

ARCHITECTURE OF AFTERLIFE: FUTURE CEMETERY IN METROPOLIS

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Key Words: Conventional Cemetery, Contemporary Cemetery, Future Cemetery,
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Architecture of Afterlife: Future Cemetery in Metropolis

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We certify that we have read this Doctorate Project and that, in our opinion, it is satisfactory in scope and quality in partial fulfillment for the degree of Doctor of Architecture in the School of Architecture, University of Hawai'i at Mānoa.

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Acknowledgments

I dedicate this thesis to everyone in my life.

I would like to express my deepest appreciation to my committee chair, Professor Joyce Noe, for her support, guidance and insight throughout this doctoral project. Many thanks to my wonderful committee members William Chapman and Brian Takahashi for their precious and valuable guidance and support. Salute to my dear professor Spencer Leineweber who inspires me in spirit and work ethic. Thanks to all the professors for your teaching and encouragement imparted on me throughout my years of study. After all these years of study, finally, I understand why we need to study and how important education is.

Overall, this dissertation is an emotional research product. As an idealist, I choose this topic as a lesson for myself to understand life through death. The more I delve into the notion of death, the better I appreciate life itself, and knowing every individual human being is a blessing; everyday is a present is my best learning outcome.

“Each day is a little life: every waking and rising a little birth, every fresh morning a little youth, every going to rest and sleep a little death.”

--- Arthur Schopenhauer

Abstract

Do you believe soul never dies?
Do you believe in afterlife?
Think but do not answer.

How do you remember a loved one who passed away?
How would you like to remember a loved one who has passed away?
Think but do not answer.

Life and Death presents an eternal topic for human beings to study. Cemeteries, human being's last stop and final dwellings, is the primary type of funerary architecture.

Contemporary Cemetery is facing a severe challenge, namely the shortage of burial space, especially in Metropolis such as London, Tokyo, Hong Kong, and etc. This severe dearth of permanent burial grounds, coupled with the high cost of rental ash holding agencies has struck a near fatal blow to the contemporary cemetery development. In my opinion, the options for future cemeteries are either change, shrink or disappear.

This doctor dissertation will mainly discuss the major problems of the conventional and contemporary cemetery and use the latest relevance case studies to explore and propose design guidelines for future cemetery design. The design research chapter will show an example of how to apply these guidelines into the architecture project in order to make the future cemetery carry on the culture and spirit aspect along with innovative technologies.

Key Words: Conventional Cemetery, Conventional Worship, Contemporary Cemetery, Urban Cemetery, High-technology Innovation, Future Cemetery

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1. Introduction

1.1 Research Purpose and Meaning

Find innovative design solution for the future cemetery

“Though you may have never attended a funeral, two of the world's humans die every second. Eight in the time it took you to read that sentence. Now we're at fourteen. If this is too abstract, consider this number: 2.5 million. The 2.5 million people who die in the United States every year.” (Doughty 2014)

Architecture is the first and last stop for human lives. The first stop is the hospital where the newborn is celebrated and welcomed to the world. The last stop is the cemetery where the departed rests in peace. In the history of civilization, death is inevitable. To cope and soften the immense pain inflicted by the loss of our beloved ones, a plethora of various theories and scenarios pertaining to afterlife have been concocted, culturally, spiritually, geographically and what have you culture and religion are always the two ingredients detected in these posthumous spirits and beliefs.

As compared to the past splendid cemetery work such as Pyramid, Taj Mahal, Terra Cotta warriors and etc. contemporary cemetery design has often been found devoid of characteristics and spirits. Everything has its own period of time, same as architecture. Contemporary architecture should not be built as a replica of the ancient architecture, but to design innovatively which correspond to its own period of time. The purpose of this research is to study the most current case study and discover the parameters for innovative design suitable to the contemporary and future supply and demand.

1.2 Research Scope

Study the most current work to predict the future trend

The research of this dissertation will focus on the most current urban cemetery design and explore the technological innovations that could be implemented into the futuristic urban cemetery design. The research includes:

Understand the precondition of the conventional cemetery and conventional funeral customs is vital to set up a solid foundation for the research. Contemporary burial customs along with new ways of burial offer a different developing trend for the future cemetery. The most current case studies in the urban high-dense city provide a clear picture of building function and structural system in terms of architectural design. The field trip case study of the Hawaiian cemetery denotes the importance of spiritual and humanity aspects in architecture design. And the high-tech innovation research provides the hope of a better futures that would change human life substantially.

A design prototype of the futuristic urban cemetery can be constructed through the design guidelines discovered through the analysis of the research. In this dissertation, I have adopted the Chinese model accentuated by its acute shortage of burial grounds, therefore, the architecture design has to be based on Chinese culture and religion. The prototype created within the guidelines can be universally modelled after with the necessary adjustments in local culture and religion settings.

1.3 Research Question and Research Hypothesis

How to implement high-technology into future cemetery design?

Research Question

How to implement high-technology into future cemetery design?

Cemetery is a type of the burial architecture which uses to burial and remember the past love ones. Undeniably, burial architecture occupies a prominent in the architecture filed. However, due to the old and pertinacious tradition of many cultures, some try to avoid the related topic of death and therefore, in some instances the modern and contemporary burial architecture has not been well researched. On the contrary, ancient burial architecture exhibits much more than just a burial structure, they are expressions of calculated design practicality, artistic display as well as historic representation.

Hypothesis

My hypothesis of the research is “With high-technology innovations, future cemetery will become a multifunctional creation that will preserve and store the memories of all the deceased. Linkage to this “memory museum” will allow people worldwide to worship the deceased with this prototype.

1.4 Research Methodology and Research Structure

1.4.1 Research Method

This dissertation adopts three research methods: case study research, casual comparative study, and field research to analyze and compare the current knowledge of urban cemetery design.

Case study:

Case study dedicated to understanding the relevant historical and contemporarily projects as well as the existing theory that could unravel the past design discipline and provide a good foundation for the future research.

Casual comparative study:

Comparison analysis of the cases summarizes the important design parameters of the contemporary cemetery. Understanding the essence of each case through the comparative approach will set up a solid research background to help to identify the common threads of urban cemetery design.

Field research:

This dissertation also uses field research method which provides reliability and authenticity to the research. The field research in this dissertation mainly focuses on the contemporary cemetery in American which can clearly show the different design parameters between the eastern and western cemetery.

1.4.2 Research Structure

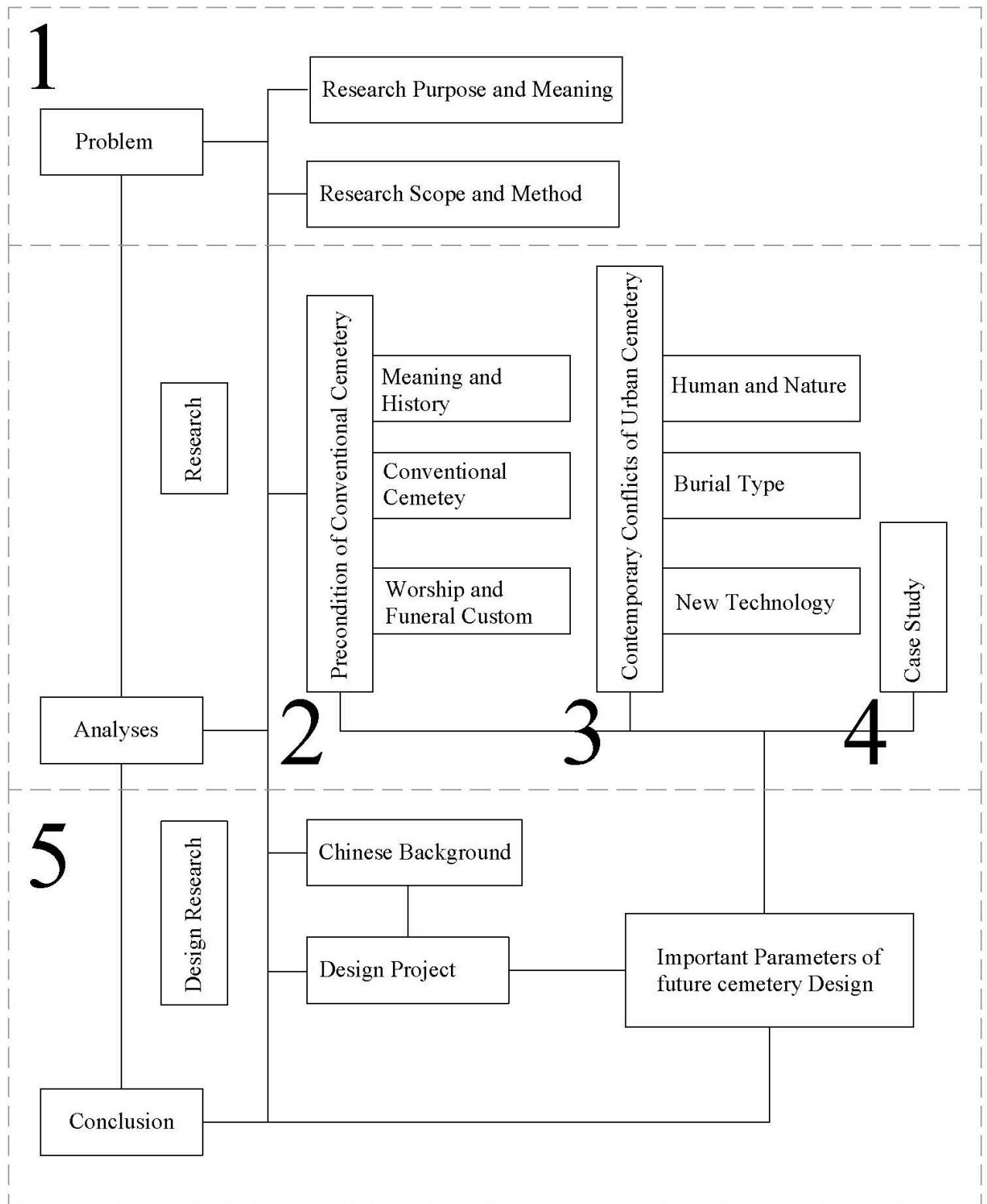


Figure 1. Research Structure

2. Precondition of Conventional Cemetery and Worship

This chapter will set up a solid context through exploring the meaning of death culture, the history of the cemetery and the precondition of the conventional cemetery. By analyzing the conventional cemetery types, worship customs, and common religious funeral customs gives a general idea of social and culture condition of the cemetery.

2.1 Meaning of Death Culture and Cemetery

To understand the meaning of life through death

The Definition of Death

In philosophy, no issue is more central to the metaphysical controversies than the philosophical verdict on death, because it entails a judgment on life as well. A lot of philosophers from different eras contribute to guide people's thinking and view of life and death which set up the different foundations for the funeral culture.

In the ancient period, most memorable dramatic lines in the history of Western philosophy is from Socrates at the end of Plato's *Apology*: "The hour of departure has arrived, and we go our own ways- I to die, and you to live. Which is better God only knows" (Edman 1930) He says that no one can be sure that death would not be the greatest blessing to a man. This argument is sound and solid because it is impossible for any living man to know what comes after death, and it is impossible to communicate or ask the dead. Socrates think fear of death is intellectual arrogance because no man knows whether it is not the greatest of all goods; and yet men fear it as though they well knew it to be the worst of evils.¹ Another point of him is death is a great gain, either there is an afterlife, or that death is an eternal sleep.

Plato, another great philosopher, Socrates' apprentice believed that death is most definitely not an eternal sleep but rather the moment at which the soul is finally released from the body (its earthly prison). Plato attempts to prove the immortality of the soul by an argument: The soul is incapable of death because death is, after all, decomposition (wherein the dying subject is dissolved), but the soul cannot decompose. These two thinkers have profound influences for western funeral tradition.

¹ --[Socrates](#) (ca 470 BC- 399 BC), cited by [Plato](#) (ca 427-347 BC). Translated by [Benjamin Jowett](#) (1817-1893) in *The Dialogues of Plato, Volume 2*, translated by Benjamin Jowett, 3rd Edition (Oxford: Oxford University Press, 1892), pages 109-135.

In Modern and Contemporary period, the religion and the science and technology deeply influenced the western philosophy which set up the foundation to have a deeper and more comprehensively view of death and the psychological appeal for modern people

German philosopher, Arthur Schopenhauer, who called death the “muse of philosophy” thinks “all religious and philosophical systems are principally directed toward comforting us concerning death and are thus primarily antidotes to the terrifying certainty of death”. (Schopenhauer 1948) Schopenhauer interprets death as the aim and purpose of life and the origin of all philosophy. He maintains that to live is to suffer, death is inevitable, and that existences is a constant dying. His view of death is against the soul never dies or heavenly fantasies but rather in rigorous logical thinking. His thinking has pessimism feelings but romantic as well. For example, one of his quote says: “After your death you will be what you were before your birth.”

Everyone interpret death differently. Different perception of death will affect the way we live. How would you like to live? And how would you like to die? These questions are worth to think about.

Meaning of Death Culture²

There are three reasons that we as a human being need to understand the death culture.

First, help to establish the right view of life and ethic. No one could escape from death, therefore, the view of death is a part of the view of life, and only the brave and wise man face it with a positive attitude. The right thanatopsis (view of death) is important for individuals moreover the society, only this, a positive society can be formed.

Second, help to understand the funeral arrangements. The society always has different types of funeral activities according to the death incident. To have a correct knowledge of the folk funeral custom, we have to understand death culture rationally, which based on the social condition, social meaning and social function.

Third, help to transform social traditions which could correspond with new death culture according to current society status. The funeral custom in the 21st century has many problems because of the industrial development, urbanization, population growth, lack of natural resources such as land, space, water, forest and so on. Traditional ground burial is not suitable for China. Even though the government changed the burial policy to force the cremation, there are still a lot of place despite the prohibitions. From this, we can see that people do not want to end or change the culture rapidly, people wants to keep and carry on the traditional culture values that would enhance today’s funeral customs in the society.

² Wang, Zhiguo. *"Binzhang Wenhua Xue -- Siwang Wenhua De Quanzhangwei Jiedu" (Funeral Culture Study -- All Perspective Interpretation of Death Culture)*. Beijing: china Social Press, 1998.

Meaning of Cemetery

A cemetery is a place where the remains of dead people are buried. The word cemetery is from Greek *koimētérion*, sleeping place, which implies the land is specifically designated as burial ground. The intact or cremated remains of people may be interred in a grave as burial, or an “above-ground grave” as a tomb, mausoleum, columbarium, niche, or other edifice. Now the Oxford English Dictionary defines a cemetery as a burial ground which is a large public park or ground laid out for the internment of the dead. And based on the different cultural practice and religious beliefs, funeral ceremonies are different. For example, in Western cultures, funeral ceremonies are often observed in cemeteries and in Eastern cultures, funeral ceremonies are often observed at home or neighborhood instead.

2.2 History of Cemetery

How the problems occur through history?

2.2.1 Prehistory

Prehistoric cemeteries are referred to by the term “grave field”. In Mumford’s book *The City in History: Its Origins, Its Transformations, and Its Prospects*, he talked about the origin of cemetery. “Human life swings between two poles: movement and settlement.”³ At every level of life one trades mobility for security, or in reverse, immobility for adventure.

Before the human society was formed, wandering of mankind seek for a fixed meeting place and eventually a continuous settlement. The first permanent dwelling was for the dead such as a cave, a mound marked by a carin or a collective barrow. The living returned to these landmarks at intervals to commune with or placated the ancestral spirits. In one sense, indeed, the city of the dead is the forerunner of every living city. A famous American historian, a sociologist who particularly noted for his study of cities and urban architecture, Lewis Mumford believe that “Urban life spans the historic space between the earliest burial ground for dawn man and the final cemetery, in which one civilization after another has met its end.”⁴ Historical evidence for his thoughts gives this idea a little bit ironic overtone. The first traveler who approached to a Greek or a Roman city, he would have passed the row of graves and tombstones that lined the roads to the city.

After the city was formed, there are two rites that draw men into the city which are social and religious impulses. From the social perspective, man gather at a shrine functioned as a ceremonial center which allows people to congregate and have a social enjoyment through share a vision of a better life. From the religious perspective, the people who shared the same religious beliefs tend to stay together periodically or permanently. Once the city becomes crowded modern city, the most general exodus occurred, which is the migration of the dead from the urban to the sub-urban cemetery. The sub-urban cemetery is relatively quiet and closer to a romantic Elysium. Elysium is a conception of the afterlife which allows the dead to live in a perfect blessed adobe.

2.2.2 Early Christianity

From the seventh century, European burial only could occur in the holy church ground. But the practice is different in continental Europe, which the bodies were usually buried in a mass grave for decomposition. Bones were excavated and stored in the box, either place in the cemetery or place under floor slabs and behind walls of the church.

³ Ibid., 5.

⁴ Mumford, Lewis. *The City in History: Its Origins, Its Transformations, and Its Prospects*. New York, Harcourt, Brace & World, 1961. 7.

In most cultures those who were rich, noble, or had high social position were usually buried in individual crypts with their name, date of death and other biographical data for relevant worship. Most people were buried and divided in the cemetery based on their social status. Typically, more words and symbols engraved on the tombstone, more expensive it was. Wealthy families used to compete for the artistic value of their family headstone to others by adding statue on the grave. Those who cannot pay a tombstone usually have some religious symbol such as Christian cross made from wood or metal.

2.2.3 Modernity

From the beginning of the nineteenth century, the rapid population growth during the industrial revolution cause the outbreak of infectious diseases near the cemetery and limit the burial space in the cemetery. Because of this, burial in graveyards was eventually banned by the government legislation in many European countries. The new burial places were moved to rural area where not heavily populated. New cemeteries either owned by the government or by private corporations, and thus the new cemetery is completely separated from churchyards.

The biggest migration of human remains from urban graveyards into catacombs occurred in 18th century Paris which about six million people's bones were found and transferred. Another concept of burial, landscape-style cemetery, occurred in Europe when Napoleonic invasions. In Britain, the public health concern drove the landscape-style cemetery outside the city which opens the cemetery industry to the private corporations.

The population of London grew rapidly in the beginning of 19th from 1 million to 2.3 million which caused severe shortage of burial place. John Claudius Loudon, an urban planning and one of the first professional cemetery designers encouraged to construct large municipal cemetery outside London. After, the Metropolitan Burial Act establish the first national system of government funded municipal cemeteries and opening the way for massive expansion burial infrastructure.

2.3 Conventional Cemetery

Different types of cemetery reflect the diversity of cultural and religion practices around death.

2.3.1 Urban Cemetery

Urban cemetery located in the village, town or city. The burial plots of urban cemetery often use grid layout to show it is orderliness. As urban development over time, urban cemetery becomes more landscaped formed to show more comprehension of urban civilization and harmony with nature.

Sanitary is the primary public health concern of urban cemetery. Safely dispose the decomposing corpses is a difficult process. Even with deep burial, the decomposition of human corpses could generate pathogenic bacteria, fungi, and viruses which could cause disease and illness. Coffin and burial equipment could also release toxic chemicals such as arsenic and formaldehyde and toxic metals.

The reuse of urban cemetery usually takes up to twenty-five years for the body to decompose, and the bones could be dug up and relocated. However, not all urban cemeteries could be reused. Many culture and beliefs prevent the reuse of cemetery and this caused the modern shortage of burial plot. Also, some of the non-reusable cemeteries became into disrepair and abandoned because of the lack of fund.

Multiple burials in the same grave is another problem which result the size limitation of the urban cemetery.

Three problems need to be considered in the future urban cemetery design are sanitary issue, reuse possibility, and size of burial plot.

2.3.2 Rural or Garden Cemetery

Rural cemetery or garden cemetery typically associate with landscape design. Plants such as trees, bushes, and flowers are the most important design elements along with the burial ground. The garden cemetery usually located on the rural area where the land is cheap and abundant. But garden cemetery can be located in the urban area as well, as a garden or park form. Nowadays, garden cemetery usually features monuments and memorials, mausoleums, and columbaria.

2.3.3 Monumental Cemetery

Monumental cemetery is one of the traditional cemeteries. Because of the headstone or the monuments usually made of marble or granite and it rise vertically above the ground, it is easy to be damaged overtime base on the difficulty of maintenance. The family members are responsible for the maintenance of the headstone, but could not help deterioration overtime.

One major difficulty for cemetery authorities is that the monumental cemeteries are difficult to maintain because it is difficult to use lawn movers based on the layout of the grave. Other types of maintenance such as string trimmers require heavy labor which could bring up the maintenance cost.

2.3.4 Natural Cemetery

Natural cemetery is a way of eco burial which desire to motivate environmental protection. The burial site of natural cemetery usually is in the forest or natural wetland because the soil condition could help rapidly decomposing the body. “Returning to nature” is the major concept of the natural cemetery, therefore, typically there is no grave marking such as tombstones. Instead, a rock or a tree is more appropriate way to commemorate the dead. In terms of land use, natural burial might not efficient than traditional burial, but the grave site could be reused faster than the traditional burial.

2.3.5 Columbarium wall

Columbarium wall is a common feature of many cemeteries since the cremation popularized and increased. Cremation allows the families to keep part of the deceased into an urn or scattered in some other places which could provide more memorial meaning. High space efficiency is the primary advantage of columbaria wall where each niche is just big enough for a person’s cremains. Compare with other types of burial plot, columbarium wall is a cheaper alternative.

The niches going close to ground level are not popular because it is hard to read, especially for older people who cannot bend down very low. The eye leveled niches are the most popular ones.

Low maintenance is another big advantage of columbarium wall. Mourner leaves the flowers on top of columbarium wall or at the base, and as the flowers decay, they simply fall to the ground and could be cleaned by the maintenance workers.

2.4 Conventional Worship Customs

Human worship

Flowers

Flower is a very common way of worship, especially in western countries. Visitors always sent out flowers in the major holiday, birthday or anniversaries. They place or plant the flowers on the graves. After a few weeks, the maintenance workers of the cemetery will dispose these flowers in order to keep the space clean.

Stones

To place a flower on the grave is fleeting, but stone will stay. The visitors place a small stone on the top of a headstone or a grave is a way to show their respect, and the small stone represent love, honor, memory, and soul of loved one are eternal. This stone symbology often happens in Jewish cemeteries.

Crosses

War graves usually have small wooden cross with red poppy in the center. These crosses usually have carved with messages.

Candles

Burning candle on the cemetery to worship the dead is a common commemoration in Poland. It is the main custom on All Souls' Day.

Figure 2. Stone⁵

Figure 3. Flower ⁶

Figure 4. Cross ⁷

Figure 5. Candle ⁸

⁵ https://www.flickr.com/photos/amys_pixels/2542079021/in/gallery-jswad-72157623519279006/

⁶ <https://s-media-cache-ak0.pinimg.com/736x/91/77/49/91774908249a7bd70fb77187a4dd0a23.jpg>

⁷ https://en.wikipedia.org/wiki/File:American_military_cemetery_2003.JPG

⁸ <https://s-media-cache-ak0.pinimg.com/originals/27/25/94/272594d8d8c3d6ffa1210d9f34821d42.jpg>

Incense

The word incense comes from Latin for *incendere* meaning “to burn”. It is aromatic sticks releases fragrant smoke when burned. This worship custom is well practiced in Asia countries.

Gong

Gong is a singing bowl resonate like bell which often used for ancestor worship. Japanese practice this custom widely because they believe the sound of the gong call God into the place then they bow and pray.

Food

Food offering to the ancestor usually consist various dishes, fruits, sweets, and chopsticks to eat the food, as well as drinks such as tea or wine along with the cups.

Imitation money

In traditional Chinese ancestor veneration, burning paper money is the most common way to show condolences and worship to the ancestor. People believe the paper money is the money deceased would use in the afterlife world, Chinese call it “the netherworld”.

Figure 6. Incense⁹

Figure 7. Gong¹⁰

Figure 8. Food ¹¹

Figure 9. Imitation Money¹²

⁹ <http://www.mccullagh.org/db9/vietnam/incense-thien-mu-pagoda.jpg>

¹⁰ <https://s-media-cache-ak0.pinimg.com/236x/54/bf/d6/54bfd6ba19eea2ca673a09e07fd4c61e.jpg>

2.5 Common Religious Funeral Custom

Praying – the common thread of all religion

2.5.1 Buddhist Funeral

Buddhism considers death as a way for human to reincarnate, therefore, death is only a transition from this life to next life. When death occurs, all the accumulated karma of the deceased will determine his or her next rebirth. Therefore, among Buddhists, death is a significant occasion for deceased and for the survivors to learn Buddha's teaching on impermanence.

There are a number of different sects within Buddhism which have various funeral customs. Some funerals are very ritualistic while others are quiet simple, but peace and serenity are the main theme of a Buddhist funeral. In general, a Buddhist funeral is presided over by monks, along with chanting. The altar used to display the portrait of the deceased, along with candles, incense, flowers and fruit is indispensable. The mourners will bow with lit incense sticks and placed it in the altar to show their condolences.

The traditional final disposition for Buddhism is cremation, although buried is fine. Chanting is the last rites before the casket is sealed. During the chanting, all attendees should be sending their good thoughts to the deceased and the family, also contemplating the impermanence of life.

2.5.2 Christian Funeral

Christian has its own understanding and view of death based on the Bible. Christian belief about the afterlife vary between denominations and individual Christians, but the vast majority of Christian believe in heaven, in which the deceased enjoy the presence of God and loved ones for eternity. In correspond to heaven, hell is a place of suffering where unbelievers or sinners are punished. Why people born with original sin? Based on the Bible, human being are all born into the world with sinful natures, due to the sin of Adam. By confess our sin to God and receive his forgiveness will cleanse our sin. Catholic Christians also believe in purgatory, a temporary place of punishment for Christians who have died with unconfessed sins.

After cleanse our sin, death is a reunion with the God and righteous loved ones with full possession of eternal bliss. However, many Christians think of the soul as an immortal entity within us that goes on living after death. The Bible says: "And the LORD God formed man of the dust of the ground, and breathed into his nostrils the breath of

¹¹ http://www.nationsonline.org/oneworld/Chinese_Customs/taoism_ancestor_worship.htm

¹² http://www.wikiwand.com/en/Money_burning

life; and man became a living soul”¹³ (Genesis 2:7, KJV). Some theologian argues that God did not put a soul into man. He breathed his life spirit into the lifeless body that he made from the dust. Therefore, when a person dies, the soul no longer exists. “The dust returns to the ground it came from, and the spirit returns to God who gave it” (Ecclesiastes 12:7, NIV).

Church as the Christian architecture always holds the funeral ceremony for deceased. Since the body is from the dust, Christianity more inclined to plain funeral which mainly focuses on praying for the deceased. After the ceremony, people tend to bury the deceased near the church where usually located in the peaceful rural area. After the ceremony, guests need to show condolences to the families.

Burial is one of the traditional Christian funeral practice because of the belief in resurrection of the body. Any destructive process, such as cremation was opposed for many years. Nevertheless, cremation became popular and has come to a greater acceptance over the last past century because of the advocacy of many rationalist and classicists.

Even though the final dispositions may be different, the ceremony process are similar which include offering prayers, scripture reading from the Bible, a sermon, homily, or eulogy, and music.

2.5.3 Hindu Funeral

In Hindu culture, cremation is typically for dead adult, and child usually is buried. The last rites or last sacrifice, known as Antyesti in Hinduism, usually cremated the dead body within a day of death. The body need to be washed and rapped in cloth, white cloth for a man or a widow and red cloth for a married woman, and two toes need to tied together with a string and a red mark need to be drawn on the forehead. After these preparation of the body, friends and families carried the dead body to the cremation ground near the river and place the body on the pyre with feet facing south. The eldest son or a male mourner circumambulate the pyre with the body, says a eulogy, sprinkles the ghee (clarified butter) and draw three lines signifying Yama (deity of the dead) , Kala (time, deity of cremation) and the dead, and lastly set ablaze. After cremation, the ashes will consecrate to the river. The Ganges is the most famous river for Hindus spread the ashes of the deceased. In some regions, the eldest son or whoever held the ceremony need to shave their head after the cremation to show their respect. Lastly, to invite friends and relatives to eat a simple meal together in remembrance of the deceased.

Hindu believes the soul is immortal essence and the last rites will release the soul, and the body will return to the origin of the five elements: air, water, fire, earth and space.

¹³ The Holy Bible, English Standard Version. ESV® Permanent Text Edition® (2016). Copyright © 2001 by Crossway Bibles, a publishing ministry of Good News Publishers.

2.5.4 Islamic Funeral

In Islam, cremation is forbidden. Common Islamic funeral procedure includes bathing and shrouding the body, followed with funeral prayer. When burial the dead body in a grave, the head of the deceased must be facing towards Mecca.

2.5.5 Jewish Funeral

Jewish funeral shares many similar characteristics with Islamic funeral, such as bathing and shrouding the body, accompanied by prayers. Lastly, place the feet of the deceased facing the Temple Mount in Jerusalem and bury in the grave. Cremation is also forbidden in Orthodox Judaism but allowed in Reform Judaism.

2.5.6 Summary

Every religion or culture has specific and meaningful funeral custom and ceremonies to show their beliefs on death and the afterlife. Through the research, the common thread of all religious funeral custom is praying.

3 Contemporary Conflicts of Urban Cemetery

3.1 Human and Nature and Urban City

3.1.1 Cemetery under high-dense urban context

Rapid population growth caused urban cemetery shortage

As urbanization developing, the city dwellers could notice that conventional burial is a luxury. Lack of space and high cost have been forced the city to adapt innovative ways of burial. When all the cemeteries are full in the city, the options left for cemeteries are either change, shrink or disappear.

As the cremation became popular around the world, the columbaria wall and vertical cemetery helped to ease the pressure of shortage of space. However, in megalopolis such as London, New York, and Hong Kong, many are crammed into micro-apartments that cost hundreds of dollars a month to rent. To transfer to a permanent unit, need to be on the waiting list and requires a lot more money.

One common solution to this scarcity is to build up, creating vertical cemeteries similar to apartment buildings. However, there are many innovative strategies that could build urban resilience for the cemetery, such as tree burial, space burial, eco burial, high technology columbarium, and so on. This following chapter will mainly discuss the new innovative strategies that could implemented into the future urban cemetery design. These design strategies should substantially solve the current difficulty and problems and should be easy to adopt.

Creating space for burial while making space more functionally useful, environmentally friendly, and culturally essential are the challenges that need to be solved.

3.2 Contemporary Burial

Adapted contemporary burial

Burying a loved one is a very difficult thing to do. Throughout history, mankind has always been fascinated and sorrowed by death. Different cultures bury their dead one in different ways, and with technological advances, there are increasingly new techniques and means of burying the dead. What is common and appropriated in one culture may be very different in another culture. The following are some common and newly adapted ways that people have been buried throughout the centuries or recently been put in use.¹⁴

3.2.1 Traditional Burial

Ground Burial

Most common method of burying passed individuals. Typically, bodies are placed into a casket and buried deep into the ground in cemeteries. Tombstones are then placed above ground to mark the location of the body and allow people to give their respect to the deceased.

Cremation

Cremation is one of the most common burial method chosen by many for personal, religious or culture reasons. Cremation is the process of disposing remains by using intense heat to vaporized and oxidize the dead body. Ashes can be given to relatives to disperse as they wish.

Both ground burial and cremation have some adverse environmental impacts.

¹⁴ <http://legacyfunerals.com/burial-methods.html>

Figure 10. Ground Burial ¹⁵

Figure 11. Cremation ¹⁶

3.2.2 Eco Burial

Sky Burial

Sky Burial is a funerary practice which placed the human corpse on a mountaintop and offered to the animals, especially vultures. It is practice in Chinese provinces and autonomous region of Tibet, Qinghai, Sichuan and Inner Mongolia. These places usually have high-altitude which is unsuitable for burial because the ground is rocky frozen, and with the scarcity of wood and fuel to cremate the dead, sky burial is perfectly logical. Also, people who live in these region majority are the herdsman who eats the animals for living, and they believe it is fair to let the animal eat them after they die.

In Tibet, sky burial is a ritual that has great religious meaning. Most of the Tibetans are Buddhist who believe the soul of the deceased has exited the body to be reincarnated into another cycle of life, therefore the corpse is nothing more than an empty vessel so there is no need to preserve the body. Tibetans believe vultures are Dakinis, angle-like figures that will take the soul into the heavens, where they await reincarnation into their next lives.

In 2015, the Regional People's Congress of Tibet, the local legislature passed a bill to regulate sky burials, covering issues like management of the site, environmental protection and qualification of ritual hosts. Chinese government has stopped the use of burial sites for tourism and the Tibetan government issued a law to banned sightseeing, photographing and video recording at such burial sites. This shows the respect and offers protection to this millennium-old tradition.

¹⁵ http://i.iheart.com/v3/re/new_assets/57ae0164ac0daf4ded53eaf1

¹⁶ https://upload.wikimedia.org/wikipedia/commons/thumb/9/99/Verbrennung_eines_Toten_in_einem_Krematorium_2009-09-05.JPG/220px-Verbrennung_eines_Toten_in_einem_Krematorium_2009-09-05.JPG

Figure 12. Tibetan Sky Burial ¹⁷

Figure 13. Tibetan Sky Burial-Buddhist monk ¹⁸

Resomation

Resomation, also called biocreamation, is an eco-friendly burial method that decomposes the body using an alkali and water based solution under high pressure which breaks down the body into liquid and its chemical components. The liquid can be recycled into the ecosystem by pouring it into a garden or nature. The ash is white-colored dust which can be collected and placed into an urn and returned to the next of kin.

This process produces less carbon dioxide and pollutants than cremation. United States adapt this method for the disposition of remains in 2007.

Figure 14. Resomation ¹⁹

Figure 15. Resomation is a green Creamation ²⁰

¹⁷ http://assets.atlasobscura.com/article_images/6628/image

¹⁸

http://www.paindoo.com/images/paindoo/life/2015/11/medium/paindoo.com_11201514467927216308139.jpeg

¹⁹ http://img.timeinc.net/time/photoessays/2009/10_eco/resomation.jpg

²⁰ <http://www.james-barber.com/wp-content/uploads/2015/02/bio-cremation1-300x271.jpg>

Promession

Promession is an environmentally friendly burial method founded by a Swedish company, Promessa Organic Burial. Promession is the concept of freeze the corpse in liquid nitrogen and use vibration to shattered into an organic powder. The powder remains are then buried into the top layer of soil, which will eventually decompose into compost. The disadvantage of this concept is that most people cannot accept that turning the loved one's body into fertilizer.

Figure 16. Promession Process²¹ Figure 17. Back to the land²²

Summary

No matter what kind of eco burial, the core idea is for the body back into the elements it is made of and physically returning to the earth's natural system. Eco burial has lower environmental impact which will reduce carbon emissions, conserving natural resources and preserving habitat. Also, it is cheaper than the traditional burial in terms of the maintenance fee.

3.2.3 Advantage and Disadvantage of Contemporary Burial

The development of the philosophy of death has experienced a changing process from religious theology to rational thinking which tremendously affected the design of modern cemetery architecture. The design of the space of modern cemetery architecture focused more on the form and the function but lacking spiritual function and space. Therefore, most of the modern cemeteries give people unpleasant feelings. The space design of cemetery architecture in modern times should express as serenity, kindness, and nobleness which could fulfill the means of "harmony between man and nature".

The landscape and the architecture of the modern cemetery should follow the modern trend as well, but more important is to follow the spiritual trend of the past in order to be meaningful. In architecture, design language means that modern cemetery design principle should base on the spirit first, then comes to the form and function.

²¹ https://bonesdontlie.files.wordpress.com/2014/02/cycle-promession_sfd1.jpg

²² http://natural-burial.typepad.com/photos/uncategorized/2007/06/03/tarn_moor_woodland.jpg

3.3 High-Technology Burial Trend

High-Tech adaption made changes of people's perception of death

With the boundary between the virtual and physical lives becoming ever-more blurred, technology is sure to play a greater role in death, too. In Canada, some cemetery has proposed using satellite units instead of headstones, to help visitors use GPS location to find graves. In Japan, some company offers descendants online visit to virtual graveyards, where they can light a virtual incense stick and show their worship rather than travel the long distance to visit the grave in person. In Hong Kong, the government opened the electronic gate on virtual cemetery where people can upload photos and videos of their loved ones. This gives the mourners opportunity to pay their respects online. In spite of all these technologies that had applied in the cemetery design, there are many controversies such as against the tradition and culture. How to inherit the culture in an innovative way and reflect the times spirit is the primary consideration of futuristic cemetery design.

3.3.1 Memorial Diamonds

Memorial Diamonds are made by pressurizing ashes or hair of the deceased into a diamond. These gems can be made into jewelry and serve as keepsake of a loved one that can always be with you. A lot of people choose this is because they desire an everlasting connection to the one they have lost. This one of a kind diamond could be a treasured heirloom in the family for generations.²³

Figure 18. LifeGem Prices²⁴

²³ <http://www.lifegem.com/LifeGemPrices.php>

²⁴ <http://www.lifegem.com/LifeGemPrices.php>

3.3.2 Cryonics

Cryonics is used when an individual may not be necessarily dead such as people who are diagnosed brain dead. The body can then undergo cryopreservation, in which the body is frozen. This preservation technique is used with hopes that the body can be revived at a later time when improved technology can recover the individual.

One of the companies who offers this service is the ALCOR Life Extension Foundation. Hundreds of instance are already been practiced. The whole body cryopreservation costs \$200,000, but this fee does not include standby and transportation costs. Neurocryoperservation, cryopreserve the neuros, cost \$80,000.

Figure 19. Dewar being filled with liquid nitrogen²⁵

Figure 20. Alcor Life Extension Foundation Brochure²⁶

²⁵ http://photoworks.org.uk/wp-content/uploads/2016/04/Murray-Ballard_0140-608x469.jpg

²⁶ <http://www.alcor.org/>

3.3.3 Space Burial

Space burial is to launch cremated remains into outer space using a rocket. This may seem a little out of this world, but famous astronomers and even the creator of Star Trek have selected this form of burial. Space burial was initiated by NASA in 1992. Later in 1997, Celestis Inc. a company started its business to launch cremated human remains into space. Each time the rocket will carry two to three hundred remain samples.

Figure 21. Flight Modules; Spacecraft on board; Launch ²⁷

Figure 22. Price of different destination ²⁸

3.3.4 Advantage and Disadvantage of High-Tech Burial

High-tech burial offers people unique ways to deal with the physical body. whether make it to diamond or scattered it into space, both shows people's ambition of showing their uniqueness. High-technology also offers human being a fantasy about immortality. Medical technologies do make people's life-expectancy longer and with the diseased cannot be cured right now, technology offers people an option of pause and resume life. However, for those who pause their lives currently, we could never know if they can resume their life again or not. There weren't any successful examples yet. Overall, I think high-tech burial has positive influences and it will lead the burial trend in the future.

²⁷ <http://www.celestis.com/services.asp>

²⁸ <http://www.celestis.com/services.asp>

3.4 New Technology Possibilities of Futuristic Cemetery

Future technology – will change our lifestyles

Smartphone was not in the picture 10 years ago

3.4.1 Digital Transformation²⁹

Technology is changing how people live, communicate, and work, therefore, the evolution of technology has directly impact on human behaviors, life expectations and culture customs. As technology becomes a permeant fixture in everyday life, current technology is evolving faster than people can naturally adapt. This sets a new era for Digital Transformation.

Digital transformation as the most important movement today is forcing the business to look beyond the world people knew. Digital transformation seeks out how to use technology in ways that improve customer experiences and relationships, and this will change customer's behavior over time. One reasonable prediction is people will undergo digital transformation and gains empathy in the process.

Figure 23. Cloud-based data storage ³⁰

²⁹ <http://www.briansolis.com/2016/02/26-disruptive-tech-trends-2016-2018/>

³⁰ <http://raconteur.net/technology/seeing-big-data-through-the-cloud>

3.4.2 Hologram

Hologram is a three-dimensional image formed by the interference of light beams from a laser or other coherent light source. Holographic technology is well spread in the entertainment industry. 3D movie and holographic stage have been known for decades. Nowadays, it spread to all public performance area such as concert venues, exhibition centers, retail stores, and nightclubs.

Figure 24. Hologram next step in Realistic Training ³¹

Figure 25. Stage Musion Eyeliner Projection System³²

3.4.3 Virtual Reality

Oculus, Hololens, MagicLeap are the virtual reality technology companies that bring the virtual world to life. VR/AR are already a given high-end gaming product which is able to transpose the users to someplace else through closed visors or goggles. Immersive computing will find its niche beyond gaming industry and start to permeate other high-end industries. It will open up an entirely new world that truly brings VR/AR alive or closer to lifelike.

Figure 26. Magic Leap's mixed reality platform makes it possible to see virtual 3-D objects as if they were part of the real world ³³

³¹<http://www.nationaldefensemagazine.org/archive/2014/November/Pages/HologramsNextStepinRealisticTrainingforTomorrow%E2%80%99sTroops.aspx>

³² <http://www.hologram3ddisplay.com/sale-3988539-stage-musion-eyeliner-projection-system-high-definition-3d-hologram-system.html>

3.4.4 Virtual Paradise

Do you believe by using technology, people can make a heaven on the earth?

Make a heaven on earth through technology is a virtual concept introduced in “San Junipero”, the forth episode of the third series of a British Show called Black Mirror. This series released on 21 October 2016. Even the story is fiction but it shows people’s fantasy about afterlife. Human being afraid of death and trying to use technology to build this virtual paradise and being immortal.

The episode tells a story about two old ladies, one is about to pass away and she decides to enter this virtual paradise, and the other one does not buy the idea of virtual paradise. I believe the scripter trying to discover humanity through different people’s perception towards death. However, in the end, another lady decides to enter this virtual paradise as well which shows human’s fear of death and will of live.

Figure 27. In the reality two old ladies are about to die, in the virtual reality they are young

Figure 28. The memory and the conscious will store in this virtual paradise forever

³³ <http://www.marketwatch.com/story/the-most-hyped-tech-startup-around-could-see-secrets-leak-in-legal-battle-2016-06-04>

4 Case Study

Most current case studies show the glimpse of the future

4.1 High-tech Cemetery Concept of the Future

We have a rapidly aging population but cemetery space is already hard to come by. According to research Coutts has conducted with Carlton Basmajian, an assistant urban planning professor at Iowa State University, right now roughly 76 million Americans are projected to reach the current age of average life expectancy, 78 years, between 2024-2042.³⁴ If they were all buried in standard burial plots, it would require roughly 130 square miles of pure grave space which is equivalent to the size of Las Vegas.

Coutt says his ideal solution would be for cities to landscape walkable spaces where citizens could scatter the ashes of their loved ones after securing for a small fee, and the fee would create a small municipal funding stream. This concept would allow the land for the dead benefit the living as part of a city's green infrastructure.

Dense cities like London and Hong Kong had to find creative ways to deal with their dead. London local government promoted grave recycling programs which facilitates families with ancestors buried in public cemeteries to lease the grave site to a new occupant. The grave marker will flip backwards and refurbished, and the new occupant will gets engraved. Hong Kong is already in the throes of a burial shortage, with reports of five-year waiting lists for ashes to be placed in a reused public burial niche.

Smart card is one solution has been mechanized columbaria. Families enter a specialized facility and swipe their smart card to retrieve their relative's ashes from a library of thousand urns and proceed with their visitation.

³⁴ <http://www.citylab.com/housing/2012/10/americas-looming-burial-crisis/3752/>

4.1.1 Vertical Cemetery³⁵

Vertical cemetery is a new concept to solve land shortage issues for the urban cemetery. This ‘skyscraper cemetery’ design proposal was submitted by Martin McSherry, a student at Copenhagen’s Royal Danish School of Architecture, at the Oslo Conference for Nordic Cemeteries and Graveyards. The proposal addresses the need in Norway for alternative burial methods as land becomes more scarce and crowded. The presented idea was the slots in the structure would gradually be filled in time as a solution.

Norway has practiced grave recycling for a long time which allows the citizens to reused the grave after twenty years. Due to the health sanitary concerns about decomposing bodies would affecting water and soil source, a law was passed that required bodies to be buried and wrapped in plastic. Change the way of burial could not solve the problem completely.

McSherry’s vision for the future cemetery is that to build up as a skyscraper. Different floors are designed specifically for different religions and for non-believers. McSherry envisions that “existing cemeteries will slowly be removed to provide land to the city’s living souls. The vertical cemetery will become a significant part of the city and daily reminder of death’s existence. In time, the city’s tallest and largest building will become a grave for all its citizens – the city’s ever-changing monument.”³⁶

Figure 29. Skyscraper Cemetery Concept Figure 30. Open-air building with Burial Parkland

Advantage

Some people think there is nothing particularly charming about the idea of rotting under the earth, therefore, reach for the sky might be a cool idea.

Disadvantage

A lot of people do not like the idea of being buried in a skyscraper because many of us spend an entire life hustling from high rise to high rise.

³⁵ <http://www.usurnsonline.com/oddbits/will-cemeteries-future-look-like/>

³⁶ <https://www.thelocal.no/20131128/vertical-cemetery-commended-at-oslo-grave-conference>

4.1.2 Cemeteries of the Future: Lighting the Way

Winner of the Future Cemetery Design Competition held by the University of Bath's Centre for Death and Society, the "Sylvan Constellation" which was submitted by Columbia University's Graduate School of Architecture. The design concept proposes "a network of memorial vessels which would transform biomass into an elegant and perpetually renewing constellation of light which could illuminate pathways."³⁷ The aim is to work towards a feasible design for a future prototype.

Figure 31. Lighting the way by using corpse as biomass³⁸

Advantage

The design perfectly captures the trending ideas of energy efficiency, sustainability, and conservation of land in a way that combines them with beautiful sensibilities and budding technology capabilities.

Human is an organic matter which could be seen as a biomass. Dr. John Troyer, Director of the University of Bath's Centre for Death and Society and co-founder of the Future Cemetery explains the Sylvan Constellation is an outstanding mix of both respectful dispositions for human remains and longer term thinking around the disposal of digital data.

Disadvantage

On the other hand, use the corpse as biomass to generate electricity maybe not culturally acceptable. For instance, organ donation could be seen as a form of biomass transfer, but there are still a lot of people choose to remain their body as one piece.

³⁷ <http://www.bath.ac.uk/news/2016/03/01/future-cemetery/>

³⁸ http://www.bath.ac.uk/news/system/wp-content/uploads/2016/03/3.-Sylvan-Constellation_Collective-e1456853516622.jpg

4.1.3 Floating cemeteries

In Hong Kong, there is barely enough land for the living, let alone the dead. Burial sites, therefore, are impractical and 90% of the population opts for cremation. However, even for a tiny square foot of niche for ashes in a public columbarium, families need to be on the waiting lists for several years to get the niche. Meanwhile, a private columbarium niche could be another option but it cost over \$100,000. According to Food and Environmental Hygiene Department (FEHD), Hong Kong, a city of 8 million people will be having a shortage of 400,000 niches by 2023.

The “Floating Eternity” is a sea-faring cemetery drifting along Hong Kong’s coastline. It aimed to provide a solution to relieving pressure on the country’s lack of land space and aging population problem. This Floating Eternity design proposal would offer 370,000 columbarium space to house the ashes.

Paul Mui, design director at a local architecture firm Bread Studio explain the design concept as in Hong Kong, it is traditional to visit the ancestors’ graves twice a year, therefore, it seems like a waste to reserve so much valuable land for places we only visit twice a year. A cruise for cremains could run by the different company, and during busy seasons such as Qing Ming festival or Chong Yang festival, the cruise will stay docked at various piers.

Figure 32. Floating Eternity, Hong Kong ³⁹

³⁹ <http://www.cnn.com/2016/09/21/asia/future-of-funerals/>

Figure 33. A Cruise of cremains

Figure 34. Eternally floating cemetery takes burial to the open sea

Advantage

The idea of this eternally floating cemetery could be a solution to the overcrowded graveyards and columbarium of Hong Kong. The capacity that this cruise could house is incredible. The bamboo garden and positive fengshui design of the interior of the cruise correspond to the Chinese culture as well. Different function of space such as food court and bamboo garden could provide a good family bonding experience.

Disadvantage

High maintenance fee is the major disadvantage of this cruise concept. Only during the busy season of worship festival, the cruise will stay docked at various piers, and all the other time it will drifting in the ocean which will consume a lot of energy resources, and it is not convenient for people to visit at the same time.

4.2 High-Tech Urban Cemetery⁴⁰

Japan is facing severer rapidly aging society issues right now. One in four people in Japan is over 65 years old, and the population of 127 million is expected to shrink by nearly 30 million people over the next 50 years. Tokyo is the world's largest metropolis, with a population of about 36 million people, and land is both expensive and in high demand. Cemetery in the city can cost more than \$100,000, therefore people start to discovering the solutions for the burial of their loved ones due to the scarcity of the land.

4.2.1 Ruriden Columbarium in KouKoko-ji Temple

Location: Tokyo, Japan

Building Type: Buddhist temple

Structural System: Reinforced Concrete

Ruriden columbarium is located in Tokyo and operated by the Koukoko-ji Buddhist Temple (琉璃殿) in downtown Tokyo. There are 2,046 small altars, each glowing Buddha statue, which is placed on the wall inside a transparent glass casing, represent a deceased person whose cremated remains lie in rest behind the statue. When visiting a deceased loved one at this cemetery, people will swipe a smart card upon arrival at the door and the corresponding LED Buddha statue will light up on the wall.

Traditionally, each family in Japan would own a plot of land and a stone tomb in a physical cemetery which cost up to \$40,000 and requiring upkeep and maintenance fees. Currently, in Japan, declining birth rates, shortages of space in cities, and skyrocketing price for cemetery plots have brought on a rethink in how the deceased are both buried and commemorated by those they leave behind. Over the last few decades, advances in technology, as well as the changing lifestyles of the Japanese have made cost effective alternatives such as Ruriden cemetery.

Figure 35. LED Buddha Vaults ⁴¹

⁴⁰ <http://weburbanist.com/2016/03/04/led-buddha-vaults-smart-card-entry-high-tech-cemetery-in-tokyo/>

⁴¹ <http://gizmodo.com/this-is-probably-the-most-high-tech-cemetery-in-the-wor-1696153589>

Figure 36. The Ruriden Columbarium ⁴²

Figure 37. Worship at Ruriden Columbarium ⁴³

Figure 38. Entrance of the Ruriden

Figure 39. Exterior of the Ruriden

⁴² <http://gizmodo.com/this-is-probably-the-most-high-tech-cemetery-in-the-wor-1696153589>

⁴³ <http://www.businessinsider.com/japanese-cemetery-identifies-the-dead-with-id-cards-2016-4>

Access

Two minutes of walk from the main station

Figure 40. Access Map ⁴⁴

⁴⁴ <http://www.ruriden.jp/about/index.htm>

Advantage

Yumiko Nakajima, a woman in her 70s, who has no children and husband passed away, selected her grave at Ruriden. She says: “It’s fate that I got introduced to this style of graveyard. It’s more convenient. I don’t want my relatives to go to the trouble of maintaining my tombstone when I’m gone.”⁴⁵ She does not want to oblige her brother to travel all the way to Kyoto to pay his respects. In addition, she does not want to burden the family with higher yearly maintenance fee. Currently, each Buddha statue costs around 750,000 yen (\$6,600) which is five times cheaper than the traditional stone tomb. Compare to the yearly maintenance fee of the traditional grave which is up to 12,000 yen (\$105), the yearly maintenance fee of Ruriden only costs 9,000 yen (\$80). Nakajima is just one of the early adopters of these space-saving and economical tombstone alternatives.

Another advantage is the ideas was borne of the necessity to adapt to changing social norms. According to Taijun Yajima, the head Buddhist priest at Koukokuji Temple to which Ruriden belongs, he says that: “Now, there are fewer children in Japan, so some people don’t have anyone to take on the responsibility of caring for their tombstone anymore.”⁴⁶ This kind of high-tech cemetery provides a resting place where people who without children or families will not feel along in the afterlife.

From the architecture perspective, one dominant advantage of this cemetery design is use the traditional temple and rebuilt the inside as high-tech cemetery which is fluent combination of culture and technology, also easier for people to accept in cultural perspective.

Disadvantage

Even though Ruriden is space-saving and economical alternatives, there are still deficiencies. First, the limited time of remains which is the most common deficiency in almost every cemetery. Ruriden guarantees the remains place inside for 33 years and after that, the remains will be moved from the locker to a communal resting place underneath the edifice. Buddhist statues and locker spaces are not re-used once emptied, instead they are kept vacant.

⁴⁵ <http://motherboard.vice.com/read/death-is-a-high-tech-trip-in-japans-futuristic-cemeteries>

⁴⁶ <http://www.designindaba.com/articles/creative-work/high-tech-repository-dead>

4.2.2 Bansho-ji Temple

Location: Nagoya, Japan

Building Type: Buddhist Temple

Structural System: Reinforced Concrete

Area: 116 m² (3F)

Site History: 1540 – 2016 (reconstructed after WWII)

Bansho-ji temple (万松寺) has a history over 470 years, located in Osu, central Nagoya. The temple was established in 1540 by Nobunaga family. The main hall was destroyed during the Pacific war and rebuilt later with iron and reinforced concrete. The temple has five above ground floors and one basement floor. The first floor totally opened and coexist with the shopping street.

The temple was popular among not only foreigners but also Japanese too because of the shopping arcades called the “Osu Shopping District”. The most famous item of the Bansho-ji temple is the Karakuri doll of Oda Nobunaga that was put there when the main hall was reconstructed. The mechanical doll “Nobunaga” performs five times in a day, every two hours between 10am to 6pm which is very popular among tourists. There are many events going on through the year. The temple festival is on the 28th of every month, there are many people in Osu, and the temple hand rice cake for people.

Figure 41. Temple Festival on the 28th of Every Month ⁴⁷

⁴⁷ <http://www.banshoji.or.jp/e/event/>

Figure 42. Reconstruction of Banshoji Temple in 1994 ⁴⁸

Divine favor is also a big attraction for people. There are kinds of Buddha that can say a prayer to. People can say a prayer by themselves or the temple could say a prayer for the people with charge and give out a talisman as a proof. Many people come here to see the lucky object in order to receive divine favor, protection from calamity, safety, health, business prosperity, better luck, and other blessings.

Figure 43. (Hondo) Main Hall of Bansho-ji Temple ⁴⁹

Figure 44. Praying for Divine Favor ⁵⁰

⁴⁸ <http://www.banshoji.or.jp/e/history/>

⁴⁹ <http://www.banshoji.or.jp/e/precincts/>

⁵⁰ <http://ikidane-nippon.com/interest/379926/>

The cemetery locates on the third and fourth floor, and the first basement of the temple, and regardless of religion, an urn can be placed inside. On the third floor, there is a room called Suisho-den (Suisho means “crystal” in Japanese) which the whole room is covered with LED light featured with bright and lavish. The 2000 glass boxes in this cinerarium hold the ashes of the dead regardless of the religion. The control system and the security system are all controlled by computer. By swiping an electronic ID card, the corresponding box where stores the relative’s ashes will light up in gold. Visitors could bring flowers or light the incense for worship.

Figure 45. Bansho-ji Temple Electronic ID Card ⁵¹

Figure 46. Bansho-ji Temple Third Floor ⁵²

Site Analysis

Three minutes of walk from Kamimaezu Station.

Figure 47. Banshoji Temple Access Map ⁵³

⁵¹ <http://www.bbc.com/news/in-pictures-32379017>

⁵² <http://www.banshoji.or.jp/e/ossuary/>

Advantage

Japan as the most advanced technology country made the death seems like a high-tech trip. Three successful points of this project are location accessibility, activities for attraction, and technology advancement.

Architecture is never a standalone building, especially in the urban shopping district. The Bansho-ji temple is an important historical temple located next to the transit station with three minutes on foot which gives huge superiority for the accessibility. Base on its location, people would love to visit this place and the good accessibility also makes the visiting easier for the family and friend. Activities play important role for the tourist attraction, in the meantime, the temple corresponding with the activities by opening the first floor as a public space and allow the activities celebrated in the temple. Lastly is the technology brought the cemetery in Bansho-ji temple successful. High-technology solve the high cost and the shortage of the cemetery plot. Also, the LED lights and advanced technology provide a backdrop to Buddhist rituals.

It is a very modern and spectacular way of dealing with death in the rapidly ageing society.

To make an architecture or a space successfully functional is not only about that space or that building, it is the whole travel experience for the people, the time, the activities, the feelings created and thought thoroughly by the architect.

Another huge advantage of this cemetery is a marketable package for specific populations. For example, same-sex couples who cannot be buried together in the traditional family tomb because many people in Japan still against homosexual. For singleton who has no children could take care of the tomb, this cemetery seems like the perfectly choice. Also for the younger generation, this might be a popular and cool place to choose as a cemetery.

Disadvantage

Tradition and innovation always go against each other. Some people may think this is a little too brazen for a traditional funeral and may not accepted by the older people. Also, reuse problem was never mentioned in public. If the plot could be reuse, how long is the duration and how to deal with the ashes need to be answer and solved. This kind of jarring combination of ultra-modernity and tradition might bring us too far in the future.

⁵³ <http://www.banshoji.or.jp/e/access/>

4.2.3 Shinjuku Ruriko-in Byakurenge-do

Location: Tokyo, Japan
Building Type: Buddhist temple
Structural System: Reinforced Concrete
Total Floor Area: 2294.52m²
Site Area: 962.4m²
Building Area: 528m²
Design Period: 2011.09 - 2012.04
Construction Period: 2012.10 - 2014.04

PROJECT OVERVIEW

Shinjuku Ruriko-in Byakurenge-do is high-tech skyscraper cemetery located in the heart of Tokyo's some of the most valuable land, the shopping district where just a three-minutes stroll from the Shinjuku station - one of the busiest in the world. Architect Kiyoshi Takeyama, the designer of this building, use high-tech skyscraper cemeteries as a design solution to solve the shortage of available final resting places in the urban environment.

The facade of Shinjuku Ruriko-in Byakurenge-do building does not look like a cemetery at all, but looks like a spaceship and function as a smart library for ashes. Its tall round body has softly curved edges, a tapered base and a white concrete facade punctured with small circles and rounded rectangles for windows. The tapered base makes the temple looks like lifted up from the ground and floating from the context. Typical Buddhist temples are built in a compound with separate structures for the main building houses the Buddha statue, an office and an ossuary. Ruiko-in Byakurenge-do has all of the facilities in a single building. It is a temple, yet it also functions as a museum and an odeum. It is no doubt this is the most cutting-edge temples in Japan. People also see this building as an ultimate 21st-century temple prototype.

This Buddhist temple is the largest building in the world that built with white concrete which is three times stronger than the regular concrete. Structural engineer Imagawa Kenei use the most advance structural technology which allows the building last longer than 300 years. The doubled seismic strength protection also prevents the building from the large earthquake of all directions. Another reason for the material choice of the building's thick concrete building is because the building is in a narrow plot among offices and hotels on a busy and noisy street. In order to cut this busy and noisy urban context, the architect decides to use strong form and thick concrete walls to protect the building and create a calm and quiet atmosphere.

Figure 48. Shinjuku Ruriko-in Byakurenge-do – Building Exterior: Floating Form ⁵⁴

Figure 49. Shinjuku Ruriko-in Byakurenge-do - Green Roof⁵⁵

Figure 50. Shinjuku Ruriko-in Byakurenge-do – Building Exterior ⁵⁶

⁵⁴ <https://www.pinterest.com/pin/267612402833331685/>

⁵⁵ <http://www.iconeye.com/architecture/news/item/12300-shinjuku-temple-tokyo>

⁵⁶ <http://www.hiddenarchitecture.net/2017/02/shinjuku-ruriko-in-byakurenge-do.html>

Figure 51. Shinjuku Temple Section ⁵⁷

Figure 52. Shinjuku Temple Ground Floor Plan

⁵⁷ <https://site.douban.com/wamp/widget/notes/112996/note/513105435/>

INTERIOR

This futuristic structure also has the traditional design aspects in the interior and within the details. Wooden material such as aromatic wood alongside with concrete and the imprinted wooden patterns onto the white concrete interior walls show the Japanese traditions was deeper rooted. The design motifs also focus on water, sound, and light inherited from the traditional Japanese temple. The sound of water greets visitors, flowing over the tiered stone surface of a water fall that spans the side of the building. And the light shines through a window which precisely onto Buddha's face during certain times of the year.

Figure 53. Sliding screen decorate a traditional tea room ⁵⁸

Figure 54. Interior concrete is precisely imprinted with planks of cedar ⁵⁹

The interior has many meditation spaces which follow the Buddhist concept of emptiness. The biggest room for meditation was 10-meter-high with a piece of sky view from the window. To add to the meditative atmosphere, a small button hidden in wood panels would activate the soundtrack. Besides this audio technology, there are more advanced technologies that have been apply in this building.

Figure 55. Room of Emptiness

⁵⁸ <http://www.iconeye.com/architecture/news/item/12300-shinjuku-temple-tokyo>

⁵⁹ Ibid.

TECHNOLOGY

This building uses advanced automated warehouse technology which developed by Toyota Industries. The machine automatically fetches the relevant ashes and transports them across a conveyor belt system to the appropriate room. An ersatz tombstone bearing the name of the deceased person and their photograph will show up after placed the electronic ID card to next to the tombstone.

According to Kinoshita, a member of the Rurikonin's public relations team, this advance technology tends to get copied, and there were people who visit there only to study the technology and layout that they use. They want to protect this technology because the neighboring Asian countries such as Singapore, Malaysia, and China are all having similar ventures looks into technology deal with shrinking space issues. Since this technology may lead the future cemetery industry, they do not want to divulge details on the cemetery technology used by the building. Also, in culture perspective, Japan does not want its specific afterlife aesthetics to be replicated elsewhere.

High-rise cemetery is increasing in popularity, appearing not only in Japan but also in Brazil, China, and Israel. Many countries are in the process of creating similar edifices, and it is only a matter of time before they spread across the rest of the globe.

Figure 56. Eight booth for viewing family urns in the basement

Figure 57. Worshipping Ancestors in the Viewing Booth ⁶⁰

⁶⁰ <http://www.theplaidzebra.com/the-first-food-grown-in-a-floating-greenhouse-in-space-was-just-eaten/>

TRAVEL EXPERIENCE

One of the great charm for Shinjuku Ruriko-in Byakurengo-do is its location. Three minutes' stroll from the world's busiest station makes the access excellent for the travelers. Japan has one of the fastest and efficient public transportation system which add merit for the accessibility for the travelers. People can easily take the bus or the bullet train from the airport to everywhere. In addition, Shinjuku is also a place for showing and advertising the Japanese art, fashion, and culture which brings energetic vibes for the place. Therefore, this Shinjuku temple is not just a cemetery for some special occasions, moreover, it is an everyday life. The convenience of the site access allows people feel free to visit and memorialized the deceased whenever they want to.

Figure 58. Transportation to Shinjuku Station ⁶¹

Figure 59. Three minutes on foot from the Shinjuku Station ⁶²

Reaching to this white concrete building gives people blessing feeling from the sky because of its shape and its building material. The design concept of Byakurengo-do (White Lotus Hall) is the white lotus bloom into Amitabha Paradise. The lifted up form gives people illusion that building is floating and receiving blessing from the sky. The material choice of the white concrete brings a peaceful, pureness into the busy urban context and create a calm and quiet atmosphere. Before entering then building, the sound of water greets visitors and the 6.6-meter-high waterfall spans the side of the building, flowing hypnotically over the tiered stone surface. Entering the lobby by sliding the smart electronic ID card on a futuristic black box and the receptionist will help you. The warmth of the wooden interior brings traditional temple feelings for the visitors.

After entering the building, visitor could explore on their own. Each floor has different functions. The heart of the building is the high-tech vault system that could hold 7000 cremated remains. And this system will automatically deliver the remains to worship room that located on the basement and the second floor. On the third floor, there

⁶¹ <http://www.byakurengedo.net/access/>

⁶² Ibid.

is a lounge and a Buddhist memorial service room. On the fourth floor, room of emptiness, a long, narrow and 10-meter-high space with a skylight inspires people for meditation. A small button hidden in the wood panels next to the door activates an abstract soundtrack to add to the meditative atmosphere.

On the fifth floor, home to “Nyorai-do” an intimate hall seating around 80 people for Buddhist services and concerts. The fenestration details well represent the delicacy throughout Japanese architecture. The delicate light pours into a space that made by heavy concrete and creates the contrast between heaviness and lightness, yet also with harmony and balance. Another highlight is the black etchings by contemporary Japanese painter Fuyuko Matsui mounted on sliding screens in the traditional tatami-mat tea room.

The project made a great gesture responding to a constrained space, and also accurately creates a transitioning atmosphere from the various functions on every floor.

5F – Fifth Floor

Figure 60. Tathagata Hall

Figure 61. Black Shoin

4F – Fourth Floor

Figure 62. Buddhist Main Hall

Figure 63. Meditation Room

3F – First Floor

Figure 64. Chant/Praying Room

Figure 65. Room with Buddhist Painting

2F – Third Floor

Figure 66. Worship Room

Figure 67. Reception

1F – First Floor

Figure 68. Entrance Hall

Figure 69. Reception

B1 - Basement

Figure 70. Worship Room

Figure 71. Special Worship Room ⁶³

⁶³ <http://www.byakurengedo.net/introduction/>

Advantage

There is no doubt the design of this temple is the most cutting-edge of the worldwide temples. This hyper-modern setting could create a new trend for the future Japanese temples, may also create an ultimate prototype for the 21st century temple.

The intention of the architect is simple but strongly carry the traditional perspective to the modernity of architecture which is to create a temple that was faithful to its original role as welcoming community hub. Takeyama thinks that “temples in Japan were not only a place of prayer and training, but also a school, hospital and cultural complex of museum, concert hall, library and so on. This project is an attempt to revive these cultural programmes in a contemporary temple’s design.” Overall, the project is clean, convenient, cost-effective and increasingly inclusive of differencing religious beliefs. This cemetery represents Japanese society’s evolving relationship with life, death, technology and the afterlife.

From economic perspective, the cost of this cemetery is relatively less than the traditional cemetery. Also, unlike the other cemetery which will be reused after two or three decades, the duration of this cemetery is eternal. There are various plans provided in Shinjuku Ruriko-in Byakurenge-do based on different family or personal condition. The cost of the individual unit is around \$8,800 with \$100 annual maintenance fee. For couples or two person’s unit cost around \$10,500 with \$100 annual maintenance fee. Family unit cost around \$15,700 with 175 annual maintenance fee. There is a special plan for individual woman which only cost around \$4,400 without maintenance fee. Best special unit cost \$44,000 with \$440 annual maintenance fee. Preserving memory through digital technology could lead the development trend of the future.

Disadvantage

Even though the high-technology solved a lot of the existing problems such as the shortage of the burial place and the high-cost, the result still can be improved. For example, this building only could hold 7000 people’s cremains, and most of these plots already sold out. This is not a good capacity according to the population of Tokyo. Plus, these plots are not reusable. Once the capacity is full, the building reaches to its limit and there is no more flexibility for the future.

The cost of this high-tech cemetery is cheaper than the traditional cemetery, however, it is only a slightly cheaper. Finding a better way to bring the cost lower and make it more affordable for people is the future task.

4.3 Contemporary Garden Cemetery

4.3.1 Hill of the Buddha

Location: Hokkaido, Japan
Building Type: Garden Cemetery
Structural System: Reinforced Concrete
Architect: Ando Tadao
Construction Period: 2013 - 2016

PROJECT OVERVIEW

The worldwide architect Ando Tadao's latest project: 頭大仏 Head of Buddha, is a garden cemetery located on Sapporo Minami-ku, Hokkaido. Hokkaido is a vast land of great natural splendor and its beauty is so awe-inspiring that it evokes people to release their emotions. This project opened to the public on July 17, 2016. People consider this site as a garden more than a cemetery.

Only half of the Buddha's head could be seen from the outside which brings mysterious and scared feeling to the scene. A stone statue of Buddha weight 4,000 tons, height 13.5 meters (44 feet) is covered in a lavender hill. There was about 15 million shares lavender planting on the hill. In early summer, Buddha surrounded by millions of lavender reveals and spectacular scenery. At winter, snow accumulates on Buddha's head, the pure white snow gives the scene more sacred feeling.

Figure 72. Sketches by Ando Tadao ⁶⁴

⁶⁴ http://takinoreien.com/wordpress/?page_id=28

Figure 73. Bird eye view⁶⁵

Figure 74. Bird eye view⁶⁶

TRAVEL EXPERIENCE

The whole design is a religious scene that brings wonderful travel experiences for people. Ando Tadao explains in his lecture that typically the Buddha's whole body is visible from anywhere, and hidden in the hills increase its mystique and make the site feel more sacred.

Reaching to the Buddha, visitor has to go through a place is filled with verdure in spring, purple lavenders in summer and pure white snow in winter. One of the charm of the cemetery is how well it achieves harmony with the natural landscape. There is a water garden sit in front of the entrance. The water garden is a sacred boundary which symbolizes the separation of the material world and the spiritual world. By detouring around the water garden instead of making a straight approach, one purifies the soul and the mindset switches from the ordinary to the extraordinary. Visitor has to walk through a 135 meters tunnel to see the whole Buddha. Only Buddha's feet can be seen while you walking in the tunnel. Ando creates this scene because he believes that people feel divinity and inspired to look up from the feet to the head of the Buddha. After visitor will walk through the tunnel, one can finally look up to the Buddha statue. The sunlight from the sky and the natural scenery overhead create a blessed moment.

⁶⁵ <https://pucchi.net/hokkaido/aonarita/201608takenoreien.php>

⁶⁶ http://nikkankensetsukogyo2.blogspot.com/2016/07/blog-post_38.html

Figure 75. Lavender Landscape ⁶⁷

Figure 76. Summer Scene of Half Buddha's Head ⁶⁸

Figure 77. Water Garden⁶⁹

Figure 78. Entrance of the Tunnel ⁷⁰

Figure 79. Tunnel ⁷¹

Figure 80. Buddha Statue⁷²

⁶⁷ <http://takinoreien.com/wordpress/>

⁶⁸ Ibid.

⁶⁹ Ibid.

⁷⁰ Ibid.

⁷¹ Ibid.

⁷² <https://pucchi.net/hokkaido/aonarita/201608takinoreien.php>

Advantage

First successful point of this cemetery is the bright feeling that the site brings to people. Iwabuchi, one of the visitor says that this cemetery is not just a grave which gives people dark feelings, but a peaceful and ideal place even children would like to use.

Second successful point of this cemetery is the “park” idea. The green space of the whole site is more than 60% and along the building and pathway, there are relaxing benches on open spaces which allow people to spend time and allows kids to play.

Third successful point of this cemetery is worship activities. Each year of August, there is an event called “Spiritual Sacrifice” (御霊祭) which the fireworks will be launched for the memorial purpose. This ceremonial bonfire in the cemetery creates this spectacular scene which really surprises and inspires people.

Overall, this cemetery is not only design for welcoming the tomb sweeping visitors but also to welcoming all visitors who want to hangout and wandering in the site.

Disadvantage

The site location is far from the city which takes at least 30 minutes’ public transportation and then 10 minute of walk from the entrance to the site. Large size of the site may create wayfinding problem, especially for visitors who want to find their loved ones who buried on the site.

4.3.2 Valley of the Temples Memorial Park

Field Trip Research Time: 2016. 12. 03

Location: Oahu, Hawaii
Building Type: Garden Cemetery
Structural System: Reinforced Concrete and Wood
Architect: Ando Tadao
Project Year: 1968

PROJECT OVERVIEW

Valley of the Temples Memorial Park is located on the windward side of Oahu island in Hawaii. This memorial park was founded by Paul Whitney Trousdale in 1963. The park features an ancient Japanese Buddhist temple, but the site is not only for Buddhist. All the religions and identity are welcoming in this memorial park. There is a chapel located on the west of the park which holds the ceremony constantly. Large catholic statues, Passion of Christ, the Virgin Mary, and other various statues shows the beauty of the variety of this memorial park. Tens of thousands people have been buried in this park. This cemetery is not only popular among Hawaiian residents, but foreigners as well. Because, unlike the cemeteries in Asian country which only have twenty to thirty years of ownership, this cemetery will be perpetual owned.



Figure 81. View from the Hill

The Byodo-In Temple

The Byodo-In Temple is located at the foot of the Ko'olau Mountains in Valley of the Temples Memorial Park which is a smaller-scale replica of the over 950-year-old Byodo-In Temple, a world heritage site in Uji, Japan. The purpose to build this temple on 1968 was to commemorate the 100 year anniversary of the first Japanese immigrants to Hawaii. The main structure is the Phoenix Hall which houses the two-ton Amida statue as well as a columbarium. The Amida Buddha represents the infinite life and light surrounding all beings.

The Byodo-In Temple welcomes people of all faiths to worship, meditate or simply appreciate its beauty. Activities such as meditation gathering, youga practicing and even wedding ceremonies are always celebrated through the year.



Figure 82. Byodo-In Temple

Sacred Bell

Sacred Bell is over 6 feet high with a bottom diameter of 57 inches and weighs over seven tons. It is housed in a bell house and closely resembles the bell hanging at the Boydo-In Temple in Japan, one of the three most famous bells in Japan. An offering and ringing of the bell brings happiness and the blessing of Buddha. It customarily rung before one enters the temple to spread the enteral teaching of Buddha. Visitors are invited to ring the bell using a soft wooden log before entering the temple and the unique tones of the sacred bell clears the mind of negativity, imparts deep peace and brings happiness, blessing and a long life. Through its resonating sound, the bell reminds us that everything is transitory.



Figure 83. Bell House



Figure 84. Sacred Bell

Meditation Pavilion

The meditation pavilion was known as Tusri-Dono, which means Emperor's fishing pavilion. It is placed behind the hill of the temple and surrounded by nature which is perfect for meditation or simply rest and enjoy the beauty of nature.



Figure 85. Meditation House ⁷³



Figure 86. Nature Surrounding

⁷³ <http://www.byodo-in.com/>

Chapel

During the field trip research at December 3, 2016 afternoon, I encounter a funeral ceremony at this chapel. The function of this chapel is for Christian worship, prayer and to hold funeral ceremonies. The exterior wall of the facade has many bronze memorials carved with the bibliography of the deceased.



Figure 87. Chapel with Columbarium Facade

Figure 88. Chapel Interior

New Development – Ocean View Terrace Nature Garden

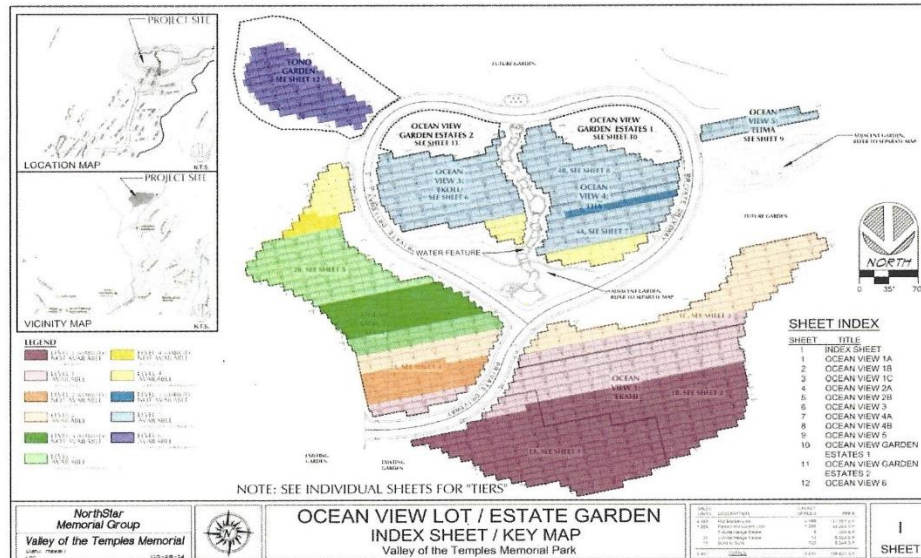


Figure 89. New Development Water Feature and Columbarium

Figure 90. New Development Plot

Through the interview with Debbi Kamakana, a family service counselor who works at Valley of the Temples, she described that the capacity of the site is getting full, therefore, a new ocean view terrace garden was developed by NorthStar Memorial Group.

Ocean View Terrace Level Pricing



GARDENS				Land	ECF	TOTAL	Sheet(s) #	Net Amount	Discount
Level One	Standard Lawn Lot - A	No View		\$ 8,385	\$ 500	\$ 8,885	1, 2, 3	\$ 7,208.00	20%
	Standard Lawn Lot - B	No View		\$ 7,285	\$ 500	\$ 7,785	1, 2, 3	\$ 6,328.00	20%
	Standard Lawn Lot - A	No View	ELUA	\$ 12,000	\$ 500	\$ 12,500	4	\$ 10,100.00	20%
Level One	Standard Lawn Lot - B	No View	ELUA	\$ 10,500	\$ 500	\$ 11,000	4	\$ 8,900.00	20%
	Standard Lawn Lot - A	No View	EKAHI	\$ 12,600	\$ 500	\$ 13,100	3	\$ 10,580.00	20%
	Standard Lawn Lot - B	No View	EKAHI	\$ 8,400	\$ 500	\$ 8,900	3	\$ 7,220.00	20%
Level Two	Standard Lawn Lot - A	View	ELUA	\$ 13,900	\$ 500	\$ 14,400	4	\$ 11,620.00	20%
	Standard Lawn Lot - B	View	ELUA	\$ 10,400	\$ 500	\$ 10,900	4	\$ 8,820.00	20%
	Standard Lawn Lot - Tier 1 - A	View		\$ 14,500	\$ 500	\$ 15,000	4, 5	\$ 12,100.00	20%
Level Three	Standard Lawn Lot - Tier 1 - B	View		\$ 11,500	\$ 500	\$ 12,000	4, 5	\$ 9,700.00	20%
	Standard Lawn Lot - Tier 2 - A	Premium View		\$ 15,100	\$ 500	\$ 15,600	5	\$ 12,580.00	20%
	Standard Lawn Lot - Tier 2 - B	Premium View		\$ 11,500	\$ 500	\$ 12,000	5	\$ 9,700.00	20%
Level Four	Monument Lawn Lot - Tier 1 - A	View		\$ 16,100	\$ 2,500	\$ 18,600	4, 5	\$ 15,380.00	20%
	Monument Lawn Lot - Tier 1 - B	View		\$ 12,500	\$ 2,500	\$ 15,000	4, 5	\$ 12,500.00	20%
	Monument Lawn Lot - Tier 2 - A	Premium View		\$ 17,285	\$ 2,500	\$ 19,785	5	\$ 16,328.00	20%
Level Five	Monument Lawn Lot - Tier 2 - B	Premium View		\$ 13,100	\$ 2,500	\$ 15,600	5	\$ 12,980.00	20%
	Standard Lawn Lot - Tier 1	View	EHA	\$ 23,500	\$ 1,000	\$ 24,500	7	\$ 19,800.00	20%
	Standard Lawn Lot - Tier 2	Premium View	ELUA	\$ 16,385	\$ 500	\$ 16,885	5	\$ 13,608.00	20%
Level Six	Standard Lawn Lot - Tier 2	Premium View	EKOLU	\$ 28,000	\$ 1,000	\$ 29,000	6	\$ 23,400.00	20%
	Monument Lawn Lot - Tier 1	View	EHA	\$ 51,000	\$ 2,500	\$ 53,500	7	\$ 43,300.00	20%
	Monument Lawn Lot - Tier 2	Premium View	EKOLU	\$ 52,000	\$ 2,500	\$ 54,500	6	\$ 44,100.00	20%
Level Five	Standard Lawn Lot - Tier 1	View		\$ 28,500	\$ 1,000	\$ 29,500	6, 7	\$ 23,800.00	20%
	Standard Lawn Lot - Tier 2	Premium View		\$ 29,500	\$ 1,000	\$ 30,500	6, 8	\$ 24,600.00	20%
	Standard Lawn Lot - Tier 3	Premium View		\$ 34,000	\$ 1,000	\$ 35,000	6, 8	\$ 28,200.00	20%
Level Six	Monument Lawn Lot - Tier 1	Premium View		\$ 49,500	\$ 2,500	\$ 52,000	6, 7, 8	\$ 42,100.00	20%
	Monument Lawn Lot - Tier 2	Premium View		\$ 51,000	\$ 2,500	\$ 53,500	6, 8	\$ 43,300.00	20%
	Monument Lawn Lot - Tier 3	Premium View		\$ 53,500	\$ 2,500	\$ 56,000	6	\$ 45,300.00	20%
Garden Estate	Standard Lot (Lots 01-10)	Premium View	EKOLU	\$ 245,000	\$ 5,000	\$ 250,000	11	\$ 201,000.00	20%
	Standard Lot (Lots 13-23)	Premium View	EHA	\$ 332,000	\$ 5,000	\$ 337,000	10	\$ 270,600.00	20%
	Premium Lot (Lots 24-26)	Premium View	EHA	\$ 495,300	\$ 5,000	\$ 500,300	10	\$ 401,240.00	20%
Garden Estate	Premium Lot (Lots 11-12)	Premium View	EKOLU	\$ 367,050	\$ 5,000	\$ 372,050	11	\$ 298,640.00	20%
	Premium Lot (Lots 01-06) - Heart	Premium View		\$ 888,500	\$ 20,000	\$ 908,500	10, 11	\$ 730,800.00	20%
	Premium Lot (Lots 07-15)	Premium View		\$ 500,000	\$ 10,000	\$ 510,000	12	\$ 410,000.00	20%

5/4/2016

Figure 91. Pricing of Nature Garden

Signature Services

This artful piece was found on Debbi's desk as a work of art, however, she says it is also use to store the ashes of the loved ones. The artwork shows below sell for \$300. Other types of memorial signature such as necklace, diamond rings, and so on are also offered by the company.



Figure 92. Artful Ashes

Accessibility

Hawaiian public transportation system is not as convenient compare to Asian countries with large populations. The city bus #8 and #65 have the stop at the intersection of the site which usually take 1.5 to 2 hours from Waikiki vs. 30 minutes by taxi which cost approximately \$40 one way.

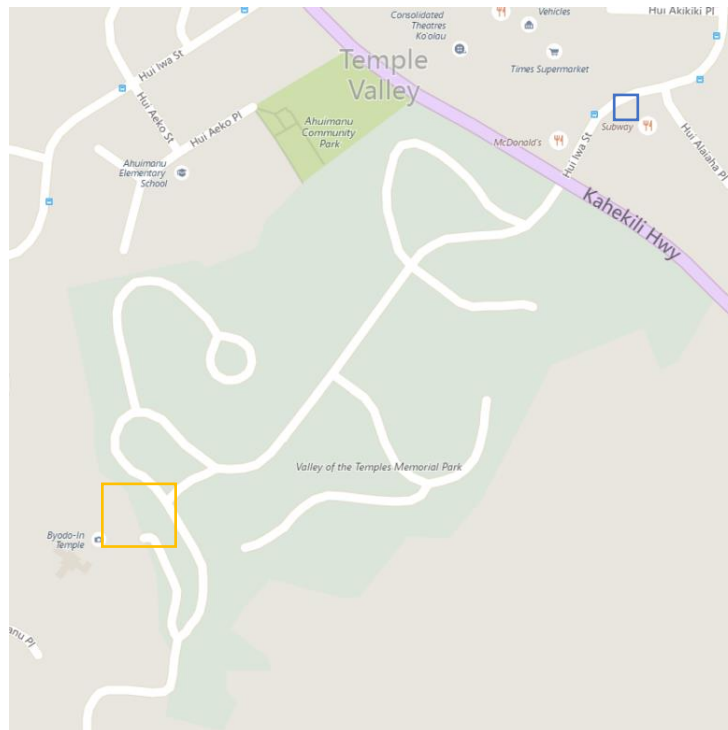


Figure 93. Map of Valley of Temples ⁷⁴

⁷⁴ <https://www.bing.com/maps>

Advantage

Valley of Temples Memorial Park is a very successful cemetery based on its culture influences and landscape design. The variety of religion and identity made this cemetery diversified. Different religious beliefs coexist in one cemetery represent the diversity of Hawaiian culture which implies a level of equal respect to all beliefs.

The variety is not only limited to different beliefs and identity, but also it accommodates all different levels of price based on different financial conditions. Figure 91. Pricing of Nature Garden shows the price range from \$8,000 to \$900,000, but still the price is quiet high.

Fengshui is extremely important especially for burial site. The site of this memorial park is leaning against mountains and facing water which consider good luck for people who live in there. Since the site following good Fengshui principle, it will create strong energy (Qi) for the buried one and their posterity. In Fengshui, Qi is a universal term for energy. It is the origin of all things. Plants can grow profusely and humans can live longer and in good health in a place with lots of energy.

Within the site, the accessibility is very convenient if you have a car. There are plenty parking space and you can also park beside the road and walk to the lawn to worship.

Disadvantage

A huge disadvantage I discovered through the field trip intervention was the sanity issue. Some traditional burial place smell bad, that may be the smell of the decomposing corpse. Along with the smell, there are a lot of mosquitos which can simply transmit diseases from one to another. The columbarium or place with cremated ashes does not have this kind of sanity problem.

Accessibility to the site could consider as another problem since it is far away from town and the inconvenience of Hawaiian public transportation.

4.4 Important Design Parameters of Cemetery Design

4.4.1 Location and Accessibility

The primary design parameter for architecture is location. To understand the context of the site location and its connections with the city is the first step. Five physical case studies exhibit two types of location: the centre of downtown and suburbs. The cemeteries that are located in the centre of downtown areas require about three minutes of walk from the adjacent stations as opposed to about 10 minutes for those located in the suburb areas.

Location influences the function and the type of the cemetery to be designed. Due to the space shortage in the downtown areas, urn storage seems a sensible and practical option. The more available land in the suburb areas provides more choices such as ground burial as well as tree burial.

Visiting Experience

	Opening Hours	Appointment	Visiting Fee (US Dollar)	Drive time from near town	Walk time from near Station
Ruriden	5:00-22:00 9:00 - 17:00 (open to public)	No	Free	15 min	2 min
Bansho-ji	9:30 - 19:30	No	Free	15 min	3 min
Shinjuku Ruriko-in	10:00 - 18:00	Yes	Free	30 min	3 min
Hill of the Buddha	Apr-Oct 9:00-16:00 Nov-Mar 10:00 - 15:00 Close: Dec29-Jan4	No	3	30 min	10 min
Valley of Temple	9:00 – 17:00	No	3	40 min	5 min

4.4.2 Architectural Space and Emotion of the Space

The architectural space efficiency of contemporary cemeteries is achieved through diversity. Temples are being converted to a single big room lined with columbarium walls. These kind of construction is easy to construct and cost efficient, however, the function of the space is complex. Case study Shinjuku Ruriko-in establish a good example for modern temple shows that space for cemetery is not only limit to columbarium wall and worship rooms. Space diversification allow the building to accommodate different functions and provide more services.

Architectural Space

	Building Type	Site Area (m ²)	Total Floor Area (m ²)	Space
Ruriden	Buddhist Temple	-	104	Columbarium Worship Room
Bansho-ji	Buddhist Temple	-	116 (3F)	Columbarium Worship Room
Shinjuku Ruriko-in	Modern Temple	962	2,294	Worship Room Waterfall Garden Entrance Hall and Lounge Meditation Room Meeting Room Seminar Room Chant Room
Hill of the Buddha	Worship cemetery	2,294	2,294	Administration Office Burial Garden Worship Space with Buddha
Valley of Temple	Buddhist Temple and chapel	970,000	200,000	Administration Office Temple Chapel Garden

Emotion, is an important design parameter

Funerary architecture need a space for emotions to release. Provide spaces for the visitors to channel their emotions, resonating either with the space or other fellow visitors is paramount design parameter. When the aura of space and human emotions reach a certain level of unison, emotional and spiritual fulfillment is being attained. Then the cemetery becomes a spiritual shelter for the heart and soul. Failing to recognize this mental aspect of funerary design would be an inexcusable blunder.

Cemetery design is mostly centered upon positive energy and the feeling of tranquility, leading people to joyful experience and positive attitude.

Emotion of Space

	Space	Emotion	Sense
Ruriden	Columbarium Worship Room	Peaceful	Vision
Bansho-ji	Columbarium Worship Room	Peaceful	Vison
Shinjuku Ruriko-in	Worship Room Waterfall Garden Entrance Hall and Lounge Meditation Room Meeting Room Seminar Room Chant Room	Peaceful Inspiring Welcoming Liberated Solemn Solemn sacred	Vision Audition Olfaction
Hill of the Buddha	Administration Office Burial Garden Worship Space with Buddha	Welcoming Peaceful Sacred	Vision Audition
Valley of Temple	Administration Office Temple Chapel Garden	Welcoming Inspiring Inspiring Peaceful	Vision Audition Olfaction Somatosensation

Five Senses

Sight / Vision
Hearing / Audition
Taste / Gustation
Smell / Olfaction
Touch / Somatosensation

Sense and sensibility translate the body experience to brain and create different thoughts and emotions. In architecture, to design sense is a hard task, if not impossible. The essence of this task is accommodation and integration.

A Britain architecture professor Juhani Pallasmaa published a book about architecture and the senses called *The Eyes of the Skin*. She thinks all the senses are extension of the tactile sense and all sensory experience are related to tactility. She argues that in architectural design, vision and touch are the dominant senses because there are more intuitive. (Pallasmaa 2005) One of the quotes from the book caught my attention and made me think that senses maybe can be switched in some ways to create interesting experiences.

“The hands want to see; the eyes want to caress.” – GOETHE, J.W. von ⁷⁵

Our experiences are the result of our perception with senses. To design an architecture is not only to simply design a decent space, but to create a wonderful travel experience and without senses there would be no experience.

⁷⁵ GOETHE, J. W. von, as quoted in PALLASMAA, J. (2005) *The Eyes of the Skin: Architecture and the Senses* (p. 14)

Senses and Technology

There are many senses being reflected and displayed in an architectural design with the ubiquitous presence of advanced technology. Modern art museums always exhibit show rooms that interact with people. To create senses for human beings by using technology could create wonderful travel experiences.

Figure 94. Rain room at the Museum of Modern Art

Figure 95. Infinity mirror room- yayoi kusama

4.4.3 Economic Affordability and Technology Innovation

“It was *death* that the public was being cheated out of by the funeral industry, not money.”

(Doughty 2014)

Nowadays, the last dwelling for human being is expensive and some are not permanent. In spite of all the land shortage and rapid population growth issues, the funeral industry is an unnoticed high profit industry. Caitlin Doughty who works in the funeral industry since her early twenties interpreted death and death industry differently. She thinks the high profit of funeral industry is caused by the lack of understanding of death. Plus, the emotion to deal with the death of loved ones make people unconscious and vulnerable which provides perfect opportunity for the business.

The economic chart compares all the plot price of each case study along with general pricing in Hong Kong, China and Tokyo. Price variation represents the various services the company provides. Ruriden is the only case study has one type of service which gives a sense of equality. However, price variation is more suitable for the market in economic perspective.

Transition from Physical to Virtual

Another big challenge is the year of ownership. Cemetery, human beings last dwelling, should be a permanent place for the deceased. Currently, the world is in the Information Age, a period of shifting the traditional industry to digital industry.⁷⁶ Digital technology has become part of human’s life. Computer and internet change the way of how people interact with each other. It could change how people will be remembered as well. Traditional cemetery need physical space to store either human bodies or cremains. By using digital technology, virtual cemetery is an innovative concept being slowly adopted in some countries. It does not require space and it could accommodate infinite information. Online worldwide cemetery could take place of traditional cemetery and become a trend.

To store memories into the digital world allows people to access the information from anywhere in the world. More importantly, this infinite storage of memories represents eternal preservation and gives an actual meaning of all who have passed away. Thus, in a technological sense, people’s perception of death can become an evolving process.

⁷⁶ https://en.wikipedia.org/wiki/Information_Age

Economic Chart

	Price / unit (US Dollar)	Maintenance Fee (US Dollar)	Year of Ownership	Capacity
Ruriden	6,600	80 / year	33	2,046
Bansho-ji	3,700 – 18,000	0-700 flat rate	Permanent	2,000
Shinjuku Ruriko-in	4,400 - 8,800	0 – 100 / year	Permanent	7,000
Hill of the Buddha	6,000-110,000	50 / year	7-33	N/A
Valley of Temple	7,000-880,000	500-10000 flat rate	Permanent	N/A
Typical Burial / Columbarium				
Hong Kong	10,000 – 400,000	10% of the burial price Typ. 400/year	20 - Permanent	
China First Tier City	3,000 +	200 / year	20-70	
Tokyo	40,000 - 100,000	105	20-30	

Building Material and Technology

	Structural System	Exterior	Interior	Technology Innovation
Ruriden	Reinforced Concrete	Wood and concrete	wood	LED lights
Bansho-ji	Reinforced Concrete	Wood and concrete	wood	LED lights
Shinjuku Ruriko-in	Reinforced Concrete	Heavy white concrete	wood	LED lights
Hill of the Buddha	Reinforced Concrete	concrete	concrete	Automated warehouse technology
Valley of Temple	Reinforced Concrete	Wood and concrete	wood	Online Services

4.4.4 Cultural Influence

As much as we fancy ourselves open-minded, we are still imprisoned by our cultural beliefs.

(Doughty 2014)

Cemetery is a place for people to remember and miss the deceased, and this place should be deeply influenced by cultural connotations. Without the presence of culture idiosyncrasy and cultural connotation, there will be no identity. Different ways of burial and different types of cemetery depict cultural variations of a nation. In Romanian, there is a unique cemetery called Merry Cemetery. It features colorful gravestones, painted in heavenly blue, and the dead being serenaded with a poem engraved. Some epitaphs are funny; some are whimsical. Romanians take the lighter side of death which shows their positive and optimistic attitude. Because of the special characteristics of its national culture, nowadays, Merry Cemetery has become an open-air museum and a national tourist attraction.⁷⁷ Same as the case studies in Japan and Hawaii. The uniqueness of cultural characteristics is mostly incorporated in their cemetery design. It's generally observed that, in most cultures, the deceased should be given proper respect from the living.

Culture Attraction

	Burial Type	Religion	Cultural Activities
Ruriden	Cremation	All Religion w/out zoning	Worship and education
Bansho-ji	Cremation	All Religion w/out zoning	Temple festival
Shinjuku Ruriko-in	Cremation	All Religion w/out zoning	Worship and education
Hill of the Buddha	Cremation	All Religion w/ zoning	Regular park activities Worship activities: Meditation Funeral ceremony
Valley of Temple	Burial and Cremation	All Religion w/ zoning	Regular park activities Concerts Wedding Funeral ceremony

⁷⁷ <http://romaniatourism.com/press-the-merry-cemetery.html>

4.4.5 Conclusion

Virtual worldwide cemetery with physical architectural space will lead the death culture to a new direction.

Human civilization is establishing on top of the death culture development. Funerary architecture originates with the concept of animism, soul never dies, and all worship ideology. However, human being always have a mental burden toward death which caused the sluggish development of the funerary architecture. Because of the shortage of the land and other economic reasons, two types of funeral architecture can be applied in the future, urban leisure place and urban landmark. To build funeral architecture in the center of the city is a way of remembering the deceased, and showing and educate the livings. The development of funerary architecture will change with time along with the view of death. Traditional funeral customs cannot catch up with contemporary social and economic development. Additionally, the rapidly aging problem brings the difficulty to another level which will force the culture and tradition shift to a new direction.

“But in vain I set out to visit the city: forced to remain motionless and always the same, in order to be more easily remembered, Zora has languished, disintegrated, disappeared. The earth has forgotten her.” (Calvino 1978)

In the book *Invisible Cities*, the author Italo Calvino express that the city that never changes will be languished, disintegrated and disappeared from the earth. Change must happen in order to survive. Abandon the bad customs, keep the good culture and adopt the new innovation is the fundamental way to improve. But more importantly, respect and remember the past. Memories will last as an essential identity of the place, and our experiences of all the places we visited will embodied into the incarnate memory of our body and mind. And those memories become part of our body and being.

5 Design Project

5.1 Design Intent

Design architecture that honor the memories of human being

Most of the human beings pass away and return to dust quietly without a trace. Death is not the end, being forgotten is. How to prove you lived once? What is your mark in the world?

If your answer is I do not know, your history will surely be lost.

From the Doc I research, I realize how small human being is and how easy we will be forgotten in time. Creating a memory library for human beings and keep records of all human beings who once lived in this world is achievable with current technology. Virtual space is infinite. It could keep and store all the data to be passed on timelessly. This new way of recording human history should be happening today, at this moment.

The best way to learn the meaning of life and appreciated it is by looking at death. To design this library of the deceased is the best way to honor their memory and moreover to educate and inspire later generations.

PROBLEM

A problem resounds for many cities that are growing as the world urbanizes and more people flock to large cities.

CHALLENGE

Cemetery that explores the relationship between life and death within the city the need to examine the condition is not efficiently response to the issue of space but also look into the preservation of human beings' memories.

OBJECTIVES

1. Explore the relationship between death and architecture.
2. Look for innovative ways a cemetery can be experienced.
3. Create a solution that efficiently addresses issue with space.
4. Define a relationship between the cemetery and the city.
5. Explore the connection between a cemetery and current culture

5.2 Design Research

5.2.1 Background Research

Barring any unforeseeable catastrophic destruction, the world population has and will always be growing. The newest demographic census shows in the end of 2015, the world has a population of 7.347 billion with China leading with 1.37 billion. In addition, China is facing a severely aging population, which in turn, will lead to a surge in mortality rate in the crisis of a ubiquitous shortage of burial space. Recent studies have revealed one outcome of the strict population policy (one child born per family) that has been enforced for centuries in China is the demographic aging trend is rapidly increasing. Figure 1 shows the population distribution in China in 2015, by age group. Nearly twenty-seven percent of the dramatic ageing of population being sixty or older. According to the demographic census 2015, Chinese average life expectancy is around seventy-five. This means in the next fifteen years, twenty-seven percent of the population will pass away, which can be translated to 367 million people dying in the next 15 years. This meteoric rise in mortality rate in the foreseeable future generates a high level of social discomfort, largely due to the seemingly unattainable affordability.

Figure 2 below offers evidence to display the huge gaping discrepancy between earnings and burial costs among its general population in china. For most of the Chinese families, one must plan years ahead while alive to prepare for the advent of death, especially in the densely populated metropolitan cities. Unfortunately, there has not been any meaningful government intervention as to ease this precarious crisis other than limiting the size of burial plots.

In addition, China is a developing country while still in its developing period, and whiles the city is being urbanized with higher density, less space for the public cemetery. Therefore, population decline and burial space have been subjects of highly contested debates. By necessities, different regions in China adopt various policies, which include the size of the plot and the length of its occupancy. The purpose of this this research is to study, analyze, compare and discuss possible feasibilities from the architectural perspective to cope with this dire situation.

Figure 96. Population distribution in China 2015

Figure 97. China average yearly wages

Ever since the return to china in 1997, Hong Kong has been facing the most severe challenge in public cemetery in terms of supply and demand. Within all the cities in

China, Hong Kong is the densest city with the most severe challenges for public cemetery. With a total land area of 1,106 square kilometers (426mi²) and a population over 7.3 million of various nationalities, it ranks as the world's fourth most densely populated sovereign state. In Hong Kong, there is barely enough land for the living, let alone the dead. Burial sites, therefore, are impractical and 90% of the population opts for cremation. However, even for a tiny square foot of niche for ashes in a public columbarium, families need to be on the waiting lists for several years to get the niche. Meanwhile, a private columbarium niche could be another option but it cost over \$100,000. According to Food and Environmental Hygiene Department (FEHD), Hong Kong, a city of 8 million people will be having a shortage of 400,000 niches by 2023. Typical columbarium building could provide around 10,000 niches which means 40 buildings need to be built in the next ten years in order to serve the market demand.

Hong Kong Current Cemetery Condition

5.2.2 Cultural Research

Understand the basic beliefs of people are necessary in order to design for the people. Traditional Chinese religion remains the most important religion in Hong Kong. Because of the Confucianism, Daoism, and Buddhism, ancestral worship plays an important role in Hong Kong society. Second large belief is Christianity. Christian churches run many educational institutions ranging from nurseries to college, as well as clinics and hospitals.⁷⁸

Chinese Religious Beliefs

Filial Piety and Order of Confucianism

Confucianism is one of the most influential religions in China. Confucius thoughts lead the Chinese education until today. It is an ethical system that sought to teach the proper way for all people to behave in society in order to lead to a just and harmonious society.

Confucianism provided ethical guides to the proper behavior of each individuals which set up the context of burial custom. In Confucianism, filial piety and courtesy are the foremost ethical principle. Before death, one should treat others with filial piety, and after death, one should treat others with courtesy. This thought set up the foundation of the traditional Chinese burial customs.

Confucianism admires and worships ancestors with filial piety as one of the major Chinese cultural characteristics. Confucianism respects hierarchy and order, emphasizing respect for the elders. Confucianism advocate elaborate funeral that include many sophisticated rituals in the process intended to show filial piety for their ancestors. This has had a profound impact of the traditional funeral custom.

Natural Law of Daoism

Daoism is a religious, philosophical and ritual tradition of Chinese founded by Laozi and Zhuangzi. Same as Confucianism, Daoism also provide ethical guides to the proper behavior of individuals. Dao (道, literally means “way”) is the fountainhead of everything. Daoism sought to promote the inner peace of individuals and harmony with their surroundings. Daoist believe there are innumerable constraints in physical world and a man who could go beyond all can truly comprehend the meaning of life.

Daoism advocate the importance of following nature’s laws. Life and death are the same just like the four seasons change, “happy to be alive, happy to be dead”. Daoism believe that people who pass away will enter an eternal wonderland, and death is the way to enter this world.

⁷⁸ <https://www.internations.org/hong-kong-expats/guide/15908-culture-shopping-recreation/religion-in-hong-kong-15922>

However, unlike the elaborate funeral that Confucianism advocates, Daoism advocate the opposite, plain funeral. Daoism have the rational brilliance of the view of life and death which deeply influences the later Chinese culture.

Reincarnation of Buddhism

Buddhism originated from India and spread into China in second century BC. After hundreds of years' dissemination and development, Buddhism become to a major religion in China which influences all levels of society. Under this culture circumstance, Chinese had deeper roots of the view of reincarnation. Buddhism brought some fundamental ideas to China which became to the essential life views for Chinese people, such as soul never dies, six realm of samsara, karma, and so on.

Buddhism consider death as a way for human to reincarnate. Death is the end of this life for human, but also it is a beginning for next life. Meanwhile, Buddhism introduce the cremation into China which had huge physiological impact for Chinese people who believe in traditional burial custom "burial bring peace to the deceased". It changed peoples view of burial and way of burial, and then became to an important funeral custom in the folk.

Resurrection of Christian⁷⁹

Chinese Christians believe a person should die at home instead of in the hospital. Often, a dying person will be brought to home to die peacefully and surrounded by loving families and friends. When the death occurs, family will remove all the mirrors from home to avoid the reflection of the casket and hang a white cloth at the front door.

After death, family or funeral professional will dress favorite outfit for the deceased and start to prepare for the wake. The wake process typically last from three to seven days, and families must ensure the candle is lit and burns continuously throughout the wake as family and friend praying for the dead. They believe the light and the prayers will help their love one goes to heaven sooner. Relatives and friends often bring white envelopes of money to the family to help defray the cost of funeral.

On the day of funeral, the family prays before the casket is taken to the burial site and each family member need to wear a piece of colored cloth on the sleeve to indicates their sadness.

Summary

Chinese people do not have a unified religion, and therefore, the traditional view of funeral and funeral customs are based on the combined influences of the three religion listed above. Death can be comprehended as reincarnation, entering an eternal wonderland, or enter to an unknown world. People refuse to accept and admit death,

⁷⁹ <http://peopleof.oureverydaylife.com/chinese-funeral-etiquette-1705.html>

therefore any religion or knowledge that could help and conquer the contradiction of life and death will be naturally adopted.

Contemporary Chinese Funeral Custom

Funeral Condolence Process

The happiest event in traditional Chinese culture is called “red and white happy event” which red represent wedding, and white represent funeral. The color represents the color of the clothes that need to be wore in the event. The celebration of death should have the same effort and commitment as the wedding.

When a loved one passed away, the immediate families need to run back immediately to hold a ceremony as a host. Relatives, friends, and neighbors need to attend the ceremony to show condolences as a guest. Usually, the ceremony will hold inside the house or have a mourning hall (lingtang) outside of the house, or near the neighborhood. The arrangement and decoration of the mourning hall need to be solemn. Usually, a photo of the deceased need to place on the center of the wall and an elegiac couplet need to place on the left and right of the photo. A rectangular desk place in the front of the photo with a memorial table on the center and red or white candles on each side. Chrysanthemum, flower for funeral, usually white and yellow color, need to place inside the mourning hall to show the respect and memory of the deceased. White chrysanthemum carries a symbolic meaning of lamentation and grief in Chinese culture, therefore, usually the guest who attend the ceremony more likely to wear a white chrysanthemum to show their condolences.

The ceremony usually will last three days after the loved one passed away, and within these three days, families, friends, and neighbors could come and show the condolences. This is not only because ancient believe the soul of the deceased will come back and visit the families within the first three days after the death, moreover, three days

provide enough time for the ceremony preparation and enough time for the family and friend who live far away to come over and show condolences.

The family members are expected to hold vigils over the dying in order to accompany the deceased until the very last moment before entering the afterlife. During the vigil, the night-watcher must make sure the light is on all the time in order for the soul to find its way home. This process is known as shou ling (守灵) which is a way for loved ones to show filial piety and loyalty to the deceased. Another reason for vigil is to pray for the soul of the dead. It is believed that the soul might face many obstacles, including torment and torture for sins committed in life. Therefore, a monk or Taoist will chant at night based on different beliefs. These prayers are accompanied by music played on the gong, flute and trumpet. Nowadays, to not disturb the residence, the chanting and music played switch from the night to the daytime.

At the last night of the vigil, a one to one scale animal which made of paper and wood need to be burned in order to lead the way for the soul of the deceased. Typically, the horse if for male and cow is for female.

Another interesting tradition is Ku Sang(哭丧), funeral cry, some people think this is superstition, even absurd. Traditional Chinese funerals honor the dead in many ways, including hiring a professional mourner to help wail for the family in their sorrow. Because louder the crying is, shows more reverence and filial piety the family has for the deceased. The professional mourner chants, cries, shouts, wails, collapses on the floor, and performs funeral cry as dramatic as possible on behalf of the family members of the deceased. In modern days, funeral cry tradition has largely disappeared in urbanized cities, but still popular in rural areas.

QingMing Festival - Tomb Sweeping day⁸⁰ Worship for Ancestor

Four traditional Chinese festivals that had been listed on national intangible cultural heritage list are: Qingming Festival, Duanwu (Dragon Boat) Festival, Spring Festival, and Mid-

Autumn Festival. Qingming Festival, also called Tomb Sweeping day, usually falls on April 4th or 5th based on Chinese lunar calendar. It has over 2,500 years of history and listed as national holiday in 1935, officially three-day public holiday. It is the most important ritual festival to worship ancestor and sweep their tomb. Qingming used to be the second of 24 solar terms on the traditional Chinese solar calendar. It is a time for people to go outside and start enjoying the greenery of spring. In contrast to the sadness of the tomb sweepers, people also enjoy hope of spring with bright sunshine and green lively natures which symbolize as a fresh start of life.

Celebration in Qingming festival are not only tomb sweeping and spring outing but also tree planting, kite flying and stick willow branches for good luck. Modern days on Qingming Festival, all cemeteries are crowded with people who came to sweep tombs, bring flowers, burning incense and symbolic paper money, and offer sacrifices. The customs have been greatly simplified today. After slightly sweeping the tombs, people offer food, flowers and favorites of the dead, then burn incenses and paper money and bow before the memorial.

Traditional Ritual of worship

Qing Ming Festival is the most important national holiday for people to visit their ancestor's grave and worship them. However, Qing Ming is not the only date for the ancestor worship. In traditional Chinese culture, people worship their ancestor four times a year which are date of die, New Year's Eve, Qingming, Hungry Ghost Festival (the 14th and 15th of the seventh lunar month).

Due to many reasons, the families could not visit the grave in person and yet they still want to worship for their ancestor. Burning paper money is the most common way to show condolences and worship to the ancestor. People believe that paper money is the money deceased would use in the afterlife world, Chinese call it "the netherworld", and to burn the money is a way of sending the money to the deceased to have a better life. Besides Qingming Festival, Spring Festival and some other festivals also require burn the paper money for the deceased. It is not necessary to burn the paper money in front of the grave, it could be next to the neighborhood, usually at the intersection because it is easier for wayfinding.

Before burning the paper money, the recipient name need to be written on each stack of paper money. Next, a magic charm needs to be drawn onto the ground to ensure ancestor will get the money and others won't take the money. The magic charm for female is a circle with a bit opening which facing the hometown or grave of the deceased,

⁸⁰ <http://www.chinahighlights.com/festivals/qingming-festival.htm>

and for male is a cross in the center and an open circle outside which the opening also facing the hometown or grave of the deceased. After the magic charm was drawn, the paper money can be burned. Once the paper money was burned, a small portion needs to be move out of the magic charm and spread to other ghost so that they won't grab the money for the ancestor. While people doing this ritual ceremony, they can talk to the ancestor to send their regards and ask them for bless.

This burning paper money ritual is a traditional Chinese ritual custom based on Buddhism reincarnation theory. It is a way to release their lovesickness. But some people think this as a superstition which is useless. Rather treat alive love one with filial piety than burn paper money to the dead.

Figure 98. Qingming Festival Ancestor Visiting⁸¹

Figure 99. Qingming Festival Activities⁸²

Figure 100. Spring Outing⁸³

⁸¹ http://www.mrbigben.com/hong_kong_website/Fesitvals/Ching_Ming_Festival.jpg

⁸² http://www.mrbigben.com/hong_kong_website/Fesitvals/Ching_Ming_Festival.jpg

⁸³ https://tingsa.baidu.com/timg?image&quality=80&size=b9999_10000&sec=1491883218&di=373543e87a34ccf20698c12684e7f2f7&imgtype=jpg&er=1&src=http%3A%2F%2Fimg1.cache.netease.com%2Fcatc hpic%2FB%2FB6%2FB678D48CBE93179AE8F2960C44A5A51E.jpg

5.3 Design Concept

5.3.1 Location and Accessibility

Site Selection – Cemetery in the city

There are several major cemeteries in Hong Kong and most of them are distributed on the outskirts of the city because the space shortage within the city. HKCCCU Kowloon Cemetery is one of the very few cemeteries located in the middle of the city adjacent to the shopping and educational districts. This site is over 90 years old and is incredibly dense that the graves and the public street are only separated by a wall. Based on my Doc I research, this site fulfills my research purpose and criterion of the major problem of space shortage.



Figure 101. MAP. HKCCCU Kowloon Cemetery

Site Access – within 5 minutes

It takes about three minutes of walk from Lok Fu station to HKCCCU Kowloon Cemetery. The major roads are well connected and the public bus routes made the site easy to access. Having a good and efficient public transportation system is pivotal to urban growth of any sorts.

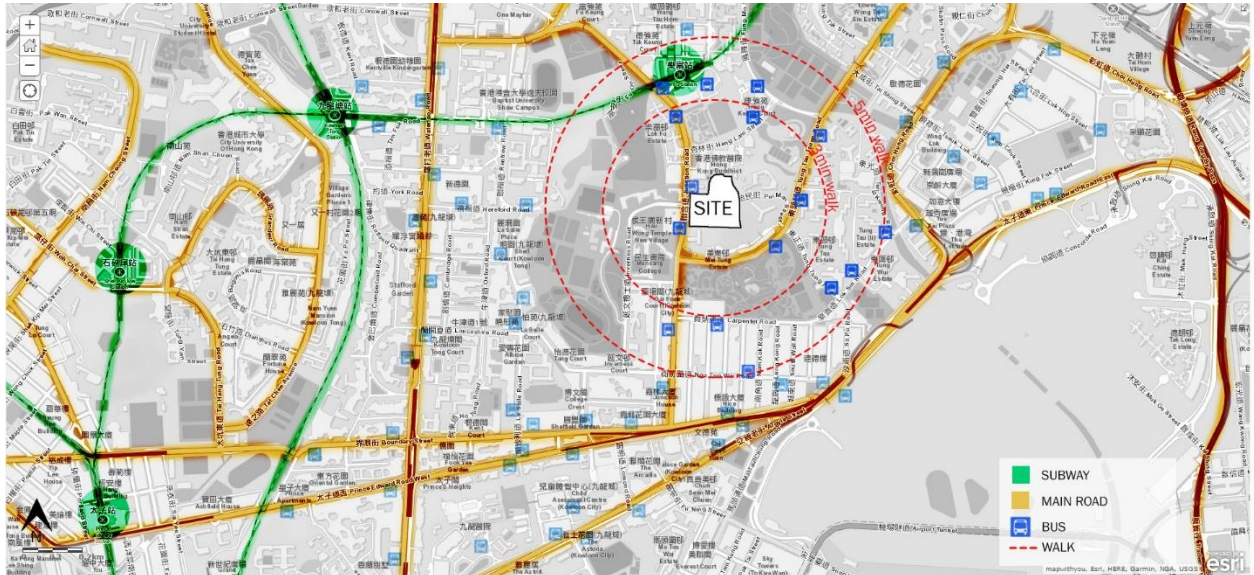


Figure 102. MAP. HKCCCU Kowloon Cemetery. ACCESS

One of the interesting phenomena I noticed during the research is many of the cemeteries are within close proximity to a hospital. The reason one can imagine. However, the site does not have any capacity to hold more people.



Figure 103. MAP. HKCCCU Kowloon Cemetery. CLINICAL BUILDING

Urban Context

The site is located next to the education district. There are many higher education institutions such as City University of Hong Kong and Hong Kong Baptist University, as well as K-12 educational institutions.

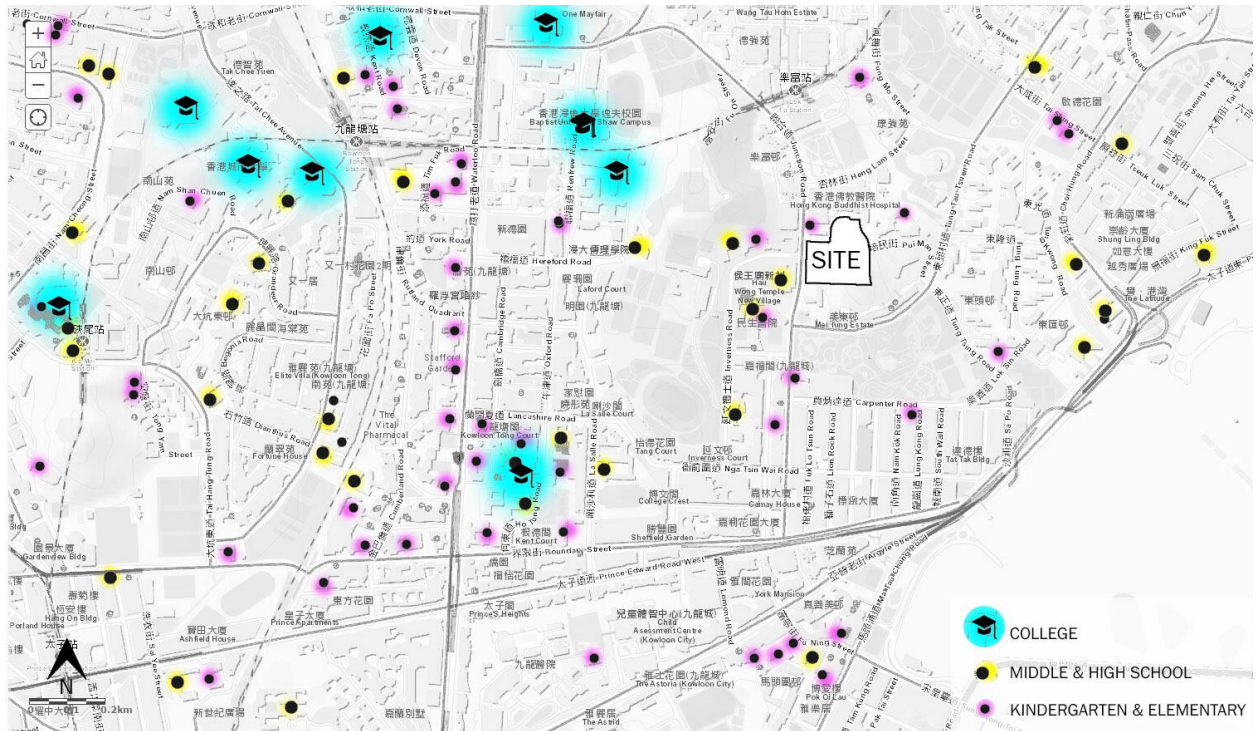


Figure 104. MAP. HKCCC Kowloon Cemetery. EDUCATIONAL INSTITUTION

Neighborhood Analysis

The site is surrounded by a hospital, schools, commercial buildings, two religious buildings and four public parks. Hybrid neighborhood presents many opportunities to the site. A new building should have good impact on its neighborhoods. In other words, this design must serve the surrounding needs on education, health and religion.

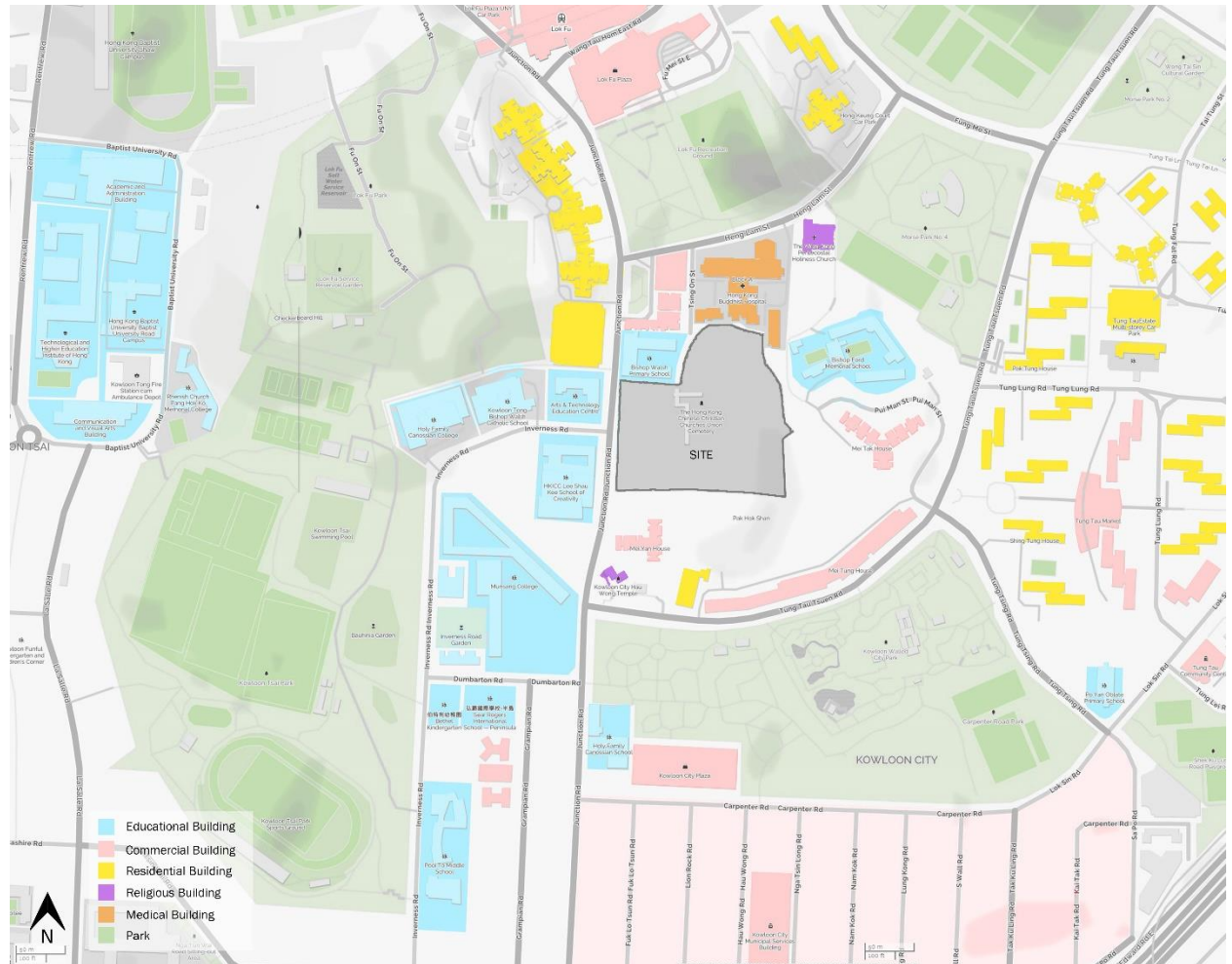


Figure 105. MAP. HKCCCU Kowloon Cemetery. SITE CONTEXT

Background

Figure 106. MAP. HKCCCU Kowloon Cemetery. ZONING ⁸⁴

Figure 107. Columbarium Building ⁸⁵

⁸⁴ http://www.eac.gov.hk/en/distco/2015dc_elect_map.htm

⁸⁵ <http://www.hkcccu.org.hk/cs/090509/JPG/2-3.jpg>

Accessibility Problem

The current site condition has two severe accessibility problems: large elevation difference and crowded people flow which creates difficulties for people's visiting experience. Because the cemetery is located on a very steep mountain, stair is the only option for large elevation change. Almost every cemetery in Hong Kong has this problem. I visited three cemeteries at the Happy Valley, south of Hong Kong. And for young people like myself felt very challenging to climb to the top of the site. Another problem for this cemetery is the crowded people flow caused by the one and only entrance along the street. There is a large amount of people flow during the Qingming Festival and other worship holidays, and one entrance function as entry and exit create this crowded condition.

SOLUTION

There was a proposal presented in the district council's committee meeting in 2012. The proposal wants to add another entrance on the site in order to solve this crowd problem. The proposal is not successful because of the very narrow street and the surrounding buildings which are a primary school and a business building that already have high people flow rate. This would not solve the circulation problem.

Figure 109. View from inside

Figure 108. District proposal ⁸⁶ Figure 110. Main Entrance

⁸⁶ http://www.districtcouncils.gov.hk/wts/tc_chi/meetings/dcmeetings/dc_meetings.php

In my design proposal, I decide to locate the building next to the church and the hospital because there was enough space behind these two buildings that could handle a higher people flow. During the worship festivals the building function as the major exit of the site. Besides accessibility reason, there is also symbolic meaning of the site location choosing. The hospital symbolizes life, and the church symbolize religion and belief, also there was a school on the east which symbolize education. These surrounding contexts has huge influences in later design development.



Figure 111. Site Plan

Travel Experience

When visitors going to the cemetery to worship their families, they will climb to the mountain and worship in front of the tombstone or columbarium. After the worship, they will walk downhill to exit the cemetery through this building. The visitors will experience their memorial journey through the building and leave the site with their good memories.



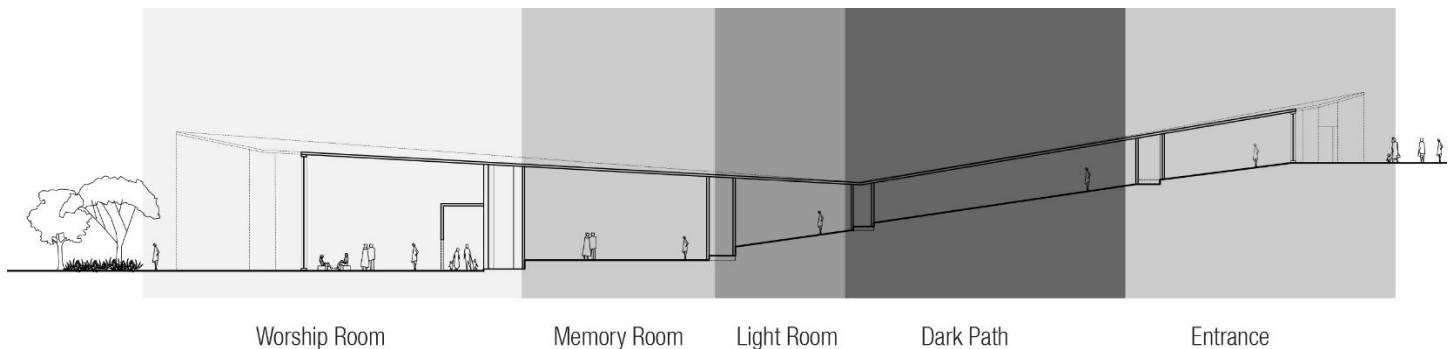
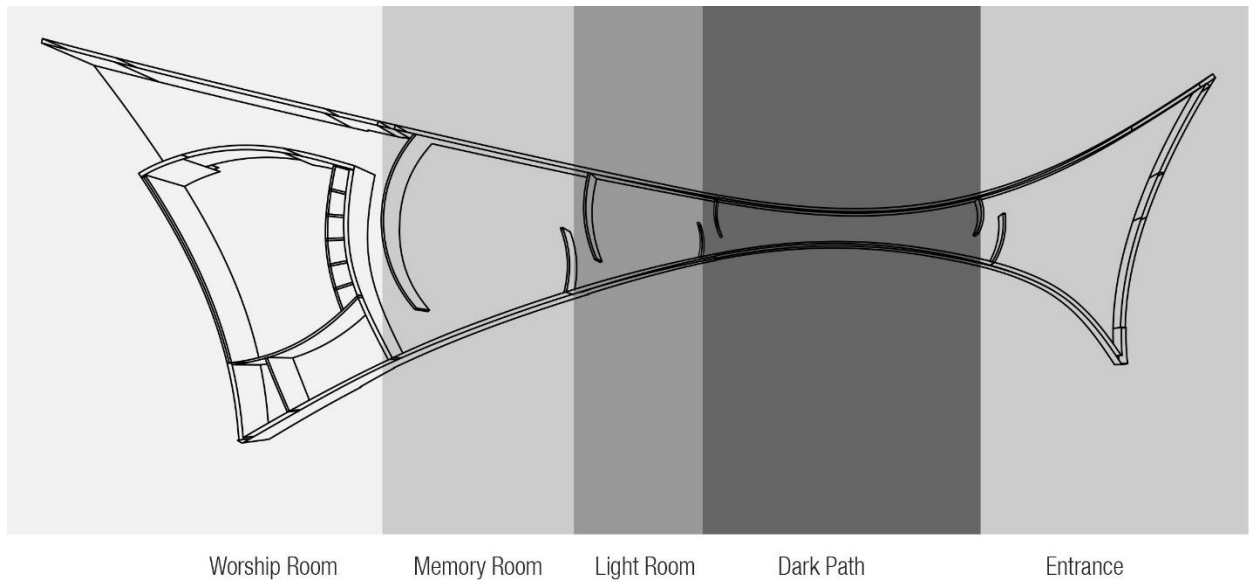
Figure 112. Travel Experience Diagram

5.3.2 Architectural Space and Technology Innovation

Dark to Light, Narrow to Wide, Death to Life

Site condition limits the architecture form, but it provides various opportunities at the same time. Long and narrow shaped site with 24 feet elevation difference provides opportunities to design narrow spaces and tall spaces.

The concept of the spaces is the transformation from dark to light and narrow to wide which symbolize the concept from death to life. The purpose of the design is to let people sense the death, cherish and appreciate life when they walk out of this building.



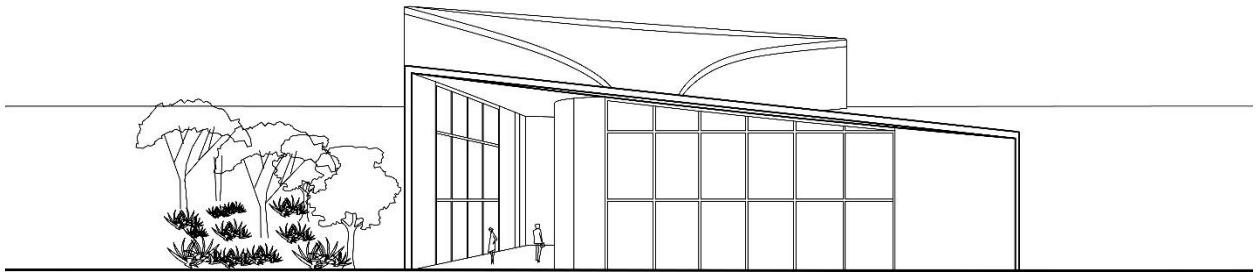


Figure 113. North Elevation

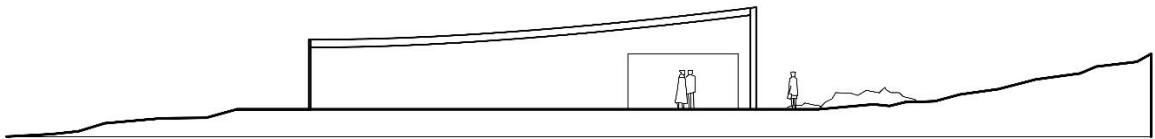


Figure 114. South Elevation

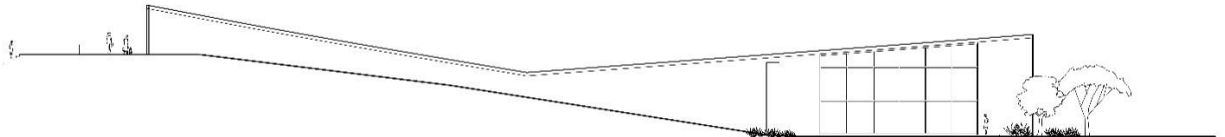


Figure 115. East Elevation

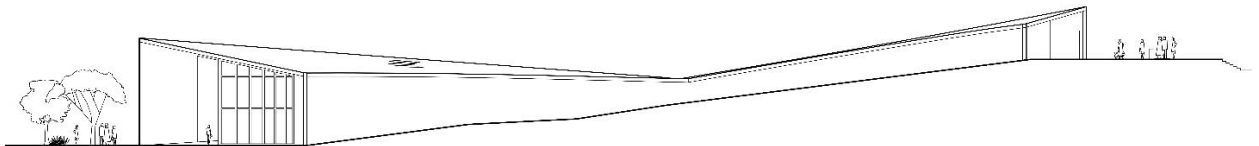


Figure 116. West Elevation

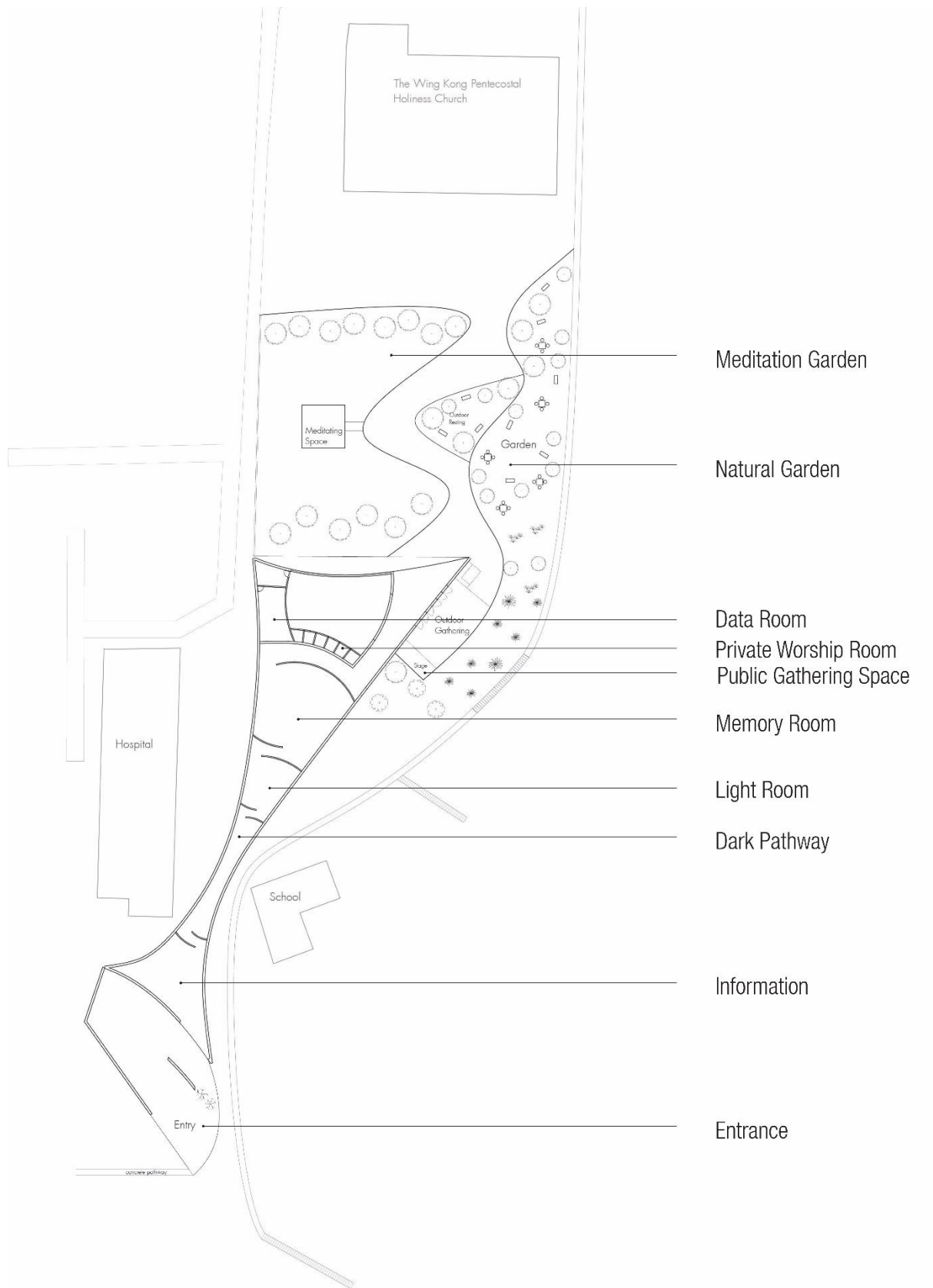


Figure 117. Floor Pla

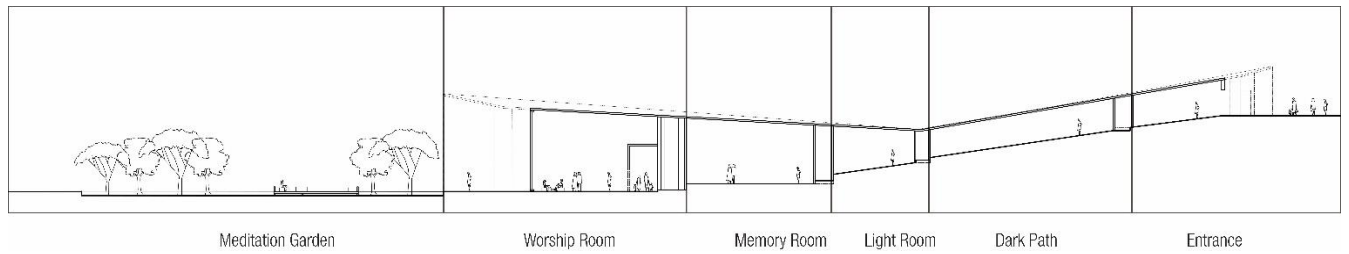


Figure 118. Section

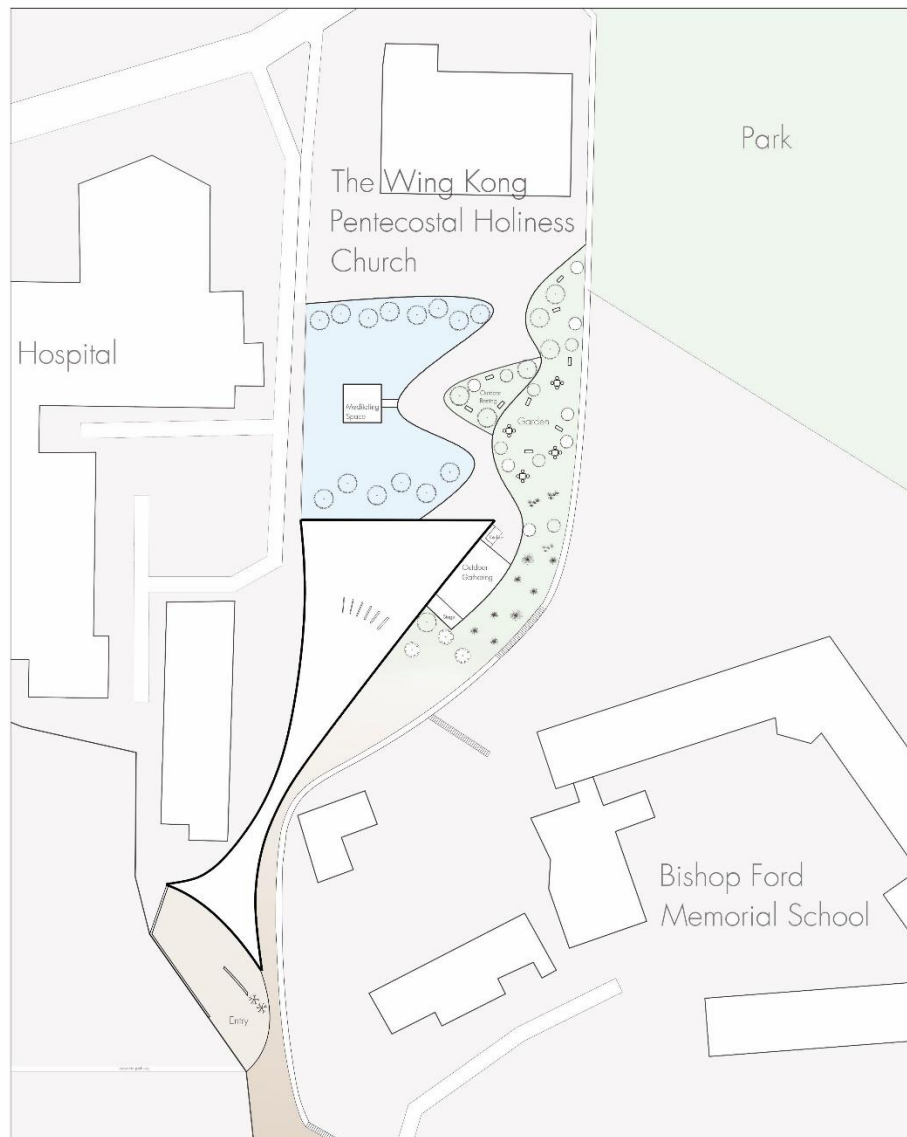


Figure 119. Outdoor Space

Entrance – Sight, Touch

The design emotion for the entrance is death. Rammed earth as the material to symbolize human being's final destination is back to earth. Pavement and the building facade use dry desert pattern to symbolize death. The pavement is slowly changing to lighter color towards the building as a transition feeling for the journey. The dead trees sculptures and the building sign in front of the entrance function as separation objects to guide people walk around the plaza.

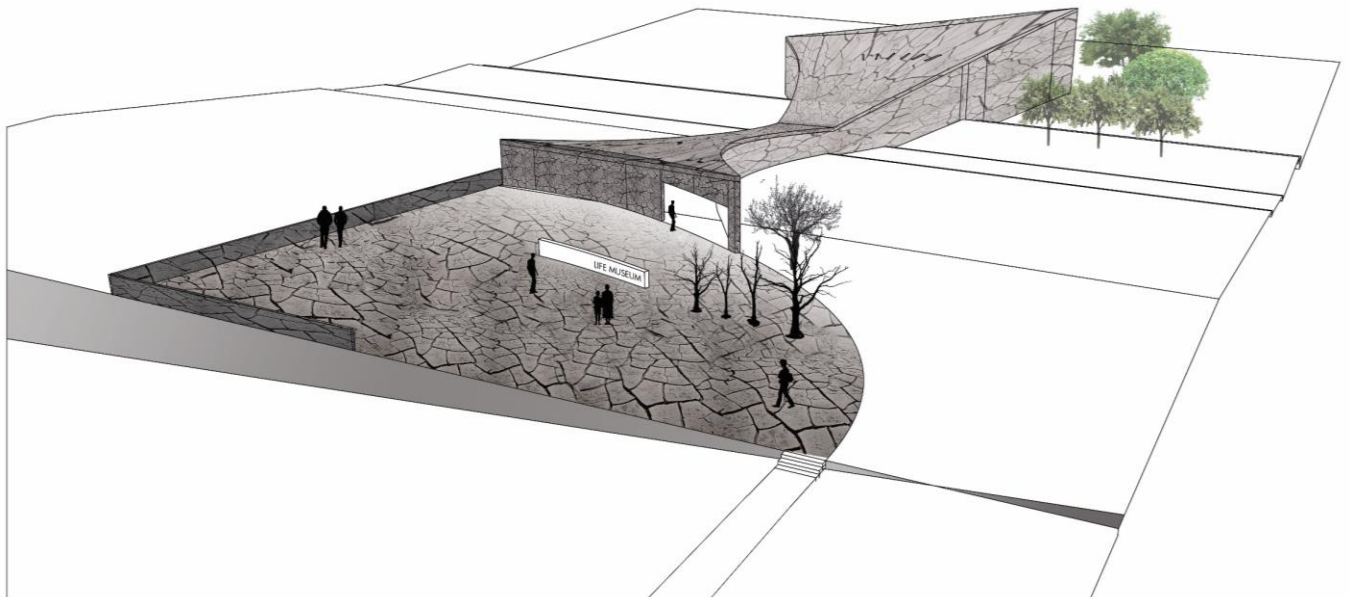


Figure 120. Entrance Rendering

Information - Sight, Hearing

Information space include reception space and information display space both provide background information for the old and new cemetery.

Dark Path – Hearing, Smell, Sight

Dark path is designed for people to experience the feeling of death. Water feature offers visitors an opportunity to experience the wet, dark feeling. The site elevation difference also provides an opportunity for the visitors to experience going into the earth by having a steep slope going downhill.

Figure 121. Rain Room ⁸⁷

⁸⁷ <https://www.moma.org/calendar/exhibitions/1352?locale=en>

Light Room – Sight, Hearing, Touch

The Light room create vision contrast compare with the dark path. Each light symbolizes a soul of a person, and the light will change according to different parameters. For instance, it can change according to the birth rate and mortality rate which is around 4.2 birth per second, and 1.8 death per second.



Figure 122. Crystal Universe ⁸⁸

⁸⁸ <https://www.team-lab.net/tw/w/crystaluniverse/>

Memory Room – Sight, Hearing, Touch

Memory room provides visual and audio media such as music, photos and videos of the deceased. Different data will display for each visitor. A person's life value and achievements also could add in the memory data which allows the later generation to know and memorize their ancestors. This also has an education purpose for people, especially young generations, to find their life value and make some achievements in their lives.

Figure 123. Cleveland Museum⁸⁹

⁸⁹ https://www.neh.gov/files/imagecache/neh_large/humanities/articles/2016-april_webimages_1_mittelman.jpg

Private Worship Room – Sight, Hearing, Touch

Private worship room function as same as the memory room. However, it allows the visitors to add and update the information of the deceased. Memories from families and friends to the deceased is the most valuable data for humanity.

Figure 124. Worship Room

Figure 125. Special Worship Room ⁹⁰

Public Gathering Place - Sight, Hearing, Smell, Touch

Public gathering place is an outdoor space with a natural garden, an outdoor kitchen, and a stage. Natural garden has public seating and tables and it is a good place for people to hangout and have social activities. It also functions as a transition area between the cemetery to the real world. The garden is design to have intimate seating space for people's alone time to miss their ancestor and think of the old days after their cemetery visiting. Outdoor kitchen and the stage are function for public amenities. The potential users of this space are the church people, hospital patients, and neighborhood residences. This public space provides an opportunity for general activities for the community.

Figure 126. Garden Seating⁹¹

Figure 127. Public Gathering ⁹²

⁹⁰ <http://www.byakurengedo.net/introduction/>

⁹¹ <http://www.trendhunter.com/trends/brush-inspired-seating-big-scrubber-garden-seat>

⁹² <http://www.istockphoto.com/search/stock/613059663>

Meditation Garden

Meditation garden is composed with a platform and water. Still water have peaceful feeling which helps the meditation. Meditation has many benefits for human mental health and it has be taught in many religions. Meditation will sharper memory and help people to manage their stress and strong emotions. It also functions as an important transition space between the cemetery and the real world.

Figure 128. Meditation ⁹³

Figure 129. Meditation along the still water⁹⁴

⁹³ <http://www.rocketswag.com/health/longevity/2012/2/How-To-Improve-Your-Mental-Fitness.html>

⁹⁴ <https://visualmeditation.co/7-types-of-meditation/>

5.3.3 Economic Affordability and Cultural Influence

How the Hong Kong public cemetery charges?

Since 1980, the HKCCC union decides the time limit for burials and niches. The compulsory exhumation of remains after a period of years is the government response to demand shortage issue. The newest research of 2017 shows different prices for different type of niches. The regular niches only allow people to use for six years and after it will transfer to the bone bank. Same as the re-use niches, six years of use without time extension. The extendable plot is more expensive which cost twenty times expensive than the six years' niches. The extendable plot has twenty-year right of use and extend every ten-year. The high extension fee caused many abandon graves.

Currently, there are 7,294 ground burial plots and 14,768 ashes columbarium units on site. On each April, the union will start a lottery for the people who are on the waiting list. Figure -Reuse Niches Waiting List clearly shows the demand shortage problem. The average waiting time is about sixty-month and there are thousands of applicants on the waiting list, yet only two or three plots are available on each public cemetery.

Figure 130. Cemetery Price Chart

重用骨灰龕輪候時間
Reuse Niches Waiting Time
(截至: 2016 年 12 月 7 日)

骨灰安置所		骨灰龕 (標準/ 大型)	現時輪候 骨灰龕人數 (約) Waiting People	最近獲邀請 配售骨灰龕 輪候編號	上一位申請人 獲配售骨灰龕 的輪候時間 waited time of last applicant (Month)	預計下次邀請 可供配售重用 骨灰龕數目 Next years available plot
哥連臣角		標準	4138	7298	54 個月	12 月 (14 個)
		大型	644	297	76 個月	12 月 (1 個)
鑽石山		標準	9197	S-9445	78 個月	12 月 (2 個)
		大型	1162	L-0944	82 個月	12 月 (0 個)
富山		標準	559	S-1008	66 個月	12 月 (1 個)
		大型	160	L-0154	79 個月	12 月 (0 個)
葵涌	I 及 III 期	標準	3156	S-1662	78 個月	12 月 (3 個)
	II 期	標準	622	S-0958	66 個月	12 月 (1 個)
和合石	I 期	標準	169	S-0624	59 個月	12 月 (1 個)
		大型	97	S-0667	28 個月	12 月 (1 個)
	II 期	標準	27	L-0084	46 個月	12 月 (0 個)
		大型	27	L-0084	46 個月	12 月 (0 個)
	III 期	標準	635	S-3969	23 個月	12 月 (0 個)
		大型	90	L-0333	58 個月	12 月 (1 個)
	IV 期	標準	314	S-0925	36 個月	12 月 (1 個)
		大型	314	S-0925	36 個月	12 月 (1 個)
長洲	I 期	標準	3074	S-0644	22 個月	12 月 (2 個)
		大型	192	L-0019	25 個月	12 月 (0 個)
	II 期	標準	---	L-0002	1 個月	12 月 (0 個)
		大型	---	L-0002	1 個月	12 月 (0 個)
	II 期	標準	---	S-00010	2 個月	12 月 (2 個)
		大型	1	L-0001	不適用	12 月 (0 個)
坪洲		標準	---	S-0007	1 個月	12 月 (1 個)
		大型	---	不適用	不適用	-
南丫島		標準	---	不適用	不適用	12 月 (4 個)
		大型	---	L-0001	不適用	12 月 (0 個)

注意：以上資料只供參考

Figure 131. Reuse Niches Waiting List

Innovative Design- Culture + Technology

Two essential factors must be concluding in the future memorial object are memory and physical remain. With today's technology, a small chip could contain a large amount of information for the deceased, such as their images and videos, letters and thoughts from the family and friends, and their values and achievements in life. As the technology developing, DNA data and neuro data could be preserved as well. In this sense, this could preserve the history for human beings. Each individual who passed away could be stored in this memorial object and they will never be forget.

Second essential factor for the deceased is the physical remain. Compare with the digital memory, human being is emotionally more attached with the physical form. Based on the Chinese culture, I propose seal as a carrier product to store the physical remains.

Seal has been recorded since the 3rd century BCE in China. It evolved from human pressed fingerprints and handprints in clay and later transformed to print on paper.⁹⁵ Nowadays, the word seal called (yin) 印 in mandarin means imprint and printing. Seal functions as a printing stamps which is used as a signature. There are three different seal types: official seal, family seal, and personal seal. Official seal symbolizes the social hierarchy from emperor to public officials. Emperor's imperial seal always buried with the emperor as a burial object. It considers as a cultural treasure for China. Family seal represents the family's reputation. Traditional Chinese family also use hierarchy for family structure. Usually, the father or the first son plays a dominant role within the family. Personal seal was popular among the intellectuals such as poets, calligraphers, and painters. They use seal as a signature to show their names in their works such as painting, poem, and calligraphy. Professionals would look at the seal first to identify the knowledge of the author. The form of the personal seal is informal which could be very different based on personal interest. Overall, seal had a long history and important influences in Chinese culture, therefore, it is a valuable object to symbolize a person's identity.

Figure 132. Qian Long Emperor Imperial Seal, Qing Dynasty 1759, ¥161,000,000 (\$23,400, 000)

Figure 133. Jia Qing Emperor Imperial Seal, Qing Dynasty 1759, ¥79,000,000 (\$11,500, 000)

Figure 134. An unofficial Personal Seal

⁹⁵ [https://en.wikipedia.org/wiki/Seal_\(East_Asia\)](https://en.wikipedia.org/wiki/Seal_(East_Asia))

The below pictures shows the seal lost its beauty along time.

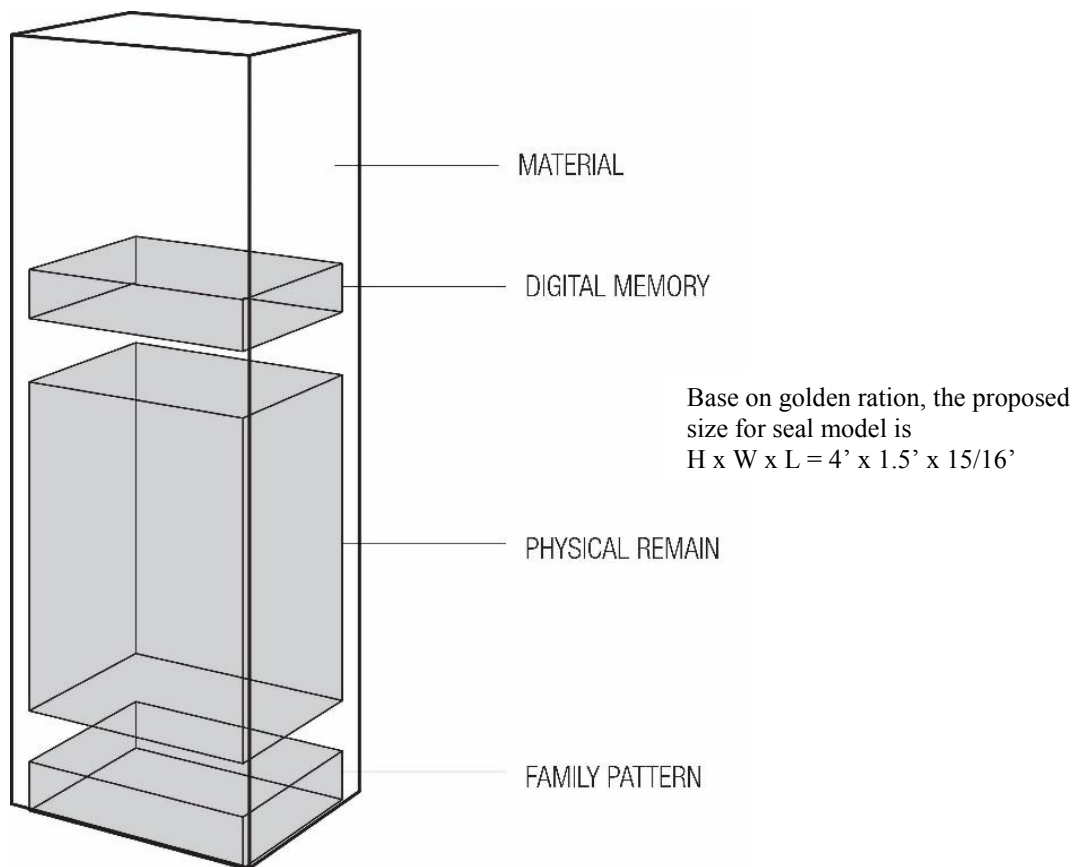
Figure 135. Personal Seal

Figure 136. Personal Seal

Figure 137. Official Seal

Figure 138. Official Seal

With modern technology, a small chip holds tremendous data could use to store a person's bibliography. Personal seal could represent a person's life and family seal could represent the family history. Seal is an art piece as well. Material and patterns variation represent the variety of culture or belief. Overall, seal function as cultural carriers.



This design product provides economic flexibility for people based on different material choice. Jade, crystal, or rare stone could be very expensive, however, wood or other stones could be very cheap. The object can be beautiful in any kind of material. The seal can function as art display as well. Each individual is a small art piece and together it can be an art exhibition.

Figure 139. The Ruriden Columbarium ⁹⁶

⁹⁶ <http://gizmodo.com/this-is-probably-the-most-high-tech-cemetery-in-the-world-1696153589>

5.4 Conclusion and Future Work

“Our imagination is the only limit to what we can hope to have in the future.”

Charles F. Kettering

This thesis aims to provide solutions for space shortages and the dilemma in cultural inheritance problems of existing cemetery. Future cemetery in the city needs to explore the relationship between life and death within the cultural context of the society. Space efficiency should not be the lone concern of designing. Cultural and historic preservation should be incorporated as well.

Design suggestions for future cemeteries in the city as follows:

1. The site should be located in the center of the city for easy access. Travel time should be under 5 minutes from the major public transportation station systems.
2. The future cemetery should function as a social hub for multiple purposes. Architectural design must incorporate various functions and provide more services for the community.
3. Future cemetery design must include emotion design in human scale. (Five senses)
4. Technology is the key tool that will solve the space shortage and enhance economic affordability problem.
5. Memory is one of the cultural treasures that needs to be preserved and inherited. Using technology to transfer abstract memories into digital data allows humans to preserve the memories infinitely.

Future Work

A myriad of different conceptual ideas have been proposed, but none implemented yet. Future work should focus on and take advantage of the incessant technological advance and its implementation. The prototype design is a lengthy and costly process and the fruition of which should be translated into feasible application. Moreover, future research efforts should incorporate more emphasis on cultural, social, and educational perspectives so a wider demand can be satisfied.

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