

cricklepit mill
historic building
preservation
versus sustainable
design

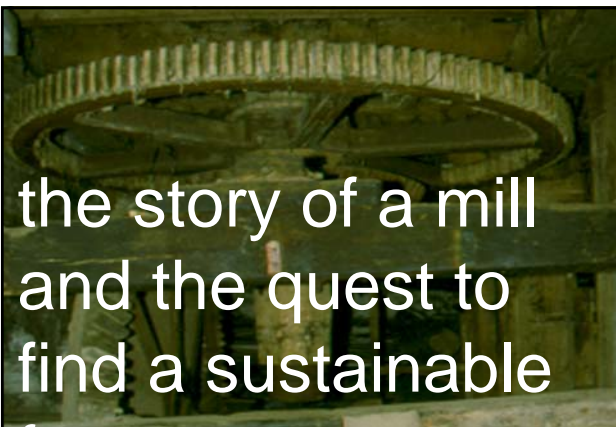
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the story of a mill
and the quest to
find a sustainable
future

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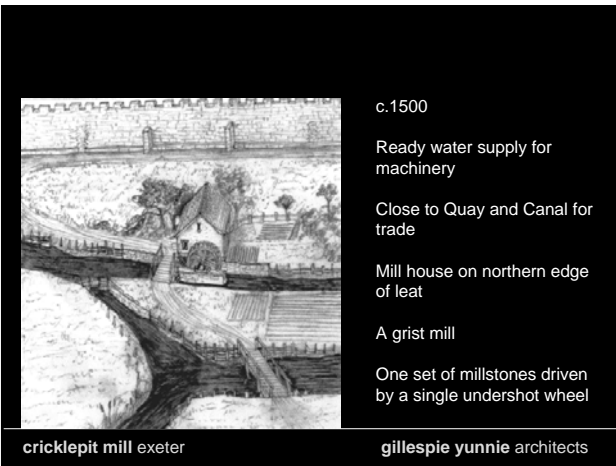








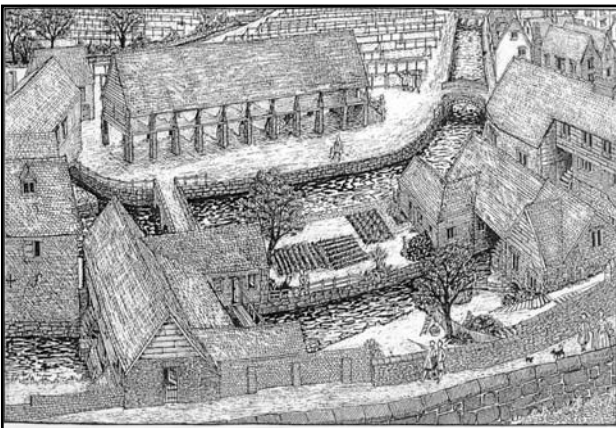
Braun Hogenberg engraving of 1618, from Hooker's map of 1584



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- c.1500
- Ready water supply for machinery
- Close to Quay and Canal for trade
- Mill house on northern edge of leat
- A grist mill
- One set of millstones driven by a single undershot wheel

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c1750 Cricklepit Mill, Drying House, Rackfields and Lower Mills



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27 march 1999

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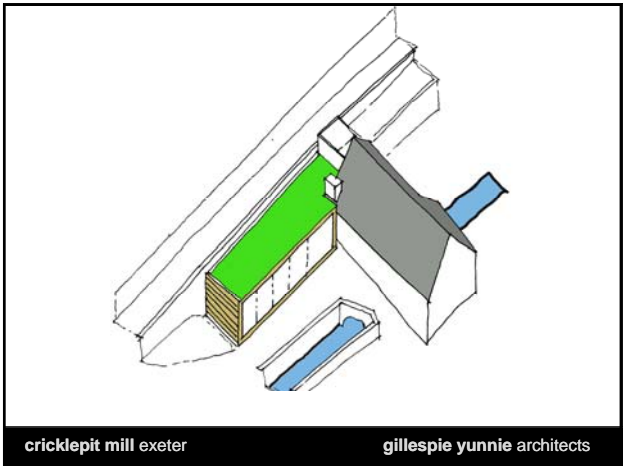


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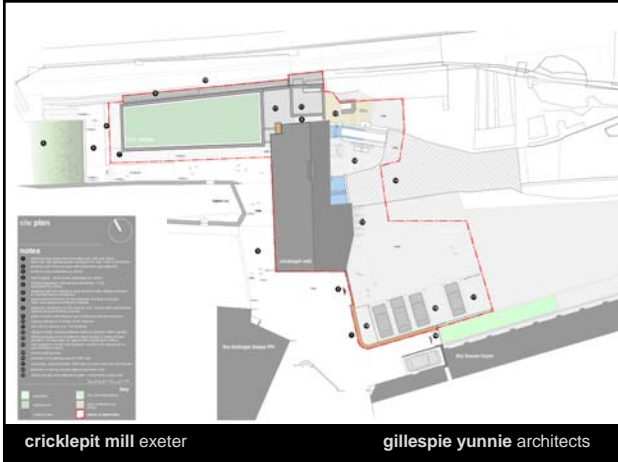
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Key issues in converting the listed building to offices

DWT's brief required thirty five staff to be accommodated on site, which involved the following alterations before even considering the 'green' agenda:-

- New openings in mediaeval fabric to connect to new circulation core and provide disabled access
- Removing stairs within the Mill to create additional 'useable' space
- Enclosing the wheelhouse
- Raising the tie on the roof trusses
- New openings to allow access to main site
- Covering up of the 17th century Millers house fireplaces
- Loss of sensitive archaeology

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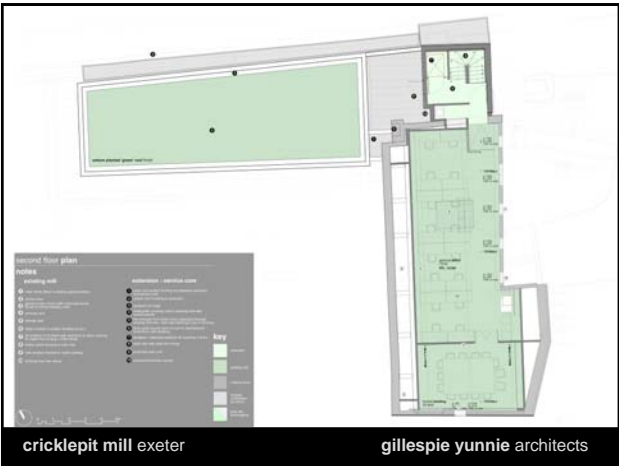
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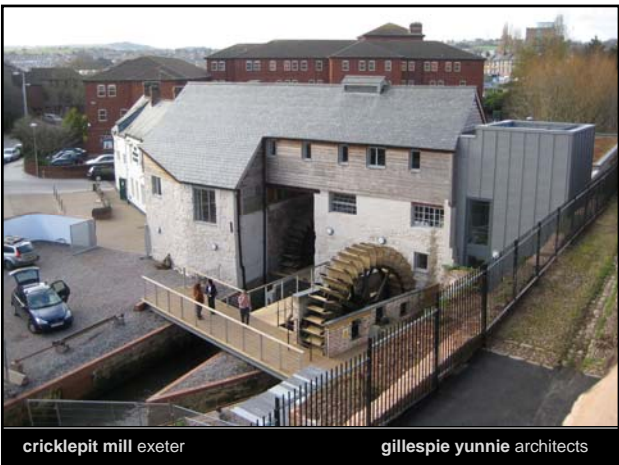


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the green options ?

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Key 'green' issues considered

In embarking on the Cricklepit Mill project, the project team carried out an evaluation of energy saving and low carbon opportunities:-

- Energy sources considered:-
photovoltaic solar collection, solar water heating, hydroelectric, wind power, biomass (wood chips), heat pump drawing energy form the leat, alternative fossil fuels, combined heat and power, water extraction from leats

Hydroelectric and leat water extraction most viable/feasible

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Key 'green' issues considered

- Energy conservation incorporated:-

passive design (ventilation, lighting), improved thermal design (insulation/air tightness), heating/ lighting controls

- Water saving considered:-
- water saving devices, grey water recycling, leat water usage, sustainable drainage systems and reducing rainwater run off
leat water for toilet flushing, sedum roof and permeable external finishes were incorporated to reduce rainwater run off

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Key 'green' issues considered

- Material specification
natural materials to minimise embodied energy, responsibly and locally sourced materials, on site waste management, recycled materials.
- Social and economic
DWT were already located in the City with a lot of staff living locally
Create a wildlife haven within the City and support the 'Wild City' project
Opportunity to create an educational facility - historic, wildlife, green.
City Centre site limited parking, DWT green travel plan - pool cars, showers and secure cycle parking
Regeneration - Cricklepit part of catalyst for regeneration of area

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Materials

Devon Wildlife Trust were keen to use 'green' materials.

- FSC timber
- Goats hair carpet, jute matting
- Natural, self finished materials
oak wall panelling, sw timber panelling to Mill ceilings and walls, natural slate floors, existing brick , stone wall finishes
- Natural/ VOP paints and wax finishes
- Furniture made from recycled material
- Sedum roof
SUDS and creates wildlife garden

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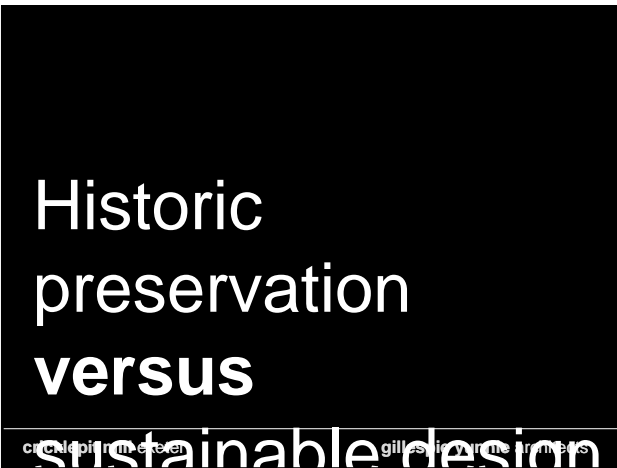
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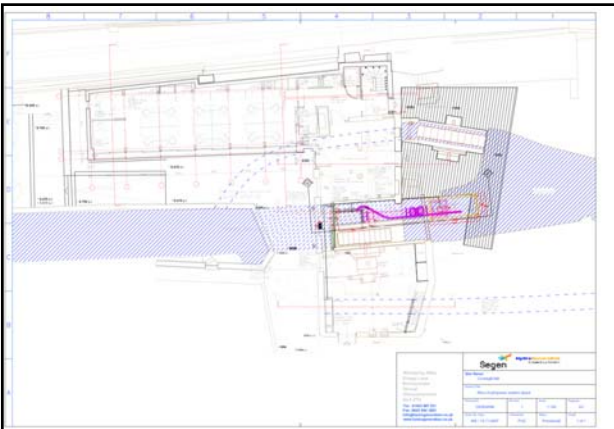
Energy Source hydro electric



- Devon Wildlife Trust were keen to install a hydro turbine to both reduce the carbon footprint of the site and as an educational showpiece
- The hydropower system will provide up to 18,400kWh annual power output which supply 80% of the Trusts needs

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Energy Source hydro electric



- Hydro generation requires a lot of "kit" that has to be incorporated into the historic setting!
- Intake screen, fish by pass, tilt gate, penstock pipe

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Hydro electric conservation issues



- rare survival of a mediaeval urban watermill
- impact on setting of mediaeval wheel house and 19th century mill wheel
- Impact on historic setting of 11th century leat
- sensitive archaeology and irreversible loss of historic fabric

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Hydro electric



A huge leap of faith!

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Energy Source leat water



- Leat water is used to flush the wc's
- Space in the Mill was limited so the tank had to be located externally
- Impact on external appearance of listed Mill
- Sustainability and educational benefits

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energy conservation

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Energy conservation natural lighting and ventilation



- Few windows to the top floor of the Mill meant that the space was dark and poorly ventilated
- DWT were keen to install roof lights to allow adequate natural light and ventilation for the proposed office use

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Natural lighting and ventilation conservation issues



- Appearance of rooflights in an industrial building
- Roof structure entirely new but built mostly to original specifications
- Roof covering local slate laid to traditional coursing detail
- Public funding used in reconstruction

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Roof lights impact of decision



- Office use means that lights have to be on during the day
- Mechanical ventilation required during the summer months
- Mechanical extract to vent is obtrusive within the space

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Energy conservation improved thermal performance



- Re-constructed Mill was completely un-insulated
- Improvements to thermal efficiency of the existing fabric wherever possible
- New elements were insulated to an enhanced level 30% above Building Regs

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Improved thermal performance conservation issues



- impact on appearance of C17th wheel house and 19th century mill wheel
- rare survival of mediaeval fabric
- 18th century single glazed timber windows

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Improved thermal performance impact of decision



- Heat loss from existing solid brick, stone walls to southern mill and wheelhouse
- Heat loss from historic single glazed windows
- Use of the spaces - ☐ office spaces require heating to a higher level. A decision was made to use the southern mill for with the greatest heat loss as a staff room

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An alternative to Breeam for historic buildings ?

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BREEAM scoring methods?

- Points are awarded for grey water recycling but where untreated water is used for toilet flushing there is no box to tick so no points awarded.
- maximum of 3 credits for power generation but only measures up to 15% of demand.
- The scoring system does not give adequate support to the green roof - water absorption, insulation, low maintenance, and ecological benefits from new habitat.
- The scheme assumes buildings developed are for letting or end sale but not for end user client – goat hair and jute carpet, recycled material furniture and recyclable components throughout score zero.

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BREEAM what incentive for historic buildings?

- The re-use of an existing structure should be one of the most ecologically sound approaches a developer can adopt. The BREEAM process only scores very modestly against this environmental saving..
- Preserving an historic structure should also be important, but there are no points allocated for this.
- Working with a listed structure makes a big difference to what can be achieved. At Cricklepit, it limited additional openings for passive ventilation systems and lighting, levels of insulation allowed within structures and insulation depths.

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QuickTime™ and a
TIFF (Uncompressed) decompressor
are needed to see this picture.



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BREEAM what incentive for historic buildings?

- Cricklepit Mill scored 53 points prior to the installation of the hydro turbine. This might now increase to the 55 points required to reach the 'very good' category.
- Cricklepit was a collaborative project with a 'green' client and a pragmatic conservation officer, but still fell short of the 'excellent' category that we should all be targeting if we are to impact on climate change.
- A new headquarters for Devon Wildlife Trust seemed the perfect viable and 'sustainable use' for Cricklepit Mill at the time, but should a lower impact use have been considered.
- Cricklepit was designed five years ago - perhaps we would have made different decisions today!

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