Workshop Road Map

A. VI2065: The Vision for Vancouver Island in 50 Years

B. Water and the Urban Environment - Adapting to a Changing Climate

C. Agriculture and Water – How Will Climate Change Impact the Future?

D. Landscape Irrigation – How Efficiency Can Be Improved

In Module D, you will learn HOW…..

the efficiency of landscape irrigation can be improved through use of state-of-the-art tools

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SMART Watering Systems

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Module D Team – Landscape Irrigation

Landscape Irrigation Assessment – tools to assess and reduce water use

Can tools improve efficiency?

Presented by: Chris Le Conte, CIC, CLIA, WSIP.

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Certified B Corporation
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measure . manage . monitor

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Certified Irrigation Contractor
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Thoughts on Efficiency

- What is the largest influencer on landscape irrigation efficiency?
- What is the impact of poor efficiency?
- How efficient are irrigation systems?
- How do you measure efficiency?
- How much water can be saved through efficiency improvements?
- After you identify savings opportunities, how do you implement changes?
- How do you get end users to care about efficiency?
- How do you encourage end users to spend money on efficiency?

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How Much Water does an Irrigation System Use? (Current approach)

1 Acre Inch per week

27,100 US Gallons
102,000 Litres
102m³

1 Acre Property
(If 100% Efficient)

2,040,000L/Year

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How Much Water Does an Irrigation System Use? (or how much should they use?)

1 Acre Property
(If 50% Efficient)

4,080,000 L/Year
(4,080 m^3)

FACT: Most of The Commercial Landscape Irrigation Systems Designed and Installed in the 90's and 2000's Have Been Operating at 50% Efficiency (or Less)

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Background-ICI Efficiency

- In 2009, Municipal water departments were starting to target large ICI clients for investigating water conservation opportunities.
- ICI chosen using analyzed billing data.
- How could we present water saving information to the end user that was most likely not a subject matter expert?
- What information would an end user need in order to make a decision on budgeting for system improvements?
- Decided against catch-cans due to several factors.
- Program began in 2010.
- GOAL: reduce system annual water use over a 20 week period.
- Identify and eliminate causes of water waste.

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The Challenge

- 2 BIG problems – How do you make data collection scalable and effective (force action).
- Estimating Irrigation water savings is not the same as low flush toilets (3.5 GPF vs 1GPF).
- Water conservation can be a tough “sell” due to competing priorities for sustainability dollars.
- The perception that efficiency or conservation means “poor quality” landscape.
- Cost of water is low compared to other utilities and other utilities have retro-fit programs that are easier to implement (switch to high efficiency version)
- Cost of water is typically paid by tenant (ICI).
- Outdoor use is typically not measured (at least not yet)
- There is no published metric for water use over a landscaped area (How much should I be using if I have 3 acres of turf and an acre of trees?

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Methodology

- Used traditional tools such as pressure gauges and soil probes.
- Used measuring wheels and flow measurement equipment to quantify gross water application over an area.
- Set a target of .5” per week as a target irrigation amount. (22” of ET vs. 12” of rainfall)
- Performed site evaluation after system start-up in the spring.
- Average of 5 minutes per zone.
- Presented findings in a report to the property manager (not always presenting face-to-face).

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Soil Probe & Pressure Gauge

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Ultrasonic Flow Meter

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Great Plant Material Selection but Poor Water Delivery.


One Leak can Equal 30,000 litres per Month.

Table 1 - Zone Summary: IMAX - 2010

Zone Number	Zone Location	Area, m^2	Landscape Type	Rotors	Sprays	PSI	Flow rate, L/min	run time min/cycle	cycles/week	mm/week	inches/week	m3/year	Leak Observed	Potential Savings, m^3/yr: Hardware Savings[1]	Additional w/ Smart Controller[2]	Additional w/ Central Controller[3]
1	NE corner of bldg	1,171	TURF/TREES	15	•	38	120	40	4	16	0.65	384		87	119	149
2	E side of bldg	471	MIXED	12	•	40	108	45	4	41	1.62	389		269	48	60
3	Boulevard between driveways	1,310	TURF/TREES	20	•	22	130	45	4	18	0.70	468	✓	135	133	166
4	S boulevard	641	MIXED	19	•	26	122	45	4	34	1.35	439		276	65	81
5	E side of pond	2,137	MIXED	14	•	45	108	45	4	9	0.36	389			63	117
6	N and S of pond	1,918	TURF/TREES	9	•	46	115	45	4	11	0.43	414			122	170
7	N of pond, S of bldg	2,731	TURF/TREES	14	•	34	147	45	4	10	0.38	529			113	182
8	S side of bldg	676	MIXED	9	•	33	112	45	4	30	1.17	403		231	69	86
9	Planting Beds at bldg entrance	552	SHRUBS/TREES	•	18	35	160	15	4	17	0.68	192		52	56	70
10	Lunch courtyard	487	SHRUBS/TREES	•	12	38	115	10	4	9	0.37	92			18	30
11	S side of bldg	1,076	TURF/TREES	13	•	32	125	40	4	19	0.73	400		127	109	137
12	NW side of shipping driveway	279	TURF	•	17	25	150	30	4	65	2.54	360	✓	289	28	35
13	W side of parking lot	242	TURF	•	14	36	120	30	4	59	2.34	288		226	25	31
14	N side of parking lot	166	TURF/TREES	•	12	35	104	30	4	75	2.95	250		207	17	21
15	E side of parking lot	230	TURF	•	10	32	86	30	4	45	1.77	206		148	23	29
16	N boulevard	1,479	TURF/TREES	13	•	34	105	45	4	13	0.50	378			153	190
17	E side parking lot and around naturalized area	2,146	TURF/TREES	15	•	34	108	45	4	9	0.36	389			62	116
18	POND FILLER VALVE															
19	N corner of bldg	914	TURF/TREES	15	•	40	150	40	4	26	1.03	480	✓	248	93	116
	Total Annual Irrigation Demand, m3/year =											**6,450**				
	Total Estimated Annual Savings, m3/year =													**2,296**	**1,315**	**1,788**
	Percentage Savings =													**36%**	**20%**	**28%**

Comparison between 2010 water use and 2011 water use

Changes were made to sprinkler nozzles, zones changed from sprays to drip, run-times adjusted

Average savings equal 27%

Zone Number	mm/week in 2010	inches/week in 2010	m3/year in 2010	mm/week in 2011	inches/week in 2011	m3/year in 2011	Overall reduction m3/year	Overall reduction Gallons/year	Percent Reduction
1	16	0.65	384	12	0.46	276	108	28,531	28%
2	41	1.62	389	27	1.07	257	132	34,871	34%
3	18	0.70	468	11	0.45	298	170	45,015	36%
4	34	1.35	439	22	0.87	283	156	41,211	36%
5	9	0.36	389	9	0.35	378	11	2,853	3%
6	11	0.43	414	10	0.41	396	18	4,755	4%
7	10	0.38	529	9	0.35	490	40	10,461	7%
8	30	1.17	403	31	1.20	414	-11	-2,853	-3%
9	17	0.68	192	12	0.47	132	60	15,850	31%
10	9	0.37	92	10	0.40	98	-6	-1,691	-7%
11	19	0.73	400	10	0.38	206	194	51,144	48%
12	65	2.54	360	25	0.97	137	223	58,963	62%
13	59	2.34	288	28	1.09	134	154	40,577	53%
14	75	2.95	250	36	1.42	120	130	34,237	52%
15	45	1.77	206	24	0.93	108	98	25,995	48%
16	13	0.50	378	12	0.46	346	32	8,559	9%
17	9	0.36	389	8	0.31	342	47	12,363	12%
18	POND FILLER VALVE								
19	26	1.03	480	18	0.70	324	156	41,211	33%
						Total =	**1,711**	**452,051**	
						Cost savings at $1.525/m3	**$2,610**		

Comparison between 2010 water use and 2011 water use

Changes were made to sprinkler nozzles, zones changed from sprays to drip, run-times adjusted

Watering days adjusted by SMART Controller

Average savings equal 45%

Zone Number	mm/week in 2010	inches/week in 2010	m3/year in 2010	mm/week in 2011	inches/week in 2011	m3/year in 2011	Overall reduction m3/year	Overall reduction Gallons/year	Percent Reduction
1	16	0.65	384	9	0.35	207	177	46,758	46%
2	41	1.62	389	20	0.80	193	196	51,831	50%
3	18	0.70	468	9	0.34	223	245	64,669	52%
4	34	1.35	439	17	0.65	212	227	59,914	52%
5	9	0.36	389	7	0.26	284	105	27,817	27%
6	11	0.43	414	8	0.30	297	117	30,908	28%
7	10	0.38	529	7	0.26	367	162	42,796	31%
8	30	1.17	403	23	0.90	311	93	24,489	23%
9	17	0.68	192	9	0.35	99	93	24,568	48%
10	9	0.37	92	8	0.30	74	18	4,808	20%
11	19	0.73	400	7	0.28	155	245	64,775	61%
12	65	2.54	360	18	0.72	103	257	67,998	72%
13	59	2.34	288	21	0.82	101	187	49,453	65%
14	75	2.95	250	27	1.06	90	160	42,162	64%
15	45	1.77	206	18	0.69	81	125	33,127	61%
16	13	0.50	378	9	0.34	259	119	31,384	31%
17	9	0.36	389	6	0.24	257	132	34,950	34%
18	POND FILLER VALVE								
19	26	1.03	480	13	0.52	243	237	62,609	49%
						Total =	**2,896**	**765,016**	
						Cost savings at $1.525/m3	**$4,416**		

Meadowvalve (2000 Argentia Road)	
PRE	
PRE Irrigation Demands per 20-week season	10,463 m^3
Area of Irrigation	21,125 m^2
Weekly Irrigation Demands	25 mm/week
Maximum Target (estimated) savings	7,244 m^3
POST	
POST Irrigation Demands per 20-week season	4,503 m^3
POST Irrigation Demands per 20-week season	11 mm/week
Savings	
Actual water savings	5,960 m^3
Percentage water savings	57%
Percentage of Target Savings Achieved	82%

Microsoft	
PRE	
PRE Irrigation Demands per 20-week season	5,994 m^3
Area of Irrigation	10,073 m^2
Weekly Irrigation Demands	30 mm/week
Maximum Target (estimated) savings	4,715 m^3
POST	
POST Irrigation Demands per 20-week season	2,128 m^3
Weekly Irrigation Demands	11 mm/week
Savings	
Actual water savings	3,866 m^3
Percentage water savings	64%
Percentage of Target Savings Achieved	82%

Why Develop I.P.A.T?

- Saves Time!
- Paper and Clip-Board Approach is Labor Intensive and a Barrier to Profitability.
- To Advise Clients on ROI, We Needed to know Water Use on a Per-Zone Basis.
- Impact on Operating Budgets is Increasing.
  - Businesses and individuals are taking notice.
  - They just need ROI info to make decisions.
- Standardization of Methodology.
- Building a Database of Client Information and Irrigation Infrastructure.
- Long Term Data Tracking.

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What is I.P.A.T?

- IPAT Allows for Calculation of Return on Investment for Zone Specific Retro-fits and Calculates Water Use based on Flow Rates, Schedules, and Local Water Rates.
- In Use for 3 Years by Water Utilities and Contractors.
- Over 1000 Assessments Completed to Date.

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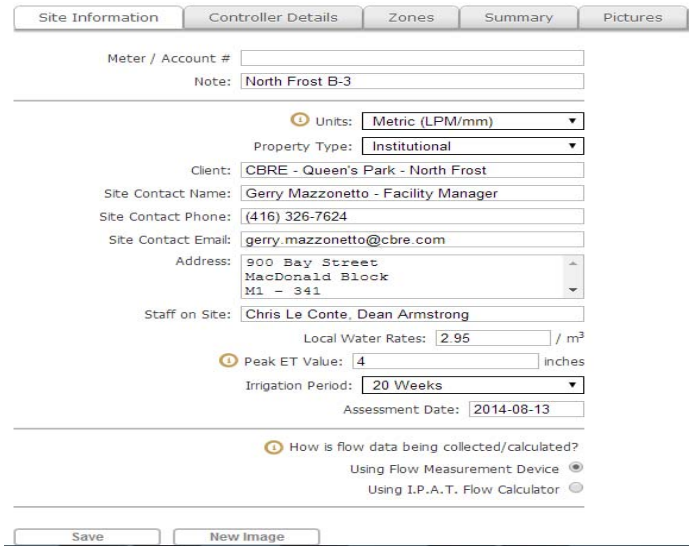
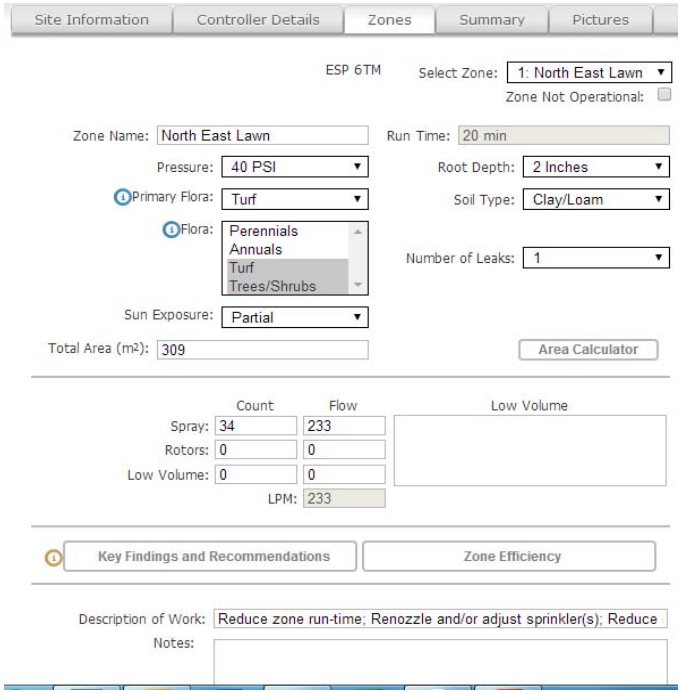
Part 1

- Data collection in the field.





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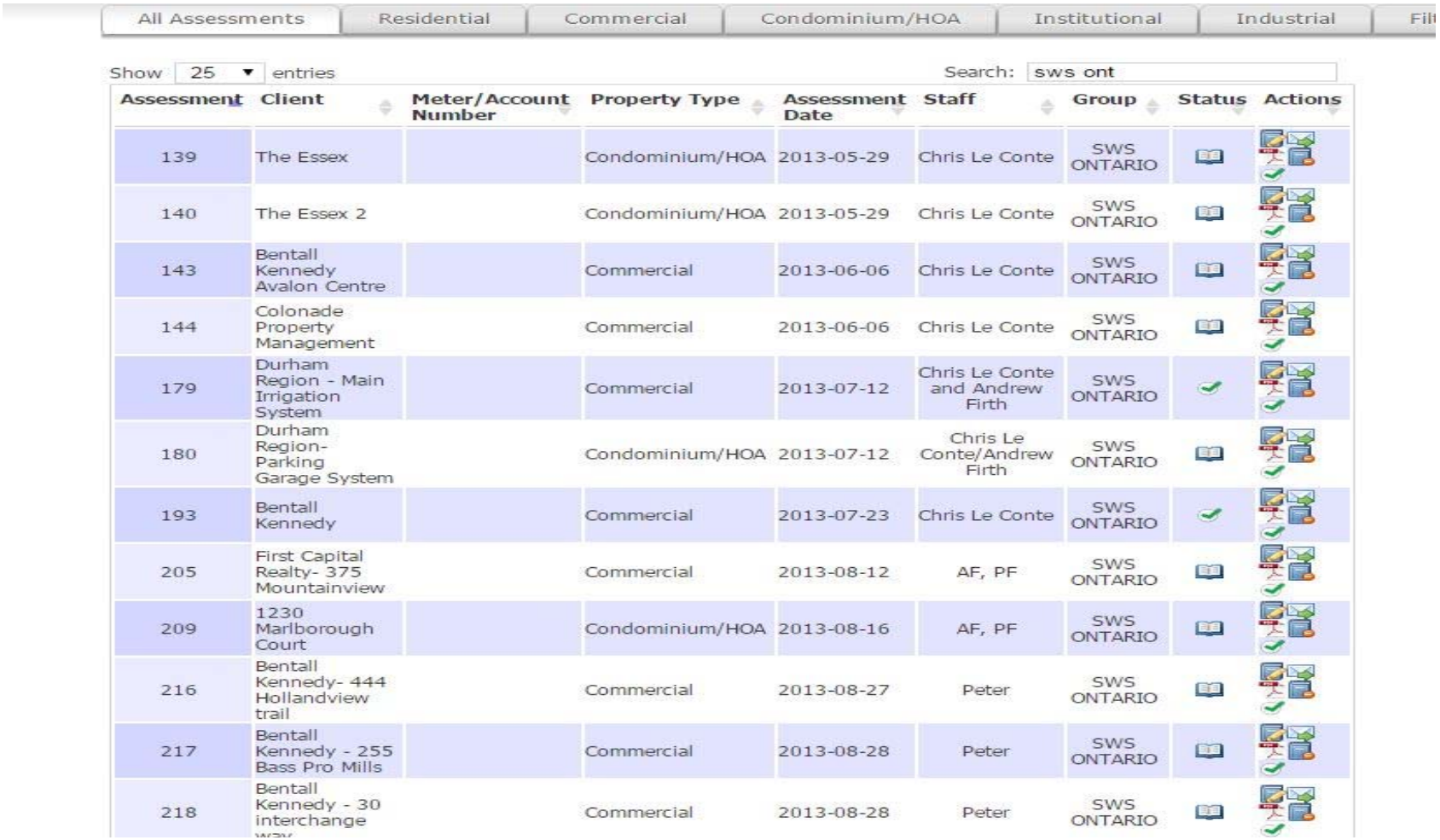
Part 2

- Database for managing reporting and data.



All Assessments | Residential | Commercial | Condominium/HOA | Institutional | Industrial | Fil

Show 25 entries Search: sws ont

Assessment	Client	Meter/Account Number	Property Type	Assessment Date	Staff	Group	Status	Actions
139	The Essex		Condominium/HOA	2013-05-29	Chris Le Conte	SWS ONTARIO		
140	The Essex 2		Condominium/HOA	2013-05-29	Chris Le Conte	SWS ONTARIO		
143	Bentall Kennedy Avalon Centre		Commercial	2013-06-06	Chris Le Conte	SWS ONTARIO		
144	Colonade Property Management		Commercial	2013-06-06	Chris Le Conte	SWS ONTARIO		
179	Durham Region - Main Irrigation System		Commercial	2013-07-12	Chris Le Conte and Andrew Firth	SWS ONTARIO		
180	Durham Region- Parking Garage System		Condominium/HOA	2013-07-12	Chris Le Conte/Andrew Firth	SWS ONTARIO		
193	Bentall Kennedy		Commercial	2013-07-23	Chris Le Conte	SWS ONTARIO		
205	First Capital Realty- 375 Mountainview		Commercial	2013-08-12	AF, PF	SWS ONTARIO		
209	1230 Marlborough Court		Condominium/HOA	2013-08-16	AF, PF	SWS ONTARIO		
216	Bentall Kennedy- 444 Hollandview trail		Commercial	2013-08-27	Peter	SWS ONTARIO		
217	Bentall Kennedy - 255 Bass Pro Mills		Commercial	2013-08-28	Peter	SWS ONTARIO		
218	Bentall Kennedy - 30 interchange way		Commercial	2013-08-28	Peter	SWS ONTARIO		

City of Fort Collins Utilities

Lisa Schroers 1006 Timber Lane

Contact Name
Lisa

Contact Phone

Contact Email
Lschroers@fcgov.com

Property Type
Residential

Staff
Andy and Eric

Date of Assessment
2014-05-09

Report Summary

Local Water Rate
$2.91 per 1000 Gallons

Irrigation Period
26 Weeks

Daily Water Use
802 Gallons

Daily Water Cost
$2

Weekly Water Use
5,614 Gallons

Weekly Water Cost
$16

Annual Water Use
145,964 Gallons

Annual Water Cost
$425

Potential Annual Water Savings
99,099 Gallons

Potential Annual Cost Savings
$288

Total Irrigated Area
2,910 ft^2

Photos

Entrance planting beds

large leak

Controller

Controller wiring should be cleaned up and a new controller with Monthly Seasonal adjust should be installed.

Zone 1

70 psi

zone 3

damage caused by lawn maintenance

Potential Controller Savings

Number	Controller Technology	Percent Water Use Reduction	Estimated Cost of Upgrade	Annual Water Savings in Gallons	Annual Dollar Savings	Return on Investment (Years)
1	Rain Sensor	15	150	79513	199	0.8
2	Soil Moisture Sensor	0	0	0	0	0
3	SMART Controller	0	0	0	0	0
4	Irrigation Management System	0	0	0	0	0

Potential Zone Savings

Zone Number	Zone Description	Finding	Recommendation	Percent Water Use Reduction	Estimated Cost of Upgrade	Annual Water Savings in Gallons	Annual Dollar Savings	Return on Investment (Years)
1	Entrance planting beds	Excessive zone run-time Mixed sprinkler/precipitation rates Overpressured sprinkler(s) Overwatering causing run-off	Reduce zone run-time Retrofit sprinkler(s) and/or nozzles to match precipitation rates Install pressure regulated sprinkler(s) Reduce run-times	54	750	52312	131	5.7
2	Front Lawn Turf	Overpressured sprinkler(s) Sprinkler overspray Incorrect sprinkler nozzle Sprinkler not level	Regulate zone pressure Renozzle and/or adjust sprinkler(s) Install correct sprinkler nozzle Level sprinkler	52	120	277472	694	0.2
3	Side Planting Beds and turf	Excessive zone run-time Overpressured sprinkler(s)	Reduce zone run-time Install pressure regulated sprinkler(s)	56	500	82742	207	2.4
4	Back Lawn Turf	Overpressured sprinkler(s) Overwatering causing run-off	Regulate zone pressure Implement Cycle + Soak schedule	41	600	113818	285	2.1
Total					**1970**	**526344**	**1316**	**1.5**

New Schedule with Improvements

Zone Number	Zone Description	Rotors	Sprays	A Program - Cycles/Week	A Program - Mins/Cycles	B Program - Cycles/Week	B Program - Mins/Cycles	C Program - Cycles/Week	C Program - Mins/Cycles	D Program - Cycles/Week	D Program - Mins/Cycles	Sprinkler PSI	Current Flow Rate in GPM	New Flow Rate in GPM	Current Application Amount Per Week in in	New Application Amount Per Week in in	Current Annual Water Use in Gallons	New Annual Water Use in Gallons	Percent Water Use Reduction
ML																	0	0	100
1	Entrance planting beds	0	17	4	15	0	0	0	0	0	0	80	23.3	14.3	2.21	1.02	96928	44616	54
2	Front Lawn Turf	14	6	4	40	0	0	0	0	0	0	70	42.9	31	5.51	2.65	535392	257920	52
3	Side Planting Beds	5	12	4	20	0	0	0	0	0	0	70	20.2	15.46	5.67	2.48	147056	64314	56
4	Back Lawn Turf	8	0	4	45	0	0	0	0	0	0	70	22.2	17.44	2.85	1.68	277056	163238	41

Summary of Findings

- Over 50% of all zones were over watering (1000 zones)
- On average at least 1 significant leak per system and several minor leaks. (this was very surprising)
- Significant overspray visible on most systems (documented with pictures).
- Very few rain sensors. Many not functioning.
- Mixed precipitation rates and over-pressurization were the most common deficiencies. (and the easiest to fix)
- Rotor zones were typically deficit irrigating. (and we never told clients to increase their application amounts).
- Landscape health and appearance improved.

Summary of Findings (continued)

- 50% uptake with participants.
- Only 1 system was problematic (we could not make any recommendations to improve the system. We recommended decommissioning and starting over.

Factors influencing program participation included:

- Change in corporate priorities.
- Contractor not fulfilling requests for proposal.
- Changes in personnel.
- Funds not available due to unforeseen circumstances.
- Longer ROI than acceptable.

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Contractor Participation

- At first, they were not happy and suspicious (concerned about client perception).
- After they saw the business opportunity, most were very supportive.
- The program drove uptake of over 50 smart controllers.
- Resulted in implementation of pressure regulated sprinklers, low volume irrigation and improved maintenance practices.
- Contractors got to see first hand how their expertise was valued by end users.
- Most contractors are now requesting municipal support in reaching out to their client base.

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Next steps

- Municipalities are moving forward with training industry professionals on new evaluation techniques and creating incentives to encourage greater industry participation.
- Irrigation improvements are getting easier to sell (water cost in 2009 was $1.45/m3 and is now $1.95/m3). This is still one of the lowest water rates in Ontario. Most cities are above $2.50/m3.
- $2.50/m3 = $9.46 per 1000 Gallons.

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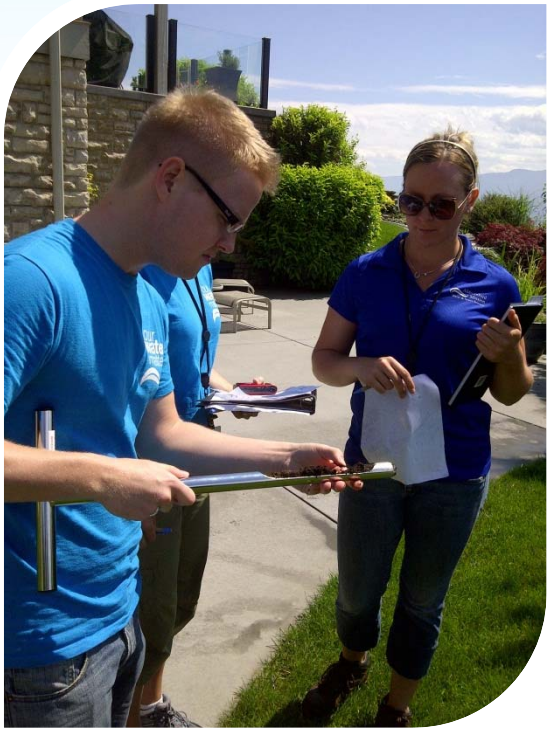
Final Thoughts

- Tools can only improve the efficiency of data collection. Contactors are needed for implementation of efficiency measures.
- Return on Investment is a large factor in end-user decision making.
- The irrigation system improvements opportunity is large if contractors have the tools and interest to target it. (market transformation)
- Data collected during these assessments start to build a picture of water use on a property by property basis.
- Knowing how many systems are in operation, their components and level of performance is very useful data to have if attempting to address irrigation water demands placed on municipal infrastructure.



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How can we use technology?

We can gather relevant information to frame decision making

- Average irrigation application amount per acre?
- Average daily, weekly, monthly, annual water use per system?
- Inventory of irrigation infrastructure
- Total number of spray heads vs Rotors
- Total number of potential “fixtures” needing replacement.
- Establishing a performance benchmark or enforcing water waste by-laws.
- What % of systems have rain sensors?
- Plan for infrastructure renewal
- Build up a “pipeline” of retro-fit work

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Our Responsibility Now . . . Water For Tomorrow

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Thank you!

Presented by: Chris Le Conte, CIC, CLIA, WSIP.

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Next, Kirby Ell will explain….

High Efficiency Irrigation System Rating Tool

High Efficiency Irrigation Standard

Why was HEIS created??

A. To obtain a higher level of water efficiency

B. It takes a holistic approach to water conservation
   - Consider ALL factors that impact water efficiency
   - Not just the design & installation of irrigation systems

Initial Planning

A. Geographical Evaluation
   - What is the local climate like?
     - Desert, rainforest…
   - Does the location have adequate soil?
   - Is wind a factor?

Initial Planning – Water Budget

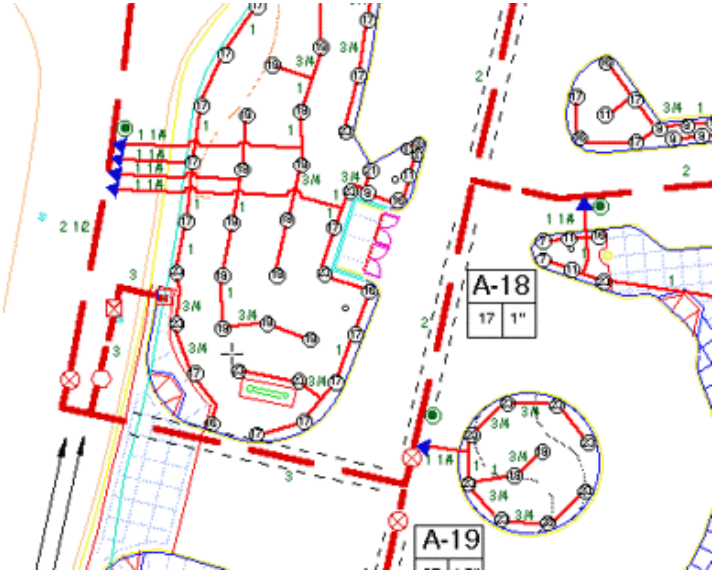
B. Determine how much water is available
   - Size & pressure of municipal service
   - Watering restrictions
   - Well or aquifer capacity

C. Calculate an initial water budget
   - Determine how much water the project will require
   - Is the amount of water available enough to satisfy the amount of water required?
   - Is the initial concept still feasible?

Initial Planning – Water Efficient Plants

Design

A. Certified Landscape & Irrigation Design
   - Ensures the design conforms to HEIS spec's

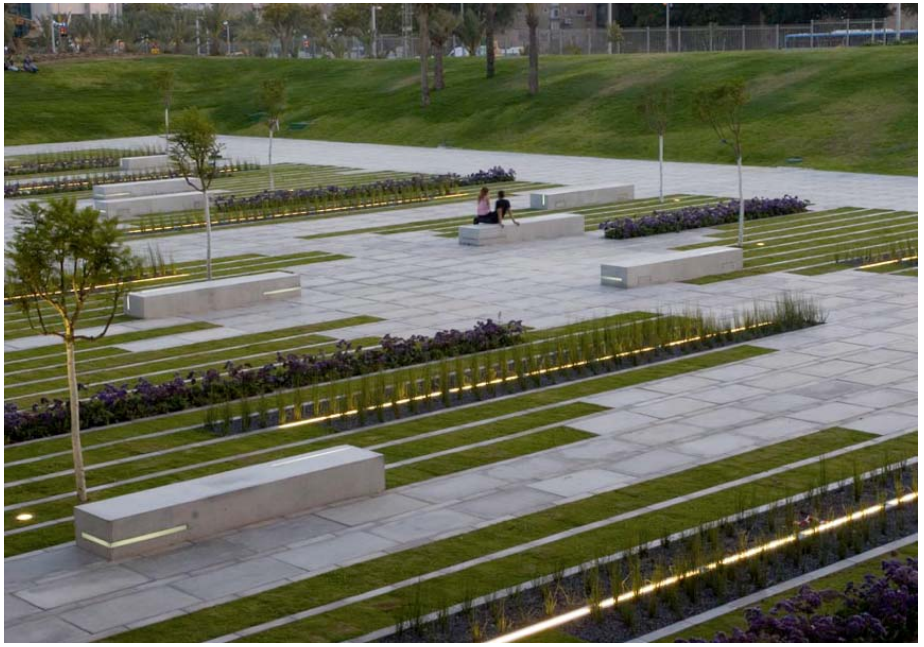


Design – Water Saving Layout

B. Landscape layout should consider product limitations
   - Limit curved planter beds
   - Turf dimensions divisible by typical spray radius

Design - Water Saving Layout

C. Minimum width of turf and shrub areas
   - Prevent run off or overspray onto hardscape



Design - Weather Sensors

D. Weather Sensors
- Rain Sensor
- Soil Moisture Sensor
- Smart Controllers
  - Save 30 - 50% of water used by traditional controllers

Design – Water Efficient Products

E. Ensure the irrigation system uses water saving products
- Efficient sprinklers – min level of distribution uniformity (DULQ)
- Pressure regulation
- Check valves to prevent low-head drainage
- Flow sensor - leak detection

Design – Good Quality Soil

F. Soil specifications
   - Minimum depth & quality
   - Specify soil with good moisture holding capacities

Installation - Certification

A. Certified Irrigation Contractor & Certified Irrigation Technician to install the irrigation system

B. Trained & Certified personnel
   - Vested interest in creating a well functioning system
   - Identify abnormal conditions which affect system's efficiency

Installation – Quality Control

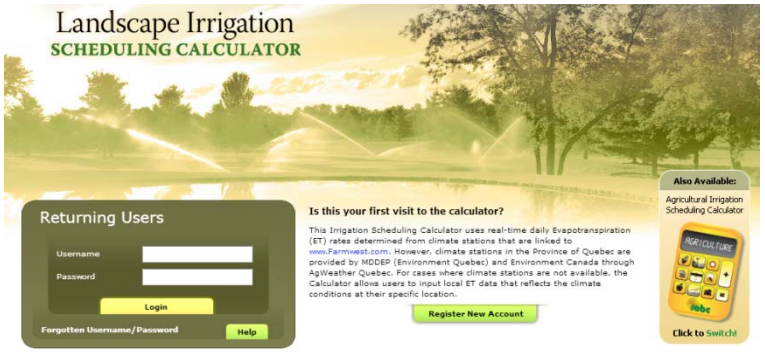
C. Set the controller, sensors and heads properly

D. Check for leaks & pressure test mains

Scheduling

A. Create an accurate schedule
   - Soil, plants, sprinkler precip rates, current weather conditions...
   - Use IIABC scheduling calculator

B. Evaluate System Performance
   - Audit the irrigation system to ensure its performing as designed
   - Compare actual landscape water usage to a target water budget



Online HEIS Tool

HEIS Project
Point Accumulation Tracker

Mandatory | Minimum 1 of 2 required | Optional | To achieve project rating

Preliminary Project Information (required)		Site IIABC Professionals	
Steps			
1	181	IIABC Base Standards (Minimum of 100 required)	Info
2	100	Water Use Allocation Budget	Info
3	80	Design Capacity Worksheet	Info
4	82	Product Component Rating	Info
5	0	Irrigation Management - Scheduling Worksheet	Info
6	0	IIABC Certified Professionals	Info
7	10	Complete Irrigation System Proficiency Assessment	Info
	84	**Irrigation System Efficiency Rating**	
8	100	Soils Condition Assessment / Recommendation	Info
9	0	Conservation Enhancements / Water Collection - Reuse	Info
	50	**High Efficiency Water Use for Project**	

STANDARDS FOR HIGH EFFICIENCY LANDSCAPE IRRIGATION SYSTEMS

March 2014 Edition

IRRIGATION INDUSTRY ASSOCIATION OF BRITISH COLUMBIA

Project Compiler

General

Section Score Tracker

7	4	1	4

Entire Standards Score Tracker

42	4	4

- [x] 1. **Scope of Work**
  - Supply and install all components of an automatic irrigation system to efficiently cover the landscape.
  - Utilize the IIABC's HEIS system components calculator to confirm the system is of sufficient efficiency.
  - Provide a scaled design drawing
- [x] 2. **Quality Assurance**
  - The combination of the following IIABC Certified Professionals must be used (see HEIS calculator):
  - ◦ Certified Irrigation Contractor
    ◦ Certified Irrigation Designer
    ◦ Certified Irrigation Technician – Level 2
    ◦ Certified Irrigation Scheduler
  - The contractor is a member of the IIABC
  - A written guarantee of a minimum of one year is provided to the owner
- [x] 3. **Submittals**
  - Provide a scaled as built drawing showing controller location, master valve, zone control valves, main water connection, blow out connection, pump and other pertinent features.
  - Provide an operating and maintenance manual.
  - Provide a base schedule based on evapotranspiration for the location of the project.
  - Provide information on how to obtain local evapotranspiration data.
  - Provide an operating schedule for all zones for the peak time of year with suggested run times for seasonal changes.
  - Provide special tools required to service installed equipment.
- [ ] 4. **Site Conditions**
  - Verify and mark the location of all on site utilities.
  - Verify and mark the location of all buried cables, conduits, pipes, etc., prior to trenching.
  - Adjust the design as required to suit existing site conditions before proceeding with the work.
  - Protect existing landscape features, plant material structures, the work in progress and the work of other trades from damage.
  - Ensure that sequencing of work is carried out in coordination with other trades.
  - Ensure all sleeves are appropriately installed.
- [x] 5. **Owner or Representative**
  - Prior to starting the job the persons properly authorized to make decisions are identified.
- [ ] 6. **Regulations**
  - Obtain all permits and licenses applicable to the work to be done.
  - Ensure compliance with relevant codes and regulations during both design and installation.

How much water do we need?

To calculate the LWR for the site, enter the information requested below (enter data in white cells only).

Step 2A - Enter The Annual Precipitation At The Site (R)

Average annual precipitation at site (inches/year)

9

STEP 2B - COMPLETE TABLE 1 BELOW (enter data in white cells only)

Enter the area of the hydrozone (square feet). The total area must equal the landscape area entered in Step 1A.

Choose the plant type from the dropdown list (source data is displayed in Table 2). Note, you may add additional plant types and associated KL values if you prefer.

Choose the irrigation type from the dropdown list (source data is displayed in Table 3).

Landscape Water Requirement

Zone	Hydrozone/Landscape Feature Area (sq. ft.)	Plant Type or Landscape Feature	Landscape Coefficient (K_L)	Irrigation Type	Irrigation Efficiency (IE)	LWR_H (gal/yr)
1	10000	Cool Season Turfgras	0.8	Rotor	80	82092.19
2	20000	Ground Cover	0.5	Drip - Pres	95	75355.26
3	20000	Scrubs	0.5	Fixed Spra	75	95450

Is the water required less than the water allowed?

STEP 3B - REVIEW THE LWA AND LWR FROM PART 1 AND PART 2

LWA

299195.91

LWR

252897.45

OUTPUT - DOES THE DESIGNED LANDSCAPE MEET THE WATER BUDGET?

Yes

If YES, then the water budget criterion is met.
If NO, landscape and/or irrigation system adjustments need to be made and reflected in Step 2B - LWR.

The designed landscape is

20

Turf

Design Capacity and Dynamic Pressure Calculator

Project Compiler

A Record Site Information

1.	Static pressure at the source (main):	135	PSI
2.	Net elevation change (positive or negative) source to POC:	-10	FEET
3.	Pressure change resulting from change in elevation (Line 2 X 0.433)	-4	PSI
4.	Static pressure at POC (Line 1 +/- Line 3):	131	

		Number / Length	Size	Type of Pipe
5.	Service Line	20	1	NaN
6.	Delivery Line	100	1	NaN
7.	Water Meter	1	1	0
8.	Gate Valves	1	1	NaN
9.	Other	0	0	0

B Determination of Design Capacity

		factor	restriction		
10.	Pressure Loss through the Water Meter		Not to exceed 10% of available PSI at the source (see Line 1)	14	GPM
11.	Volume through the Water Meter	50	Not to exceed 75% of maximum safe flow of the meter	38	GPM
12.	Velocity through the Service Line (Supply Main to Meter)		Not to exceed 7.5 fps	30	GPM
13.	Design Capacity		Lowest of 3 values - Lines 10, 11 & 12	14	GPM

C Calculation of Dynamic Pressure at Design Capacity

14.	PSI loss in Service Line	100	PSI loss per 100ft/100 x actual length in feet	20		20	PSI
15.	PSI loss in Delivery Line	8	PSI loss per 100ft/100 x actual length in feet	15		1	PSI
16.	PSI loss in the Water Meter at Design Capacity					2	PSI
17.	PSI loss in gate valves		1	Equivalence Factor		0	PSI
		x	5	PSI loss per 100ft of std steel pipe/100			
		x	2	Number of gate valves			

Product Rating Guide

Minimum of 80 Rating Average across all Product Categories on Project

2	82	1	**Controllers**				
		1	Four (4) Program Capability				
		3	Season Adjustment % by Program				
		1	Multiple Programmable Sensor Inputs				
		1	Master Valve Activation				
		1	Flow Log Capabilities (Entered Flow or Actual Real Time Flow)				
		3	Ability to self adjust station run times from current climatic / site data				
		3	Ability to respond to flow sensor with system shut down & alert				
					13	13	150
1	82		**Backflow Preventer**				
					1	1	200
0	82	1	**Master Valves**				
					1	0	0
1	82	0	**Flow Sensors**	2 Water Meter Size			
				FLOW SENSOR REQUIRED			
					5	5	125
1	82	12	**Solenoid Control Valves**				
		2	Flow Control				
		3	Pressure Regulation Compatible				
					5	5	100
				Site Static			
1	82		**Pressure Regulator @ POC**	135 psi			
		1	Static PSI at POC over 75 PSI	PRESSURE REGULATION ADVISED			
					4	4	150
0	82	1	**Filters (with pressure gauge at POC)**				
					1	0	0
2	82		**On Site Sensors**				
		0	Rain				
		5	Climate				
		0	Wind				

Product Pass or Fail?

1	82	2	**Low Volume / Low Pressure Components**			
		1	Adhere to HEIS Details and Specifications			
				1	1	150
2	82		**Pipe**			
		1	Class 200 (minimum rating) Lateral Piping &/or HDPE			
		2	Schedule 40 Mainline Piping &/or HDPE			
		2	Flow Rates below 5 fps			
				5	5	50
1	82		**Connections**			
		3	Triple Swing Joints on all Sprinkler Heads and Quick Couplers			
		2	Threaded Schedule 80 Fittings on all Valve Assemblies			
				5	5	35
1	82		**Wire**			
		3	Single 14 gauge to each control valve, shared 14 or 12 gauge Common			
		2	Gel Filled Enclosure for each splice			
				5	5	40
				1460		
				PASS		
				FAIL		
			Total Product Categories	17		82

Certification Points

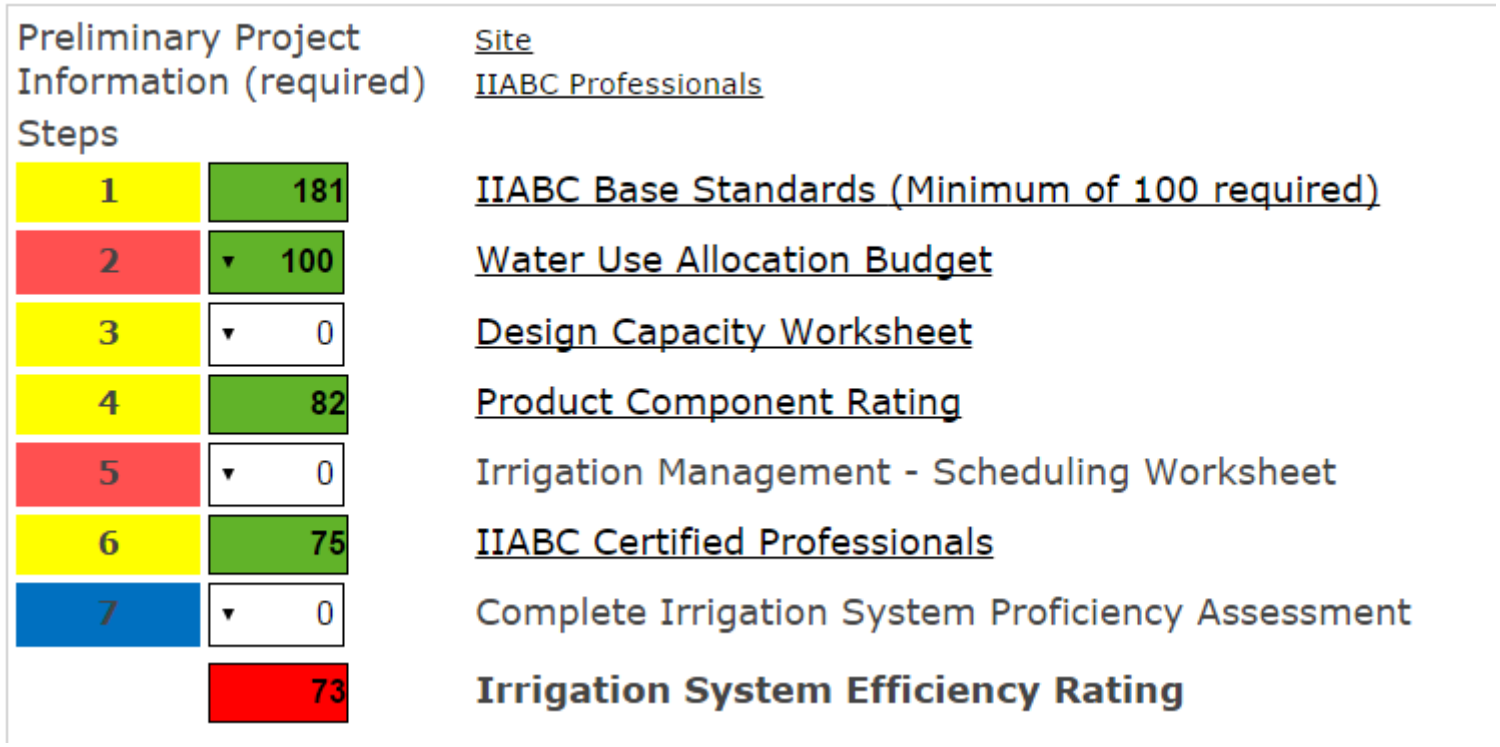
IIABC Certified Professionals Point Accumulation

Certifications (complete professional certification submittal for each category establishing points - click on the appropriate certification drop down box)

	Assigned User		
CID		10	Irrigation Design Completed by CID
CIC	Administrator eVision	10	Certified Irrigation Contractor
CITII	Administrator eVision	5	Certified Staff installing project
CIS	Administrator eVision	5	Pre Construction Irrigation Schedule developed
CIS		10	Post Construction System Audit conducted

100 Overall Project IIABC Certified Professional Rating

System Pass or Fail?




THE END