

Innovations in Fire and Flood Suppression



FIRE & FLOOD EMERGENCY SERVICES LTD.

PRESENTATION FOR:

ALBERTA INDUSTRIAL FIRE AND EMERGENCY MANAGEMENT ASSOCIATION

MARCH 9, 2022

About Fire & Flood Emergency Services



- ▶ Fire and Flood Emergency Services Ltd, an experienced group of industry specialists **operating in Alberta and B.C. to protect lives and livelihoods from increasingly frequent natural disasters.**
- ▶ Our patented technology, equipment and services cover a wide spectrum of environmental and economic resiliency through disaster planning and preparedness, fire and flood mitigation, **rapid response deployment, and training programs.**
- ▶ We work effectively with provincial wildfire and emergency response agencies including Alberta Forestry, AEMA, EMBC, as well as municipalities, First Nations, and industry on everything from preventative planning and workforce development to rapid deployment.

“The leading edge of innovation to outpace the growing demands of climate readiness.”

Patented Technology



Innovation, Sciences et Développement économique Canada
Office de la propriété intellectuelle du Canada

Innovation, Science and Economic Development Canada
Canadian Intellectual Property Office

Brevet canadien / Canadian Patent

3,093,478
Numéro de brevet
Patent number

Le commissaire aux brevets a accordé un brevet pour l'invention décrite dans le mémoire descriptif portant le numéro de brevet susmentionné. Le mémoire descriptif est accessible dans la Base de données sur les brevets canadiens sur le site Web de l'Office de la propriété intellectuelle du Canada.

The Commissioner of Patents has granted a patent for the invention described in the specification under the above-noted patent number. The specification is accessible in the Canadian Patents Database on the website of the Canadian Intellectual Property Office.

Commissaire aux brevets
Commissioner of Patents



(CIPO - 91) 2020-09-15

Titre de l'invention / Title of invention
SYSTEME D'EXTINCTION D'INCENDIE ET PROCEDE DE DEPLOIEMENT ASSOCIE

FIRE SUPPRESSION SYSTEM AND PROCESS OF DEPLOYMENT

Breveté(s) / Patentee(s)
FIRE & FLOOD EMERGENCY SERVICES LTD.
Inventeur(s) / Inventor(s)
RAYMOND, TERRY

Date de l'octroi et de la délivrance du brevet / Patent grant and issue date
2022-01-25

Date de dépôt de la demande / Filing date of the application
2019-03-13

Date d'accessibilité au public / Date application open to public inspection
2019-10-03

Canada

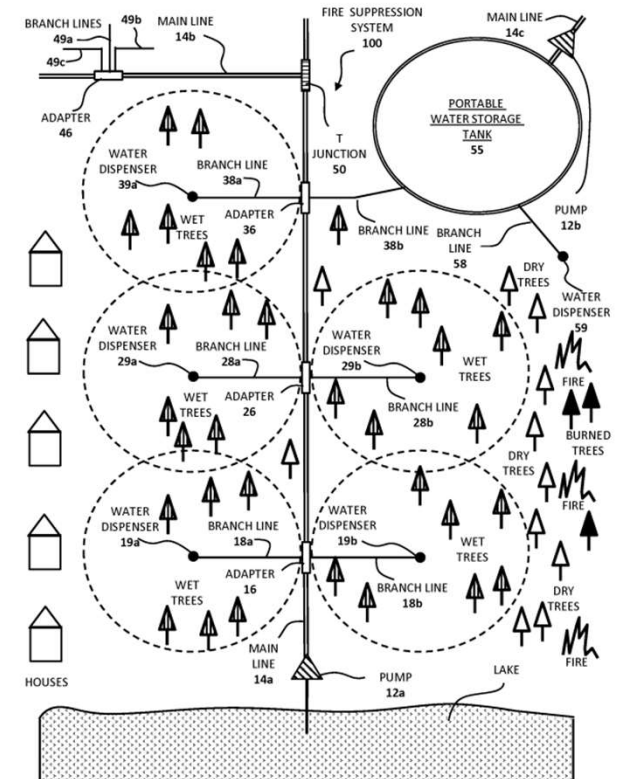


Fig. 2
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Our Services



Disaster Response Planning

- Partnership with engineering consultants
- Pre-feasibility studies, implementing permanent solutions
- Partnering with First Nations, local authorities, industry, and Government



Fire & Flood Suppression

- Patented high volume water delivery systems
- Flood barrier deployment and training
- Remote controlled, safely operated
- Scalable response – large or small, interim or permanent



Training & Safety

- Recent acquisition of RapidFire & Rescue (training specialty)
- Consulting and custom solutions for equipment, human effort, logistics and safety protocols

Complete Service





Disaster Response Planning

We pre-plan with communities and industry so we can deploy quickly when needed.

- ▶ Pre-feasibility studies to establish corridors for flooding and fire.
- ▶ What needs protecting? Minimizing loss and suffering.
- ▶ Partnership with engineering consulting.
 - ▶ How do we protect your community, values, and interests?
- ▶ Ongoing support in the form of future consultations or permanent and mobile installations and the crews to run them.
- ▶ Equipment available as needed.
- ▶ FireSmart strategies through consultation of fuel load reduction through manual alteration and low intensity prescribed burning.



Fire Suppression

Our system directly injects water into the fire environment, absorbing mass heat transfer, lowering the temperature, and raising the relative humidity.

Fire & Flood's high volume water systems have demonstrated an increase in humidity over a large area stretching over 3km.

- ▶ By creating widespread rainfall equivalent and increasing humidity, Fire & Flood significantly reduces impacts to lives, property, the environment, and the economy.
- ▶ Rapid response for direct attack on wildfires or structural protection.
- ▶ Remote controlled equipment like remote sprinkler systems and water pumps.
- ▶ Protection of log decks, industrial equipment, critical infrastructure, and personal property.
- ▶ Specialized in protecting linear and energy infrastructure like power lines, pipeline, roads, and rail lines.



Aviation Support

Direct support for aviation crews with water containment units and permanent water storage.

- ▶ Improved safety
- ▶ Increased efficiency
- ▶ Maximize effective flight time, minimize travel to water

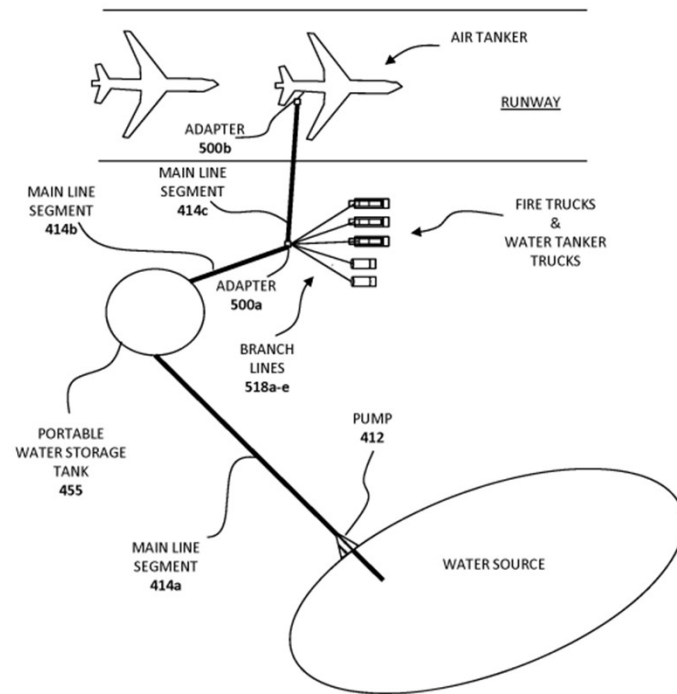
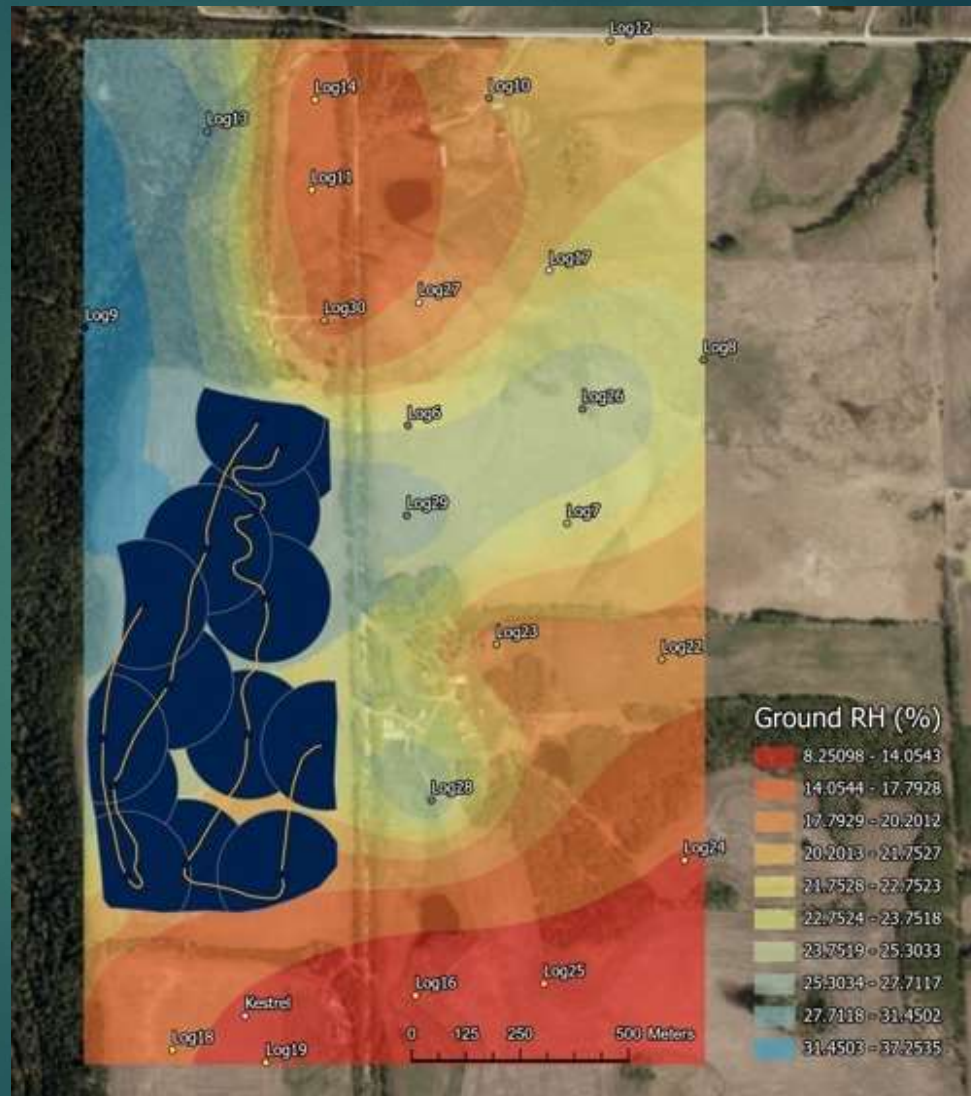


Fig. 7



Our Impact

- ▶ Map demonstrates thermal impacts of Fire & Flood's water suppression system at max capacity
- ▶ System reduces heat and creates moisture for hundreds of metres per cannon
- ▶ Capable of eliminating surface water runoff by reducing run times and minimizing environmental impact





FP Innovations Report

Area-Based Water Delivery Systems

Project Number: 301014417

“A two-day test was executed during which the 4- and 12-inch systems were set up and sprinkler operations were carried out.”

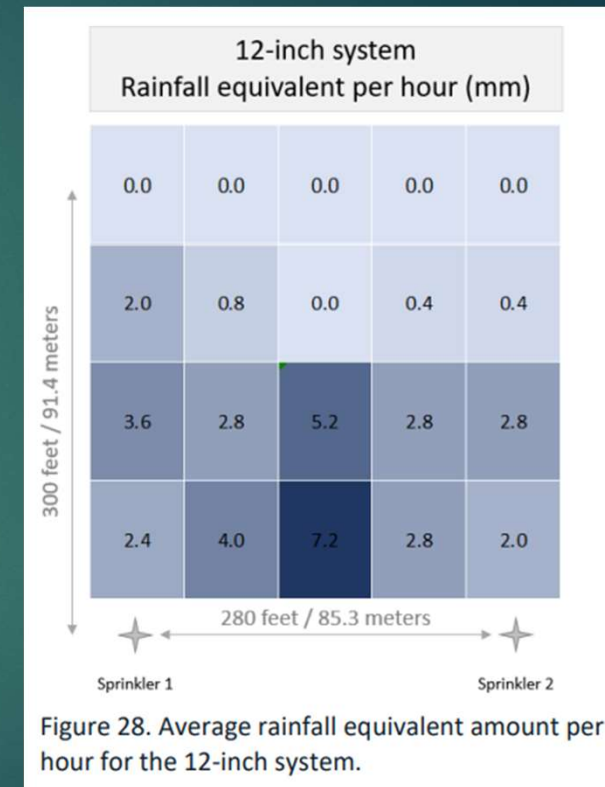
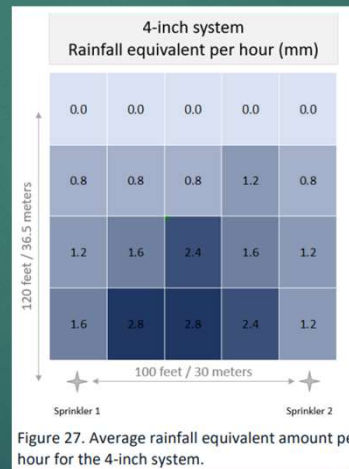
Study measured rainfall per cannon

Result: Fire & Flood can create moderate to heavy rainfall up to and beyond 100 metres.

Moderate rain: 0.5 mm – 4.0 mm

Heavy rain: 4.1 mm – 8.0 mm

Source: <https://water.usgs.gov/edu/activity-howmuchrain-metric.html>



*0.0 = Trees obstructing sensor data.

Flood Suppression

Inadequate infrastructure for drainage during emergency events such as heavy snowmelt, heavy rainfall and storm surge are common.

Fire & Flood Emergency Services have the means to redirect water to safer areas in a very short time frame.

- ▶ Protect vital infrastructure or remove water from flooded areas
- ▶ Rapidly deploy flood barriers
- ▶ When flood barriers overflow, we can install pumps to remove water and get equipment running
- ▶ Train communities to deploy flood barriers and other preventative techniques – calling Fire & Flood is an additional layer of protection
- ▶ Deployed in hours, not days



Mobile Command Centre

- ▶ Integrated support and capacity
- ▶ Full array communications
- ▶ Self sustained and fully mobile
- ▶ Allows for on the ground and real-time communication and strategies



Training & Safety



We have the experts; you have the people

Our experts are committed to:

- ▶ Community protection from wildfire and flood;
- ▶ Prevention and mitigation through FireSmart methods; and
- ▶ Creating a capable workforce that can work within your environments safely and effectively.

We offer consulting and customized training sessions with RapidFire & Rescue, including equipment, human effort, and logistics for:

- ▶ Municipalities; First Nations; government agencies; wood production plants; solar and wind farms; power lines; railway systems; mining operations; ranch lands; private industry; and the energy sector

Fire & Flood's safety policies and procedures comply with all Federal, Provincial and Local Regulations applicable to Worker safety.

Proud Members Of:



Training Certifications

RapidFire & Rescue has 30+ years experience delivering training to industry and government agencies.

- ▶ Can train up to 24 in a classroom setting or 8 in the field per instructor
- ▶ Training includes consultation and industry-specific packages
- ▶ Connected with the best third-party training providers; no limits to training available
- ▶ Offer worker competency inspections
- ▶ Prepare employees for multi-hazard environments
- ▶ Ability to cross train between municipalities, industry, First Nations, Alberta Forestry, Alberta Environment and Wather, and BC Wildfire
- ▶ Dixon dam contract with Alberta environment – improving guarding and repairing the dam



Type II Firefighting Accredited

Alberta FireTack

First Aid

ICS 100

CIFFC Integration

High Angle Safety & Rescue

Confined Space Safety & Rescue

Chainsaw Training & Safety

Industry Safety (e.g. H2S Alive)

Agency & Industry Cross Training

Climate Mitigation

Mitigation saves \$13 per \$1 invested
(National Institute of Building Sciences)

Prevention and mitigation strategies prepare for emergencies before they happen. It includes support for industry and agencies – includes wildland engines, firefighting equipment and pumping systems, and personnel.

- ▶ Emphasis on preventing disasters by cleaning up dry brush and other hazardous materials
- ▶ We provide wildland fire training to both agencies and industries alike
- ▶ Prevention and mitigation through FireSmart programs
- ▶ Training for rescue teams
- ▶ Emergency Response planning
- ▶ Training for onsite safety supervisors

“Three major outdoor air pollutants... together cause about 15,300 premature deaths in Canada annually, with an economic cost of \$114 billion... Key air pollutants are produced... from wildfires, which are increasing as a result of climate change.”

[Health Impacts of Air Pollution in Canada](#)



Opportunities

- ▶ **Planning and rapid deployment is key to saving lives and livelihoods**
- ▶ **Support for Structural Protection**
 - ▶ Bring water to fire fighters
 - ▶ Integrate with fire fighters for better overall deployment
- ▶ **Aircraft water loading support**
 - ▶ Fill aircraft at forward attack bases
 - ▶ On site helicopter loading
- ▶ **Continued support in the Alberta WUI program and system**



Testimonials



“Their flood mitigation and water management have gotten us back into service sooner and safer than previous methods, and due to their response, service, and fire suppression equipment, we are able to preserve critical infrastructure throughout western Canada. From planning and prevention to management and response, they are a one stop company for anything and everything emergency response, and as such, Fire and Flood has quickly become our first call...”

Trevor Billick
Supervisor, Bridges and Structures
Canadian National Railway

“Fire and Flood was a key company to the success of protecting two large industrial wood processing facilities... They have brought their expertise into the Wildland Urban Interface world with a capability never seen before... Whether it’s facility protection, water delivery, fire line work or flood mitigation, I highly recommend Fire and Flood Emergency Services.”

Rodney Schmidt, PCP
Fire Chief, Director of Protective Services
Town of High Level

“Fire & Flood Emergency Services helped us control a log deck fire in 2021 and... within hours had the fire under control. We have had several fires in the past at our High-Level site and were so impressed with Fire & Flood’s patented equipment that we are looking for them to provide a permanent installation.”

Wayne Lewis
General Manager
West Fraser OSB – High Level

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