Upper Bow River Hazard Study

We would like to provide you with a brief update on the status of the Upper Bow River Hazard Study that commenced in the Upper Bow Basin this fall. Although we have been making progress on several project components, Northwest Hydraulic Consultants' (NHC) primary focus over the last few months has been the Survey and Base Data Collection component.

The purpose of the field survey was to collect river channel and ground elevation information, including specifics like river channel characteristics, bridge and culvert geometry, and the locations, elevations, and shapes of dedicated flood control structures (berms and dykes). Additionally, new LiDAR data was collected and processed over the last several months to provide floodplain ground elevations. This combination of LiDAR and survey data will be used to create the hydraulic model this spring.

NHC worked diligently this past fall to complete a significant portion of the field survey. However, due to a number of challenges, including river access and weather conditions, some areas of the study reach were not surveyed before winter arrived. These areas will be surveyed in the spring, once the river is free of ice.

Through the spring and early summer, NHC will be using the LiDAR and collected survey data to develop the hydraulic model of the Upper Bow River. The hydraulic model is a key deliverable for Alberta Environment and Parks as it will be foundational for future project deliverables, including the Flood Inundation Mapping, Flood Hazard Mapping, Ice Jam Analysis, and the Flood Risk Assessment and Inventory components.

Being conducted in parallel with the Upper Bow River Hazard Study, the Bow, Elbow, Highwood and Sheep River Hydrology Assessment will provide current estimates of the 2, 5, 10, 20, 35, 50, 75, 100, 200, 350, 500, 750 and 1000-year floods for the study area. Golder Associates has collected the required river flow data and prepared annual naturalized and regulated flows for all locations. They are now working on calculating the flood frequency estimates.

The Upper Bow River Hazard Study is expected to be complete in spring 2017. Our finalization process will include both local authority review and public engagement for major deliverables. Approved draft reports and maps will be provided to local authorities for comment following internal review to ensure they meet provincial Flood Hazard Identification Program standards. Following completion of the study, open houses will be held to give the public the opportunity to learn more about the Flood Hazard Identification Program and the products produced by the Upper Bow River Hazard Study.

More information about the Alberta Flood Hazard Identification Program can be found at www.floodhazard.alberta.ca. If you have any questions regarding the work, please contact Chris Leptich by email at Christopher.Leptich@gov.ab.ca, or by phone at (403) 355-2491.

Alberta Government

Project Background

The Upper Bow River Hazard Study will identify and assess river-related hazards along a 120 km reach of the Bow River, including Canmore, Cochrane, Exshaw, Kananaskis Improvement District, Lac des Arcs, Municipal District of Bighorn, Rocky View County, and Stoney Nakoda First Nation. The study extends from the Banff National Park boundary to Bearspaw Dam. Major tributaries at select communities will be included.

The main study deliverables (outlined in more detail below) will include a hydrology assessment, new hydraulic river models, updated and new flood inundation and flood hazard mapping, a flood risk inventory, and a channel stability assessment – all of which will be provided to each community within the study reach to support their local emergency response and land-use planning needs.

- **Hydrology Assessment**
  - The hydrology assessment estimates flows for a wide range of possible floods along the Bow River, including the 2, 5, 10, 20, 35, 50, 75, 100, 200, 350, 500, 750 and 1000-year floods. The analysis will include the 2013 flood.
- **Hydraulic River Modelling**
  - A new hydraulic computer model of the entire river system will be created using new survey data and modern tools. The model will be calibrated using surveyed highwater marks from past floods to ensure that results for different floods are reasonable.
- **Open Water Flood Inundation Mapping**
  - Flood maps for 13 different sized floods, based on the hydraulic model results and the hydrology assessment, will be produced. Flood inundation maps can be used for emergency response planning and to inform local infrastructure design. These maps show areas of isolated flooding or areas that could be flooded if local berms fail.
- **Ice Jam Assessment**
  - Along the Bow River reach through Cochrane, ice conditions are known to have caused significant historical flooding. This assessment will include (1) an analysis of the ice jam flood history along this reach, and (2) an analysis to estimate water levels for the 50-, 100-, and 200-year ice jam floods. The hydraulic computer model will be enhanced to accommodate ice conditions. Flood inundation maps for the 50-, 100-, and 200-year ice jam floods will be produced, as well as ice jam floodway criteria maps, which are based on the 100-year ice jam flood.
- **Flood Hazard Mapping**
  - Flood hazard mapping divides the 100-year floodplain into floodway and flood fringe zones, which show where flooding is deepest and most destructive. The flood hazard mapping will reflect the worst-case flood hazard of the open water and ice jam scenarios. These maps can be used to help guide long-term development planning.
- **Flood Risk Assessment & Inventory**
  - AEP will create an inventory of structures at risk of flooding for all of the mapped flood scenarios. This flood risk assessment and inventory can support future flood damage assessments.
- **Channel Stability Investigation**
  - The main goal of this study component is to provide insight into general channel stability along the Bow River. We will compare current and historic riverbank locations and channel cross sections, going as far back as 1949 using historic aerial photos.