

The Hive

Sustainability Trail



The Hive Sustainability Trail - Supporting Notes

The Hive is full of sustainable design features, and we have developed the Sustainability Trail as a self-guided tour and teaching resource to raise awareness of these unique features.

These notes are for the self-guided Sustainability Trail at The Hive. Basic information is in black with more detailed information **highlighted in blue**.

The Hive is a very unique building - the first joint academic and public library of its kind, developed in partnership between Worcestershire County Council and the University of Worcester. The Hive was opened by the Queen in July 2012.

Built to very high design criteria, The Hive was awarded BREEAM 'Outstanding' - the highest environmental standard for best practice in sustainable design from the UK Building Research Establishment.

Follow the trail map, starting at point 1 in the café on Level 1. There are stickers on the windows/walls at each numbered point around the building. There is more information detailed below for each point on the trail.

Protecting...

The Environment

www.thehiveworcester.org

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a partnership between

 University
of Worcester

 worcestershire
county council

1. What's that chimney?

- The Hive is heated by burning biomass (wood chips) – you can see the huge chimney for the boiler out of the window.
- Biomass is classed as a renewable form of energy.
- Uses locally, sustainably sourced wood chips.
- **Since the organic plant matter in biomass fuel has absorbed carbon dioxide as it grows when it is burnt it releases the same carbon dioxide back into the atmosphere. Therefore as long as the energy involved in processing and transporting the fuel is relatively limited, it is considered a carbon neutral fuel.**

Head to the main atrium, stop at the bottom of the stairs and look up

2. Why this shape?

- The Hive is a very unique shape, it has been designed like this to help with keeping the building cool.
- The design also gives a light and airy feel to the building – the more natural daylight that is drawn in, the less artificial light is needed – which helps to cut down on unnecessary energy costs.
- **The Hive is naturally ventilated (hot air is drawn upwards towards vents in the ceiling and cooler air is drawn in from lower levels). Furthermore, high level shading within the roof lights causes the top two to three metres of the roof void to heat up and act as a solar chimney, further increasing the driving pressure for air to leave via the roof lights - which means that less mechanical ventilation is needed to keep the building cool.**
- **The passive design strategy also included thermal insulation, good airtightness and maximised use of natural daylight. Shading devices and solar control glass are used where appropriate to limit gains from the sun and so reduce the demand on cooling systems.**

Remain on Level 1

- walk to the right-hand side of the main staircase and look underneath

3. Underground...Is that important too?

- While The Hive was being built, Roman remains were found. This limited how deep the building foundations could go, and extra supports were needed to spread the weight.
- The Hive draws air through an underground tunnel to aid cooling in the summer. The tunnel entrance faces the river to make use of the prevailing winds blowing from the Malvern Hills.

Proceed up the stairs to Level 2

- in front of you is the County's Archive and Archaeology Service

4. Worcestershire Archive and Archaeology Service are saving water too!

- Rainwater is collected (rainwater harvesting) from the roof of The Hive – this water is used to wash archaeological finds and also to flush the toilets in the building.
- Using rain water means that we are reducing mains water consumption and saving money in the process.
- The County's archives are housed in water-tight rooms in the basement of The Hive, and are therefore protected should there be a flood.

Walk to point 5 on the map and look out of the window towards the secure cycle storage

5. Eco-friendly ways to get to The Hive

- Due to its central location, The Hive is really easy to travel to in a sustainable way – whether walking, using public transport, or cycling. Secure cycle storage is available to staff and to the public.

Cross to the other side of the building with the lifts to your right, stop when you are over-looking the Children's Library

6. Our building knows

- As you can see, there are lots of windows at The Hive. The Hive is a very clever building and the windows will open automatically if the building detects it is too warm inside or if more fresh air is needed.
- **The windows are controlled by the intelligent Building Energy Management System (BEMS) and will open automatically if the building identifies that certain areas are too warm or uncomfortable.**
- **The BEMS also controls the lighting and other electronic equipment in the building.**

Walk to your left, stop at the sticker about half way along the walkway

7. River water cooling

- As we saw earlier, the building is kept cool with the help of its unique shape, but it is also cooled using water from the River Severn next door.
- Water is drawn from the river through a large pipe which runs underneath the car park and into the building. The water runs through coils in the ceiling above you which helps to cool the building.
- **A 5 metre deep chamber is located within the river bank so as not to disrupt the flow and contains the pumps and filter mechanisms.**
- **The flow and return pipes were installed using directional drilling to avoid disturbance to the roads and car park above.**
- **Exposed concrete soffits provide the majority of the thermal mass. In very hot weather, when the natural ventilation can no longer maintain the required conditions, cool water from the river is circulated around chilled beams in the concrete slabs to provide further cooling.**

Proceed up the main staircase to Level 3
- at the top of the stairs turn around to look over the atrium

8. Our building materials are eco-friendly too!

- From this point, look up and down - you get a really good feel for how much wood has been used in the construction of The Hive.
- Each of the roof cones are made from large, laminated wooden panels. These panels are made from sustainably sourced softwoods.
- The ground floor is clad with natural stone sourced from the Forest of Dean.
- **Materials were selected to minimise embodied energy and generation of toxins in manufacture, use and ultimate disposal. A number of the building materials were chosen specifically because they could be recycled.**
- **The concrete used in the building has reduced cement content, so it has a lower environmental impact.**
- **You will have seen on your way in that the outside of the building is a vibrant gold colour – this is a copper aluminium alloy. This was chosen as it is easily recyclable when the building comes to the end of its life. The alloy will weather over time but will still retain its colour through the life of the building.**

Walk to the left, stop at the large windows overlooking the car park towards the river

9. We look after the River Severn

- As we have learnt, we take water from the river to cool the building. Once it has been run through the building it is returned back to the river.
- We have to be very careful to ensure the water is returned at a safe temperature and flow rate so as not to affect the wildlife in the river.
- **Water temperature and flow is monitored by the BEMS to ensure there are no detrimental effects on the biodiversity of the river. These standards are agreed with the Environment Agency.**

Walk to the right, in front of the large windows
- stop when you get to the next sticker on the window, before the seating area

10. We are protected from flooding

- The Hive is on the flood plain for the River Severn.
- The building and grounds were designed to cope with flooding – look down from the large windows – there are two big water meadows – these will only have water in them at time of flood, they hold the flood water back to protect the building.
- **To protect The Hive, two water meadows have been planted – look down from the large windows. This, along with rainwater harvesting, attenuation basins and planting, forms part of the Sustainable Drainage System (SuDS). This absorbs rain and floodwater, and prevents water levels from rising.**

Walk to the right, in front of the large windows, to the other side of the seating area. Look out over the children's story island

11. Wildlife thrives at The Hive

- The grounds at The Hive have been planted with lots of native species to promote biodiversity.
- If you look closely at the story island you will see there are bat roosts on the side to house the local bat population.
- **The water meadows are planted with a range of native, traditional meadow wildflowers, including the cowslip to increase biodiversity.**
- **Worcestershire Black Pear Trees have been planted, and the western boundary of The Hive is planted with the rare Black Poplar. Features provide space for bird nests and stag beetle habitats.**
- **Over 4000m² of the soft landscape are dedicated to enhancing the biodiversity of the site.**

You have completed the Sustainability Trail at The Hive! We hope that you enjoyed learning a little more about the sustainability features of this fantastic building. If you would like to know more, please email sustainability@worcestershire.gov.uk

Please share your experience of this self-guided tour on our Twitter page

 @sustainableworc

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