

The Pivot of Defence of Upper Canada: An Overview of the Structural History of Fort Henry

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Fort Henry's design was the result of almost ten years of planning on the part of the Royal Engineers that culminated in 1829. The fort, constructed between 1832 and 1848, was to be the citadel of a system of fortifications intended to make Kingston the focal point for the defence of Upper Canada. The paper will look at aspects of the structural history of the fort, the only redoubt of the 1829 scheme to be built. Of particular note was Fort Henry's greatest enemy: water infiltration of its casemates caused by a flawed design not suited to the harsh Canadian climate. The Royal Engineers and later the Canadians have fought an ongoing siege against the elements that has seriously impacted the fort to this day.

Introduction: The Planning and Construction of Fort Henry

Prior to the War of 1812, Point Henry, upon which Fort Henry sits, was wooded and undeveloped. With the outbreak of war, the British were quick to realize the importance of the commanding nature of the point, both over their naval yard on Point Frederick and the town of Kingston across the Cataraqui River. On the height of Point Henry, the British initially threw up a *blockhouse* and a *battery* but as the war progressed a more substantial fieldwork replaced the earlier fortifications (Figure 1). Within this fortification were *barracks*, stone towers, storehouses and a *powder magazine*. To the northwest of the fort the British also erected numerous storehouses and workshops. By the end of the war Point Henry had the appearance of a busy and active military establishment.

The haste of construction during the war resulted in some substandard work and almost immediately after the conflict the Royal Engineers highlighted these deficiencies in their reports to colonial officials. To correct this situation several commissions of Royal Engineers were sent to Kingston in the 1820s to systematically study the requirements for fortifications on Point Henry. Lieutenant Colonel J.R. Wright drafted at least three sets of plans to replace the now desperately rundown 1812 post, but it was not until 1829, when senior Royal Engineer Major General Sir

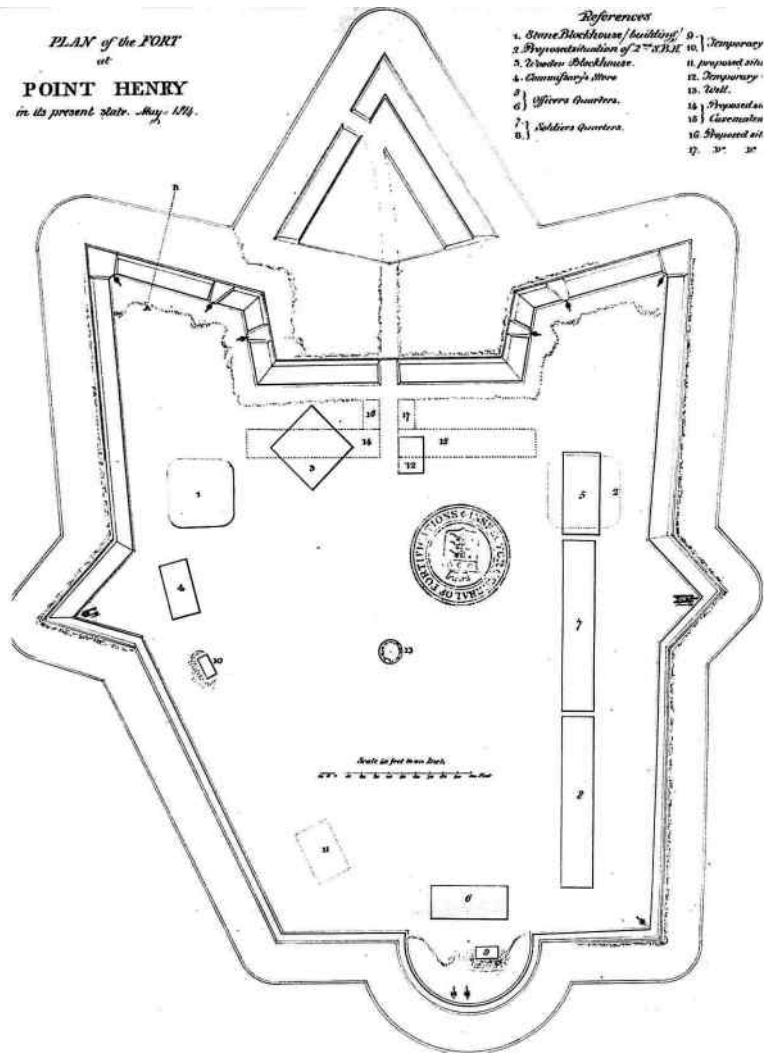
Alexander Bryce convened a committee to review all of the plans, that a final design was agreed upon (Bryce 1829).

Bryce's committee rejected proposals for a traditional *bastioned* fortification and instead put forth a scheme for a bombproof, *casemated redoubt* defended by *reverse fire chambers* embedded in the *counterscarp*. A redoubt better suited the ground on Point Henry and would cost less than half that of a bastioned fort. In addition to Fort Henry, which would be the centre, or citadel, of Kingston's defences, Bryce proposed five similar though smaller redoubts, six *Martello Towers* and four batteries to surround the town.

Fort Henry would have four parts (Figure 2). The first would be a masonry redoubt, whose guns would cover the ground to the north, surrounded by a substantial *ditch* that held reverse-fire chambers for close-in defence. The second feature would be the Advanced Battery (AB), located behind the redoubt and covering the lake approach to the fort. The third element would be casemated storerooms for the Commissariat Department. These twin buildings would link the redoubt to the AB. The final components were the two branch ditches: projecting outwards from the redoubt's ditch and extending down to the water's edge, these branch ditches would enhance the security of military structures on the southern portion of Point Henry.

Fort Henry's position was crucially important. As the citadel of the proposed system of defence

Figure 1. Fort Henry, 1814.
Library and Archives of
Canada, NMC 4677.



it would protect the southern end of the Rideau Canal, a strategic and vital supply route between Upper and Lower Canada that circumvented the vulnerable St. Lawrence River. The post would also stand guard over the Royal Navy dockyard on the adjacent Point Frederick and protect the numerous military shops and storehouses present on Point Henry. As Bryce (1829) described it, the location was surely, “the pivot of defence of Upper Canada.”

Work on Fort Henry commenced in 1832 and was substantially completed by 1837. Prior to construction, Colonel Gustavus Nicolls, Commanding Royal Engineer in Canada, modified the redoubt design and added a third face to its

northern side to better cover the *glacis* (Nicolls 1832, Figure 3). Constructed of locally quarried limestone, the redoubt’s casemates were arched in eight layers of brick. The northern casemates had two levels, providing quarters on the upper and storage on the lower while the officers were housed in the single level west and east casemates. The *curtain wall* on the south side of the redoubt contained the privies, guardrooms and additional storage and a magazine located in the northeast corner held 1,000 barrels of gunpowder. The garrison’s water supply was held in large cisterns, capable of holding 182,000 litres, built under the eastern end of the redoubt’s *parade* (Holloway 1849).

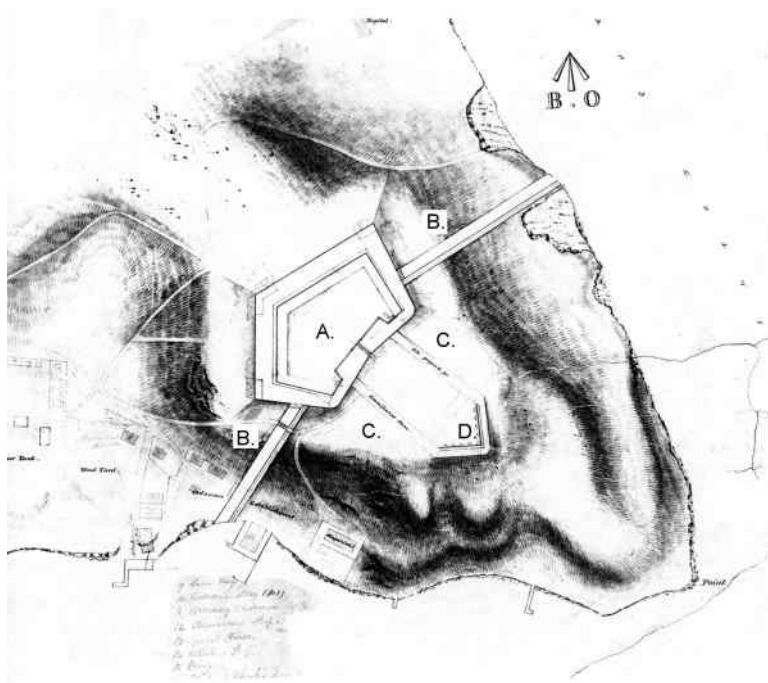


Figure 2. *The proposed Fort Henry, 1829. A. Redoubt, B. Branch Ditches, C. Commissariat Stores and D. Advanced Battery. Library and Archives of Canada, NMC 4540.*



Figure 3. *Fort Henry, 1835. The plan shows the additional front added to the northern side of the redoubt by Lieutenant Colonel Nicolls. Library and Archives of Canada, NMC 22430.*

Fort Henry's *terreplein* (the surface of the rampart above the casemates) provided a platform for an impressive array of smoothbore ordnance. Positions were constructed for twenty-seven 24-pounder cannons mounted on wooden traversing platforms while two 24-pounder carronades covered the branch ditches. Two ten-inch and two eight-inch mortars, located on the redoubt's parade, provided high angle fire. The two reverse-

fire chambers of the main ditch were designed to hold a total of six 18-pounder carronades and soldiers protected in a masonry *caponnière* in the north ditch could augment these cannons with their musketry (Oldfield 1840).

The British completed the AB by 1839. This arrowhead-like structure facing Lake Ontario was a battery for nine 32-pounder smoothbores and one 13-inch mortar (Oldfield 1840). The

parapet and the ditch walls of the AB were constructed of ashlar limestone.

The Royal Engineers started work on the Commissariat Stores in 1841, finishing them in 1843. Each structure had eleven bombproof casemates that secured communications between the AB and the redoubt. The majority of the casemates were meant for the Commissariat Department, which handled the army's provisions and pay, but two were designed as magazines for the guns of the AB. The engineers also constructed cisterns holding 60,000 litres behind the AB to augment the fort's water storage capacity (Holloway 1849).

The last major additions to Fort Henry were the branch ditch towers. The towers were not envisioned in the original planning for the site, but by the early 1840s the Royal Engineers realized the vulnerability of the lower ends of the glacis and the branch ditches to infiltration by enemy troops (Holloway 1845). To correct this shortcoming the towers, each armed with a short 24-pounder cannon, were sited to provide *enfilade fire* along the shores of Point Henry as well as the branch ditches. Commenced in 1846, the masonry towers were completed in 1848. The branch ditch towers were similar in appearance to the four Kingston Martello Towers also erected in the mid-1840s. The ditch towers were, however, smaller in diameter, less heavily armed, and did not have the central masonry pier characteristic of the Martello towers.

The fort provided accommodation for a garrison of 327 troops and eleven officers with storage for rations and supplies (Figure 4). The two cisterns could provide water for a ninety-day siege at the rate of two imperial gallons (9.1 litres) per soldier per day. Numerous British infantry regiments and detachments of Royal Artillery called the redoubt their home over the course of thirty years. The size of the garrison varied, depending upon the situation, from a low of a few dozen to its maximum capacity. While never fired upon in anger, the fort did see service during the Upper Canada Rebellion as a prison for Canadian rebels and their American sympathizers (Bonnycastle 1839).

British Alterations and Improvements

The British improved the armament slightly during their tenure at the fort. In the late 1840s they laid iron racers (tracks) over the curbstones for the cannon traversing platforms (Gordon 1855). Prior to this improvement, frost heaving of the stones had made it difficult to traverse the guns. In the early 1850s, two newer types of improved ordnance were introduced. The northeast angle of the redoubt was modified for an 8-inch shell gun, which had a longer range than the 24-pounder (the 8-inch gun would not be installed until 1862). The

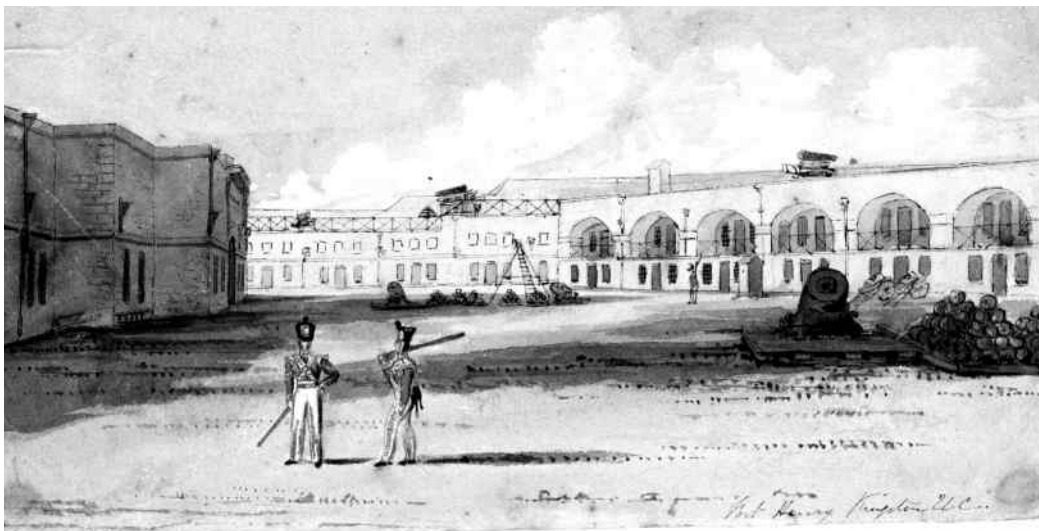


Figure 4. The interior of the completed redoubt, circa 1840, by George St. Vincent Whitmore. Library and Archives of Canada, C-150293.

engineers adapted the *salient* angle of the AB to accommodate a larger and more powerful 56-pounder smoothbore. In 1863 three positions on the eastern front of the redoubt were updated to accommodate a newer pattern of 24-pounder traversing platform (Storer 1863).

The fort itself underwent various modifications and upgrades during the British tenure. In the late 1840s the engineers added a *blast wall* to the area in front of the magazine. About the same time the curtain wall was raised and loopholed. In the 1850s the drainage from the privies was altered in an effort to decrease their odour. By the 1860s the majority of the casemates within the Commissariat Stores had been converted into gunpowder magazines (Ford 1865).

Alterations to Fort Henry were not confined to the built structures. The Royal Engineers were keenly aware that the natural contours of Point Henry provided ample dead ground for an undetected approach to the fort. To remedy this they had, by 1846, sculpted the glacis to the north of the redoubt. Lieutenant Minor Knowlton, an American military engineer visiting Kingston in the early 1840s, observed that the southern portion of the point was much more rugged and would require an immense effort to contour (Knowlton 1840). He was not mistaken. Despite constant work, the British would not complete the southern glacis until 1858.

Perhaps the greatest challenge for the British was to keep the redoubt casemates dry. This component of the fort had been planned to act, in part, as a catch basin for rainwater to be saved in the cisterns. However, the Royal Engineers did not reckon with the heat and cold extremes of the Canadian climate when drafting their design. Water that should have been flowing from the terreplein, into drains leading to the cisterns, was instead infiltrating through the brick arches and into the casemates. The annual freeze and thaw caused the limestone masonry to displace, creating further leakage.

This alarming trend was noticed as early as 1839. Royal Engineer Captain Benjamin Stehelin, hoped that time would allow the casemates to “mature” and dry out (Stehelin 1840). However, this was not to be and in 1841 the British launched the first of at least six efforts to combat

leaking in the redoubt. Asphalt was laid over the terreplein, but this proved a temporary fix. In the mid-1840s Colonel William Holloway, the Commanding Royal Engineer in Canada, executed a major revamp of the redoubt by lifting the fill from the terreplein, asphaltting over the casemate arches and rerouting the drainage of water (Holloway 1848, Figure 5). This seemed to work for a few years, but by 1854 the terreplein again needed excavation for the leaks to be sealed. In addition, the superior slope of the parapet was repointed. Even this was not enough to stop the leaking and between 1858 and 1861 the engineers covered the parapet with a roof-like structure of wooden boards (Servante 1863). In 1862 the fill above the officers’ casemates had to be removed and part of the interior wall rebuilt to stop the leaking (Servante 1861). This ongoing battle with water was in stark contrast to the Commissariat Stores: during the initial construction, the installation of a proper roof undoubtedly saved these casemates from the fate of those in the redoubt.

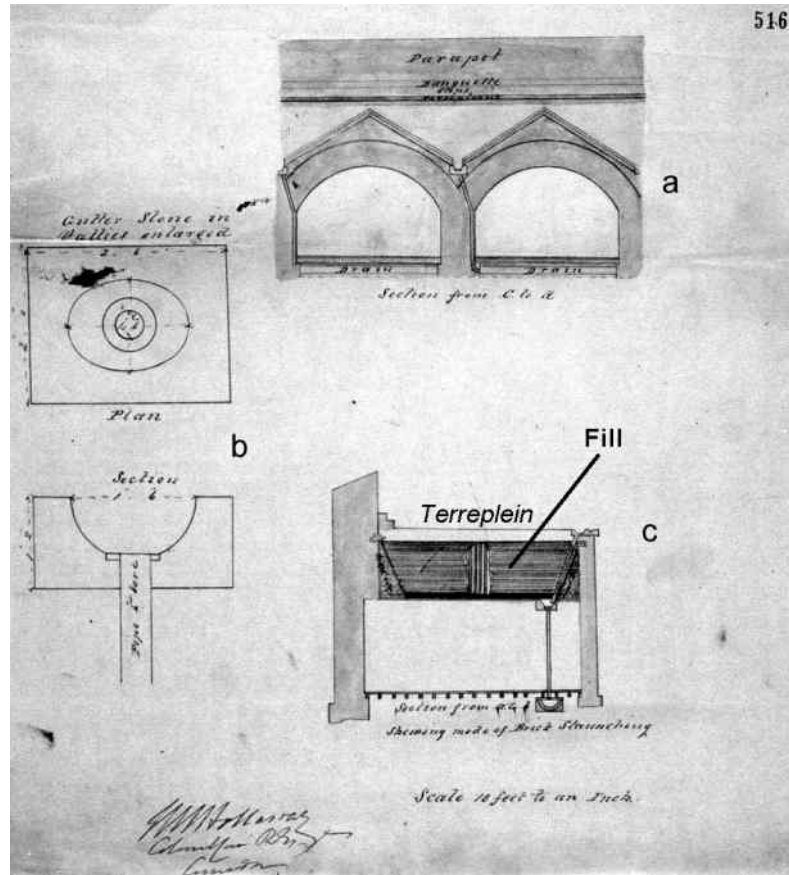
The Canadians Take Over

With the end of the American Civil War in 1865 and the founding of the Dominion of Canada in 1867, the British government reconsidered its imperial defence obligations. Starting in 1870 the British gradually withdrew their garrisons in Canada. The Royal Engineers transferred Fort Henry to the Canadian government’s agents in August of that year.

In 1871, when “A” Battery of the Canadian Regiment of Artillery set up its school of instruction at the fort, it was realized that further work would be required to keep the site in repair. From 1875 to 1877 the Department of Public Works extensively renovated the redoubt: the department’s contractors pointed the masonry, covered the terreplein with a wooden block and tar pavement, and renewed the board covering of the superior slope of the parapet (Department of Public Works 1876).

There was also an attempt, if only half hearted, to update the ordnance of the redoubt. In 1875 the Canadians installed the first piece of modern

Figure 5. Colonel Holloway's alterations to Fort Henry: a profile of the redoubt showing the routes of the drainpipes through the brick arches to drains beneath the floors of the casemates (a); one of the new stone drains installed under the terreplein (b); a section illustrating the drainage from the terreplein through pipes to the sub-floor drains (c). Also indicated is the area of fill that was removed to facilitate the asphaltting of the casemate arches. The National Archives:Public Record Office, WO55/882, f. 516.



artillery, a seven-inch breech loading, rifled Armstrong gun which replaced the shell gun at the northeast angle. The Canadians also renovated ten sets of the curbstones on the terreplein. However, the 24-pounder guns and their traversing platforms were never remounted upon these positions. It is not clear why the Canadian military took this decision, but smoothbores were becoming obsolete (the American Civil War had amply demonstrated the superiority of rifled ordnance) and it may not have been worth the expense to re-install them. By the late 1870s the redoubt's armament had been significantly reduced, yet with the cannons in the AB the fort still had an ample array of serviceable guns to train the militia gunners attending the artillery school.

Despite the efforts of the Canadians, the redoubt continued to deteriorate. By the late 1880s the commandant of the artillery school noted the serious situation of the curtain wall, but little was

done to correct its condition (Cotton 1889). In 1897 it was in such a ruinous state that it had to be demolished.

In part, a lack of purpose for the redoubt contributed to its decay. Military officials recognized that it was an outmoded fortification and that to restore the fort would involve a great expense that could not be justified (Militia and Defence 1892). In the 1890s the Department of Militia and Defence converted parts of the redoubt into a storage depot, but it was not extensively used again until the First World War.

In stark contrast to the redoubt were the Commissariat Stores. Routine maintenance continued on the two buildings and the structures remained sound, providing dry and secure storage for the ammunition housed within.

At the beginning of the First World War (1914-1918) the redoubt became an internment camp, initially for civilian citizens of the central powers

and later for German military prisoners (Figure 6). Canadian engineers installed security measures and a new roof over the terreplein of the redoubt, but the long neglected fort provided less than ideal living conditions for its inhabitants. The badly pointed masonry allowed water into the casemates and the walls of the former officers' quarters had to be propped up to prevent them from collapsing (Royal Canadian Engineers 1915). In 1917 the site closed and the prisoners transferred to other camps.

Through the 1920s and into the 1930s the Canadian military continued to use the redoubt and Commissariat Stores to house ammunition and supplies. Very little, if any, money went into the maintenance of the redoubt and, as a result, water infiltration continued. The walls of the ditch surrounding the fort crumbled, as did sections of the walls on the exterior and interior of the redoubt. By the mid-1930s sections of Fort Henry were indeed a ruin (Figure 7).

The Redoubt Restored

It took the bleak economic depression of the 1930s to change the fortunes of Fort Henry. Negotiations initiated by Ontario provincial officials with the Department of National Defence produced an agreement to repair the redoubt and lease it as a tourist destination (The military retained use of the Commissariat Stores). Architect William Somerville and the site's first curator Ronald Way lead the restoration project. Between 1936 and 1938 a substantial program,

costing over \$800,000, was undertaken to rebuild the redoubt, the branch ditches and towers, and completely reconstruct the curtain wall (Way 1965, Figure 8). Work crews lifted the terreplein again and installed a concrete slab in hopes of forestalling the penetration of water. The fort was literally reborn and the overall appearance of the site today reflects the work done in the 1930s.

The Second World War (1939–1945) interrupted Fort Henry's new role as a heritage site. The military reoccupied the fort and used it at different times as a prisoner of war camp, a vehicle depot and as a detention centre for Canadian soldiers guilty of military offences. Once again the site was extensively modified: the casemates of the redoubt became prison cells and the AB provided quarters for the camp's guards.

In 1947 National Defence returned the redoubt to the province of Ontario (eventually the Commissariat Stores were transferred as well). Curator Way oversaw a large-scale rehabilitation and clean up of the site to repair damage caused during the course of the war. Around \$100,000 was spent on the renovations (Comber 1956).

Leaks in the redoubt's parapet and terreplein would once again become a leading maintenance issue. Between 1949 and 1988 there were at least two major attempts to address water seepage into the casemates (Patterson 2003). The parapet was coated with vinyl, the surface of the terreplein sealed with various membranes and flashing installed at critical junctures. All of these measures have had limited success.



Figure 6. Fort Henry as a Prisoner of War camp in the First World War. Library and Archives of Canada, C-017323.

Figure 7. *East officers' casemates, 1931. Archives of Ontario, I0002554.*



Figure 8. *The reconstruction of the curtain wall during the 1936-1938 restoration. Fort Henry Archives.*



The 2002 Stabilization Effort

Parks Canada assumed federal administrative responsibility of Fort Henry in 1999. Operation of the site remained in the hands of the St. Lawrence Parks Commission, an agency of the Province of Ontario. Recognizing that the site once again needed urgent work to preserve its built heritage, the federal and provincial governments contributed a total of \$15 million for a stabilization project. Since 2002 this endeavor has addressed the most urgently needed repairs. To date, the entrance cutting leading from the Commissariat Stores to the redoubt has been repaired and repointed, and the Commissariat Stores roof, lightning protection and eavestroughs have been replaced. Work is proceeding on the stone replacement, waterproofing and repointing of the

redoubt and should be complete by late 2006 (Figure 9). Stabilization of the Branch Ditch Towers should also commence in 2006.

With these efforts it is hoped that this national cultural resource will be secured for the immediate future. A new generation of engineers are now testing their mettle against those formidable and most relentless of enemies of Fort Henry: water infiltration and the harsh Canadian weather.

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Figure 9. *The rehabilitated terreplein above the east officers' casemates, summer 2005. Parks Canada, 2005.*

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La conception de Fort Henry a nécessité, de la part des ingénieurs royaux, presque 10 ans de planification qui ont culminé en 1829. Le fort, construit entre 1832 et 1848, devait être la citadelle d'un système de fortifications destiné à faire de Kingston le coeur de la défense du Haut Canada. Cet article va considérer les aspects de l'histoire structurelle du fort, la seule redoute du plan de 1829 à être construite. Le plus grand ennemi de fort Henry est digne de mention—l'infiltration de l'eau dans les casemates découlant d'une conception négligée et impropre au rigoureux climat canadien. Les ingénieurs royaux et, plus tard, les ingénieurs canadiens, ont subi un siège incessant de la part des éléments qui ont continué à avoir un impact sérieux sur le fort jusqu'à nos jours.

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