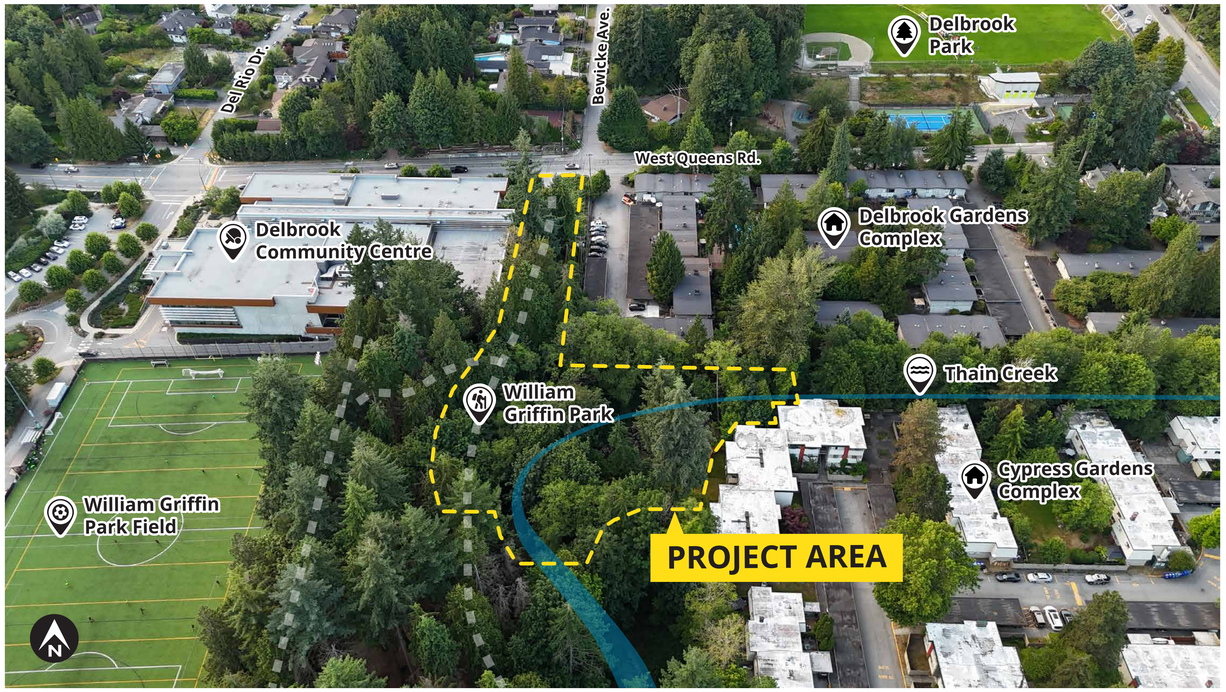
THAIN CREEK RESTORATION

PROJECT OVERVIEW



Project Overview

The City is planning restoration work to address ongoing slope instability and erosion along a section of Thain Creek, just east of Delbrook Community Centre.

This work is in response to the atmospheric river event in October 2024 that significantly worsened erosion and affected slope stability in the area.

The City has been developing a comprehensive restoration plan ahead of the upcoming storm season to address the underlying causes of erosion and protect surrounding properties from potential future risk. Our long-term goal is to improve the area's capacity to adapt and recover from increasingly frequent extreme weather events.

Project Objectives

- Stabilize creek banks and slopes
- Protect nearby properties from future erosion-related risks
- Restore fish habitat and improve the ecological health of Thain Creek
- Strengthen the area's resilience to future extreme weather events

Working with Partners

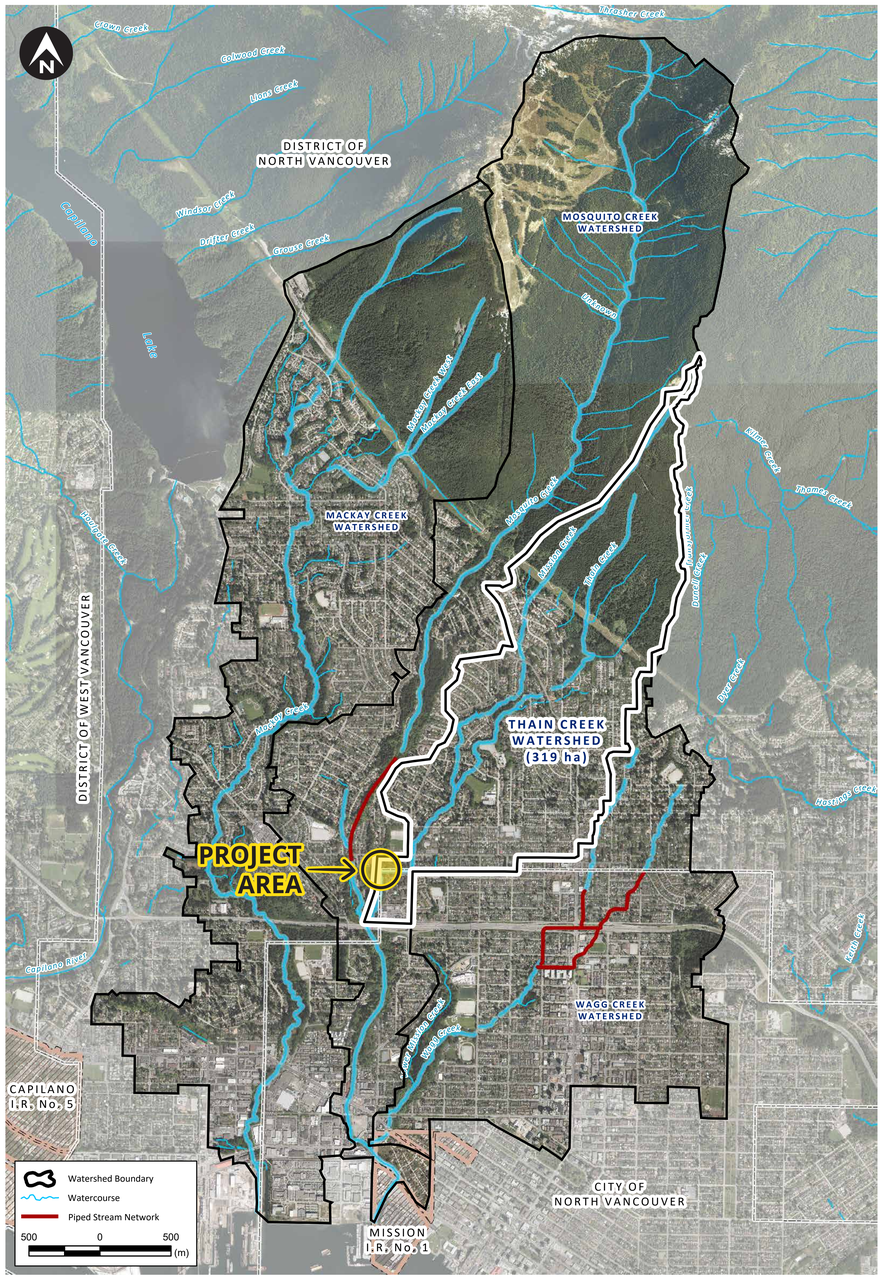
The City is working closely with the District of North Vancouver, local First Nations, regulatory agencies, and other interest-holders to address current risks and advance the long-term health of North Shore's watersheds and natural areas.

Learn more at:
cnv.org/ThainCreek

city of north vancouver

THAIN CREEK RESTORATION

THAIN CREEK WATERSHED



A Changing Creek System

Thain Creek is a small but important waterway in North Vancouver that flows through both the City and District before joining Mosquito Creek. Over the last century, the creek has experienced a number of major changes and interventions:

- **1950s** Mission Creek was redirected into Thain Creek to support new residential development in the area. This increased the volume of water flowing through the creek, making it more prone to erosion and slope instability.
- **1999** A 200m buried section of the creek (upstream of project area) was replaced by an open channel and area along the banks restored, improving flood protection and enhancing fish habitat.
- **2021** An atmospheric river storm eroded and undermined the slope near Cypress Gardens complex, causing the creek bank to recede.
- **2024** A second more powerful atmospheric river storm caused further erosion and slope failure, requiring urgent action through this project to stabilize the slope.

Critical Habitat

Thain Creek provides habitat for several fish species, including coho salmon and cutthroat trout. Urban development, steep slopes, and barriers to fish passage make it hard for fish to travel upstream.

Safety and Property Concerns

Ongoing erosion along the creek banks and nearby slopes pose a risk to local buildings and adds debris to the stream, which blocks water flow and creates barriers for fish. As climate change leads to more frequent and intense storms, a long-term solution is needed to stabilize the slopes and creek, and protect the area against future impacts.

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THAIN CREEK RESTORATION

OCT 2024 ATMOSPHERIC RIVER EVENT

What is an Atmospheric River?

An atmospheric river is a long, narrow band of moisture in the atmosphere that carries large amounts of water from the tropics and can cause intense and prolonged rainfall. On the North Shore, these events are becoming more common and severe, increasing the intensity and amount of rainwater that our infrastructure must manage.

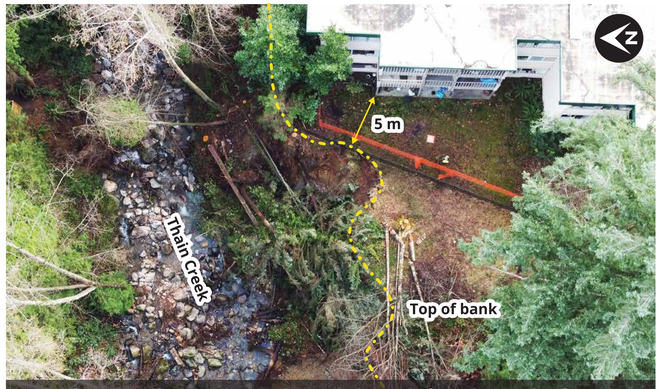
October 2024 Event

From October 18 to 20, 2024, a powerful atmospheric river brought historic rainfall to the North Shore. Some areas received over 300 mm of rain in just three days, exceeding what usually falls in an entire month.

While the intensity and duration of the storm varied throughout the North Shore, it was classified as a 1:200 year event within the Thain Creek watershed, indicating a 0.5% chance of occurrence in any given year. High creek flows, flooding, and erosion caused widespread impacts across both the City and District of North Vancouver.

Community Impacts

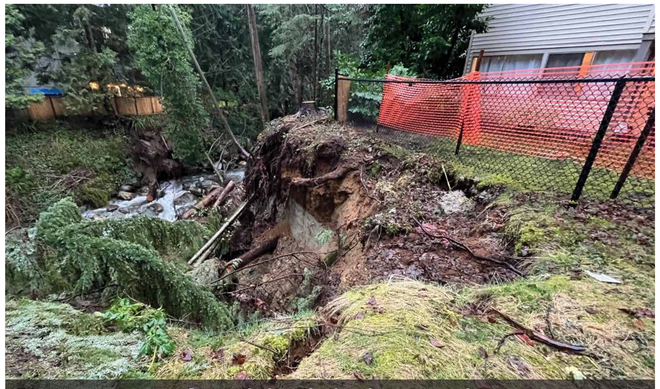
In the City of North Vancouver, sections of the storm and sewer systems were overwhelmed, causing localized flooding. Creeks such as Mosquito, Wagg and Thain experienced historic water and debris flows, causing erosion and damaging trails and natural areas. At Thain Creek near Cypress Gardens, the storm caused the slope to erode by up to 5 meters.



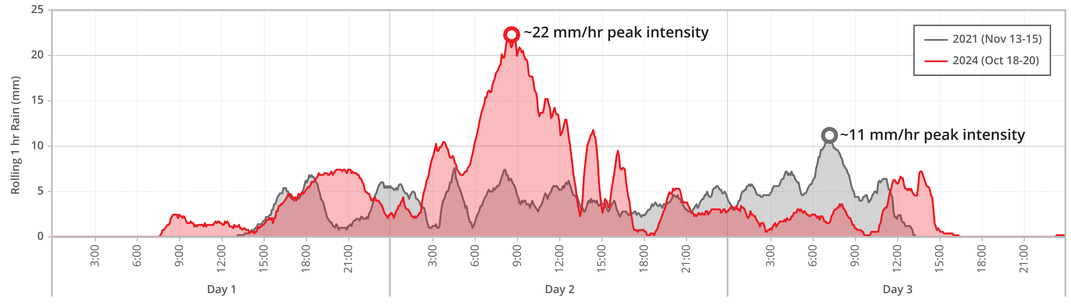
Aerial view of Thain Creek and destabilized south slope


Erosion & undermining of south slope (looking east)

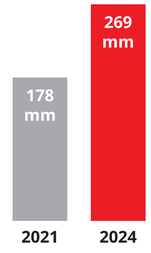

Boulders & debris within creek channel (looking north)


Erosion at top of south bank (looking north)

Hourly Rainfall Intensity
(over 72hrs, measured at District Hall)



72-hr Total Rainfall
(measured at District Hall)



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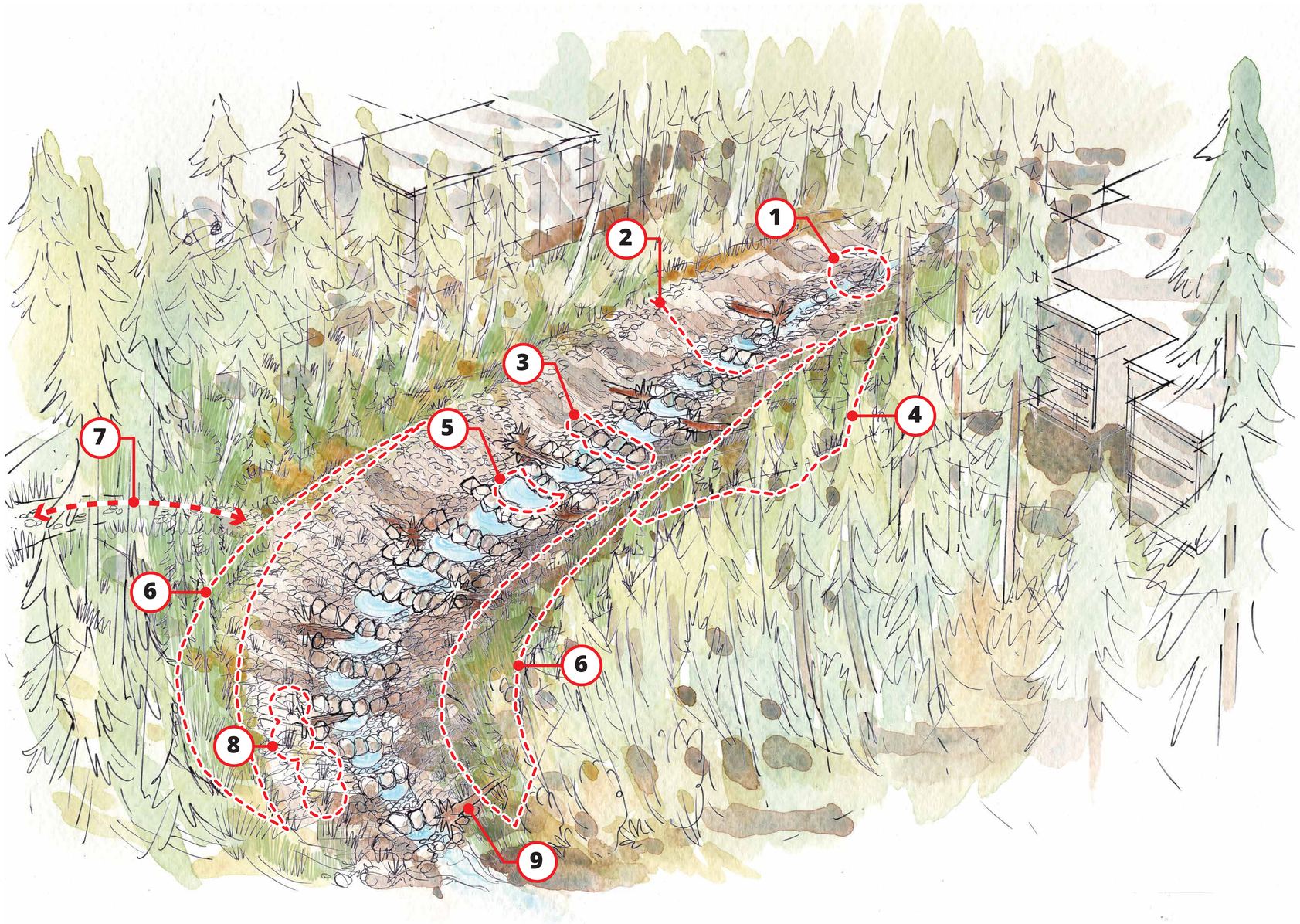
THAIN CREEK RESTORATION

DESIGN OVERVIEW



Design Features

1. Boulder clusters
2. Raised channel & embankments
   (armoured with large interlocking rocks)
3. Rock weir
   (breaks slope and controls stream flow)
4. Restored & revegetated slope
5. Step pool
   (provides breaks and refuge habitat for fish)
6. Streamside restoration area
7. Maintenance access ramp
8. Willow staking areas
   (planted into armoured embankments)
9. Salvaged habitat log

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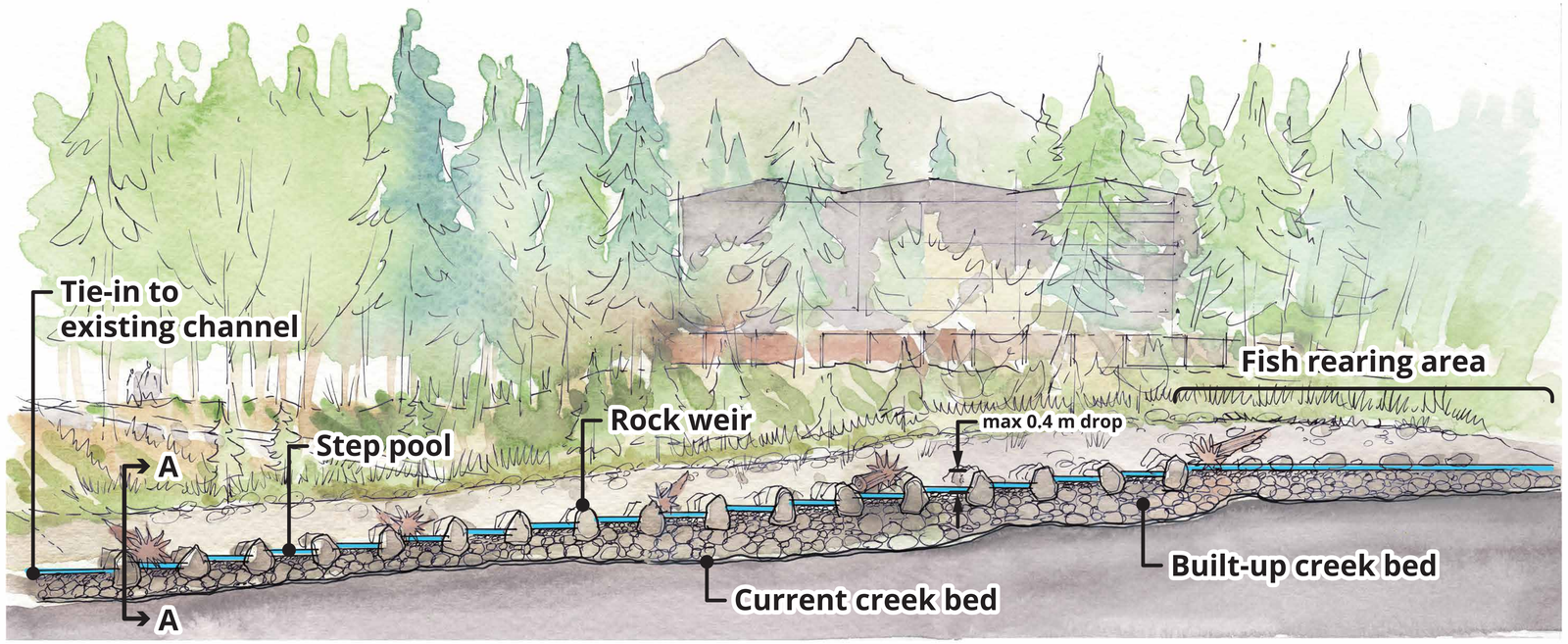
THAIN CREEK RESTORATION

DESIGN FEATURES

Channel Profile

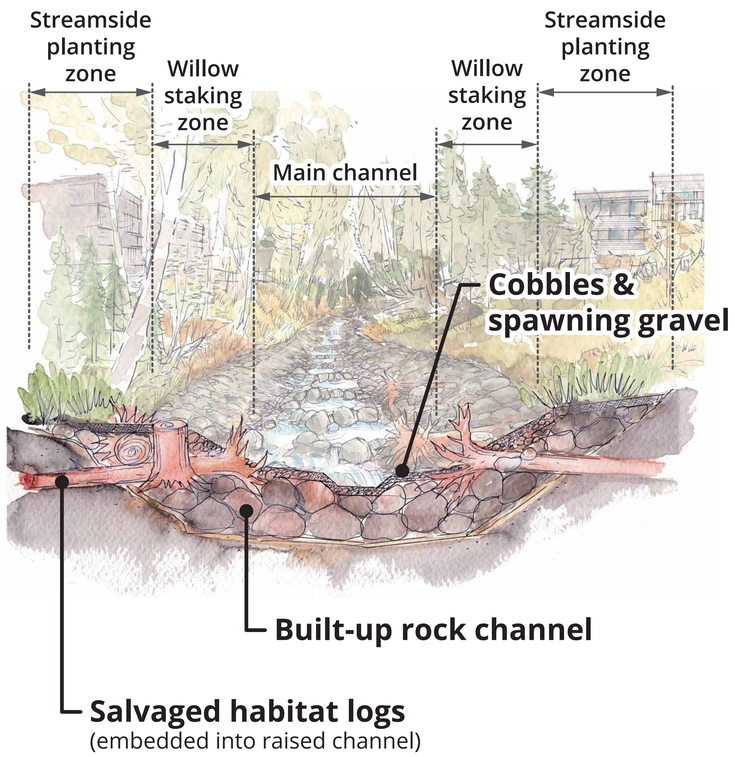
The design raises the existing creekbed using large rocks to protect both the bed and banks from erosion. Sand will be used to fill the voids between the rocks and will be capped with a layer of spawning gravel to create suitable fish habitat. Upstream, a gently sloped rearing area provides calm water for juvenile fish. Downstream, the channel transitions into a stepped section with rock weirs and step pools that improve fish passage and help dissipate stream energy.



Channel Cross Section

(Section A-A)

Salvaged logs are anchored into the banks and raised creekbed to provide habitat complexity. Riparian planting zones above the channel stabilize slopes, reduce erosion, and enhance long-term ecological function.



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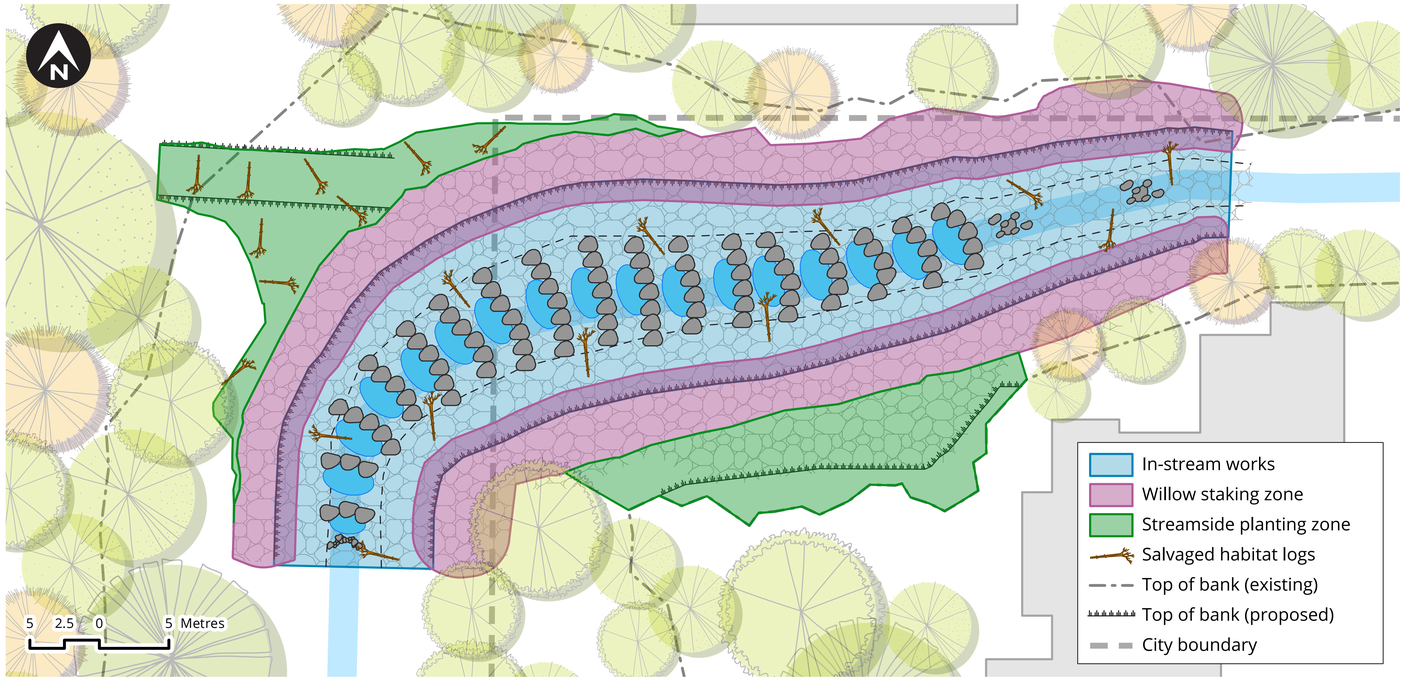
THAIN CREEK RESTORATION

RESTORATION PLAN

Following creek stabilization, the project will include extensive restoration and replanting to enhance the ecological function of the area. Invasive plant species will be removed and replaced with a mix of native trees, shrubs, and ferns to help stabilize the banks and support local wildlife.



Planting Highlights

- Vine maple
- Devil's club *
- Salmonberry *
- Red Elderberry *
- Osoberry
- Nootka rose *
- Thimbleberry *
- Pacific ninebark
- Sword fern
- Red huckleberry *
- Trailing blackberry *
- Common snowberry

* Indicates selection from Squamish Nation's *Culturally Significant Vegetation*

Restoration Timeline

Current
June 2025

Eroded slope with unstable creek banks and boulder pile in the channel impeding fish passage

After Construction
December 2025

Stabilized channel with newly planted vegetation

Established
4-6 years later

Lush, naturalized streamside with well-established growth

Learn more at:
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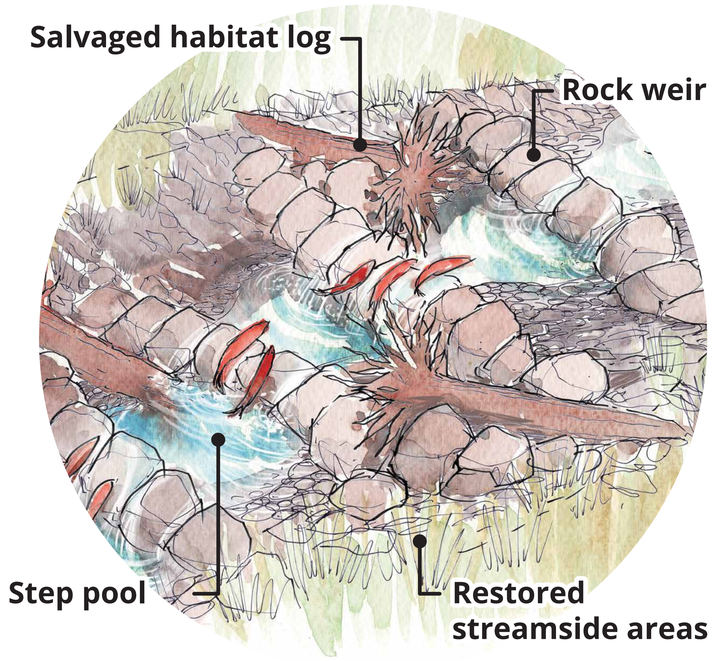
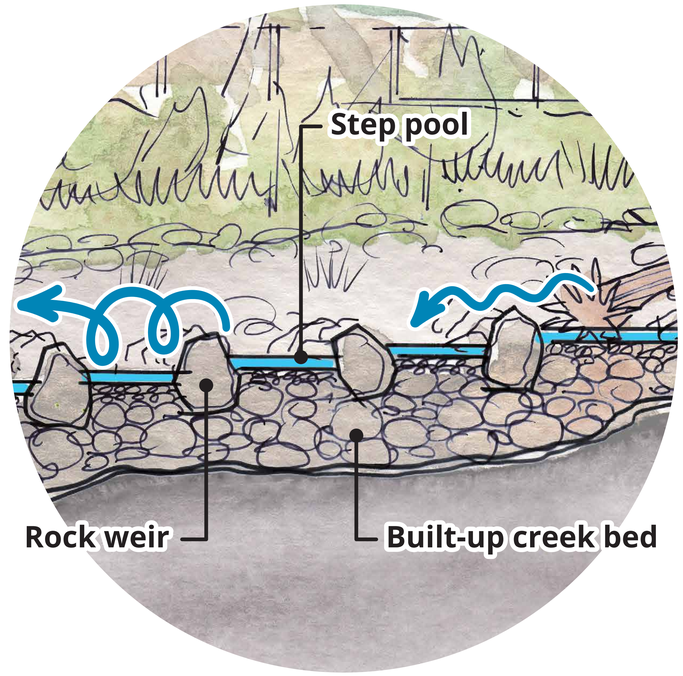
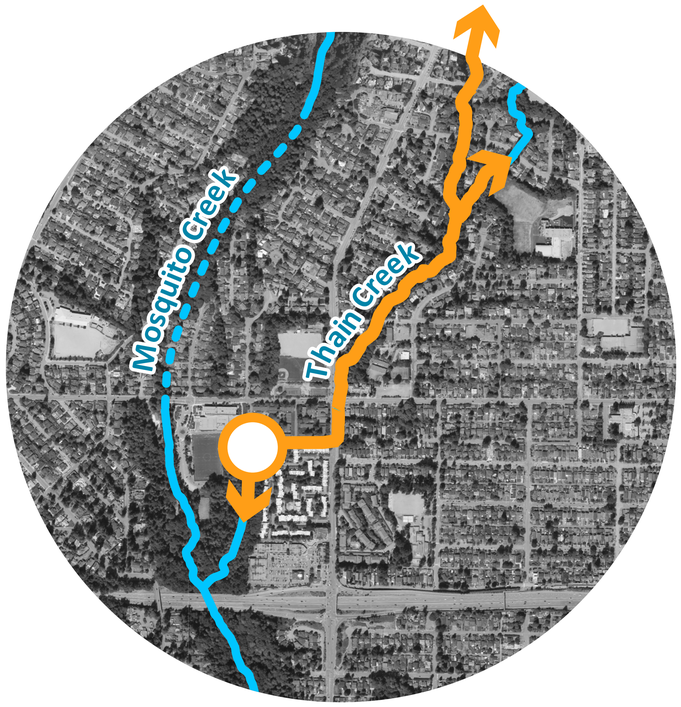
THAIN CREEK RESTORATION

HABITAT ENHANCEMENT BENEFITS







Enhance Riparian Habitat

- Integrate salvaged woody debris and boulder clusters to increase fish cover and habitat complexity
- Plant native shrubs and ferns to stabilize creek banks and increase biodiversity
- Provide additional habitat for spawning and rearing

Reduce Slope & Flow Speed

- Raise creekbed to remove steep falls, reduce slope and slow water flow
- Create step pools using rock weirs to improve passage and water oxygenation
- Minimize subsurface flows to maintain surface flow during dry season

Reconnect Upstream Habitat

- Improve connection to ~1.2km of restored and fish-passable upstream habitat along Mission and Thain creeks
- Support juvenile rearing and seasonal migration throughout the system
- Complement broader watershed restoration efforts

Learn more at:
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THAIN CREEK RESTORATION

PROJECT IMPACTS

Construction Schedule

Work will take place within the City and District's noise control bylaw:

- Weekdays: 7 am – 8 pm
- Saturdays: 9 am – 5 pm
- Sundays & Holidays: no construction

Additional weekend work may be permitted through a variance to ensure project completion.

Temporary Traffic Changes

Crews will access the site from **West Queens Road and Bewicke Avenue**. There will be increased truck traffic in the area throughout the project.

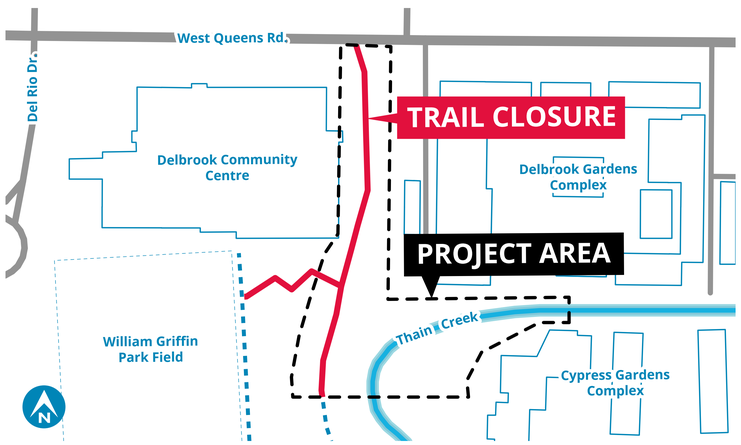
Temporary traffic changes will be required along West Queens Road. We anticipate one-lane alternating traffic at times to allow trucks to access the project site. Traffic personnel will be on-site to help keep traffic moving and ensure pedestrians and cyclists can move through the area safety.

Street Parking

We do not anticipate any impacts on street parking availability. Equipment will be delivered at the start of the project and stored in a nearby staging area off West Queens Road.

Temporary Trail Closure

Access to some trails surrounding Thain Creek will be temporarily restricted. Signage will be in place before construction begins and throughout the project.



Tree Removal

The project requires the removal of some trees from in and around the creek. A tree inventory and risk assessment was completed by a professional arborist during the design phase. Many of these trees are considered to be in poor health and pose a safety risk to workers. In addition, some trees will be removed to provide access to the site.

Trees removed during construction will be replaced in accordance with the City and District's tree bylaws with input from urban forestry teams from both jurisdictions.

Learn more at:
cnv.org/ThainCreek

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THAIN CREEK RESTORATION

PROJECT TIMELINE & NEXT STEPS

WE ARE HERE

ATMOSPHERIC RIVER EVENT
Oct. 18–20, 2024

Responded to significant slope failure:
- engaged engineers to assess slope stability
- removed undermined trees
- protected slope base
- began ongoing monitoring

ASSESSMENT & CONCEPTUAL DESIGN
Nov. 2024 – Feb. 2025

- Assessed extent of damage
- Developed stabilization concepts
- Evaluated feasibility of proposed options

DESIGN & PERMITTING
Mar. – Jul. 2025

- Prepared detailed design & specifications
- Completed environmental assessments & reviews
- Engaged with local First Nations
- Applied for permits from regulatory authorities

PRE-CONSTRUCTION
July 2025

- Select a qualified contractor
- Coordinate with interest holders
- Provide information to residents & public
- Prepare site for access & construction

IN-STREAM CONSTRUCTION
Aug. – Sept. 2025

Implement in-stream channel improvements:
- raise the creekbed
- reconstruct and armour creek banks
- complete in-stream habitat enhancements

PLANTING & RESTORATION
Oct. – Nov. 2025

Replant streamside and upland areas with native species of shrubs & trees to stabilize soils, restore urban forest, and control invasive vegetation

Have further questions?

Contact us with your questions or concerns:

Web cnv.org/ThainCreek
Email eng@cnv.org
Phone 604-983-7333

Learn more at:
cnv.org/ThainCreek

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