

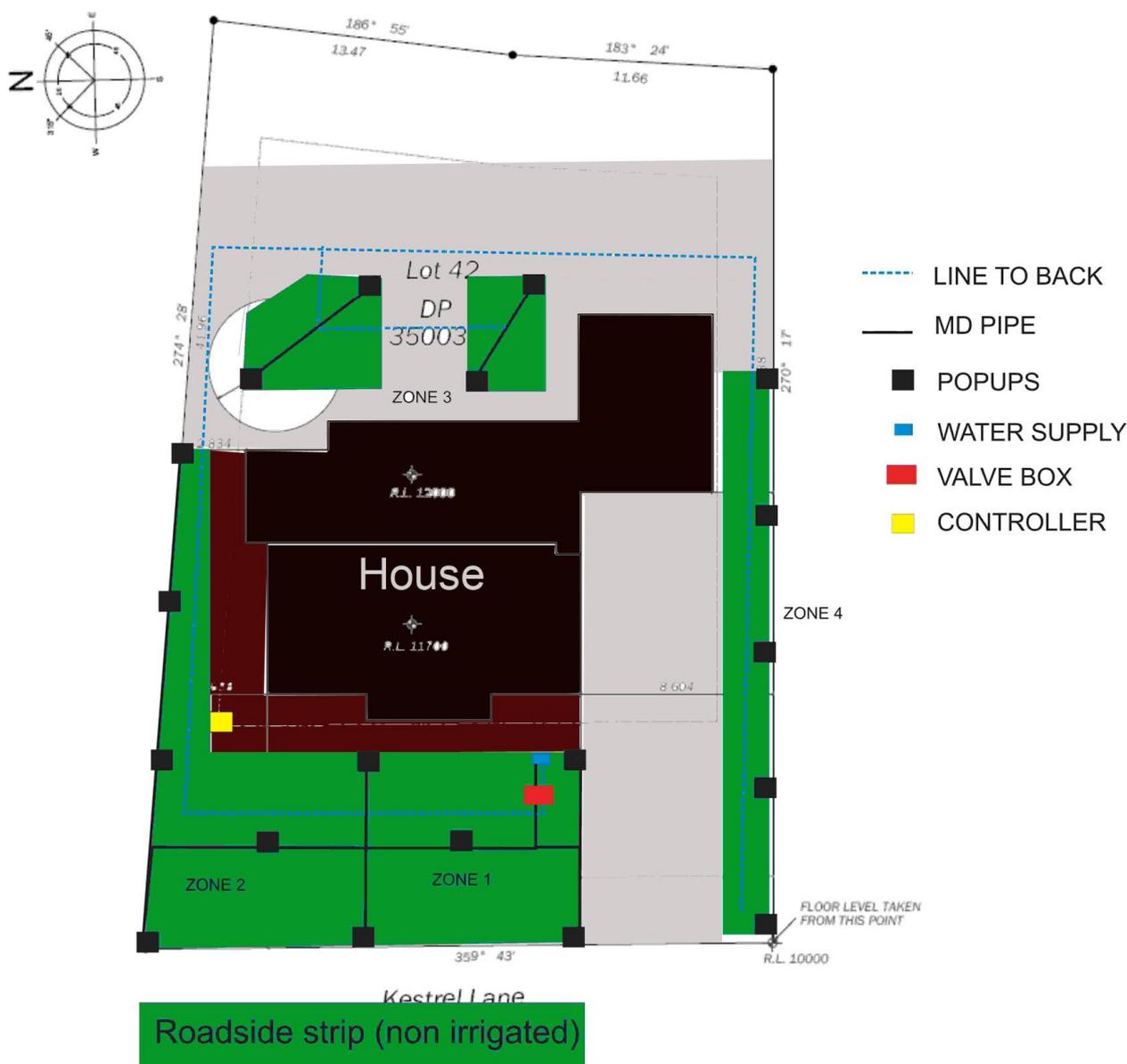
# How to design and install and a basic residential automatic irrigation system

By David Gordon – Baywide Dingos

Tools you will need:

- A Dingo and Trencher or a shovel and a full breakfast
- Your irrigation supplies and pipe
- Your design plan
- A can of Dazzle spray paint
- EZ cut Pipe cutters
- A flask of boiling water
- Electrical Tape
- Hack Saw
- Hammer
- Pipe Wrenches
- Plastic Sheet
- Pliers
- Rags
- Rake
- Screwdriver
- Shovels – Trenching, Flat, Spade or Round Point
- Tape Measure
- Wire Cutters
- Rain Sensor
- Location of main water Toby
- Teflon Tape or Teflon Paste (Used on all thread-to-thread fittings)
- Valve Boxes
- Poly grips

As with other types of projects like retaining walls etc they usually have a generic way to do them but each job is different with different plans, setups and water pressures. The following is a basic system we installed and general steps involved:



## **Plan and Design**

The first step in designing a residential system is to measure the property or get a plan of the house and section. Be sure to include all concrete or brick walks and patios, driveways and fences. While you are measuring, locate any trees, shrubs and lawns and draw them on the sketch. Also keep in mind any paths/driveways you will have to get pipe under.

On the plan, divide the property into areas as seen in my plan. The areas should be rectangles or squares and as large as possible to maximise efficiency. I divided the front into two zones, zone 1 & 2. The back squares into zone 3 and the side strip for zone 4. It will depend a bit on the pressure as to how many pop ups you can have per zone but we will get to that soon. Unless you have a very small back yard or only want to irrigate a small section of your lawn you will need to split your system into zones. It is not recommended to install only 1 popup in the middle as this would give you uneven coverage of water.

ZONE 1 – front RHS – 5 pop-ups (3x 90 degrees, 1x 360 degrees, 1x180 degrees)

ZONE 2 – front LHS – 5 pop-ups (1x 90, 1x360, 1x180, 1x side strip)

ZONE 3 – Rear patio – 4 pop-ups (4x 90 degrees)

ZONE 4 – Side lawn – 5 pop-ups (3x side strip, 2x 90's)

You must determine what the capacity is of your irrigation system. Ideally you need to measure the working pressure with a proper gauge. Place the gauge on the outside tap and record the static water pressure in kPa or Bars.

The other method is to determine the flow. Time how long it takes to fill a 10L bucket and determine the L/min. So if it took 15secs to fill up 10L. Divide 60secs by 15sec and multiply by 10 this gives you 40 L/min.

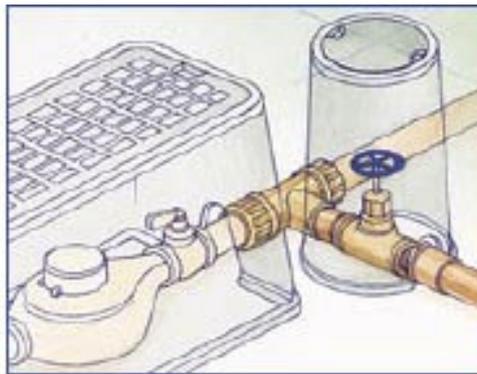
You now have 2 measurements that will help you determine the amount of sprinklers you can use per zone and the safe pressure to run them which won't cause any damage. Look up on the sprinkler specifications and find out how much flow it uses and using the chart find out how many you can run eg: if one head uses 6 L/min we can run a max of 8 pop-ups per zone without allowing for a buffer.

For this job we only used one type of sprinkler which has interchangeable rotors that throw different distances and angles (HUNTER MP ROTOR). There are

many different types of sprinklers and you may need to seek advice as to the best for your situation.

### **Locate your water supply**

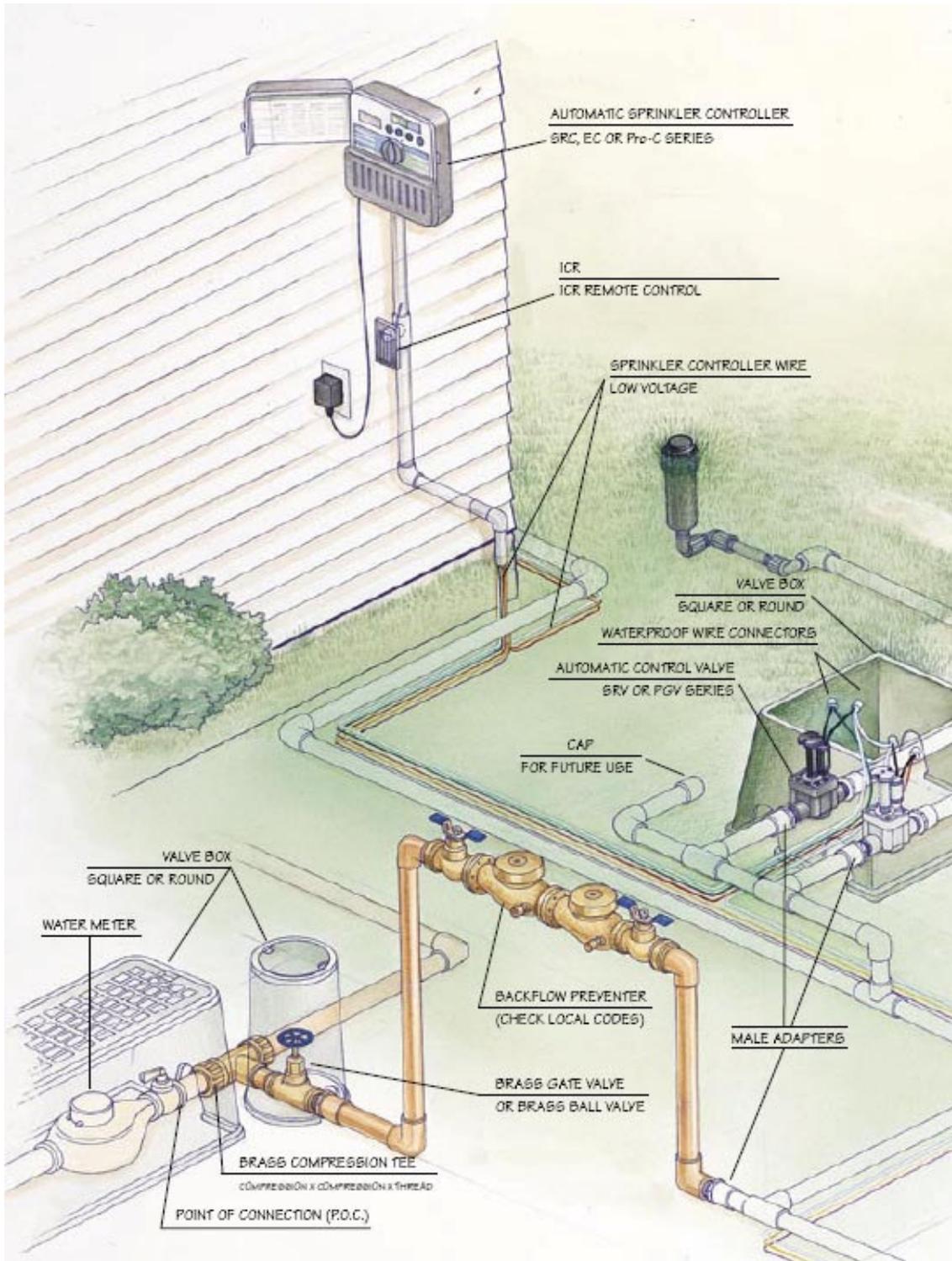
What we did for this plan was to specify to the plumber we needed an external in ground line supplied for the irrigation. You can tee off the house outside tap and still have the same effect although it is nicer to have it all underground out of site with the use of valve boxes ( see picture). Every zone must have its own solenoid valve. The valve controls the on-off flow of water to a sprinkler zone. In our case, four valves were needed. You will need a 'manifold' to connect all the valves together and make sure you check your council requirements for the need for a check valve to stop water going back into their system when not in use. Determine where you want the valve manifold. In our case, right by the water supply was easiest.



The two most common types of pipe used in sprinkler systems are MD and LD. MD is thicker and harder to install but I feel lasts longer. LD is thinner and a lot cheaper and you can use slip on fittings with clip rings to secure them which are also a lot cheaper than the MD fittings. I like to use a flask of hot water and dip the pipe in the flask to make it easier for each fitting to slide on. It is also a must have to have a pipe cutter – it will be the best \$40 you'll ever spend.

The main line to the valve box should be the biggest pipe size and then just use a common size like 15mm/20mm to link everything else together.

See the diagram below (courtesy of the Hunter Website). They have used PVC pipe fittings instead of MD/LD and the double check valves as discussed. Notice the manifold setup to hold all the valves.



## **Step by step installation guide**

1. Mark on the ground from the plan where your trenches should go and trench them with the machine. Usually a max of 300mm deep considering the pop-ups are typically only 150mm thick. It's nice to have them deeper in case someone digs later on. In this example it was nice to have some depth because I had to fit 4 pipes in the 1 trench for the main lines.
2. After you have installed the manifolds and screwed together all the solenoid valves, connect the 1<sup>st</sup> fitting and pipe to the 1<sup>st</sup> zone. Run a mainline to the each zone from each corresponding solenoid, then use a reducer to 20mm and fit the pop-ups from there. Do not install the heads on the pop-ups yet – they need to be flushed.
3. Backfill and lay you're the pipe in the ground as you go – this prevents the pipe from springing everywhere.
4. Find a good location for your controller box (near a power source of course) and remember to run your low voltage insulated colour coded controller wire from where it is located to your solenoid valve box. See Hunter picture again for details.
5. Use colour-coded irrigation wire to connect the valves to the controller. The total number of wires you need is one for each of the valves, plus one common wire. This is a 4-zone system, so at least a 5 wire cable long enough to reach from your controller to the valve box was needed
6. Connect the wires to the valves with waterproof twist connector. You will need one wire for each valve, plus one common wire which will be connected to one of the wires on all of the valves.
7. Next backfill all the trenches and compact.
8. Now, open the main ball valve to turn the water on and turn the top of one solenoid valve. This turns on each zone without the need for setting the controller. Flush each zone out one at a time for at least a minute. Then install the pop-up heads.
9. Adjust the popup heads so they are spraying the right angles and change the head if it doesn't flow enough or flows too much
10. Now you can install the lawn!

### **Water application rates:**

Watering application rates will vary where you live and what season it is. New lawn must be kept moist, and the sunny and shady areas will need different watering times. Once the lawn has struck you will need to reduce the frequency of the watering and soak for longer.

- Do not operate more than one valve/zone at a time.
- Water early in the morning when it is least windy and pressure is the greatest. Evening watering is more likely to cause disease overnight especially during the summer.

### **Programming the Controller**

What days to water, what time to start the zones watering, and how long each zone will run is all you need to program in. See your controller instructions for information on this. If you install a rain sensor it will automatically switch the controller off for a set number of days.

Hope that helps you in your quest for the perfect lawn.

Any questions feel free to contact us – good luck!