



the partnership
for water sustainability in bc

Waterbucket eNews on November 14, 2023
<https://waterbucket.ca/wscblog/>

Living Water Smart in British Columbia:

***Shifting the ecological
baseline to replicate a healthy
watershed requires boldness***

Note to Reader:

Waterbucket eNews¹ celebrates the leadership of individuals and organizations who are guided by the vision for [Living Water Smart in British Columbia](#)².

The edition published on November 14, 2023 featured Carrie Baron. Leadership and innovation defined her professional career as Drainage Manager at the City of Surrey from 1997 through 2021. Carrie Baron has consistently been on the leading edge in advancing green infrastructure and protecting stream health.

The umbrella for Partnership initiatives and programs is the [Water Sustainability Action Plan for British Columbia](#)³. In turn, the Action Plan is nested within [Living Water Smart, British Columbia's Water Plan](#).



¹ <https://waterbucket.ca/wscblog/>

² https://waterbucket.ca/wcp/wp-content/uploads/sites/6/2017/11/livingwatersmart_book.pdf

³ <https://www.waterbucket.ca/cfa/sites/wbccfa/documents/media/81.pdf>

One-Minute Takeaway



“The lucky part in Surrey was that the people who set the green infrastructure groundwork at the lower levels all advanced to senior levels where their duties were bigger than drainage. But they all had that base knowledge.”

Carrie Baron, former Drainage Manager

Shifting the ecological baseline requires boldness

Carrie Baron has always been a trailblazer. There were few women in engineering when she graduated in the mid-1980s. Leadership and innovation defined her professional career as Drainage Manager at the City of Surrey from 1997 through 2021.

When senior governments cut programs in the 2000s and downloaded responsibilities to local government, the City of Surrey and Carrie Baron stepped up. Her passion and commitment garnered internal support at Surrey to fund data collection and performance monitoring programs. These advanced science-based understanding.

Carrie Baron could always be counted upon to lend her credibility to a good idea. Her efforts helped get multiple regional, intergovernmental, and inter-regional initiatives off the ground. Her record of involvement as a champion of intergovernmental collaboration speaks volumes.

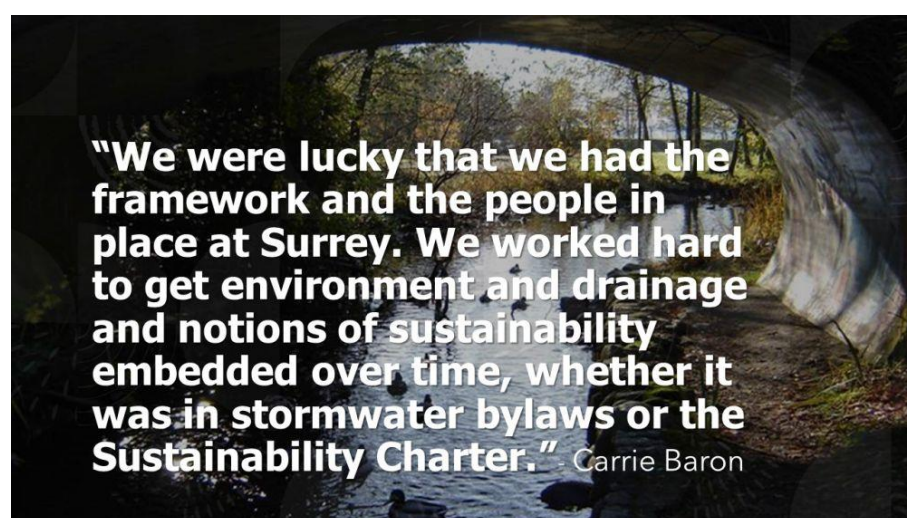
Carrie Baron stands out for another reason. In this era of organizational amnesia and loss of oral history, Carrie Baron and her contemporaries planned ahead, and Carrie successfully passed the intergenerational baton to Samantha Ward as Drainage Manager. This story features both individuals.

Passing of the intergenerational baton

"Surrey is a large organization serving a large population. Surrey has always run a lean operation," comments Samantha Ward who has been with the City for a decade.

"The benefit is that, even though you are wearing a certain hat or title, there are a half-dozen people in the organization who have similar experience or expertise in the same area as you. And it is no big deal to go down the hall and chat with that person."

"I think that is part of passing the baton piece; I am able to learn from others and we can solve issues together."



"When I was leaving, I told my staff do not be afraid of change. New people have new ideas, and this is good. You do not want to keep everything the way it has been forever. You must be open to trying things and ideas. Review the information from the past so that you are not repeating mistakes." - Carrie Baron



Editor's Perspective by Kim A Stephens

Story of the Metro Vancouver region's Green Infrastructure Journey (1997-2023)

The "story behind the story" that follows weaves quotable quotes by Carrie Baron and Samantha Ward into a succinct storyline. This preview about the Surrey experience is extracted from:

Create Liveable Communities and Protect Stream Health in the Metro Vancouver Region: *Moving Along the Green Infrastructure Continuum*

This legacy resource will be published early in 2024. There is so much oral history to be documented. It is a story that begins in 1997 with passage of the Fish Protection Act. However, the genesis is actually the 1970s. Thus, the story is truly intergenerational in nature.

In my experience, three words define Carrie Baron's engineering career: leadership, innovation and science. Carrie Baron has consistently been on the leading edge in advancing green infrastructure and protecting stream health. She is passionate about learning by doing.

Both Carrie Baron and Samantha Ward are valuable sources of oral history. To provide the interested reader with a fuller picture, the complete interviews are included as an appendix to the downloadable version of this edition of Waterbucket eNews.

Improve planning and engineering practices

Surrey is one of two Metro Vancouver municipalities that have a history of leadership over decades in:

- undertaking original and science-based research,
- doing demonstration applications, and
- hosting "convening for actions" forums for peer-based learning on multiple occasions.

The other municipality is the District of North Vancouver where Richard Boase is the champion. He and Carrie Baron collaborated to provide peer-based learning. But that is a story for another day.

Quotable Quote: "The more you learn, the more you try to bring in," says Carrie Baron. "That was always the key – we knew that as technology advanced and we learned more, we had to change."



"Integration is the **KEY MESSAGE** – integration with the ecosystem, recreation, land use, and community groups. Use effective green infrastructure, lighten the 'water footprint', and protect stream health."

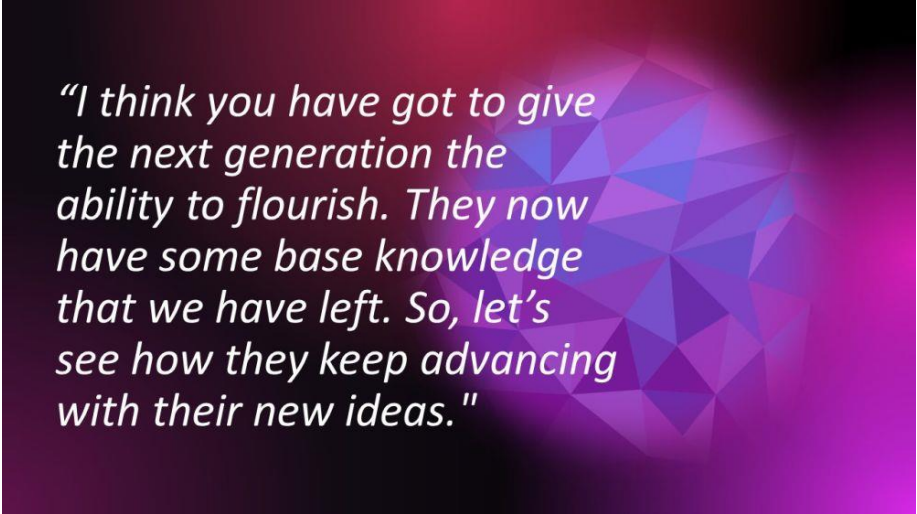
Carrie Baron

STORY BEHIND THE STORY:

Shifting the ecological baseline requires boldness - *conversations with Carrie Baron and Samantha Ward about their Surrey experience*

“When I reflect on my career, it is with a sense of satisfaction because of the enjoyable opportunities I had to work on a variety of issues. These opportunities allowed me to push forward science and incorporate new ideas and concepts,” says Carrie Baron.

“Our society is always changing, and we need to be open to change and learning from nature. We also cannot work in silos. Our best progress comes from working together and solving issues together. Younger staff also need to move forward with their ideas and concepts.”



“I think you have got to give the next generation the ability to flourish. They now have some base knowledge that we have left. So, let’s see how they keep advancing with their new ideas.”

Passing of the intergenerational baton

When Carrie Baron retired in 2021, she passed the drainage baton to Samantha Ward.

“Samantha had worked as a drainage consultant for years before joining Surrey in 2014 as an Infrastructure Program Manager. Once she joined Surrey, she saw the bigger picture through the Neighbourhood Concept Plans (NCPs) because she was coordinating all the engineering pieces.”

“When Samantha succeeded me, she already had the bigger picture. So, I did not need to teach her. She has a really good background as a result of reviewing all the ISMPs (i.e., *integrated stormwater management plans*) completed in the Metro Vancouver region during the first decade. Now it is a matter of where she wants to take things.”

“I come from a different set of experiences. We all bring our past into our current role and then move forward. Other people who are new to the City of Surrey are doing the same thing. We are constantly evolving and growing in that sense.”

Samantha Ward, current Drainage Manager



Biodiversity Conservation Strategy - *guidance for watershed actions*

“Led by Stephen Godwin, the City of Surrey’s Biodiversity Conservation Strategy was groundbreaking when it was adopted in 2014,” says Carrie Baron with obvious pride.

“The Executive Summary includes a defining statement that has for a decade provided guidance for watershed-based planning and actions that ultimately create a watershed health legacy.”

Embedding of a collaborative culture

“A watershed-based approach is more than drainage. To be truly integrated, it must be about overlapping layers. It is about what each department can do to support the strategies of other departments.”

“We could do this because Surrey has an embedded team-building culture. Collaboration is the way the city staff do business. It is just natural. Everyone understands what others are doing.”

“The approach is to integrate as best we can and meet the needs of many in the process. At the end of the day, this is what makes for a better community.”



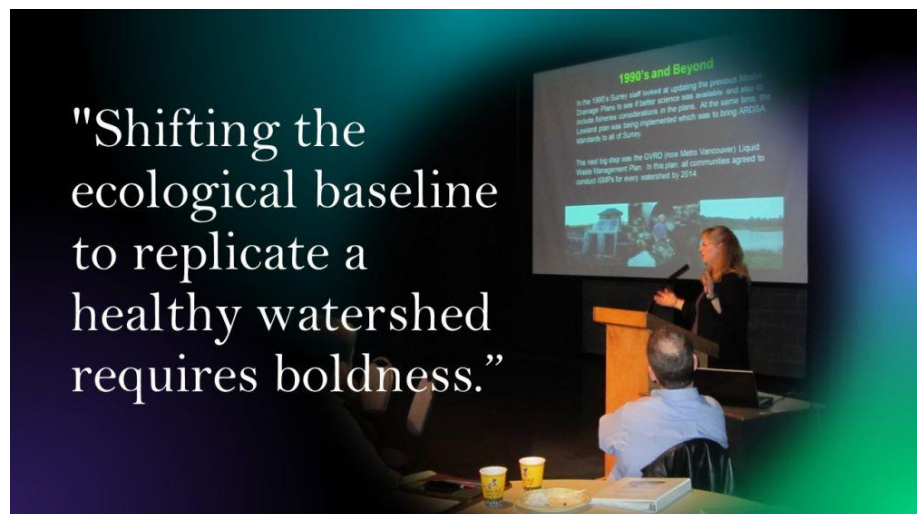
Good engineering practice is founded on observation and deduction

“You observe what happens. And then you can try to apply that understanding in your simulations or your designs when building something. Look at things! Do not just sit in a room with a computer.”

“You have got to be out there watching and trying to understand what is happening in nature. I describe this as research with a purpose.”

“Greenfield development is comparatively easy. The real challenge is in restoration of watershed health. Retrofits are tougher to implement.”

“Shifting the ecological baseline to replicate a healthy watershed requires boldness.”



What it means to have a mindset of taking risks and it being okay to fail

"We treat our watercourses like the gift that they are," adds Samantha Ward. "We try to do the best we can with how we grow and develop the community while recognizing those watercourses and protecting an important part of our natural system."



"Other communities may not have the people, resources and budget. So, they may not have the same flexibility that we might have."

Nature-based Foreshore Enhancements

"We have been fortunate to have political support to allow us to try things. The Living Dyke project on the coast is a current example. We are trying four different concepts. We do not know how well they will perform."

"The intent is to figure out what works and what does not. Then we can adapt as we move forward. To be successful, you need that work environment where you have the support to be able to try."

APPENDIX A

A window into the green infrastructure journey in the Metro Vancouver region:

Conversational interviews with Carrie Baron and Samantha Ward yield insights about their City of Surrey experience



Carrie Baron, former Drainage Manager, City of Surrey (1997 – 2021)

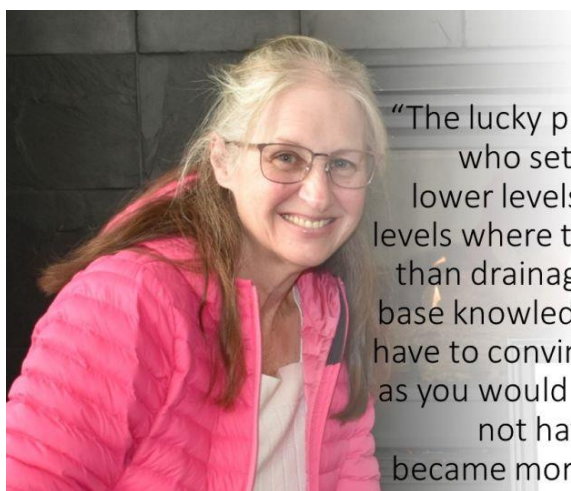
Leadership and Innovation

Carrie Baron has always been a trailblazer. There were few women in engineering when she graduated in the mid-1980s. Leadership and innovation defined her professional career as Drainage Manager at the City of Surrey during the 24-year period from 1997 through 2021.

Surrey is one of two Metro Vancouver municipalities that stand out for undertaking original and science-based research over decades, doing demonstration applications, and hosting “convening for actions” forums for peer-based learning on multiple occasions.

Carrie’s dual portfolio

“A few months after I joined Surrey, drainage was split into two sections. My section dealt with existing drainage and had a focus on resolving drainage issues. The other section dealt with planning for land development. Later, when Surrey created a drainage utility, my portfolio was expanded to encompass both drainage and environment. I would manage this section for almost 20 years. About 2015, the city put the two drainage sections back together but spun off the environment portfolio.”



“The lucky part was that the people who set the groundwork at the lower levels all advanced to senior levels where their duties were bigger than drainage. But they all had that base knowledge. And so, you did not have to convince them the same way as you would with someone who did not have a base knowledge. It became more of a fluid discussion.”

Dual portfolio: Drainage and Environment

“When I reflect on my career, it is with a sense of satisfaction because of the enjoyable opportunities I had to work on a variety of issues. These opportunities allowed me to push forward science and incorporate new ideas and concepts,” says Carrie Baron.

“Our society is always changing, and we need to be open to change and learning from nature. We also cannot work in silos. Our best progress comes from working together and solving issues together. Younger staff also need to move forward with their ideas and concepts.”

Monitoring & science-based understanding

“My first decade with Surrey was the period when the city developed master drainage plans. ISMPs followed,” continues Carrie Baron. “The more you learn, the more you try to bring in. That was always the key – whether it was master drainage planning or ISMPs – we always knew that as technology advanced and we learned more, we had to change.”



Program cuts by senior governments

“Provincial and federal governments cut their monitoring programs in the early 2000s. This has affected generations. How do we know what is happening when you have no monitoring?”

“We do not have rainfall and streamflow stations like we once had. What we have today is dismal compared to the 1980s. It was disheartening when senior governments started cutting all the science and data collection programs which would have helped us learn more.”

Downloading of responsibility to local government

“At Surrey, I had a hefty budget in our 10-year plan just to do rainfall monitoring across the city. And we had to do it because Environment Canada was little help. And then I took on water quality monitoring. We did the pilot project when East Clayton was developing.”

“We had committed to offsite monitoring to see how that development changed the watershed and if our (rainfall capture) measures would work. That started my bigger monitoring program that evolved over the years to really prove whether and how onsite measures were working.”

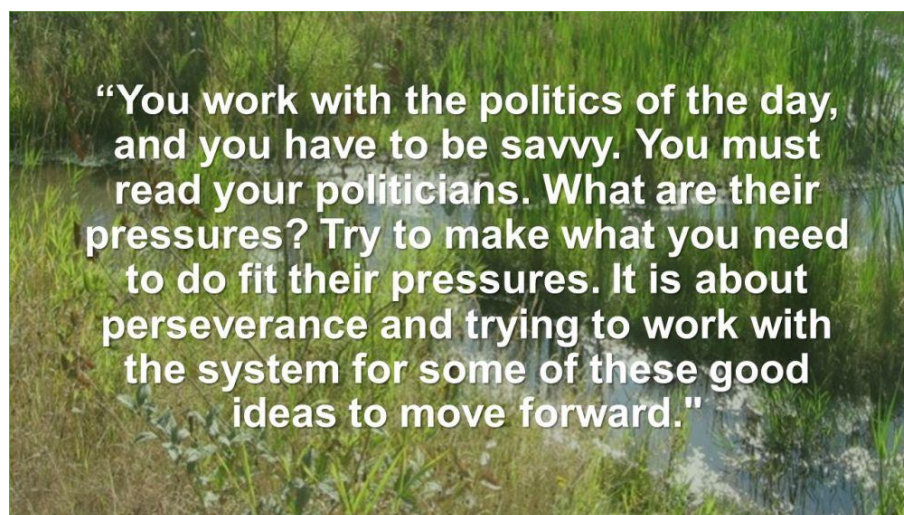
“Not every watershed is the same. Surrey has been collecting benthic data for years on the same streams so that you can get an idea as to how stream health is changing as land develops. The City has now expanded the program scope to include ocean monitoring to measure sea level rise and storm surge.”

Why did municipalities have to do that? “The federal and provincial levels of government are supposed to be the authorities. But most agencies are doing things at such a high global level that you cannot see what is happening in your municipality. That used to frustrate me to no end the way results would be generalized.”

“Later, people were trying to regionalize the data, but the regions were too big. They were dummifying down the data to fit what they thought was happening. And the models had such a big mesh that you really could not look at a smaller area.”

Adapt Language to Achieve the Goal

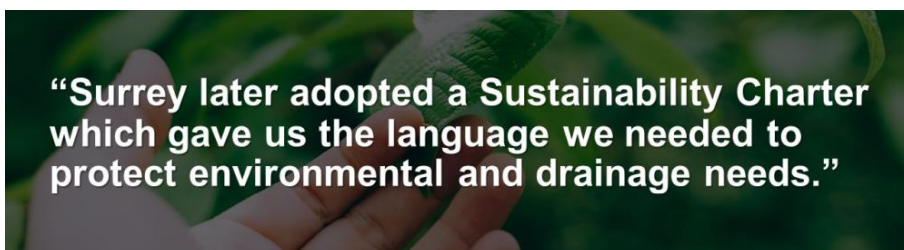
“We cannot ignore that we all had to switch strategies with legislative changes. When the federal government significantly altered fish protection in the mid-2000s, it became a free-for-all. Municipalities were left to go it alone in trying to protect fish habitat and fish,” recalls Carrie Baron.



Riparian Areas Protection Regulation

“Even though the provincial government brought in the Riparian Areas Protection Regulation in the early 2000s, in Surrey we fought against it because we believed that the regulation lowered habitat protection. Sure enough, it did.”

“All of a sudden, you had all these consultant reports saying that you can develop right to the edge of creeks. This made it really hard for some of us to maintain good environmental corridors for fish, wildlife, flood protection and creek stability.”

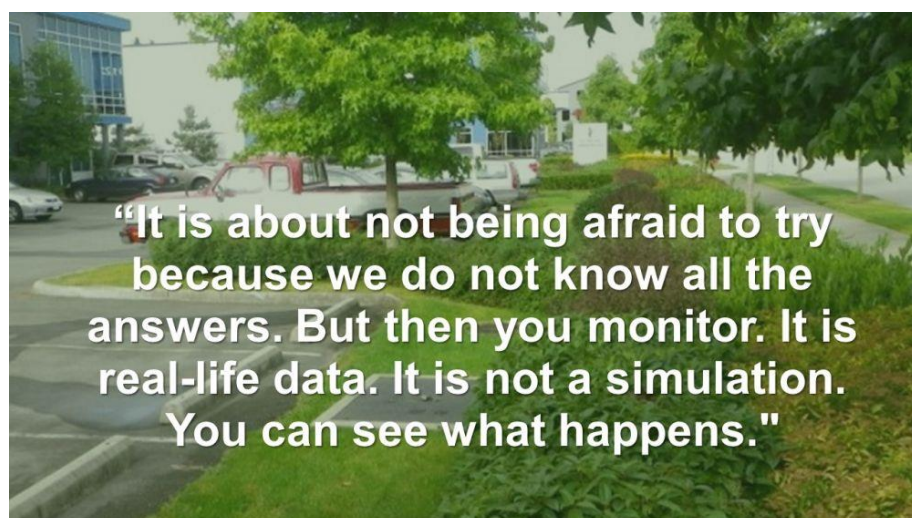


“We were always trying to find out where the political and thus legislative focus was during that era, and then trying to fit our program to meet their focus. We used their language but still did what we needed for the City.”

Good Engineering: *Observation & Deduction*

"I remember when Surrey began the [Salmon Habitat Restoration Program](#) (SHaRP) in 1996 and we started doing instream work. We had no clue what we were doing. We actually did work in streams that later on we would not even consider doing for various reasons. But we did not know that at the start," continues Carrie Baron.

"There was huge value in that experience because we learned. Trying it. Being willing to take the risk. That way we learned what works and what does not. You cannot be afraid if it fails. You can do it again, especially if there is no life lost or no property damaged. I am talking about work in the riparian corridor."



Commit to walking the talk

"In the Sustainability Charter (2008) we made a commitment that the City would not just ask developers to do things. We said we would do those things on City developments as well. And we would test them at our own cost. We made a commitment. The City would walk the talk!"

Learning by doing: *research with a purpose*

"You observe what happens. And then you can try to apply that understanding in your simulations or your designs when building something. Look at things! Do not just sit in a room with a computer. You have got to be out there watching and trying to understand what is happening in nature. I describe this as research with a purpose."

"We were lucky that we had the framework and the people in place at Surrey. We worked hard to get environment and drainage and notions of sustainability embedded over time, whether it was in stormwater bylaws or the Sustainability Charter."

Stephen Godwin was appointed Environment Manager when Carrie Baron's original dual portfolio was split into separate Drainage and Environment sections.

Biodiversity Conservation Strategy - *guidance for watershed actions*

"In 2014, and led by Stephen Godwin, the City of Surrey's [Biodiversity Conservation Strategy](#) was groundbreaking," reports Carrie Baron. "The Executive Summary includes a defining statement that has for a decade provided guidance for watershed-based planning and actions that ultimately create a watershed health legacy."



"This Biodiversity Conservation Strategy recognizes Surrey's biodiversity as a key foundation of a healthy, livable and sustainable community. Preserving nature provides many benefits (including reduced infrastructure)."

An emphasis on internal integration

"City projects have interdepartmental steering committees. Internal conversations lead to integrated outcomes, complete with policies and regulations that support implementation. The approach is to integrate as best we can, and meet the needs of many in the process. At the end of the day, this is what makes for a better community."

Embedding of a collaborative culture

"The guiding philosophy behind the Biodiversity Strategy is to do what is good for the long-term health and livability of Surrey, and makes sense to the community. A watershed-based approach is more than drainage. To be truly integrated, it must be about overlapping layers. It is about what each department can do to support the strategies of other departments."

"We could do this because Surrey has an embedded team-building culture. Collaboration is the way the city staff do business. It is just natural. Everyone understands what others are doing."

Restoration of already urbanized watersheds: "Greenfield development is comparatively easy. The real challenge is in restoration of watershed health. Retrofits are tougher to implement. Shifting the ecological baseline to replicate a healthy watershed requires boldness."

"When a community has a long-term and realistic vision of what is needed, then it is all about seizing opportunities as they arise. But keep in mind that progress towards the vision will be incremental. Avoid steps that are too big." **Figure B1** illustrates the Robson Park Revitalization project which is a source of pride for Carrie Baron.

Figure B1 –
Robson Park Revitalization in North Surrey demonstrates how to incrementally restore the health of an already urbanized watershed



The 5-hectare project successfully merged the need for drainage runoff management with the need to revitalize a dated park facility. Completed in 2011, creek daylighting resulted in a new park with educational water features.

Transformation of Robson Park

“We are really excited about the impact that Robson Creek daylighting has had in mobilizing the community in this North Surrey neighbourhood.”

“Park transformation started with Engineering and Parks collaborating on a joint project. We then involved the neighbourhood, streamkeepers and local school to create a shared vision.”

“The locals say they have never seen so many people use the revitalized Robson Park. This success story shows that things don’t have to stay the same; over time we can bring value back into a neighbourhood.”

Carrie Baron, as quoted in
Beyond the Guidebook 2015



Stormwater Features



Engineering Objectives: Minimize stream erosion velocities. Provide detention for frequent runoff events. Provide water quality treatment of storm inflows. Provide some spawning and rearing habitat. Increase oxygen in the system



Champion of Intergovernmental Collaboration

During her years with the City of Surrey, Carrie Baron was a steadfast supporter of the Partnership for Water Sustainability and a champion of intergovernmental collaboration. She could always be counted upon to lend her credibility to a good idea.

Carrie Baron had a leadership in role in getting multiple initiatives off the ground. Among her many contributions, these three stand out: founding partner in the [Water Balance Express](#); founding representative for the Metro Vancouver region in the [Georgia Basin Inter-Regional Education Initiative](#); and hosting and co-developing the curriculum for the [Course on the ISMP Course Correction](#).

Figure B2 foreshadows what follows in Section 9 of Part D. It provides a snapshot of why the ISMP course correction was needed.

Power and art of showcasing series

"We have to get back to encouraging walkabouts. You cannot do that remotely or from your house or office. It is so valuable to know what is happening. Question, just question things."



"We learn from seeing what works and what does not. And that is what the showcasing series did. We saw different lenses, different perspectives, and the issues others had to get around. Everyone gets a better understanding. You just cannot be in a room talking or on a Zoom screen. There is a lost art in actually getting out and looking at things."

Passing of the inter-generational baton

"I think you have got to give the next generation the ability to flourish. They now have some base knowledge that we have left. So, let's see how they keep advancing with their new ideas."

"When I was leaving, I told my staff do not be afraid of change. New people have new ideas, and this is good. You do not want to keep everything the way it has been forever. You must be open to trying things and ideas. Review the information from the past so that you are not repeating mistakes."



Figure B2 - ISMP Course Correction - genesis for 'Sustainable Watershed Systems, through Asset Management'

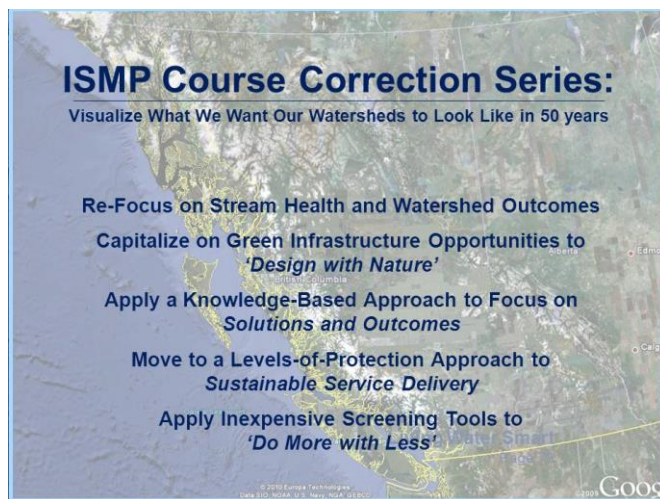


Unfunded municipal liabilities = the "elephant in the room"

WHY A COURSE CORRECTION

"Unfortunately, ISMPs completed to date have tended to be engineering-centric, and in general can be described as 'glorified' master drainage plans. ISMPs that do not integrate land use and drainage planning are resulting in unaffordable multi-million-dollar infrastructure budget items that become municipal liabilities, without providing offsetting stream health benefits."

Metro Vancouver Reference Panel
Final Report, July 2009



Series Brought Together Two Streams of Thinking: Watershed-Based Planning & Infrastructure Asset Management

The series drew attention to successful approaches and wisdom gained by local government leaders.

The series purpose was to assist local governments in moving beyond pipe-and-convey 'stormwater' to a 'design with nature' approach to community design – one that integrates 'rainwater management' with land use planning, climate change adaptation and infrastructure asset management. Each document in the series explored a theme area (listed opposite).



The course was the genesis for the Georgia Basin Inter-Regional Education Initiative (IREI). Representatives from 4 of the 5 IREI partner regions attended.

Course on the ISMP Course Correction

Hosted by the City of Surrey, themes for the 2-day course were: Build the Vision (Day#1) and Create the Legacy (Day #2).

The course elaborated on methodologies and tools that would help local governments: 1) get the watershed vision right; 2) establish achievable performance targets; 3) create an affordable watershed blueprint; and 4) integrate with other processes and/or plans to incrementally implement the watershed blueprint over decades.

Reference Source: Figure 53 in Beyond the Guidebook 2015

Samantha Ward, Drainage Manager, City of Surrey (since 2014)

Passing of the Baton

Samantha Ward joined the City of Surrey in 2014 as a Project Engineer and then as Infrastructure Program Manager. When Carrie Baron retired in 2021, she passed the *drainage baton* to Samantha.

“Samantha had worked as a drainage consultant for years before joining Surrey,” notes Carrie Baron. “When she joined Surrey, she saw the bigger picture through the Neighbourhood Concept Plans (NCPs) because she was coordinating all the engineering pieces.”

“When Samantha succeeded me, she already had the bigger picture. So, I did not need to teach her. She has a really good background as a result of reviewing all the ISMPs completed in the Metro Vancouver region during the first decade. Now it is a matter of where she wants to take things.”

“I come from a different set of experiences. We all bring our past into our current role and then move forward. Other people who are new to the City of Surrey are doing the same thing. We are constantly evolving and growing in that sense.”

“When I think back, I come at it with a different lens because my career began in consulting. One thing that always struck me about Surrey was the forward thinking and how progressive the ideas were that were coming out and the things that we were being asked to do as consultants. I always found it refreshing because it felt like Surrey was pushing the envelope of the day.”



“Surrey is a large organization serving a large population. Surrey has always run a lean operation,” comments Samantha Ward. “The benefit is that, even though you are wearing a certain hat or title, there are a half-dozen people in the organization who have similar experience or expertise in the same area as you. And it is no big deal to go down the hall and chat with that person. I think that is part of passing the baton piece; I am able to learn from others and we can solve issues together.”

Watercourses are part of the Urban Fabric

“Surrey has always been unique. Early on, Council recognized the importance of our natural drainage systems as part of an overall system of service for the community. The policy has been in place for decades,” continues Samantha Ward.

On having a mindset of taking risks and it being okay to fail

“Because of our size and because we have an environment where you have the support to be able to try, this has enabled us to do things.”

“Other communities may not have the people, resources and budget. So, they may not have the same flexibility that we might have.”

“Surrey has a great role to play (as a regional leader). Going back to 2006 when Surrey was at the forefront of moving things forward in the region, part of it was having the privilege of being able to do that.”

“It was the way Surrey was structured, who was here at the time, and the opportunities that presented themselves. Everything aligned.”



“We treat our watercourses like the gift that they are. We try to do the best we can with how we grow and develop the community while recognizing those watercourses and protecting an important part of our natural system.”

Political will and support for innovation

“There are so many benefits associated with watercourses that go well beyond moving water from A to B. This understanding is reflected in our [Biodiversity Conservation Strategy](#). Without our watercourses, Surrey would feel different. It would not be the place that it is.”

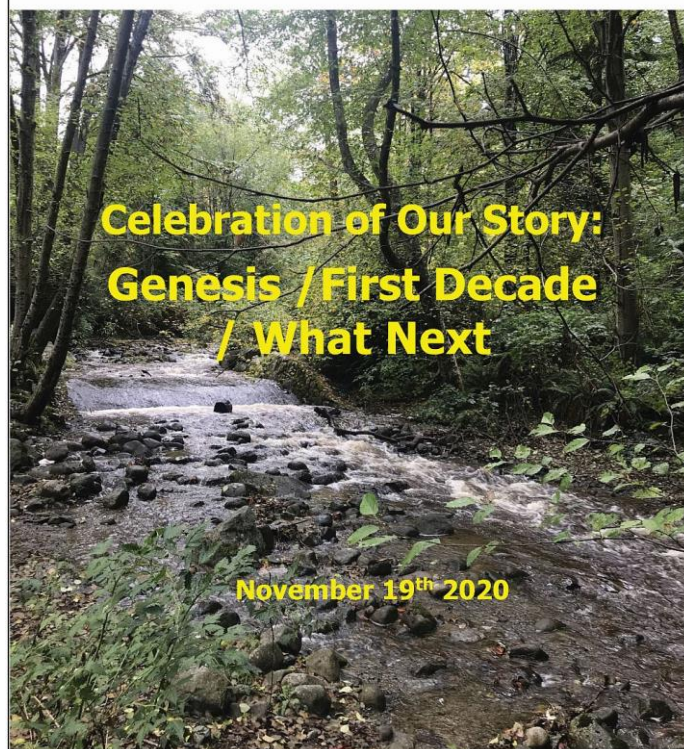
“In the uplands, it is the biodiversity piece. And going beyond just setting a corridor to ask, how can we enhance that corridor to maximize the biodiversity value it brings. On the coast and in the lowlands, we have been focusing on flood resiliency and adaptation.”

“Surrey has a [Development Cost Charge Bylaw for Biodiversity](#). This has been in place since 2019. Surrey is the only municipality in BC that has one, to my knowledge. The intent is to help acquire lands that are identified in the City’s Biodiversity Conservation Strategy.”

“We have been fortunate to have political support to allow us to try things. The Living Dyke project on the coast is an example. We are trying four different concepts. We don’t know how well they will perform. The intent is to figure out what works and what does not. Then we can adapt as we move forward. To be successful, you need that work environment where you have the support to be able to try.”



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About the Partnership for Water Sustainability in British Columbia

Incorporation of the Partnership for Water Sustainability in British Columbia as a not-for-profit society on November 19, 2010 was a milestone moment. Incorporation signified a bold leap forward.

Over two decades, the Partnership had evolved from a technical committee in the 1990s, to a “water roundtable” in the first decade of the 2000s, and then to a legal entity. The Partnership has its roots in government – local, provincial, federal.

The Partnership has a primary goal, to **build bridges of understanding** and pass the baton from the past to the present and future. To achieve the goal, the Partnership is growing a network in the local government setting. This network embraces collaborative leadership and **inter-generational collaboration**.

The Partnership believes that when each generation is receptive to accepting the inter-generational baton and embracing the wisdom that goes with it, the decisions of successive generations will benefit from and build upon the experience of those who went before them.



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