This presentation premiered at WaterSmart Innovations

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Streamlining Water Surveys using Tablets/Software: Lessons Learned Navigating New Technology

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MADDAUS WATER MANAGEMENT

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Agenda

1. Background & Need for the Software
2. Highlights of Tablet Technology
3. Overview of Water Audit Software
4. Case Studies of Audits with Training
   - City of Santa Barbara, California
   - Army Corps of Engineers Ft. Shafter, Hawaii
   - Abbottsford, Canada
5. Questions

1. Background & Need for the Software

- Maddaus Water Management has been doing audits for over 20 years, providing training since 2004 and using electronic tablet software since 2011
- Provide easy way to store data <u>electronically</u>

More time efficient	Reduce data entry time for complex sites
More sustainable	Eliminate use of printed paper
Safe Storage	Paper cannot get wet / lost during a site survey
“Real time” information in the field	Provide real time fixture data and organized list of water conserving projects
Data Collection Consistency	Software allows consistency between different staff

2. Highlights of Tablet Technology

- Three main types of tablet platforms:
  1. Windows
  2. iPad
  3. Android

Windows 8

- Not all tablets are created equal
- Not all tablets have the same battery life
- Not all tablets can run Microsoft Excel
- Not all tablets are the same cost $$
- Software written for one tablet cannot run on another

iPad

Online Resources Available

- Microsoft Windows “Surface Pro”: (Released February 2013)
- Apple “iPad”
- Google various “Android” Tablets (mfg. Samsung, etc.)

- Only option above that runs full version of Microsoft Office / Microsoft Excel is Windows Surface Pro
- Overview of all three technologies:

  http://reviews.cnet.com/best-tablets/

Benefits of Windows based software

- Windows has the benefit of running Microsoft Excel
  - ✓ Allows Excel based report or file to easily be emailed to CII customer and/or agency following the completion of the audit
  - ✓ Allows files to run on a laptop in addition to a tablet
  - ✓ No need to do additional software training, most employees already know the basics of Excel
  - ✓ Excel based applications can easily add more graphs / tables for written summary audit reports

Lesson Learned #1 –

All Stylus are not created equal

Does NOT work well!

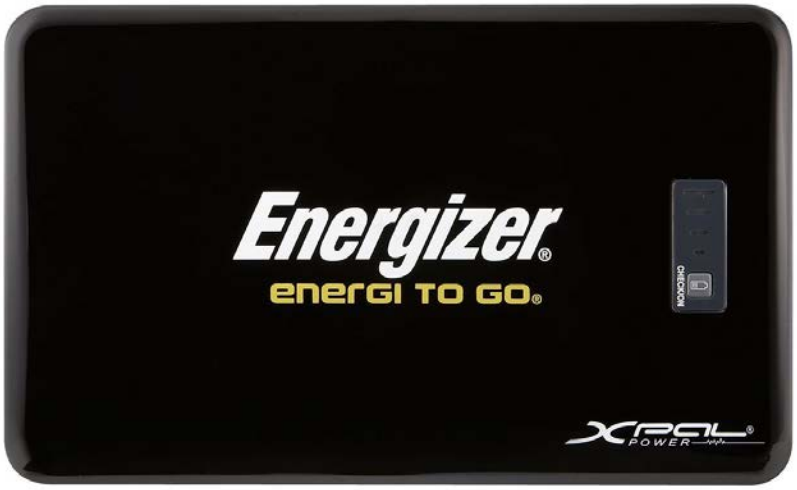
Pointed tip stylus “pen” much easier!

Rounded stylus tip is very difficult to use

Having a stylus port is useful so it does get lost

Lesson Learned #2 –

An external battery charger is useful



External battery pack works for full day of audits

Multiple types of ports allows tablets, laptops and phones!

3. Overview of Water Audit Software

5 Basic Steps to the Water Audits Software MS Excel Application:

1. Enter Basic Site Data
2. Select Area with Water Using Equipment / Fixture ("Rooms")
3. Enter Equipment / Fixture Data
4. Review List of Projects & Summary Data
5. Report Summary Graphs / Tables / Charts

Step 1: Enter Basic Site Data

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Water Audit Tool v2.4

Start Audit | Getting Started | Troubleshooting

Facility Name
Santa Barbara Community College

Date Audited	**May 9 2013**			
Customer Billing Category	**Institutional**			
Green Business Type				
Average Monthly Water Use				
Meter Numbers				
Date Account Opened				
Water connection size (inches)				
Number of Employees Working in Building				

Contact(s)

Name				
Title				
Address				
Company				
E-mail				
Telephone				

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Step 2 – Select Room/Area Type

Back to Interview

Rooms

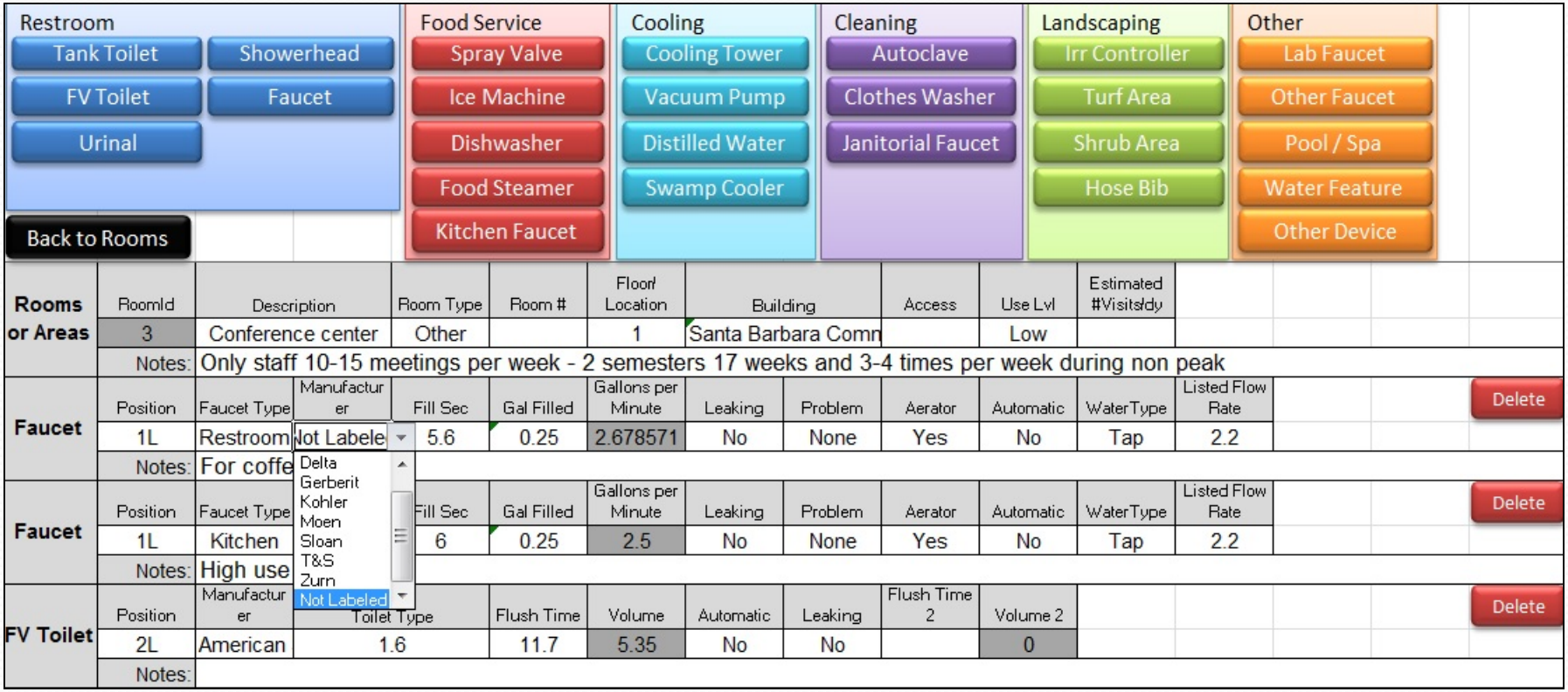
Restroom	Laundry Room	Maintenance	Laboratory	Landscape Area	Other Room/Area
Food Service	Fitness Room	Janitorial	Exam Room	Pool/Spa Area	
Hotel Room	Locker Room	Mechanical	Classroom	Water Feature	Payback Analysis
Salon/Barber/Spa		Roof			Project List

Facility Name

Santa Barbara Community College

Room	Type	Description	Room #	Floor	Actions
Room1	Classroom	Drama Music - Garvin	0	1	Edit Copy Delete
Room2	Food Service	Snack shop business communication	0	1	Edit Copy Delete
Room3	Other	Conference center	0	1	Edit Copy Delete
Room4	Laboratory	LRC break room	0	1	Edit Copy Delete
Room5	Classroom	Earth biology science	various	1	Edit Copy Delete
Room6	Laboratory	Physics	0	0	Edit Copy Delete
Room7	Classroom	ESL - English second language	0	1	Edit Copy Delete
Room8	Other	Student services	0	2	Edit Copy Delete

Step 3 – Enter Equipment / Fixture Data



Step 4 – Review Summary Projects / Data

Back to Rooms | Project

Projects

	Name	Description	Room	Delete
Project Idea	Laundry Recycling	Recycling system installed but not functional	Laundry	
Project Idea	Ice defrosting for fish	Non standard industry practice for defrosting of fish	Kitchen	
Project Idea	Spray valves	Pre Rinse Spray Valves were old and need replacing	Kitchen	
Project Idea	Check dishwasher nozzles	Replace current dishwasher nozzles with efficent model	Kitchen	
Project Idea	Check cooling tower cycles	Tested via TDS meter and obtained 3 cycles	Roof	

Step 5 – Create Payback Tables

Back to Rooms

Add Project

Conservation Pr

	Project Name	Fixture	Existing Fixtures Total Current Water Use (gpd)	New Fixtures Total Estimated Water Use (gpd)	Number of Fixtures Replaced	Number of Days Item in Use	City Will Pay Entire Unit Cost	Uses Hot Water
1	Install Spray Valve in EBS 223	Spray Valve	296 gpd	85 gpd	1	225	FALSE	TRUE
2	Replace 25 Faucet Aerators in Physics Labs	Aerator	925 gpd	347 gpd	25	225	TRUE	TRUE
3	Replace Ice Machine in 2nd floor Physics	Ice Machine	616 gpd	74 gpd	1	225	FALSE	FALSE
4	Replace Clothes Washer Machine in Physics	Clothes Washer	12 gpd	5 gpd	1	225	FALSE	TRUE
5	Replace Toilets in Student Center	FV Toilet	148 gpd	32 gpd	2	225	FALSE	FALSE
6	Replace Hand Wash Sink Aerators Admin + Health	Aerator	52 gpd	11 gpd	7	225	TRUE	TRUE
7	Install Spray Valve in Student Pastry Kitchen Pot Washing Station	Spray Valve	191 gpd	128 gpd	1	225	FALSE	TRUE
8	Install Spray Valve in Cafeteria Kitchen	Spray Valve	409 gpd	128 gpd	1	225	FALSE	TRUE
9	Add Faucet Aerators in Kitchen Sinks Used for Hand Washing	Aerator	74 gpd	9 gpd	3	225	TRUE	TRUE
10	Fix Leaking Valve on Dishwasher in Cafeteria Kitchen	Fix Leak	13 gpd	0 gpd	1	225	FALSE	FALSE
11	Fix Leaking Faucets in Teaching Kitchen 108 & JSB Café	Fix Leak	27 gpd	0 gpd	2	225	FALSE	FALSE
12	Replace Showerheads in Men's and Women's Locker Rooms	Showerhead	5,666 gpd	2,552 gpd	92	225	FALSE	TRUE
13	Add Spray Valve in JSB Café	Spray Valve	693 gpd	128 gpd	1	225	FALSE	TRUE
14	Replace Faucet Aerators in Women's Locker Room	Aerator	1,304 gpd	555 gpd	2	225	TRUE	TRUE

Case Study: City of Santa Barbara, California

- City of Santa Barbara Training and 7 audits completed:
  - 1 Large Laundry facility
  - 2 Large Retirement Communities
  - Water front Marina
  - 1 Large Hotel
  - Santa Barbara City College

Santa Barbara Audits and Training, May 2013

Case Study: City of Santa Barbara

- Trained (2) two person teams
- Created new “short reports” - 2 page reports and report generation
- Learned tablet screen size makes a difference. Screen sizes too small can be a challenge to work with and slow down data entry.

Santa Barbara Audits and Training, May 2013

Lesson Learned #3 –
Screen size is important

- Ideal screen size is minimum of 1280x800.
- The new Microsoft Surface Pro 2 planned to be released in October 2013 will be 1920x1080.

Smaller screens are difficult for data entry.
Smaller is not always better!

Case Study: Ft Shafter, Hawaii

- Training of Army Corps Staff to conduct Survey of Army Base Facilities
- Base includes:
  - Military barracks
  - Irrigation
  - Offices
  - Golf course
  - Community center
  - Swimming pool
  - Kitchens
  - Bowling alley
  - Single family homes

Audit Training in Hawaii, July 2013

Case Study: Ft Shafter, Hawaii

- Trained a total of (5) two person teams.
- Two person teams are ideal as one can test the fixtures and one can enter the data
- Catch can tests can be used on unmetered landscape areas to help estimate irrigation water use

Irrigation Audit Training in Hawaii, July 2013

Lesson Learned #4 –

Neck strap helpful with arm fatigue, safety of the tablet (dropped)

Case Study: Abbotsford, BC, Canada

Agriculture / Industrial audits

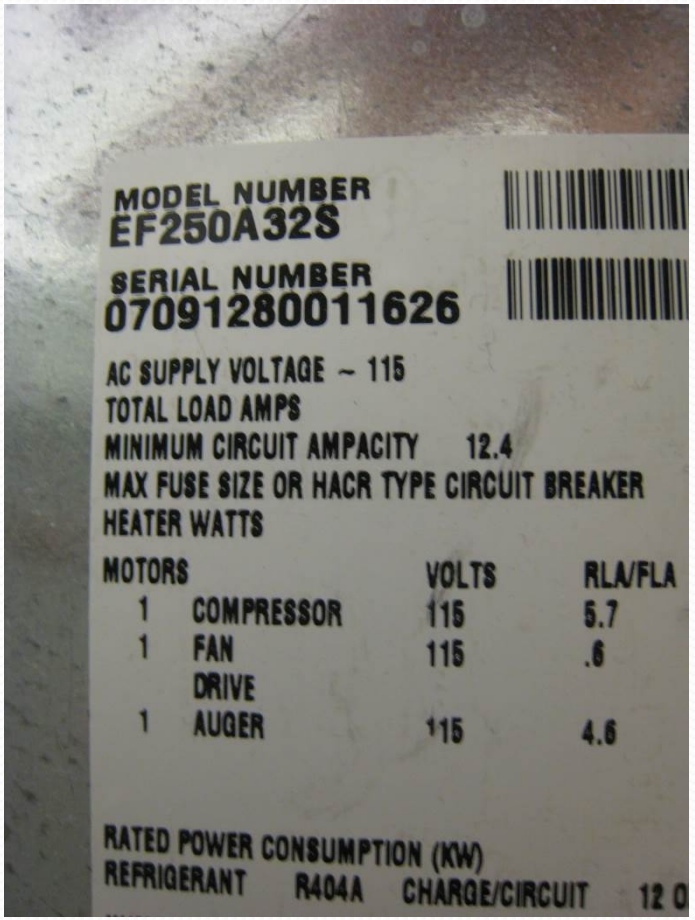
- Trained a total of 4 staff to conduct water surveys of agriculture and industrial sites.
- Surveys included:
  - Largest bell pepper grower in North America
  - Poultry processing plants
- Included many unique pieces of equipment

Group question – anyone want to guess what is in this picture?

Abbotsford, August 2013

Lesson Learned #5 –
Use of photos in the field

- Photos help for verification of the model and serial number when back in the office
- Photos of the site are a nice addition to individualized site reports

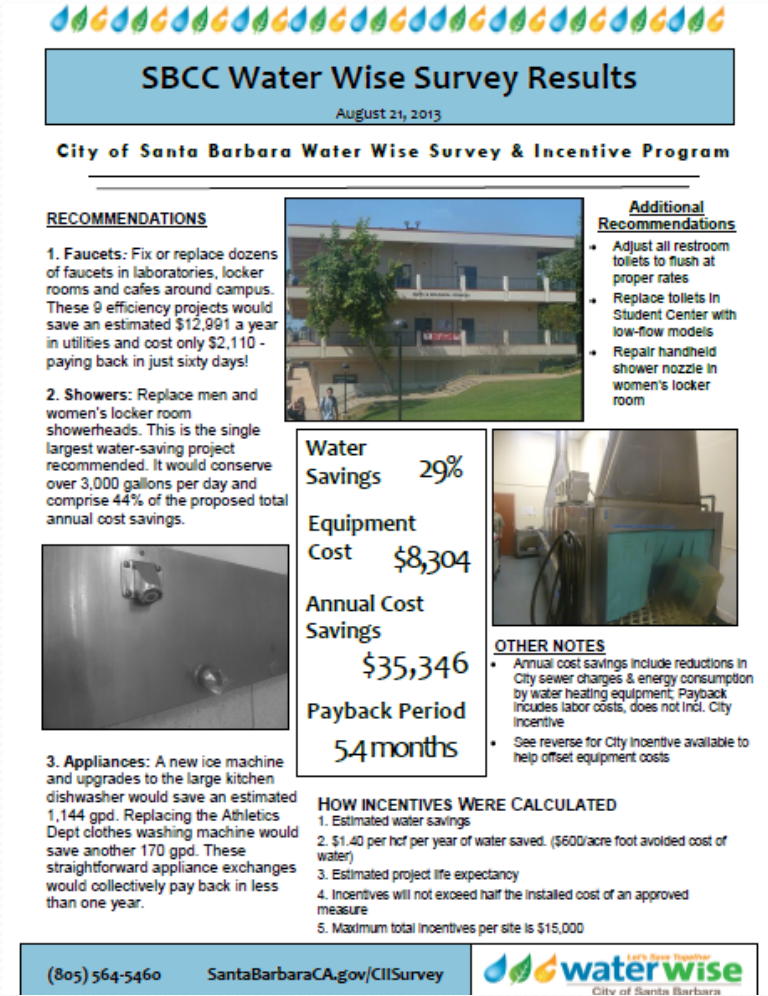


Lesson Learned #6:
Tablets Allow for More Connection to Training Concepts & Efficiency Levels

- Training attendees learned data with real time results for fixture flow rates
  - Very helpful to reinforce levels of equipment efficiency
    - "I measured 10 seconds and 2.5 gpm. What did you get?"
  - Learn detail needed for calculations and photos
  - How to work efficiently in teams of 2 auditors for complex sites

Lesson Learned #7:
Easy to Understand Results

- Keep it simple! 2-page short report for decision makers
- Customers provided with recommended list of projects:
  - Bathroom and other plumbing fixtures
  - Landscape improvements
  - Cooling tower adjustments
  - On-site laundry upgrades
  - Kitchen equipment (dishwashers, spray valves)
- Payback calculation results



SBCC Water Wise Survey Results

August 21, 2013

City of Santa Barbara Water Wise Survey & Incentive Program

RECOMMENDATIONS

1. Faucets: Fix or replace dozens of faucets in laboratories, locker rooms and cafes around campus. These 9 efficiency projects would save an estimated $12,991 a year in utilities and cost only $2,110 - paying back in just sixty days!

2. Showers: Replace men and women's locker room showerheads. This is the single largest water-saving project recommended. It would conserve over 3,000 gallons per day and comprise 44% of the proposed total annual cost savings.

3. Appliances: A new ice machine and upgrades to the large kitchen dishwasher would save an estimated 1,144 gpd. Replacing the Athletics Dept clothes washing machine would save another 170 gpd. These straightforward appliance exchanges would collectively pay back in less than one year.

Additional Recommendations

- Adjust all restroom toilets to flush at proper rates
- Replace toilets in Student Center with low-flow models
- Repair handheld shower nozzle in women's locker room

Water Savings 29%

Equipment Cost $8,304

Annual Cost Savings $35,346

Payback Period 54 months

OTHER NOTES

- Annual cost savings include reductions in City sewer charges & energy consumption by water heating equipment; Payback includes labor costs, does not incl. City incentive
- See reverse for City incentive available to help offset equipment costs

HOW INCENTIVES WERE CALCULATED

1. Estimated water savings
2. $1.40 per hcf per year of water saved. ($600/acre foot avoided cost of water)
3. Estimated project life expectancy
4. Incentives will not exceed half the installed cost of an approved measure
5. Maximum total incentives per site is $15,000

(805) 564-5460 SantaBarbaraCA.gov/CIISurvey waterwise

Summary

- Electronic CII and Residential Survey Data Collection works!
- Tablets and Software can help with the following:
  - ✓ Improved efficiency and accuracy with real-time data collection
  - ✓ Reduces or eliminates data entry back in the office
  - ✓ Provides data collection consistency with field auditing staff
  - ✓ Allows audit calculation checks in the field
  - ✓ Supports easy creation of electronic payback tables of recommended projects
  - ✓ Easy report generation and/or ongoing inventory tracking
  - ✓ Facilitates roll-up of MS Excel database across facilities for businesses and conservation program planning

Closing Remarks and Questions?

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