CONSERVATION BULLETIN SERIES

Water Management

FOR THE CONSERVATION OF HISTORIC BUILDINGS IN SASKATCHEWAN

Saskatchewan Heritage FOUNDATION

The Saskatchewan Heritage Foundation (SHF) is a Crown Corporation established by provincial legislation in 1991 to support heritage projects at the provincial and community level that seek to conserve, research, interpret, develop and promote Saskatchewan's diverse heritage resources.

The Heritage Conservation Branch (HCB) of the Ministry of Tourism, Parks, Culture and Sport facilitates the protection and conservation of heritage resources in Saskatchewan under *The Heritage Property Act*.

The Standards and Guidelines for the Conservation of Historic Places in Canada (the "Standards & Guidelines") represents nationally-adopted guidance on how to best conserve Canada's irreplaceable heritage resources. The Standards & Guidelines have been adopted by the SHF and the HCB.

Water Management - This Conservation Bulletin is a resource guide for some of the most common issues that affect the physical integrity of historic buildings in Saskatchewan. When materials are subject to water getting and staying in places that can lead to deterioration, it can also raise water management issues. This bulletin provides information to anyone who owns, leases, manages or otherwise utilizes the Province's non-renewable historic places.

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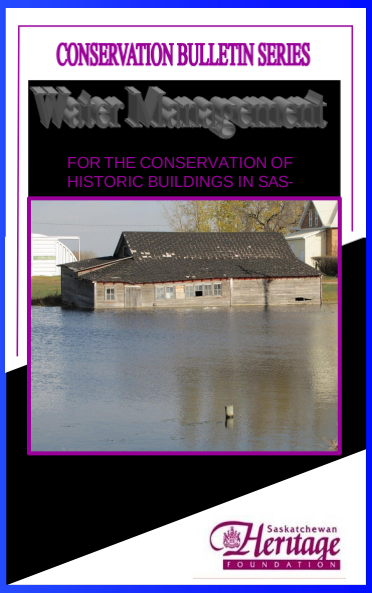

1. INTRODUCTION

Why Do We Need to Worry about Water?

Water is essential for nature and living organisms as well as a functioning society. It is also widely regarded to be a building's worst enemy — potentially, far more devastating than fire, wind and snow loads.

The preservation of groundwater is important for the insitu preservation of archaeological sites; however when this is combined with hydrological forces and the tendency of moisture to be transported horizontally through soil, the high moisture levels that may be seen in some of Saskatchewan's basements remains problematic.

Whether climatic or seasonal variations, water is likely to fall upon Saskatchewan's historic places with the help of gravity. We will of course need to plan for that likelihood. That planning must include provision for the collection of water; directing it along the path of least resistance; and dispersing it well-away from places where it can cause material to deteriorate or chemical reactions such as efflorescence to occur.

In cold climates such as Saskatchewan, the build up of ice, snow and the unforgiving freeze-thaw cycles can lead to the use of materials and methods which in of themselves can cause problems on historic properties. In this bulletin, not only will it illustrate examples of the effects of interventions intended to control water but it will also depict the destructive nature of water throughout Saskatchewan when the management of water, especially rainwater, becomes out-of-sight out -of-mind.

This bulletin is not intended to cover such complex systems of hydrology; natural water systems; urban watersheds; surface infiltration modeling; or climatic variations that influence the interrelationship between surface and ground water management. It is however intended to be a practical reminder of the importance of water management at the individual building level that have been observed throughout Saskatchewan.

Fig. 1— Presbyterian Church, Saskatoon (M. G. Miller 2011)

2. THE STANDARDS & GUIDELINES FOR THE CONSERVATION OF HISTORIC PLACES IN CANADA

How does water management relate to the conservation of historic places in Saskatchewan?

Conservation is the overarching term for protecting historic places. It consists of all actions or processes aimed at safeguarding the heritage values of an historic place while extending its physical life.

This may involve Preservation, Restoration, Rehabilitation, or a combination of these actions or processes. To conserve means to keep. It is the supreme preservation principle. Together with stabilization, conservation work that protects the fabric of a historic place and prevents its further loss should therefore have absolute priority over all other measures.

Water management is therefore well-aligned with preservation, because they both involve preventative and reactionary measures to protect the historic fabric. In preservation, efforts are often aimed at protecting historic materials from the elements. Since water is widely recognized as a building's worst enemy, preservation efforts are by default, associated in some form with water.

Preservation is a fundamental aspect of the *Standards and Guidelines for the Conservation of Historic Places in Canada* (the "Standards & Guidelines") recognized as the benchmark for best-practice in the conservation of historic places in Canada. The Standards & Guidelines were adopted by the Saskatchewan Heritage Foundation in 2004.

***Preservation** involves the protection, maintenance and stabilization of the existing form, material and integrity of an historic place while protecting its heritage value.*

Preservation can include both short-term and interim measures to protect or stabilize the place, as well as long-term actions to stave off deterioration or prevent damage. This will keep the place serviceable through routine maintenance and small repairs, rather than inoperable during intrusive interventions, extensive replacement and new construction. Consider *Preservation* as the **primary treatment** when:

(a) Materials, features and spaces of the historic place are essentially intact and convey the historic significance, without extensive repair or replacement;

(b) Depiction during a particular period in its history is not appropriate; and,

(c) Continuation or new use does not require extensive alterations or additions.

Preservation tends to be the most cautious of the conservation treatments and retains the most materials. It is therefore more appropriate when heritage values related to physical materials dominate. A plan for Preservation should be developed before work is undertaken.

3. FLOORS

Interior

The solution to your wet basement may lie initially in managing surface run-off water from the roof.

Notwithstanding the spring floods in Saskatchewan (see cover photograph), if your basement appears wet all the time, this may be the result of high groundwater.

Unless the foundation is surrounded by soil that has a high clay content, which can hold rainwater and snowmelt for months, surface runoff problems usually come and go as storm water drains away. However, if your basement is consistently wet long after a storm, or if water is infiltrating through your basement walls, this is more likely to be a subsurface water issue. You may wish to check with your local authority to see if the water table is unusually high in the area or if underground springs are common.

Solutions to high moisture content in soils and therefore wet basements can range from the relatively simple (injecting absorbent clay into the soil and urethane caulk into cracks) to a more involved (creating a sump and installing a sump pump) approach.

It may also be advisable to combine a sump pump with perimeter drains made of 100 mm. perforated PVC drainpipe laid in gravel inside foundation footings. These interior systems, which channel away water before it enters, may require extensive jack hammering where concrete floors are in place. Exterior subsurface drainage systems, which run at the base of the footings, are more costly approaches because they often require removing the landscaping, excavating to expose the foundation, covering it with a waterproofing membrane and laying perimeter footing drains in a bed of gravel. Additional work may be required in basements that have re- tained a soil floor. In these instances, the wa- ter in the soil will not only have to be man- aged with internal drains and/or external pe-

Fig. 2 —Woseley and District Museum, Woseley (M. G. Miller, 2011)

rimeter drains, but it is likely that some form of vapour barrier will be necessary in order to prevent rising damp from occurring within the basement walls.

High levels of moisture in basements that have exposed timber construction are an additional matter requiring water management so that the conditions that allow rot and mould to flourish in wood are not encour- aged.

Exterior

When moss takes over your exterior masonry floor, it may be a sign of inadequate drainage.

As with efflorescence, the appearance of moss, mold, mildew, lichens or algae is usually an indication that excess moisture is present. This excess moisture may result from ponding, where depressions in the masonry allow moisture to collect. Exterior decks, patios, landings and verandahs need to be so designed as to allow rain-water that is collected, to be drained away. This preferred condition does not always apply to heritage structures that may have been designed differently or may have settled over time. If the

(Floors continued)

latter is closer to the conditions on your property, diligence in water management will be in great demand.

Before attempting to correct the biological growth on the surface of the masonry, determine the source of excessive moisture, i.e. leaky downspout, standing water, etc., make any necessary repairs to the "components" of your water management system first. Then determine the type of biological growth that is present. If lichens and algae for example, the following procedure may be most effective:

- Remove as much plant growth as possible using a knife blade and stiff natural bristle brush.
- Water rinse the surface to remove most of the plant material.
- Allow water to soak plant growth for approximately 30 minutes.
- Gently scrub the surface with a stiff, natural bristle brush.
- Thoroughly rinse the surface again with clean, clear water at low pressure from a garden hose.

Fig. 3 — Keyhole Castle, Prince Albert (M. G. Miller 2011)

4. WALLS

Standards & Guidelines

Guidelines for Buildings

Walls

Recommended

*Conserving, **Protecting** and maintaining exterior walls by cleaning and repairing damaged materials, and checking exterior wall assemblies for moisture penetration and insect infestation, taking corrective action, as necessary and as soon as possible.*

In relation to protecting exterior walls from moisture penetration, no where is the old adage "A stitch in time…" more applicable than to the protection of the exterior walls from moisture infiltration or at the very least, early correction of such conditions.

Maintenance planning is self-rewarding: managed maintenance costs less than unprogrammed or deferred maintenance, whether the initial step is a condition assessment or writing a checklist of cyclical maintenance items, the key to increasing the effectiveness of your investment in protecting the exterior walls of your heritage property is to begin planning today.

Timber window sills for example are notorious for collecting water and if there are not adequately sloped to drain, they can be a weak spot in your exterior wall (Figure 4). Unattended deterioration can allow water to migrate into the wall where further deterioration of the historic fabric can continue and go un-noticed. In this instance, the sill has reached a stage of deterioration that only replacement in kind will address ongoing deterioration to the masonry wall.

Where brick sills are present (Figure 5), the corrective measure will involve the identification and repair of sources of water infiltration before re-pointing the brickwork using a mortar that is as soft or softer than the historic mortar.

Open cracks in masonry walls (Figure 6)

Fig. 4 —Timber sill showing effects of moisture entrapment, Stone Church, Wishart (M. G. Miller, 2011)

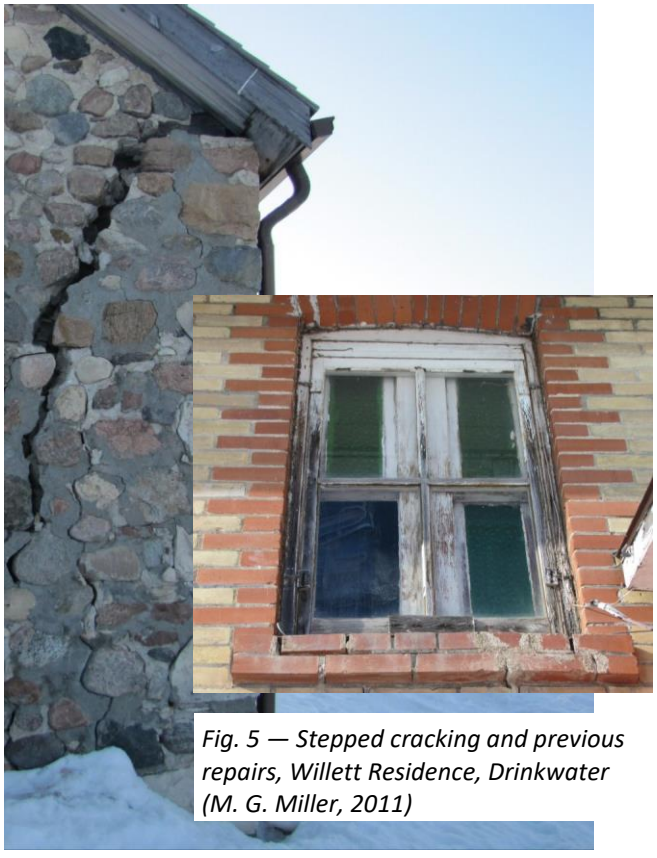

Fig. 5 — Stepped cracking and previous repairs, Willett Residence, Drinkwater (M. G. Miller, 2011)

Fig. 6 —Large crack in stone wall is an opportunity for moisture entrapment, Stone Church, Wishart (M. G. Miller, 2011)

provide ample opportunity for water to infiltrate and unless these exposed areas are tarped to prevent water getting deep within the wall, these areas will almost certainly be- come more costly to rectify once a good old fashioned Saskatchewan freeze-thaw cycle begins to fractural, spall and crack irreplaceable historic masonry.

In certain circumstances, allowing excessive water to infiltrate your heritage property may lead to the growth of plants in places that are difficult to garden (Figure 7). These locations may also impede the free flow of water from your eaves troughs (gutters) to the rain-water leaders (downspouts).

Biological Growth

By the time plants appear above the eaves trough, effective water management is already in the distant past. If the drains are plugged with sediment, soil and leaves, the entire rain-water collection system will likely fail. This occurs when water is forced to take the path of least resistance rather than where it should be directed to flow. If water is allowed to back up, it will find its way through cracks and crevices that may go unnoticed for extended periods of time.

Fig. 7 — 1772 Montreal Street, Regina (M. G. Miller, 2011)

(Floors continued)

Keeping your eaves troughs clear and free of debris is the first step in achieving practical water management of your property.

With regards to biological growth on masonry walls (Figure 8) see also the discussion regarding *exterior floors* on page 7 and the corresponding condition depicted in Figure 3. In a similar order of investigation, property owners should examine their water management system and identify the source of the problem before embarking upon any masonry conservation work.

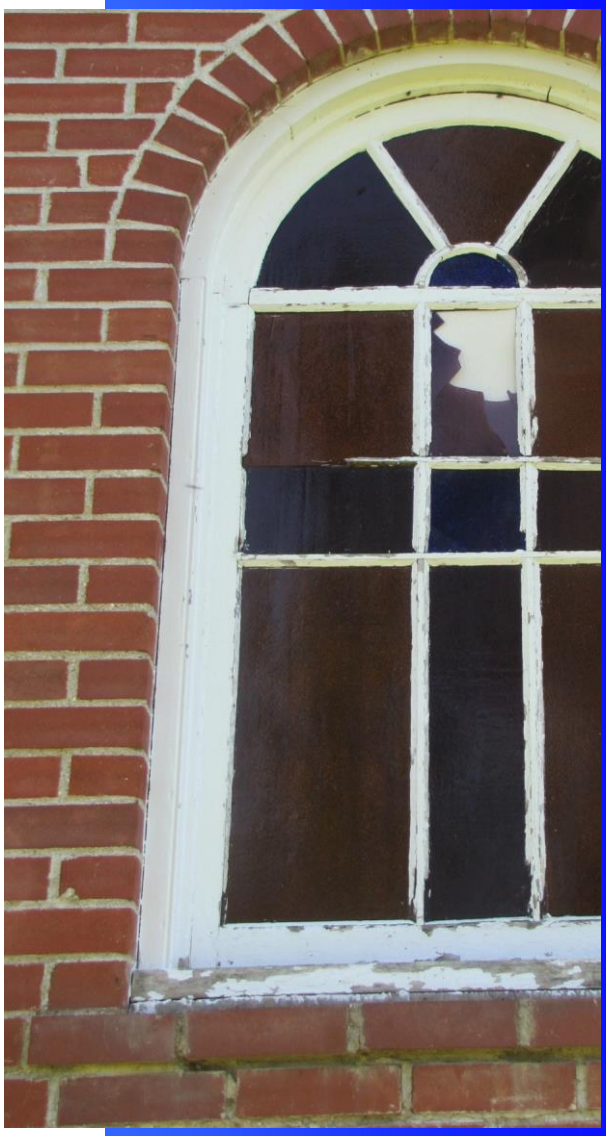

Fig. 8 — Biological growth in the mortar joints, Ukrainian Catholic Parish of St. John Bohoslow, RM of Big Quill (M. G. Miller, 2011)

Efflorescence

Efflorescence is the re-crystallization of soluble salts from within the masonry and the subsequent deposit of those salts on the masonry. It may be found where eaves troughs overflow; where an eaves trough is leakage; or in the case of the Bishop's Residence in Gravelbourg (Figure 9) where destruction has likely been caused by the build-up of ice and snow against the wall.

In relation to St. John's Anglican Cathedral in Saskatoon, the efflorescence appearing on the exterior masonry wall and buttresses (Figure 10) is a result of water infiltrating the building envelope from the eaves troughs which had been continuously repaired over the years by adding new layers of membranes within the gutter, thus reducing the capacity of the eaves trough to collect and dispose of rain water.

Generally, efflorescence can be brushed-off with a stiff natural bristle brush, provided the source of the water has been corrected. In many cases, if the brushing leaves stubborn residue that appears like chalk, this will be washed away after several rains.

In the case of the Bishop's Residence, however, brushing alone will not address the advanced state of salt migration that has resulted in the powdering of the masonry. Here, the extensively deteriorated masonry will need to be removed and replaced in kind after the water source has been addressed..

Fig. 9 — Bishop's House, Gravelbourg
(M. G. Miller, 2011)

Rain-Water Leaders at Walls

Defective rain-water leaders are often the first step on the road to ruin, however, preventative measures can be very practical.

This bulletin captures only a selection of rain-water leader and eaves trough issues throughout Saskatchewan. The importance of these "components" to an effective water management system cannot be over-stated. The frequency to which the ineffectiveness of these components are found throughout Saskatchewan is eluded to in this bulletin.

At the Bishop's Residence for example, a rain-water leader must travel a circuitous route with many joints that may be prone to leakage. This, in combination with the disposal of the collected water immediately adjacent to the foundation is not particularly advantageous.

Much further north in St. Walburg, the location of the rain-water leader in relation to an opening-up of the projecting wall forms the conditions that are conducive to impressive water infiltration at the Museum (Figure 11). Two immediate interventions are appropriate in these circumstances:

- Install a temporary rain-water leader to carry the water away from the building; and
- Protect the exposed structure from further water infiltration by tarping the area until more permanent conservation works can be undertaken.

Fig. 10 — St. John's Anglican Cathedral, Saskatoon (M. G. Miller, 2011)

Fig. 11 — St. Walburg Museum, St. Walburg (M. G. Miller, 2011)

Fig. 12 — St. Walburg Museum, St. Walburg (M. G. Miller, 2011)

5. ROOFS

Parapets, Cornices & Chimneys

Standards & Guidelines
Guidelines for Buildings
Roofs
Recommended

Protecting *and maintaining a roof by cleaning and maintaining the gutters, downspouts and flat roof drains, and re-placing deteriorated flashing in kind.*

If defective eaves troughs are the first step on the road to ruin, defective roofs, parapets and chimneys must certainly be the first line of defense against rain water. This first line of defense is often inhibited by access challenges. Some roofs require cherry pickers, boom lifts or hydra ladders just to get close enough to see what has been taking place nearly "out-of-sight—out-of-mind". Masonry parapets are particularly vulnerable as water tends to find its way down through parapet cap cracks, loose bricks or behind flashings.

In Rouleau for example, the masonry parapet at The Stoop (Figure 13) shows signs of mortar loss, discontinuous parapet cap, and the dislodgement of bricks. In certain circumstances, deterioration precipitated by water infiltration has reached such an advanced stage that complete disassembly of the parapet and rebuilding it in kind may be the minimum intervention.
Similarly, the chimney at the Village Centre

Fig. 13 — The Stoop , Rouleau
(M. G. Miller, 2011)

Fig. 14 — The Village Centre, Chaplin
(M. G. Miller, 2011)

Fig. 15 — The Village Centre, Chaplin
(M. G. Miller, 2011)

(Figure 14) shows signs of mortar loss, dislodged bricks, and a dislodged metal cap. Just below the roof of the same building, a timber cornice (Figure 15) shows signs of localized deterioration that serves as a potential point of entry for water and/or unauthorized pests. Both of these areas are critical in relation to water management; both are somewhat isolated in their location making visual and physical access an added consideration to diligent water management.

The red brick chimney at Scandia Heritage Church (Figure 16), while showing signs of loose and missing capping bricks, would appear to warrant insitu (in its current location without disassembly) repair. This work in conjunction with a close-range inspection of the flashings are critical aspects of effective water management.

Since access to these critical areas is acknowledged as a matter to be carefully considered within the full scope of water management, so too should other related work that is contemplated in the same general area. For example, if your roof is being repaired or replaced, include necessary water management activities for other elements that might otherwise be difficult to gain access. The relevant conservation principle in relation to roofs is captured in the following Guidance:

Standards & Guidelines
Guidelines for Buildings
Roofs
Recommended

Repairing *masonry by re-pointing the mortar joints where there is evidence of deterioration, such as disintegrating or cracked mortar, loose bricks, or damp walls.*

Before repair, water management must be effective. Water management is much about drainage; drainage is much about the controlled flow of water; and gravity is the driving force behind drainage. If the details that we create to manage water are poorly designed, installed or deteriorate, it can create severe problems as well.

Fig. 16 — Scandia Heritage Church (M. G. Miller, 2009)

Fig. 17 — Holy Spirit Ukrainian Orthodox Church, Mazeppa, RM of Sliding Hills (M. G. Miller)

Soffits & Fascias

The fascias are critical elements of a roof edge that serve to support eaves troughs. The effective maintenance of your eaves troughs is the number one method to prevent rain water issues from becoming greater than maintenance.

To start with, fascias and soffits do not like water! If your water collection and dispersal system is working well, then your fascias and soffits are generally protected. However, some water running down the roof surface will adhere to the underside of the shingle and drip down onto the fascia board. A "drip edge" is critical to the process of water man- agement and protecting the fascia and soffit from water. A drip edge is a component (often made of aluminum) that runs parallel to the eaves trough and shingle edge, in order to direct the water from the fascia and soffit and into the eaves trough.

Fig.18 — Keyhole Castle, Prince Albert
(M. G. Miller, 2011)

Standards & Guidelines
Guidelines for Materials
Wood and Wood Products
Recommended

Protecting *and maintaining wood by preventing water penetration; by maintaining proper drainage so that water or organic matter does not stand on flat, horizontal surfaces or accumulate in decorative features; and by preventing conditions that contribute to weathering and wear.*

If you see rain overflowing or cascading behind your eaves troughs, immediately inspect them for stoppage and confirm whether they are effectively secured to the structure. If a soffit or fascia becomes so deteriorated that it ca no longer support an eaves trough, that should be a clear indication that water management has been either deferred or ineffective.

There are however, three key steps that you can take as part of your effective water management system:

1. Keep those eaves troughs clean;
2. Keep wood fascias and soffits caulked and painted; and
3. Keep unauthorized animals and insects away!

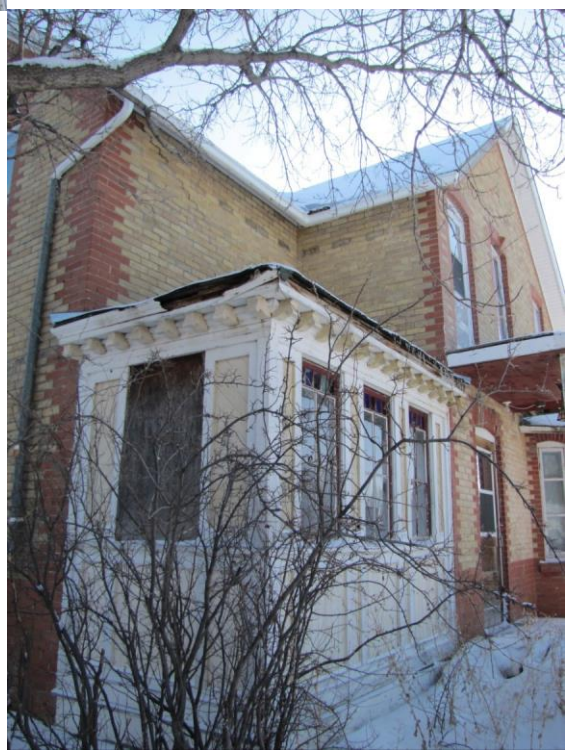

Fig. 19 — Willett Residence, Drinkwater
(M. G. Miller, 2011)

6. COMPONENTS

Flashings

Flashings are fundamental to any water management system. They are intended to direct water away from the "drainage plane" of a construction assembly.

The "drainage plane" is intended to be between the siding and the sheathing. This is typically in the form of building, which laps over the flashing. The flashing should therefore be located behind the cladding.

In many cases, sealants and caulks are used to keep water out from behind the installation of flashing that may lead to problems (Figure 20). While the use of sealants and caulks may serve a temporary purpose, if water becomes entrapped behind sealant, this could exacerbate an existing problem. Where roofs require flashing at junctions with an adjacent vertical plane, stepped flashing is a common and long -used approach. Flashing at these locations should be tucked into a reglet (groove in mortar) and counterflashed.

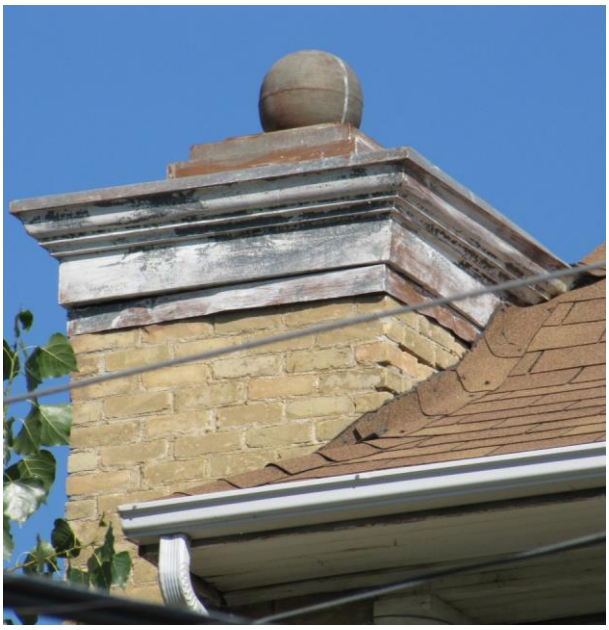

Fig.20 — Central School, Fort Qu' Appelle (M. G. Miller, 2011)

Eaves troughs

Eaves troughs in colder climates such as Saskatchewan are known to take more abuse from exterior weather conditions, particularly ice and snow, than any other component of the building assembly.

Outside of the ice and snow seasons, leaves, mud and debris can block the drains in eaves troughs that direct the water to rain-water leaders. If no one takes the time to keep them clean, one of the three key steps that you could take in implementing an effective water management system will be forfeited.

Eaves troughs must be free enough to collect water from the roof surface if they are to be an effective component of water manage- ment. An eaves trough that falls short of the length required, will allow water to pass be- yond the end of the trough thus exposing the fascia to deterioration. If there is no "drip edge", water will find its way to locations where it will be more costly to manage.

Fig. 21 — Khedive Recreation Centre, Khedive (M. G. Miller, 2011)

7. CONNECTIONS

Detachment

There are four (4) common issues that can lead to eaves trough failure.

- Installation
- Warping
- Clogging, and
- Ice damming

Detachment, for example, is worthy of mention here. Eaves troughs must be designed to take into account the volume of water to be carried; the placement of rain- water leaders; and the number of valleys to be accommodated. Older eaves troughs were often installed with spike-and-ferrules, however spikes do not allow for expansion and contraction and over time, the eaves trough will pull away from the building. Water then leaks between the eaves trough and the fascia board, cause the fascia to deteriorate (see Soffits and Fascias, page 14).

Fig. 22 — Elk School, RM of Heart's Hill (M. G. Miller, 2011)

Misalignment

Connections between eaves troughs and rain-water leaders require continued maintenance to assure that drains are free of leaves and debris and that connections have not become loose. In addition to ensuring that drains are free from debris, of fundamental importance is making sure that the rain-water leader is actually connected to the eaves trough. In the absence of this connection, more water will be drawn to the fascias and soffits.

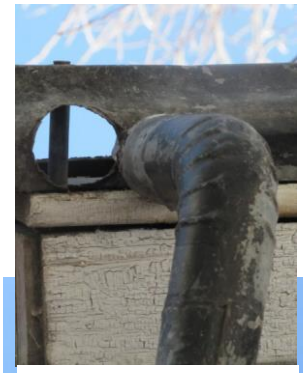

Fig. 23 — Waddell Residence, Regina (M. G. Miller, 2011)

Fig. 24 — Kerrobert Courthouse, Kerrobert (M. G. Miller, 2011)

Fig. 25 — Elfros Union Church, Elfros (M. G. Miller, 2011)

8. JUNCTIONS

Roof & Chimney Junctions

Often there are at least four (4) key reasons why such junctions fail:

1. original design and/or construction;
2. inadequate workmanship or materials;
3. previous inappropriate repairs; and
4. lack of appropriate maintenance

All junctions require special attention during the above stages in order to reduce problems at the water management stage.

Eaves trough & Rain-water Leader Junctions

Eaves troughs and rain-water leaders are sectional and rely on sound joints to keep them water tight. If these junctions are not water tight and periodic inspections with follow-up maintenance is not part of a water management strategy, leakage will occur. The potential effects of leakage discussed previously are significant, and include increased water around the foundation, efflorescence, loss of mortar, fascia and soffit deterioration, etc.

Fig. 29 — Kerrobert Court-house, Kerrobert
(M. G. Miller, 2011)

Fig. 26 — The Stoop, Rouleau
(M. G. Miller)

Fig.27 — Keyhole Castle Prince Albert
(M. G. Miller)

Fig. 28 — Assumption of Marysburg RC Church, RM of Humbolt
(M. G. Miller, 2011)

Fig. 30 — Flood Residence, Regina
(M. G. Miller)

Fig. 31 — St. Laszlo RC Church, Prud ' Homme
(M. G. Miller, 2011)

9. DISPOSAL

There is ample evidence that water management on and around Saskatchewan's heritage properties indicates that there is much work to do. From planning, collecting, and managing to disposal; water is widely acknowledged at being a building's greatest enemy. The evidence suggests that humans are far more culpable than water itself.

The basic premise that water must be collected and directed away from the building challenges property owners to become and remain diligent.

Effectively collecting water is only part of the water management process. Taking it away and disposing of it at an appropriate location is critical to all previous efforts.

Disposing water at the foundation is precisely where it should not be released. In regards to timber structures, this routing is an almost certain guarantee that the deterioration of the historic fabric will be accelerated.

Fig. 32 — Woseley & District Museum, Woseley
(M. G. Miller)

With regard to the disposal of water at the base of a masonry structure, this can have serious adverse effects if water is allowed to enter cracks or voids left by failing mortar. Water that infiltrates cracks and crevices can freeze and as a result, expand within a confined space. The strength of the expansion can and often does exceed the capacity of the masonry to resist. Repeated freeze-thaw cycles can cause spalling and further cracking of the masonry to occur. This type of water infiltration, like the previous types of infiltration, are all preventable.

Fig. 33 — E, A, Davies Building, Saskatoon
(M. G. Miller, 2011)

10. ADVICE

If we consider the *Standards & Guidelines for the Conservation of Historic Places in Canada*, we can turn to Standard 8, which is as follows:

Standard 8 — Maintain *character-defining elements* on an ongoing basis.

This standard introduces the basic hierarchy of interventions. Maintain first, then repair rather than replace the deteriorated parts of character-defining elements. This Standard promotes the ongoing maintenance of an historic place, an essential but often undervalued aspect of conservation. Rigorous maintenance reduces long-term costs as well as the frequency of major interventions.

Maintenance is the most important treatment for extending the life of your heritage property. Water is the greatest enemy of buildings. Effective water management is therefore the recommended solution.

11. REFERENCES

Claxton, Bevis, *Maintaining and Repairing Old Houses*, A Guide to Conservation, Sustainability and Economy, 2008

How Soffits and Fascia are Rotted and Ruined, www.MasterMyList.com

Johnson, Ron, *The Basics of Site Drainage*, Heritage Notes no.7, Alberta Historic Resources Foundation and Alberta Community Development

Tips on Home Maintenance in Canada, Moisture and Older Buildings, Nuts and Bolts, a Publication of the Heritage Canada Foundation

Park, Sharon, *Maintaining the Exterior of Small and Medium Size Historic Buildings*, Preservation Briefs 47, National Park Service, U.S. Department of the Interior

Removing Biological Growth from Exterior Masonry and Stucco, Historic Preservation Technical Procedures, US General Services Administration

Standards and Guidelines for the Conservation of Historic Places in Canada, Second Edition (2011)

Varin, Francois, Nuts and Bolts, Form Follows Function—Keeping Water at Bay

Water Management Details, Housewraps/Flashings/Windows, Building Science Corporation, January 2007 www.buildingscience.com

Wagner, John D., *Drying Out a Wet Basement*, This Old House, Aug.— Sept. 1984, p.150-151

Whelchel, Harriet, *Caring for Your Historic House*, National Park Service, U.S. Department of the Interior

Fig. 7 — 1772 Montreal Street, Regina (M. G. Miller, 2011)

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