



celebrating  
50 years

Rainwater Harvesting &  
Stormwater Management

# 2020 | Case Studies

Professional Water Resource Management Solutions

# RAINWATER HARVESTING

Rainwater Harvesting Systems Case Studies



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# CASE STUDIES

## Abbotsford Entertainment Centre: Rainwater Collection System



BARR supplied the main components and advised on the design and installation of a Rainwater Harvesting system to collect and clean rainwater to be used to create and maintain an ice surface for professional hockey. In its first full season of use, over 1 million litres of water was collected and used from a 12,960 ft<sup>2</sup> portion (approx. ¼ of the total roof area) of the sports centre's roof. Downspouts were diverted to the collection tank system to clean and capture 8000 gallons (30,400) for every 1" of rainfall from this surface area. High volume 32 micron GRAF External Optimax Filter System from BARR first cleans the rainwater of any visible debris and then passes through an even finer filtration system before reaching the storage tanks. The system is connected to two boilers to supply warm water to the



Zamboni ice resurfacing machine. The full tanks, installed in the warm mechanical room, also absorb the ambient heat that helps to warm the water prior to entering the boilers therefore saving energy on heating the water. Global Spectrum's Dan Rubino, (the facility operator) Director of Special Projects said the company is looking at other possible Global

Spectrum-managed facilities where similar rainwater harvesting systems can be installed.

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BARR is the Canadian distributor for cost-effective and versatile GRAF systems.

Check out our GRAF rainwater harvesting systems on our website:

<http://e-barr.com/barrRHW>

### Project Team

Supplier: BARR Plastics

Installer: Saxon Mechanical Limited

Operator: The Abbotsford Mission Water and Sewer Services

### Standard

SWM City Policy

### BARR Product

Total capacity was 4,000 USG  
15,100 L Narrow Profile Rain Water Harvesting Tanks with an External Optimax Filter



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# CASE STUDIES

## City of Abbotsford Public Works Yard: Custom Rainwater Harvesting System



AW 9,000 USG system comprised of 3 tanks that collects from 5000 sq. ft. roof and supplies water for filling mobile equipment and washing equipment.



In the image on the left is a carwash station for all municipal police department vehicles, with a 5,000 USG tank system collecting from a 5000 sq. ft. roof.



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### Project Team

Supplier: BARR Plastics  
Operator: Abbotsford Water and Sewer Services

### Standard

SWM City Policy

### BARR Product

Total capacity was 8,000 USG.  
30,000 L Custom Rain Water Harvesting Tank with twin External Optimax Filters



# CASE STUDIES

## SonBuilt Residential Development: Custom Residential Rainwater System

### Largest StormStop residential rainwater harvesting system installed in Canada



As part of the R-2000 Net Zero Energy Home pilot project by Natural Resources Canada, SonBuilt Custom Homes Ltd, and University Sprinklers have successfully installed the largest residential GRAF rainwater harvesting system in Canada. The nine 1,700 US gallon GRAF Carat tanks from BARR were installed belowground, connected together for a maximum storage capacity of 15,300

gallons of rainwater via a downspout. The rain collected will be used for a variety of basic home and landscape needs, including irrigation, vehicle washing, flushing toilets, and running laundry. Similar projects under the Net Zero Energy initiative are expected to take place in the near future for approximately 20 other homes across Canada.



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### Project Team

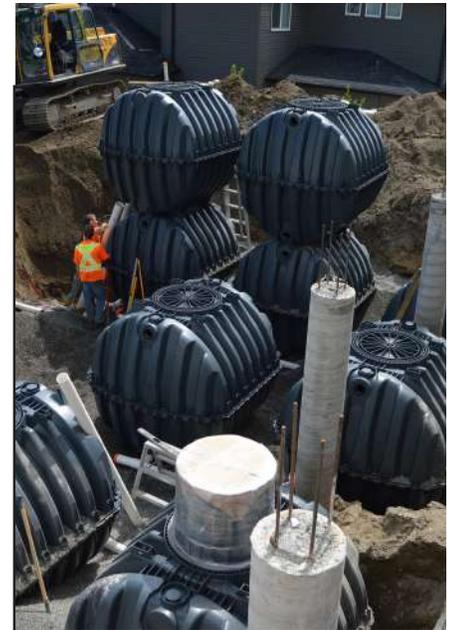
Supplier: BARR Plastics  
Designer: Sonbuilt Homes  
General Contractor: Sonbuilt Homes  
Installer: University Sprinklers

### Specifications

R2000, Net Zero Energy Home

### BARR Product

GRAF Carat Storage Capacity 1700 USG x 9 tanks in series



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# CASE STUDIES

## SFU UniverCity Childcare, Burnaby: Custom Rainwater Harvesting System

**The first childcare centre in the world to integrate the Living Building Challenge™.**



UniverCity Childcare is the first childcare centre in the world to comply to the Living Building Challenge™, the next generation of green building requirements that goes beyond LEED Platinum. This 510m<sup>2</sup> childcare centre addresses the considerable environmental design ambitions of the Living Building Challenge with the early childhood learning objectives of Reggio Emilio. LEED allows you to choose the credits to pursue; the Living Building Challenge is unequivocal. The SFU Childcare Centre is registered in version 1.3, with 16 design prerequisites, all of which must be met in order to achieve Living Building certification. The prerequisites are grouped into six categories: Site, Materials, Energy, Water, Indoor Quality, and Beauty & Inspiration.



By collecting rainwater in a 10,000-gallon cistern for use within the building, the storm-water run-off will be significantly reduced. Any additional run-off will be infiltrated on site and, if necessary, diverted to the community's sustainable storm-water treatment system.

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### Project Team

Supplier: BARR Plastics  
Architect: HCMA  
Civil Engineer: AECOM  
General Contractor: Ledcor  
Landscape Architect: Space2Place  
Mechanical Engineer: Integral Group

### Specifications

Living Building Challenge  
Version 1.3, Net Zero Energy

### BARR Product

10,000 Gallon Custom FRP  
Rainwater Harvesting Tank with  
external Optimax Filter



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# CASE STUDIES

## City of Abbotsford TRADEX: Custom Rainwater Harvesting System



We worked with Abbotsford Water & Sewer Services to create an 8,000 USG ASTM rated poly tank with engineered seismic tie-downs. This custom rainwater systems collects from 48,000 sq. ft. of roof area to collect up to 1.6 million US gallons per year to flush over 30 bathroom fixtures. It was designed to meet the demands of a tradeshow day which can commonly use up to 8,000 US gallons.



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### Project Team

Supplier: BARR Plastics  
Operator: Abbotsford Water and Sewer Services

### Standard

SWM City Policy

### BARR Product

Total capacity was 8,000 USG.  
30,000 L Custom Rain Water Harvesting Tank with twin External Optimax Filters



# CASE STUDIES

**Aquaquest; The Marilyn Blusson Centre:** Vancouver Aquarium

## Aquaquest Center Teaches Sustainable Living Through Design



This \$22M project adds 4,050 sq. m. of offices, gallery and exhibit spaces, classrooms and ancillary spaces to the Vancouver Aquarium. The elimination of traditional mechanical refrigeration equipment lowered energy costs by 38% compared to the Model National Energy Code for Buildings. The innovative rainwater harvesting system directs roof drains to a stormwater storage system that supplies water for irrigation and toilet flushing, combined with low-flow plumbing fixtures. This significantly reduced potable water consumption of the building as a whole.



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## Project Team

Supplier: BARR Plastics  
Architect: Stantec Architecture  
Contractor: Stuart Olsen  
Construction, Tiger Purification  
Geotechnical Design: Geopacific  
Consultants Ltd.  
Landscape Architect: Sharp &  
Diamond  
LEED: Gold  
Mechanical Engineer: Cobalt  
Engineering  
Structural Engineer: Equilibrium  
Consultants

## Specifications

### BARR Product

10,000 Gallon Custom FRP  
Rainwater Harvesting tank with  
external Optimax filter



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# CASE STUDIES

## Fire Halls, Gabriola/Saanich: Emergency Water Supply System



**Factory built galvanized steel tanks with epoxy lining and engineered seismic tie down systems**

**Gabriola:** 4 - 3750 US gallon galvanized steel epoxy lined tanks for toilets, vehicle wash, and emergency water supply.



**Central Saanich:** 5 - 3718 US gallon galvanized steel epoxy lined tanks for toilets, vehicle wash, tanker fill, and emergency supply.

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### Project Team (Gabriola)

Supplier: BARR Plastics  
Architect: Johnston, Davidson Architects  
Installer: Mount Benson Mechanical  
Mechanical Engineer: Flow Consulting

### Project Team (Saanich)

Supplier: BARR Plastics  
Architect: Johnston, Davidson Architect  
Installer: Kinetic Construction  
Mechanical Engineer: Flow Consulting

### Standard

SWM City Policy

### BARR Product

Factory built galvanized steel tanks with epoxy lining and engineered seismic tie down systems.



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# CASE STUDIES

## Munford Residence, North Vancouver: Rainwater Harvesting



### The Challenge

Vancouver experienced stage 3 water restrictions in 2015. To combat this, the client chose to install a rainwater harvesting system to this modern home, with laneway addition, for landscape irrigation.

### The Solution

We positioned the Graf RWH tank conveniently under the Laneway home driveway; it provides drip irrigation for landscapes to the front and back yards and two green roofs.



### Project Team

Supplier: BARR Plastics  
Engineer: GES Vancouver  
Contractor: Architek Ltd, University Sprinklers  
Builder: Hart Tipton Construction  
Landscape Architect: Claire Kennedy Design

### Specifications

### BARR Product

Carat S 6500 L Tanks  
Clean Rain Advanced



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# CASE STUDIES

**Maplewood Farm, District of North Vancouver:** Rainwater Harvesting



## Project Team

Supplier: BARR Plastics  
Contractor: Modern Drainage  
Designer/Engineer: District of North Vancouver Engineers

## BARR Product

Rain Barrels (6)  
Black Poly Tank

## The Challenge

Utilize free rainwater to flushing out of duck pond on premise as well as showcasing the benefits of using rainwater harvesting in a farm setting to visitors.

## The Solution

Install a 1250 IG Poly Tank in the back of the barn and 7 Graf Barrica Rain Barrels in key rain collection locations around the farm. The whole system was interconnected, equalized, and raise to let gravity to the work when the duck pond needed to be flushed.



# CASE STUDIES

## Kocsis Residence, Lanark, ON: Rainwater Harvesting



An off grid rural property owner installed 2 x 6500L Carat tanks outfitted with Optimax self-cleaning filter package and a Grundfos SBA-45 pump. The system will collect rainwater from the 900 sq. ft. roof of a new garage building. The water will be used to water landscaping and to supply a wash station in the garage. With 2 tanks the owner installed the filter package in one tank and the pump in the other tank to ensure ease of access for any future pump maintenance.



### Project Team

Supplier: Makeway

### Specifications

City Policy

### BARR Product

- 2 x 6500L Carat S Belowground Tanks
- 1 x Optimax filter package
- 1 x Grundfos SBA-45 pump



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A construction site showing the installation of stormwater management systems. In the foreground, there is a large, rectangular, multi-layered plastic structure, likely a filter or separator, with a circular manhole cover on top. The structure is surrounded by a grid of plastic components, possibly a filter mat or separator. In the background, workers in safety vests are visible near a concrete wall, and a ladder is leaning against it. The scene is set outdoors with trees and buildings in the distance.

# STORMWATER MANAGEMENT

Stormwater Management Systems Case Studies

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# CASE STUDIES

Penmat Developments, South Surrey: Stormwater Management



## Project Team

Supplier: BARR Plastics  
Developer: Penmat Mana  
Engineer: Coastland  
Civil Contractor: Southwest Contracting

## Specifications

Volume: 90 m<sup>3</sup>  
Application: Detention

## BARR Product

EcoBloc Inspect Flex



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# CASE STUDIES

**Skyview Terrace, Kelowna:** Stormwater Detention & Infiltration



## The Challenge

Create a stormwater surge reservoir in a non-standard excavation site (triangular) for hardscape runoff in a multi-family townhome project.

## The Solution

Utilizing an Ecobloc Flex stormwater infiltration system enabling direct infiltration into the ground with overflow into the storm sewer system. The surface above the system was turned into a park greenspace.



## Project Team

Supplier: BARR Plastics

Contractor: Kelowna Highland Developments

Engineer: D.E. Pilling & Associates

## Specifications

Volume: 90m<sup>3</sup>

Loading: Pedestrian

Application: Detention/Infiltration

## BARR Product

Ecobloc Inspect flex



# CASE STUDIES

## Lynn Valley, North Vancouver: Custom Stormwater Management System



When tasked with finding an efficient and compliant stormwater management system in North Vancouver's Lynn Valley, the developer enlisted the expert help of a local civil consulting firm. They approached BARR Plastics Inc for a durable solution that would not only protect the development against flooding but would also work with the site's unique, tight hilly profile. It was also key for the system to meet the District of North Vancouver Hastings Creek Watershed Stormwater report stringent storage volume requirement of 1,143 cu.m / Ha.



The expert team at GRAF & BARR Plastics Inc specified, designed and supervised the installation of three stormwater infiltration systems, which were fitted in two phases. During the first phase, a 1,180 m<sup>3</sup> two-tank system was installed. It was built using 5,760 heavy-duty EcoBloc Inspect Flex modules to meet a burial depth of 5 meters with in-built inspection channels for easy maintenance. During phase two, a second, 658 m<sup>3</sup> system was fitted consisting of 3,210 EcoBloc Inspect Flex modules.

This system was built with enough capacity to resist the kind of extreme storm only likely to happen once in a 100-year period, with an additional 15% contingency buffer for climate change on top of this. This ensures complete peace of mind for everyone – including the developer and future residents.

### Project Team

Supplier: BARR Plastics

### Standard

SWM City Policy

### BARR Product

EcoBloc Inspect flex

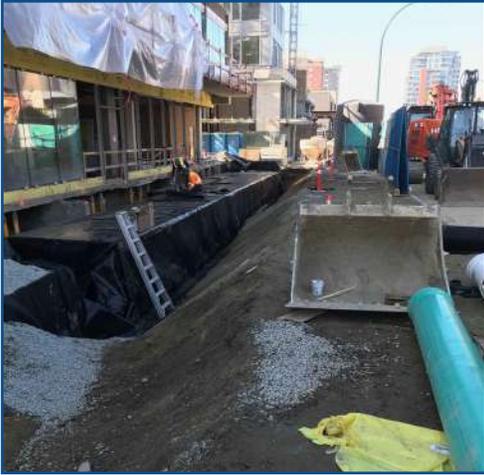


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# CASE STUDIES

Georges St., North Vancouver: Stormwater Management



## Project Team

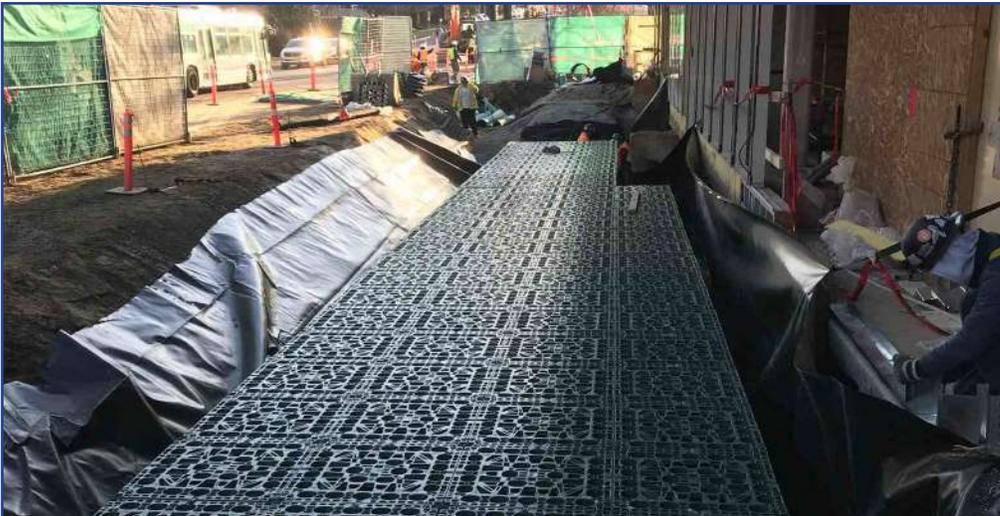
Supplier: BARR Plastics  
Developer: ITS Developments  
Engineer: WSP  
Civil Contractor: Ponte Bros

## Specifications

Volume: 142 m<sup>3</sup>  
Application: Detention

## BARR Product

EcoBloc Light



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# CASE STUDIES

## Coyote Creek Townhomes, Surrey BC: Stormwater Management System



### Design Requirement

To install a below-ground infiltration system rated for fire truck loading (HS-25) under a Laneway of Coyote Creek townhouse development in Surrey, BC. These tanks were designed to promote ground water recharge and minimize the hydraulic loads in the sewer system during storms to prevent flooding.

### The Solution

BARR Plastics Inc supplied a Graf Ecobloc stormwater management system. Ecobloc is a single piece interlocking modular system with 95-97% void ratio to minimize excavation volume and installation time. High vertical & lateral strength of the modules allow for installation depths of up to 5 meters or 14 layers with heavy duty lorry-bearing loading capacity of HS-25. Local availability of the product and no assembly of the block required for modules, Ecobloc proved to be a convenient and cost-efficient option for the developer and contractor.



### Project Team

Supplier: BARR Plastics  
Developer: Anthem Properties  
Engineer: WSP  
Contractor: Mainland Civil Site Services Inc.

### Specifications

System Size:  
33.6m L x 4.0m W x 0.68m H (Tank #1),  
27.2m L x 4.0m W x 0.68m H (Tank #2)  
Tank Volume: 86.78 m<sup>3</sup> (Tank #1),  
70.25 m<sup>3</sup> (Tank #2)  
Loading: HS-25/60t  
Application: Infiltration

### BARR Product

Ecobloc Inspect flex



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# CASE STUDIES

**Kanaka Industrial Park, Maple Ridge:** Stormwater Infiltration & Attenuation



## The Challenge

City grey infrastructure at capacity; the site required onsite infiltration. Located in a new industrial park that had no storm sewer.

## The Solution

BARR provided an EcoBloc 17,000 gallon direct infiltration system, as specified by Vector Engineering. The system was installed under the car park to the south side of the building.



## Project Team

Supplier: BARR Plastics

Engineer: Vector Engineering

## Specifications

Application: Attenuation-Infiltration

Loading: 60t/HS-25

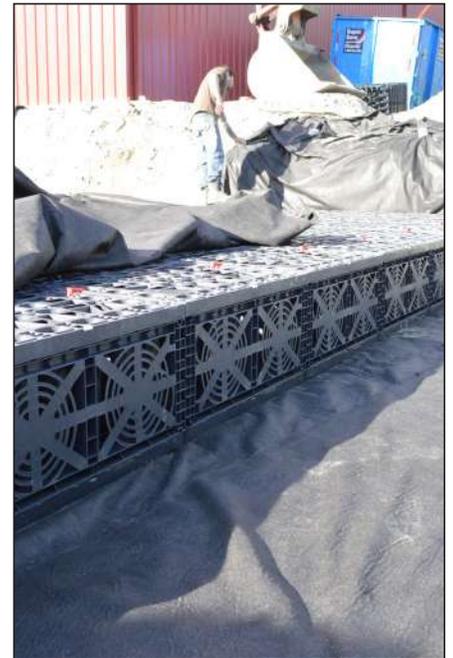
Roof size: 20,000 ft<sup>2</sup>

System Size: 76' x 23' 7"  
(23.3m x 7.7m)

Volume: 17,430 USG  
(62.68 m<sup>3</sup>/65,979 L)

## BARR Product

Ecobloc Inspect flex



# CASE STUDIES

Fraser Landmark, Surrey BC: Stormwater Detention System



This site came with several challenges; the first was that the tank location needed to be installed in a tight space with height restrictions. Secondly, the tank location was built in an existing, irregular-shaped planter courtyard. This made the tank more difficult to fit into this unusual space, but we were able to find a tank configuration that fit well and maximized the available space.



## Project Team

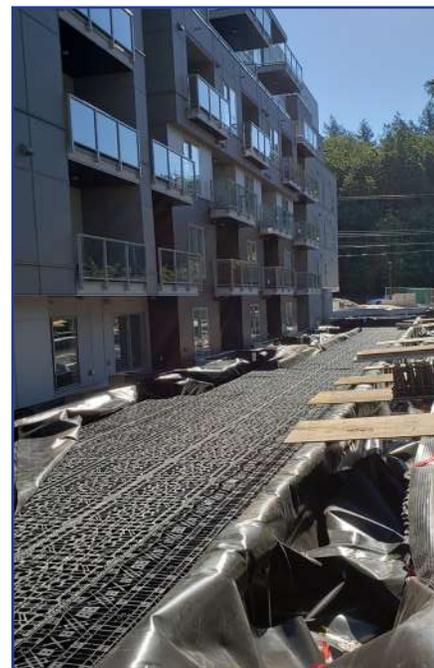
Supplier: BARR Plastics  
Developer: Darshan Builders  
Engineer: Citiwest

## Specifications

Volume (m<sup>3</sup>): 115  
Application: Detention

## BARR Product

Graf EcoBloc Inspect Flex  
Graf EcoBloc Maxx



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# CASE STUDIES

**Maddaugh Elementary, Surrey BC:** Stormwater Detention System



## The Challenge

The burial depths & earth cover for this particular installation were outside Ecobloc standard installation parameters.

## The Solution

This EcoBloc tank had to be wrapped with a single piece, factory welded liner to avoid any leaks.



## Project Team

Supplier: BARR Plastics  
Developer: Surrey School District  
Engineer: Coastland

## Specifications

Volume (m<sup>3</sup>): 595  
Application: Detention

## BARR Product

Graf EcoBloc Inspect Flex  
Graf EcoBloc Maxx



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# CASE STUDIES

## Volkswagen, Chilliwack BC: Stormwater Detention System



This site required increased onsite storage required by the Municipality, high water table & constant heavy traffic loading on the tank. We used the Graf EcoBloc Maxx block to create this 240 m<sup>3</sup> detention tank, complete with accessories like the manway extension in the photo below.



### Project Team

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Supplier: BARR Plastics  
Developer: N/A  
Engineer: Aplin Martin

### Specifications

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Volume (m<sup>3</sup>): 240  
Application: Detention

### BARR Product

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Graf EcoBloc Maxx



# FIREFIGHTING EQUIPMENT

Firefighting Equipment & Containment Case Studies



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# CASE STUDIES

## Flat Skid Firefighting Unit: Fire Fighting & Containment



### The Challenge

Due to more frequent dry weather and forest fires in BC, a notable Forestry Management company required more fast response but economical fire-fighting equipment that would fit quickly onto their existing trucks and equipment with no significant modifications to the vehicles.

### The Solution

The customer provided us with the truck and we custom designed and manufactured a skid mounted 1035 US Gallon quick response firefighting unit with a high performance firefighting pump and foam injector kit.



### Project Team

Supplier: BARR Plastics

Engineer: BARR Plastics

### Specifications

- 1035 USG Elliptical Leg Tank
- 300 PSI Waterax High Performance Fire Fighting Pump
- 1.5" Universal Fire Hose Connections (x2)
- 2" Dust Control Spraybar System
- 20 USG Foam Injector Kit
- Internal Baffle Ball Surge Stabilizers

### BARR Product

FF1035FL-GHWA300-D1



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# CASE STUDIES

## Flat Skid Firefighting Unit: Fire Fighting & Containment



### The Challenge

Site management company was looking for a quick response firefighting unit on standby to help combat the frequent fires (inside piles of organic waste) at an organic compost facility.

### The Solution

We designed and manufactured a customer trailer mounted firefighting unit with 1035 US Gallon capacity, with all of the necessary features to make this unit a highly functional firefighting and general water handling system.



### Project Team

Designer: BARR Plastics

Manufacturer: BARR Plastics

### Specifications

- 1035 USG Elliptical Leg Tank
- 85 PSI Honda Fire Fighting Pump
- 1.5" Universal Fire Hose Connections (x2)
- 3/4" Garden Hose Connection
- 3" Fire Hose Fill Valve Fitting
- Lockable Equipment Box
- 14' - 14,000lb Dual Axle Flat Deck Trailer

### BARR Product

FF1035T-GHAL85



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