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# **Shubenacadie Lakes Floodplain & Sackville Rivers Mitigation Studies**

NDMP Projects

March 13, 2020

# NDMP

\$200 Million from 2015-2020

Federal Funding Program Via 4 Phases:

- Risk Assessment
- Floodplain Mapping
- Mitigation Planning
- Mitigation Project Investment

# Studies Origin

- In 2015, HRM and Halifax Water compiled a list of known areas prone to flooding within the service boundary.
- Initially, over 5700 drainage issue sites were identified.
- Floor Risk Assessment Study yielded 10 sites.

# Studies Origin



| Ranking | Site Name   |
|---------|---|
| 1       | Sackville Rivers  |
| 2       | Shubenacadie Lakes  |
| 3       | Karlson's Wharf @ Upper Water Street - Halifax                |
| 4       | Inglis Street @ Barrington Street - Halifax                   |
| 5       | Highway 2, from Holland Road to Miller Lake Road - Fall River |
| 6       | Pleasant Street, near Dartmouth General Hospital - Dartmouth  |
| 7       | Cole Harbour Road @ Perron Drive - Cole Harbour               |
| 8       | Shore Road - Eastern Passage                                  |
| 9       | Hammonds Plains Road @ Bluewater Road - Bedford               |
| 10      | Mount Saint Vincent at Bedford Highway                        |

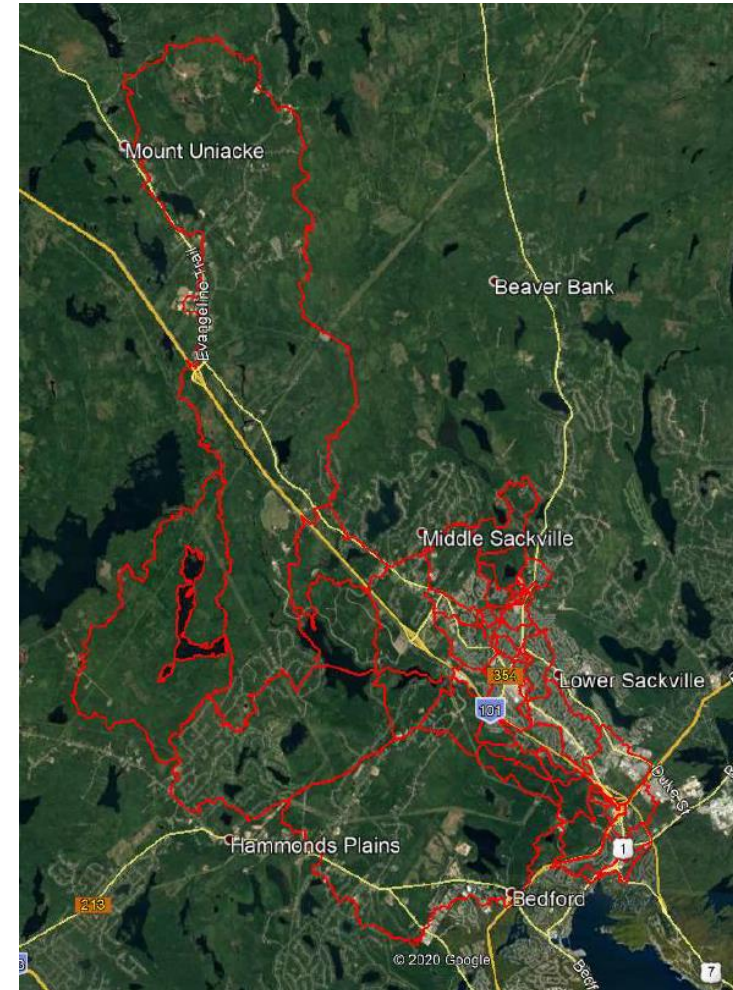
# Sackville Rivers Mitigation Planning Study

# NDMP Process

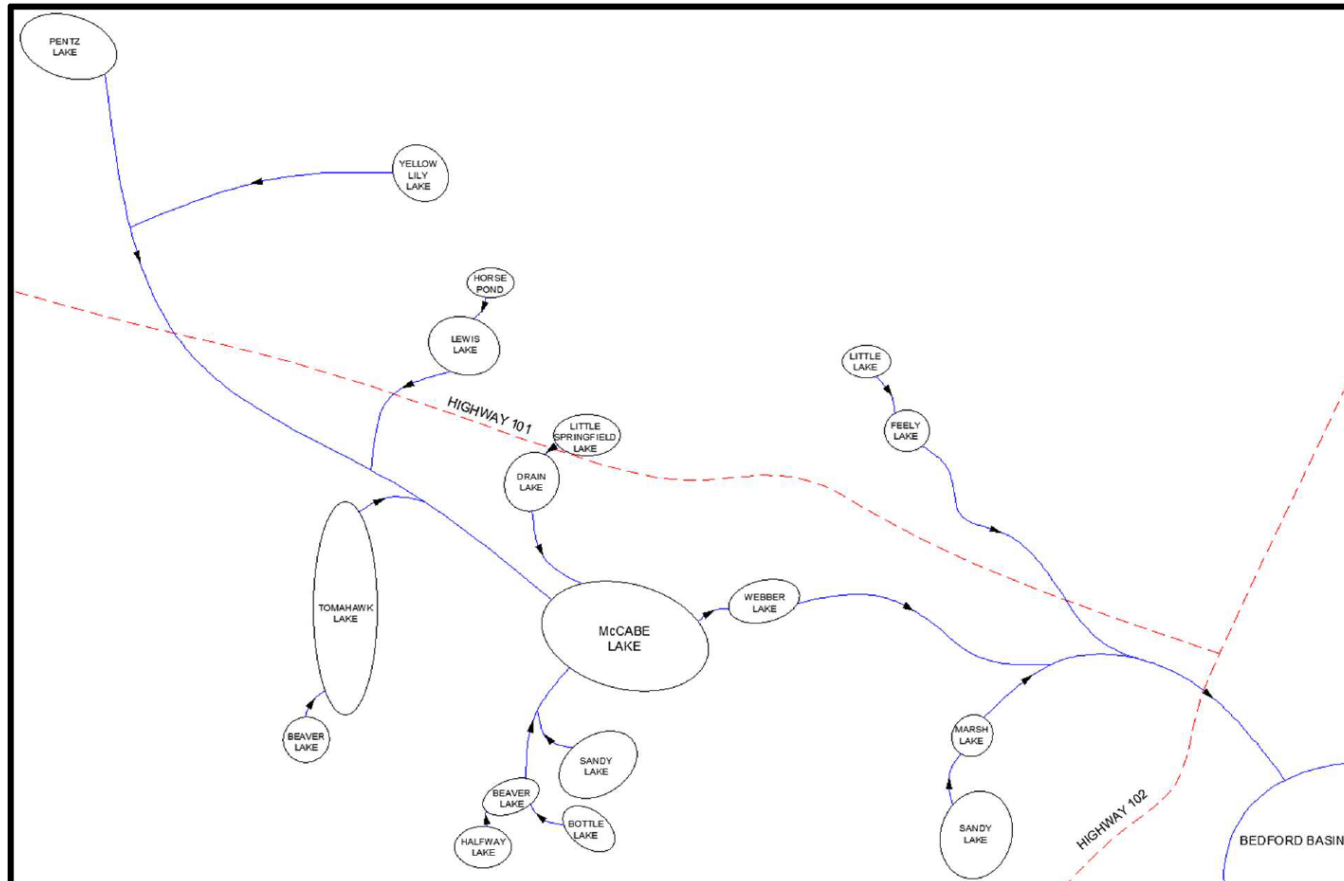
- ✓ Risk Assessment
- ✓ Floodplain Mapping
- Mitigation Planning
- Mitigation Project Investment

# Sackville Rivers Watershed

- Several Tributaries
- Developed & Undeveloped Areas
- Crosses HWY 101 & 102
- Notable Lakes:
  - Tomahwak
  - McCabe
  - Webber
  - Sandy
- Discharges to the Bedford Basin



# Watershed Sketch



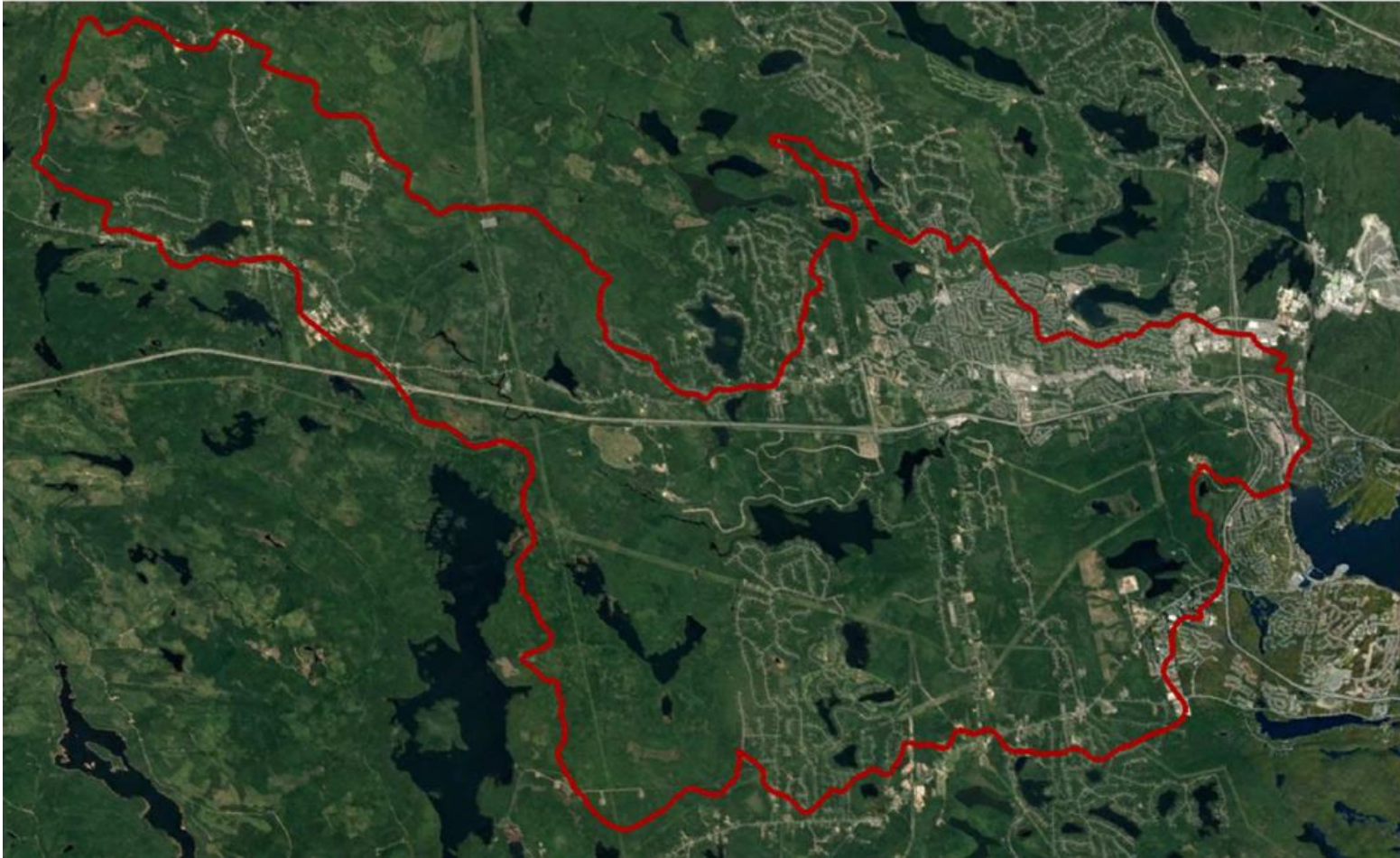


# Development Impacts - 1984

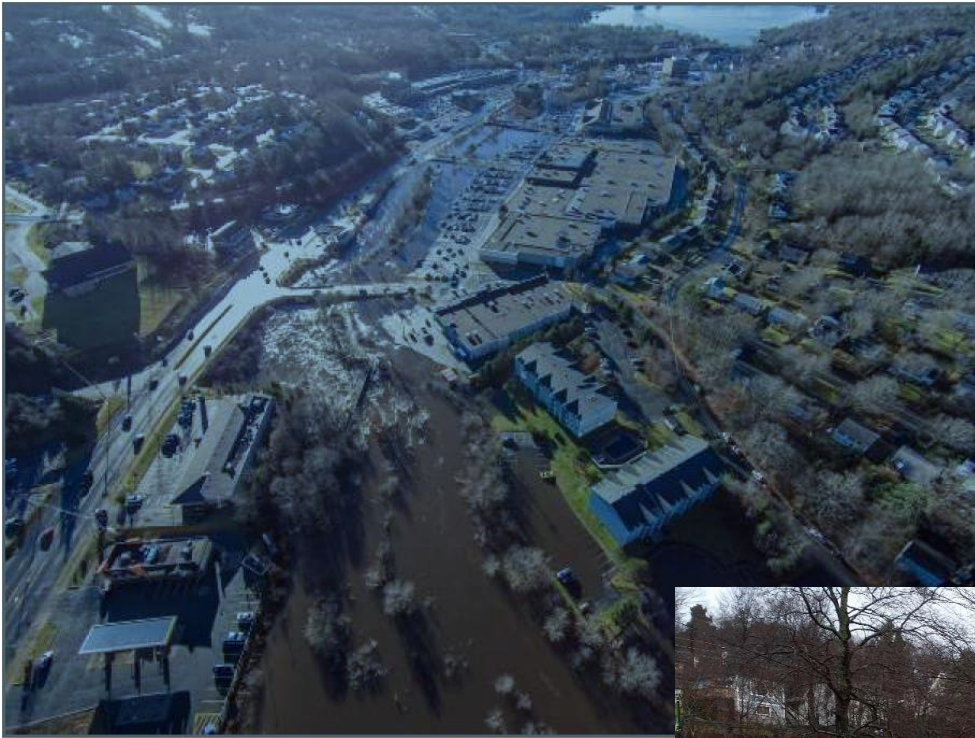


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# Development Impacts - 2020



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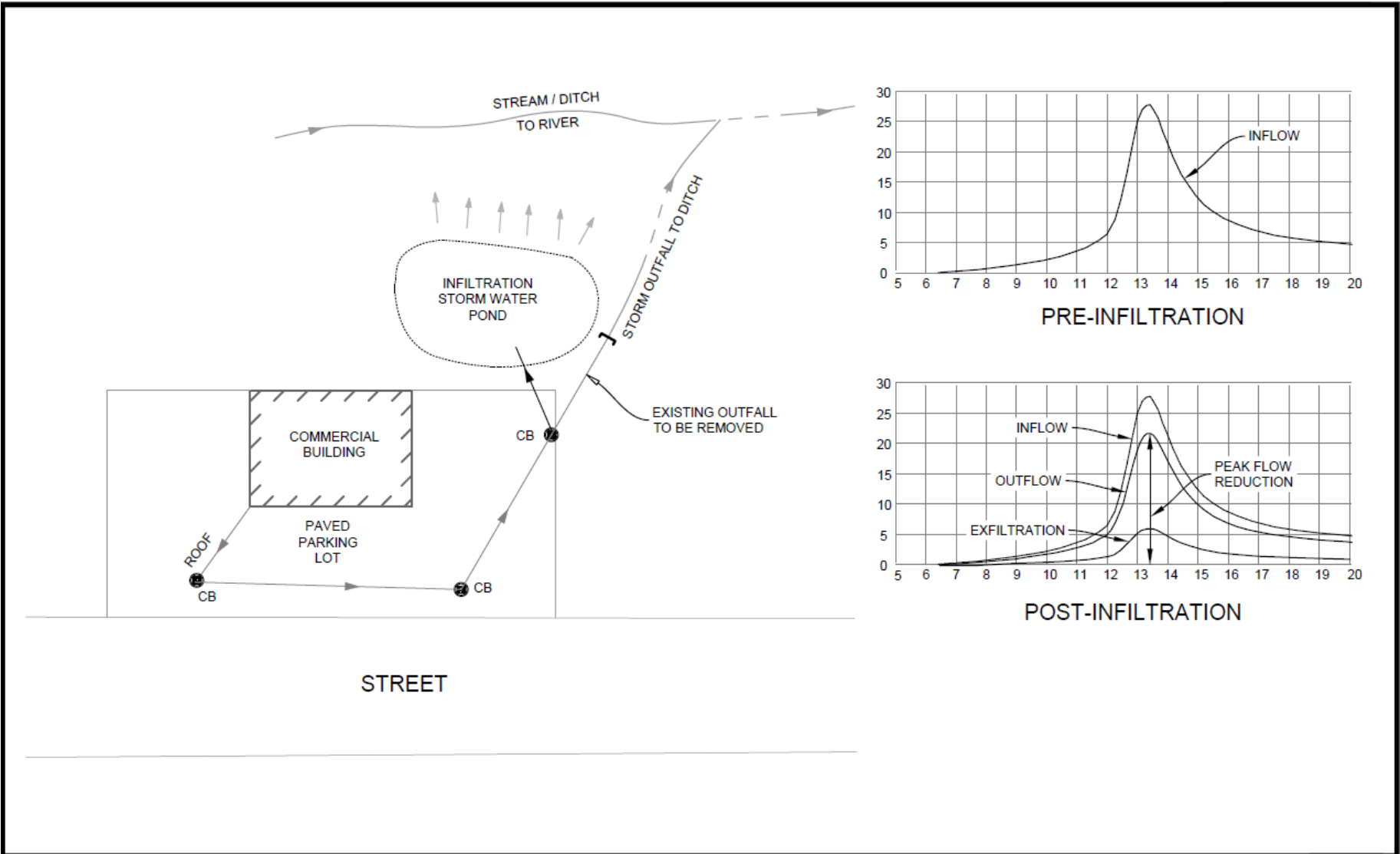
# Methodology

- Sackville Rivers Phase 1 and Phase 2 study review
  - Included hydrological and hydraulic models (PCSWMM)
- Future Development Conditions Included
- Analyze Mitigation Options

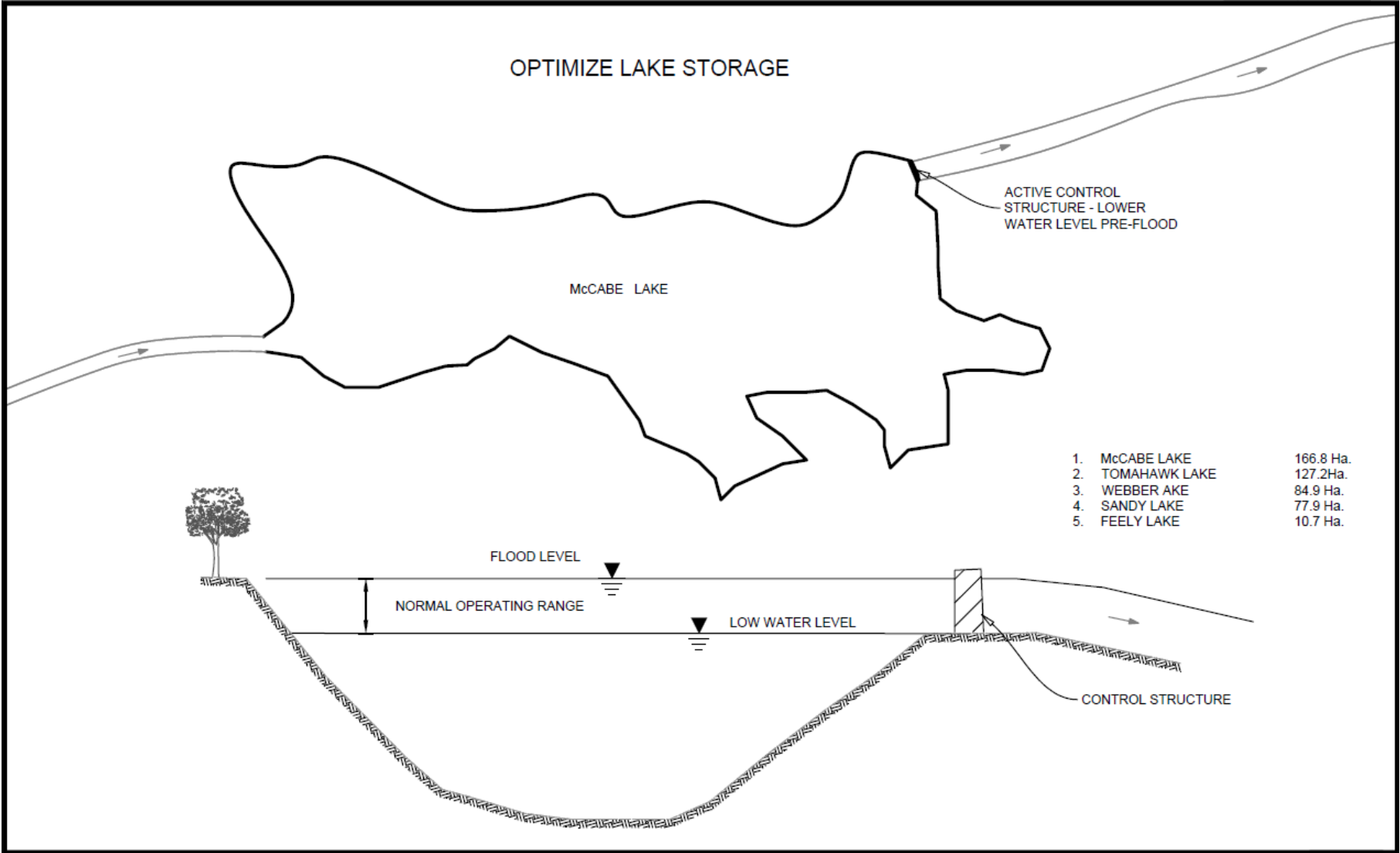
# Modelled & Historical Flows

| Flood Event        | Annual Probability of Exceedance | Flow (m <sup>3</sup> /s)  |                                  |
|--------------------|----------------------------------|---------------------------|----------------------------------|
|                    |                                  | Sackville River (01EJ001) | Little Sackville River (01EJ004) |
| 1 in 5-year        | 20%                              | 241                       | 38                               |
| 1 in 20-year       | 5%                               | 393                       | 64                               |
| 1 in 100-year      | 1%                               | 593                       | 113                              |
| Historical Maximum | -                                | 106 (March 2003)          | 22 (July 1982)                   |

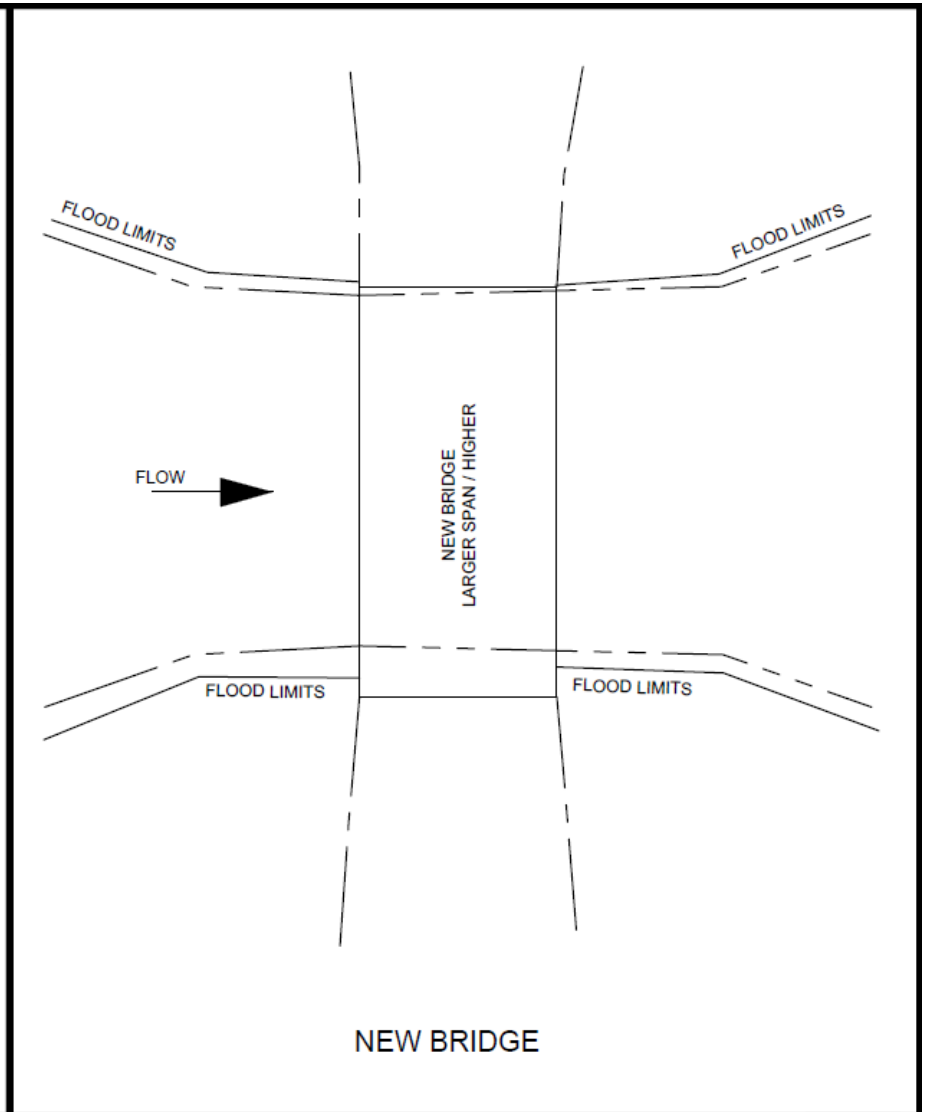
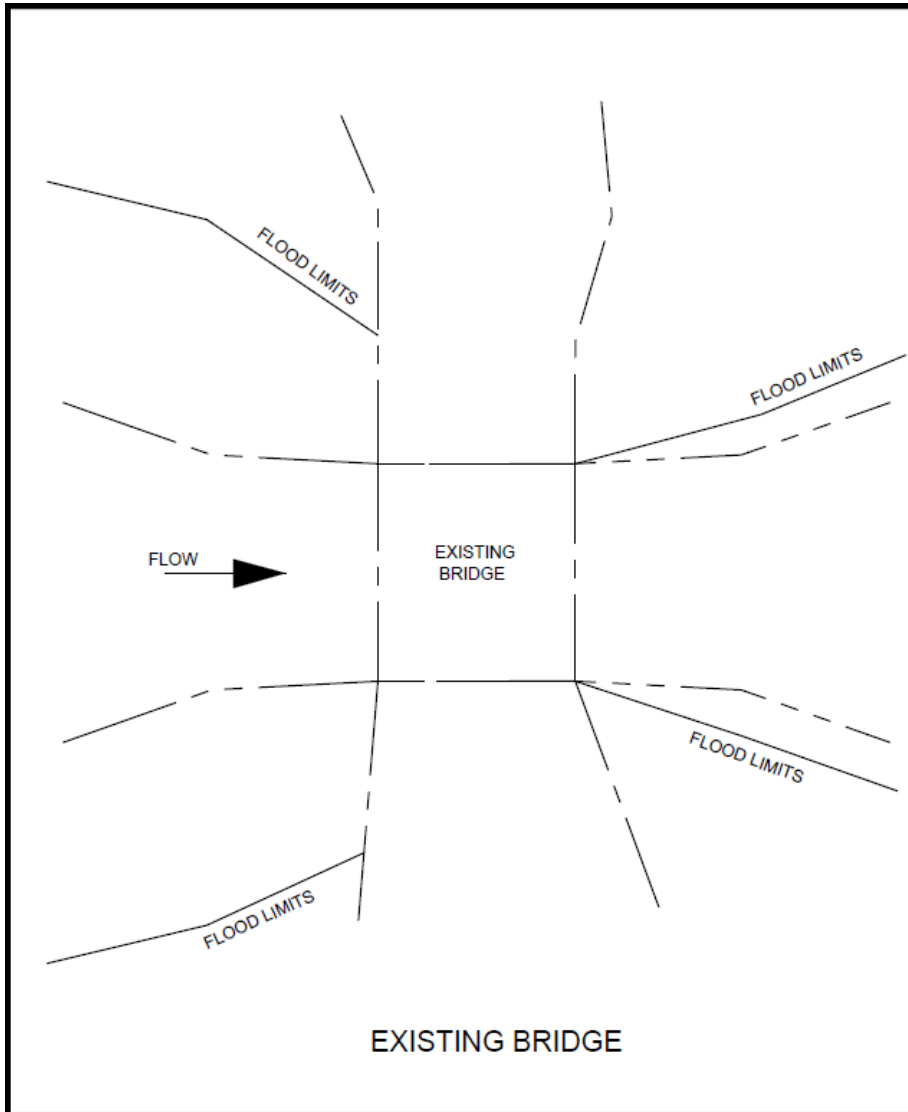
# Mitigation Strategies

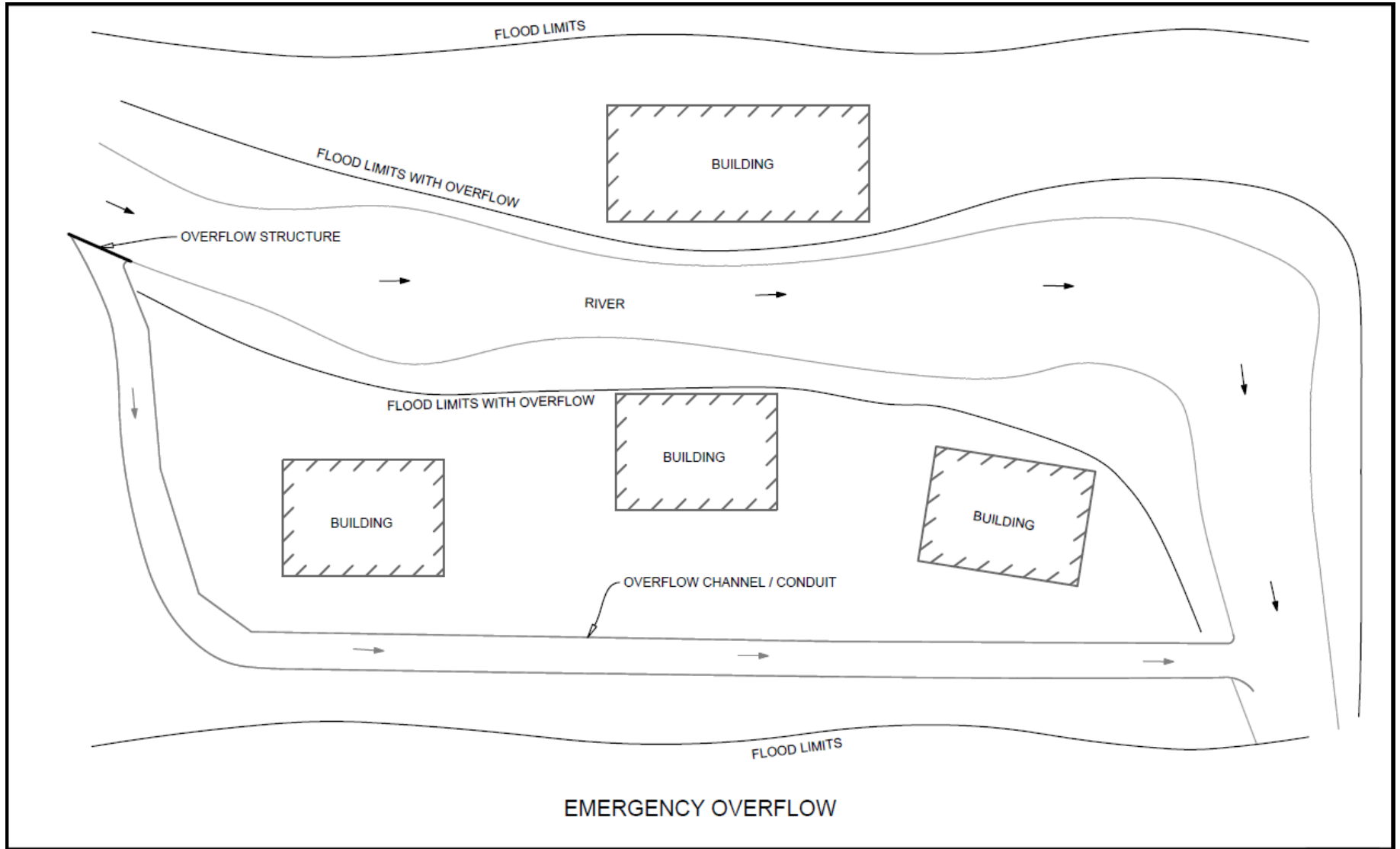


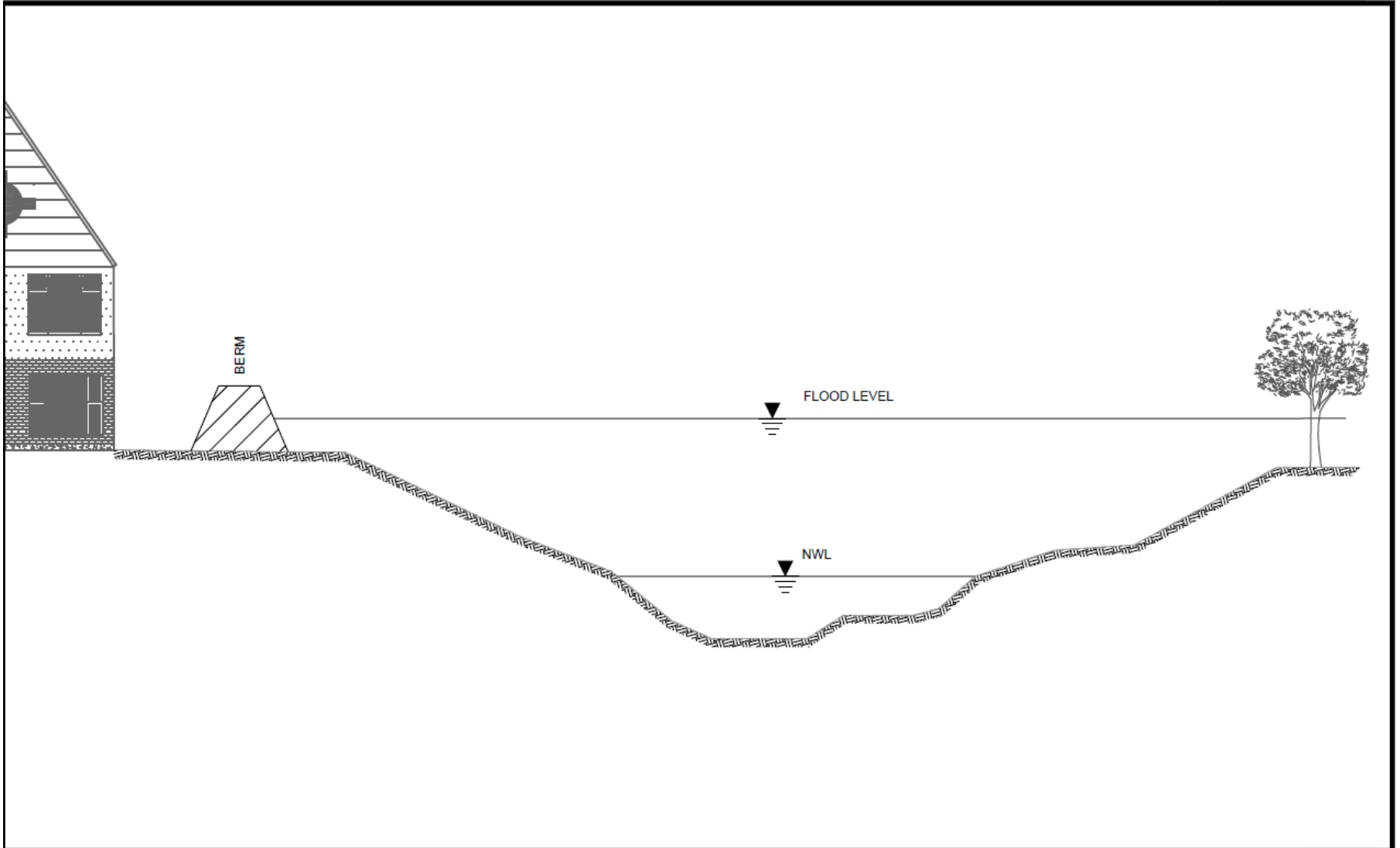
# OPTIMIZE LAKE STORAGE

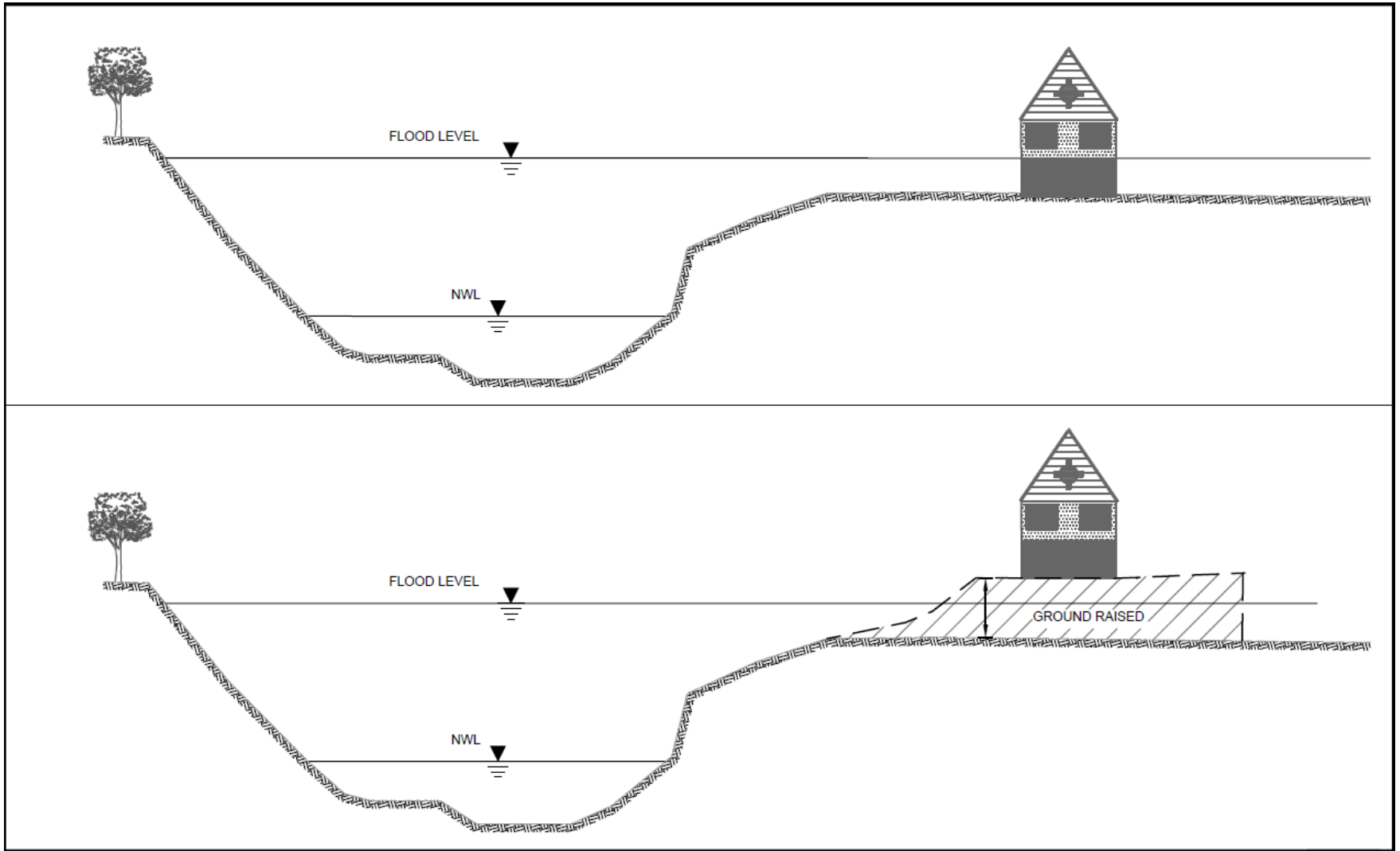


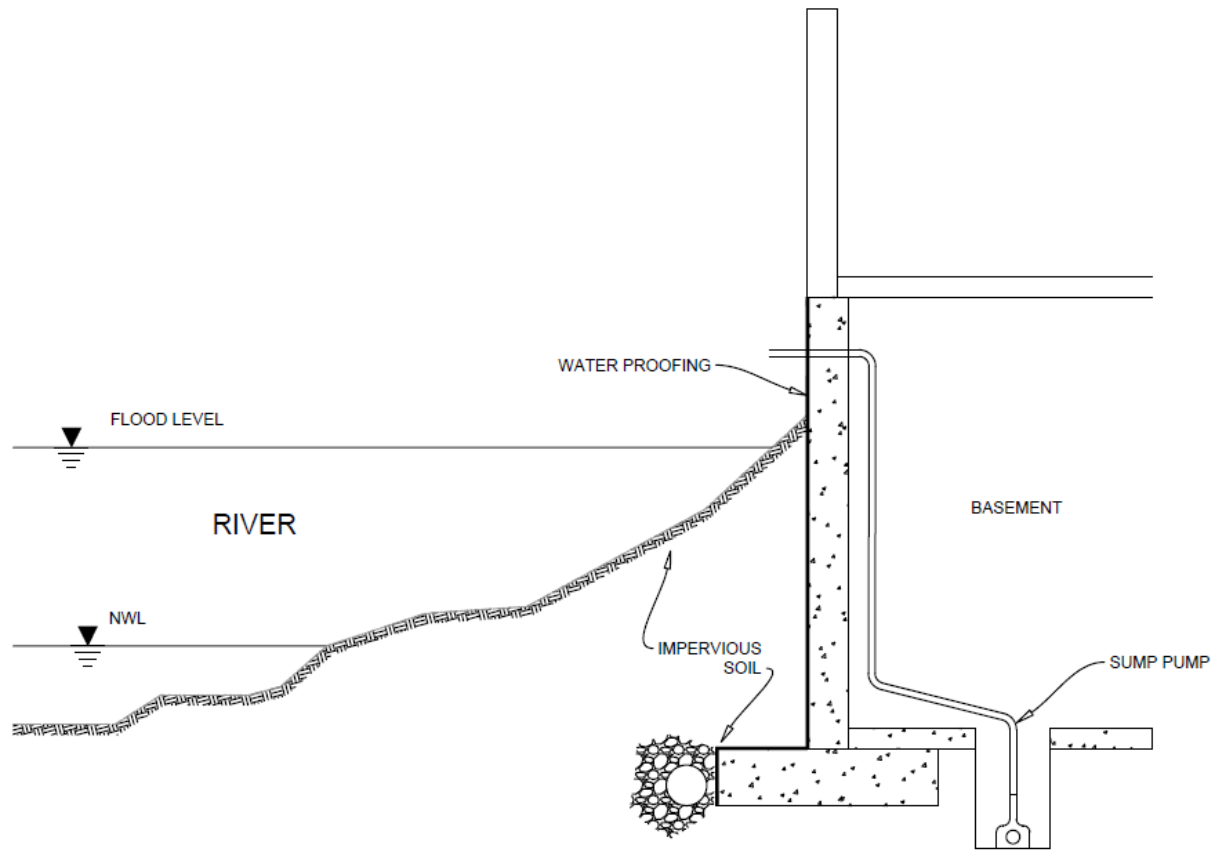




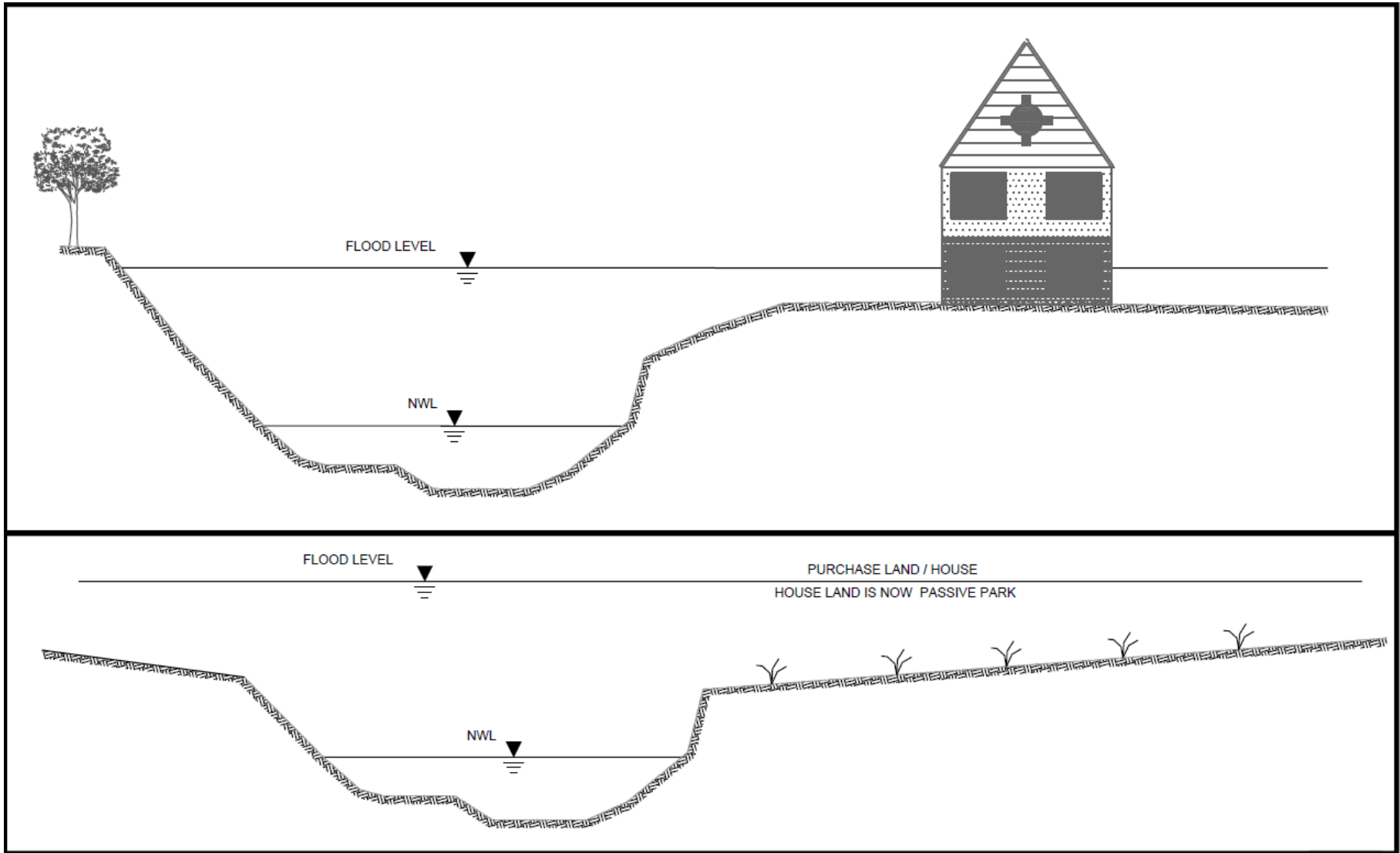


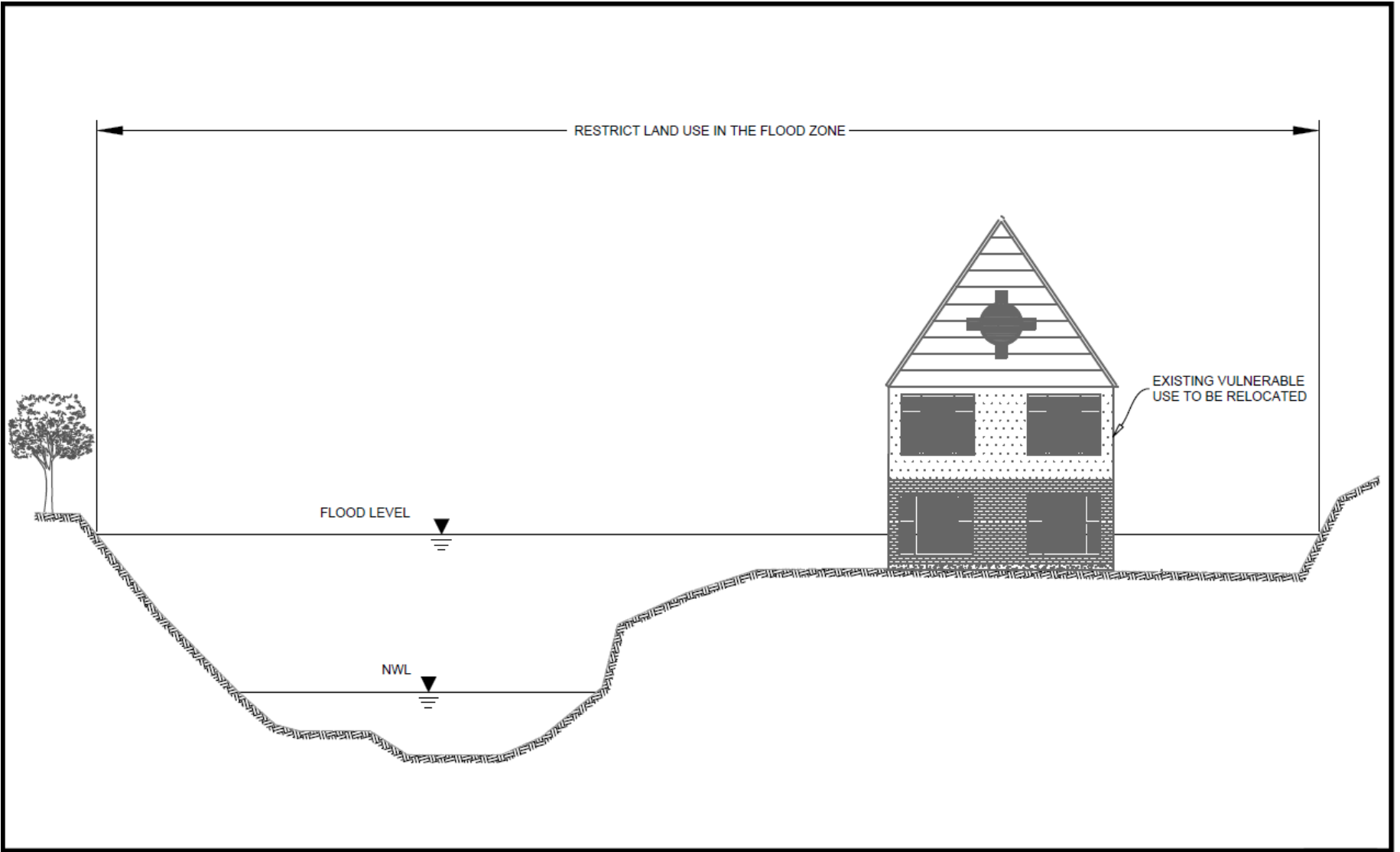






STRUCTURAL FLOOD PROTECTION





# Next Steps

- Complete Modeling
- Finalize Report & Recommendations
- Implementation Plan
- Regional Council



# Shubenacadie Lakes Floodplain Study

# NDMP Process

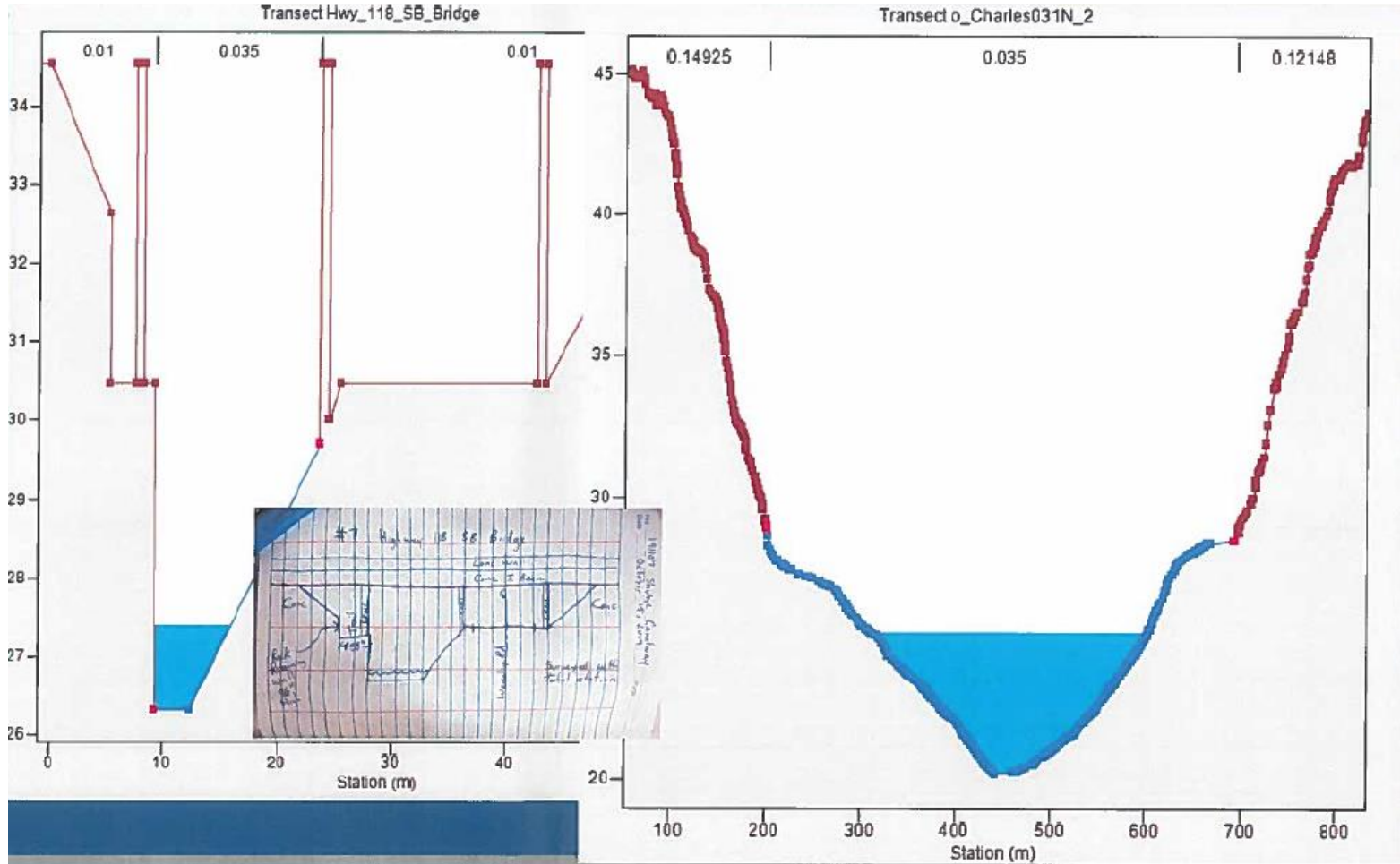
- ✓ Risk Assessment
- Floodplain Mapping
  - Mitigation Planning
  - Mitigation Project Investment

# Methodology

- ✓ Desktop Research
- ✓ Site Visits & Survey
- ✓ Operation Staff Workshops
- ✓ Hydrological & Hydraulic Modeling
  - ✓ Utilizing PCSWMM
- ✓ Model Calibration
- Maps Production

# PCSWMM Modeling

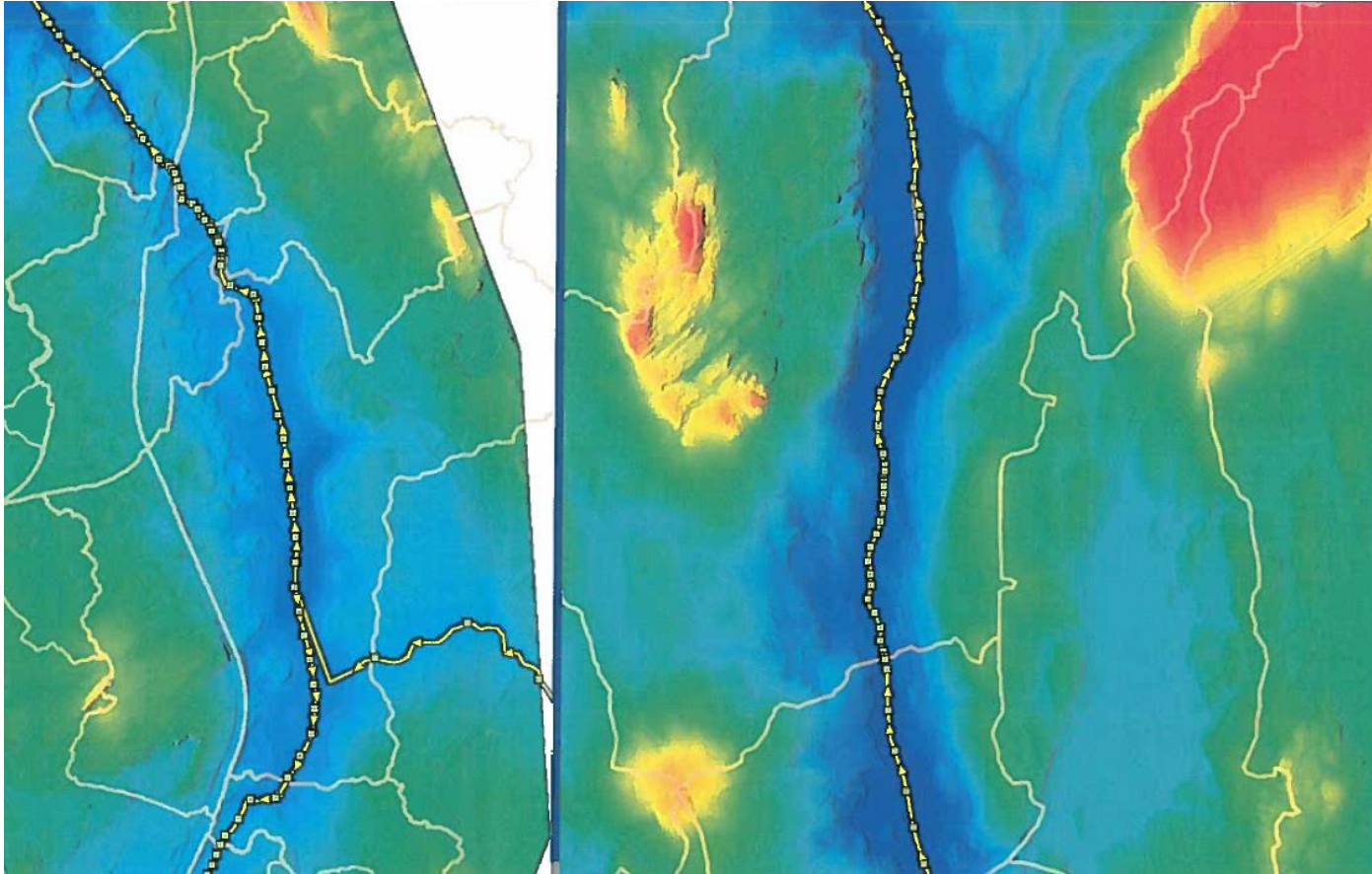
# Model Cross Sections



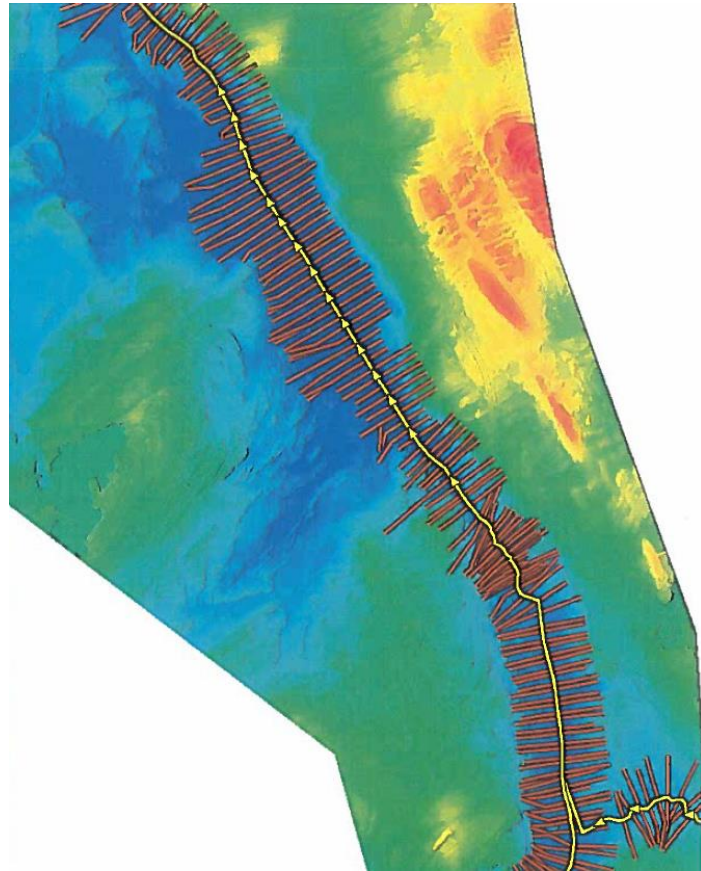
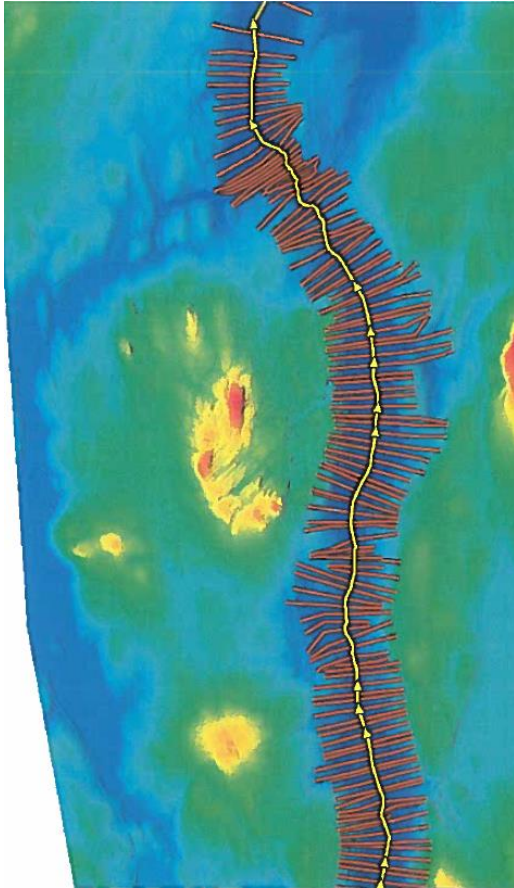
# HWY 118 Bridge



# Underwater Depth Survey

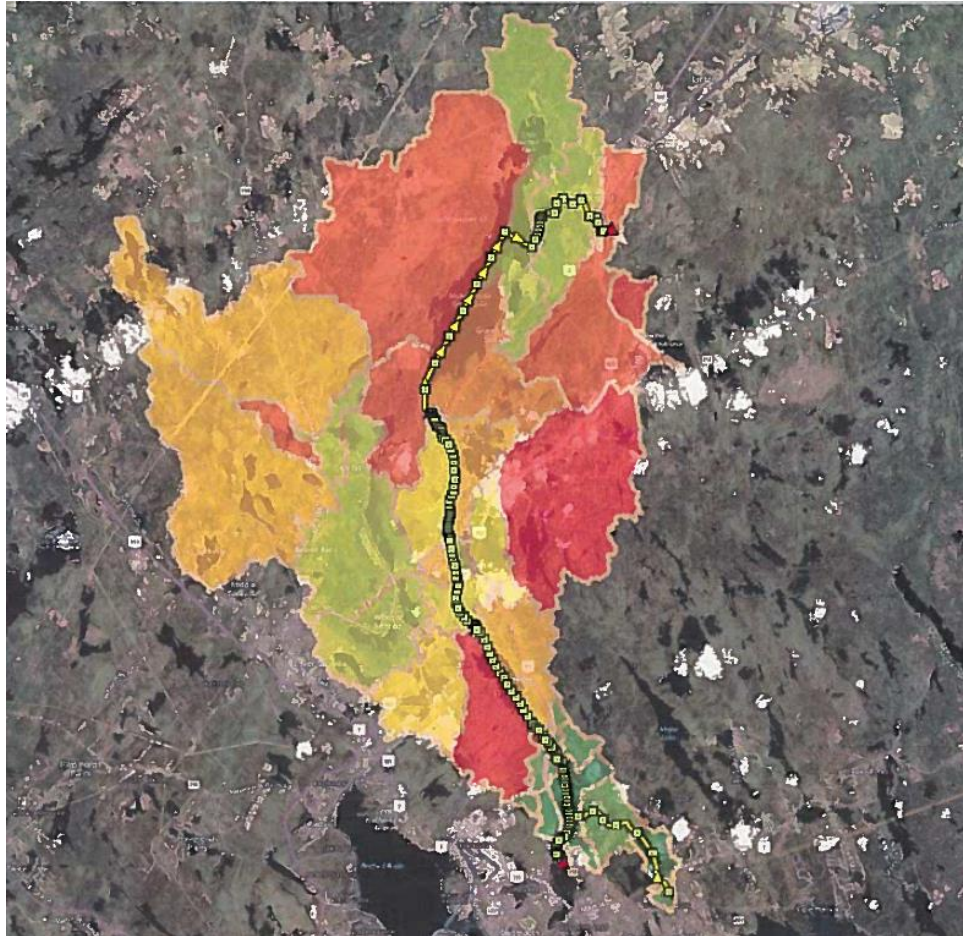


# Model Cross Sections

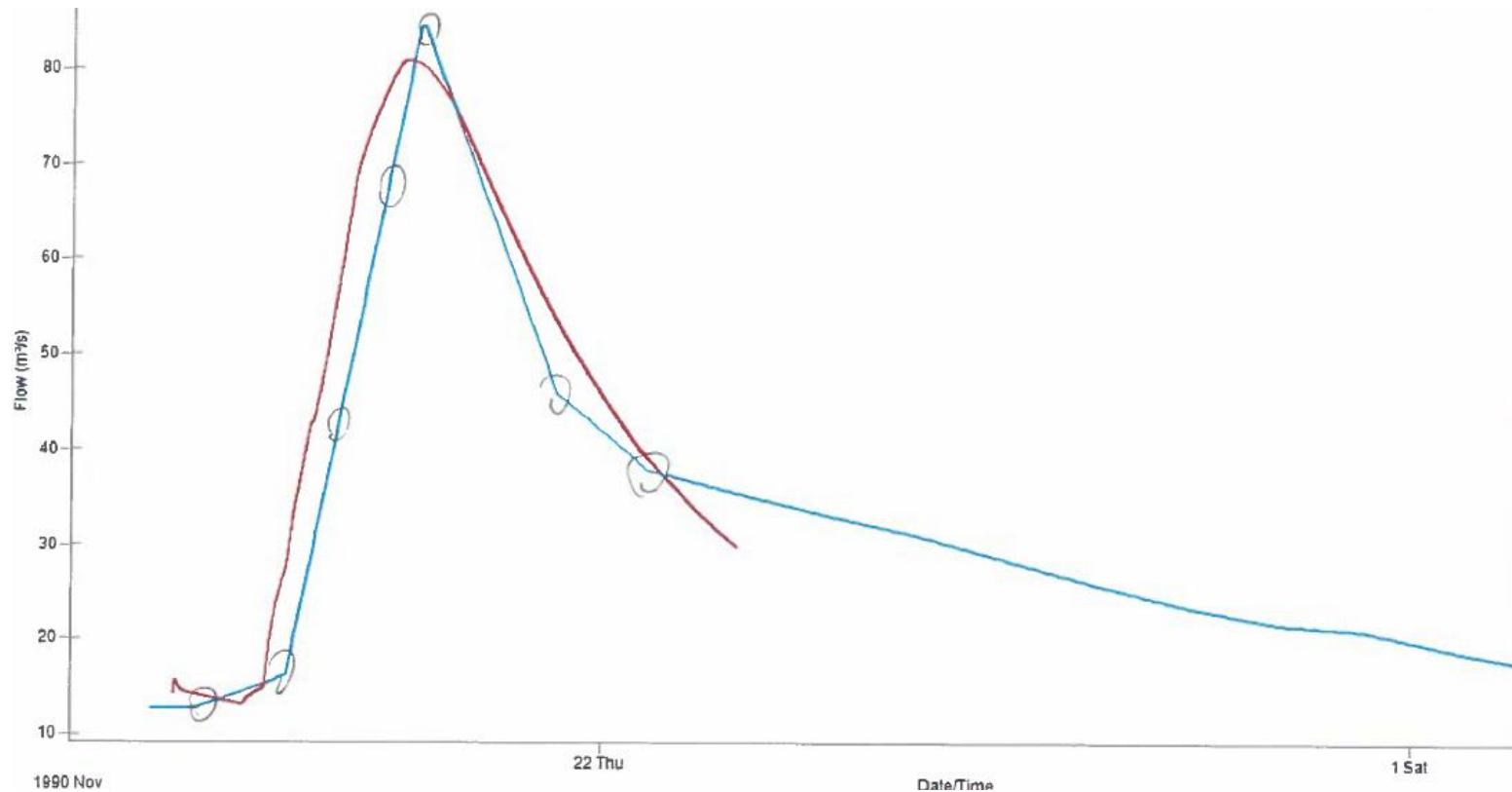




# Watershed Delineation



# Model Calibration Exercise





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Halifax Regional Municipality

Shubenacadie Lakes System  
Floodplain Study

Flood Line Delineation

Map

November 1990 Calibration Event

**Legend**

November 1990 Floodline

SCALE: 1:30,812

Date: February 2020  
CBCL Project#: 191107.00



**CBCL LIMITED**  
Consulting Engineers

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# Next Steps

- Flood Map Production
- Finalize Report & Recommendations
- Implementation Plan
- Regional Council