



National  
Trust

## Building design guide

- adaptive re-use of dilapidated vernacular building
- environmentally sensitive location
- improved access for all
- partnership with another conservation organisation



Wicken Fen,  
Cambridgeshire



# The Dragonfly Centre

Renovation of old store house to create office and exhibition space  
July 2009

## Background

Wicken Fen was the first Nature Reserve to be owned by The National Trust. It remains one of the most important wetlands in Europe - an iconic ecological asset; it has one of the longest lists of species for any nature reserve in the UK, in all over 8,400, and has the appropriate protection in national and international law.

The Wicken Fen Vision is a one hundred year project by the National Trust to create a landscape-scale nature reserve and green lung for Cambridgeshire and the East of England; covering 53km<sup>2</sup>, it will stretch from the existing Wicken Fen National Nature Reserve to the outskirts of Cambridge. The Vision will see the re-creation of a mosaic of fenland habitats to help protect and conserve endangered species of wildlife whilst providing a vast area for public access for leisure, relaxation, exercise and education.

The nature reserve is approached from a car park in Lode Lane, off Wicken village. One of the first building's encountered is a small old fen workers cottage. The building was acquired by the National Trust some time in the first half of the twentieth century. It was first used as a museum to show traditional fen crafts as it sits directly in front of Keepers Cottage, which was the main staff residence on site. It was also the first port of call for visitors to obtain permits to visit the fen. However following a fire in the 1960s and the construction of the William Thorpe visitor building, these cottages were renovated as a store room. During the renovation many of the original features were removed or covered. The store received limited maintenance, so by 2008 was in very poor repair.



## Renovation of old store house to create office and exhibition space

Wicken Fen, Cambridgeshire

Above The 1950s reference photograph

# Background

The cottage is prominently located by the car park and is one of the first things that visitors see as they walk down the lane to the Fen. In its present state it gives a very poor first impression. Also, due to the unusual layout at Wicken Fen, with the car park separated from the main property and presence of private modern housing located between the parking and the main visitor building, it is not always obvious to the first time visitor where the property actually starts.

It is therefore the main aim of this project to renovate the old store house to its 1950s state, so that it looks welcoming, helps create a link between the car park and the visitor building, and improves the initial experience of our supporters. Photographs from the 1950s will aid the renovation.

Once complete the building will be rented to the Dragonfly Partnership, who will use it as a base on the Fen during the summer season. The Dragonfly Centre will house the British Dragonfly Museum interpreting the life cycle of dragonflies, some of the main dragonfly conservation messages and provide an environment suitable as a breeding ground with ponds. Wicken Fen provides an aquatic habitat for the twenty-five species of damselfly and dragonflies within the nature reserve. Part of the building will be a small staff office used as a research base. The main room will be set out for interpretation, with microscopes, identification charts, life cycle information and so on.



Above The new Dragonfly Centre

# Project brief

- Secure the long-term survival of the last remaining house in a small group mostly lost within the twentieth century
- Bring back into use a much altered and neglected vernacular historic building without any statutory protection
- Renovate, refurbish and preserve the small semi-derelict Fen worker's cottage to its external façade circa 1950
- Undertake sympathetic repairs to the building and construct a small extension for use as an external store - an outshot from the southwest gable
- Improve the thermal performance of the building and install a new electrical system
- Reinsert two dormer windows previously destroyed by fire, replace the door and remaining rotten windows
- Establish a new national dragonfly bio-museum/ information centre and a base for the Dragonfly Partnership (British Dragonfly Society and Dragonfly Project) during the dragonfly season
- Enhance the visitor experience and provide additional recreational and learning value for visitors to Wicken Fen
- Improve access for less able visitors



## Key factors

- Improve first impressions of property
- Photographic evidence to aid renovation
- Upgrading to modern standards
- Landscaping to attract wildlife

## Consultees

- The British Dragonfly Society
- The Dragonfly Project
- Wicken Fen Management Committee
- Close neighbours
- Environment Agency

Above **Work in progress, fitting the new windows**

## Site issues

- Planning permission was required for change of use and also for the adjacent store as this was beyond permitted development
- Asbestos was present in the building in the form of a roll of lino and some boarding, but it was removed without problems
- Access to the back of the work site was via a National Trust staff garden

## Designations

The building is unlisted but sits on the edge of a sensitive landscape with the following designations:

- National Nature Reserve
- Site of Special Scientific Interest (SSSI)
- Special Area of Conservation (SAC)
- Wetland protected under the international Ramsar Convention



Above Rebuilding the rear wall, with new buttress

# Design approach

- The design was determined by the tenant who required an exhibition space and office accommodation.
- The building had to be low maintenance, hard wearing and economical.
- The dormer windows would be reinstated to maximise on the natural daylight, creating energy savings on lighting for the exhibition panels.
- An extension would be built onto the southwest gable where there had previously been a similar outshot; this would be replicated in scale and detail as far as possible. The former outshot was thought to have been attached to the building until the fire in the sixties and could be seen in an old photograph.
- An approach of repair and re-use would be followed where possible. The existing pan tiles would be re-used on the front elevation, for example.
- Materials, details and colours would be selected with historical relevance to this type of building. Other local vernacular buildings, such as the Fen worker's Cottage, would be taken into account.

Above right **Another Fen worker's Cottage at Wicken Fen the details of which were considered in this reconstruction project**

Far right **Swift boxes**



©NTPL/Paul Harris

## Accessibility

Access would be improved within the constraints of the existing building. Wheelchair access would be achieved by the provision of a level threshold and new paths leading up to the building would be of a suitable width, surface and gradient.

## Engagement

A 'Conservation in Action' panel would be erected to explain the project to interested passers-by.

## Nature Conservation

The area is particularly important as a habitat for dragonflies, bats and swifts. The project aims to improve biodiversity by creating dragonfly ponds and swift boxes and allowing bat access where possible.



# Project team

## Property manager

Chris Soans

## Project manager

Philip Tew, Building Surveyor (Projects)

## Community warden

Emma Shepherd

## Curatorial advisor

Mike Sutherill

## Nature conservation advisor

Dr Stuart Warrington

## Main contractor

Mark Driver, Taylor Driver Construction

## Architect

Brian Page, Archimage Chartered Architects and Designers

## CDM Co-ordinator

John Norman, Ely Design Group Chartered Building Surveyors

## Structural engineers

John Howlett, AFP Consulting Engineers Ltd.



# Construction

The building may have originally been built of a lean timber frame with wattle and daub infill, or clay lump, which had been replaced by brick in at least two stages to leave a small, storey-and-a-half building with a gabled, pan-tiled roof and central chimney stack containing two hearths. A third large older cooking hearth at the northeast end of the building had been hidden behind a modern partition. This hearth, probably the oldest part of the building remaining, was not tied into the abutting walls.

There was no longer access to the roof space or the first floor which had been moved upwards, possibly when two dormer windows were destroyed by fire. All openings were to the northwest consisting of a four-panel door and three windows (two small, one larger), all modern and of painted softwood.

Top left **New internal fittings**

Left **Reconstructing the rear wall**

# Construction

## Exterior

■ The existing pan-tiles were sorted, cleaned and where possible re-used on the front elevation. The rear elevation was tiled using new handmade Blythe Barco terracotta pan-tiles. A void was left to allow Swifts access to two special Swift boxes.

■ The poor quality of the original build has meant some extensive tying of brickwork in places to make it structurally sound. The single leaf brick rear wall was unstable. It had to be carefully demolished and a foundation put in. The wall was then replaced with a brick plinth and timber studwork finished with weather boarding. The other walls were stripped of the majority of the existing masonry paint and repainted using a lime-based paint in an off-white colour to match the nearby Fen Worker's Cottage.

■ Paint was removed from the chimneys so they could be repointed in a NHL2 lime mortar and repainted in a lime-based paint. The second chimney required a new chimney pot.

■ New rainwater guttering was constructed of cast aluminium with simple round down pipes and half-round gutter sections.

■ A pvc system was used to take rainwater run off into the new pond in the garden area.

■ The windows, which were in a poor state of repair and between twenty and thirty years old, were replaced following the design of the ground floor pair shown in the historic photograph. The larger of the three windows was replaced to match the two smaller windows. It was more practical to have three matching windows produced. In addition, by reducing the size of the window a greater wall space could be achieved for the exhibition area.

■ The dormer windows as shown in the early photographs were recreated. It was not intended to replace the upper floors as the ceiling height would not be suitable for modern use. The interior remained full height, with the upper windows providing additional light.

Top right **Work in progress, the larger window by the door has been replaced**

Right **The new rear wall, protected by weather boarding**





# Construction

## Interior

Internally the building was divided into two sections, the earlier/lower section to the left had a concrete floor slab and exposed rafters. This may have been due to a fire at some point in the history of the house. The later section to the right of the building (the southeast chamber) contained an area of ceiling up to the central chimney stack. The floor in this area was a built-up timber floor in very poor condition.

The floor throughout the building was made level, with insulation fitted between the joists. This was finished with oak boarding.

## Office

A new internal wall was erected to divide the office area from the exhibition space.

The walls were finished with new wainscoting, skirting and a dado rail. The existing ceiling mouldings were re-used.

The windows in the office were given secondary glazing.

Heating was provided to the office space by a thermostatically controlled electric convector heater.

Low energy bulbs were used to provide lighting in both rooms.

Top and right **New internal fittings**

Right **Uncovering the hidden chimney**



## Exhibition space

The plaster was in a bad condition inside. It was brushed off as far as possible and repaired and re-plastered using lime plaster. In the end room the walls were left as exposed brick work.

The exhibition space was equipped with a wood burning stove to provide occasional heat during winter months.

Some locally made water-based barn paint was donated to the project. The paint is a water-based product without any solvents that could be damaging to the environment. It is also child, animal and plant friendly. The principal ingredients are water, plant oils, iron oxide pigments, clay, Suffolk chalk and zinc oxide. This paint was used to coat the exterior joinery.

# Construction



## New build

■ The outshot store sits on a slab base. The external walls are constructed of tarred timber weather boarding, matching the new rear wall finish. The roof is covered with the remaining saved pan tiles. Reclaimed bricks were used for the new brick plinth below the timber walls.

Above **Nearing completion, raised dragonfly pond in the foreground**

## Landscaping

■ The garden to the building was of rough grass. A pond was dug to the south of the building and a raised, wheelchair accessible pond created from Oak sleepers and a butile liner outside the front door to act as an education pond. The remainder of the garden was planted with flower and herb borders and managed to encourage dragonflies and other wildlife.

■ A new entrance path and gate were installed. The previous entrance was blocked up with hedging to match the existing. A new wide hoggin path provides direct access to the building as well as access to a picnic bench, a seat overlooking the pond, and interpretation boards.

■ Picnic benches and interpretation boards were also installed.

# Products and services

## Roof tiles to rear elevation

### Barco Pantile

William Blythe, Hoe Hill,  
Barton-upon-Humber DN18 5RB  
T 01652 632175  
www.williamblythe.co.uk

## Cast iron rainwater goods from the Heritage Half Round Range, painted slate grey

### The Alumasc Group plc

Burton Latimer, Kettering  
Northamptonshire NN15 5JP  
T 01536 383844  
F 01536 725069  
www.alumasc.co.uk  
info@alumasc.co.uk

## Stockton 5 wood burning stove Stovax

Falcon Road, Sowton Industrial  
Estate, Exeter, Devon EX2 7LF  
T 01392 474000  
F 01392 219932  
www.stovax.com

## Secondary glazing

### Storm Windows Ltd

Unit 7 James Scott Road, Off Park  
Lane, Halesowen, West Midlands  
B63 2QT  
T 01384 636365  
F 01384 410307  
www.stormwindows.co.uk  
sales@stormwindows.co.uk

## Pozilime

### The Traditional Paint Company

1 North End, Bury Mead Road  
Hitchin, Hertfordshire SG5 1RT  
T 0845 8903434  
www.traditionalpaint.co.uk  
info@traditionalpaint.co.uk

## Fence & Barn paint

### Earth & Reed

48-50 High Street, Needham Market,  
Suffolk IP6 8AP  
T/F 01449 722 255  
www.earth-and-reed.co.uk  
info@earth-and-reed.co.uk

# Funding

- £34,395 Rural Development Programme for England (RDPE)
- £27,498 National Trust
- £8,333 Environment Agency
- £2,000 Anglian Water
- £1,000 British Dragonfly Society

## Funding requirements:

Funding was allocated on the provision that at least three thousand people use the centre by the end of October 2010, and a copy of the lease be supplied to the British Dragonfly Society.

## Cost breakdown:

- Building contract: £53,500 + VAT
  - Fees: £6,606
  - Garden area, equipment + interpretation: £13,120
- Total: £73,226**

Right **Chris Packham at the grand unveiling**



## Procurement

- The project used competitive tendering – four local companies tendered in accordance with the JCT Practice Note 6 (series 2) 'Main Contract Tendering'
- A local architect was appointed
- The contract was a JCT Minor Works Building Contract with Contractor's design, 2005, Revision 1 2007

## Project duration

- Tenders invited: 30 March 2009
- Tenders received: 10 April 2009
- Contractors selected: 17 April 2009
- Contract terms finalised and building work commences: 5 May 2009
- Building made structurally sound and weather tight, internal and external renovation complete: 24 July 2009
- External ground works, fences, ponds and paths complete: 25 July 2009
- Project completion: 26 July 2009
- High profile media day - Centre opened by Chris Packham: 26 July 2009
- Dragonfly Partnership assume responsibility for the day to day running of the Centre: 27 July 2009

# Post project review

In collaboration with two key organisations the Trust has brought a redundant vernacular building back into use. This project would not have been possible without the financial backing of the new tenant.

## Best practices

- The building company was considered to be an appropriate sized firm for the project. It was financially advantageous to use a local supplier with knowledge of local building materials.

- The builder was conscientious and keen to develop a relationship with the Trust and in doing so proved flexible, pro-active and prepared to find solutions.

## Lessons learnt

- An original door was discovered during the renovation, an archaeological investigation prior to works commencing would have highlighted this.

- There were issues with a lack of foundations on the rear side requiring these to be installed along with the rebuilding of a new wall.

- Despite allowing plenty of ventilation beneath the oak floor, it swelled up during the winter months pushing against the back wall. Remedial works have been required to create a larger gap around the edges ahead of next winter.

Top right **Dragonfly Centre** nearing completion

Right **The exhibition space** with seasonal space heating



## Further information

### Contact

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Lode Lane, Wicken, Ely, Cambridgeshire CB7 5XP  
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If you require this information in alternative formats, please telephone **01793 817791** or email **[buildingdesignguide@nationaltrust.org.uk](mailto:buildingdesignguide@nationaltrust.org.uk)**

### Case study information

This case study was researched and compiled by Ingrid Chesher, with help from Philip Tew, Chris Soans, Dragonfly Society and Julie Catlow. Acknowledgements to Angela Collins.

Design by Inkcapp Design.

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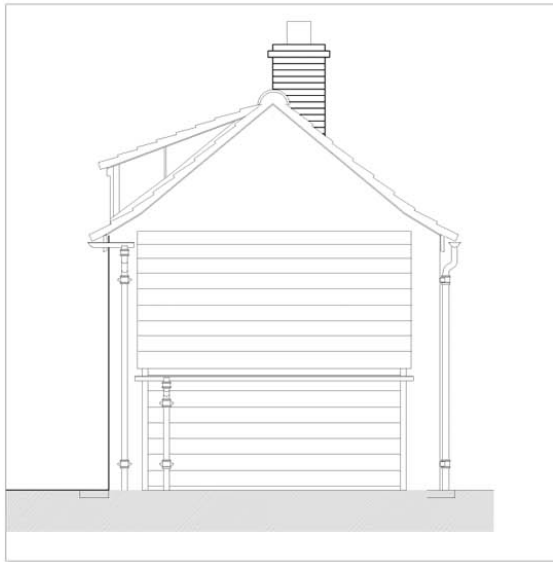
Building Design Guide concept devised by Rory Cullen and developed by Jonathan Howard, with acknowledgements to Jacky Ferneyhough, Ingrid Chesher and Angela Collins.

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Above Proximity to neighbours, the Dragonfly Centre in context

# Plans



1 SOUTH WEST ELEVATION  
901 - 52



2 NORTH WEST ELEVATION  
901 - 52

**Notes:**

See structural engineer's information regarding ground conditions and below ground proposals; Base for timber framed store also to be as S.E.'s recommendations.

External Walls: remove existing paint; repaint in a NHL2 lime mortar; repaint in a lime based system e.g. Pozilime

Roof Finish: remove existing roof paniles; select best to refurbish north west pitch and supply new to match for the south east pitch

Store: feather edged rough sawn boards fixed on 100 x 50mm studs at 450mm c/s colour of boards TBA; slab base as SE specification; Roof of store to receive matching paniles as main building with pitch of 34deg

Chimney 1: remove existing paint; repaint in a NHL2 lime mortar; insert bedjoint reinforcement as directed by SE; locate a high and low level terracotta 225 x 225mm air brick; repaint as dwelling

Chimney 2: remove existing paint; repaint in a NHL2 lime mortar; repaint in a lime based system e.g. Pozilime; supply and locate 2No clay chimney pots and make good haunching

Heating: Office area to be heated by thermostatically controlled electric convector heater. Exhibition area to have wood burning stove as Stovax Stockton 5 guarded by traditional fire guard fixed to brick returns. Flue from stove to be connected to metal plate with accessible cleaning point on soffit of chimney

NB carry out a smoke test prior to installing stove

WICKEN FEN: 3 LODGE LANE  
DRAGONFLY PROJECT  
ELEVATIONS

scale  
1:50

date  
NOV 2008

drawing number  
901 - 52

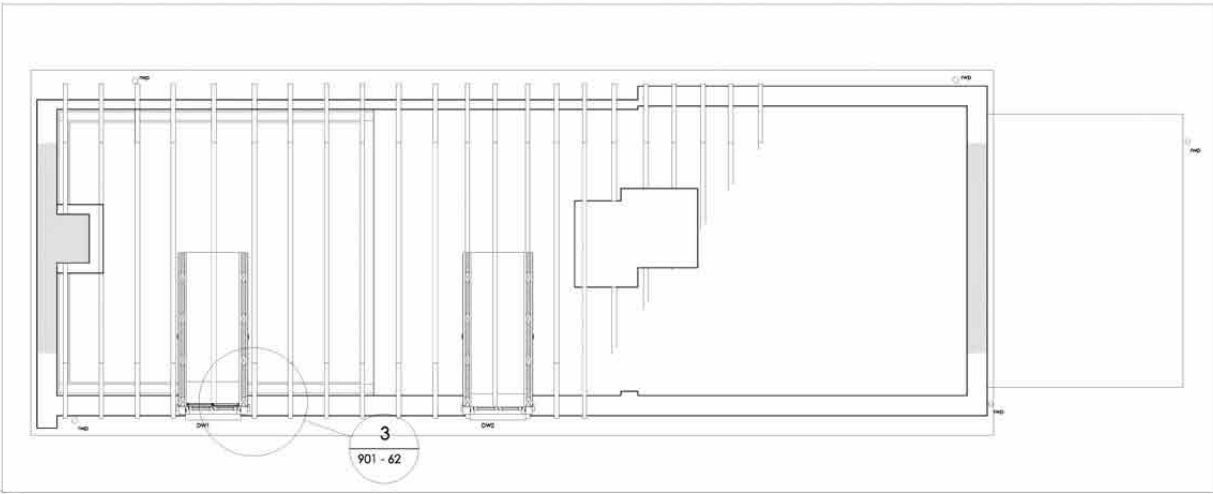
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Telephone - 01353 741711  
Fax - 01353 741656

# Plans



1  
901 - 51  
FIRST FLOOR PLAN

Notes:

Floor: 120 x 19 t+g square edge Douglas Fir boarding nailed to new timber 100 x 45mm floor joists supported on slate pads with 90mm thick Rockwool Flexi insulation between joists  
NB P/A = 1.33 for office area

New internal walls: 100 x 50mm new timber stud walls separated from existing external wall with impreg s.w. spacers and Tyvek Reflex breather membrane with internal 19mm ext grade plywood and 12.5mm plasterboard and skim to improve U-value to 0.3

Ceilings: ceiling joists as existing but with 100mm rockwool flexi between joists and 100mm overlay across joists to achieve a U-value of 0.23. Internal ceiling finish to be 12.5mm plasterboard and skim.

Dormers: side cheeks with external face of code 6 lead; class A building paper; 19mm ext quality plywood; 50mm Celotex insulation; vapour check plasterboard and skim

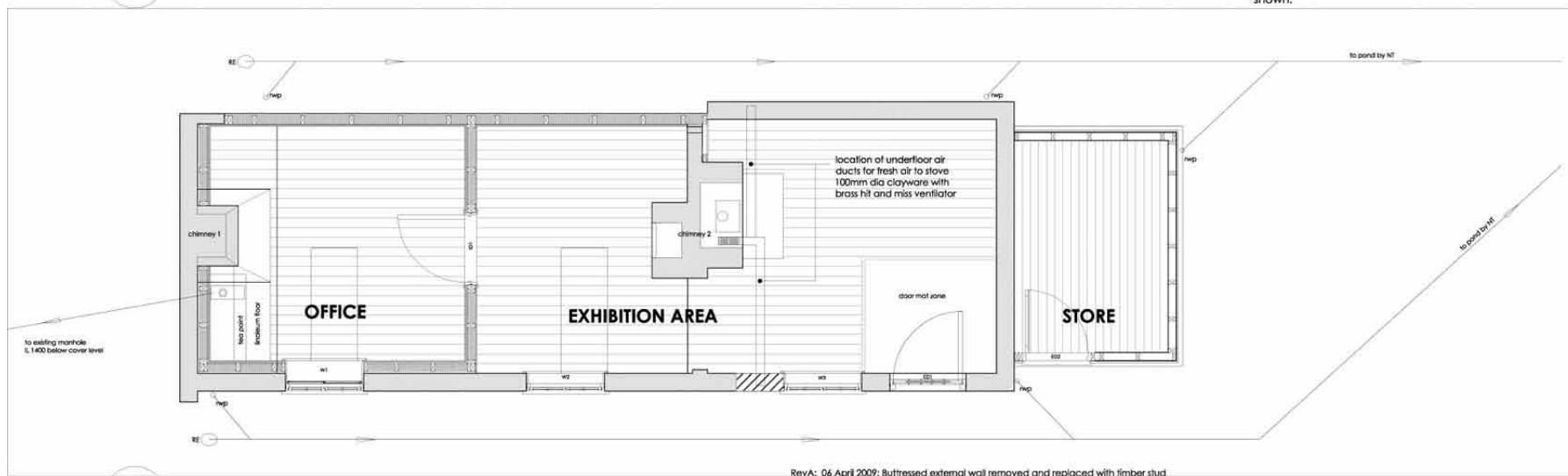
Door ED1: framed and boarded with 35mm Celotex insulation between inner and outer faces

Windows: new timber framed opening casements with 'Storm' secondary glazing set into window reveal

Foul Water Drainage: pvc system by Osma OEA taking waste from sink into existing system as shown.

Rainwater Goods: Alumasc cast aluminium rainwater goods from the Heritage Beaded Half Round Range painted slate grey.

Surface Water Drainage: pvc system by Osma OEA taking waste from new downpipes into existing system as shown.



2  
901 - 51  
GROUND FLOOR PLAN

RevA: 06 April 2009; Buttressed external wall removed and replaced with timber stud

WICKEN FEN: 3 LODGE LANE  
 DRAGONFLY PROJECT  
 GROUND + FIRST FLOOR PLANS

scale 1:50	date NOV 2008	drawing number 901 - 51	rev A
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