How To Inspect Your Irrigation System
...so you can water efficiently!

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Get to Know Your System!

• Where the system begins...
• Service lines provide water to a residence via a Municipal meter
• Do you know where your meter is?
Irrigation System Overview

- Water flows from supply lines (mainlines) to system control valves
- Find your valve boxes...
Irrigation System Overview

- An irrigation controller communicates electronically with remote control valves (RCV) to run each zone.
Irrigation System Overview

- Water flows from valves to sprinklers in individual zones
Irrigation System Overview

• Water is distributed through sprinkler heads to nozzles that throw water into the air for a specific distance
• Nozzles emit water at a specific rate
  - gallons/minute (GPM)
  - inches/hr (Precip. Rate)
Point of Connection (POC) Inventory

WATER METER

- Municipal equipment for measuring water consumption

RDN Residential Water Meter
Water Meter

**TEST**
- Mainline leak

**PROCEDURE**
- Turn off all water inside and outside.
- If water meter continues to count up then there is a leak in the mainline.
- Call city / water provider

*Water Meter Reading*
Water Meter

Test
• Consumption per watering event

Procedure
• Write down the water meter reading before and after your irrigation system completes a full cycle
• Anything over 1-2 cubic meters (220 – 440 gallons) per watering event = excessive
• Reduce times, check for leaks!
Point of Connection (POC) Inventory

BACKFLOW PREVENTER

• Contributes to health safety
• Stops contaminated water (fertilizers, animal waste, road run-off, etc..) from backing up in to the municipal water system
Backflow Preventer

**POTENTIAL PROBLEMS**

- Leaking, plugging, malfunctioning

**TEST**

- Backflow preventers should be inspected and tested annually by a professional

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Backflow Test

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*Photo courtesy of IV Landscape LLC, Oregon, WA*
Controller Inventory

PURPOSE

• The irrigation controller opens each valve automatically, allowing water in to the lateral lines (zones) in order to operate irrigation emission devices (sprinklers)
• Controls watering days, times and intervals
• How might your controller waste water?
Irrigation Controller

POTENTIAL WATER WASTE

• Lawn and shrubs are running the same amount of time
• System runs in the rain
• System is running the same amount of time all year
• Zones are running for too long

Controller Programming
Irrigation Controller

POTENTIAL WATER SAVERS

• Reduce run times for shrubs
• Install rain, moisture or Et sensor
• Use budgeting tool on controller to adjust run times monthly
• Use the Irrigation Industry of British Columbia (IIABC) landscape irrigation calculator to determine watering requirements
Remote Control Valve (RCV) Inventory

PURPOSE

• The irrigation controller opens each valve automatically allowing water in to the lateral lines to operate irrigation emission devices

• Malfunctioning RCV will affect the pressure of an entire system

RCVs in Valve Box
Remote Control Valves (RCV)

POTENTIAL PROBLEMS
• Leaking
• Submerged
• Buried under soil
• Cannot locate
• Does not open
• Does not close

POTENTIAL SOLUTIONS
• Replace RCV
• Annual maintenance
• Repair/ replace wiring malfunction
Station / Zone Inventory

STATIONS / ZONES

• The number of the Station on the controller corresponds with a valve in the field that provides water to a Zone.

• Know how many Zones you have and where they are located.

Station # = RCV #
ZONES

• Irrigation system should be designed based on plant water needs
• Lawn and shrubs should NOT share a zone
• Ideally zones should be separated based on aspect (ie: NE and SW)
• Sometimes new landscaping does not fit older irrigation zones....
Station / Zone Inventory

PLANT TYPE

• Lawn
• Shrub
• Fruit / Vegetables
• Annuals / Flowers

= Different water needs
Typical Emission Devices a.k.a Sprinklers

ROTOR

POP-UP SPRAY HEAD

MP ROTATOR

Photos courtesy of Hunter Industries Incorporated

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Typical Emission Devices

BUBBLER

DRIP LINE – AREA

*Photos courtesy of the Rain Bird Corporation*
Typical Emission Devices

**DRIP – INDIVIDUAL PLANT**

**MICROSPLAY**

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Emission Device Inventory

NOZZLE RADIUS –
(HOW FAR THE SPRINKLER WILL SPRAY)

• Read the fine print...
• The manufacturer's name, model, radius, arc length and orientation is indicated on the top of the head & nozzle
Emission Device Inventory

NOZZLE RADIUS – ROTOR \(^5\)

- Rotor: the manufacturer’s name and body model is indicated on the top of the head.
- The nozzle is colour-coded for cross reference to manufacturer’s catalogue.
- Fully adjustable (flow & distance)

\(^5\)Photo courtesy of the Rain Bird Corporation.
Issues

SPRAY PATTERN ALIGNMENT

- **Overspray** on to adjacent structures, paving and properties

POTENTIAL SOLUTIONS

- Adjust nozzle radius to suit
- Replace fixed radius nozzles with adjustable radius nozzles to suit
- Adjust head orientation to accommodate fixed radius

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Image courtesy of the Rain Bird Corporation

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8 Image courtesy of the Rain Bird Corporation
Issues

**DRY AREAS**

- Yellow/brown areas in lawns
- Wilting plants among vigorous ones
- May be that the sprinklers are missing that area
- May not be lack of water, but rather poor soil or chemical burn

*Photo courtesy of www.turfology.com*
Emission Device Inventory

ROW SPACING

• The distance between underground lateral lines
• Should be the distance indicated on the nozzle
Emission Device Inventory

HEAD SPACING

• The distance between sprinklers
• Should be the distance indicated on the nozzle
Issues

RUN-OFF

• When station has run for a full cycle (or less) & water runs over the top of the surface away from the intended watering area

• Do not apply water faster than soil can absorb it

6 Photo courtesy of Christina Milesi c/o NASA
RUN-OFF SOLUTIONS

• Reduce station run times
• Program station for multiple start times to allow water to soak in
• Amend soil with organic material to increase its absorbency
Issues

COMPACCTION & HEAVY THATCH

- Increases run-off
- Reduces the ability for water, air and nutrients to travel through the soil
Compaction & Heavy Thatch

**SOLUTIONS**

- Aerate lawns in spring or autumn
- Remove thatch annually
WET AREAS / PONDING

• Standing water
• Soggy soil
• Mossy patches
• If not a leak....
• May indicate clay soils (low infiltration rate)
• Overwatering in shady areas
Head / Nozzle Inventory

UNMATCHED NOZZLE

• The make and model of the nozzles in a single zone should not vary
• Precipitation Rates must match (inches/hour) for adequate pressure & coverage
• These rates are indicated in the Manufacturers Spec Sheet, usually available online
Head / Nozzle Inventory

**MATCHED PRECIPITATION RATE (MPR)**
- Nozzles should apply water evenly over a whole zone
- Full and part circle rotors should not share a zone unless nozzles (GPM) are sized to compensate
- Every sprinkler within a zone should have the same head, nozzle and spacing

**POTENTIAL SOLUTIONS**
- Replace nozzles and adjust spacing as required
LOW PRESSURE

- When zone is initiated, water does not throw the distance indicated on the nozzle or per manufacturer’s specifications.
Low Pressure

POTENTIAL PROBLEMS
- There are too many heads on a single zone based on the available pressure for the site 9/10
- The mainline or lateral line size is not adequate for the number of heads in a single zone
- Valve is malfunctioning
- Filters are plugged
- Leak in the line

POTENTIAL SOLUTIONS
- System design change: split individual zone into (2) or more zones, increase mainline or lateral line size as required
- Replace RCV
- Clean filters
- Check for leaks and repair
High Pressure

- Spray heads and rotors mist or fog
- Test spray heads and rotors with pressure gauge
- Install a pressure regulator if necessary

Photo courtesy of The New Mexico Water Conservation Alliance
Pressure Regulation

PURPOSE

• To maintain adequate and constant pressure to irrigation emission devices
• Generally residential spray and MPRotators require 30 PSI at the last nozzle on a given zone
• Drip systems often only require 15 PSI to function properly
Types of Pressure Regulation

PRESSURE REGULATING VALVE\textsuperscript{11}

- Installed after the backflow preventer
- Whole system pressure issues

\textsuperscript{11}Photo courtesy of Zurn
Types of Pressure Regulation

PRESSURE REGULATING MODULE

- Attaches to RCV
- Set to ideal pressure for specific emission devices
- Pressure issues in individual zones
- Easiest and most cost-effective solution for residential systems
Types of Pressure Regulation

BUILT IN TO SPRAY BODY

- Pressure regulators are built in to the stem of the spray or rotor body
- Pressure issues with specific sprinklers

12 Image courtesy of the Rain Bird Corporation
SUNKEN / OVERGROWN SPRINKLERS

**INDICATORS**

- Top of sprinkler head below grade
- Grass has grown up and around heads blocking spray / causing puddling around head
- Spray is blocked by plants or other obstructions

**POTENTIAL SOLUTIONS**

- Adjust/ dig up sprinklers and set to grade
- Trim around sprinkler heads
- Trim plants, increase/ decrease pop-up height
- Remove obstructions
SPRINKLER ROTATION

**INDICATORS**
- Rotation time to make one complete rotation should be the same for each head in a zone
- Rotor does not rotate

**POTENTIAL SOLUTION**
- Worn gear driven assemblies may need replacement
**BROKEN SPRINKLERS OR PIPES**

**INDICATORS**

- For broken heads look for:
  - irregular spray pattern
  - a pop-up that does not pop
  - puddling around head

- For broken pipes look for puddling or ‘springs’ within a zone

- One broken head or pipe can reduce the performance in an entire zone

**POTENTIAL SOLUTIONS**

- Repair or replace

*Broken Nozzles*
Head / Nozzle Inventory

TILTED SPRINKLERS
• Even a few degrees of tilt will affect the radius of a sprinkler head

POTENTIAL SOLUTIONS
• Adjust sprinkler head so it is perpendicular to grade
• On a slope the sprinkler should be installed at ½ the grade of surrounding slope
Head / Nozzle Inventory

PLUGGED SPRINKLERS
• Dirt, sand, algae etc. can clog sprinklers
• Spray head does not pop-up the whole way
• Spray head does not throw the specified radius

POTENTIAL SOLUTIONS
• Remove nozzle and clean filter
• Install flush caps and turn on system to clean
LOW HEAD DRAINAGE

• Emission device at the bottom of a hill continues to drain when zone is turned off resulting in puddling, run-off and erosion

\(^9\)Photo courtesy of Waterboy Sprinkler Specialist’s
Low-Head Drainage

POTENTIAL SOLUTIONS

- Replace with head with factory installed check valve

10 Image courtesy of the Rain Bird Corporation
Now, try it at home!

A efficient irrigation system makes sense and saves you dollars.
Irrigation Inspections – Residential Systems

THANK YOU