June 2011

HERITAGE IMPACT ASSESSMENT

Crooks Hollow Dam at Spencer Creek
Community of Greensville, Town of Flamborough
Regional Municipality of Hamilton
Wentworth County, Ontario

Submitted to:
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REPORT

Report Number: 11-1136-0029-R01

Distribution:

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Executive Summary

The *Hamilton Conservation Authority – Crooks' Hollow Dam Class Environmental Assessment*, completed by Hatch Energy in 2009 for the Hamilton Conservation Authority, identified the preferred solution to decommission and remove the Crooks Hollow Dam on Spencer Creek in the Town of Flamborough, Regional Municipality of Hamilton, Ontario. (Figure 1) This would involve complete demolition of the dam and removal of the rubble. The reservoir would be drained and restored back to a natural river condition. The *Environmental Assessment* determined that the existing dam is not considered to be of historical or cultural significance.

The Hamilton Conservation Authority subsequently retained Golder Associates to complete a Heritage Impact Assessment (HIA) of the Crooks Hollow Dam at the request of the Ontario Ministry of Tourism and Culture (MTC). The heritage value of the Crook's Hollow Dam and other built features were evaluated using Ontario Regulation 9/06 of the *Ontario Heritage Act*. The impacts of the proposed undertaking on the heritage resources were evaluated and mitigation recommendations prepared.

The HIA determined that the Crooks Hollow Dam had cultural heritage value because it illustrated the changing human use of Spencer Creek over the last two centuries. Throughout the 19th century the creek through Crooks Hollow was utilized for water power. For the first half of the 20th century it was used as a municipal water supply. From the 1960s onwards the valley has become a public recreation area. The Crooks Hollow Dam and the adjacent Cockburn Mill and Morden Mill dams are physical remnants that illustrate this changing use of Spencer Creek.

The HIA provided the following recommendations to mitigate the adverse effects of the proposed undertaking on the Crooks Hollow Dam:

1) General

- **Deposit Copies:** Copies of this report should be deposited with the Dundas Museum and Archives and the Hamilton Public Library.

2) Crooks' Hollow Dam

- **Construction Monitoring:** Prior to the commencement of demolition and re-naturalizing the valley, a plan should be developed that identifies culturally significant features that should be avoided during the project. During demolition of the dam, the work should be monitored by a qualified person to document historic construction details of the dam.
- **Retain Dam Ruins:** As much as possible of the Crooks Hollow waterworks dam should be retained, and specifically the cast iron water conduit; a portion of the south abutment, and as much as possible of the north earth and concrete dam. If possible the valve chamber (if it exists) should be retained.
- **Landscaping:** A landscaping plan should be developed that considered the silt deposits in the reservoir as part of the historic character of the Spencer Creek Valley. The headpond landscape above the Cockburn dam site and the Morden Mill dam should be used as models on which to base the landscape design of the former reservoir.

3) Crooks' Hollow Conservation Area Master Plan

- **New Pedestrian Bridge:** The design and location of the new foot bridge over Spencer Creek should aid in the interpretation of the historic human use of Spencer Creek.
- **Mill Ruins Conservation Plan:** The Cockburn Mill building foundations and dam ruins as well as the Morden Mill earth dyke and stone weir should be stabilized to prevent further deterioration. The use of Spencer Creek for both water power and water supply should be interpreted at these two mill sites. The selective removal of vegetation should be considered for the Cockburn Mill ruins and the Morden Mill earth dyke to assist in the conservation of these resources and to aid in visual appreciation of their historic character.
- **Interpretation:** The use of Spencer Creek for both water power and water supply should be interpreted at the two mill sites. A range of interpretation techniques – including signage, trails and landscaping – should be used to convey the information to the public.

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PLATES

1.0 STUDY PURPOSE AND METHOD

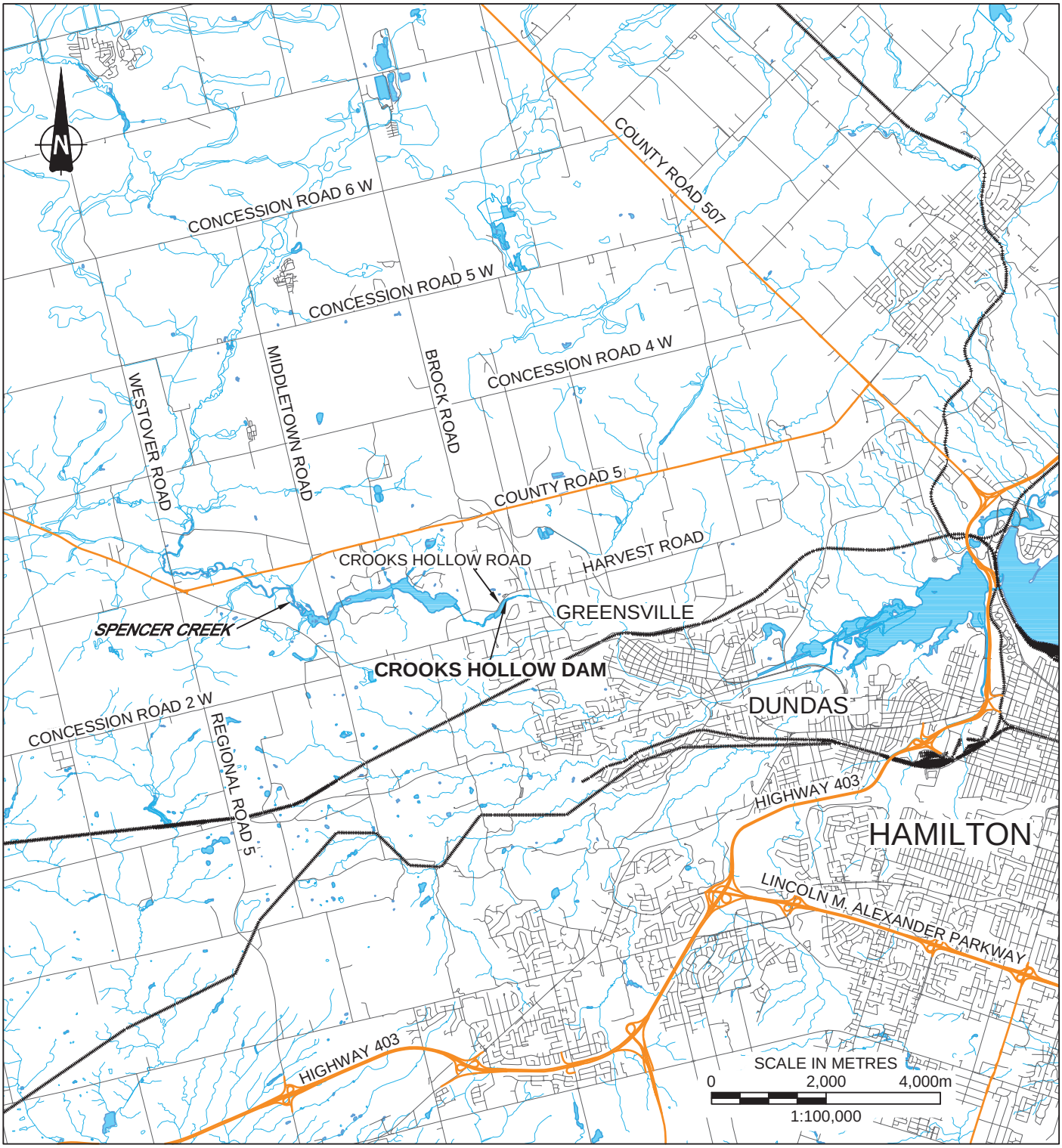
The Hamilton Conservation Authority completed an Environmental Assessment (EA) of the Crook's Hollow Dam on Spencer Creek in the Town of Flamborough, Regional Municipality of Hamilton, Ontario. (Figure 1) The *Hamilton Conservation Authority – Crooks' Hollow Dam Class Environmental Assessment*, completed by Hatch Energy in 2009, identified the preferred solution to decommission and remove the Crooks Hollow Dam. This would involve complete demolition of the dam and removal of the rubble. The reservoir would be drained and restored back to a natural river condition. The EA determined that the existing dam is not considered to be of historical or cultural significance.

The Hamilton Conservation Authority was required to complete a Heritage Impact Assessment (HIA) of the Crooks Hollow Dam at the request of the Ontario Ministry of Tourism and Culture (MTC) as part of the detailed design for the removal of the Crooks Hollow Dam. Golder Associates Ltd. (Golder) was retained by the Hamilton Conservation Authority to undertake this HIA.

The study area for this HIA followed Spencer Creek from the ruins of the Cockburn Mill a few hundred metres downstream of the Crooks Hollow Dam to the former Morden Mill dam at the upstream end of the reservoir. A background land use history was prepared in order to evaluate the historical significance of the property. A field review of the study area was conducted on April 21, 2011.

The heritage value of the Crook's Hollow Dam and other built features were evaluated using Ontario Regulation 9/06 of the *Ontario Heritage Act*. The impacts of the proposed undertaking on the heritage resources were evaluated and mitigation recommendations prepared.

Dr. Christopher Andreae, Ph.D. was the project director and Meaghan Rivard, M.A., provided research assistance. Patrick Ragaz, Water Resources Engineer with the Hamilton Conservation Authority provided invaluable assistance in providing background material for this report.



REFERENCE

DRAWING BASED ON ONTARIO BASIC MAPPING BY THE GEOGRAPHYNETWORK AS OF MAY 16, 2011; AND CANMAP STREETFILES V2008.4.

NOTES

THIS DRAWING IS SCHEMATIC ONLY AND IS TO BE READ IN CONJUNCTION WITH ACCOMPANYING TEXT.

ALL LOCATIONS ARE APPROXIMATE.

PROJECT

HERITAGE IMPACT ASSESSMENT
CROOKS HOLLOW DAM
GREENSVILLE, WENTWORTH COUNTY, ONTARIO

TITLE

STUDY AREA LOCATION

Golder Associates
LONDON, ONTARIO

PROJECT No.	11-1136-0029		FILE No.	1111360029-R01001
			SCALE	AS SHOWN
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FIGURE 1

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2.0 HISTORICAL DEVELOPMENT

2.1 Spencer Creek

Spencer Creek is name after Joseph Spencer who constructed a dam and mill on the creek in 1834.[1] The main flow of Spencer Creek is generated by the Beverly Swamp although the tributaries extend to the boundary of the Hamilton Conservation Authority watershed. (Figure 1) As the Creek approaches the Niagara Escarpment springs provide additional volume. At the end of a drought in 1936, spring flows raised the water level two feet (60 cm) in two days at the Crook's Hollow Dam.[2]

Seasonal changes in flow became more extreme due to the rapid loss of forest cover in the late 19th century. Forest removal exacerbated both flood conditions in the spring and drought in the summer and fall. In 1851, 57% of Flamborough Township was still covered in forest. Ten years later, this had declined to 42 percent and to 15 percent by 1891. The Township of Beverly, just upstream from Flamborough, had a similar rate of decline from 59 percent in 1851 to 17 percent in 1891.[3]

Although accurate measurements of the flow in Spencer Creek stream began only in July 1958, the 19th century mill owners had a good empirical knowledge of the water regime. The main flood problem on Spencer Creek occurred during the spring breakup as a result of ice and snow melt. Since 1860 at least seven major floods on Spencer Creek affected the town of Dundas.[4] The first year of measurements in 1958-59 was indicative of the flow. The highest flows were recorded in March and April 1959 with flows of more than 600 ft^3/minute. By early May stream flows had fallen below 100 ft^3/minute and by August were down to one cubic foot per minute. The flow increased gradually through the fall but did not go above 100 ft^3/minute again until December.[5]

The wide seasonal range of flows had a pronounced impact on the water power potential of Spencer Creek. High spring flood could destroy 19th century dams, and sometimes the mill. Low summer flows could force a mill to shut down for extended periods.

People were certainly aware of the connection between forest cover and wide swings in stream flow. In 1913, the former Dundas Public Utilities engineer, John Armour, was advocating reforestation of the headwaters of Spencer Creek to ensure a more regular supply of water. However, in keeping with the economic attitudes of the day he thought that the cost of reforestation should not exceed the cost of the water supply that it created.[6] Flood control of Spencer Creek through Crooks Hollow was not completed until the Christie Dam and reservoir opened in 1971.

[1] Spencer Creek Conservation Authority. *The Spencer Story*.20-21.

[2] Ontario Dept of Commerce & Development, *Spencer Creek Conservation Report 1960*. Part 3 – Water; *Dundas Star* July 25, 1907; *Hamilton Spectator* August 14, 1936.

[3] Ontario Dept of Commerce, *Spencer Creek Conservation Report 1960*. Toronto 1960 Part 2 – Forest; *Dundas Star* March 20, 1913

[4] Ontario Dept of Commerce, *Spencer Creek* Part 3 – Water p. 10,18

[5] Ontario Dept of Commerce & Development, *Spencer Creek Conservation Report 1960*. Part 3 – Water; 7-8.

[6] *Dundas Star* May 1, 1913

2.2 Nineteenth Century Mills

For the entire 19th century mills that extended from the future Christie dam to Webster's Falls used Spencer Creek to generate mechanical power for grist, saw, and paper mills. This era of milling later impacted the future use of the Creek as a source of drinking water for Dundas. In less than five kilometres Spencer Creek drops nearly 30 m (100 feet). This fall of water led to the construction of eight mill dams in this section of creek. Conversely milling was not possible between Webster's Falls and the Town of Dundas because of the steep fall of the creek down the Niagara Escarpment and the inaccessibility of the ravine.[7] Milling did not begin again until the base of the Niagara Escarpment just at the point where the Canadian National Railway crosses Spencer Creek.

Of the eight mill sites in Crooks Hollow the Cockburn Mill and the Morden Mill were directly associated with the subsequent use of the creek for water supply. Mill sites were initially sold by the government and granted rights to the owner to dam a stream for water power. Without ownership of these rights, water could not be removed or used for other purposes. As long as water powered mills were profitable, no mill owner would want to sell these rights.

Transportation was as important as water power in the successful operation of a mill. Without a means of shipping good to market, there was no value in producing a product. Locally, a road, known today as Crooks Hollow Road, ran along the north side of Spencer Creek and served all the mills. Crooks Hollow was on top of the escarpment that separated Dundas and Hamilton on the plain below. A road was constructed at a very early date up the escarpment from Dundas. In 1831 £50 were spent on the road "up the mountain" indicating that this was an important road by then.[8]

Spencer Creek as it passed through Crooks Hollow was ideally suited for 19th century industrial development. The gradient was not too steep such that a large headpond could be created at each mill site by a reasonably low dam. Grist, saw, and paper mills required little power by modern standards. However conditions had changed by the end of the century and the value of the creek's water power declined. The increasingly irregular flow of the stream made water power unreliable. As industry expanded, machinery required greater power than could be supplied by the creek – even if the flow had been predictable and steam power increasingly replaced, or augmented, water power. Steam powered factories, unlike water mills, could be located to take maximum benefit of labour, transportation and/or markets. Waterpower was fixed to the source of power and thus lacked as such mills lost any locational advantage over steam. In the case of Spencer Creek, however, as the role of mill power declined, the Creek offered the possibility of alleviating the Town of Dundas' increasingly short supply of potable water.

[7] Spencer Creek Conservation Authority. *The Spencer Story*. By Thomas Thomson. 1965

[8] Ont. Dept of Lands and Forests. *Spencer Creek Conservation Report, 1962 – History* Toronto p.139-40.

2.3 Dundas Waterworks

2.3.1 Early History

Until the 1880s the citizens of Dundas seem to have relied on private wells and possibly the streams flowing through the town as their source of water. In 1871, Dundas had a population of 3,135 and had grown to 3,509 ten years later. This growth required a more reliable source of water and in 1884 the municipality completed a public waterworks. The supply of water was distributed by gravity from springs on the Niagara Escarpment, about four kilometres away from the town. The springs fed a one million gallon reservoir constructed adjacent to the Grand Trunk Railway on the slope of the escarpment. (Plates1, 2) From this elevated position water was distribution into the town at a pressure of 75 psi.

By 1888 Dundas had reached a population of about 5,000. The Town proposed a by-law to raise $10,000 for unspecified additions to the waterworks. There is no record if the bylaw passed or that work was done.[9] The 1880s marked the high-water point for the polulation of Dundas. It was becoming increasingly residential and losing its commercial and industrial activity to Hamilton. By 1901 the population had decreased back to 1871 levels; a decline of nearly 2,000 or 40 percent of the population. By contrast Hamilton had grown from 36,500 in 1881 to 52,500 in 1901.[10]

Spring water flowing out of the Niagara Escarpment could have been a reliable source for the waterworks. Yet as mill owners already experienced, the loss of forest cover madet the flow of ground water into the springs unreliable as a source for the municipal water supply.[11] From about 1900 until 1936 when the town constructed a trunk waterline to Hamilton, Dundas struggled from one water crisis to another.

2.3.2 Water Shortage

The first efforts to reduce the dependency on spring supplies occurred about 1906. The Dundas Public Utilities Commission laid a six inch pipe to connect the lower end of Dundas with the City of Hamilton waterworks system. Other plans mooted at the time included finding additional springs – Enright's Spring was mentioned by name although the location was not given – to bring water from Copetown and pumping water from the canal basin.[12]

[9] Canada. Commission of Conservation. *Waterworks of Canada* compiled by Leo G. Denis Ottawa, 1912; *Dundas True Banner*, Sept 30, 1888 in Hamilton Public Library, *Dundas Scrapbook,* Volume 1, 1875-1949

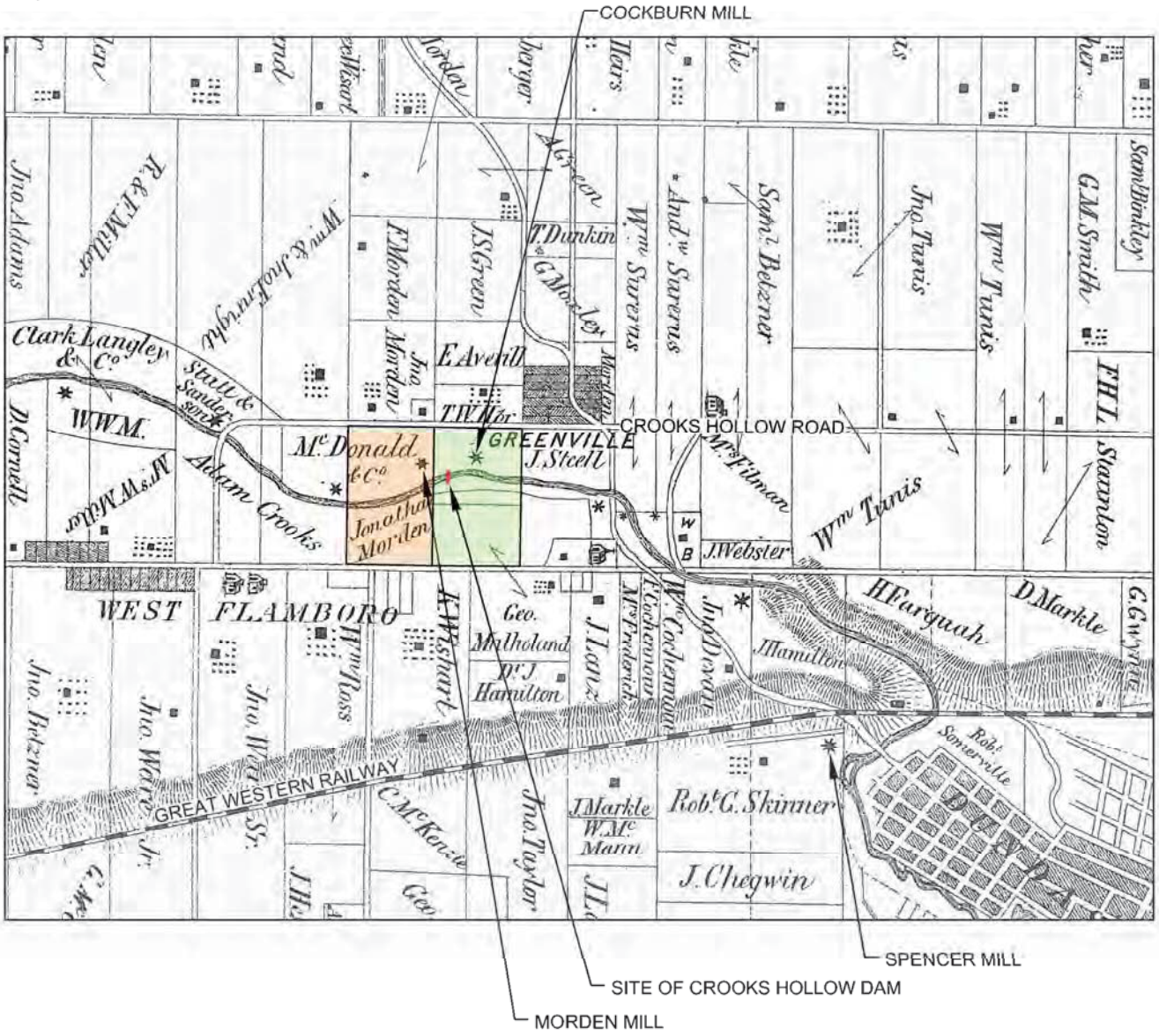
[10] Ontario. Dept of Lands and Forests. *Spencer Creek Conservation Report, 1962 – History*

[11] *Dundas Star* July 25, 1907

[12] *(Hamilton Spectator* September 18, 1918; *Dundas Star* July 25, 1907.

The most promising solution was to utilize water drawn from Spencer Creek in Crooks Hollow. Water could flow by gravity through a conduit to the existing reservoir. A study completed around 1902-1903 determined that the existing shortage could be alleviated by taking creek water at the Cockburn Mill near the hamlet of Greensville. This location would require the purchase of water rights from mill owners. One drawback was that the valley shape dictated that the future reservoir would be broad and shallow and subject to greater evaporation loss and leakage than if a deep reservoir could be used.[13]

[13] *Dundas Star* February 7, 1907; March 20, 1913, May 1, 1913



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- LOT 7 CON II
- LOT 8 CON II

REFERENCE

DRAWING BASED ON PAGE AND SMITH, ILLUSTRATED HISTORICAL ATLAS OF THE COUNTY OF WENTWORTH, ONT. TORONTO: PAGE & SMITH, 1875.

NOTES

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ALL LOCATIONS ARE APPROXIMATE.

PROJECT

HERITAGE IMPACT ASSESSMENT
CROOKS HOLLOW DAM
GREENSVILLE, WENTWORTH COUNTY, ONTARIO

TITLE

SPENCER CREEK IN CROOKS HOLLOW WENTWORTH ATLAS, 1875

Golder Associates
LONDON, ONTARIO

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FIGURE 2

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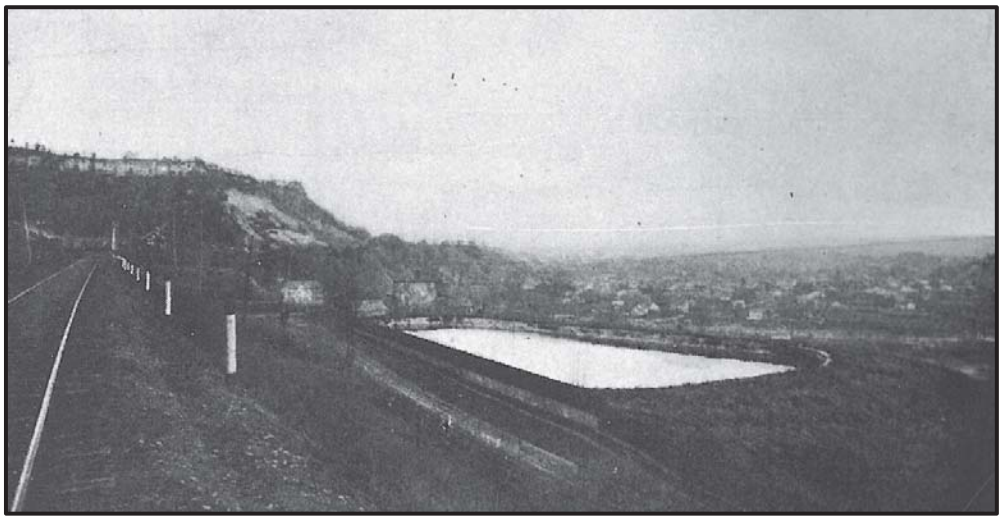


Plate 1: Dundas Reservoir c.1898 with railway tracks on left and Town of Dundas in rear-right

Plate 2: Pumphouse at the Dundas reservoir in 2011

The Cockburn mill site was the best location. The mill had originally been built by Jas. Kerby in 1830 to supply power for a sawmill. In 1862 the property had been sold to Francis Hore. The old sawmill was demolished and a two-storey stone mill was constructed also as a sawmill. The mill was destroyed by fire in 1879. In 1886 Cockburn purchased the property and built a framed structure on top of the old stone foundations. The family operated a lumber and chopping business.

The Town of Dundas began drawing water from the headpond under an agreement with the Cockburns. J. F. Armour, the Public Utilities engineer commented in July 1907 that the town's water supply could be increased by doubling the capacity of the conduit from the Cockburn dam. When a break occurred in the dam in the summer of 1912, the town paid for the cost of repairs. The mill operated until about 1914 when the water rights and property were sold to the Town of Dundas. Ultimately the size and location of the Cockburn Dam was considered inadequate and a new dam – the existing "Crooks Hollow Dam" – was completed in 1916. The mill was demolished to make way for the new structure. A partial restoration was undertaken of the mill ruin in 1970.[14]

A major drought in 1936 led to the use of a variety of expedients. Emergency water was drawn from Fisher's dam located on Spencer Creek at the base of the escarpment. The dam and mill had been built in 1834 by Joseph Spencer and acquired by John Fisher in 1867. The mill closed in 1923. Dundas also began drilling test holes for wells within the municipality. At the time of the article there had been no practical discoveries. Well drilling had also been tried 20 years earlier with similar lack of success.[15]

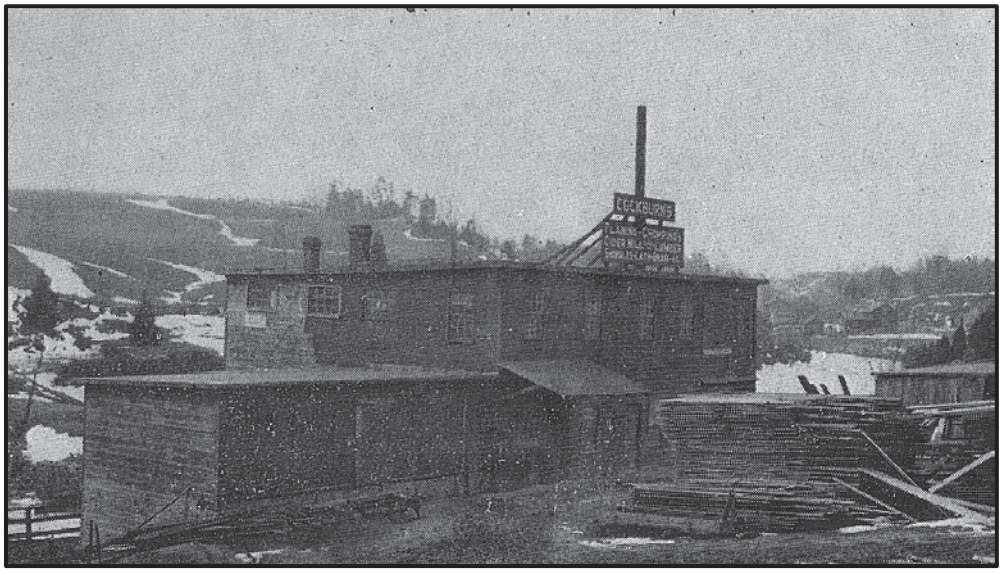


Plate 3: Cocukburn Mill

[14] *Dundas Star* July 25, 1907; August 8, September 5, 1912Department of Commerce and Development, *Spencer Creek Conservation Report 1960*. Toronto 1960 Part 4 – Recreation p.19-20; Spencer Creek Conservation Authority, *Annual Report* 1970

[15] Township of Flamboro, *West Flamboro Township Centennial, 1850-1950*; *Dundas Star* May 1, 1913; *Hamilton Spectator* August 14, 1936.

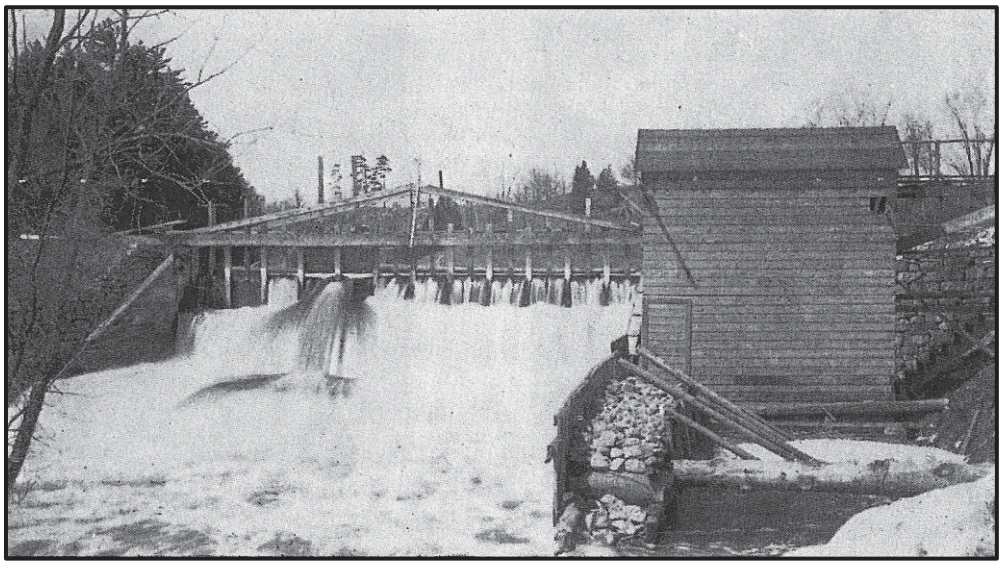


Plate 4: Cockburn Dam

The precarious situation in Dundas was finally resolved in 1936 when the City of Hamilton approved the construction of an enlarged pipe to supply drought stricken Dundas. Hamilton constructed a 16 inch conduit along on Main Street to the present city limit. The Town of Dundas then built a six inch main from the city limits to connect with their existing system in Dundas. Initially the plan had been to lay a 12-inch main but the diameter was reduced due to cost. The intention of the Dundas Public Utilities Commission had been to use this connection only as a standby service.[16] Although not stated in the article, it is assumed that the six inch pipe laid 30 years earlier still remained in service.

In 1959 the town began to purchase all of its supply from the City of Hamilton and the dam and reservoir were no longer used. The Dundas Golf and Country Club, adjacent to the waterworks reservoir on the escarpment, was permitted to draw a limited amount of water from the reservoir. The Dundas Public Utilities Commission continued to maintain the waterworks dam until it was leased to the Conservation Authority in 1964 for 50 years. The golf course (today the Dundas Valley Golf and Curling Club) stopped drawing water from the reservoir for irrigation purposes in 2001.[17]

[16] *Hamilton Spectator*, August 8, 1936; *The Canadian Engineer* November 10, 1936

[17] Spencer Creek Conservation Authority. *The Spencer Story*. By Thomas Thomson. 1965, p.54; Peto MacCallum Ltd. *Crooks Hollow Dam Integrity Assessment*, Feb 1993

2.4 Design of Dam

2.4.1 Dam

The 1912 failure of the Cockburn Dam seems to have been the beginning of assessing the need for an entirely new dam. The break had been caused by the absence of an impervious stratum under the dam. The Public Works commissioners determined that bed rock found about 600 feet upstream was the preferred location for a new dam. However, according to Mr Armour the reservoir capacity would be only half of that associated with enlarging the Cockburn Dam.[18] Despite this limitation, the dam was constructed at the new location.

At the beginning of June 1915 the town council voted to proceed with construction of the new dam. E.H. Darling Consulting Engineers in Hamilton designed the structure and supervised construction. Tenders for construction of the dam were received up to Saturday June 17, 1916. The firm of McAllister and Taylor were the successful contractors and the dam was completed by the end of the year.[19] Despite shortages of labour and materials due to the First World War there were no accounts of delays in construction of the dam.

The quality of the concrete in the dam was consistent with early 20th century practice. The spillway concrete consisted of large gravel, probably from river bed; intermixed with smaller crushed stone. By the 1920s concrete was made only from crushed stone. Core drilling in 1992 found that the buttress concrete was in poorer condition than the spillway, possibly due to numerous freeze-thaw cycles. The core samples also indicated evidence of pockets of contamination in the concrete due to the inclusion of clay.[20] By the time of construction of this dam, concrete technology had advance to a point where substantial and durable dams, bridges and other structures had been built that still function today. The somewhat course concrete and clay inclusions found in the Crooks Hollow dam may be indications of the difficulty of finding skilled trades during the War.

In 1968 the Hamilton Region Conservation Authority commissioned an engineering study of the dam. The study noted that timber planks were missing from the bridge and that an open man-hole existed in the north abutment. More seriously, it was recommended that the buttresses on the spillway be removed down to the level of spillways 1, 3, and 4. The concern was the risk of overturning of the dam by the high centre of gravity if all the stop logs were placed.[21]

In 1977 repairs of the downstream wall of the north end of the dam were undertaken by H Cole Construction as a result of findings from a routine inspection the previous year. Shotcrete was applied to the dam above water level in 1988.[22]

[18] *Dundas Star* August 8, 1912; March 20, 1913

[19] *Dundas Star* June 10, 1915 May 31, Nov 2, 1916.

[20] Peto MacCallum Ltd. *Crooks Hollow Dam Integrity Assessment* Feb 1993

[21] William L. Sears and Associates Limited, *Crooks Hollow Dam: Report on the Investigation of the safety of the dam* June 1968.

[22] Spencer Creek Conservation Authority, *Annual Report* 1977 Peto MacCallum Ltd. *Crooks Hollow Dam Integrity Assessment*, 1993

In 1992 a study of the integrity of the dam was undertaken. The study concluded that although the concrete in the dam was in poor condition, the dam was still functional and stable as long as the water level in the reservoir was kept to the level of the spillways 1, 3 and 4. If, however, it was to be operated at its maximum potential using stop logs in the buttresses above the spillways, then major reconstruction would be required.[23]

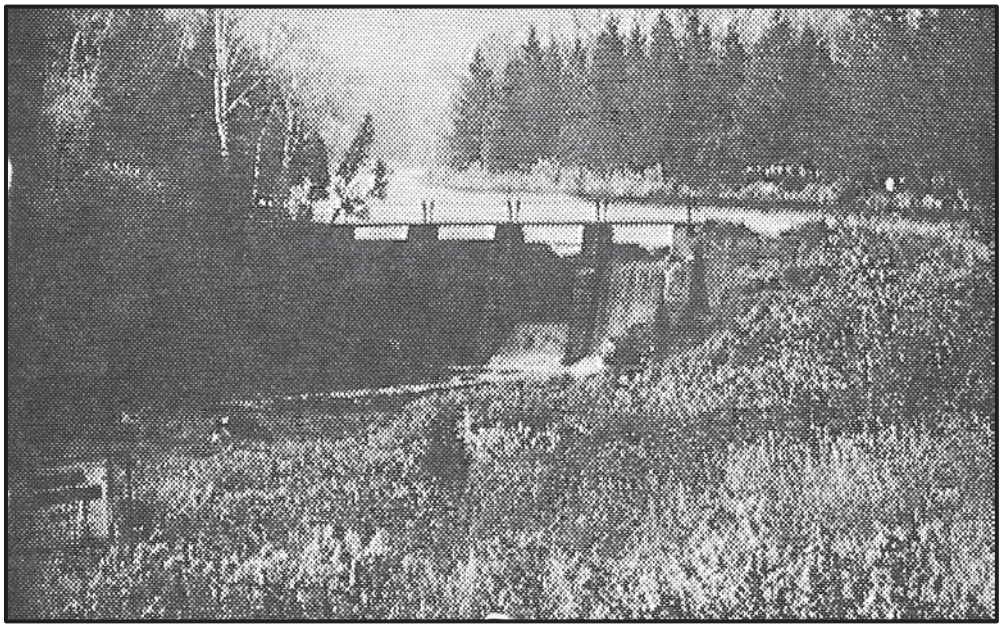


Plate 5: Waterworks Dam c 1959

2.4.2 Reservoir

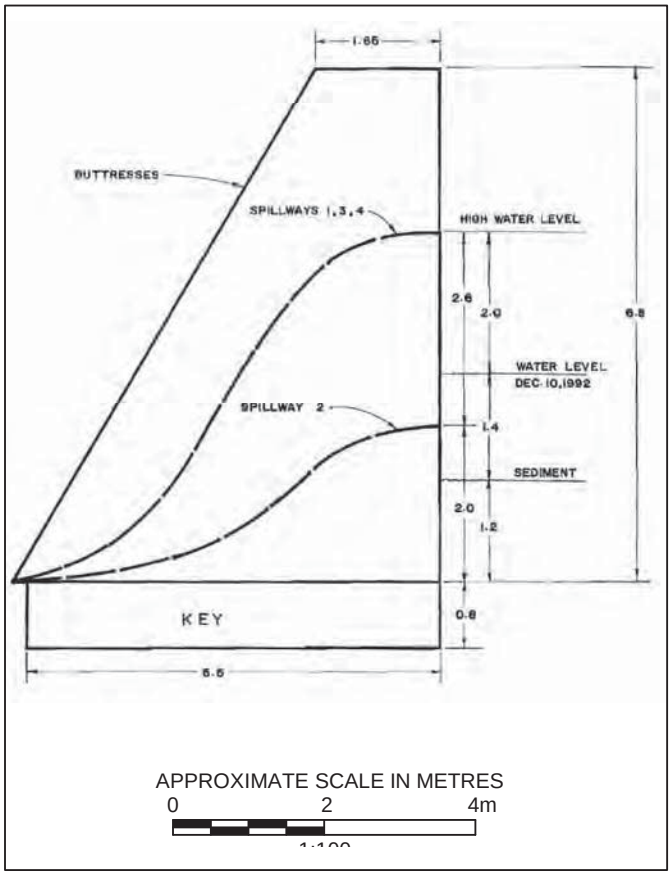
When the decision was made to build the new dam upstream of the Cockburn Mill dam, the reservoir would flood out the dam of the Morden Mill. James “Big Jim” Morden built a small dam to run a sawmill at this location about 1810. In 1841 a small gristmill was added. His son and grandson operated these mills until they burned in March 1905. John, the grandson of “Big Jim”, then built a small chopping mill. In 1915 the Town of Dundas secured the water rights for the Morden Mill and pulled down the mill. The Dundas reservoir covered about 22 acres and the remains of the dam almost cut the reservoir in half.[24]

This study did not determine if the stop logs in the buttresses were used on a regular basis to raise the water level. It is assumed that the reservoir was maintained at the crest height of Spillways 1, 3 and 4. After the reservoir was no longer used for water supply the reservoir level was reduced in the winter to the crest level of spillway 2.[25]

[23] Peto MacCallum Ltd. *Crooks Hollow Dam Integrity Assessment Crooks Hollow Road, Town of Flamborough, Ontario* Prepared for the Hamilton Region Conservation authority, Feb 1993.

[24] *Dundas Star* June 10, 1915; Ontario. Department of Lands and Forests. *Spencer Creek Conservation Report, 1962 – History* Toronto p.112; Spencer Creek Conservation Authority. *The Spencer Story*. By Thomas Thomson. 1965

[25] Peto MacCallum Ltd, 1992.



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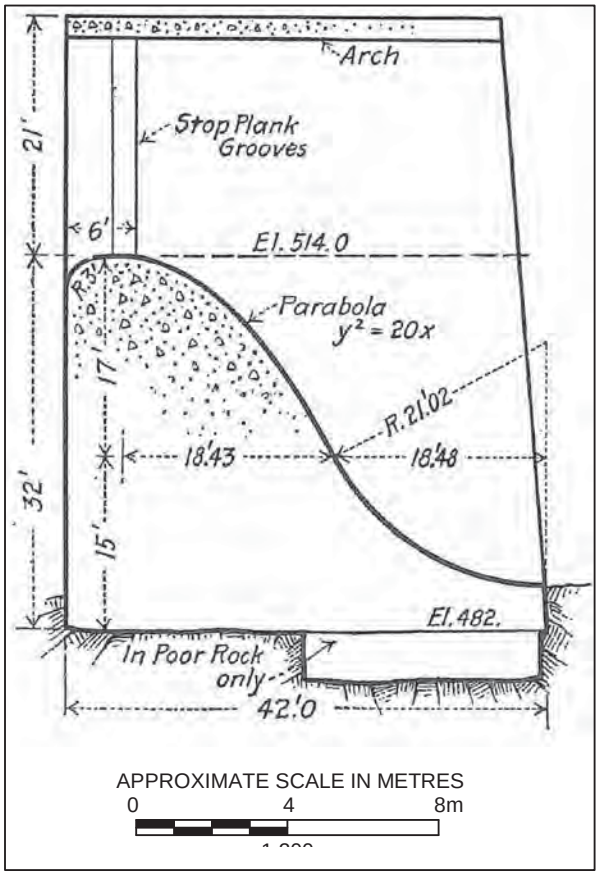

3b

REFERENCE

3a - DRAWING BASED ON PETO MacCALLUM LTD. CROOKS HOLLOW DAM INTEGRITY ASSESSMENT, CROOKS HOLLOW ROAD, TOWN OF FLAMBOROUGHT, ONTARIO. PREPARED FOR THE HAMILTON REGIONAL CONSERVATION AUTHORITY, FEBRUARY 1993.

3b - DRAWING BASED ON FLINN, ALFRED, ROBERT WESTON AND CLINTON BOGERT, WATERWORKS HANDBOOK NEW YORK: McGRAW-HILL, 1918.

NOTES

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ALL LOCATIONS ARE APPROXIMATE.

PROJECT

HERITAGE IMPACT ASSESSMENT
CROOKS HOLLOW DAM
GREENSVILLE, WENTWORTH COUNTY, ONTARIO

TITLE

CROSS SECTION OF CROOKS HOLLOW DAM FROM FIELD MEASUREMENTS, 1992

Golder Associates
LONDON, ONTARIO

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FIGURE 3

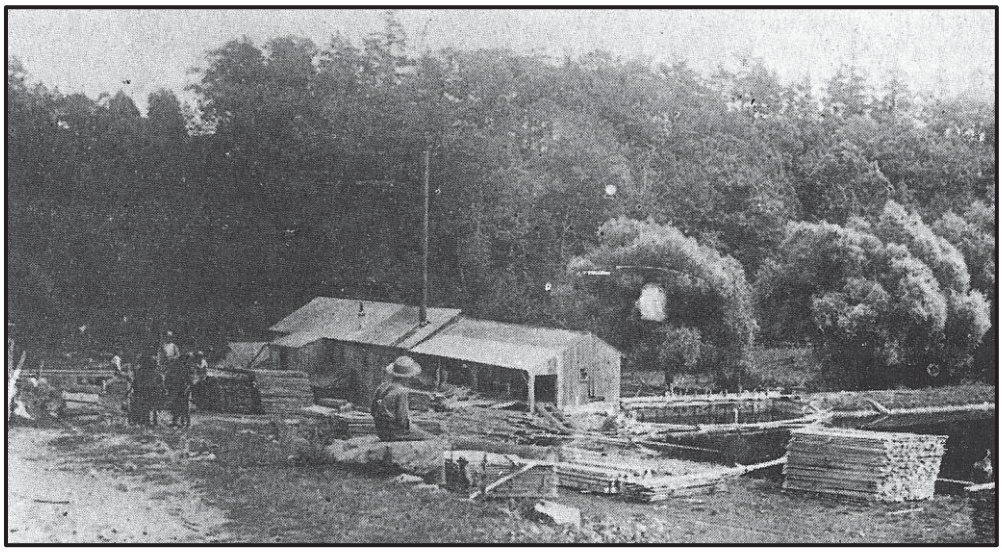


Plate 6: Morden Mill. The stone weir and earth dam that remains today is visible to the right of the mill building

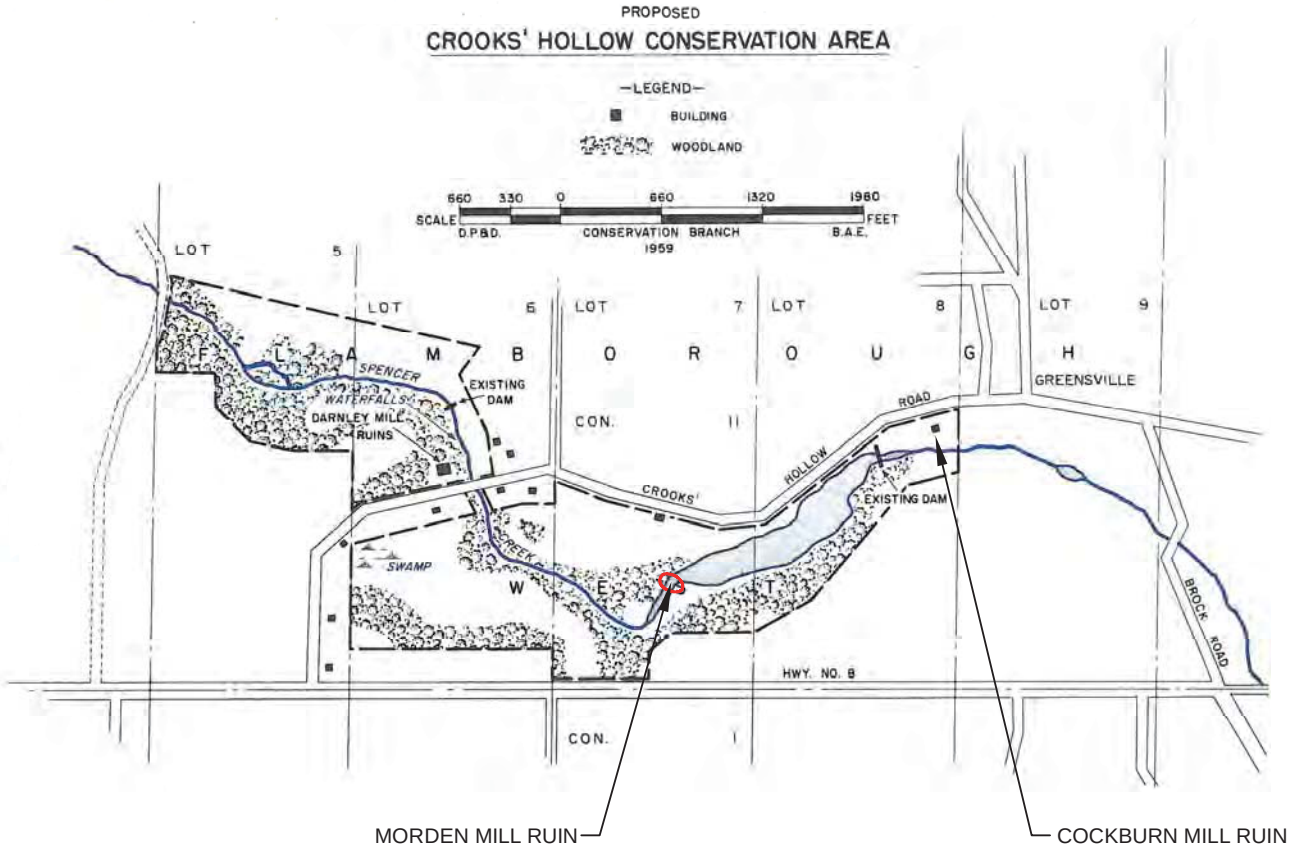
2.5 Crooks Hollow Conservation Area

The Spencer Creek Conservation Authority was established in 1958 (Figure 4). In 1966 it was enlarged to become the Hamilton Region Conservation Authority, today the Hamilton Conservation Authority. The Crooks Hollow Conservation Area was the first recreational scheme proposed by the new Conservation Authority in 1959. However, negotiations with the Dundas Public Utilities Commission caused delays in the plan until 1964. Thus the Conservation Authority went on to open other public areas prior to the Crooks Hollow site.[26]

The proposed Crook's Hollow Conservation Area included most of the 19th century mill sites of the upper Spencer Creek. The conservation area consisted of 97 acres of which 30 acres were woodland, 45 acres open and 22 acres of water in the waterworks reservoir. The land occupied much of the south half of lots 5, 6, 7 and 8 of concession 2, in the former Township of West Flamborough. The portion of land below the Dundas reservoir has been mostly leased for grazing.[27]

[26] Spencer Creek Conservation Authority. *The Spencer Story*. By Thomas Thomson. 1965, p.54

[27] Department of Commerce and Development, *Spencer Creek Conservation Report 1960*. Toronto 1960 Part 4 – Recreation p.19-20; Spencer Creek Conservation Authority, *Annual Report* 1970



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REFERENCE

DRAWING BASED ON SPENCER CREEK CONSERVATION AUTHORITY, 1959.

NOTES

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ALL LOCATIONS ARE APPROXIMATE.

PROJECT
HERITAGE IMPACT ASSESSMENT
CROOKS HOLLOW DAM
GREENSVILLE, WENTWORTH COUNTY, ONTARIO

TITLE
MAP OF CONSERVATION AREA, 1960

Golder Associates
LONDON, ONTARIO

PROJECT No. 11-1136-0029			FILE No. 1111360029-R01001	
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3.0 SITE INVENTORY

3.1 Crooks Hollow Dam

The Dam is a monolithic concrete gravity structure 100 feet (30.5 m) long and 17½ feet (5.3 m) high from the bed of the creek to the crest of the spillways. Although no drawings exist today, the height concurs with field measurements and core sampling undertaken in 1992. The dam has four spillways of which the crest of spillway #2 is considerably lower than the other three and had stoplog slots in order to raise the water to the crest of the other three. The design of the spillways was typical of the early 20th century.[28] (Figure 3, Plates 7-11)

Extending above the spillways are buttresses that supported a foot bridge across the dam. The buttresses were also built with stoplog slots such that the water level could be raised to increase the capacity of the reservoir. (Plate 11) It is not known if this extra capacity was ever used. By the late 20th century the crest of the spillway was the operating height of the reservoir.[29]

The south abutment of the spillway is very short and butts into the rock of the steep valley wall. The abutment on the north end is considerably longer and visually appears to be an earth structure with a concrete retaining wall on the reservoir side. Road access to the dam came from Crooks Hollow Road onto the embankment.

A single, cast iron conduit carried water from the dam to the reservoir. In 2011 a portion of the conduit was visible on the surface of the north bank of the creek. (Plates 12, 13) A valve chamber was located on the north embankment.

A 1959 report noted that a pump house and an abandoned shed were located near the dam. They seem to have been removed by 1965.[30]

[28] *Dundas Star Nov* 2, 1916; Peto MacCallum Ltd, 1992; Flinn, et.al., *Waterworks Handbook*, 1918.

[29] *Dundas Star* Nov 2, 1916.

[30] Spencer Creek Conservation Authority, "Crooks Hollow Conservation Authority, Scheme #1," Sept 25, 1959; (Spencer Creek Conservation Authority. *The Spencer Story*. By Thomas Thomson. 1965

Plate 7: Upstream View of Dam looking to east abutment. The low #2 spillway is evident as are the buttresses that could increase the depth of the reservoir if needed. The metal footbridge provides a public crossing of the stream.

Plate 8: Looking upstream to Dam showing lower level of Spillway 2 crest

Plate 9: Concrete and earth abutment on west side of dam

Plate 10: Dam crest, and stop log slot, earth berm and bridge looking to west bank

Plate 11: Large gravel evident in concrete visible in stop log slot of Spillway 4

Plate 12: The cast iron water conduit was laid on the ground adjacent to the creek rather than buried

Plate 13: Iron conduit along bank of Spencer Creek with dam in rear

3.2 Morden Mill Dam

The Morden Mill Dam was originally constructed in 1810 and depicted in c.1900 in Plate 6. Today it consists of a long earth and stone dyke extended from the south bank almost across the creek valley. (Figure 6) The dyke appears to be the original length and has been stabilized from flooding by natural regeneration of trees. The remains of a stone weir lie between the dyke and the north bank. (Plate 14)

The unusual aspect of the weir is the use of large stone blocks. (Plate 15) More typically mill dams were rock-filled timber cribs, such as used at the Cockburn Mill.

Plate 14: Looking upstream to the dam at Morden Mill

Plate 15: Detail of stone blocks in the weir as it is attached to the dyke on the south bank.

3.3 Cockburn Mill and Dam

The Cockburn mill consists of an extensive complex of ruins located on the north bank of the Creek. (Figure 5) The mill and dam as it appeared in the early 20th century is illustrated in Plates 3 and 4. The dam across Spencer Creek was proably breached in 1915 before construction of the Croosk Hollow Dam commenced. The earth abutment of the dam still exists on the south bank. (Plate 16)

The concrete spillway weir depicted in Plate 4 still exists today. (Plate 17) The stone-filled, timber crib design is still evident today. (Plate 18) This weir possibly dates from the rebuilding of the dam in c.1912.

Plate 16: Remnant of breached Cockburn Mill earth abutment on south bank of Spencer Creek

Plate 17: Cockburn Mill concrete weir, looking west with mill ruins in rear

Plate 18: South end of Cockburn Mill dam concrete weir. The earth dam across Spencer Creek would have extended to the left of this structure. The rock filled crib construction is visible in the end of the weir.

3.4 Cultural Heritage Landscapes

There are three distinct cultural landscapes associated with the Crooks Hollow Dam.

3.4.1 Reservoir

The upstream end of the reservoir occurs just belwo the Modern Mill Dam ruins. At this point the valley consists of a broad flat valley. The course of the river is ill defined over a rock strewn stream bottom. (Plate 23)

Almost a century of flooding of the reservoir has created a silt layer on the bottom of the Crooks Hollow Reservoir. The tree line defines the edge of the reservoir when spillway #2 was closed. (Plates 19-21) Given the size of the evergreens, the reservoir had not been filled to the maximum height of stop logs for many years.

Plate 19: Drained reservoir above dam

Plate 20: Looking upstream from dam over reservoir

Plate 21: Looking downstream over reservoir at Morden Mill Dam

3.4.2 Above and Below Dam

The stream landscapes are distinctly different above and below the Crooks Hollow Dam. Between the Dam and Cockburn mill downstream, Spencer Creek flows in a narrow, well defined and relatively straight channel along the south valley wall. There is no flood plain. The north bank of the creek forms a undulating flood plain containing the ruins of the mill. (Plate 22)

Above the end of the reservoir at the Morden Mill dam ruin, Spencer Creek flows through a meandering channel marsh land and meandering river channel. (Plate 23) This section of the creek appears to be flowing though the vestiges of the silted-in, 19th century mill pond.

Plate 22: Spencer Creek downstream from dam. The Cockburn mill ruin is on the left side of the creek in the middle of the photo.

Plate 23: Spencer Creek upstream from Morden Mill dam

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4.0 CULTURAL SIGNIFICANCE

4.1 Cultural Heritage Values

Ontario Regulation 9/06 is used to evaluate the cultural heritage value of inventoried features. The regulations describe three types of heritage value: design value or physical value (Section 4.1.1), contextual value (Section 4.1.2) and historical or associative value (Section 4.1.3)

4.1.1 Design Value or Physical Value

A property may have design value or physical value when it:

i) is a rare, unique, representative or early example of a style, type, expression, material or construction method; or

ii) displays a high degree of craftsmanship or artistic merit; or

iii) demonstrates a high degree of technical or scientific achievement.

The criterion of *Design or Physical Value* applies to buildings, dams, earthworks, artefacts or other tangible man-made objects. The criterion can also apply to deliberately designed landscapes such as parks.

4.1.2 Contextual Value

A property may have contextual value when it:

i) is important in defining, maintaining or supporting the character of an area; or

ii) is physically, functionally, visually or historically linked to its surroundings; or

iii) is a landmark.

The criterion of *Contextual Value* can apply to a single, large physical feature such as a large building or to a vernacular landscape consisting of a group of buildings and structures or to large scale modifications of natural features such as a dammed reservoir.

4.1.3 Historical Value or Associative Value

A property may have historical or associative value when it:

i) has direct associations with a theme, event, belief, person, activity, organization or institution that is significant to a community; or

ii) yields, or has the potential to yield, information that contributes to an understanding of a community or culture; or

iii) demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.

The criterion of *Historical or Associative Value* can apply to a physical feature such as a building owned by a well-known family or designed by a well known architect/engineer. It could also be a landscape that is associated with a historic event, such as the improvement of public works in a municipality.

4.2 Evaluation of Crooks Hollow Dam

4.2.1 Design or Physical Value

The Crooks Hollow dam has design value because:

- It functioned as a water supply dam rather than as a water power dam.
- The site was determined by geotechnical conditions that were not considered in the earlier power dams in the valley.

4.2.2 Contextual Value

The Crooks Hollow dam has contextual value because:

- It was one of a series of eight dams on the upper Spencer Creek that took advantage of the creek's steep gradient to provide dam sites.
- The ruins of two 19th century mills link the earlier waterpower use of the valley with the 20th century need for municipal water.
- The reservoir was the only surviving pond in the 20th century and has been a component of the Crooks Hollow Conservation Area since the 1960s.

- The wooded valley slopes and location of Crooks Hollow Road convey the feeling of an early 20th century landscape.

4.2.3 Historical/Associative Values

The Crooks Hollow dam has considerable historical/associative value because:

- It was a major solution to the provision of water supply to the Town of Dundas in the early 20th century.
- The use of Spencer Creek for municipal water was delayed because of the private mill ownership of the water rights on the creek.
- The municipal water shortage and the end of water power on the creek were due in large part to the deforestation of the Spencer Creek watershed.

4.3 Heritage Attributes

The waterworks function of the Crooks Hollow Dam is physically represented by:

- The crest of spillways 1, 3 and 4 at a higher level than spillway 2;
- The buttresses separating the spillways that contained stoplog slots to raise the water level above the normal depth;
- The valve chamber (existence to be confirmed);
- The cast iron pipe sections of the conduit which carry water from the dam to the Dundas Reservoir; and
- The silting upstream of the dam as part of the historic process caused by impounding water.

The waterworks function of the Cockburn Mill is physically represented by:

- The concrete rubble dam and the earth dam abutment on the south bank of the Cockburn Mill that created the reservoir use for water supply before the Crooks Hollow Dam was constructed. The building ruins pre-date the waterworks when the mill was a commercial, water-powered operation; and
- The location of the mill site downstream of the Crooks Hollow Dam which illustrates why the water rights of the dam had to be purchased by the Town.

The association of the Morden Mill with the waterworks is physically represented by:

- The earthwork dam and stone spillway that had to be acquired by the Town because the waterpower potential of the site was lost when the reservoir was flooded.

4.4 Statement of Cultural Heritage Value

The Crooks Hollow Dam has cultural heritage value because it illustrates the changing human use of Spencer Creek over the last two centuries. Throughout the 19th century the creek through Crooks Hollow was utilized for water power. For the first half of the 20th century it was used as a municipal water supply. From the 1960s onwards the valley has become a public recreation area. The Crooks Hollow Dam and the adjacent Cockburn Mill and Morden Mill dams are physical remnants that illustrate this changing use of Spencer Creek.

5.0 PROPOSED UNDERTAKING

5.1 Description of Undertaking

The *Hamilton Conservation Authority – Crooks' Hollow Dam Class Environmental Assessment* completed by Hatch Energy in 2009 identified the preferred solution to decommission and remove the Crooks' Hollow Dam. The report states that:

> *The Crooks' Hollow Dam was constructed in 1913 and is over 95 years old. Although various repairs have been periodically carried out over the years, no significant rehabilitation work has been done. The dam, now nearing its useful life expectancy is in substandard condition. Recent engineering studies have confirmed that the dam requires corrective rehabilitation to ensure its safe operation under major storm events or it should be decommissioned and either removed or modified into an overflow weir.*
>
> *Given the high costs to reconstruct a new operable replacement dam and the fact that the existing operable structure does not provide significant flood control benefits, decommissioning and removal of the dam is considered to be the most effective solution for the long-term disposition of the facility. The removal of the dam will address safety concerns regarding the dam's deteriorated condition, eliminate long-term operating and maintenance costs and enhance local and downstream environmental conditions with no net long-term negative impacts to the environment.*

This would involve complete demolition of the dam and removal of the rubble. The reservoir would be drained and restored back to a natural river condition.

5.2 Cultural Heritage Impacts

The *Crooks' Hollow Dam Class Environmental Assessment* determined that the existing dam is not considered to be of historical or cultural significance so that the repair, modification or removal was not anticipated to result in a significant adverse impact. Lowering the reservoir would change the upstream reach of Spencer Creek into a more riverine setting. However, the EA did not considered this to be a significant impact as the upstream reach of the creek had not been designated as a cultural heritage landscape.[31]

The Hamilton Conservation Authority commissioned this Heritage Impact Assessment of the Crooks Hollow Dam at the request of the Ontario Ministry of Tourism and Culture. Therefore this report was not undertaken as part of the Class Environmental Assessment. The purpose of the study was to review the cultural heritage evaluation of the study area and, as appropriate, recommend mitigation of the adverse impacts of any identified resources.

[31] Hatch Energy *Hamilton Conservation Authority – Crooks' Hollow Dam Class Environmental Assessment* (2009) Table 5-1

Section 4 of this report determined that the dam and reservoir both contain distinctive built heritage features and landscapes. This Section 5.2 identifies the adverse impacts of the preferred solution to decommission the dam. Section 5.3 identifies potential mitigation options that could minimize the adverse effects of the proposed undertaking

5.2.1 Demolition of Dam

Demolition of the dam will result in the removal of a structure that played a key role in the provision of water to the Town of Dundas. The design of the spillway structure was distinctive to a waterworks dam rather than that of the earlier power dams on Spencer Creek. This function is evident in the low crest of spillway 2 and in the raised buttresses for stoplogs above spillways 1, 3 and 4 that provided additional storage capacity. (Figure 3, Plate 8) Although not noted during the field inspection, it is possible that a valve chamber exists in the north abutment that regulated flow into the waterworks conduit.

5.2.2 Naturalization of Dam Site and Reservoir

The process of naturalizing the property will require temporary access roads to the creek, lay-down area and coffer dams during demolition and silt management activities. The layout of these structures could damage cultural features, specifically:

- Morden Mill dam and spillway including both the remnant of the stone weir and the long earth dyke extending from the south bank. (Figure 6, Plate 14)
- Cast iron conduit extending downstream from the dam. (Plates 12, 13)

5.2.3 Landscape of Former Reservoir

The proposed undertaking will remove the Crooks Hollow reservoir. For 200 years Spencer Creek, from Webster's Falls upstream to the Christie Dam, was regulated by a series of mill dams. The ruins of many of these dams still exist. The Crooks Hollow Dam creates the last surviving reservoir in this valley. Collectively these dams are remnants of the economic value of the creek to Dundas – first for water power and later for potable water.

The removal of the dam will result in the regarding of the Spencer Creek channel and relocation of silt deposits upstream of the former dam. The gradual silting of pond reservoirs is a normal characteristic of small dams. The marsh landscape above the Morden Dam appears to have been created by silting of the mill pond. The Cockburn Dam silt is not as obvious and appears to be on the north bank.

The proposed naturalization of the former reservoir will create another man-made landscape from re-shaping the slit and engineering the creek channel. The historic landscapes of the undammed Spencer Creek can be seen in the former mill pond above the Cockburn Mill (Plate 22) and the Morden Mill (Plate 23).

A new pedestrian bridge will be required over the creek because removal of the dam will result in the loss of the current structure. The design of the new bridge may not be sympathetic to the historic character of the valley.

5.3 Mitigation Options

5.3.1 Introduction

This HIA has identified significant cultural heritage resources associated with the Crooks Hollow Dam. The preferred mitigation option would be to rehabilitate the dam and maintain the present operating procedures for water regulation. However, this HIA assumes that the dam will be removed as a result of the recommendations of the EA. The following are options to that may mitigate some of the adverse effects of the undertaking.

5.3.2 Construction Monitoring

Prior to the commencement of demolition and re-naturalizing the valley, a plan should be developed that identifies culturally significant features that should be avoided during the project.

During demolition of the dam, the work should be monitored by a qualified person to document construction details of the dam.

5.3.3 Retain Dam Ruins

As much as possible of the Crooks Hollow dam should be retained, specifically:

- As much as possible of the cast iron water conduit should be left in place and avoided in future developments (Plates 12, 13)
- As much as possible of a portion of the south abutment should be left in-situ to trace the profile of the dam. A similar abutment remains from the Cockburn Dam on the south bank. (Plate 16)
- As much as possible of the north earth and concrete dam should be retained to outline the scale of the former dam(Plate 9)

If possible the valve chamber (if it exists) should be retained. If not possible, it should be documented prior to demolition.

5.3.4 Landscaping

A landscaping plan should be developed that considers the silt deposits in the reservoir as part of the historic character of the Spencer Creek Valley. The headpond landscape above the Cockburn dam site and the Morden Mill dam should be used as models on which to base the landscape design of the former reservoir.

5.3.5 Pedestrian Bridge

The design and location of the new foot bridge over Spencer Creek should aid in the interpretation of the historic human use of Spencer Creek. The design could be based on structures used over similar dams, such as illustrated in Plate 4 or a radically modern architectural design that creates a new cultural resource within the valley. If appropriately designed, the bridge location should be such that it complements the interpretation of the cultural heritage resources in the valley. If not, it should be located not to detract from the historic resources.

5.3.6 Conservation and Interpretation Plan

Mill Ruins Conservation Plan

The Cockburn Mill foundations and dam ruins, as well as the Morden Mill earth dyke and stone weir should be stabilized to prevent further deterioration. The removal of vegetation should be considered for the Cockburn Mill ruins and the Morden Mill earth dyke to assist in the conservation of these resources and to aid in visual interpretation of their historic character.

Interpretation

The use of Spencer Creek for both water power and water supply should be interpreted at the two mill sites. A range of interpretation techniques – including signage, trails and landscaping – should be used to convey the information to the public.

Name of Dam

The Conservation Authority may wish to re-examine the name of the dam. *Crooks Hollow Dam* seems to have been adopted when the conservation area was organized in the 1960s. The most widely used name in the 20th century – at least in newspapers – was the *Greensville Dam*. The term was used by the *Dundas Star* in August 8, 1912 to describe the Cockburn dam as the “waterworks dam at Greensville”. The *Hamilton Spectator* also called it the Greensville Dam in August 14, 1936. The name *Town Dam* was used in the Spencer Creek Conservation Authority booklet, *The Spencer Story* (1965).

6.0 RECOMMENDATIONS

6.1 General

Copies of this report should be deposited with the:

Dundas Museum and Archives 139 Park Street West Dundas, Ontario L9H 1X8

Hamilton Public Library 55 York Boulevard Hamilton, Ontario L8N 4E4

6.2 Crooks' Hollow Dam

6.2.1 Construction Monitoring

Prior to the commencement of demolition and re-naturalizing the valley, a plan should be developed that identifies culturally significant features that should be avoided during the project.

During demolition of the dam, the work should be monitored by a qualified person to document historic construction details of the dam.

6.2.2 Retain Dam Ruins

As much as possible of the Crooks Hollow waterworks dam should be retained, specifically:

- As much as possible the cast iron water conduit should be left in place and avoided;
- As much as possible a portion of the south abutment should be left in-situ to trace the profile of the dam. This is similar to that left at the Cockburn Dam; and
- As much as possible of the north earth and concrete dam should be retained to outline the scale of the former dam

If possible the valve chamber (if it exists) should be retained. If not it should be documented prior to demolition.

6.2.3 Landscaping

A landscaping plan should be developed that considered the silt deposits in the reservoir as part of the historic character of the Spencer Creek Valley. The headpond landscape above the Cockburn dam site and the Morden Mill dam should be used as models on which to base the landscape design of the former reservoir.

6.3 Crooks' Hollow Conservation Area Master Plan

6.3.1 New Pedestrian Bridge

The design and location of the new foot bridge over Spencer Creek should aid in the interpretation of the historic human use of Spencer Creek. If appropriately designed the bridge location should be such that it complements the interpretation of the former Crooks Hollow Dam and the cultural heritage resources in the valley. If not, it should be located not to detract from the historic resources.

6.3.2 Mill Ruins Conservation Plan

The Cockburn Mill building foundations and dam ruins as well as the Morden Mill earth dyke and stone weir should be stabilized to prevent further deterioration. The selective removal of vegetation should be considered for the Cockburn Mill ruins and the Morden Mill earth dyke to assist in the conservation of these resources and to aid in visual appreciation of their historic character.

6.3.3 Interpretation

The use of Spencer Creek for both water power and water supply should be interpreted at the two mill sites. A range of interpretation techniques – including signage, trails and landscaping – should be used to convey the information to the public.

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