

Atlantis®
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Walnut Gate Shopping Mall

Project Location

Langley, British Columbia, Canada

Atlantis Application

Stormwater Detention

Project Overview

The Walnut Gate Shopping Mall development required an underground stormwater detention system capable of managing runoff from a large commercial parking area while preserving valuable surface space for vehicle circulation and parking.

Specified by McElhanney Consulting Services Ltd., the Atlantis Flo-Tank® system was installed beneath the parking lot to temporarily store stormwater collected from the site's catch basin network. The system combines underground detention, controlled discharge and partial exfiltration, helping reduce peak stormwater flows while supporting more sustainable on-site stormwater management.

Technical Summary

Project	Walnut Gate Shopping Mall
Location	Langley, British Columbia, Canada
Application	Underground Stormwater Detention
Completion	July 2005
Storage Capacity	770 m^3
Surface Use	Commercial Parking Lot
Cover Depth	600 mm
Atlantis System	Flo-Tank®
Design Loading	H-20 Traffic Loading
Discharge Method	Controlled outlet to municipal storm sewer with partial exfiltration

Design Challenge

Commercial developments generate large volumes of impervious surface runoff that can rapidly overwhelm downstream drainage infrastructure if not appropriately managed.

The stormwater management system was required to:

01 Provide underground detention beneath an operational commercial parking lot.

02 Accommodate runoff from a 1 in 100-year storm event.

03 Maintain structural integrity under H-20 traffic loading.

04 Operate with only 600 mm of cover above the storage system.

05 Reduce peak discharge into the municipal stormwater network.

06 Promote partial infiltration where permitted by the native soil conditions.

Engineering Solution

A 770 m³ Atlantis Flo-Tank® underground detention system was constructed beneath the shopping centre parking area.

Stormwater collected through a network of surface catch basins is conveyed into the underground storage system, where runoff is temporarily detained before being released through a controlled outlet to the municipal stormwater network.

Because the surrounding native soils exhibit slight permeability, a portion of the stored stormwater is also able to exfiltrate naturally into the surrounding ground. This dual hydraulic function reduces the volume of water discharged to the municipal drainage system while maintaining the detention capacity required for major storm events..

Design Benefits

✓ 770 m³ underground stormwater detention beneath a commercial car park.

✓ Designed for a 1 in 100-year storm event.

✓ Controlled discharge reducing downstream peak flows.

✓ Partial exfiltration supporting natural groundwater recharge where site conditions permit.

✓ H-20 traffic loading achieved with only 600 mm of cover.

✓ Underground installation preserving valuable commercial land use.

✓ High-void modular storage maximising detention within the available excavation footprint.

Construction Considerations

The Atlantis Flo-Tank® system provided an efficient modular construction methodology suitable for commercial developments.

Installation included:

- Assembly of the modular storage units.
- Wrapping of the storage structure with geotextile.
- Placement within the prepared excavation.
- Progressive side backfilling and compaction.
- Final backfilling above the tank prior to pavement construction.

The lightweight modular system simplified handling during construction while allowing rapid installation beneath the future parking area. Proper geotextile encapsulation and controlled backfilling helped maintain the long-term hydraulic and structural performance of the underground storage system.
re parking area while maintaining structural support for the pavement above.

Project Outcomes

- 770 m³ underground detention system successfully installed.
- Stormwater management for runoff generated by the commercial parking area.
- Designed to accommodate a 1 in 100-year storm event.
- Controlled discharge to the municipal stormwater network.
- Partial exfiltration reducing runoff volumes where soil permeability allows.
- H-20 traffic loading achieved with only 600 mm of cover.
- Full preservation of above-ground parking capacity.

Engineering Insight

Modern stormwater management increasingly relies on combining multiple hydraulic processes within a single system. Rather than simply storing runoff, integrated detention systems can also regulate discharge rates and, where ground conditions are suitable, promote controlled infiltration into surrounding soils.

This approach supports Water Sensitive Urban Design (WSUD) principles by reducing peak flows, lowering pressure on downstream infrastructure, and encouraging more natural movement of water through the urban environment while preserving valuable developable land.

Did You Know?

What is the difference between detention and infiltration?

An underground detention system temporarily stores stormwater and releases it at a controlled rate to reduce downstream flooding and erosion. An infiltration system, by contrast, is designed to allow water to soak into the surrounding soil.

Some modular systems, like the one used in this project, can perform both functions simultaneously. Where native soils are sufficiently permeable, a portion of the stored water naturally exfiltrates into the ground while the remaining volume is discharged through a controlled outlet. This hybrid approach reduces runoff volumes and supports more sustainable stormwater management without increasing the surface footprint.













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Thank You For Your Attention



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