

# **APPENDIX A**

Summary of Background Information

No.	Background Item	Currently Available	Source	Notes
01. Climate Data				
A. IDF Curves				
B. Provincial Climate Data				
	i. NLFR0014 - Avalon West	Y	WRMD	Meteorological data from June 5, 2018 to January 12, 2022
	ii. NLELCL0012 - Vale LH1 Met	Y	WRMD	Meteorological data from December 1, 2020 to January 12, 2022
	iii. Ruby Line 5 Minute Rainfall Data	Y	WRMD	5-minute rainfall data from January 1, 1999 to December 31, 2014
	iv. Windsor Lake 5 Minute Rainfall Data	Y	WRMD	5-minute rainfall data from January 1, 1999 to December 31, 2014
C. ECCC Climate Data				
	i. St. John's West CDA CS	Y	ECCC	Historical data for Climate Station 8403605 from 1996 to 2007
	ii. St. John's West Climate	Y	ECCC	Historical data for Climate Station 8403603 from 2010 to 2021
	iii. St. John's Intl A	Y	ECCC	Historical data for Climate Station 8403505 from 2012 to 2021
	iv. Carbonear	Y	ECCC	Historical data for Climate Station 8401075 from 1972 to 1974
	v. St. John's	Y	ECCC	Historical data for Climate Station 8403500 from 1874 to 1975
	vi. St. John's A	Y	ECCC	Historical data for Climate Station 8403506 from 1942 to 2000
	vii. Argentia A (AUT)	Y	ECCC	Historical data for Climate Station 8400104 from 1992 to 2017
	viii. Agentia A	Y	ECCC	Historical data for Climate Station 8400100 from 1945 to 1986
	ix. Dunville	Y	ECCC	Historical data for Climate Station 8401528 from 1990 to 1997
	x. Placentia	Y	ECCC	Historical data for Climate Station 8402956 from 1970 to 1975
F. Canadian Precipitation Analysis Data				
	Precipitation data (April 2016, June 2018, September 2020, November 31, 2021 and January 30, 2022			
	i.	Y	EC	Gridded 6-hour precipitation data over the Avalon Peninsula
02. Hydraulic Data				
A. Hydraulic Structure Information				
	i. Fox Harbour River Bridge Shop Drawing and Details	Y	WRMD	As-built drawings
	ii. Dam Inventory	Y	WRMD	
	iii. Carbonear Culvert Information	Y	Town of Carbonear	Culvert Diameters
	iv. Carbonear Bridge Drawings	Y	Town of Carbonear	As-built drawings for two bridges
	v. Carbonear Hydraulic Structure Locations	Y	Town of Carbonear	
	vi. Salmon Cove Culvert Information	Y	Town of Salmon Cove	Culvert Diameters
	vii. Placentia Culvert Information	Y	Town of Placentia	Culvert Diameters
03. Hydrologic Data				
A. Hydrometric Data				
	v. WSC Data - Historical			
	a. 02YJ001 Daily Flow Data	Y	WSC	
	b. 02YJ003 Daily Flow Data	Y	WSC	
	c. 02YK002 Daily Flow Data	Y	WSC	
	d. 02YN002 Daily Flow Data	Y	WSC	
	e. 02ZA001 Daily Flow Data	Y	WSC	
	f. 02ZA002 Daily Flow Data	Y	WSC	
	g. 02ZA003 Daily Flow Data	Y	WSC	
	h. 02ZB001 Daily Flow Data	Y	WSC	
	i. 02ZC002 Daily and Instantaneous Peak Flow Data	Y	WSC	
	j. 02ZD002 Daily Flow Data	Y	WSC	
	k. 02ZE001 Daily and Instantaneous Peak Flow Data	Y	WSC	
	l. 02ZE004 Daily and Instantaneous Peak Flow Data	Y	WSC	

No.	Background Item	Currently Available	Source	Notes
	m. 02ZF001 Daily and Instantaneous Peak Flow Data	Y	WSC	
	n. 02ZG001 Daily and Instantaneous Peak Flow Data	Y	WSC	
	o. 02ZG002 Daily and Instantaneous Peak Flow Data	Y	WSC	
	p. 02ZG003 Daily and Instantaneous Peak Flow Data	Y	WSC	
	q. 02ZG004 Daily and Instantaneous Peak Flow Data	Y	WSC	
	r. 02ZH002 Daily and Instantaneous Peak Flow Data	Y	WSC	
	s. 02ZK001 Daily and Instantaneous Peak Flow Data	Y	WSC	
	t. 02ZK003 Daily and Instantaneous Peak Flow Data	Y	WSC	
	u. 02ZK004 Daily and Instantaneous Peak Flow Data	Y	WSC	
	v. 02ZK005 Daily and Instantaneous Peak Flow Data	Y	WSC	
	w. 02ZL003 Daily and Instantaneous Peak Flow Data	Y	WSC	
	x. 02ZL004 Daily and Instantaneous Peak Flow Data	Y	WSC	
	y. 02ZL005 Daily and Instantaneous Peak Flow Data	Y	WSC	
	z. 02ZM006 Daily and Instantaneous Peak Flow Data	Y	WSC	
	aa.02ZM009 Daily and Instantaneous Peak Flow Data	Y	WSC	
	ab.02ZM010 Daily and Instantaneous Peak Flow Data	Y	WSC	
	ac.02ZM016 Daily and Instantaneous Peak Flow Data	Y	WSC	
	ad.02ZM017 Daily and Instantaneous Peak Flow Data	Y	WSC	
	ae.02ZM018 Daily and Instantaneous Peak Flow Data	Y	WSC	
	af.02ZM019 Daily and Instantaneous Peak Flow Data	Y	WSC	
	ag.02ZM021 Daily and Instantaneous Peak Flow Data	Y	WSC	
	ah.02ZN001 Daily and Instantaneous Peak Flow Data	Y	WSC	
	ai.02ZN002 Daily and Instantaneous Peak Flow Data	Y	WSC	
	aj. 02ZK006 Instantaneous Peak Flow Data	Y	WSC	
	ak. 02ZM008 Instantaneous Peak Flow Data	Y	WSC	
	al. 02ZM020 Instantaneous Peak Flow Data	Y	WSC	
	am. 02ZK002 Daily Water Level Data	Y	WSC	
	viii. Tidal Information for Argentia and Holyrood	Y	DFO	
04. Soil Data				
	A. National Soils Database Version 2	Y	NRCAN	Soils database
05. Remote Sensing and Orthometric Imagery Data				
	A. SPOT-6 Satellite Captures on August 10, 2020 and August 16, 2020	Y	ESA	
	B. Carbonear, Salmon Cove, Victoria and Placentia Orthometric Imagery	Y	Govt. of NL	
09. Reports				
	H. Climate Reports			
	i. Projected Impacts of Climate Change for the Province of Newfoundland and Labrador	Y	WRMD	
	ii. 2014 NL RFFA - Report	Y	WRMD	
	iii. 2014 NL RFFA - Users Guide	Y	WRMD	
	iv. 2016 NL RFFA	Y	WRMD	
	v. Past and Future Sea Level Change in NL	Y	WRMD	
	vi. 2015 Intensity-Duration-Frequency Curve Update for Newfoundland and Labrador	Y	WRMD	
	I. Flood Risk Mapping			
	i. Flood Risk Mapping Study for Carbonear, Victoria, Salmon Cove, Whitbourne, Hearts Delight, Winterton and Hants Harbour	Y	WRMD	
	ii. Hydrotechnical Study of the Placentia Area Flood Plain	Y	WRMD	

No.	Background Item	Currently Available	Source	Notes
12. Topographic & Bathymetric Data				
	A. High Resolution Digital Elevation Model	Y	NRCan	
	B. Nonna Bathymetry Data	Y	CHS	
	C. Carbonear Bay Baythymetry	Y	Town of Carbonear	
14. WRMD Flood Inventory				
	A. Historical Flood Inventory	Y	WRMD	Provided in Kickoff Meeting

# **APPENDIX B**

## Historical Flood Event Inventory

Start Year	Season	General Location	Community Name	Water Bodies	Type of Event	Description	Source
1955	Winter	East Coast, St. John's and Carbonear	Carbonear		Coastal Flooding	MR: The "worst storm in memory" battered the East Coast. Surging waves sent water 200 feet in the air against the steep cliffs around St. John's Harbour. 12 wharves and two small boats were destroyed. General damages were said to be extensive	MR: Department of Natural Resources Website, The Daily News
1955	Fall	Placentia	Placentia		unknown		Hydro technical Study of the Placentia Area Flood Plain
1961	Spring	East Coast, St. John's and Carbonear	Carbonear		Ice Jam	MR: An ice jam at the piers of an abandoned railway caused a backup which inundated a warehouse in Carbonear. Flooded farmland in Bonavista South area, one farmer was reported as leaving after his property was inundated.	Flooding Events in Newfoundland and Labrador - An Historical Perspective
1964	Winter	Placentia	Placentia		Coastal Flooding	Severe flooding. Houses flooded, people forced to row along roads in dories. Unusually high tides flooded houses in St. Mary's.	Heritage Newfoundland Website
1976	Spring	Placentia	Placentia		unknown		Hydro technical Study of the Placentia Area Flood Plain
1977	Winter	St. John's, Placentia	Placentia		Coastal Flooding	MR: High seas caused damages to fisherman's wharves in the Battery area. high winds and heavy seas damaged wharves (potentially Petty Harbour). High winds and heavy seas damaged wharves (potentially Ferryland). The seas were so high in Placentia that the spray went over the barrier beach and mixed with snow and rain causing basement flooding	Flooding Events in Newfoundland and Labrador - An Historical Perspective
1982	Winter	Placentia	Placentia		unknown	No Details	Dept Natural Resources Website
1982	Winter	Placentia	Placentia		Coastal Flooding	Worst flooding in history of community. Houses flooded, people forced to row along road in dories. Unusually high tides flooded houses in St. M	Heritage Newfoundland Website
1982	Winter	Placentia	Placentia		Coastal Flooding	Waves broke through the beach and washed across the road in the area of the high school. The water flooded some areas that were still under water from the flood a week earlier	Hydro technical Study of the Placentia Area Flood Plain
1983	Winter	Placentia	Placentia		Coastal Flooding	Severe flooding occurred during storm. Remedial measures cost in excess of \$3,000,000	Heritage Newfoundland Website
1989	Winter	Placentia	Placentia		Winds / Tides	40-50 homes in the area affected by flooding, some didn't evacuate	The Evening Telegram

Start Year	Season	General Location	Community Name	Water Bodies	Type of Event	Description	Source
1990	Winter	Victoria	Victoria	Salmon Cove River	Ice Jam	The cover of the river broke and jammed downstream of the bridge, some of the ice and water bypassed the ice jam and flooded the surrounding area	Flood Risk Mapping Study of Carbonear, Victoria, Salmon Cove, Whitbourne, Heart's Delight, Winterton, Hant's Harbour
1990	Winter	Carbonear, Victoria	Carbonear	Powell's Brook	Rainfall	MR: Heavy rains caused extensive flooding, roads were washed away when ice broke loose. A ice jam occurred in the night time and due to darkness and the ice cover in the area measures to rectify the situation were delayed until daylight and three houses were flooded	Flood Risk Mapping Study of Carbonear, Victoria, Salmon Cove, Whitbourne, Heart's Delight, Winterton, Hant's Harbour
1990	Winter	Carbonear, Victoria	Victoria	Salmon Cove River	Ice Jam	MR: Heavy rains caused extensive flooding, roads were washed away when ice broke loose. A ice jam occurred in the night time and due to darkness and the ice cover in the area measures to rectify the situation were delayed until daylight and three houses were flooded	Flood Risk Mapping Study of Carbonear, Victoria, Salmon Cove, Whitbourne, Heart's Delight, Winterton, Hant's Harbour
1991	Winter	Victoria, Winterton, St. John's	Victoria	Salmon Cove River	Rainfall	MR: Heavy rains combined with snowmelt caused damages to several residences. Rain combined with snowmelt caused flooding conditions, water flowed over the highway and overtopped the river banks. snowmelt and rainfall caused flooding in many areas in the Gould's. Doyles River flooded its banks.	MR: Flood Risk Mapping Study of Carbonear, Victoria, Salmon Cove, Whitbourne, Heart's Delight, Winterton, Hant's Harbour. Flood Risk Mapping Study of Gould's, Petty Harbour and Ferryland
1991	Winter	Placentia	Placentia		Winds / Tides / Rainfall	Flooding caused by winds and tides, many people evacuated from their homes, 1/3 of town under water	The Evening Telegram
1999	Summer	South Coast	Placentia Bay		Rainfall	Tropical Storm Gert. St. Bride's. Hurricane Gert downgraded to Tropical Storm Gert caused damage to the breakwater, wharf and other Federal property as well as private fishing vessels. 2 dozen fishermen affected with several losing boats and gear and it cut their season short.	Department of Natural Resources Website
2007	Summer	Western Avalon Peninsula	Dunville, Argentia, Placentia, Carbonear		Rainfall	MR: Many streams overflowed their banks washing away roads and culverts and caused property damage. Shearstown Brook burst its bank and the bridge over the river was in danger of failing. Numerous basements were flooded. The access road was washed out meaning the Marine Atlantic ferry couldn't run. The road to the fish plant was washed out. Houses had 4-5 feet of water in them, 4 different sections of the road was washed out.	MR: VOCM. CBC. Telegram. The Charter

Start Year	Season	General Location	Community Name	Water Bodies	Type of Event	Description	Source
2009	Winter	Dunville	Dunville		Rainfall	Damages to the property of one household.	The Charter
2010	Fall	Southern and Eastern Newfoundland	Dunville, Carbonear, Freshwater, Placentia, Salmon Cove, Southwest Arm, Victoria		Rainfall		Multiple
2014	Winter	Carbonear, Victoria	Carbonear		Rainfall and Snowmelt	Sections of road closed because of standing water and excess water bubbling out of the storm sewer system. Unseasonably warm temperatures and rain caused snow banks to melt and drain downhill.	The Compass
1912	Winter	Placentia	Placentia	Atlantic Ocean	Coastal Waves	Charles Cosgrove was apparently swept out to sea by huge waves whilst heading for Ship Cove after a wedding in Placentia. His horse and cart were found, and later his body washed up.	Dept Natural Resources Website
1931	Fall	Placentia	Placentia	Atlantic Ocean	Storm Surge	A severe storm caused higher tides than during the Burin 1929 tsunami in Prowseton and Davis Cove. Wharves and flakes were destroyed. Four houses were flooded. Placentia was also damaged.	Dept Natural Resources Website
2013	Winter	Placentia		Placentia Bay	Storm Surge	A surge on Wednesday night tossed large rocks and other debris along the area known as Beach Road. The two-kilometre boardwalk serves as both a recreational walkway and as a breakwater. Mayor Wayne Power said a couple of sections of the boardwalk are completely destroyed. It is closed until further notice. "A large portion of it has been pretty well destroyed and lifted up," said Power.	CBC
2016	Winter	Placentia		Placentia Bay	Storm Surge	In Placentia, storm surges caused infrastructure damage to Veteran's Way, formerly known as Beach Road. The town sent staff and the fire department to close down the road, along with Orcan Drive.	CBC



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2020	Fall	Placentia			Rainfall	In just 39 hours, 205.9 millimetres of rain fell in Placentia between Friday and Saturday. The town mobilized workers Saturday to respond to several road washouts and in a post on the Town of Placentia Facebook page officials said a number of areas in the community suffered "significant damage." Some roads were closed entirely, and, like a portion of Route 100, completely washed out.	CBC
2021	Fall	Placentia			Rainfall / Wave Runup	Representatives from the Town of Placentia noted that the wave runup and storm surge caused by Hurricane Larry were the worst in recent memory in Dunville, resulting in considerable damage to retaining walls throughout the area	Town of Placentia
2021	Fall	Victoria			Rainfall	Representatives from the Town of Victoria noted that there were very high river flows due to the high rains from Hurricane Larry resulted in minor flooding in town.	Town of Victoria