















## Project Gallery

# ALHAMAT: analysing materiality of the *Alhambra* to elucidate the Nasrid dynasty's power in the Emirate of Granada

Carolina Cardell<sup>1</sup> , Guillermo García-Contreras<sup>2,\*</sup> , Teresa Koffler<sup>2</sup> ,  
Juan Manuel Ríos-Jiménez<sup>2</sup> , Alberto García-Porras<sup>2</sup> ,  
Javier Alejandro-Sánchez<sup>3</sup> , Domingo Sánchez-Mesa<sup>4</sup> ,  
Mario De La Torre-Espinosa<sup>4</sup> , Luca Mattei<sup>2</sup> , David Rodríguez-Sánchez<sup>5</sup>,  
Emilio Cano-Padilla<sup>5</sup>, Nicolás Losilla<sup>2</sup> , Esther Cardell<sup>6</sup>, José Miguel Nieto<sup>7</sup>  &  
Fernando Martínez-Avila<sup>8</sup> 

<sup>1</sup> Department of Mineralogy and Petrology, Granada University, Spain

<sup>2</sup> Department of Medieval History and Historiographic Sciences and Techniques, Granada University, Spain

<sup>3</sup> Department of Architectural Constructions II, Seville University, Spain

<sup>4</sup> Department of General Linguistics and Literary Theory, Granada University, Spain

<sup>5</sup> Freelance Archaeologist, Granada, Spain

<sup>6</sup> Freelance Scientific Illustrator, member of Alhamat Project, Granada, Spain

<sup>7</sup> Department of Earth Science, Huelva University, Spain

<sup>8</sup> Department of Archaeology, Alhambra and Generalife Council, Granada, Spain

\* Author for correspondence ✉ [garciacontreras@ugr.es](mailto:garciacontreras@ugr.es)

The Nasrid emirate of southern Iberia emanated power through architecture; this project aims to better understand how this was made possible, via an interdisciplinary exploration of the Alhambra monument and other *Al-Andalus* constructions. Initial results of archaeological campaigns, structure chronologies and communication plans undertaken in 2021 and 2022 are presented.

Keywords: South-west Europe, Spain, Middle Ages, Al-Andalus architecture, architectural archaeology, radio-carbon dating

## Background

The Alhambra (Granada, Spain) was a fortified medieval Islamic palatine town, and today it is a UNESCO World Heritage Site (Figure 1). It is a unique monumental complex, from an artistic and cultural viewpoint, that represents the grandest and finest extant example of Middle Ages Islamic art and architecture in the Western world. Its formation evolved from the construction of defensive structures in the eleventh century AD to the raising of palaces

Received: 27 February 2023; Revised: 13 June 2024; Accepted: 9 August 2024

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Figure 1. The Alhambra and Generalife monument (photograph by C. Cardell).

during the Nasrid dynasty, the last Islamic rulers in the south of Iberia governing the Emirate of Granada (AD 1238–1492). Since the Christian conquest of the Nasrid emirate by the Crown of Castile (1492), the Alhambra has endured restructurings, new constructions, ruination, restoration and global tourism, all of which have modified its original character (Diez Jorge *et al.* 2018). Probably due to this complex evolution, the Alhambra has been studied in a fragmented way; that is, research addresses singular aspects or buildings, reiterates questions of urbanism or analyses decorative features without considering its wider territorial context.

The Alhambra was independent from the city of Granada, built on a territory organised by periods, though spatially well-planned originally (Malpica-Cuello 2002). The town was divided into the defensive sector or *Alcazaba*, the palatine area, the town itself, peri-urban gardens and orchards (*almunia*), and the Generalife (Figure 2). Agricultural growth of the Alhambra, and the wider Nasrid emirate, required an economic transformation with concurrent social and political changes. These actions led to the use of diverse construction techniques and materials. Since the Alhambra was the seat of governance and acted as the centre of political, ideological, symbolic and material power, certain construction programmes also influenced the principal palaces, towers, walls and fortresses of the Nasrid elite beyond the Alhambra. To date, however, research into the Alhambra's territorial and temporal dimension, and its relationship with other Nasrid constructions from a holistic perspective, is lacking. Similarly, the expression of the social, economic and political dynamics of Nasrid power through the architecture and urban evolution of the Alhambra has been little investigated, despite the existence of a substantial body of literature focusing on the Alhambra (for more details see <https://www.alhambra-patronato.es/>).

The ALHAMAT project (*ALHambra MATerial: the tangible Alhambra as the seat of Nasrid power*) attempts to clarify these issues through collaboration between the humanities and the social, natural and applied sciences, as well as the administrative and heritage authorities responsible for the monument itself. The main goals are: 1) to describe, date and catalogue the architectural programmes present in the Alhambra and other Nasrid structures, classifying materials, construction techniques and fabrics according to chronology; 2) to identify the radiating effect of these programmes on Nasrid architecture in Granada and on the borders of the Nasrid emirate; and 3) to establish the bases that enabled the development of such construction plans. Additionally, ALHAMAT focuses on knowledge dissemination via new communication strategies to reach a broad audience. The primary material for our analysis is rammed earth walls, known as *muros de tapial* in architectural historiography. This is the most widespread construction system throughout *Al-Andalus*, including during the Nasrid period, and its use extended from urban and rural domestic contexts to palaces, walls and fortresses.

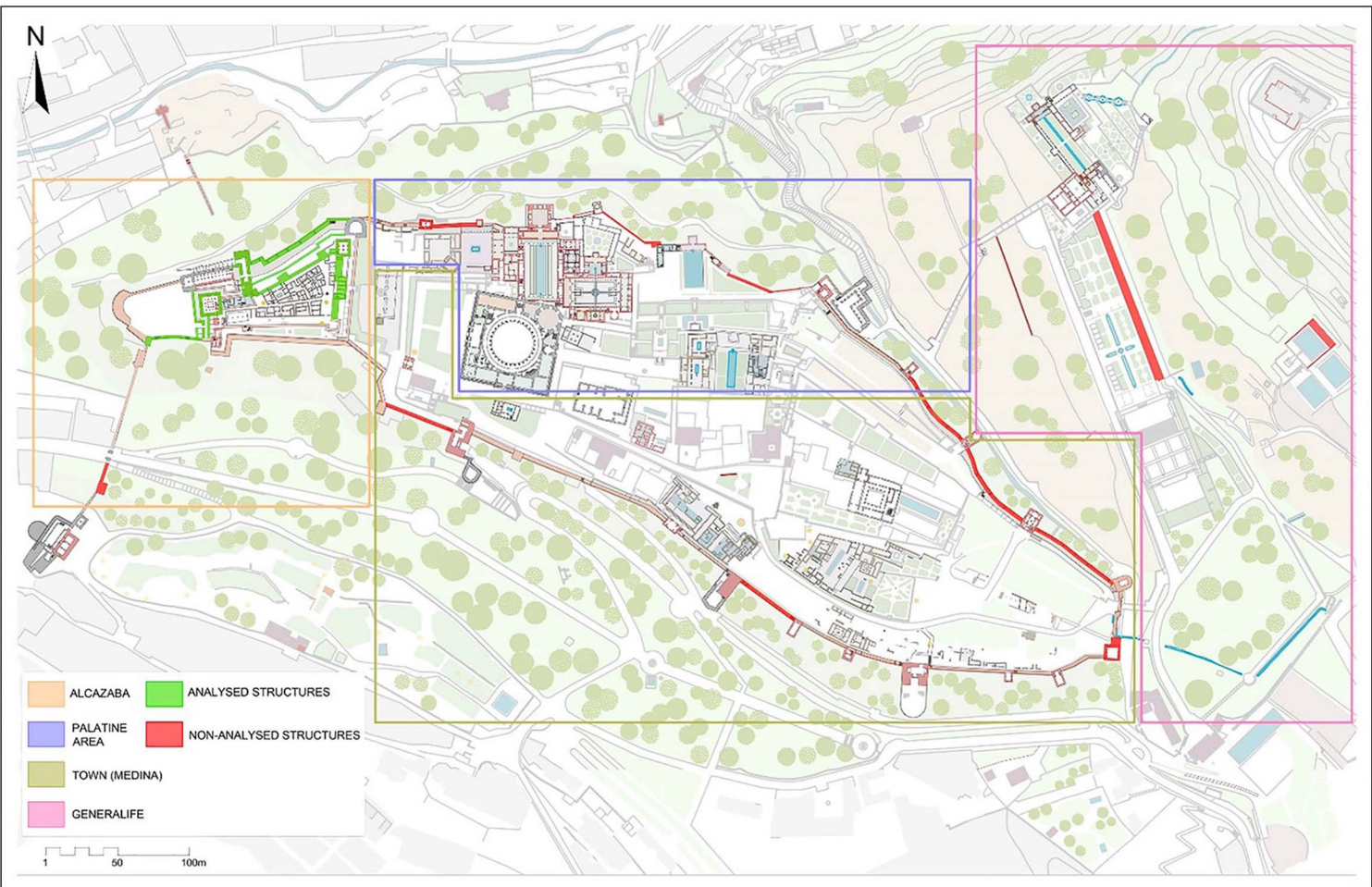


Figure 2. Map of the Alhambra showing its division zones (map from Alhambra and Generalife Council, amended by T. Koffler).



## Methods

The project combines historical-archaeological, scientific-technical and architectural studies to comprehensively investigate the materiality of the Alhambra. These analyses include exploration of architectural archaeology, Arabic and Castilian written documents, underlying geology, construction materials and the stratigraphic relationships of constructed elements (comparing dimensions, plans and elevations between different sectors of the Alhambra and with other constructions in the surrounding area), as well as consideration of the insertion of the architecture in the landscape and radiocarbon dating of organic material in the walls (National Center of Accelerators, Seville). This is achieved in synergy with experts from diverse disciplines and in collaboration with the Andalusian Ministry of Culture. Results are compared with 10 Nasrid-border fortresses studied in this project and one Al-Andalus palace in Granada city (Figure 3).

## Preliminary results

The Alhambra is characterised by its architectural complexity with numerous construction phases (Figure 4). Our project centres on the Al-Andalus structures (eleventh–fifteenth centuries) whose fabrics were built mainly with the *tapial* system but also included facing-courses of stone masonry and bricks. The *tapial* is a rammed-earth construction that compresses soil mixed with aggregates, lime and water into a formwork to form a consistent material (Figure 5). Studies of the archaeology of the architecture in the Alhambra focused initially

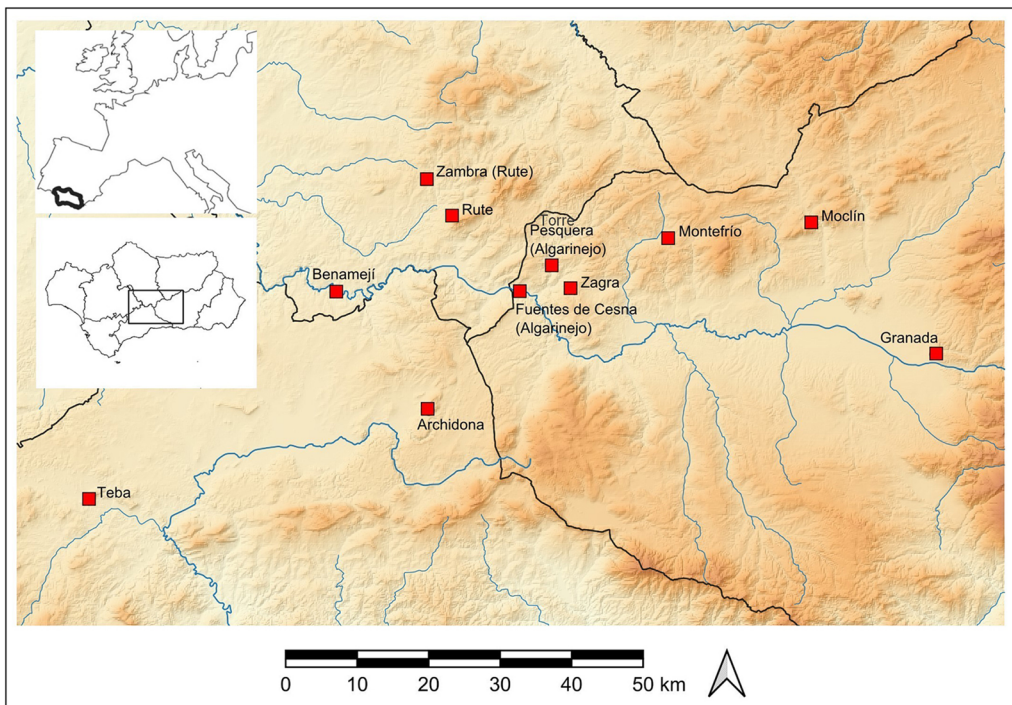


Figure 3. Nasrid-border fortresses investigated in the project (map by J.A. Rojas-Cáceres).





Figure 4. Examples of overlapped construction phases in the Alhambra: A–E) Alcazaba; F) Nasrid palaces (photographs by T. Koffler).

on the *Alcazaba*, assessing archaeological stratigraphy, architectural and structural typologies, construction materials, constructive imprints and finish, and metrics, and implementing photogrammetry (3D images, orthophotographies and archaeological planimetry) and radiocarbon dating ( $n = 6$ ) (Figure 6).

For the first time, this archaeological research approach is being systematically applied to the whole of the Alhambra and not only to isolated structures or part of the palatine town (most recently Brazille *et al.* 2023). So far, four elements of analysis (stratigraphic unit, structure, constructive elements and samples) have proved useful in elaborating a chrono-typological catalogue of the construction techniques and materials identified, which is compared with the Alberc3n del Moro de Cartuja palace in Granada city, and selected Nasrid-border fortresses.

Traditionally, the *Alcazaba* area has been attributed to the Zir3 period (eleventh century AD) (V3lchez-V3lchez 2018). Recent archaeological studies, however, propose its ascription to the Almohad period (twelfth–thirteenth centuries) (Garc3a-Granados 2014). Our

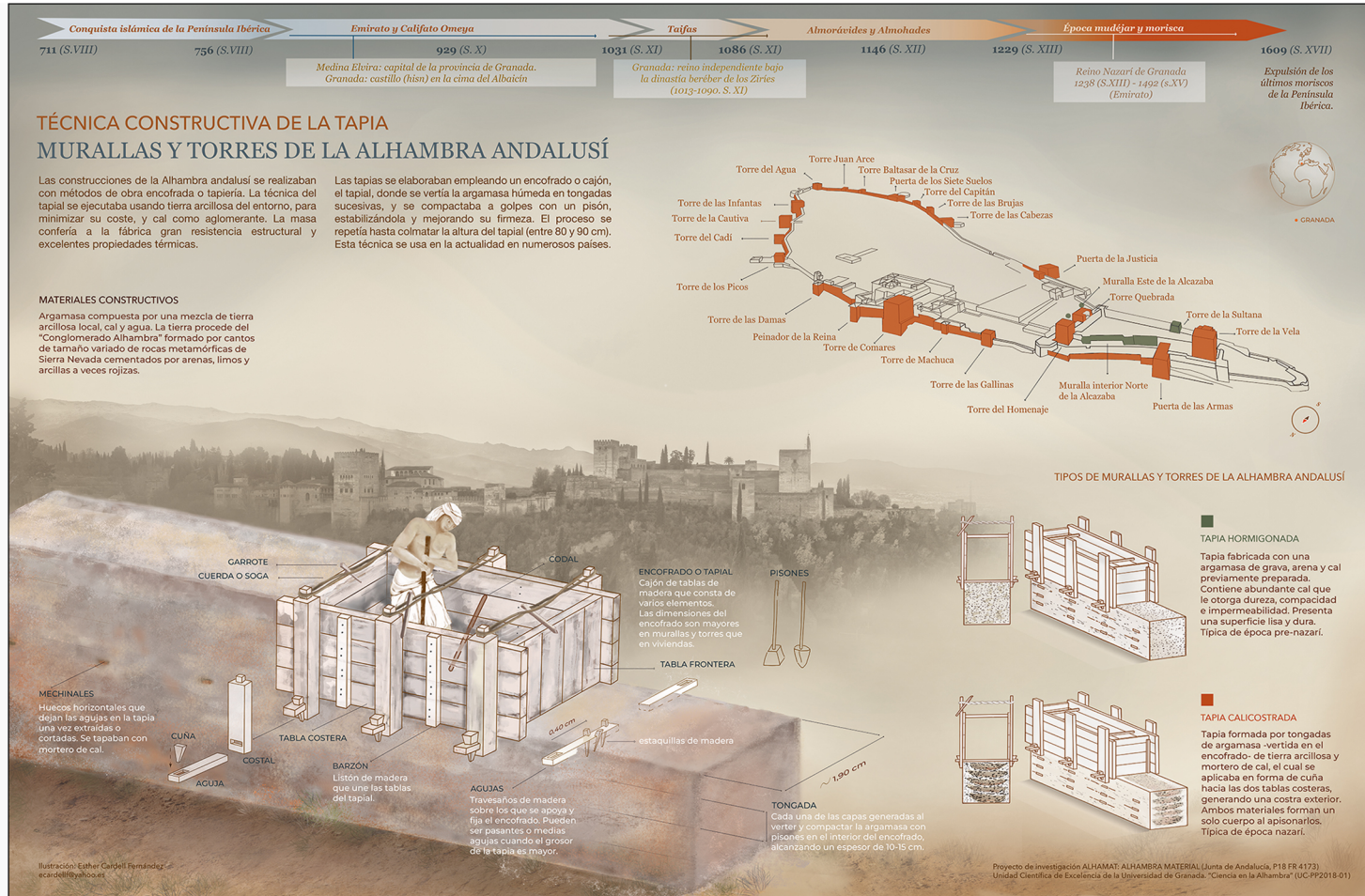


Figure 5. Infographic (in Spanish as exhibited in the Alhambra) showing the tapial system to build the Andalusí walls and towers in the Alhambra (scientific illustration by E. Cardell).



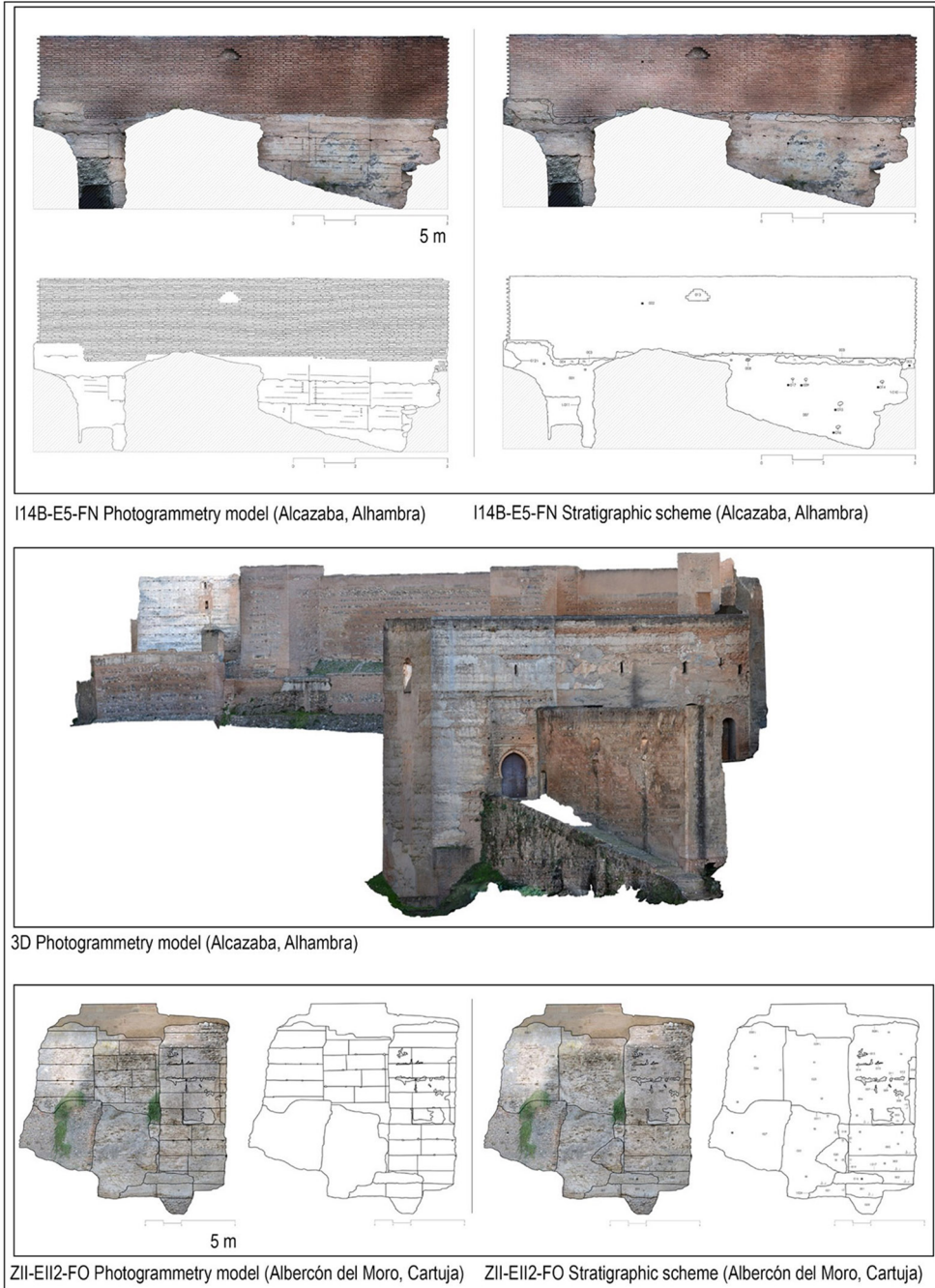


Figure 6. Photogrammetry and stratigraphic analysis of walls in the Alhambra and the Albergón del Moro de Cartuja in Granada (figure by T. Koffler).



preliminary unpublished radiocarbon results (n = 19) support an Almohad date and invite a rethink of the history of this area. Dating of the border fortresses also opens an archaeological debate. The fortresses had been assigned to the Nasrid period following an assumption that their fabrics were reinforced as part of a construction programme emanating from the Nasrid power centre in the mid-fourteenth century (Torres-Balbás 1949). Although absolute dating is available for only four of 10 fortresses, results confirm this premise in the fortresses of Moclín and Montefrío but ascribe those of Torre Pesquera and Teba to the Almohad period (Figure 3).

Information on construction programmes in the Alhambra and its territory in Arabic sources are rare. References focus on the Alhambra's grandiosity, wealth of territory and water abundance. Thus, we are investigating the philology of terms for construction tools and techniques in Al-Andalus and translating them into Arabic and English to establish a vocabulary of construction equipment. This forms part of our innovative transmedia storytelling dissemination strategy intended to reach a broad and international audience (tourists, experts, professionals and students), consisting of diffusion through the social network Instagram, production of a short film of ALHAMAT researcher interviews, and infographics (Figure 5).

### Acknowledgements

We thank the Alhambra and Generalife Council.

### Funding statement

Research was funded by the Andalusian Research Projects P18-FR-4173 and P18-FR-2046, and the Excellence Unit of the Granada University *Science in the Alhambra* (UCE-PP2018-01). Funding for Open Access charge: Universidad de Granada/CBUA.

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