

**Successful Stormwater Management Practices: Evaluating the Effects of the
WaterLinks Project**

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Executive Summary

The purpose of this report is to identify the residual effects of the 2000-2001 WaterLinks/Communeauté project in the City of Ottawa as well as identify the characteristics that contribute to successful lot-level stormwater management campaigns. Interviews were conducted with members of the Public Advisory Committee (PAC) and Technical Advisory Group (TAG), former city staff, the municipal councillor involved in the project and an education expert. In total, 8 interviews were conducted with key stakeholders in the project. The interviews were analyzed using a grounded theory approach where the main issues and themes are generated by the interviewees. Due to the limited number of interviews and memory challenges related to the fact that the interviews were by conducted 12 years after the delivery of the program, existing literature on municipal stormwater management practices was also utilized in the report for comparative purposes and as examples to draw on to inform the researchers' key recommendations.

In terms of residual effects of the Waterlinks project, a number of successes and challenges were identified. Successes included the initial distribution of rain barrels, creating community champions to advance the project and engaging the community in municipal projects. Challenges included limited sustained use of rain barrels due to aesthetic, maintenance challenges and limited understanding of the purpose of the rain barrels beyond active gardeners.

The elements contributing to successful lot-level stormwater management campaigns were involvement of the community in program design, following a social marketing approach, conducting ongoing participatory evaluation, and involving both youth and schools in the program. There is potential for greater involvement of the PAC in the initial design of the program that has the potential to foster greater understanding and engagement in the program. By following a social marketing approach that seeks to identify several behaviours and barriers to participation (physical and psychological), there is potential for greater participation. Cost is not always the primary motivator and a symbolic or emotional message may be a more appropriate initiator. Ongoing participatory evaluation produces ownership in the program from targeted community members, evaluation is conducted from the participants in the project and the evaluators serve as educators in the targeted community. Greater involvement of youth and schools in wastewater management projects has the potential to provide mutual benefits to students and the program. Involving youth can produce local community champions who become more active community members in the future. Heightened youth interest in environmental projects and the 40 hours of community involvement required by the Ontario Secondary School Diploma provides the potential for future collaboration with local schools.

The report lists a number of key recommendations based on our results. It also includes a summary of the Durham Region and Portland, Oregon's watershed management strategies in the appendixes.

Introduction

The WaterLinks/Communeauté project was a stormwater management initiative developed by the City of Ottawa in 2000-2001 in portions of the Alta Vista and Riverview Park neighbourhoods. The project was designed and implemented with the involvement of individuals from regional government departments (TAG- Technical Advisory Group), the Public Advisory Committee (PAC) consisting of resident volunteers and members of local community associations, and consultants.

Canvassers went door-to-door in an education campaign that focused on encouraging and providing residents with incentives to change their stormwater management practices by purchasing subsidized rain barrels, outdoor and indoor water efficiency kits, lot naturalization (tree planting, mulch) and toxicity information kits on house and yard pollution prevention. The purpose of the program was to tackle the problem of pollutants entering local watersheds through partially separated stormwater sewers and reducing stormwater runoff on the lot level. Stormwater sewers expel untreated water directly into rivers and streams and can carry a variety of urban pollutants such as driveway runoff, fertilizers, pesticides and other biological or chemical elements.

The WaterLinks project was supposed to be a three-year initiative, but was ended abruptly after the first year due to sudden changes to municipal government in the Ottawa region caused by amalgamation. The program successfully distributed rain barrels and other measures in the neighbourhoods, but the overall, sustained impact of the project was not apparent. This report attempts to uncover the impact of the program and highlight successful elements of the stormwater management campaign.

Purpose

The purpose of this community based research project is to aid the City of Ottawa in the identification and assessment of what the lasting effects of lot level stormwater management practices were as a result of the 2000 Waterlinks campaigns and to ascertain the factors that contribute to successful stormwater management. An analysis of the delivery and effectiveness of the factors of Waterlinks highlights areas that were either successful in the engagement of residents in lot-level stormwater management or those areas that had particular challenges. The suggestions that arise out of this critique can be applied by the City of Ottawa in the development of future endeavours that are similar in nature, like the Pinecrest Creek/Westboro Stormwater Retrofit pilot as a part of the Ottawa River Action plan to improve the water quality of the Ottawa River. The research questions investigated in this project are:

1. What are the residual effects of the Waterlinks project?
2. What are the factors that contribute to successful community engagement of lot level stormwater management campaigns?

The evaluation of these aforementioned themes in the Waterlinks campaign demonstrate what was effective and what strategic improvements can be employed by the City in the design, the delivery and monitoring of similar programs. The ultimate goal of the research project is to provide council on methods to increase rates of sustainable participation of lot level stormwater

management practices by community members and to offer advice in regards to particular program management practices.

Methodology

The primary data collected in this project derived from interviews conducted with stakeholders in the Waterlinks program. The interviewees were five members of the PAC; the Councillor of the target area, Peter Hume; an active city staff member involved in the Waterlinks program and an expert in the field of education. The questions posed were, generally, open-ended in nature to allow for the interviewees to express how they felt about the issues. This community based research project was conducted in the spirit of Strand et al with the intent of university researchers to share their expertise to benefit local community members.¹ The data collected provided the researchers with the personal accounts of what the interviewees recollected as the salient points of a program that occurred twelve years prior to the research project. The time lapse between the delivery of the program and the evaluation was a challenge in itself; the researches benefited by unearthing data that was not focused necessarily on details but wider themes that were easily comparable.

The researchers approached the study in a “pluralistic” manner.² Each researcher conducted their interview analysis individually and then synthesised the findings to make up the content of this report. Doug Hagar and William Blackler both conducted the Councillor Peter Hume interview together and independently analysed the interview transcript. This method of a pluralistic analysis facilitates the identification of the significant themes and caused the researchers to consolidate and think deeper into matters where they diverged. By interviewing several stakeholders and comparing Waterlinks to other similar projects the researchers engaged in “triangulation” to synthesis their findings that were grounded in “diverse viewpoints or standpoints [that] cast light on a topic.”³ By mixing the methods and data sources the profound themes reveal themselves in different layers of the research.

Each researcher applied a “grounded theory” approach in the analysis of the interviews. This approach allows for the “the explanations [to] emerge gradually from the data as the study proceeds.”⁴ This theoretical method allows for the data to authentically reveal the explanations itself rather than making the data work within the limits of particular theoretical lenses. Thus, the findings that arise from the research stem directly from the interviews themselves and act as a bulwark to the bias of the researchers.

The researchers interviewed key stakeholders involved in the Waterlinks program. The majority of the data derived from interviews of the Public Advisory Committee (PAC). The

¹ Kerry Strand, Sam Marullo, Nick Cutforth, Randy Stoecker, and Partick Donohue. *Community-Based Research and Higher Education: Principles and Practices*. San Francisco: John Wiley and Sons, 2003.

² Nollaig A. Frost, Sevasti-Melissa Nolas, Belinda Brooks-Gordon, Cigdem Esin, Amanda Holt, Leila Mehdizadeh and Pnina. Shinebourne. 2012. “Pluralism in qualitative research: the impact of different researchers and qualitative approaches on the analysis of qualitative data.” *Qualitative Research* 10(4): 441–460.

³ Olsen, Wendy. “Triangulation in Social Research: Qualitative and Quantitative Methods Can Really Be Mixed” forthcoming in *Developments in Sociology*. Ed. Ormskirk M. Holborn Harlow: Causeway Press (2004) retrieved from <http://ccsr.ac.uk/staff/vv.pdf>

⁴ Dick, Bob. “Grounded theory: a thumbnail sketch.” *Resource Papers in Action Research* (2005). <http://www.scu.edu.au/schools/gcm/ar/arp/grounded.html>

PAC was a group established before the implementation of the Waterlinks program as a testing ground and was a source of “third party validation”⁵ for the strategies that the City was embarking on in this campaign. Councillor Peter Hume, the councillor of Ottawa’s ward 18 (where the target area was located), was the public face of the WaterLinks program and was extremely committed to the success of the program. The researchers also interviewed a key city staff member and attempted to interview a representative of the consultant firm that delivered the program, but the individual was unable to meet with the researchers.

The very nature of the twelve-year time lapse between the WaterLinks campaign and the research project was a major limitation that the researchers had to surmount. Due to this time lapse, the researchers did not have the means to interview the target population of the WaterLinks campaign and focused on key stakeholders as subjects to collect interview data from. There is the reality that twelve years later many people moved, forgot or never even participated in the program in the target region. By directing the research to stakeholders, the data collected represented the WaterLinks program itself, rather than an attempt to find valid data. However, many of the interviewees had difficulty remembering the details of the campaign; what was remembered can be seen as the salient points that stood out for the most active members in the campaign. As previously mentioned, the researchers used triangulation to eliminate outliers and to compare WaterLinks to other related programs to find identify similarities, contradictions and gauge which practices were superior.

Residual Effects of WaterLinks

The WaterLinks project had a number of positive short-term effects including initial success distributing rain barrels, engaging the community in municipal programs, and creating local “champions” for the cause of stormwater management.⁶ The project had a number of challenges including limited long-term take-up as well as limited monitoring. This section will briefly explore each of these elements.

SUCCESSFUL ELEMENTS

The WaterLinks program achieved success distributing rain barrels to the target zone during the program. The practicality of the rain barrels was quite evident, “tangible” and embodied a concept that was easy to express to the citizenry.⁷ It had a very strong appeal to gardeners and was subsidized to the point that the cost was minimal.⁸ The participation rate in the delivery of the rain barrels was 30% of the 2,260 homes in the target area.⁹ The program was effective in the initial delivery of the message to the targeted population and was successful in engaging interest, but the main challenge was sustaining this sense of importance symbolized in the rain barrel. Some respondents expressed that the initial take-up of the rain barrels was limited:

⁵ Hume.

⁶ Hume.

⁷ Hume.

⁸ PAC 5.

⁹ City of Ottawa. *Review of the WaterLinks Pilot Project*, Prepared by R.V. Anderson & Assoc. (March 2003): 24.

I sort of remember asking people about getting a rain barrel, but I don't remember a tremendous amount or a tremendous response. ...[T]o be perfectly honest I don't remember many people- maybe one or two getting rain barrels in the area.¹⁰

A residual effect of the program identified by interviewees was creating individual champions in the community tackling the issue of stormwater management. One interviewee identified that the most successful aspect of the program was that it promoted “controlling it in your yard rather than insisting that the city do it.”¹¹ This was supported by other interviewees and Councillor Hume who said that the message was clear to the targeted zone that the citizenry took ownership and a sense of responsibility in the contributing to improving the local environment. However, this is not to say that everyone in the target zone adopted this attitude, the City attempted to communicate clearly that the onus was on the citizenry as supplemental to the City’s strategies.

CHALLENGES

Long-term program take-up appears to be limited. Some interviewees expressed difficulties remembering the actual impact of the program because twelve years have passed. The difficulty knowing the impact of the program was equated with the abrupt ending of the program and limited monitoring: “In all fairness, I don't recall any feedback as far as how effective it was *even then*. Since then, who knows.”¹² The length of time since the program has also resulted in changing demographics in the neighbourhoods that make it difficult to estimate the ongoing impact of the program: “Traditionally it was an older community and now a lot of the older citizens have died off and it's all families now...twelve years later it is a totally different demographic.”¹³

Although some interviewees who were involved in the program still had rain barrels,¹⁴ several identified that they had removed them.¹⁵ People interested in gardening were the main individuals who adopted rain barrels. It appears that they bought the rain barrels to help with their gardening but did not connect that with a broader sense of purpose or wastewater management.

I think a lot of people are aware enough now that the people that would use one, probably have one. This is gonna be kind of a hard sell now beyond anything else.¹⁶

Additionally, ongoing maintenance of rain barrels,¹⁷ aesthetics and an unclear purpose were identified as barriers to adoption by interviewees.¹⁸ Maintenance was found to limit involvement because of the ongoing upkeep required for the rain barrels.

There is maintenance that people don't realize is required. If they made them so that they could be opened up somehow so that they could be cleaned out that would be great. There is a whole bunch of stuff that get

¹⁰ PAC 1.

¹¹ PAC 2.

¹² PAC 3; supported by PAC 4.

¹³ PAC 3.

¹⁴ PAC 2; PAC 4; PAC 5.

¹⁵ PAC 1; PAC 3.

¹⁶ PAC 3.

¹⁷ PAC 1; PAC 3.

¹⁸ PAC 5.

washed into them that needs to be cleaned out like leaves and dirt and even dead animals... So if you could open them up and swing open a door on them, I think that would really help to cut down on how difficult they are to maintain. You could open it up and spray it out.¹⁹

In terms of aesthetics, rain barrels were perceived to not blend into the existing environment well. The target neighbourhood was quite affluent, and so, the aesthetics of the rain barrels was a recurring theme through three of the interviews.²⁰ Though the researchers cannot be certain how widespread this concern was throughout the targeted community, it can be assumed that affluent people may be more likely to be concerned about items that affect the overall aesthetics of their property. One interviewee highlighted this topic by stating the following:

One thing that they should do with rain barrels is they are big ugly things that don't blend in with the landscaping. They stick out like a sore thumb. If there was some way to make them a bit more appealing, people would be more likely to use them. Incorporating them into the structure somehow or making them square to hide them away or be able to build something around them.²¹

In addition to practical challenges, there was also a difficulty communicating the purpose of the rain barrels and other activities to the public. It seemed a lot of the individuals who obtained rain barrels were active gardeners.²² When the interest in gardening waned or when new residents moved in, the rain barrels were removed. Furthermore, the rain barrels were difficult to clean and due to the fact that such an emphasis was placed on the practicality of the rain barrels for the gardening purposes, the overall understanding of the goal to improve the water quality of the waterways appears to have been lost on the participants. There is also the fact that if the rain barrels were not prepared for the winter season, the water would freeze in the rain barrels, the rain barrels would break and the rain barrels would be thrown out in the spring. The link to reducing water runoff does not appear to have been the primary motivation in obtaining rain barrels among the interviewees we spoke with.²³

Factors Contributing to Successful Engagement

The following section will explore the factors that contribute to successful community engagement on lot-level stormwater management campaigns drawing upon data obtained through the interviews and existing literature on similar practices. Issues explored are the benefits of involving the community in the design of the project, the social marketing method, participatory project evaluation, connecting the municipality to the citizens promotes social cohesion and involving youth in the project. The discussion will point to the case of Portland, Oregon's Community Watershed Stewardship Program as a good basis to inform the production of future lot-level stormwater management practices.

PUBLIC ADVISORY COMMITTEE (PAC)

Interviewees identified that the PAC size was appropriate and conducive to quality discussion.²⁴ The PAC was also representative of the WaterLinks neighbourhoods.²⁵ The PAC

¹⁹ PAC 3.

²⁰ PAC 3; PAC 4; PAC 5.

²¹ PAC 3 and claim supported by PAC 4.

²² PAC 1; PAC 4.

²³ Debatably, with the exception of PAC 4.

²⁴ PAC 4 and PAC 5.

was involved mainly as a check on the municipal program to make sure that there were no “red flags” raised by the program.²⁶ PAC members did not directly contribute to the initial design of the program but they provided input on the implementation of the project. Involving the community is an important element to creating ownership in the project and adds a democratic tone to people’s commitment to the project. By establishing goals with a focus on involving the community in the discussion of a topic allows the space to “induce reflection on their part.”²⁷ By making people think and talk about a particular issue, they can contribute to how the program could be best delivered to them and their peers. Moreover, by giving the stakeholders a sense of power in the role of governance, this creates an opportunity for another layer of commitment to the success of the problem. This is of most value in the initial planning stages of a program, where the grounds are most fertile to sow the seeds of stewardship in the targeted community. By involving the community or community leaders in the planning stages, they are committed to it at the very outset and vested in a sense of power that their contributions are of significant value in this horizontal form of governance, As Hume stated “we’re not focused on getting down to the individual level. We’re often focused on keeping it at the very very high level.”²⁸ By involving the citizens in the discussion with the city staff and official, decision makers both benefit from the feedback of the citizens in the formation process and foster a superior relationship with the citizenry.

Involving community input into the design process of programs helps foster ownership. Shandas & Messer evaluated Portland’s Community Watershed Stewardship Program (CWSP) and found that involving the public early in the design of the project created greater ownership in the programs and “community members became more aware of the connection between their actions and the health of the environment.”²⁹ CWSP allowed community members and organizations to present proposals for improving local watersheds and provided grants to support the projects. The process helped improve understanding, ownership and produce dedicated volunteers that produced tangible results.³⁰ Technical experts played a peripheral role. Involving the community in the design of future wastewater programs could help encourage greater ownership and better results.

SOCIAL MARKETING

The City of Ottawa identified that the WaterLinks project was a social marketing program.³¹ Door-to-door engagement was used to drive interaction and “give people a product, tell them why and how to use it, and over time through use and other education efforts residents

²⁵ PAC 3.

²⁶ Hume.

²⁷ This is a concept from John Dryzek who speaks of “deliberative democracy” in the context of power politics and democratization, his principle can be applied to community based research. By bringing more voices to the table, especially in the formation process, not only provides a more democratic tone to the program, but it both engages people by making them a part of it, giving them an authentic sense of power and engages people in reflection. There are multiple layers of engagement, and when it comes to behaviour, the most essential engagement is reflection on the topic. John S Dryzek. “Democratization as Deliberative Capacity Building.” *Comparative Political Studies* 42 (2009): 1379-1402.

²⁸ Hume

²⁹ V. Shandas & W.B. Messer. Fostering green communities through civic-engagement: community-based environmental stewardship in the Portland Area. *Journal of the American Planning Association* 74 (2008): 414.

³⁰ *Ibid*, 415.

³¹ City of Ottawa. *Review of the WaterLinks Pilot Project*, Prepared by R.V. Anderson & Assoc. (March 2003): 1.

may come to understand the relationship between their actions and the environment.”³² Ground-level engagement is an important element to social marketing, but it seems that the psychological and physical barriers to adoption were not as great of a focus of the project.

Social marketing has four stages:

1. Selecting behaviors and identifying barriers
2. Designing a program to overcome barriers to participation
3. Piloting the program
4. Evaluation³³

When identifying barriers, there is a focus on social and psychological barriers to changing behaviours and the design stage must “devise ways of overcoming the barriers and promoting the desired behaviours.”³⁴ Although respondents suggested focusing on the cost of water and storm sewers as motivations for encouraging participation,³⁵ it is also apparent that the cost of water is still relatively low³⁶ and there is no direct financial incentive to reduce water runoff—only to reduce water usage. Therefore, focusing on cost is unlikely to stimulate much participation.

In order to encourage community behavioural changes on consumption reduction issues, Peattie & Peattie suggest creating marketing efforts that “reflects emotional and symbolic responses.”³⁷ There is a parallel here with education where “it is commonplace for parents to severely constrain personal consumption in order to give their children the best education possible.”³⁸ This is similar to sustainability, where restrained consumption can be seen to contribute to a better and healthier future.³⁹ One interviewee also suggested appealing to more symbolic or emotional responses to motivate individuals:

The fish grates that you guys have- you know, when you are going to dump something down the city grate and they have the fish on it. And you look at it and go oh well that's going directly into the water system and I'm going to be drinking that later. Something like that is needed- some image to help umm.... Like if they could get a symbol like that- I'm not sure what exactly they could use but an image of some kind would be good.⁴⁰

Emotional or symbolic messages could be a good driver to action in wastewater reduction.

A common psychological tool used in other wastewater campaigns is obtaining *commitments* by citizens.⁴¹ As part of a stormwater reduction strategy in 1997, Durham Region went door-to-door in a pilot project distributing information on lawn watering reduction as well as distributing a water gauge to measure their weekly usage. One group of residents were given

³² Ibid, 1.

³³ Tim Jackson. Motivating sustainable consumption: a review of evidence on consumer behaviour and behavioural change. *Sustainable Development Research Network* (2005): 118.

³⁴ Ibid, 119.

³⁵ PAC 1, PAC 2 and PAC 3.

³⁶ PAC 1

³⁷ Ken Peattie & Sue Peattie. Social marketing: a pathway to consumption reduction? *Journal of Business Research*. 62 (2009): 266.

³⁸ Ibid, 267.

³⁹ Ibid, 267.

⁴⁰ PAC 2.

⁴¹ Jackson, 118.

‘information-only’ and the other group was asked to sign a commitment to watering their lawns only on odd or even days and limiting watering to one inch per week. Residents who committed to the program reduced lawn watering by 54%, while ‘information-only’ residents *increased* lawn watering by 15%.⁴²

Although, commitments were not used, it seems that WaterLinks was able to encourage some participation by socially and psychologically motivating residents to become involved by showing a serious commitment to the project by visibly getting key regional government officials involved in promoting the project.⁴³

The WaterLinks project did have some features that socially and psychologically motivated residents to participate, but it seems that a greater focus on the social marketing approach where behaviours and barriers are first identified, tools are chosen that fit those desired behaviours, and then barriers to action are eliminated would be important for future programs. The PAC could be utilized to identify potential psychological, social and physical barriers as well as identify strategies to address those barriers.

PARTICIPATORY EVALUATION

A concept that can benefit the City to enhance community engagement in programs targeted at citizens is Mathison’s notion of participatory evaluation. Mathison argues that the participatory evaluation approach is the preferred framework for conducting evaluations of organizations. It is a type of evaluation that depends on engaging the stakeholders with not only the evaluation process, but in the design of evaluative strategies themselves.

There are three clear advantages to this form of evaluation, two that are Mathison’s and the latter being inferred by the researchers. First, is that it not only empowers the stakeholders, but it “actively engage[s] stakeholders in the shared commitment to better programs.”⁴⁴ Second, there is the opportunity for a long-term partnership to develop between the evaluator, stakeholders and the organization where systemic factors can be addressed in the delivery goods, services or programs by an organization.⁴⁵ Third, by engaging the stakeholders in the program, one garnishes richer qualitative data and by engaging them in the evaluative process, the stakeholders contribute their experiences to future program delivery and policy development of the organization being evaluated. It is clear how the commitment of the PAC members to the success of the program could benefit from this strategy of horizontal governance and methodological approach in the evaluation of the program. This requires foresight and for the municipal government to view the citizens as partners that have an invested interest in every stage the program, from conception to evaluation. Two PAC members stressed the need for the evaluation and monitoring framework to be established in any similar program in the future to ensure that it is conducted properly.⁴⁶ There is an opportunity to enhance the engagement of the community stakeholders by bringing them into the planning aspect of the program and not just

⁴² Doug McKenzie-Mohr. Promoting sustainable behaviours: an introduction to community-based marketing. *Journal of Social Issue*. 56 (2000): 550-551.

⁴³ Hume; PAC 1, 2, 3, 4, 5.

⁴⁴ Sandra Mathison. “RETHINKING THE EVALUATOR ROLE: Partnerships Between Organizations and Evaluators.” *Evaluation and Program Planning* 17(1994): 303.

⁴⁵ Mathison, 299.

⁴⁶ PAC 5 and PAC 3.

use groups like PAC as a testing ground for ideas or as representative of the community “rubber stamping” city proposals.⁴⁷ That is, allow them to contribute to framing what ideas should be tested and determining what is considered valid.

Mathison draws on Greene’s utilization-oriented participatory evaluation.⁴⁸ In Greene’s article, “Stakeholder Participation in Evaluation Design: Is it Worth the Effort?” (1987) she affirms that stakeholders significantly contribute to the improvement of the evaluation, the narrowing of the methods of data collection by refining the process and facilitate the dissemination of the results of the evaluation. The City can improve the intensity of interest and stewardship in the delivery of their programs that target household member behaviour by considering Mathison and Greene’s concepts of participatory evaluation design. It should also be noted that these concepts can easily be thought of in terms of the design of the program to add more ownership of the program in the citizenry and creates an easy avenue for disseminating relevant information to the citizenry at every stage of the program.

Participatory evaluation meshes well with principles of adaptive management. Adaptive management calls for horizontal governance and allows for separate discourses on similar topics to merge and inform how programs are managed. Rebekah R Brown examines stormwater management practices in Sydney Australia and understands that the key barrier to effective storm water management in Sydney (at the time of the study) was the static culture of administrative practices. She claim that:

A key ingredient to a successful reform to a governance approach include capacity building specifically directed at fostering horizontal integration of the various functions of the existing administrative regime underpinned by a learning culture that values integration and participatory decision making. By default, a participatory decision-making process will necessitate an adaptive approach to implementation.⁴⁹

By expanding the discourse, listening and learning from stakeholders, the administration of municipal organizations can benefit from the views of the public and integrate the citizenry in how programs are designed, monitored, evaluated and adjusted in a way that fosters not only superior participation rates, but superior levels of commitments by participants.

INVOLVING SCHOOLS AND YOUTH

Councillor Hume raised the point that youth involvement in door-to-door canvassing was one of the many successful elements of the WaterLinks campaign. Youth involvement allowed the creation of champions in the communities encouraging parents to act as ambassadors reinforcing the program.⁵⁰ Other interviewees raised the point that increased school and youth involvement is a necessary element for advancing the success of local stormwater management plans.

Getting out to the schools more. Incorporating the schools in educating people. [T]o start at a younger age so that people understand earlier⁵¹

⁴⁷ PAC 4: “rubber stamping”.

⁴⁸ Jennifer C. Greene. “Stakeholder Participation in Evaluation Design: Is it Worth the Effort?” *Evaluation and Program Planning*, 10 (1987): 375.

⁴⁹ Rebekah R Brown. “Impediments to integrated Urban Stormwater Management: the Need for Institutional Reform.” *Environmental Management* 36 (2005): 466.

⁵⁰ Hume interview

⁵¹ PAC 2.

The interviewee also identified that youth have respected previous tree planting and environmental projects in the neighbourhoods in the past:

There is very little vandalism when it comes to the new trees that were planted in the ice storm. And the bags that they use for water retention aren't being vandalized. So if you take an area with 5 high schools and elementary schools, the kids are respecting that. They may spray graffiti on buildings but when it comes to their trees they are quite respectful. So working with them, I feel that they would *really* want to do this.⁵²

Shandas & Messer identified that Portland's CWSP achieved success by involving local educational institutions.⁵³ According to educational scholars, there exists rich evidence that communities should perceive students as assets and resources as well as partners.⁵⁴ One interviewee identified that there was a lack of knowledge that existed in households with regards to watersheds, drainage and stormwater management.⁵⁵ With genuine buy-in and treating students as partners, the City can develop dedicated community champions to help stimulate involvement in the wastewater management program as well as support student understanding and awareness of these areas. With new understandings of environmental issues and resource management awareness, students will be able to disseminate such information and further create awareness regarding these areas, especially at home and school.

There exists increasing evidence from educational scholars that supporting successful student community engagement enhances the personalization of learning. In today's schools "seat time" is becoming less of a valuable educational instrument and teachers are trying to incorporate lessons that are more motivating and engaging. According to Joselowsky, students require more than just classroom experiences; they require "relationships, relevance, connectedness, interest, challenge, and interconnection."⁵⁶ Educators today refer to such components of engagement as the personalization of learning.⁵⁷ Such components of engagement and the overall motivation of students today can be achieved through valuable community-school collaborations.⁵⁸

The learning experience has to be motivating but also needs to meet academic goals. The City has the opportunity to provide these personalized learning experiences for students on wastewater management and these experiences can help students meet the Ontario graduation requirements. Ten years ago, the Ontario School Board considered broadening the student learning experience to include community-learning experiences. Today, in order to graduate from high school, all Ontario students must complete a 40-hour community involvement requirement. The purpose of such is to "help students understand how they can make a positive difference in their environment," help "contribute to their environment" and "increase student

⁵² PAC 2.

⁵³ Shandas and Messer, 416.

⁵⁴ Peter Benson. All kids are our kids: What communities must do to raise responsible and caring children and adolescents. (San Francisco, CA: Jossey-Bass, 1997). Ferman, B. Youth civic engagement in practice. *The Good Society* 14 (2005): 45–50.

⁵⁵ Staff interview 1.

⁵⁶ Francine Joselowsky. Youth Engagement, High School Reform, and Improved Learning Outcomes: Building Systemic Approaches for Youth Engagement. *NASSP Bulletin*, 91(2007): 257-276.

⁵⁷ Education expert interview

⁵⁸ Joselowsky, 278.

awareness of community needs.”⁵⁹ Victor highlights the importance of this school requirement as this provides an opportunity for students to develop passions or interests beyond academics. The City could benefit from maintaining a regular communication loop with schools and principals. There exists common ground for both the City and schools to create a positive volunteer spirit within the community.

A current municipal project that seizes upon student 40-hour volunteer requirements is the *Cleaning the Capital*⁶⁰ program that the City of Ottawa currently delivers for high school student volunteers fulfilling their 40-hour volunteer requirement. The *Cleaning the Capital* program allows students to participate in graffiti removal and cleaning up public spaces. Student volunteers join existing project teams or can form teams of their own. The program could be expanded to include wastewater management activities for student volunteers as well including tree planting, rain barrel maintenance and general gardening support.

The opportunity to engage students in community-school collaborations promotes positive citizenship and promotes the health and welfare of the City. The learning environment is vital for such an activity. Within a positive community context, students engaging in volunteer programs with the City will have the opportunity to build meaningful relationships with community members, City employees and mentors. Through such positive community engagement students will have the opportunity to internalize their experiences in a meaningful way. When the experiences are consequential and engagement is relevant, students will develop a sense of belonging to their community and take an active interest in it. This sense of community belonging will help promote student self-esteem and confidence, resulting in a positive contribution to the overall environmental health and economic welfare of the community.⁶¹ The level of involvement of youth in construction of and implementation of the project is a balancing act. It is important to avoid focusing on conducting a superficial activity and, on the contrary, defining the project goals in such broad terms that it is difficult to maintain sustained momentum.⁶² Campbell found that structures that allow for youth leadership and for regular informal interaction between involved youth’s friends were important to foster engagement in projects.

Conclusion

This report has identified the residual effects of the WaterLinks project. It was apparent that the rain barrels received a great deal of interest during the program and that the program engaged the community. In the long-term, it was identified that many rain barrels were removed due to maintenance, aesthetics and an unclear purpose. Residents interested in gardening were easy to encourage participation from, but they saw the barrels as benefitting gardening rather than reducing wastewater. It was apparent that evaluating the program twelve years after made it difficult for some interviewees to gauge the long-term success of the program.

A number of factors were identified that contribute to successful community engagement in lot-level stormwater management campaigns. Based on interviews with WaterLinks

⁵⁹ Ottawa-Carleton District School Board: Secondary School Courses for 2012-2013, 4.

⁶⁰ The following is the website: <http://ottawa.ca/en/residents/water-and-environment/green-living/background-information#school>

⁶¹ David Campbell. “Engaging youth in community change: three key implementation principles,” *Community Development* 43 (2012): 4.

⁶² *Ibid*, p. 74.

participants and existing literature it was found that involving the community in the design of the program has the potential to foster greater ownership and participation. Social marketing involving door-to-door engagement successfully encourages participation, but the approach also should focus on changing behaviours, identifying and removing psychological and physical barriers to participation, and using symbolic or emotional messaging. Additionally, a participatory evaluation framework has the potential to produce more invested citizens and to aid in the dissemination of information. Local educational institution and youth involvement can foster a greater sense of community belonging and provide mutual benefits to municipalities and youth. Municipalities benefit from having willing and engaged participants and youth benefit by meeting volunteer requirements and being involved in personalized learning experiences.

The report's findings support and build on Shandas & Messer's findings on successful elements of community-initiated wastewater and environmental stewardship initiatives. They found that the Community Watershed Stewardship Program (CSWP) was successful due to by having stakeholder involvement in the design of the program, forming relationships with local educational institutions, and creating a strong sense of ownership in the early stages of the program.⁶³ It was also found that a greater focus on social marketing and participatory evaluation also contribute to successful lot-level stormwater management initiatives.

⁶³ Shandas & Messer, 414.

Key Recommendations

Marketing/Communications

- Follow a social marketing framework that identifies desired behaviours to change and psychological and physical barriers to adoption. Develop the strategy addressing the identified barriers to adoption.
- Provide emotional or symbolic incentives for people to participate that stresses the contribution to the local environment, shows the incorporation of the whole community (including commercial and public works) and, as PAC 5 suggested, show the cost of wastewater management (specifically stormwater management) on the water bill so people know what portion of the bill goes towards wastewater management to provide economic incentive too.
- Take advantage of West Fest as the Waterlinks program did with a community picnic. Set up an information booth to promote awareness of the Pinecrest Creek/Westboro Stormwater Retrofit pilot and invite key City staff and local council to the event.
- Obtain written commitments on residents from behaviours that the City wishes to advance (as in Durham, see Appendix II: a case in social marketing: Durham Region).
- Engage in door-to-door education campaigns, but make it an ongoing campaign with multiple visits to each household in the targeted region, as was done in Durham region. Each visit must be limited to one message to not conflate or confuse the issue.

Evaluation/Governance

- Participatory evaluation as a framework for evaluation design: include stakeholders in the design of the monitoring and evaluation techniques to foster layers of commitment in the targeted population that is ongoing.
- Involve the community in the design of the program as was done in the case of Portland, Oregon's CWSP.
- Ensure that program is followed through and not cancelled before maturation.
- Pursue a horizontal governance approach in the delivery of stormwater management programs targeted at the population as opposed to the traditional modes of municipal vertical governance. Allow for a reciprocal discussion with the targeted citizens, the City administration and all stakeholders with a willingness to learn from these discussions to promote a devoted commitment to the success of the program with all stakeholders.

Outreach/Involvement

- There is a benefit to a political presence in promoting the project – all interviewees identified Councillor Hume contributions as a very positive element of the Waterlinks program that should be emulated in future programs.
- Continue to foster partnerships with local universities by providing research projects for various departments to allow for students from various fields to offer unique views. Continue to network to benefit from cutting edge management practices, policy analysis techniques and means of scientific analysis. Diversify the fields of input on such projects to learn from various points of view.
- Establish a research grant to provide incentive for university students to commit to researching the project and to receive, most likely, a long list of potential candidates.
- Establish a follow-up framework to ensure that there is proper maintenance of the rain barrels, to reinforce the educative component of the program and to remind people of the impact the individual can have on the condition of the local environment.
- Establish a framework for volunteers to participate in the education, monitoring and evaluation of the campaign so that a partnership can be made with local secondary schools.
- A program based on engaging a targeted population to change stormwater management practices needs to grow to be kept relevant and important in the minds of the citizenry. It is best practice to include them in the design of the program to foster stewards of the program in the community.
- Expand the *Cleaning the Capital* program to include wastewater management activities as well as establish and maintain an on-going communication relationship with these local high school principals. The relationship could seize upon the youth 40-hour volunteer participation requirement in future wastewater management programs. Student participation could include activities such as planting trees and shrubs maintenance, rain barrel maintenance and general garden support.
- Provide student mentorship to provide support to youth-led wastewater management activities.

Other

- Keep records of demographic data of participants in future programs to facilitate evaluation and analysis.
- Collect quantifiable data from various sources in order to triangulate conclusions and aid program evaluation, the more sources, methods and techniques used, the stronger the conclusions are based on overlapping empirical evidence.

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APPENDIX I: Portland's Community Watershed Stewardship Program

Portland's Community Watershed Stewardship Program (CWSP) used a bottom-up approach to encouraging community-driven watershed management practices. The CWSP used a collaborative approach involving the City of Portland's Bureau of Environmental Services, Portland State University and the community. The CWSP won the first Jimmy and Rosalynn Carter Partnership Award for Campus Community Collaboration in 2008 since over 700 students have led community improvement projects through CWSP. The CWSP provided grants to community members and students to develop individual stewardship projects. Shandas and Messer identify that over the first 12 years of the program, "people submitted more diverse proposals, and funded projects included ecoroofs, bioswales, and stormwater retention and detention facilities widely dispersed across the city."⁶⁴

The bottom-up approach resulted in involving more university, community partners, volunteers and residents in the program.⁶⁵ In the first 12 years of the program, 23,000 volunteers have devoted 150,000 hours in watershed improvements. Since 1995, CWSP has funded 197 projects in the City of Portland. The 2011 CWSP project costs were approximately \$83,000 and matched by \$250,000 in donations of materials, services and volunteer time.⁶⁶

The approach was able to produce a greater sense of belonging and higher involvement through more personal connections and a high rate of project completion.⁶⁷ The projects were small and "the tangible completed projects gave participants a sense of accomplishment."⁶⁸ Residents also more fully understood the connection between their actions and the condition of the environment.

Portland's CWSP differs from the City of Ottawa in that the watershed stewardship actions are developed and implemented principally by community members. The CWSP selects projects to fund and provides limited project support (technical expertise). The WaterLinks project instead was primarily designed and implemented by the municipality with input from community members on the Public Advisory Committee (PAC).

⁶⁴ Shandas & Messer, p. 413.

⁶⁵ Shandas & Messer, p. 413.

⁶⁶ *Community Watershed Stewardship Program: Annual report 2010-2011*. Portland, Oregon, City of Portland. <http://www.portlandonline.com/bes/index.cfm?c=51709&a=380589>

⁶⁷ Shandas & Messer, p. 415.

⁶⁸ Shandas & Messer, p. 415.

APPENDIX II: A case in social marketing: Durham Region

Durham Region's *Outdoor Water Conservation Pilot Program* was developed in 1997 and was modified and expanded to include Pickering, Ajax, Whitby, Oshawa, Port Perry and Uxbridge by 2001. The program sought to address summer lawn watering because summer water usage can rise by 50% during the summer months.⁶⁹ The program employed summer students to engage with neighbourhood residents over the summer months as well as monitor lawn watering. The students interacted with residents multiple times in order to gain trust and obtained written commitments from residents.

As part of the 1997 stormwater reduction strategy, Durham Region surveyed residents to assess what barriers to adoption existed in reducing lawn watering. One barrier identified was that residents were largely unaware of how often they watered their lawns. Students went door-to-door in a pilot project distributing information on lawn watering reduction as well as distributing a water gauge to measure their weekly usage. One group of residents were given 'information-only' and the other group was asked to sign a commitment to watering their lawns only on odd or even days and limiting watering to one inch per week. Residents who committed to the program reduced lawn watering by 54%, while 'information-only' residents *increased* lawn watering by 15%.⁷⁰ The written commitment was found to increase the success rate due to psychological reasons.

By 2001, Durham Region's neighbourhood resident engagement strategy was the following:

- *Visit #1* (June 15-July 12) – Students conducted door-to-door discussions with residents introducing the program, having residents complete a questionnaire, provide a rain gauge, recording card, and fridge magnet.
- *Visit #2* (June 30- July 13) – Residents were given a 60-page water efficiency guide and a hose bibb reminding them to water on odd or even days. Students flipped through the water efficiency guides highlighting relevant sections of the areas of interest.
- *Visit #3* (July 13- 28th) – Students focused on water efficient gardening. Students provided residents with two brochures introducing gardening strategies and identifying water efficient plants.
- *Visit #4* (July 28th- mid August) –The students obtained written commitments from residents. The commitment forms listed a number of individual water saving actions that residents could choose to commit to (committing to limit irrigation obtained a 90% commitment rate).

⁶⁹ Doug McKenzie-Mohr. Promoting sustainable behaviours: an introduction to community-based marketing. *Journal of Social Issues*. 56 (2000): 550-551.

⁷⁰ McKenzie-Mohr.

Durham Region obtained a reduction in water usage of approximately 30% in all of the piloted programs.⁷¹ The cost of the program varied between \$40-88 per household. Durham Region estimated that the peak level water savings allowed the municipality to save \$945,000 in the cost of water plant development.⁷²

⁷¹ Water Efficiency Durham. *Fostering Sustainable Behaviour: Community-Based Social Marketing*. Accessed <http://www.cbsm.com/cases/water+efficiency+durham> 165

⁷² McKenzie-Mohr, p. 551.