JENKS ASSOCIATES LIMITED
Building Services Consulting Engineers

PREMIER INN – WELWYN GARDEN CITY

24 Bedroom Extension

Sustainable Energy Strategy Report – PL3-SESR (08/05/2018)

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PL2	08/05/18	BMS	CMS	Updated site plan included
PL3	15/08/18	BMS	CMS	Updated site plans included

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1. INTRODUCTION

This Sustainable Energy Strategy/Report has been developed by Jenks Associates Limited, Building Services Consultants, for the proposed twenty-four (24) Bedroom Extension at Welwyn Garden City Premier Inn, Stanborough Road, Welwyn Garden City, Hertfordshire, AL8 6FQ

Therefore, the proposed building will be subject to Part L 2013 England Building Regulations for compliance.

A thermal model will be completed prior to construction using IES Virtual Environment with an 'As Designed' BRUKL compliance document issued prior to start on site, an 'As-Built' BRUKL compliance document issued on completion, and an Energy Performance Certificate lodged for the building via Jenks Associates Limited Accreditation body (CIBSE).

This will be carried out by Mr Andrew John Kay (Accredited Energy Assessor Number LCEA 006823).

The Part L weather location will be 'London'.

This Strategy/Report should be read in conjunction with the project planning submission and the site layouts/elevations issued by C H Q Architects.

The proposed Extension is two storeys with the following room type arrangement:

<u>Ground Floor Level</u>

- One (1) UA Bedroom
- Two (2) Twin Bedrooms
- Two (2) Quad Bedrooms
- Three (3) 3.1m Shower Rooms
- Plantroom
- Linen Store
- Lift/Circulation Areas

<u>First and Second Floor Levels</u>

- One (1) UA Bedroom
- Two (2) Twin Bedrooms
- Two (2) Quad Bedrooms
- Three (3) 3.1m Shower Rooms
- Linen Store
- Lift/Circulation Areas

For planning purposes, the proposed building will be C1 usage (Hotel).

This Report will provide details of the energy saving/low carbon technologies which will be incorporated into the overall design for the project.

Fig 1 Site Layout – CHQ Architect's Drawing number CHQ 15.11456-PL05

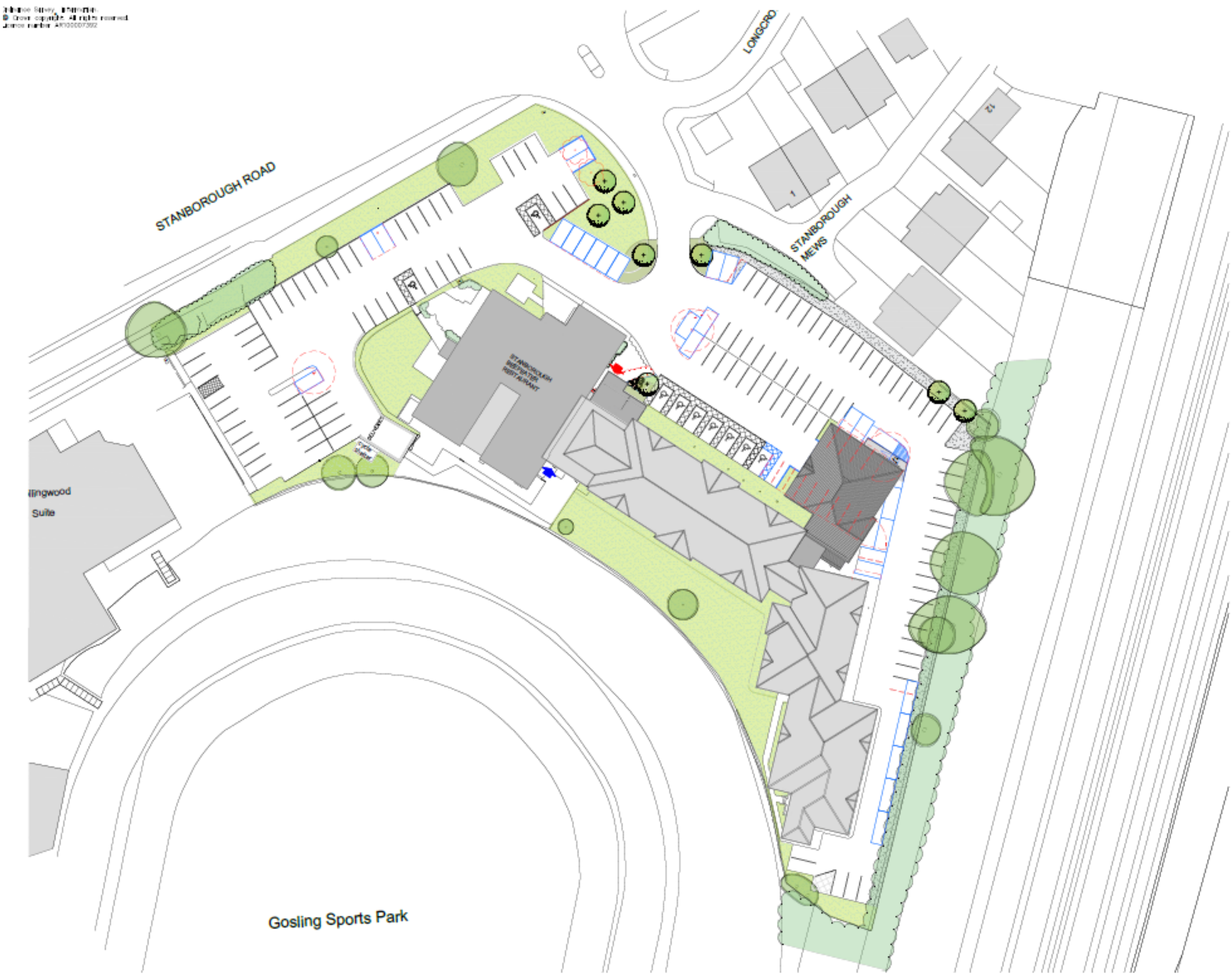


Fig 2 Ground Floor Plan – CHQ Architect's Drawing number CHQ 15.11456-PL06

Fig 3 First Floor Plan – CHQ Architect's Drawing number CH 15.11456-PL06

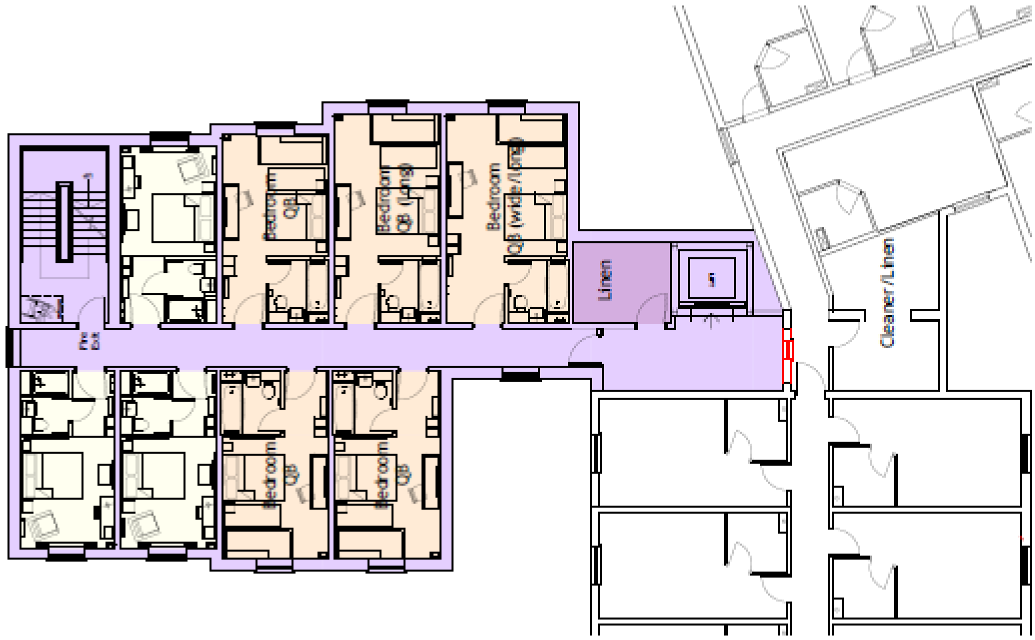


Fig 4 Second Floor Plan – CHQ Architect's Drawing number CHQ 15.11456-PL06

Fig 5 Proposed Ground Floor Reception and Key Plan – CHQ Architect's Drawing number CHQ 15.11456-PL07

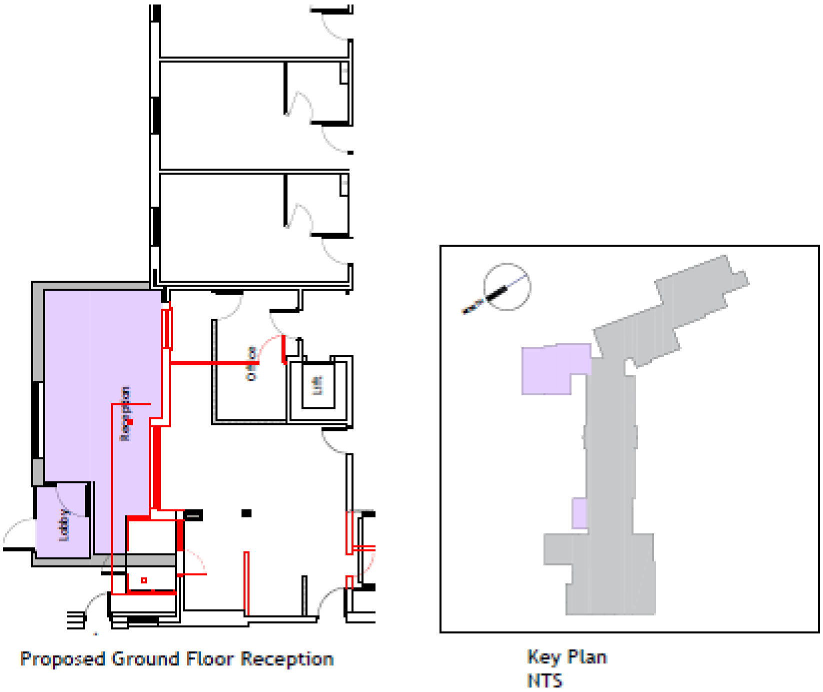


Fig 6 Elevations – CHQ Architect's Drawing number CHQ 15.11456-PL07

Proposed North West Elevation

Proposed East Elevation

Proposed North East Elevation

2. SITE IMPROVEMENT MEASURES

In line with the recommended hierarchical approach to energy and carbon savings, the following improvement measures are aimed to be included for the whole site:

Be Lean – use less energy
Energy efficiency measures that have beneficial impacts on the initial demands for energy; i.e. building fabric, air-tightness, lighting.

Be Clean – supply energy more efficiently
Efficient energy consuming plant and equipment, with a preference for centralised or communal energy provision.

Be Green – use renewable energy
Renewable and low carbon technologies to offset the remaining demands for energy.

The following Model energy efficiency measures are intended implemented on every Premier Inn Extension project to reduce the overall energy use for the development and to reflect the Be Lean and Be Clean measures:

- Building 'U' values improved beyond the minimum standards imposed by Building Regulations 2013 (England).

  For the Premier Inn, the following 'U' values will be applicable

Walls	0.15 W/m^2K
Floor	0.15 W/m^2K
Roof	0.10 W/m^2K
Windows	1.00 W/m^2K

- Thermal bridge interfaces all constructed to accredited details
- Building air permeability of $5m^3/m^2h$ @50Pa or lower
- All lighting installed to be based on LED lamps, or low energy high frequency fluorescent where necessary
- All Premier Inn Hotel Bedroom lighting circuits shall be occupancy controlled
- Lighting to corridors and ancillary areas shall be controlled via occupancy sensors
- Mechanical ventilation and heat recovery
- Natural Ventilation to circulation areas
- Use of highest efficiency and best energy rating white goods
- Inverter control to all pumps and fan motors where appropriate

3. LOW CARBON AND RENEWABLE TECHNOLOGY

An initial options viability assessment has been carried out using the 'CIBSE RESET' software to ascertain which technologies would be most feasible to use to achieve compliance with Part L 2013 England Building Regulations.

A summary of these results and additional selection commentary is provided below for all systems.

3.1 SMALL SCALE WIND TURBINE

Wind turbines harness the power of the wind and utilise this to generate electricity.

Approximately 40% of wind energy in Europe blows over the UK which makes wind technology a viable solution.

There is a high capital cost involved and ongoing maintenance costs to consider.

Generally, annual average wind speeds greater than 4m/s (9mph) are required for small wind electric turbines and utility scale wind power plants minimum average wind speed of 6m/s (12mph).

Fig 7 UK Annual Wind Speed Map

Our development site (at NN16 8FX) has the following average wind speeds:

10m above ground level - 4.8m/s (10.74mh)

Due to the low average wind speeds, the height/size of the turbine(s) required to offset a reasonable amount of carbon emissions, and the obvious noise and visibility issue to the surrounding areas; this would not be considered a viable solution for this development.

3.2 BIOMASS INSTALLATION

Renewable organic materials, such as wood, agricultural crops/waste, and municipal wastes can be used as a source of fuel or energy or can be burned directly or processed into biofuels such as Ethanol and Methane.

This option has not been considered further as there is minimal potential for wood pellets to be delivered to the site from a local source.

3.3 SOLAR THERMAL HOT WATER

Solar water heating systems, or 'solar thermal' systems utilize free heat from the sun to warm domestic hot water via solar panels/collectors (evacuated tubes or flat plate collectors).

This option has not been considered further due to the limited new build south facing roof available to assist for domestic hot water production in this development.

3.4 COMBINED HEAT AND POWER (CHP)

Cogeneration or combined heat and power is the use of a heat engine (or power station) to generate both electricity and useful heat at the same time. Combined heat and power (CHP) plant recovers otherwise wasted thermal energy for heating.

This option has not been considered further due to the non-constant use of the building, the minimal requirement for heating/hot water production, and the limited plant space available for the excessive buffer storage.

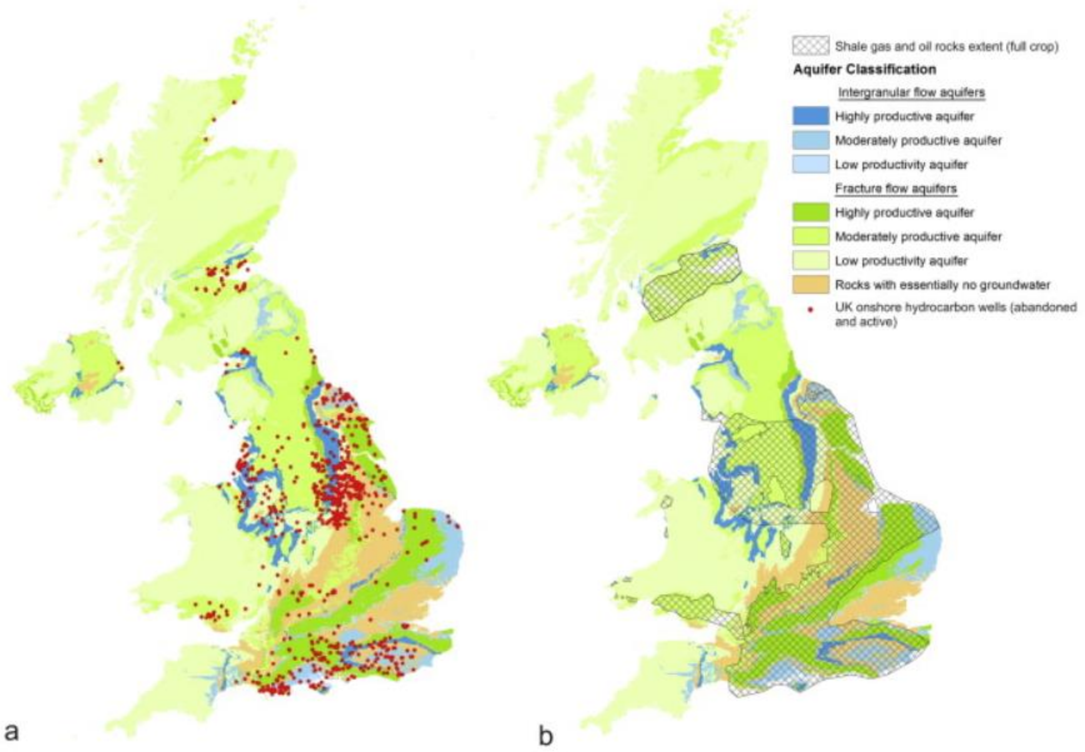
3.5 GROUND WATER COOLING

A ground water cooling system requires the presence of an aquifer from which water can be extract via a borehole.

Cold water is abstracted from one part of the aquifer system (the 'cold' well) and is utilized via a heat exchanger for the cooling of a development.

The resultant heated water is then recharged into the aquifer at a different location (the 'hot' well). A second borehole is not a requirement for many installations in areas where the water table is rising, which is the case in the London area, and extracted ground water can often be re-used as grey water or discharged to the sewer.

Fig 8 UK Aquifer Map



Ground water cooling could be a viable technology for the building, but the feasibility of an open loop system would need to be confirmed by the local Environmental Agency or a vertical closed loop system which would be subject to local consent.

This option is not suitable to the Premier Inn Model installation.

3.6 GROUND SOURCE HEAT PUMPS

A geothermal heat pump or ground source heat pump (GSHP) is a heating and/or cooling system that transfers heat to or from the ground.

It uses the earth as a heat source (in the winter) or a heat sink (in the summer).

The temperature in the ground below six (6) metres is roughly equal to the mean annual air temperature at that latitude at the surface.

Geothermal heat pumps can reach reasonably high coefficient of performance (CoP), 3 to 6, in the winter when compared to air source heat pumps at between 1.75 to 2.

There are high capital costs to consider in any pay-back calculation.

This option is not suitable to the Premier Inn Model installation

3.7 PHOTOVOLTAIC INSTALLATION

A photovoltaic system is a power system designed to supply usable solar power by means of photovoltaics.

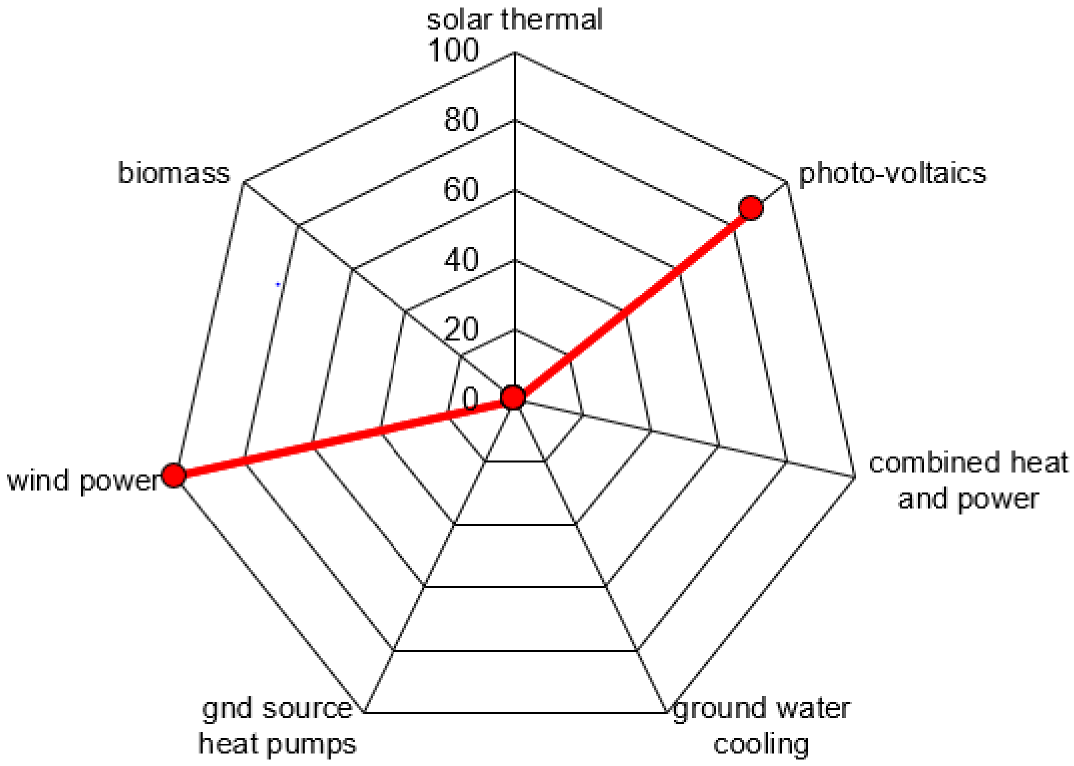
It consists of an arrangement of several components, including solar panels to absorb and convert sunlight into electricity, a solar inverter to change electric current from DC to AC, as well as mounting equipment to suit site specific requirements.

This option has not been considered further due to the limited new build south facing roof available and the potential pay-back on such a small project.

3.8 CIBSE RESET TM38 TOOL RESULTS

Building Information	Hotel and Restaurants
Location	Suburban
Exposure	Normal
Cost effectiveness ranking	4
Carbon savings ranking	5
Marketing/Image ranking	2
Technology risk ranking	3

Fig 9 CIBSE RESET Chart



As can be seen, wind power array is the only feasible solution, but this has been discounted as detailed in Section 3.1, and then a Photo-Voltaic array which has been discounted as detailed in Second 3.7.

4. CONCLUSIONS/RECOMMENDATIONS

The site specific Premier Inn Extension thermal model/Part L 2013 calculations have given the following results:

Notional Building/Target CO_2 Emissions Rate (TER) = 79.80kgCO_2/m² annum

Actual Building CO_2 Emissions Rate (BER) = 73.40kgCO_2/m² annum

Proposed Building Floor Area = 819.90m²

Notional Building Annual CO_2 Emissions = 65,348.22kgCO_2

Actual Building Annual CO_2 Emissions = 60,107.26kgCO_2

This results in a carbon emissions saving of 8.0% above the requirements of Part L 2013 England Building Regulations.

Energy Consumption by End Use (kWh/m²)		
	Actual	Notional
Heating	32.69	54.69
Cooling	0.0	0.0
Auxiliary	9.13	5.06
Lighting	7.84	11.11
Hot Water	223.45	250.94
TOTAL	**273.12**	**321.80**

Notional Building Annual Energy Consumption = 263,522.97kWh

Actual Building Annual Energy Consumption = 223,657.97kWh

This results in an energy consumption saving of 15.1% above the requirements of Part L 2013 England Building Regulations.

We would expect to achieve an energy performance asset rating of B/33 which is lower than the expected newly built Benchmark of B/35.

These results are due to the site improvement measures detailed in Section Two of this Report.

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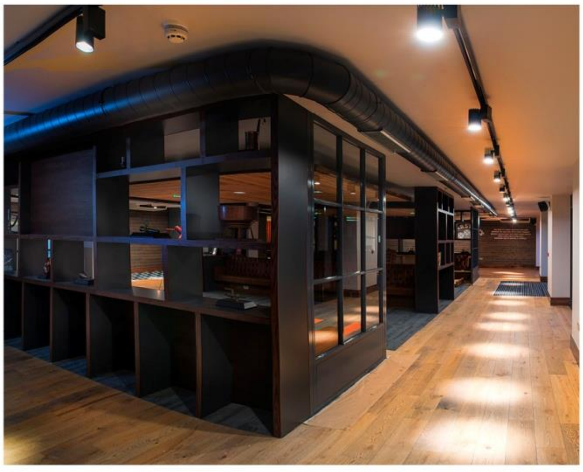

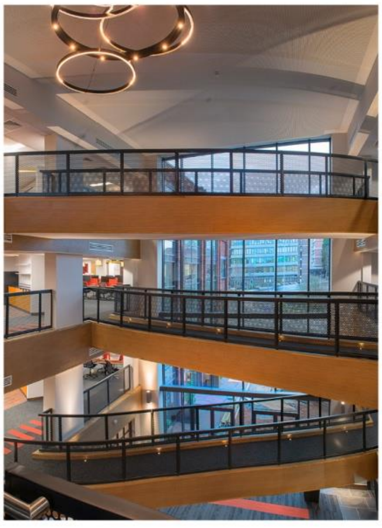

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