

Emergent design for a linear polyculture

Location: Grounds of Earthworm Housing Co-operative (EW)

Start: 2014

Implementation: 2014 onwards, ongoing

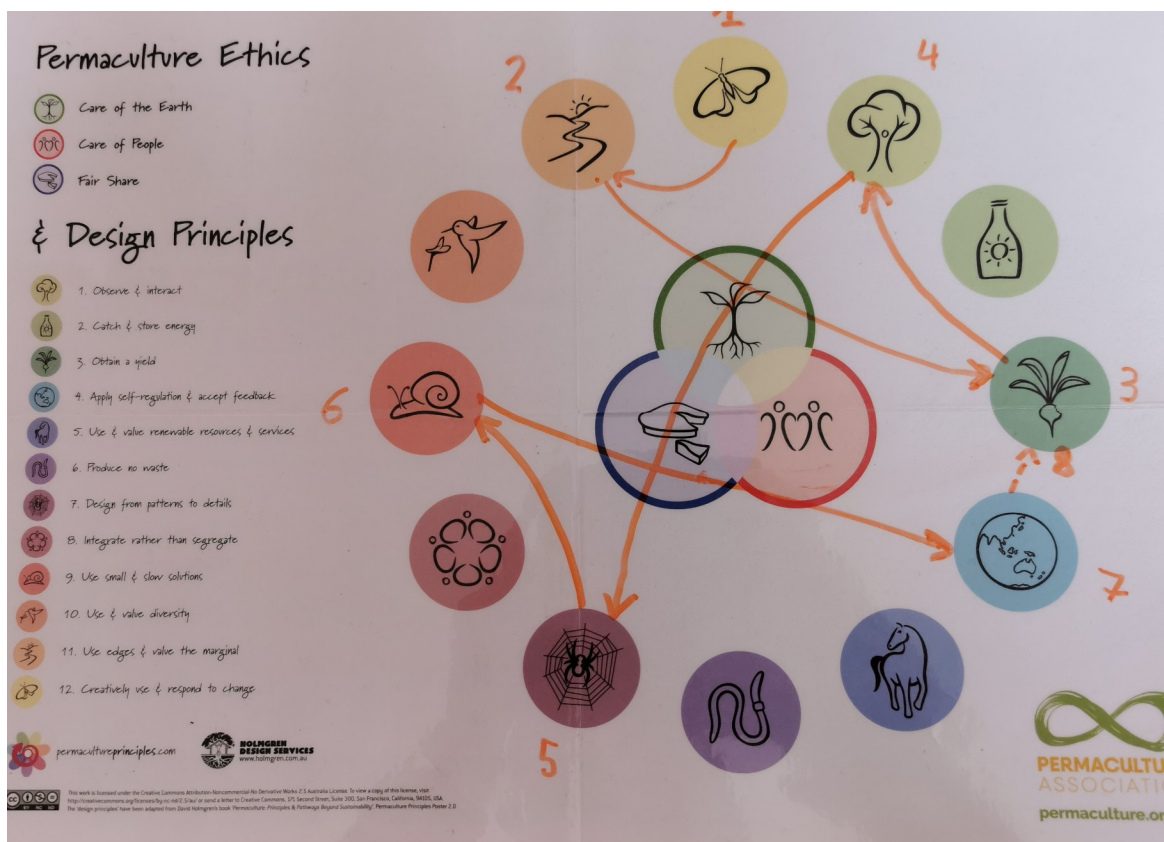
Process: Web of Principles (WoP)

Tools & Methods: Location map, Site survey, Sectors, PMI, Roses/Thorns/Buds

This is another experiment with using the Holmgren Principles as anchor points in a non-linear design process, very much like Looby Macnamarra's Design Web.

Informal designs often happen not according to a master plan but as an ongoing, iterative and intuitive process. Guided by the principles, we can capture this process in a shareable way.

The image below shows the pathway taken during this design.



1. “Creatively use and respond to change”

also “The problem is the solution”, “Produce no waste”

In summer 2014, the installation of a WET system installation left us with a large amount of surplus soil from digging the ponds. It also involved laying the outflow pipe from the septic tank to the ponds very close to the soil surface. Our site had a history of living vehicles using the field to park up, so it was important to prevent that from happening in the future, even “accidentally”. Any weight on the pipes would risk them cracking, resulting in leaking of sewage.



The sewage outflow pipe goes into the ground.

We combined these two potential “problems” into one neat solution by creating a linear mound on top of the pipe using some of the surplus soil. We left a gap in the middle of the pipe run for easy passage by foot and wheelbarrow, just too narrow for vehicles to pass through.



1
2 Location of the mounds on our land

2. “Use edges and value the marginal”

also “Use and value renewable resources”

At this point we were just starting our renovation which we knew would absorb most of our energy for years, and the new mounds were not going to get any attention soon. To cover the ground temporarily, we decided to compare two methods of weed control: a crimson clover/phacelia green manure mix on one half, and woven polypropylene (Mypex) sheet on the other.

The green manure worked well enough for a year. In spring 2015 we decided to populate this section with a lot of blackcurrant bushes that we had grown from cuttings. They were mulched with recycled cardboard and woodchip created from woody offcuts from elsewhere on our land.

3. “Obtain a yield”

also “Work with nature not against it”

Within two years we were getting a good berry crop from this area, and we have added a handful of gooseberries in the meantime. As we never get round to establishing an intentional herb layer under the fruit bushes, nature took its course and filled it in with locally abundant nettles, burdock, buttercups and the like. They are proving good companions to the berries, hiding them from birds while they are ripening. When the berries are ready to pick we simply chop & drop the surrounding vegetation and have quick and easy access for harvesting. Not all berries will be ripe at that time, and we are quite happy to let the birds have their share afterwards.



Mound 1 after 7 years, with mature blackcurrant bushes and clearly quite overgrown.

4. "Observe and (then) interact"

By 2018 we were sufficiently on top of the renovation that we had capacity to develop the second section of the mound. In the meantime the mulch mat covering this area had begun to disintegrate through a combination of sunlight, frost and animal action - our very free range chickens were actively involved in this.

Survey

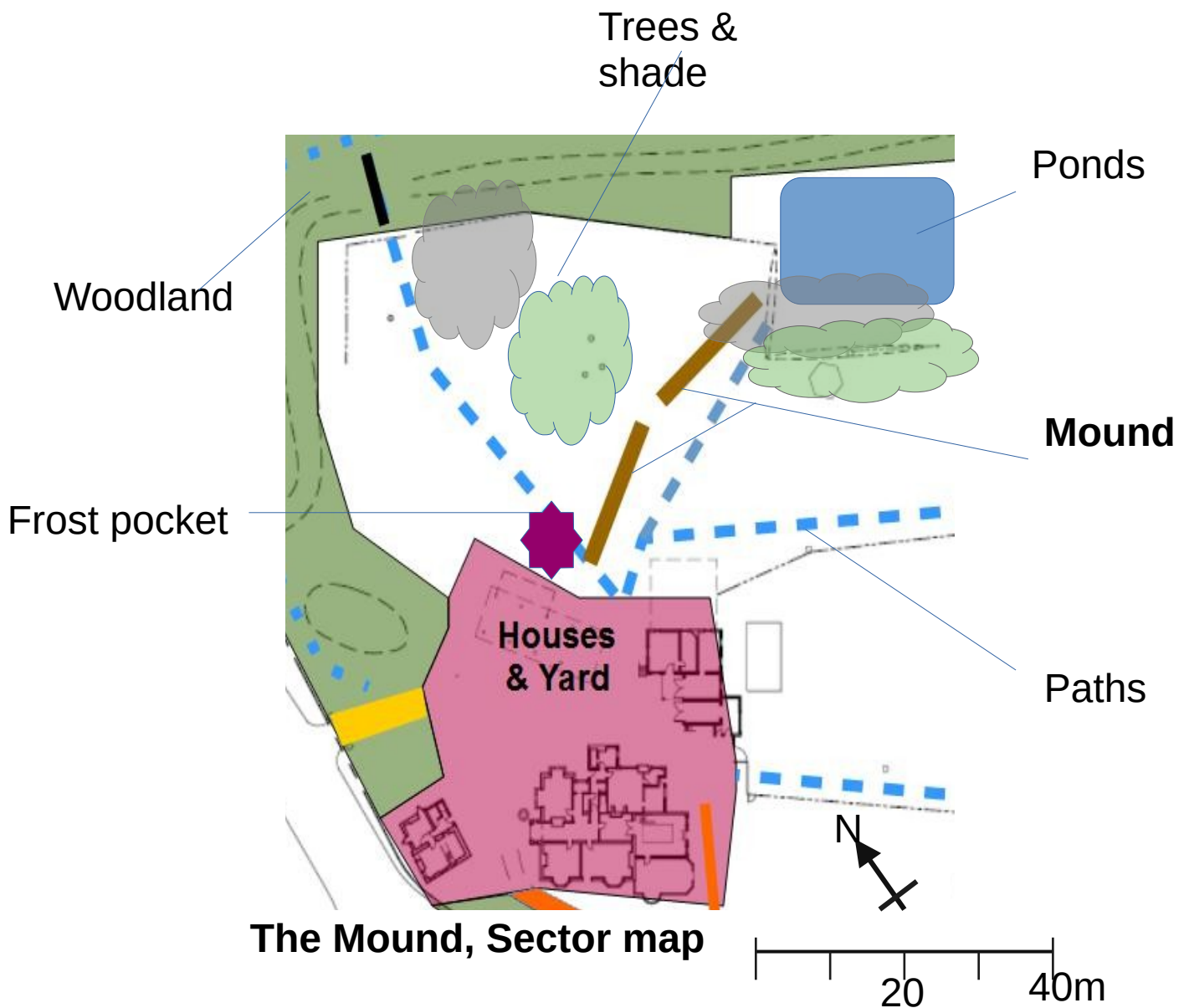
new boundary within the previous "events field"; creating a smaller field and a distinct space occupied by a triplet of mature trees (2 copper beech, 1 silver birch)

existing use: play space; thoroughfare; occasional events

Soil: clay loam with much rubble included – heavy soil but still fairly free draining

South facing edge

Adjacent vegetation/likely to move in: nettles, buttercup, burdock, hogweed – typical ruderals/opportunists; also meadow species – meadowsweet, fleabane, wild geranium, wild carrot(!)



5. “Design from pattern to detail”

Goal definition:

Functions/Yields:

- food – fruit, herbs, flowers and leaves
- Screen, backdrop and boundary for events space
- Protection of the sewage pipe
- Wildlife habitat

Qualities:

- beautiful but not manicured
- low maintenance

Analysis

Boundaries

- No trees – they might end up sending their roots into the pipe, which would be disastrous!
- Low or no cost
- No fences
- Disturbance from rabbits, chickens, pheasants, children

Development options

	Plus	Minus	Interesting
Wild vegetation	No cost No establishment effort	Least productive for humans Aesthetics? Will need mowing or will turn to bramble/blackthorn scrub	Will probably come in whatever else we plant
Sown mix	Low effort Low cost	Prone to encroachment by wild neighbours	Can integrate with wild plants or planted mix
Planted polyculture	Crop yield Aesthetics Clear boundary for Events field Can be added to over time	Cost Prone to encroachment by wild neighbours	Can integrate with other two options

As each option has its benefits and drawbacks, the chosen solution was a combination of all three. This reduced cost and maintenance effort and “works with nature not against it”.

Resources

Soil improvement: We have our own garden compost, humanure (rocket fuel for any fruit crops!) and woodchip

Plants: There are a number of candidates for transplanting

Design decisions

Planting structure and criteria:

3-layer linear polyculture with small shrubs as canopy, tall herbs and ground cover below

Shrub size restricted to protect soil pipe

Species chosen to be robust against impact of herbivores, scratchers and children

Wish list/favourites & sources

Aronia

Babbington leeks

Echinacea

Gooseberries

Ice plant

kiwi (*Actinidia arguta*)

Loganberry (from our own land)

Mallow

Michaelmas daisies

Mugwort

Roses for blossom and hips

Ground preparation & planting:

Remove remaining mulch sheet

Individual planting holes, mixing present soil with compost and small amount of humanure

Cardboard & woodchip spot mulch around individual shrubs

Cardboard & woodchip sheet mulch around perennials

6. “Use small and slow solutions”

Implementation

Year 1: Rosa rugosa, Gooseberries, Elaeagnus ebbingei, Hardy kiwi;

Echinacea, Great burnet, Babbington leeks, Lupins, ground ivy

Sown marigolds

Year 2: Aronia, Lavatera, Redcurrants

Apple mint, Ice plant, more ground ivy

Year 4: Evening primrose, Catmint, Michaelmas daisies

Year 5: Japanese quince, Mugwort, more ice plant

7. “Apply self regulation and accept feedback” & “Observe and interact”

Evolution of the polyculture

Most plants thrived over their first season, with the exception of the kiwi which never got off the ground.

In year 2, Wormwood became very leggy and was eventually taken out. Its

Chickens and rabbits quickly loved the echinacea and lupins even more than us, and these plants disappeared after flowering. We continue experimenting with other plants. Most

Some Babbington leeks near the edge of the mound were accidentally mown by our scything team.

As anticipated wild plants moved in, though at a much slower rate that I had expected.

Encourage – Meadowsweet, Fleabane, wild carrot

Tolerate – Buttercup, burdock, rosebay willowherb, other willowherbs

Rein in – Nettles, hogweed,



Everything gardens. Chickens as gardeners are even messier than I am!

Seasonal Maintenance

Operations include:

- Shaping and pruning soft fruit
- Cut back perennials and use as mulch

Succession & Disturbance

Evaluation

Review against goals, spring 2024 – after 7 years

food – fruit, herbs, flowers and leaves

Loganberries and Gooseberries are just beginning to crop; Rosehips growing well

Aronia has been nibbled by rabbits, but surviving

Japanese Quince still settling in – first spring of good blossom this year!

Herb layer:

Screen, backdrop and boundary for events space and children playing

Protection of the sewage pipe achieved!

Wildlife habitat evolving

Mound 1 v Mound 2

Mound 1 was minimum effort for fairly good effect – in the long run the decision to let the plants run free has led to some decline in productivity. Some weaker shrubs have been overrun and died. While nettles, burdock and hogweed have been fairly co-operative, chicory has become a bit of a menace in recent years.

Mound 2 took much longer to establish – in fact I am still fiddling with it now. I actually see this as a benefit as I keep finding niches for plants, and plants for niches. Mulching out local vegetation for several years has definitely improved the survival rate of what I have brought in. I am glad not to

have added much compost, apart from in planting holes, as this has reduced growth rate of volunteer ground cover and given me time to establish more food and decorative plants. In terms of aesthetics, Mound 2 wins hands down.

Roses	Thorns	Buds
+ Design goals achieved! + beautiful but not manicured + low maintenance + robust against intrusions of herbivores, scratchers and children + fallen birch tree adds interest & play structure	- ground cover not fully established – still gaps - fallen birch impedes access	Migrating plants – self seeders, runners – observe and interact as necessary! Succession – self seeded hazel and cherry plum moving in; sycamore nearby – monitor and remove where unwanted In future patch development, some more conscious steering and early intervention may be beneficial

Ethics applied in this design

EC: Polyculture with domestic and wild participants, allows many species to thrive

PC: crops and pretty plants for people for minimum effort

FS: No fences, no weed extermination – space open to all species who want to contribute and harvest

FC: The sewage pipe remains protected

8. “Obtain a yield” – in this case Learning!

Reflections

Learning about soil:

After 6 years, there are still gaps in the ground cover. I put this down to the naturally very compacted soil. This allows for introduction of further plants as they come my way. Given the heavy soil and inclusion of much rubble, the mound itself is stable enough to not be threatened by erosion. Once some compost and (sometimes) humanure is added, most plants seem to thrive on the mound.

Reflections – Web of Principles

Presenting informal design processes

Web of principles is very well suited to this. Tools can be slotted in, and the design flow is allowed to naturally emerge. Focus on principles ensure that permaculture thinking is embedded at every step.

Flow and pulse/ Overlay with other processes

Interesting to note that while much of the design *flowed* fairly intuitively through observations, reflection and interaction (resembling the Action Learning Cycle), there was a *pulse* of deliberate and conscious designing at a critical point. The switch happened when the holding strategy of mulching had run its course, and a more permanent solution was required. At this point I went through a more ‘formal’ and linear sequence of Goal definition, Analysis and developing Solutions (GAS??), before ‘relaxing’ again into an iterative and responsive *flow* of implementation.

Where to show the ethics

I always wonder where ethics appear in the Web of Principles. The Holmgren diagram may hold the key to this – the ethics are in the centre, so they can (in theory) be applied with each and every principle. In practice, some ethical phrasings are more relevant to particular principles than others (see WoP design)

Reflection - tools

PMI v R/T/B

While Roses = Plus and Thorns = Minus is a more or less direct substitution, “Interesting” is more open than “Buds” which suggests forward movement, learning and development.

Gratitude

to Carla Moss for reviewing this design report and giving valuable feedback.

Next steps

Update WoP design

After assessment, add this design to the PA Design Library