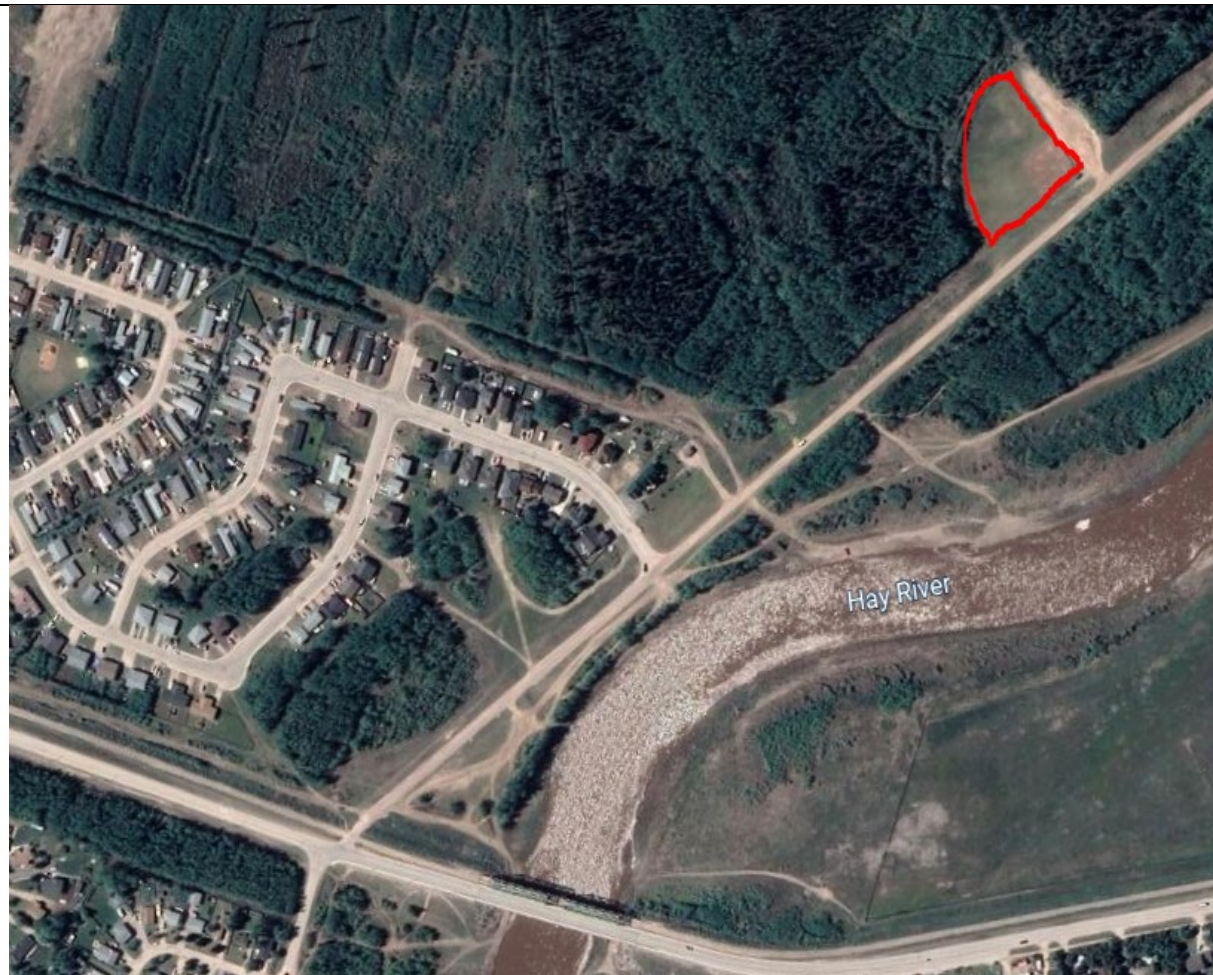
Estimated Repair Time: Summer 2023

6. Don Wright Ball Diamond

Don Wright Ball Diamond is located west of Cranberry Crescent and Saskatoon Drive on the water treatment plant road which runs parallel to the West Channel of the Hay River.

The outfield and infield of DW ball diamond remain completely submerged (photos below) by waters that flooded the area when water and ice flows breached the banks of the river's West Channel and flooded areas surrounding Cranberry Crescent and Saskatoon Drive.

Drainage is poor beyond the outfield fence as the field surface is at the same elevation as drainage ditch behind, and lower than ground level of the forested area beyond that.



Estimated cost of repairs: \$100,000

Estimate Type: Class B

Identified funding sources:

- Disaster Assistance Policy

Estimated Repair Time: Summer 2023

Proposed Mitigation Measures:

- Raise grade of playing surface
- Improve drainage via additional ditching and repairs to existing
- Include erosion control measures such as weeping tile

Estimated cost of mitigation: \$525,000	Estimate Type: Class C
Identified funding sources: Disaster Assistance Policy	
Estimated Mitigation Time: Summer 2023	



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7. Old Town Connector Trail

The Old Town Connector Trail runs from the Vale Island bridge to Porritt Landing Marina. The trail is separated into 3 sections which skirt the cemetery, Merlyn Carter Airport and CN yard.

Four sections of the trail were heavily impacted by water and ice during peak flooding. Silt, driftwood, ice, and debris were deposited onto approximately 1.5km of trail.



Trees and trail furnishings were uprooted, displaced, and damaged. Four benches, two picnic tables and two bearproof garbage bin were damaged and will need replacement. Tree removal is underway and will require weeks to complete.



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Initial Cleanup and Repairs:

Ice has melted or been removed, and mud has dried up. Silt remains on most of the trail and will need to be removed with use of street sweepers and high-pressure watering. Three sections of the trail remain impassable due to the amount of debris deposited on the trail. Heavy equipment and experienced tree fellers are required to clear those sections.

Asphalt resurfacing will be required for several hundred meters of the trail that were impacted by heavy equipment used to repair road and rail washouts. Once initial cleanup is completed, paved surfaces will be assessed further to determine how much resurfacing is required.

Estimated cost of repairs: \$205,000

Estimate Type: Class C

Identified funding sources:

- MACA Disaster Assistance Policy
- Trans Canada Trail
- United Way donations
- Charge Back related to previous road and rail repairs

Estimated Repair Time: Completion by October 2022

8. Porritt Landing Marina

June 23, 2022

High water and icebergs submerged most of Porritt Landing Marina infrastructure during peak flood periods. Silt, driftwood, ice, and debris were deposited onto the boat launch and parking area, as well as the access roads.

There was also significant erosion of surface aggregate in the parking area and along the marina's retaining walls. Retaining walls appear to be unaffected structurally, though further assessment will be performed as water levels continue to drop.

Park furnishings were not damaged but there was surface damage to wood finger dock sections and plastic modular docking.



Initial Cleanup and Repairs:

THR Recreation Maintenance staff have cleared and removed the majority of debris and silt from the boat launch, parking area and access roads. A local contractor was hired to address erosion of the parking area and access roads.

Park furnishings and docking were relocated and installed as per seasonal start up routines. Repairs required to finger dock surfaces and structure will likely be performed by THR staff.

Estimated cost of repairs: \$20,000

Estimate Type: Class C

Identified funding sources:

- THR labour, equipment, and O&M budgets
- Disaster Assistance Program

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Estimated Repair Time: Completion by August 2022



9. Fishermen's Wharf Pavilion

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The Fishermen's Wharf Pavilion was submerged in rushing waters during 2022 flooding. The parking area and building were heavily impacted by water and ice which breached the sheet pile retaining walls.



The Pavilion main building received flood waters for several hours, which deposited approximately 2" of silt throughout. The main building was assessed by the Town's insurance adjusters and it has been thoroughly cleaned via an abatement process. Wall panels and drywall and floor tiles have been removed in all booths. All remaining materials were not impacted and the building is drying until contractors return on June 13th to begin repairs.

Significant flooding impact was observed in the main building booths, as well as the detached secondary building, due to water eddying in and around corners. See image below.

Estimated cost of repairs: \$200,000

Estimate Type: Class C

Identified funding sources: THR Insurance Policy

Estimated Repair Time: completion by June 25th, 2022

June 23, 2022



The parking area was eroded considerably, FWP parking barricades were pushed over and displaced. Three sea cans, flower planters and other furnishings were also displaced during the peak of flooding. Silt was also deposited in 2'-3' high mounds at the northeast corner of the parking lot.



10. West Channel Playground

West Channel playground is a small greenspace with small playground furnishing on a fenced in lot which is leased by THR from a private property owner. The greenspace is located across the highway from West Point First Nation but is managed and maintained by the Town's Department of Recreation and Community Services.

The park was severely impacted by high water levels, rushing waters and large chunks of ice. The fencing was broken, pushed over and damaged by water and ice around most of the perimeter. The parks soil and playground fall zone remain saturated with water and littered with debris all of sorts and sizes.



Proposed Cleanup and Repair:

Proposed cleanup and recovery for the greenspace include removal of demolition of current fence, removal of current playground equipment, removal of debris with heavy equipment, raising the grade of the park, addition of berms for erosion control and flooding prevention, replacement of fencing and playground equipment.

Estimated cost of repairs: \$105,000

Estimate Type: Class B

Identified funding sources: Disaster Assistance Policy

Estimated Repair Time: tbd

11. Vale Island Recreational Area

Vale Island Recreational Area (Old Town Playground) saw minimal flooding in 2022 but it has seen flooding in previous years and remains a high-risk location.

The Town has secured funding via the Investing in Canada Infrastructure Program (ICIP) for \$300,000 improvements to the greenspace. Town Management is postponing the project to 2023 in order to reassess and explore mitigation measures that could protect against future flooding.



Additional Mitigation Measures to Explore:

Haul and place fill to east and south edges of greenspace to act as landscaped berms that would prevent erosion and flooding. The landscaped berms would also serve as amphitheater seating for gatherings and viewing of performances at the greenspace.

Estimated cost of repairs: \$40,000

Estimate Type: Class B

Identified funding sources:

- ICIP funding
- United Way donations

Estimated Repair Time: 2023

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12. Hoffman Way

The road shoulder and ravine slope have eroded significantly in places as result of improper drainage ditches and culverts. The proposed access road repairs would include chip seal repair, road surface refurbishment, drainage improvements, and other general access road construction work.





Initial Cleanup and Repairs:

A drainage survey will be used for repairs and improve gradation, ditch shaping, culvert quantity and culvert sizing. Following the drainage improvements, road repairs will include:

- Remove of current chip seal surface
- Repair road base where impacted significantly by drainage issues and seepage
- Resurface road with ¾" crushed gravel
- Regular road maintenance, including watering/calcium application via O&M budgets

Estimated cost of repairs: \$320,000

Estimate Type: Class A

June 23, 2022

Identified funding sources: GNWT Summer Community Accessibility Program; Disaster Assistance Policy

Estimated Repair Time: RFP issued with proposed completion by October 31st 2022



Additional Mitigation Measures to Explore:

Realignment away from the riverbank is being explored as a possible long-term solution. Realignment would use the current highway access point but redirect Hoffman Way behind the current campground and golf course driving range. Scope of work includes tree clearing, removal of organics, ditching, establishment of proper road base with asphalt surface.

Estimated cost of mitigation: \$3,275,000

Estimate Type: Class B

Identified funding sources: MACA Disaster Assistance Program

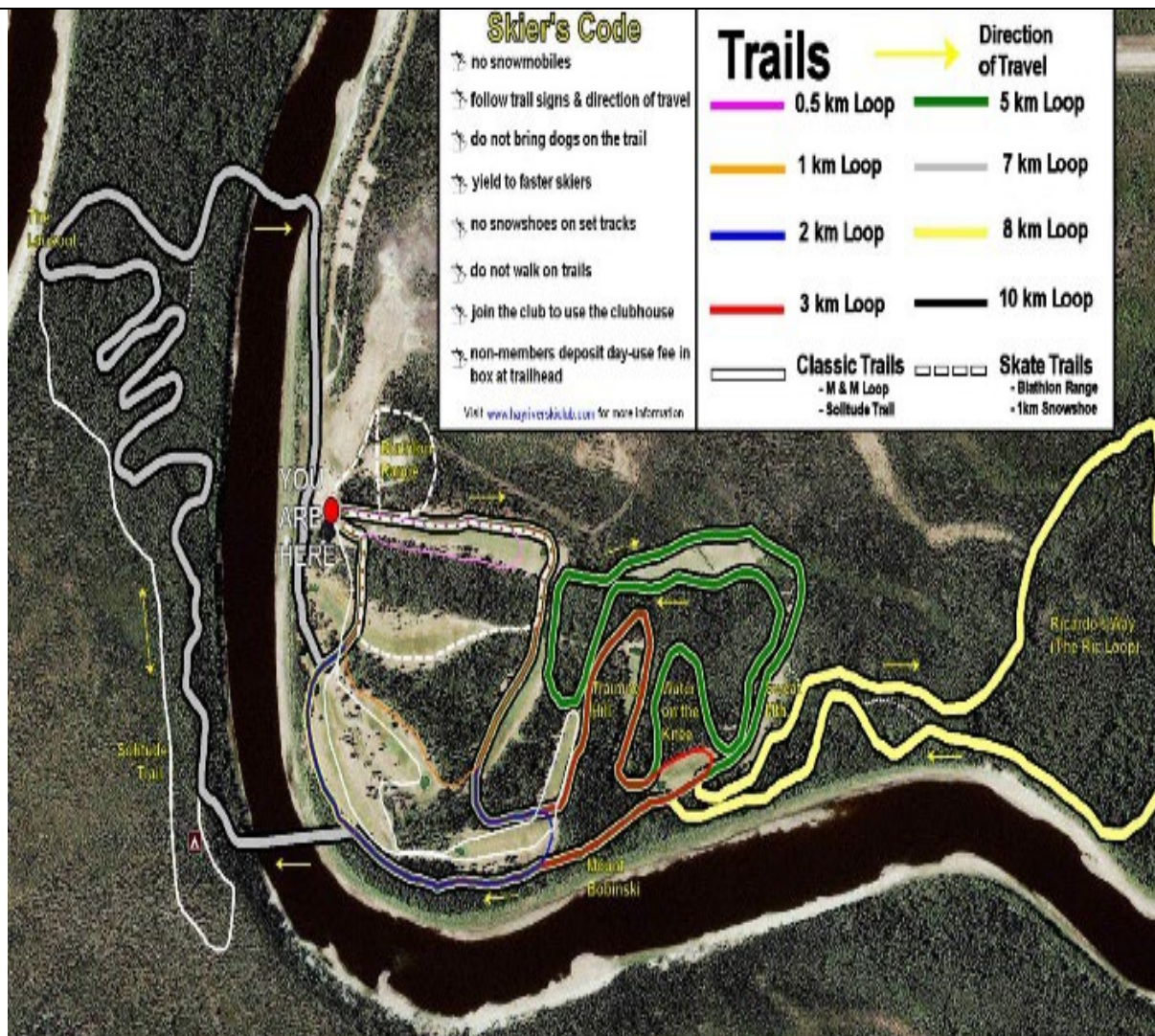
Estimated Repair Time: tbd

June 23, 2022

13. Ski Club and Trails

Sections of trails bordering the river are completely blocked by fallen trees & debris. Proper equipment and training are required for removal of trees because some are hung up or have broken limbs above head. Heavy equipment with large grapplers will be required to lift timber away first to partly clear the trails.

There may also be damage to some of the poles supporting trail lights. Further assessment is required, which should also allow trails to dry out enough for heavy equipment to access.



There was a washout of maintenance road that angles down to provide river access for the ski and golf clubs. The Golf Club used that road in the past to access the river to pump water up to fill the pond b/w 6 & 7, as well as provide water to the sprinkler system on the lower holes whenever the upper irrigation was not functioning.

Riverbanks have eroded significantly across the river, which has blocked access to the continuation of the Brendan Green Trail. Other trail sections that have similar low spots have been impacted similarly by erosion and trees being knocked down.



Initial Cleanup and Repairs:

Removal of obstructions and hazards to reopen trails and ensure safety, accessibility, and usability of trails. The work will be completed by contractors with some support from Ski Club volunteers. Contractors would perform a one-time mechanical brushing and mulching to eliminate any potential hazards to users, and their equipment, opening trail width to 12 feet wherever possible. Volunteers would help with prep of trails, cleanup, and installation of appropriate signage, including trail markers once work is complete (as per picture above).

Estimated cost of repairs: \$50,000

Estimate Type: Class B

Identified funding sources: GNWT Summer Community Accessibility Program; Disaster Assistance Policy

Estimated Repair Time: Completion by November 2022



Preliminary Flood Damage Assessments with Repair and Mitigation Estimates

June 23, 2022

2022 Town of Hay River Flood Damage Assessment With Funding

22-Jun-22

Department	Asset	Activity	Primary Fund	Amount	Priority
Recreation	Hoffman Way - Golf Course	Mitigation	DAP	\$320,000	B
Recreation	Hoffman Way - Golf Course	Repair	CAP	\$3,275,000	C
Recreation	Ski Club Trails	Repair	CAP	\$50,000	B
Recreation	Bob McMeekin Park	Repair	DAP	\$44,000	A
Recreation	Bob McMeekin Park	Mitigation	DAP	\$746,200	C
Recreation	Glenn Smith Field	Repair	DAP	\$10,000	A
				\$	
Recreation	Glenn Smith Field	Mitigation	DAP	100,000	B
Recreation	Rotary Trail	Repair	DAP	\$161,000	A
Recreation	Rotary Trail	Mitigation	DAP	\$625,000	C
Recreation	Irma Miron Trail	Repair	DAP	\$10,000	A
Recreation	KFN Ice Crossing Day Use Area	Repair	DAP	\$5,000	B
Recreation	Don Wright Ball Diamond	Repair	DAP	\$100,000	C
Recreation	Don Wright Ball Diamond	Mitigation	DAP	\$525,000	C
Recreation	Vale Island Playground	Repair	DAP	\$40,000	B
Recreation	Vale Island Playground	Mitigation	DAP	\$220,000	C
Recreation	Old Town Connector Trail	Repair	DAP	\$205,000	A
Recreation	Porritt Landing Marina	Repair	DAP	\$20,000	A
Recreation	Fisherman's Wharf Pavilion	Repair	Insurance	\$200,000	A
Recreation	West Channel Playground	Repair	DAP	\$105,000	A
PWS	Downtown Berm	Mitigation	DAP	\$1,800,000	C
PWS	Industrial Area Roads	Repair	DAP	\$130,000	A
PWS	Industrial Area Roads	Mitigation	DAP	\$30,000	C
PWS	Water Treatment Plant Road	Mitigation	DAP	\$600,000	C
PWS	Vale Island / West Channel Roads	Repair	DAP	\$75,000	A
PWS	Vale Island / West Channel Roads	Mitigation	DAP	\$80,000	B
PWS	Riverview Drive	Repair	DAP	\$200,000	A
PWS	Riverview Drive	Mitigation	DAP	\$200,000	A
PWS	Lift Station 1	Assessment	Insurance	\$20,000	A
PWS	Lift Station 1	Repair	Insurance	\$1,600,000	A
PWS	Lift Station 1	Repair	DAP	\$2,500,000	A
PWS	Lift Station 1	Mitigation	Mitigation	\$1,200,000	C
PWS	Lift Station - Beaver Cres	Repair	Insurance	\$25,000	A
PWS	West Channel Berm - Alaska Road	Repair	DMAF	\$1,300,000	C
PWS	West Channel Berm - Other	Repair	DAP	\$100,000	A
PWS	West Channel Berm - Other	Mitigation	DAP	\$100,000	B
PWS	Paradise Road - Temporary	Repair	GNWT	\$750,000	A
PWS	Paradise Road - Temporary	Repair	DAP	\$100,000	A



Preliminary Flood Damage Assessments with Repair and Mitigation Estimates

June 23, 2022

PWS	Paradise Road - Permanent	Mitigation	DAP	\$2,500,000	C
PWS	Fraser Place	Mitigation	DAP	\$110,000	A
PWS	Landfill	Repair	DAP	\$250,000	C
PWS	Landfill Waste Processing	Repair	GNWT	\$60,000	A
PWS	Old Town Firehall	Repair	Insurance	\$40,000	A
PWS	Miron Storm Outlets	Repair	DAP	\$650,000	B
PWS	Miron Storm Outlets	Mitigation	DAP	\$100,000	B
PWS	99 Woodland Drive House	Repair	Insurance	\$30,000	A
PWS	Dewatering Ravine Lift Station 1	Repair	DAP	\$100,000	A
PWS	Road Silt Removal	Repair	DAP	\$3,000	A
PWS	Storm System Silt Removal	Repair	GNWT	\$20,000	A
PWS	Water Treatment Plant Intake Line	Assessment	DAP	\$300,000	C
PWS	Water Treatment Plant Intake Line	Repair	DAP	\$10,000,000	C
PWS	Water Treatment Plant	Mitigation	DMAF	\$20,000,000	C
PWS	Water Treamt Plant Operation	Repair	DAP	\$80,000	A
PWS	Manholes and Catch Basins	Repair	DAP	\$35,000	B
PWS	Crosswalk Signs - Airport crossing	Repair	Insurance	\$10,000	B
Admin	Town Hall Contents	Replace	Insurance	\$5,000	A
PS	Water Monitoring Equipment	Replace	DAP	\$50,000	B
Total				\$51,914,200	