

**Underground Architecture Typology as Crisis Management:  
An Analysis Through Derinkuyu Underground City**

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By 2020, world health has collapsed. Natural resources, masks, and food are in short supply. Natural disasters, viruses, and tragedies rule with death: Australian bushfires, COVID-19 pandemic, Beirut explosion...

However, these events were bound to happen because every day, we are facing different crises without preparation. A crisis is when a community of people perceives an urgent threat to life-sustaining functions, which must be dealt with under conditions of uncertainty.<sup>1</sup> Crises have existed since ancient times, shaping the understanding of architecture.

For housing and protection within the ecosystem in the early days of human life, the underground was one of the first architectural resorts.<sup>2</sup> People lived in underground spaces while using the above tracts of land for growing their crops.<sup>3</sup> Derinkuyu Underground City (Derinkuyu) is one of the most remarkable underground cities in the Cappadocia region. Made of soft tuffs that are easy to process, Derinkuyu was carved by people of ancient times.<sup>4</sup> Its first inhabitants being Assyrians, Derinkuyu consists of eight floors and is large enough to accommodate a crowded community. The site is part of a UNESCO World Heritage Site where the special geology of the region (volcanic tuffs) made possible the development of a unique vast underground refuge. Passed through generations, Derinkuyu was used as a shelter to protect themselves from diseases, natural disasters, and attacks.

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<sup>1</sup> Arjen Boin and Paul T. Hart, "The Crisis Approach," In *Handbook of disaster research*, (New York: Springer, 2007), 42.

<sup>2</sup> Zaher A. Al-shanty, "Towards a Futuristic Underground Cities," *International Journal of Civil Engineering and Technology* 10, no. 3 (2019): 2294, <http://www.iaeme.com/IJCIET/issues.asp?JType=IJCIET&VType=10&IType=03>.

<sup>3</sup> Khayat M. Arij, "Underground Architecture," *Global Journal on Advances in Pure & Applied Sciences* 00, no. 1 (2014): 1, [www.awer-center.org/pit](http://www.awer-center.org/pit).

<sup>4</sup> Kadir Dirik, "Kapadokya Bölgesi'nin jeolojisi, jeomorfolojisi ve bunların bölgedeki medeniyetler üzerindeki etkisi," *1. Tıbbi Jeoloji Çalıştayı* 30 (2009): 6-9.

Architecture can't be separated from its environment. In the case of Derinkuyu, the unique geology of the volcanic tuffs allowed ancient people to live in it for centuries. Therefore, I aim to explore the formation of the volcanic tuffs in Cappadocia and how the unique geology gave rise to human habitation.

With this research: (1) I hope to exemplify some crises today and how they can be managed through underground architecture, (2) analyze the geological location and features of Derinkuyu as a crisis management system, (3) create an underground architecture typology that can be used and adapted through time with improving technology.

Through my research, I will seek to answer two questions: (1) As a precedent underground architecture, what geological and architectural elements helped Derinkuyu achieve its aim of protection from crises? (2) Reflecting upon Derinkuyu, how can we create an underground architecture typology that can protect us from future crises?

I'll create an underground architecture typology using my findings and explore if it can be applied to the future. I'll use Adobe Illustrator to highlight and label elements that make Derinkuyu a crisis management system. I'll consider the questions: What common elements were seen in successful underground architecture? How can this underground architecture typology be applied to today or the future? Can this typology be applied even if the circumstances (such as technology and climate) are changed?

Therefore, my main purpose is to emphasize the importance of crisis management in architectural planning to improve survival. We realized the need for alternative architectural typologies during the pandemic when we experienced how crises could catch the world unprepared. By looking at Derinkuyu and suggesting how underground architectural typology

can be applied to the future through the Laidlaw Program, I hope we can better adapt to the different crises we may face in the future.

## Bibliography

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