Hydrotechnical Information System Tool Overview

The department's current Hydrotechnical Design Guidelines are based on application of physical parameters and historic information. To assist in application of these guidelines, the Hydrotechnical Information System (HIS) tool was developed to make available historic and physical parameter data easily available to both department and consultant staff. The tool is based in Microsoft Excel, using VBA to extract and manipulate data from associated Microsoft Access databases and present external PDF files.

Presentation of available data is based on a stream. Each stream in the province that is crossed by at least one bridge-size structure has been assigned a series of identifiers that uniquely identify that stream and its relationship to its tributaries and the streams that it flows into. Stream name was inadequate for this purpose as there are many duplicate names and many unnamed streams. Each bridge-size stream crossing has been assigned to one of these streams and its sequence along the stream has also been noted. Using this data structure, HIS can identify the stream of interest based on entry of a bridge file number. Alternatively, a list of streams that match a certain name or are crossed by a certain highway can also be presented. Once a stream has been selected, a list of all tributaries or all streams that it flows into can be shown. The lists of streams are shown on the "Select Stream" sheet.

After the stream of interest has been selected, clicking on a button will present a list of all bridge-size structures on that stream in order on the "Bridge List" sheet. Pertinent inventory data is presented for each bridge along with drainage area, stream slope and available hydrotechnical parameters. This list helps to readily identify all structures that may have information relevant to the design of a given crossing. The bridge file number font properties are modified to quickly inform the user of available data for that bridge. This includes presence of flood observation documents, hydrotechnical file histories, and hydrotechnical summaries.

From the "Bridge List" sheet, selecting a site and clicking on one of the "Site Data" buttons will enable access to additional information. The "Flood" button will open the "Flood Docs" sheet, which will list all flood documents available for that site, and a button to open any of these documents in the default PDF viewer (the "All Flood" button will list all flood records for the current stream). The "History" button will open a hydrotechnical file history PDF (summary of relevant information extracted from bridge correspondence files, bold font for site number indicates availability). The "Summary" button will open a hydrotechnical summary PDF file (summary of application of Hydrotechnical Design Guidelines to that site, data in Y,V,Q fields will indicate availability). All of these PDF files are stored externally to HIS and are named systematically to enable launching from within HIS. The "Inspection" button will load the Inspection sheet with relevant data from the BIM level 2 inspection programs (pier scour and RPW) and survey history data.

Clicking the "Profile" button on the "Bridge List" sheet will generate a longitudinal profile plot of the current stream on the "Stream Profile" sheet. This plot, based on

profiles extracted from DEM data and stored in an Access database, notes the location of all bridges and WSC gauges. This view is valuable in graphically identifying longitudinal channel changes and assessing the extent of a hydraulically similar reach. In addition to the profile, a plan view is automatically generated, to provide context for a given location on the profile. A slope measurement tool has been added to the "Profile" sheet to enable estimation of the longitudinal slope at any location by moving the end points of a line. The slopes presented on the "Bridge List" sheet have been derived using this tool. Slopes derived from this tool are more representative of the governing hydraulic slope at most sites that values derived from site surveys. To provide equivalent accuracy in a survey would require profiles extending over several kilometres in many cases, which is a difficult and expensive task. Unless a hydrotechnical summary is present, the Slope value reported on the "Bridge List" sheet should be checked with the profile, as it may be more current.

While the framework for HIS has been in use for several years, the content has been steadily improved and increased. Regular updates are made in the form of additional flood documents, file histories, and hydrotechnical summaries, plus updates to the HIS DB. The status of the current release can be found in the text file "HIS Status.txt" , located in the same folder as the HIS files. Installation guidance is also available in the text file "HIS Instakllation.txt".