

Typomorphological Study of Beyarmudu / Pergamo, Cyprus

By Jason Winn – 12 June 2017

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Introduction



Figure 1. 1573 map by Jacomo Franco of Venice¹



Figure 2. inset from Figure 1



Figure 3. Colonial era village parcel map²

Beyarmudu (Turkish for “Lord Pear”) was rechristened in 1958 following the end of British colonialism on the island of Cyprus. Previously the town had been called Pergama, Pergamo or Pergamos, a reference to an ancient city on mainland Greece. In the mid-twentieth century, the town played host to a British military barracks installation, which resulted in the production of a pair of modern parcel maps used to develop this study.

Life was and is focused on agriculture, with the potato being a particular specialty of Beyarmudu. Since the conflict of 1974 the village saw a small amount of Turkish farmer immigrants, and more recently, villa construction on the north of town.

¹ Source: <http://cyprusscene.com/2015/06/08/the-great-maps-of-medieval-cyprus-by-ismail-veli/>

² Source: <http://spd.gov.ct.tr/tr-tr/%C3%BCstmenu/planlamaharitalar%C4%B1/planharitalar%C4%B1/lefko%C5%9Faimarplan%C4%B1.aspx>

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Initially, we examine the influence of water on the site selection and street layout (the “*pre-urban nucleus*”). This pattern establishes the historic development of the town, and through examining the groupings of building based on their material, elevation, and proximity to the street we can begin to understand the *Genetic Plan Unit*. The rapid redevelopment of the town has removed many of the historic structures indicated on the older parcel maps, leaving most of the original architecture types scattered around the town. The new typologies are predominantly variations of reinforced concrete construction (both monolithic and frame).

In the development of this study, we endeavor to explain the urban study processes of both typology and morphology as applied to Beyarmudu. The goal is such results can be compared to other cities and help predict the changes anticipated for like cities under similar circumstances.

Figure 4. Colonial era village parcel map including military³

Acknowledgements

Our team would like to thank the administration and residents of Beyarmudu for allowing our team to learn from their history and lives. Additionally, Dr. Nevtar Zafer Cömert provided us with the background and encouragement necessary to complete this assignment.

This report was produced with the following software:

Microsoft Word 2016
Trimble SketchUp Pro 2017
ESRI ArcMAP 10
Autodesk AutoCAD 2017
Adobe Photoshop CC 2015
Adobe Acrobat XI Pro

The field equipment used for data collection included:

Sony PowerShot SX110 IS
Samsung Galaxy Mini-S
Apple iPhone 6

³ Ibid.

Pre-Urban Nucleus

Built on a Hydrographic Divide

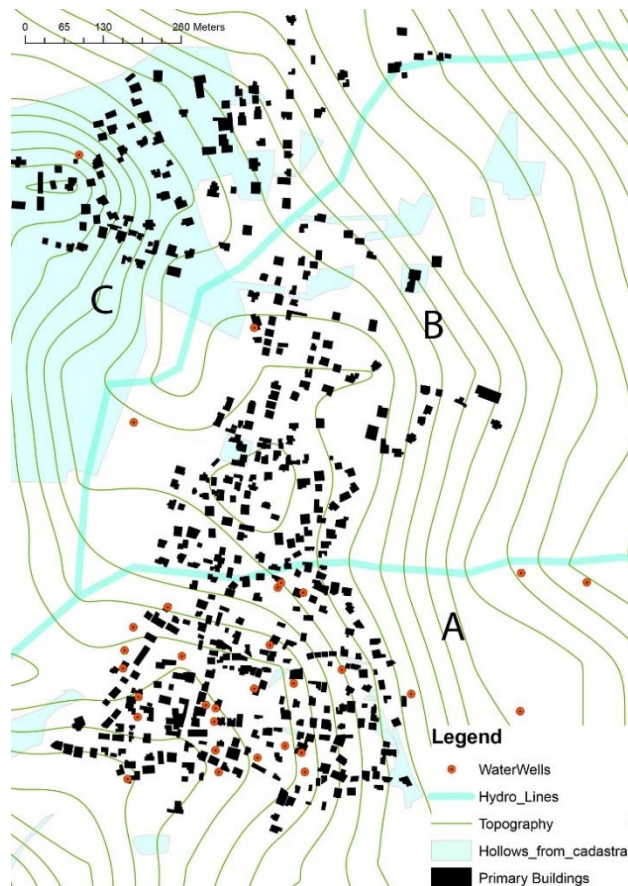


Figure 5. Site Hydrology and Topology

The initial layout of the town is strongly influenced by the immediate relief on the site. The central town was built on a hydrographic divide⁴ surrounded by a ring of arable land. This is a typical agricultural model of development of a pre-urban nucleus that would then dictate much of the form going forward.

As indicated in Figure 5, the central portion of the town – built relying on well water – was south of the wash that runs through the middle of town (section A). The second phase of growth, then relying on piped water, developed later onto a second slight hill along the north-south road (section B). The current new development is focused to the north-west across the north fork of the wash (section C). The figure-ground analysis indicates a marked awareness of the risk of flood at the north wash. This is different from the wash dividing A and B, for which the parcel map does not indicate any legal areas for protecting water-prone land from development (Figure 7).

The topography indicates the wash dividing C and B is considerably flatter, with associated drainage issues. This is consistent with what previous surveyors indicated as a marsh and would explain the lack of early development north of section B.

Hydrologically Influenced Street Pattern



Figure 6. Colonial parcel map showing location of "hollows" and water wells

A latent clue to the city's development pattern is in what is not built: the "hollows". Several locations in the British-era parcel maps include un-platted areas marked "H" for hollow. These areas were historically too low to build upon, as they would flood during significant rain events. The pattern of hollows indicates the pre-colonial town depended on the hollows for storm-water management, leading to an organic form of rivulets setting the street pattern.

⁴ Ridge or elevated land area which separates the direction of flow of streams and rivers. The division of the watersheds. Glossaries of BLM Surveying and Mapping Terms 1980

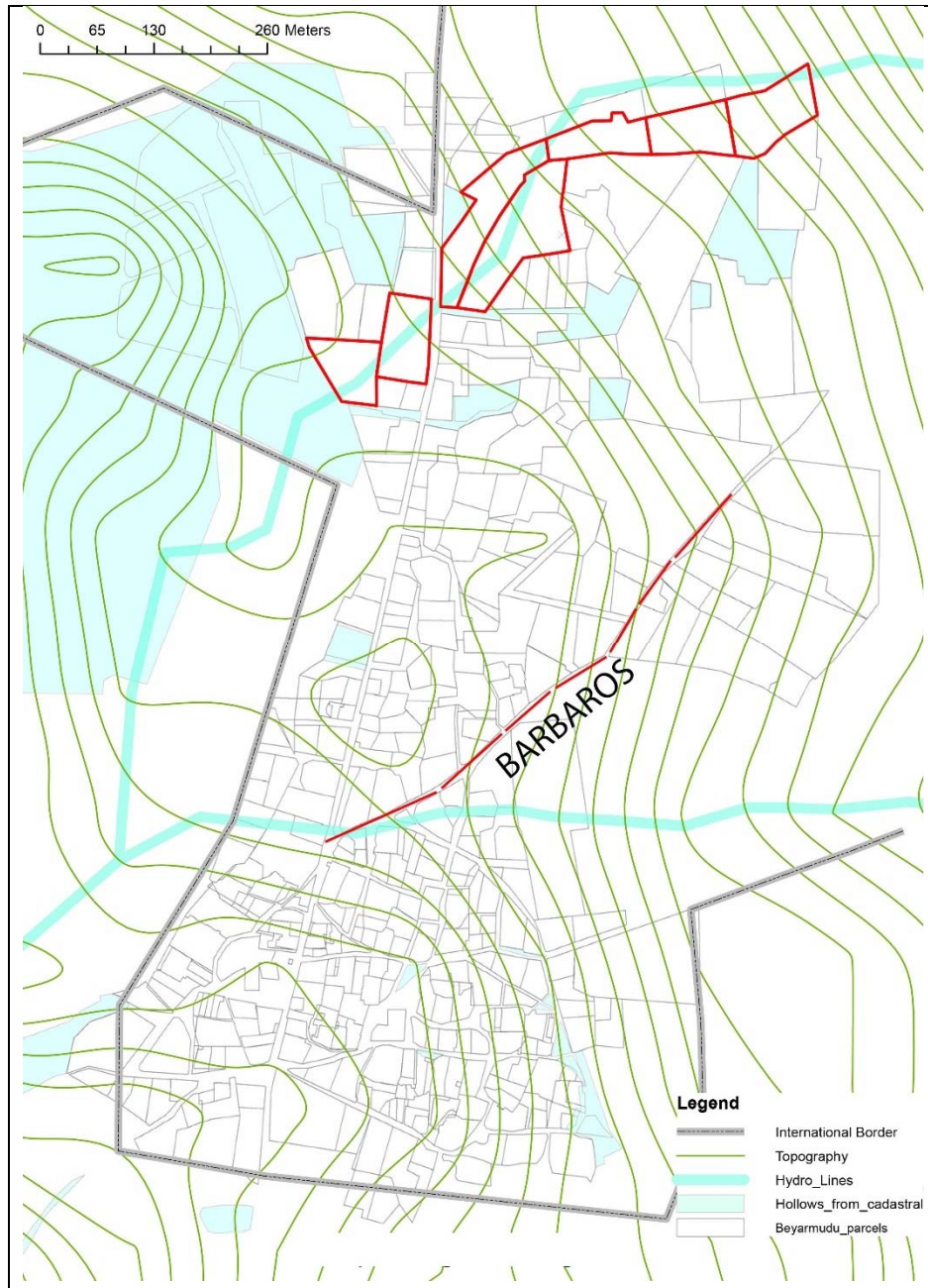


Figure 7. Flood areas and parcel pattern

Barbaros Road is laid out in exactly the manner of an irrigation ditch: it diverts water from a slow-moving section of a wash and heads gently downhill across the grain of the topography. The pattern of parcels on the east edge of town indicates a gravity irrigation tap off of Barbaros to flood crops. Given the large number of parcel-mapped hollows on the east edge of the old town, the fields immediately east of the old town were irrigated with run-off water from the residential roads of the old town itself.

Also clear from Figure 7, the area around the eastern extension of the wash that divides sections A and B was never platted, and held as high production agricultural land. The parceling pattern cups this draw. On the west side of town, the primary draw provides a similar, if less well-defined pattern of development as indicated by the sparse distribution of early wells shown on Figure 5.

Historical Building Analysis

As indicated on Table 1, the primary construction system is concrete built in the post-Ottoman era, with a minority of historic construction still visible. There are isolated examples of other construction systems, but for the purpose of this analysis they will not be considered.

Construction Systems

Primary Construction System	Total	Historical Period			Steps Elevated from Grade					
		Pre-Colonial	Colonial	Post-KKTC	0	1	2	3	5	7
Concrete	413	0	89	314	205	1	92	3	96	15
Adobe	55	52 ⁵		3	50		5			
Fired Brick	5		3	2	5					
Ashlar Stone	1	1 ⁶			0					
Pre-Fabricated	1			1					1	
Steel Frame	1			1	1					

Table 1. Buildings period and elevation from grade

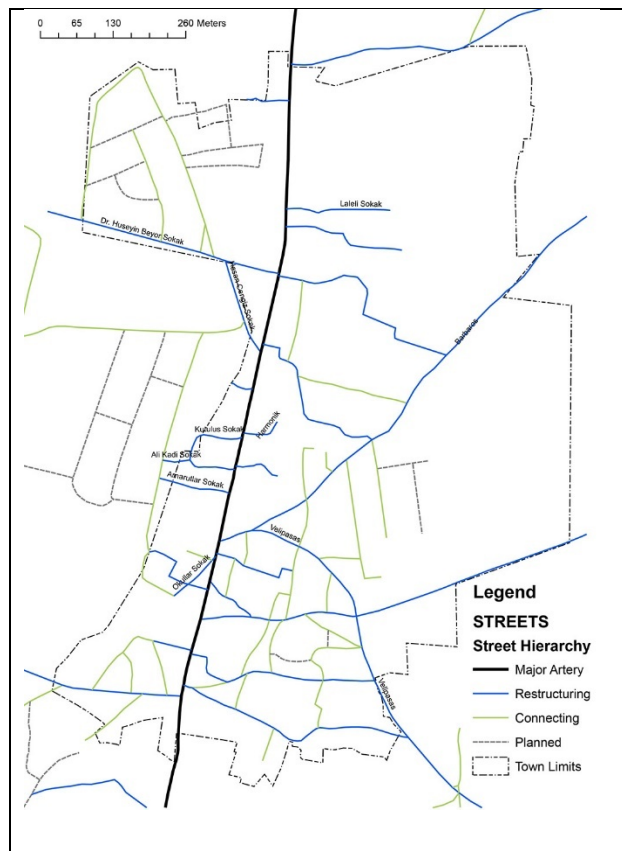


Figure 8. Street Hierarchy

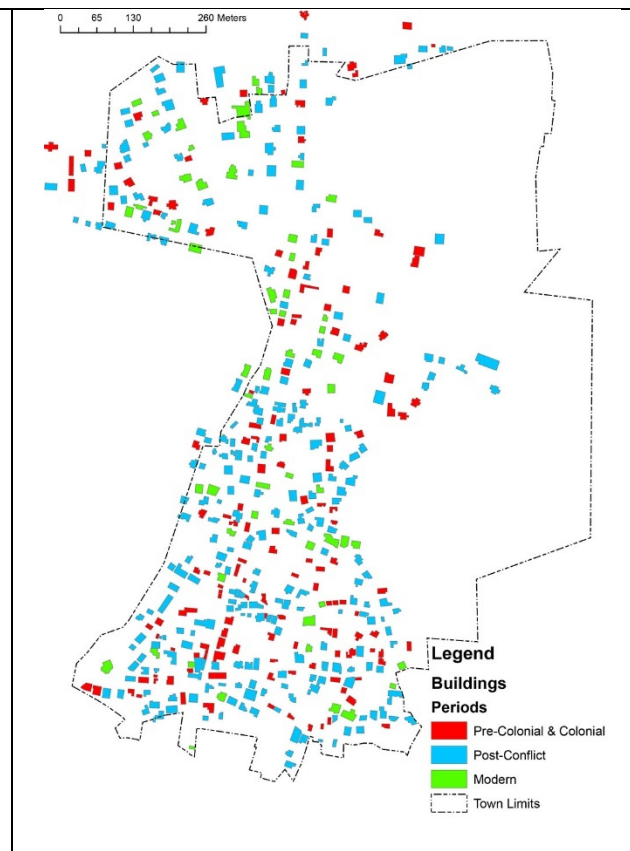


Figure 9. Building periods

⁵ The era of adobe and stone construction could not be determined with this study's methodology

⁶ Ibid

Beyond some clustering of older structures in the old town, there is little influence from the vertical construction on the definition of plan units (see *Figure 31* and *Figure 35* in the appendix). By evaluating the street hierarchy, the persistence of a pattern begins to emerge when combined with how buildings—old and new—have continued to relate to the street on which they front.

Elevation and Setback

More than half of the concrete buildings are 3.5 to 4 meters set back from the street line, but as with the elevation from grade, there is no definitive geographic pattern.

Adobe construction is typically at grade with 30 percent built at the street edge and 51 percent built within one meter. Only 27 percent of those with near set-backs are located in the older part of town.

When only looking at buildings with zero or one steps and with a setback less than 3 meters (*Figure 10*), a pattern emerges. The buildings that follow this pattern largely appear on the restructuring roads Sht. Esat, Sht. Erol Hocalar, and Ogretmen Ismail Sokak. With this pattern in the old town, the kernel of the lot type ratio becomes apparent.

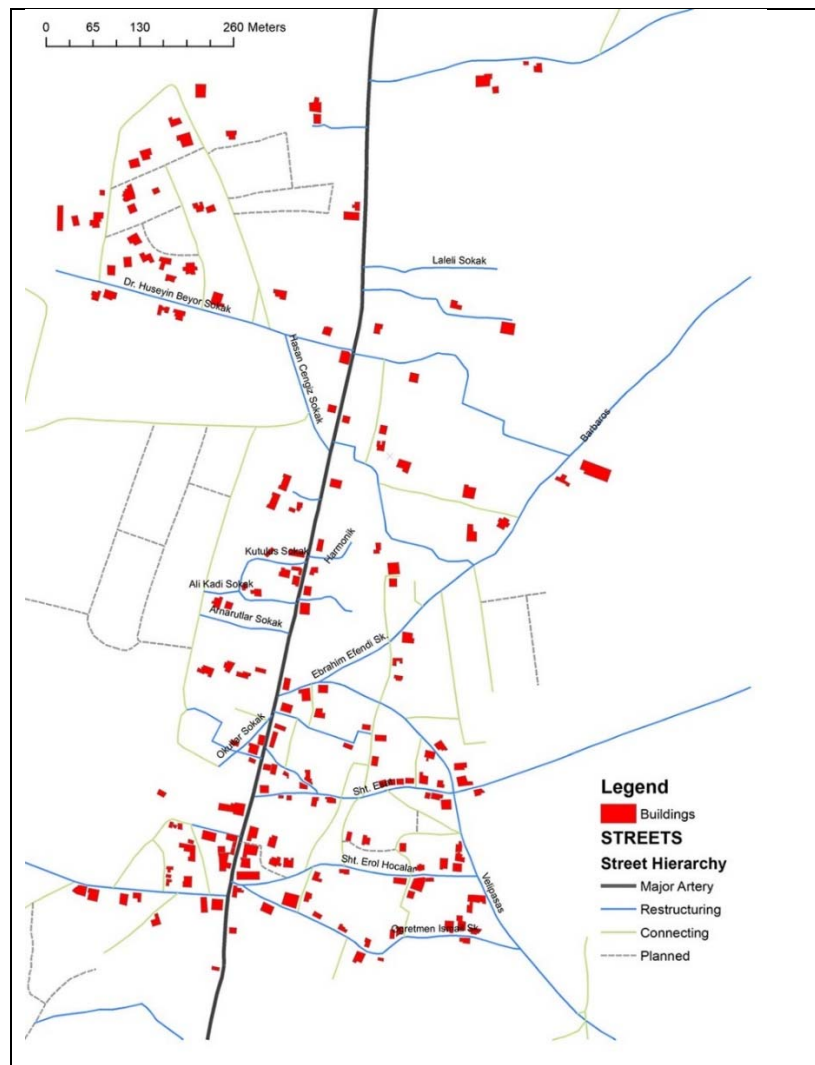


Figure 10. Buildings with less than 2 steps off grade and setback less than 3 meters

Morphology of the Town

The three systematic form complexes composing the historic townscape of Beyarmudu are the relief, the typical land use, and the genetic plan units. The pre-colonial vertical construction of the town has been largely purged, leading the team to rely on comparison of the street and parcel patterns (Figure 10) to identify the morphological regions of Beyarmudu.

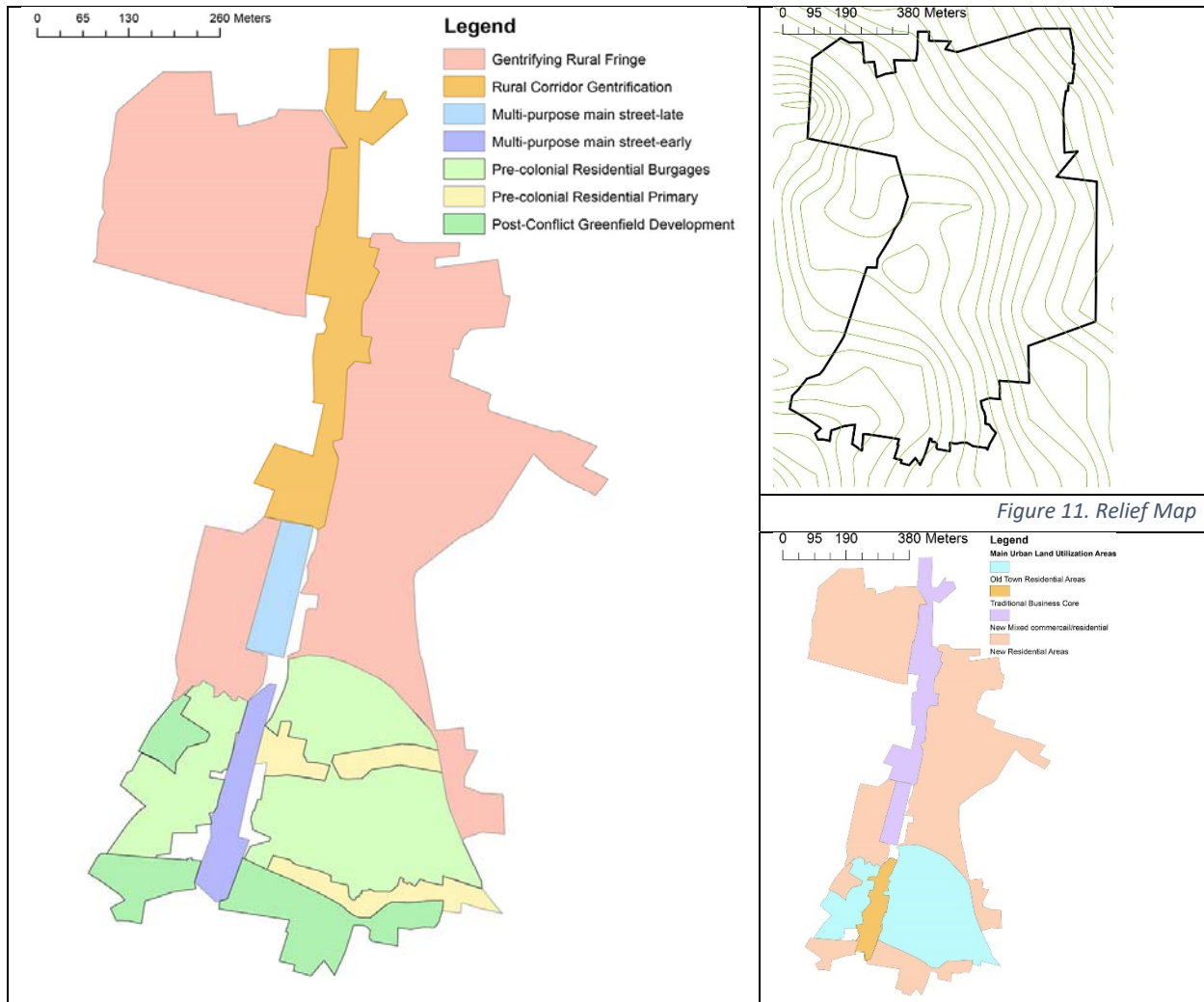


Figure 12. Genetic Plan Units

Figure 13. Main Urban Land Utilization Area

The site analysis did discover that two streets in the old town had a regular relationship with lot dimensions, setback from the street, and elevation from grade. These two streets are the original genetic urban unit of residential development in Beyarmudu. The water wells in this area are consistently to the rear of the building. The intervening subdivision between the two roads is likely a manner of burgages that developed as families grew. The street pattern indicates that these secondary subdivisions were aggregated on social paths, and did not follow the prime drainage patterns (Figure 7).

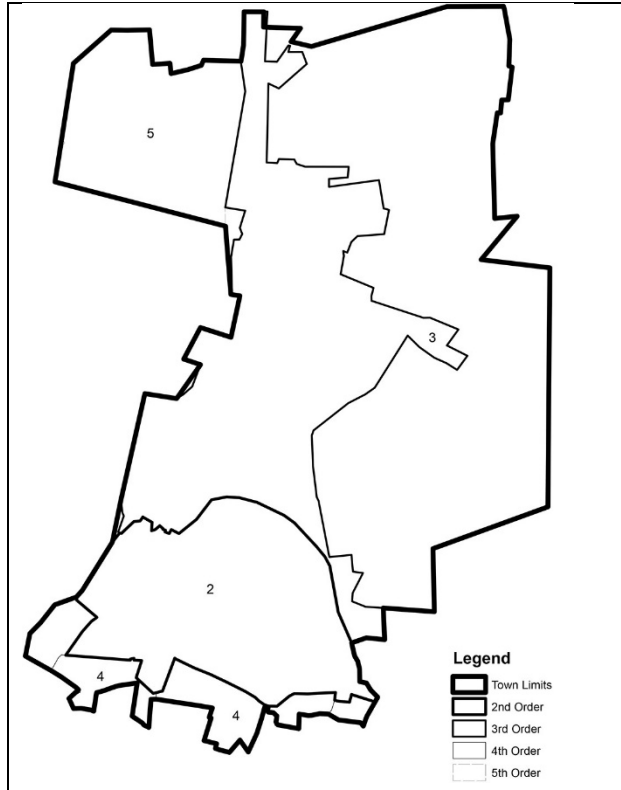


Figure 14. Generic plan type areas

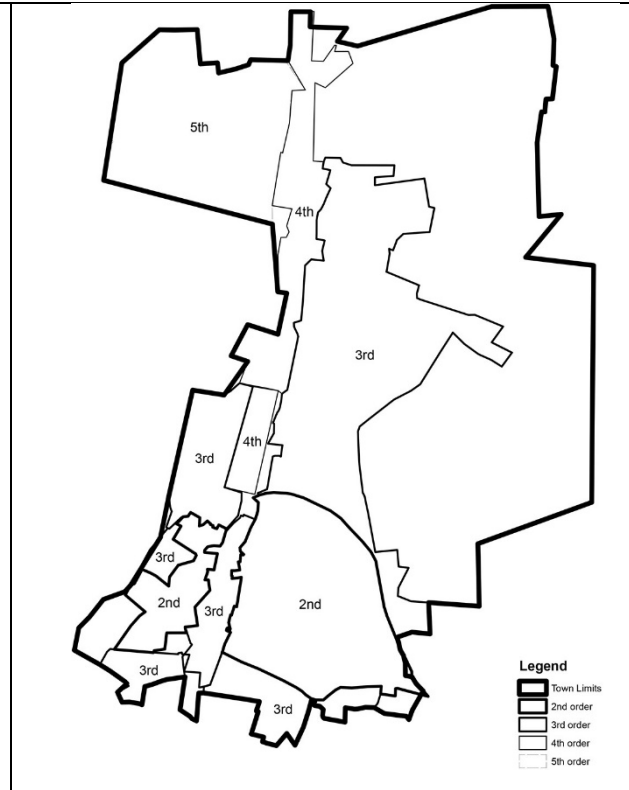


Figure 15. Main urban land utilization areas

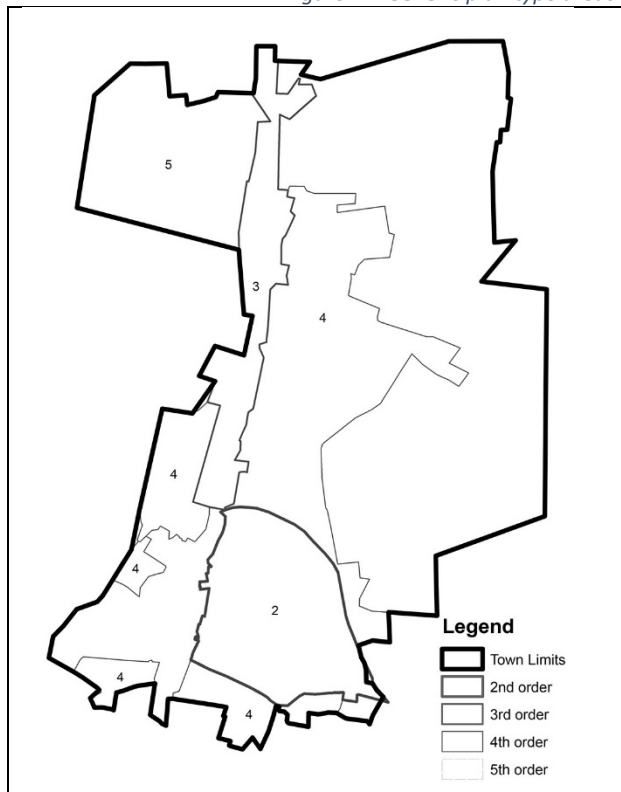


Figure 16. Morphological regions

The early influence of hydrology to the town is the single greatest clue to the morphology of Beyarmudu. This initial pattern established the logic of the streets, then the lots facing those streets. Beyond the main seams of the restructuring roads, the 2nd order region is a rich tapestry of subdivisions to account for marriages, 2nd sons, and the like. Later development was required to work into a parcel pattern fundamentally amorphous in the third order and in the 4th, because both were early greenfield parcels drawn on the land without regular geometry. The end result is a sprawling suburb that is quickly out-growing reasonable walking distance to get to the commercial core, the school, and public square. The surprising institution fringe is found at the new mosque in the southwest corner.

The logic of the town's plan, building fabric, and urban land utilization is summarized on Table 2:

Systematic form complex	Degree of form persistence	Morphological periods	Morphological constituents of historical stratification	Contribution to hierarchy of townscape regions
Town Plan	Maximal	1573 (earliest record of Pergamo)	Hydrology-based design for town-siting and street system	High rank (major genetic plan unit) Intermediate rank (main street plan unit)
		Colonial (early-mid 20 th cen.)	Extension of development north of south-fork wash	
Building Fabric	Less durable early periods, more durable in recent years	Pre-Colonial (pre-1900)	Considerable number of mud brick constructions still existent	
		Colonial (early-mid 20 th cen.)	Many concrete replacement buildings following set-back requirements	
		Post-Conflict (1974-1990)	Early green field development on the immediate old town perimeter	Intermediate/low rank (morphotopes)
		Modern (1990-)	Predominantly concrete frame with tile infill buildings, few examples, but construction activity is increasing	Lowest rank (morphotopes)
Urban Land Utilization	Minimal	Pre-Colonial (pre-1900)	Major land use areas (business core, residential areas, farmland)	
		Colonial Pre-Colonial (early-mid 20 th cen.)	Considerable subdivision of original lots	
		Post-Colonial (1974-)	Gentrifying Rural Fringe	Intermediate rank (morphotopes)

Table 2. The systematic form complexes as morphological regulators in Beyarmudu

Matrix Street Building Typology

One perspective on the morphology of a town is to document the change in building type. A low-resolution technique that yield results for Bayarmudu was to compare the fenestration ratios and building materials. Morphological periods can be distinguished by construction, and the matrix street study area has highest integration of morphotopes. While there are a number of one-off variants that express a unique character, they are outnumbered by the types which fall into pre-colonial, colonial, and post-colonial ranges.

Pre-Colonial Type



Figure 17. by Jason Winn

Several examples exist of the adobe construction relying on full height multi-light doors on the street side, and eschewing windows.

Where they do have windows, they are tall multilight windows, essentially glass doors with a sill installed above entry level (Figure 19). This is indicated of buildings that intended to be naturally cooled: very large fenestration ration to façade, and high ceilings to allow hot air to rise to a transom window over the door.



Figure 18. by Jason Winn

This construction type weathers poorly when no facing material is maintained (Figure 17 and Figure 19). A more recent modification has been the application ceramic tile manufactured in faux stone pattern (Figure 18).

Given the predominance of wood roof framing, the original roofs were gables. Overtime, these buildings have received concrete bond beams on the wall tops to allow for retrofitted reinforced concrete roofs.



Figure 19. by Jason Winn



Figure 20. by Jason Winn

Colonial Type



Figure 21. by Jason Winn



Figure 22. by Jason Winn



Figure 23. by Jason Winn

In addition to the mandatory setbacks, colonial period architecture was commonly monolithic reinforced concrete. Such was considered a “properly modern” building but morphologically was very similar in profile to its adobe predecessor it replaced. The key difference is to be found in the windows.

Large pane glass presumes a quality road network over which to transport them, a shipping logistics that is not available prior to the colonial period at reasonable cost. A window height to width ration of 1:1 indicates the turn of the century construction with typical pair of 1:2 shutters.

Installed lights will usually be 1/3 of the opening, with floating hinged to another on a single casement single-barrel hinge.

In addition to the tradition of single-barrel hinge windows in the 1/3 ratio, the 1:1 header dimension is one of the easiest to build rough in concrete, and shim wood window frames into place to account for the rough condition.

Post-Colonial Type



Figure 24. by Jason Winn



Figure 25. by Jason Winn



Figure 26. By Jason Winn

The concrete frame with fired-clay tile system typical to Turkey became a common practice as immigrants from Turkey arrived needing housing. Such construction is not genetically related to the preceding periods, and is characterized by large vertically oriented floor to head-height windows that can be used as doors, or happen to be doors (Figure 24, Figure 25, Figure 26).

Post-colonial concrete construction does not adhere to the 1/3 light in a 1:1 header. The typical fenestration is horizontal bay-windows permitted by concrete frame construction with its reinforced beams. The 2:1 horizontal sliding sash window is typical of factory manufactured fenestrations.

Characteristic of the later modern buildings is their floor-to floor height: a presumption of air conditioning. Shallow ceilings made of concrete tend to absorb and transmit heat to the occupant's heads, necessitating mechanical cooling.

Conclusion

Geographically, Beyarmudu's urban fabric is evolving in a random way dictated by an early parcel pattern established to support an agricultural economy of small farmsteads. The newer developments in the north-west corner of town are the first example of organized subdivision development. Future efforts in urban design should capitalize on the character of the higher-density old town. With considerable plat revisions, the opportunity for detached single family construction can be directed towards the burgages along the connecting roads. Any new green-field developments need to flow from the matrix road to ensure access to retail, services, and infrastructure.



Figure 27. Pre-colonial. Photo by Jason Winn



Figure 28. Colonial. Photo by Jason Winn



Figure 29. Early modern. Photo by Jason Winn



Figure 30. Late modern. Photo by Jason Winn

About the Author:

Jason Winn is a registered architect with the State of Texas, certified planner with the American Institute of Certified Planners, and certified energy manager with the Association of Energy Engineers. He has practiced architecture and urban planning in San Antonio and Chicago for 13 years and is currently studying urban design at the Eastern Mediterranean University. Read his research on storytelling and persistence in the built environment at blog.SpacePoetics.com

Appendix

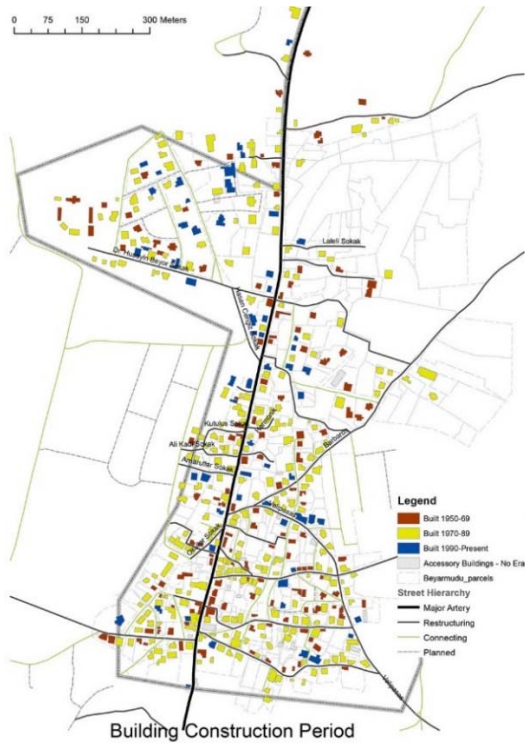


Figure 31

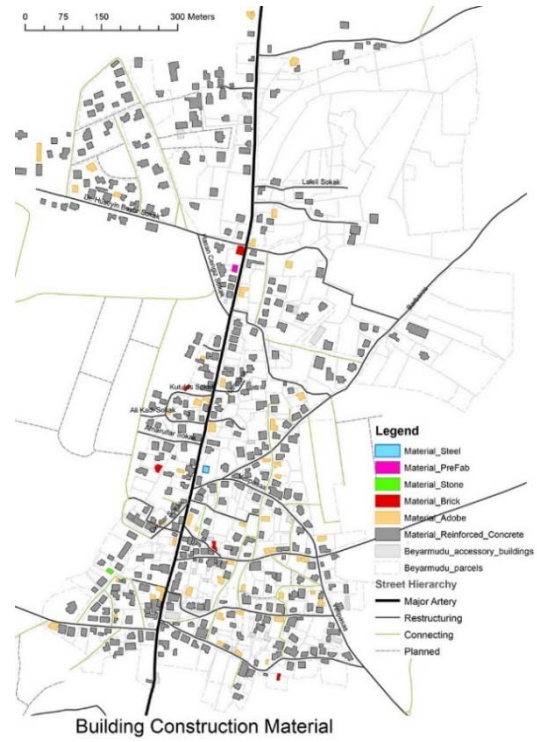


Figure 32

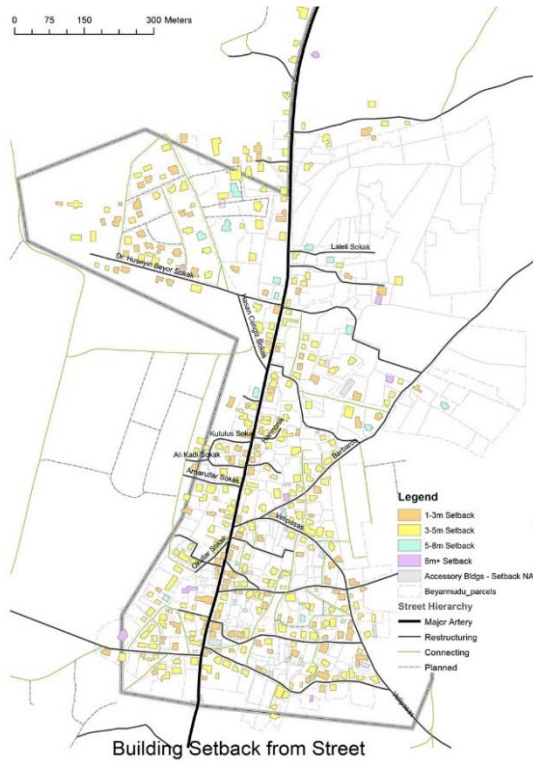


Figure 33

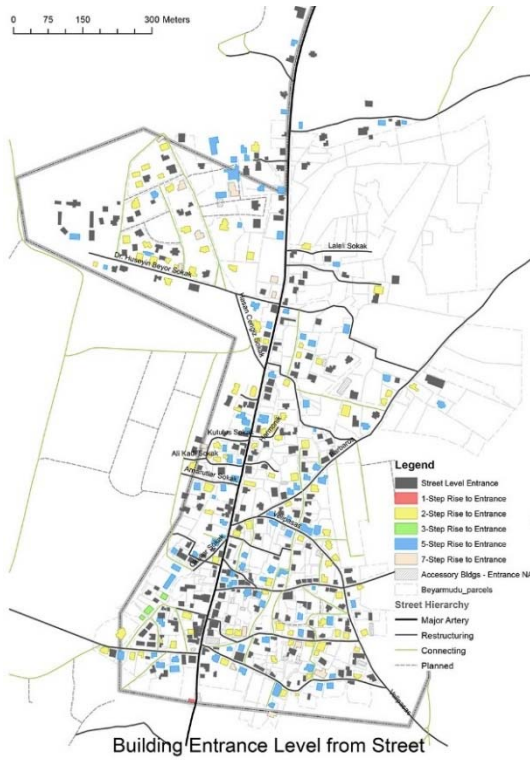


Figure 34

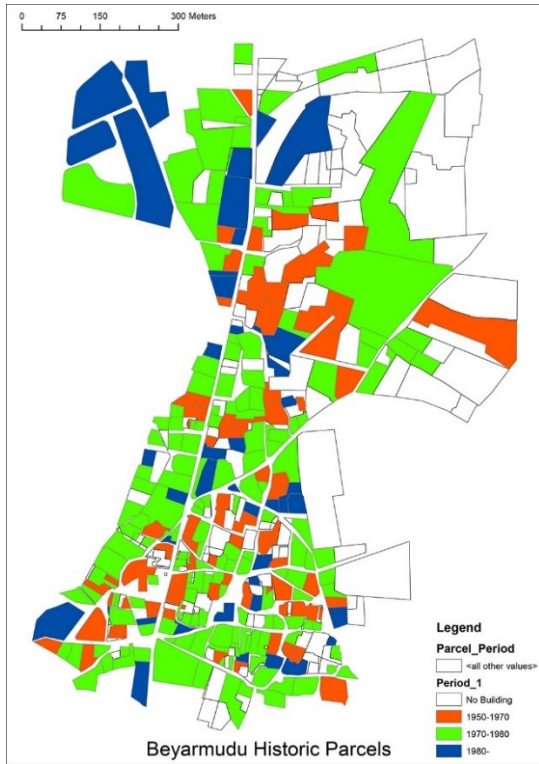


Figure 35

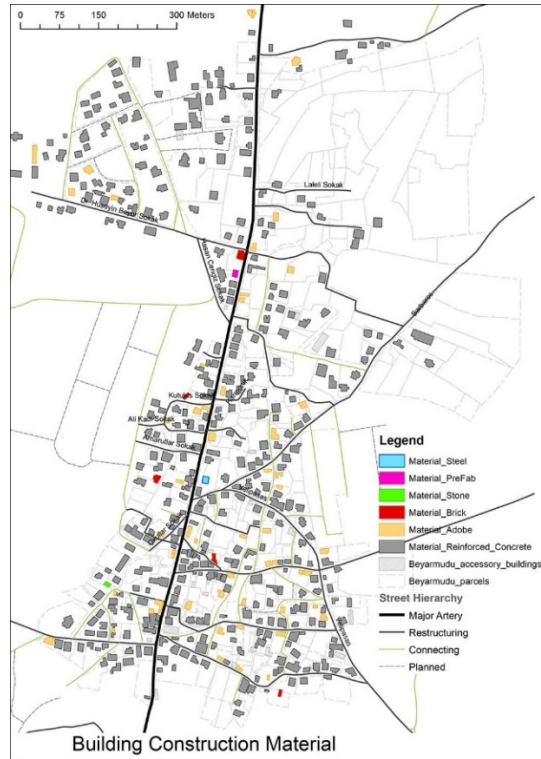


Figure 36

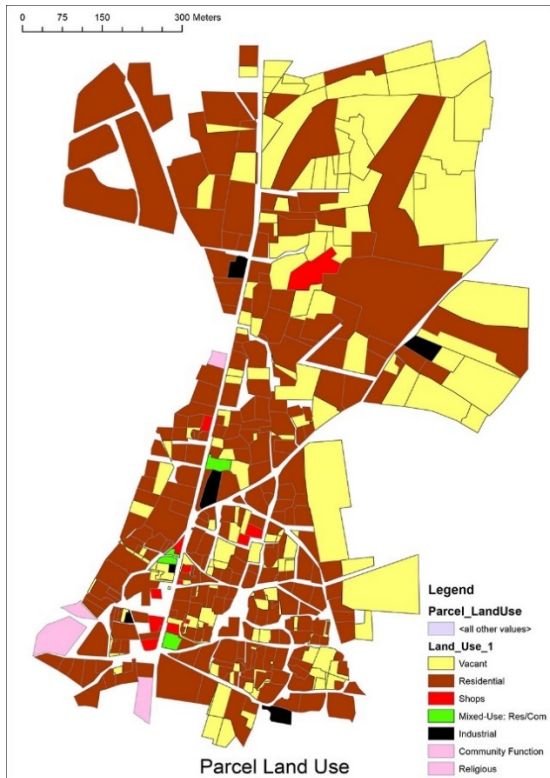


Figure 37

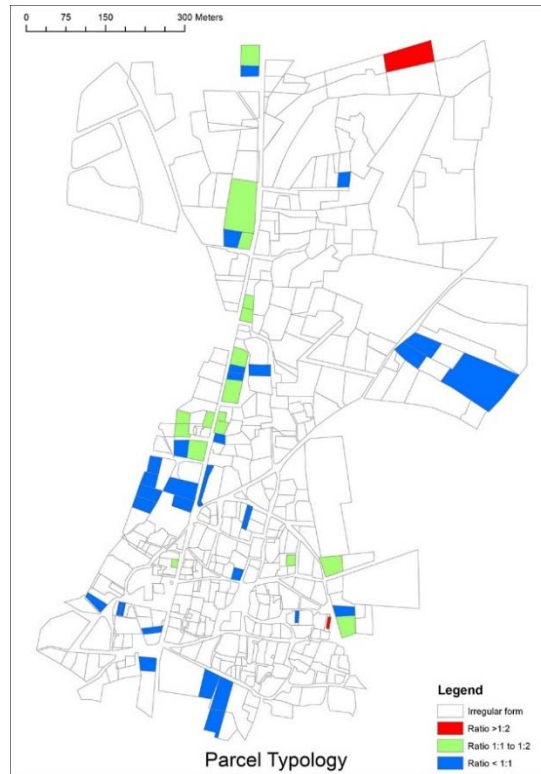


Figure 38