INSTITUTE OF SCIENCES

DEPARTMENT OF ARCHITECTURE

EVALUATION OF HOTELS IN TERMS OF SUSTAINABILITY AND GUESTSATISFACTION: IN THE CASE OF CAPPADOCIA

A Dissertation

Submitted by

ROZA SABER MAAROF

in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

February 2019

Program: Architecture

EVALUATION OF HOTELS IN TERMS OF SUSTAINABILITY AND GUESTSATISFACTION: IN THE CASE OF CAPPADOCIA

A Dissertation

by

ROZA SABER MAAROF

Submitted to the Institute of Sciences and Engineering of

OKAN UNIVERSITY

in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

Approved by:

Prof. Dr. Nur Esin
Supervisor

Prof. Dr. Demet Irkli Eryildiz

Prof. Dr. Gül Koçlar Oral

Dr. Demet Mutman

Dr. Baharak Tabibi

February 2019

Program: Architecture

ABSTRACT

Numerous hospitality experts do not have an unmistakable comprehension of how sustainability and service quality fit together in the built environment and how these choices influence guest satisfaction. In hotels, style and comfort are two key factors that add to a guest satisfaction encounter: yet sustainable design is frequently thought to be not good in appearance and uncomfortable then again the design, style and comfort of built hotels influence guest satisfaction, and the likelihood of coming back to or prescribing a hotel. The service quality in the hotel industry has everything to influence a fantasy to work out as expected. Be that as it may, the most critical thing is that customers are fulfilled after their stay so hotels must take care of customer demand; in this manner, the essential focal point of this investigation is to evaluate guest satisfaction with sustainable highlights of their rooms and also their overall view of their hotels. Because of the reality of Cappadocia that fundamental concerns of the hotels there on vernacular style, yet the city has been decided for advance examination keeping in mind the end goal to direct how they design sustainable and service quality hotels in their vernacular setting. Hence, this investigation recognizes green environmental characteristics in hotel service environments in light of vernacular architecture. Along these lines, it is vital to look at traditional Cappadocia architecture so as to enhance contemporary sustainability and, therefore, make a style that is neither authentic nor new, yet is roused by the past. Along these lines to accomplish proposal's targets the useful investigation expected to comprise of three sections:

The First section: An inside and out writing audit was directed to distinguish sustainable and guest satisfaction design highlights of premium hotels, and significant design clashes between the twin objectives.

The Second part: which to investigate the idea of sustainability characteristic in Cappadocia's vernacular architecture, yet to combine the idea of sustainability a coordinated technique that connections Building Information Modeling (BIM), energy examination devices with Building Performance Analysis (BPA), have been chosen to recognize verification of consistence with ASHRAE 90.1 and ARCH 2030 benchmarks. Consequently, three unique cases were chosen to distinguish and dissect green design that makes a sustainable environment.

The Third Part: To quantify the vacationer's recognitions on guest satisfaction toward markers identified with the service quality in the hotel, the most prevalent model is SERVQUAL with 7-Likert scale have been picked. In addition, it reports the distinction in the customer expectations and perceptions identified with the hotel services. Moreover, questionnaires were dispersed to the hotel sightseers to comprehend their impression of, while, factorial investigations are utilized to evaluate service quality and the effect of on guest satisfaction.

Key words: Hotel, Sustainability, Guest satisfaction, Service quality, Vernacular architecture, Building Information Modeling (BIM), Building Performance Analysis (BPA), ASHRAE 90.1, SERVQUAL

KISA ÖZET

Konaklama sektöründe birçok otel işletmecisi, sürdürülebilirlikle konforun birleştirilmesi ve bunun müşteri memnuniyeti üzerindeki etkileri konusunda yeterli bilgiye sahip değildir. Ust kalitedeki otellerde tarz ve konfor olumlu bir deneyimin iki kilit faktörudür. Ancak sürdürülebilir tasarımın genellikle konforla çelişebilecegi iddia edilir. Otellerin tasarım, stil ve konforu müşterinin seçimlerini, memnuniyetini, oteli tekrar ziyaret etme ve tavsiye etmesini etkiler. Lüks otel endüstrisi bir hayali gerçekleştirecek bütün donanıma sahiptir. Fakat en önemlisi müşterilerin konaklama sonrası deneyimleridir. Dolayısıyla oteller müşterinin taleplerini karşılamalıdır. Bu çalışmanın odağında müşteri memnuniyeti, odaların sürdürülebilir ve konfor özellikleri ve müşterilerin otele dair genel izlenimleri değerlendirilecektir. Kapadokya yöresi, barındırdığı otellerin geleneksel tasarım konusundaki hassasiyeti sebebiyle lüks anlayışının ve sürdürülebilir içeriğin bir arada sunumunun incelenmesi için seçilmiştir. Dolayısıyla bu çalışma, otel servis ortamındaki geleneksel mimariyi temel alan çevreci özellikleri belirleyecektir. Bundan ötürü geleneksel Kapadokya mimarisini incelemek çağdaş sürdürülebilirliği geliştirmek ve ardından ne tam tarihi ne de yepyeni olan bir stil yaratmak için önemlidir. Tezin hedeflerine ulaşmak için uygulamalı çalışma üç bölümden oluşur:

İlk bölümde seçkin otellerin sürdürülebilir ve kullanıcı konforuna ve memnuniyetine yönelik tasarım özellikleri belirlenerek ayrıntılarıyla değerlendirilir ve bu iki tasarım hedefi bir aradayken oluşan çatışmalar belirtilir.

İkinci bölümde Kapadokya'nın geleneksel mimarisinin özünden gelen sürdürülebilirlik kavramı keşfedilir. Sürdürülebilirliğin Yapı Bilgi Modellemesi (BIM) ile enerji analiz teknikleriyle Yapı Performans Analizinin (BPA) ilişkilendirilmesi sağlanır. Yapının uygunluğu ASHRAE 90.1 VE ARCH 2030 standartları ile doğrulanır. Bununla birlikte sürdürülebilir çevreyi sağlayan yeşil tasarımı ayırt etmeye yardımcı üç örnek irdelenir.

Üçüncü bölümde ise müşterinin hizmet kalitesi ve müşteri memnuniyeti üzerindeki algısı otelin konfor içeriğiyle ilişkili belirteçlerle ölçülür. Bu iş için en yaygın model olan 7-Likert ölçeğiyle SERVQUAL modeli seçilmiştir. Ayrıca bu bölümde otel hizmeti hakkında müşterinin beklentileriyle izlenimleri arasındaki farka da değinilmiştir. Otel müşterilerine değerlendirmelerini elde etmek amacıyla anketler dağıtılmış ve etmensel analizler hizmet kalitesini ve bunun müşteri memnuniyetine etkisini belirlemek için kullanılmıştır.

Anahtar Sözcükler: *Otel, Sürdürülebilirlik, Konuk Tatmini, Hizmet Kalitesi, Yöresel Mimari, Yapı Bilgi Modellemesi (BIM), Yapı Performans Analizi (BPA), ASHRAE 90.1, SERVQUAL*

Dedication To…

My family with great appreciation and love

ACKNOWLEDGMENTS

First of all, thanks, and all the praise goes to Allah, the lord of the world. I would like to express my appreciation and gratitude to a number of people who have been helpful in contributing to the completion of this dissertation. First Special gratitude is given to my supervisor Prof. Dr. Nur Esin for her guidance during the preparation of this study. Her words of encouragement and careful reading of all of my writing will never be forgotten, she is one of the rare advisers whom students dream they will find. And I would also like to express my deepest gratitude to the jury members Prof. Dr. Demet Irklı Eryıldız, Prof. Dr. Gül Koçlar Oral, Dr. Demet Mutman and Dr. Baharak Tabibi they were very helpful, guidance, encouragement, patience and useful comments during my study. Many thanks to my best professor Asst. Prof. Dr. Özlem Özer for her kindness and generous support.

I am grateful to the Erbil Government for generous financial support throughout the years of my graduate studies.

These acknowledgments would not be complete without mention of the University of Salahaddin Architecture Department, where my teachers, colleagues and students have supported and encouraged me since my initial proposal through my research and analysis until my investigation was completed. I greatly appreciate the assistance and advocacy of Dr. Muhanad Rassam & M. Nawzad Kakamand to whom I am intellectually indebted for their informative conversation on my work. Many thanks are extended to the field research crews and to all the persons in Erbil city who dedicated their time to participate in this work and always warmly welcomed my visits in their daily life during the field study.

Many thanks to my best friend Birsen Özsoy for her invaluable help to cope with foreing environment in Turkey.

Finally, these acknowledgements would not be complete without heartfelt thanks to my husband, who supported me in everything. His support, his care and commitment have made my completion of this study possible.

TABLE OF CONTENTS

LIST OF TABLE

LIST OF FIGURES

ABBREVIATION

United States Green Building Council's (USGBC)

Leadership in Energy and Environmental Design (LEED)

Building Information Modeling (BIM)

Building Performance Analysis (BPA).

Lifecycle Assessment (LCA)

Building Research Establishment Environmental Assessment Method (BREEAM)

American Society of Heating, Refrigerating, and Air-Conditioning Engineers, (ASHRAE)

Industry Foundation Classes (IFC)

Extensible Markup Languages (XML)

Green building Extensible Markup Languages (gbXML)

American Automobile Association (AAA)

I.INTRODUCTION

The hospitality and tourism industry is a major monetary division on the planet and generates vital social advantages. Regardless of numerous difficulties incorporating moderate monetary recuperation in numerous nations, the quantity of global entries has expanded by 5% by and large since 2010, and as indicated by the UNWTO, is gauge to achieve 1.8 billion by 2030 (Sustainable Tourism Program, 2015). The serious development of this industry can lead to genuine natural and social issues, which will make many challenges for sustainable advancement. In particular, hotels work in a sustainable way, where, as indicated by estimates, hotels have the most negative effect on the environment in all business structures (Chen, Legrand & Sloan, 2009:2). This pattern towards sustainable hotels not only addresses ecological interests by saving energy, water, and assets, but also at the same time is relied upon to enhance gest satisfaction and comfort (Becker 2009; Millar & Baloglu2008). Guest satisfaction, determination to return, and the probability of recommending the hotel is critical elements for accomplishment in the hospitality business. In any case, there is frequently a view of some contention between guest satisfactions, comfort and green building performs in hotels that seek to sustainability. As indicated by Kirk (1995), this may emerge because of the preservation of assets, including water and energy, which could bring down a visitor's involvement and comfort. For example, qualities of hotel’s services are large roomier and incorporate extravagant or outlandish materials, advanced lighting that feels warm and welcoming, and restrooms with expansive baths and various shower-heads (Schor 2008). These quality of services highlights appear differently in relation to the sustainable design development where a portion of the key components of sustainable design are: use less space when conceivable; materials and non-exotic items, recycled, natural, or rapidly renewable, the most energy-saving lighting cuts, (McLennan, 2004). For this reason, the quality services in hotel industry focuses on the experience of the guests alongside their satisfaction and the visitors who have high expectations. Guest satisfaction in the hotel might be challenging as the experience of service qualities varies alone and is very private (Danziger, 2005). Given that guest satisfaction is very private and closely identified with every individual's expectations, dreams and about ways of life, it is hard to determine about create a guest satisfactory hotel experience. While, the design, style and comfort of hotels built in hotels change the visitor’s favorite of hotel experience, satisfaction, and the possibility of visiting or recommending it. (Heide & Gronhaug, 2009; Kasim, 2004; Ramsaran-Fowdar, 2007; Skogland & Siguaw, 2004). Yet, Vito Lotta His revised explanation is “sustainability is tied in with satisfying our visitors' present dreams and wants without giving up what's to come ages' fantasies and wants. The goal is to accomplish sustainability without making it about forfeit” (Sheehan,200, p. 23).

As we know that the concept of sustainability is not a new or innovative term, but this concept is evident through vernacular construction in variant places in planet, the vernacular style lately turns into a famous character and model handled by construct engineers to design the hotel. In the tourism industry, the former culture has a strong influence on design as a sign of culture legacy (Hassan, 2000,6). The majority of this research is concentrating on the sustainable guest satisfaction condition and its association with vernacular architectural style; where we discovered ventures expecting to apply created methodologies of vernacular advances for safeguarding social vernacular traditions, in order to catch most visitors to the country.

From a similar point of view, an ongoing case of neo-vernacular architecture has risen up out of the astute utilization of innovation in accomplishing the appealing extravagances vernacular Gouna resort in Hurghada, Egypt. Supportable design answers for the congruity of the traditional composition environment can be seen in Turgut Cansever and Cengiz Bektaş works they are Turkish architects. At the turn of the 21st century the United States Green Building Council's (USGBC's) Leadership in Energy and Environmental Design (LEED) models wound up acknowledged among building experts as an approach to separate fluctuating levels of sustainable building improvement through outsider confirmation (McLennan, 2004, USGBC, 2007). In July 2006, just two cabin offices in the United States had gotten LEED certification; be that as it may, by toward the finish of 2007 118 hotel areas were joined and endeavoring to accomplish LEED affirmation (Hasek, 2007). The USGBC noted in April of 2009 that 496 hospitality ventures were joined and taking a shot at accomplishing LEED accreditation (Coleman, 2009). Perceiving the gigantic development of sustainable building advancement and the LEED rating framework inside ongoing years, the hotel business has all the earmarks of being experiencing a noteworthy move in qualities and an eyewitnesses of this move trust that guest satisfaction portion is driving the way (NEWH: The Hospitality Industry Network, 2007). Building Information Modeling (BIM) devices enable clients to do finish energy examination and investigate diverse energy sparing options for existing building and amid the design organize. BIM's device is tweaked to permit its incorporation with Building Performance Analysis (BPA). This exploration recognizes green environmental properties in services qualities of hotels in view of vernacular architecture. The analysts in this way directed three cases investigation of the hotel in, Cappadocia/Turkey to recognize Verification of consistence with ASHRAE 90.1 and ARCH 2030 gauges while in the meantime furnishing their gest satisfactory with qualities of hotel’s services.

1.1. The Research Problem

Architects have started to give careful consideration to lessening the effect of their buildings on the environment, contrasted with different items. It is hard to assess environmental buildings since they are vast and complex in the materials models. Likewise, fabricating forms are less institutionalized than most customer items, in view of the test with the hotel business is that it works 24 hours every day, 7 days seven days, 365 days a year, with guests expecting certain quality of hotel’s services, for example, eateries, fitness focuses, and spas. While travel and tourism industry is developing quickly, World tourism is relied upon to increment by 179% and will build guests' evenings by 156% by 2035 (UNEP, 2010). This raises the issue; in what capacity can the business be sustainable yet keep up the level of guest satisfaction that guests expect while remaining at a hotel. For these reasons, sustainability and its design implications should be considered at the beginning of each new structure, especially the strategies of vernacular architecture, it uses local solutions for gaining environmental sustainability. Because of a step toward tourism, which is one of the most important industries around the world and fast growth, Cappadocia's hotels have been chosen as case study, it is one of the most important centers of historical, natural and cultural attraction in Turkey. This is caused more attention to simulate sustainability for the hotels of this context of vernacular architectural style and test the perception of the guests toward indicators related to the guest satisfaction.

1.2. Purpose and Objective of the Research

The primary focus was to simulate the ecologically sustainable design solutions used in the context of vernacular architectural style at Cappadocia's hotels. Assessing guest experiences and their general view of the hotel is another focal domain. A survey of withdrawing guests was produced to investigate guest satisfaction for quality of hotel's services used in the context of vernacular architectural style in Cappadocia's hotels. This research looks at how sustainable building characteristics influence guest satisfaction and impression of quality of hotel's services. It is hypothesis that, the qualities and traits of guest satisfaction can be seen as clashing with the qualities and properties of sustainable design. Thus the purposes and objectives of the research are as follow:

(A) To examine the main goals, which are conflicts between the twin objectives of accomplishing sustainability in the meantime giving an environment high quality comfort for guest satisfaction;

(B) To simulate the concept of sustainability in the context of vernacular architecture as a strategy, to be a reference for sustainable hotels in present time and the future.

(C) To test guest satisfaction toward indicators related to the quality of hotel’s services based on vernacular architecture in Cappadocia.

A. The sub-objectives for achieving sustainability are:

(A.i) Review of the relationship between man and the environment and maintain to extraction the principles of sustainability in the vernacular building via documents, comparing vernacular architecture and their solutions in response to various climatic conditions, to create and increase a general attention towards of vernacular architecture.

(A.ii) Integrating BIM System and (BPA), in an attempt to maximize the benefits from this synergy and achieve the most sustainable constructions as well as covering the three pillars of sustainability.

(A.iii) Compare the sustainability in architecture with the sustainability in vernacular architecture.

B. The sub objectives for achieving guest satisfaction are:

(B.i) To recognize the key design for quality of hotel’s services that can elevate a hotel’s guest satisfaction status.

(B.ii) To search guest satisfaction for quality of hotel’s services arrangements utilized in the context of vernacular architectural style in Cappadocia’s hotels.

(B.iii) To obtain the overall guest satisfaction which are the correlation between the expectation of the level of service (before the buy) and the apparent service (after the buy)

1.3. Research Question

Since the qualities and characteristics of guest satisfaction can be seen as clashing with the qualities and traits of sustainable design, **thus the research seeks to answer the accompanying inquiries:**

What are the international norms and tools to calculate sustainability?

What are the parameters of the service quality for hotel design?

How to measure the sustainability for the hotels?

Do the qualities of hotel's services affect guest satisfaction?

What are the main features of vernacular architecture, and their sustainable strategies?

Is it conceivable to join sustainability and guest satisfaction with regards to vernacular architectural style?

1.4. Research Hypothesis

This research assumes that the qualities and characteristics of guest satisfaction can be seen as clashing with the qualities and properties of sustainable design. So the absent of relationship between the sustainability in architecture with the sustainability in vernacular architecture motivate our study. For those reasons this study examines the following hypothesis see Table: 1.1.

Table I.1. The Research Hypothesis

Proposed Hypothesis	
Number of Hypothesis	**Statement of Hypothesis**
Hypothesis I:	It is conceivable to join sustainability and guest satisfaction in hotels inside the setting of vernacular architectural style.
Hypothesis II:	Simulating the concept of sustainability in the context of vernacular architecture achieves Verification of compliance with ASHRAE 90.1 & ARCH 2030 standards.
Hypothesis III:	There is a positive connection between guests' overall satisfaction level and quality of hotel’s services practices.
Supposition IV:	There is a positive connection between the sustainability in architecture and the sustainability in vernacular architecture.

1.5. Methodology

The contextual investigation approach is a test inquires about that researches that wonder in its actual setting (Yin, 2002). The contextual analysis additionally takes after a hypothetical way to deal with replication that produces conflicting outcomes for unsurprising reasons (Groat and Wang, 2001). Picking contextual analysis technique was likewise upheld by information accumulation from various sources, illustrations and details of a building, designer archives, environmental measurements, and questionnaire; all must be utilized to gather the data required for getting the outcomes. As indicated by this system three cases were decided for the examination blended technique approach is utilized in this proposal. Since the proposed technique coordinates of sustainable building ventures in 3D with energy investigation frameworks and to know the overall satisfactions of the guests the improvement executed through the accompanying stages:

Stage 1: Include of drawing the three-dimensional building pattern using Revit program detailed by Autodesk (Autodesk, 2017). Under correct conditions as it was attracted up AutoCAD 2D. It implies considering architectural subtle elements, including designed openings and other specific conditions, outside windows and all dividers had particular measurements and distinctive conditions as per unique plans.

Stage II: Spotlights on redoing BIM's instrument to fit the coordination prerequisites with building performance analyses (BPA) the proposed method.

Stage III: Following the architectural modeling there is requiring defining energy suppositions for the whole undertaking and particular inside conditions. At that point, the location and more appropriate where at station are chosen for characterizing outer limit conditions. Also, enthusiastic spaces with exact conditions were made for all rooms and indoor spaces, which were assembled into primary zones for setting up worldwide heating and cooling conditions. Moreover, singular heating and cooling estimation and 3D energy show were produced on Revit before running the energy examination. Revit tells if there are issues on the connection among spaces and energy zones, which must be settled before to proceed with the procedure.

Stage IV: Includes the age of the energy display bundles all design data and limit conditions in a solitary gbXML record, which will be tried on the GBS cloud-based program. A positive alarm is creating by Revit once the investigation is finished, and an energy report will be delivered. Also, solar and indoor daylight investigation was finished utilizing an introduced module accessible for Revit, which utilizes cloud and nearby computations for show each examination separately.

Stage V: Hotel guest satisfactions were estimated with a self-directed questionnaire, which was produced based on a writing audit and embraced to suit the particular highlights of a hotel setting. Among the service quality models for some specialists, Ramsaran Fowdar's (2007) scale is chosen as a fundamental model for this investigation since her model comprises of a rich wellspring of measurement items.

The measurement shows that developed included 62 quantifiable t items see Appendix-A-. As an establishment for questionnaire advancement, the SERVQUAL demonstrate was utilized. The survey comprised of four areas. The primary segment estimated guest satisfactions of hotel characteristics utilizing an adjusted SERVQUAL demonstrate. SERVQUAL depends on seven measurements of service quality, to be specific, 'Tangibility', 'Reliability', 'Assurance', 'Empathy', 'Environment', 'Technology' and Entertainment' is operational as two -62- item segments to quantify customer expectations and perceptions. Respondents were solicited to rate the level from significance before their actual experience of the hotel's service among -62- items in view of their expectations (E) along a 7-point Likert-type scale, with 1 set as 'strongly unimportant', 4 set as 'normal', and 7 set as 'strongly important' (in area 1 questionnaire). The utilization of 7-point Likert-type scale depended on Lai and Hitchcock's (2015). Multi day or a couple of days after the fact, respondents were solicited to rate the level from execution among -62- items in light of their actual experiences (perception, P) of getting a charge out of the hotel's services along a 7-point Likert-type scale, with 1 set as 'extremely poor performance ', 4 set as 'normal', and 7 set as 'excellent performance' (in area 2 of the questionnaire).

Area 3 asks into relevant general foundation data, and area 4 is utilized to quantify the overall satisfaction with the hotel services experienced. For each measurement, the SERVQUAL scale gives a score to customer expectations (E) and a score for customer perceptions (P) of service suppliers' exhibitions. As indicated by Parasuraman and his associates, the distinction between the two scores is service quality (Q). Q = (P-E) the way to improving service quality is to expand this positive whole score. The negative estimation of this whole score uncovers the dissatisfaction of customers. With reference to Lai and Hitchcock's (2015) rules, the significance traits in this investigation are independent factors and in overall satisfaction is dependent variable. Partial correlation was utilized on the grounds that there are countless and subsequently the consequences of various relapses may command few properties (in which coefficients are vast) along these lines causing different qualities fall into the low verifiable significance region. Besides, the correlation between the significance of each attributes and overall satisfaction is free of different correlations; in this way utilizing a partial correlation is more fitting for this situation since partial correlation just estimates the level of relationship between two factors, so partial correlation examination is more reasonable than relapse investigation for evaluating the impact of autonomous factors on subordinate factors (Hair, Anderson, Tatham, and Black, 1995).

1.6. Significance of the Research

Numerous hospitality experts do not have a reasonable comprehension of how sustainability and guest satisfaction may fit together in the built-environment. A great deal of research has been done on hotels identified with quality of service; consumer esteems, guest dedication and numerous different territories see Appendix-A-. However few examinations have been accounted for on guest satisfaction of sustainable highlights inside hotel environments with regards to vernacular architecture. This investigation will help hoteliers and their design staff to comprehend the connection between sustainable design and guest satisfaction, which depends on the strategies of vernacular architecture. In order to achieve the internal space of modern hotel buildings, in addition to the proper external environment. Thus, the concept of sustainability in vernacular architecture has already become a condition of designing any building in present and the future time, especially in hotel buildings. Table I.2. Show the previous study on designing hotels, sustainability practices and vernacular architecture.

Table I.2. The Previous Study Review

Authors name	The date	Study type	Title of the study	Purpose of the study	The study abut	Conduction of the study
Talal Mahmeed	(2011-2012)	Doctoral thesis	**(Opportunities And Challenges For Green Design Practice In The State Of Kuwait: An Exploratory Study Of Design Firm Perception)**	-To establish a baseline for green design practices in the State of Kuwait; -To investigate the possible challenges and opportunities of green design practice as perceived by architecture/ engineering firms; -To identify potential strategies for promoting green design practices in the country.	**Sustainability**	The ANOVA tests between the firm's experience and green design strategies showed significant difference on the frequency of applying sustainable site, water efficiency, energy savings, lighting, and IAQ strategies. There was also a significant result between firm's size and its frequency of applying water efficiency, energy savings, and lighting strategies.
Kathy Pui Ying LO	(2010-2011)	Doctoral thesis	**(Emotional Design for Hotel Stay Experiences: Research on Guest Emotions and Design Opportunities)**	The core argument is that design can influence guest experience and elicit pleasant guest emotions on three progressive levels: Actual Offerings, Augmented Offerings, and Experiential Offerings.	**Hotel Design**	The design emphasis increases in complexity with higher levels of hotel offerings, resulting in greater emotional impact that uplifts the level of guest perception from mere acceptance to satisfaction and memorable experience.

Nicole Bieak Kreidler	(2010-2011)	Doctoral thesis	**(An Examination of Green Environmental Attributes in Hotel Service Settings)**	-To construct a framework of green environmental attributes. -To develop an empirically validated measurement scale that identifies consumer perceived importance of green environmental attributes within a hotel service setting.	**Hotel And Green Service**	Three factors of green environmental attributes--physical design attributes, ambient design attributes, and behavioral attributes--were identified through a consumer survey of recent hotel guests. Through this study many opportunities for the advancement of research within the service environment have been recognized.
Cynthia L. Stacey	(1995-1996)	Doctoral thesis	**(The Integration Of Heritage And Sustainable Development In The Community Context)**	The research attempted to capture the essence of heritage and sustainable development in models which comprehensively define their meaning, critical analysis of the philosophical and decision-making tenets inherent in heritage-based community development programs in Canada, the United States and the United Kingdom	**Sustainability And Heritage In Community**	Research results clearly indicated that the heritage and sustainable development principles are the foundation components for the programs. The heritage principles serve as the underlying philosophical tenets and the ethical and strategic principles of sustainable development serve as the general decision-making tenets to be used when relevant and necessary in program operation.

Marwa Dabaieh	(2011-2012)	Doctoral thesis	**(A Future for the Past of Desert Vernacular Architecture)**	-To bridge the gap between desert vernacular architecture as a heritage and contemporary housing needs in desert vernacular settlements so as to allow for a fit between traditional and contemporary vernacular building values. -She has investigated how desert vernacular settlements are changing due to rapid change caused by technological, socio-cultural and socio economic factors.	**Vernacular Architecture**	Finally the thesis is an attempt to ring the alarm that signals that it is about time for individuals, researchers and decision makers to take the initiative and look seriously at creative solutions to protect the inherited desert vernacular architecture. It is still hard to predict the future, but what can be predicted is that there will be serious challenges if the current situation continues.
Ahmad Sanusi Hassan	(2010-2011)	Paper	**(Development of Successful Resort Design with Vernacular Style in Langkawi, Malaysia)**	-To Discuss resort design with an adoption of vernacular style in Langkawi, Malaysia. Three vernacular resorts are selected for the case study based on their different designs and locations	**Vernacular In Resort**	The study found that Kampung Tok Senik Resort is the best design for vernacular style's resort. This study is also able to indicate several critical factors in the analysis for improvement of the resort design in the future.

Jen-Son Cheng, Ta-Wei Tang, Hsin-Yu Shih, Tsai-Chiao Wang	(2016-2017)	Paper	**(Designing lifestyle hotels)**	This study investigated the process through which hotel operators design lifestyle hotels. Moreover, this study involved constructing an operational framework that adopted art as the basis for differentiation.	**Hotel**	The researcher revealed that in introducing art concepts into a hotel service system, hotels operators must attach a high level of importance to several key activities, including hiring a full-time executive artistic manager in the top management team to engage in innovation, integrating local culture and the natural environment into the design of an artistic services cape, catering to customers' needs, and adopting high-performance human resource practices.
Ar.Rupa T.Ganguly	(2015-2016)	Paper	**(Role of Vernacular Architecture of India In Green Building Design A Case Study of Pauni)**	This paper talked about one such 14th century settlement located in Paoni, achieving sustainability through planning, orientation, materials and architectural practices evolved from long time due to socio, economic and environmental factors.	**Vernacular**	The study of local vernacular architecture and lessons about climate responsive planning, techniques can be helpful to generate an approach towards green building design

Ab. Aziz Shuaib, Olalere Folasayo Enoch	(2013-2014)	Paper	**(Integrating the Malay Traditional Design Elements into Contemporary Design: An Approach towards Sustainable Innovation)**	Investigated that the elements of traditional design can play a significant role in establishing local identity for global positioning of the nation. Therefore, integrating these traditional design elements into contemporary design is seen as an approach towards sustaining the nation's heritage values as genius loci.	**Vernacular To Contemporary**	Illustrated by examples how these elements can be enhanced and sustained by integrating them into contemporary building designs either as direct or adaptive design.
Hadi Shahamat	(2013-2014)	Paper	**(Formal Sustainability in Traditional Architecture of Iran According To Five Principles of Traditional Architecture of Iran)**	Used an interpretive-historical research method whereby the principles of Iranian traditional architecture and sustainable architecture are compared. Despite the diversity of society at different regions and the variety of climates,	**Vernacular**	Proved the conformity of both architectures (i.e. traditional and sustainable) in the field of architectural form.

Kambiz Abharak Pour	(2014-2015)	Paper	**(The Role Of Sustainability On Improving The Function Of Hotel In Hot Climate)**	Investigated that Building a five-star hotel in coast Boulevard of Karoun and knowing its role on increasing tourists and passengers in Ahwaz (Khuzestan center) undoubtedly can result in economic development, improvement of urban spaces including entrances, plazas and streets, green spaces, lighting and public transport system.	**Sustainability in Hotels**	Insufficient number of five-star hotels depicts depletion in this area. In this article, the sustainable principles for building a five-star hotel are discussed.
Dr. Antony Wood	(2015-2016)	Paper	(**Rethinking the Skyscraper in the Ecological Age: Design Principles for a New High-Rise Vernacular)**		**New Vernacular For The Skyscraper**	The paper suggested ten design principles which, if adopted in skyscraper design, could result in tall buildings which are more appropriate to the place in which they are located physically, environmentally, culturally, socially and economically. In doing this, it promotes the need for a new vernacular for the skyscraper in each region of the world, and suggests this would have significant ecological, as well as social, benefits.

Sandeep Sharma and Puneet Sharma	(2013-2014)	Paper	**(Traditional and Vernacular buildings are Ecological Sensitive, Climate Responsive Designs- Study of Himachal Pradesh)**	Identified that the traditional architecture, buildings were designed to achieve human comfort by using locally available building materials and construction technology which were more responsive to their climatic and geographic conditions.	**Sustainability In Vernacular Architecture**	Learning from traditional wisdom of previous generations through the lessons of traditional buildings can be a very powerful tool for improving the buildings of the future. Traditional Architecture forms the back bone of social and cultural set up of the place
Samira Alidadi	(2016,2017)	Paper	**(Designing A Five Star Hotel With The Approach Of Sustainable Architecture In Bandar Abbas)**	designing a hotel obtaining practical needs beside its aesthetic aspects	**Designing Sustainable Hotel**	The results showed that the sustainable tourism can provide guidelines for accessing to a stable development in tourism and using the sustainable energy is emphasized. The concept of sustainable development is an important change in understanding the relationship between humans, their communications and nature.

1.7. Summary of the chapter

Hotels that have developed in the process (best service, cost savings, increasing guest satisfaction, and retaining local talent) that one achieving better results in attracting costumer. In any case, later on, the industry must keep on building on these things with a specific end goal to prevail with regards to move towards more sustainable model of efficiency driven development. However a standout amongst the most vital elements influencing the achievement of hotel administration in the present worldwide aggressive environment is the capacity to make distinction. In an environment like this, crafted by superior hotels relies upon their key reasoning and capacity to apply them. Plainly most human settlements have been sustainable through history. The specialty of living in congruity with nature and making the exquisite utilization of nearby materials and innovation lessens our weight on constrained energy assets and recoveries the environment from promote disintegration. The vernacular buildings furnish us with an awesome supply of characteristic and social legacy that demonstrates a genuine and advantageous association with the soul of a specific place. This relationship, interceded by learning and qualities, can be an important exercise for 21st Century Architecture. We ought to speak to environmentally touchy issues identified with atmosphere and culture to accomplish manageable human settlements. Environmental design starts with the exact information of a specific place as it is little, immediate and receptive to local and nearby conditions. On the off chance that we are touchy to the subtleties of the place, we can live without destruction.

II.LITRATURE REVIEW

2.1. SUSTAINABILITY, GUEST SATISFACTION AND HOTEL INDUSTRY

In this part develops and factors of sustainability and guest satisfaction will be characterizing and disk to give a setting to this examination. It exhibits an outline of hotel industry, it's composing and additionally examines about the grouping of the hotel these days. Nowadays, hotel isn't as straightforward as the building; it turns into an industry that utilizes numerous individuals, particularly the female.

2.1.1. Sustainability

This section examines the concept of sustainability, sustainable development and sustainable in architecture with its assessments.

2.1.1.1. The Concept of Sustainability

The expression "*sustainable*" has numerous definitions; everybody concedes to one key point; in any case, we utilize our reality and its assets. We should safeguard the capacity of future ages to do likewise (Harrison, Wheeler and Whitehead, 2004, P.1). The idea of sustainability has been acquainted with focus on the planet's prosperity, preceded with development and human improvement. Then again, sustainable advancement, as a reasonable setting, includes discovering approaches to join social, economic and environmental objectives. It will incorporate work from all parts of society, from government to business, networks and people (Best Practice Energy Efficiency, 2005, P.6). This requires for meeting the four key objectives in the whole world at the same time by (Adams, 2009).

(i) The social growth that admitted the necessities for all.

(ii) The efficient preservation to the environment.

(iii) The rational profit of the natural resources.

(iv) The upkeep of the high and stable levels of the economic development.

2.1.1.2. Sustainable Development

Practical advancement is improvement that addresses the issues of the present without bargaining the capacity of the cutting edge to address their issues. Perceiving the focal measurement of human improvement, the United Nations General Assembly received in 1986 a Declaration on the Right to Development, which expresses that individuals are the focal topic of advancement and approaches States individuals to guarantee access to training, essential assets, nourishment, work, lodging, wellbeing services and the fairest dispersion of wage (Sustainable Human Development 1995). Sustainable advancement comprises of three sections: the economy, the environment and society. On the off chance that we take a gander at the three circles covering and have a similar size, the contact zone or the focal territory of obstruction between the three circles will be human welfare. In the event that the environment, economy and society turn out to be better, the territory of cover and human prosperity will likewise expand see Figure.II.1.

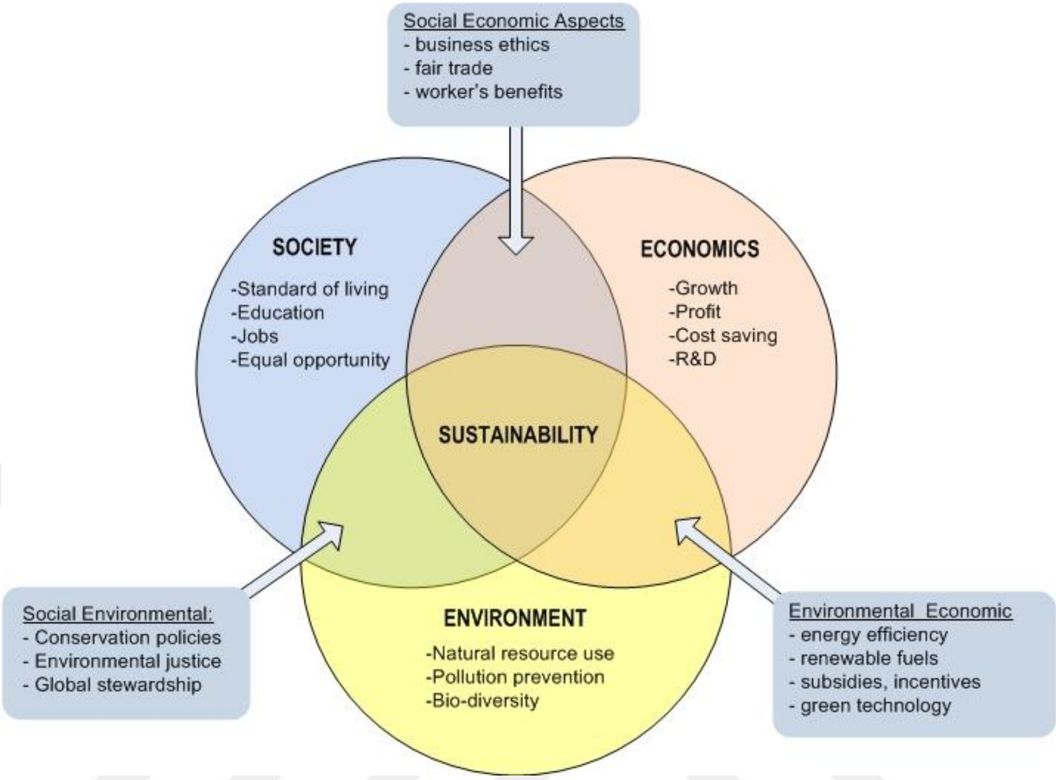


Figure II.1. Interplay of the environmental, economic, and social aspects of sustainable development[1]

2.1.1.3. Sustainable Design and Architecture

Sustainability by "Nature Architecture": To accomplish this, design issues ought to be connected with the encompassing environment assets. All, the more completely, the principal effect of political, economic and social issues must be the arrangement with a cultural and profound background in which the longing for sustainability itself reflects such a vital move in esteem. At exhibit, considering nature and looking after the environment has turned into an imperative issue far and wide. The principle objective of sustainable architecture is to make ideal connections amongst individuals

[1] Adopted from the University of Michigan Sustainability Assessment (Rodriguez et al., 2002)

and their environments. It plans to discover an architectural arrangement that ensures the prosperity and concurrence of people, the urban environment and the common habitat.

Sustainable design is one of those strategies and is additionally alluded to as environmental design, green architecture, green design and environmentally friendly design (Edwards, 2005). It is characterized as “a design theory that tries to expand the quality of the built environment, while limiting or taking out negative effect to the regular habitat" (McLennan, 2004, p.4). Its unique prologue to architecture in the 1960s took numerous references to crude existence with next to zero present day comforts, influencing numerous individuals to think green buildings are ugly and uncomfortable. Be that as it may, this development logic has no design style; it very well may be incorporated into numerous styles, can be tastefully excellent and can be comfortable (Gould and Hosey, 2007; McLennan, 2004). Amid the main decade of the 21st century, green design development was developing and quickly developing (McLennan, 2004). One pointer of this has been the expanding acknowledgment of the United States Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED) rating framework in numerous business segments.

2.1.1.4. Sustainable Building Rating System

There is a considerable measure of models; devices and systems chose to enable associations to convey brilliant environmental execution concerning building stock. In this research, we will talk about (LCA, BIM, LEED, BREEAM and ASHRAE). A sustainable building alludes to both structure and process in charge of the environment more all through the whole life cycle of the building. The existence cycle comprises of stages are: Choosing the location, designing the building, operation and up keeping, reconstruction, and destruction.

The process of sustainable building in order to reduce the effect of the surrounding environment on the building by:

(i) Use the resources more efficiently (like water, energy) to promote and protect the well-being and the health of the occupants.

(ii) Minimize the negative effects (like pollution, waste, sewage).

Thus sustainable buildings are the structures that construct the environment in a responsible manner through increased utilization of materials, decreased utilization of assets, guaranteeing the prosperity and strength of residents and the environment today and future generations.

2.1.1.4.1. Life-Cycle Assessment Framework

A Life-Cycle Assessment Framework (ISO 14040, 1997) is chosen to evaluate the environmental effect of the place of business. The ISO 14040(1997) characterizes the lifecycle appraisal LCA as a structure for recognizing, measuring and surveying info and yield and the potential environmental effect of an item, process or service for the duration of its life cycle, from support to grave, i.e. from the procurement of crude materials, through generation, utilize and transfer. LCA is frequently referred to as the most proper approach to survey the environment (Curran, 1996). LCA models depend on framework considering, which expresses that any item or service can be depicted as a framework (Consoli et al., 1993). The framework is characterized as an arrangement of physical and energy-related procedures that play out a particular capacity. LCA is broadly utilized in the business to dissect environmental issues and is assembled to be the focal inhabitant in modern nature (Graedel and Allenby, 2003). For concentrate the existence cycle (material extraction, producing, development process, utilize, end-of-life), LCA is the most deliberate and target process.

2.1.1.4.2. Building information modeling

BIM helps sustainability by accessing building performance analysis in a virtual simulation environment. This is also commonly termed as BEM or Building Energy Modeling, which is adapted from BIM. Krygiel and Nies (2008) noticed that BIM could help in the accompanying parts of sustainable design:

(i) Building orientation (to choose the best building orientation that outcome in least energy costs).

(ii) Building massing (to dissect building structure and advance the building envelope).

(iii) Day lighting investigation.

(iv) Energy demonstrating (to diminish energy needs and analyze renewable energy source choices, for example, sunlight based energy).

(v) Water collecting (to diminish water needs in a building).

(vi) Sustainable materials (to decrease material needs and to utilize reused materials).

Integrating of BIM and BPA can possibly change traditional design practices and deliver elite business design. Since it’s presented via Autodesk Company (Autodesk, 2007), the phrasing and the utilization of BIM by designers has been boundless.

2.1.1.4.3. BIM and Building Performance Analysis (BPA)

Revit Architecture is programming created via Autodesk and built for overseeing BIM process, which can give high advantages credited to the innovation in light of parametric building demonstrating. This implies any adjustments in spreadsheets or 3D show are consequently refreshed without additionally activity from the client (Autodesk, 2007). Notwithstanding, BIM rehearses go up against more prominent significance and turn out to be more productive when they are blended with different methods, for example, building performance analysis (BPA). The BIM technique is utilized to actualize sustainable building design by testing, investigating and improving the 3D computer model demonstrate amid the design procedure (Autodesk Sustainability Workshop, 2015). At long last, Figure II.2. exhibits a chart of data with the connection amongst BIM and BPA practices, where the BIM display is the premise of energy age and other execution ponders. By BPA could obtain among which: lighting and indoor sunlight, solar investigation and shadows, climate, energy execution, which can assist designers with making speedy and suitable choices promptly enhance the building.

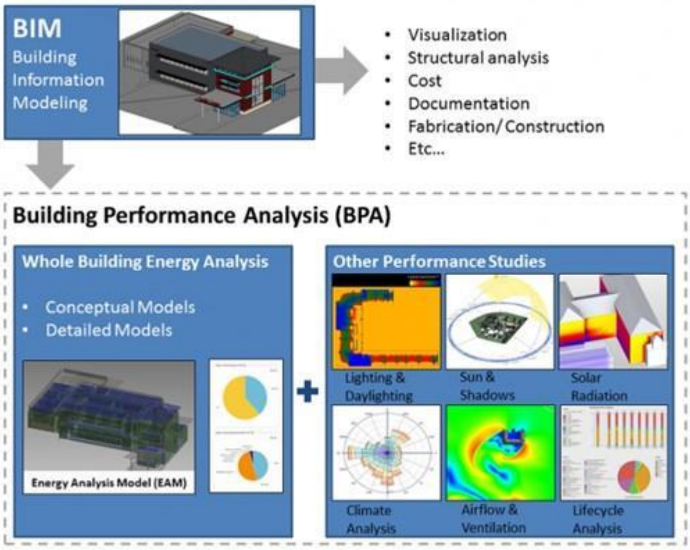


Figure II.2. Relation between BIM & BPA (Autodesk Sustainability Workshop, 2015)

2.1.1.4.4. LEED rating system

Under the supervision of the U.S. Green Building Council (USGBC), LEED is running and LEED implies (Leadership in Energy and Environmental Design) is an eco-arranged building certification program. LEED centers its endeavors on enhancing execution in six key area sustainable site development, water efficiency, energy efficiency, material selection, indoors environmental quality and innovation& design process see Figure. II.3. the green building apparatus manages the whole life cycle of the building category. The building certification process is not an administration organization built up in Washington and began in 1998. LEED has a unique order framework material to a wide range of structures, including homes, schools, health care, offices and retail. Order frameworks are accessible for new building and real remodels and also existing buildings. LEED is relying upon sentiment of The USGBC characterize it "a satisfactory broadly benchmark for designing, building and activity for superior green buildings". Contingent upon the organization of the American Architects and LEED have activity at the US offices in Agriculture. Moreover, there are distinctive sorts of LEED ventures, which are directly progressing in excess of 40 different nations, including Canada, Brazil, India and Mexico. Depending on the LEED reference manual, for the new building and the main renewal certificates granted according to the Figure.II.4.

N	Category	Points
1	Sustainable site development	26
2	Water efficiency	8
3	Energy efficiency	35
4	Materials selection	14
5	Indoor environmental quality	15
6	Innovation and design process	10
Total		108

Figure II.3. Assessing the performance of LEED Reference Guide (LEED Guide)

Level	Points
Certified	40 – 49 points
Silver	50 – 59 points
Gold	60 – 79 points
Platinum	80 points and above

Figure II.4. The Main LEED Certifications of LEED Reference Guide (LEED Guide)

2.1.1.4.5. BREEM Rating System

Building Research Establishment Environmental Assessment Method (BREEAM) is the most important method in evaluating the global environment and system rating of buildings, with 2 million registrants for evaluation and 425,000 buildings with BREEAM certified ratings since it was first discharged in 1990.

BREEAM sets principles for best practices in feasible building design. It promotes designers, customers and others to think about the efficiency of low design and low carbon and reduce energy requirements that are generated by a building before considering energy efficiency and lower carbon techniques. BREEAM covers a scope of development composes that include: homes, modern units, retail units, workplaces and schools. Other building composes can be evaluated utilizing Bespoke BREEAM (point by point is another word to fabricate as indicated by request). At the point when the building is assessed, focuses are ascertained for every paradigm and focuses are added to the aggregate of focuses. The overall execution of the building is granted as a “Pass”, “Good”, “Very Good” or “Excellent” rating in light of the score see Figure.II.5.

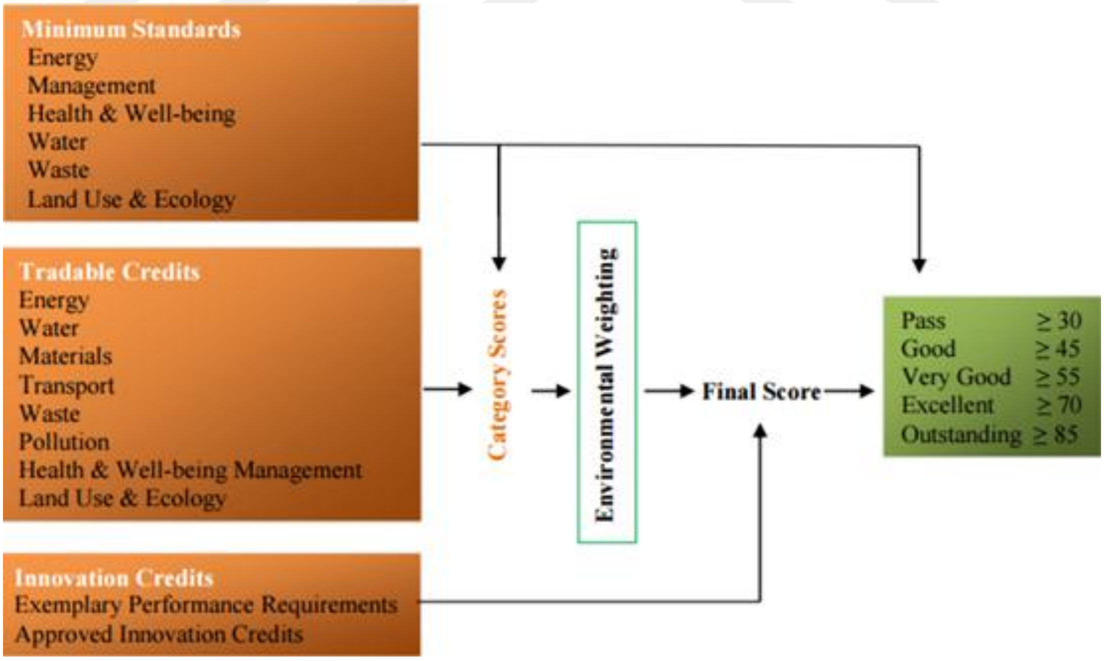


Figure II.5. The diagram below explains the process of BREAM (Building Research Establishment Environmental Assessment Method Guide)

2.1.1.4.6. ASHRAE

ASHRAE (American Society of Heating, Refrigerating, and Air-Conditioning Engineers) is a global community that promotes human prosperity through the sustainable innovation of the built environment. The Association and its individual's center searches around building frameworks, energy effectiveness, inside air quality, cooling and sustainability inside the business. ASHRAE constitutes tomorrow's built environment was established in 1894 and in 2012, as a major aspect of the brand change. The utilization of ASHRAE mirrors the affiliation's participation worldwide and will keep on evolving internationally.

2.1.1.5. Benefits of Green Building

Green Building means the act of building structures and utilizing asset productive environmental procedures through the existence cycle of a building that sits on design, development, task, upkeep, remodel and disassembling. This training grows and supplements the concerns of exemplary design for buildings of sturdiness, economy, offices and comfort. Green building is likewise characterized as a practical or elite's building (see Figure.II.6.).

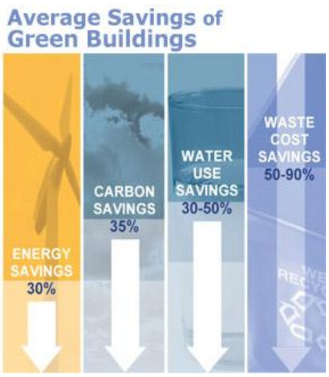


Figure II.6. Benefits of Green Building (LEED Guide)

By utilizing green building practices, it is conceivable to progress in the direction of the objective of "addressing the necessities and desires of today without trading of the capacity of future ages to address their own issues" (Brudtlland 1989). A few investigations have demonstrated how green buildings that consolidate green building practices offer advantages. For instance, it can help moderate building issues and incorporating environmental issues related with existing buildings, and in addition give more beneficial environments to building clients see Table II.1. One of the key pointers of the achievement of this development is the expanding acknowledgment of green building arrangement frameworks, specifically LEED (Energy Leadership and Environmental Design) in numerous business segments, including tourism and accommodation.

Table II.1. Major Green building practices and their potential benefits.[2]

Categories	**Major Practices**	**Specific Benefits**
Sustainable Site	Sustainable site arranging and finishing Sun powered orientation of building Open transportation Tempest water administration	•Decrease environmental effects •Efficiency of site utilize •Heat island impact • Reduction of common frameworks
Energy Efficiency	Sun oriented introduction High effectiveness envelopes (proficient windows and high R- value protection) High effectiveness HVAC framework	• Energy saving • Reduction in greenhouse gases • Lower operating costs

[2] (Fisk 2000; Kats 2003a; Kats 2003b; Ding 2004; Bohdanowicz 2006; Kibert 2008; USGBC 2009; Boecker, et al. 2009; Ahn 2010; Ahn, et al. 2011).

	Building mechanization frameworks Day lighting and high effectiveness lighting On location sustainable energy sources (photovoltaic)	
Water Efficiency	• Water sparing installations and advances • Rainwater gathering framework	• Water sparing • Lower working expenses
Materials & Resources	• Green supplies and materials • Construction squander administration • Recycled content materials • Regional materials, privately sourced • Rapidly sustainable materials	• Resource sparing • Reduce environmental effects
Indoor Environment Quality	• Day lighting and high effectiveness lighting • Adequate air filtration • Low VOC materials • Mold anticipation • Enhanced acoustical execution	Profitable and solid indoor spaces Give ideal indoor environment to building clients Enhanced tenant wellbeing and prosperity
Building Operation & Maintenance	Green cleaning supplies Indoor irritation aversion and control Squander decrease and reusing Energy and water protection Green grounds keeping Electronic versus paper correspondence Guest training/correspondence program	• Reduced environmental effects • Reduced operational and upkeep costs
Demolition	• Exposed roof • Nylon 6 reused cover	• Reduce development squander

2.1.2. Guest Satisfaction

Guest satisfaction has long been an area of interest in academic research. Hunt (1975) considers satisfaction, as an evaluation on which the guests have experienced with the services is at least as good as it is supposed to be. Oliver (1981) defines customer satisfaction as an emotional response to the use of a product or service. It is more conceivable; however, that guest satisfaction is a complex human process, which involves cognitive and affective processes, as well as other psychological and physiological influences (Oh and Parks, 1997). A traditional definition of guest satisfaction follows a disconfirmation paradigm of guest satisfaction/dissatisfaction (GS/D), which suggests that GS/D may result in interaction between a guest's pre-purchase expectation and post- purchase evaluation (Engel et al., 1990). Thus, consumers are likely to compare expectations to perceived performance in order to make an evaluation (Gronroos, 1983). A guest is considered satisfied when his weighted sum total of experiences shows a feeling of gratification when compared with his expectations. On the other hand, a guest is considered dissatisfied when his actual experience shows a feeling of displeasure when compared with his expectation. Anton (1996) provides a more contemporary approach in defining satisfaction in that he defines guest satisfaction as a state of mind in which the guest's needs, wants, and expectations throughout the product or service life have been met or exceeded, resulting in repurchase and loyalty. Although guest satisfaction has been defined in various ways, the underlying conceptualization is that satisfaction is a post-purchase evaluative judgment, leading to an overall feeling about a specific transaction

(Fornell, 1992). Different researchers separated the components of satisfaction. Gronroos (1983) separates the components of satisfaction into two levels of quality: technical quality and functional quality; Reuland et al. (1985) suggest three elements of satisfaction, including product, behavior and environment; Czepiel et al. (1985) identify functional and performance-delivery elements in guest satisfaction; Davis and Stone (1985) mention direct and indirect services for satisfaction; Lovelock (1985) divides product and service attributes into core and secondary types; Lewis (1987) classifies essential and subsidiary elements for the service encounter attributes. Even though the terminology is different, the fundamental concept is the same across various research studies.

Measuring guest satisfaction is an integral part of the effort that improves a product's quality, resulting in a company's competitive advantage (Garvin, 1991). The theory of guest behavior, as discussed by Engel et al. (1990), points out that guest's buying behaviors and levels of satisfaction are influenced by the guest's background, characteristics, and external stimuli. As guest satisfaction is influenced by the availability of guest services, the provision of quality services has become a major concern of all businesses (Berry and Parasuraman, 1991).

2.1.3. Hotel Industry

Food, lodging and dress are the three elementary things of humanity. The hotel industry alone provides two basic things: food and lodging. So, what is hotel industry? The hotel is part of the hospitality industry and is an inclusive term for a variety of service industries including, but not limited to, hotels, restaurants and casinos. The hotel is often referred to as "home away from home". If we consider the meaning of the hotel in the dictionary, the hotel is a building you pay to have a place to sleep and where you can eat meals (Cambridge dictionary). The American term “hotel” was borrowed in the 1760s from the French term hôtel, which originally referred to a nobleman’s residence, large official building, or town hall. Accordingly, the hotel is the place where tourists stop being a traveler and become a guest. It is an industry whose main goal is to make profits for hoteliers, although this may change at times. Traditional hotels offer rooms, banquets and restaurants. Additional hotels also receive revenue from telephone call services, laundry services, travel services, Internet services, and leisure and entertainment activities in hotels.

2.1.3.1. History of Hotel Industry

The hotel might be one of the most established enterprises on the planet. Hotel history is firmly identified with human civic establishments. As indicated by a few records, the principal motel showed up in the sixth century BC when a few couples acquainted huge corridors for explorers with drink and the service was finished by the proprietors. To different reports, since early scriptural occasions, Greeks created warm showers in towns for rest. Afterward, the Romans built castles to give lodging to government works. Romans built up the principal warm showers in England, Switzerland and the Middle East. In the medieval times, the religious built hotels was built to address the issues of their partners moving. At first, the lodging did not offer suppers; they give just haven and permit changing ponies all the more effectively. Travel ended up ordinary, and the impact of the Industrial Revolution in England spread broadly, prompting a change from social or government travel to business travel. The introduction of the hotel business occurred in Europe. Toward the start of the fifteenth century, in France, out of the blue, there was a law necessitating that hotels keep an enlist. Amid this period, the principal travel manual was likewise distributed. English guidelines for hotels were likewise presented at the time. In the meantime, 1,500 warm wellbeing resorts have been produced in Carlsbad and Marinbad. Be that as it may, the genuine development of the cutting edge hotel industry in the United States of America occurred through the opening of the City Hotel in New York in 1794. The flood of building movement has developed in hotels in various urban communities. A portion of the best hotels in the USA was built in this time, yet the genuine blast came in the mid twentieth century. It included extensive speculations, huge benefits and professionally prepared hotel administration. At exhibit, modelers, designers, architects, administrators and others understand that the essence of guests might be extraordinary, as indicated by their desires or needs. Subsequently, they should catch new patterns, characterize better guidelines, and give present day models with a specific end goal to enhance the quality of life in hotels.

2.1.3.2. Type of Hotel Industry

There are two ways to categorize hotels: by functions or by star ratings

(A) By functions, hotel has been classified into several types as follows:

(A.i) Commercial Hotel: A series of hotels that have service structures and standard facilities.

(A.ii) Airport Hotel: Hotel is close to the airport but does not have to be connected or adjacent to the airport. It can be located five miles away. Most hotels in airports have shuttle service to and from stations.

(A.iii) Conference Center: A specialized hotel (usually in a less crowded but easily accessible location) is designed and built almost exclusively for hosting conferences, exhibitions, large meetings, seminars, training courses, etc. The conference center often provides office facilities and a range of business activities (Business dictionary).

(A.iv) Economy Hotel: This hotel offers little amenities (J.K. Krishan, “Dictionary of Tourism”, Gyan Books, 2005).

(A.v) Suite or All-Suite Hotel: A hotel each room has an attached living room and / or kitchen.

(A.vii) Residential Hotel or Apartment Hotel: A serviced residential complex uses a hotel-style booking system. It is like renting an apartment, but without fixed contracts and passengers can "leave" whenever they wish.

(A.viii) Casino Hotel: The business combines a casino with a hotel or building that houses both a hotel and a casino.

(A.ix) Resort Hotel: A hotel caters primarily to vacationers and tourist usually offers amenities and services in a more aesthetic atmosphere than other hotels. These hotels are located in attractive and natural tourist destinations and their customers are groups and couples who love adventure with elegance and comfort. The area's attractions vary, some of which offer golf, tennis and scuba diving, and may also depend on other recreational activities depending on the surrounding natural areas.

(B) By Star Ratings, hotel has been classified into several types as follows:

(B.i) Five Star Hotel: Luxury hotels; The most expensive hotels / resorts in the world; many additions to enhance the quality of customer stay, for example, some have private golf courses and even a small private airport.

(B.ii) Four Star Hotel: First class hotels. Expensive (by middle class standards); has all the services listed previously; they have many "luxury" services, for example, a massage or spa.

(B.iii) Three Star Hotel: Hotels in the middle class. It has a daily maid service, room service, and can be dry cleaning, internet access and swimming pool.

(B.iv) Two Star Hotel: Budget hotels; a little more expensive is usually a maid service daily.

(B.v) One Star Hotel: Budget low cost hotels. You may not have maid service or room service.

(B.vi) No Category Hotels: These include motels, rural homes, bungalows and others with limited services. However, these hotels represent 41% of the total hotel market share.

2.1.4. Summary

Sustainability issues influence all parts of the hotel proprietorship, including advancement and tasks. In this part numerous drivers of sustainability distinguished and indicated an expanding reliance between sustainability and guest satisfaction anticipate that this affiliation will keep on being reinforced in the coming years. The hotel and settlement network is getting ready to grasp a sustainable procedure and develop as a way to save our environment, yet additionally to enhance proficiency, accomplish cost funds, enhance representative resolve, improve guest satisfaction and oversee speculator expectations. Sustainability issues affect about all parts of the hotel sustainable guest satisfaction methodology has a monetary enthusiasm for the nation, with respect to the tourism performers and concerning the populace.

2.2. THE ANALYSIS OF CONCEPT OF SUSTAINABILITY AND GUEST SATISFACTION APPLIED IN HOSPITALITY INDUSRTY

Not exclusively is present guest satisfaction confirmation of significant worth, yet in addition hotels do likewise. Hotel history and design highlights track changes in esteem and advances after some time. The hotel's present design mirrors our overwhelming culture and our craving for future development through innovation. Hotel groupings frameworks help characterize guest satisfaction by utilizing service quality expressive and mechanical design highlights acknowledged by our culture and identified with current wants. Moreover, this thesis gives a nitty-gritty depiction and clarification of the fundamental sustainable practices appropriate to hotel business utilizing different cases of contextual investigations.

2.2.1. Sustainable Hotel Design

Traditionally, the idea of sustainability rotates around environmental practices: protection of constrained assets, decrease of contamination, and safeguarding of regular biological communities. In 1987, the Brundtland Commission of the United Nations proclaimed in a report that, sustainable improvement is advancement that addresses the issues of the present without trading off the capacity of future ages to address their own issues." The meaning of Brundtland is extremely prevalent and various distinctive enterprises offer diverse elucidations of the meaning of Brundtland. At the point when the term sustainability is connected to the hotel business, the definition is altered marginally. As indicated by a hotel agent, for the business, sustainability is tied in with meeting guests' present wants without relinquishing the wants of who and what is to come (Sheehan, 2007). Generally Green Hotels are environmentally sustainable properties whose supervisors hope to make water saving projects, save energy and diminish solid waste while setting aside some cash to help ensure our unrivaled earth. Actually, applying the term sustainability to the accommodation business is somewhat challenging. Traditionally, this term implies forfeit, hotels spin around liberality. Washing towels and cloths every day, giving makeup in little bundling bottles, the utilization of expendable flatware in eating offices, and an assortment of other run of the mill components of the hotel encounter are inconceivably inefficient methods. Keeping in mind the end goal to enter sustainable components in the tourism business, accentuation must be set on the most proficient method to coordinate the comfort and enthusiasm of guests, paying little heed to the sustainability plan. As indicated by the above, it is additionally conceivable to characterize the idea of "green practices", which as per "(Holleran, 2015), for the most part utilizes reusing, reuse and general protection of waste. Also, things, for example, diminishing greenhouse gas emanations, preserving water and possibly lessening land contamination are all piece of green strategies. The most point by point meaning of sustainability business in the author’s view is given by Sloan (2013) states that the improvement and administration of the hospitality division addresses the issues of the present guests, hoteliers and partners without bargaining the capacity of future guests, hoteliers and partners to profit by similar services, items and aptitude. Thus sustainable activities in accommodation can be described by various commonly strengthening approaches, often integrated to achieve the "sustainability" objectives of a hotel company these include: Environmentally touchy design; Environmental administration activities; Corporate social obligation; Reducing carbon impression; Nature preservation; Environmental detailing; Guest devotion programs.

Thus, one of the main green confirmation organizations in the US and Europe 'Green Key' proposes another rating in view of enhanced hotel activities. As indicated by Green Key (2015), there are eight noteworthy operational zones that can make them more sustainable and diminish the main part of the environmental effect of the hotel. These are: Energy protection; Water protection; Solid waste administration; Hazardous waste administration; Indoor air quality; Community outreach; Building framework; Land utilize.

In the writing survey an exertion was made to incorporate sustainability at each phase of the friendliness service involvement. The author comprehends that sustainability is an expansive subject in which every zone might be adequate to direct a different doctoral research, so the author trusts that it plans to give key sustainable practices that are habitually utilized in everyday tasks.

2.2.1.1. Energy conservation practices

As indicated by Chen, Legrand and Sloan (2013) the hotel can be viewed as a design bunch from three unmistakable zones, all filling particularly unique needs:

(i) The guest room region (rooms, washrooms/showers, toilets), Individual spaces are frequently with costly coating, the utilization of offbeat and different energy loads;

(ii) People in general region (reception hall, lobby, campaign, bars, eateries, meeting rooms, swimming pool, rec center, sauna, and so on.), High temperature trade rates with outer environment (warm misfortune) and high inward loads (inhabitances, apparatuses, hardware, lightning);

(iii) The service region (kitchens, workplaces, store rooms, clothing, staff offices, machine rooms, and other specialized zones), Intensity of energy utilize requiring propelled air taking care of (ventilation, cooling and warming).

Accordingly indicated by Webster (2000), Sloan, Legrand and Chen (2013), five noteworthy zones can be distinguished where energy proficiency will be enormously enhanced and five activities proposed:

(i) The establishment of a computer-controlled cooling framework or "smart" hotel rooms framework;

(ii) The establishment of double coating or Low-E glass that reflects infrared "warmth" energy over into the building;

(iii) The establishment of an energy proficient kitchen;

(iv) The purchase of fuel proficient refrigeration and;

(v) The purchase of fuel proficient transport.

Moreover, protection can have extremely valuable outcomes to keep the warmth in winter and keep the buildings cool in the mid-year. Intelligent window movies can be utilized comparatively to warm transformation in the mid-year months. In hotels designed to be sustainable, sun based boards are probably going to be available. In any case, they are not extremely well known in any case as a result of the way that hotels won't see prompt advantages in actualizing these strategies. Rather, sun based board installments for instance are long haul contrasted with the quick impacts of minimal effort innovation, for example, LED lights. Notwithstanding, sun-oriented innovation, as other developing advances, is probably going to fall in cost and increment productivity rapidly. Hotels can buy offices from organizations that give wind control or hydropower as an elective method to run tasks. According to (Greenhotelier, 2004a) present day aerating and cooling frameworks devour 30% less energy than frameworks that are 15 years of age and can reuse warm to preheat water for washing or swimming pools. And (Greenhotelier, 2005a) contends that environmentally sustainable hotel approach, and in addition staff preparing on energy sparing conduct, can contribute altogether to energy preservation. For example in the assessment of some spa specialists if the spa hotel is in the advancement arrange, interests in wind or sunlight based energy ought to be considered keeping in mind the end goal to help the energy that will be brought about amid task.

2.2.1.2. Water conservation practices

Water is in truth an essential asset for the hospitality business on account of its shortage and part in various exercises on property, for example, clothing, nourishment generation, (Baker, 2005:70). Webster (2000) contends that exclusive five percent of a hotel's overall water utilize is used for eating and drinking while the bigger part is utilized for cleaning (counting showering, washing, washing and dishwashing). Many water-saving advancements introduced by hotels and different organizations have short recuperation times, making them financially appealing. Many water saving arrangements can be partitioned into three fundamental gatherings relying upon the useful region in which they are introduced:

(i) *In the restroom territory*, water-sparing fittings can be utilized to give up to 2 liters of water for each hand wash, stream controllers or low-stream installations can be introduced in flying where water weight is less imperative as in sustenance getting ready and guest toilets, water utilize can be lessened up to 33%. Other serious offices in the hotel's rooms incorporate toilets and showers that are in charge of family water use by up to 40%. Place the relocation gadget in the tank or fill the without water urinal and the low-stream latrine, which utilizes under 4 liters of water for every flush water, lessening water use significantly. Another approach to enhance the utilization of water in toilets is to reuse dim water to wash toilets that can set aside to half of family water utilize, yet require some filtration and cleansing.

(ii) *Hotels that work laundries* in the building have numerous choices to diminish water utilization. The first is the utilization of front loaders that devour less water and less cleaned than the best stacking machines. Another approach to lessen energy by washing is to wash the low temperature, which adequately diminishes the energy use by 30% prompting the arrangement of the customer. What's more, a few hotels put printed cards on non-guest rooms that ask the guest whether cloths ought to be changed. The guest's ability to partake in these activities furnishes the hotel with a huge number of liters of water, cleaning items and energy every day. A similar procedure can be utilized to lessen the measure of new towels required

(iii) *Swimming pools, spa, water offices and greenery enclosures* are another region that expends energy and water in the hotel. Swimming pools ordinarily require a lot of water and also energy to warm them up. Warm water dissipates all the more rapidly and water ends up colder, however in Sloan, Legrand and Chen (2013), cool water in the swimming pool may cause guest dissatisfaction. Pool covers can be a fractional answer for this issue since it will decrease vanishing and additionally warm misfortune, particularly in chilly atmospheres. Moreover, more filtration gadgets can upgrade water quality in the meantime, diminishing discharging and compound utilize, bringing about huge investment funds amid the year. Another eco-accommodating arrangement is to fabricate a purported characteristic pool that takes a shot at indistinguishable standards from lakes and lakes that utilization plants and common life forms to deliver spotless and clean water. Common pools highlight the additional favorable position of having water include in the hotel grounds.

2.2.1.3. Waste management practices

> "*Expenses can be enormously decreased through waste minimization and the substitution of regular waste transfer exercises with practices went for reuse, dismantling, reusing and treating the soil*" (Baker, 2005: 71).

Legitimate waste administration is a proportion of cost decrease and in addition a measure to diminish environmental effect. Four classes of waste piece can be recognized by Baker, 2005:

(i). After-effect of site evacuation;

(ii). All through the operational existence of the hotel;

(iii). Amid the remodel;

(iv). Toward the finish of the life of the building or if there is an adjustment being used.

Nonetheless, Baker (2005) states that the greater part of waste will be created all through the operational existence of a hotel. Numerous provisions can be reused, for and must be refilled, supplanting the little plastic suppresses that end in the junk in case in a hotel restroom: cleanser holders must be made of glass the home, another illustration is material reuse: the change of harmed materials, for example, regalia and materials, into valuable things, for example, guest clothing packs, infant kiddie aprons, cleaning garments and so forth. (Sloan, Legrand, Chen, 2013: 82). This sort of waste minimization diminishes the cost of waste treatment since it keeps away from extra expenses through reusing, family unit squander gathering, burning and land filling.

2.2.1.4. Social Perspective of Sustainability in Hospitality

For what reason should hotel administrators be occupied with building up the social segments of their sustainability systems? As noted before, environmental components of sustainability cannot be isolated from the social thought. Estabrook (2013) underlines that in spite of the way that the friendliness business has accomplished surprising improvement in "green" administration by driving towards more sustainable advances and procedures that assistance the environment and the baselines, sustainable improvement must incorporate the three components of individuals’ planet and benefit (3Ps) which implies long-term contemplations for all partners. Build up a culture of eco-accommodating mindfulness among your workers through low-affect ensures and the utilization of sustainable practices and materials that won't upgrade the overall effectiveness and sustainability of the hotel and spa, and will feel a more profound feeling of wellbeing and satisfaction which is our definitive objective (Singer, 2010). An ongoing report by London Met's University of Hotels in England found that 60% of the staff talked with needed to partake more in sustainable hotel approaches (Trainor-Buckingham, 2009), affirming this view as it were.

2.2.1.5. The Model of Sustainability and Energy Analysis for Hotel Industry

For as far back as 50 years, an assortment of building energy reproductions and examination instruments (i.e., BLAST, EnergyPlus, eQUEST, TRACE, DOE2, Integrated Environmental Solution (IES-VE), Ecotect and BPA) have been produced, improved and connected all through the building business (Crawley et al. 2005). In view of (Kubba, 2012), the improvement of a schematic model before the making of a point by point building model enables the designer to make a more exact evaluation of the proposed conspire and survey whether it meets the utilitarian and sustainable prerequisites distinguished by the proprietor; this expands venture execution and overall quality. Nonetheless, building energy investigation gives a chance to settle on savvy choices that influence the building life cycle and meet energy protection objectives. The development business has started to move towards BIM due to its advantages for the duration of the life of the venture, from the origination through development to the operational stages. The effect of BIM on design rehearse is vital on account of the way that it is growing new ways and procedures to convey design, development and utility administration services. Building proprietors are not just required to be designed and conveyed on time, at a suitable cost and of high caliber, yet in addition for services past design and development (Clayton et al., 1999). Building Information Modeling apparatuses assist clients with performing an entire energy examination and investigate different energy-saving choices amid the design stage. This will encourage proprietors and designers settle on energy choices that significantly affect the cost of the proposed development lifecycle. Krygel and Nice (2008) take note of that BIM can help with sustainable design angles including: building orientation, building massing, day lighting investigation, water collecting, energy displaying, practical materials and site& logistics administration. In spite of the upsides of BIM, there is a wide gap in interoperability between its apparatuses and the energy examination program, albeit new arrangements, for example, interoperable document positions, have been created record groups, have been produced. Record positions, for example, the Industry Foundation Classes (IFC) and Extensible Markup Languages (XML), known as various gatherings in the development part to encourage the exchange of data are advancing "gbXML" stored in building information models to empower coordination and interoperability between design models and other building examination devices. In this research, this postulation recommends an approach to coordinate BIM and power investigation apparatuses into building performance analyzes (BPA) to help designers in the sustainable design of the proposed building. In such manner, Jalal and Jerid (2013) thought about the abilities of different record arranges in exchanging data from the BIM device to energy examination and recreation applications. The consequences of this check demonstrated that gbXML contains a streamlined plan for energy examination and along these lines is the favored frame that can be utilized amid the advancement of early design or arranging stage. The reconciliation of every one of these applications at a beginning time amid the calculated design period of the proposed sustainable development undertakings will enable the design to group to look at and investigate different energy results (i.e. heat gains/losses, temperature gain comparisons, total annual energy, etc.).

2.2.2. Guest Satisfaction in the Hotel

Guest satisfaction became among the most important antecedent that the hotel management needs to achieve while delivering services to customers. Guest satisfaction, leads to various effects and it was known to be an indicator of a company's future income and profit (Forozia, Zadeh & Gilani, 2013). In other word, service provider of hotel industry should put a priority in fulfilling guest's need as their main objectives. Furthermore, guest satisfaction has become the determinant and predictable aspects of success, therefore, hotels are not able to compete with their rivals without satisfying guests (Forozia et al. 2013). They further asserted that guest satisfaction analysis helps hotel operators to assess their weaknesses and flaws, ergo solving guest's real needs and wants. In addition, Mohajerani and Miremadi (2012) postulated that guest's satisfaction will occur when guest's perception are met or exceeds guest's expectation. Similarly, Torres and Kline (2014) stated that guest satisfaction is defined as the individual's perception of a performance of products or services that tailored to his or her expectation. This means that if a hotel is able to fulfilling guest's needs, in return they will be satisfied vice versa.

Guest satisfaction can be seen as a guest's perspectives in which his or her needs, wants, and expectations throughout the product or service life cycle have been met or surpassed, bringing about ensuring repurchase and delay unwaveringness (Usta, Berezina & Cobanoglu, 2014). Guest satisfaction is a business beliefs which leads to the creation of value for guests, anticipating and managing their expectations, demonstrating ability, and responsibility to satisfy their needs (Dominici & Guzzo, 2010). If the hotel industry can easily understand and satisfy guest needs, they will conceivably make greater profits than those who fail to satisfy them. Dominici and Guzzo (2010) also stated that as the cost of attracting new guests is higher than the cost of retaining the existing ones, therefore, managers must focus on retaining the existing guests by improving policies and procedure in managing guest satisfaction and guest loyalty. Guest satisfaction is the most important criteria in determining the quality of service delivered to guests through the products or services and other supplementary services (Wai & Low, 2005).

2.2.2.1. Guest Satisfaction and Service Quality

Service quality is dealt with as a wellspring of guest satisfaction in numerous examinations in hospitality and tourism (eg, Baker and Crompton, 2000; Cronin and Taylor, 1992). Guests are said to be fulfilled just if there are certain affirmations of expectations. In any case, regardless, the level of guest satisfaction shifts among various customers on the grounds that every one of them has own needs and requests and also his experience. We frequently talk and hear "quality" however not all individuals really comprehend what quality is a few people botch quality with luxury or toughness. In the lexicon, quality is characterized as "general magnificence of the standard or level". To the supernatural approach, "Quality is synonymous with natural and supreme perfection and all around known:" You will know it when you see it. "As per this view, the item or service is classified" qualified "if the benchmarks meet or ought to be said to be of the most astounding standard. Quality goes about as a general judgment of relative esteem. In this exploration, the service quality models recorded in Table II.2. Ramsaran (2007) was chosen as a fundamental model for this examination since its model comprises of a rich wellspring of estimation components.

Table II.2. The Service Quality Models

Duty modality forms for hotels				
Author(s)	Sample size	No. of dimensi ons	No. of items	Dimensions
Knutson, Stevens, Wullaert, Patton, and Yokoyama (1990)	201	5	26	Effects, Reliability, Responsiveness, Assurance, Empathy
Saleh and Ryan (1991)	200	5	33	Effects, Reliability, Responsiveness, Assurance, Empathy
Knuston et al. (1993)	201	5	26	Effects, Reliability, Responsiveness, Assurance, Empathy
Heung and Wong (1997)	200	5	26	Effects, Reliability, Responsiveness, Assurance, Empathy
Ekinci, Riley, and Fife-Schaw (1998)	99	5	22	Effects, Reliability, Responsiveness, Assurance, Empathy
Mok and Armstrong (1998)	253	5	22	Effects, Reliability, Responsiveness, Assurance, Empathy
Mei et al. (1999)	155	3	44/27	Employees, Effects, Trustiness
Choi and Chu (2001)	402	7	29	Staff Service Quality, Room Qualities, General Amenities, Business Services, Value, IDD Facilities

Min, Min, and Chung's (2002)	281	3.3	20	Guest room esteem: Effects, Working environments, Guest room setting Front-office services e Responsiveness of representatives, Reliability, Amenity
Getty and Getty (2003)	222 (216)	5	26	Substantial quality, Reliability, Responsiveness, Confidence, Communication
Tamagni, Micheli, and Zanfardini, (2003)	48	3	23	Physical help and hotel general services quality, room quality, worker's consideration quality
Juwaheer and Ross (2003)	401	9	39	Dependability, Assurance, Extra room comforts, Staff correspondence and extra pleasantries looked for, Room engaging quality and stylistic layout, Empathy, Staff viewpoint and precision, Food and service related, Hotel environment and environmental elements
Juwaheer (2004)	401	9	39	Unwavering quality, Assurance, Extra room courtesies, Staff correspondence and extra luxuries looked for, Room appeal and style, Empathy, Staff standpoint and exactness, Food and service related, Hotel environment and environmental variables
Nadiri and Hussain (2005)	258	2	22	Sensible, Complex
Akbaba (2006)	234	5	29	Effects, Adequacy in Service Supply, Understanding and Caring, Assurance, Convenience
Albacete-Saes, Fuentes-Fuentes, and Llorens-Montes (2007)	172	5	21	Individual Response, Complementary Offer, Tourist Relations, Tangible Elements, Empathy
Ramsaran-Fowdar (2007)	293	7	59	Unmistakable, Reliability, Assurance, Empathy, Environment, Technologies, Entertainment
Wilkins, Merrilees, and Herington(2007)	664	3(7)	30	Physical Product (Stylish Comfort, Room Quality, included Extras), service understanding (Personalization, Speedy Service, Quality Staff), Quality Food and Beverage
Ladhari (2009)	200	5	26	Substantial quality, Reliability, Responsiveness, Confidence, Communication
Markovic and Raspor (2010)	253	4	29	unmistakable, Reliability, Empathy, Competence of Staff, Accessibility
Mohsin and Lockyer (2010)	271	3	23	Front-office, Room Service, In-house Cafe/Restaurant
Al Khattab and Aldehayyat (2011)	280	5	26	Unmistakable, Reliability, Responsiveness, Assurance, Empathy
Amissah (2013)	228	4	23	Unmistakable, Reliability, Assurance, Empathy
Amissah and Amenumey (2015)	172	4	32	Tangibles, Empathy & Assurance, Reliability, Availability of Other Services

2.2.2.2. The Model of Service Quality toward guest Satisfaction in Hotel Industry

The point of giving top quality services is to fulfill customers. Quality of service estimation is a superior method to direct whether the services are great or terrible and whether customers are fulfilled or not. The most well-known model for estimating customer satisfaction is the SERVQUAL scale in the service business. This model depends on the customer's quality of service assessment, which contrasts the expected esteem and the esteem accomplished and the gaps in the service conveyance process. The premise of SERVQUAL scale was the gap display (See Figure.II.7).

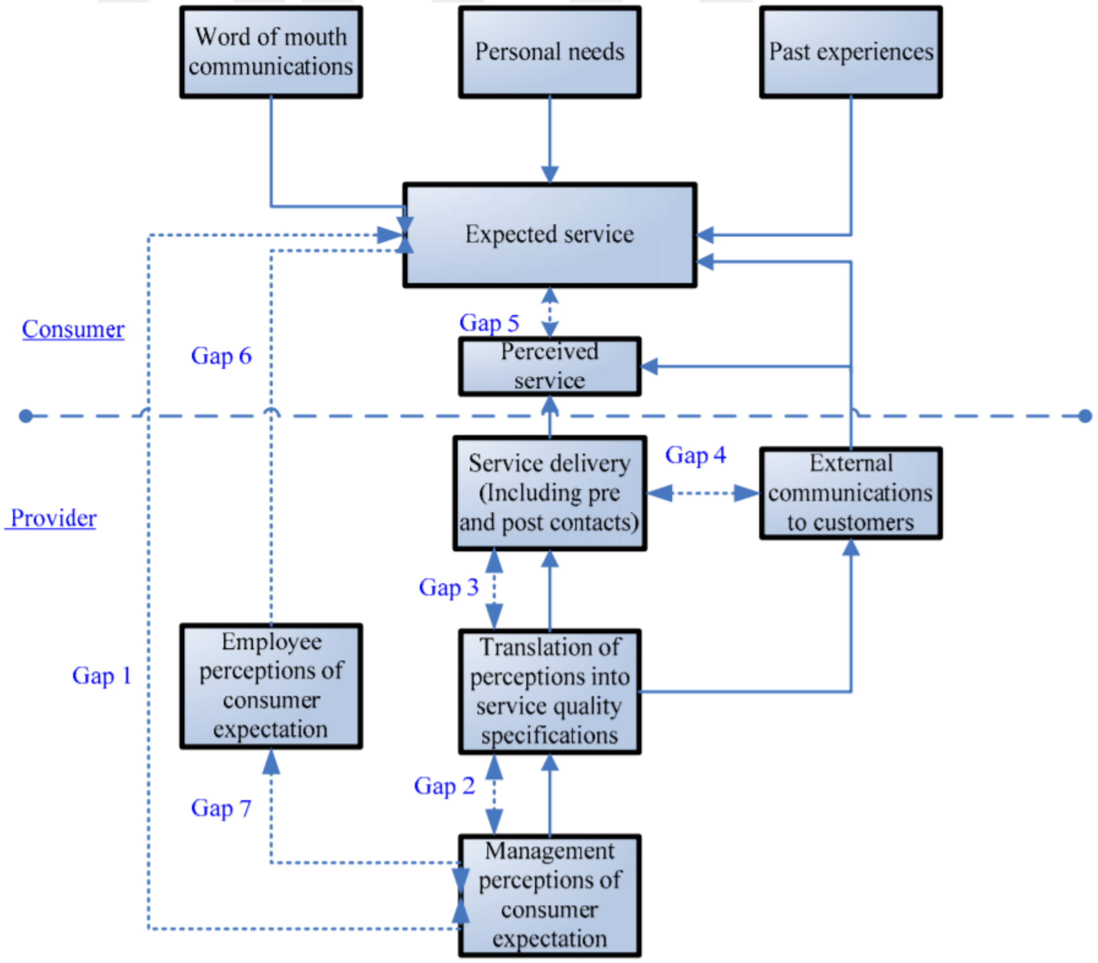


Figure II.7. Model of service quality gaps (Parasuraman et al, 1988)

The gaps display is an expansion of Parasuraman et al. (1988). There are seven noteworthy gaps in the idea of service quality:

Gap 1: the gap between customer expectations and administration perception;

Gap 2: The gap between administration perception and service determination;

Gap 3: The gap between service determinations and service conveyance;

Gap 4: The gap between services versus outer correspondence;

Gap 5: The gap between customer expectations versus their perceived service conveyance. This gap is vital and is the genuine proportion of quality of service. Has an immediate association with the outer customer is likewise the gap that influences the SERVEQUAL demonstrate.

Gap 6: The gap between customer expectations and worker perceptions;

Gap 7: The contrast between staff recognitions and administration observations.

In the service quality idea, to every one of the seven gaps, the littler gap, the most elevated quality of service can be acquired. Regardless of whether just a single gap emerges, service gaps will show up on the grounds that they mean customer dissatisfaction. In light of this model, Parasuraman et al. (2007) SERVQUAL scale is built. The SERVQUAL scale contains alluring attributes of seven service quality measurements: "Tangibility", "Reliability", "Assurance", "Empathy", "Environment", Technology and Entertainment, is operational as two -62- items segments to gauge customer expectations and perceptions. In any case, the scientists found that when SERVQUAL is connected to various ventures, things must be expelled or included request to redo the scale to suit contrasts in service settings. In the advancement of quality estimation in the hotel business, every one of the seven unique measurements of SERVQUAL was utilized to recognize any conceivable measurements, particularly the one of a kind measurement of the business. These measurements are in the Appendix-A- After the blend and shortening, has 62 items. Everything was isolated into two articulations: one for estimating expectations about associations inside a given service region and the other for estimating perceptions around an association whose services were assessed. The scale was eluded from “strongly agree” (7) to “strongly disagree” (1). 50% of the expressions were planned decidedly and the sentence was detailed contrarily with the improvement of the scale (Churchill 1979). For each measurement, SERVQUAL scale gives a level of customer expectations (E) and a level of customer perception (P) for the execution of service suppliers. Customer expectations are "customer needs or wants" (Miller, 1977), what they feel that service suppliers must give or can be foreseeing future occasions. Show up before you utilize the service. While customer perceptions are estimated specifically inside and outside their involvement in utilizing the service. Uncovers customer appraisals about what they gain from service. As indicated by Parasuraman and his partners, the contrast between the two scores is service quality (Q). Q = P - E key to enhance the quality of service is to boost this positive gap. The negative estimation of this gap result uncovers customer dissatisfaction. The contributions for computing this outcome are customer criticism. Since each measurement differently affects service quality, and to ascertain the overall service quality, each measurement must be assessed in extent to its significance. These weights can be distinctive among hotels in a single nation and in addition in various nations, relies upon hotels strategy and culture of every region.

2.2.2.3. The Increasing Connection of Sustainability and Guest Satisfaction in Hotels

A noteworthy component of sustainability centers on decreasing the impression that people have over their environment by diminishing asset utilization to necessities (Kirk, 1995; McLean, 2004).The estimations of sustainable improvement make a checked clash with the estimations of luxury. Kirk (1995) focuses to a contention between environmental sustainability activities and hotel guest satisfaction; because of preservation of assets it can reduce the guest experience. There are contrasts in values, as well as in the qualities and ideas of sustainability and guest satisfaction. A portion of the most part acknowledged highlights of sustainable design are that they add to an all the more environmentally solid future: space effectiveness, materials and items that are non-intriguing, reused, regular or inexhaustible materials, and extra fluorescent lighting to decrease energy and ration water (McLennan, 2004). In any case, the general highlights of the guest satisfaction encounter are: more space, luxurious or colorful materials, modern lighting that looks warm and welcoming, and washrooms with vast baths and different showerheads (Schor, 2008). These guest satisfaction properties look like evident logical inconsistencies of run of the mill sustainable design characteristics. Additionally, there are not just "logical inconsistencies" amongst sustainability and guest satisfaction as to qualities, yet additionally with how they are perceived. In hotels, style and comfort are key elements adding to experience (Talbot, 2004); in any case, usually expected that sustainable design is ugly in appearance and uncomfortable (McLennan, 2004; NEWH: The Hospitality Industry Network, 2007). This Concept began in the 1960s when architecture turned into the primary practical pattern with crude living references with little innovation and not very many present day enhancements (McLean, 2004; NEWH: Hospitality Industry Network, 2007).

The design, style, and comfort of the hotel building environment impacts the guest's decision of their hotel experience, their satisfaction, and the likelihood of returning to or prescribing a hotel (Hyde and Grønhaug 2009, Kassem, 2004; Ramsgaran-Fowdar 2007; Skogland and Siguaw, 2004). Therefore, style and comfort are viewed as to a great extent foreseeing the hotel's budgetary achievement. On the off chance that it is conceivable to touch base at an appropriate cooperative energy between an extraordinary affair for guests and sustainable objectives in the hotel, it might open up new open doors for business tries.

2.2.2.4. Reconsider the Cooperation of Sustainability and Guest Satisfaction in Hotels

As indicated by Hong et al. (2006), green or sustainable hotels can be characterized as "hotels that embrace a sheltered, sound and environmentally well-disposed approach, apply green administration hones, advocate green utilization, ensure the environment and utilize assets appropriately".

The hospitality field reconsiders how to effectively join guest satisfaction and sustainability together in a way that does not bring down the magnificent *guest experience. When consolidating sustainability, the guest experience is imperative* (Sheehan,2007, p. 273).

Current meanings of sustainability put extensive accentuation on forfeit to be powerful in hospitality environments, and a changed definition is required for fruitful sustainable usage. This definition is: *Sustainability is tied in with satisfying our guests, understanding the fantasies and wants of our present guests without giving up the fantasies and wishes of who and what is to come. The objective is to accomplish sustainability without relinquishing it* (Sheehan, 2007, p. 23). LEED gauges of USGBC may give a system to hotels to adjust sustainability and live up to guests' desires. This is on account of the LEED evaluation framework gives third-party confirmation of sustainable objectives, yet in addition looks to give more comfortable environments to inhabitants of the building (Sheehan, 2007). The new model rotates around what green can add to a guest's involvement, not what it can take away.

In any case, the conviction that sustainability can really build guest satisfaction appears to change the hotel industry. In any case, additionally examine is expected to check whether this sort of connection amongst sustainability and guest satisfaction is conceivable.

2.2.3. Hotel Rating System

In spite of the fact that the United States has a very created hotel-rating framework because of a dynamic hotel industry, there is no formal hotel-rating framework, and there was just a casual framework. Walker (2005) brings up that there is no official arrangement of hotels in the United States by the administration. The two most lofty hotel rating frameworks in the United States are the American Automobile Association (AAA) and the Forbes Travel Guide (already known as the Mobile Travel Guide). The AAA Diamond design includes the lobby design highlights of a four- diamond hotel as takes after: Area Size and area situation of arrangements give an unmistakable level of openness permitting expanded portability for some guests. Various intelligent pools, including at least one privacy zones; can be recognized guest service zone and ringer stand (American Automobile Association, 2008, p. 12). The hotel's five- diamond hotel lobby are as per the following: Area and size of arrangements give a wealth of free stream of room that adds to most extreme comfort and unwinding for some guests; Concierge Area (American Motor Society, 2008, p. 12) Guest rooms, AAA Diamond for four-shading hotels, "reflect current industry benchmarks and give an exquisite look" (AAA, 2008, p. 17). For a five star hotel, guest rooms must mirror similar principles and give a lavish look. The five-star manual for the Mobil Travel Guide, 2013 shows that the design highlights of the 5-star hotels incorporate very much outfitted guest rooms and wellness offices, regularly with no less than one pool, and a portable travel manage. The 5-star design highlights extreme entryways, classy decorations, and brilliant materials in guest rooms regularly alongside innovation excitement, Jacuzzi and/or plant tubs, and perhaps warming pools. Recognize that star evaluations accessible on movement sites, for example, Travelocity, Expedia, Orbitz, Priceline and Hotwire are to some degree unique in relation to the Mobil Travel Guide appraisals. Booking locales frequently make their own particular benchmarks for star levels; however more often than not allude to the Forbes AAA travel control appraisals, alongside customer input (Becker, 2009). Hotels have two essential approaches to give an upper hand: (i) high quality or (ii) low price (Bojanic, 1996). The AAA Diamond rating and star rating frameworks in the Mobile Travel Guide make hotel classifications as indicated by quality. Another ordinarily utilized order device for distinguishing luxury shape non-luxury hotels is by pricing fragments notes (2005). In any case, this might be abstract in light of the individual understanding required to characterize guest satisfaction. Furthermore, there have been an expanding number of environmental confirmation programs focusing on the friendliness area. Table II.3. on the following page records the absolute most basic accreditation programs identified with the hospitality sector.

Table II.3. Selected environmental programs relevant to the hospitality sector

Type of Program	**Name**	**Organization**	**Brief Description**	**Website**
Environmental Certification Programs Specific to Hospitality	Green Key Global	Green Key Global, Hotel Association of Canada, LRA Worldwide, Inc.	Environmental confirmation program for hotels. Gives specialized direction. Taking an interest offices are granted somewhere in the range of 1 and 5 Green Keys relying upon adherence to criteria.	www.greenkeyglobal.com
	Sustainable Tourism Ec o-Certification Program (STEP)	Sustainable Travel International	Environmental accreditation program for visit administrators, hotels, attractions, transportation, and the journey business. Gives direction, self-appraisal apparatus, and 2 to 5-star eco-logo rating framework. Isolate accreditation offered for luxury housing.	www.sustainabl etravel inter national .org
	Green Globe Certification Standards	Green Globe International	Environmental confirmation program for all parts of friendliness and travel industry. Enrollment required for access to gauges. Gauges incorporate 337 consistence markers connected to 41 singular sustainability criteria. Adherence to >51% gauges required for confirmation. Outsider confirmation required before affirmation.	www.greengl obe.com

	Earthcheck Assessed and Earthcheck Certifi ed	Earthcheck	Consultancy with customers in the movement and tourism division. Gives benchmarking, revealing, specialized direction, and environmental accreditation services.	w ww . earthc hec k . org
	Ec otel	HVS	Environmental confirmation program grew particularly for hotels. Gives benchmarking, examining, specialized direction, and staff preparing. Proposals are characterized by money related suitability. On location assessment required preceding confirmation.	www.ecotelhotels.com
	Global Sustainable Tourism Criteria	Global Sustainable Tourism Council	Worldwide coalition of associations attempting to create expanded comprehension of sustainable tourism standards. Gives confirmation of tourism affirmation programs against worldwide economical tourism gauges.	www.gstcouncil.org
Green Building Certification Programs	Leadership in Energy and Environmental Design (LEED)	U.S. Green Building Council	Universally perceived green building confirmation framework. Gives outsider check that a building was designed and built utilizing techniques went for accomplishing elite in human and environmental wellbeing.	www.usgbc.org
	BRE Environmental Assessment Method	Building Research Establishment (BRE)	BRE is an autonomous research-based consultancy, testing and preparing association. Gives accreditation (environmental and wellbeing), R&D, and consultancy services for the built environment.	www.bre.co.uk
	Green Globes	Green Buildings Initiative (U.S.) and BOMA BESt / ECD Jones Lang Lasalle (Canada)	Building environmental design and administration apparatus. Gives online appraisal convention, rating framework and direction for green building design, task and administration.	www.greengl obes.com
Product-Specific Standards and Certification Programs	Energy Star	U.S. Environmental Protection Agency	Willful legislative program that gives free benchmarking services to an assortment of building composes. Additionally rates apparatuses and gives assets to proprietors/administrators.	w ww . energy s tar. go v
	Green Seal	Green Seal	Creates life-cycle based affirmation of items and services. Gives green building direction to open lodging offices and environmental accreditation for hotels and cabin properties.	www.greenseal .org
	Green Tag	Ecospecifier	Database of screened items in framework, private, business, mechanical, and other development. Membership based service.	www.ecospecifer.com.a u
	Greenguard	Greenguard Environmental Institute	Assesses outflows from inside items and building materials.	www.greenguard.org

2.2.4. Summary

The results of the theoretical part support the hypothesis that sustainability and guest satisfaction can be combined in hotels. Based on the analysis conducted, it tends to be accepted that in spite of the fact that the term is translated in various ways, the idea of sustainability is outstanding in the administration of guest satisfaction land. Besides, guest satisfaction is essential for hotels to flourish and in this way it is imperative for hotel staff and hotel designers to think about the satisfaction of guests in each choice. By considering the guest experience out of the blue sustainable practices can be effectively coordinated into the hotel business and the built environment. By survey choices through this viewpoint, as it will discuss in chapter five, sustainable practices and service quality can be viewed as adding to hotels. The appropriation of sustainable practices, both amid development and task, is accepted to build the aggressiveness of hotels and brands (Penny, 2007). In the event that these practices are executed effectively in view of the guest experience, this can enable business to prosper in an inexorably focused market (Kasim, 2004). Hoteliers should utilize this further bolstering their good fortune to extend the customer base; in any case, they ought not utilize improper advertising plans to draw in green consumers, indicating next to zero genuine sustainable practices (Heung, Fei, and Hu, 2006; LEED rating frameworks at USGBC help keep this sort of "green cleaning" by giving third-party confirmation of sustainable improvement.

2.3. THE CONCEPT OF VERNACULAR ARCHITECTURE

Each major civilization developed a structure with distinctive lines, such as language, fashion or folklore. For a large number of years, man has created architectural ideas to give adequate comfort in a particular environment, considering local climatic conditions, accessible building materials and in addition social and religious angles. This part shows numerous techniques that have been utilized in vernacular architecture building

2.3.1. The Concept of Vernacular Architecture

The expression "vernacular" has diverse implications, contingent upon the setting of its utilization. Planners, historians, archeologists, folklorists and others have utilized this term. The word gets from Latin *vernaculus*, which signifies "native". Given that architecture is characterized as the exploration of development (Oliver, 2006, p. 4), we can just say that the meaning of vernacular architecture is "local exploration of development". In another definition, Oliver depicts the setting of vernacular architecture:

> *"Vernacular architecture involves the homes and different buildings of the general population." as far as their environmental settings and accessible assets, they are normally built on the proprietor or network, utilizing traditional strategies. "All types of vernacular architecture are built to address particular issues, obliging the qualities, economies and lifestyles of the way of cultures that create them." (Oliver, 1997, p.ii).*

It likewise incorporates another meaning of Oliver:

"*…with regards to vernacular architecture, it grasps what is known and what is acquired about the home, building, or settlement, and incorporates the aggregate insight and experience of society and the standards that are acknowledged by the gathering as suitable to its built environment." (Oliver, 1997)*

In his book House Form and Culture, Amos Rapoport analyzes buildings that have a place with the amazing design traditions and traditions of society tradition. (Rapoport, 1969, p.2) According to Rapoport, the momentous buildings of the grand design tradition were built to awe the majority either with the intensity of the supporter, or an associate gathering of designers and cognoscenti with the insight of the designer and the great taste of the benefactor. Then again, society tradition is the immediate and oblivious interpretation into the physical shape, needs and estimations of culture and additionally the desires, dreams and enthusiasm of a people. It is a little worldview, a "perfect" environment for individuals communicated in buildings and settlements, without a designer, craftsman or draftsman with an issue (however to what degree the designer is really a point-molded designer). The society traditions are firmly connected to the culture of lion's share and life since they effectively live more than the great design traditions, which speak to the way of life of the tiptop. Bernhard Rudovsky was the first to utilize the term vernacular in an architectural setting. He displayed the thoughts of "Architecture without Architects" in a show in 1964 and in his book in 1970 of a similar title. Convey the idea to standard architecture and additionally to the overall population's consideration. Since the coming of the term in the 1970s, vernacular contemplations have assumed an expanding part in architectural design, albeit singular draftsmen have generally unique perspectives about the benefits and ethics of the vernacular dialect. Prior, Paul Oliver clarified, in his book Dwellings; the term vernacular is a kind of building that isn't designed by architects or expert manufacturers (Oliver, 1987 and Cynosine, 2002). The Encyclopedia of Vernacular Architecture of the World (Volume one) characterizes architecture as places of individuals related with their local environmental settings and accessible assets. They are normally exclusive or network built and utilizes traditional acquired procedures. In his book (Design Strategies in Architecture), Baker characterizes the vernacular architecture as takes after: In vernacular architecture, the procedure of development keeps utilizing a model of alterations and changes. Vernacular architecture does not have hypothetical or stylish speculations or models that advance as indicated by local, climatic and economic elements (Baker, 1996, p. 15). Frank Lloyd Wright depicted the vernacular architecture in another way. He said

“Vernacular building is developing in light of genuine needs, being introduced in the environment by individuals who don't know how to fit in with their unique inclination". Oliver clarified that this structure is built to address particular issues and to assimilate the nearby qualities, financial matters and lifestyles of cultures delivered by them (Oliver, 1997). He additionally displays the accompanying basic meaning of vernacular architecture: the architecture of the general population and by the general population (Oliver, 2003, p. 14). Vicky Richardson comprehends vernacularism as an

oblivious work of artisans built utilizing the collected learning of age (Richardson, 2001). In accordance with past definitions, John May characterizes vernacular architecture as the architecture of individuals, designed by local networks, families and manufacturers. His vernacular architecture is built-in of local materials utilizing local instruments and is controlled by local climatic conditions, environment and topography (May 2010). In 1946, Egyptian designer Hassan Fathy was delegated to design the town of New Gurna close Luxor. In the wake of concentrate the traditional Nubian settlements and advancements, he blended the traditional earth block basements of Nubian settlements into his designs. The analysis bombed, because of an assortment of financial reasons, however it was the main endeavor by the designer to address the social and environmental prerequisites of building clients by receiving techniques and vernacular structures. In his book " Vernacular Architecture ", Henry H. Glassie had an alternate view, he clarified vernacular as a term we utilize while defying architectural objects with a craving to comprehend their implications (Glassie, 2000). UNESCO distributions on vernacular architecture are characterized by two primary criteria. The first is that it was built without engineers, and the second is traditional (Ringbom, 1984, p. 7). In (Archi-Speak), a manual for architectural phrasing created by Tom Porter and other recognized donors, the term vernacular architecture was characterized as takes after: Vernacular alludes to the local dialect or tongue of one's local nation, while its utilization in architecture identifies with normal ordinary buildings, as opposed to their well off partners. The Vernacular depicts the traditional dialect of development, normally made out of an obscure, built of nearby materials to suit its unique position, the original climate, and its own local needs. By building locally accessible materials, for example, stone, mud, timber, and straw, vernacular buildings elude little to the overall style or to any predominant architectural speculations. (Porter, 2004, p. 203) Also Bruce Allsopp, in the book (A Modern Theory of Architecture), gives a meaning of vernacular architecture, as takes after: vernacular architecture is a general technique for design got from people architecture. It might be viewed as the improvement of "*natural*" architecture for a locale that can be recognized as far as climate, culture and materials.

In any case, the vernacular architecture, of its own temperament, is constrained to those that can be appropriately communicated “in the vernacular ". It very well may be utilized for otherworldly, fantastic and offices however the cutoff points of aspiration are assemble taste and judgment, scale is a basic factor. Vernacular architecture is homogenous to individuals and thoughtful to the environment. (Allsopp, 1977, p.8) Based on the prior correction of the vernacular term from the perspective of architects and vernacular masters, it very well may be underlined that: vernacular architecture is a structure designed and made by individuals to address the issues, comfort, offices and usefulness of their abodes. Local building materials and motivation from the encompassing environment are the key components in the accomplishment of nearby architecture that keeps them right up 'til the present time.

2.3.1.1. Sustainability in Vernacular Architecture

Sustainability was obvious in traditional social orders and in the lifestyle. The environment was the wellspring of living, and accordingly "sustainability" was not utilized fundamentally as a rule of life; they executed rule in their every-day lives. They lived, developed, ate and built sustainably. Cooperation with the local environment and utilization of normal assets was a piece of their survival on Earth. Hassan Fathy, the Arab archaeologist, considers architecture as a characteristic result of the every-day life of the general public that created it. He says, "Traditional architecture is wiped out in light of the fact that it is a piece of the old lifestyle," (Fathy, 1973, P.35). In like manner, a community that lives in a sustainable way expands on a practical premise. Traditional architecture in the Arab world was a characteristic result of the connection between environmental components (area, geology, geography, climate) and social and cultural qualities (religion, traditions, traditions and cultural foundation). Hutin (2003), a prof. of architecture and sustainable pathways, accepts there are six verifiable standards for accomplishing sustainable homes. They are siting and design; shade; ventilation; earth protect, thermal inertia; and isolated space passages. It is likewise trusted that sustainable design can lessen the measure of the building and perceive traditional, social and cultural qualities.

2.3.1.2. Examining the Characteristics of Vernacular Architecture through the Samples

The characteristics of vernacular architecture based on the concept of realistic sustainability in the following examined angles.

2.3.1.2.1. Compact Urban Planning

The urban fabric of traditional architecture is small in size and the building is built into one complex structure in which it is hard to recognize singular houses. Keeping in mind the end goal to maintain a strategic distance from outrageous daylight amid the late spring and secure against extraordinary temperatures and dust storms, to diminish warm warmth stack on the buildings envelopes, particularly houses (Figure. II8, II.9). A group of patio houses has a cell structure that recommends that man is working in congruity with nature (Macintosh, 1973, P. 7).

Figure II.8. The Compact urban is in Muş / City Center - Kale District (Keskin K., Erbay M., 2016)

Figure II.9. İbrahimpaşa- Ortaköy, compactness of traditional settlements in Cappadocia (Solmaz, F., Şakar, N., Güçhan, Ş., 2014)

2.3.1.2.2. Surrounded urban environment

As a whole, the city's structure is similar to the battles completely closed from all directions that prevent enemy invasion from any side. In fact, it is for defensive purposes and prevents high-speed winds and sand storms from penetrating into the town (Figure II.10).

Figure II.10. Surrounded urban environment in Cyprus castles and fortresses (Pinterest.com)

Thus, the presence of within the city is totally unique in relation to the outside, and the air inside is more static than outside the city.

2.3.1.2.3. Narrow and irregular streets

The city's principle roads confront the overarching winds. Obviously, the boulevards are smaller than those built for different purposes. Certainly if the streets are not narrower than the sand has been blown up the streets and penetrated into the provinces (Figure II.11). Being narrow and surrounded by tall houses, these streets direct breezes, reducing the volume of flights and thus increasing their speed.

Figure II.11. House Façades and narrow streets in the old town of Diyarbakir (Baran, M., Yıldırım M., Yılmaz, A.2010)

2.3.1.2.4. Site planning

The overall architectural style aims to select a suitable direction for the building to reduce the internal temperature during the day and to produce a shaded outdoor living area. (Baran M., Yıldırım M., Yılmaz A., 2010), conducted a comprehensive climatic study over three months (February, May and July) to represent an entire year in a typical, traditional Diyarbakır house, known as a Cahit Sıtkı Tarancı House, which is currently used as a museum see (Figure II.12). Temperature measurements were made in the daytime in each room located in four different parts of the house, including the courtyard, pantry, recess and cooling room. The spring side measurements and autumn side measurements of the house generally gave similar results so only the spring side measurements were used in calculations.

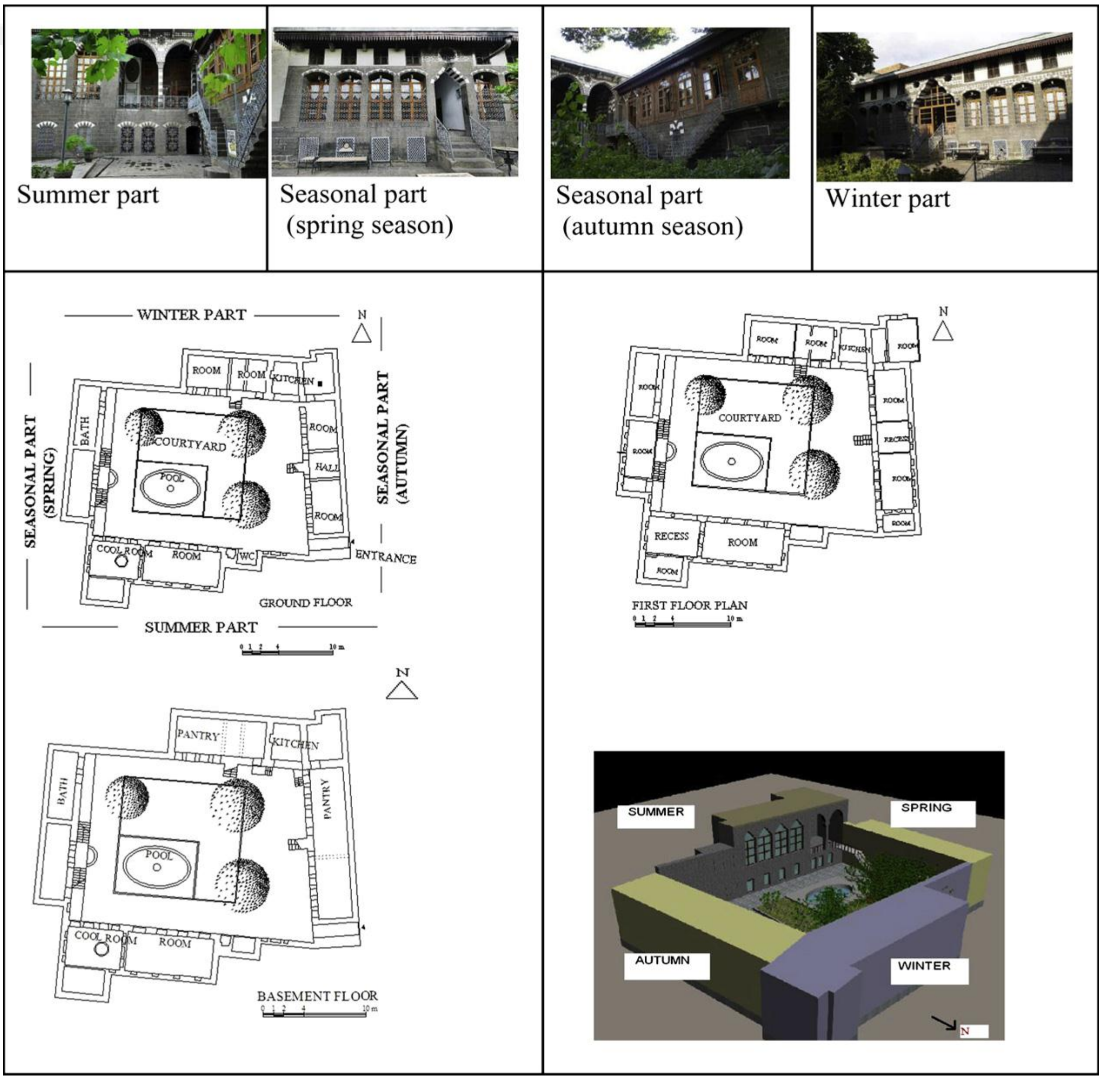


Figure II.12. Seasonal areas within the traditional house in the old city of Diyarbakir (Cahit Sıtkı Tarancı House), (Baran, M., Yıldırım M., Yılmaz, A.2010)

2.3.1.2.5. Design Conception

The concept of vernacular architectural design depends on two methodologies: security and insurance. These two systems impacted house arranging, spatial connections, and architectural points of interest. The focal inward yard, which is open for all rooms, is constrained to family utilize. The Courtyard gave a proper and socially suitable arrangement; it gives shading and protection in an open space (Bagnid, 1989, P. 45). The vast majority of the day-by-day services were in the yard. The yard is a consistent component of local architecture in the vast majority of the Islamic world; be that as it may, it has been produced in various ways and impacted by existing nearby traditions, building materials and environmental variables (Sibley, 2006, p. 49). On the environmental level, the yard was thermally managed, so presentation to the sun ought to be maintained a strategic distance from, and the yards ought to stay little and ruled by high dividers, edges and huge leaves (Macintosh, 1973, P.8). Amid the evening, the road, yard and building are more secured by the shadows of close-by buildings. At the point when the sun sets in the hot bone-dry areas, the air temperature drops quickly as the yard spreads quickly into the starry evening sky. Chilly air starts to dive to the yard and finish the cycle (Moore, 1993, P.51) (see Figure II.13).

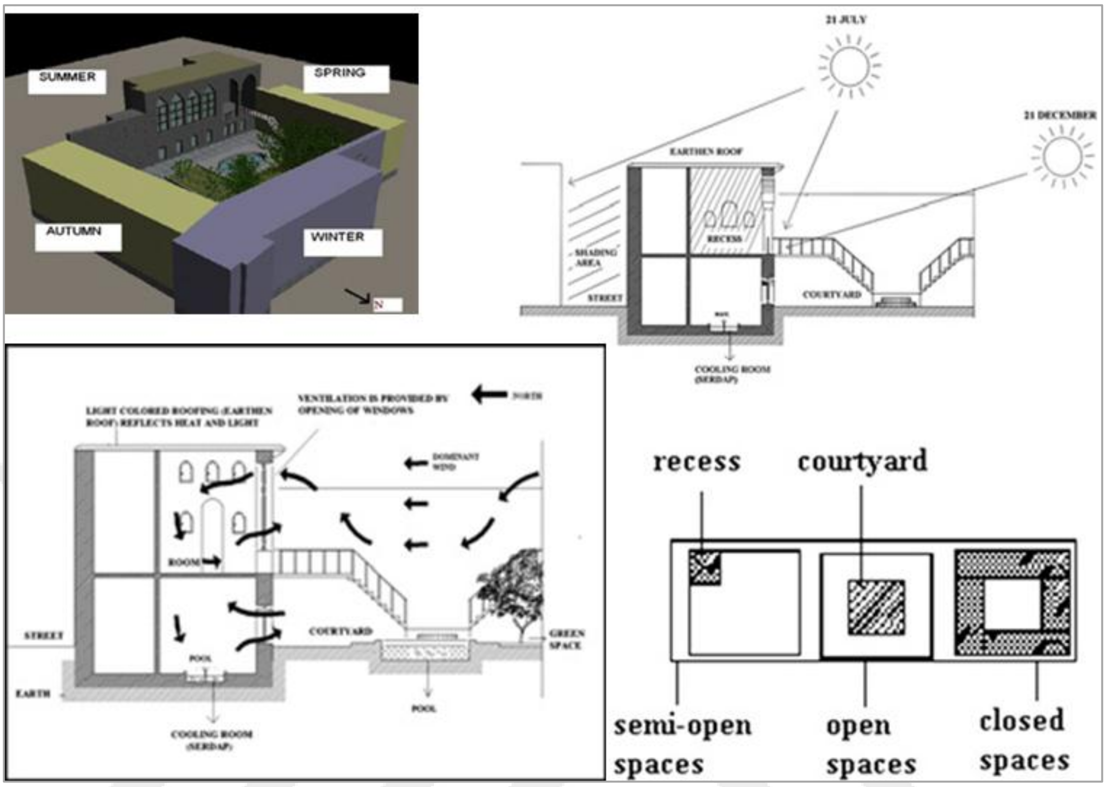


Figure II.13. Thermal performance of the courtyard in a traditional house of Diyarbakir (Baran, M., Yıldırım M., Yılmaz, A.2010)

2.3.1.2.6. Building envelope and materials

Building envelope in traditional house is a powerful hindrance against the most exceedingly awful climate conditions. The principle capacity of the house envelope is to oppose warm exchange, mirroring the sun's beams however much as could be expected, lessening heat and sun oriented pick up to make cool conditions at house and opposing the unreasonable increment in sun oriented energy. (Giovani, 1998, P.120). See (Figure II.14).

Figure II.14. The thickness of Inner faces of the wall stones, Ürgüp increases time lag(Solmaz, F., Şakar, N. Güçhan, Ş.,2012)

Traditional building materials, for example, rock-cut, masonry, stone, palm trunks and wood, are typically ordinary, so they are by and large low in exemplified energy and dangerous (Kim and Rijdon, 1998b, p. 13). Traditional building materials, for example, bricks and stone were gigantic. The warm separators were great when utilized as thick dividers with negligible outside openings (See Figure II.15).

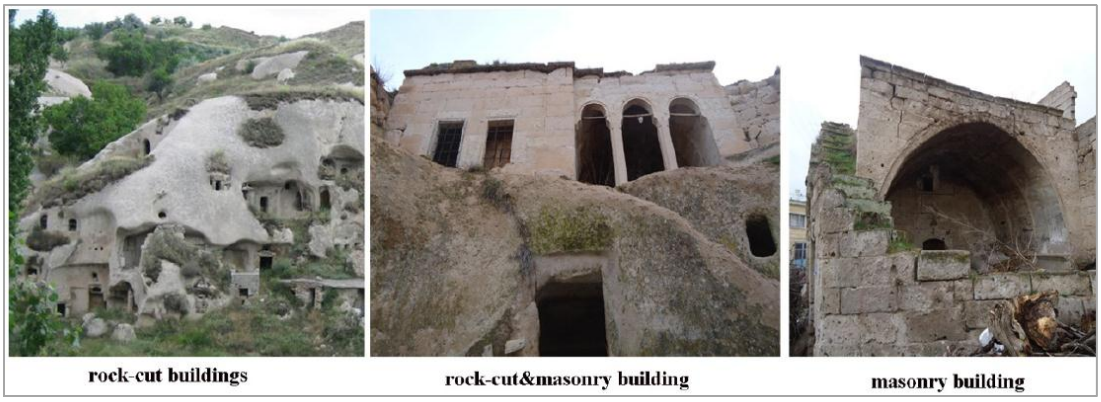


Figure II.15. Use of vernacular components such as rock-cut, and masonry in Cappadocia-Turkey (Ozata S., 2015)

2.3.1.2.7. The Effect of Urban Surfaces

The buildings were unevenly elevated with setbacks on the upper floors and high parapet walls, creating unequal horizons and shading each other in the process. The air breeze that flows on this irregular upper surface tends to create turbulence at this height, thus moving the hot air block among the houses. In addition, the facades of the building were not straight, but were overlapping with a projection barrier to provide shade contrast and receive cold breezes flowing in narrow alleys (Albena, Ibrahim Alam, 1984, p121), (see Figure II.16).

Figure II.16. Many different combinations of stone patterns they employed for roof parapets in Erzurum (Kirbas B., Hizli N., 2016)

2.3.1.2.8. Ivan, Terrace or Tarma

In traditional buildings, there is dependably an interface called semi-open space that connects enclosed spaces to the external environment, light and climate. On the contrary, traditional buildings link closed areas to the external environment and light through an interface, called semi-open space (Roaf et al., 2005, p34). Most often houses have a high terrace with arches or with columns (Colonnade, or Tarma) overlooking the courtyard and acting as a medium space to rooms on the top floor. The terrace is accessed directly through steps from the courtyard. Behind the corridors or columns, which are located on one side or two sides of the courtyard, are the main rooms of the house. This tradition's component of architecture is climatically huge in making warm comfort conditions in adjoining indoors spaces. Ivan will be more effective in winter, while it can create more effectiveness in the spring and summer when confronting the north and the last more usually utilized in many parts of traditional buildings. Ivan was utilized to fill in as a place to live and rest amid the day, rest around evening time, have supper and breakfast, gather guests, pass streets, associate rooms and exploit perspectives of the sky and yard, (see Figure II.17).

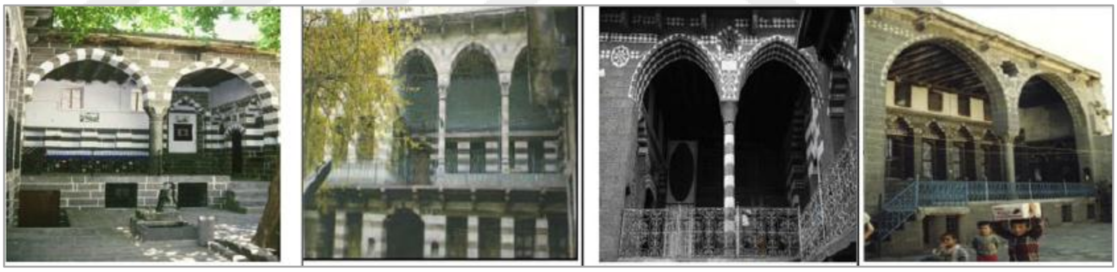


Figure II.17. Ivan, Terrace or Tarma in Diyarbakir (Baran, M., Yıldırım M., Yılmaz, A.2010)

2.3.1.2.9. Natural Ventilation and Chimney Solutions

Ventilation system design is an important part of architecture because of its effects on people's health. Air pollution in a vernacular house of the village is generally caused by the smoke of clay oven which is used for warming or cooking. Chimneys are an important part of ventilation just as windows are. Natural ventilation is possible with an efficient chimney. A well-known principle about fluids is used while chimneys are being designed. According to this principle, ‘‘the narrowing section makes the speed of fluid higher.’ So, the smoke leaves the space immediately. Moreover, there is a small gap which opens to an outer space and this gap provides oxygen for burning without smoking. Explained systems are shown in (Figure II.18., II.19). The chimney of rock-cut buildings is constructed by carving the rock. In addition, the traditional grain pots are used for constructing the chimney of masonry buildings. Using that kind of pots facilitates the process of chimney construction because they are found easily in the region and they are produced with regions’ special clay. The chimney of the rock-cut & masonry buildings has similar features to the other two chimney types.

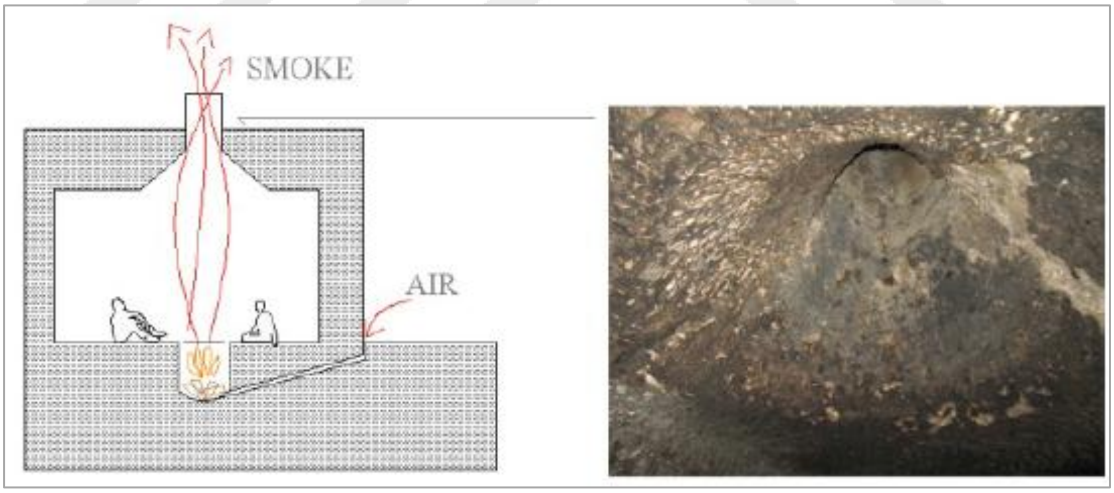


Figure II.18. Chimney detail of rock-cut building in Cappadocia-Turkey

(Ozata S., 2015)

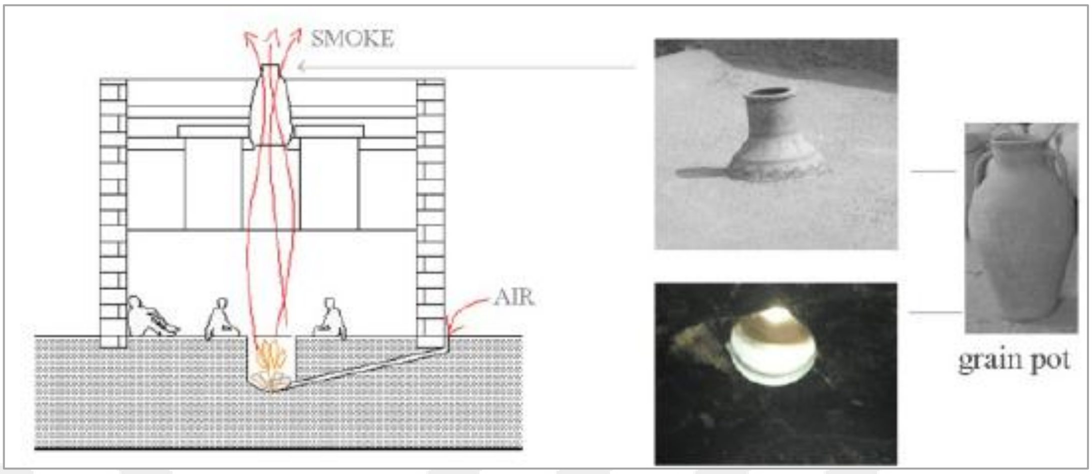


Figure II.19. Chimney detail of masonry building and used grain pot in Cappadocia-Turkey (Ozata S., 2015)

2.3.1.2.10. Natural lightning

Windows are small, and the ratio between their width and length is about 1:2. As seen in (Figure II.20). The amount of natural light of any kind of space is a very important aspect of building design. Windows are designed with an inclination from inside to outside, so that light is received effectively. This window design has two main aims. The former aim is providing more light for the inside part of a building; the latter is narrowing the external area of the window with minimal outer surface in order to prevent the entrance of cold air. These types of windows are generally common for rock-cut buildings.

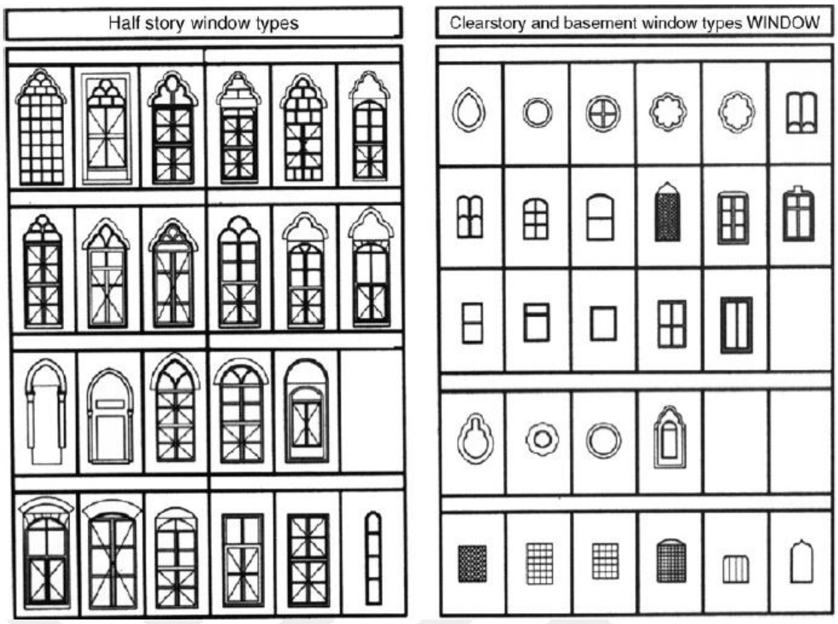


Figure II.20. Window types of the old houses (Serefhanoglu M. S., G. Zorer, Gedık, 2007)

Another common feature of buildings is rock sofas in front of the windows. The aims of designing sofas are making the area which is near to windows more lightened and generating a sitting area which exploits sunlight more effectively. Details of designed sofas and windows are shown in (Figure II.21).

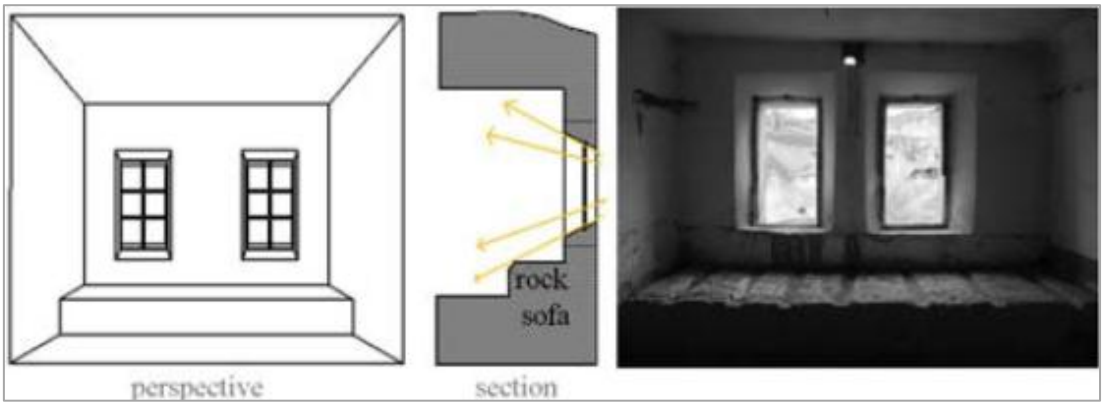


Figure II.21. Natural lighting solutions and rock sofa in Cappadocia-Turkey (Ozata S., 2015)

2.3.1.3. Examples of Vernacular Architecture

Samples of local settlements are historical documents of cultural spread and cultural adaptations from past to present; they vary from place to place and they increase the variety of “places”; therefore they are particularly important. This thesis investigates how to benefit from vernacular architectural knowledge today and in the future. For this reason three architects (Hasan Fathy, Turgut Cansever and Cengiz Bektas) were selected who succeeded in making use of vernacular architectural knowledge and their effectiveness. These architects made attempts to expose their vernacular architectural knowledge through identifications, observations and publications and put their experiences of architecture in particular philosophically in the center of their understanding of architecture.

2.3.1.3.1. New Gourna village in Egypt by architect Hassan fathy

The Gourna Project was implemented around the Upper Nile, in front of Luxor and on the site of the former Thebes village and the Thebes Cemetery of Nobles.It was made to protect the community of the old Gourna (Gournii) who lived over the tombs in the old burial ground of Thebes and thought about their exchange as an answer for lessen the harm to the Pharaonic tombs. The principle highlights of New Gourna are its reinterpretation of traditional urban and architectural environments, their legitimate utilization of local materials and advances, and their unordinary affectability to climate issues (see Figure.II.22). In the time of “modern movement ", it has been demonstrated that sustainability and social union can likewise be coordinated by nearby architecture, materials and strategies. Thus, it is a prime case of sustainable human settlement and the fitting utilization of innovation in architecture and arranging. These thoughts are uncovered in one of the significant references in architecture and arranging, to be specific "Architecture for the Poor": An Experiment in Rural Egypt by Hassan Fathy, distributed in 1976, propelled by these thoughts another age of designers and organizers around the globe through the reconciliation of vernacular innovation with present day compositional standards.

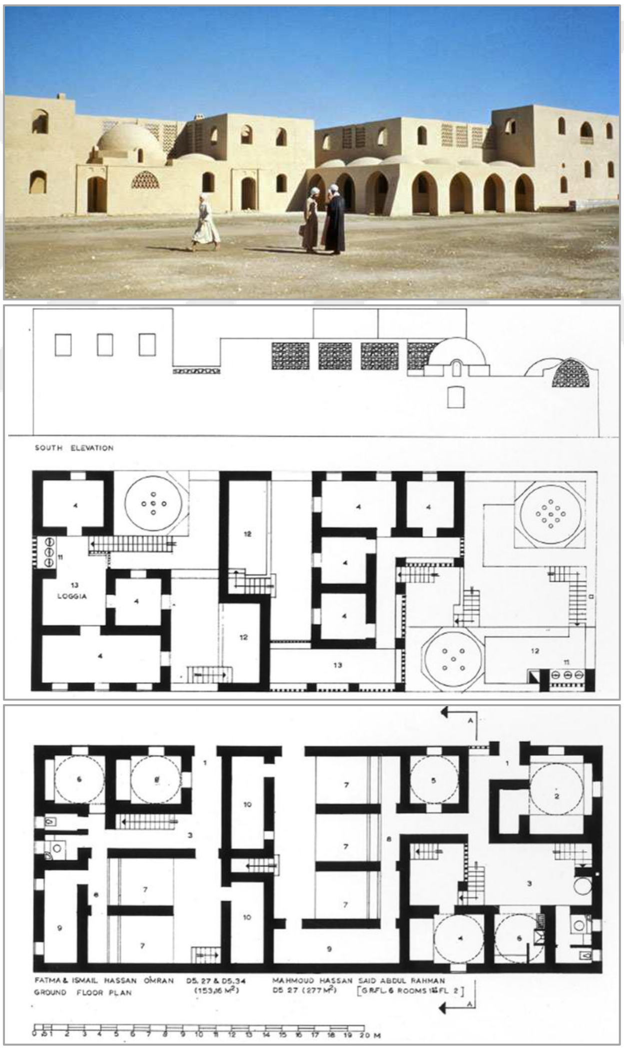


Figure II.22. Defending task of Hassan Fathy's New Gourna Village.[3]

[3] A UNESCO Initiative, Preliminary Phase Document April 2011

2.3.1.3.2. Demir Holiday Village, Bodrum, Turkey by Architect Turgut Cansever

Demir Holiday village is located to the north of Bodrum on Mandalya Bay, where the Aegean and Mediterranean intersect. It is 5 h of land on the bay encircled by a national park. The initial stage of the Demir Holiday village was the erection of Demir houses consisting of 35 independent residences. The settlement consists of certain number of housing types with alternatives including single, two and three-story buildings and the differences between the houses form a whole. In the whole structure, common decisions and principles of all houses are directed to form features; differentiation and dynamism are achieved through articulation of masses of higher scale or through the combination of different types of buildings in line with a programme. The settlement, which is formed through the repetition of housing types, does not create a repetition orientated routine. The status that provides variety is not achieved through differentiation or change of predefined components and housing types. Differentiation and variety are achieved through differences of predefined, standard and unchangeable components and housing types when they get together. These differences provide physical conditions stemming from appropriate positioning of houses towards topography or landscape such as places benefitting from sunlight. This variety and differentiation paves the way for an open-ended settlement. It does not create a closed totality; it can constantly grow and allows for articulation. Cansever paid attention to the reflection of values and behaviors on architecture such as respect for rules of nature, being plain, clarity and neighborhood relations (Ekincioğlu, 2001). Similarly, according to Ayıran (2011) a respectful attitude towards the existing natural environment has been adopted in this village as with local architecture. So everything has been done in accordance with the local construction tradition that abstains from excavation. Tanyeli (2007) also indicates that Cansever constructed Demir houses with a combination of recent technology and old practices. Reinforced concrete and masonry patterns, window frames and open transparent surfaces share the same environment. Cansever suggested the removal of the impregnable epistemological border between the new and the old, which was drawn in the early modern world. He believes that eliminating meanings and usefulness of style and techniques, just because they are old, is not a necessity (Tanyeli, 2007). As streets between houses develop in a pattern that is linear and not based on routine and repetition, a walker faces different perspectives on each occasion. These roads are references to the past and the locality but they also provide possibilities for different experiences to the user (see Figure.II.23).

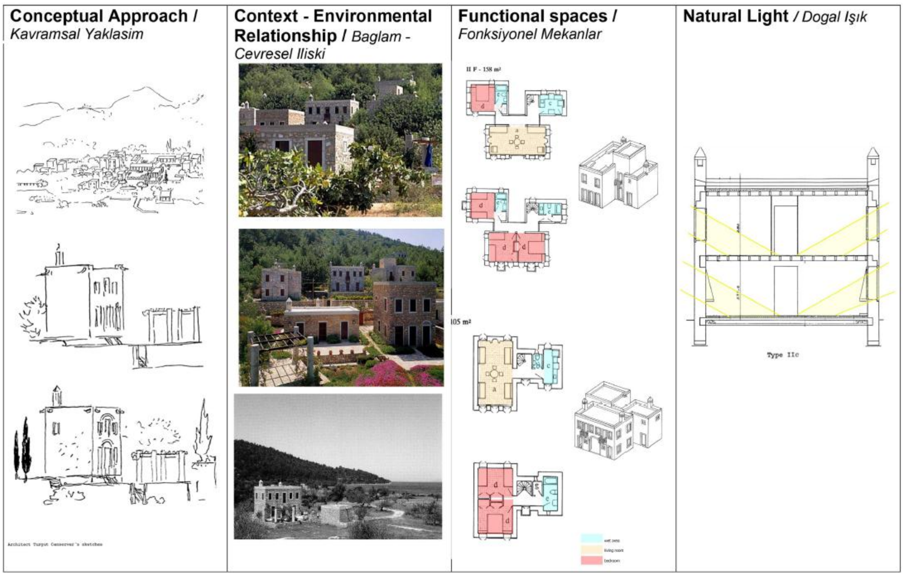


Figure.II.23. Projects of Demir Holiday Village, by architect Turgut Cansever (Alkiser Bregger Y., 2014-2015)

2.3.1.3.3. Olbia Social Centre, Antalya, Turkey by architect Cengiz Bektas

The Olbia Social Centre was designed for the Akdeniz University (Mediterranean University) in Antalya, Turkey. The concept of the new center was based on the architect's belief that, in order for a sense of community to flourish, it is imperative that people from different disciplines should meet and exchange ideas in a relaxed atmosphere much in the way that past civilizations used a common space. He also stressed the importance of incidental and informal learning therefore raising the need to create an adequate space for the students to interact with each other and with the teaching staff. The project received an Aga Khan Award for its intimate human scale, its function as a bridge between several architectural styles and geographic areas of an existing university campus, and its innovative fusion of contemporary architectural elements with local materials. Using symbolic, historical and cultural elements, the centre creates new connections to the past, showing how today's architects can look deep into their own cultures.

The project comprises an auditorium complex; an amphitheater; rooms for student societies; a restaurant and various cafés; a book and stationery shop and various other shops; an exhibition area; and a circulation area articulated with public spaces, waterscape elements, plants and sculptures. One of the tasks in designing the Centre was to solve the identity problems of buildings that existed in different styles, and tie together the disparate parts of the university. The complex is designed according to a basic module that gives flexibility in area divisions and functional changes. The spaces of the project, created in an intimate human scale, flow into each other in a perpetual (see Figure.II.24.a, b,).

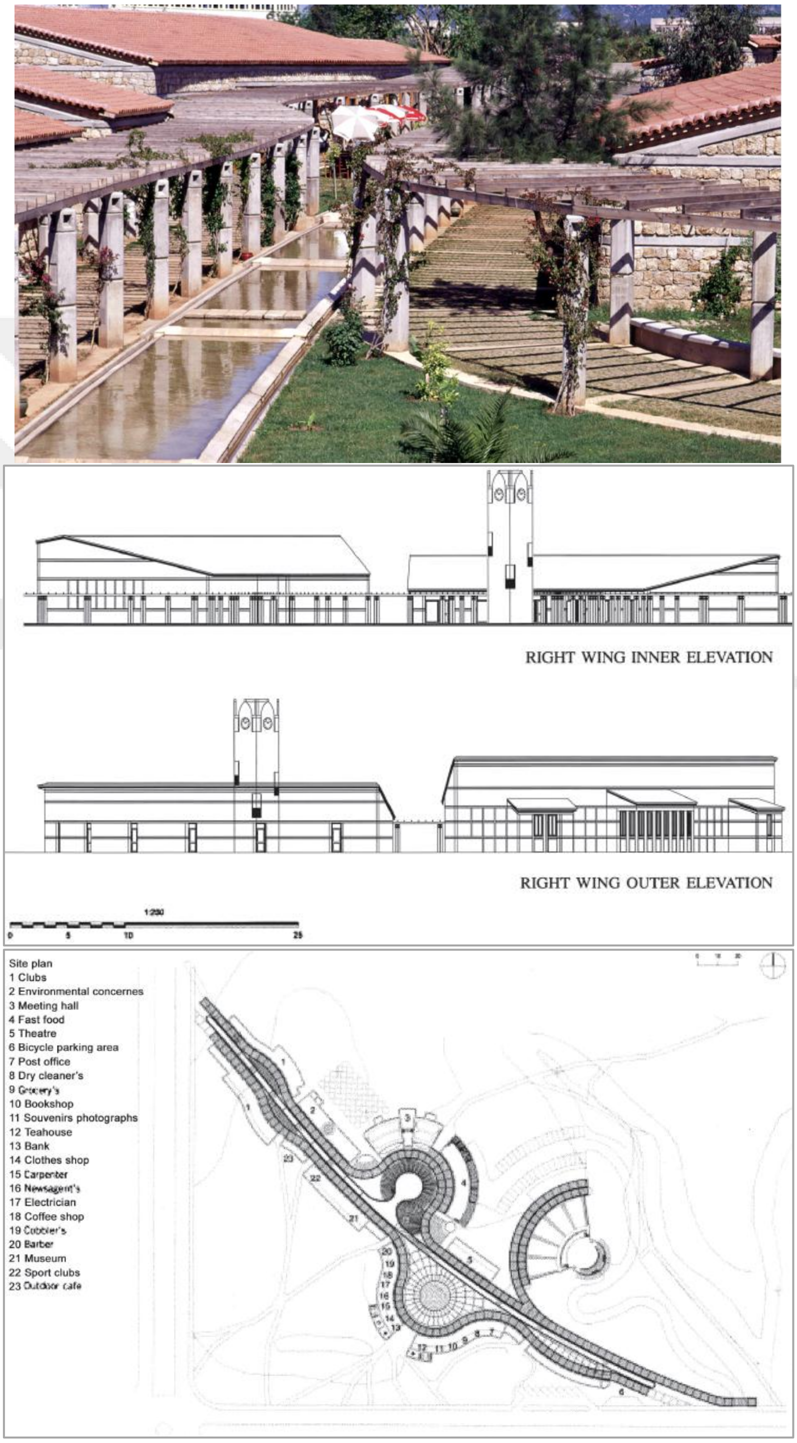


Figure.II.24.a. Olbia Social Centre by architect Cengiz Bektas (ElKerdany D. 2001)

Figure.II.24.b. Olbia Social Centre by architect Cengiz Bektas (ElKerdany D. 2001)

In a shell nut we can summaries the definition of vernacular architecture for each architect who concerned their works on vernacular architecture in Table II.4.

Table II.4. The summary definition of vernacular architecture.

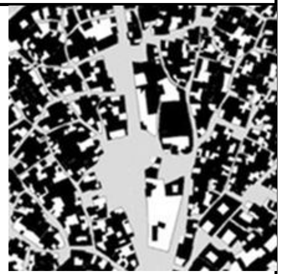
The definition of vernacular architecture by	**Explanation of vernacular architecture**
Oliver-2006	"*Vernacular architecture includes the homes and different buildings of the general population. Identified with their environmental settings and accessible assets they are generally proprietor or network built, using traditional advances. All types of vernacular architecture are built to address particular issues, obliging the qualities, economies and lifestyles of the way of life that create them.*"
Amos Rapoport 1969	"*The society tradition, its needs and qualities and also the wants, dreams, and interests of a people. It is the worldview writ little, the "perfect" environment of a people communicated in buildings and settlements, with no designer, craftsman, or engineer with an issue. The society tradition is considerably more firmly identified with the way of life of the larger part and life as it is truly lived than is the fabulous design tradition, which speaks to the way of life of the tiptop. The people tradition likewise speaks to the main part of the built environment.* "
Bernard Rudofsky-1970	Who initially made utilization of the term vernacular in an engineering setting. He presented the thoughts of "*architecture without architects*"
Baker-1996	"*In vernacular architecture, the procedure of advancement utilizing a model proceeds with changes and varieties. Tradesmen presently build the home. Vernacular architecture does not have hypothetical or tasteful demands and models create as per local, climatic and monetary components*".
Frank Lloyd Wright-1934	"*Vernacular building develops in light of genuine needs, fitted into the environment by individuals who knew no superior to fit them with local inclination*"
Vicky Richardson-2001	"*Realizes vernacular as the oblivious work of specialists that is built utilizing the gathered information of ages*"
John May-2010	"*Vernacular architecture is the architecture of individuals, designed by neighborhood networks, families and developers. Vernacular architecture is what is built from neighborhood materials utilizing nearby devices and characterized by the nearby climatic conditions, biology and topography*"
Hassan Fathy 1973	He is the principal recorded endeavor by a modeler to address the social and environmental prerequisites of building clients by embracing the strategies and types of the vernacular.

Henry H. Glassie 2000	He explained vernacular as a term we use when facing architectural objects with a wish to understand their meanings.
UNESCO 1984	Distributions on vernacular architecture characterize vernacular as indicated by two fundamental criteria. The first is that it is built without draftsmen and the second is that it is traditional.
Tom Porter 2004	*Vernacular alludes to the dialect or lingo of one's local nation, while its utilization in architecture is worried about regular, conventional buildings instead of their fantastic partners. Vernacular depicts a traditional dialect of building, generally of obscure creation, developed from nearby materials to suit their local setting, indigenous atmosphere, and particular neighborhood needs. Being built from locally accessible materials, for example, stone, mud, timber and cover, vernacular buildings make little reference to standard style or to any pervasive hypotheses of architecture.*
Bruce Allsopp 1977	*Vernacular architecture is a summed up method for design got from people architecture. It might be viewed as the improvement of the "natural,, architecture of an area, which is determinable as far as atmosphere, culture and materials. Of its own inclination, in any case, vernacular architecture is restricted to what can appropriately be communicated „in the vernacular". It very well may be utilized for profound, amazing and utility buildings yet points of confinement of respectability are set taste and judgment. Scale is a critical factor. Vernacular architecture is amiable to individuals and thoughtful to environment.*
Turgut Cansever 2000	A Wise man conceives that God gave demonstration of judgment to people so planners can utilize this ability to make new designs as human. He has been prominent figure in reinterpreting and refashioning the centuries old architectural heritage of Turkey through inventing a novel approach that combines traditional architectural principles pertaining to a set of moral values and beliefs with a modern perspective. Turgut Cansever is the only architect, who won the Aga Khan Award for Architecture three times in the world.
Cengiz Bektaş 2006	"*The buildings constructed by those people who have no idea about their own culture and tradition bring into our minds the question "Could these people be the children of such a past?"* *According to me, an architect, especially a Turkish architect has to be aware of the cultural heritage. Architecture is for people and it should be done in a way to provide them humanitarian dimensions; this means to work for their requirements, happiness and health*."

2.3.1.4. The Relationship between the Concepts of Sustainability in Architecture and Sustainability in Vernacular Architecture

Thus by looking on the vernacular architecture in the past we can learn many things about how “home” systems and “human” systems were integrated through creating a perfect eco-system. Today, we cannot take a step backwards to the past’s architectural experiences. We should solve our problems by looking ahead and being aware of our past experiences in order to reproduce a system that is more appropriate to our real needs. There is no doubt that the most important step for this is to give credit to this knowledge within architecture education and base the attempts of conservation and sustainability in architecture in this context. Only through this approach is it possible to generate sustainable and humane living environments. Thus we can conclude the connection and the relationship between the concept of Vernacular Architecture and Sustainable Architecture as in Table II.5.

Table II.5. Relationship between vernacular architecture sustainable architecture[4]

Sustainable Architecture			Vernacular Architecture	
Requirements	Criterion elements	Application goals	Application methods	Illustrations
The site characteristics	**1. Site selection**	- Avoid advancement of unseemly locales - Reducing the negative environmental effects coming about because of the nearness of the building on the site	♣Make the location of the city in the highlands so as not to be subject to drowning and protection from the enemy. ¦♣ Create small rivers to replenish the air and allow for a more beautiful city ♣ Not allowed to build in nature reserves ♣ Not to allow construction in public places such as streets and sidewalks ♣Choose suitable locations where temperance and air quality are considered of the availability of a nearby water source in the city or construction on the outskirts near the water source One of the following methods: ♣Linking cities to rural areas ♣Connecting the cities with the main commercial road ♣ Linking cities with marine sites by isolating industrial areas away from the city because of environmental damage resulting from them	 
	2.Development Density & fabric of society	-Development of urban areas using the existing infrastructure and encourage development a high Density so as to preserve the open space and limit urban sprawl	♣ Division of land and role according to inheritance rules. ♣The existence of a core nucleus representing the heart of the city including buildings and public markets. ♣Assembly services on places of worship. ♣Linking public squares with places of worship for social, cultural and religious events. ♣Divide the city into sections where all basic services are available. ♣Convergence of buildings to represent a single architectural block to resist climatic factors ♣Use an interwoven pattern of urban fabric pattern to juxtapose buildings and residential buildings to achieve a safety point of isolation between resident and outsiders. ♣ Alleys and winding roads (including closed roads) inside camp houses.	

[4] The thesis supported on LEED Guide

The site characteristics	**3.Transportatio n**	- The reduction of the pollution caused by the use of cars -Reducing the space used for cars	♣The use of transportation, such as beauty and horse transport, do not harm the environment ♣Customize parking spaces and transportation, called Merabedh ♣Clean up those places periodically and take advantage of the transfer of waste in fertilizing the land ♣No road congestion,	
	4. Increase of open spaces	-Increase the percentage of open space to optimal use and contain water fountains and green plants	♣Choose the dimensions and squares suitable for the human scale, climatic factors and people's needs. ♣The allocation of squares or squares for each group of buildings ♣Customization of yards within most homes ♣Planning the gardens in the shape of a rectangle around a longitudinal axis. ♣Use waterfalls in gardens and fountains in the inner courtyard of houses. ♣Use colored mosaics and use stained glass. ♣The use of wood and wood decorated by man.	
	5. Reducing the impact of the sun's heat.	-Reduce heat stored as a result of exposure to sunlight and reduce the effects of the sun on the human body and housing.	♣ Construction of narrow streets and inner courtyards. ♣Led winding streets and high buildings led to uneven shadows and shadows. ♣Use building materials with thermal insulation, such as bricks. Use of wood in the work of roofs Use domes to give protection from sunlight more than flat roofs. ♣Cultivation of the courtyard and placing fountains in the middle.	
	6. Reducing light pollution	-Reduction of light scattering from the building and the site and improve the Night Vision severe reduction of lights. -Reduction of natural light intensity	♣ Natural or industrial lighting. Reduce the impact of natural sunlight. ♣The use of lighting methods in oils and fire absolute, fire is the basis of all functions. ♣The use of a lamp and openings in the walls may be narrow inside and out from outside such as the Palace of Zahra in Andalusia. ♣Use marble sculpted geometric shape, written forms. ♣The stained glass was used in the windows as Moonlet. ♣Use Mashrabiya to allow fresh air to enter the house and adjust the passage of direct sunlight.	

The efficiency	**a. Water Distribution** **b. Waste water**	-The efficiency of the distribution of water and do not use Drinkable water for irrigation Reduction of sewage	♣ Digging trenches and establishing dams and canals, such as Baghdad and Cairo. ♣ Channels slit for some cities that rely on wells, springs and rivers. ♣ The use of the theory of waste vessels to connect water as a network of pipes to homes. ♣ Using underground channels, the water moves with gravity. ♣ Drilling of water wells in the houses, away from sewage, because they are not affected by the pool where the waste is collected and cleaned by specialized workers.	
The energy	**a. Improving energy use** **b.Renewable Energy in Site**	- Improving the utilization of energy and decrease of environmental effects of energy use in buildings - Encourage the improvement and utilization of sustainable power sources	♣ Shadow Care In all parts of the urban fabric that we see clearly in energy-saving vernacular architecture, shade contributes energy savings of up to 30% in solar energy and natural phenomena.	
Materials and resources	**-The use of local materials** **-Waste management of buildings** **-Re-use materials**	-Increased demand for construction materials locally manufactured -Reducing waste and environmental impacts of manufacturing raw materials -Redirecting recyclable materials	♣The walls are built of local materials and thickness ensures flexibility and resistance to heat and humidity. ♣Use local materials such as palm fronds, stones and reeds. ♣Use a mixture of gypsum and lime in the manufacture of burnt bricks and the use of hard stones such as granite and marble. ♣Kinds of innovation of mechanical machinery to lift large weights using pulleys, machines such as Krahn and sieve. ♣The use of animal waste in bone walls. ♣Use reeds, wheat, barley and corn to arm bricks ♣Use parts of dead trees in roofing. ♣The use of animal manure mixed with lime in heat insulation. ♣Collecting solid waste from households and using fuel for public baths and plant	 

Healthy Interior Environment	**-Take advantage of the outside air** **-Increased ventilation**	-Increased external sources of -ventilation to ensure the indoor environment ventilation The use of natural -lighting inside the building Control of thermal comfort to increment the comfort of the inhabitants inside the building	♣Using air conditioners (Mlaagaf): the roof openings represent air entrances and push into the room out of the inner courtyard to complete air movement, and be triangular sides ♣The use of Mashrabiya: an architectural approach that allows the air to enter the wind to modernize the interior buildings ♣Use of windows and openings: open the window penetrates the wall and be narrow inside and outside from the outside to expand the angle of vision and prevent direct sunlight from entering ♣The use of plaster or marble engraved with large window sizes in geometrical shapes called sunshades called either by the name of the lesser known moon ♣The use of the courtyard (Hush), which was an open space of the upper rooms and the house overlooking it.	 

2.3.3. Summary

The vernacular architecture, which can be viewed as a sustainable and natural contract amongst man and nature, is the consequence of creative energy, advancement years and climatic prerequisites. It was restricted to local materials and systems accessible at a given time. This has prompted valuable ideas that consider the comfort of the populace as well as the nearby assets and environmental effects of the development utilize. In this section, vernacular architecture was inspected as a wellspring of learning for manageable development arrangements. Key highlights identified with sustainability in vernacular architecture were recognized through a casual examination. The principle goals of sustainable development ventures are adjusting to adaptable and changing environmental conditions, long life, energy protection, squanders minimization, low upkeep cost, and giving individuals the best indoor air quality. In such manner, the consequence of this examination shows that vernacular architecture has noteworthy manageable highlights as it includes the utilization of local materials and unique building materials, and motivation to advance the continuation of low-tech, environmentally friendly solutions and energy effective design standards. Vernacular settlements have all the earmarks of being an awesome chance to find sustainability encounters. Vernacular architecture has inborn advantages with its eco-accommodating methodology. In a nutshell, we can see a lot of relations between the sustainability in architecture and sustainability in vernacular, and it seems that the intermediate element between them is "nature".

2.4. EXAMPLES ON THE RELATIONSHIP BETWEEN THE CONCEPTS OF SUSTAINABILITY & GUEST SATISFACTION

There are numerous misguided judgments about turning into a sustainable hotel, particularly since it isn't monetarily conceivable, that there is little interest for it or that green hotels don't compare to comfort or guest satisfaction. As Sheehan, a specialist in the hotel industry, says, sustainability does not mean sacrificing guest satisfaction but "fulfilling the dreams and desires of our current guests without sacrificing the dreams and desires of future generations. This section will highlight some of the LEED's certified and sustainable hotels around the world that support the idea of

> *…effectively join sustainability and guest satisfaction together in a way that does not take away from an incredible guest experience. When joining sustainability and luxury, the guest experience is critical (Sheehan, 2007). LEED principles at USGBC may give a structure to hotels to adjust sustainability and live up to guests' desires. As noted in chapter III, the LEED evaluation framework comprises of five categories; every one of the five categories can be separated into more particular categories with the measure of credits that can be earned from every class. In any case, the building turns out to be more energy productive and has less effect on the environment.* "

The following section explained the examples of `how to get these credits`.

2.4.1. Examples on the Selected Hotels

This section examines some of the LEED's certified and sustainable hotels around the world as in follow:

2.4.1.1. The Proximity Hotel in Greensboro, North Carolina, LEED “Platinum” Certified Hotel

Certification in 2008 by winning 55 of the 69 focuses accessible under the LEED New Construction adaptation 2.2 rating framework see reference appendix -B-. It comprises of 147 rooms, 5000 square feet of meeting and occasion space and a full-service eatery and flaunts a Four Diamond Rating.

Sustainable site credits: One of the first attractions to greet guests when they turn into an unfamiliar office garden outside the Green Valley Road are 100 solar panels floating above the handsome hotel, which from a distance looks like an old fabric warehouse that brought back to life. Visitors with low-emission and fuel-efficient vehicles can enter a preferred parking space near the front entrance, where the US Green Building Council seal is declared LEED Platinum a designation for the most energy-efficient buildings. An area of two acres (0.8 hectares) of the site including the stream on the west side of the property has been placed in a permanent facility for conservation. The developer also renovated the Creek itself on a large scale, creating the comfort of the hotel, restaurant and terrace. In addition, the construction of the dam in the rainwater catchment pool that collects surface water from the entire 22-acre office complex (8.9 hectares). This dam controls flow, improving its value as habitat and habitat for wildlife.

Energy and atmosphere, credits: About 100 solar panels cover an area of 4000 square feet (372 square meters) of surface, saving 60% of the hotel's needs of hot water. Proximity Hotel utilizes 41% less energy than ASHRAE 90.1, an industry standard that sets a proficient pattern for warming, cooling, water and electrical frameworks in buildings and 36.5% less energy than conventional hotels. The proximity has installed a geothermal cooling system, work sensor systems, and enhanced daytime lighting.

Water efficiency, credits: Water is recycled through sun oriented boards and warmed, at that point put away in tanks, permitting, for instance, a guest to shower high temp water warmed by the sun the day preceding. Lessening water utilize might be the greatest challenge confronting the hotel business and settlement. The Proximity Hotel utilizes low-stream showerheads (2.0 gallons [7.6 liters] every moment versus 2.5 gallons [9.5 liters]), low-stream toilets (1.28 gallons [4.84 liters for every flush), and low-stream fixtures. The engineer reached CEO Kohler specifically while considering the utilization of low-stream toilets, and at last picked a latrine that utilized less water per stream, however contained extra water put away in the repository, utilizing a straightforward gravity to build water strain to expand effectiveness. As per the designer, the execution of water preservation measures has diminished request by in excess of 30 percent contrasted with the utilization of water in other luxury hotels. Proximity has spared 2 million gallons (7.57 million liters) of water in its first year - $ 13,000 a year in savings, compared to a one-time cost of $ 7,000 for water-saving installations.

Materials and resources credits: The Proximity's eatery bar is made of rescued walnut trees that passed on of common causes, room service plate are made of bamboo pressed wood, and reused building materials included 90% reused strengthening steel, 100% reused gypsum board and half reused staircase steel

Indoor environmental air quality credits IAQ**:** 95% of the hotel's occupied area offers access to natural lighting along with outdoor views. IAQ proximity has been addressed by circling a lot of outside air in guest rooms utilizing energy recuperation innovation "External air eased emitted air" (Pearce et al., 2013) Dennis Quaintance, a senior design officer, points out that LEED rating system is a decent model to take after in light of the fact that it offers believability to its sustainable practices (Marano, 2008). Quaintance trusts that sustainability and guest satisfaction can orchestrate agreeably when the guest experience is the principal need. He feels emphatically that sustainable design ought not be stylish, but rather should be homogenous in the environment. Guest perceptions of satisfaction have yet to be altogether investigated inside the setting of a sustainable hotel (Figure II.25).

Figure II.25. The Proximity Hotel images (Ahn, Y. H., Pearce, A.R.&Ku. K. 2011)

2.4.1.2. The Bardessono Hotel in Yountville, California, LEED “Platinum” Certified Hotel

Located on an area of 4.9 acres in the core of Napa Valley, Bardessono is the main hotel on the west shore of the United States to get LEED Platinum, certified in 2010 by gaining 52 of the 69 focuses accessible under the LEED New Construction version 2.2 rating framework see reference appendix -B-. The Bardessono incorporates 62 luxury rooms, a spa, a 75-foot endlessness housetop pool and a fine-eating eatery.

Sustainable site credits: Protection from the rivulet side buildings are reestablished 35 feet from the Hopper Creek, with the establishment of local plants to reestablish the characteristic living space of untamed life and fish while diminishing soil disintegration. Manure: Bardessono collects all vegetables and plants in the kitchen and garden in the "ground bowl". Dividers cut from strong earth and 100-year-old olive trees. Clearing stones and sand on the passageway street to enable water to saturate the dirt.

Water efficiency, credits: The hotel has actualized low water stream offices, twofold toilets and waterless urinals. In outside, nearby dry spell safe scene serves by covered dribble water system framework. Water Recycling: All gray and black water is prepared and reused for water system in Yountville.

Energy and atmosphere, credits: Bardessono has included low-glazed windows that reduce the amount of UV wavelengths from entry into space, ground warm pumps, LED lights, fluorescent lights, and high-proficiency HVAC frameworks, to give some examples. Every one of the guest rooms is furnished with work sensors that naturally control the temperature controllers to alter the temperature in like manner.

The holes introduced on the external surface of the windows diminish the measure of heat in the summer, yet at the same time enable daylight to enter the winter and warmth the rooms. The windows are outfitted with programmed screens to decrease warmth and tallness. The photovoltaic boards put at first glance produce around 260,540 kWh, lessening the reliance of the electrical matrix.

Materials and resources credits: Bardessono acquired the vast majority of its local materials including Monterey Cypress on the outside of a few buildings, reused red wood was utilized from wine drums for a few roofs and open entryways, while walnut was utilized for floors and passage entryways.

Indoor environmental air quality credits: 95% of the hotel's occupied area offers access to natural lighting along with outdoor views. Bardessono contains outdoor venetian blinds that are consequently controlled to perceive daylight and warmth (see Figure II.26).

Figure II.26. The Bardessono Hotel images (Ahn, Y. H., Pearce, A.R.&Ku. K. 2011)

2.4.1.3. The Crosby Street Hotel, LEED "Gold" Certified Hotel,

The UK's dynamic hotel group has launched the first hotel in the United States with a high honor to award the first LEED Gold Certificate in New York State. Certified in 2011 by earning 39 of the 69 grades based on the LEED New Instruction version 2.2 rating system see Appendix-B-. This new 11-storey building is located in

Manhattan's lower SOHO district and is perfectly suited to its historic neighbors. Features brick walls, high ceilings and lots of light. The architects, Stonehill & Taylor, skillfully perfected this hot new hotel in a very small location and gave it the most suitable face for SOHO. There are 86 rooms and suites featuring full-height windows with steel frames. The common spaces reflect a bold and artistic interaction of furniture, color paintings and decorative fabrics.

Sustainable site credits: giving elective transport, bike stockpiling and evolving rooms can acquire them. It offers bike racks and shower/change spaces for guests, guests and staff. Dispense with the requirement for autos and in this manner decrease carbon emanations. Site choice empowers the utilization of green techniques; new development on a site can't be viewed as a noteworthy rural land, close water or wetlands, or land that is viewed as natural surroundings for imperiled or debilitated species. The hotel has reestablished the environment by reestablishing 25% of the nearby estates, and utilizing a green rooftop lessens the island's warm effect, both under the class of site determination.

Water output, validity: are earned for a 20% or 30% decrease of water utilize. By introducing double flush toilets, low stream urinals, and low stream washroom spigots, the hotel decreased water use by 20%.

Energy and atmosphere, validity: Can be picked up to enhance energy execution. A portion of the powerful energy-saving estimates connected in the hotel incorporate the establishment of warmth broken windows designed to stop cool and warmth exchange, the establishment of a 90% more effective gathering evaporator than standard water radiators, and inhabitance sensors introduced in like manner zones. The hotel gives lighting costs, High proficiency in mechanical gear.

Components and resources validity: There are various approaches to acquire acknowledges, for example, changing over 75% of development squander from landfill locales, and Crosby Street has figured out how to change over 95% of the development squander into a reusing facility. To acquire credits for the aggregate reused content, no less than 10% of the aggregate estimation of the materials, both steel, concrete, protection and gypsum items were reused. The utilization of local items, for example, gypsum sheets, blocks, concrete and steel items helped the hotel to get credits for the utilization of provincial materials.

Internal environmental air modality validity: They were filled with the use of low VOC emitting carpets, paints, adhesives and sealants. The rooms were supplied with 100% external air, sifted with successful channels previously being brought into space, and green cleaning hones connected to maintain a strategic distance from the utilization of cruel synthetic concoctions. Outside, the hotel's development has lessened contamination by controlling soil disintegration, water sedimentation and airborne residue age by sifting storm flood passageways utilizing straw parcels, and introducing dust fencing at the building site, utilizing washing boxes to keep flotsam and jetsam from building and conservation. The soil off general society lanes incorporates pictures of Crosby Street, which speaks to the high caliber the hotel keeps up while meeting LEED prerequisites (see Figure II.27).

Figure II.27. The Crosby Street Hotel images (Benson, J., 2013)

2.4.1.4. Orchard Garden Hotel

Opened in November 2006, Orchard Garden is certified in 2007 by acquiring 27 of the 69 focuses accessible under the LEED New Construction form 2.2 rating framework see appendix -B-. These endeavors come because of the designer's responsibility to sound inward designs, the Director General's enthusiasm for sustainable design, and the general temporary worker's learning of the subject. The hotel's proficient building and sustainable highlights create benefits in a few different ways, including fundamentally bring down service bills and positive customer and representative reactions. Subsequently, Orchard Garden offers a common contextual analysis in the group's successful coordinated effort and superior building.

Sustainable site credits: The site is portrayed by concentrated urban improvement near open transport, following the standards of keen development. Amid the development of the plantation cultivate, measures were taken to diminish the measure of soil disintegration, precipitation in waterways and dust.

Water efficiency, credits: Clothing works on, including mass washing and less successive washing, save assets. Tap fans and low-stream washroom toilets help to save water. No outside water system framework is required.

Energy and atmosphere, credits: Daylight is integrated into 82% of the occupied areas at Orchard Garden. The hotel's high ceiling coating reduces the island's thermal impact and saves energy. The residence uses an energy conservation system with a guest room scratch card, which is required to lessen power utilization by 20%. The focal warming and cooling framework in the building is more productive than propeller curl framework. Through appointing, the group has tackled issues ahead of time and lessened energy utilization by guaranteeing that the designed frameworks are in activity.

Materials and assets credits: The aggregate sum of reused materials in building is over 10% (on a cost premise). Building development decides fly fiery debris in cement to keep away from transfer of landfills, moderating regular assets, and diminishing the effect of thermal breaking. 55% of the materials were extricated locally, and 22% of the materials were produced locally. Out of the aggregate new wood in the office, the hotel utilizes half of the board endorsed for Steward Forest (FSC) from Minnesota for a large portion of the furniture and weaving. Every guestroom gives in-room reusing to plastic containers, metal jars and paper, and the hotel offer a scope of batteries utilized for guests.

Indoor environmental air quality credits: The hotel's heating and central cooling system does not require any ozone-exhausting substances (CFCs, HCFCs or halons). Family unit cleaning specialists utilize non-poisonous, natural product based cleaning items. Cements, paints, cover frameworks, furniture, and fittings have low volatile organic compound (VOC) discharges. Figure III.6.contains pictures of Orchard Garden, which represents the high modality hotel upkeep during the session LEED necessities (see Figure II.28).

Figure II.28. Orchard Garden Hotel images (Benson, J. 2013)

2.4.1.5. Hilton Vancouver Washington and Vancouver Convention Center

The Vancouver Washington Hilton and its addition, the Vancouver Convention Center, are certified in 2006 by gaining 26 of the 69 grades based on the LEED New Instruction version 2.2 rating system see Appendix-B-. This task has helped lead the route in the sustainable development and activity development.

Sustainable site credits: This undertaking is a case of the advancement of urban bundles, designed to expand the advantage of open space. All underground parking, which lessens the heat impact on the island, 100% of the rainwater reaching the site is breached. Implementation of best corrosion and sediment control practices during construction.

Water efficiency, credits: Local off-site washing machines use environmentally friendly techniques. The outdoor landscape is local and bear drought. Irrigation is done with unattended peak irrigation.

Energy and atmosphere, credits: Ventilation control utilizing carbon dioxide (CO2) sensors lessens the inside air temperature range to decrease the energy utilized for heating and cooling. The intelligent rooftop significantly decreases the heat island impact and spares energy. The hotel and meeting focus utilizes different sensor advancements, for example, movement control and inhabitance sensors, to expand energy protection. The focal warming and cooling framework in the building is more effective than propeller loop framework. Exercise the command to enhance energy proficiency by guaranteeing that the gear determinations comply with design details. Warmth, as a side effect of swimming pool bundle gear, warmed the swimming pool.

Materials and resources credits: 80.5% of the building squander was reused. Steel, stonewalls, roof tiles and light apparatuses have been related to adjusted substance. 25.6% of building materials and inside design were utilized locally, and 26% of privately utilized materials were made. Each room furnishes guests with reusing in the room and Hilton presently has compost and offers biodegradable hot glasses. The undertaking utilized the cover column with reused content from Bentley Bryan Street.

Indoor environmental air quality credits: CO2 sensors in meeting rooms keep up steady natural air levels. The building HVAC framework does not require any ozone-draining substances (CFCs, HCFCs or halons). Property holders utilize green cleaning items from Johnson Diversity and Ecolab. Cements, paints, cover frameworks, and composite wood has VOC outflows. The heat is controlled through loadable windows and indoor regulators in guest rooms, and also heat associations in meeting territories. Figure III.7. Shows pictures of Hilton Vancouver Washington and Vancouver, which represents the high quality maintained by the hotel while meeting Convention Center LEED requirements (see Figure II.29).

Figure II.29. Hilton Vancouver Washington and Vancouver Convention Center image (Benson, J. 2013)

The following Table II.6. is summery of sustainable and guest satisfaction hotels, which have been certified by LEED while at the same time they maintain the luxuries features.

Table II.6. Summary of sustainable and guest satisfaction hotels

Case study of sustainability &luxury hotels	Construction date	location	Size	LEED Certification level	Earning points	Rating	General Manage	Site page
Proximity	2008	**Greensboro, North Carolina**	147 rooms, 5000 square feet	**Platinum**	55/69	Four Diamond	Dennis Quaintance	https://www.proximityhotel.com/leed_platinum/
Bardessono	2010	**Yountville, California**	4.9 acres, 62 luxury rooms	**Platinum**	52/69	Five Diamond	Jim Treadway	http://www.bardessono.com/
Crosby Street	2011	**New York State**	86 guest rooms	**Gold**	39/69	Five Diamond	architects, Stonehill & Taylor	http://www.architectural-holidays.com/venues/crosby-street-hotel-2/
Orchard Garden	2006	**San Francisco, California**	86 @ 648 GSF per room	**Certificate**	26/69	Three Diamond	Stefan Mühle	http://www.theorchardgardenhotel.com
Hilton Vancouver Washington and Vancouver Convention Center	2005	**Vancouver, US**	226 @ 863 GSF per room	**Certificate**	26/69	Four Diamond	Hilton Hotels Corporation	http://www1.hilton.com/en_US/hi/hotel/PDXVAHH-Hilton- Vancouver-Washington-Washington/index.do

2.4.2. Summary

Characteristics can reduce capital costs for building hotels and material by increasing the required heating and cooling systems, rainwater capacity, and reuse of foundation and equipment.

The required size for heating and cooling systems in the building can be accomplished through a building-proficient building envelope.

The utilization of normal water and/or filtration maintenance can diminish the requirement for costlier repositories and frameworks. Adjusting a current building or reusing building materials for a venture can decrease in advance expenses by limiting the measure of new development materials and lessening the measure of waste sent to the landfill.

By making an incorporated arranging and design group, and by using entire frameworks considering, overall capital development expenses can be lessened.

Minimizing impenetrable surfaces lessens the required measure of tempest water foundation and the utilization of traditional clearing materials.

Recycling development waste can limit costs in light of the fact that most landfill expenses are higher than reusing charges, and extra development materials can be reused or exchanged.

In a shell nut we can state that guest satisfaction still can't seem to be altogether investigated inside the setting of a sustainable hotel.

III. EVALUATION OF HOTELS IN TERMS OF SUSTAINABILITY AND GUESTSATISFACTION: IN THE CASE OF CAPPADOCIA

The examination segment of this thesis will begin with expressing the hypothesis of the investigation and this will likewise incorporate an examination of the picked methodologies and move made amid the conduction of the exploration. The hypothesis of the investigation that fills in as the concentration for information gathering, decides the bearing and extent of the examination is the accompanying:

(i) It is possible to combine sustainability and guest satisfaction in hotels within the context of vernacular architectural style.

(ii) Simulating the concept of sustainability in the context of vernacular architecture achieves Verification of compliance with ASHRAE 90.1 & ARCH 2030 standards.

(iii)There is a positive relationship between guests' overall satisfaction level and hotel service quality practices.

(iv)There is a positive relationship between the sustainability in architecture and the sustainability in vernacular architecture.

It is expected that sustainability and guest satisfaction in struggle however this thesis chose to examine the genuine circumstance and see if it is true. Furthermore, examples on sustainability and guest satisfaction hotel in the previous chapter supported the hypothesis of the study that sustainability and guest satisfaction should not be in dispute, choose to inspect the declaration of this presumption in struggle and chooses to look at how far this suspicion is affirmed in a genuine setting. Blended strategy has tried the examination's theory. Mixed method was thought to be the most proper for gathering information required for testing the study's hypothesis. The primary favorable position of a subjective report is that it endeavors to gather, incorporate, and display information from an assortment of wellsprings of proof as a feature of any given investigation (Yin, 2011:7). As indicated by Flick (2007) another preferred standpoint is that with subjective research it is conceivable to deliver point by point and correct investigations of a couple of cases, in which the members have opportunity to figure out what is significant for them and to introduce in its specific situation. The practical study consists of two parts; for exploring the concept of sustainability and guest satisfaction inherent in Cappadocia's vernacular architecture.

Measuring sustainability inherent in Cappadocia's selected vernacular hotels,
Identifying guest satisfaction in Cappadocia's selected vernacular hotels.

3.1. Measuring Sustainability Inherent in Cappadocia's Selected Vernacular Hotels

To explore the concept of sustainability inherent in Cappadocia's vernacular architecture, yet to consolidate the concept of sustainability an integrated method that links Building Information Modeling tools (BIM), with Building Performance Analyses (BPA) have been chosen. BIM's instrument is altered to permit its mix with the energy examination application to distinguish the potential pick up or loss of energy for the building, recognize and assess its sustainability in light of ASHRA standard. Building Information Modeling devices (BIM) enable clients to do finish energy examination and investigate distinctive energy saving choices amid the design organize and existing buildings. This would encourage proprietors and designers settle on energy related choices that have high effect on the proposed building life cycle cost. As before mentioned in chapter two that Krygiel and Nies (2008) indicated BIM can help in the accompanying parts of supportable design.

Building orientation

Building massing

Day lighting examination

Energy demonstrating

Water gathering

Sustainable materials

Site and coordination administration

Nevertheless, BIM practices take more significance and turn out to be more effective when are blended with different strategies as Building Performance Analysis (BPA). For this reason, the study adopted to choose three different cases in Cappadocia/Turkey to distinguish and investigate green design that make a sustainable environment. Since the proposed strategy incorporates of sustainable building ventures in 3D with energy examination, building performance analyses.

3.1.1. Case Study Selection

For the purpose of this study, three hotels in Cappadocia/Turkey have been selected which are (Millstone cave suites) - (Jacob's Cave Suites) & (Hidden Cave Hotel).Since Cappadocia, is popular with its natural scenic beauty, also has many important and special vernacular architectural features. In this study, hotel cases which were built in Cappadocia were simulated and an energy report was delivered. Also, solar and indoor daylight investigation was finished utilizing an introduced module accessible for Revit, which utilizes cloud and nearby computations for show each examination separately.

3.1.2. Cappadocia Region and its Vernacular Architectural Characteristics

The Cappadocia region is located in Central Anatolia, Turkey. Defining the exact boundaries of Cappadocia is difficult due to its changing borderlines in history. According to most of the written documents, it is bordered by Taurus Mountains in the south, Kızılırmak River in the north, Kayseri province in the east and Tuzgölü basin in the west. Boundaries of Cappadocia Region according to its morphological characteristics are limited by boundaries of Nevsehir province and a valley of Kayseri province, Soganlı (see Figure III.1). Winters are cold, rainy and snowy; summers are hot and dry. Continental climate is dominant in the region. The rainiest months are March and December and the hottest and driest months are July and August. Dominant winds blow from north. There are three main building types in Cappadocia. These are rock-cut, rock-cut & masonry and masonry buildings. Rocky earth of the region has great effects on the vernacular architecture.

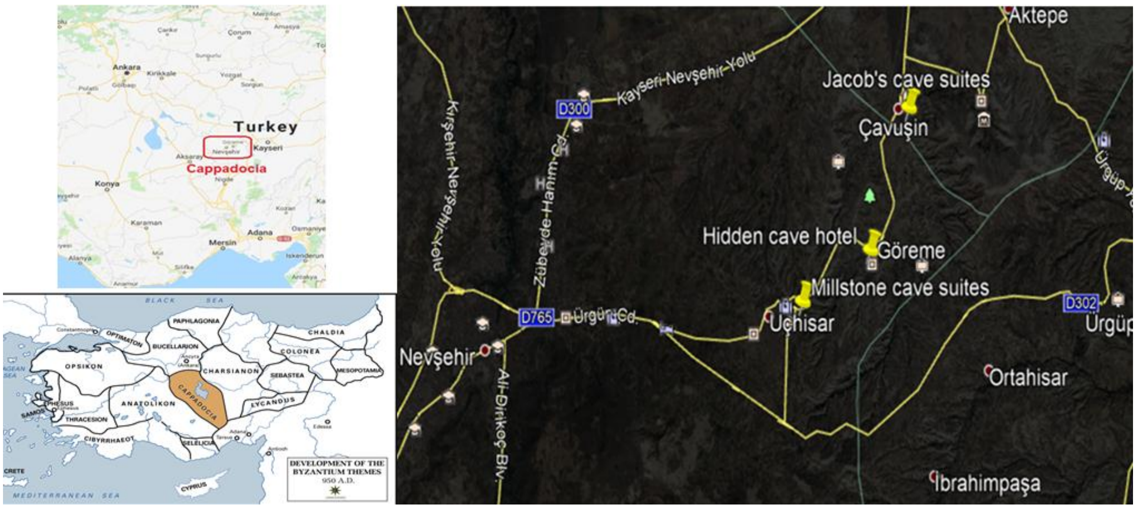


Figure III.1. The place of Cappadocia region and study area (Google earth)

3.1.2.1. Millstone Cave Suites

Situated on a hill overlooking Goreme, the Kızıl Valley and the Guvercinlik Valley, Millstone Cave Suites features scenic Uchisar views. This landscape is one of the outstanding features of the hotel and is highly appreciated. The Millstone Cave Suites is a stylishly designed cave hotel with impressive details in every room and every corner of the hotel (Figure III.2).

Figure III.2. Millstone cave suites images.

3.1.2.2. Jacob's Cave Suites

Jacob's Cave Suites is located in the Old Greek Village of Çavuşin in the heart of Cappadocia in the historical National Park. Jacob's Cave Suites were opened to service in August 2015 as a result of the restoration of the two caves, which consist of 8 cave rooms, 4 stone arch rooms and a faithful restoration. The building, with its historic features, is equipped with the modern facilities of today and offers its guests a unique stay with its 12 suites and services. The Greek architecture of the region is very dominant in the Çavuşin. The most important reason for this is that cave houses are cool in summer and hot in winter. Although the exact date of the cave rooms on the first floor of our facility is not known, the stone and arched rooms on the second floor were added to the 1920s with completely natural stones removed from the area. After the addition of the second floor, cave rooms were used as food storage, cellar and kitchen (see Figure III.3).

Figure III.3. Jacob's Cave Suites Hotel images.

3.1.2.3. Hidden Cave Hotel

Situated in the heart of Goreme, Hidden Cave Hotel offers traditional architecture with traditional stone walls. The resort also has a terrace with city views. The simply decorated rooms all have a seating area (see Figure III.4).

Figure III.4. Hidden Cave Hotel images

3.1.3. Evaluation Process

This research considered three different buildings that have been built under vernacular architecture concepts with similar indoor space idea and uses between them. Thus, an equal procedure was developed for each building and it was based on building performance analysis process using Autodesk programs as Revit Student 2017, Insight 360 and Form It. The aim of this section is to explain the analysis and program configurations starting by climate, followed by setting up of initial models, energy calculation settings and finalizing with insight 360 scenarios. In this way, the assessment procedure comprises of a few phases, starting with the improvement of the building data model and finish of compliance with ASHRAE 90.1 and ARCH 2030.Come among the best performance scenarios.

3.1.4. Site and Climate Settings

Considering real environmental conditions, it means that climate data, site In order to achieve the best results possible, all programs were set up location and weather station were carefully selected taking into account its relevance and nearest number from actual conditions. For this research the location and weather conditions for all studied buildings are in Table III.1.

Table III.1. The location and weather conditions for all studied buildings

Requirements	**Address**
Address of all projects:	50502 Avanos, Turkey.
Virtual weather station in Revit 2017	1256087_2006
Latitude	38.669189453125
Longitude	348368873596191
Altitude	1237.00 m.a.s.l.
Clearness number	1
Heating Design Temperature	- 10 °C
Use HVAC design data from W/Station	Yes

Moreover, (Figure III.5) shows the entire weather configuration done for all models and data input selected in the Autodesk Revit 2017 program. As it is shown, the cooling design temperatures were similar to the environmental conditions of the area as was explained before.

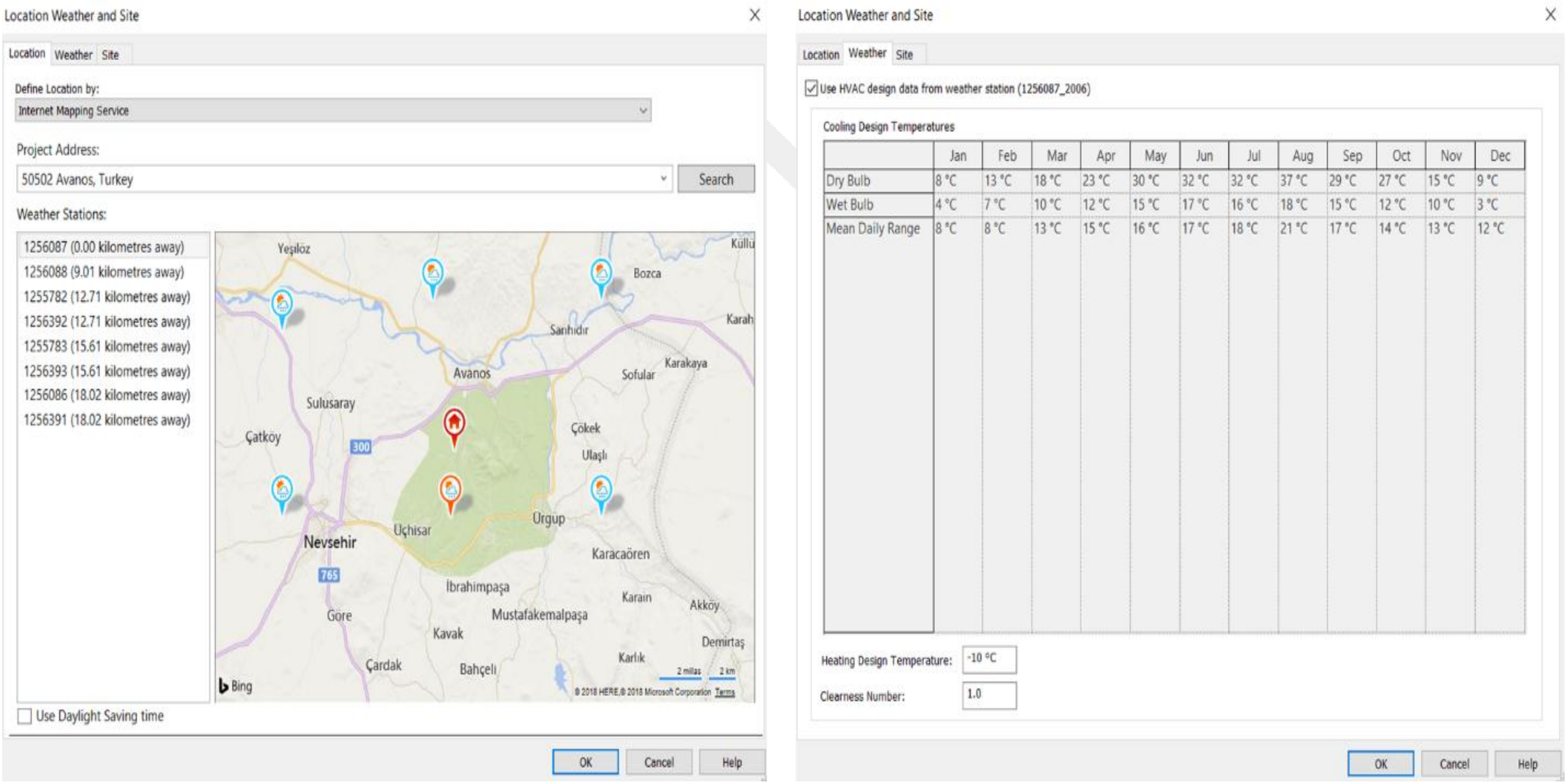


Figure III.5. Location and Weather station configuration (Revit, 2017)

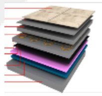
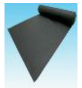
3.1.5. Building Information Modeling - Initial Building

The three-dimensional building model was created in exact conditions and was produced in AutoCAD 2D. This implies it contains the most vital subtle elements keeping in mind the end goal to build the unwavering quality of this investigation. All three buildings were modeled on Autodesk Revit Student 2017.

According to Bergin, et al. (2014), it procedure allows to create and handle a digital model that includes real building properties as materials with its physical and thermal attributes. In addition, all models on the first step were basically formed by a local material called Rock with an average thickness of 0.71 m with an overall resistance R- value 1.1455 (m2*K)/W and a thermal mass of 153.54 kJ/K. Those two values are really important for energy use calculation because it conditions the amount of heat is absorbed or expelled by indoor areas due to the heat flux through all building elements. All specific attributes of this Rock material, which were used for calculation of the data explained beforehand, are shown in Table III.2. And (Figure III.6, III.7, III.8, III.9, III.10, III.11, III.12) also more information about materials can be seen in Appendix-C-

Table III.2. Material Information Analytical Properties

Material Information			Analytical Properties				
English translate Materials	**Picture / Resim**	**Brand or supplier**	**Heat Transfer Coefficient (U) W/(m.K)**	**Thermal Resistance (R) (m2.K)/W**	**Density**	**Specific .heat**	**Thermal Mass kJ/K**
Paving stones (Kaldırım taşları) 2cm		Stone contact	1,7	0,588235294	2000	1000	2000000
Alum (Şap)2 cm		Styron it	0,38	2,631578947	1200	1000	1200000
Rock (Kaya)			2,6	0,384615385	2600	1000	2600
Bituline(Bituline) 3-6cm		Ondu line	0.500	2	1700	1000	1700000
Pebble (Çakıl) 4cm		stone contact	0,96	1,041666667	1800	1000	1800000
Stone arched cover(Taş kemerli kapak)			2,6	0,384615385	2600	1000	2600
Topcoats Bituline(Topcoats Bituline) 8mm		Ondu line	0.500	2	1700	1000	1700000
Stone-looking ceramic coating(Taş görünümlü seramik kaplama) 2-3 cm		Turkish ceramics	1,3	0,769230769	1900	800	1520000

Laminated wooden beam (Laminalı ahşap kiriş 24/10		Nova wood	0,138	7,246376812	620	1300	806000
Floor heating system (Zeminden ısıtma sistemi) 4-5cm		Olesen	//	//	//	//	//
Thick wooden		//	0,1	10	500	1000	500000
Polystyrene panel		//	0,035	28,57142857	25	1400	35000
Concrete screed		//	0,38	2,631578947	1200	1000	1200000
Filter layer -felt (Filtre katmanı-keçe)		ÜRÜN KATEGO RISI	0,042	23,80952381	150	1340	201000
Veneer (Kaplama) 14 mm		Milano Agac Kaplama A.S.	0,138	7,246376812	620	1300	806000

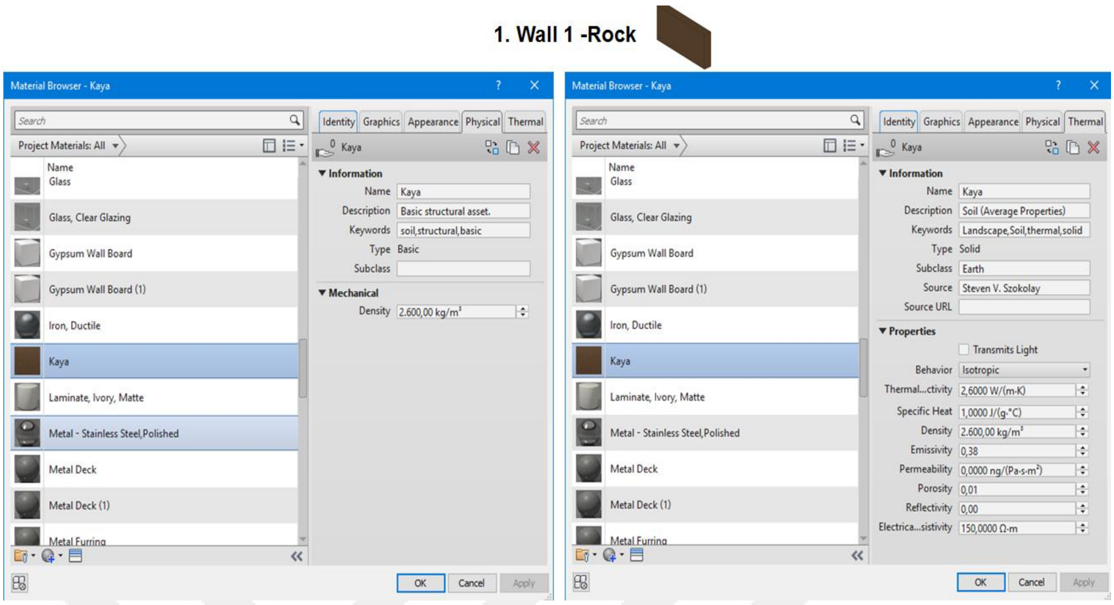


Figure III.6. Physical and Thermal properties of Rock-wall (Revit, 2017)

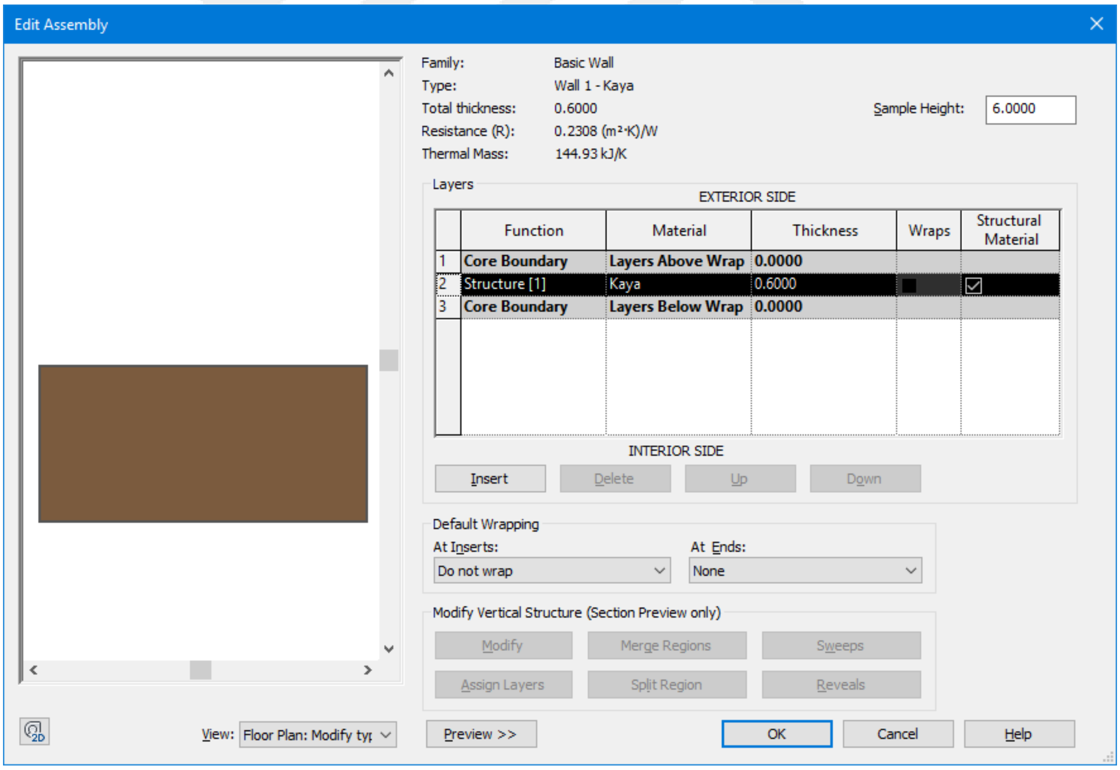


Figure III.7. Total thickness and Thermal properties of the Rock-wall (Revit, 2017)

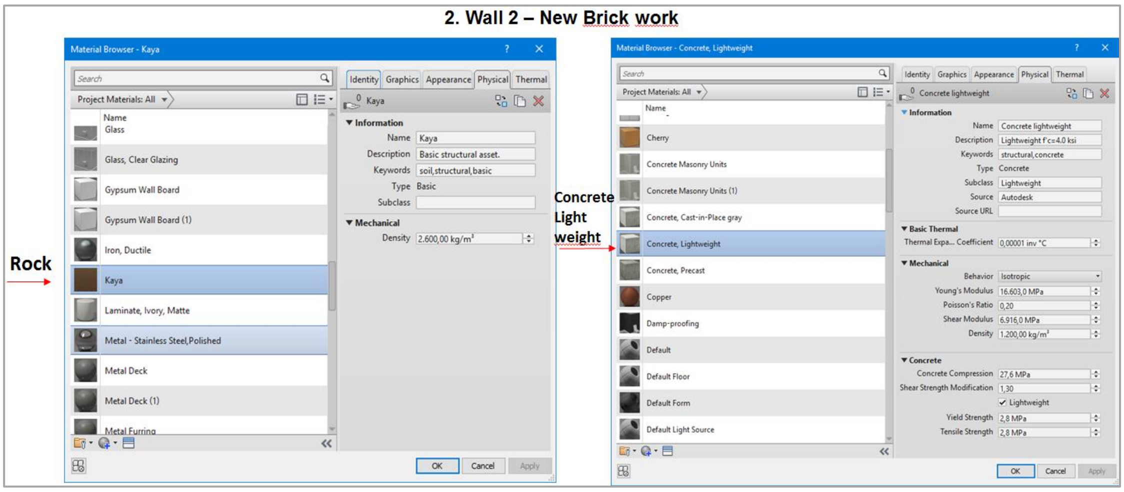


Figure III.8. Physical and Thermal properties of the New Brick work (Revit, 2017)

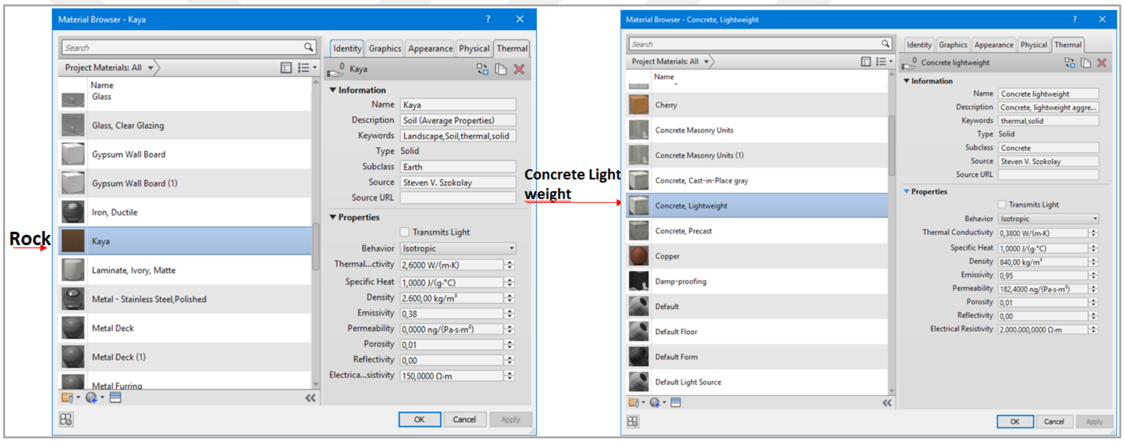


Figure III.9. Physical and Thermal properties of the materials (Revit, 2017)

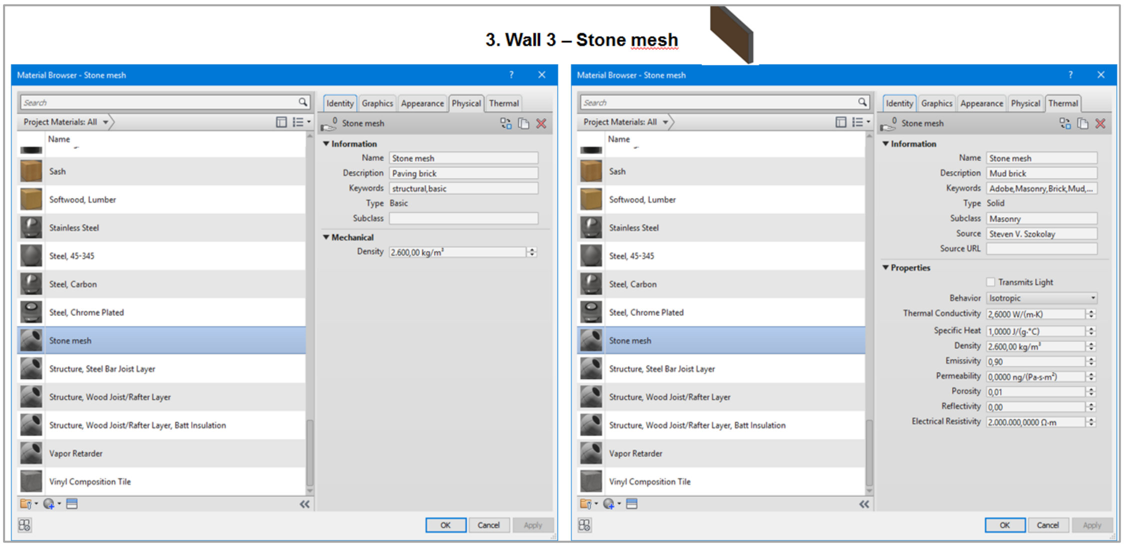


Figure III.10. Physical and Thermal properties of the Stone wall (Revit, 2017)

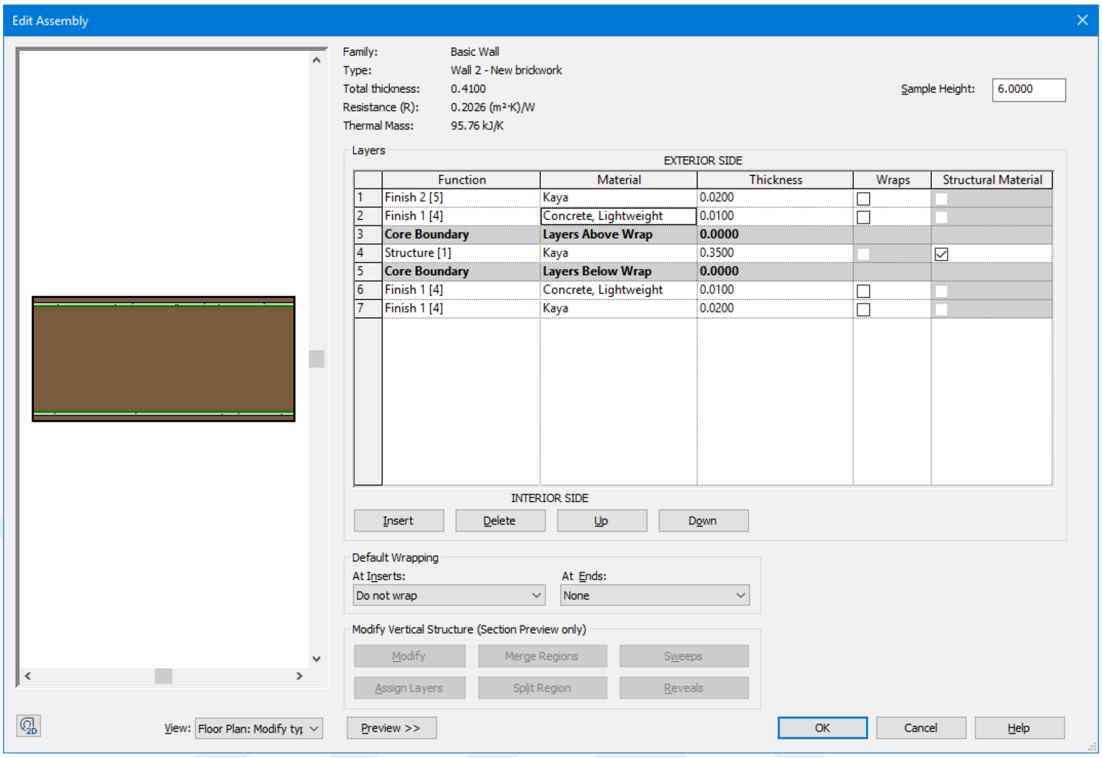


Figure III.11. Physical and Thermal properties of the New-Brick wall (Revit, 2017)

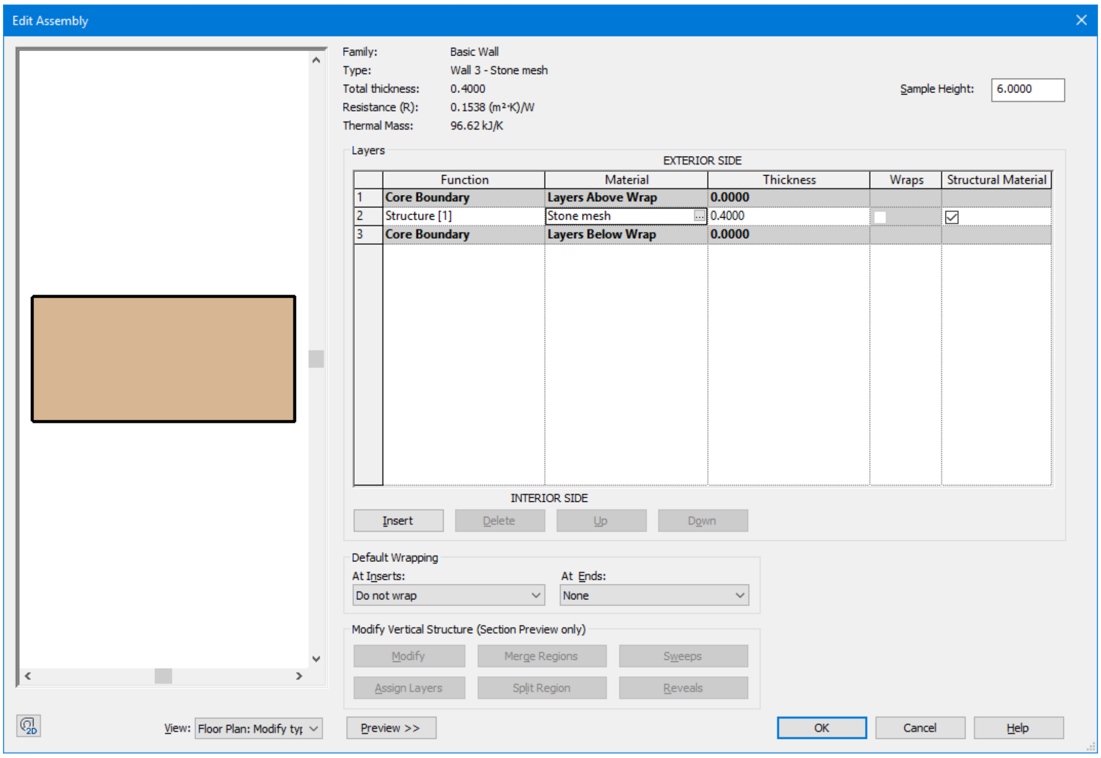


Figure III.12. Physical and Thermal properties of the materials (Revit, 2017)

With the aim to increase the accurate of this research, all models were done taking into account all internal and external elements as windows, doors, floor levels, roof forms and immediate landscape areas like streets, mountains or breast walls. See example on following (Figure III.13, III.14, III.15).

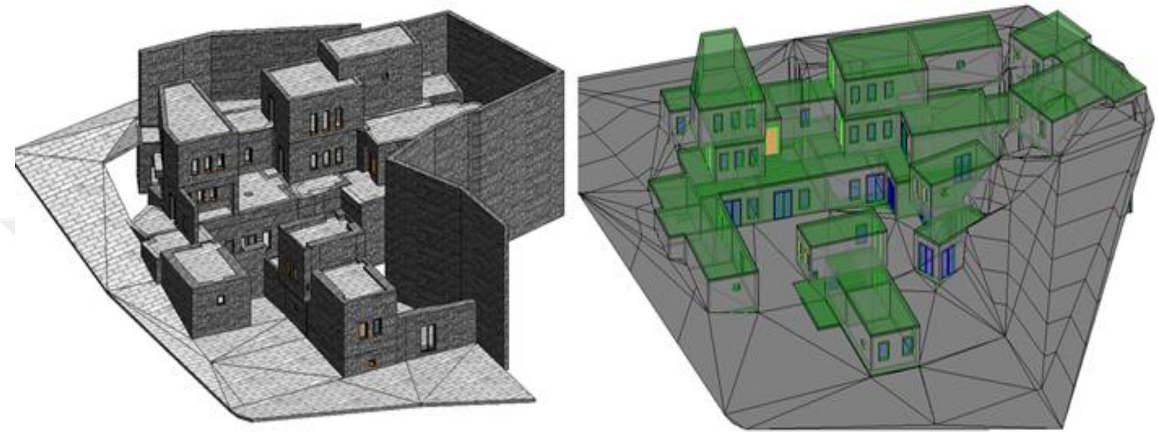


Figure III.13. Example of BIM model of Millstone cave suites Hotel(Revit, 2017)

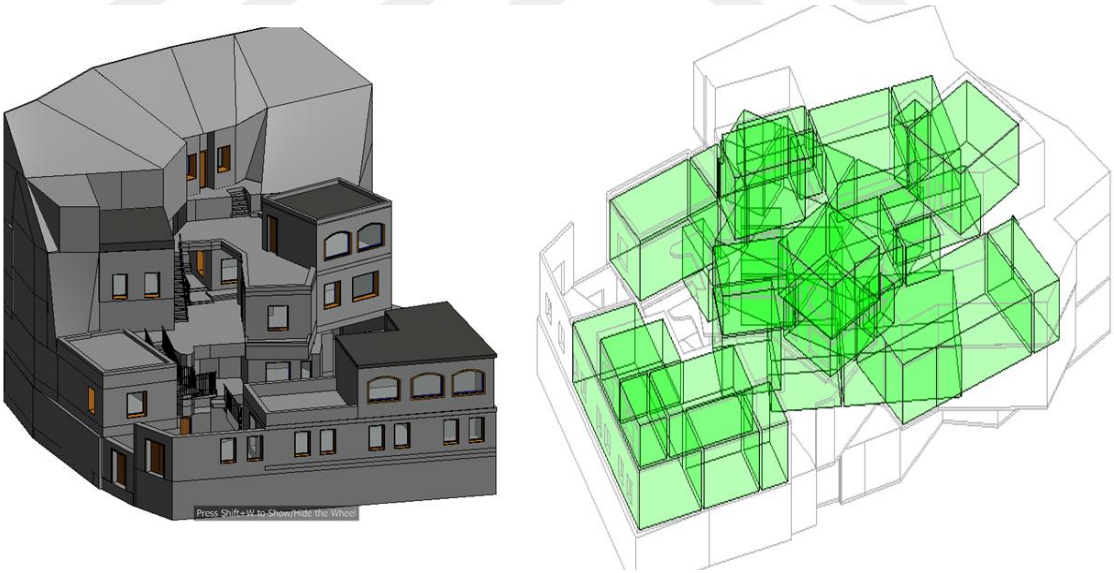


Figure III.14. Example of BIM model of Hidden Cave Hotel (Revit, 2017)

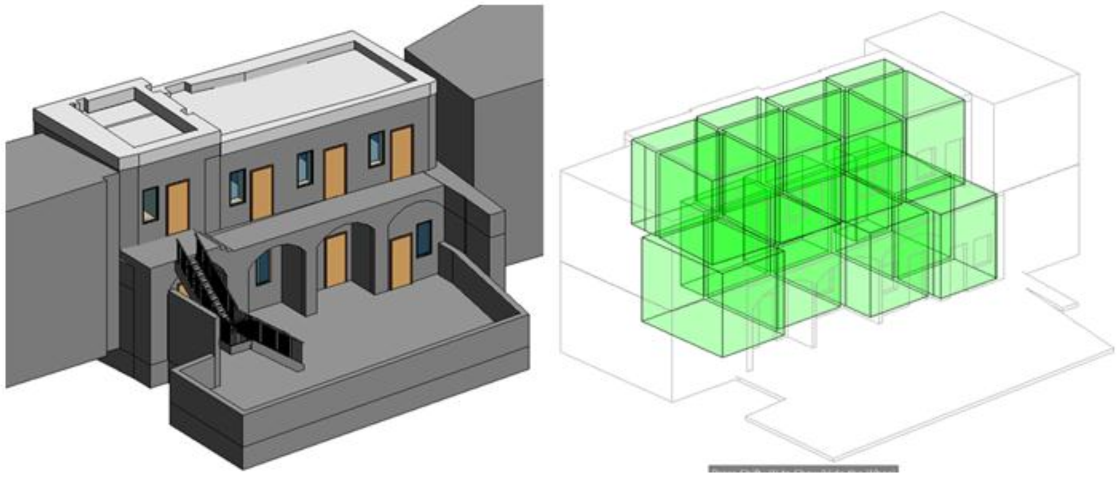


Figure III.15. Example of BIM model of Jacob's Cave Suites Hotel (Revit, 2017)

3.1.6. Energy Settings

After architectural modeling, there was a need to determine the energy assumptions of the entire project and specific internal conditions. It is widely known that the results of any program calculation are directly related with the initial information used as input data. For this case of study all models were configured considering its particular space use and the entire energy zones respond to particular loads including people and equipment's. Revit program creates a Green Building XML file from the entire model and its energy conditions; this file is analyzed by Green Building Studio (GBS) web-based program development by Autodesk, which is capable for energy analysis but it cannot perform a building model from the scratch (Autodesk Sustainability Workshop, 2015). It is for that reason why the energy settings are very important. In all models the building type was configured as hotel with default operation hours and HVAC system, which is corresponding to a hotel facility located in cold climates. In addition, the analytical configurations as space and surface resolutions were set up as default REVIT program, which are 0.4572 and

0.3048 respectively. Moreover, with the aim to increase the performance of analysis the export mode and category were configured for use conceptual masses, building elements and energy spaces inputs. All general inputs are shown on (Figure III.16, III.17, III.18). And Appendix -H, I, J-

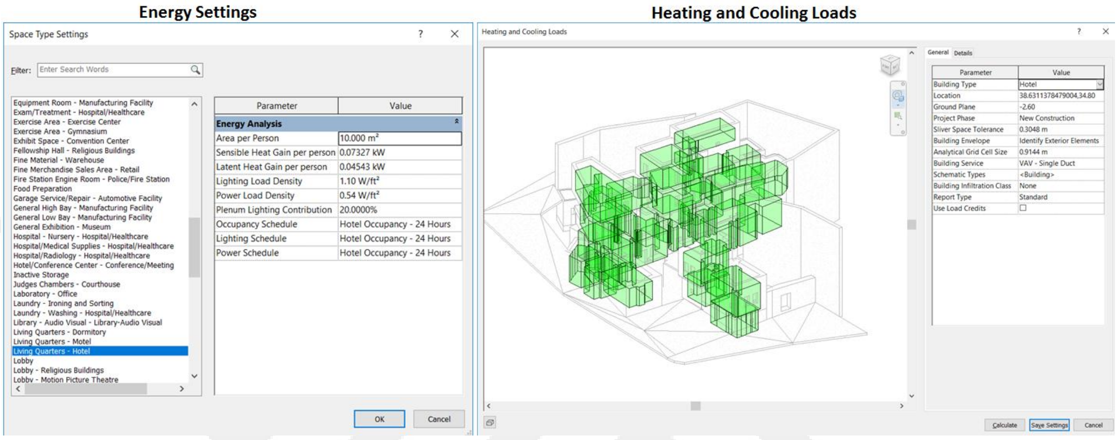


Figure III.16. General Energy settings for Millstone cave suites Hotel tested (Revit, 2017)

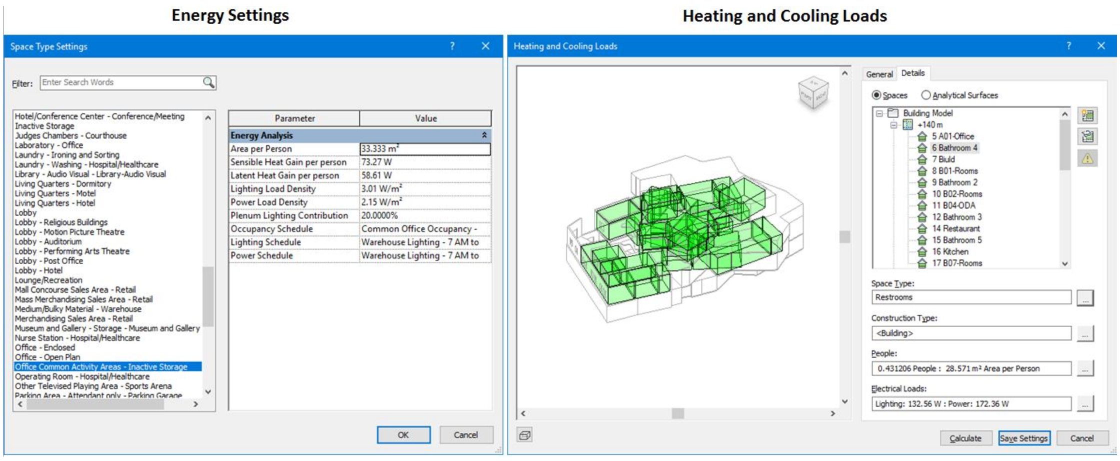


Figure III.17. General Energy settings for Hidden Cave Hotel tested (Revit, 2017)

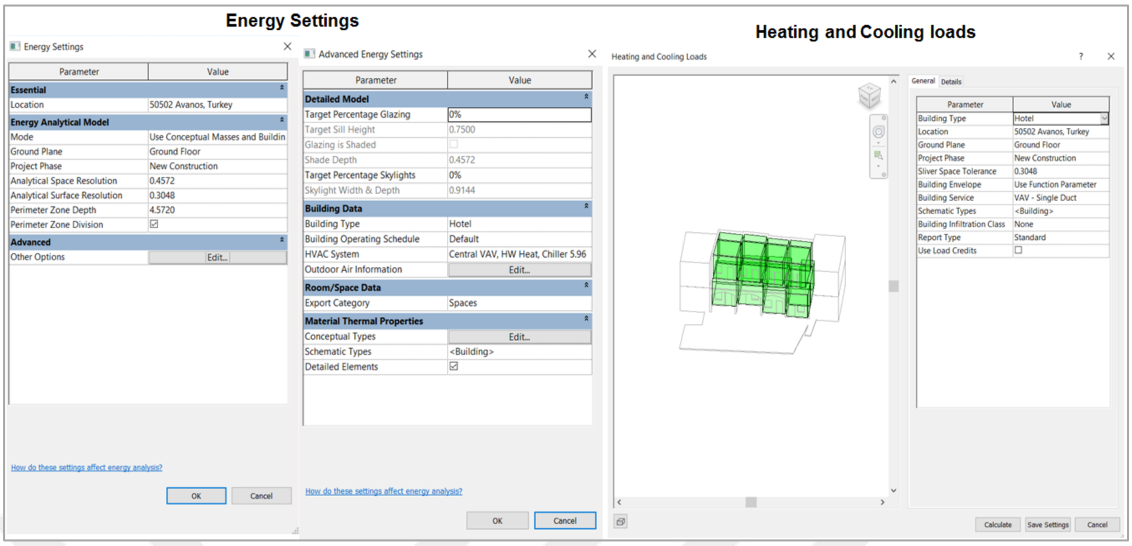


Figure III.18. General Energy settings for Jacob's Cave Suites Hotel tested (Revit, 2017)

Each room and energy space was set up taking into account particular schedule of uses and energy loads for a typical hotel occupancy. For example, the dormitory rooms had a space use of 10 meters square per person with sensible and latent heat gains of 73.27 W and 45.43 W respectively. Also, the lighting and power loads were around 11.95 W/m^2 and 5.81 W/m^2; the plenum lighting contribution was considered as 20 percent of the total loads from lights. (See Figure III.19).

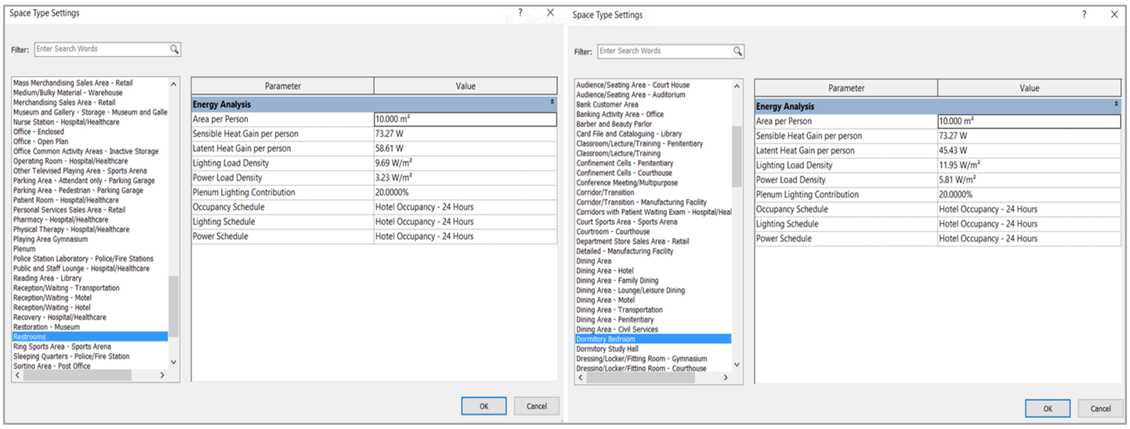


Figure III.19. Energy Loads inputs for indoor rooms and spaces of Hotels (Revit, 2017)

Furthermore, the occupancy, lighting and power schedule were set up as Hotel Occupancy of 24 hours; it means that the buildings were tested at its full capacity and operation time. The percentage of use per parameter per hour is clearly displayed on (FigureIII.20).

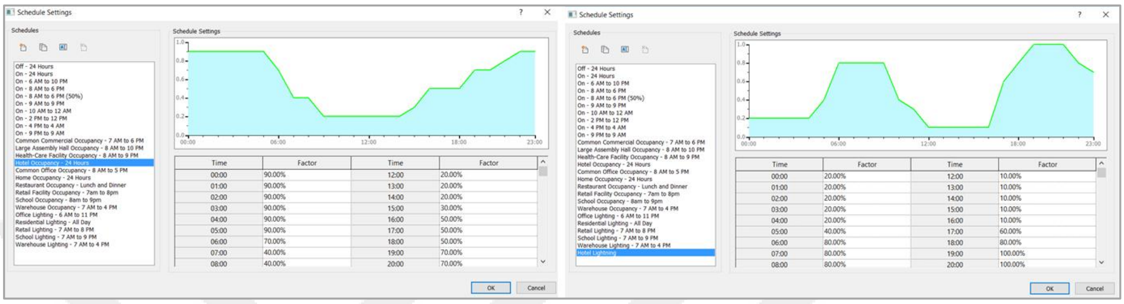


Figure III.20. Occupancy, lighting and power schedule used (Revit, 2017)

Finally, Revit program creates a final energy model using all inputs explained before and mathematical logarithms for predicting heating and cooling loads per space and building area. This energy model is converted to GBSxml file and uploaded to the GBS cloud-base program for calculating the energy demand and consumption taking into account the weather conditions and energy loads per building. All three final energy models are shown on the (Figure III.21, III.22, III.23) which includes nearest environment elements as streets, Rock Mountain and attached buildings.

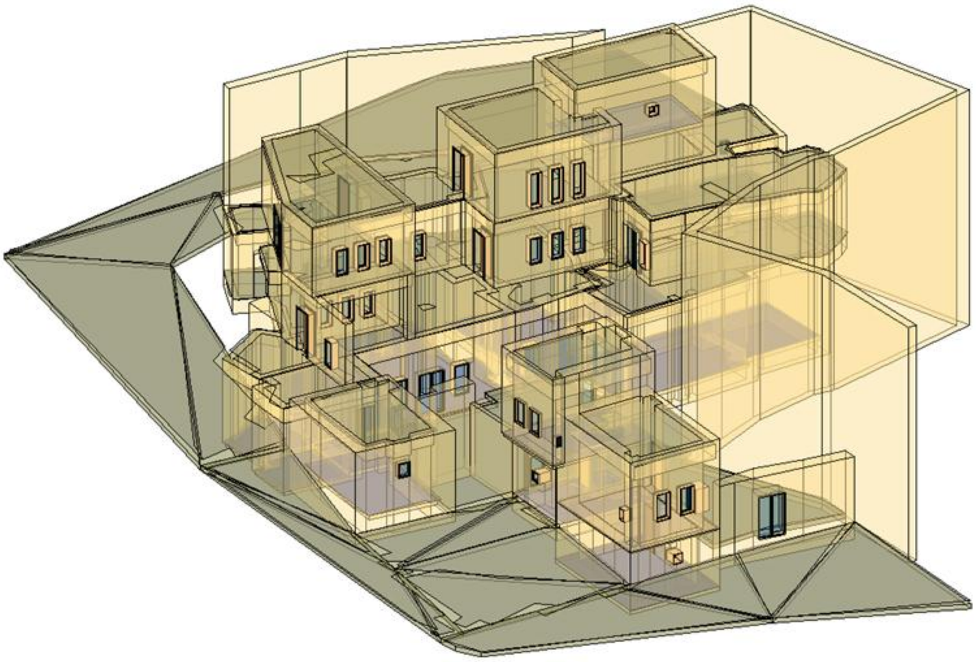


Figure III.21. Graphical appearances of Energy Models for Millstone cave suites Hotel (Revit, 2017)

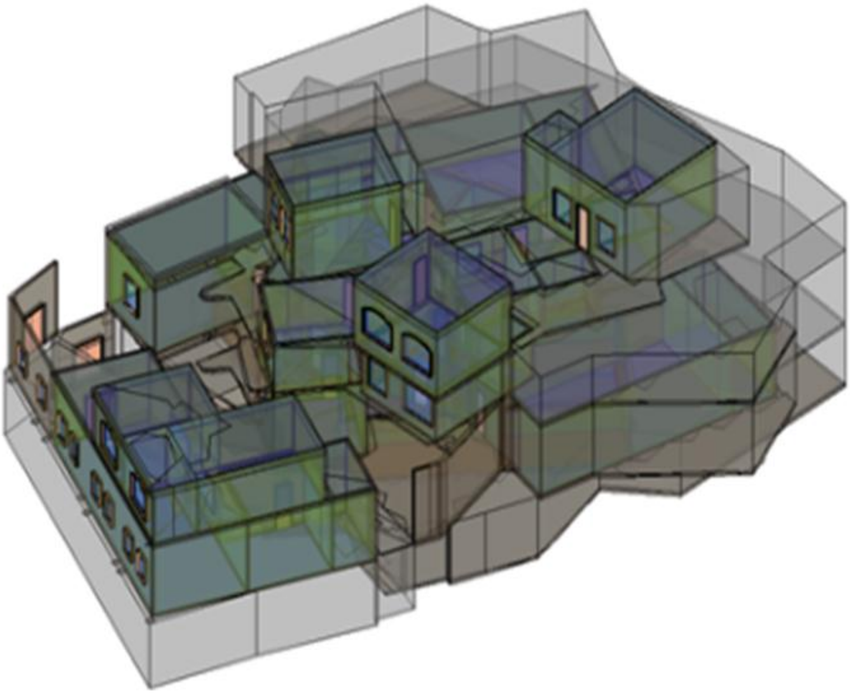


Figure III.22. Graphical appearances of Energy Models for Hidden Cave Hotel (Revit, 2017)

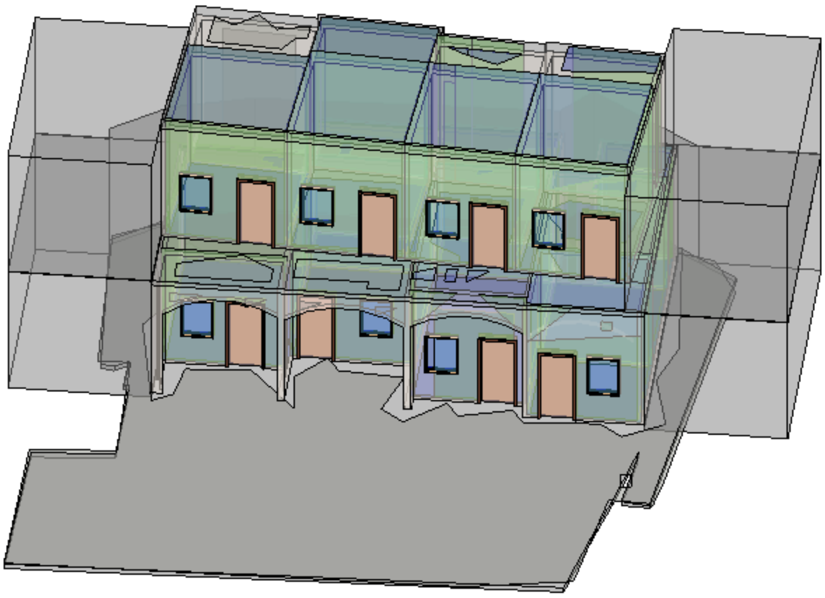


Figure III.23. Graphical appearances of Energy Models for Jacob's Cave Suites Hotel (Revit, 2017)

3.1.7. Parametric Study Configuration

The parameters were chosen for facilitate changes and energy examination considering the consequences of the main Revit and GBS. In addition, at this stage, the strategy utilized was the local affectability that was restrictive on transforming one parameter and one variable at any given moment already clarified. Notwithstanding, the figuring of aggregate heating and cooling loads and power age show were ventures to be performed after every parameter adjustment.

3.1.8. Individual Cloud-Based Running

Subsequent to demonstrating all progressions and defining new limit conditions for every parameter, you should rehash the strategy depicted in the power settings for singular power reports. Notwithstanding, now and again, there were failed examines, which were caused by issues with limit conditions or particular thermal properties.

For this situation of study, these unique difficulties were made through divider alterations, which were fathomed by adjusting the properties of the dividers in the gbXML document and re-submitting them to GBS for energy examination. Be that as it may, these systems don't permit comparative show reports in the Revit results and look at the window in light of the fact that they are directly on GBS (Figure III.24) shows an example of the alert and procedure for adjusting the wall.

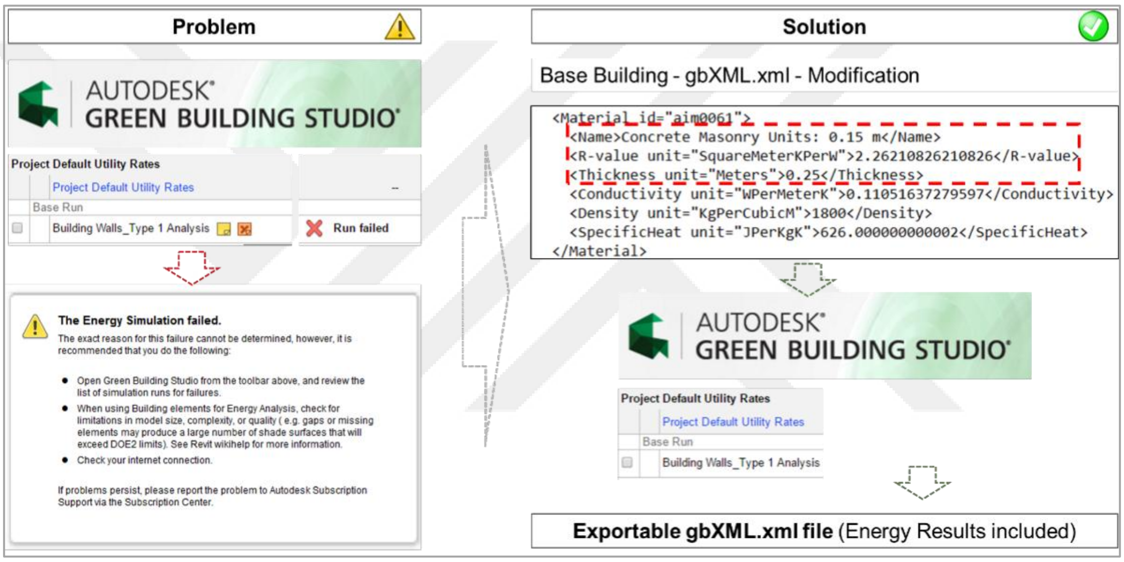


Figure III.24. Energy Analysis problem and method of solution in GBS (Revit, 2017)

3.1.9. Comparison of Building materials

In order to have comparable situations and better conclusions by each building, three different material configurations were tested, assuming probable and affordable situations. One of the big conditions was that the vernacular architecture and its facades configuration must be respected, thus the principal change was performed on the resistance value of materials and building elements.

Rock Analysis: Because of we should respect the vernacular architecture and its facades thus at first the three buildings were modeled only with the material that was

ROCK in all areas, it means walls, roofs and floors. It is the general sustainable results of the initial building. It is important because it is the base data, which will be use as initial energy consumption for improving it.

Double Rock layer Analysis: It is the same building but includes the material configurations considering the improving building ensembles. It means that all material information and (roofs & floors) configurations that were detailed on sent AutoCAD were included for testing the building performance and analyzing the incidence of those strategies on the whole building performance.

Five Rock layer Analysis: Finally, this is our original building, as estimated that the walls of the three hotels are covered by five layers of ROCK here it is clear about increasing of R-Value of the walls while maintain the aesthetics of vernacular architecture.

3.1.10. Daylight Configuration Process

In order to test the incidence of the orientation and possible building modifications, the hotel was tested considering the following considerations:

Initial Building with all rooms; Initial Building without some rooms: considering only the habitable rooms, it means not bathrooms.

Initial Building rotated 45º East

Initial Building rotated 45º East including external glass doors

Initial Building rotated 45º West

Initial Building rotated 45º West including external glass doors

More information on daylight configuration can be seen in Appendix-E,F,G-

3.2. Identifying guest satisfaction in Cappadocia's Selected Vernacular Hotels.

Applied structure was produced to distinguish the ability to foresee the guest satisfaction in light of the measurements of service quality. The applied casing work delineates the connection between the independent and the dependent factors. Right now Ramsaran Fowdar's (2007) scale is chosen as the best SERQUAL model to gauge service quality in service divisions particularly with the customer point of view. This thought creates a supposition that the seven measurements of SERQUAL model could have an immediate association with guest satisfaction.

3.2.1. Data Collection of guest satisfaction in Cappadocia's Vernacular Hotels.

In this examination, two professors of neighborliness and tourism to discover whether there are false impressions or ambiguities and to check for content legitimacy checked the questionnaire. They likewise assessed the setting in which quantifiable things on the questionnaire are put for lessening the reasons for the basic predisposition. The last form of the survey was then settled upon. A questionnaire overview was utilized so as to learn guests' expectations of the service quality given by hotels in Cappadocia. The survey included one channel question and four areas. Respondents were solicited to rate the level from significance before their purchase of the hotel's service among 62 items in light of their expectations along a 7-point Likert-type scale, with 1 set as 'unequivocally insignificant', 4 set as 'normal', and 7 set as 'firmly vital' (in area1 of the questionnaire). Then a day or a few days later, respondents were asked to rate the level of performance among 62 items based on their actual experiences of enjoying the hotel's services along a 7-point Likert-type scale, with 1 set as ‘very poor performance’, 4 set as ‘average’, and 7 set as ‘excellent performance' (in section 2 of the questionnaire). Area 3 asks into logical general foundation data, and area 4 is utilized to gauge the overall satisfaction with the hotel services experienced. The overall satisfaction was estimated through three things (satisfied with the services, expectations, and satisfied with experience) adjusted from Maxham and Netemeyer (2002) and the American Customer Satisfaction Index (ACSI) show from Fornell, Johnson, Anderson, Cha, and Bryant (1996). This survey structure can upset potential obstruction between inquiries of independent variables and questions of the dependent variable The questioners gathered information in Cappadocia including the Millstone cave suite, Hidden cave and Jacob's Cave Suites, from November 2017 to January 2018 Interviewers remained in every area for one to ten days from 11:00 to 19:00 and chose one respondent each 30 min. Furthermore the survey was conveyed in two dialects (Turkish, English). As it was inconceivable in this investigation to gather measures for various develop from various sources, information were gathered at various focuses in time and area so as to have a broadened test and diminish the logical impacts. A sum of 600 arrangements of questionnaire was conveyed, yet just 315 arrangements of finished survey were gathered. Be that as it may, 25 inadequate questionnaires were wiped out, leaving 290 surveys as legitimate for examination, 106 questionnaires were for Jacobs cave suit hotel, 93 for Mileston cave suits hotel and 91 Hidden cave hotel.

3.2.2. Demographic Information

The example comprised of 146 males (50.35%) and 144 females (49.65%) guests. The lion's share of respondents (52.75%) was between the ages of 20-29. Taking all things together, (18.27%) held a master's degree and higher, (33.44%) held a bachelor's degree. Respondents with a month to month pay beneath US$1000 represented (28.62%) and taken after by US$1000-2999 (25.2%). Point by point data on the example portrayal is exhibited in Table III.3.

Table III.3. Description of respondents (n =290)

Variables	Categories	Frequency	Percentage (%)
Gender Age	Male	146	%50.35
	Female	144	%49.65
	Under 20	15	%5.2
	20-29	153	%52.75
	30-39	60	%20.68
	40-49	34	%11.72
	50 or above	28	%9.65
Income	Without income	15	%5.17
	Below USD1000	83	%28.62
	USD1000-2999	73	%25.2
	USD3000-4999	56	%19.3
	USD5000 or above	63	%21.72
Education	Primary school	36	%12.41
	Secondary school	43	%14.82
	College diploma	61	%21.03
	Undergraduate	97	%33.44
	Postgraduate	53	%18.27
Nationality	Chinese	70	%24.13
	Korean	55	%18.96
	Russian	74	%25.5
	Turkish	80	%27.58
	Spanish	5	%1.7
	Arabian	6	%2
Purpose of visit	Business/Official work	47	%16.2
	Visit friends and relatives	35	%12.06
	Vacation	196	%67.58
	Others	12	%4.13
Duration of stay at hotel	1-3 days	87	%30
	4-7 days	167	%57.58
	8 days and more	36	%12.41

3.3. Summary of the Section 3.1- 3.2

As before mentioned that traditionally accepted sustainability and guest satisfaction in strife yet this thesis chose to examine the genuine circumstance and check whether it is valid. The chose investigate strategy was thought to be the most suitable for gathering information required. Furthermore, the calculation process was done in order to test the vernacular hotel considering the Building Performance Analysis (BPA) methodology; this is for testing sustainability that inherent in vernacular Cappadocia’s hotels. On the other hand, theoretical system was created to distinguish the ability to foresee the guest satisfaction in view of the measurements of service quality. Next chapter will explain the results and conclusions.

3.4. THE RESULTS OF SUSTAINABILITY AND GUEST SATISFACTION IN CAPPADOCIA'S VERNACULAR HOTELS

This section will discuss the results of sustainability in vernacular Cappadocia's hotels and the results of guest satisfaction based on the dimensions of service quality then testing the research's hypothesis. Beginning with the solar analysis, Daylight Analysis, Energy Use Intensity comparison, Monthly Heating& Cooling Loads, Renewable Energy Potential, Annual Carbon Emissions, then finalizes with insight 360 scenarios and comparison of compliances of with ASHRAE 90.1 and ARCH 2030. It is also discussed the data findings of service quality to measure the guest's perceptions on service quality toward indicators related to the guest satisfaction of hotels, while, factorial analyses are used to assess service quality and the impact of quality on guest satisfaction and at the end their conclusions.

3.5. Building Performance Analysis Results

This section explains solar analysis, Daylight Analysis, Energy Use Intensity comparison, Monthly Heating& Cooling Loads, Renewable Energy Potential, Annual Carbon Emissions, then finalizing with insight 360 scenarios and comparison of compliances of with ASHRAE 90.1 and ARCH 2030.

3.5.1. Solar analysis

Solar and radiation studies are really important in order to understand the incidence of energy radiation in all building faces. In this case, the model included the attached buildings on the exterior area and the vernacular architecture composition. The analysis was done considering one-year cumulative energy and the incidence of radiation per each month. It permits to understand the real influence of this parameter and possible actions for resolving existing problems. The year cumulative analysis shows that the principal façade, which is located to the southwest, receives in average during the year around 950 Kilowatts hour per square meter. However, the first floor had less amount of radiation, 650 KWh/sqm in average, due to the vernacular architecture arcs, walls and the required external corridor. The following images are samples of the obtained results.

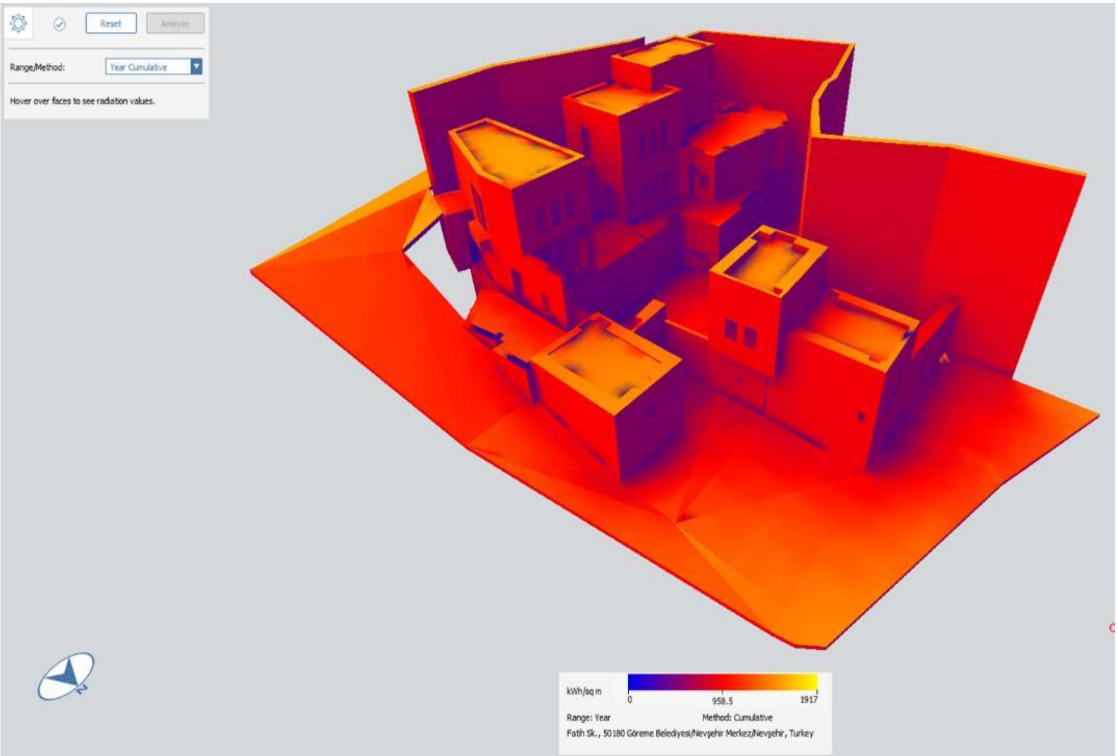


Figure III.25. Images of solar analyze Models of Millstone cave suites Hotel (Revit, 2017)

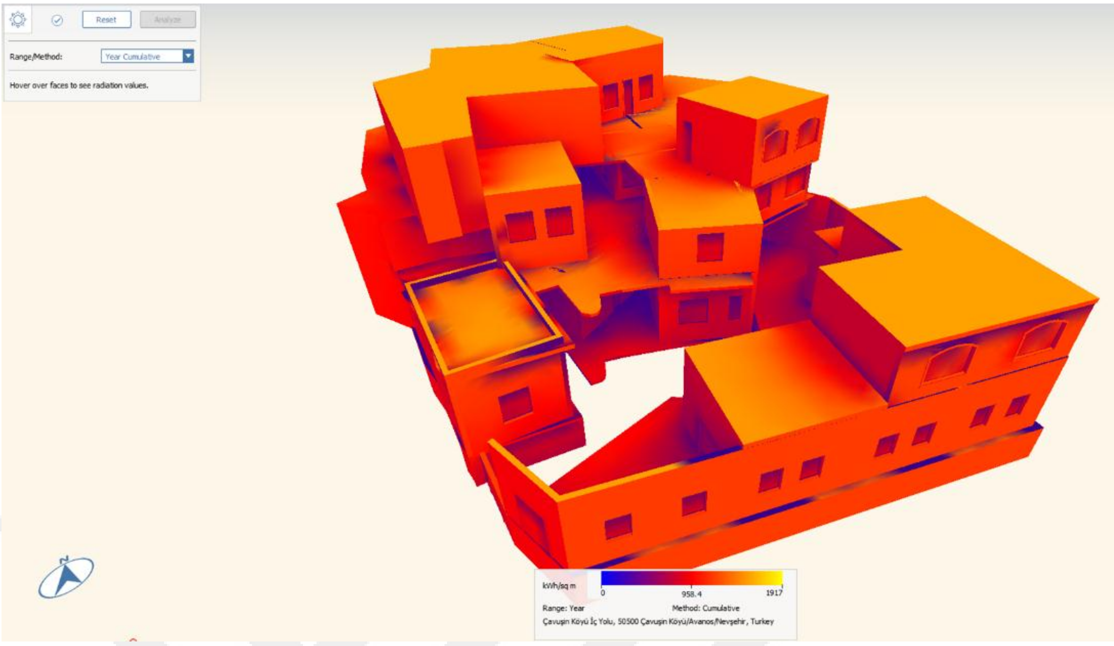


Figure III.26. Images of solar analyze Models of Hidden Cave Hotel (Revit, 2017)

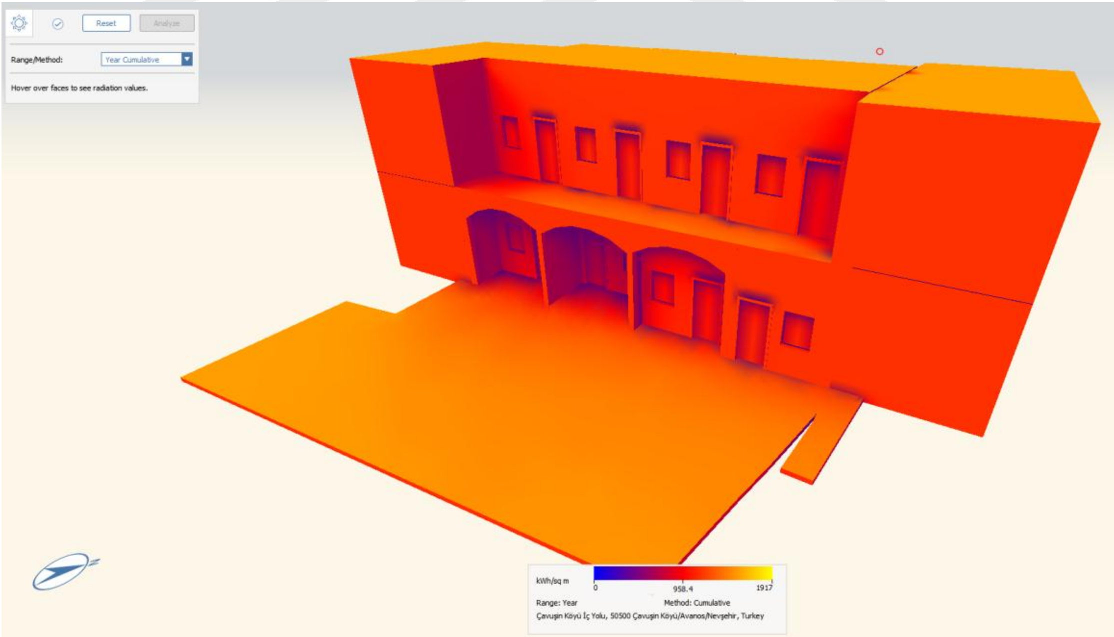


Figure III.27. Images of solar analyze Models of Jacob's Cave Suites Hotel (Revit, 2017)

Each image (Annual / monthly) had graphic scale, which is easily to understand in order to generate analysis taking into account the amount of energy received by walls, doors and windows as shows in (Figure III.28) And Appendix-D-

Figure III.28. Image of graphical (Annual / monthly) solar analyses of hotel (Revit, 2017)

For example: The year cumulative analysis shows that there is high presence of projected shadows on the middle building, which are conditioning the indoor daylight and possible solar energy gains. Considering that the majority of facades of the building are receiving less than 800 kWh/sqm/yr. It is clear that the orientation and building shape were not considering for maximizing the luminance.

3.5.2. Daylight Analysis by Hotel

This analysis is done to verify the indoor daylight LEED V4 EQc7 compliance. REVIT program calculates this parameter considering the ratio of windows in relation to the rooms and orientation of the building. Moreover, the LEED standard for obtaining points requires that all habitable spaces passing at least 75% of the hours on the threshold, which is between 1000 to 3000 Lux during equinox at 9:00 a.m. and 3:00 p.m. The program generates a summary of results which includes the data of percentage that is below and above of the threshold at each required time.

First Hotel: All of these configurations have floor plans of Jacob's Cave Suites with colour scale for each analyzed time, it means 9:00 am and 3:00 pm. as it is shown in (Figure III.29). And Appendix-E-

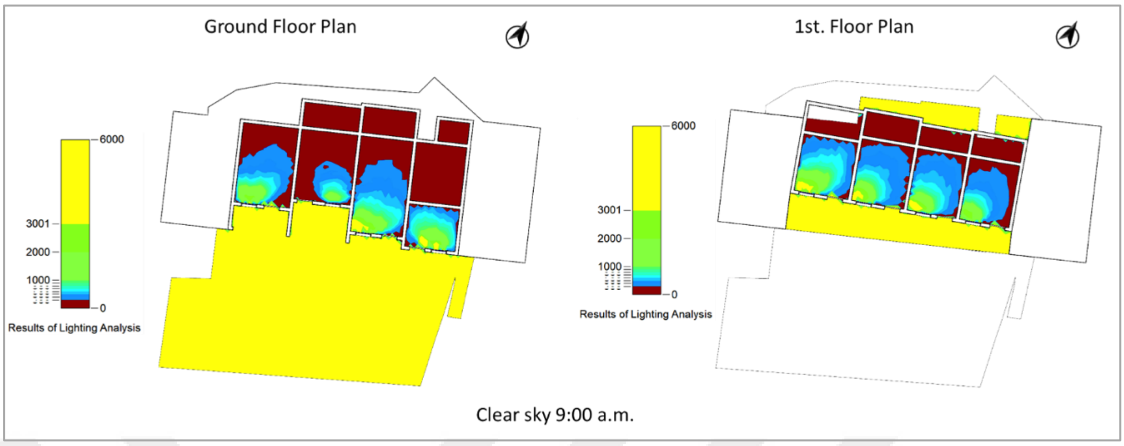


Figure III.29. Images of day lighting analyze Models of Jacob's Cave Suites (Revit, 2017)

The results of Jacob's Cave Suites could be computed in order to analyze and give suggestions for improving the external ratio of windows or architectural aesthetics with the aim to increase the compliance of this parameter (Figure III.30).

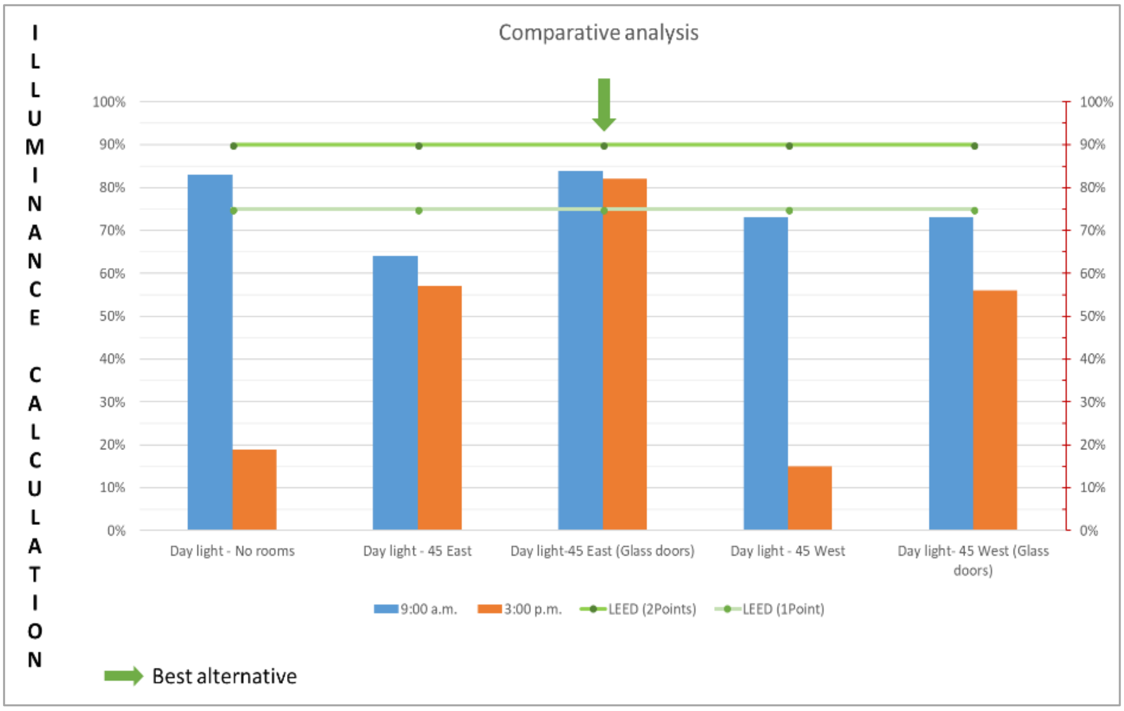


Figure III.30. Comparative day lighting analysis of Jacob's Cave Suites

Second Hotel: All of these configurations have floor plans of Hidden Cave Hotel with colour scale for each analyzed time; it means 9:00 am and 3:00 pm, as it is shown in (Figure III.31.). and Appendix-F-

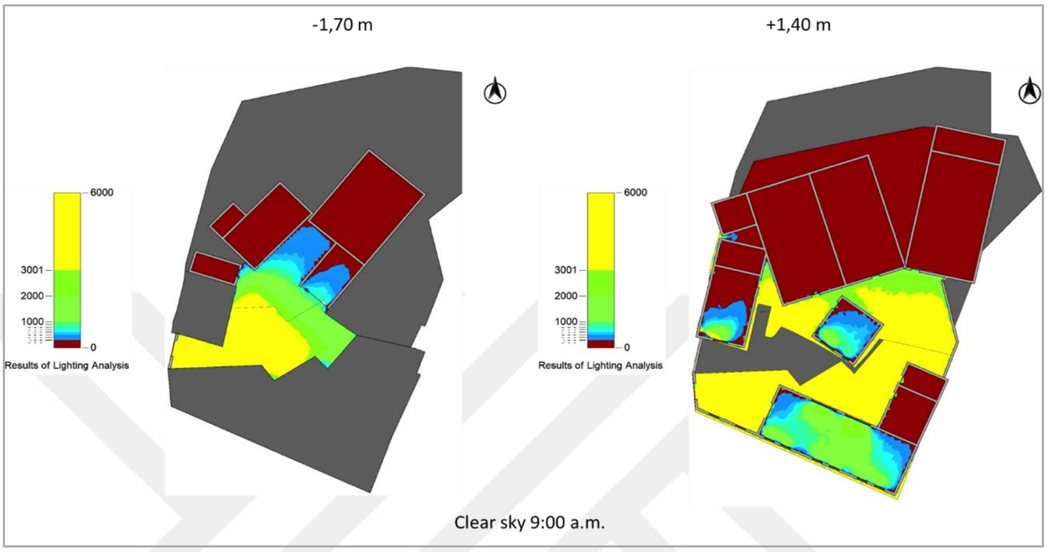


Figure III.31. Images of day lighting analyze Models of Hidden Cave (Revit, 2017)

The results of Hidden Cave Hotel could be computed in order to analyze and give suggestions for improving the external ratio of windows or architectural aesthetics with the aim to increase the compliance of this parameter (Figure III.32).

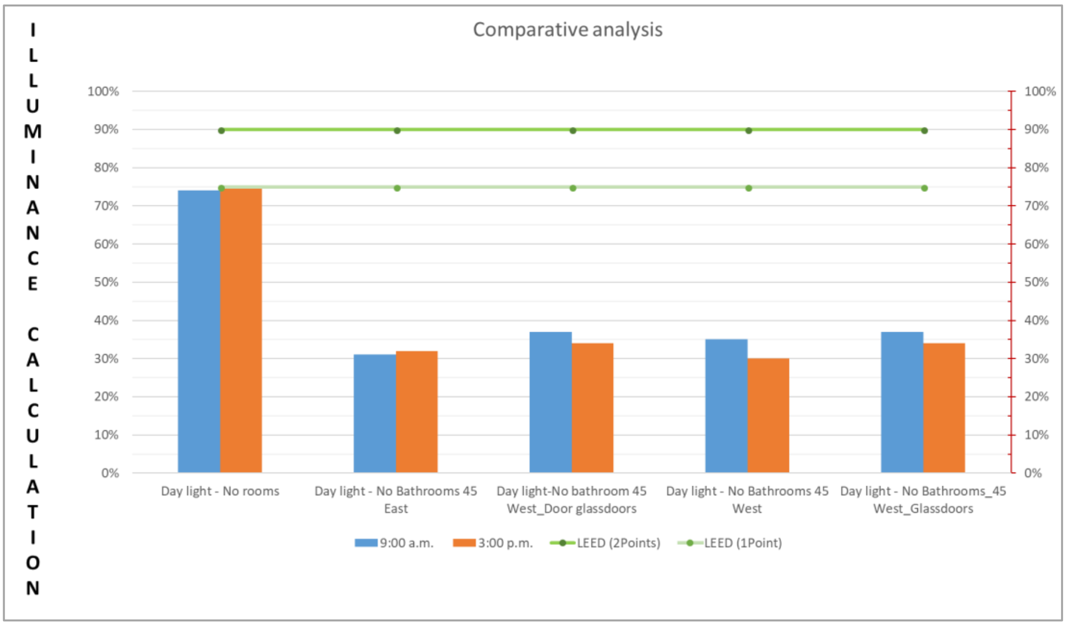


Figure III.32. Comparative day lighting analysis of Hidden Cave Hotel

Third Hotel: All of these configurations have floor plans of Millstone Cave Suites hotel with colour scale for each analyzed time, it means 9:00 am and 3:00 pm. as it is shown in (Figure III.33). And Appendix-G-

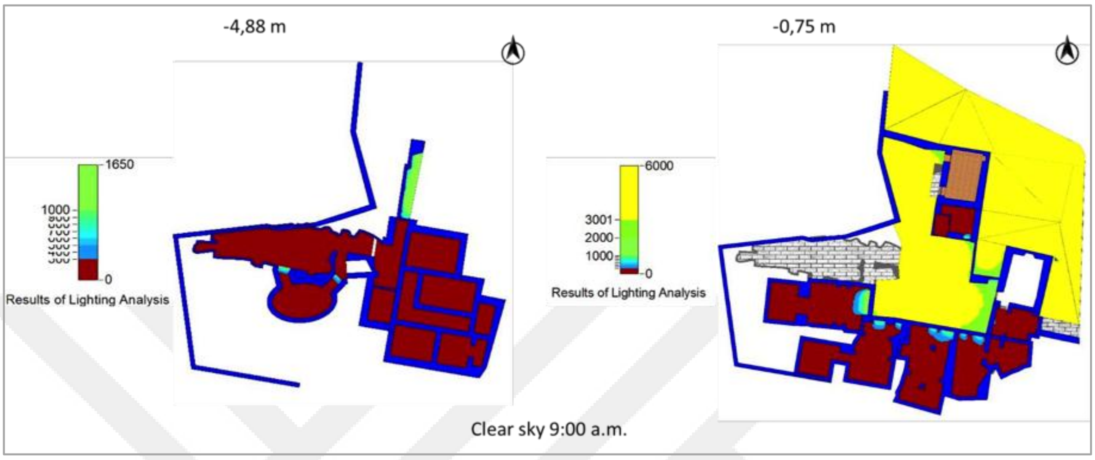


Figure III.33. Images of day lighting analyze Models of Millstones (Revit, 2017)

The results of Millstones Cave Suites hotel could be computed in order to analyze and give suggestions for improving the external ratio of windows or architectural aesthetics with the aim to increase the compliance of this parameter (Figure III.34).

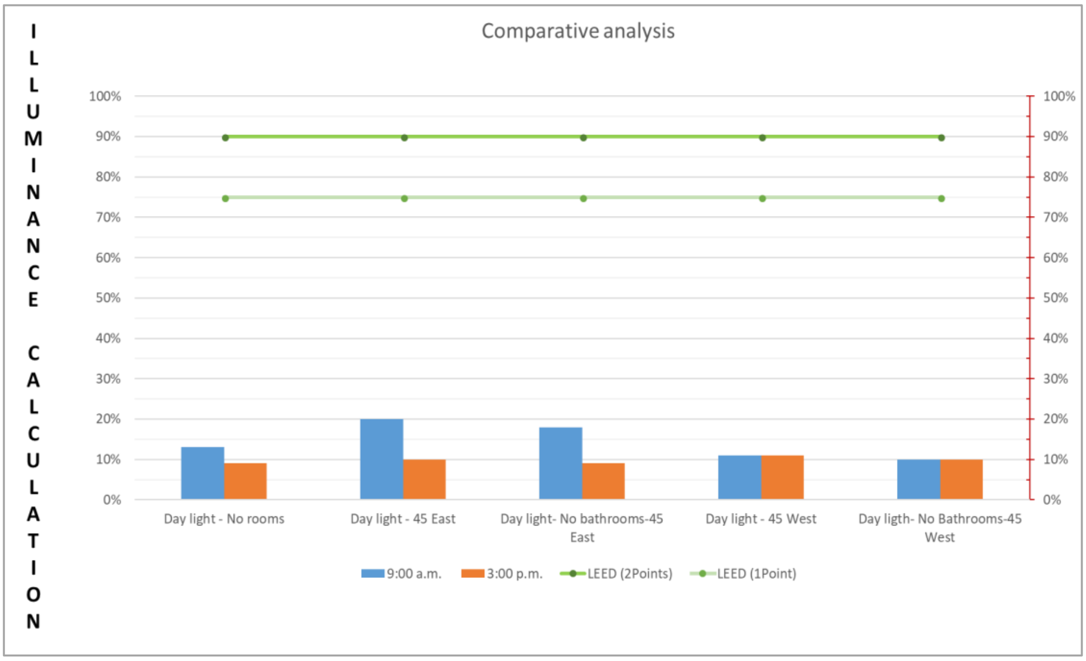


Figure III.34. Comparative day lighting analysis of Millstones Cave Suites hotel.

As mentioned before in solar analysis it is clear that the orientation and building shape were not considering for maximizing the luminance.

3.5.3. Energy Use Intensity Comparison

For each of the three hotels three different material configurations were tested as mentioned in chapter six, in order to have comparable situations and better conclusions by each building, additionally to have best results by each hotel.

3.5.3.1. Jacob’s Cave Suites

During the analysis of Jacob's Cave Suites by three specifically simulation previously described, it was found regarding for the energy use intensity, the total energy consumption of the building for the first scenario is 3846 MJ/sm/yr.

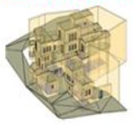
The total energy consumption for the second scenario is 2996 MJ/sm/yr, having an energy decrease of 22% in relation for the first scenario. The total energy consumption for the third scenario is 1522 MJ/sm/yr, having an energy consumption decrease of 60% in relation for the first scenario see (Figure III.35).

Jacob's Cave Suites	Energy Use Intensity	Rock Analysis	Double Rock layer Analysis	Five Rock layer Analysis
	Electricity EUI:	219 kWh / sm / yr	192 kWh / sm / yr	134 kWh / sm / yr
	Fuel EUI:	3,059 MJ / sm / yr	2,304 MJ / sm / yr	1,040 MJ / sm / yr
	Total EUI:	3,846 MJ / sm / yr	2,996 MJ / sm / yr	1,522 MJ / sm / yr

Figure III.35. Results of Energy Use Intensity comparison for Jacob's Cave Suites with three different material configurations

3.5.3.2. Millstone Cave Suites

During the analysis of Milestone cave suites by three specifically simulation previously described, it was found regarding for the energy use intensity, the total energy consumption of the building for the first scenario is 8024 MJ/sm/yr. The total energy consumption for the second scenario is 6186 MJ/sm/yr, having an energy decrease of 22.90 % in relation for the first scenario. The total energy consumption for the third scenario is 3539 MJ/sm/yr, having an energy consumption decrease of 55.89% in relation for the first scenario see (Figure III.36).



Millestone suites	Energy Use Intensity	Rock Analysis	Double Rock layer Analysis	Five Rock layer Analysis
	Electricity EUI:	361 kWh / sm / yr	294 kWh / sm / yr	189 kWh / sm / yr
	Fuel EUI:	6,726 MJ / sm / yr	5,127 MJ / sm / yr	2,859 MJ / sm / yr
	Total EUI:	8,024 MJ / sm / yr	6,186 MJ / sm / yr	3,539 MJ / sm / yr

Figure III.36. Results of Energy Use Intensity comparison for Milestone cave suites with three different material configurations

3.5.3.3. Hidden Cave Hotel

During the analysis of Hidden Cave Hotel by three specifically simulation previously described, it was found regarding for the energy use intensity, the total energy consumption of the building for the first scenario is 3936 MJ/sm/yr. The total energy consumption for the second scenario is 2937 MJ/sm/yr, having an energy decrease of 25.38 % in relation for the first scenario. The total energy consumption for the third scenario is 1339 MJ/sm/yr, having an energy consumption decrease of 65.98 % in relation for the first scenario see (Figure III.37).

Hidden Cave	Energy Use Intensity	Rock Analysis	Double Rock layer Analysis	Five Rock layer Analysis
	Electricity EUI:	257 kWh / sm / yr	212 kWh / sm / yr	155 kWh / sm / yr
	Fuel EUI:	3,010 MJ / sm / yr	2,172 MJ / sm / yr	780 MJ / sm / yr
	Total EUI:	3,936 MJ / sm / yr	2,937 MJ / sm / yr	1,339 MJ / sm / yr

Figure III.37. Results of Energy Use Intensity comparison for Hidden Cave with three different material configurations

It is clear that by changing the materials of the building it can have an important improvement regarding the energy consumption, this passive strategy can have a clear impact in energy efficiency.

3.5.4. Monthly Heating Loads

Part of the analysis of the hotels that was conducted by three specifically simulations, by changing the materials of the building, the first simulation is the building with Rock material, the second simulation with Double Rock layer and the third simulation is the materials with Five Rock layer, is important to evaluate the monthly heating loads reduction.

3.5.4.1. Jacob's Cave Suites

During the analysis of Jacob's Cave Suites by three specifically simulation previously described, it was found regarding for the monthly heating loads, the first scenario during January that the monthly heating load for the walls is around -55000 MJ. The total monthly heating loads for the second scenario during January is about -44000 MJ, having an energy decrease of 20 % in relation for the first scenario. The total monthly heating loads for the third scenario during January -18000 MJ, having a monthly heating load decrease of 67.2 % in relation for the first scenario (see Figure III.38).

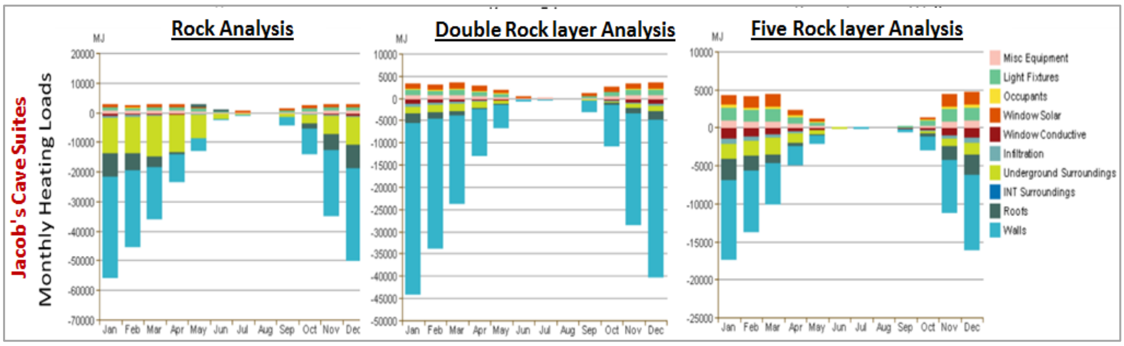


Figure III.38. Monthly heating load consumptions for Jacob's Cave Suites with three different material configurations

3.5.4.2. Millstone Suites

During the analysis of Millstone Suites by three specifically simulation previously described, it was found regarding for the monthly heating loads, the first scenario during January that the monthly heating load for the walls is around -190000 MJ. The total monthly heating loads for the second scenario during January is about -110000 MJ, having an energy decrease of 42.3% in relation for the first scenario. The total monthly heating loads for the third scenario during January -80000 MJ, having a monthly heating load decrease of 57.8% in relation for the first scenario (see Figure III.39).

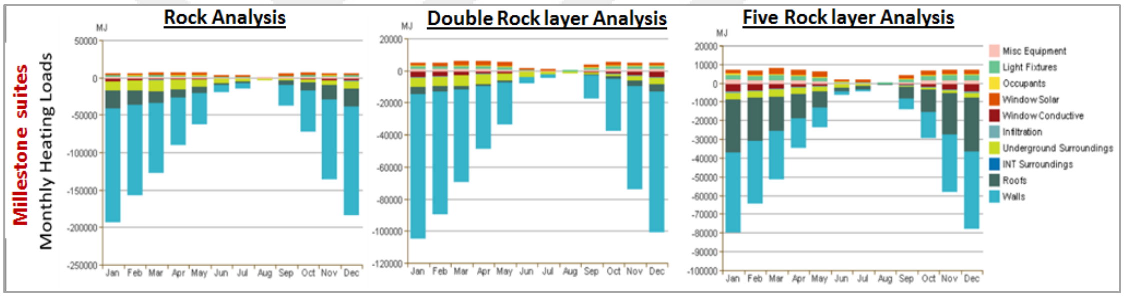


Figure III.39. Monthly heating load consumptions for Millstone Suites with three different material configurations

3.5.4.3. Hidden Cave Hotel

During the analysis of Hidden Cave Hotel by three specifically simulation previously described, it was found regarding for the monthly heating loads, the first scenario during January the monthly heating load for the walls is around -250000 MJ. The total monthly heating loads for the second scenario during January is about -180000 MJ, having an energy decrease of 28% in relation for the first scenario. The total monthly heating loads for the third scenario during January-70000 MJ, having a monthly heating load decrease of 72% in relation for the first scenario see (FigureIII.40).

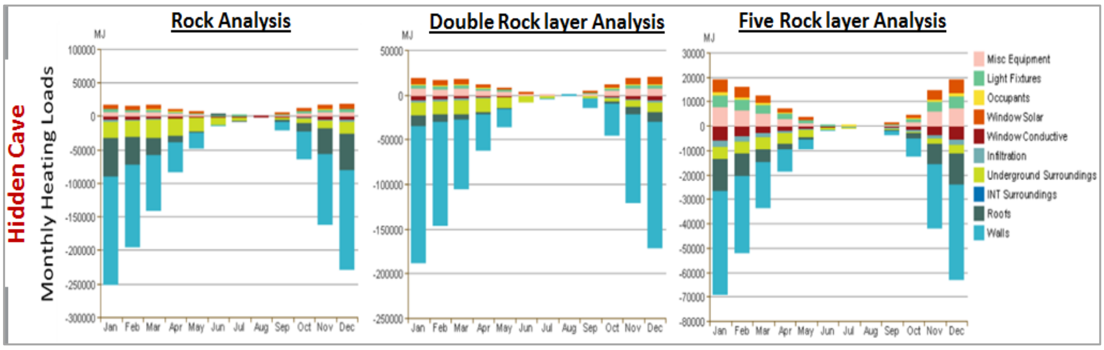


Figure III.40. Monthly heating load consumptions for Hidden Cave Hotel with three different material configurations

3.5.5. Monthly Cooling Loads

Part of the analysis of the hotels that was conducted by three specifically simulations, by changing the materials of the building, the first simulation is the building with Rock material, the second simulation with Double Rock layer and the third simulation is the materials with Five Rock layer, in this evaluation it will focus in the monthly cooling loads reduction.

3.5.5.1. Jacob's Cave Suites

During the analysis of Jacob's Cave Suites by three specifically simulation previously described, it was found regarding for the monthly cooling loads, the first scenario during August that the monthly cooling load for the walls is around 22000 MJ. The total monthly cooling loads for the second scenario during August is about 20000 MJ, having an energy decrease of 10 % in relation for the first scenario. The total monthly cooling load for the third scenario during August is 11000 MJ, having a monthly cooling load decrease of 50 % in relation for the first scenario (see Figure III.41).

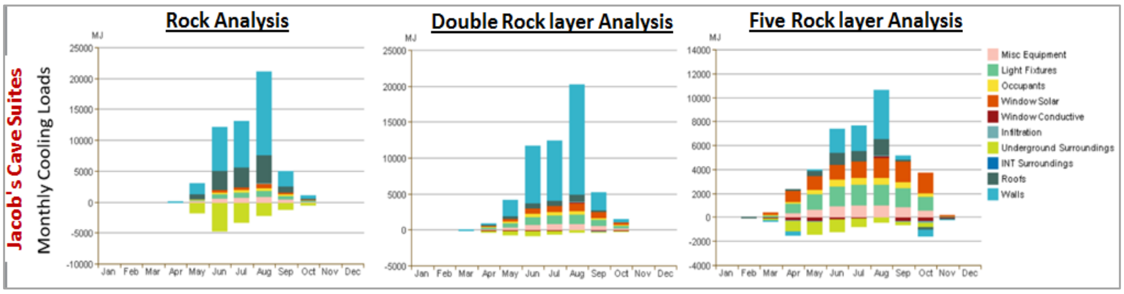


Figure III.41. Monthly cooling load consumptions for Jacob's Cave Suites with three different material configurations

3.5.5.2. Millstone Suites

During the analysis of Millstone Suites by three specifically simulation previously described, it was found regarding for the monthly cooling loads, the first scenario during August that the monthly cooling load for the walls is around 32000 MJ. The total monthly cooling loads for the second scenario during August is about 21000 MJ, having an energy decrease of 34.37% in relation for the first scenario. The total monthly cooling load for the third scenario during August is 19000 MJ, having a monthly cooling load decrease of 40.62% in relation for the first scenario (see Figure III.42).

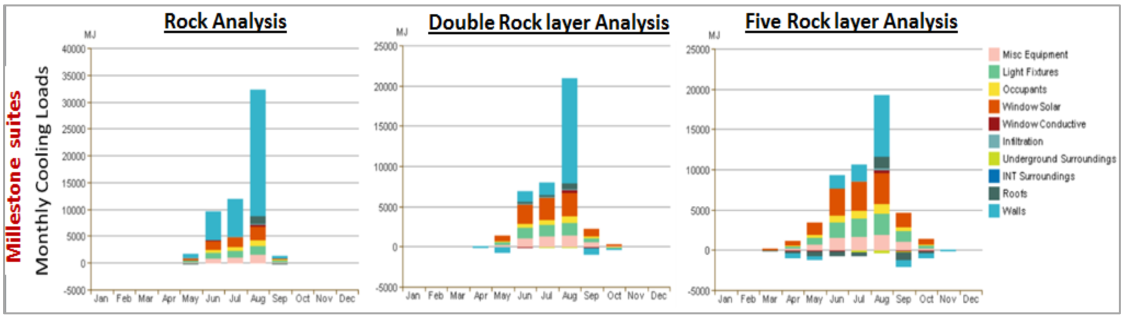


Figure III.42. Monthly cooling load consumptions for Millstone Suites with three different material configurations

3.5.5.3. Hidden cave hotel

During the analysis of Hidden Cave Hotel by three specifically simulation previously described, it was found regarding for the monthly cooling loads, the first scenario during August that the monthly cooling load for the walls is around 110000 MJ. The total monthly cooling loads for the second scenario during August is about 85000 MJ, having an energy decrease of 22.72 % in relation for the first scenario. The total monthly cooling load for the third scenario during August is 48000 MJ, having a monthly cooling load decrease of 56.36 % in relation for the first scenario (see Figure III.43).

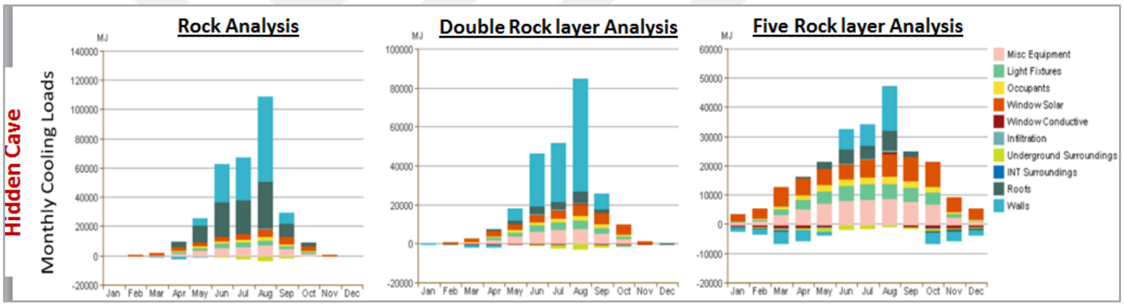


Figure III.43. Monthly cooling load consumptions for Hidden Cave Hotel with three different material configurations

3.5.6. Renewable Energy Potential

The Renewable Energy Potential analysis was conducted for the three hotels, taking into account the potential of PV system, single 15´ Wind Turbine Potential. For the PV system it was important to define that PV efficiencies are assumed to be 5%, 10 % and 15% for low, medium and high efficiency systems.

3.5.6.1. Jacob's cave suites

During the analysis of Jacob's Cave Suites it was found that a roof mounted PV system (high efficiency) will have an energy potential about 14927 kWh/yr and a Single 15´ Wind Turbine energy potential of 778 kWh/yr (see Figure III.44).

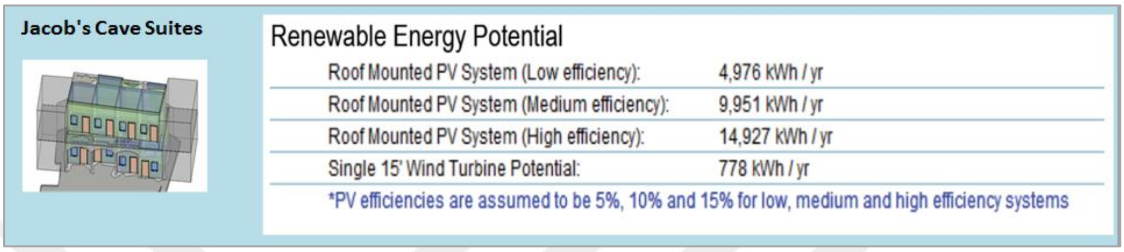


Figure III.44. The Renewable Energy Potential analysis of Jacob's Cave Suites

3.5.6.2. Millstone Suites

During the analysis of Millstone Suites it was found that a roof mounted PV system (high efficiency) will have an energy potential about 72687 kWh/yr and a Single 15´ Wind Turbine energy potential of 778 kWh/yr (see Figure III.45).

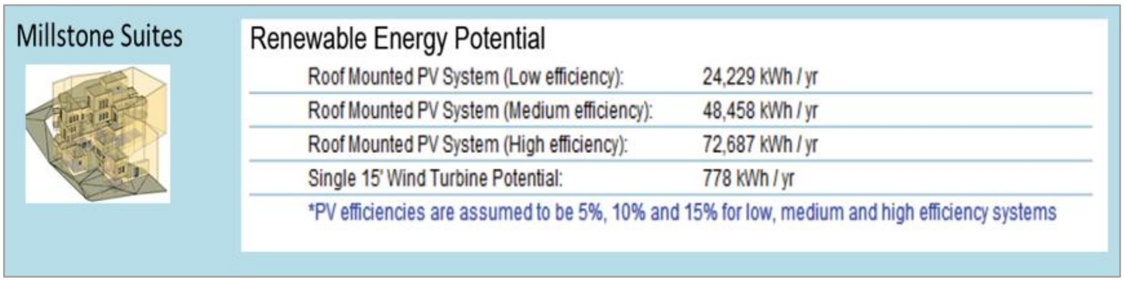


Figure III.45. The Renewable Energy Potential analysis of Millstone Suites

3.5.6.3. Hidden Cave Hotel

During the analysis of Hidden Cave Hotel it was found that a roof mounted PV system (high efficiency) will have an energy potential about 81242 kWh/yr and a Single 15´ Wind Turbine energy potential of 778 kWh/yr (see Figure III.46).

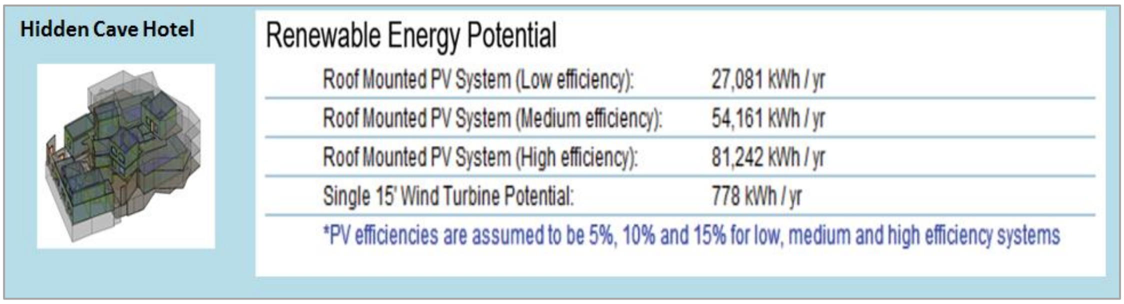


Figure III.46. The Renewable Energy Potential analysis of Hidden Cave Hotel

3.5.7. Annual Carbon Emissions

The Annual Carbon Emissions was evaluated for the three hotels, by changing the materials of the building, the first simulation is the building with Rock material, the second simulation with Double Rock layer and the third simulation is the materials with Five Rock layer, having into account the electricity consumption of the buildings and the Net CO_2

3.5.7.1. Jacob's Cave Suites

During the analysis of Jacob's Cave Suites by three specifically simulation previously described, it was found regarding for the energy use intensity, the total electricity consumption of the building for the first scenario is 6 (metric tons/yr) and the Net CO_2 22 (metric tons/yr). The total electricity consumption for the second scenario is 5 (metric tons/yr) and the Net CO_2 16(metric tons/yr). The total electricity consumption for the third scenario is 4 (metric tons/yr) and the Net CO_2 of 7 (metric tons/yr), having an electricity consumption decrease of 33% in relation for the first scenario (see Figure III.47).

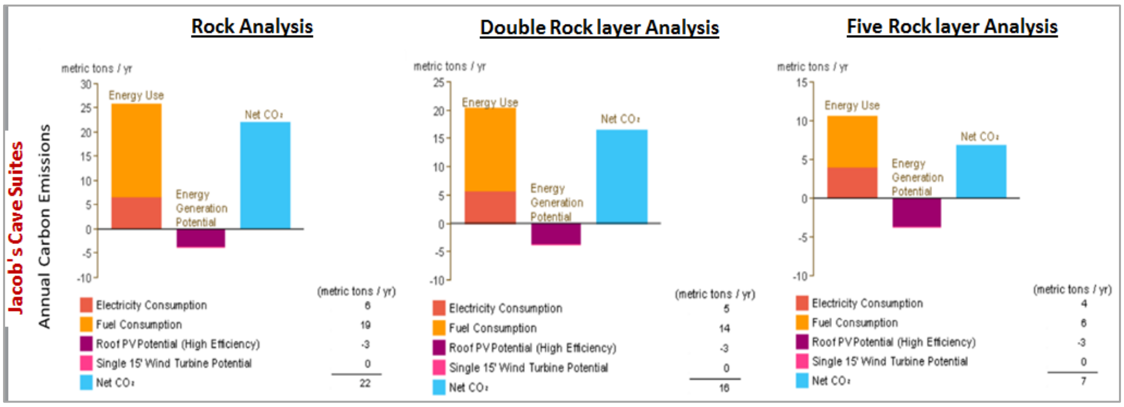


Figure III.47. The electricity consumption of Jacob's Cave Suites and the Net CO_2

3.5.7.2. Millstone Suites

During the analysis of Millstone Suites by three specifically simulation previously described, it was found regarding for the energy use intensity, the total electricity consumption of the building for the first scenario is 22 (metric tons/yr) and the Net CO_2 69 (metric tons/yr). The total electricity consumption for the second scenario is 13 (metric tons/yr) and the Net CO_2 43(metric tons/yr).The total electricity consumption for the third scenario is 11 (metric tons/yr) and the Net CO_2 of 29 (metric tons/yr), having an electricity consumption decrease of 50% in relation for the first scenario (see Figure III.48).

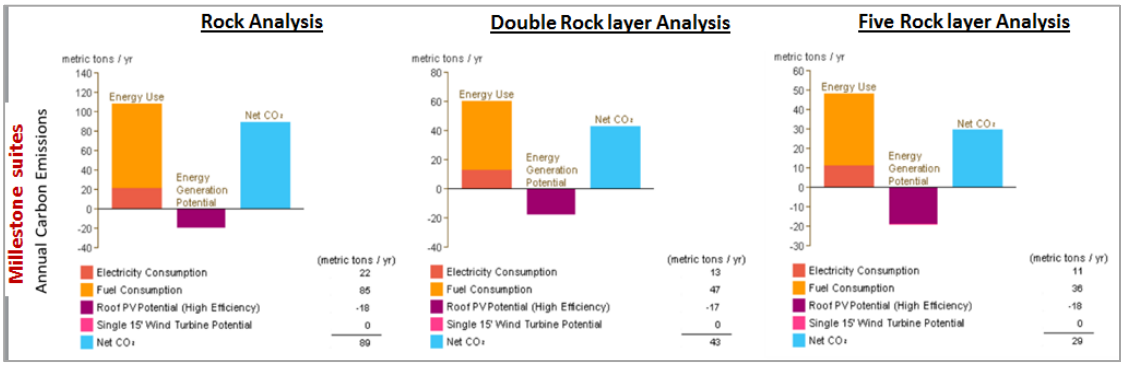


Figure III.48. The electricity consumption of Millstone Suites and the Net CO_2

3.5.7.3. Hidden Cave Hotel

During the analysis of Hidden Cave Hotel by three specifically simulation previously described, it was found regarding for the energy use intensity, the total electricity consumption of the building for the first scenario is 33 (metric tons/yr) and the Net CO_2 95 (metric tons/yr). The total electricity consumption for the second scenario is 27 (metric tons/yr) and the Net CO_2 66(metric tons/yr).The total electricity consumption for the third scenario is 20 (metric tons/yr) and the Net CO_2 of 22 (metric tons/yr), having an electricity consumption decrease of 40% in relation for the first scenario (see Figure III.49).

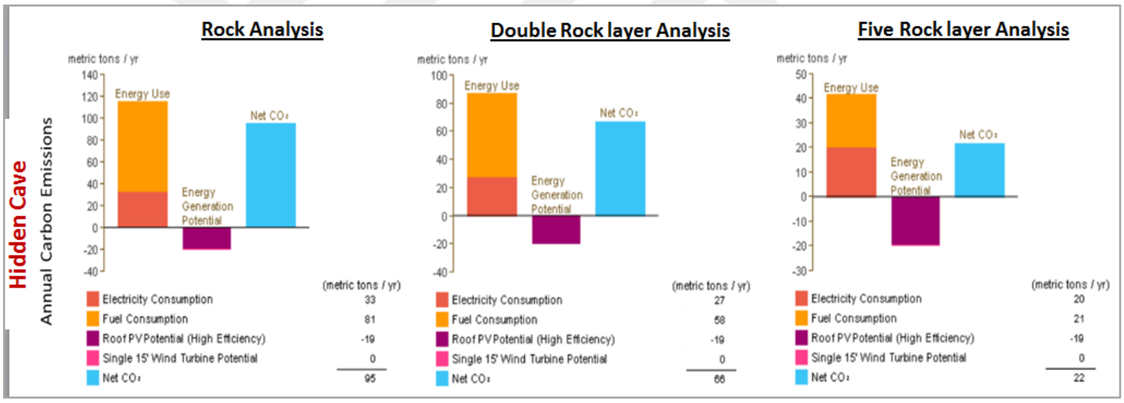


Figure III.49. The electricity consumption of Hidden Cave Hotel and the Net CO_2

3.6. Comparison and Compliances of International Regulations as ASHRAE 90.1 and Architecture 2030: for Testing Hypothesis

3.6.1. Jacob's Cave Suites

It is clear that most vernacular hotels in Cappadocia are composed by Rock material. **The first adapted scenario,** which includes Rock material in all building elements, had an energy cost mean of 48.3 USD per square meter per year. This is almost 6.00 USD/m2/yr more than the ASHRAE 90.1 benchmark for Turkey, which is 42.4 USD/m2/yr according to Autodesk Insight 360 program. Furthermore, **the**

second adapted scenario, which includes double Rock layers on walls and exterior roofs, achieved an important reduction of energy consumption that is below of ASHRAE 90.1 requirement with an overall energy cost mean of 38.5 USD/m2/yr.

Finally the third scenario (original building): Which includes five Rock layers on walls and exterior roofs, had an energy cost mean of26.4 USD per square meter per year. This is almost 16.00 USD/m2/yr less than the ASHRAE 90.1 benchmark for Turkey, which is 42.2 USD/m2/yr according to Autodesk Insight 360 program. **Thus the first hypothesis that simulating the concept of sustainability in the context of vernacular architecture achieves verification of compliance with ASHRAE 90.1 & ARCH 2030 standards was confirmed with the third scenario, as shown in the (**Figure III.50).

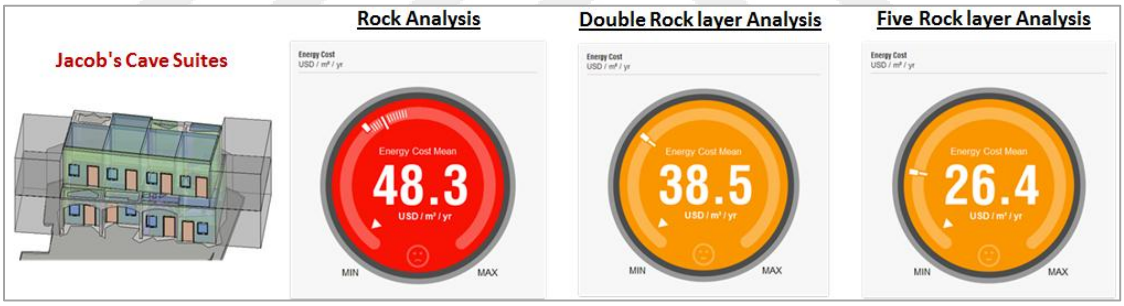


Figure III.50. Image of the three scenario for Jacob's Cave Suites and Comparative with ASHRAE 90.1 and Architecture 2030

3.6.2. **Millstone Cave Suites Hotel**

It is clear that most vernacular hotel in Cappadocia which is composed by Rock material in all building elements. **The first adapted scenario,** which includes Rock material in all building elements, had an energy cost mean of 77 USD per square meter per year. This is 34.8 USD/m2/yr more than the ASHRAE 90.1 benchmark for Turkey, which is 42.2 USD/m2/yr according to Autodesk Insight 360 program. Furthermore, **the second adapted scenario,** which includes double Rock layers on walls and exterior roofs, had an energy cost mean of 62.5 USD per square meter per year. This is 20.3 USD/m2/yr more than the ASHRAE 90.1 benchmark.

Finally the third scenario (original building): Which includes five Rock layers on walls and exterior roofs, had an energy cost mean of 42.2 USD per square meter per year. This is almost same to the ASHRAE 90.1 benchmark for Turkey, which is 42.2 USD/m2/yr according to Autodesk Insight 360 program. **Thus_the hypothesis that simulating the concept of sustainability in the context of vernacular architecture achieves verification of compliance with ASHRAE 90.1 & ARCH 2030 standards was confirmed with the third scenario, as shown in the** (FigureIII.51).

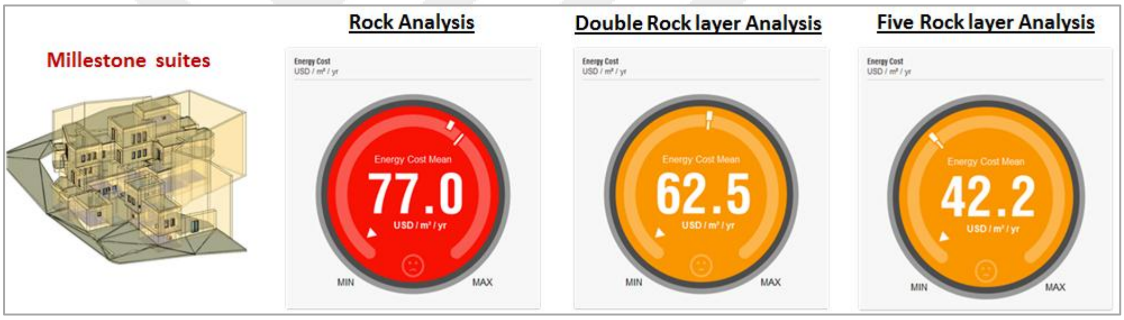


Figure III.51. Image of the three scenario for Milestone cave suits hotel and Comparative with ASHRAE 90.1 and Architecture 2030

3.6.3. **Hidden Cave Hotel**

It is clear that most vernacular hotel in Cappadocia which is composed by Rock material in all building elements. **The first adapted scenario,** which includes Rock material in all building elements, had an energy cost mean of 49 USD per square meter per year. This is 6.8 USD/m2/yr more than the ASHRAE 90.1 benchmark for Turkey, which is 42.2 USD/m2/yr according to Autodesk Insight 360 program. Furthermore, **the second adapted scenario,** which includes double Rock layers on walls and exterior roofs, achieved an important reduction of energy consumption that is below of ASHRAE 90.1 requirement with an overall energy cost mean of 40.7 USD/m2/yr. **Finally the third scenario (original building):** Which includes five Rock layers on walls and exterior roofs, had an energy cost mean of 27.1 USD per square meter per year. This is almost 15.1 USD/m2/yr less than the ASHRAE 90.1 benchmark for Turkey, which is 42.2 USD/m2/yr according to Autodesk Insight 360 program. **Thus the hypothesis that simulating the concept of sustainability in the context of vernacular architecture achieves verification of compliance with ASHRAE 90.1 & ARCH 2030 standards was confirmed with the third scenario, as shown in the (**Figure III.52).

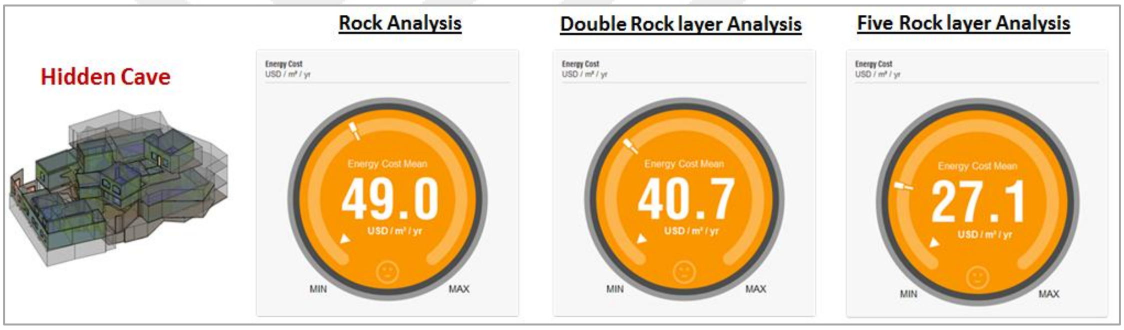


Figure III.52. Image of the three scenario for Hidden Cave Hotel and Comparative with ASHRAE 90.1 and Architecture 2030.

3.7. Comparison of three hotels considering Energy Use Intensity and specifically the last scenario (original building)

Considering the final results of energy use for the three Hotels and its three scenarios of material changes it was clear that the last simulation which considered five Rock layers on walls and exterior roofs had more impact than the previous one. That difference was not only evidenced on energy use but also on the percentage of its reduction which was not similar for all studied cases, as was in the second scenario. The following (Figure III.53) shows that comparison, and it is clear that in the second scenario the percentage of reduction for all hotels was around 23.4 %, but in the final test the percentage of reduction has a variation between 55.8 % and 65.9 %.

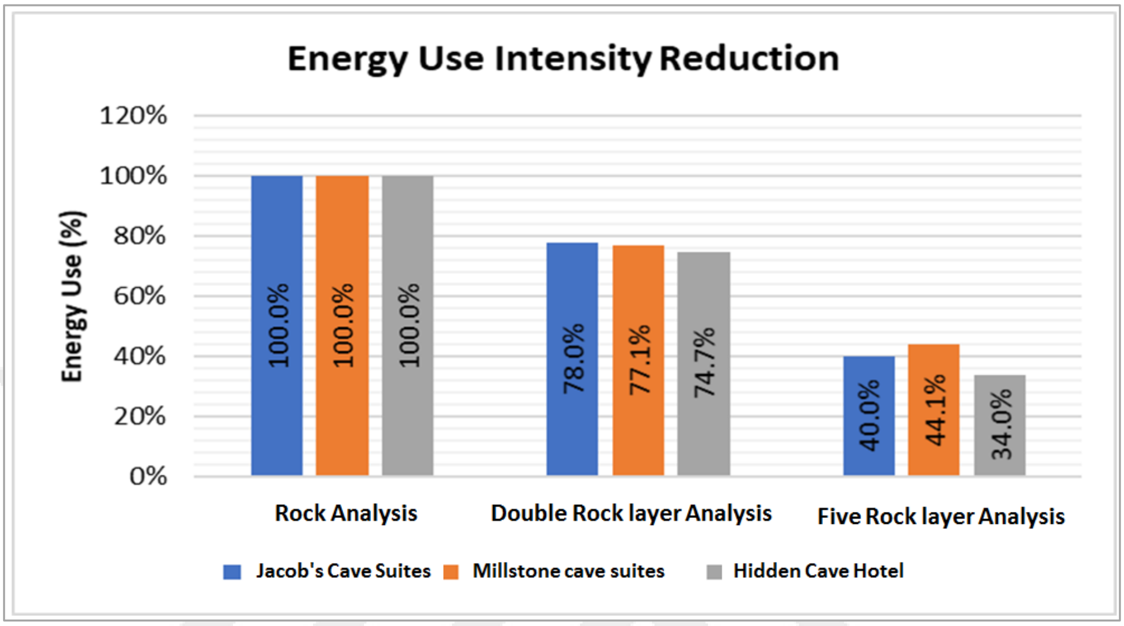


Figure III.53. Comparison of the three hotels considering Energy Use Intensity

Furthermore, the energy metrics of the last scenario shows that Jacob's Cave Suites and Hidden Cave Hotel have similar energy use per square meter per year which is1522 and 1339 MJ respectively. On the other hand, Millstone Suites has more than twice times of these energy uses per square meter with about 3539 MJ. It is directly proportional for each type of energy use as electricity and fuel as it is shown on the following (Figure III.54).

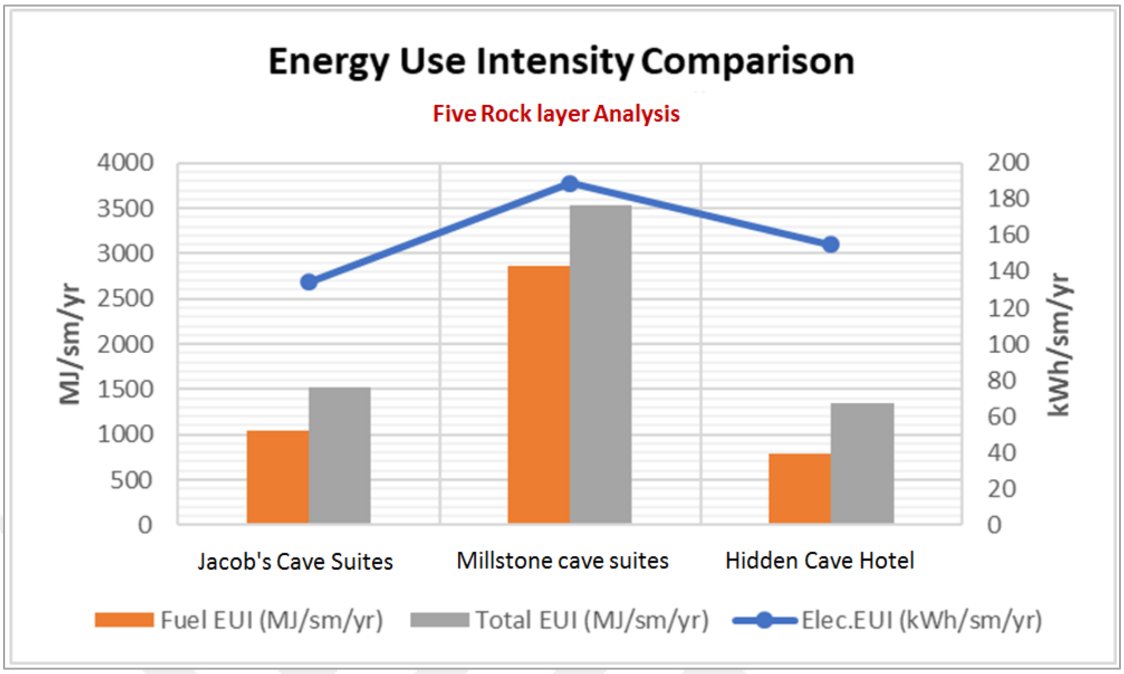


Figure III.54. Comparison of three hotels considering Energy Use Intensity and specifically the last scenario (original building)

Similar analysis and results were obtained at the moment of comparing the other variables previously studied as: Monthly Heating and Cooling loads, Annual Carbon emissions and Energy costs per square meters per year. It is because, all of them are consequences of the energy and heat flux simulated for each building and its different scenarios.

3.8. Analysis of Data Findings for Service Quality toward Guest Satisfaction

Service quality is made out of seven measurements are recorded as (tangible)', 'reliability', 'assurance', 'empathy', 'environment', 'technology', and 'entertainment'. 290 respondents were requested, 106 questionnaires were for Jacobs cave suit hotel, 93 for Mileston cave suits hotel and 91 Hidden cave hotel. The respondents were requested to rate every announcement concerning their expectation in Likert Scale, 1 set as 'emphatically insignificant', 4 set as 'average', and 7 set as 'strongly important' and perception 1 set as 'very poor performance', 4 set as 'average', 7 set as 'excellent performance', of service quality in of Cappadocia's hotel to look at the dimensionality of the 62 items. The systematic discoveries of the service quality of each measurement were as per the following Table III.4.

Table III.4. The analytical findings of the service quality of each dimension

Dimension	N.	Mean Customers' Expectation Score(E)	N.	Mean Customers' Perception Score (P)	Mean Gap Score (P-E)
Tangibility					
Q1 Modern and comfortable furniture	290	5.468	287	6.284	0.816
Q2 Appealing interior and exterior hotel decoration	290	5.599	290	6.408	0.809
Q3 Attractive lobby	290	5.414	290	6.408	0.994
Q4 Cleanliness and comfort of rooms	290	6.130	288	6.789	0.659
Q5 Spaciousness of rooms	290	5.686	271	6.348	0.662
Q6 Hygienic bathrooms and toilets	290	6.117	285	6.682	0.565
Q7 Convenient hotel location	290	5.434	284	6.358	0.924
Q8 Neat and professional appearance of staff	290	5.842	273	6.231	0.389
Q9 Availability of swimming pool, sauna and gym	290	5.103	278	5.699	0.596
Q10 Complimentary items	290	4.943	290	6.047	1.104
Q11 Visually appealing brochures, pamphlets, etc.	290	4.742	276	5.037	0.295

Q12 Image of the hotel	290	5.668	290	6.338	0.67
Reliability					
Q13 Staff performing services right the first time	290	5.439	283	6.505	1.066
Q14 Performing the services at the time promised	290	5.659	286	6.475	0.816
Q15 Well-trained and knowledgeable staff	290	5.530	290	6.391	0.861
Q16 Experienced staff	290	5.487	279	6.231	0.744
Q17 Staff with good communication skills	290	5.436	290	6.448	1.012
Q18 Accuracy in billing	290	5.940	275	6.334	0.394
Q19 Accuracy of food order	290	5.515	290	6.130	0.595
Q20 Accurate information about hotel services	290	5.535	284	6.284	0.749
Q21 Advance and accurate information about prices	290	5.715	288	6.395	0.68
Q22 Timely housekeeping services	290	5.682	278	6.388	0.706
Q23 Availability of transport facilities	290	5.706	286	6.398	0.692
Q24 Reliable message service	290	5.234	290	5.950	0.716
Q25 Willingness of staff to provide help promptly	290	5.188	276	6.127	0.939
Q26 Availability of staff to provide service	290	5.404	287	6.334	0.93
Q27 Quick check-in and check-out	290	5.334	290	6.411	1.077
Q28 Prompt breakfast service	290	5.271	290	6.054	0.783
Q29 Problem-solving abilities of staff	290	5.545	267	6.485	0.94
Assurance					
Q30 Friendliness of staff	290	5.702	288	6.515	0.813
Q31 Courteous employees	290	5.532	274	6.291	0.759

Q32 Ability of staff to instill confidence in customers	290	4.938	284	5.783	0.845
Empathy					
Q33 Availability of room service	290	4.736	290	5.465	0.729
Q34 Understanding the customers' requirements	290	4.391	276	5.067	0.676
Q35 Listening carefully to complaints	290	5.568	290	6.140	0.572
Q36 Hotel to have customers' best interests at heart	290	5.156	286	6.164	1.008
Q37 Giving special attention to the customer	290	5.237	290	6.418	1.181
Q38 Recognizing the hotel customer	290	5.331	279	6.388	1.057
Q39 Addressing the customer by name	290	5.004	290	6.284	1.28
Q40 Customer loyalty programme	290	5.442	287	5.813	0.371
Environment					
Q41 Comfortable, relaxed and welcome feeling	290	5.671	290	6.428	0.757
Q42 Quietness of room	290	5.993	290	6.656	0.663
Q43 Variety/quality of sports and recreational facilities	290	5.483	279	5.920	0.437
Q44 Security of room	290	6.323	290	6.756	0.433
Q45 Security and safety at the hotel	290	6.312	290	6.786	0.474
Q46 Comfortable and clean mattress, pillow, bed sheets and covers	290	6.336	290	6.779	0.443
Q47 S room rates	290	5.140	268	6.539	1.399
Q48 Variety of basic products and services offered (toothpaste, soap, shampoo, towels, toilet paper, stationery, laundry, ironing, tea, coffee, drinking water)	290	5.754	290	6.495	0.741
Q49 Room items in working order (kettle, air conditioning, lighting, toilet, fridge, etc.)	290	6.027	287	6.667	0.64
Q50 Quality of food in restaurant(s)	290	5.498	290	6.784	1.286
Q51 Choice of menus, buffet, beverages and wines	290	5.336	278	6.543	1.207

Technology					
Q52 In-room technologies (Wifi, smart TV, telephone, voicemail, on demand PC, television, internet plug, meal ordering, email, wake-up system)	290	4.947	290	6.437	1.49
Q53 Hotel technologies (online reservation, email, internet, fax, international calling facilities, hotel website, direct hotel email, computerized feedback form, special promotions on hotel website, acceptance of credit and debit cards)	290	5.509	279	6.743	1.234
Entertainment					
Q54 Provision of children's facilities (playground, baby-sitting, swimming pool, etc.)	290	5.088	276	5.678	0.59
Q55 Provision of evening entertainment	290	5.082	290	6.867	1.785
Q56 Casino	290	5.848	285	6.856	1.008
Q57 Variety show (such as concert)	290	5.262	278	5.736	0.474
Q58 Recreation and therapy (such as SPA)	290	5.318	290	5.761	0.443
Q59 Shopping center	290	2.508	278	2.765	0.257
Q60 Acrobatics performances (such as the House of Dancing Water)	290	1.247	269	2.765	1.518
Q61 Convention and exhibition center	290	5.222	279	5.612	0.39
Q62 Tourist attractions	290	5.286	290	6.898	1.612

As indicated by Parasuraman and his partners, the distinction between the two scores is service quality (Q). Q = P – E The way to advancing service quality is to amplify this positive gap score. The negative estimation of this gap score uncovers the dissatisfaction.

Table III.5. Overall satisfactions

Questions	N.	Overall satisfactions
OS1 I was fully satisfied with the services offered by this hotel.	290	6.361
OS2 The services offered by this hotel met my expectations.	290	6.653
OS3 I am satisfied with my experience in this hotel.	290	6.567

3.8.1. Descriptive Statistics

Table III.6. Shows us some critical factual outcomes which are (Mean, Standard Deviation). The mean value clarified the idea of the respondent answer about any inquiries asked to members since it is a standout amongst the most critical factual procedures in proportion of propensity.

Table III.6. Descriptive Statistics of all variables

Variables	N	Mean	Std. Deviation	Skewness	Kurtosis
Q1	267	6.236	0.859	-1.157	1.232
Q2	267	6.419	0.616	-0.564	-0.594
Q3	267	6.404	0.656	-0.893	0.756
Q4	267	6.704	0.497	-1.355	0.795
Q5	267	6.337	0.803	-1.299	1.926
Q6	267	6.667	0.503	-1.064	-0.087
Q7	267	6.345	0.795	-1.331	2.116
Q8	267	6.221	0.867	-1.107	1.036
Q9	267	5.727	0.991	-0.271	-0.581
Q10	267	6.000	0.897	-0.630	-0.052
Q11	267	5.071	0.879	0.228	-0.351
Q12	267	6.341	0.795	-1.323	2.108
Q13	267	6.494	0.674	-0.983	-0.237
Q14	267	6.468	0.633	-0.956	0.707
Q15	267	6.393	0.770	-1.454	2.720
Q16	267	6.217	0.883	-1.133	0.859
Q17	267	6.427	0.647	-0.943	0.927
Q18	267	6.330	0.783	-1.317	2.275
Q19	267	5.989	0.903	-0.595	-0.146
Q20	267	6.255	0.864	-1.187	1.071
Q21	267	6.419	0.768	-1.531	2.942
Q22	267	6.382	0.811	-1.529	2.617
Q23	267	6.404	0.762	-1.448	2.732
Q24	267	5.914	0.920	-0.412	-0.478
Q25	267	6.022	0.892	-0.588	-0.166
Q26	267	6.348	0.777	-1.373	2.505
Q27	267	6.397	0.649	-0.861	0.789
Q28	267	6.004	0.852	-0.522	-0.388

Q29	267	6.483	0.603	-0.920	0.923
Q30	267	6.494	0.674	-0.983	-0.237
Q31	267	6.277	0.826	-1.200	1.350
Q32	267	5.719	0.934	-0.277	-0.533
Q33	267	5.502	0.994	-0.075	-0.658
Q34	267	5.116	0.844	0.269	0.074
Q35	267	6.120	0.867	-0.792	0.144
Q36	267	6.180	0.870	-0.909	0.323
Q37	267	6.446	0.637	-0.981	1.103
Q38	267	6.386	0.759	-1.452	2.908
Q39	267	6.292	0.825	-1.236	1.437
Q40	267	5.734	0.930	-0.322	-0.479
Q41	267	6.457	0.620	-0.884	0.712
Q42	267	6.622	0.584	-1.282	0.643
Q43	267	5.903	0.908	-0.413	-0.404
Q44	267	6.730	0.477	-1.455	1.051
Q45	267	6.768	0.457	-1.741	2.108
Q46	267	6.760	0.462	-1.679	1.865
Q47	267	6.532	0.639	-1.036	-0.026
Q48	267	6.536	0.589	-1.082	1.340
Q49	267	6.659	0.506	-1.024	-0.184
Q50	267	6.768	0.457	-1.741	2.108
Q51	267	6.524	0.645	-1.024	-0.068
Q52	267	6.464	0.678	-1.181	1.285
Q53	267	6.734	0.475	-1.481	1.141
Q54	267	5.704	1.033	-0.249	-0.767
Q55	267	6.858	0.371	-2.495	5.563
Q56	267	6.843	0.385	-2.284	4.393
Q57	267	5.723	1.025	-0.288	-0.712
Q58	267	5.734	0.946	-0.277	-0.593
Q59	267	2.831	1.919	0.602	-1.116
Q60	267	2.783	1.865	0.607	-1.091
Q61	267	5.652	1.020	-0.160	-0.753
Q62	267	6.884	0.344	-2.955	8.476

3.8.2. Frequency Table

A recurrence table is built by masterminding gathered information esteems in rising request of size with their relating frequencies. It will give us a condensed gathering of information partitioned into totally unrelated classes and the quantity of events in a class. Recurrence table can be utilized for both subjective and quantitative information. The employments of Frequency Distribution are as per the following;

(i) To help us for breaking down the information.

(ii) To appraise the frequencies of the populace based on the example.

(iii) To ease of calculation of different factual measures.

(iv) To develop a recurrence circulation table, one needs to tally the quantity of perceptions that fall into every class. The quantity of perception falling inside a class interim is called class recurrence of that class interim.

In this investigation about "guest satisfaction of Hotels in Cappadocia zone", we have71 factors that are on the whole absolute information. We have utilized recurrence tables for some of them that will give us a visual show of the information and it is one approach to compose information so it bodes well.

From the questionnaires that we had dispersed to 290 respondents of our overview however because of missing qualities we have considered 267 opinions into account, which 106 questionnaires were for Jacobs cave suit hotel, 93 for Mileston cave suits hotel and 91 Hidden cave hotel.

3.8.3. Factor Analysis

Factor investigation is a method for recognizing designs in information, and communicating the information so as to feature their similarities and contrasts. Additionally through factor investigation we can distinguish the most essential factors effect on such a phoneme. Since designs in information can be elusive in information of high measurement, where the guest satisfaction of graphical portrayal isn't accessible, factor analyzing is a powerful strategy for dissecting information. There are different approaches to do as such and Principal Components Analysis (PCA) is a standout amongst the most use one.

The principle favorable position of PCA is that once you have discovered these examples in the information, and you pack the information, i.e. By lessening the quantity of measurements, absent much loss of data. This procedure utilized in picture pressure, as we will find in a later section.

In the wake of leading PCA on our information in SPSS program the accompanying yields are made, as we will experience the principle critical outcomes. We can utilize this correlation matrix to check the example of relationships. In the first place, filter the essentialness esteems and search for any factor for which the dominant part of qualities are more noteworthy than 0.05. At that point look for the correlation coefficients themselves and check for any more prominent than 0.9. On the off chance that any of them are discovered then we ought to know that an issue could emerge on account of peculiarity in the information. For that we have to check the determinant estimation of the correlation coefficients matrix recorded at the base of the matrix. Here its esteem is 0.00005 which isn't zero generally the issue of not directing factor analysis shows up. In this way, multi-collinearity isn't an issue. All in all, all inquiries are connected genuinely well and there is no compelling reason to cancel any inquiries at this stage.

3.8.3.1. Factor Analysis for each Hotels Separately

This section examines the factor analysis for each of Jacob's Cave Suites, Millstone Suites and Hidden Cave Hotel separately.

3.8.3.1.1. Jacob's Cave Suites

The factor analysis for Jacob Cave and Table III.7, Express the Kaiser-Meyer-Olkin measure of sampling adequacy and Bartlett's test of sphericity. Since the value is greater than 0.5 which is (0.665), therefore using Factor Analysis is likely to be appropriate.

Table III.7. Test of KMO and Bartlett's

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.665
Bartlett's Test of Sphericity	Approx. Chi-Square	1342.132
	df	1128
	Sig.	0.0001

As seen that the below table Table III.8, demonstrates the main results of the factor analysis. After seven cycles of decreasing the number of factors retained, 22 measurement items were removed and 40 measurement items were retained unlike the other result which 48 measurements were joined. Here in this sample, 10 factors have been chosen as the best using PCA which describes the total variability of the data. All 10 factors extracted have eigenvalues greater than **1**. % of Variance column specifies how much of the variability in the data has been modeled by the extracted factors. All 10 factors are the main factors which influence people to decide leaving their places and the total variability from those factors are 92.626 % and each factor clarifies (45.846 %, 13.553 %, 8.758 %, 4.865 %, 4.097 %, 3.832 %, 3.640 %, 3.146 %, 2.689 %, 2.199 %,) respectively. The scree plot shows that seven components are an appropriate solution.

Table III.8. Total variance of each component

Component	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	21.089	45.846	45.846	11.886	25.839	25.839
2	6.234	13.553	59.399	8.258	17.952	43.791
3	4.029	8.758	68.157	4.963	10.788	54.580
4	2.238	4.865	73.022	4.222	9.177	63.757
5	1.885	4.097	77.119	3.924	8.530	72.286
6	1.763	3.832	80.951	2.327	5.059	77.346
7	1.675	3.640	84.592	2.012	4.375	81.720
8	1.447	3.146	87.737	1.925	4.185	85.905
9	1.237	2.689	90.427	1.761	3.827	89.732
10	1.012	2.199	92.626	1.331	2.893	92.626

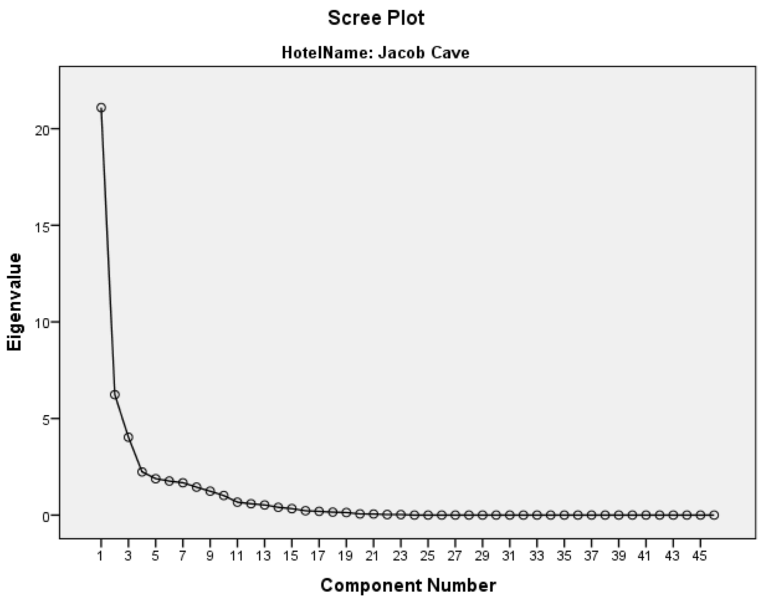


Figure III.55. Screen plot of eigen value vs compnents for Jacob Cave suites

Table III.9. Illustrates the significant factors have impact on leaving decision and they are dependent on significant variables;

	1	2	3	4	5	6	7	8	9	10	Communalities
Q1	0.643										0.874
Q5	0.924										0.992
Q15	0.924										0.992
Q16	0.924										0.992
Q18	0.924										0.992
Q22	0.924										0.992
Q23	0.924										0.992
Q31	0.924										0.992
Q35	0.734										0.875
Q36	0.734										0.875
Q38	0.924										0.992
Q20	0.924										0.992
Q4		0.923									0.995
Q6		0.923									0.995
Q13		0.923									0.995
Q42		0.908									0.945
Q47		0.923									0.995
Q49		0.923									0.995
Q51		0.923									0.995
Q50		0.537									0.954
Q44			0.749								0.954
Q46			0.749								0.954
Q53			0.749								0.954
Q55			0.875								0.921
Q56			0.875								0.921
Q62			0.720								0.748
Q2				0.510							0.787
Q14				0.671							0.861
Q27				0.707							0.893
Q29				0.838							0.950
Q37				0.838							0.950
Q41				0.838							0.950
Q9					0.727						0.827
Q54					0.931						0.986
Q57					0.931						0.986
Q61					0.931						0.986
Q10						0.740					0.916
Q25						0.761					0.913
Q58						0.697					0.634
Q48							0.936				0.991
Q52							0.936				0.991
Q59								0.931			0.902
Q60								0.904			0.868
Q33									0.841		0.832
Q34									0.891		0.861
Q11										0.726	0.649

Factor 1: First factor always has the maximum power, so in choosing hotel Jacob Cave, so the first factor explains (45.846%) total variance, with this percentage has impression on determining to elect that hotel and the variables which share their influences in these factors are as followings in order:

	Variables		Factor loading
1:	Spaciousness of rooms	Q5	0.992
2:	Well-trained and knowledgeable staff	Q15	0.992
3:	Experienced staff	Q16	0.992
4:	Accuracy in billing	Q18	0.992
5:	Timely housekeeping services	Q22	0.992
6:	Availability of transport facilities	Q23	0.992
7:	Courteous employees	Q31	0.992
8:	Recognizing the hotel customer	Q38	0.992
9:	Accurate information about hotel services	Q20	0.992
10:	Listening carefully to complaints	Q35	0.875
11:	Hotel to have customers' best interests at heart	Q36	0.875
12:	Modern and comfortable furniture	Q1	0.874

Factor 2: This factor is rank at second place and explains (13.553 %) of total variance. The variables contributable are given below;

	Variables		Factor loading
1:	Cleanliness and comfort of rooms	Q4	0.995
2:	Hygienic bathrooms and toilets	Q6	0.995
3:	Staff performing services right the first time	Q13	0.995
4:	Quietness of room	Q42	0.945
5:	Reasonable room rates	Q47	0.995
6:	Room items in working order (kettle, air conditioning, lighting, toilet, fridge, etc.)	Q49	0.995
7:	Choice of menus, buffet, beverages and wines	Q51	0.995
8:	Quality of food in restaurant(s)	Q50	0.954

Factor 3: This factor is rank at third place and explains (8.758%) of total variance. The variables contributable are given below;

	Variables		Factor loading
1:	Security of room	Q44	0.954
2:	Comfortable and clean mattress, pillow, bed sheets and covers	Q46	0.954
3:	Hotel technologies (online reservation, email, internet, fax, international calling facilities, hotel website,	Q53	0.954
4:	Provision of evening entertainment	Q55	0.921
5:	Casino	Q56	0.921
6:	Tourist attractions	Q62	0.748

Factor 4: This factor is rank at fourth place and explains (4.865%) of total variance. The variables contributable are given below;

	Variables		Factor loading
1:	Problem-solving abilities of staff	Q29	0.950
2:	Giving special attention to the customer	Q37	0.950
3:	Comfortable, relaxed and welcome feeling	Q41	0.950
4:	Quick check-in and check-out	Q27	0.893
5:	Performing the services at the time promised	Q14	0.861
6:	Appealing interior and exterior hotel decoration	Q2	0.787

Factor 5: This factor is rank at fifth place and explains (4.097%) of total variance. The variables contributable are given below;

	Variables		Factor loading
1:	Provision of children's facilities (playground, baby-sitting, swimming pool, etc.)	Q54	0.986
2:	Variety show (such as concert)	Q57	0.986
3:	Convention and exhibition center	Q61	0.986
4:	Availability of swimming pool, sauna and gym	Q9	0.827

Factor 6: This factor is rank at fifth place and explains (3.832%) of total variance. The variables contributable are given below;

	Variables		Factor loading
1:	Complimentary items	Q10	0.916
2:	Willingness of staff to provide help promptly	Q25	0.913
3:	Recreation and therapy (such as SPA)	Q58	0.634

Factor 7: This factor is rank at seventh place and explains (3.640%) of total variance. The variables contributable are given below;

	Variables		Factor loading
1:	Variety of basic products and services offered (toothpaste, soap, shampoo, towels, toilet paper, stationery,	Q48	0.991
2:	In-room technologies (Wifi, smart TV, telephone, voicemail, on demand PC, television, internet plug, meal	Q52	0.991

Factor 8: This factor is rank at eighth place and explains (3.148%) of total variance. The variables contributable are given below;

	Variables		Factor loading
1:	Shopping center	Q59	0.902
2:	Acrobatics performances (such as the House of Dancing Water)	Q60	0.868

Factor 9: This factor is rank at ninth place and explains (3.218%) of total variance. The variables contributable are given below;

	Variables		Factor loading
1:	Availability of room service	Q33	0.832
2:	Understanding the customers' requirements	Q34	0.861

Factor 10: This factor is rank at ninth place and explains (2.733%) of total variance. The variables contributable are given below;

	Variables		Factor loading
1:	Visually appealing brochures, pamphlets, etc.	Q11	0.649

It can also be specified the impact of single variable of on deciding to stay at the hotel Jacob Cave in Cappadocia. The Communalities column in Table III.9, that is derived for each variable by taking the sum of the squared factor loading for each of the factors associated with the variable. All variables are loading factor 1, have about 90% variability, on deciding to stay which is very large as it should be. However, the average percentage of variability of variables in factor 2 is about to 95%. Also other variables have quite reasonable influence on deciding to stay which is about 85% variability.

3.8.3.1.2. Millstone Suites

The factor analysis for Milestone Cave Suits and Table III.10, express the Kaiser-Meyer-Olkin measure of sampling adequacy and Bartlett's test of sphericity. Since the value is greater than 0.5 which is (0.567), therefore using Factor Analysis is likely to be appropriate.

Table III.10. Test of KMO and Bartlett's

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.567
Bartlett's Test of Sphericity	Approx. Chi-Square	1234.196
	df	1128
	Sig.	0.000

As seen that the below table Table III.11, demonstrates the main results of the factor analysis. After seven cycles of decreasing the number of factors retained, 22 measurement items were removed and 40 measurement items were retained unlike the other result which 48 measurements were joined. There are (12) factors as extracted using PCA which explains the total variability of the data. All 12 factors extracted have eigenvalues greater than **1**. % of Variance column indicates how much of the variability in the data has been modeled by the extracted factors. All 12 factors are the main factors which influence people to decide leaving their places and the total variability from those factors are 78.121% and each factors explains (22.776%, 11.682%, 10.318%, 7.042%, 6.589%, 5.961%, 4.245%, 3.558%, 3.218%, 2.733%, 2.563%, 2.335%) respectively. The scree plot shows that seven components are an appropriate solution.

Table III.11. Total variance of each component

Component	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	10.477	22.776	22.776	5.409	11.759	11.759
2	5.374	11.682	34.458	4.677	10.168	21.927
3	4.746	10.318	44.776	4.628	10.060	31.987
4	3.239	7.042	51.818	4.379	9.521	41.507
5	3.031	6.589	58.407	3.275	7.120	48.627
6	2.742	5.961	64.368	2.944	6.399	55.026
7	1.953	4.245	68.613	2.878	6.257	61.283
8	1.637	3.558	72.171	2.602	5.657	66.939
9	1.480	3.218	75.388	2.584	5.618	72.558
10	1.257	2.733	78.121	1.926	4.186	76.744
11	1.179	2.563	80.684	1.716	3.731	80.474
12	1.074	2.335	83.020	1.171	2.545	83.020

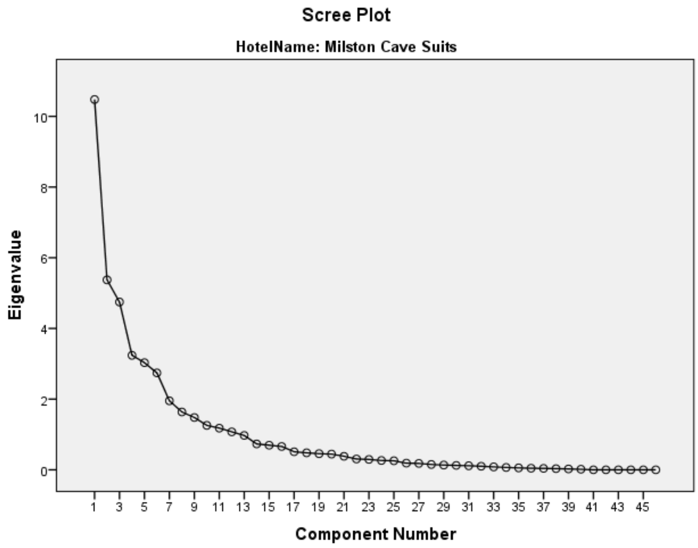


Figure III.56. Screen plot of eigen value vs compnents for Milestone Cave Suits

Table III.12. Illustrates the significant factors have impact on leaving decision and they are dependent on significant variables;

	1	2	3	4	5	6	7	8	9	10	11	12	Communalities
Q9	0.808												0.939
Q11	0.537												0.939
Q33	0.772												0.939
Q34	0.740												0.888
Q54	0.924												0.845
Q57	0.924												0.822
Q61	0.924												0.703
Q1		0.504											0.852
Q5		0.763											0.840
Q15		0.833											0.813
Q18		0.704											0.810
Q22		0.728											0.788
Q23		0.794											0.749
Q38		0.737											0.658
Q46			0.794										0.973
Q53			0.601										0.973
Q55			0.973										0.973
Q62			0.973										0.833
Q50			0.973										0.773
Q16				0.860									0.889
Q31				0.797									0.872
Q35				0.877									0.846
Q36				0.735									0.817
Q20				0.834									0.720
Q13					0.911								0.899
Q25					0.447								0.839
Q47					0.883								0.804
Q51					0.839								0.682
Q27						0.483							0.879
Q29						0.766							0.836
Q37						0.886							0.769

Q41						0.905							0.661
Q2							0.886						0.900
Q14							0.818						0.832
Q44								0.410					0.943
Q56								0.600					0.943
Q59								0.918					0.760
Q60								0.918					0.596
Q4									0.616				0.973
Q6									0.952				0.973
Q49									0.952				0.782
Q10										0.730			0.816
Q58										0.663			0.730
Q48											0.774		0.745
Q52											0.868		0.803
Q42												0.485	0.765

Factor 1: First factor always has the maximum power, so in choosing hotel Milestone Cave Suits, so the first factor explains (22.776%) total variance, with this percentage has impression on determining to elect that hotel and the variables which share their influences in these factors are as followings in order:

	Variables		Factor loading
1:	Provision of children's facilities (playground, baby-sitting, swimming pool, etc.)	Q54	0.939
2:	Variety show (such as concert)	Q57	0.939
3:	Convention and exhibition center	Q61	0.939
4:	Availability of swimming pool, sauna and gym	Q9	0.888
5:	Availability of room service	Q33	0.845
6:	Understanding the customers' requirements	Q34	0.822
7:	Visually appealing brochures, pamphlets, etc.	Q11	0.703

Factor 2: This factor is rank at second place and explains (11.682%) of total variance. The variables contributable are given below;

	Variables		Factor loading
1:	Spaciousness of rooms	Q5	0.852
2:	Accuracy in billing	Q18	0.840
3:	Modern and comfortable furniture	Q1	0.813
4:	Well-trained and knowledgeable staff	Q15	0.810
5:	Availability of transport facilities	Q23	0.788
6:	Timely housekeeping services	Q22	0.749
7:	Recognizing the hotel customer	Q38	0.658

Factor 3: This factor is rank at third place and explains (10.318%) of total variance. The variables contributable are given below;

	Variables		Factor loading
1:	Provision of evening entertainment	Q55	0.973
2:	Tourist attractions	Q62	0.973
3:	Quality of food in restaurant(s)	Q50	0.973
4:	Hotel technologies (online reservation, email, internet, fax, international calling facilities, hotel website,	Q53	0.833
5:	Comfortable and clean mattress, pillow, bed sheets and covers	Q46	0.773

Factor 4: This factor is rank at fourth place and explains (7.042%) of total variance. The variables contributable are given below;

	Variables		Factor loading
1:	Experienced staff	Q16	0.889
2:	Listening carefully to complaints	Q35	0.872
3:	Accurate information about hotel services	Q20	0.846
4:	Courteous employees	Q31	0.817
5:	Hotel to have customers' best interests at heart	Q36	0.720

Factor 5: This factor is rank at fifth place and explains (6.589%) of total variance. The variables contributable are given below;

	Variables		Factor loading
1:	Staff performing services right the first time	Q13	0.899
2:	Reasonable room rates	Q47	0.839
3:	Choice of menus, buffet, beverages and wines	Q51	0.804
4:	Willingness of staff to provide help promptly	Q25	0.682

Factor 6: This factor is rank at fifth place and explains (5.961%) of total variance. The variables contributable are given below;

	Variables		Factor loading
1:	Comfortable, relaxed and welcome feeling	Q41	0.879
2:	Giving special attention to the customer	Q37	0.836
3:	Problem-solving abilities of staff	Q29	0.769
4:	Quick check-in and check-out	Q27	0.661

Factor 7: This factor is rank at seventh place and explains (4.245%) of total variance. The variables contributable are given below;

	Variables		Factor loading
1:	Appealing interior and exterior hotel decoration	Q2	0.900
2:	Performing the services at the time promised	Q14	0.832

Factor 8: This factor is rank at eighth place and explains (3.558%) of total variance. The variables contributable are given below;

	Variables		Factor loading
1:	Shopping center	Q59	0.943
2:	Acrobatics performances (such as the House of Dancing Water)	Q60	0.943
3:	Security of room	Q44	0.760
4:	Casino	Q56	0.596

Factor 9: This factor is rank at ninth place and explains (3.218%) of total variance. The variables contributable are given below;

	Variables		Factor loading
1:	Hygienic bathrooms and toilets	Q6	0.973
2:	Room items in working order (kettle, air conditioning, lighting, toilet, fridge, etc.)	Q49	0.973
3:	Cleanliness and comfort of rooms	Q4	0.782

Factor 10: This factor is rank at ninth place and explains (2.733%) of total variance. The variables contributable are given below;

	Variables		Factor loading
1:	Complimentary items	Q10	0.816
2:	Recreation and therapy (such as SPA)	Q58	0.730

Factor 11: This factor is rank at ninth place and explains (2.563%) of total variance. The variables contributable are given below;

	Variables		Factor loading
1:	Variety of basic products and services offered (toothpaste, soap, shampoo, towels, toilet paper, stationery,	Q48	0.745
2:	In-room technologies (Wifi, smart TV, telephone, voicemail, on demand PC, television, internet plug, meal	Q52	0.803

Factor 12: This factor is rank at ninth place and explains (2.335%) of total variance. The variables contributable are given below;

	Variables		Factor loading
1:	Quietness of room	Q42	0.765

We can also specify the effect of single variable of impacting on deciding to stay at the hotels in Cappadocia. The Communalities column in Table III.12, that is derived for each variable by taking the sum of the squared factor loading for each of the factors associated with the variable. All variables are loading factor 1 have about 85% variability on deciding to stay. However, the average percentage of variability of variables in factor 2 is about to 83%. Also other variables have quite reasonable influence on deciding to stay which is about 80% variability.

3.8.3.1.3. Hidden Cave Hotel

Lastly, the factor analysis was implemented for Hidden Cave Suits and Table III.13, displays the Kaiser-Meyer-Olkin measure of sampling adequacy and Bartlett's test of sphericity. Since the value is greater than 0.5 which is (0.786), therefore using Factor Analysis is likely to be appropriate.

Table III.13. Test of KMO and Bartlett's

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.786
Bartlett's Test of Sphericity	Approx. Chi-Square	2314.132
	df	1128
	Sig.	0.002

In this sample, 8 factors were selected using PCA which specify the total variability of the data. All 8 factors chosen have eigenvalues greater than **1 indeed**. % of Variance column specifies how much of the variability in the data has been modeled by the extracted factors. All 10 factors are the main factors which influence people to decide leaving their places and the total variability from those factors are 91.337% and each factor clarifies (54.632%, 9.699 %, 8.283%, 6.232%, 4.259%, 3.550%, 2.356%, 2.327%) respectively. The scree plot shows that seven components are an appropriate solution see Table III.14.

Table III.14. Total variance of each component

Component	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	25.131	54.632	54.632	12.773	27.768	27.768
2	4.462	9.699	64.331	8.521	18.524	46.292
3	3.810	8.283	72.614	5.936	12.905	59.197
4	2.867	6.232	78.846	5.047	10.972	70.169
5	1.959	4.259	83.104	4.653	10.116	80.284
6	1.633	3.550	86.654	2.222	4.830	85.115
7	1.084	2.356	89.010	1.572	3.417	88.532
8	1.070	2.327	91.337	1.290	2.805	91.337

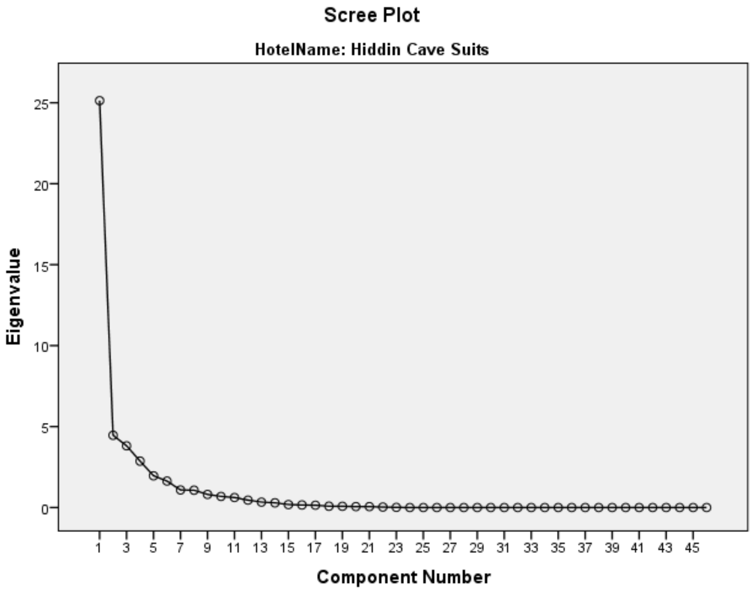


Figure III.57. Screen plot of eigen value vs compnents for Hidden Cave Suits

Table III.15. Illustrates the significant factors have impact on leaving decision and they are dependent on significant variables;

	1	2	3	4	5	6	7	8	Communalities
Q5	0.912								0.998
Q15	0.912								0.998
Q16	0.912								0.998
Q18	0.912								0.998
Q22	0.912								0.998
Q23	0.912								0.998
Q31	0.912								0.998

Q35	0.912								0.998
Q36	0.912								0.998
Q38	0.912								0.998
Q20	0.912								0.998
Q4		0.764							0.939
Q6		0.920							0.985
Q13		0.920							0.985
Q42		0.878							0.878
Q47		0.920							0.985
Q49		0.824							0.874
Q51		0.920							0.985
Q1			0.531						0.919
Q2			0.605						0.919
Q10			0.531						0.919
Q14			0.652						0.815
Q25			0.531						0.919
Q27			0.826						0.986
Q29			0.826						0.986
Q37			0.826						0.986
Q41			0.826						0.986
Q58			0.468						0.587
Q44				0.655					0.906
Q46				0.664					0.734
Q53				0.676					0.800
Q55				0.848					0.912
Q56				0.848					0.912
Q62				0.848					0.912
Q50				0.655					0.906
Q9					0.906				0.945
Q33					0.772				0.698
Q54					0.906				0.945
Q57					0.782				0.792
Q61					0.847				0.784
Q59						0.955			0.945
Q60						0.958			0.952
Q48							0.690		0.919
Q52							0.690		0.919
Q11								0.535	0.641
Q34								0.820	0.760

Factor 1: First factor always has the extreme influence, so in choosing hotel Hidden Cave Suits, so the first factor explains (54.632%) total variance, with this percentage has impression on determining to elect that hotel and the variables which share their influences in these factors are as followings in order:

	Variables		Factor loading
1:	Spaciousness of rooms	Q5	0.998
2:	Well-trained and knowledgeable staff	Q15	0.998
3:	Experienced staff	Q16	0.998
4:	Accuracy in billing	Q18	0.998
5:	Timely housekeeping services	Q22	0.998
6:	Availability of transport facilities	Q23	0.998
7:	Courteous employees	Q31	0.998
8:	Listening carefully to complaints	Q35	0.998
9:	Hotel to have customers' best interests at heart	Q36	0.998
10:	Recognizing the hotel customer	Q38	0.998
11:	Accurate information about hotel services	Q20	0.998

Factor 2: This factor is rank at second place and explains (9.699%) of total variance. The variables contributable are given below;

	Variables		Factor loading
1:	Cleanliness and comfort of rooms	Q4	0.939
2:	Hygienic bathrooms and toilets	Q6	0.985
3:	Staff performing services right the first time	Q13	0.985
4:	Quietness of room	Q42	0.878
5:	Reasonable room rates	Q47	0.985
6:	Room items in working order (kettle, air conditioning, lighting, toilet, fridge, etc.)	Q49	0.874
7:	Choice of menus, buffet, beverages and wines	Q51	0.985

Factor 3: This factor is rank at third place and explains (8.283%) of total variance. The variables contributable are given below;

	Variables		Factor loading
1:	Modern and comfortable furniture	Q1	0.919
2:	Appealing interior and exterior hotel decoration	Q2	0.919
3:	Complimentary items	Q10	0.919
4:	Performing the services at the time promised	Q14	0.815
5:	Willingness of staff to provide help promptly	Q25	0.919
6:	Quick check-in and check-out	Q27	0.986
7:	Problem-solving abilities of staff	Q29	0.986
8:	Giving special attention to the customer	Q37	0.986
9:	Comfortable, relaxed and welcome feeling	Q41	0.986
10:	Recreation and therapy (such as SPA)	Q58	0.587

Factor 4: This factor is rank at fourth place and explains (6.232%) of total variance. The variables contributable are given below;

	Variables		Factor loading
1:	Security of room	Q44	0.906
2:	Comfortable and clean mattress, pillow, bed sheets and covers	Q46	0.734
3:	Hotel technologies (online reservation, email, internet, fax, international calling facilities, hotel website,	Q53	0.800
4:	Provision of evening entertainment	Q55	0.912
5:	Casino	Q56	0.912
6:	Tourist attractions	Q62	0.912
7:	Quality of food in restaurant(s)		

Factor 5: This factor is rank at fifth place and explains (4.259%) of total variance. The variables contributable are given below;

	Variables		Factor loading
1:	Availability of swimming pool, sauna and gym	Q9	0.945
2:	Availability of room service	Q33	0.698
3:	Provision of children's facilities (playground, baby-sitting, swimming pool, etc.)	Q54	0.945
4:	Variety show (such as concert)	Q57	0.792
5:	Convention and exhibition center	Q61	0.784

Factor 6: This factor is rank at fifth place and explains (3.550%) of total variance. The variables contributable are given below;

	Variables		Factor loading
1:	Shopping center	Q59	0.945
2:	Acrobatics performances (such as the House of Dancing Water)	Q60	0.952

Factor 7: This factor is rank at seventh place and explains (2.356%) of total variance. The variables contributable are given below;

	Variables		Factor loading
1:	Variety of basic products and services offered (toothpaste, soap, shampoo, towels, toilet paper, stationery,	Q48	0.919
2:	In-room technologies (Wifi, smart TV, telephone, voicemail, on demand PC, television, internet plug, meal	Q52	0.919

Factor 8: This factor is rank at eighth place and explains (2.327%) of total variance. The variables contributable are given below;

	Variables		Factor loading
1:	Visually appealing brochures, pamphlets, etc.	Q11	0.641
2:	Understanding the customers' requirements	Q34	0.760

It can also be specified the impact of single variable of on deciding to stay at the hotel Jacob Cave in Cappadocia. The Communalities column in Table III.15, that is derived for each variable by taking the sum of the squared factor loading for each of the factors associated with the variable. All variables are loading factor 1 have about 99% variability on deciding to stay which is very large as it should be. However, the average percentage of variability of variables in factor 2 is about to 90%. Also other variables have quite reasonable influence on deciding to stay which is about 87% variability.

3.8.3.2. Factor analysis for all the Three Hotels Together

Table III.16, demonstrates a few critical parts of the outcome; the Kaiser-Meyer-Olkin proportion of examining ampleness and Bartlett's trial of sphericity. The KMO measurement shifts somewhere in the range of 0 and 1. Since the esteem is more noteworthy than 0.5 which is (0.880), thusly utilizing Factor Analysis is probably going to be proper.

Table III.16. Test of KMO and Bartlett's for the three hotels

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.880
Bartlett's Test of Sphericity	Approx. Chi-Square	17958.196
	df	1128
	Sig.	0.000

Bartlett's measure tests the invalid hypothesis that the first correlation matrix is a character matrix. For factor analysis to work we require a few relationships amongst factors and if the r- matrix were a personality matrix, at that point all correlation coefficients would be zero. In this manner, we need this test is to be huge and it is without a doubt. Table III.17, shows the fundamental aftereffects of the factor analysis. After seven cycles of diminishing the quantity of factors held, 14 measurement items were expelled and 48 measurement items were held. As observed there seem to be (9) factors, which have been separated utilizing PCA, which clarifies the aggregate inconstancy of the information. We can see that we have (9) removed factors as picked automatically by the program and picked just those which have eigenvalues more noteworthy than 1. % Of Variance segment demonstrates the amount of the changeability in the information has been displayed by the extricated factors. Every one of the 9 factors are the fundamental elements which impacts uprooted individuals to choose leaving their places and the aggregate changeability from those elements are 80.934% and every factor clarifies (37.108%, 13.396%, 7.374%, 5.975%, 4.762%, 3.695%, 3.175%, 3.095%, 2.353%) individually. The scree plot demonstrates that seven segments are a proper arrangement.

Table III.17. Total variance of each component for the three hotels

Component	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	17.812	37.108	37.108	10.558	21.996	21.996
2	6.430	13.396	50.504	5.599	11.665	33.661
3	3.540	7.374	57.878	5.201	10.835	44.495
4	2.868	5.975	63.853	4.814	10.030	54.525
5	2.286	4.762	68.615	3.551	7.398	61.923
6	1.773	3.695	72.310	2.899	6.040	67.963
7	1.524	3.175	75.485	2.426	5.055	73.018
8	1.486	3.095	78.580	1.962	4.087	77.105
9	1.130	2.353	80.934	1.838	3.829	80.934
10	0.915	1.906	82.840			
11	0.870	1.813	84.653			
12	0.790	1.646	86.298			
13	0.722	1.504	87.802			
14	0.624	1.300	89.102			
15	0.536	1.117	90.220			
16	0.501	1.043	91.263			
17	0.444	0.925	92.188			
18	0.402	0.838	93.026			
19	0.368	0.766	93.792			
20	0.323	0.673	94.465			
21	0.314	0.654	95.119			
22	0.263	0.548	95.666			
23	0.220	0.458	96.124			
24	0.206	0.428	96.552			
25	0.161	0.335	96.887			
26	0.157	0.327	97.214			
27	0.141	0.293	97.507			
28	0.124	0.259	97.767			
29	0.113	0.235	98.002			
30	0.101	0.211	98.212			

31	0.093	0.194	98.406			
32	0.089	0.185	98.592			
33	0.074	0.155	98.747			
34	0.072	0.150	98.897			
35	0.065	0.136	99.033			
36	0.059	0.122	99.155			
37	0.056	0.116	99.271			
38	0.054	0.112	99.383			
39	0.044	0.092	99.475			
40	0.042	0.088	99.564			
41	0.041	0.085	99.648			
42	0.036	0.076	99.724			
43	0.031	0.064	99.788			
44	0.026	0.055	99.843			
45	0.022	0.047	99.890			
46	0.021	0.043	99.933			
47	0.018	0.037	99.970			
48	0.015	0.030	100.000			
Extraction Method: Principal Component Analysis.						

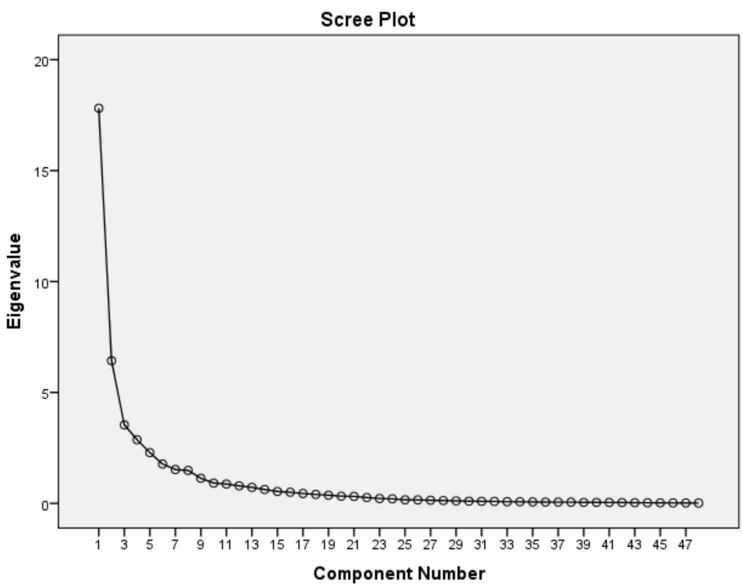


Figure III.58. Screen plot of eigen value vs compnents for the three hotels

Table III.18. Illustrates the significant factors have impact on leaving decision and they are dependent on significant variables; for the three hotels

	1	2	3	4	5	6	7	8	9	Communalities
Q5	0.881									0.876
Q18	0.875									0.898
Q20	0.869									0.843
Q22	0.864									0.827
Q15	0.862									0.843
Q31	0.860									0.827
Q16	0.857									0.859
Q23	0.821									0.803
Q38	0.779									0.704
Q35	0.765									0.775
Q36	0.743									0.694
Q1	0.658									0.738
Q10	0.584									0.792
Q55		0.917								0.864
Q62		0.849								0.761
Q50		0.847								0.887
Q46		0.809								0.755
Q56		0.807								0.732
Q44		0.798								0.831
Q53		0.745								0.737
Q47			0.866							0.872
Q51			0.838							0.840
Q13			0.836							0.867
Q42			0.775							0.694
Q6			0.775							0.839
Q49			0.752							0.807
Q4			0.621							0.828
Q29				0.887						0.900
Q41				0.881						0.889
Q37				0.870						0.865
Q27				0.774						0.826
Q14				0.671						0.724
Q2				0.619						0.710
Q61					0.874					0.936
Q54					0.864					0.962
Q57					0.849					0.946
Q9					0.688					0.863

Q58						0.860				0.856
Q32						0.845				0.886
Q25						0.579				0.741
Q28						0.444				0.493
Q59							0.883			0.847
Q60							0.866			0.844
Q34								0.869		0.775
Q33								0.684		0.745
Q11								0.550		0.436
Q52									0.911	0.911
Q48									0.903	0.896

Factor 1: (Perception) First factor dependably has the most astounding effect, so in choosing hotels in Cappadocia zone the principal factor clarifies (37.108%,) add up to difference. It implies with this rate has effect on choosing to pick that region and the factors which share their persuasions in these elements are as followings all together:

	Variables		Factor loading
1:	Spaciousness of rooms	Q5	0.881
2:	Accuracy in billing	Q18	0.875
3:	Accurate information about hotel services	Q20	0.869
4:	Timely housekeeping services	Q22	0.864
5:	Well-trained and knowledgeable staff	Q15	0.862
6:	Courteous employees	Q31	0.860
7:	Experienced staff	Q16	0.857
8:	Availability of transport facilities	Q23	0.821
9:	Recognizing the hotel customer	Q38	0.779
10:	Carefully to complaints	Q35	0.765
11:	to have customers' best interests at heart	Q36	0.743
12:	Modern and comfortable furniture	Q1	0.658
13:	Complimentary items	Q10	0.584

Factor 2: (Amusement) This factor is status at second place and clarifies (13.396%) of aggregate fluctuation. The factors contributable are given underneath;

	Variables		Factor loading
1:	Provision of evening entertainment	Q55	0.917
2:	Tourist attractions	Q62	0.849
3:	Quality of food in restaurant(s)	Q50	0.847
4:	Comfortable and clean mattress, pillow, bed sheets and covers	Q46	0.809
5:	Casino	Q56	0.807
6:	Security of room	Q44	0.798
7:	Hotel technologies (online reservation, email, internet, fax, international calling facilities, hotel website,	Q53	0.745

Factor 3: (Employee's quality attention) This factor is status at third place and clarifies (7.374%) of aggregate difference. The factors contributable are given beneath;

	Variables		Factor loading
1:	Sustainable room rates	Q47	0.866
2:	Choice of menus, buffet, beverages and wines	Q51	0.838
3:	Staff performing services right the first time	Q13	0.836
4:	Quietness of room	Q42	0.775
5:	Hygienic bathrooms and toilets	Q6	0.775
6:	Room items in working order (kettle, air conditioning, lighting, toilet, fridge, etc.)	Q49	0.752
7:	Cleanliness and comfort of rooms	Q4	0.621

Factor 4: (Sympathy) This factor is status at fourth place and clarifies (5.975%) of aggregate fluctuation. The factors contributable are given underneath;

	Variables		Factor loading
1:	Problem-solving abilities of staff	Q29	0.887
2:	Comfortable, relaxed and welcome feeling	Q41	0.881
3:	Giving special attention to the customer	Q37	0.870
4:	Quick check-in and check-out	Q27	0.774
5:	Performing the services at the time promised	Q14	0.671
6:	Appealing interior and exterior hotel decoration	Q2	0.619

Factor 5: (Hotel surroundings and environmental factors) This factor is status at fifth place and clarifies (4.762%) of aggregate fluctuation. The factors contributable are given underneath;

	Variables		Factor loading
1:	Convention and exhibition center	0.874	Q61
2:	Provision of children's facilities (playground, baby-sitting, swimming pool, etc.)	0.864	Q54
3:	Variety show (such as concert)	0.849	Q57
4:	Availability of swimming pool, sauna and gym	0.688	Q9

Factor 6: **(Convenience)** This factor is status at sixth place and clarifies (3.695%) of aggregate fluctuation. The factors contributable are given underneath;

	Variables		Factor loading
1:	Recreation and therapy (such as SPA)	Q58	0.860
2:	Ability of staff to instill confidence in customers	Q32	0.845
3:	Willingness of staff to provide help promptly	Q25	0.579
4:	Prompt breakfast service	Q28	0.444

Factor 7: **(Core hotel benefit)** This factor is status at seventh place and clarifies (3.175%) of aggregate fluctuation. The factors contributable are given underneath;

	Variables		Factor loading
1:	Shopping center	Q59	0.883
2:	Acrobatics performances (such as the House of Dancing Water)	Q60	0.866

Factor 8:**(Confirmation)** This factor is status at eighth place and clarifies (3.095%) of aggregate fluctuation. The factors contributable are given underneath;

	Variables		Factor loading
1:	Understanding the customers' requirements	Q34	0.869
2:	of room service	Q33	0.684
3:	Visually appealing brochures, pamphlets, etc.	Q11	0.550

Factor 9:(Technology) This factor is status at ninth place and clarifies (2.353%%) of aggregate fluctuation. The factors contributable are given underneath;

	Variables		Factor loading
1:	In-room technologies (Wi-Fi, smart TV, telephone, voicemail, on demand PC, television, internet plug, meal	Q52	0.911
2:	Variety of basic products and services offered (toothpaste, soap, shampoo, towels, toilet paper, stationery,	Q48	0.903

We can likewise indicate the impact of single variable of affecting on choosing to remain at the hotels in Cappadocia region. The communalities section in Table III.18, That is determined for every factor by taking the whole of the squared factor stacking for every one of the elements related with the variable. All factors are stacking factor 1 have around 80% inconstancies on choosing to remain. Notwithstanding, the normal level of changeability of factors in factor 2 is going to 79%. Additionally, different factors have very sensible impact on choosing to stay, which is around 85% changeability.

3.8.4. Relationship between Guests' Overall Satisfaction Level and Hotel Service Quality Practices

One of the fundamental points of our examination is to know how strong and which heading these two terms is connected. Along these lines, we have directed Spearman Correlation in various visions.

3.8.4.1. Correlation between overall satisfaction and hotel Quality service dimensions separately

Table III.19, displays relationship between overall satisfaction and dimensions of hotel quality service. As shown that the value of correlation coefficients are all greater than 0.4 with plus sign except between Entertainment and overall satisfaction. Thus, it is evidence that there are positive relationships between them and the value of presented correlation is significant since the Sig. value is less than 0.05. This indicates that the link is not occurred by chance.

Table III.19. Spearman Correlation result between Overall Satisfaction and hotel quality service dimensions

	Spearman's rho/Sig. Test	Overall Satisfaction
Tangibility	Correlation Coefficient	.562**
	Sig. (2-tailed)	0.000
Reliability	Correlation Coefficient	.587**
	Sig. (2-tailed)	0.000
Assurance	Correlation Coefficient	.620**
	Sig. (2-tailed)	0.000
Empathy	Correlation Coefficient	.494**
	Sig. (2-tailed)	0.000
Environment	Correlation Coefficient	.746**
	Sig. (2-tailed)	0.000
Technology	Correlation Coefficient	.435**
	Sig. (2-tailed)	0.000
Entertainment	Correlation Coefficient	0.115
	Sig. (2-tailed)	0.059

3.8.4.2. Correlation between Overall Satisfaction and Hotel Quality Service Dimensions Together

The below Table III.20, gives us data about the mentality relationship between overall satisfaction and overall quality service dimensions. Once more, there is a positive relationship in light of the fact that the estimation of Pearson correlation is more prominent than 0.3. It is additionally worth saying that the relationship isn't happened by chance due to having Sig. value more noteworthy than 0.05.

Table III.20. Relationship between overall satisfaction and overall quality service dimensions.

	Pearson's rho/Sig. Test	Overall Satisfaction
Overall quality service dimension	Pearson Correlation	.578**
	Sig. (2-tailed)	0.000

From the above outcomes we can reason that there is a strong positive correlation between overall satisfaction and hotel quality service, and this outcome matches with our examination hypothesis and additionally objective. Subsequently, it ought to be considered keeping in mind the end goal to get substantially more satisfaction from the guests. Along these lines from the outcomes we can presume that it is conceivable to join sustainability and satisfaction of guest in hotels inside the setting of vernacular building style.

VI. EVALUATIONS AND CONCLUSIONS

Since hotels are cornerstones in the global cultural economy, they constitute temporary places for mass tourism and business travel, and they are maintained by diverse local and extra local service workforces. This is reflected in the different activities that occur in the various parts of the hotel, from lobbies and conference halls to hotel rooms and spas, and on to kitchens and service areas. The aim is to catch most visitors to the country.

Yet this thesis examined the possibility of combination of sustainability and guest satisfaction in the context of vernacular architectural style. Thus this chapter will discuss the conclusions for sustainability in vernacular Cappadocia's hotels and guest satisfaction based on the dimensions of service quality.

Concluding the Concept of Sustainability in Cappadocia's Vernacular Hotels

Providing an integration of today's technology and vernacular architecture which are compatible with nature, have comfort requirements like thermal and visual comfort, and minimize the use of energy in regions like Cappadocia, which has cold climate in winters, hot and dry in summers. Traditional design and construction process have constituted worthwhile examples of architecture by gathering local resources and workforces. In the scope of this study, hotels which have the general vernacular architectural features of Cappadocia Region, Millstone cave suites, Jacob's Cave Suites and Hidden Cave Hotel were chosen to work on. To explore the concept of sustainability an integrated method that links Building Information Modeling tools (BIM), with Building Performance Analyses (BPA) have been chosen for analysis. Beginning with the Solar Analysis, Daylight Analysis, Energy Use Intensity

Comparison, Monthly Heating& Cooling Loads, Renewable Energy Potential, Annual Carbon Emissions, then finalizing with insight 360 scenarios and comparison of compliances of with ASHRAE 90.1 and ARCH 2030. The outcomes of this research obtained from the hotels in Cappadocia's vernacular architecture are given below:

Solar and radiation analysis was done considering one-year cumulative energy and the incidence of radiation per each month. It permits to understand the real influence of this parameter and possible actions for resolving existing problems. Each image (Annual / monthly) had graphic scale, which is easily to understand in order to generate analysis taking into account the amount of energy received by walls, doors and windows.

***Daylight analysis*:** However daylight analysis of the hotels couldn't verify the indoor daylight LEED V4 EQc7 compliance. Yet a small glass area reduces heat transfer effects as does placing the window frame inside the window recess. This design does however reduce the utilization of daylight in winter. Consequently daylight illumination levels decrease especially on overcast days. In summer life is spent outdoors, so no negativity is incurred.

local materials : Using local materials for the constructions without affecting the nature adversely is very important for protecting nature and for sustainable design.

Energy Use intensities in three hotels are in the following;

-The analysis of Jacob's Cave Suites by three specifically simulation, it was found regarding for the *energy use intensity*, the total energy consumption of the original building, has an energy consumption decrease of 60% in relation for the first scenario.

- The analysis of Millestone cave suites by three specifically simulation, it was found regarding for the energy use intensity, the total energy consumption of the original building, have an energy consumption decrease of 55.89% in relation for the first scenario.

-The analysis of Hidden Cave Hotel by three specifically simulation, it was found regarding for the energy use intensity, the total energy consumption of the original building, have an energy consumption decrease of 65.98% in relation for the first scenario.

Monthly heating loads of three hotels are in the following;

-The analysis of Jacob's Cave Suites by three specifically simulation, it was found regarding for the monthly heating loads, The total monthly heating loads for the original building during January, have a monthly heating load decrease of 67.2% in relation for the first scenario.

-The analysis of Millstone Suites by three specifically simulation, it was found regarding for the monthly heating loads, The total monthly heating loads for the original building during January, have a monthly heating load decrease of 57.8% in relation for the first scenario.

-The analysis of Hidden Cave Hotel by three specifically simulation, it was found regarding for the monthly heating loads, The total monthly heating loads for the original building during January, have a monthly heating load decrease of 72% in relation for the first scenario

Monthly cooling loads of three hotels are in the following:

-The analysis of Jacob's Cave Suites by three specifically simulation, it was found regarding for the monthly cooling loads, The total monthly cooling load for the original building during August, have a monthly cooling load decrease of 50% in relation for the first scenario.

-The analysis of Millstone Suites by three specifically simulation, it was found regarding for the monthly cooling loads, The total monthly cooling load for the original building during August, have a monthly cooling load decrease of 40.62% in relation for the first scenario.

-The analysis of Hidden Cave Hotel by three specifically simulation, it was found regarding for the monthly cooling loads, The total monthly cooling load for the original building during August, have a monthly cooling load decrease of 56.36% in relation for the first scenario.

The Renewable Energy Potential analysis was conducted for the three hotels, taking into account the potential of PV system, single 15´ Wind Turbine Potential. For the PV system it was important to define that PV efficiencies are assumed to be 5%, 10 % and 15% for low, medium and high efficiency systems.

The total electricity consumption:

- The analysis of Jacob's Cave Suites by three specifically simulation, it was found regarding for the energy use intensity, The total electricity consumption for the original building, have an electricity consumption decrease of 33% in relation for the first scenario.

-The analysis of Millstone Suites by three specifically simulation, it was found regarding for the energy use intensity, the total electricity consumption for the original building, have an electricity consumption decrease of 50% in relation for the first scenario.

-The analysis of Hidden Cave Hotel by three specifically simulation, it was found regarding for the energy use intensity, the total electricity consumption for the original building, have an electricity consumption decrease of 40% in relation for the first scenario.

ASHRAE 90.1 benchmark for Turkey: The analysis of Jacob's Cave Suites had an energy cost mean which it’s almost 16.00 USD/m2/yr less than the ASHRAE 90.1 benchmark for Turkey, according to Autodesk Insight 360 program.

-The analysis of Millstone Suites had an energy cost mean which it’s almost same to the ASHRAE 90.1 benchmark for Turkey, according to Autodesk Insight 360 program.

-The analysis of Hidden Cave Hotel had an energy cost mean which it’s almost 15.1 USD/m2/yr less than the ASHRAE 90.1 benchmark for Turkey, according to Autodesk Insight 360 program.

Moreover, it is possible to achieve the ASHRAE 90.1 standard of the building compromising the building vernacular architecture, because the increasing of its performance had a positive impact on the diminution of the total energy use intensity, as is was demonstrated on the analyzed data and energy results.

Energy consumption optimization and the comparison of three hotels with its three simulations, it is clear that even when the material modification had a high impact on the energy demand of buildings, the orientation is determinant for this location. The Jacob's Cave Suites and Hidden Cave hotels had their entire shape and windows oriented to the south, in contrast, that was happening on the Millstone Suites which had the majority of its spaces and windows oriented to the north and east direction. This resulted in higher consumption per square meter per year for this hotel, which required more than twice the others analyzed buildings.

Finally, the best performance was obtained by Hidden Cave Hotel which evidenced the high reduction in all scenarios and principally the highest decrease at the last simulation. It means that the shape of this hotel and its configuration in relation to the north had an outstanding performance in relation to the other analyzed hotels at the same location. It does not mean that this hotel is perfect as was evidenced in the daylight analysis, carbon emissions and energy loads, but it could be a great example for considering before to design a new development or before to start a retrofit intervention of hotels in that latitude.

Concluding the Concept of Guest Satisfaction Based on the Dimensions of Service Quality in Cappadocia's Vernacular Hotels

We have come to conclude the result as done in previous section under the headings of demographical information, factor analysis for guest satisfaction,

Demographical information: Based on the data we had quite similar number of participations regarding to gender as about 54.7% were male and 45.3% were female. With regards to age of the respondents, we tried to join as many different categories of ages as possible and as shown that the highest one is age 20-29 with 57.7%. This is of course affecting the result since this age may have different view regarding to guest satisfaction. Another important aspect of this study was the income of the visitors, there is no doubt that income has a significant effect on choosing the most aggressive and attractive hotels. The visitors that we interviewed provided different income. As discussed in the previous part, the largest percentages were for below 1000$. This means that 31.09% of the visitors had income below 1000$. This is also another factor to choose a less quality hotel and eventually the services provided may not satisfy the customers. The more income gain, the higher quality of hotel can be chosen. Moreover, we have also asked the reason of visiting the hotels, most of the answer was Vacation and the wanted to stay for 4 to 7 days at most.

Factor analysis for guest satisfaction: After examining the factor analysis for each of Jacob's Cave Suites, Millstone Suites and Hidden Cave hotel separately, it can be concluded that:

-For Jacob's Cave Suites hotel 10 factors have been chosen as the best using PCA which describes the total variability of the data. All 10 factors extracted have eigenvalues greater than **1**. % of Variance column specifies how much of the variability in the data has been modeled by the extracted factors. All 10 factors are the main factors which influence people to decide leaving their places.

-For Milestone cave suites hotel 12 factors as extracted using PCA which explains the total variability of the data. All 12 factors extracted have eigenvalues greater than 1. % of Variance column indicates how much of the variability in the data has been modeled by the extracted factors. All 12 factors are the main factors which influence people to decide leaving their places.

-For Hidden Cave hotel 8 factors chosen have eigenvalues greater than 1 **indeed**. % of Variance column specifies how much of the variability in the data has been modeled by the extracted factors. All 10 factors are the main factors which influence people to decide leaving their places.

Staying decision: It can also be specified the impact of single variable of on deciding to stay at:

- The hotel Jacob Cave in Cappadocia. All variables are loading factor 1 have about 90% variability of to stay, which is very large as it should be. However, the average percentage of variability of variables in factor 2 is about to 95%. Also other variables have quite reasonable influence on deciding to stay which is about 85% variability.

-We can also specify the effect of single variable of impacting on deciding to stay at the hotel Milestone cave suites in Cappadocia. All variables are loading factor 1 have about 85% variability on deciding to stay. However, the average percentage of variability of variables in factor 2 is about to 83%. Also other variables have quite reasonable influence on deciding to stay which is about 80% variability.

-It can also be specified the impact of single variable of on deciding to stay at the hotel Hidden Cave in Cappadocia. All variables are loading factor 1 have about 99% variability on deciding to stay which is very large as it should be. However, the average percentage of variability of variables in factor 2 is about to 90%. Also other variables have quite reasonable influence on deciding to stay which is about 87% variability.

Factor analysis for three hotels together: After implementing the factor analyses for each hotel separately, the same procedure has implemented for all hotels together, thus it can concluded that:

Service quality is made out of seven measurements are recorded as (tangible)', 'reliability', 'assurance', 'empathy', 'environment', 'technology', and 'entertainment'. Most importantly, the factor analysis was conducted on the data and revealed several important outputs, we reached to 9 extracted factors with total variance 80.934%, in addition to that with 9 factors namely: **(Perceptible),**

(Amusement), (Employee's attention quality), **(Sympathy), (Hotel surroundings and environmental factors), (Convenience), (Core hotel benefit)**, **(Confirmation)** and **(Technology).**

-***We can explain the variability of the data towards guest's satisfaction*** with 80.934%. Furthermore, the first factor was about how the customers were treated and served during their presence at the hotel it always proves its highest impact in factor analysis. Last but not least, we can conclude that there is a strong positive correlation between overall satisfaction and hotel quality services, and this result matches with our study hypothesis as well as objective.

Comparison of service quality vs. ***guest's satisfaction:*** At this point a conclusion could be drawn that service quality has a huge association with guest satisfaction and service quality measurements. Therefore, it should be taken into account in order to get much more satisfaction from the visitors. Guest satisfaction is critical for hotels to flourish and it is, in this manner, essential for hoteliers and hotel designers to consider guest satisfaction in each choice.

Concluding the Relationship of Hotels in terms of Sustainability, Vernacular Architecture and Guest Satisfaction: in the case of Cappadocia Hotels

Examples on sustainability and guest satisfaction for hotels in Chapter two supported the hypothesis of the study that sustainability and guest satisfaction should not be in dispute. Furthermore, choose to inspect the declaration of this presumption in struggle and chooses to look at how far this suspicion is affirmed in a genuine setting. This was supported by the author's own research which examined the possibility of the level of implementation of various sustainable and guest satisfactions in the context of vernacular architectural. Moreover, it is possible to achieve the ASHRAE 90.1 standard of the building compromising the building vernacular architecture, because the increasing of its performance had a positive impact on the diminution of the total energy use intensity, as is was demonstrated on the analyzed data and energy results. In addition, the strategies on material resistances that could be utilized keeping in mind the end goal to expand the building execution, which is advantageous for the potential interests in this sort of building since they have a critical scope of conceivable outcomes.

Last but not least, it can be concluded that sustainable accommodation satisfying our guests' present dreams and wants without yielding what's to come ages' fantasies. The goal is to accomplish sustainability without making it about forfeit. Sustainable practices can be seen as adding to a guest encounter, instead of cheapening it. And also we can characterize sustainable design as a design theory that looks to boost the quality of the built environment, while limiting or taking out negative effect to the common habitat. To balance these propensities and presumptions, it is in this way important to distinguish green building practices that can be actualized over the building's whole life cycle to decrease its environmental effect, boost social and monetary chances, and enhance guest satisfaction.

Table VI.1, represents the relationship of Hotels in terms of Sustainability, Vernacular Architecture and Guest Satisfaction: in the case Of Cappadocia Hotels.

Table VI.1. The relationship of Hotels in terms of Sustainability, Vernacular Architecture and Guest Satisfaction: in the case of Cappadocia Hotels.

Sustainable Architecture				**Vernacular Architecture**	**Guest Satisfaction based on the Dimension of Service Quality**			
Criterion elements	**Cases of Cappadocia's Hotels**				Dimension of Service Quality	**Cases of Cappadocia's Hotels**		
	Jacob's Cave Suites	Milestone cave suites	Hidden Cave Hotel	Application methods	Factor Analyses altogether	Jacob's Cave Suites	Milestone cave suites	Hidden Cave Hotel
the Site Characteristics	♣ Jacob's Cave Suites is located in the Old Greek Village of Çavuşin in the heart of Cappadocia in the historical National Park. The Greek architecture of the region is very dominant in the Çavuşin. The most important reason for this is that cave houses are cool in summer and hot in winter.	♣ Situated on a hill overlooking Goreme, the Kızıl Valley and the Guvercinlik Valley, Millstone Cave Suites features scenic Uchisar views. This landscape is one of the outstanding features of the hotel and is highly appreciated. The Millstone Cave Suites is a stylishly designed cave hotel with impressive details in every room and every corner of the hotel	♣ Situated in the heart of Goreme, Hidden Cave Hotel offers traditional architecture with traditional stone walls. The hotel also has a terrace with city views	♣Make the location of the city in the highlands so as not to be subject to drowning and protection from the enemy. ♣Choose suitable locations where temperance and air quality are considered of the availability of a nearby water source in the city or construction on the outskirts near the water source One of the following methods: ♣Linking cities to rural areas ♣Connecting the cities with the main commercial road ♣ Linking cities with marine sites by isolating industrial areas away from the city because of environmental damage resulting from them	**♣Factor 1 : (Perception)** **(37.108%,)**	**♣Factor 1** **(45.846%)**	**♣Factor 1** **(22.776%)**	**♣Factor 1** **(54.632%)**
					Q5	Q5	Q54	Q5
					Q18	Q18	Q57	Q18
					Q20	Q20	Q61	Q20
					Q22	Q22	Q9	Q22
					Q15	Q15		Q15

Daylight analysis	♣However daylight analysis of the hotels couldn't verify the indoor daylight LEED V4 EQc7 compliance. Yet a small glass area reduces heat transfer effects as does placing the window frame inside the window recess. This design does however reduce the utilization of daylight in winter. Consequently daylight illumination levels decrease especially on overcast days. In summer life is spent outdoors, so no negativity is incurred.	♣ Natural or industrial lighting. Reduce the impact of natural sunlight. ♣The use of lighting methods in oils and fire absolute, fire is the basis of all functions. ♣The use of a lamp and openings in the walls may be narrow inside and out from outside such as the Palace of Zahra in Andalusia. ♣Use marble sculpted geometric shape, written forms.	Q31	Q31	Q33	Q31
			Q16	Q16	Q34	Q16
			Q23	Q23	Q11	Q23
			Q38	Q38		Q38
			Q35	Q35		Q35
			Q36	Q36		Q36
Transportation	♣The reduction of the pollution caused by the use of cars. ♣Reducing the space used for cars. ♣The use of transportation, such as beauty and horse transport, does not harm the environment.	♣The use of transportation, such as beauty and horse transport, do not harm the environment ♣Customize parking spaces and transportation, called Merabedh ♣Clean up those places periodically and take advantage of the transfer of waste in fertilizing the land ♣No road congestion,	Q1	Q1		
			Q10			
			♣Factor 2: (Amusement) (13.396%)	**♣Factor 2: (13.553%)**	**♣Factor 2: (11.682%)**	**♣Factor 2: (9.699%)**
			Q55	Q4	Q5	Q4
			Q62	Q6	Q18	Q6
			Q50	Q50	Q1	Q13

Solar Analysis	♣ The Jacob's Cave Suites had their entire shape and windows oriented to the south ♣ The orientation had a high impact on the energy demand of buildings	♣ The Millstone Suites which had the majority of its spaces and windows oriented to the north and east direction ♣. This resulted in higher consumption per square meter per year for this hotel, which required more than twice the others analyzed buildings.	♣The Hidden Cave hotels had their entire shape and windows oriented to the south ♣ The best performance was obtained by Hidden Cave Hotel which evidenced the high reduction in all scenarios and principally the highest decrease at the last simulation	♣The allocation of squares or squares for each group of buildings ♣ Construction of narrow streets and inner courtyards. ♣Led winding streets and high buildings led to uneven shadows and shadows. ♣Customization of yards within most homes ♣Planning the gardens in the shape of a rectangle around a longitudinal axis. ♣Cultivation of the courtyard and placing fountains in the middle. ♣Use colored mosaics and use stained glass.	Q46	Q42	Q15	Q42
					Q56	Q47	Q23	Q47
					Q44	Q49	Q22	Q49
					Q53	Q51	Q38	Q51
						Q13		
					Factor 3: (Employee's attention quality) (7.374%)	**♣Factor 3: (8.758%)**	**♣Factor 3: (10.318%)**	**♣Factor 3: (8.283%)**
					Q47	Q44	Q55	Q1
								Q2
Materials and resources	♣The strategies on material resistances that could be utilized keeping in mind the end goal to expand the building execution, which is advantageous for the potential interests in this sort of building since they have a critical scope of conceivable outcomes. ♣ Using local materials such as Rocks for the constructions without affecting the nature adversely is very important for protecting nature and for sustainable design.			♣Use building materials with thermal insulation, such as bricks. Use of wood in the work of roofs Use domes to give protection from sunlight more than flat roofs. ♣Use a mixture of gypsum and lime in the manufacture of burnt bricks and the use of hard stones such as granite and marble. ♣The use of animal waste in bone walls. ♣Use parts of dead trees in roofing. ♣The use of animal manure mixed with lime in heat insulation.	Q51	Q46	Q62	Q10
								Q14
								Q25
					Q13	Q53	Q50	Q27
					Q42	Q55	Q53	Q29
					Q6	Q56	Q46	Q37
					Q49	Q62		Q41
					Q4			Q58

The energy use intensity	♣The analysis of Jacob's Cave Suites by three specifically simulation, it was found regarding for the energy use intensity, the total energy consumption of the original building, has an energy consumption decrease of 60% in relation for the first scenario.	♣The analysis of Millestone cave suites by three specifically simulation, it was found regarding for the energy use **intensity**, the total energy consumption of the original building, have an energy consumption decrease of 55.89% in relation for the first scenario.	♣ The analysis of Hidden Cave Hotel by three specifically simulation, it was found regarding for the energy use intensity, the total energy consumption of the original building, have an energy consumption decrease of 65.98% in relation for the first scenario.	♣ Shadow Care In all parts of the urban fabric that we see clearly in energy-saving vernacular architecture, shade contributes energy savings of up to 30% in solar energy and natural phenomena.	**Factor 4:** **(Sympathy)** **(5.975%)**	♣**Factor 4:** **(4.865%)**	♣**Factor 4:** **(7.042%)**	♣**Factor 4:** **(6.232%)**
					Q29	Q29	Q16	Q44
					Q41	Q41	Q35	Q46
					Q37	Q37	Q20	Q53
					Q27	Q27	Q31	Q55
					Q14	Q14	Q36	Q56
					Q2	Q2		Q62
					Factor 5:(Hotel surroundings and environmental factors) **(4.762%)**	♣**Factor 5:** **(4.097%)**	♣**Factor 5:** **(6.589%)**	♣**Factor 5:** **(4.259%)**
					Q61	Q61	Q13	Q61
					Q54	Q54	Q47	Q54

Heating loads	♣ The analysis of Jacob's Cave Suites by three specifically simulation, it was found regarding for the monthly heating loads, The total monthly heating loads for the original building during January, have a monthly heating load decrease of 67.2% in relation for the first scenario	♣ The analysis of Millstone Suites by three specifically simulation, it was found regarding for the monthly heating loads, The total monthly heating loads for the original building during January, have a monthly heating load decrease of 57.8% in relation for the first scenario.	♣ The analysis of Hidden Cave Hotel by three specifically simulation, it was found regarding for the monthly heating loads, The total monthly heating loads for the original building during January, have a monthly heating load decrease of 72% in relation for the first scenario	♣ The design construction of vernacular houses Improving the utilization of energy and decrease of environmental effects of energy use in buildings ♣The walls are built of local materials and thickness ensures flexibility and resistance to heat and humidity.	Q57	Q57	Q51	Q57
					Q9	Q9	Q25	Q9
								Q33
					Factor6: (Convenience) (3.695%)	**♣Factor 6: (3.832%)**	**♣Factor 6: (5.961%)**	**♣Factor 6: (3.550%)**
					Q58	Q58	Q41	Q59
					Q32	Q10	Q37	
Cooling loads	♣ The analysis of Jacob's Cave Suites by three specifically simulation, it was found regarding for the monthly cooling loads, The total monthly cooling load for the original building during August, have a monthly cooling load decrease of 50% in relation for the first scenario	♣ The analysis of Millstone Suites by three specifically simulation, it was found regarding for the monthly cooling loads, The total monthly cooling load for the original building during August, have a monthly cooling load decrease of 40.62% in relation for the first scenario	♣ The analysis of Hidden Cave Hotel by three specifically simulation, it was found regarding for the monthly cooling loads, The total monthly cooling load for the original building during August, have a monthly cooling load decrease of 56.36% in relation for the first scenario	♣Customization of courtyard within most homes ♣The stained glass was used in the windows as Moonlet. ♣Use Mashrabiya to allow fresh air to enter the house and adjust the passage of direct sunlight.	Q25	Q25	Q29	Q60
					Q28		Q27	
					Factor 7:(Core hotel benefit) (3.175%)	**♣Factor 7: (3.640%)**	**♣Factor 7: (4.245%)**	**♣Factor 7: (2.356%)**
					Q59	Q48	Q2	Q48
					Q60	Q52	Q14	Q52
					Factor8: (Confirmation) (3.095%)	**♣Factor 8: (3.148%)**	**♣Factor 8: (3.558%)**	**♣Factor 8: (2.327%)**

Healthy Interior Environment	♣The analysis of Jacob's Cave Suites by three specifically simulation, it was found regarding for the energy use intensity, The total electricity consumption for the original building, have an electricity consumption decrease of 33% in relation for the first scenario. -	♣The analysis of Millstone Suites by three specifically simulation, it was found regarding for the energy use intensity, the total electricity consumption for the original building, have an electricity consumption decrease of 50% in relation for the first scenario	♣The analysis of Hidden Cave Hotel by three specifically simulation, it was found regarding for the energy use intensity, the total electricity consumption for the original building, have an electricity consumption decrease of 40% in relation for the first scenario	♣Using air conditioners (Mlaagaf): the roof openings represent air entrances and push into the room out of the inner courtyard to complete air movement, and be triangular sides ♣The use of Mashrabiya: an architectural approach that allows the air to enter the wind to modernize the interior buildings ♣Use of windows and openings: open the window penetrates the wall and be narrow inside and outside from the outside to expand the angle of vision and prevent direct sunlight from entering ♣The use of plaster or marble engraved with large window sizes in geometrical shapes called sunshades called either by the name of the lesser known moon ♣The use of the courtyard (Hush), which was an open space of the upper rooms and the house overlooking it.	Q34	Q59	Q59	Q34
					Q11	Q60	Q60	Q11
					Q33		Q44	
							Q56	
					Factor 9: (Technology) (2.353%%)	♣**Factor 9: (3.218%)**	♣**Factor 9: (3.218%)**	
					Q52	Q33	Q6	
					Q48	Q34	Q49	
							Q4	
					♣**Nine** factors have been conducted	♣**Ten** factors have been conducted	♣**Twelve** factors have been conducted	♣ **Eight** factors have been conducted

Future Research

Although the present study was able to accomplish its research objectives, a number additional research thrusts have been identified during the course of this study, including:

(1) HOTELS 2030: What the hotel industry will look like in 11 years' time

How the demands on hotels will change over the next 11 years. In all probability the future of the hotel industry where guests are center stage and technology plays a key role. Probably the most striking is the way the technology is predicted as transforming the guest experience.

(2) Beyond brand: Meeting new customer expectations

Hotels are in a period of significant evolution and opportunity. From online travel agents to the commoditization of hotels, changes in the travel and hospitality industry are challenging hotels to move beyond brand identity and extend and deepen their relationships with travelers.

(3) The influence of social media on the consumers' hotel decision journey

How social media influence the way consumers search, evaluate and select a hotel within the 'evaluation stage' of the wider hotel decision-making process.

REFERENCES

AAA Diamond Rating Guidelines for Lodging. (2008).

Adams W. M. (2009), Green Development: Environment and Sustainability in a Developing World. Routledge, London.

Ahn, Y. H. (2010), "The Development of Models to Identify Relationships between First Costs of Green Building Strategies and Technologies, and Life Cycle Costs for Public Green Facilities", Ph.D. dissertation, Virginia Tech, Blacksburg, VA.

Ahn, Y. H., Pearce, A.R.&Ku. K. (2011), "Paradigm Shift of Green Buildings in the Construction Industry." International Journal of Sustainable Building Technology and Urban Development, 2 (1), 52-62.

Alkiser Bregger, Y., (2014-2015), ITU Faculty of Architecture, Department of Architectural Design, Spring ARCH. DESIGN PROJECT IV.

Allsopp, Bruce, (1977), A Modern Theory of Architecture, Routledge & Kegan Paul.

Anton, J., (1996). Customer relationship management. Making Hard Decisions with Soft Numbers. Prentice-Hall, Upper Saddle River, NJ.

Bader, E., & Smith, K. (2005), European hotel transactions. From top gear into overdrive. Retrieved February 8, 2006 from, http://www.hotelnewsresource.com/pdf/hvs1862.pdf

Bagnid, A. (1989), "Indigenous Residential Courtyards": Typology, Morphology & Bio-Climate, *C.E.D.R.* Vol. 6, PP. 40-56.

Baker, C. (Ed.). (2005), Sustainable Hotel. London: Prince of Wales Business Leaders Forum.

Baker, D. A., & Crompton, J. L. (2000), “Quality, satisfaction and behavioral intentions”. Annals of Tourism Research, 27(3), 785e804.

Baker, Geoffrey H., (1996), Design Strategies in Architecture, an Approach to the Analysis of Form, E & EN Spon,

Baran, M., Yıldırım, M., Yılmaz, A., (2010), “ Evaluation of ecological design strategies in traditional houses in Diyarbakir, Turkey”, Contents lists available at Science Direct Journal of Cleaner Production

Baum, J. and P. Ingram. (1998), “Survival-enhancing learning in the Manhattan hotel industry” 1898-1980.” Management Science. 44.7:996-1016.

Becker, E. J. (2009), “The Proximity Hotel: “A Case Study on Guest Satisfaction of Sustainable Luxury Environments” Master’s Thesis, the University of North Carolina at Greensboro, Greensboro, NC.

Benson,J. , (2013), “Sustainable Strategies for Green Hotel Design”, Master thesis, College of Technology Eastern Michigan University.

Bernstein, L. (1999), “Luxury and the hotel brand: Art, science, or fiction?” Cornell Hotel & Restaurant Administration Quarterly, 40(1), 47-53.

Berry, L.L., Parasuraman, A., (1991). Marketing services: competing through quality. The Free Press, New York, NY.

Boecker, J., Horst, S., Keiter, T., Lau, A., Sheffer, M., B., T., and Reed, B. (2009), The Integrative Design Guide to Green Building. John Wiley & Sons, Inc, Hoboken, NJ.

Bohdanowicz, P. (2006), "Environmental Awareness and Initiatives in the Swedish and Polish Hotel Industries Survey Results." Hospitality Management, 25, 662-682.

Bojanic, D. (1996), "Consumer perceptions of price, value and satisfaction in the hotel industry" An exploratory study. Journal of Hospitality and Leisure Marketing, 4(1), 5-22. Zubaidi.

Brundtland, G.H. (1987), Protecting the Global Commons. Earth Ethics, Fall, 12.

Bryman, A. (2004), Social Research Methods. (2e). Oxford: OUP. Building Materials. National Pollution Prevention Center forHigher Education, Michigan,

Chaudhuri, A. & Holbrook, M. (2001), "The chain of effects from brand trust and brand affect to brand to brand performance: The role of brand loyalty" Journal of Marketing, 15(2), 81-94.

Chen, J., Legrand, W, & Sloan, P. (2009), Sustainability in the Hospitality Industry. Oxford: Buttenworth-Heinemann.

Clayton M., Johnson R. and Song Y. (1999), "Operations documents; addressing the information need for facility managers. Durability of Building Materials and Components" Volume 8, pp. 2441-2451.

Coleman, M. (2009), “On green building in today’s economy” Boutique Design, March/April, 14-15.

Crawley D., Hand J., Kummert M. and Griffith B. (2005), “Contrasting the capabilities of building energy performance simulation programs” Joint Report, Version 1.0.

Cronin, J. J., Jr., & Taylor, S. A. (1992), “Measuring service quality: A reexamination and extension” Journal of Marketing, 56(3), 55e68.

Curran, Mary Ann, (1996), Environmental life-cycle assessment. New York, NY: McGraw Hill.

Curtis, E. (2001), Hotel: Interior Structures. Wiley-Academy, West Sussex, Great Britain.

Czepiel, J.A., Solomon, M.R., Suprenant, C.F., Gutman, E.G., (1985). Service encounters: an overview. The Service Encounter: Managing Employee Customer Interaction in Service Business. Lexington Books, Lexington, MA.

Danziger, P. (2005), Let them eat cake: Marketing luxury to the masses as well as the classes. Chicago, IL: Dearborn Trade Publishing.

Davis, B., Stone, S., (1985). Food and Beverage Management. 2nd Edition. Butterworth-Heinemann, Oxford.

Denscombe, M. (2007), The Good Research Guide. Berkshire: Open University Dimensions of Urban Design. Burlington: Architectural Press.

Dominici, G., & Guzzo, R. (2010). “Customer satisfaction in the hotel industry: A case study from Sicily”. Internatioal Journal of Marketing Studies, *2*(2), 3-12.

ed. Society of Environmental Toxicology and Chemistry. Brussels, Belgium.

Edgell, D. (2006), Managing sustainable tourism: A legacy for the future. Binghamton, NY: The Hawthorn Hospitality Press.

Ekincioğlu, M. Turgut Cansever, Çağdaş Türkiye Mimarları Dizisi. (2001), İstanbul: Boyut Yayın. Ayıran, N. (2011), “Architectural continuity towards cultural sustainability in bodrum”, Open House International, 36(2), 82-96.

Engel, J.F., Blackwell, R.D., Miniard, P.W., (1990). Consumer Behavior , 6th Edition. Dryden Press, Hinsdale, IL.

Estabrook, M. (2013), “Addressing the Social Side of Sustainability: Guidelines for the Hospitality Industry”. Retrieved April 25, 2014 from http://www.hospitalitynet.org/news/4060804.html

Fathy, Hassan (1973), Architecture for the Poor. Chicago Press, USA.

Fisk, W. J. (2000), “Health and productivity gains from better indoor environments and their relationship with building energy efficiency.” Annual Review of Energy and Environment and Resources, 25, 537-566.

Fornell, C., (1992). “A national customer satisfaction barometer”: the Swedish experience. Journal of Marketing 56, 6–21.

Fornell, C., Johnson, M. D., Anderson, E. W., Cha, J., & Bryant, B. (1996), “The American customer satisfaction index: description, findings, and implications” Journal of Marketing, 60(4), 7e18.

Forozia, A., Zadeh, M. S., & Gilani, M. H. (2013). Customer satisfaction in hospitality industry: Middle East tourists at 3 star hotels in Malaysia. Research Journal of Applied Sciences, Engineering and Technology, 5 (17), 4329-4335.

Garvin, D.A., (1991). “How the Baldrige award really works”. Harvard Business Review 69 (6), 80–95.

Gilbert, D.C., Morris, L., (1995). “The relative importance of hotels and airlines to the business traveler”. International Journal of Contemporary Hospitality Management 7 (6), 19–23.

Giovani, Baruch (1998), Climate Considerations in Buildings & Urban Design. John Wiley & Sons, Inc. USA.

Glassie, Henry H. (2000), Vernacular architecture. Philadelphia: Material Culture.

Graedel, T., and Allenby, B. (2003), Industrial Ecology. 2nd. Ed. NJ: Prentice Hall, pp.412

Green Hotel Association. (n.d.). Retrieved October 30, 2007, from http://www.greenhotels.com/whatare.htm

Green hotelier Chillers. 31(2): 1-4. (2004a).

Green hotelier. Saving energy in kitchens. 37(1): 1-4. (2005a)

Green Key Eco Rating Retrieved on 10 of March, 2015 from (2015). http://www.hotelassociation.ca/site/programs/green_key.htm

Groat, L., and Wang, D. (2001), Architectural Research Methods. New York, NY: John Wiley & Sons, Inc. p. 357.

Gronroos, C., (1983). Strategic Management in the Service Sector. Marketing Science Institute, Cambridge, MA.

Hair, J. F., Jr., Anderson, R. E., Tatham, R. L., & Black, W. C. (1995), Multivariate data analysis: With readings. (4th ed.), Englewood Cliffs, New Jersey: Prentice-Hall.

Harrison, Andrew; Wheeler, Paul & Whitehead, Carolyn, (2004), The Distributed Workplace. Spon Press, UK.

Harrison,R., Newholm, T., & Shaw, D. (2005), The ethical Consumer. Thousand Oaks, CA: Sage Publications Inc.

Hasek, G. (2007), Hospitality gets greener. LEED applications pile up as the program becomes an accepted standard. NEWH: The Hospitality Industry Network, 12.

Hassan, A. S. (2000), "Housing industry: questioning authenticity of Southeast Asian architecture" Journal of Housing, Building and Planning. Penang: Universiti Sains Malaysia Press.

Heide, M. & GrØnhaug, K. (2009), "Key factors in guests' perception of hotel atmosphere" Cornell Hospitality Quarterly, 50(1), 29-43.

Heung, V. Fei, C., and Hu, C. (2006), "Customer and Employee Perception of a Green Hotel The Case of Five-Star Hotels in China." China Tourism Research, 2(3), 270-297.

Hunt, J.D., (1975)." Image as a factor in tourism development". Journal of Travel Research 13, 3–7.

ISO 14040, (1997), Environmental Management – Life Cycle Assessment - Principles and Framework. International Organizationfor Standardization, Geneva, Switzerland.

Jeong, K.-S., Lee, K.-W., and Lim, H.-K. (2010), Risk assessment on hazards for decommissioning safety of a nuclear facility. Annals of Nuclear Energy, 37(12), (1751-1762).

Jones L., (2008), Environmentally Responsible Design: Green and Sustainable Design for Interior Designers. Hoboken, Wiley, New Jersey.

Jones, D., Mak, B., & Sim, J. (2007), "A new look at the antecedents and consequences of relationship quality in the hotel service environment" Services Marketing Quarterly, 28(3), 15-31.

Jrade, A., and Jalaei, F. (2013), "Integrating building information modelling with sustainability to design building projects at the conceptual stage." Proc., Building Simulation, Springer, 1-16.

Kasim, A. (2004), "Socio-environmentally responsible hotel business" Do tourists to Penang Island, Malaysia care, Journal of Hospitality& Leisure Marketing, 11(4), 5-28.

Kats, G. (2003), "The Costs and Financial Benefits of Green Buildings" A Report to California's Sustainable Building Task Force, Sacramento, CA.

Kats, G. (2003), Green Buildings Costs and Financial Benefits Massachusetts Technology Collaborative, Boston, MA.

Keskin, K., Erbay, M. (2016),” A Study on the Sustainable Architectural Characteristics of Traditional Anatolian Houses and Current Building Design Precepts”. Urban Planning and Architecture Design for Sustainable Development, UPADSD 14- 16 October 2015.

Kibert, C. J. (2008), Sustainable Construction: Green Building Design and Delivery. 2nd Ed., John Wiley & Sons, Hoboken, NJ.

Kirbas, B., Hizli, N. (2016), “Learning from Vernacular Architecture: Ecological Solutions in Traditional Erzurum Houses”, Urban Planning and Architecture Design for Sustainable Development, UPADSD 14- 16 October2015

Kirk, D. (1995), “Environmental Management in Hotels.” Internationa Journal of Contemporary Hospital Management, 7 (6), 3-8.

Koçlar Oral, G., (2004), 'The making of modern Turkish architecture': Turkey Today.

Krygiel, E., and Nies, B. (2008), Green BIM: successful sustainable design with building information modeling. Wiley. com.

Kubba S. (2012), Handbook of Green Building Design and Construction: LEED, BREEAM, and Green Globes. UK: Butterworth Heinemann.

Lai, I. K. W., & Hitchcock, M. (2015), “Importance-performance analysis in tourism: a framework for researchers”. Tourism Management, 48, 242e267.

Lakshmi-Raton, R. & Iyer, E. (1988), “Similarity analysis of scripts” Journal of the Academy of Marketing Science, 16(Summer), 36-42.

Le Corbusier, (2009), The City of Tomorrow and it’s Planning. Dover, New York (1987).

LEED RATING SYSTEMS. U.S. Green Building Council.

Lewis, R.C., (1987). “The measurement of gaps in the quality of hotel services”. International Journal of Hospitality Management 6 (2), 83–88.

Lovelock, C.H., (1985). Developing and managing the customer- service function in the service sector. Lexington Books, Lexington, MA.

Macintosh, Duncan, (1973), The Modern Courtyard House. Lund Humphries Publishers Ltd., London, UK.

Maki, Eiji, William McDonough, and Anna Ray Jones, (2000), Sustainable Architecture in Japan: The Green Buildings of Nikken Sekkei. Sussex: Wiley`Academy.

Maxham, J. G., & Netemeyer, R. G. (2002), “A longitudinal study of complaining customers' evaluations of multiple service failures and recovery efforts” Journal of Marketing, 66(4), 57e71.

May, John, (2010), Handmade houses & other buildings: the worldof vernacular architecture. London: Thames & Hudson.

McLennan, J. (2004), The philosophy of sustainable design. Kansas City, MI: Ecotone Publishing Company.

Millar, M., Baloglu, S., (2008), “Hotel guests’ preferences for green hotel attributes” In: Proceedings of the European Council for Hotel, Restaurant, and Institutional Education Conference, Dubai, United Arab Emirates.

Millar, M., Baloglu, S., (2011), “Hotel guests’ preferences for green guestroom attributes” Cornell Hospitality Quarterly 52 (3), 302–311.

Mohajerani, P., & Miremadi, A. (2012). Customer satisfaction modeling in hotel industry: A case study of Kish Island in Iran. International JournalofMarketingStudies,4(3),134-152. Tourism Malaysia (2014).Facts and Figures .Retrieved Jan 5,2015fromhttp://corporate.tourism.gov.my/research.asp?page=facts_figures

Moore, Fuller, (1993), Environmental Control Systems. International Edition, McGraw-Hill, Inc, New York, NY, USA.

Mortada, H. (2003), Traditional Islamic Principles of Built Environment., RoutledgeCurzon, Londo.

NEWH: (2007), "The Hospitality Industry Network". Organic opulence: NEWH and HD magazine explore the issue of eco luxury. November, p.14.

O"Halloran, R. (2015), Sustainable Hospitality and Tourism. Just Get Started. Retrieved from April 24, 2015 from http://hotelexecutive.com/business_review/2188/sustainablehospitality-and-tourism-just-get-started.

Oh, H., Parks, S.C., (1997). "Customer satisfaction and service quality: a critical review of the literature and research implications for the hospitality industry". Hospitality Research Journal 20 (3), 35–64.

Oliver, Paul, (2003), Dwellings: the vernacular house worldwide. London: Phaidon.

Oliver, Paul, (2006), Built to meet needs: cultural issues in vernacular architecture. Architectural Press.

Oliver, R.L., (1981). “Measurement and evaluation of satisfaction processesin retail settings”. Journal of Retailing 57, 25–48.

Our Common Future: (1987), “A Report of the World Commission on Environment and Development”. Rep.United Nations.

Ozata, S., (2015), “Ecological Approaches from Past to Present: Traditional Architecture of Cappadocia Region”, IACSIT International Journal of Engineering and Technology, Vol. 7, No. 4, August 2015

Parasuraman, A. Valarie A. Zeithaml and Leonard L. Berry, (1998), “Servqual: A Multiple-Item Scale for Measuring Consumer Perceptions of Service Quality”, volume 64, number 1, spring 1988 USA.

Parrish, R., Perriman ,R., Postlethwaite, D., Quay, B., Seguin, J. and Vigon, B. (1993), Guidelines for life-cycle assessment: A code of practice. 1st

Penny, W. (2007), “The use of environmental management as a facilities management tool in the Macao hotel sector” Facilities, 25 (7/8), 286-295.

Porter, Tom, (2004), Archi-Speak. Spin Press.

Ragette, Friedreck, (2003), Traditional Domestic Architecture of the Arab World. Axel Menges, Stuttgart, Germany.

Ramsaran-Fowdar, R. (2007), “Developing a service quality questionnaire for the hotel industry in Mauritius”. Journal of Vacation Marketing, 13(1), 19- 27.

Rapoport, Amos, (1969), House Form and Culture. Foundations of Cultural Geography Series.

Reuland, R., Coudrey, J., Fagel, A., (1985).”Research in the field of hospitality”. International Journal of Hospitality Management 4 (4), 141–146.

Richardson, Vicky, (2001), New vernacular architecture. London: Laurence King.

Ringbom, Sixten, (1984), “Vernacular architecture & cultural identity” Seminar on vernacular architecture. Finnish National Commission for UNESCO, Helsinki.

Robinot, E., & Giannelloni, J. L. (2010), “Do hotels green attributes contribute to customer satisfaction?” Journal of Services Marketing, 24, 157-169.

Rudofsky, Bernard, (2008), Architecture without architects. A short introduction to non-pedigreed architecture. Albuquerque, N.M.: University of New Mexico Press.

s/Sustai (Charlyn Keating Chisholm, about.com. guide) http://collections.infocollections.org/ukedu/en/d/Jsk02ce/3.3.html

Saco, R. M. and A. Goncalves. (2008), “Service design: an appraisal.” Design Management Review, 19.1.

Schank, R. & Abelson, R. (1977), Scripts, plans, goals and Understanding. Hillsdale, NJ: Lawrence Erlbaum Associates.

Schor, P. (2008), “Seeing Green: Rethinking Hospitality Design from a Sustainable Viewpoint.” Lodging Hospitality, 63 (10), 22-24.

Serefhanoglu S., M., Zorer Gedık, G., (2007), “Evaluation of traditional architecture in terms of building physics: Old Diyarbakır houses”, Building and Environment 42 (2007) 1810–1816

Sheehan, P. (2007), "Seeing green: Rethinking hospitality design from a sustainable viewpoint" Lodging Hospitality, 63 (10), 22-24.

Sibley, Magda, (2006), The courtyard Houses of North African Medinas: Past, Present. England, New York: Taylor& Francis.

Singer, J. L. (2010), "Spa Sustainability Strategies for the Environment, the Guests and Your Business", Retrieved January 12, 2014 from.http://hotelexecutive.com/business_review/218/spa-sustainability-strategies- for the environment-the-guests-and-your-business

Skogland, I. & Siguaw, J. (2004), "Are your satisfied customers loyal?" Cornell Hotel and Restaurant Administration Quarterly, 45(1), 221-234.

Sloan, P., Legrand, W., and Chen, J.S. (2013), Sustainability in the Hospitality Industry. Principles of Sustainable Operations (2nd ed.). New York: Routledge

Smith, R. & Houston, M. (1985), "A psychometric assessment of measures of scripts in consumer memory" Journal of Consumer Research, 12(2), 214- 224.

Solmaz, F., Şakar, N. Güçhan, Ş., (2012), "Traditional Structural Elements In Ürgüp: Walls and Vaults", 5th International Congress on Construction History

Solmaz, F., Şakar, N., Güçhan, Ş., (2014), "A Unique Example of Vernacular Construction in Anatolia the Construction Technique In Traditional Cappadocia: Houses", SAHC2014 – 9t International Conference on Structural Analysis of Historical Constructions F. Peña & M. Chávez (eds.) Mexico City, Mexico, 14–17 October 2014.

Sustainable Tourism Programme. Retrieved from April 25 from, (2015). http://www.unep.org/10yfp/Programmes/ProgrammeConsultationandCurrentStatu

Talbott, B. (2004), Looking ahead: Marketing luxury hotels in the 21st century. In B. Dickinson & A. Vladimir (eds.), The Complete 21st Century Travel & Hospitality Marketing Handbook (555-568), Upper Saddle River, New Jersey: Pearson Custom Publishing.

Tanyeli, U. (2007), Cansever Kimlikleri, Turgut Cansever: Düşünce Adamı ve Mima. İstanbul: Osmanlı Bankası Arşiv ev Araştırma Merkezi.

Trainor-Buckingham, S. (2009), What use does Sustainable Development have within the hospitality industry. Retrieved April 25, 2014 from. http://www.ignitehospitality.com/blog/what-use-does-sustainable development-have-within -the-hospitality-industry

U.S. Green Building Council, (2007), LEED for New Construction Version 2.2. Reference Guide. Washington, DC: USGBC.

U.S. GREEN BUILDING COUNCIL. LEEDTM Reference Guide version 2.0, (2009), Paladino Consulting LLC. UNEP. Tourism and hospitality. from http://www.unep.org/climateneutral/Topics/Tourismand Hospitality/tabid/151/Default. aspx. Retrieved May 20, 2010

USGBC. LEED 2009 for New Construction and Major Renovations, U.S. Green Building Council, Washington, DC. (2009).

Usta, M., Berezina, K., & Cobanoglu, C. (2014). “The impact of hotel attributes' satisfaction on overall guest satisfaction”. Journal of Service Management,*6*(3),1-12.

Wai, C. P., & Low, K. L. T. (2005). “Are travellers satisfied with Malaysian hotels?” International Journal of Contemporary Hospitality Management, 17(3), 217-227.

Walker, J. (2005), Introduction to hospitality. New York, NY: Prentice Hall, 136-140.

Webster, K. (2000), Environmental Management in the Hospitality Industry. New York: Cromwell.

Williams D. E., (2007), Sustainable Design: Ecology, Architecture, and planning. Wiley, New Jersey, vol.7, pp.37-44, 81-104.

Yin, R., (2002), Case Study Research: Design and Methods. 3rd.Ed. Thousand Oaks, CA: Sage Publications, p. 13.

Yong Han, A., Annie R. Pearce,(2006), “Green Luxury: A Case Study Of Two Green Hotels”, Journal of Green Building, Volume 8, Number 1.

Appendix

Appendix-A-

The measurement model that emerged comprised 62 measurable items (SERVQUAL)

Dimensions	N.	Mean Customers' Expectation Score(E)	N.	Mean Customers' Perception Score (P)	Mean Gap Score Service Quality=(P-E)
Tangibility					
Q1 Modern and comfortable furniture					
Q2 Appealing interior and exterior hotel decoration					
Q3 Attractive lobby					
Q4 Cleanliness and comfort of rooms					
Q5 Spaciousness of rooms					
Q6 Hygienic bathrooms and toilets					
Q7 Convenient hotel location					
Q8 Neat and professional appearance of staff					
Q9 Availability of swimming pool, sauna and gym					
Q10 Complimentary items					
Q11 Visually appealing brochures, pamphlets, etc.					
Q12 Image of the hotel					

Reliability					
Q13 Staff performing services right the first time.					
Q14 Performing the services at the time promised.					
Q15 Well-trained and knowledgeable staff.					
Q16 Experienced staff.					
Q17 Staff with good communication skills.					
Q18 Accuracy in billing.					
Q19 Accuracy of food order.					
Q20 Accurate information about hotel services.					
Q21 Advance and accurate information about prices.					
Q22 Timely housekeeping services.					
Q23 Availability of transport facilities.					
Q24 Reliable message service.					
Q25 Willingness of staff to provide help promptly.					
Q26 Availability of staff to provide service					
Q27 Quick check-in and check-out.					
Q28 Prompt breakfast service.					
Q29 Problem-solving abilities of staff.					
Assurance					

Q30 Friendliness of staff.					
Q31 Courteous employees.					
Q32 Ability of staff to instill confidence in customers					
Empathy					
Q33 Availability of room service .					
Q34 Understanding the customers' requirements.					
Q35 Listening carefully to complaints.					
Q36 Hotel to have customers' best interests at heart.					
Q37 Giving special attention to the customer.					
Q38 Recognizing the hotel customer.					
Q39 Addressing the customer by name.					
Q40 Customer loyalty program.					
Environment					
Q41 Comfortable, relaxed and welcome feeling.					
Q42 Quietness of room.					
Q43 Variety/quality of sports and recreational facilities.					
Q44 Security of room.					
Q45 Security and safety at the hotel.					

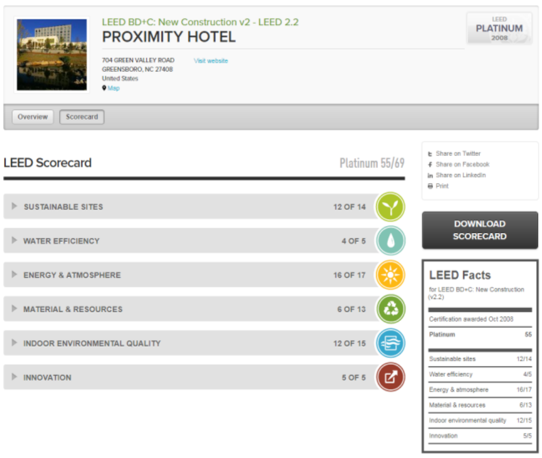
Q46 Comfortable and clean mattress, pillow, bed sheets and covers.					
Q47 Sustainable room rates.					
Q48 Variety of basic products and services offered (toothpaste, soap, shampoo, towels, toilet paper, stationery, laundry, ironing, tea, coffee, drinking water)					
Q49 Room items in working order (kettle, air conditioning, lighting, toilet, fridge, etc.).					
Q50 Quality of food in restaurant(s).					
Q51 Choice of menus, buffet, beverages and wines.					
Technology					
Q52 In-room technologies (Wi-Fi, smart TV, telephone, voicemail, on demand PC, television, internet plug, meal ordering, email, wake-up system).					
Q53 Hotel technologies (online reservation, email, internet, fax, international calling facilities, hotel website, direct hotel email, computerized feedback form, special promotions on hotel website, acceptance of credit and debit cards)					
Entertainment					
Q54 Provision of children's facilities (playground, baby-sitting, swimming pool, etc.)					

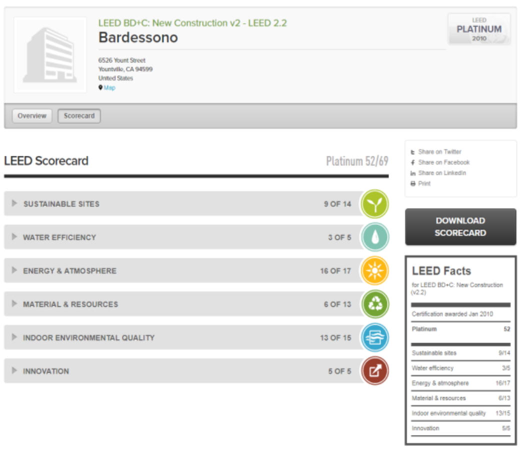
Q55 Provision of evening entertainment.					
Q56 Casino					
Q57 Variety show (such as concert).					
Q58 Recreation and therapy (such as SPA)					
Q59 Shopping center.					
Q60 Acrobatics performances (such as the House of Dancing Water).					
Q61 Convention and exhibition center.					
Q62 Tourist attractions.					

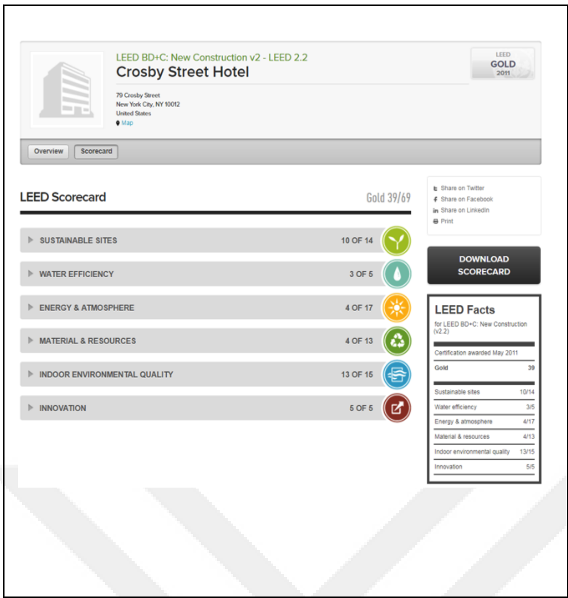
Remark:

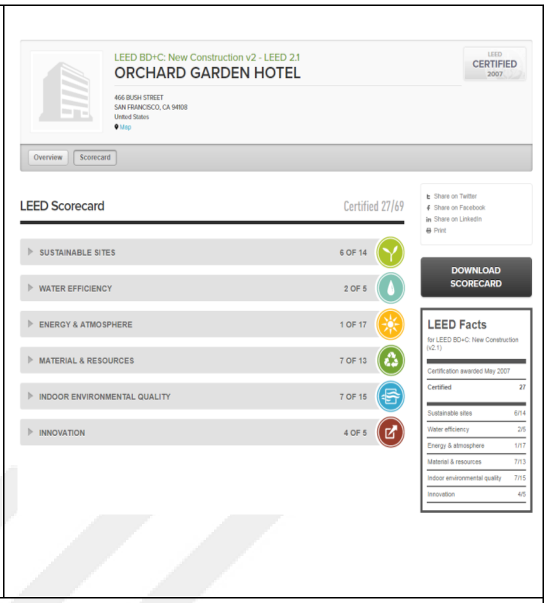
1. Q1 to Q55 are retrieved from Ramsaran- Fowdar's (2007) study.
2. Q56 to Q62 are developed in this study.

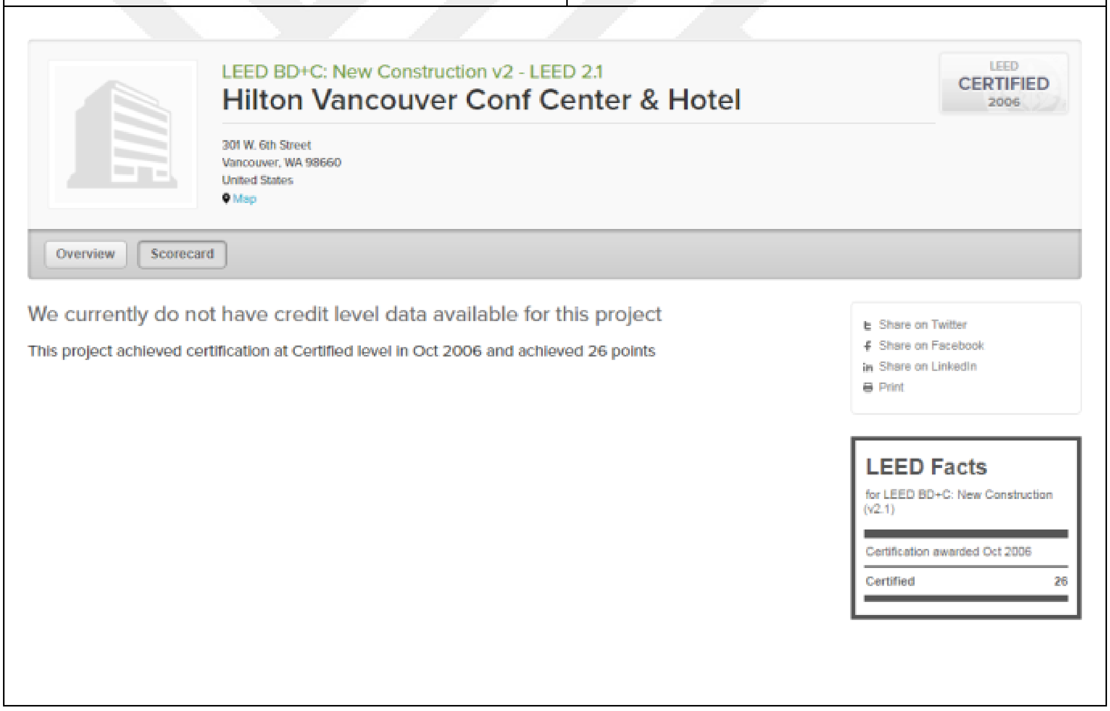
Appendix-B-



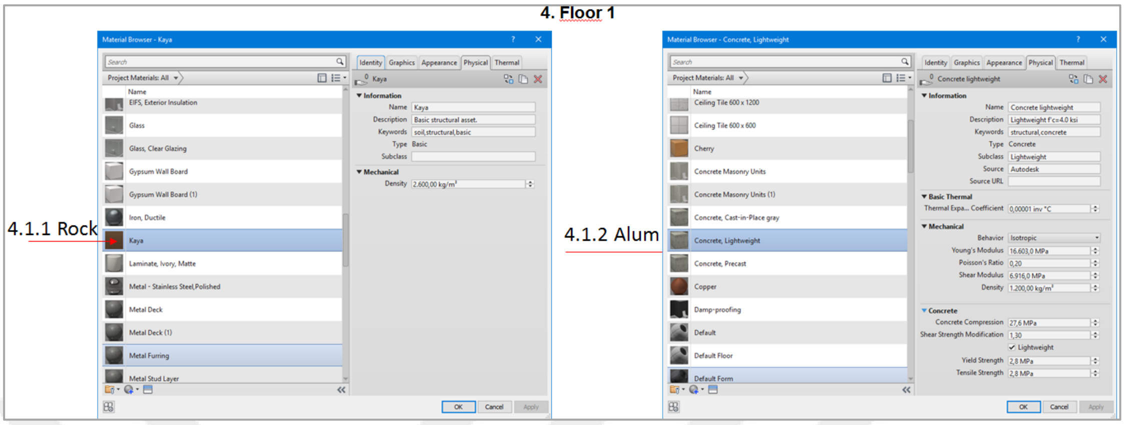


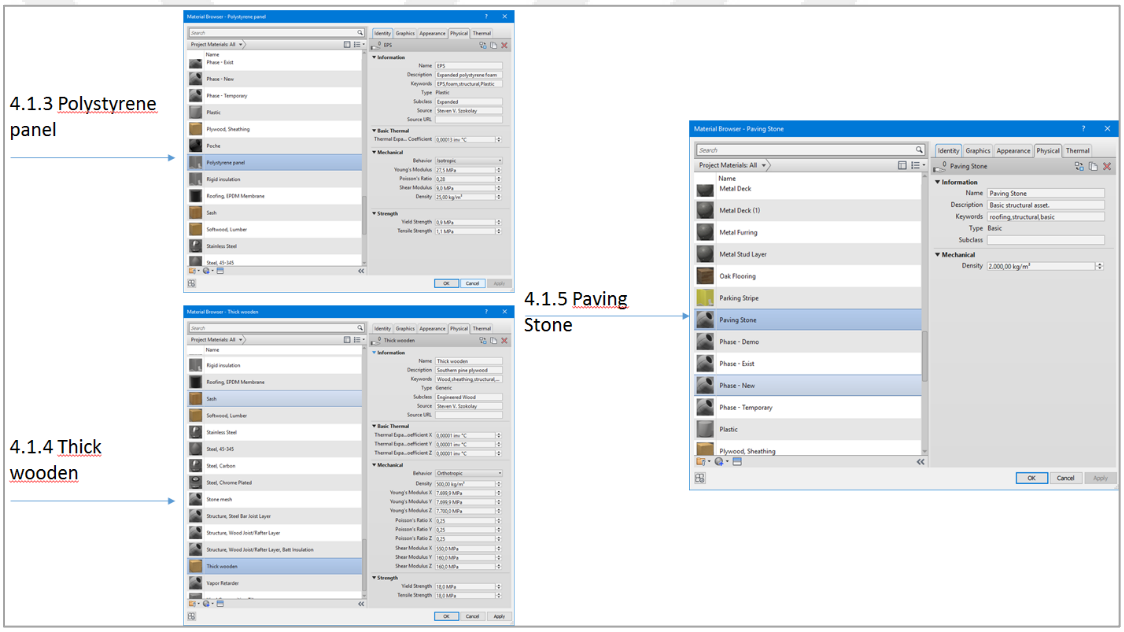

LEED BD+C: New Construction v2 - LEED 2.2
Crosby Street Hotel
GOLD
Overview
Scorecard
LEED Scorecard
Gold 39/69
SUSTAINABLE SITES 10 OF 14
WATER EFFICIENCY 3 OF 5
ENERGY & ATMOSPHERE 4 OF 17
MATERIAL & RESOURCES 4 OF 13
INDOOR ENVIRONMENTAL QUALITY 13 OF 15
INNOVATION 5 OF 5
DOWNLOAD SCORECARD
LEED Facts

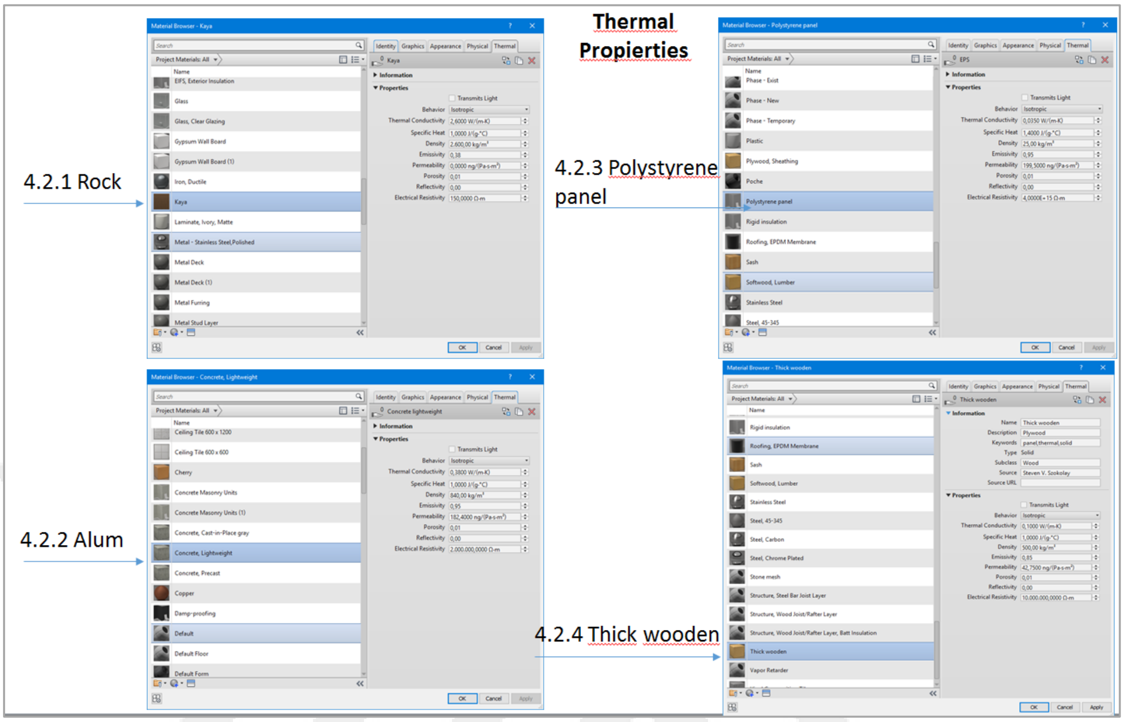

LEED BD+C: New Construction v2 - LEED 2.1
ORCHARD GARDEN HOTEL
CERTIFIED
Overview
Scorecard
LEED Scorecard
Certified 27/69
SUSTAINABLE SITES 6 OF 14
WATER EFFICIENCY 2 OF 5
ENERGY & ATMOSPHERE 1 OF 17
MATERIAL & RESOURCES 7 OF 13
INDOOR ENVIRONMENTAL QUALITY 7 OF 15
INNOVATION 4 OF 5
DOWNLOAD SCORECARD
LEED Facts

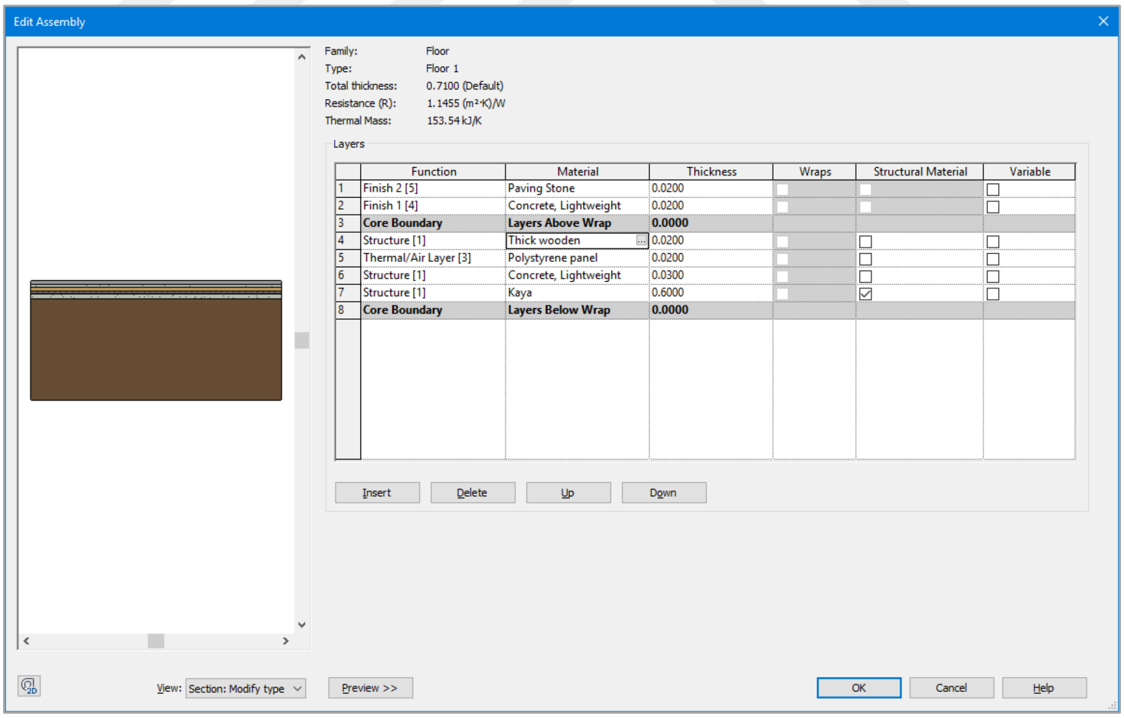

LEED BD+C: New Construction v2 - LEED 2.1
Hilton Vancouver Conf Center & Hotel
LEED CERTIFIED 2006
301 W. 6th Street
Vancouver, WA 98660
United States
Map
Overview
Scorecard
We currently do not have credit level data available for this project
This project achieved certification at Certified level in Oct 2006 and achieved 26 points
Share on Twitter
Share on Facebook
Share on LinkedIn
Print
LEED Facts
for LEED BD+C: New Construction (v2.1)
Certification awarded Oct 2006
Certified 26

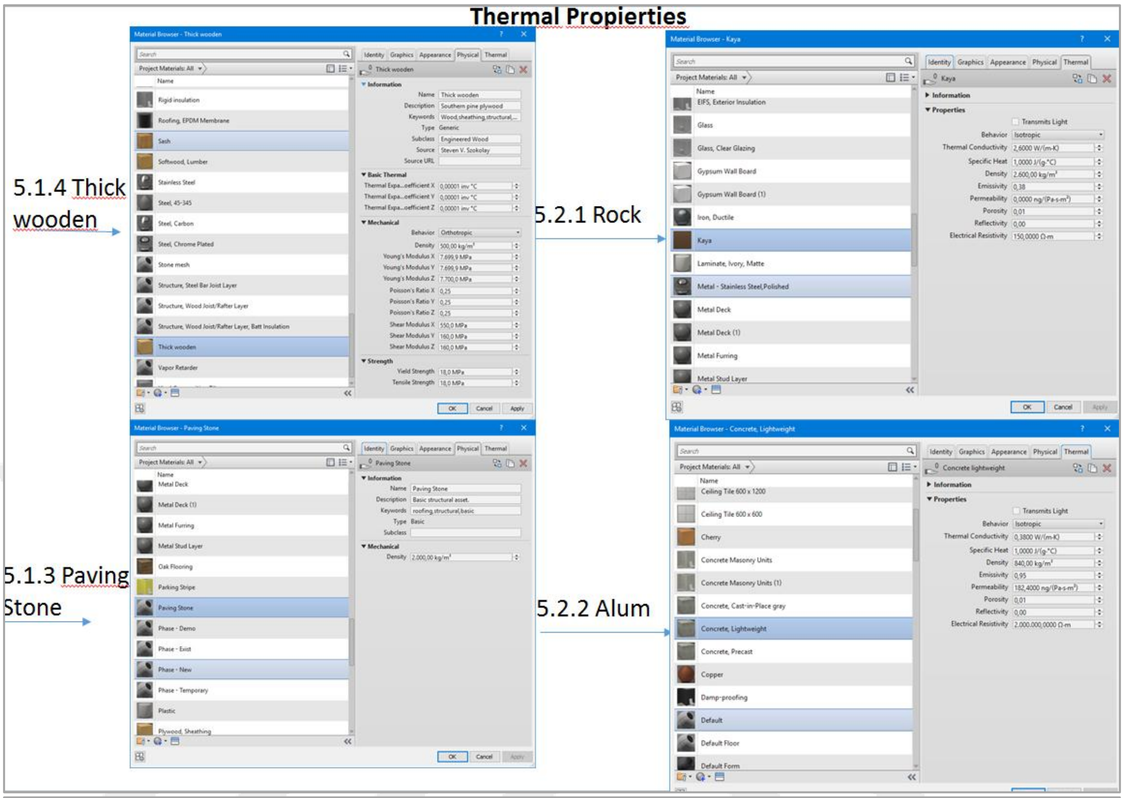
Appendix C

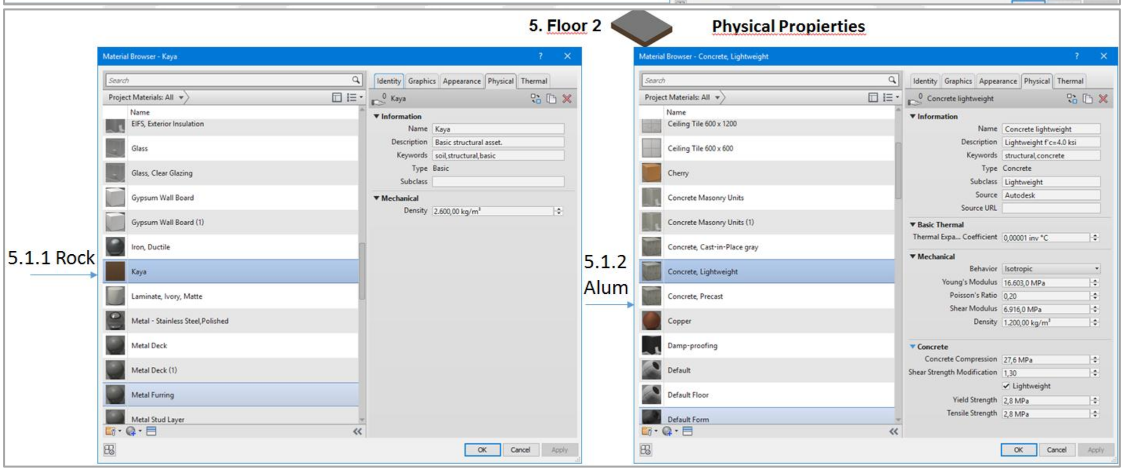

4. Floor 1
4.1.1 Rock
4.1.2 Alum

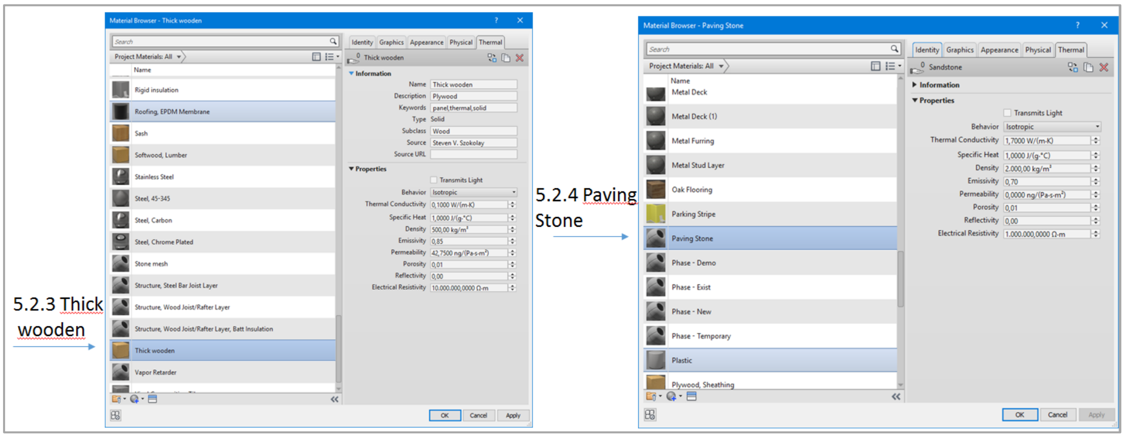

4.1.3 Polystyrene
panel
4.1.4 Thick
wooden
4.1.5 Paving
Stone

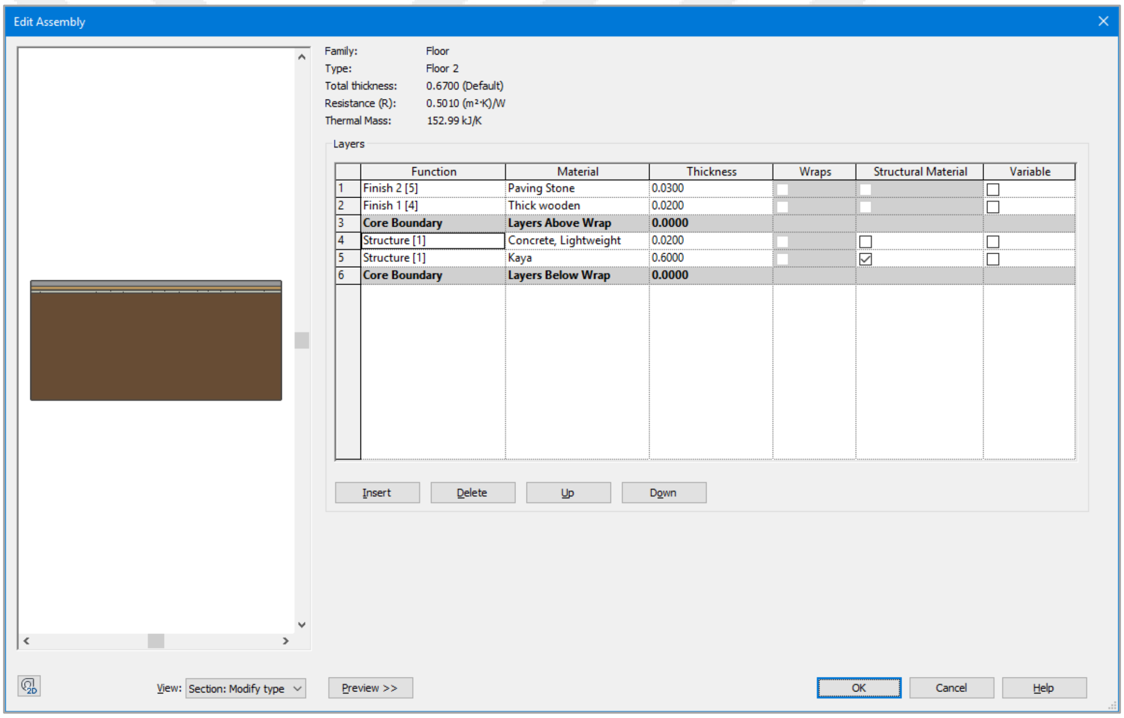

Thermal Propierties
4.2.1 Rock
4.2.2 Alum
4.2.3 Polystyrene panel
4.2.4 Thick wooden

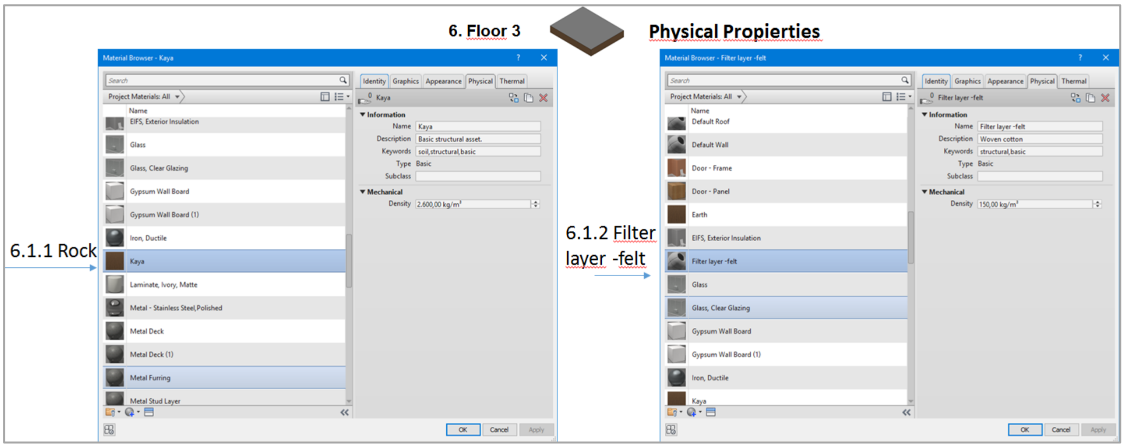

Edit Assembly
Family: Floor
Type: Floor 1
Total thickness: 0.7100 (Default)
Resistance (R): 1.1455 (m²·K)/W
Thermal Mass: 153.54 kJ/K
Layers
Function | Material | Thickness | Wraps | Structural Material | Variable
1 Finish 2 [5] | Paving Stone | 0.0200
2 Finish 1 [4] | Concrete, Lightweight | 0.0200
3 Core Boundary | Layers Above Wrap | 0.0000
4 Structure [1] | Thick wooden | 0.0200
5 Thermal/Air Layer [3] | Polystyrene panel | 0.0200
6 Structure [1] | Concrete, Lightweight | 0.0300
7 Structure [1] | Kaya | 0.6000
8 Core Boundary | Layers Below Wrap | 0.0000
Insert
Delete
Up
Down
View: Section: Modify type
Preview >>
OK
Cancel
Help

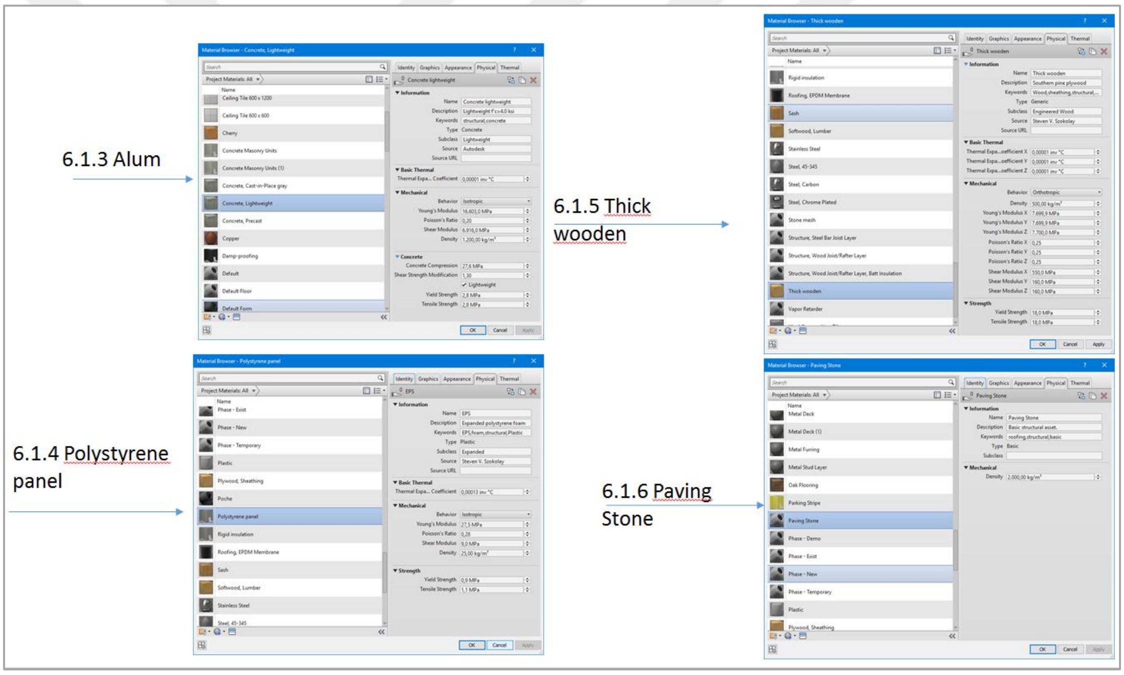

Thermal Propierties
5.1.4 Thick wooden
5.2.1 Rock
5.1.3 Paving Stone
5.2.2 Alum


5. Floor 2
Physical Propierties
5.1.1 Rock
5.1.2 Alum


5.2.3 Thick wooden
5.2.4 Paving Stone
Material Browser - Thick wooden
Material Browser - Paving Stone

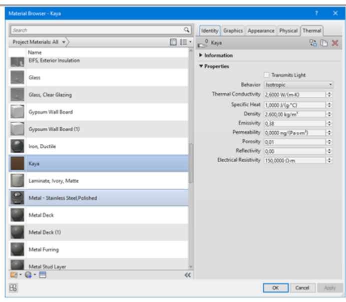

Edit Assembly
Family: Floor
Type: Floor 2
Total thickness: 0.6700 (Default)
Resistance (R): 0.5010 (m²·K)/W
Thermal Mass: 152.99 kJ/K
Layers
Function
Material
Thickness
Wraps
Structural Material
Variable
1 Finish 2 [5] Paving Stone 0.0300
2 Finish 1 [4] Thick wooden 0.0200
3 Core Boundary Layers Above Wrap 0.0000
4 Structure [1] Concrete, Lightweight 0.0200
5 Structure [1] Kaya 0.6000
6 Core Boundary Layers Below Wrap 0.0000
Insert
Delete
Up
Down
View: Section: Modify type
Preview >>
OK
Cancel
Help


6. Floor 3
Physical Propierties
6.1.1 Rock
6.1.2 Filter layer -felt

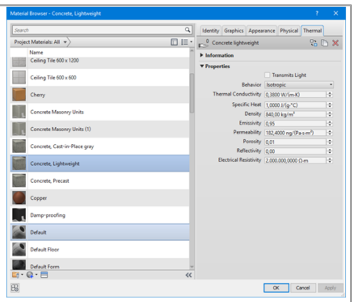

6.1.3 Alum
6.1.5 Thick wooden
6.1.4 Polystyrene panel
6.1.6 Paving Stone

Thermal Propierties

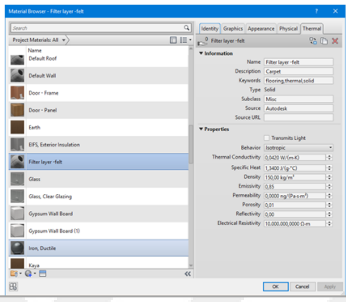
6.2.1 Rock



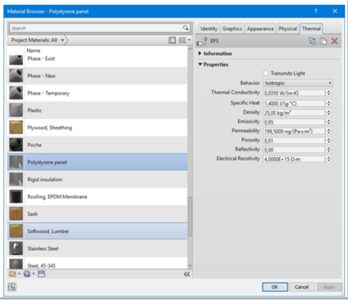
6.2.3 Alum



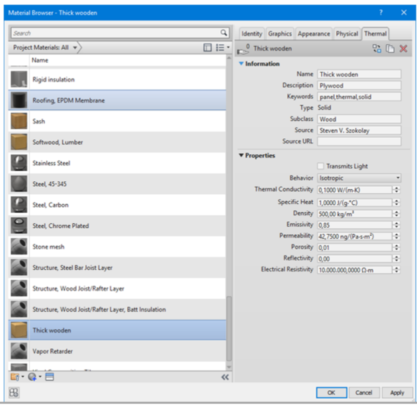
6.2.2 Filter layer -felt



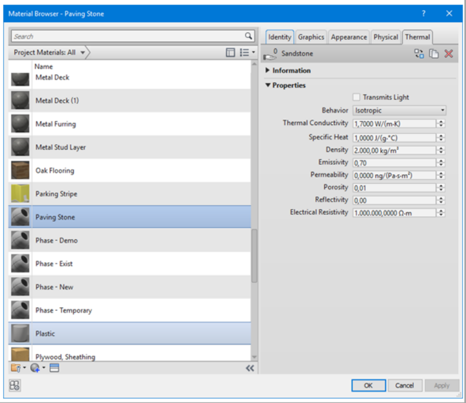
6.2.4 Polystyrene panel

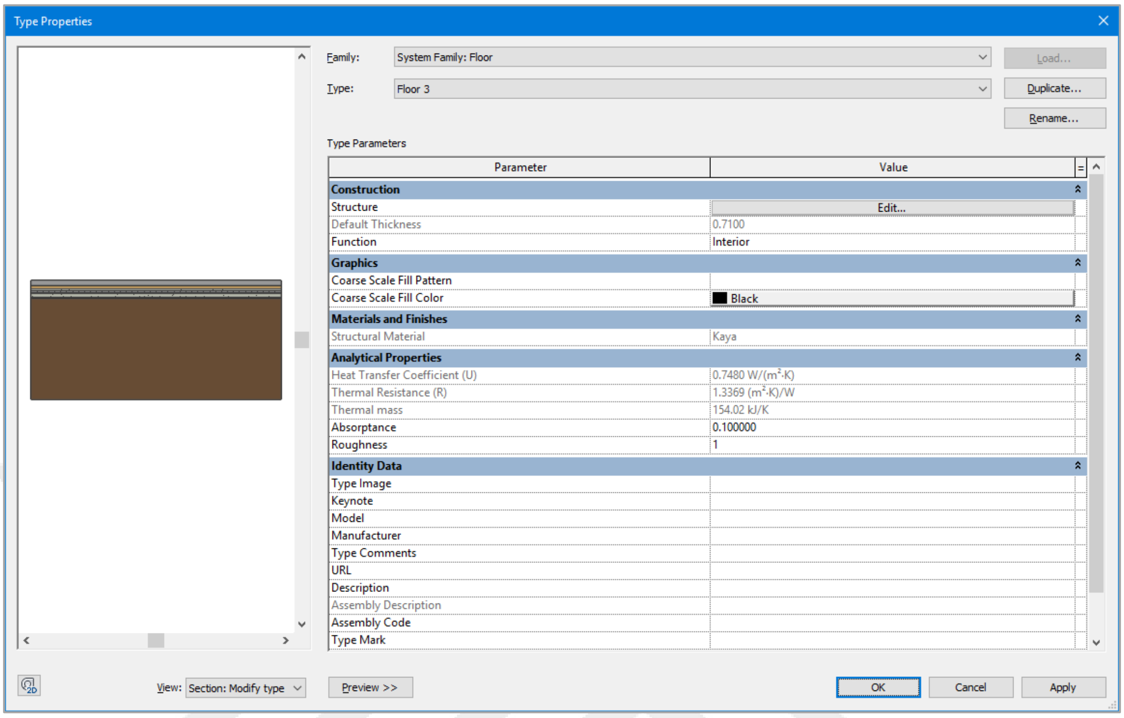


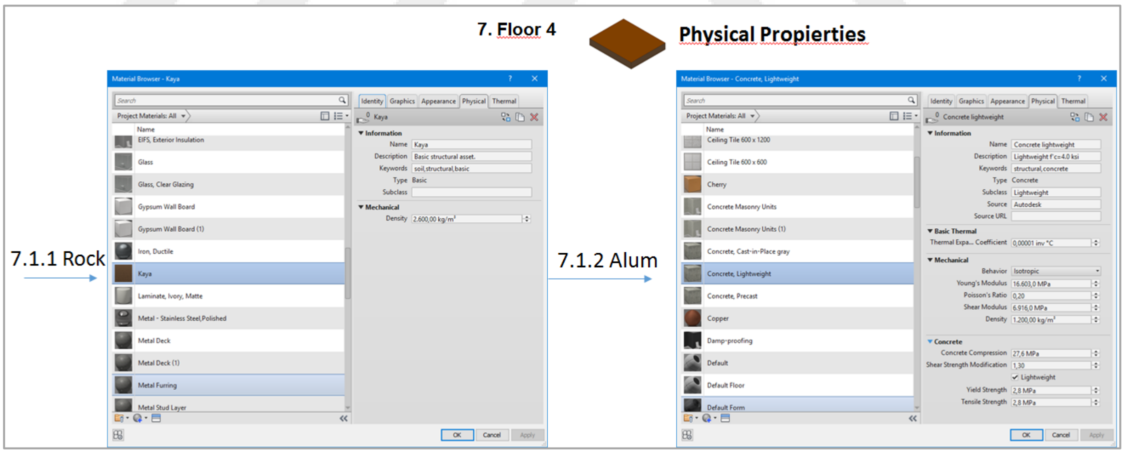
6.2.5 Thick wooden

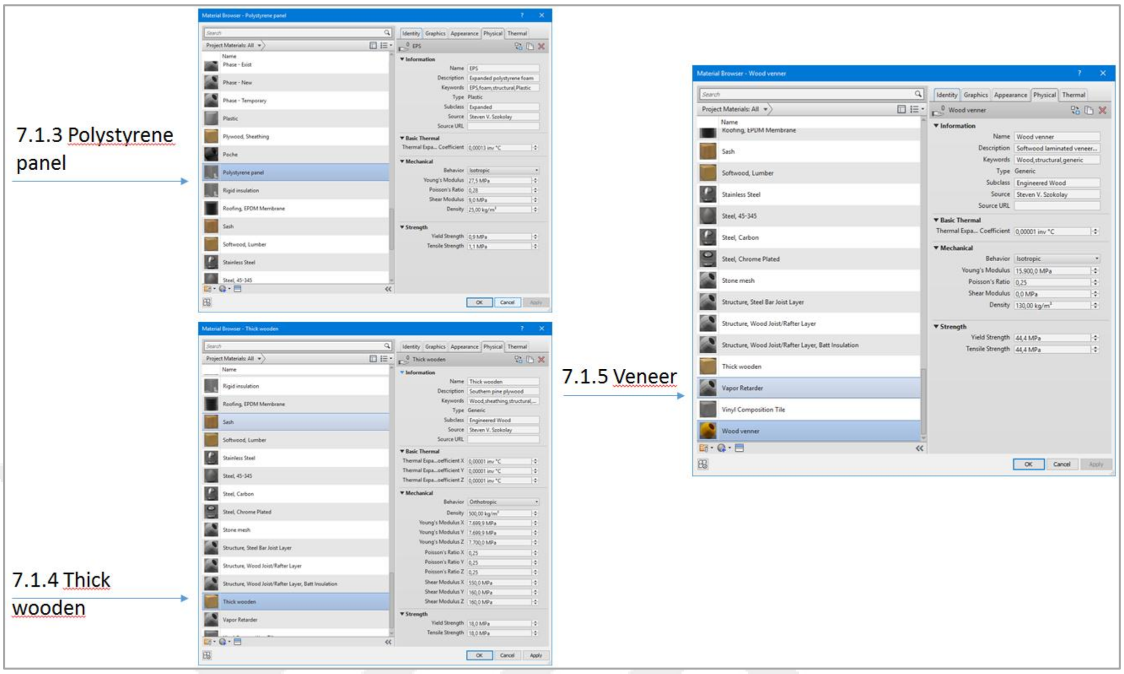


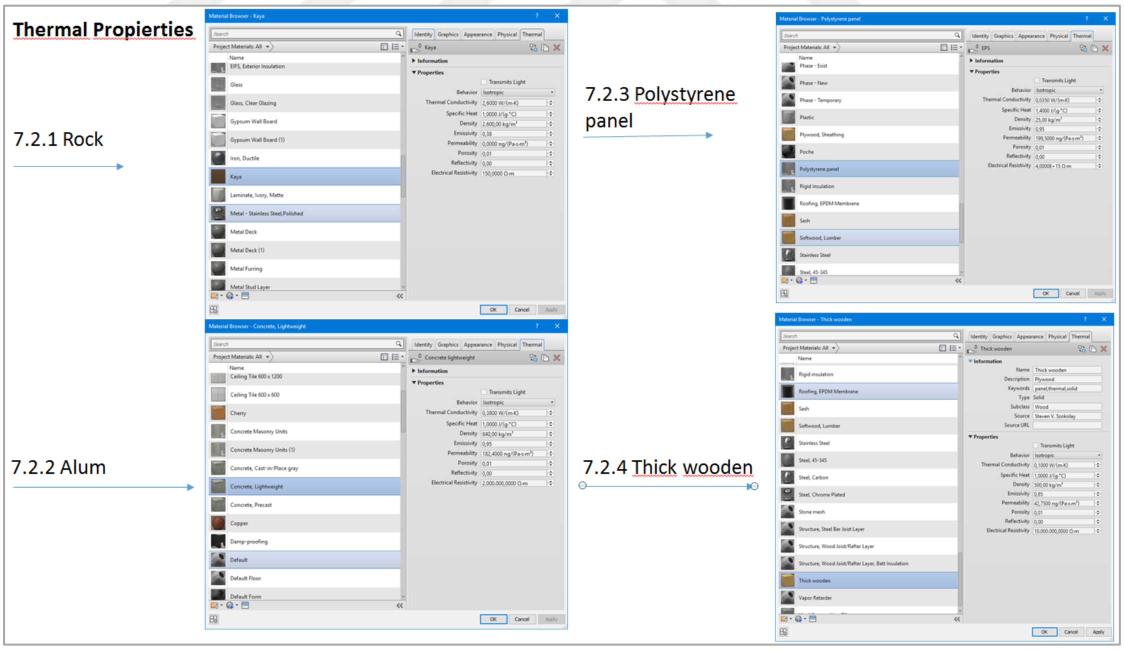
6.2.6 Paving Stone



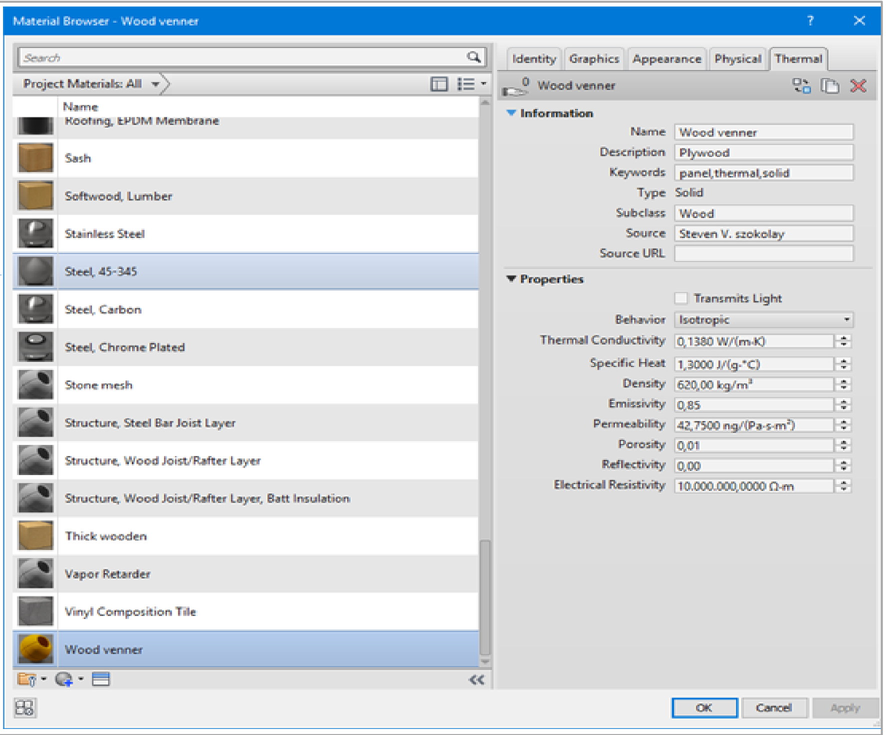

Type Properties
Family: System Family: Floor
Type: Floor 3
Load...
Duplicate...
Rename...
Type Parameters
Parameter
Value
Construction
Structure
Edit...
Default Thickness
0.7100
Function
Interior
Graphics
Coarse Scale Fill Pattern
Coarse Scale Fill Color
Black
Materials and Finishes
Structural Material
Kaya
Analytical Properties
Heat Transfer Coefficient (U)
0.7480 W/(m²·K)
Thermal Resistance (R)
1.3369 (m²·K)/W
Thermal mass
154.02 kJ/K
Absorptance
0.100000
Roughness
1
Identity Data
Type Image
Keynote
Model
Manufacturer
Type Comments
URL
Description
Assembly Description
Assembly Code
Type Mark
View: Section: Modify type
Preview >>
OK
Cancel
Apply

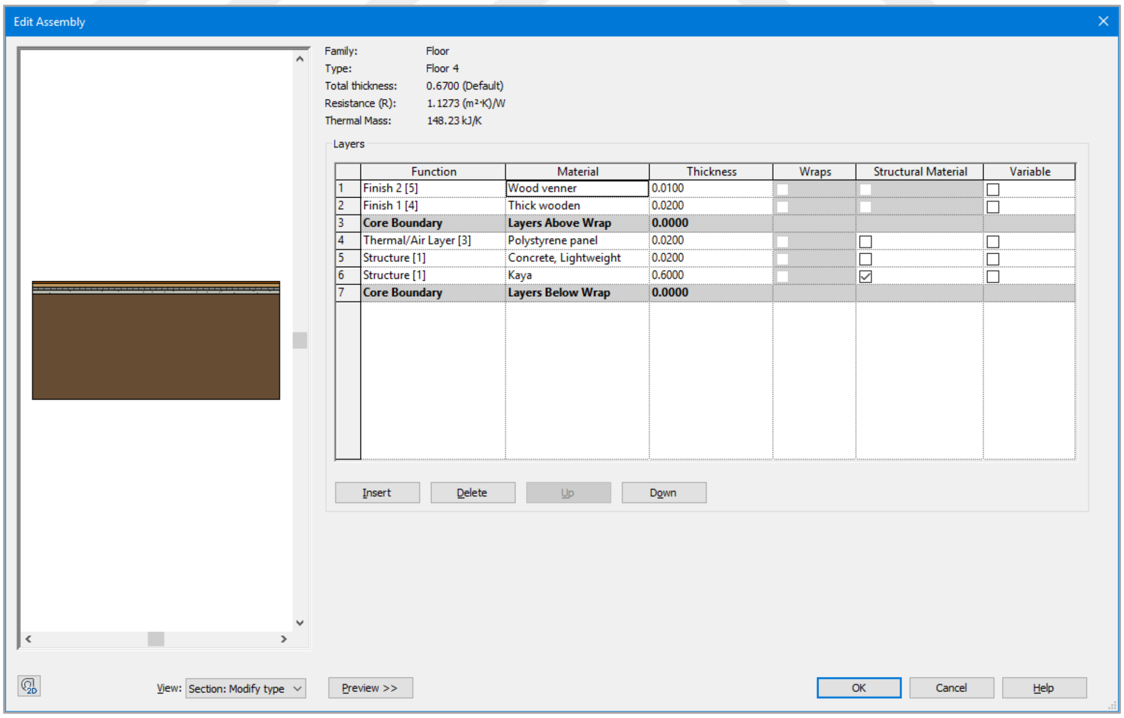

7. Floor 4
Physical Propierties
7.1.1 Rock
7.1.2 Alum
Material Browser - Kaya
Material Browser - Concrete, Lightweight

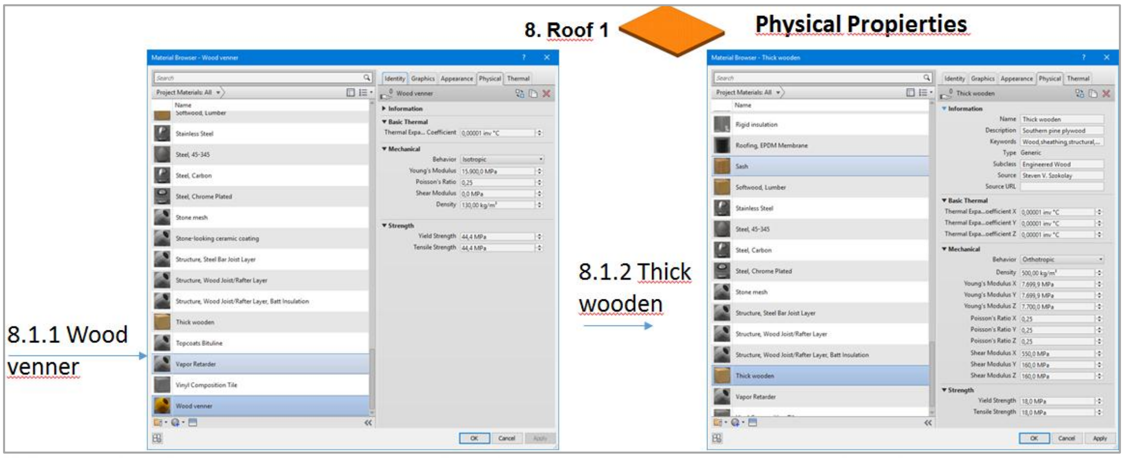

7.1.3 Polystyrene panel
7.1.4 Thick wooden
7.1.5 Veneer

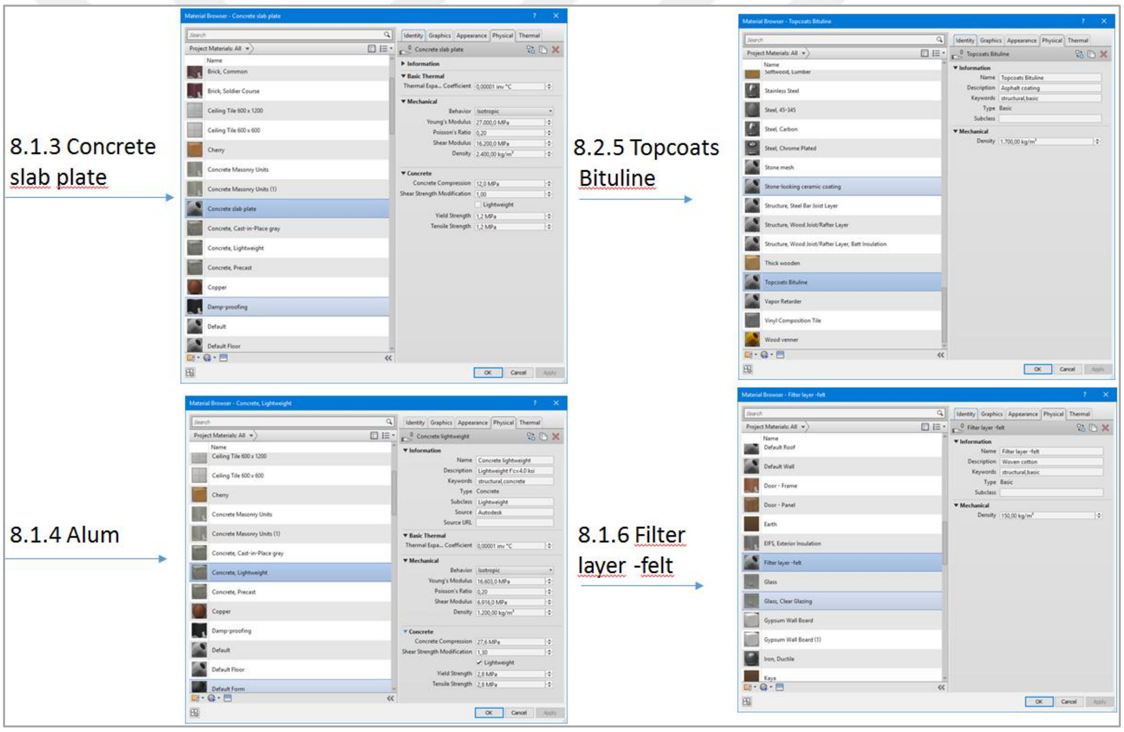

Thermal Propierties
7.2.1 Rock
7.2.2 Alum
7.2.3 Polystyrene panel
7.2.4 Thick wooden

7.2.5 Venner

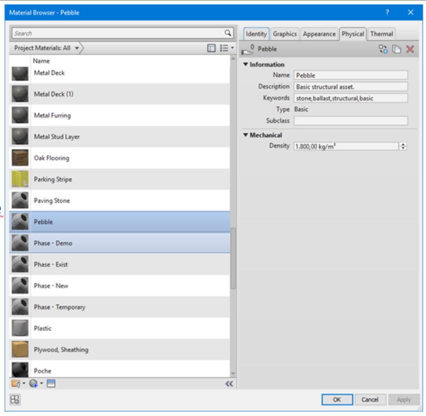

Material Browser - Wood venner
Search
Project Materials: All
Name
Roofing, EPDM Membrane
Sash
Softwood, Lumber
Stainless Steel
Steel, 45-345
Steel, Carbon
Steel, Chrome Plated
Stone mesh
Structure, Steel Bar Joist Layer
Structure, Wood Joist/Rafter Layer
Structure, Wood Joist/Rafter Layer, Batt Insulation
Thick wooden
Vapor Retarder
Vinyl Composition Tile
Wood venner
Identity
Graphics
Appearance
Physical
Thermal
Wood venner
Information
Name Wood venner
Description Plywood
Keywords panel,thermal,solid
Type Solid
Subclass Wood
Source Steven V. szokolay
Source URL
Properties
Transmits Light
Behavior Isotropic
Thermal Conductivity 0,1380 W/(m·K)
Specific Heat 1,3000 J/(g·°C)
Density 620,00 kg/m³
Emissivity 0,85
Permeability 42,7500 ng/(Pa·s·m²)
Porosity 0,01
Reflectivity 0,00
Electrical Resistivity 10.000.000,0000 Ω·m
OK
Cancel
Apply


Edit Assembly
Family: Floor
Type: Floor 4
Total thickness: 0.6700 (Default)
Resistance (R): 1.1273 (m²·K)/W
Thermal Mass: 148.23 kJ/K
Layers
Function | Material | Thickness | Wraps | Structural Material | Variable
1 Finish 2 [5] | Wood venner | 0.0100
2 Finish 1 [4] | Thick wooden | 0.0200
3 Core Boundary | Layers Above Wrap | 0.0000
4 Thermal/Air Layer [3] | Polystyrene panel | 0.0200
5 Structure [1] | Concrete, Lightweight | 0.0200
6 Structure [1] | Kaya | 0.6000
7 Core Boundary | Layers Below Wrap | 0.0000
Insert
Delete
Up
Down
View: Section: Modify type
Preview >>
OK
Cancel
Help

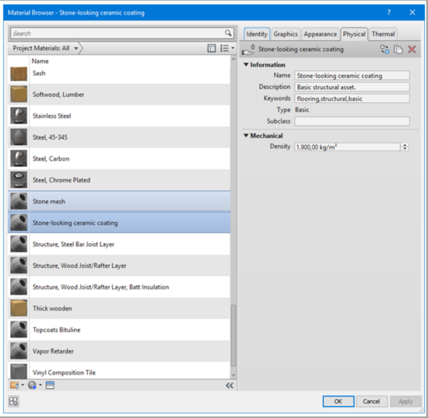

8. Roof 1
Physical Propierties
8.1.1 Wood venner
8.1.2 Thick wooden


8.1.3 Concrete slab plate
8.2.5 Topcoats Bituline
8.1.4 Alum
8.1.6 Filter layer -felt

8.1.7 Pebble

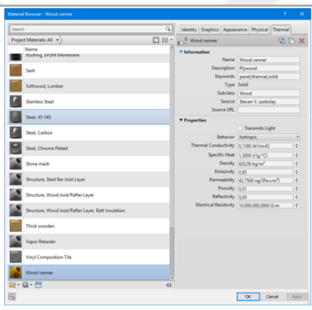


8.1.8 Stone-looking ceramic coating

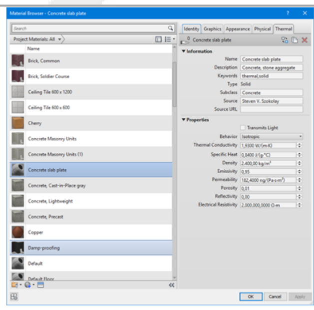


Thermal Propierties

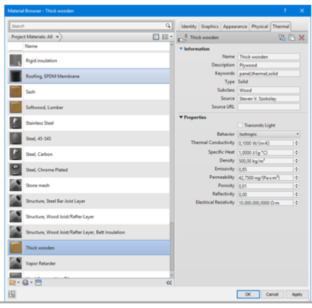
8.2.1 Wood Venner



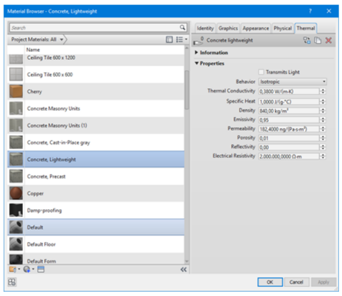
8.2.3 Concrete slab plate

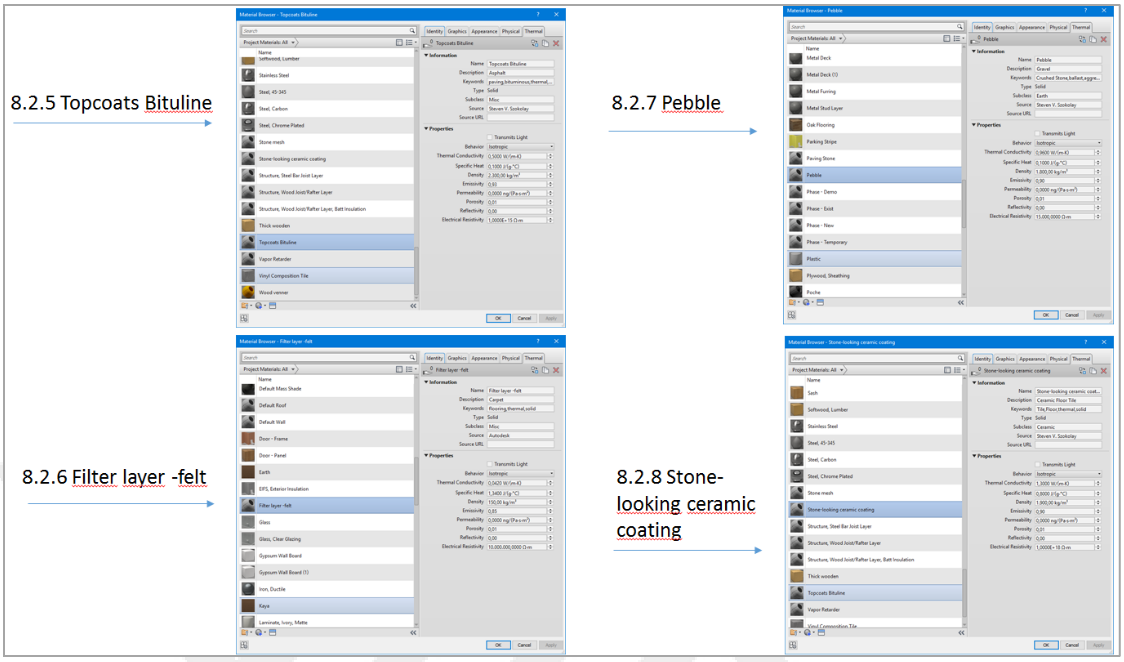


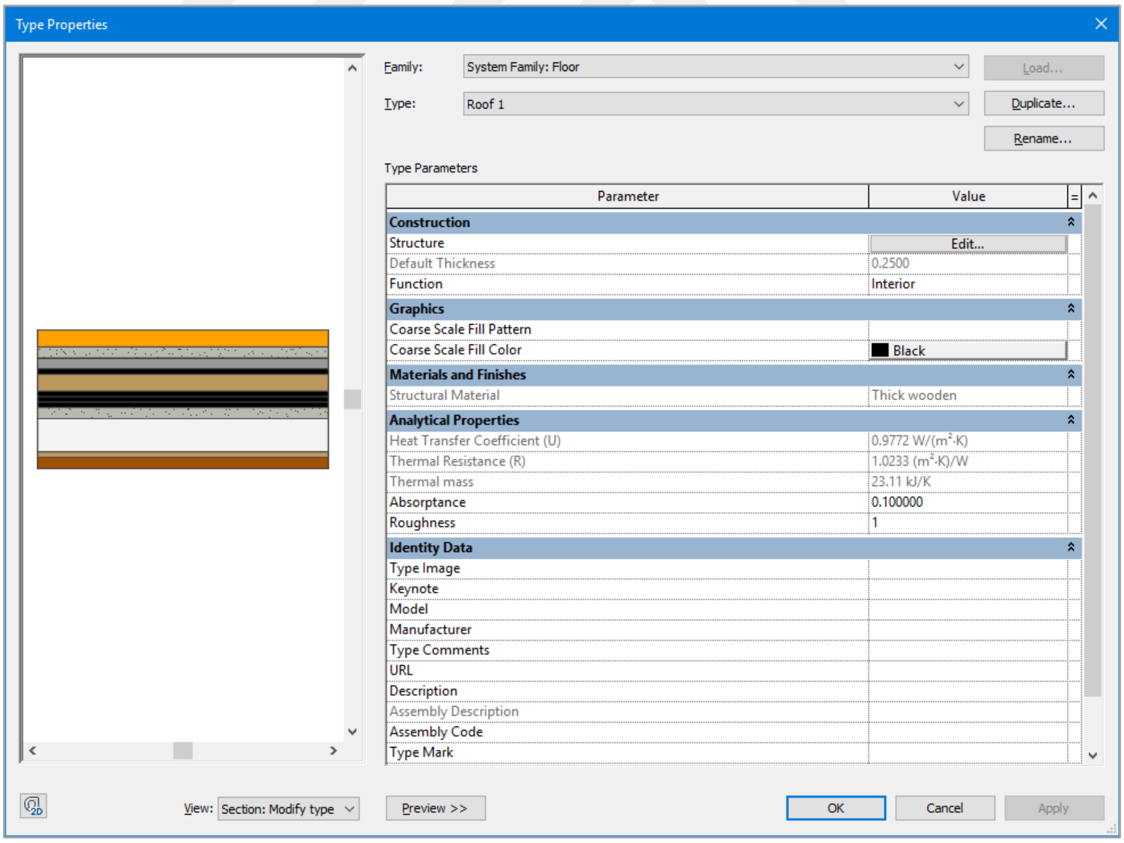
8.2.2 Thick wooden

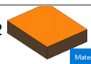


8.2.4 Alum

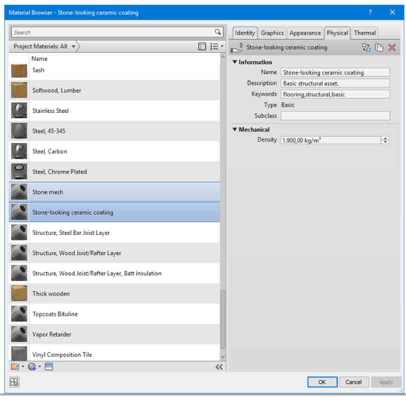



8.2.5 Topcoats Bituline
8.2.7 Pebble
8.2.6 Filter layer -felt
8.2.8 Stone-looking ceramic coating

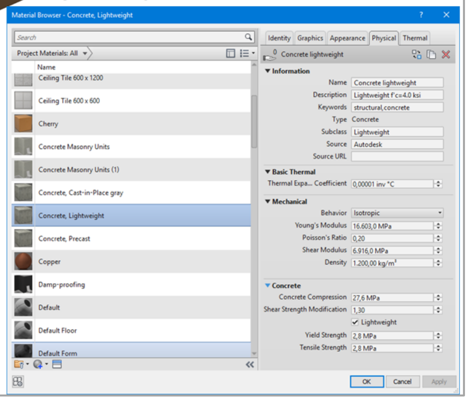

Type Properties
Family: System Family: Floor
Type: Roof 1
Load...
Duplicate...
Rename...
Type Parameters
Parameter
Value
Construction
Structure
Edit...
Default Thickness
0.2500
Function
Interior
Graphics
Coarse Scale Fill Pattern
Coarse Scale Fill Color
Black
Materials and Finishes
Structural Material
Thick wooden
Analytical Properties
Heat Transfer Coefficient (U)
0.9772 W/(m²·K)
Thermal Resistance (R)
1.0233 (m²·K)/W
Thermal mass
23.11 kJ/K
Absorptance
0.100000
Roughness
1
Identity Data
Type Image
Keynote
Model
Manufacturer
Type Comments
URL
Description
Assembly Description
Assembly Code
Type Mark
View: Section: Modify type
Preview >>
OK
Cancel
Apply

9. Roof 2  **Physical Propierties**

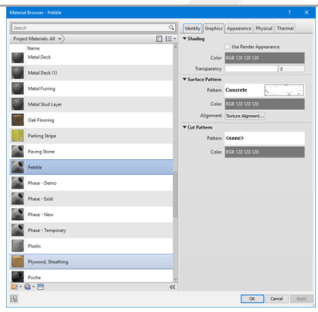
9.1.1 Stone-looking ceramic coating



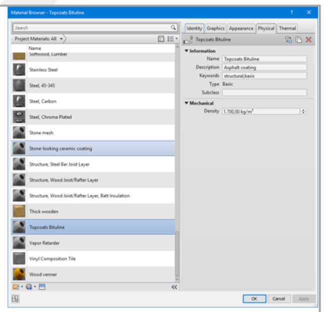
9.1.2 Alum



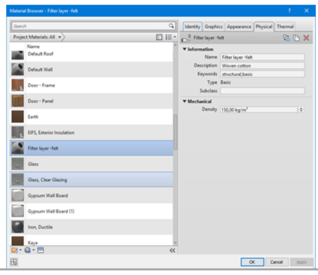
9.1.3 Pebble



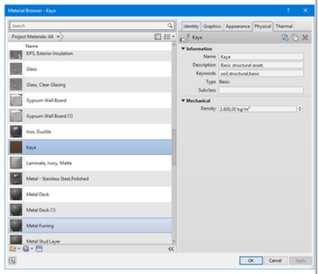
9.2.5 Topcoats Bituline



9.1.4 Filter layer -felt

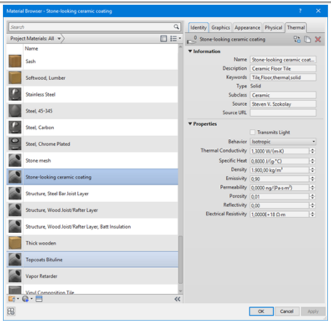


9.2.6 Stone arched cover

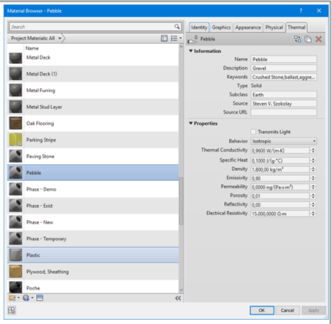


Thermal Propierties

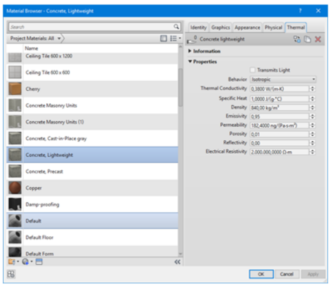
9.2.1 Stone-looking ceramic coating



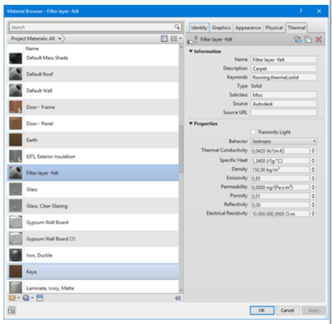
9.2.3 Pebble



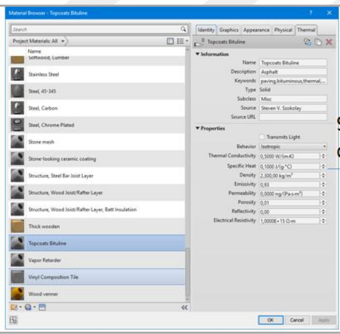
9.2.2 Alum



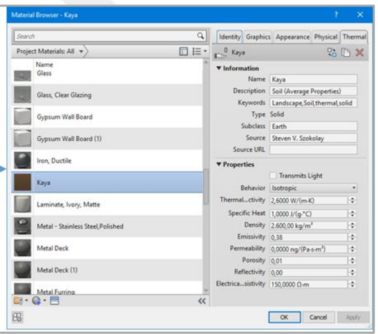
9.2.4 Filter layer -felt

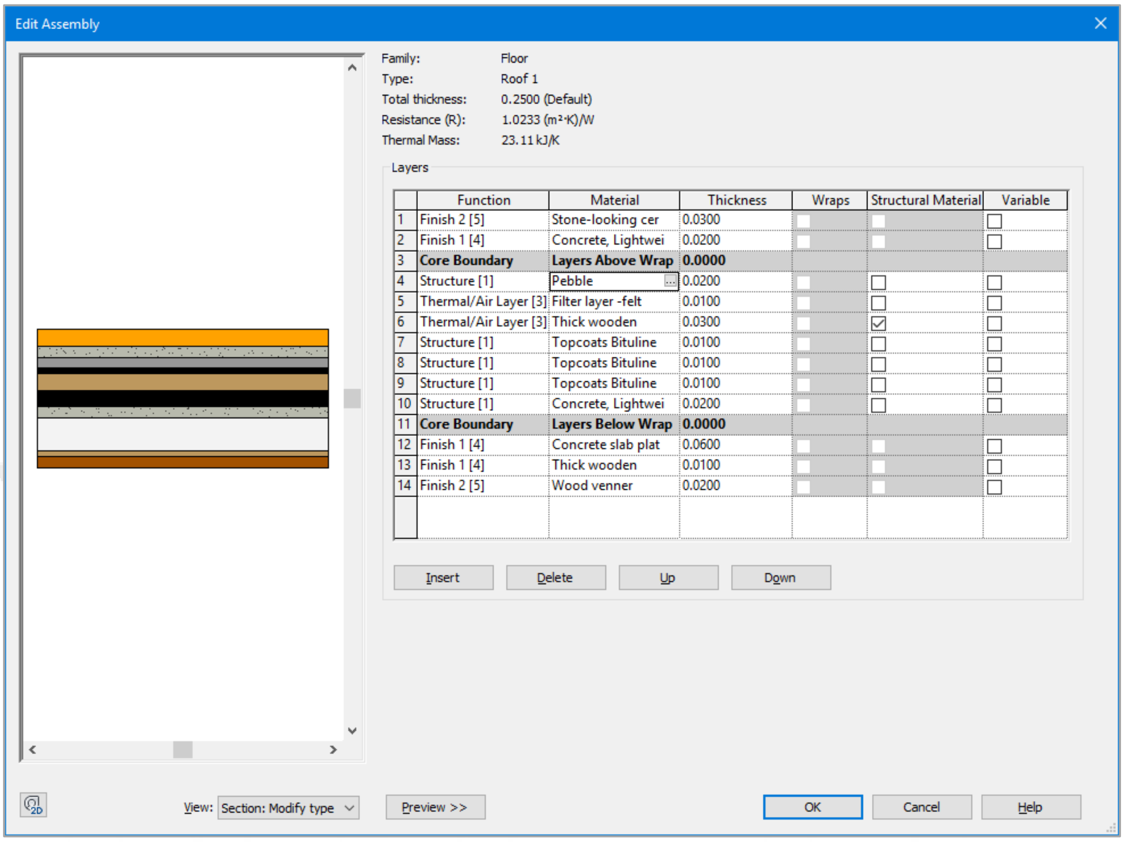


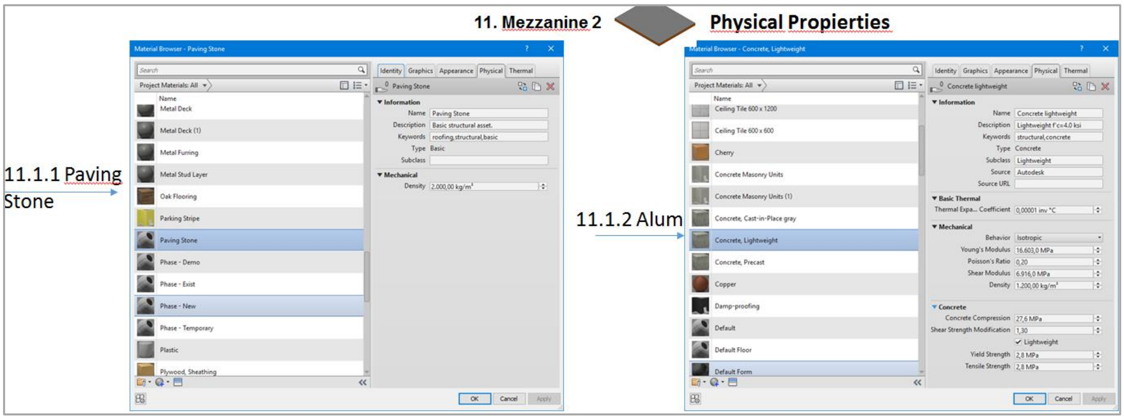
9.2.5 Topcoats Bituline



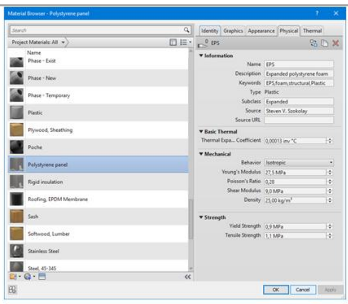
9.2.6 Stone arched cover



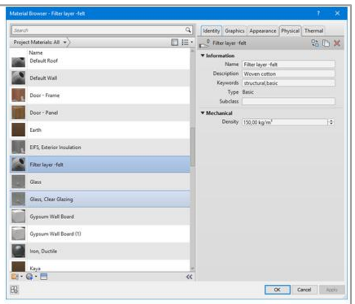

Edit Assembly
Family: Floor
Type: Roof 1
Total thickness: 0.2500 (Default)
Resistance (R): 1.0233 (m²·K)/W
Thermal Mass: 23.11 kJ/K
Layers
Function | Material | Thickness | Wraps | Structural Material | Variable
1 Finish 2 [5] | Stone-looking cer | 0.0300
2 Finish 1 [4] | Concrete, Lightwei | 0.0200
3 Core Boundary | Layers Above Wrap | 0.0000
4 Structure [1] | Pebble | 0.0200
5 Thermal/Air Layer [3] | Filter layer -felt | 0.0100
6 Thermal/Air Layer [3] | Thick wooden | 0.0300
7 Structure [1] | Topcoats Bituline | 0.0100
8 Structure [1] | Topcoats Bituline | 0.0100
9 Structure [1] | Topcoats Bituline | 0.0100
10 Structure [1] | Concrete, Lightwei | 0.0200
11 Core Boundary | Layers Below Wrap | 0.0000
12 Finish 1 [4] | Concrete slab plat | 0.0600
13 Finish 1 [4] | Thick wooden | 0.0100
14 Finish 2 [5] | Wood venner | 0.0200
Insert
Delete
Up
Down
View: Section: Modify type
Preview >>
OK
Cancel
Help


11. Mezzanine 2
Physical Propierties
11.1.1 Paving Stone
11.1.2 Alum

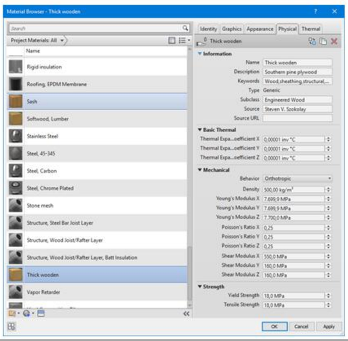
11.1.3 Polystyrene panel



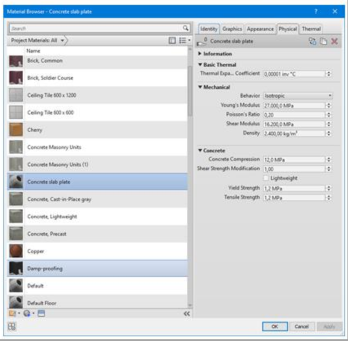
11.1.5 Filter layer



11.1.4 Thick wooden

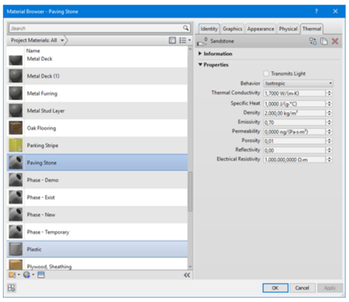


11.1.6 Concrete slab plate

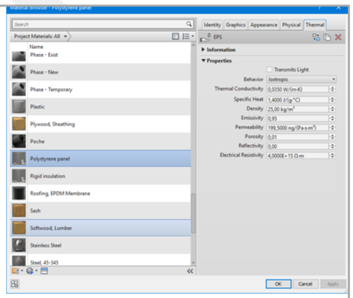


Thermal Propierties

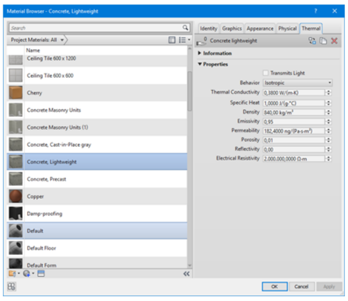
11.2.1 Paving Stone



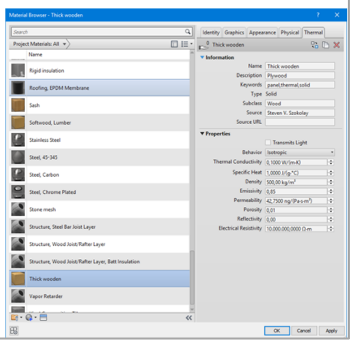
11.2.3 Polystyrene panel

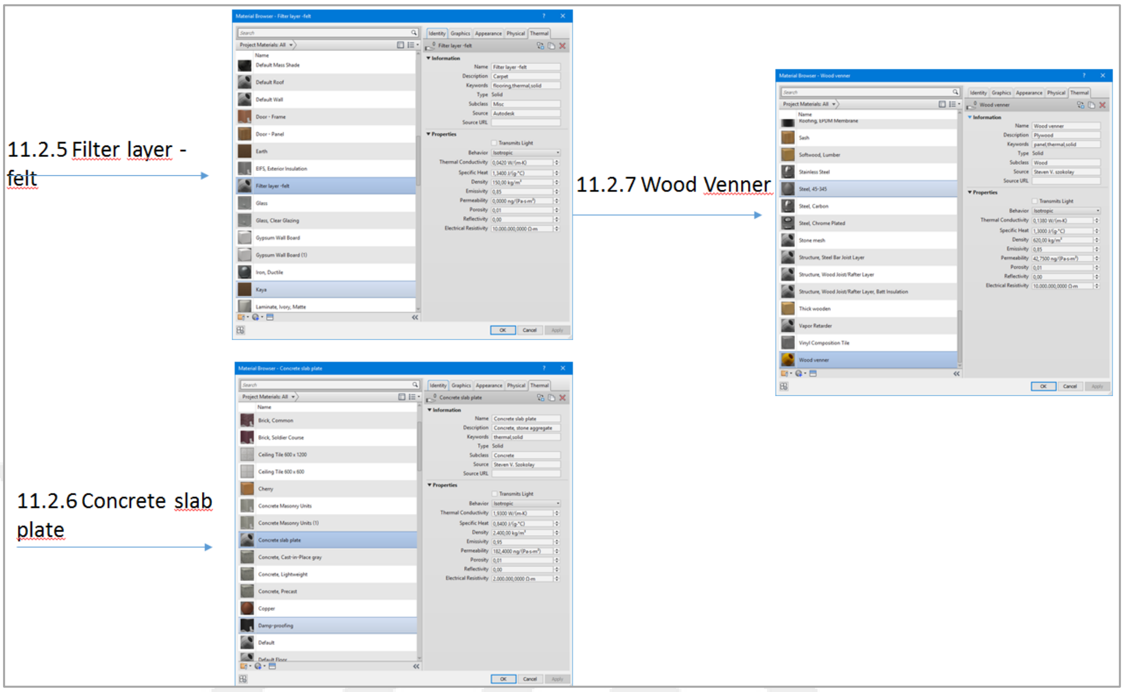


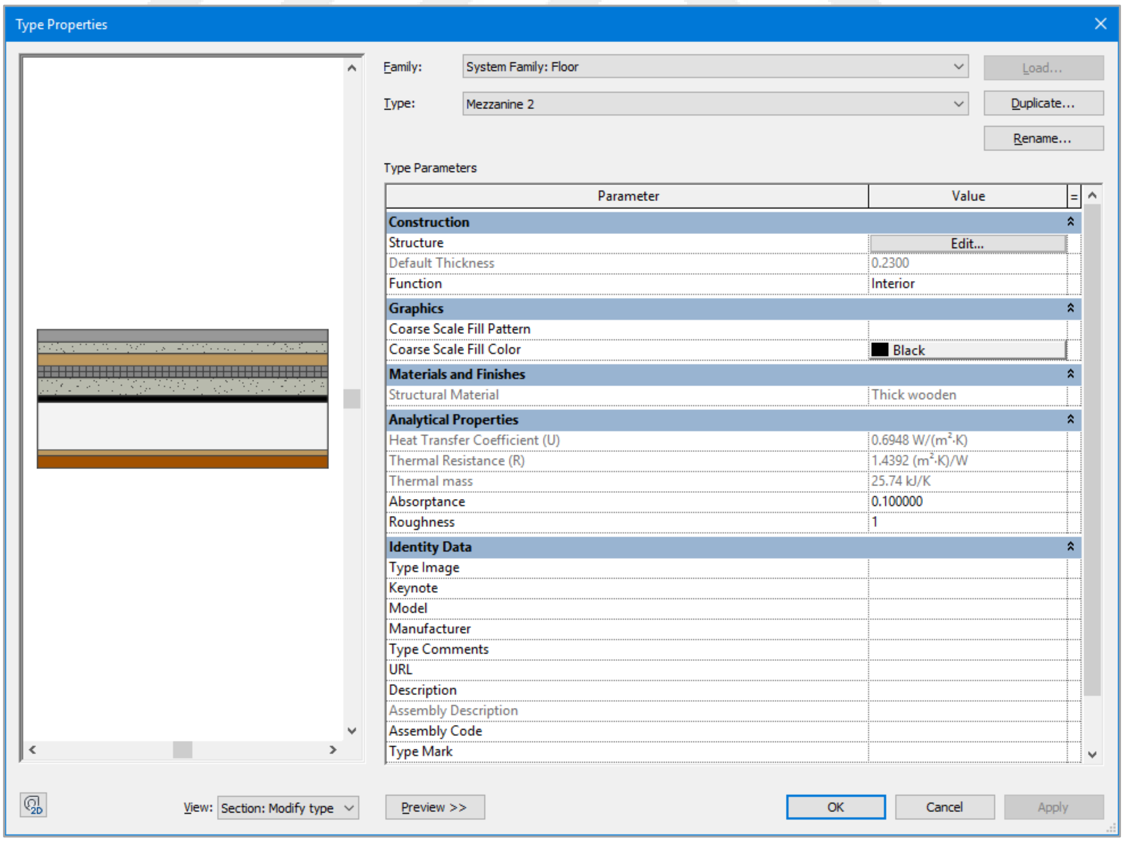
11.2.2 Alum

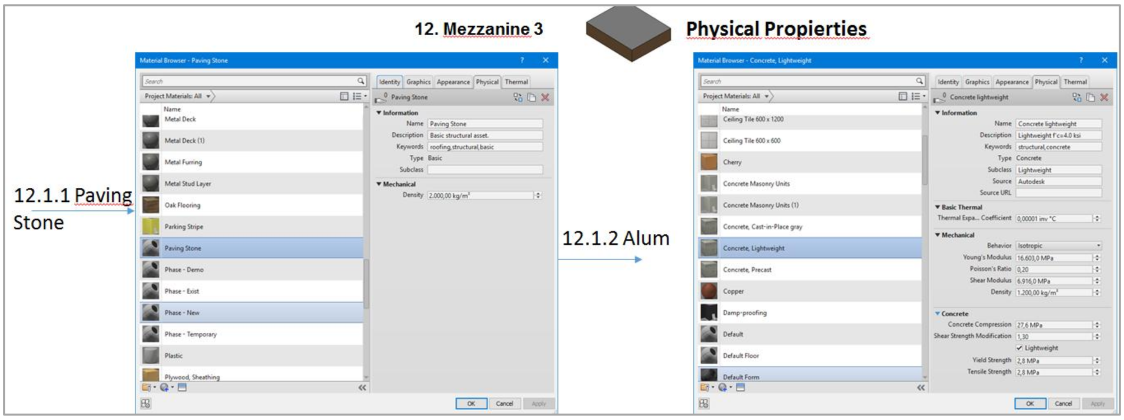


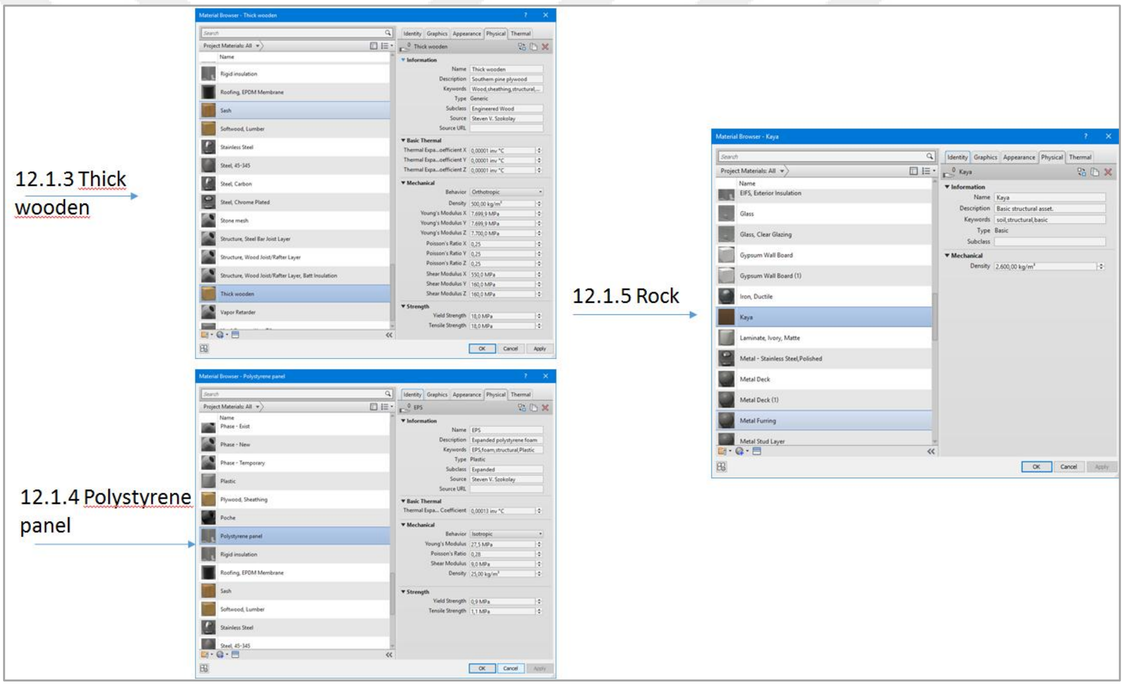
10.2.4 Thick wooden

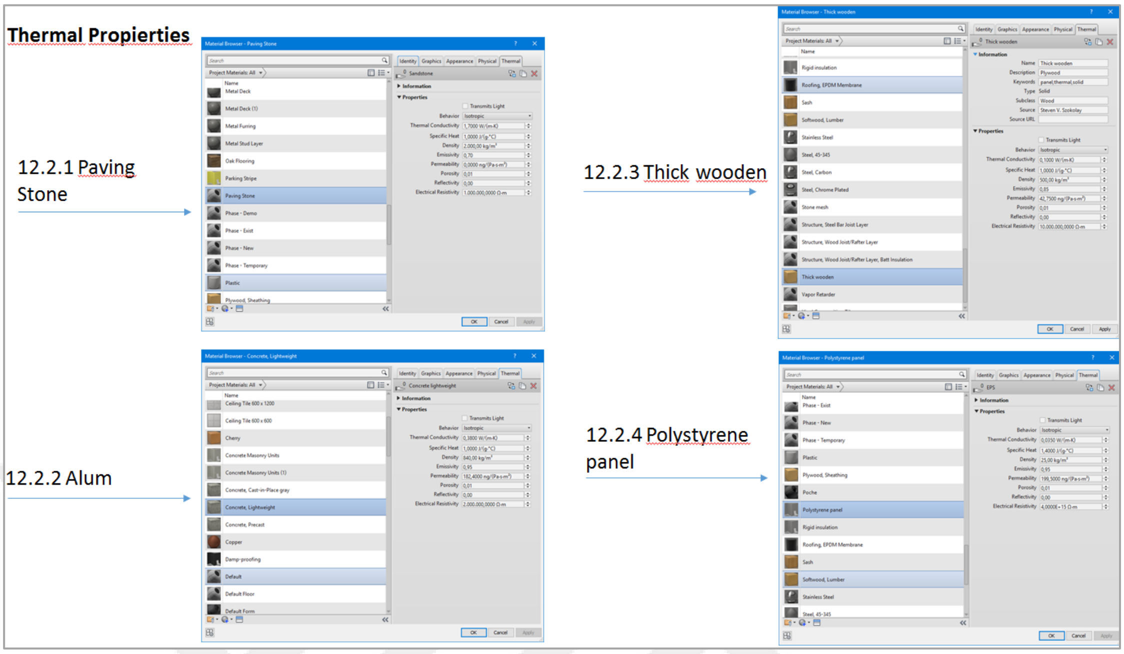


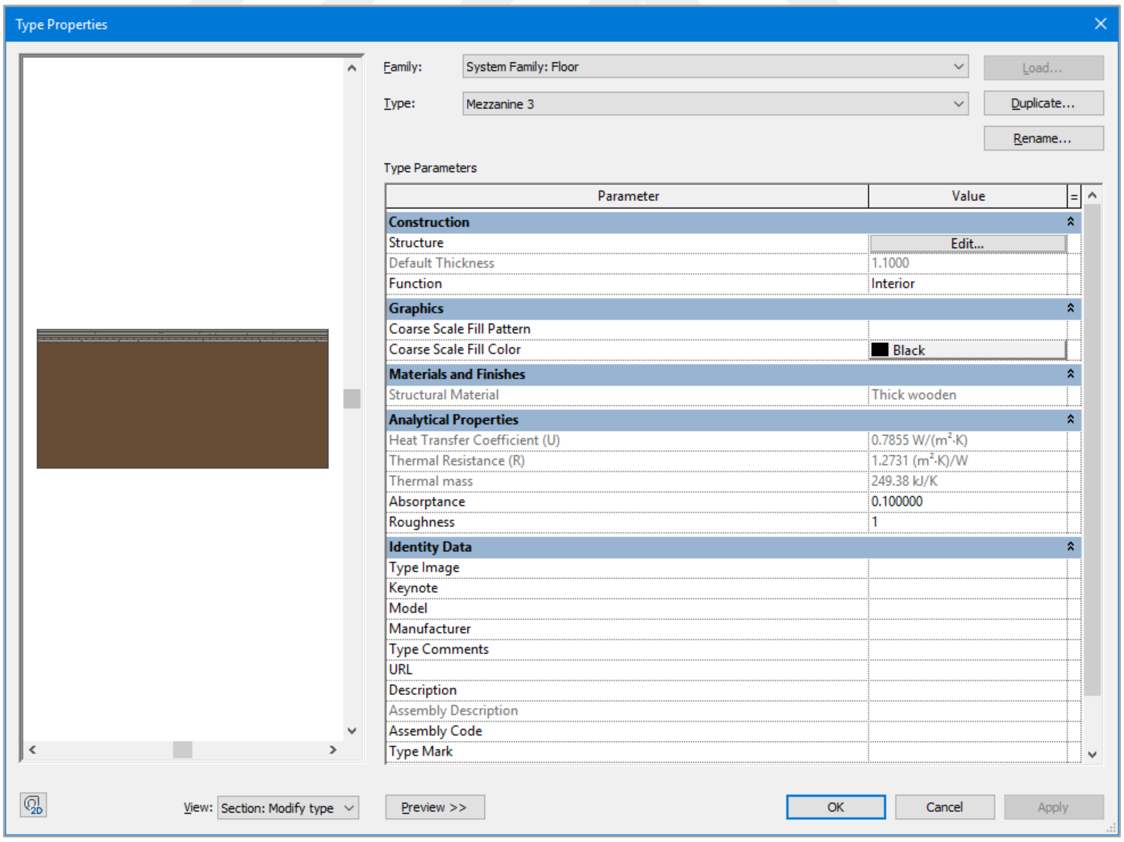

11.2.5 Filter layer - felt
11.2.7 Wood Venner
11.2.6 Concrete slab plate

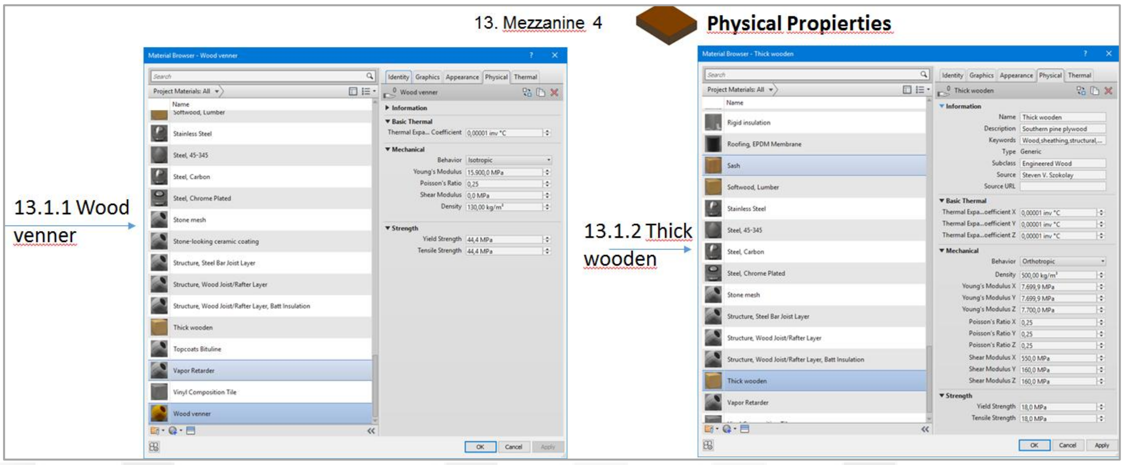

Type Properties
Family: System Family: Floor
Type: Mezzanine 2
Load...
Duplicate...
Rename...
Type Parameters
Parameter
Value
Construction
Structure
Edit...
Default Thickness
0.2300
Function
Interior
Graphics
Coarse Scale Fill Pattern
Coarse Scale Fill Color
Black
Materials and Finishes
Structural Material
Thick wooden
Analytical Properties
Heat Transfer Coefficient (U)
0.6948 W/(m²·K)
Thermal Resistance (R)
1.4392 (m²·K)/W
Thermal mass
25.74 kJ/K
Absorptance
0.100000
Roughness
1
Identity Data
Type Image
Keynote
Model
Manufacturer
Type Comments
URL
Description
Assembly Description
Assembly Code
Type Mark
View: Section: Modify type
Preview >>
OK
Cancel
Apply

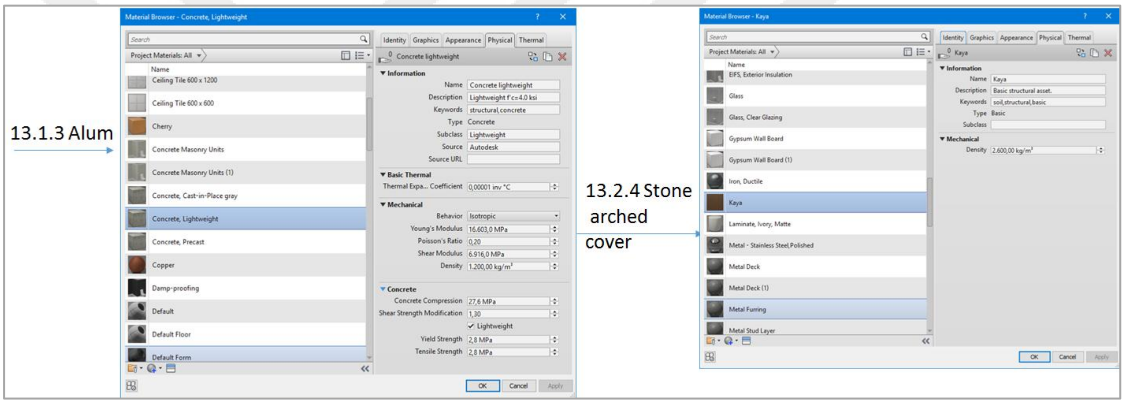

12. Mezzanine 3
Physical Propierties
12.1.1 Paving Stone
12.1.2 Alum


12.1.3 Thick wooden
12.1.4 Polystyrene panel
12.1.5 Rock


Thermal Propierties
12.2.1 Paving Stone
12.2.2 Alum
12.2.3 Thick wooden
12.2.4 Polystyrene panel

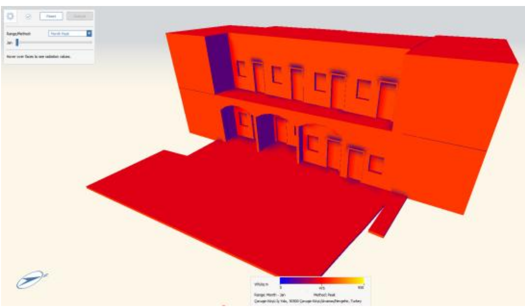
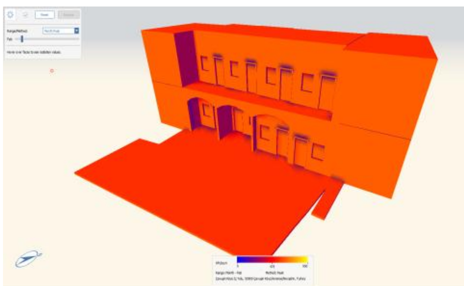

Type Properties
Family: System Family: Floor
Type: Mezzanine 3
Load...
Duplicate...
Rename...
Type Parameters
Parameter
Value
Construction
Structure
Edit...
Default Thickness
1.1000
Function
Interior
Graphics
Coarse Scale Fill Pattern
Coarse Scale Fill Color
Black
Materials and Finishes
Structural Material
Thick wooden
Analytical Properties
Heat Transfer Coefficient (U)
0.7855 W/(m²·K)
Thermal Resistance (R)
1.2731 (m²·K)/W
Thermal mass
249.38 kJ/K
Absorptance
0.100000
Roughness
1
Identity Data
Type Image
Keynote
Model
Manufacturer
Type Comments
URL
Description
Assembly Description
Assembly Code
Type Mark
View: Section: Modify type
Preview >>
OK
Cancel
Apply

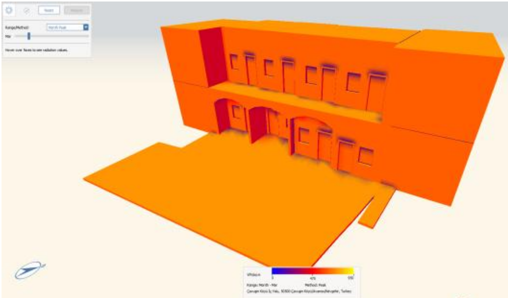
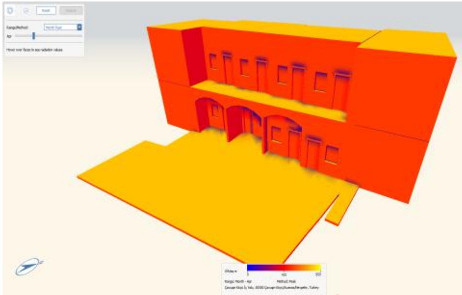
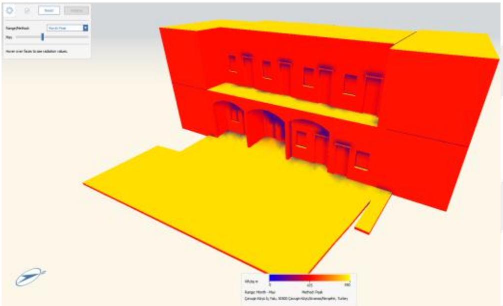
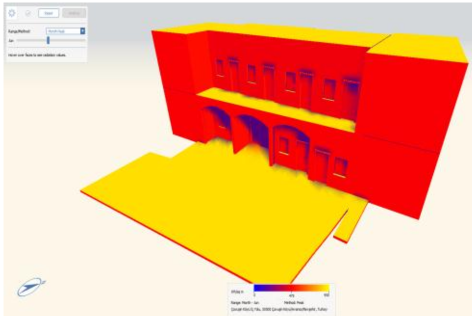
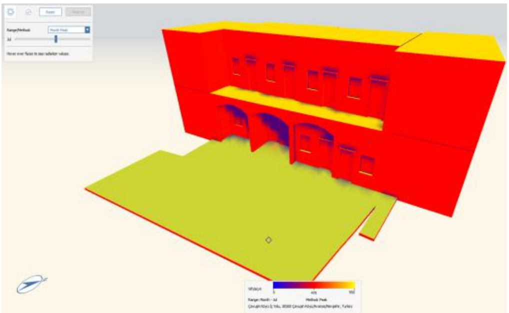
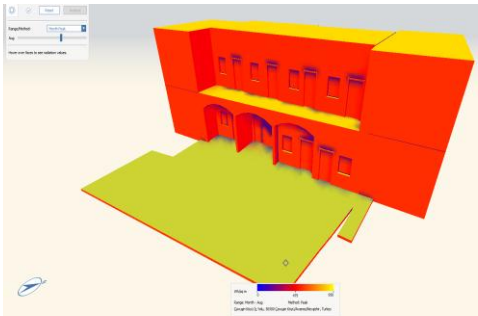




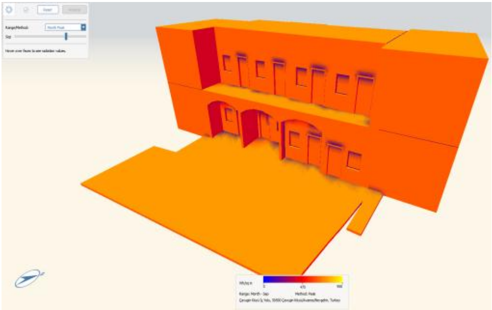
Appendix D

Image of graphical (Annual / monthly) solar analyses of Jacob's Cave Suites

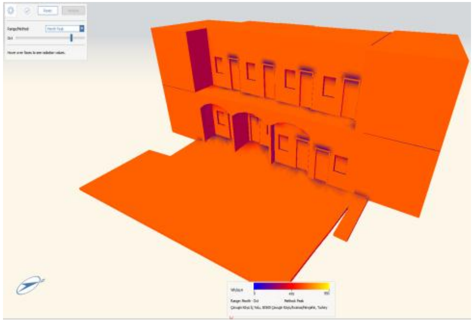
2- Solar analysis - January :	3- Solar analysis - February :
	

4- Solar analysis - March : 	5- Solar analysis - April : 
6- Solar analysis - May : 	7-Solar analysis - June : 
8-Solar analysis - July : 	9-Solar analysis - August : 

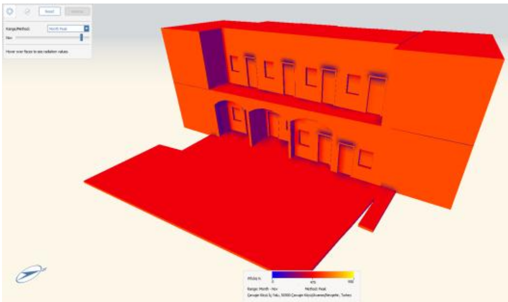
10-Solar analysis - September :



11-Solar analysis - October :



12-Solar analysis - November :



13-Solar analysis - December :

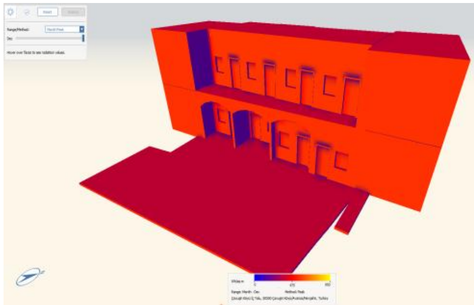
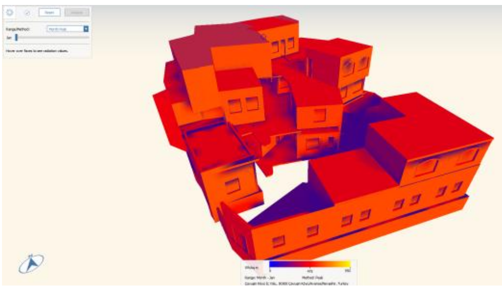
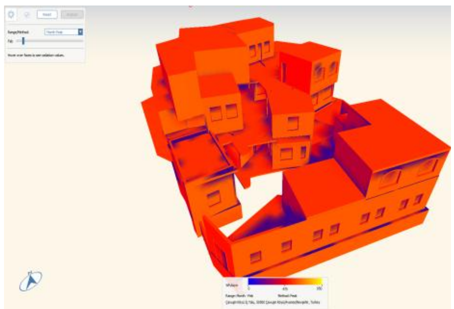


Image of graphical (Annual / monthly) solar analyses of Hidden Cave Hotel Suites

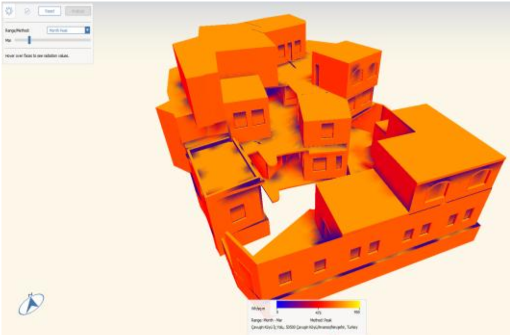
2- Solar analysis - January :



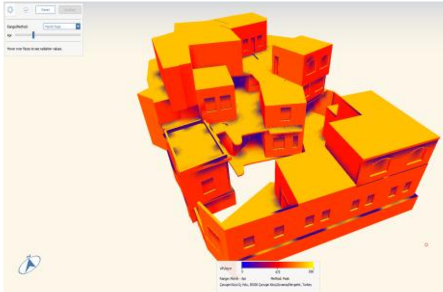
3- Solar analysis - February :



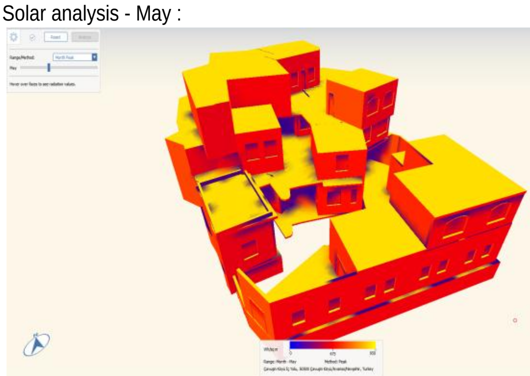
4- Solar analysis - March :



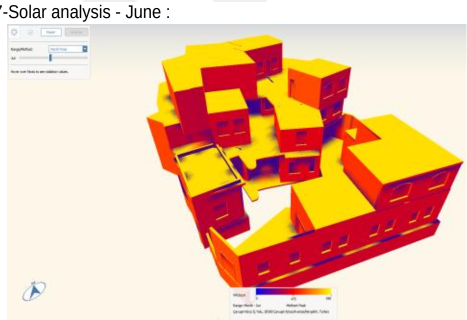
5- Solar analysis - April :



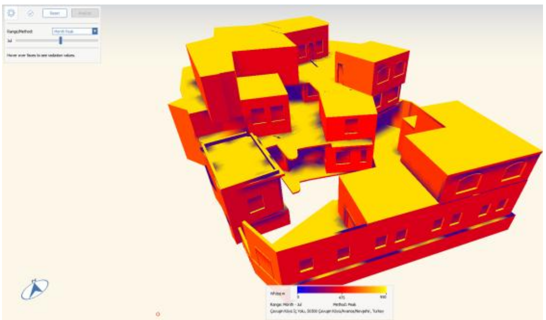
6- Solar analysis - May :



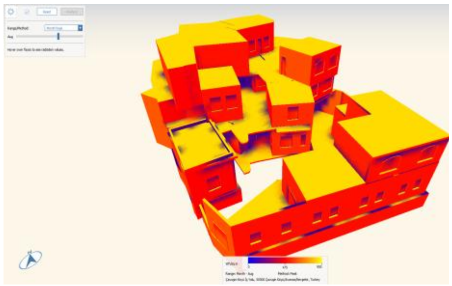
7-Solar analysis - June :



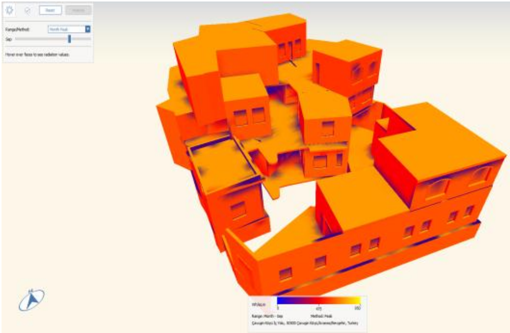
8-Solar analysis - July :



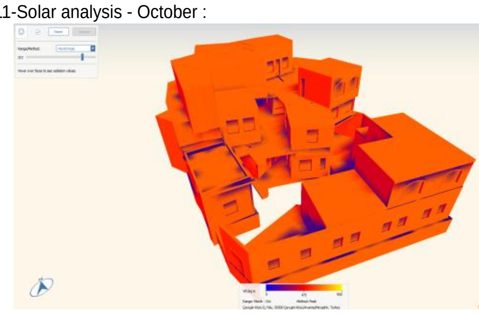
9-Solar analysis - August :



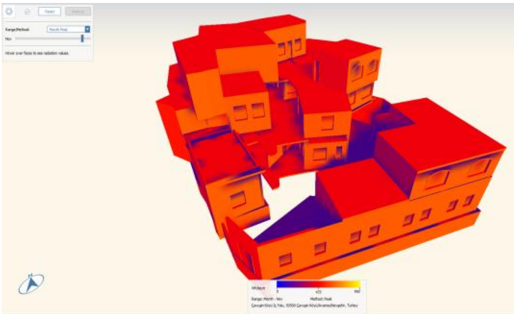
10-Solar analysis - September :



11-Solar analysis - October :



12-Solar analysis - November :



13-Solar analysis - December :

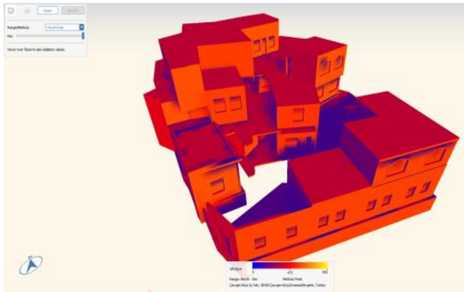
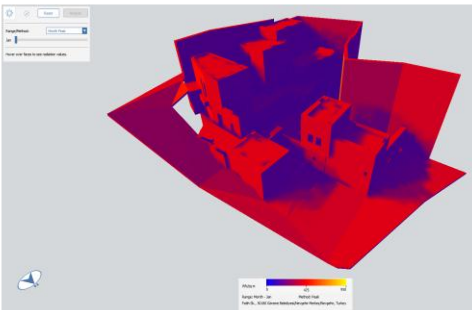
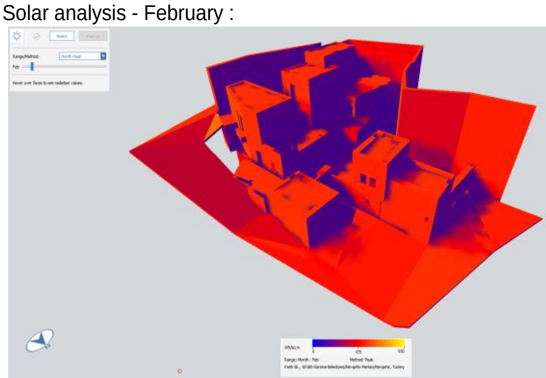


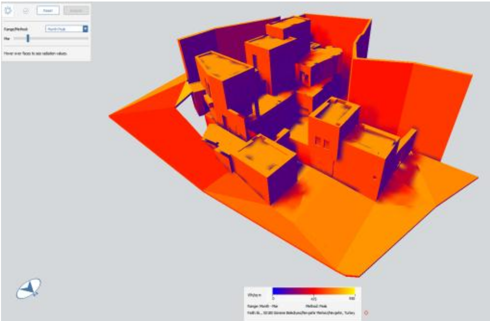
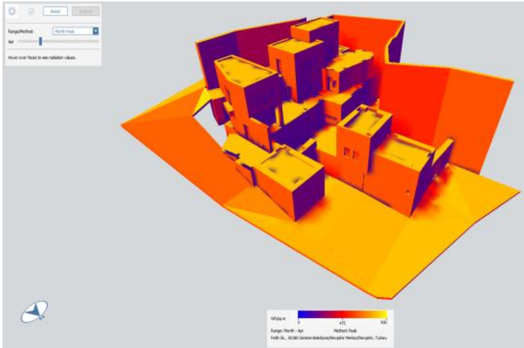
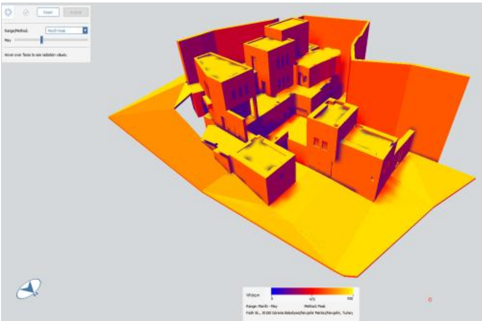
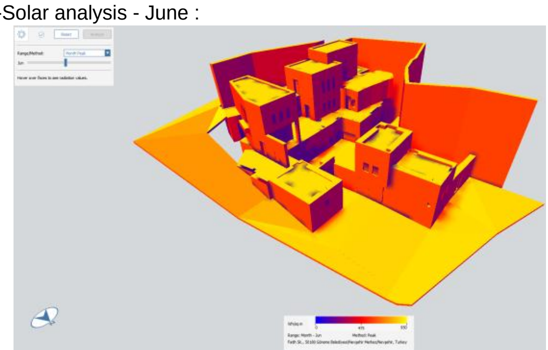
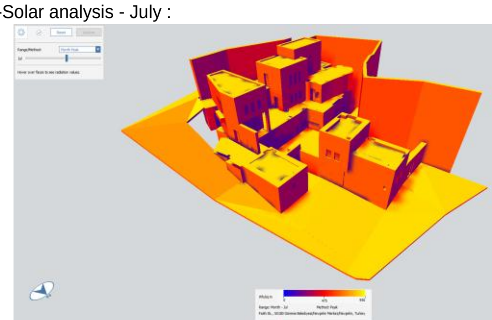
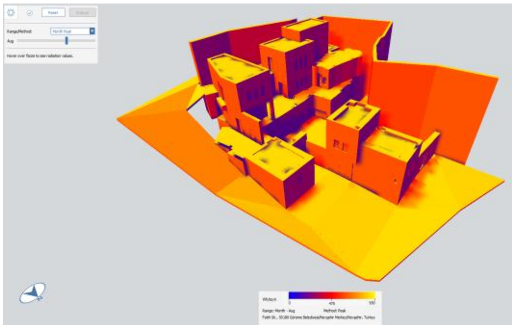
Image of graphical (Annual / monthly) solar analyses of Milstones Cave Suites

2- Solar analysis - January :

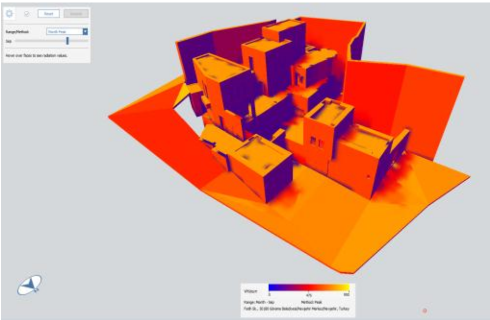


3- Solar analysis - February :

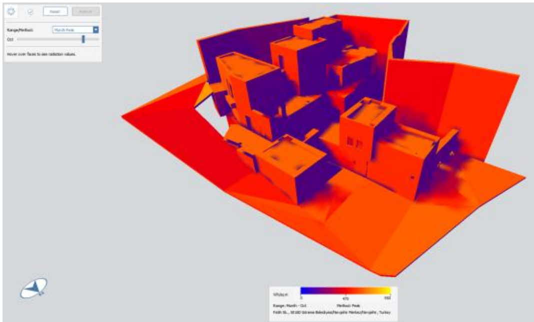


4- Solar analysis - March : 	5- Solar analysis - April : 
6- Solar analysis - May : 	7-Solar analysis - June : 
8-Solar analysis - July : 	9-Solar analysis - August : 

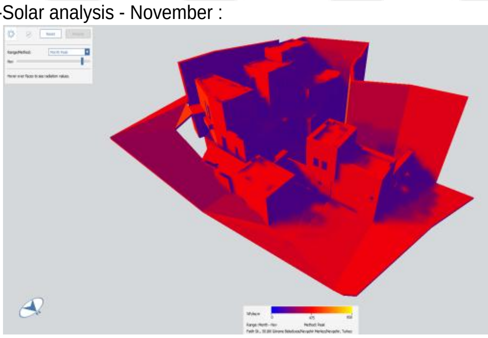
10-Solar analysis - September :



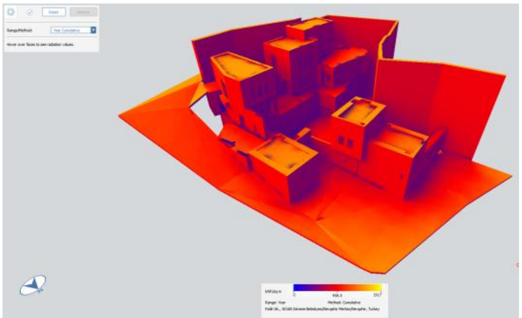
11-Solar analysis - October :



12-Solar analysis - November :

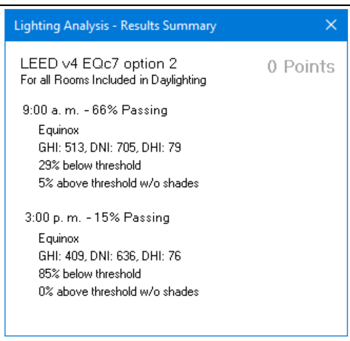


Millstone – Solar analysis
1- Year Cumulative result:

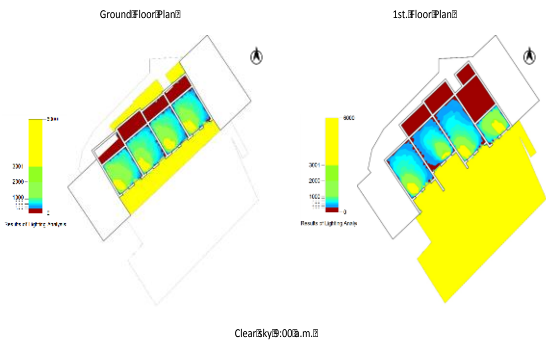


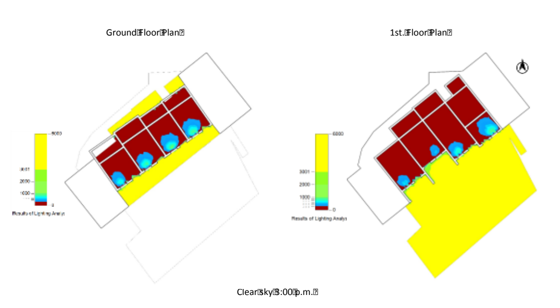
Appendix E

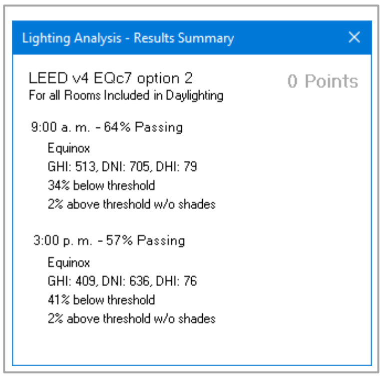
All of the configurations for Jacob's Cave Suites In order to verify the indoor daylight LEED V4 EQc7 compliance, REVIT program calculate



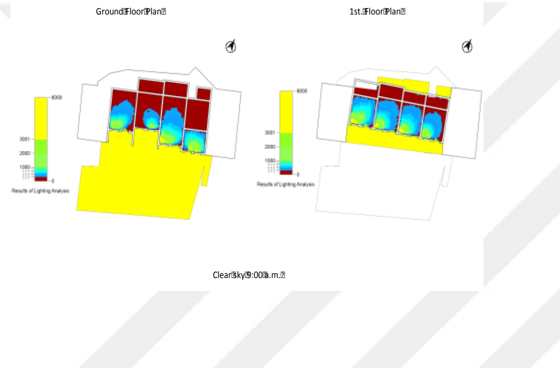
Lighting analysis – Daylight (All Rooms)

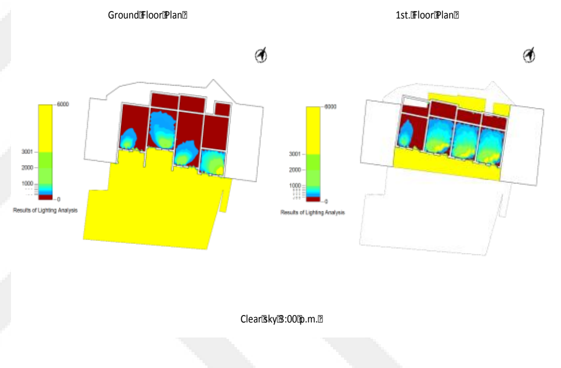


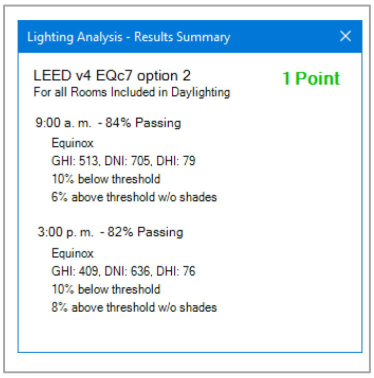


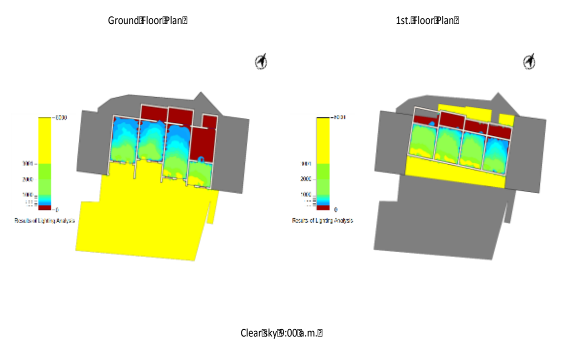


Lighting analysis – 45 East

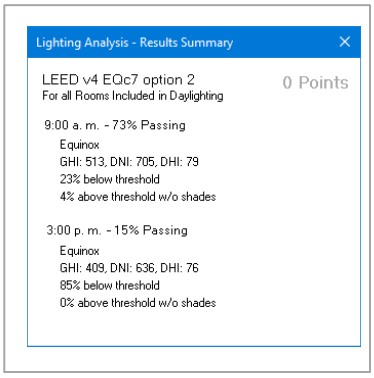




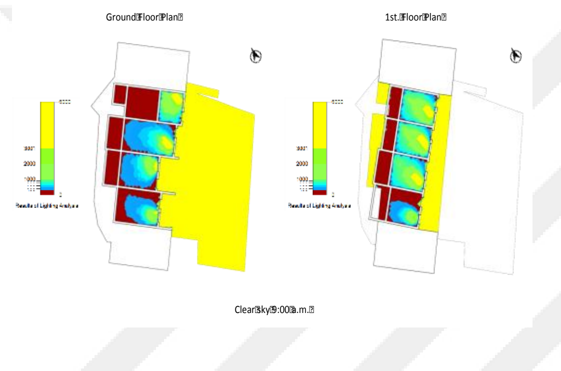


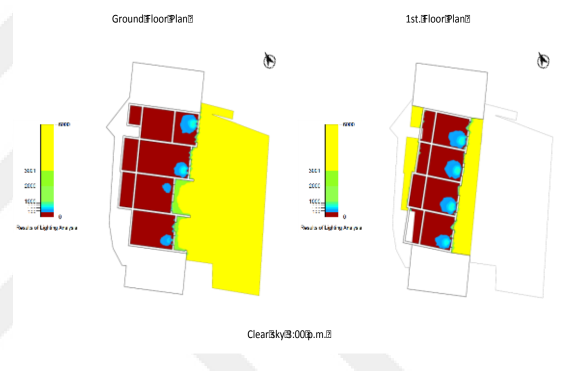


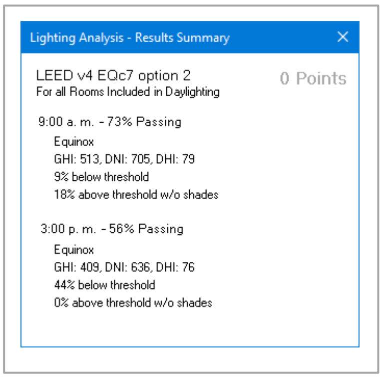
Lighting analysis – 45 East (Glass doors)



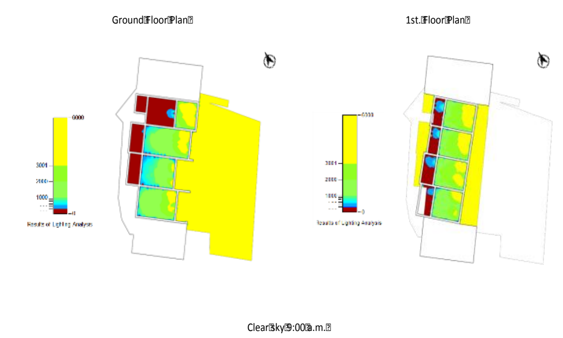
Lighting analysis – 45 West

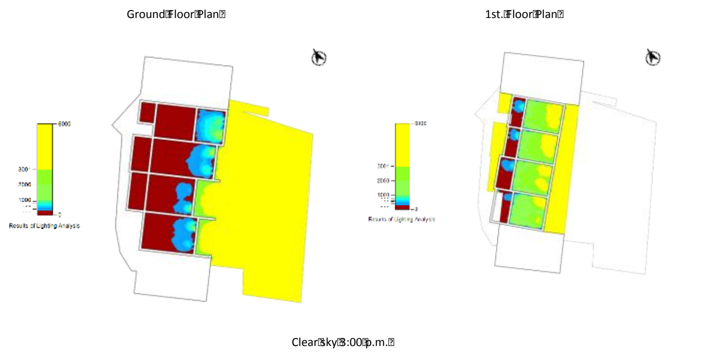






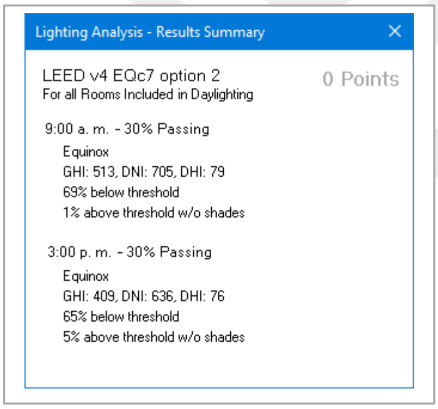
Lighting analysis – 45 West (Glass doors)





Appendix F

All of the configurations for Hidden Cave Hotel In order to verify the indoor daylight LEED V4 EQc7 compliance, REVIT program calculates



Lighting Analysis - Results Summary

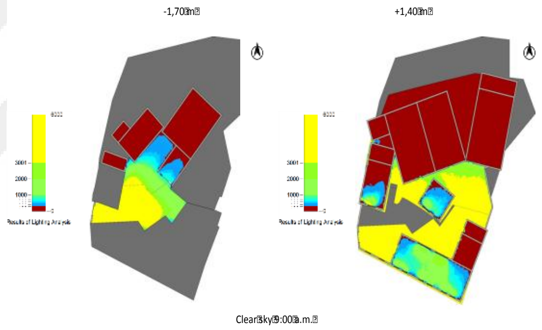
LEED v4 EQc7 option 2
For all Rooms Included in Daylighting

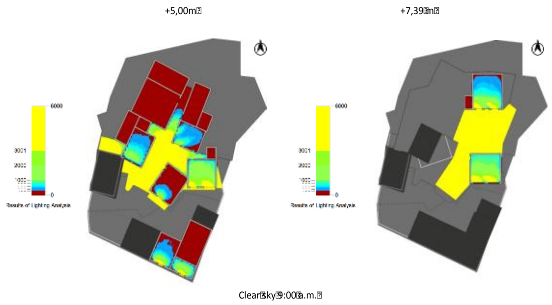
0 Points

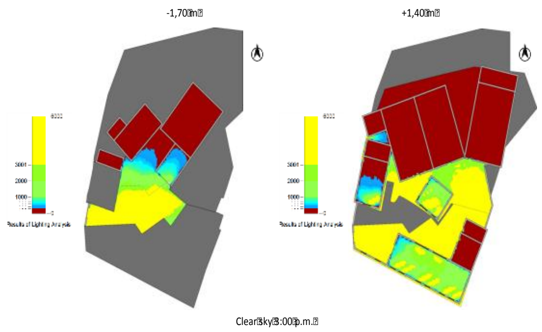
9:00 a. m. - 30% Passing
Equinox
GHI: 513, DNI: 705, DHI: 79
69% below threshold
1% above threshold w/o shades

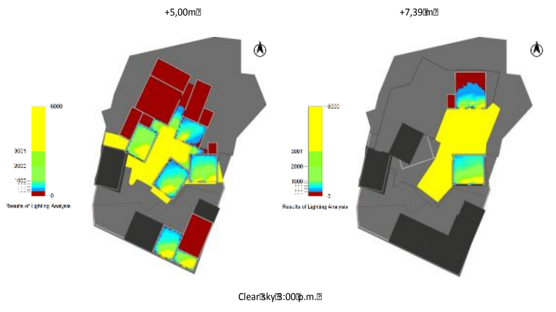
3:00 p. m. - 30% Passing
Equinox
GHI: 409, DNI: 636, DHI: 76
65% below threshold
5% above threshold w/o shades

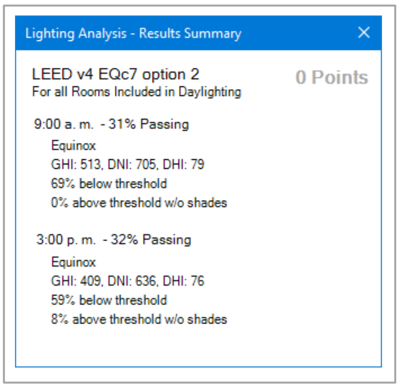
Lighting analysis – Daylight (All Rooms)



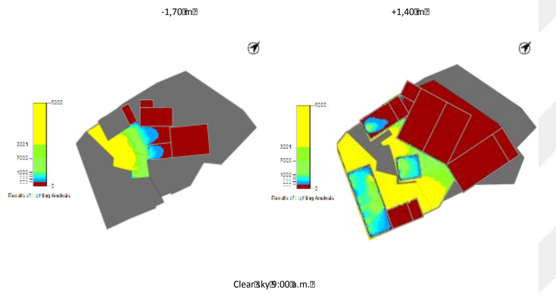


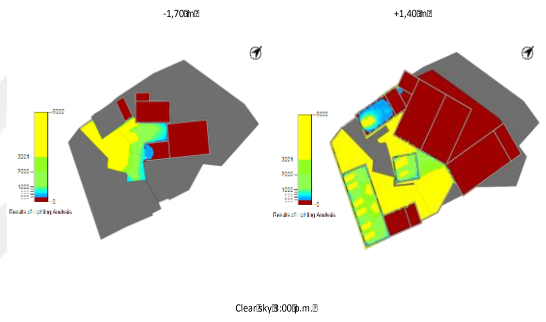


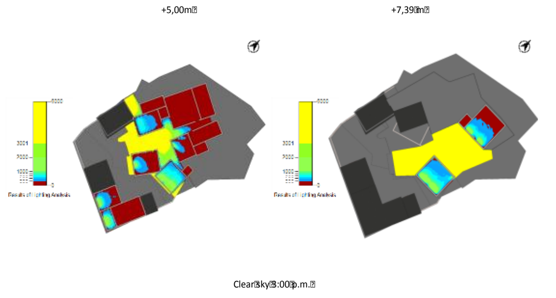


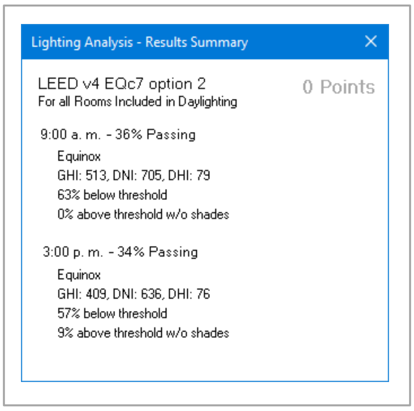


Lighting analysis – Daylight (No Bathrooms – 45 East)

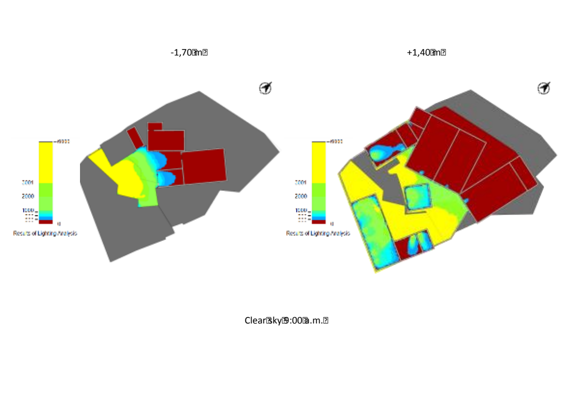


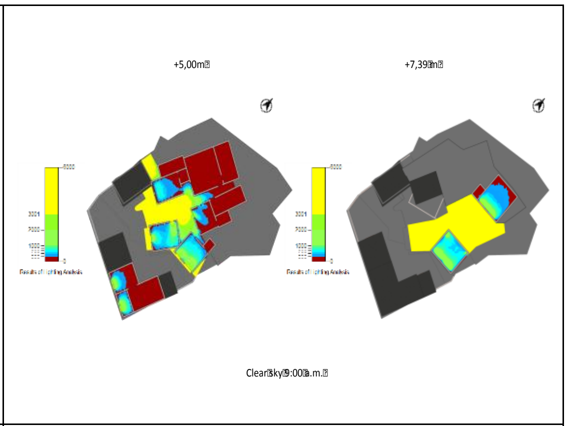


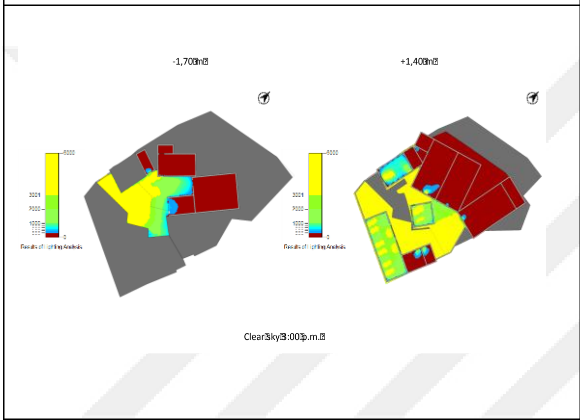


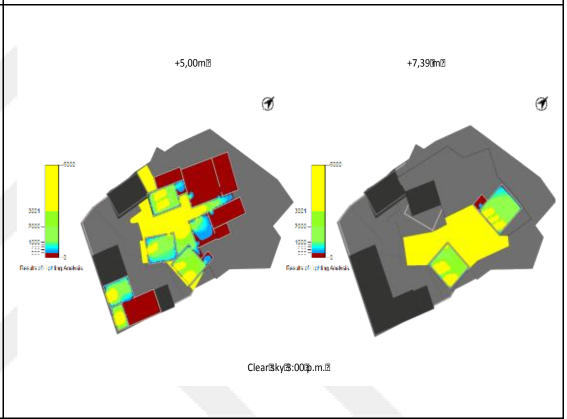


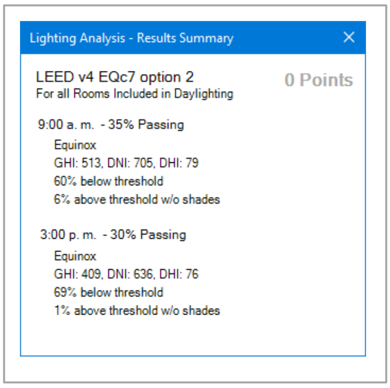
Lighting analysis – Daylight (No Bathrooms – 45 East-Glass doors)







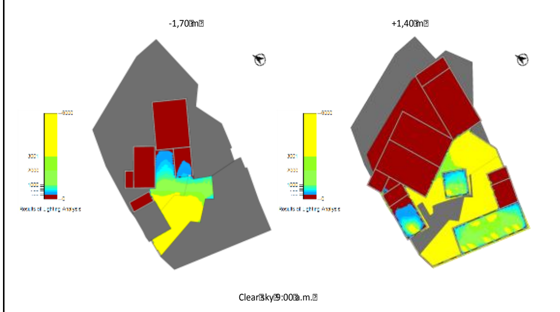



Lighting Analysis - Results Summary

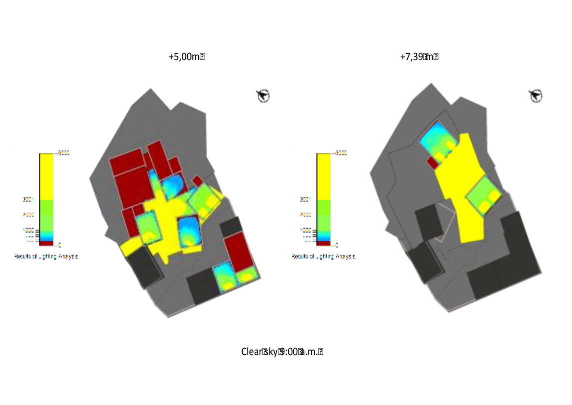
LEED v4 EQc7 option 2 — 0 Points
For all Rooms Included in Daylighting

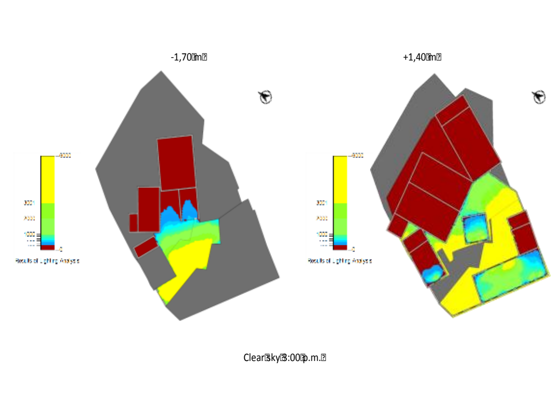
9:00 a. m. - 35% Passing
Equinox
GHI: 513, DNI: 705, DHI: 79
60% below threshold
6% above threshold w/o shades

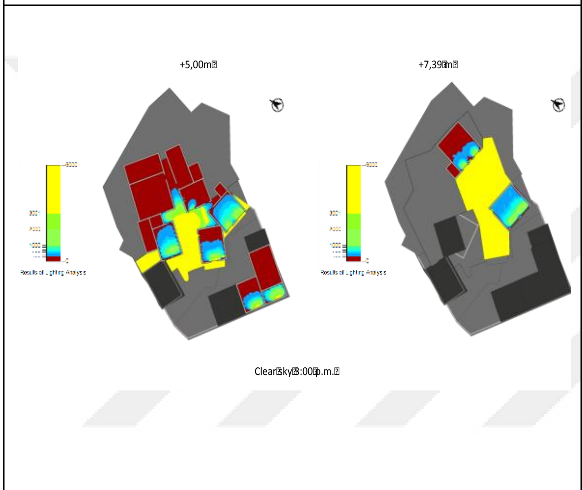
3:00 p. m. - 30% Passing
Equinox
GHI: 409, DNI: 636, DHI: 76
69% below threshold
1% above threshold w/o shades

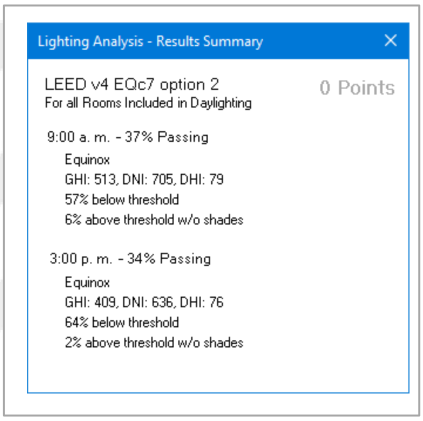


Lighting analysis – Daylight (No Bathrooms – 45 West)

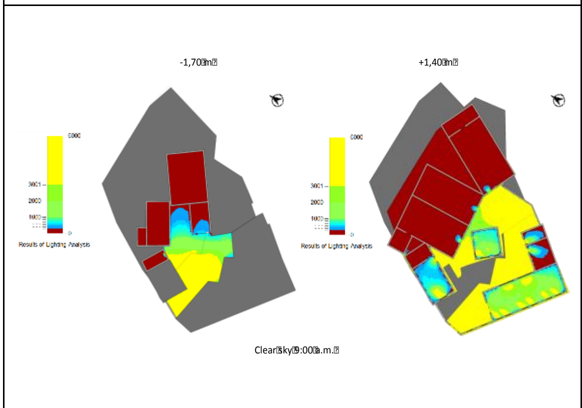


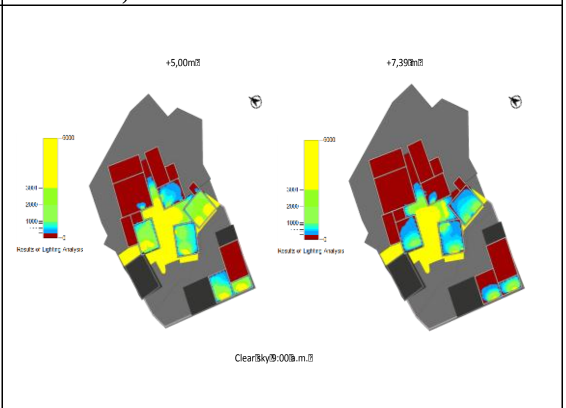


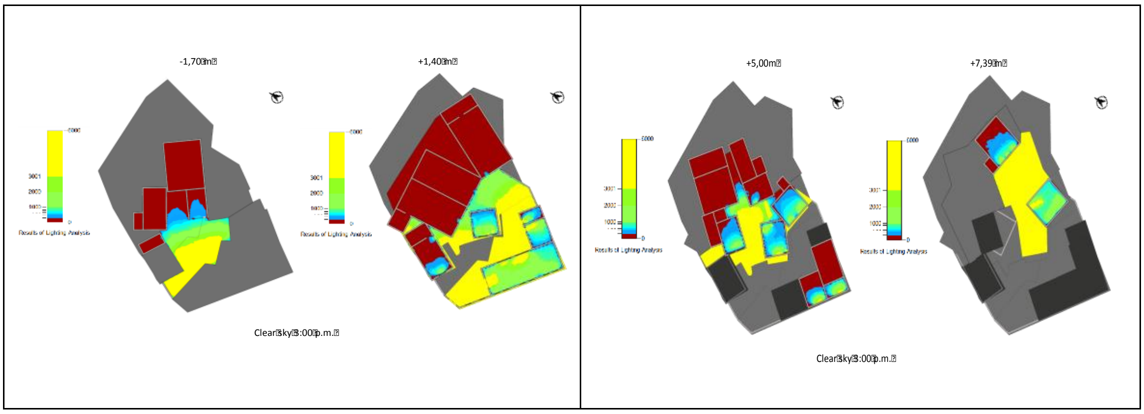




Lighting analysis – Daylight (No Bathrooms – 45 West – Glass doors)

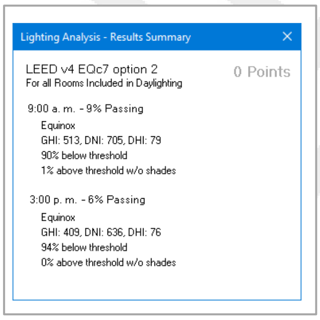






Appendix G

All of the configurations for Milstones Cave Suites In order to verify the indoor daylight LEED V4 EQc7 compliance, REVIT program calculate.

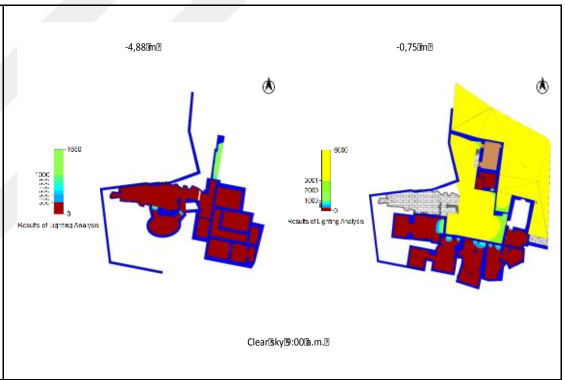

Lighting Analysis - Results Summary

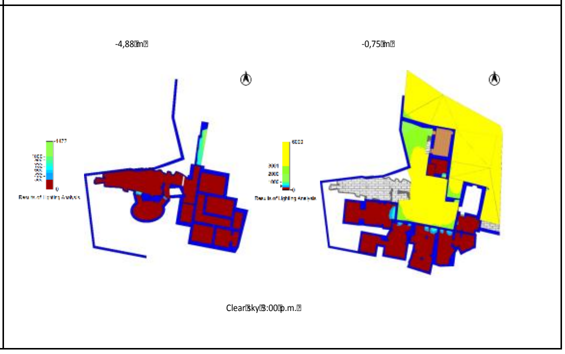
LEED v4 EQc7 option 2 — 0 Points
For all Rooms Included in Daylighting

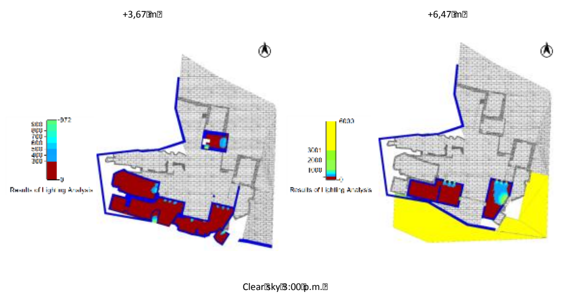
9:00 a. m. - 9% Passing
Equinox
GHI: 513, DNI: 705, DHI: 79
90% below threshold
1% above threshold w/o shades

3:00 p. m. - 6% Passing
Equinox
GHI: 409, DNI: 636, DHI: 76
94% below threshold
0% above threshold w/o shades

Lighting analysis – Daylight (All rooms)







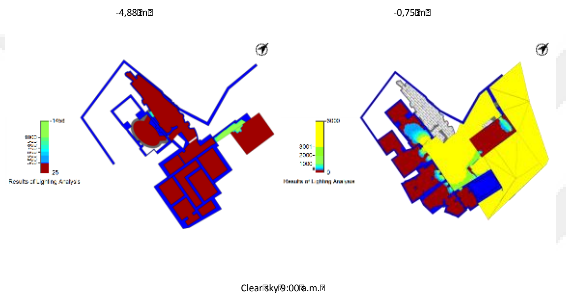
Lighting Analysis - Results Summary

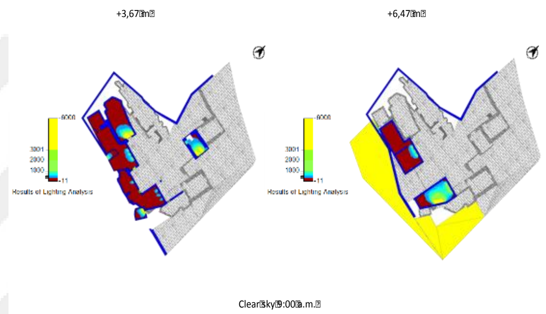
LEED v4 EQc7 option 2 — 0 Points
For all Rooms Included in Daylighting

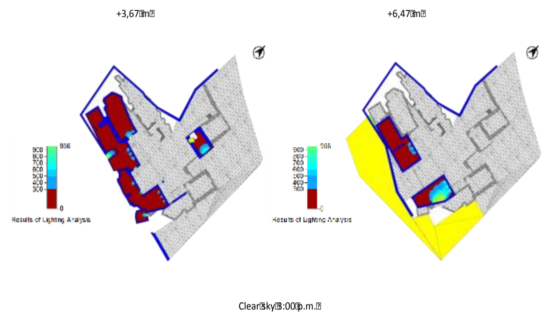
9:00 a. m. - 20% Passing
Equinox
GHI: 513, DNI: 705, DHI: 79
78% below threshold
2% above threshold w/o shades

3:00 p. m. - 10% Passing
Equinox
GHI: 409, DNI: 636, DHI: 76
90% below threshold
0% above threshold w/o shades

Lighting analysis – Daylight (45 East)







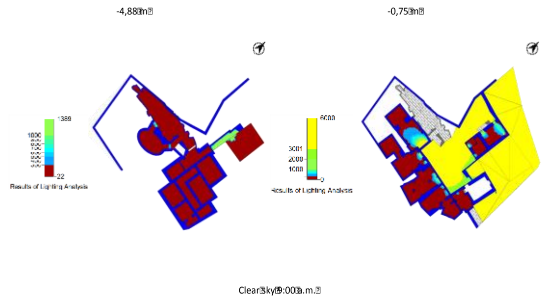
Lighting Analysis - Results Summary

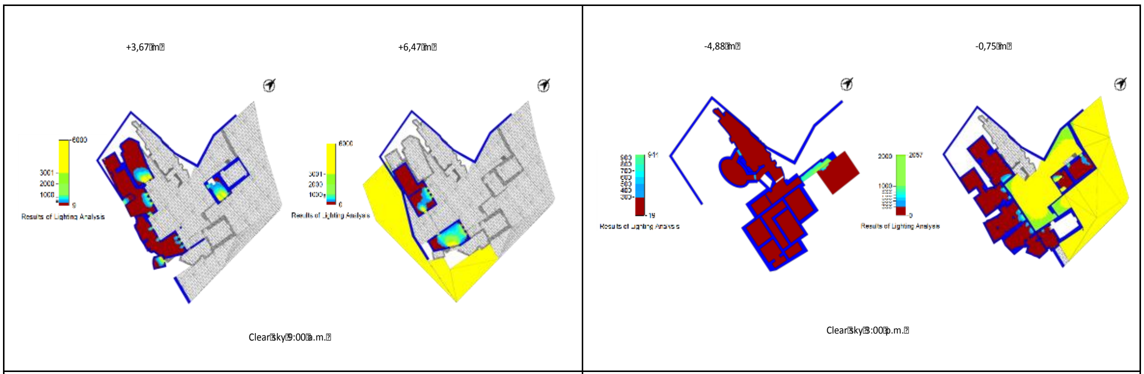
LEED v4 EQc7 option 2 — 0 Points
For all Rooms Included in Daylighting

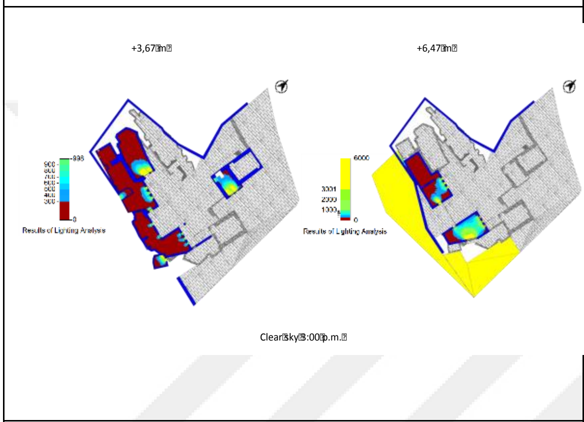
9:00 a. m. - 18% Passing
Equinox
GHI: 513, DNI: 705, DHI: 79
80% below threshold
2% above threshold w/o shades

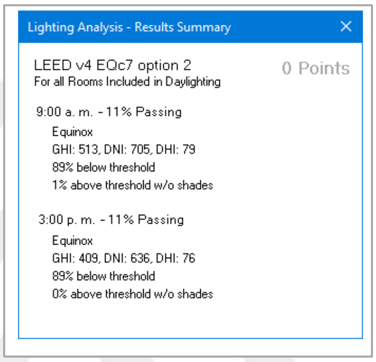
3:00 p. m. - 9% Passing
Equinox
GHI: 409, DNI: 636, DHI: 76
91% below threshold
0% above threshold w/o shades

Lighting analysis -Daylight (45 East No Bathrooms Glass doors)








Lighting Analysis - Results Summary

LEED v4 EQc7 option 2 — 0 Points

For all Rooms Included in Daylighting

9:00 a. m. - 11% Passing

Equinox

GHI: 513, DNI: 705, DHI: 79

89% below threshold

1% above threshold w/o shades

3:00 p. m. - 11% Passing

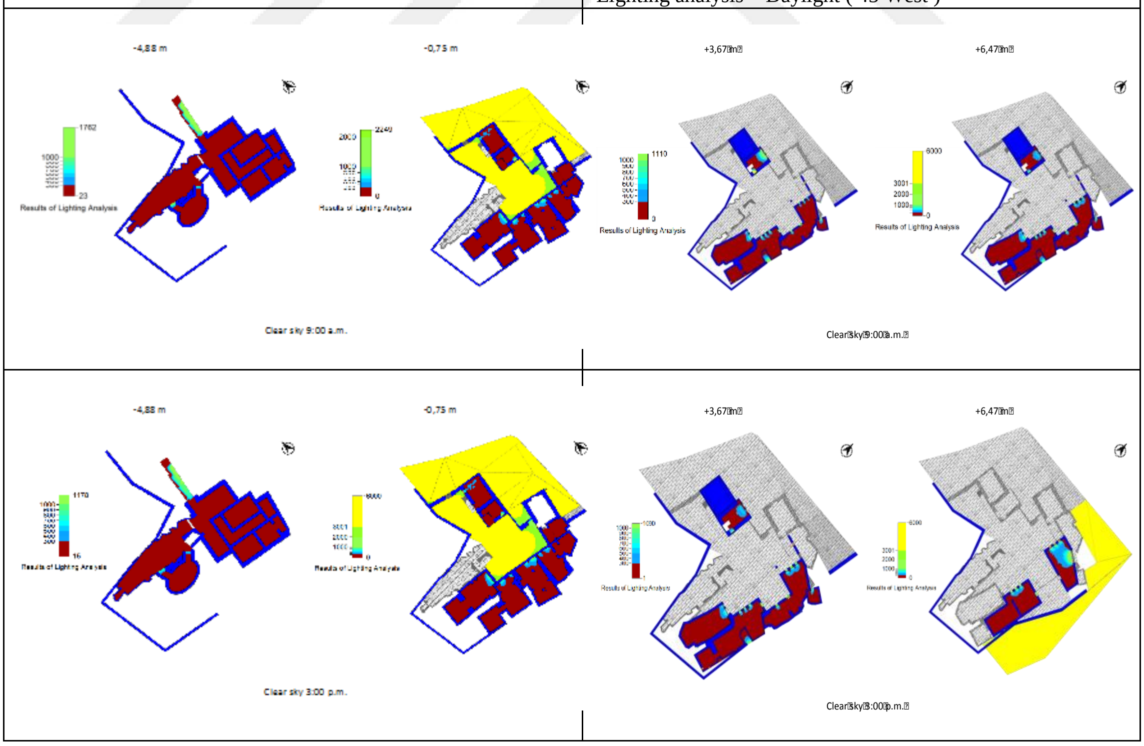
Equinox

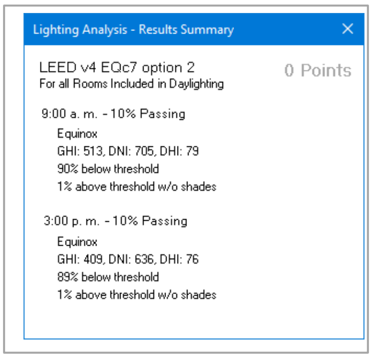
GHI: 409, DNI: 636, DHI: 76

89% below threshold

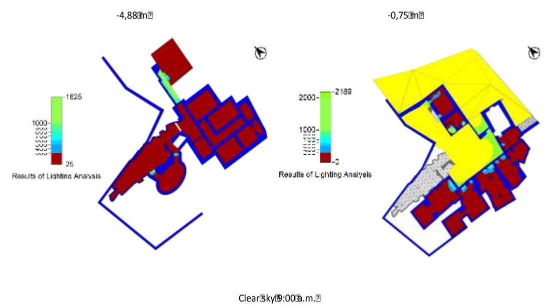
0% above threshold w/o shades

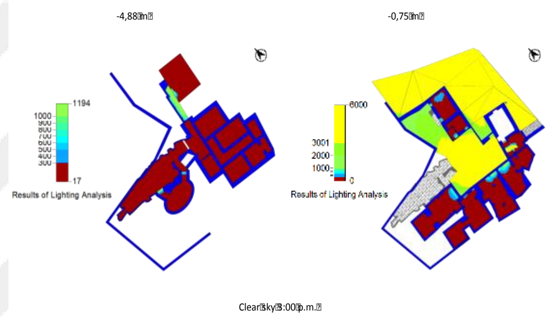
Lighting analysis – Daylight (45 West)





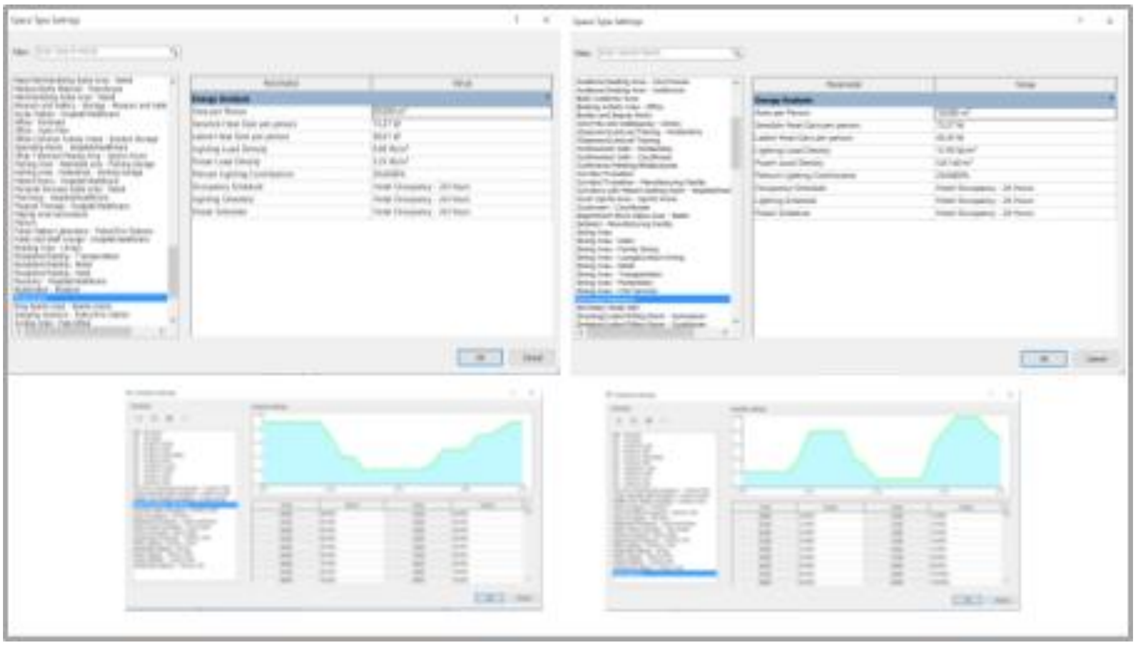
Lighting analysis – Daylight (45 West - Bathrooms Glass doors)

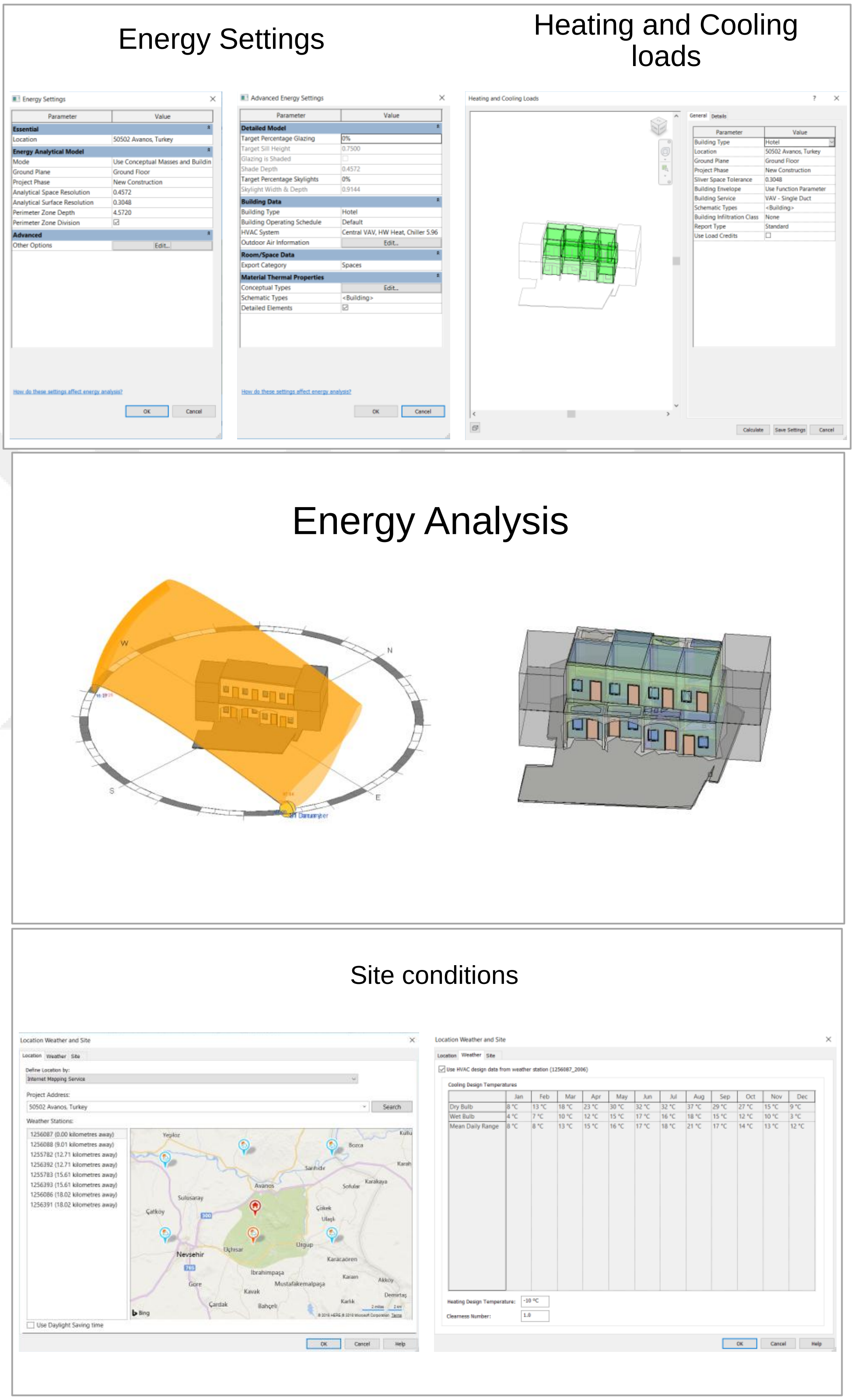




Appendix H

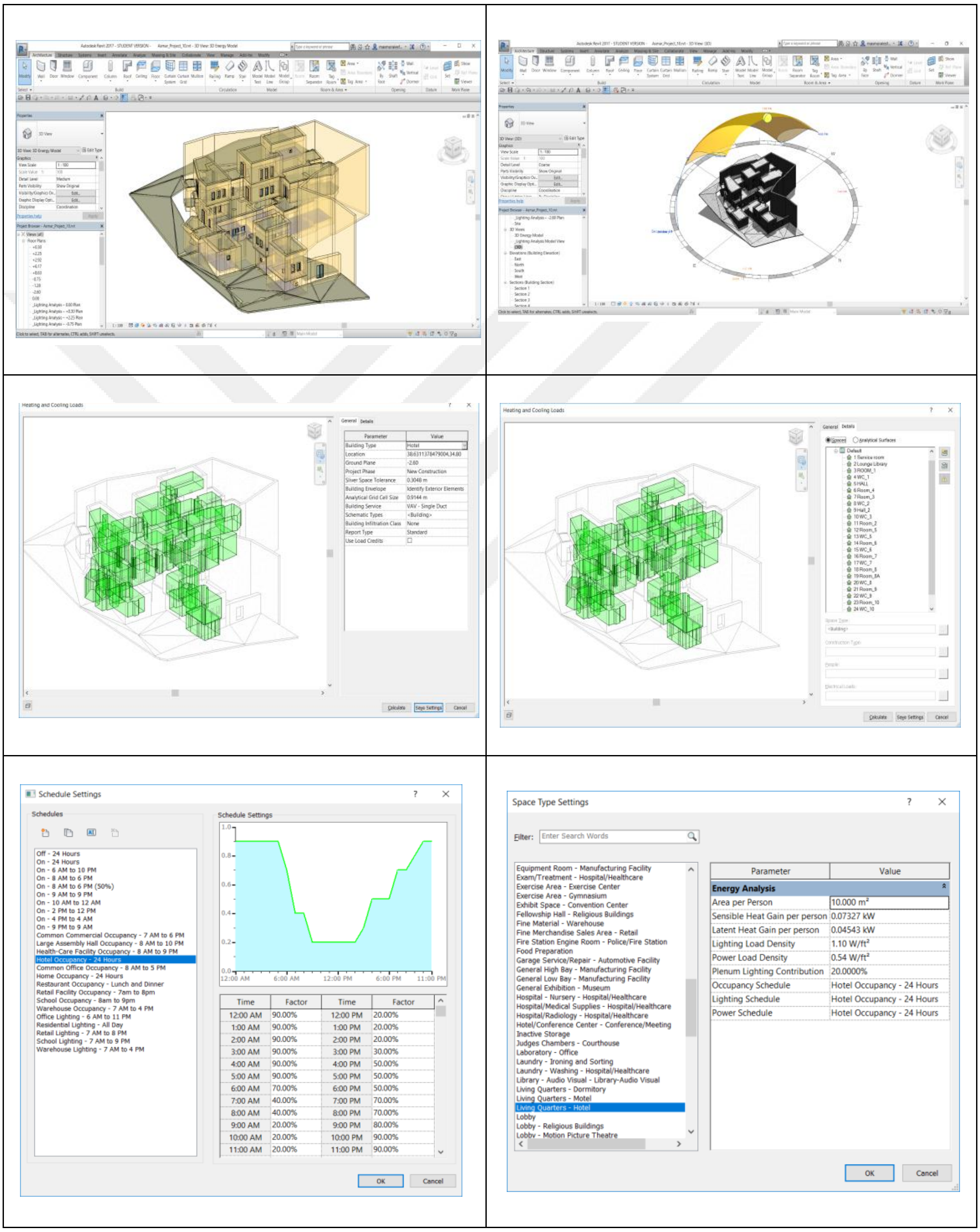
The energy analysis of Jacob's Cave Suites by three specifically simulation




Energy Settings
Heating and Cooling loads
Energy Analysis
Site conditions

Appendix I

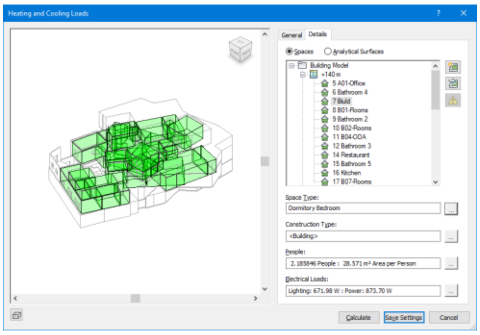
The energy analysis of Millestone cave suites by three specifically simulation



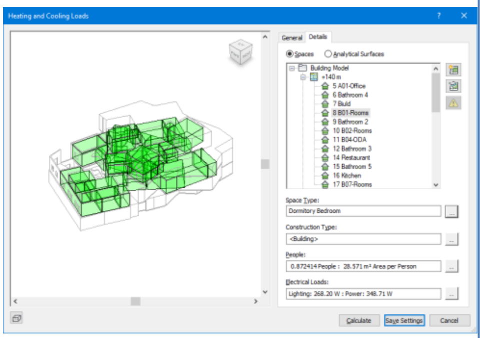
Appendix J

The energy analysis of Hidden Cave Hotel by three specifically simulation

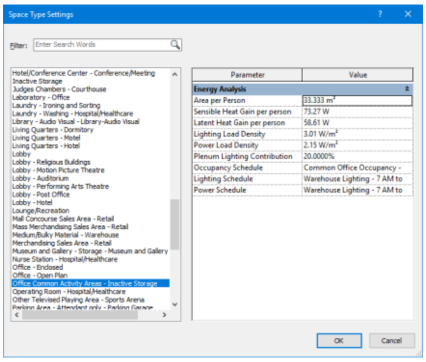
A01-Offic



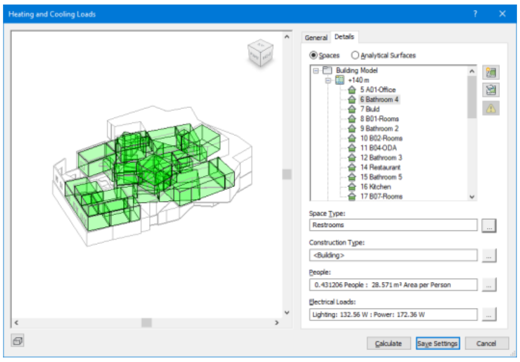
B01 rooms



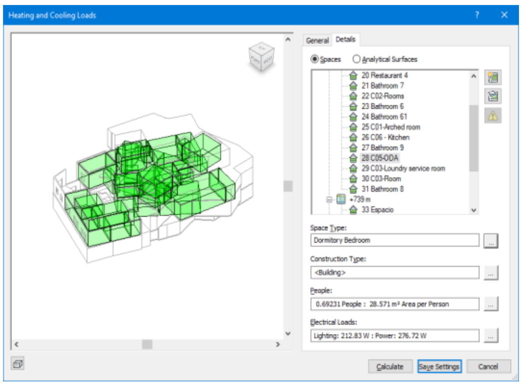
A01-Offic



Bathdroom 1



C05-ODA



C03 - Laundry service room