
CITY OF KELOWNA

MEMORANDUM

Date: December 4, 2003
File No.: 5225-05

To: City Manager

From: Drainage/Solid Waste Manager

Subject: **Drainage Upgrade Policy resulting from the Okanagan Mountain Park Fire**

RECOMMENDATION:

THAT Council endorse a policy of providing a service level equivalent to the 1 in 25 year rainfall event under the current hydrologic conditions for the watersheds impacted by the Okanagan Mountain Park Fire;

AND THAT Council endorse a policy for the use of culverts, piping, overland flow routing, storage and/or diversion on a permanent or temporary basis to accommodate the increased runoff potential;

AND FURTHER THAT all costs associated with this project, estimated at up to \$2 million, be charged to chartfield 1092-0-00126 with the 2003 Financial Plan amended with interim funding from the Drainage Reserve.

BACKGROUND:

The Okanagan Mountain Park Fire in August/September of 2003 affected over 26,000 hectares of land to the south of Kelowna. 16,000 of those hectares are within watersheds that ultimately drain through the City of Kelowna on their way to Okanagan Lake. Significant changes to the hydrology of the watersheds took place during the fire event. These include the loss of evapotranspiration, reduced interception of rain and snow fall, an increase in snowmelt and the creation of hydrophobic soils.

The largest single impact from the fire on the hydrology was the creation of hydrophobic, or water repellant soils. These are created under intense heat as the gases from the fire mix with the upper most layer of soil. This condition effectively reduces the infiltration capacity of the soil to near zero resulting in flows approximately eight times higher than what would have been expected before the fire. Fortunately, the hydrophobic condition will decay, however, this is limited within the first three years.

The rainstorm of October 22nd demonstrated the impact of these factors. For example, Rembler Creek's pre-fire 200 year flow rate was approximately 1 cubic meter per second. Actual measured flows from this 100 year plus rainstorm was 13 cubic meters per second. Similarly the flows in Lebanon Creek were measured at 30 cubic meters per second whereas the pre fire 200 year event flows were 5.8 cubic meters per second.

Dobson Engineering Ltd. has assessed the watersheds and has determined the potential flows under various storm events. In addition, they have calculated the probabilities of occurrence for these events over the time period that the hydrophobic conditions will exist. With this information, staff has been evaluating various design standards for Council's consideration.

Permanent upgrades of systems will be recommended as even after hydrophobic conditions are gone flows will be higher than pre fire standards for up to 30 years. To accommodate the hydrophobic conditions staff has considered lower design standards recognizing the short term nature of this condition and the very high potential flows. There is no "standard" level of risk for our current situation, however, various references cite a value of 10 percent as the acceptable probability of occurrence for natural hazards and seismic events. With this in mind, a 25 year rainfall event has a 10 percent probability of occurrence during the next 3 years. After this time the potential for increased runoff will begin to diminish. This service and risk level will be recommended as policy for upgrades resulting from the fire.

Potential upgrades include a combination of storage, culvert and pipe capacity increases, construction of overland flow routes, diversions and other potential flood prevention works. Temporary works may be constructed where permanent works are not cost effective.

An initial estimate of \$2 million has been given for the land acquisition, design and construction of capacity upgrades. PEP funding will be pursued for this work, however, upgrades such as these are typically non-recoverable.

It is anticipated that detailed design will be initiated before the end of December with construction commencing in late January or February.

Alan Newcombe, P.Eng.
Drainage/Solid Waste Manager

John Vos
Director of Works & Utilities

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