

A FRAMEWORK FOR NATURAL DISASTER MEMORIAL PARK DESIGN

— 5/12 EARTHQUAKE MEMORIAL PARK DESIGN

By

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Abstract

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An earthquake with a magnitude of 8.0 on the Richter scale rocked Sichuan on May 12, 2008, eventually claiming 69,227 lives, and 374,643 injured.¹ The quake toppled houses and schools, virtually destroying entire villages, and irreparably changed everyone's world there. The quake severely affected an estimated 45,547,565 residents in Sichuan province, damaged approximately 4,300,000 structures, and destroyed buildings including homes, businesses, schools, and hospitals. Thousands of innocent people lost their precious lives in this disaster. Among these people, there were young students reading out beautiful poems in books; there were mamas preparing hot milk for their kids in the morning; there were...however, those bright lives, at that moment, all became cold numbers in the history books.

A natural disaster memorial park is needed to memorialize all the survivors and victims of this great disaster, to tell stories of survival and loss, to encourage people surmounting the tragedy bravely, and to provide a refuge for future disasters.

Throughout the research conducted after the May 12 earthquake, the author has observed that no integrated system of planning and design has been established in

¹Bin Zhao and Taucer Fabio, "Field Investigation on the Performance of Building Structures During the 12 May 2008 Wenchuan Earthquake in China." *Engineering Structures* 31. no. 8 (August, 2009): 1707-1723.

natural disaster memorial park design. The thesis defines the conception of a memorial landscape and natural disaster memorial park, reviews the history of natural disaster memorial parks, and sorts through many cases of memorial parks.

A general design guideline and theory for natural disaster memorial park design will be summarized from case studies, and this guideline will be interpreted particularly in terms of the 5/12 Earthquake Memorial Park design in China.

The result of this research is an extension of an overall knowledge base and a theory explaining the difference between “natural disaster memorials” and “war memorials” design and summarizing the basic elements that constitute the physical and psychological characteristics of natural disaster memorial park design. The 5/12 Earthquake Memorial design will be a new application of the integration of the new theory about Natural Disaster Memorial Landscape design and will provide guidance and reference for park planners and designers to promote multiple functions in memorial park design in the future.

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Chapter One

Introduction

1.1 Introduction

Many countries, including Japan and China, are still at high risk for natural disasters such as earthquakes, typhoons, tsunamis, and fire. Especially when such a disaster takes place in the city, where population, buildings, and life systems are dense, the damage is huge. Earthquakes occur frequently in China. In order to memorialize and release the pain from such disasters, natural disaster memorial parks should be built.

The literature about natural disaster memorial design is limited, so many case studies need to be reviewed in order to summarize the common features of this kind of memorial park design and apply them in a real design case.

1.2 Research Questions and Purpose

The research attempts to answer following questions: What are the differences between a War Memorial and a Natural Disaster Memorial? What kind of design elements should be applied to a national disaster memorial park? How can the multisensory experience and memories be enhanced through the different design elements of the natural disaster memorial park to meet the needs of the creative visitors for a sense of a living memorial?

The purpose of the study is to provide a prototypical design solution, based upon guidelines generated from surveys and case studies, that can be applied to Natural Disaster Memorial Parks (N.D.M.P.). This study can be broken into three segments that contribute to this goal.

The first segment explores and analyzes the literature and cases surrounding the topic of all kinds of memorial parks and their basic features and differences. The study achieves

this milestone with the definition of N.D.M.P. and their basic functions.

The second portion makes a distinction between War Memorials and Natural Disaster Memorials, as well as some discussion about Disaster Preparedness and Prevention. A comparison chart, currently found on pp. 66-68, is one significant outcome of the research. Additionally, I will make a further distinction between Natural Disaster Memorial Parks (N.D.M.P.) and Natural Disaster Prevention Parks (N.D.P. P) by using different design categories.

The last segment uses the knowledge gained from the case study and survey to explore an ideal template program for N.D.M.P., which was summarized before and will be proved by the real case – the 5/12 Wenchuan Earthquake Park Design.

1.3 Key Definitions

1.3.1 The Definition of a Disaster Prevention Park

Disaster Prevention Park: In normal times, a Disaster Prevention Park is a park or land for public use, such as recreation, entertainment, exercising and ornamentation; however, when a disaster happens, it becomes the city's major disaster buffer zone to prevent the disaster from spreading, the refuge and evacuation place for residents, and a vivid educational site for learning about disaster prevention.²

1.3.2 The Difference between “Prevention” and “Preparedness”

Prevention means prevention of loss of life during a natural disaster; not prevention of a natural disaster event itself. *Preparedness* means preparedness for a possible natural disaster event in the future by providing educational opportunities and facilities in ordinary time.

²Ji Xia, “In the Research on the Planning and Design of Urban Prevention Park.” *Chinese Landscape Architecture* (2006): 77-90.

1.3.3 The Definition of Natural Disaster Memorial Park

A manmade disaster such as 9/11 is qualitatively different from indiscriminate death caused by natural cataclysm. Taylor wrote about the purpose of national disaster memorial parks, explaining,

The sheer scale of the human tragedy brought on by the unpredictable, powerful forces within our earth and by the climates that surround it should incite us all to imagine memorials that reflect our awe, respect and appreciation of nature while remembering and honoring those who died and those who live on.³

Taylor pointed out that the main purpose of national disaster memorial parks is to remember and honor the victims and survivors of the unpredictable disaster, but he didn't mention that disaster preparedness and prevention design also should be involved in national disaster memorial park design. Therefore, I provided the idea of the disaster preparedness and education in my definition of Natural Disaster Memorial Park, which is also one of the contributions of my thesis.

Based on my research, I define "Natural Disaster Memorial Park" as a special memorial park in which visitors can explore the relationship between humans and nature, seek the meaning of life, and remember the disaster victims, and in which disaster preparedness education can be provided.

³B. Brian Taylor, "Water's Healing Power." *Architectural Digest* 63, no.10 (2006, October):1-3.

Chapter Two

Literature Review and Case Study

2.1 Overview

The goals for the chapter are as follows: The literature review process began with a search for the keywords “Disaster Prevention Park” (D.P.P.) and the park’s history of development. The design features of a D.P.P. can be summarized and used in N.D.M.P. Moreover, the cases will represent all three types of memorials, followed by the comparison chart of a War Memorial Park (W.M.P.) and N.D.M.P. From these sources I will itemize the design guidelines for the N.D.M.P.

2.2 Literature Review

2.2.1 The development of Disaster Prevention Park

With the rapid expansion of urbanization and the excessive growth of population, disaster prevention has become one of humanity’s major tasks. Among various urban disaster prevention systems, the disaster prevention with memorial park is an effective way to provide not only a natural memorial, but also an evacuation place for the city. Through the analysis of the key points of the theories and cases of disaster prevention with green space in Japan, some design principles and elements of the Disaster Prevention Park will be summed up and applied to Natural Disaster Memorial Park design.

The earliest construction of disaster prevention with public green space can be traced back to the Renaissance (1450-1600). During that period, many cities were built in earthquake zones, such as Catania in Italy (1693) and Lisbon—the capital city of República Portuguesa (1755). In order to prevent and reduce the damage from earthquakes, they people changed the original layout of the city in the reconstruction plan after the quake: Narrow curvy lanes were replaced by wide straight streets, grand trees were

planted along the street, and plazas were connected by green belts, which became the basic disaster prevention system.⁴

In 1871, The Great Chicago Fire burned from Sunday October 8 to early Tuesday October 10, killing hundreds and destroying about four square miles in Chicago, Illinois. The fire was one of the largest U.S. disasters of the 19th century. Richard reported, “Of the 300,000 inhabitants, 90,000 were left homeless.”⁵ In the reconstruction plan after the disaster, the US government started to consider building the American Park System, which was to be composed of the Park (including open greenlands outside the park) and the parkway, in order to separate the crowded town center and enhance the fire prevention abilities of the city.⁶ The renowned designers of New York's Central Park, Frederick Law Olmsted and Calvert Vaux, were hired to lay out the 1055-acre park. Known originally as South Park, the landscape had eastern and western divisions connected by a grand boulevard named the Midway Plaisance. The eastern division became known as Lake Park (which was renamed Jackson Park to honor Andrew Jackson, the seventh president of the United States). There is a conduit along the parkway that connected the Jackson Park Lagoon and Washington Park Pond, and is used to channel a flood.

The Chicago Park System uses the park and parkway to separate the overbuilt central area, and to create systemic open space to prevent fire spread. This kind of planning method and the related thoughts generated the idea of disaster prevention greenland

⁴Ji Xia, “In the Research on the Planning and Design of Urban Prevention Park.” *Chinese Landscape Architecture* (2006): 77-90.

⁵F. Richard Bales, “Did the Cow Do It? A New Look at the Cause of the Great Chicago Fire,” (2004), <http://www.thechicagofire.com> (January 14, 2010).

⁶Roy Rosenzweig, “The Politics of Park Design: A History of Urban Parks in America.” *Journal of Social History* 18, no. 2: 289.

planning, which has proved highly significant.⁷ They also had great influence on the first disaster prevention greenland system plan in Japan ---- the Kanto earthquake restoration program.

In 1883, in the “Minneapolis Park System and Its Water Space Plan,” some suggestions were proposed. The first was that, given that the city was abundantly rich in water with over twenty lakes and wetlands, the Park System should be created to protect the natural environment, purify the air, and prevent fire disaster and infectious disease. The second was that it made sense to build a city waterfront park in order to protect the existing plant community and to prevent river flooding.⁸ These ideas connected park construction and disaster prevention. In the later design, the Mississippi River and many creeks and waterfalls were connected by parkways in the Chain of Lakes and the Grand Rounds Scenic Byway.

These groundbreaking notices were developed in the U.S. However, the contemporary disaster prevention park system was well-developed in Japan, which is famous for frequent earthquakes.

2.2.2 The Development of Disaster Prevention Parks in Japan

1923: The Kanto earthquake

In September 1923, the Great Kanto earthquake turned Tokyo into ruins. Fires caused by the earthquake razed the city center. According to the report, more than 140,000 people were missing or dead (90% or more were killed by the big fire), and 300,000 houses were damaged. However, greenlands and lakes in city parks had a great effect in blocking the fire and preventing the fire’s spread. Many people escaped

⁷Sonja Duempelmann, “Creating Order with Nature: Transatlantic Transfer of Ideas in Park System Planning in Twentieth-century Washington D.C., Chicago, Berlin and Rome.” *Planning Perspectives* 24, no.2 (April, 2009): 143-173.

⁸Rebecca C. Retzlaff, “The Illinois Forest Preserve District Act of 1913 and the Emergence of Metropolitan Park System Planning in the USA.” *Planning Perspectives* 25, no. 4 (October, 2010): 433- 455.

from danger by hiding in parks. During the earthquake, more than 70% of Tokyo's citizens chose parks and other public open space as their refuges.⁹ The Kanto earthquake created great pain for all the Japanese people, but at the same time, it made them realize the essential function of parks and greenland in preventing and reducing the natural disaster. Since then, Japan has assimilated the experience of the American Park System and started to plan an earthquake restoration program for the city.¹⁰

1956: City Park Law was passed

City Park Law was passed to set standards for the establishment and management of city parks. For the first time, the law regulated that parks should have a disaster prevention function.

1960: Disaster Prevention Day

The Japanese government decided that September 1 will be recognized as the annual Disaster Prevention Day.

1961: Japan Disaster Countermeasures Basic Law

The Japanese government promulgated the Japan Disaster Countermeasures Basic Law, which is helpful from the perspective of water and soil protection, project construction, and disaster prevention education and training. Since then, during the annual disaster prevention training, tens of thousands of Japanese have participated in disaster prevention drills. Relevant organizations issue to the public knowledge of disaster prevention information on ways to cope with sudden disasters to the public.

1995: Hanshin Awaji earthquake

The Hanshin Awaji earthquake measured 7.2 on the Richter scale in the southern part of Hyogo Prefecture. City parks made a great contribution: Twenty-seven parks

⁹Charles J. Schencking, "1923 Tokyo as a Devastated War and Occupation Zone: The Catastrophe One Confronted in Post Earthquake Japan." *Japanese Studies* 29, no. 1 (May, 2009): 111-129.

¹⁰Carola Hein, "Shaping Tokyo: Land Development and Planning Practice in the Early Modern Japanese Metropolis." *Journal of Urban History* 36, no. 4 (July, 2010): 447- 484.

in Kobe became refuges for residents.

After 1990s: Natural Disaster Memorial Parks

Many cities in Japan started to plan and build disaster prevention parks, such as Miki Earthquake Disaster Memorial Park (Miki City, Hyogo) and Osu Disaster Prevention Park (Ichikawa, Japan).

2005: Earthquake Disaster Management Reduction

In March 2005, the Central Disaster Management Council established an “Earthquake Disaster Management Reduction” that sets concrete goals for disaster mitigation by strategically and intensively promoting steps that include making housing and public facilities earthquake-resistant and tsunami countermeasures.¹¹

2.2.3 The Development of Disaster Prevention Parks in China

Meanwhile, in disasters such as the Chichi Earthquake in Taiwan and the Tang Shan earthquake in China, urban parks play an important role as refuges and evacuation areas. Based on the Japanese and Chinese experience in disaster prevention and reduction, the concept of the “Disaster Prevention Park” was defined and is cited below:

*In normal times, a Disaster Prevention Park is a park or land for public use, such as recreation, entertainment, exercises, and aesthetic pleasure. However, when a disaster happens, the park becomes the city's major disaster buffer zone to prevent the disaster from spreading, the refuge and evacuation place for residents, and a vivid educational site for learning about disaster prevention.*¹²

¹¹Katsutoshi Suganuma, “Recent Trend in Earthquake Disaster Management in Japan.” *Quarterly Review* 19 (2006): 91-95.

¹²Jing-Qi Li and Ji Xia, “Study of Urban Disaster Prevention Park Planning.” *Chinese Landscape Architecture* 7 (2007).

2.3 Summary of Literature Review--- Key Features in the Disaster Prevention Park

Design:

1. Site selection:

Site selection should avoid natural disaster-prone areas, such as earthquake regions, volcanically collapsed basins, landslide areas, and so on.

Site selection should take into consideration the advantages of high altitudes and of flat, open, and safe areas that can prevent earthquakes, floods, and tsunamis. In northern China, parks should avoid wind gap districts, establish protection forests, and provide protective facilities against cold and freezing conditions; in southern China, they should avoid waterlogged zones of low-lying land, establish protection forests, and include water features such as ponds, streams, and fountains in and around the park. Open areas with convenient transportation should also be considered in the park design, as these can be used as refuges where people can put up temporary tents and other facilities when necessary.

Artificial Environment:

Site selection should avoid or keep far away from manmade disaster-prone areas, such as factories that produce flammable and explosive dangerous goods, EHV or UHV transmission lines, houses that have been declared unsafe for habitation, and chemical manufacturers. The park design should take into consideration a convenient transportation system, sufficient living supplies, necessary additional facilities, a fire protection strip, and emergency evacuation routes.¹³

2. Landform--Flat

Most disaster prevention parks are located in open, flat areas, far away from tall buildings, that allow people to evacuate more easily. The main landform should be the flat

¹³马亚杰, 苏幼坡, 刘瑞兴,“城市防灾公园的安全评价.”*安全与环境工程* 1, (2005): 50-52.

terrain, and the angle of the gradient should be less than 30 °(< 30 °).¹⁴ If there are some steep slopes or is other land topography in the original site that is not suitable for excavation or use, they should be preserved and fastened by retaining walls or vegetation fences, in order to prevent the risk of debris avalanching and flowing when the earthquake occurs.

In order to increase the size of per capita index of the evacuation area, the paved area should be larger than the normal park. Paved squares or plazas and gentle lawns should be placed in flat and accessible areas that can be used as emergency shelters. The space under the plaza can be used to house water tanks and a warehouse, while the space above the ground can be used as a helicopter landing area.

The slope of the lawns should be really gentle, making them better for setting up tents. Fountains, ponds, and large constructions are obstacles during emergency evacuating, so they should not be built in the middle of public squares or emergency evacuation routes.¹⁵

3. Water

Various forms of water can not only be created as pleasant landscapes, but also can be used as fire water and drinkable water when there is a disaster.

Ponds and wetlands can store water and adjust the aquatic environment. For example, the wetland in Yuan Dynasty Capital City Wall Relics Park is the biggest manmade wetland in Beijing at, about 17000 m². During normal times, the wetland can beautify the environment and clarify the water; during a flood period, it can prevent a flood.¹⁵ Some riverfront parks, such as the Wuhan Riverfront Park, uses multiple layer banks combined with various landscapes, which not only prevent flooding, but also provide a public park for normal use.

¹⁴Tao Zhu, Suihong Kong and Bo Lan, "Research on Planning of Urban Seismic Shelter in Guangxi." *Cities and Towns Construction in Guangxi*, no. 06 (2009): 83-86.

¹⁵Ji Xia, "In the research on the planning and design of urban prevention park." *Chinese Landscape Architecture* (2006): 77-90.

Water is a natural fire barrier, and a water route can be used as an important means of transportation during a disaster. When the land route is blocked, the water route can be used for evacuation.¹⁶

4. Buildings

Based on the research, buildings in the disaster prevention park should have anti-quake architectural and fireproof structures, and they usually should be no more than 1-2 floors. They should have basements that can be used as temporary shelters during earthquakes. There should be enough space between buildings to be helpful in fire prevention.¹⁷

5. Plants

Plants provide shade and green for people in normal times. When there is an earthquake or a hurricane, some plants may support collapsed buildings or constructions, and their thick branches and leaves can prevent the building debris from falling down. Plants can lower the fire heat, and the vertical planting or fences can stop fire from spreading; in particular, roadside trees may maintain a safe and accessible emergency evacuation route and reduce life and property loss.

Plants selected for these purposes should have three basic features: 1. They should not catch on fire easily; 2. They should be hard, making them less flammable; and 3. They should provide wind protection and shade. Additionally, disaster prevention plants must have thick leaves that contain a lot of leaf water in order to prevent the fire, strong trunks and branches that can support buildings and help keep them from falling down, big crowns that can block the fire from spreading, and special features that can be used to make the

¹⁶P. Melby and T. Cathcart, *Regenerative Design Techniques: Practical Applications in Landscape Design*. (John Wiley & Sons Inc., May 2002).

¹⁷Yue S. and Y. Saito, "Inspirations from the Disaster Prevention with Public Green Space in Japan." *Chinese Landscape Architecture* (2007): 6-10.

emergency evacuation route easy to identify.¹⁸

Evergreen trees with wide leaves will be the first choice. However, if only this kind of tree is planted, the whole park will be very dark and escape from it will not easy,¹⁹ and the landscape will be simple and boring. Therefore, it is better to combine evergreen trees with some deciduous trees and flowers that can provide different landscapes in different seasons.

Types of trees that can be considered include the schima superba, the Qiongya hypericum, the Chinese Banyan, Taiwan Acacia, the Common Garcinia, the Terminalia catappa, the Japan Arrowwood, the Glossy Privet, the Chinese photinia, the Japan Euonymus, the palm, the Japan Arrowwood, the Ginkgo tree, the Japan Pagodatree, the Chinese poplar, the Cherry Blossom and so on. However, some plants that catch on fire easily, such as the camphor tree, the Sweet Osmanthus, the Red Cypress, the Orientalis Arborvitae, the star anise, and others, should be carefully placed.¹⁶

Plant Management:

In order to strengthen the plants' ability to be earthquake-proof and supportive, caretakers should refrain from pruning the tops of the main plants along or around streets and buildings, because when plants are not pruned their roots can develop fully, providing enough support to keep buildings from weakening or falling. Also, the planting bed should

¹⁸Puying Wu, "Functions of Urban Green Space and Plant Selection for Reduction and Prevention of Urban Disaster." *Zhongguo Yuanyi Wenzhai* 25 no. 07 (2009).

¹⁹Xiumei Lu, "The Plan Research of Disaster-proof Parks." *Journal of Hebei Institute of Technology* 28, no. 4 (2006).

not be higher than 70 cm in order to fulfill the users' requirements for disaster prevention.²⁰

6. Disaster Prevention Facilities

Disaster prevention facilities should be considered as part of the entire natural landscape. For example, the emergency well can be ornamented with a rockery landscape or plants (Figure 1); instead of being exposed to the public, the tap water pipes in the lawn can be decorated with plants' roots or leaves; the sound box can be made to look as if it is a rock; the monitor device can be combined with street lights; and so on.

The disaster prevention facilities of Qi Chuan Palace memorial park in Japan were designed as inconspicuous landscape elements. The treelawn around the entrance pond can stop the fire from spreading; the catch basin under the water fountain can collect rainwater for emergency needs (Figures 1, 2); the central plaza can provide an emergency evacuation place for the residents, and the underground space of the plaza can be used to store emergency supplies.²¹



Figure 1. Catch basin.



Figure 2. Catch basin.

Figures 1-2 retrieved August 12, 2009, from

Xia Ji. (November, 2006). Research on the Planning and Design of Urban Prevention Park.

Huazhong University of Science & Technology, 2006: 82

²⁰刘川和徐波等,“日本阪神、淡路大地震的启示.”*国外城市规划* 4,(1996): 2-18.

²¹曹鹏程,“绿化带阻止火灾蔓延,小广场能降救援飞机.”*环球时报*(2004).

2.4 Case Study

The following case studies are categorized under four kinds of park: war memorial parks, natural disaster memorial parks, disaster prevention parks and other memorial parks. If applicable, each case study contains the memorial information, as well as background information, followed by a listing of important features that can be applied in the design: Physical Environment Elements, Sensory Stimulants, and Psychological Elements. These are three important and well-connected categories of a successful design. Physical (man-made and natural) environment elements stimulate people's senses and behaviors, and multisensory elements influence people's psychological responses. The landscape designer must manage physical environment elements, sensory stimulants, and psychological elements to achieve the intended sense of place.

Not all case studies contain all design features, but they all have some notable features that can be used in future designs.

2.4.1 Review of Existing Memorial Parks

War Memorials:

1. Vietnam Veterans Memorial

Washington D.C
Designer: Maya Lin
Year: 1982

Background:

Black-granite, V-shaped Memorial Wall, with its west arm pointing to the Lincoln Memorial and its east extension reaching toward the Washington Monument. Granite panels: each 246 feet long. Inscribed on the wall are the names of 58,000 victims.

(See Figures 3, 4)

Most important features in this design:

Site Selection: Capital city—Washington D.C.

Physical Environment Elements:

Space form: Triangle/ V-Shape

Landform: Descend. The landscape descends into the memorial, which represents the shame and evil of warfare.

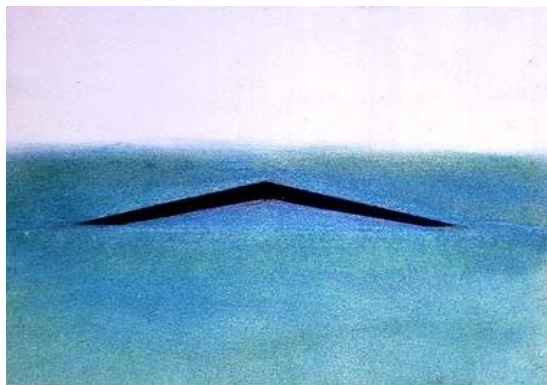


Figure 4. Vietnam Veterans Memorial.

Grass: Its open nature encourages access on all occasions, at all hours, without barriers, and yet it frees the visitors from the noise and traffic of the surrounding city.

Manmade Constructions: The black-granite Memorial Wall with all victims' names evokes a strong feeling of sadness and memory of victims who lost their lives in the war.

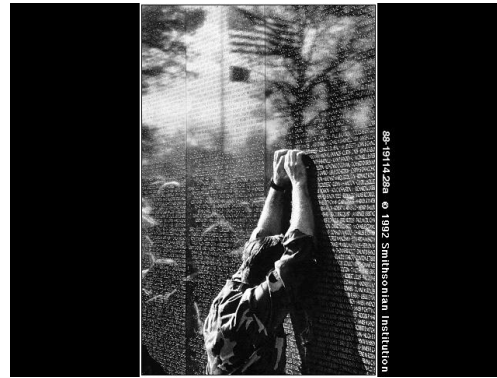


Figure 3. Vietnam Veterans Memorial.



Figure 5. Names etched in granite send a timeless message.

Sensory Stimulants:

Color: Black. It represents heaviness, grief, sacredness, coldness, fear.

Tactile: By touching the cold names etched in granite, people can feel the distance between life and death.²² (See Figure 3)

Sight: The enclosure design makes people's view focus on the names of victims, which are really powerful and strong.

Psychological Elements:

All the elements above evoke people's emotion of sadness, grief, sacredness, coldness, fear and respect for freedom.

Figure 3 retrieved August 7, 2009, from

<http://photo2.si.edu/legacy/legacy.html>

Figures 4-5 retrieved August 7, 2009, from

<http://www.loc.gov/exhibits/treasures/images/tlc0135.jpg>

²²Maria Dorsey, "The Effects of Visiting the Vietnam Veterans' Memorial on Adjustment to Bereavement," (August, 2006), <http://edt.missouri.edu/Summer2006/Thesis/DorseyM-072706-T5740/research.pdf> (accessed April 7, 2009).

2. Deportation Memorial (World War II)

Paris, France

Designer: G. Henri Pingusson

Year: 1962

Background:

This deportation memorial houses this hallway which is lined with 200,000 lighted crystals, in memory of the 200,000 French victims who died in Nazi camps.

(See Figures 6, 7)



Figure 6. Deportation Memorial.

Most important features in this design:

Site Selection: Capital city – Paris

Physical Environment Elements:

Space form: Triangle

Landform: Descending. The landscape descends into the memorial, which creates a scary and depressed atmosphere.

Grass: Open, grassy land gives people a serene place for contemplation and rest.

Manmade Constructions: Black metal sculpture and windows hanging on the white wall remind people of a prison.

Sensory Stimulants:

Light/Shadow: This deportation memorial houses this hallway, which is lined with



Figure 7. Deportation Memorial.

200,000 lighted crystals in memory of the 200,000 French victims who died in Nazi camps. (See Figure 12)

Color: Black, White and Gray represent heaviness, grief, sacredness, coldness, fear.

Tactile: By touching the rough concrete walls, people can feel the tough period during the war. (See Figure 8)

Sight: Views through the narrow walls toward the sculpture hanging on the white wall make people feel scared and uncomfortable; they also recall their old memories of the war time. Views from an enclosure, dark space make people focus on the endless names of victims. (See Figures 9, 10, 11)

Psychological Elements:

All the elements above evoke people's emotions of grief, sacredness, coldness, and fear.

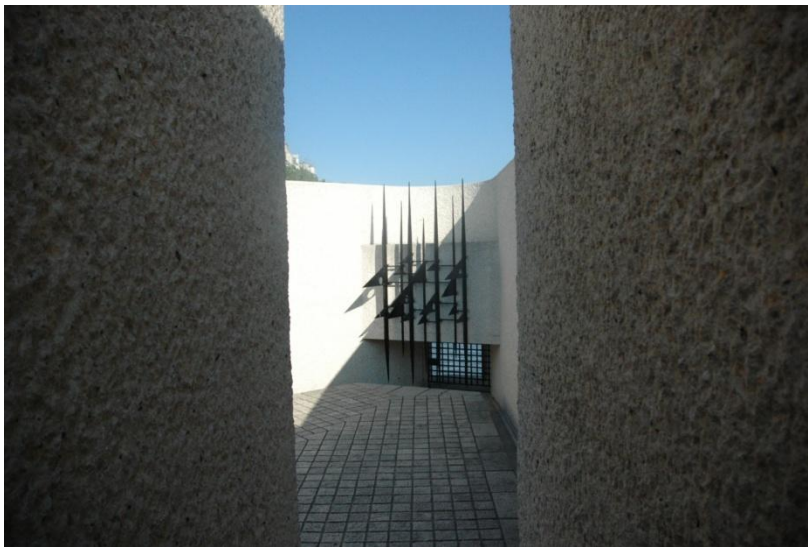
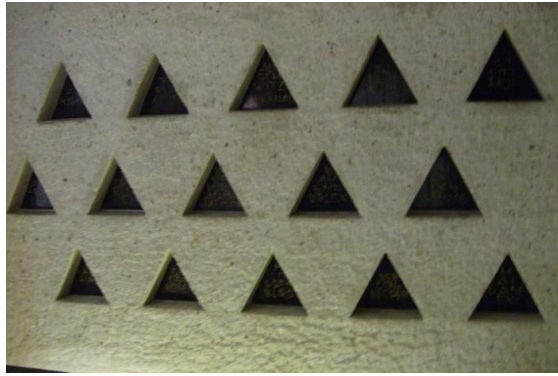


Figure 8. View through walls.



Figures 9. Entrance.



Figures 10. Symbolism.



Figures 11. Symbolism.



Figure 12. Endless names-- Crystal-Lined Hall in Deportation Memorial.

3. 9/11 Memorial Park

New York, the United States

Designer: Michael Arad, Peter Walker and Partners, Davis Brody Bond, Snøhetta.

Year: 2004

Background:

The National September 11 Memorial was built to memorialize and honor the nearly three thousand men, women, and children who died in the horrific attacks of September 11, 2001. (See Figure 13)

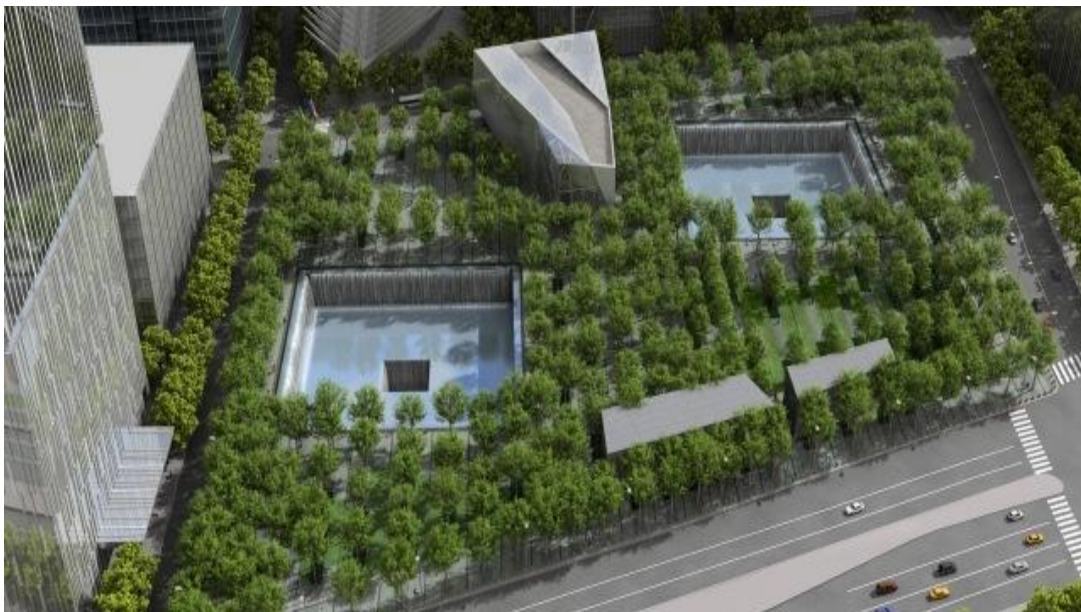


Figure 13. Eight-acre Memorial quadrant (Rendering by Squared Design Lab).

Most important features in this design:

Site Selection: Original Site – New York

Physical Environment Elements:

Space form: Square

Landform: Descending. The landscape descends into the memorial, which retains the footprints of the World Trade Center.

Water Feature: Two very large memorial pools are where the Twin Tower used to be. Huge waterfalls tumble down their sides, evoking vivid memories of the attacked buildings and of the nearly 3,000 individuals who were killed in the September 11 attacks in New York

City.

Plants: Groves of trees that represent life and regeneration evoke life with living forms, and will create a contemplative space separate from the sights and sounds of the surrounding city.

Sensory Stimulants:

Light/Shadow: Light represents a bright future. In this design, “Inversion of Light” as a living memorial represents world peace. It means that future generations should remember this great tragedy in order to pursue a peaceful life in the future.

Sound: The sound of the waterfall will block the noise of outside traffic and help people to release their pressure and negative feelings.

Color: Black, representing grief, sacredness, coldness, fear. Blue represents peace and helps people healing from the pain. Green represents life and hope.

Tactile: By touching the waterfalls, people can feel the reconnection between life and death.

Sight: Nearly 400 trees create a contemplative space separate from the sights and sounds of the surrounding city.

Psychological Elements:

All the elements above evoke people’s emotions of fear, grief, sacredness, hope, and peace.

Figure 11 retrieved August 16, 2009, from

<http://trendsblog.co.uk/?cat=17>

4. USS Arizona Memorial (USAR)

2 miles west of the Honolulu Airport in Pearl Harbor on the island of Oahu

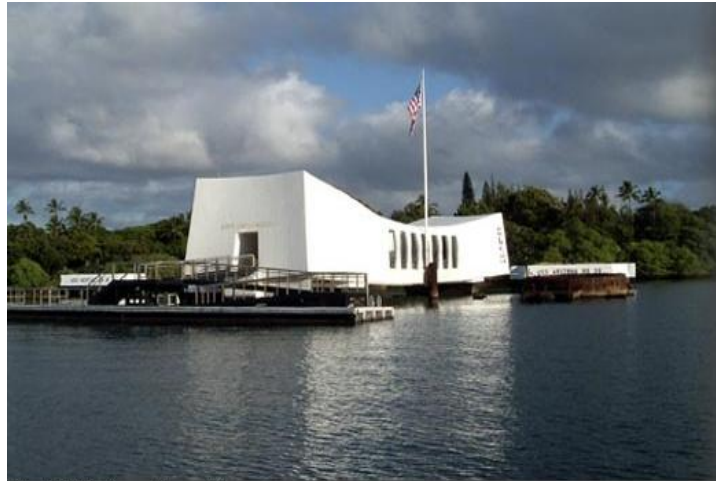
Designer: Mr. Alfred Preis of Johnson, Perkins, and Preis of Honolulu.

Year: 1960

Background:

On December 7, 1941, the sunken battleship *USS Arizona*, was bombed by the Japanese torpedo planes, and the USS Arizona Memorial (USAR) was built over the remains of the ship to remember and honor the 1,177 crewmen were killed in this battle.

(See Figure 14)



The USS Arizona Memorial

USS Arizona Memorial

Figure 14. USS Arizona Memorial.

Most important features in this design:

Site Selection: Original Site – where the event happened

Physical Environment Elements:

Form: Bridge

Manmade Constructions: The new memorial structure would span the original wreck of the *USS Arizona*.

Sensory Stimulants:

Sound: The memorial is surrounded by water, so visitors can have a submerged sense of floating while listening to the sound of the sea lapping against the boat.

Color: White, representing sacredness, peacefulness.

Sight: The design featured a submerged viewing area where visitors could view the sunken ship through portholes.

Psychological Elements:

All the elements above evoke people's emotions of honor, courage, and tragic humanity.

Figure 14 retrieved August 16, 2009, from

<http://www.arizonamemorial.org/locations/arizona-memorial-location.html>

5. Nanjing Massacre Memorial Hall (China)

Nanjing, China

Year: 1985

Background:

The Memorial Hall is built to commemorate 300,000 people who were brutally slaughtered by Japanese army (1937-1938). (See Figure 15)



Figure 15. Nanjing Massacre Memorial Hall

Most important features in this design:

Site Selection: Original Site –where countless human bones of the victims of the massacre were excavated

Physical Environment Elements:

Space Form: Combination of Square, Triangle, and Rectangle

Landform: Half underground

Water Feature:

Combining reflection ponds, which serve as a tribute to the spirits of the victims, with sculptures will create a sacred, peaceful, and serene place for contemplation, healing, and remembrance. (See Figures 16, 17)



Figure 16. Exhibition hall.



Figure 17. Sculptures.

Manmade Constructions:

Outdoor exhibits: The outdoor exhibit includes statues, sculptures, relief carvings, tablets, and a large wall listing the names of victims, as well as an atonement tablet and a memorial walkway. The memorial walkway displays footprints of survivors.

Exhibition hall: The tomb-like exhibition hall, half-underground, contains a large number of historical documents and records related to the massacre. (See Figure 16)

Sensory stimulants:

Water: Reflection ponds serve as a place for personal contemplation to reflect on the spirits of the victims.

Color: Gray, representing fear, sacredness, and grief. Gray cobblestones represent countless bones.

(See Figure 18)



Figure 18. Nanjing Massacre Memorial

Tactile: When people touch the water, they will feel the reconnection between present and past.

Sight: Sculptures were well organized as several focal points.

Psychological Elements:

All the elements above evoke a feeling of grief, hatred, unforgettability, and contemplation.

Figures 15-18 retrieved August 16, 2009, from

<http://www.panoramio.com/photo/8515082>

6. Berlin Holocaust Memorial

Berlin

Designer: Peter Eisenman

Year: 1999

Background:

The Holocaust Memorial commemorates nearly six million Jews murdered by Hitler and his forces during World War II. (See Figure 19)



Figure 19. Berlin Holocaust Memorial by Peter Eisenman.

Most important features in this design:

Site Selection: Capital City – Berlin

Physical Environment Elements:

Space Form: Rectangle

Landform: Wave-like pattern. The gray concrete slabs undulate in a wave-like pattern.

Each one is a five-sided column, individually unique in shape and size. Some are only ankle high while others tower over visitors. The paths that are shaped between the slabs undulate as well.

Manmade Constructions: The Berlin Holocaust Memorial is made up of 2,711 gray stone slabs that bear no markings, such as names or dates. Each slab can be seen as an individual monument.

Sensory stimulants:

Light/Shadow: Walking through the shadow of slabs is just like walking through many graves; people will feel scared and disoriented.

Color: Gray, representing fear, the sacred, and confusion.

Sight: The view through parallel slabs is limited, which makes people feel depressed and confused.

Psychological Elements:

All the elements above evoke a feeling of groundlessness and instability—a sense of disorientation.

Figure 13-16 retrieved August 16, 2009, from

<http://architecture.about.com/od/greatbuildings/ig/Monuments-and-Memorials/Berlin-Holocaust-Memorial.htm>

Natural Disaster Memorials:

Earthquake (See Figure 20)

- Kobe Port Earthquake Memorial (Japan)
- Smriti Van Earthquake Memorial (India)
- Taiwan Chi-Chi Earthquake Memorial (Taiwan)
- Tangshan Earthquake Memorial Park (China)

Tsunami (See Figure 21)

- Tsunami Memorial in Khao Lak – (Lamru National Park, Thailand)

Typhoon/Hurricane (See Figure 22)

- Hurricane Katrina Memorial
- The Florida Keys Memorial

Flood (See Figure 23)

- Wuhan 1954 Flood Memorial (Wuhan, China)
- 1937 Flood Memorial (Paducah, Kentucky)

Fire (See Figure 24)

- Chicago Fire Memorial ---Unidentified victims of the 1871 Chicago fire



Figure 20. Earthquake.



Figure 21. Tsunami.



Figure 22. Typhoon/ Hurricane.



Figure 23. Flood.



Figure 24. Fire.

1. Kobe Port Earthquake Memorial Park

Kobe, Japan

Year: 1995

Background:

The Port of Kobe Earthquake Memorial Park is a natural disaster memorial park that was designed to memorialize the great disasters caused by the Hanshin Awaji Earthquake on January 17, 1995.

(See Figure 25)



Figure 25. Kobe Port Earthquake Memorial Park.

Most important features in this design:

Site Selection: Original Site—Port of Kobe

Physical Environment Elements:

Space Form: Combination of Square, Triangle, and Rectangle.

Landform: Flat

Ruins: The collapsed pier and tilted street lamps are preserved as they were at the time of the aftermath of the earthquake, so that visitors can witness the intensity of the tremor.

(See Figures 24, 25)

Manmade Constructions: Near the park is an exhibition space that displays photo panels of the earthquake and other materials related to the earthquake damage.

(See Figures 26, 27, 28)

Sensory Stimulants:

Light/Shadow: Walking through the shadow of slabs is just like walking through many graves; people will feel scared and disoriented.

Color: Gray and black granite walls, representing strength, sacredness, and silence.

Tactile: By touching the broken streets, people can easily get a strong feeling about the

damage resulting from the earthquake.

Sight: Important views toward the ruin were kept as the focal points through the whole site, as they can evoke people's strong emotions about the earthquake; simultaneously, the views can serve an educational function.

Psychological Elements:

All the elements above evoke a feeling of shock, fear, grief, and contemplation.

(See Figures 31, 32)



Figure 26. Kobe Port Earthquake Memorial Park. Figure 27. K.P.E.M. Park



Figure 28. K.P.E.M. Park. Figure 29. K.P.E.M. Park. Figure 30. K.P.E.M. Park.



Figure 31. Kobe Port Earthquake Memorial Park.

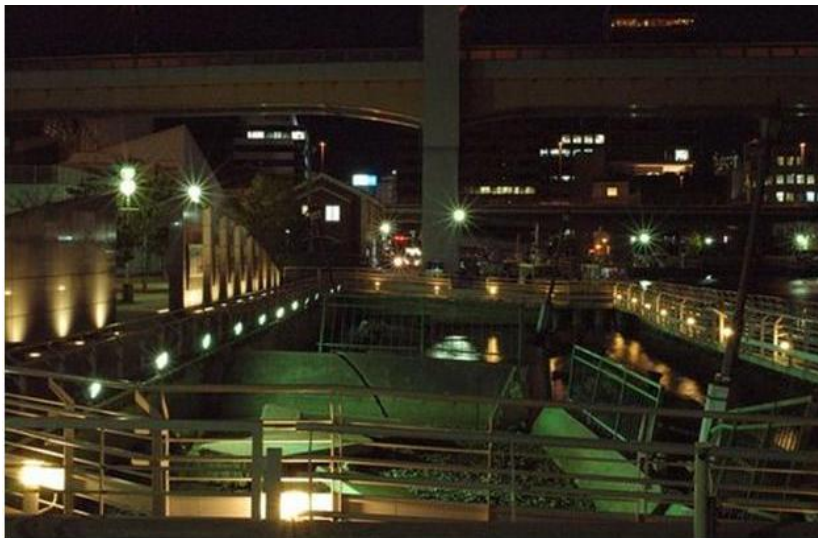


Figure 32. Kobe Port Earthquake Memorial Park.

Figure 25 retrieved August 17, 2009, from

<http://www.gstraveladvice.com/index.php?location=294>

Figure 26-32 retrieved August 17, 2009, from

http://commons.wikimedia.org/wiki/Category:Port_of_Kobe_Earthquake_Memorial_Park

2. Smriti Van Earthquake Memorial

India

Designer: Rajeev Kathpalia

Year: 2004

Background:

This is a project in western India that commemorates victims of the 2001 earthquake that took nearly 14,000 lives. The poetic quality of Rajeev Kathpalia's project lies not so much in the individual details, architectural or landscaping, but in the "remembrance of loss through a process of nature's constant regeneration."²³

Most important features in this design:

Site Selection: Original Site

Physical Environment Elements:

Space Form: Hemicycle

Landform: Convex, hilly, earthquake-prone area

Water Feature: 108 reservoirs would be arranged in the landscape for providing a safe supply of drinking water to the citizens during the earthquake. (See Figure 33)

Plants: The planners designed the park to show life as impermanent, but also sacred.

Precisely 13,805 trees representing 13,805 victims will be planted and will grow "without dependence on extraneous energy sources."²³

Manmade Constructions: Reservoirs — museum buildings, a reception plaza, a viewing promenade, and parking facilities. (See Figure 34)

²³B. Brian Taylor, "Water's Healing Power." *Architectural Digest* 63, no.10 (2006, October):1-3.

Sensory Stimulants:

Color: Blue and green, represent regeneration

Sight: Important views toward the ruin were kept as the focal points throughout the site, as they can evoke people's strong emotions about the earthquake; at the same time, the views serve an educational function.



Figure 33. Smriti Van Earthquake Memorial.

Psychological Elements:

All the elements above evoke a feeling of awe, respect and appreciation of nature while remembering and honoring those who died.



Figure 34. Smriti Van Earthquake Memorial.

Figures 33-34 retrieved August 17, 2009, from

<http://www.worldarchitecture.org/world-buildings/world-buildings-detail.asp?position=detail&country=India&no=2925>

3. Taiwan Chi-Chi Earthquake Memorial

Taiwan

Designer: Liu Yuyang, Haewon Shin, Tynnon Chow, Larry Tsoi, Yvonne Lo, Gigi Wong, Ronan Collins

Year: 1999

Background:

The memorial was built to remember the victims and survivors of the Chi-Chi earthquake in Taiwan on September 21, 1999. Two thousand, four-hundred thirty-seven people were killed, nearly 11,305 people were injured, and more than 107,002 houses were collapse.²⁴

Design:

The Project drew inspiration from both the visible and the invisible remains of the earthquake: the plateaus of ruins, the retaining walls, the fault line beneath, and the resilient trees. (See Figures 35, 36)

The design comes through the articulation of three elements—ground, canopy, and campus—out of which a new performance center and urban strategies are evolved.

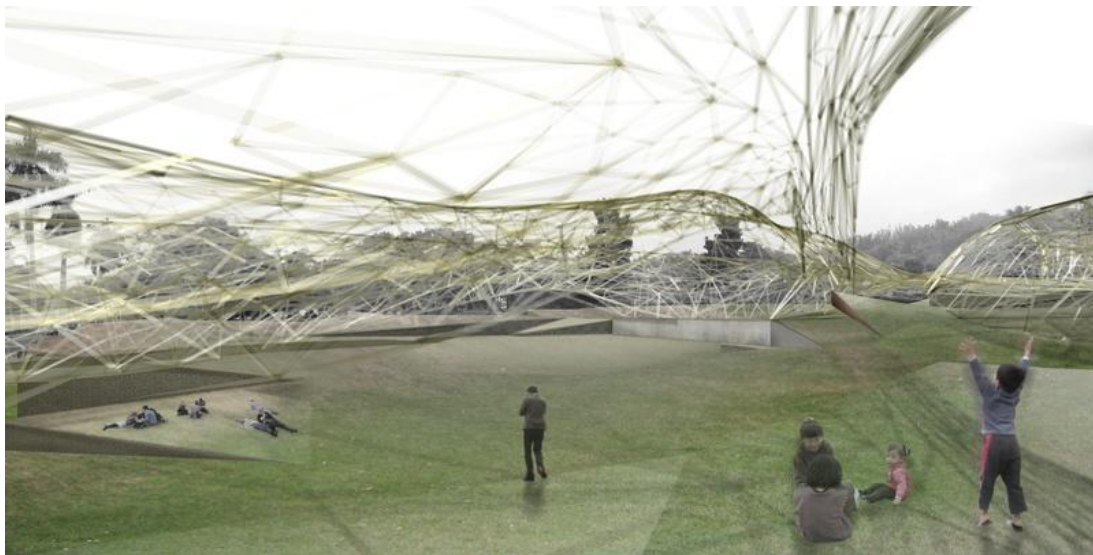


Figure 35. Taiwan Chi-Chi Earthquake Memorial.

²⁴Y. Li and Y. Yang, “The Research on Functional Adaptation of Campus as a Shelter after Earthquake.” *Urbanism and Architecture* 3 (2009): 1-23.

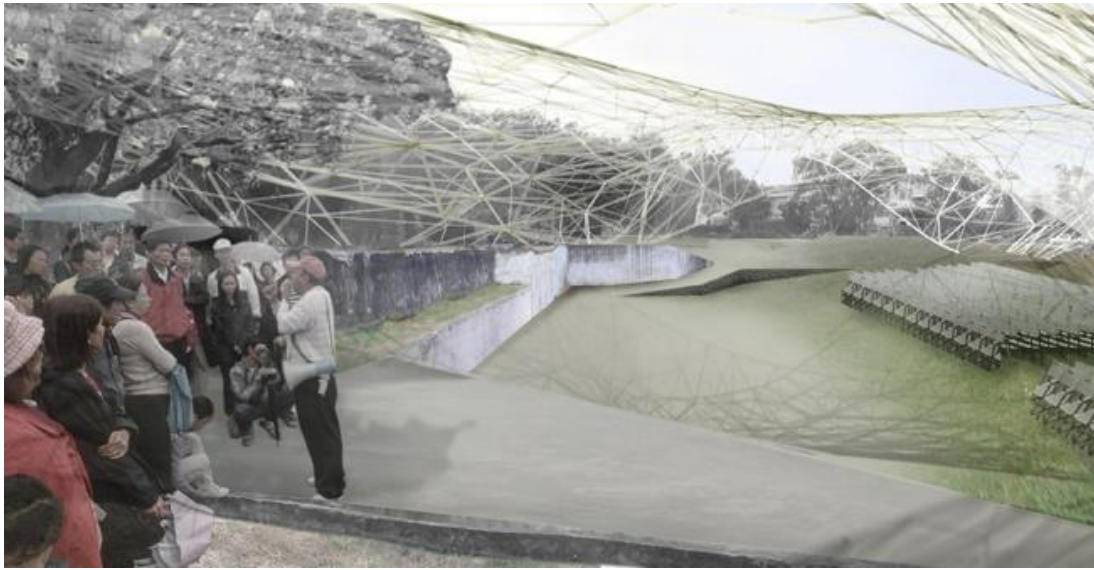


Figure 36. Taiwan Chi-Chi Earthquake Memorial.

Figures 33-34 retrieved August 17, 2009, from
<http://www.alya.cn/CCEMC.html>

4. Tangshan Earthquake Memorial Park

Tangshan, China

Designer: Latz + Partner Landschaftsarchi Tekten Planner

Year: 2008

Background:

On July 28, 1976, a severe earthquake measuring 7.8 on the Richter scale took place in Tangshan and 240,000 lives were lost. It was one of the 10 most severe natural disasters in the 20th century. (See Figures 37, 38)



Figure 37. Ruins after Tangshan quake.



Figure 38. Railroad.

Most important features in this design:

Site Selection: Original Site

Physical Environment Elements:

Space Form: Square and Triangle

Landform: Flat

Water Feature: Reflection Ponds.

Plants: Aspens, which represent the brave and noble spirit, were planted parallel to the memorial walls in order to strengthen the principal axis.

Ruins: The existing earthquake site and surrounding areas were preserved as much as possible.

Manmade Constructions:

Memorial Path: The path of Memories was introduced, which separated the existing paths into four parts, and all the four parts were connected by the design concept “Memorizing” in the earthquake site. (See Figures 39, 40)

Memorial Wall: The 400m-long black-granite Memorial Wall with all victims’ name evokes a strong feeling of sadness and memory of victims who lost their lives in the earthquake. (See Figure 42)

Sensory stimulants:

Water: Combining reflection ponds, which serve as a tribute to the spirits of the victims, with debris will create a sacred, peaceful, and serene place for contemplation, healing, and remembrance. (See Figure 41)

Sound: Aspens were planted along the memorial walls, allowing the wind to blow across the trees, creating a murmuring sound that emphasizes the sorrowful atmosphere.

Color: Black walls and gray paths represent sacredness, grief, and peace. Green represents new life and hope.

Tactile: The reflecting pool and tree islands work together, creating sensory elements that evoke psychological emotions through the use of water as a physical barrier to the tree, which represents life.

Sight: Important views toward the ruin were kept as the focal points throughout the site, as they can evoke people’s strong emotions about the earthquake.

Psychological Elements:

All the elements above evoke a feeling of sympathy for the earthquake victims and admiration for the survivors.

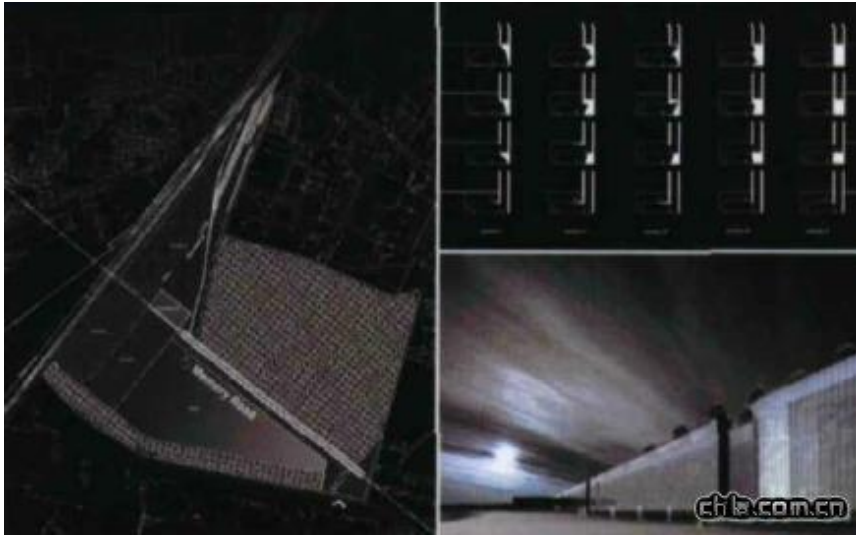


Figure 39. Tangshan Earthquake Memorial Park.



Figure 40. Tangshan Earthquake Memorial Park.



Figure 41. the Ruins.



Figure 42. 300-meter Memorial Walls (with 240,000 names).



Figure 43. Tangshan Earthquake Memorial Hall.



Figure 44. Educational Display.



Figure 45. Ceremony.

Figures 37-38 retrieved September 17, 2009, from

Chen, Deshang. "Field Phenomena in Meizoseismal Area of the 1976 Tangshan

Earthquake." in: The 1976 Tangshan, China Earthquake: papers presented at the 2nd U.S.

National Conference on Earthquake Engineering [Stanford, 1979]. Berkeley: EERI, 1980.

Figures 39-40 retrieved September 17, 2009, from

<http://www.chla.com.cn/html/c179/2008-11/22625.html>

Figures 41-45 retrieved September 17, 2009, from

http://bbs.tiexue.net/post_3549089_1.html

5. Tsunami Memorial in Khao Lak (Mountains of Remembrance)

Khao Lak – Lamru National Park, Thailand
Designer: Naga Concepts and Disc-O Architecture
Year: 2006

Background:

The goal of this design was to create a memorial site to honor the great spirit and courage of people, who have fought for their lives, and the lives of others, during and in the aftermath of the Tsunami on December 26th, 2004.

(See Figure 46)

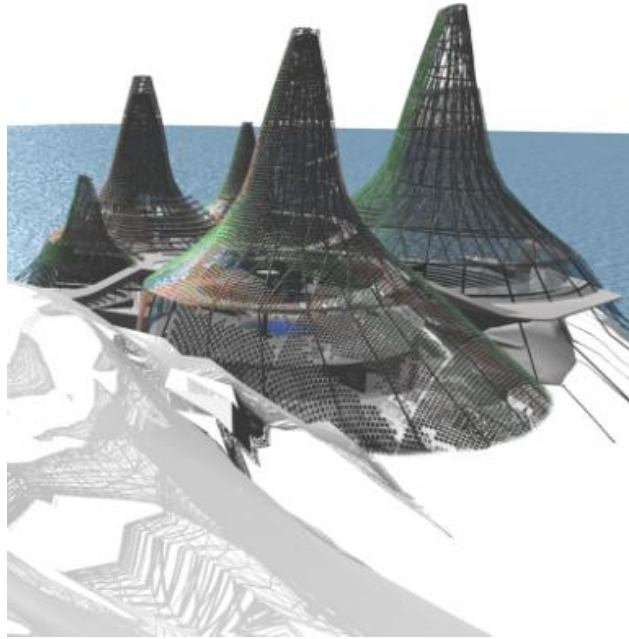


Figure 46. Tsunami Memorial in Khao Lak.

Most important features in this design:

Location-- Original Site

Memorial & Education & Disaster Prevention: The memorial allows visitors to commemorate and be educated about the causes and effects of a tsunami. It includes areas of contemplation, a museum, a library, a learning center, an amphitheater, lecture halls, conference rooms, and restaurants.

Low Impact Design: Sensitivity to nature

Five-mountain form – represents the power and forces of tsunami that ended so many lives during the disaster, which not only makes people remember this tragic event, but also helps them to understand the cause of the disaster by evoking their sense of the power of natural disasters, and giving a feeling of urgency about preventing it in the future.²⁵

(See Figure 47)



Figure 47. Tsunami Memorial in Khao Lak.

Figures 46-47 retrieved September 19, 2009, from

<http://www.inhabitat.com/2006/06/18/tsunami-memorial-winner-mountains-of-remembrance/>

²⁵“Tsunami Memorial Winner: Mountains of Remembrance,” *Tsunami Memorial Design Competition*, 2006, <http://inhabitat.com/2006/06/18/tsunami-memorial-winner-mountains-of-remembrance> (accessed June 11, 2010).

6. St. Bernard Hurricane Katrina memorial

St. Bernard Parish, Louisiana, U.S.

Year: 2006

Background:

St. Bernard Parish put up a memorial to honor 129

parish residents who died in Hurricane Katrina in

2005, along with a 13-foot-tall cross bearing the

likeness of the face of Jesus.

(See Figures 48, 49)

Most important features in this design:

Location-- Original Site

A cross stands out in the water: Evokes the emotions of loneliness, remembrance and sadness, which also represents the distance between life and death.

Memorial Wall—with the names of victims: Black reflective marble.



Figures 48, 49. Hurricane Katrina.



Figure 50. Daytime.



Figure 51. Nighttime.



Figure 52. Prayers.



Figure 53. Memorial Wall.



Figure 54. Memorial Wall.

Figures 50 retrieved September 19, 2009, from
<http://www.patricksemansky.com/updates5.html>

Figures 51 retrieved September 19, 2009, from
http://www.nola.com/news/index.ssf/2008/02/photos_for_katrina_memorial_st.html

Figures 53 retrieved September 19, 2009, from
http://www.nola.com/news/index.ssf/2008/10/photo_katrina_memorial_rededic.html

Figures 54 retrieved September 19, 2009, from
<http://quintascott.files.wordpress.com/2009/07/mrgokatrinamemorial.jpg>

7. The Florida Keys Memorial (Hurricane Monument)

Islamorada, Florida

Designer: Artists of the Miami Federal Art Project

Year: 1937

Background:

This memorial is dedicated to the victims of the 1935 hurricane that devastated the Florida Keys and took 435 lives.

(See Figure 55)

Most important features in this design:

Location: Original Site

Monument: Bas-relief pattern: depicts palm trees and ocean waves that were being blown by a hurricane.

Paving: The flooring is covered with keystone, or coquina, slabs. In the center of the flooring is a crypt. (See Figure 57)

Tile map: The top of the crypt is covered with a 22-foot-long tile map depicting the Florida Keys from Key Largo to Marathon. (See Figure 58)



Figure 55. Relief Art Sculptures.



Figure 56. Bronze Plaque.



Figure 57. The Florida Keys Memorial.



Figure 58. Crypt is covered with a map of the upper Keys.

Figures 48-49 retrieved September 19, 2009, from

<http://mozey.wordpress.com/2007/12/05/are-these-rare-photos-of-hurricane-katrina-or-bogus/>

Figures 50-51 retrieved September 19, 2009, from

http://www.nola.com/news/index.ssf/2008/02/photos_for_katrina_memorial_st.html

Figures 53-54 retrieved September 19, 2009, from

http://www.nola.com/news/index.ssf/2008/10/photo_katrina_memorial_rededic.html

Figure 55 retrieved September 19, 2009, from

<http://www.wunderground.com/blog/ThunderBev/comment.html?entrynum=102>

Figures 56-58 retrieved September 19, 2009, from

http://www.semp.us/publications/biot_reader.php?BiotID=631

8. Wuhan 1954 Flood Memorial

Wuhan, China

Year: 1969

Background:

This memorial was built to memorialize those 33,000 lives that ended as a result of the great flood in Wuhan, China, 1954.

Design:

The main part of the memorial is a monument with Mao Zedong's head sculpture, and his famous poem "Swimming" (1956), which represents people's belief and their courage in fighting the flood. (See Figures 59, 60)

Relief displaying people fighting the flood, with the slogan, "一不怕苦, 二不怕死" (First, don't fear hardships; second, don't fear death).



Figure 59. Wuhan 1954 Flood Memorial.



Figure 60. Wuhan 1954 Flood Memorial.

Figures 59-60 retrieved September 24, 2009, from

<http://commons.wikimedia.org/wiki/File:Wuhan-Flood-Memorial-0226.jpg>

10. Chicago Fire Memorial

Chicago, United States
Designer: Egon Weiner
Year: 1971

Background:

Hundreds of people were killed and about four square miles were badly destroyed by the Great Chicago Fire on October 10, 1871.²⁶

(See Figure 61)



Figure 61. Aftermath of the fire, corner of Dearborn Monroe Streets, 1871.

Most important features in this design:

Location-- Original Site: The corner of DeKoven and Jefferson, in the Near West Side Neighborhood, is the legendary site of the start of the Chicago Fire of 1871.

Memorial -- Chicago Fire Memorial: The sculpture is on the site of the fire, with the Chicago Fire Academy in the background. (See Figures 62, 63)

Municipal Flag of Chicago: On the municipal flag of Chicago, the second star commemorates the fire. To this day, the exact cause and origin of the fire remain a mystery. (See Figure 64)

Sculpture: Chicago Firefighters Memorial (Chicago). (See Figures 64, 65)



Figures 62, 63. Chicago Fire Memorial.



Figure 64. Municipal Flag of Chicago.

²⁶F. Richard Bales, "Did the Cow Do It? A New Look at the Cause of the Great Chicago Fire," (2004), <http://www.thechicagofire.com> (January 14, 2010).



Figure 65. A marker commemorating the fire outside the Chicago Fire Academy.



Figures 66, 67. Chicago Firefighters Memorial (Chicago).

Figures 61 retrieved September 24, 2009, from

<http://www.thunderbolts.info/tpod/2006/arch06/060209chicagofire.htm>

Figures 62- 65 retrieved September 24, 2009, from

<http://dailychicagophoto.blogspot.com/2009/11/chicago-fire-memorial.html>

Figures 66-67 Retrieved September 24, 2009, from

<http://www.flickr.com/photos/farndog/3350193554/>

Natural Disaster Prevention Parks:

1. Osu Disaster Prevention Park:

Ichikawa, Japan
Year: 2002-Present

Background:

Many cities in Japan started to plan and build disaster prevention parks, such as Miki Earthquake Disaster Memorial Park (Miki City, Hyogo) and Osu Disaster Prevention Park (Ichikawa, Japan), as well as others.

(See Figures 68, 69)



Figures 68, 69. Japan Hanshin Awaji earthquake, 1995.

Most important features in this design:

The park functions, in the case of emergencies/disaster occurrences, as a temporary site for refugees and rescue/aid activities, as well as a recreational site during times when there is no disaster.



Figure 70. Osu Disaster Prevention Park. Figure 71. Osu Disaster Prevention Park.



Figure 72. Osu Disaster Prevention Park.

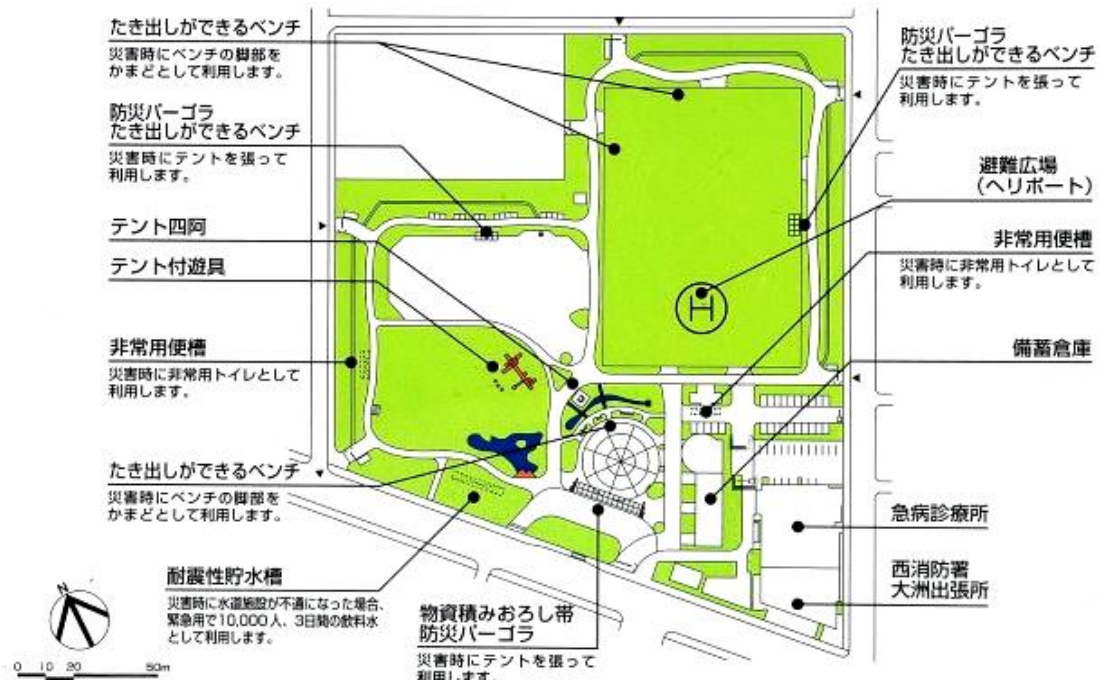


Figure 73. Disaster Prevention Facilities Management.



Figure 74. Master Plan and Emergency Escape Information.

Figures 68 retrieved September 24, 2009, from

<http://nisee.berkeley.edu/elibrary/Image/B2849>

Figures 69 retrieved September 24, 2009, from

<http://www.britannica.com/EBchecked/topic/873249/Kobe-earthquake-of-1995>

Figures 70-74 retrieved September 24, 2009, from

<http://blogs.yahoo.co.jp/ttn4euw27n/20765761.html>

2. Wuhan Riverside Park & Flood bank (Wuhan, China)

Wuhan, China
Year: 2002-Now

Background:

The Wuhan Riverside Park integrates flood control, scenery, tourism, leisure and sports into a whole.

(See Figure 75)



Figure 75. Wuhan Riverside Park.

Most important features in this design:

Flood Control: The Park can be used as flood bank, which can prevent flooding.

Scenery and Tourism: There is a vast piece of “green” at the riverside: alleys, bamboo forest, rockwork, fountain and sculptures, and benches for tourists to take a rest and sightsee. (See Figure 76)

Leisure and Sport: There are a complete set of entertainment facilities and a leisure belt stretching into the far distance together with the flowing water. It is the best place for people to exercise during the morning and night.

Memorial: There are many sculptures telling stories about the history of the city and flood.

Lighting: At night, the brilliant light and breeze make people feel reluctant to leave.

(See Figures 76, 78)



Figure 76. Wuhan Riverside Park.



Figure 77. Wuhan Riverside Park.



Figure 78. Wuhan Riverside Park.

Figure 75 retrieved September 24, 2009, from
<http://lvyou.xooob.com/tslysj/20095/379701.htm>

Figures 76-78 retrieved September 24, 2009, from
<http://www.lvyou114.com/tuku/Photofull.asp?Photoid=3908>
<http://www.cts2008.com/Member/Sight/nnhnn/>

Other Memorials:

1. Martin Luther King Memorial Park in Washington, DC

Washington D.C., the United States
Designer: ROMA Design Group
Year: 1971



Figure 79. Martin Luther King Memorial Park.

Background:

The Martin Luther King, Jr. National Memorial in Washington, DC was built to honor Dr. King’s dedication to freedom, opportunity, and justice. (See Figure 79)

Most important features in this design:

Location: Capital City

Memorial Gate: “Mountain of Despair”

Memorial Wall: A semi-circular water wall inscribed with King’s quotes. On the back side of the wall of quotes lie 24 niches along the upper walkway, some commemorating individuals who gave their lives during the civil rights movement, and some remaining unfinished and undedicated, out of “deference to the unfinished nature of the movement,” representing the unfinished fight against racism, inequality, and injustice.²⁷

(See Figures 80, 81, 82, 83)

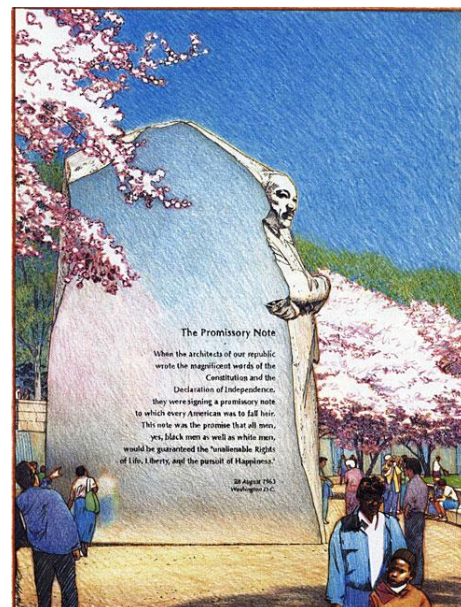


Figure 80. “Stone of Hope”.

²⁷Joshua F.J. Inwood, “Contested Memory in the Birthplace of a King: A Case Study of Auburn Avenue and the Martin Luther King Jr. National Park.” *Cultural Geographies*, January 16 (2009): 87-109.

Monument: “Stone of Hope,” featuring a partial sculpture of King overlooking the Tidal Basin, lies at the heart of the memorial. (See Figure 80)

Reflection Pond: The pond evokes the sense of freedom and peace.



Figures 81. A model of the Martin Luther King, Jr. National Memorial.



Figures 82. A model of the Martin Luther King, Jr. National Memorial.



Figures 83. A model of the Martin Luther King, Jr. National Memorial.

Figures 79-83 retrieved September 24, 2009, from

http://www.masslive.com/news/index.ssf/2010/01/western_mass_communities_plan.html

2. The Washington Monument

Washington D.C., the United States

Designer: Robert Mills

Year: 1884

Background:

The Washington Monument was built to commemorate the first U.S. president, General George Washington. It was the world's tallest structure when it was completed in Washington D.C. in 1884. (See Figure 84)

Most important features in this design:

Location: Capital City

Shape: A simple tapered obelisk. The pyramid shape of the monument was inspired by ancient Egyptian architecture.

Landform: Flat

Monument Material: It was made of white marble, granite, and sandstone.

Reflection Pond and Monument: These elements evoke the contrasting senses of Peace and Force, Horizontal and Vertical, Smooth and Sharp.



Figure 84. The Washington Monument in Washington D.C.

Figures 84 retrieved September 24, 2009, from

http://crapo.senate.gov/idaho/fast_facts/cherry_blossom.cfm

3. Church on the Water

Hokkaido, Japan

Designer: Tadao Ando

Year: 1985-1988

Background:

In the northern Japanese island of Hokkaido there is a church on the water located in Tomamu. It's a spot where the slope is facing toward a small river.²⁸ (See Figures 85, 86)

Most important features in this design:

In this project, Ando succeeds in defining sacred space in several ways:

A glass and steel cube: directs the view upwards.

A long, L-shaped wall: demarcates the church as a protected, secluded area.

The underground entry path: It is “intentionally circuitous, a sense of ritual and purification results, similar to the sufferings and revelations that define the religious experience” (He, 2009).

The Reflection Pond with a steel cross placed in the middle of it, evokes a sense of *peace, contemplation, and the sacred*.



Figure 85. Church on the Water.



Figure 86. Church on the Water.

Figures 85-86 retrieved September 24, 2009, from

<http://www.royalacademy.org.uk/events/talks/tadao-ando-hon-ra,299,EV.html>

http://www.arcspace.com/exhibitions/Ando_Ex1/Ando_Exhibition.html

²⁸Yunzhu He, “Creation of the Holy Space — An Analysis Of Tadao Ando's ‘Church On The Water’.” *Architecture & Culture* 1, (2009): 5-20.

4. Church of the Light

Ibaraki, Osaka, Japan
Designer: Tadao Ando
Year: 1989

Background:

Church of the Light, also known as “Church with Light,” was built in 1989, and it is the Ibaraki Kasugaoka Church’s main chapel. (See Figure 87)



Figure 87. Interior Space.

Most important features in this design:

The lighting is an important controlling factor. The open space is defined by light, by the physically powerful contrast between light and solid. Looking in from the front toward the cross, light grows from behind the altar from a cross cut in the concrete wall that extends vertically from floor to ceiling and horizontally from end to end, lining up perfectly with the joints in the concrete. The interior design is meant to be open space of emptiness to transfer someone into the realm of the spiritual. The discrete void space and quietness evoke a sense of peacefulness. Enclosed spaces inside were built by means of thick concrete walls. (See Figures 88, 89, 90)



Figures 88. Interior space of the church.



Figures 88. Interior space of the church.



Figures 88. Interior space of the church.

Figures 87-90 retrieved September 24, 2009, from

http://figure-ground.com/church_light/

5. Qijiang Park in Zhongshan City (Zhongshan Shipyard Park)

Zhongshan, Guangdong, China

Designer: Kongjian, Yu

Year: 2001

Background:

This park was built upon an old shipyard and a brown field. The design explains itself in terms of how landscape architects can turn a wrecked site into a beautiful, meaningful, and functional place, as well as in terms of the important role landscape architects can play in urban renovation. Many workshops and machines were conserved, including gantry cranes, railways, transformers, and so forth.

(See Figures 91, 92, 93)

Most important features in this design:

1. The designer kept the natural weeds in the site because he believed that the beauty of weeds represents neglected, ordinary, natural beauty. He explained, “Weed itself is wild and chaotic, but after design and by appreciation of people, the designed weed looks beautiful.”²⁹
2. Through the design of the waterfront trestle bridge, the spring and pane style, and hedges, the project offers people the chance to recognize a natural approach to water and exploring unseen space.

²⁹Yu Kongjian, “The Culture that Has Been Ignored, the Beauty of Weeds -- Qijiang Park in Zhongshan City.” *New Architecture* May (2001).



Figure 91. Qijiang Park in Zhongshan City.



Figure 92. The Red Box, telling the story of the Cultural Revolution and socialist China in previous decades.



Figure 93. The rust rails reused, and became central access to the park, along with wild native grasses.

3. Relationship to the urban context

Many urban facilities and functions were involved in the design. For example, they transformed docks into teahouses in order to make better use of the industrial remnants. Derelict industrial sites transformed into public areas can improve the quality of life and land use, as well as representing a transformation of old industrial sites to new cultural and environmental uses.³⁰

4. Environmental responsibility

Many natural and man-made materials used in this project were reducible and recyclable. Native plants and habitats were preserved and widely used in the park.

This park has become an environmental, educational, cultural, and historical site for the local people.

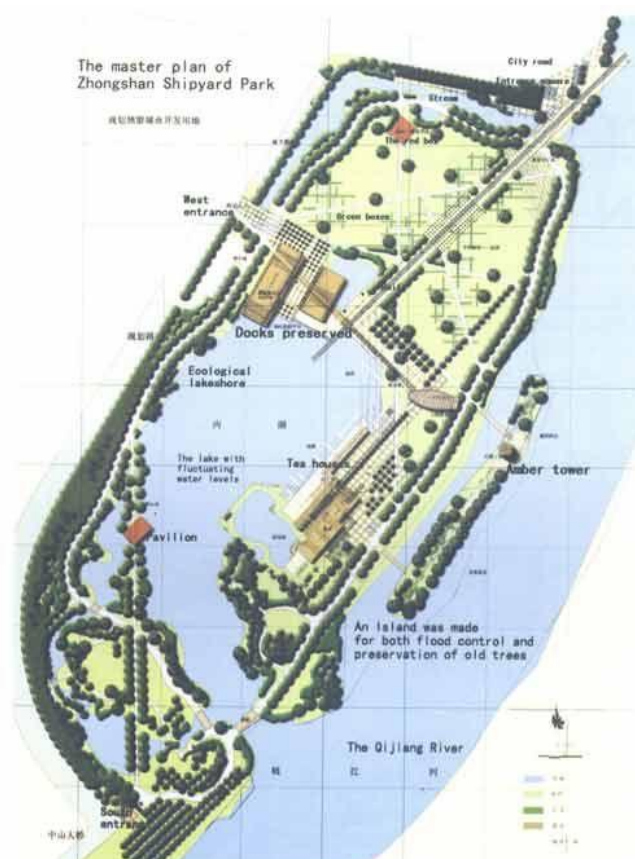


Figure 94. MasterPlan, Zhongshan Shipyard Park.

Figures 91-94 retrieved September 24, 2009, from <http://www.landscape.cn/paper/sjg/2009/034401.html>

³⁰L. Loures and T. Panagopoulos, "Sustainable Reclamation of Industrial Areas in Urban Landscapes." *WIT Transactions on Ecology and the Environment* 102 (2007): 1-4.

6. Nanjing Dr. Sun yat-sen's Mausoleum

Nanjing, China
Designer: Lu Yanzhi
Year: 1929

Background:

Dr. Sun Yat-sen's Mausoleum (中山陵) was built to honor Dr. Sun, the "Father of Modern China," who fought against the imperial Qing government and founded the Republic of China in 1911. It is located at the Mount Zijin (Purple Mountain) in Nanjing, China.³¹

(See Figure 95)

Most important features in this design:

Lying at the mountainside, the vault is more than 700 hundred meters away from the entrance, which is a long path ("Tao") visitors must travel before reaching the end. To traverse this path is like experiencing the entire life of the great hero, which evokes a sense of respect, honor, and courage.

Location: Sun Yat-sen's burial place

Landform--Ascending: The landscape ascends up to the memorial. (See Figure 94)

Style: Reclining on a mountain slope, the majestic mausoleum blends the styles of traditional imperial tombs and modern architecture.

Paifang: Traditional Chinese construction as the entrance of the mausoleum.

A three-tier stone: A stand on which a huge bronze ding, an ancient Chinese vessel symbolizing power, perches.

³¹D. Charles Musgrove, "Monumentality in Nanjing's Sun Yat-sen Memorial Park." *Southeast Review of Asian Studies* 29 (2007): 1-19.

Stairway: The 480-meter-long and 50-meter-wide stairway has 392 stairs leading to the vault. On both sides, pine, cypress, and ginkgo trees guard the way.

Entrance Gate: The tri-arched marble gate with Dr. Sun's four words, "Tian Xia Wei Gong," which means power should belong to the people, represents his belief and goal for his entire life. (See Figure 95)

Sacrificial hall

Bell-shaped vault: wherein lies the sarcophagus of Dr. Sun

Memorial monument



Figure 95. Entrance Gate.

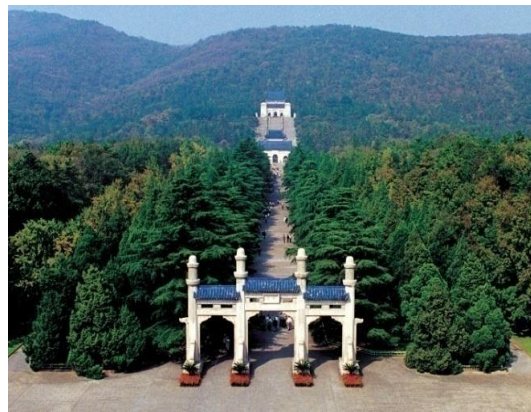


Figure 96. Nanjing Dr. Sun yat-sen's Mausoleum.



Figure 97. Entrance Gate.

Figures 95-97 retrieved September 24, 2009, from

<http://www.absoltechinatours.com/china-tours/SHEC-27/>

2.5 The Comparison Chart of W.M.P. and N.D.M.P.

The following is a summary of the comparison of War Memorial Park design (W.M.P.) and Natural Disaster Memorial Park design (N.D.M.P.) from the case study.

(See Figure 98)

	W.M.P.	N.D.M.P.
Role	A memorial for the victims of warfare	A memorial for the victims of natural disasters
Site Selection	Central/Capital City- an important emblem of political, power and ideology during and after war	Original Site- the place where the historical event/disaster happened
Physical Environment Elements	<u>Space Form</u> : Triangle, Square, Rectangle, Combination of the three (Sharp and enclosure)	<u>Space Form</u> : Square, Rectangle, Hemicycle
	<u>Landform</u> : Descending into the ground	<u>Landform</u> : Flat /Ascending up to the ground
	<u>Water Feature</u> : Running waterfall/ fountain	<u>Water Feature</u> : Reflection Pool with bronze sculpture or debris , Running water
	<u>Plants</u> : Plants were not widely used.	<u>Plants</u> : Evergreen tree & Local Plants & Special meanings: Pine-regeneration; Aspen-sorrow, brave; Bamboo- peace, moral integrity, solidarity, hope
	<u>Grass</u> : Open lawn	<u>Grass</u> : Open tree lawn
	<u>Ruins</u> : Ruins/ battle fields were hard to trace and preserve	<u>Ruins</u> : Preserve the important ruins. Some ruins/debris can be used as special design elements

Sensory Stimulants:

Manmade Constructions:
Memorial wall/ monument, museum, memorial path, memorial square, Parking lot

Manmade Constructions:
Museum, memorial path, memorial wall/monument, memorial square, disaster education center, Parking lot

Water: Reflection water evokes senses of peace, contemplation, and sacredness; Running water combined with Sculptures or display walls can provide an active space and give visitors release from sorrow.

Water: Reflection water evokes senses of peace, contemplation, and the sacred; Running water combined with sculptures or display walls can provide an active space and give visitors release from sorrow.

Light/Shadow: dark and gloomy

Light/Shadow: dark, gloomy, and then bright.

Sound:
The sound of water will block the noise of outside traffic and help people to release their pressure and negative feelings.

Sound:
The sound of water will block the noise of outside traffic and help people to release their pressure and negative feelings.

Color: Black, White, Grey, Green
White represents honor, the sacred and peace. Black represents grief, sacredness, coldness, and fear. Blue represents peace and helps people heal from the pain. Gray represents coldness, fear, and gloom.

Color: White represents honor, sacredness and peace. Black represents grief, sacredness, coldness, fear. Blue represents peace and helps people heal from the pain. Green represents life and hope, regeneration

Tactile: Using rough materials to create an uncomfortable sense. By touching the rough concrete walls, people can feel the dark period during the war.

Tactile: Rough materials can remind people about tragedy and the ruins. However, reflective material can create a contemplative and healing place. By touching the water, people can feel the reconnection between life and death.

Psychological Elements:	<u>Sight:</u> Views always have been limited within an enclosure, a narrow and gloomy space, which evokes strong senses of fear and depression.	<u>Sight:</u> Important views toward the ruin should be kept as the focal points.
	Winner: Victory, heroism, honor, glory, remembrance, peace, Loser: Shame, hatred, grief, fear, the sacred, remembrance, peace, freedom.	Grief, sympathy, fear, the sacred, awe, respect, remembrance, honor, love, courage
	Main Functions	Memorial Wall/Monument (with victims' names), Memorial garden
		Ruins, Memorial Wall/Monument (with victims' names), Cemetery, Memorial garden, Disaster education, Disaster prevention
Ceremony	National Ceremony	National/Local ceremony

Figure 98. Comparison Form of W.M.P and N.D.M.P.

2.6 Summary of the Case Study

From the comparison diagram, we can summarize the differences between and similarities among W.M.P. and N. D.M.P. The key elements that can be applied to N.D.M.P. are listed below:

- 1. Site Selection**----- Original Site- the place where the historical event/disaster happened
- 2. Main Functional Areas**----- Ruins, Memorial Wall/Monument, Cemetery, Memorial garden, Disaster education, Disaster prevention

3. Physical Environment Elements:

Landform: Flat/Ascending up to the ground

Water Feature: Using Reflection water creates peaceful and healing atmosphere. Running

water combined with sculptures or display walls can provide an active space that can attract more public participation and also can make visitors release their sorrow.

Plants: Evergreen tree & Local Plants & Special meanings: Pine-regeneration;

Aspen-sorrow, brave; Bamboo- peace, moral integrity, solidarity, hope.

Ruins: Preserve the important ruins. Some ruins/debris can be used as special design elements.

Manmade Constructions: Museum, memorial path, memorial wall/monument, memorial square, disaster education center

4. Sensory Stimulants:

Water: Reflection water evokes senses of peace, contemplation, and the sacred; Running water combined with sculptures or display walls can provide an active space and give visitors release from sorrow.

Light/Shadow: Dark, gloomy, and then bright.

Sound: The sound of water will block the noise of outside traffic and help people to release their pressure and negative feelings.

Color: White represents honor, sacredness, and peace. Black represents grief, sacredness, coldness, fear. Blue represents peace and helps people heal from pain. Green represents life and hope, regeneration.

Tactile: Rough materials can remind people about tragedy and the ruins. However, reflective material can create a contemplative and healing place. By touching the water, people can feel the reconnection between life and death.

Sight: Important views toward the ruin should be kept as the focal points.

5. Psychological Elements:

Grief, sympathy, fear, the sacred, awe, respect, remembrance, honor, love, courage

Chapter Three

Methodology and Survey Results

3.1 Research & Methodology

An interview-based survey was distributed to obtain information on different people's understanding of the earthquake and on their perceptions of the earthquake experience. The objective of the survey was to ascertain whether people would identify the concepts of the basic elements in memorial park design that were presented in the case study review. The survey was distributed through different channels over the course of two weeks; out of a possible 650 responses, 150 were received.

3.2 Procedure

Survey Instrument

The participants were introduced to the survey by a survey form (in both English and Chinese), and the requirements for participation were explained to them. The survey consisted of twelve questions that were a mix of open-ended, multiple choice, and scalar questions designed to allow the participant to recall the earthquake experience and describe or evaluate how the concepts of the memorial park design did or did not affect that experience.

Participants

In order to make this survey more comprehensive, 650 participants were chosen from a random sample that included both local people and some indirect participants from other cities, such as Wuhan, Beijing, and Chengdu.

3.3 Results

The survey began with two multiple-choices questions, inviting the respondents to answer some basic questions about themselves. The purpose of the two questions was threefold: first, to set up a positive frame of mind for answering the survey; second, to see the personality of participants; and third, to see their main purpose for visiting this site. The results of the survey show that the tourists are over 50% (332) local people and that officials make up 20% of the tourists; more than 30% of the interviewees are from the other cities outside Wenchuan, and their main purpose in coming to this site is to visit and remember. (See Figures 99, 100 for results.)

Question 1: What's your relationship to Wenchuan?

- Local person Local official Tourist Other _____

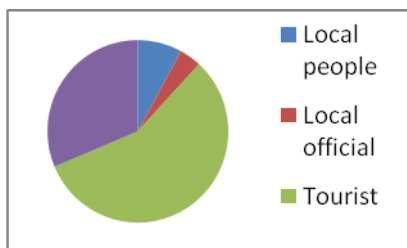


Figure 99. The result of question 1.

Question 2: Why do you come here?

- Visiting Studying Memorializing Other _____

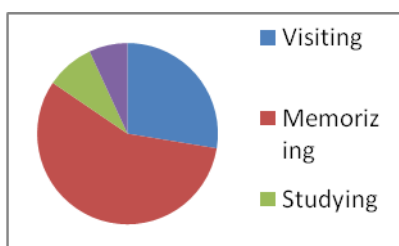


Figure 100. The result of question 2.

The purpose of Question 3 was to ascertain how much interviewees know about earthquake prevention. The answers show that nearly 64% of the interviewees have participated in some earthquake prevention maneuvers held by schools or government or

had gained some related knowledge about earthquake prevention through other media, such as TV and the Internet. However, 37% of the interviewees have never received evacuation training or information about earthquake prevention. The results of this question suggest that there should be more earthquake prevention or notice provided in the future park design. (See Figure 101 for results.)

Question 3: Have you participated in any earthquake prevention maneuvers or have some related knowledge about earthquake prevention?

Yes (where/which medium?) _____

No

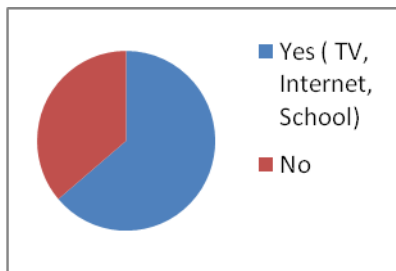


Figure 101. The result of question 3.

The purpose of Question 4 was to better understand how much the interviewees know about earthquake prevention. The results of Question 4 show that most people chose an open park or plaza as their first place to go when the disaster happened; some people also chose to hide in the basement of earthquake prevention buildings. This data illustrates that a public park will provide shelter and play a significant role in disaster reduction. (See Figure 102 for results.)

Question 4: When the disaster happens, which place below would you consider as the best one to go to?

- Residential Park Public park/ plaza Earthquake prevention building, basement
 Hospital Other

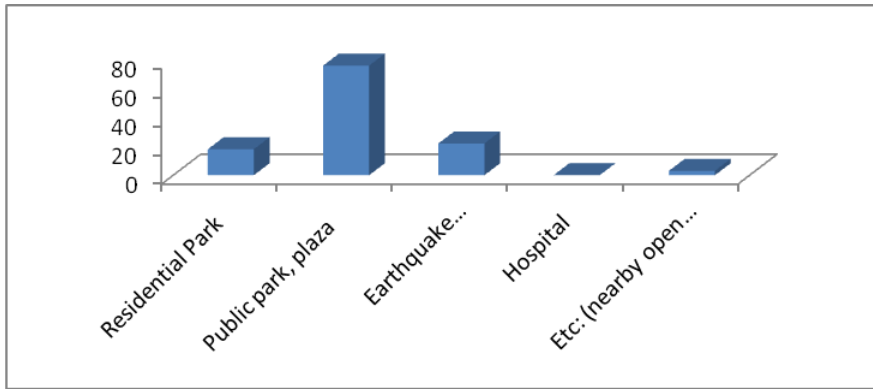


Figure 102. The result of question 4.

The results of Question 5 reaffirm the importance to local and nonlocal people of building a public park to memorialize this tragedy. For the local people, building a memorial park is very desirable in terms of attracting more visitors; the park may provide their only means of financial support in the long run. For the visitors, building a memorial park is necessary to memorialize those victims and become more familiar with the disaster. (See Figure 103 for results.)

Question 5: How important is a public park to you in serving as a memorial of this tragedy? (1 indicating little importance and 5 indicating the highest importance): 1, 2, 3, 4, 5

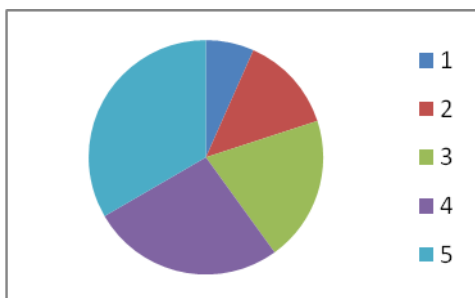


Figure 103. The result of question 5.

The purpose of Question 6 was to inquire as to where the interviewees think is the best site for building the 5/12 earthquake memorial park. The results of Question 6 show that 60% of the people asked chose Wenchuan because it is where the earthquake took place; 20% of the respondents chose Beichuan because that is where many young students are buried. Furthermore, 12% of people chose Yingxiu because it is the epicenter, which

has the most serious damage, and nearly 6% of the interviewees chose Beijing because they think the capital has the most influence on the whole country, which can make us attach importance to this big event. (See Figure 104 for results.)

Question 6: Which county do you think is the best site for building the 5/12 earthquake memorial park?

- Wenchuan Yingxiu Beichuan Beijing Other _____

Reason: _____

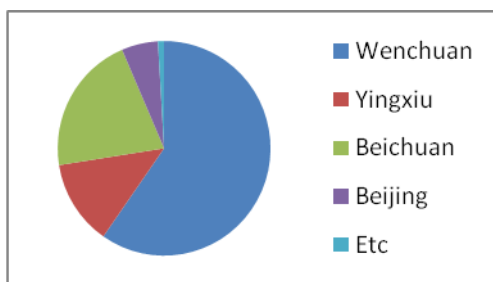


Figure 104. The result of question 6.

The purpose of Question 7 was to see which place had the strongest impact on the interviewees' experience. The results of Question 7 indicate that the most impressive place in their mind was the altar built after the quake and earthquake landforms resulting from the earthquake that can be found in the park, such as landslides, cracks, faults, and folds. (See Figure 105 for results.)

Question 7: Where is the most impressive place in your mind?

- Earthquake Landforms the Hypocenter of Niu Mian Gou Altar and Cemetery
 Other _____ Reason: _____

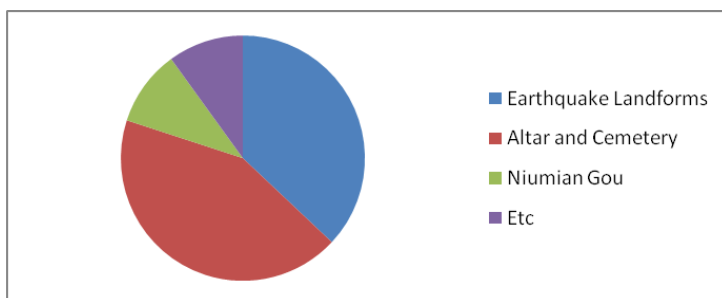


Figure 105. The result of question 7.

Question 8 was an open-ended question, inviting the respondent to think about a negative experience in the current memorial site, which was the ruins of the earthquake. The answers to this question show that there were many deficiencies, such as a lack of an obvious sign emergency exit sign and a disaster prevention place, insufficient fireproofing facilities, and the inefficient nature of some functions of park.

The results of Question 9 suggest that disaster prevention and education are the most important functions in the earthquake memorial park, while tourism, scientific research, and recreation are considered the second most important functions. (See Figure 106 for results.)

Question 9: What functions do you think the an earthquake memorial park should have?

- Memorial Ecological Disaster prevention Education
- Tourism Recreation Scientific research Other_____

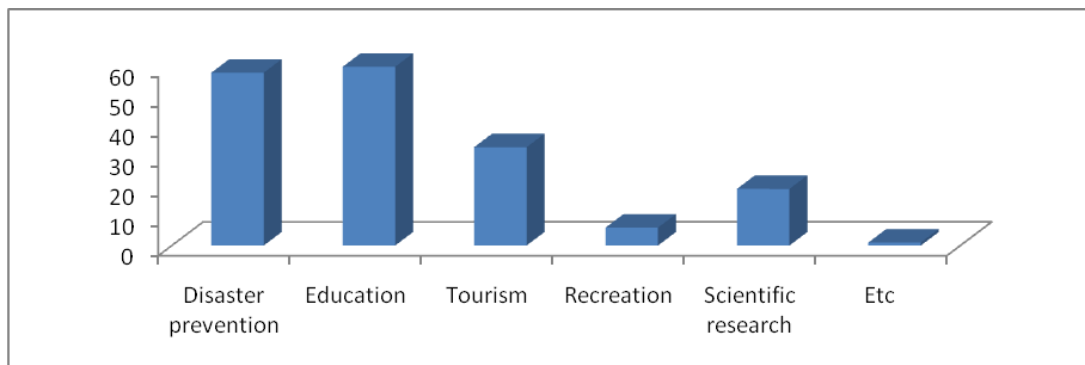


Figure 106. The result of question 9.

The purpose of Question 10 was to see if participants would identify any of the design elements of the natural disaster memorial park as contributing to their memorable experience. The answers to this question suggest that public monuments and green grass are the most important design elements, while the stone, water feature, and artwork are considered the second most important elements. (See Figure 107 for results.)

Question 10: Please select the most important elements you would want to see in a memorial park:

- Green grass
- Water feature
- Stone
- Artwork
- Public monuments
- Other _____

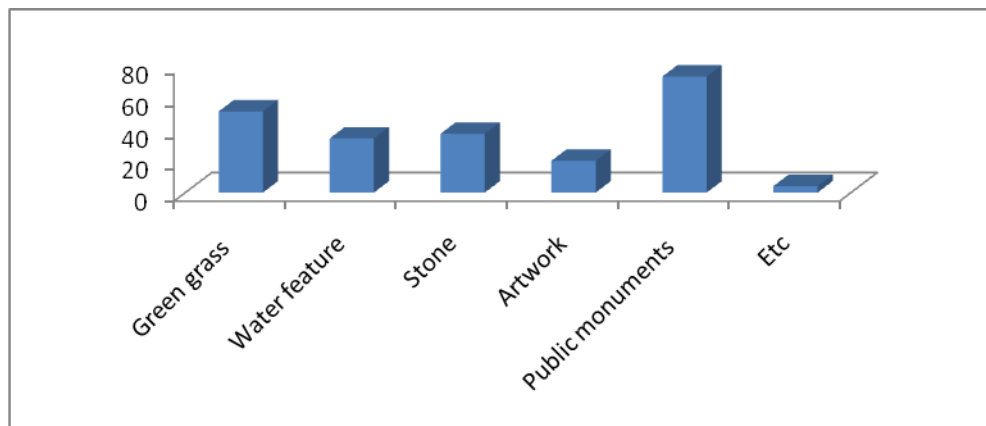


Figure 107. The result of question 10.

The purpose of Question 11 was to see how important the cultural elements will be in the future design.

Question 11: Many aspects of cultural heritages were destroyed by the Wenchuan earthquake, including those of the Aba Tibetan and the Qiang Autonomous Prefecture heritage. What percentage of cultural elements do you think should be included in the earthquake memorial park? (See Figure 108 for results.)

- <10%
- 10%—20%
- 20%—30%
- 30%—40%
- 40%—50%
- >50%

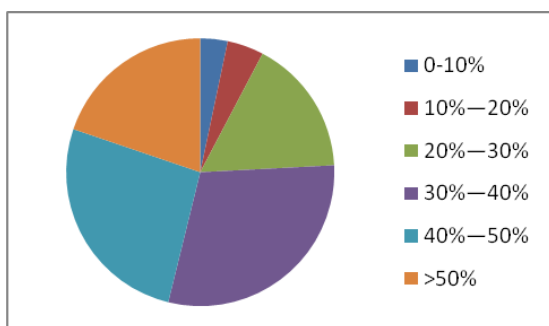


Figure 108. The result of question 11.

The survey concluded with the open-ended Question 12, which invited the respondent to think about memorable feelings and senses about the earthquake. Reports about these feelings and senses were collected in order to deeply understand people’s mentality

change and their attitudes toward this event. Based on the results, different spaces should be created depending on different senses. (See Figure 109 for results.)

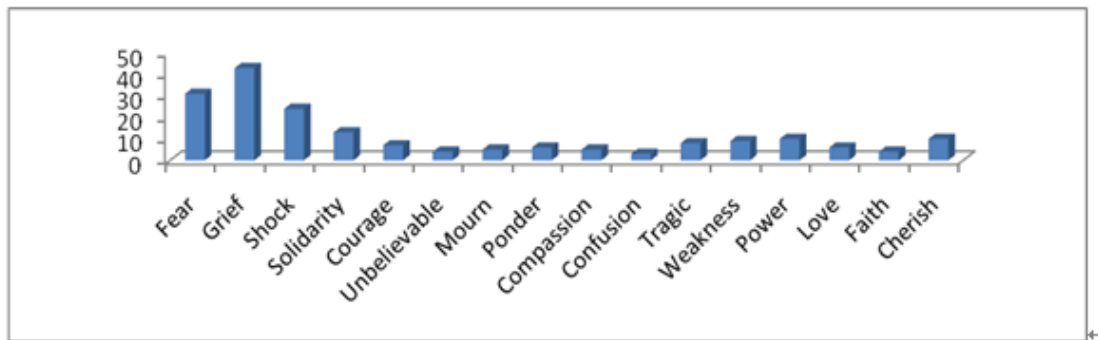


Figure 109. The result of question 12.

3.4 Discussion

From the data acquired through this survey, the following conclusion can be made:

- Participants identified that both local and nonlocal people feel that it's necessary to build a public park to serve as a memorial of this tragedy.
- Participants identified that Wenchuan should be selected as the memorial park site, since it was where the earthquake took place.
- Participants identified the altar and cemetery as the most memorable space. An altar was erected in front of the cemetery, in order to honor and memorialize the spirits of victims during the quake. Based on traditional Chinese culture, people not only offer flowers, incenses and candles on the altar, but also they will pray and baibai (拜拜) – “bowing towards an altar, with a stick of incense in one's hand”³² for the dead people, which was involved in most forms of Chinese traditional religion, such as Taoism and Buddhism.³³
- Participants identified that the current site was deficient in several ways, including

³²Liu Zhongyu, “The Relationships between Confucianism, Buddhism, Taoism and Folk Custom.” *Shijie Zongjiao* (1996): 24-32. (Regarding “baibai” as the term for the act of offering incense as a form of worship.)

³³Zhong Liu, “Burning Incense and Worshipping Spirits,” *Daoist Folk Customs*.

the lack of an obvious emergency exit sign, the absence of a place dedicated to disaster prevention place, and insufficient fireproofing measures.

- Participants identified that the public park should provide a shelter and play a significant role in disaster reduction.
- Participants identified that a natural disaster memorial park should include five basic functions, and that the top four are education, disaster prevention, tourism, and scientific research.
- Participants identified that five physical element—public monuments, green grass, stone, water features, and artworks—contributed to their having a memorable experience at the natural disaster memorial park.
- Participants identified that cultural elements are very important to include in future designs.
- Participants identified that there are many memorable feelings and senses about the earthquake, including fear, grief, shock, solidarity, courage, power, and love.

I combined some similar senses and reorganized them. I divided them into three development periods of feelings, from the left to the right (black ---gray---white), which represent, respectively, the “Negative Period,” the “Meditational Period,” and the “Positive Period.” (See Figure 110) Three periods represent three stages of psychosocial development among visitors when they go through three different areas of the park.

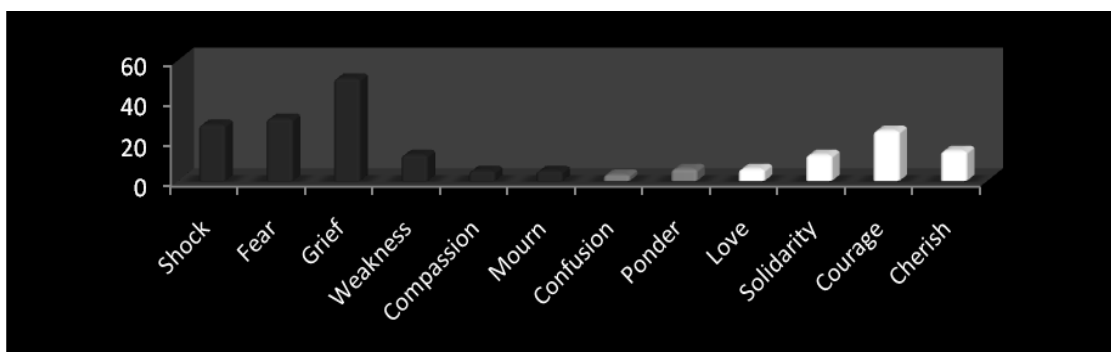


Figure 110. Three development periods of feelings.

The survey results were limited by several factors. Although the survey provided general information about people's opinions about the natural memorial park, the survey was too general. In trying to address the physical, cultural, and psychological elements, the author could not delve deeply enough into any one of the topics, and therefore produced results that were superficial. The responses to some questions varied because some participants relied on their own experience, while other did not rely on their own experience, but rather listed what the "ideal" natural disaster memorial park should be like. Another limitation of the study was that it was sent out by hand. Although the participants were chosen through random sampling, the study was limited by time, lack of funds, and place. The survey could be forwarded to people outside of the country through the Internet, for example on the IDEC list serve and similar options. The third limitation was the small number of responses, considering that only 150 out of 650 people asked replied to the survey.

Although limited, the survey did reveal that physical, cultural, and psychological elements had great effect on people's experience, thus directing the focus of the proposed memorial design project. Through developing the open-ended questions, I was able to ascertain that education, disaster prevention, tourism, and scientific research played important roles in creating a memorable experience, thereby again focusing the design of the memorial park on those four functional aspects of the space. Additionally, participants affirmed those elements listed above that assisted in creating a memorial park. Lastly, different spaces based on these strongest contrasting feelings will be created. This validation allows the designer to implement these concepts in the design of a natural disaster memorial park that provides multisensory experience.

3.5 Key Principles which can be applied to N.D.M.P.

From the summary of the literature review, case study, and survey results come ten key principles that can be applied to N.D.M.P. They are listed below.

1. Site selection:

The original site may be considered as the site for the N.D.M.P.

In traditional Chinese culture, local people had a strong tie to the home land where they were born. They built cenotaphs /memorials at the places where their family members died and were buried.

Based on the comparison between W.M.P. (War Memorial Parks) and N.D.M.P. (Natural Disaster Memorial Parks), N.D.M.P. usually are located at the place where the disaster happened. Furthermore, my survey shows that over 60% of interviewees chose Wenchuan because it is where the earthquake happened.

Unique location: (the epicenter of the earthquake)

2. Integrated design

The design integrates a disaster prevention function and usual park functions. For example, the integrated design of the park includes the refuge shelter and the park square, the green field, the park entrance configuration and periphery configuration, disaster resistant water supply facility, toilet, park trees and fireproofing woodland belt, broadcast facility, communication facility, generator facility, and lighting.³⁴ The N.D.M.P not only has the main functions of a memorial park for ordinary use, but also provides a disaster prevention function in a crisis.

³⁴S. Yue and Y. Saito, "Inspirations from the Disaster Prevention with Public Green Space in Japan." *Chinese Landscape Architecture* (2007): 6-10.

The plan augments the emergency response plan for disaster prevention by strengthening the construction of the earthquake shelters in the natural disaster memorial park.

3. Authenticity Protection

Authenticity in Relation to the Conservation of Natural and Cultural Relics

Preserve the ruins:

Natural and geological relics in the earthquake site include: epicenter sign, fault depression, landslide, debris flows, soil liquefaction, quake lake, and so on. They will also include some ruins related to manmade constructions, including important collapsed and damaged buildings, bridges, and roads. These ruins should be preserved in order to take good care of the natural and cultural heritage and create a new local culture.

4. History and Culture Continuity and Sustainability

The memorial park design should respect local history and the cultural environment, including the local people's cultures and habits.

Based on the survey and interviews, many suggestions and much site information had been collected from willing locals. The planned areas are home to many ethnic minority groups, including China's only concentrated inhabitation of the Qiang ethnic group and one of the major Tibetan settlement areas, with cultural diversity and unique historical and humanistic resources. During the earthquake, a large number of tangible and intangible cultural heritage carriers were destroyed, and it has become even more urgent to protect and carry forward the culture of the Qiang ethnic group. The unique Qiang and Tibet cultural heritage should be preserved, and local materials and traditional elements and

building styles should be involved in the design.

5. To Pass on the Legacy of Disaster-stricken Memory

A 2008 document entitled “The State Overall Planning for the Post-Wenchuan Earthquake Restoration and Reconstruction” declares that:

Earthquake ruins and relics which have important scientific values should be preserved and well protected. Reserve necessary earthquake sites and build memorial infrastructures fully embodying the great spirit of earthquake fighting and disaster relief. Memorial walls, paths, and sculptures which record the loss of life and property can recall our memory about the disaster. The memorial hall and earthquake scientific center should not only have a memorial function, but also provide direct knowledge about earthquakes in order to enhance the awareness of disaster prevention and mitigation. (The State Council No. 31, 2008)³⁵

Memorial Objects:

There are three kinds of memorial objects: people, process, and spirit.

The category of *people* includes victims, survivors, rescue squads, soldiers, salvage corps, medical personnel and contributors, and aids from the international community. For example, a memorial wall with victims’ names on it can be built to honor and remember those people who lost their lives during the disaster.

Process can reflect the entire rescue process, including the selfless support from various regions, the massive assistance from all walks of life, the cohesiveness of teamwork, the refuge tents, and the process of restoration and reconstruction. Examples might include sculptures of people fighting the disaster, the memorial wall with rescue stories, and so on.

³⁵“State Council Circular on Printing and Distributing the Overall Planning for Post-Wenchuan Earthquake Restoration and Reconstruction.” *Documents of the State Council*, no. 31 (2008): 31-32.

Spirit includes the psychological or spiritual ideas. Use abstract landscapes to represent or express different feelings and spirits, such as love, fear, courage, and so on. For example, I used three memorial hills standing above the ground to represent Love, Faith, and Courage, which are also deeply rooted in everyone's heart. They are the source of life and also the spirit of the memorial.

Natural Disaster Memorial Parks should be the media for the restoration and reconstruction of the spiritual homeland and psychological shelter for disaster-affected people. Enhance the human care in communities and popularize the great spirit of earthquake fighting and disaster relief, along with the excellent traditional culture of the Chinese nation.

The memorial elements included a memorial hall, memorial buildings, a museum, ruins, a memorial greenbelt, a memorial plaza, a memorial wall, memorial paths, a memorial landscape, educational buildings, and an earthquake training and rescue center.

Education and Scientific Research:

Build scientific research institutions, such as museums, as well as disaster prevention and training centers.

The planning and construction of the education and scientific research center plays a key role in cultural promotion, information supply, disaster prevention knowledge popularization, and technical training.

6. Ecology protection

The quake wreaked havoc on the eco-environment, with large stretches of forest destroyed, wildlife habitats lost, and ecological function degraded. The eco-environment

has degenerated; the natural environment, such as vegetation, bodies of water, soil, and so forth, has been destroyed, and the potential hazards of secondary disasters have increased.

Being of considerable ecological significance, the planned area should be designed with five factors in mind: land-saving, energy-saving, water-saving, material-saving, and environmental protection.

Pass on and carry forward the culture, and protect the ecology.

Protect and preserve the style of the building structures and buildings' historical value and ethnic features. "The State Overall Planning for the Post-Wenchuan Earthquake Restoration and Reconstruction" also declares that "reconstruction must avoid natural reserves, ancient historical and cultural relics, and water source conservation areas, as well as the new landscape that was formed by the earthquake and is worth retaining."³⁶ Build more environmental protection facilities in order to gradually improve and restore the environment and the local ecology.

7. Low-impact design

Respect the original site by using a low-impact design. Reduce the impact to the nature and site (where also many victims were buried); try to preserve the traditional style of the appearance and use local construction materials, components, or forms for the building as much as possible. Resource-saving and environment-friendly demands must be satisfied when designing the construction of the whole park.

8. Division of Multifunctional Areas

Create clear and well-connected multifunctional areas.

³⁶“State Council Circular on Printing and Distributing the Overall Planning for Post-Wenchuan Earthquake Restoration and Reconstruction.” *Documents of the State Council*, no. 31 (2008): 65-67.

Rationalize the distribution of the memorial park by arranging a scientific layout. We should take into consideration the threats posed by disasters and potential disasters, scientifically define the major functions of different areas during both normal times and times of crisis, readjust and optimize the spatial layout of the park, and connect different functional areas with the memorial path.

The case study and survey indicate that multifunctional areas should be provided to explore the relationship between human beings and nature, to seek the meaning of life, to honor the earthquake victims, and to provide disaster prevention education for future use. These areas should include ruins, an altar area, a memorial garden, an educational area.

9. Creating the Multisensory Experience

The results of the survey concur with the case study in the idea that a Natural Disaster Memorial Park should be a place for mourning, healing, reflecting, memorizing, and educating. The multisensory experience is achieved through the exploration of the dialectics of material elements (including landform, water features, plants/vegetation, and manmade constructions), as well as natural landscape elements (including light and shadow, sound and color).

A. Creating Multiple Landscape Layers

The Park consists of intervened layers of topography, vegetation, water, paths, paper lanterns, ruins, and message stones.

B. Three development periods of feelings

The design will be represented by three periods: the “Negative Period,” the “Meditational Period,” and the “Positive Period,” based on the relationships among

grief-meditation-hope, black – gray- white, and past- present- future (See figure 108).

C. Using different elements to create multi-sensory experience

The design will focus on the experience of the memorial park, utilizing the physical, cultural, and psychological elements to implement the multisensory experience. The park design will explore and provide the impact of the specific elements (landform, light, shape, etc.) on the experience of the ruins, altar, memorial garden, and educational areas.

10. Intensify the promotion of new tourism resources

Ensure development in the economy. Establish Wenchuan Natural Disaster Park. Place as the main functions the unique geological features and new post-quake landscapes, and give consideration to tourism development in the long run, as it can attract many tourists from all over the world to feel and experience the great damage and influence of the earthquake.

Improve and expand special advantage natural disaster (e.g. earthquake) tourism resources and enhance the scientific development capacity of natural disasters.

The Wenchuan earthquake park design should memorialize the earthquake on different scales (from the whole town to a single object); it should memorialize the earthquake relief and reconstruction. Meanwhile, local elements and characters should influence the design process.

The Wenchuan earthquake ruins record the most tragic page in human history; they bear witness, not only to the tragedy of Sichuan, but also to that of the entire human race. These resources should be preserved in order to help experts who are exploring the mystery of earthquakes, as well as to make more people knowledgeable about natural

disasters. Therefore, the Wenchuan earthquake ruins and memorial park will become the most precious natural, cultural, and scientific heritage and a unique tourism resource of Wenchuan.

Chapter Four

5.12 Wenchuan Earthquake Memorial Park Design

4.1 Design Strategies

Through the case study and survey results, two strategies for approaching the design of natural disaster memorial park have emerged. First, the designer should provide multiplex functional areas in the design. Second, the designer should create a multisensory experience.

4.1.1 Providing Multifunctional Areas

Function conversion----A natural disaster memorial park is a park, or a piece of green area with the function of being a refuge sheltered from disaster and for evacuation. It is constructed with the intent of saving life and property, and of enhancing the functions of disaster prevention facilities, which makes the park into a difunctional area.

The case study and survey indicate that multifunctional areas should be provided for visitors to explore the relationship between humans and nature, to seek the meaning of life, to honor the earthquake victims, and to provide disaster prevention education for future use. These areas should include ruins, an altar area, a memorial garden, and an educational area.

4.1.2 Creating Multisensory Experience

The results of the survey concur with the case study in the idea that a natural disaster memorial park should be a place for mourning, healing, reflecting, memorializing, educating, and so on. The multisensory experience is achieved through the exploration of the dialectics of material elements (including landform, water features, plants/vegetation, and manmade constructions), natural landscape elements (including light and shadow, sound and color). The purpose of this section is to provide examples of how these abstractions can be translated into the built environment.

The entire process of developing a complete and comprehensive plan for Wenchuan Memorial Park includes the following stages.

4.2 Site Selection -The Yingxiu Town

Guided by the list of requirements suggested by the case study and survey, I set out to find a site for the project. The epicenter, Yingxiu town of Wenchuan County, Sichuan, was chosen due to data acquired from my case studies and survey. The Yingxiu Town was chosen after researching the site and history of 5/12 Wenchuan earthquake resources found at the local store, including a Sichuan Province map and local picture files and videos; I also did on-site exploration. The reasons are listed below:

- Yingxiu town, Wenchuan County, is the original site.
- In traditional Chinese culture, local people had a strong tie to the home land where they were born. They build cenotaphs or memorials where their family members died and were buried.
- Based on the comparison between W.M.P. (War Memorial Parks) and N.D.M.P. (Natural Disaster Memorial Parks), N.D.M.P. usually are located at the place where the disaster happened. Additionally, my survey shows that over 60% of the interviewees chose Wenchuan because it is where the earthquake took place.
- Unique location: (the epicenter of the earthquake)

4.3 Project Goals

Through the case study and survey, this study has established that a good natural disaster memorial park is a combination of a memorial park and a disaster prevention park. Using this knowledge, as well as information gained from site and programming research, this study can now suggest ways to implement the two Design Strategies from chapter 4.1 by using the following strategy-specific tactics:

1. Providing Multifunctional Areas

A. Four basic functional areas for use in times of non-emergency: the ruins, altar and cemetery, memorial garden, and educational area.

B. A connection between different functional areas and the memorial path.

A healing memorial, “Tao,” which means “path” in traditional Chinese culture, can lead visitors on the way where they can find peace and love.³⁷

C. Functional zonings of N.D.M.P. in a disaster: Providing seismic shelters for evacuation (refuge shelter, emergency command center, fireproofing woodland belt, parking area, emergency medical care area, disaster-resistant water supply area)

2. Creating the Multisensory Experience

A. Creating Multiple Landscape Layers

The Park consists of intervened layers of topography, vegetation, water, paths, paper lanterns, ruins, and message stones.

B. Three development periods of feelings

The design will be represented by three periods: the “Negative Period,” the “Meditational Period,” and the “Positive Period,” based on the relationships among grief-meditation-hope, black-gray-white, and past-present-future. (See Figure 108)

³⁷M. La Fargue, *The Tao of the Tao Te Ching: A Translation and Commentary* (Albany: SUNY Press, 1992).

C. Using different elements to create multi-sensory experience

The design will focus on the experience of the memorial park, utilizing the physical, and cultural elements to implement the multisensory experience. The park design will explore and provide the impact of the specific elements (landform, light, shape, etc.) on the experience of the ruins, altar, memorial garden, and educational areas.

4.4 Final Sheets

4.4.1 Site Inventory and Analysis

Background:

The Wenchuan earthquake hit Sichuan in 2008, eventually claiming 87,000 lives in the Southwest Chinese province. It toppled houses and schools, virtually destroying entire villages, and irreparably changed everyone's world there.

Site Selection:

Based on **principle 1**, the epicenter—Yingxiu—should be chosen as the site for the 5/12 Earthquake Memorial Park. (**Principle 1: Site selection-----The original site may be considered as the site for the N.D.M.P.**)

Location and Surrounding Areas:

Yingxiu is a town within Wenchuan County, Sichuan, in the People's Republic of China. It is south of Wenchuan's county urban center. The distance from Yingxiu to the city of Chengdu is only 88 kilometers, meaning a convenient and effective transportation system can be provided for use in the future. Yingxiu has an area of 115 square kilometers and a population of 6,906. It is located at the epicenter and eighty percent of the town was destroyed by the earthquake. (See Figures 111, 112, 113)



Figure 111. Site Location.



Figure 112. Before Quake.



Figure 113. After Quake.



Figure 114. Tourist Maps of Earthquake Ruins and Surrounding Area.

Size and Zoning:

The government-proposed design boundary. (See Figure 115 red line area)

The new proposed design will be based on the government-proposed design and will focus on the central area. (See Figures 116, 117)

My design is different from the government-proposed design in five aspects:

1. Preserve the ruins

In the government-proposed design, many important ruins were removed and replaced by new constructions. For example, the Yingxiu Middle School was removed and replaced by the new earthquake education center, which is not good for memorializing the tragedy and victims with a living memorial.

In my design, I choose to preserve the ruins of Yingxiu Middle School as an important symbol of the quake, in order to take good care of the natural and cultural heritage and create a new and unique local landscape. Also, my design will preserve natural and geological relics in the earthquake site, including an epicenter sign, fault depression, landslide, debris flows, soil liquefaction, quake lake, and so on.

2. Preserve unique Aba Tibetan and Qiang culture heritage

In the government-proposed design, most of the new buildings and houses adopted modern materials and styles, such as the museum and the earthquake education center, which lost the unique local features of Aba Tibetan and Qiang culture heritage.

According to the survey, most people think that cultural elements should occupy 30%-50% of the total design. Therefore, I will preserve and use local materials and features in my design.

3. Integrated Design

The natural disaster memorial park is not only a park, but should also be a piece of green area with the function of providing refuge and shelter during disasters and for the

purpose of evacuation.

In the government-proposed design, they planned to build an evacuation radius of < 200 yards and cover the entire town, which is a good start, but also too general. More specific disaster preparedness and prevention elements should be considered, such as emergency signs, water supplies, and refuges and shelters.

However, my design integrates the disaster prevention function with usual park functions, and provides different functional plans for both ordinary times and times of disaster. An earthquake science and technology education center and public museum will be built for the purpose of spreading knowledge about earthquakes and disaster preparation.

4. Plants Selection

In the government-proposed design, I cannot find any reasonable planting plan to explain which kind of plants should be planted and which should not.

However, in my design, I choose not only local plants, but also the plants that can provide protection from wind and fire. I organized and listed the plants I would like to use; additionally, some plants that catch on fire easily should be carefully placed, providing a important reference for the designer in the future.

5. Creating the Multisensory Experience

In the government-proposed design, there is no detailed design about creating multisensory experience.

In my design, I created multisensory experience using different elements and multiple landscape layers, including public monuments, green grass, stone, lights and water, an underground path, and artworks, all of which contributed to individuals' having a memorable experience at the natural disaster memorial park.

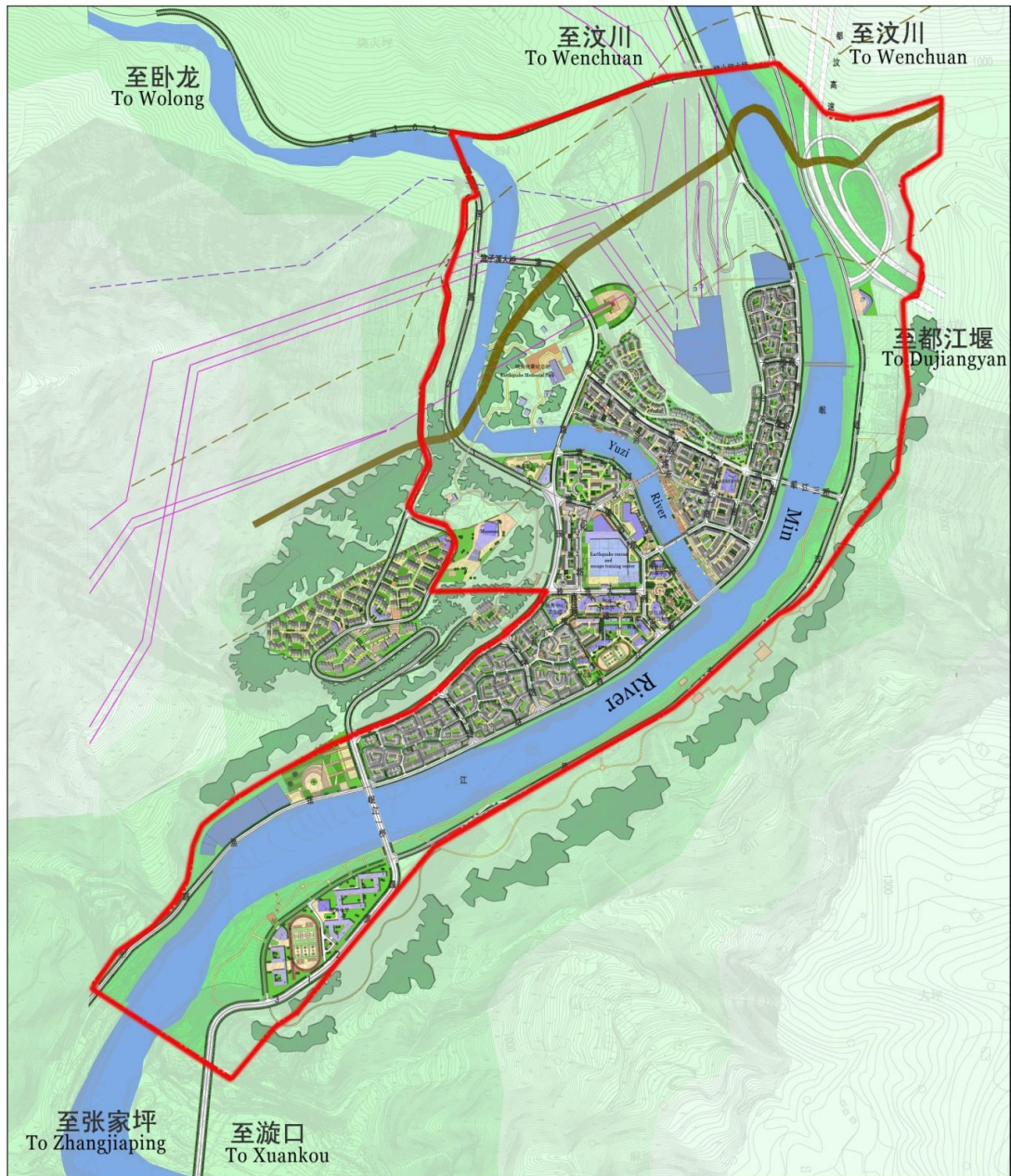


Figure 115. Government-proposed design boundary.



Figure 116. Central area (base map: the government- proposed design).



Figure 117. Central area (base map: the original site after quake).

Natural physical features:

1. Landforms

Reasonable slope and landforms should be used to solve the drainage problem. The refuge area should adopt flat terrain as the main landform and the gradient of slope should be controlled within 1%-8% for quicker drainage.

From south to north, the topography is very diverse. The topography of the southeast is relatively flat and natural, and the topography of the northwest is very hilly. Small hills and slopes are added in the southern part to provide a different spatial experience, and the west viewpoint hill provides an overview of the entire park. The trees and shrubs grow denser along the borders of the park, forming a relatively enclosed interior space. Plants are strictly organized around the entrance area, and others are planted naturally throughout the park, including all kinds of grass, reeds, bamboo, and trees.

2. Water: Water will be used throughout the park in ponds and streams. The ruined river—Min River—is the center of the water system, and from here it stretches throughout the park.

Using reflection water creates a peaceful and healing atmosphere.

Running water combined with sculptures or display walls can provide an active space that can attract more public participation and also can help visitors find release from their sorrow.

3. Plants

Problems:

On the hills surrounding the site, there are only occasional clumps of shrub, offering visual relief from its drab slopes

A huge amount of native vegetations at the site was destroyed by the quake.

Possible solutions:

Preserve and replant the native plants (bamboo) as main plants in the park.

Add more species of plants, and preserve views from existing trees.

A screen of evergreen trees should be planted along the east side of the site to block unwanted wind.

Wenchuan is close to the world-famous hometown of Panda—the Wolong Nature Reserve in Sichuan, which is rich in bamboo. Bamboo is also a traditional plant in China; it represents a lot of meanings, such as the peace, moral integrity, national solidarity, and new hope after the dark.³⁸ (See Figures 118, 119, 120).



Figure 118. Local plants
----- Bamboo



Figure 119. Stone paving.



Figure 120. Native animals
----- Panda

Man- made features:

1. Site Parking

Problems:

Existing parking areas are too small. They cannot provide enough parking spaces for the future. There is a lack of green plants, entertainment facilities, and necessary trails.

³⁸Hexian Jing and Haijing Hua, “Bamboo Culture in Chinese Classic Gardening.” *Bamboo Research* 4, (1998, March): 1-5.

Possible solutions:

Reorganize and add some parking and resting spaces.

Add proper plants and benches to create a comfortable public space.

Combine the parking area and sidewalk design.

2. Design of architecture

The entire town was demolished by the earthquake; most of the buildings and constructions were completely destroyed, meaning there are not enough living places, either for visitors or for local users. The quality of most constructions is very poor, meaning they could not survive another quake in the future. Most rebuilt constructions and buildings lost their local features, which were simple copies of buildings in other places.

The whole town should be rebuilt as the earthquake memorial site, and earthquake prevention buildings will be designed for the local people and visitors.

New constructions should use local materials, use local style and features, and fulfill the basic requirements of modern life.

Based on the research, buildings in the N.D.M.P should have anti-quake architectural and fireproof structures, and they usually should be no more than 1-2 floors; the basement can be used as temporary shelter from earthquakes. Leaving enough space between buildings is good for fire prevention. Public buildings, such as an emergency command center, a museum, and an emergency materials warehouse, should meet the higher design standards of anti-seismic buildings.

Circulation (Path and Pavement Design)

Organize a memorial transportation system:

1. Memorial Path/Bridge connects important earthquake relics. Set some view points in order to provide the best places for overlooking the entire earthquake site.

2. Create a strong feeling along the memorial path.

Underground Path: This path connects the ruins and the museum, representing the connection between the past and the future. By intentionally making the entry path circuitous, a sense of ritual and purification results, similar to the feelings that arise from the sufferings that define the tragic experience.

The memorial paths are made out of white gravel and connect the various parts of the park. Occasionally they widen to form fields, and sometimes they turn into bridges made out of white painted wood spanning water or reeds. When black message stones are placed on the paths, they stand out against the white background.

Angled Paths: Straight memorial paths shorten the distance between the functional areas, and the zigzag shape, which represent splits, will also evoke visitors' strong sense of an earthquake.

Point Generated Circulation: Healing paths connect all the monuments and historic points.

3. Disaster Prevention & Emergency Evacuation

Construct a public green belt while establishing emergency shelters and paths.

In order to ensure the normal flow of rescue vehicles, the main road and highway 213 need to be widened. The main road should be no less than 5 meters, with 1-meter grass verge paving on both sides, so it can be used as a 7-meter-wide rescue path, and the whole site should adopt a barrier-free design.

The surface of the pavement should consist of soft and anti-seismic materials, and the roadbed should consist of hard material, in order to reduce the possibility of cracks or subsidence after a quake.

Utilities:

1. Disaster Prevention

Problem: Limited disaster prevention design was used for the current site.

Possible solutions: Provide:

More public open space

Refuges/ Protected areas

Signage: Educational signs & training

Disaster Prevention Areas:

Evacuation radius < 200 yards; cover the entire town



Figure 121. Emergency sign.



Figure 122. Evacuation radius.

Sensory:

1. Views

It is important to maintain existing views looking toward remaining buildings, such as the concrete wall and broken window, which is strong and attractive.

2. Sounds

Heavy trucks, cars and nearby businesses can create a cacophony of intrusive noise. It

is important to reduce the traffic noise through effective landscaping.

Human and Culture: History and culture continuity

1. Preserve the ruins

As a national-level cultural relic, the earthquake ruin area is the natural and cultural remnant that has many values, for example for scientific research, spirituality, education, and culture. The design principle is to maintain the original status of the ruin and explore necessary design ideas regarding its surrounding environments, in order to provide a richer and safer tour.

The ruin is treated in two ways. The bulk of it is left exposed to the elements. On the ground, the bushes are replaced with a water surface mirroring the ruin and emphasizing the beauty of its decay as time goes by. This part of the ruin is to be seen from the outside as a monument. The other part is incorporated into the museum; it is to be restored so that visitors can walk safely through it. Shielded from the elements, it will be preserved in its present state for future generations.

In this design, the most important ruin is Yingxiu Middle School. A glass cube will be built that directs the view upwards and provides a place from which to see the inside of the ruins. Visitors can go through the underground path and reach the glass house to see the ruins inside. These are the main ruins:

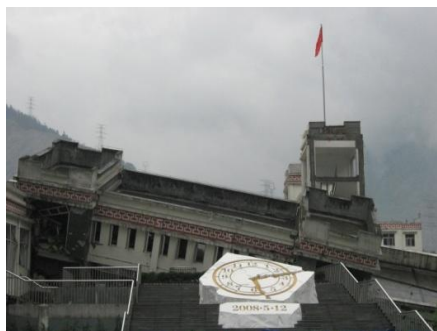


Figure 123. The Ruins of Yingxiu Middle School.

The Ruins of Yingxiu Middle School:

The collapsed Middle School in Yingxiu, the township at the epicenter of the quake, has been turned into a 5/12 memorial. Forty-three students and eight teachers were buried there.

Tianbeng Rock:

At the moment of the 5/12 earthquake, many rocks tumbled down. Some of them slipped down to the bottom of the mountain, while others crossed over the road and rolled into the Minjiang River.



Figure 124. Tianbeng Rock.

However, a high center of gravity rock that was 33' long, 27' high, and about 10' wide rolled past the highway and landed at the riverside. This rock became one of the symbols of the earthquake on the roadside of Duwen highway.

The Hypocenter of Niu Mian Gou:

The macro-epicenter was located at Niumian beginning in the valley of Lianhua Xin and stretching to Caijia Gang Village of Xuankou town, an area of about 982.8 acres (4 square kms). When the earthquake occurred, the power was equal to that of 255 atomic bombs exploding simultaneously.³⁹



Figure 125. Bird's Eye View.

³⁹白勇和樊力,“灵魂之震——汶川地震 120 小时.”*商界* 6,(2008): 1-16.



Figure 126. Niumian Gou Entrance Rock.



Figure 127. The quake lake -- Landslide dam.



Figure 128. Houses collapsed.



Figure 129. Lianhua Xin Waterfall.

Broken Bridge:

Baihua Bridge, which was built in 2004, connected the towns of Xuankou and Yingxiu. It swayed acutely during the earthquake. Nowadays, the ruins of bridge surfaces and piers become important earthquake remains.



Figures 130. Broken bridge. Figures 131. Broken bridge. Figures 132. Broken bridge.

Yuzixi Viewing Platform:

Prefabricated housing was built for Yizixi villagers. Looking over from the viewing

platform, you can see all the ruins of Yingxiu town.



Figure 133. Looking over from Yuzixi Viewing Platform.



Figure 134. Temporary refuges -- prefabricated housing.

Earthquake Statues:

In the course of my survey, I found that the most vivid impression in the interviewees' minds were made by the altar and the earthquake statue, which are the unique geological landforms caused by the earthquake.



Figure 135. Earthquake Statues -- Bulrush.

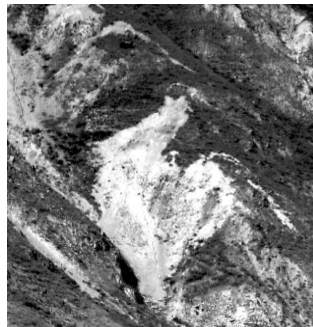


Figure 136. Earthquake Statues -- Chicken.

Altar and Cemetery:



Figures 137. Altar and Cemetery.



Figures 138. Altar and Cemetery.

2. Preserve unique Aba Tibetan and Qiang culture heritage

Problems:

Culture is a big issue in design; especially in this case, much cultural heritage was destroyed by the Wenchuan earthquake, including the Aba Tibetan and the Qiang Autonomous Prefecture heritage. E.g.: The Qiang “Diaolou” (Watch Tower) and Stone houses. (See Figure 139)



Figure 139. Stone houses submerged in flood.

Possible Solutions: According to the survey, most people think that cultural elements should occupy 30%-50% of the total design. Therefore, I will preserve and use local materials and features in my design.

Figures 139 retrieved September 5, 2009, from

[http://ab.newssc.org/system/20100816/000989735.htm`](http://ab.newssc.org/system/20100816/000989735.htm)

3. Education

Problems:

There were limited educational opportunities and medias for the local people to get to know about the earthquake and how to escape from it, which caused a great loss when the disaster happened; so earthquake knowledge popularization is a crucial issue.

Possible solutions:

Earthquake rescue and escape training center: A series of facilities for experiencing

the strong quake will be constructed. Many people can participate in disaster prevention drills. Relevant organizations will issue information to the public about disaster prevention and ways to cope with sudden disasters.

Public museum: Create a complete record of the “5/12” Wenchuan earthquake using a panorama, cultural relics, architectural sculptures, video media, and so on.

4. Memorials

The memorial elements will include: a memorial hall, memorial buildings, a museum, ruins, a memorial greenbelt, a memorial plaza, a memorial wall, memorial paths, a memorial landscape, educational buildings, an earthquake training and rescue center, and so on.

Ceremony: Ceremony also can be a special form of memorial. We can see from the chart that a national ceremony should be held in the memorial park. (The Chinese government has set up “5/12” as the anniversary of the earthquake disaster to memorialize the victims of the Wenchuan earthquake.) During the ceremony, participants can light candles, or release or float lanterns, to remember and pray for the victims and survivors.



Figure 140. Floating Lanterns



Figure 141. Releasing Lanterns

Figures 140-141 retrieved September 5, 2009, from
<http://www.alighting.cn>

Climate:

Problem: Windy weather:

Although Wenchuan is located in a river valley, its climate is nevertheless hot and arid. Its average annual precipitation is less than 500 mm, even lower than Beijing's 585 mm. This makes it hard for trees and grass to grow on the mountain slopes. Most of its precipitation also falls between June and August, with rainstorms giving rise to mudslides that are fatal to the area's sparse vegetation.

Strong wind in the valley blows up the sand and dust, forming a huge yellow expanse that blankets the whole county. The earthquake, which added more than 300 hazardous spots such as landslides around the county seat, made the environmental situation worse. Local residents say they have suffered from daylong sandstorms for half a month following the quake.

Possible solutions:

Windbreaks are created by planting sufficiently dense rows or stands of trees at the windward exposure of an open field subject to wind erosion (Mingyuan Du, 1998). Evergreen species are preferred to achieve year-round protection.

Things as such as silt fences, fiber/mulch blankets, wattles, sediment traps, inlet protection, and temporary seeding can be used to stop or contain the flow of silt and sediment that may enter the watershed.

4.4.2 Conceptual Plan

4.4.2.1 Design Concept

1. Determine the theme:

Based on the on-site investigation, questionnaire forms, and interviews, first-hand site information can be collected, which includes: special geological, landform changes and various individuals, events, and objects that are worthy of being remembered as they existed during the period of earthquake, disaster relief, and reconstruction. After scientific analysis and evaluation, basic components of the memorial park system were summarized and the purpose of the design was decided upon: to embody respect for nature, love of life, and the history of the event, as well as to explore science and technology.

The overall theme for the project – “a place of living memories” — was inspired by the traditional Chinese philosophy of the “Tao,” which means “path” or “way.”

A healing memorial path that is omnipresent throughout the park, constituting one of its many layers and connecting different functional areas, was proposed for the memorial park. Juxtaposed with greenery, monuments, and daily life, remembrance becomes a natural part of the park.

The Zigzag Memorial Path: The path is a living memorial leading the way to the bright future. It means that future generations should remember this great tragedy in order to pursue a better life in the future. A series of zigzag paths stretches throughout the park, luring the visitor forward. As a contemporary interpretation of the traditional Chinese philosophy “Tao,” the path becomes a symbol of remembrance and hope.

The relationship among grief-meditation-hope, black-gray-white, and past-present-future recurs throughout the project, materialized in the relationships among the paths, the water, the plants, the paper lanterns, and the ruins. (See Figure 142)

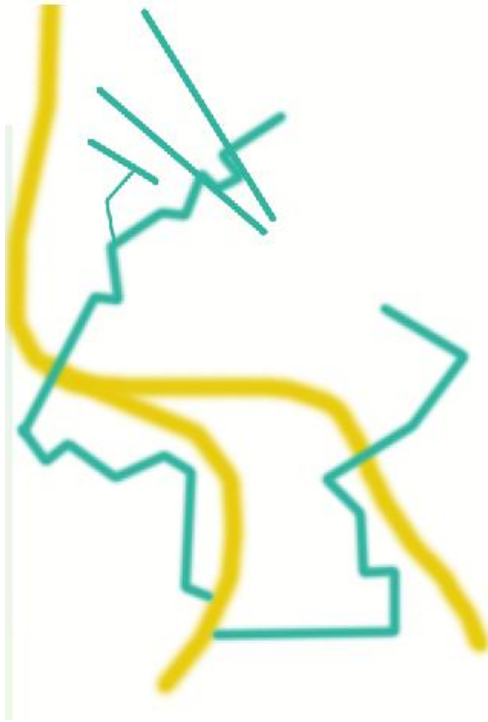


Figure 142. Conceptual Plan.

4.4.2.2 Functional Grouping and Zoning Maps in ordinary and disaster times

Create clear and well-connected multifunctional areas.

Function conversion—The natural disaster memorial park is a park, or a piece of green area, with the function of providing refuge and shelter during disasters and for purpose of evacuation. It is constructed with the intent of saving life and property, and to enhance the functions of disaster prevention facilities, which makes the purpose of the park difunctional. According to the design principles of N.D.M.P, an integrated design of disaster prevention function and usual park functions is optimal, which means that N.D.M.P functions as a memorial park during regular times and also plays a role in disaster prevention and amelioration during times of crisis.

Functional zonings of N.D.M.P. in ordinary times (See Figure 143):

1. The Ruins Area - should be preserved.
2. Education Area - including the museum complex and the Earthquake Education

Center

3. Cemetery and Museum Area

4. Memorial Garden

Other functional areas are:

5. Public Transportation

6. Commercial Area

7. Public Square

8. Residential Area

Functional zonings of N.D.M.P. in disaster: Providing seismic shelters for evacuation

(See Figure 144)

1. Refuge Shelter

2. Emergency Command Center

3. Fireproofing Woodland Belt

4. Parking Area

5. Emergency Medical Care Area

6. Disaster Resistant Water Supply Area



Figure 143. The Functional Grouping and Zoning Map in Ordinary Times.

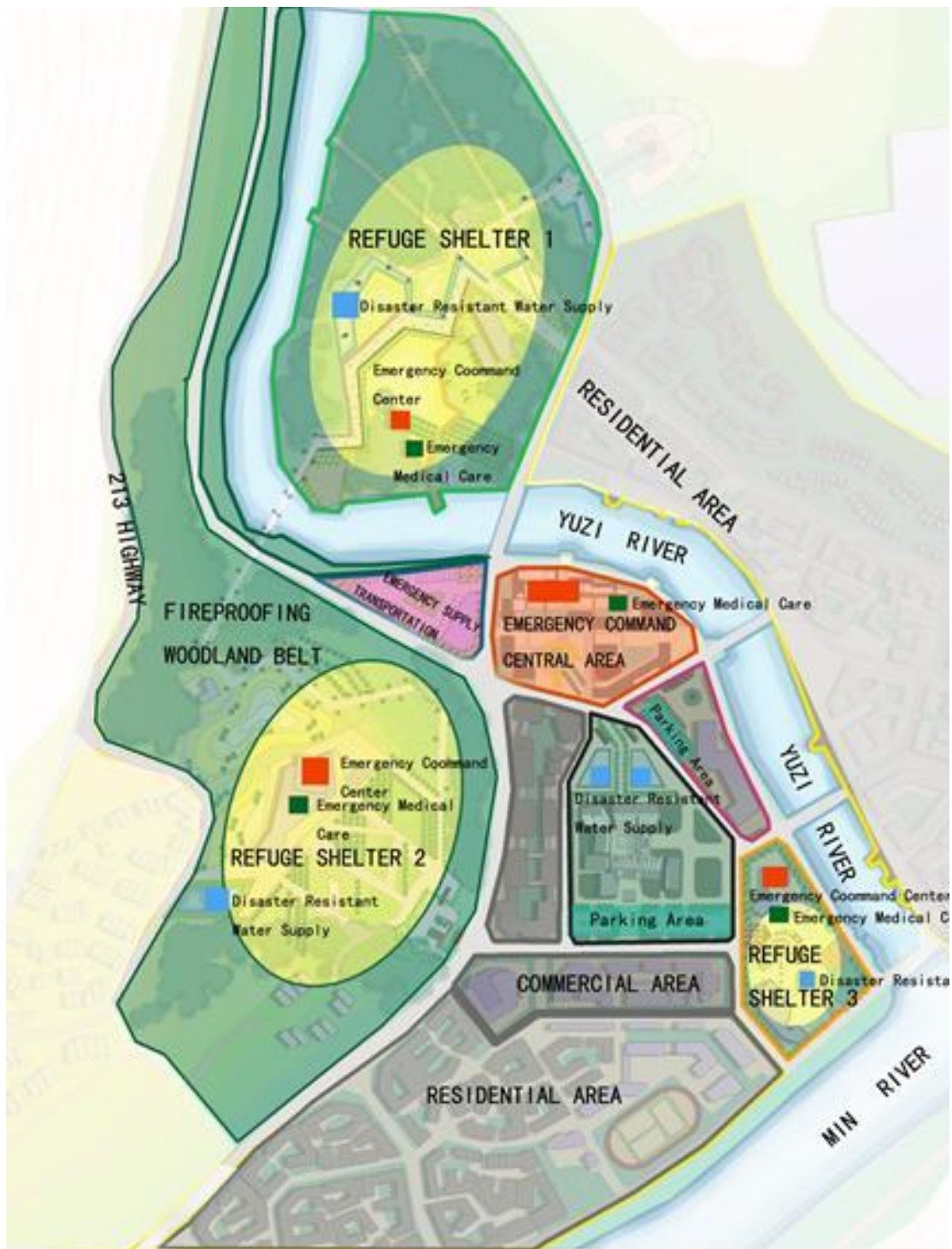


Figure 144. The Functional Grouping and Zoning Map During the Disaster.

4.4.3 Planting Plan

Multiple layers and different types of plants create a diversiform landscape. There are different combinations that represent different themes, so they can evoke people's different senses, as well as provide a natural healing place for people. The local plant bamboo was used widely since it is not only an evergreen plant, which can benefit the local environment, but also represents some spiritual ideas, such as solidarity and strength. Thousands of bamboo trees were to be placed in the cemetery, each one representing one victim who died in the earthquake.

In order to fulfill the requirements of disaster prevention, the plants should have three basic features: 1.They should not catch on fire easily; 2. They should be hard, making them less flammable; and 3. They should have thick leaves that contain a lot of water in order to provide wind protection and shade, as well as to prevent the fire.

Evergreen trees with wide leaves will be the first choice.⁴⁰ However, if only this kind of tree is planted, the whole park will be very dark and not easy to escape from,⁴¹ besides which the landscape will be simple and boring; therefore, it's better to combine evergreen trees with some deciduous trees and flowers that can provide different landscapes in different seasons.

The following information is the plant list for different areas.

(See Figures 145, 146)

1. 榉树 *Zelkova serrata* (Thunb.) Makino
2. 女贞 *Ligustrum lucidum* Ait.glossy privet

彩萼石楠 *Calluna vulgaris* / Heather,ling

榉树 *Zelkova serrata* (Thunb.) Makino

⁴⁰Jing-qi Li and Ji Xia, "Study of Urban Disaster Prevention Park Planning." *Chinese Landscape Architecture* 7 (2007).

⁴¹ 曹鹏程, "绿化带阻止火灾蔓延, 小广场能降救援飞机." *环球时报* (2004).

枫香 *Liquidambar formosana* Hance

乌柏 *Sapium sebiferum* (Linn.) Roxb.

苦楝 *Melia azedarace* L.

无患子 *Sapindus mukorossi* Gaertn.

重阳木 *Bischofia polycarua* (Levl.) Airy -Shaw

黄栌 *Cotinus coggygria* Scop.

3. Trees:

水杉 *Metasequoia glyptostroboides*

垂柳 *Salix babylonica* L. weeping willow

龙爪槐 *Sophora japonica* Linn. var. *japonica* f. *pendula* Hort.

枫杨 *Pterocarya stenoptera* C. DC.

乌柏 *Sapium sebiferum* (Linn.) Roxb.

香椿 *Toona sinensis* (A. Juss.) Roem.

Shrubs:

木芙蓉 *Hibiscus mutabilis* Linn.

梔子 *ardenia jasminoides* Ellis var. *jasminoides*

糯米条 *Abelia chinensis* R. Br.

枫香 *Liquidambar formosana* Hance

棣棠 *Kerria japonica* (Linn.) DC. f. *japonica*

Herbs:

山麦冬 *Liriope spicata* (Thunb.) Lour.

石蒜 *Lycoris rosea* Traub et Moldenke

鸢尾 *Iris tectorum* Maxim.

4. Trees:

槲栎 *Quercus aliena* Blume var. *aliena*

马尾松 *Pinus massoniana* Lamb. var. *massoniana*

苦槠 *Castanopsis sclerophylla* (Lindl. et Paxton) Schottky

南酸枣 *Choerospondias axillaria* (Roxb.) Burtt et Hill

麻栎 *Quercus acutissima* Carr. var. *acutissima*

小叶栎 *Quercus chenii* Nakai

Shrubs:

木芙蓉 *Hibiscus mutabilis* Linn.

梔子 *ardenia jasminoides* Ellis var. *jasminoides*

冬青 *Ilex guangnanensis* C. J. Tseng ex Y. R. Li

忍冬 *Lonicera japonica* Thunb.

Herbs:

山麦冬 *Liriope spicata* (Thunb.) Lour.

石蒜 *Lycoris rosea* Traub et Moldenke

络石 *Trachelospermum jasminoides* (Lindl.) Lem. var. *jasminoides*

5. 白玉兰 *Magnolia heptapeta* (Buchoz) Dandy

茶花 *Rhododendron camelliiflorum* Hook. f.

金丝桃 *Hypericum bellum* Li

6. Trees:

女贞 *Ligustrum lucidum* Ait. glossy privet

榉树 *Zelkova serrata* (Thunb.) Makino

栾树 *Koelreuteria paniculata* Laxm.

鹅掌楸 *Liriodendron chinense* (Hemsl.) Sarg.

香椿 *Toona sinensis* (A. Juss.) Roem.

臭椿 *Ailanthus altissima* (Mill.) Swingle

重阳木 *Bischofia polycarpha* (Levl.) Airy -Shaw

Shrubs:

粉团蔷薇 *Rosa multiflora* Thunb. var. *cathayensis* Rehd. et Wils.

冬青 *Ilex guangnanensis* C. J. Tseng ex Y. R. Li

紫荆 *Cercis chinensis* Bunge

胡颓子 *Elaeagnus davidii* Franch.

映山红 *Rhododendron simsii* Planch.

Herbs:

鸢尾 *Iris tectorum* Maxim.

白三叶 *Trifolium repens* L.

红花酢浆草 *Oxalis corymbosa* DC.

7. 紫竹园 Bamboo Garden: *Phyllostachys munroblackjoint* bamboo

8. 箭竹 *Pseudosasa japonica* Maki

9. Trees:

含笑 *Michelia skinneriana* Dunn

杜英 *Elaeocarpus prunifolioides* Hu var. *prunifolioides*

刺槐 *Robinia pseudoacacia* Linn.

泡桐 *Paulownia fortunei* (seem.) Hemsl.

朴树 *Celtis sinensis* Pers.

Shrubs:

蚊母树 *Distylium chinense* (Fr.) Diels

夹竹桃 *Nerium indicum* Mill.

Herbs:

白三叶 *Trifolium repens* L.

婆婆纳 *Veronica henryi* Yamazaki

紫花地丁 *Viola philippica* Cav.

10. 白杨 *Populus lasiocarpaplpar*

11. 梧桐 *Firmiana simplex* (L.) Wightphoenix-tree

12. 黄栌 *Cotinus coggygria* Scop.smoke-tree

女贞 *Ligustrum lucidum* Ait.glossy privet

13. 枫香 *Liquidambar formosana* Hance

15. 杜英 *Elaeocarpus chinensis* (Gardn. et Champ.Hk. f.ex Benth.

16. 无患子 *Sapindus mukorossi* Gaertn.

香椿 *Toona sinensis* (A. Juss.) Roem.

乌柏 *Sapium sebiferum* (Linn.) Roxb.

17. 白玉兰 *Magnolia heptapeta* (Buchoz) Dandy

银杏 *Ginkgo biloba* L.maiden-hair tree

结香 *Edgeworthia chrysantha* Lindl.

梔子 *Gardenia jasminoides* Ellis

红花酢浆草 *Oxalis corymbosa* DC.

18. 白玉兰 *Magnolia heptapeta* (Buchoz) Dandy

19. 含笑 *Michelia szechuanica* Dandy

鹅掌楸 *Liriodendron chinense* (Hemsl.) Sarg.

山茶 *Camellia japonica* L.

南天竹 *Nandina domestica* Thunb.

石蒜 *Lycoris rosea* Traub et Moldenke

麦冬 *Ophiopogon japonicus* (Linn. f.) Ker-Gawl.



Figure 145. Planting Plan.

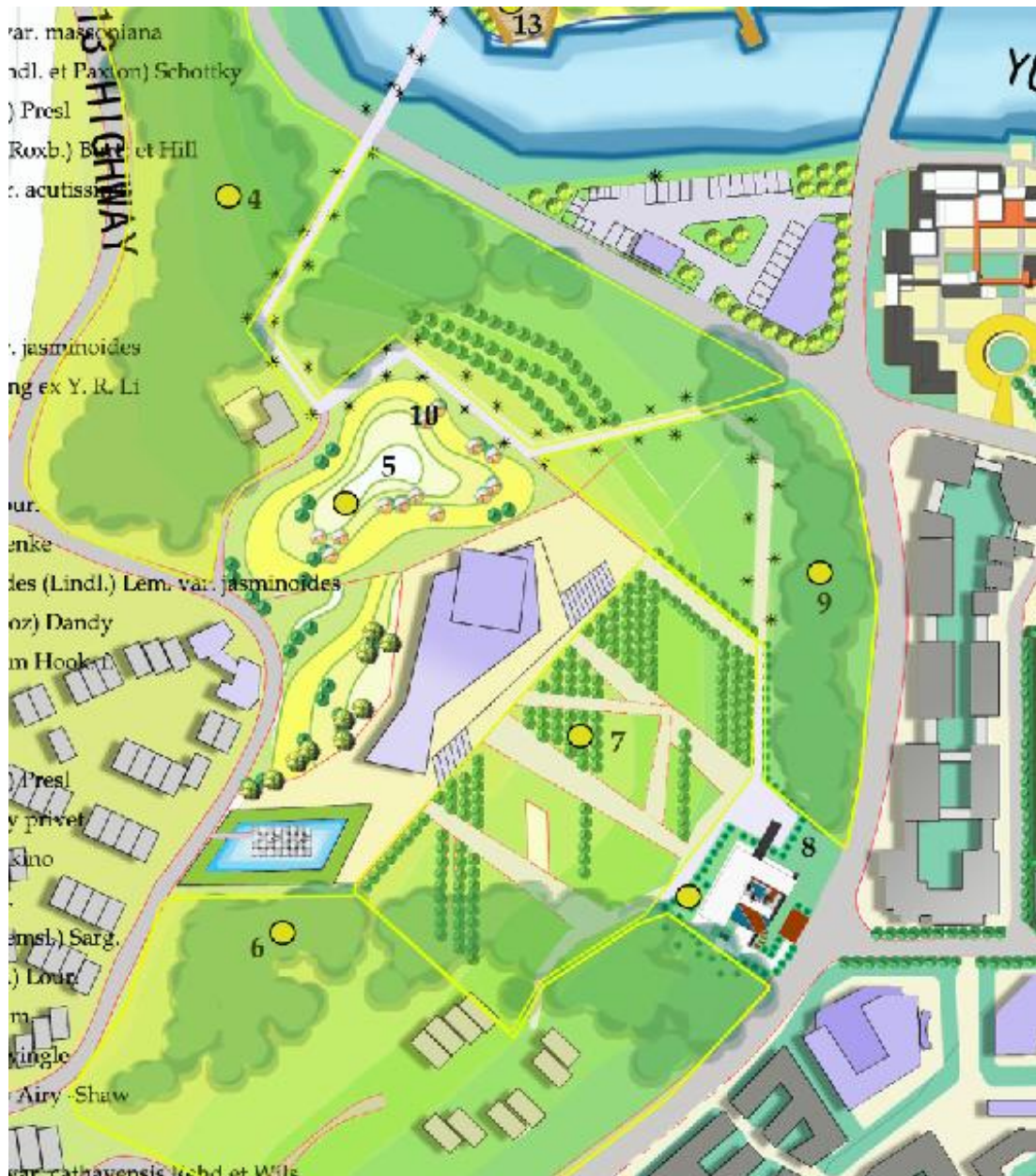


Figure 146. Planting Plan.

4.4.4 Master Plan

1. Memorial Square (Main Entrance): A memorial and ceremonial place where we pray for the people who are suffering from the disaster.

2. Bus station

3. Museum: Respecting the original site condition (low impact design. There are several steps to develop it. (See Figure 147)

The museum will be positioned strategically in connection to the entrance and the ruin.

Part of the ruin will be incorporated into the museum.

An underground path connects the ruins and museum, representing the connection between the past and the future.

After passing an introductory exhibit, visitors can walk safely through the ruins.

The various second-floor exhibition halls can be unified through the core cross porch; rooms on the first floor can be used for commercial purposes.



Figure 147. The design process of Museum.

4. Earthquake Science and Technology Education Center: The earthquake science and technology education center is 1-2 floors higher than the other museum buildings, and it serves as the focal point of the museum complex.

The earthquake science and technology education center will be 4-5 floors and will be organized in the purple frame. The second and third floors will be the museum.

5. Underground Path: connects the Ruins and the Museum, representing the connection between the past and the future. By intentionally making the entry path

circuitous, a sense of ritual and purification results, similar to the one that comes from the sufferings that define the tragic experience.

6. Message Stone: Upon entering the park, the visitor passes a carved-out block made up of 60,000 white cobblestones placed in bamboo meshes. Visitors can write a message with white chalk on the stone and place it back in the mesh box. It provides a good way to communicate with dead people by creating individual activities of remembrance. Bamboo boxes become containers of memories and wishes for thousands of visitors.

7. Parking Lot

8. Reflecting Pools: Two reflecting pools in front of the ruins create sensory elements that evoke emotion, and provide victims and their families with a place for contemplation, healing, and rest.

9. Ruins: Yingxiu Middle School. Visitors can go through the underground path and reach the glass house to see the ruins inside.

10. Glass Cube: Directs the view upwards and provides a place to see the inside of the ruins.

11. Parking lots

12. Seat wall with Historic Timeline

13. Boardwalk

(See Figure 148)



Figure 148. Master Plan.

14. Visitor Center

15. West Entrance with Display Walls

16. Lawn Area over Graves: Each tree represents each victim, as well as regeneration

17. Memorial Hall: Primary area of focus, featuring memorial sculpture

18. Display of Artwork

19. Walls with Wenchuan Earthquake Artifacts and Stories

20. Memorial Path/Bridge & Milestone: to show all the important points/events

during the earthquake. (See Figure 149)

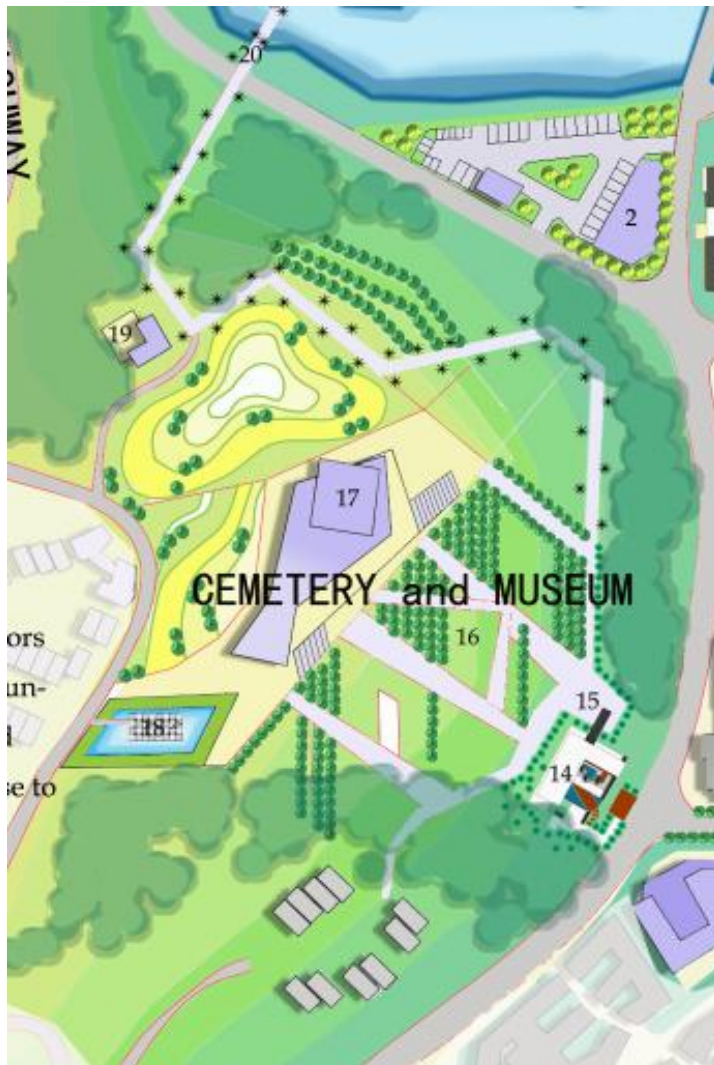


Figure 149. Memorial Path with Milestone.

21. Wooden Platform

22. Zigzag shaped Memorial Wall: Based on **principle 5**, *people* are a very important memorial object, in order to pass on the legacy of disaster-stricken memory. A memorial wall with victims' names can be built to honor and remember those people who lost their lives during the disaster.

In my design, a grand monument is the black-granite, Zigzag-shaped Memorial Wall. Inscribed on the wall are the names of 88,000 victims of the quake. (Names etched in granite send a timeless message.) The zigzag shape also represents seismic waves spreading and the continuity of living memories.



Figure 150. Memorial Wall.

Aspens were planted along the memorial walls; the wind blows across the trees, creating a murmuring sound that emphasizes the sorrowful atmosphere.

23. Running Water with Color-Changing Lights: Provides illumination and sensory experience for both day and night visitors. The sound of the waterfall will also block the noise of outside traffic and help people to release their pressure and negative feelings.

24. Existing Building Foundation Featuring Displays of Artifacts & Artwork

25. Reflection Ponds with Debris and Bronze Statues: Combining reflection ponds, which serve as a tribute to the spirits of the victims, with debris will create a sacred, peaceful, and serene place for contemplation, healing, and remembrance.

26. Historic Path with Brick Pavers

27. Paths, Featuring Historic Information

28. Memorial Hills: Based on **principle 5**, *Spirit* is another important memorial object, which includes the psychological or spiritual ideas. Abstract landscapes can be used to represent or express different feelings and spirits, such as love, fear, courage, and so on. In my design, there are three small hills standing above the ground to represent

Love, Faith, and Courage, which are also deeply rooted in everyone's heart. They are the source of life as well as the spirit of the memorial.

29. Restroom

30. Benches below Tree Canopy

31. North Entrance with Display Walls: Based on **principle 5**, *Process* is also an important memorial object; therefore, in my design, some display walls with information tell the stories of the entire rescue process, including the selfless support from various regions, the massive assistance from all walks of life, the cohesiveness of teamwork, the refuge tents, and the process of restoration and reconstruction.

32. Memorial Sculpture

33. Paper Lanterns: A series of paper lanterns stretches throughout the park, luring the visitor forward. (*) Lights as a living memorial represent a bright future. They indicate that future generations should remember this great tragedy in order to pursue a better life. As a contemporary interpretation of the traditional, a symbol of remembrance and hope lies in the Chinese rice lamp. To reach visual and spatial variation, they differ in scale and density, creating a place of solitude and remembrance. The lanterns interact with their surroundings in a number of ways. The lanterns also double as sources of illumination. (See Figure 151)



Figure 151. Paper Lanterns.

n Entrance): a
place where we
are suffering

Memorial Sc
18. Display of

d Technology



Figure 152. Master Plan.

4.4.5 Section Plan and Perspective:

Section Plan:

1. A—A' Section Plan: This portion of the plan shows the view of the walkway along the riverside. (See Figure 153)

2. B—B' Section Plan: This portion of the plan shows the wooden platform and the surrounding landscape. (See Figure 154)

3. C—C' Section Plan: This portion of the plan shows the memorial hills and the surrounding environment. (See Figure 155)

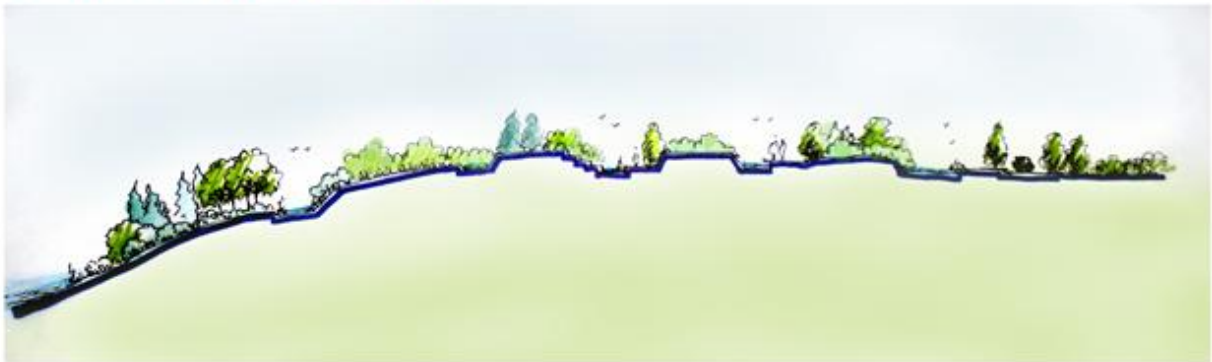


A - A' SECTION PLAN

Figure 153. A—A' Section Plan.



B - B' SECTION PLAN



C - C' SECTION PLAN

Figures 154. B—B' Section Plan.

Figures 155. C—C' Section Plan.

Perspectives:

A. Memorial Walls: Shows the view looking toward the memorial walls. (See Figure 156)

B. Memorial Bridge: Shows the view looking toward Memorial Bridge. (See Figure 157)

C. Lights and Running Water: Shows the view looking at lights and running water in front of memorial walls. (See Figure 158)

D. Memorial Museum and Ruins: Shows the view looking toward the memorial museum and earthquake training center and its connection with the ruins. (See Figure 159)

E. Visitor Center: Shows the view looking toward the visitor center with bamboo planted around. (See Figure 160)

F. North Entrance: Shows the view looking from the north entrance toward the memorial garden. (See Figure 161)



Figure 156. Memorial Bridge.



Figure 157. Memorial Walls.



Figure 158. Lights and Running Water.

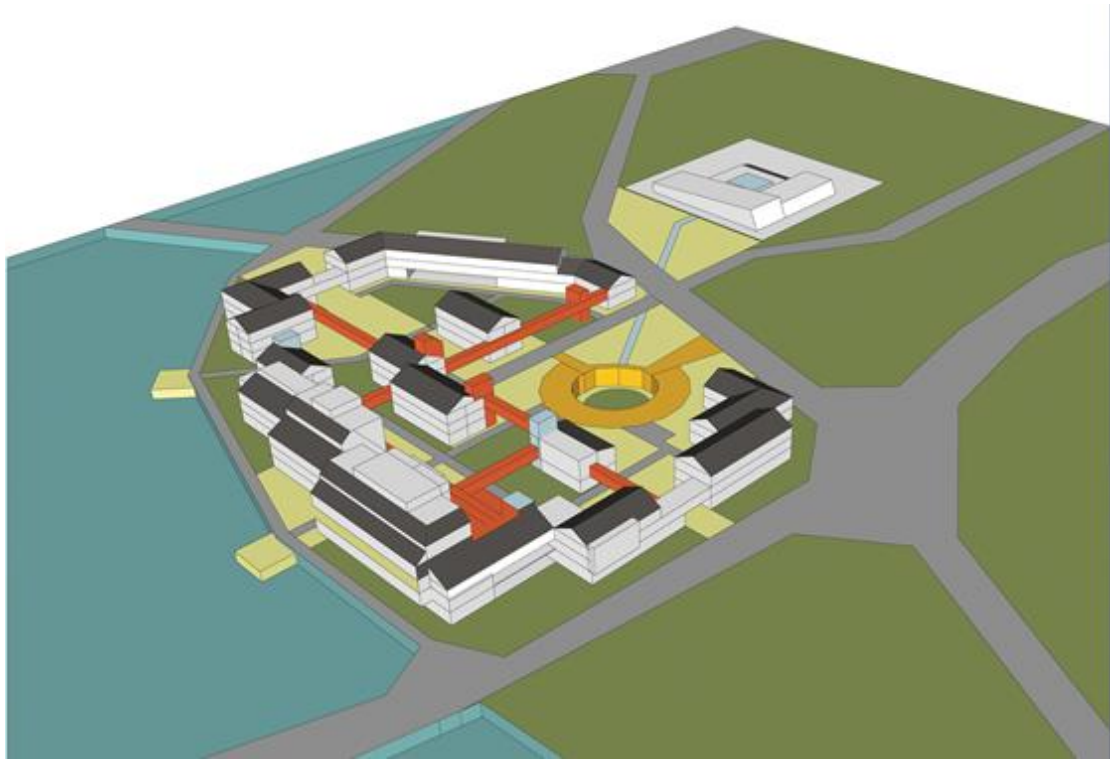


Figure 159. Memorial Museum and Ruins.

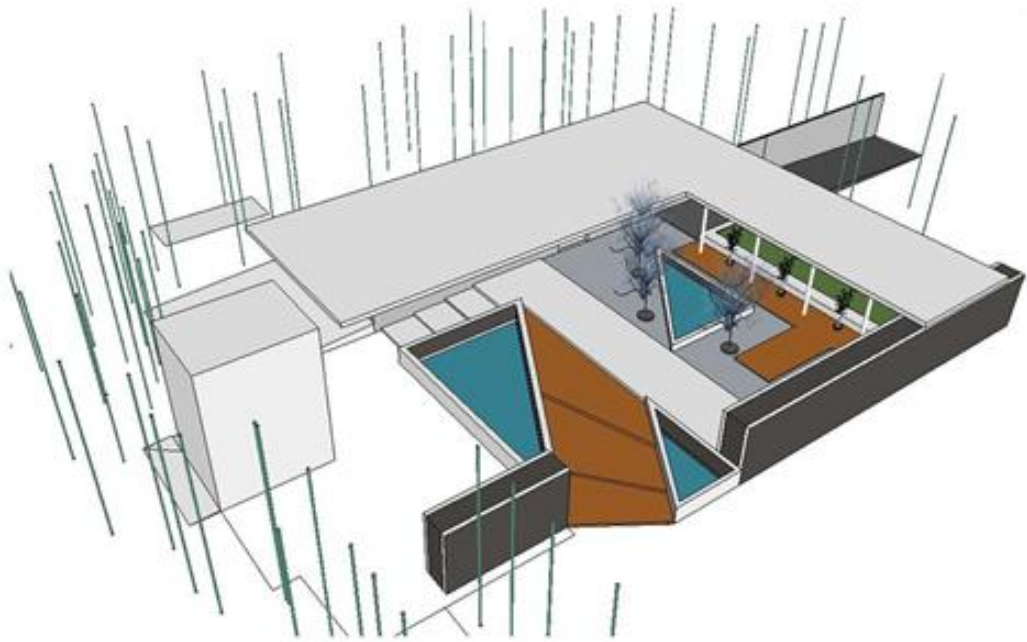


Figure 160. Visitor Center.



Figure 161. North Entrance.

4.5 Summary of the 5/12 Wenchuan Memorial Park Design

The design kept government-proposed business areas and residential areas. Several green belts connected the memorial park and commercial areas, as well as residential areas; meanwhile, similar local elements and characters were widely used in the park and housing design, in order to enhance the connection between them, which made the whole town a unified living memorial.

Wenchuan Earthquake Memorial Park is meant to encourage the “people, process, spirit” of the town and region; therefore, my proposed design of the memorial park can achieve a sense of the continuity of past, present, and future for the people of the town in three ways:

Through preservation of the Wenchuan earthquake ruins and resources, people remember the *past*—the most tragic page in human history.

Through memorializing the earthquake spirit and the entire rescue process, including

the selfless support from various regions, the cohesiveness of teamwork, the refuges, and the process of restoration and reconstruction, people create the *present*—the rebirth of the quake-hit town.

By building the Wenchuan Earthquake Memorial Park and enhancing the scientific development capacity of natural disaster preparedness and prevention through people looking into the *future*, the Wenchuan earthquake ruins and memorial park will be established as components of precious natural, cultural, and scientific heritage, and the most unique tourism resource of Wenchuan.

4.6 Summary of the Design Project

The design project focused on the effects of memorial design elements (cultural elements, physical elements, sensory elements and psychological elements) on a natural disaster memorial park—the 5/12 Earthquake Memorial Park design.

4.7 Analysis of Project

The goal of this design project was to explore an ideal template program that was summarized before and proved by the real case. It may provide a useful reference for future designs.

4.8 Limitations and Further Applications

Several factors limited the design project. The first was the challenge of defining a new design field: one for Natural Disaster Memorial Parks. Although there are many memorials that were built to memorialize natural disasters, little literature exists that can provide a clear and exact definition of the term. The second limitation was that the comparison between W.M.P. and N.D.M.P. was not completed, and it still needs to be improved. The third limitation was the broad nature of the survey, which covered too many general topics and didn't get specific enough to delve deeply into each element. The fourth limitation was a shortage of important resources. There was no clear site map and other information; the design was based on the government-proposed design and some unclear photos, so the design was influenced by the reality encountered. The fifth limitation of this project was time: Specifically, this study did not delve into the length of time that is required to establish a deep connection with space and people. There was not much time to get enough information from the local people. The sixth limitation was that most of the local people were not well-educated, and many of them didn't understand the

questions very clearly or were unable to give professional answers, so the survey itself cannot provide enough useful information related to design. Lastly, the design project was limited because it was not built; therefore, it is not possible to thoroughly evaluate whether the memorial park proposal is applicable.

There are several directions for the further application of this literature within the Natural Disaster Memorial Park design context. First, cultural issues and a definition of *sense of place* can be applied to understanding and enriching the memorial experience for different users. Second, the framework could be explored individually to express a place for or kind of approach to the design of a memorial park. A third study would be similar to this one, as it would use the framework in combination with various kinds of natural disasters (such as hurricanes, fire, floods, etc.) to explore how each kind of natural disaster would affect the outcome of the design project.

4.9 Strengths and Weaknesses

The overall goal of this project was to provide a framework that can be applied to Natural Disaster Memorial Parks (N.D.M.P.). This study can be broken into three segments or milestones that contributed to this goal. The first segment explored and analyzed the literature and cases surrounding the topic of all kinds of memorial parks and their basic features and differences. The study achieved this milestone with the definition of N.D.M.P. and their basic functional areas. The second portion compared War Memorials and Natural Disaster Memorials using different design categories. The last segment used the knowledge gained from the case study and the survey to guide the design framework of N.D.M.P. and used a real case—the 5/12 Wenchuan Earthquake Park Design—to explain it. Although the ultimate measure of feasibility for the framework and success for this design would take place through post-occupancy evaluation, I have

resolutely worked through reflection and critique to allow the case study and survey to direct the design of the project.

In conclusion, the success of this study stems from the comparison between War Memorials and Natural Disaster Memorials, as well as from some discussion about disaster prevention parks. The idea of the preparedness and education element in my new definition of Natural Disaster Memorial Parks, which Taylor didn't mention in his definition, is also one of the contributions of my thesis. Did the study answer the research question: What are the differences between War Memorials and Natural Disaster Memorials? What kind of design elements and design principles should be applied to N.D.M.P.? As the project remains conceptual, it is impossible to fully evaluate the approach suggested in this project. However, this study revealed that some common features can be found and used in future designs, based on numerous case studies and surveys. This study provides a framework that can be applied to Natural Disaster Memorial Parks. Through the design project, this study investigated how to enhance the multisensory experience and memories of visitors through the different design elements of the Natural Disaster Memorial Park to meet the needs of the creative visitors for a sense of a living memorial. Thanks to the establishment of such parks, people and events will be remembered forever.

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Appendices

Appendix A:
Questionnaire and Results of the 5.12 Earthquake Site Survey

5.12 EARTHQUAKE SITE SURVEY

汶川地震遗址调查

Linjun Yang – Summer 2009 / 杨琳君 – 2009 年夏
Washington State University, U.S. / 华盛顿州立大学, 美国

1. What's your identity in Wenchuan? / 您在汶川的身份是?

Local person / 当地居民 Local official 地方官员 Tourist 游客 Other/ 其它_____

2. Why do you come here? / 请问您来这儿的目的是?

Visiting / 参观 Studying 学习 Memorizing 悼念 Other/ 其它_____

3. Have you participated in any earthquake prevention maneuvers or know some related knowledge about earthquake prevention? 您参加过防灾演习或通过一些渠道了解过防灾避难的相关知识吗?

Yes / 有 (where/which medium? 哪里/ 哪种媒介?) _____

No/ 无

4. When the disaster happened, which place below you would consider as the best one to go? / 灾害发生时, 您会优先选择以下的哪个地方避难?

Residential Park / 居民区公园 Public park, plaza / 大公园, 广场 Earthquake prevention building, basement / 抗震建筑, 地下室 Hospital / 医院 Other/ 其它_____

5. How important is a public park to you in serving as a memorial of this tragedy? / 您认为建设灾害纪念公园的重要性有多少? (select between 1 to 5, with 1 being the least and 5 being the highest / 从 1—5, 依次代表从程度由低到高): 1, 2, 3, 4, 5

6. Which county do you think is the best site for building the 5/12 earthquake memorial park? / 如果要建 5.12 地震纪念性公园, 您认为最佳的选址是:

Wenchuan/汶川 Yingxiu/映秀 Beichuan/北川 Beijing/北京 Other/其它_____

Reason:/原因: _____

7. 哪个地方对您的印象最深刻? / Where is the most impressive place in your mind?

Earthquake statue/地震壁画 Niumian Channel/牛眠沟 Altar/祭坛 Other / 其它_____

Reason/原因: _____

8. What aspects of the current memorial park do you think are deficient? / 您认为现有的纪念公园有哪些不足？（例如：避难标志是否明显，设施是否齐全，功能是否合理等等）

9. What functions do you think the earthquake memorial park should have? / 您觉得地震纪念公园应具有的功能有哪些？

Memorial/纪念 Ecological/生态 Disaster prevention/防灾 Education/教育

Tourism/旅游 Recreation/娱乐 Scientific research/科研 Other/其它 _____

10. Please select the most important elements you would want to see in a memorial park: / 请您选择以下您最希望在纪念公园中看见的元素：

Green grass /绿草地 Water feature/ 水景（喷泉，水池等） Stone / 石

Artwork / 艺术品 Public monuments / 纪念碑 Other/ 其他 _____

11. Many cultural heritages were destroyed by the Wenchuan earthquake, such as those of Aba Tibetan and Qiang Autonomous Prefecture. What percentage of cultural elements do you think should be included in the earthquake memorial park? / 汶川特大地震破坏，阿坝藏族和羌族文化遗产受损极为严重。您认为在未来地震纪念公园设计中当地文化元素应占的比例是？

10%或以下 10%—20% 20%—30% 30%—40% 40%—50% 50%以上

12. What's your feeling about the earthquake? / 请您描述下对这次地震的感受：

NOTICE: The purpose of this survey is to collect comments on the Earthquake Memorial Park design. Your personal information will be kept confidential and nothing about you personally will be identifiable. This survey is for an academic design project only and it will not be published to the public. （注意：这项调查的目的是为了搜集民众对建设 5.12 地震纪念公园的态度及看法。这项报告不涉及填写人的任何私人信息。以上所有信息仅限于学校设计项目的资料，而非对外发表。）

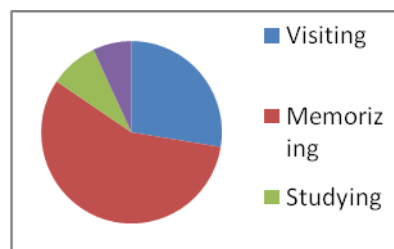
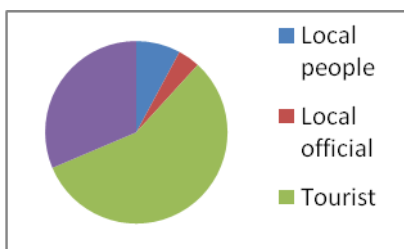
I understand all the information above. / 本人完全理解以上信息。

Signature / 签名： _____

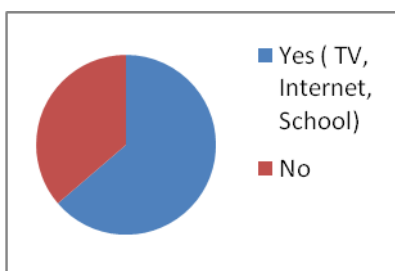
5.12 EARTHQUAKE SITE SURVEY

Linjun Yang – Summer 2009
Washington State University, U.S.

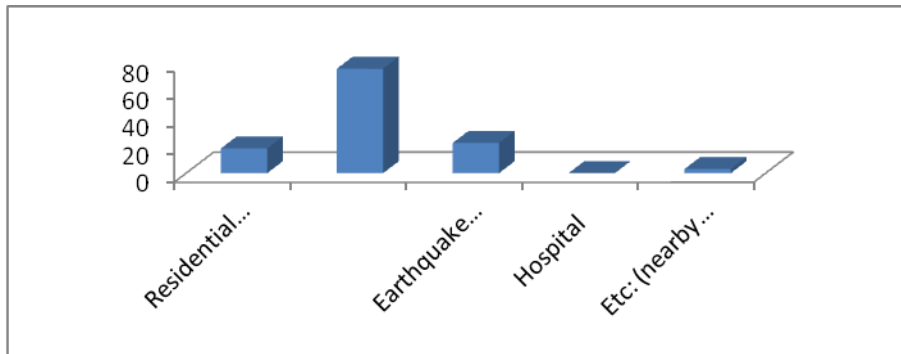
I did a survey at the earthquake site—Wenchuan in China in the summer of 2009. In order to make this survey more comprehensive and involve all kinds of people, I also did a survey in some other cities, such as Wuhan, Beijing, and Chengdu. In this random sample, I find that more than half of the interviewees are tourists (150 of the total); the local people and officials who are the direct victims played only a small part in the survey responses—nearly 10%. More than 30% of the interviewees are from other cities outside Wenchuan. They as bystanders also shared their feelings about and understanding of the earthquake and gave some thoughtful suggestions to the site design. Their main purpose to this site is visiting and memorializing.



Nearly 64% of the interviewees have participated in some earthquake prevention maneuvers held by schools or government, or had gained some related knowledge about earthquake prevention through other media, such as TV and the Internet. However, 37% of the interviewees have never received evacuation training or information about earthquake prevention. That result shows that we should provide more earthquake prevention design or notice in the future park design.

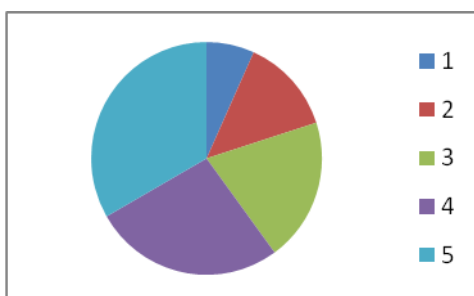


In order to better understand how well they know about earthquake prevention, I asked them where they went immediately after the earthquake. The results are shown below:

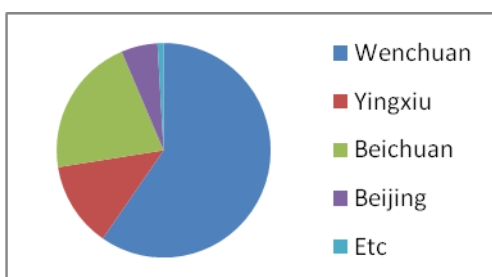


Most people will choose an open park or a plaza as their first place to go; some people also will choose to hide in the basement of earthquake prevention buildings. This data illustrates that a public park will provide a shelter and take a significant role in disaster reduction.

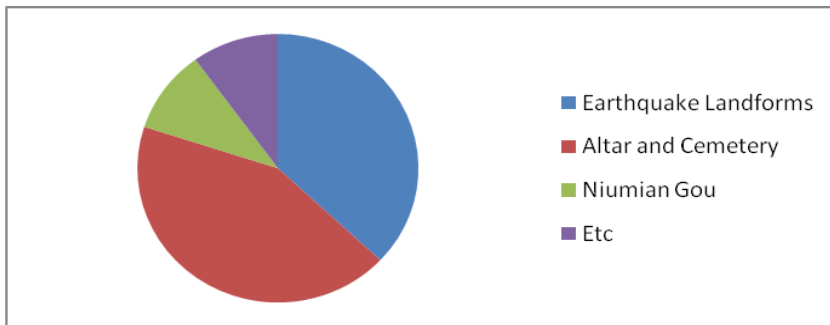
Do local and nonlocal people find it necessary to build a public park to serve as a memorial of this tragedy? In order to prove this, I let them select between 1 and 5, with 1 representing the least importance and 5 representing the most. The results show that most people think it is important to build a memorial park. I interviewed 15 local people, and they told me that building a memorial park is very desirable for them because it can attract more visitors and it may constitute their only money supply in the long run. For the visitors, they want to memorialize those victims and know better about the disaster, so a natural disaster memorial park is needed.



For the question: “What place do you think is the best site for building the 5/12 earthquake memorial park?” 60% of the people chose Wenchuan because it is where the earthquake happened, and 20% of the people chose Beichuan, where many young students are buried. Also, 12% of the people chose Yingxiu because it is the earthquake center which has the most serious damage, and nearly 6% of the people chose Beijing because they think the capital has the most influence on the whole country, which can make us attach importance to this big event.

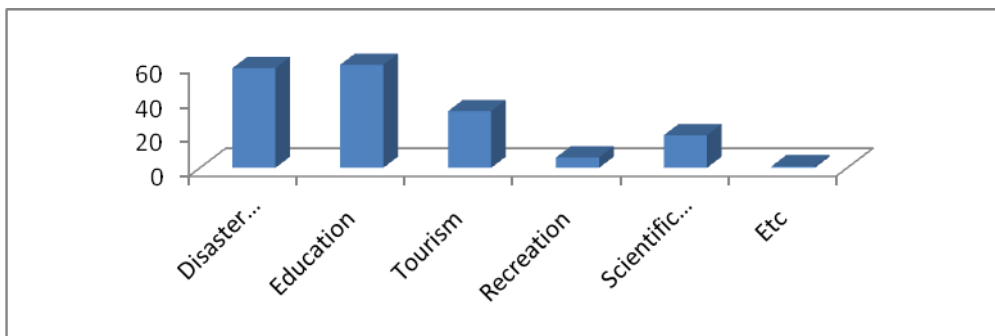


It is significant to know what the most impressive place in visitors' minds is, in order to organize the site for the future design. I found that the greatest impression was made in their minds by the altar and cemetery, and earthquake landforms, which consist of unique geological landforms caused by the earthquake.

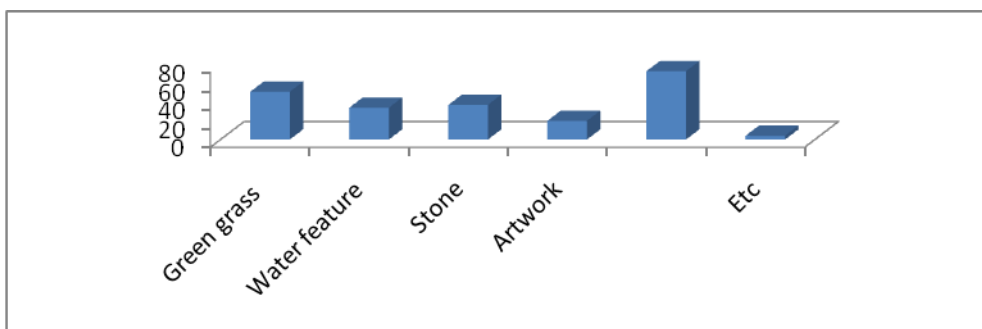


Through the research, I also found that the current memorial site is just the remains of the earthquake. It is deficient in many aspects, such as having no obvious sign for an emergency exit and no disaster prevention place, insufficient fireproofing facilities.

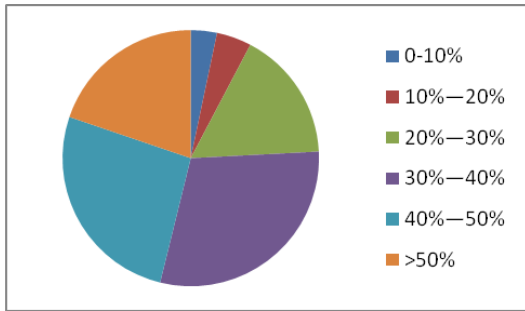
I asked what functions they thought the earthquake memorial park should have, and the results are below:



I asked them to select the most important elements they would want to see in a memorial park:

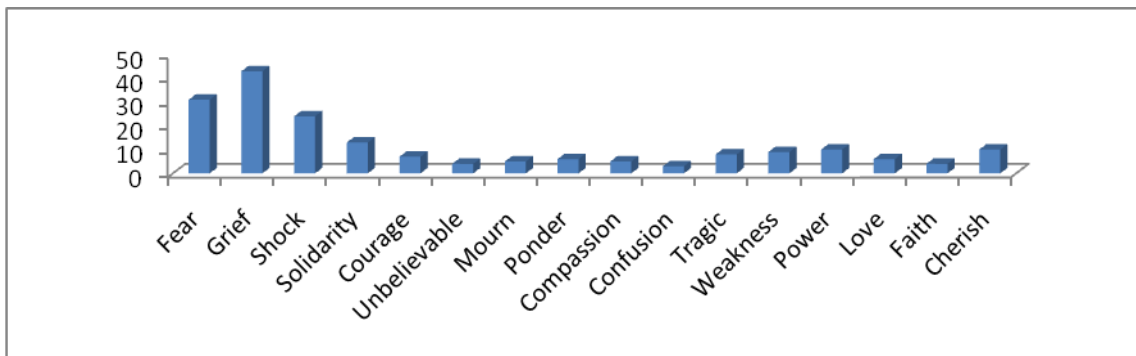


Culture is a big issue in design. This is especially true in this case, in which much cultural heritage was destroyed by the Wenchuan earthquake, such as those of Aba Tibetan and Qiang Autonomous Prefecture. I wanted to know what percentage of cultural elements they thought should be included in the earthquake memorial park.



From the chart above, most of people think that cultural elements should occupy 30% -50% of the total design.

At the end of my interview, I also asked about their feelings about the earthquake. I collected these feelings in order to deeply understand people’s mentality change and their attitudes toward this event. Based on that information, I create different spaces depending on different senses.



Appendix B:
Presentation Posters

汶川 5.12

Wenchuan Earthquake

A PLACE OF LIVING MEMORIES

BEFORE and AFTER



Background:

The Wenchuan earthquake hit Sichuan in 2008, eventually claiming 87,000 lives in the Southwest Chinese province. It toppled houses and schools, virtually destroying entire villages, and irreparably changed everyone's world there. We will remember them forever.....



The Ruins of Yingxiu Middle School:

The collapsed Middle School in Yingxiu, the township at the epicenter of the quake, has been turned into a 5/12 memorial. Forty-three students and eight teachers were buried there.

Circulation:

Existing trails are not convenient. Highway 213 was seriously damaged and most of the places were inaccessible. A memorial transportation system should be organized to connect important earthquake relics and zigzag shape which represent splits will also evoke visitors' strong feeling about earthquake.



MEMORY BEFORE and AFTER



Site Location and Surrounding Areas:

Yingxiu is a town within Wenchuan County, Sichuan, China. It is south of Wenchuan's county urban center. The distance from Yingxiu to the city of Chengdu is only 88 kilometers. Yingxiu has an area of 115 square kilometers and a population of 6,906.

It is located at the epicenter and 80% of the town was destroyed by the earthquake.

Human and Culture:

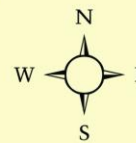
Cultural heritage was destroyed by the quake, including the Aba Tibetan and the Qiang Autonomous Prefecture heritage. E.g.: The Qiang "Diaolou" (Watch Tower) and Stone houses.

- Stone
- White
- Red
- Grey



Main Plants: Bamboo

Wenchuan is close to the world-famous hometown of Panda—the Wolong Nature Reserve in Sichuan, which is rich in bamboo. Bamboo is also a traditional plant in China; it represents a lot of meanings, such as the peace, moral integrity, national solidarity, and new hope after the dark.



Climate:

Strong wind in the valley blows up the sand and dust, forming a huge yellow expanse that blankets the whole county. The earthquake, which added more than 300 hazardous spots such as landslides around the county seat, made the environmental situation worse. Evergreen species are preferred to achieve year-round protection.



Ceremony

SITE INVENTORY and ANALYSIS

5.12 EARTHQUAKE MEMORIAL PARK DESIGN

(YINGXIU, CHINA)

LANDSCAPE DEPARTMENT OF WASHINGTON STATE UNIVERSITY
SPOKANE, WASHINGTON

DESIGNER: Linjun Yang

INSTRUCTORS: David Wang, Bob Scarfo, Jolie B. Kaytes

汶川 5.12

Wenchuan Earthquake

A PLACE OF LIVING MEMORIES

The overall theme for the project – “a place of living memories” – was inspired by the traditional Chinese philosophy of the “Tao,” which means “path” or “way.”

A healing memorial path that is omnipresent throughout the park, constituting one of its many layers and connecting different functional areas, was proposed for the memorial park. Juxtaposed with greenery, monuments, and daily life, remembrance becomes a natural part of the park.

The Zigzag Memorial Path: The path is a living memorial leading the way to the bright future. It means that future generations should remember this great tragedy in order to pursue a better life in the future. A series of zigzag paths stretches throughout the park, luring the visitor forward. As a contemporary interpretation of the traditional Chinese philosophy “Tao,” the path becomes a symbol of remembrance and hope.

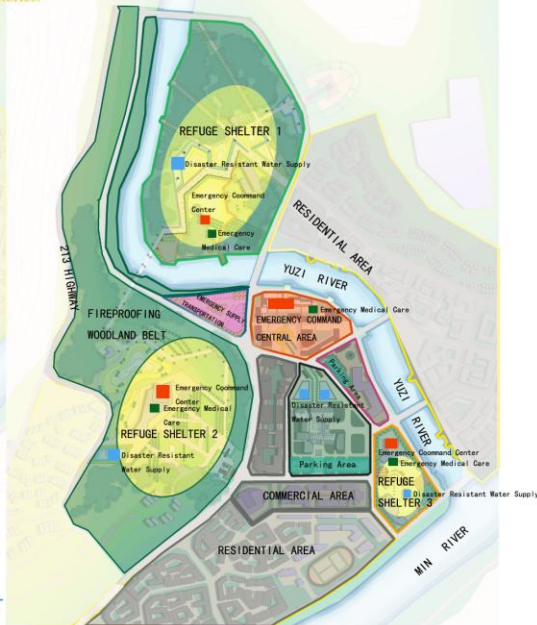
The zigzag shape also represents seismic waves spreading and the continuity of living memories.



Function conversion – The natural disaster memorial park is a park, or a piece of green area, with the function of providing refuge and shelter during disasters and for purpose of evacuation. It is constructed with the intent of saving life and property, and to enhance the functions of disaster prevention facilities, which makes the purpose of the park difunctional. An integrated design of N.D.M.P functions as a memorial park during regular times and also plays a role in disaster prevention and amelioration during times of crisis.

Functional zoning map of N.D.M.P. in ordinary time:

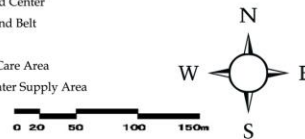
- | | |
|--------------------------------------------------------------------------------------|------------------------------------|
| 1. The Ruins Area - should be preserved. | Other functional areas are: |
| 2. Education Area - including the Museum complex and the Earthquake Education Center | 5. Public Transportation |
| 3. Cemetery and Museum Area | 6. Commercial Area |
| 4. Memorial Garden | 7. Public Square |
| | 8. Residential Area |



Functional zoning map of N.D.M.P. in disaster:

1. Refuge Shelters 1,2,3
2. Emergency Command Center
3. Fireproofing Woodland Belt
4. Parking Area
5. Emergency Medical Care Area
6. Disaster Resistant Water Supply Area

FUNCTIONAL GROUPING AND ZONING MAPS 1/2



CONCEPTUAL PLAN

5.12 EARTHQUAKE MEMORIAL PARK DESIGN

(YINGXIU, CHINA)

LANDSCAPE DEPARTMENT OF WASHINGTON STATE UNIVERSITY
SPOKANE, WASHINGTON

DESIGNER: Linjun Yang

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汶川 5.12

Wenchuan Earthquake

A PLACE OF LIVING MEMORIES

1. Memorial Square (Main Entrance):

A memorial and ceremonial place where we pray for the people who are suffering from the disaster.

2. Bus Station

3. Museum

4. Earthquake Science and Technology Education Center

5. Underground Path -- connects the Ruins and the Museum, representing the connection between the past and the future.

6. Message Stone --

Upon entering the park, the visitor passes a carved-out block made up of 60,000 white cobblestones placed in bamboo meshes.

7. Parking Lot

8. Reflecting Pools

9. Ruins -- Yingxiu Middle School. Visitors can go through the underground path and reach the glass house to see the ruins inside.

10. Glass house

11. Parking Lots

12. Seatwall With Historic Timeline

13. Board walk

14. Visitor Center

15. West Entrance With Display Walls

16. Lawn Area Over Graves

17. Memorial Hall: Primary Area of Focus, Featuring Memorial Sculpture

18. Display of Artwork

19. Walls With Wenchuan Earthquake Artifacts and Stories

20. Memorial Path/Bridge & Milestone: to show all the important points/events during the earthquake.

21. Wooden Platform

22. A grand monument is the black-granite, Zigzag-shaped Memorial Wall. Inscribed on the wall are the names of 88,000 victims of the quake.

23. Running Water with Color Changing Lights

24. Existing Building Foundation Featuring Displays of Artifacts & Artwork

25. Reflection Ponds with Debris and Bronze Statues

26. Historic Path With Brick Pavers

27. Paths, Featuring Historic Information

28. Memorial Hills: There are three small hills standing above the ground to represent Love, Faith, and Courage,

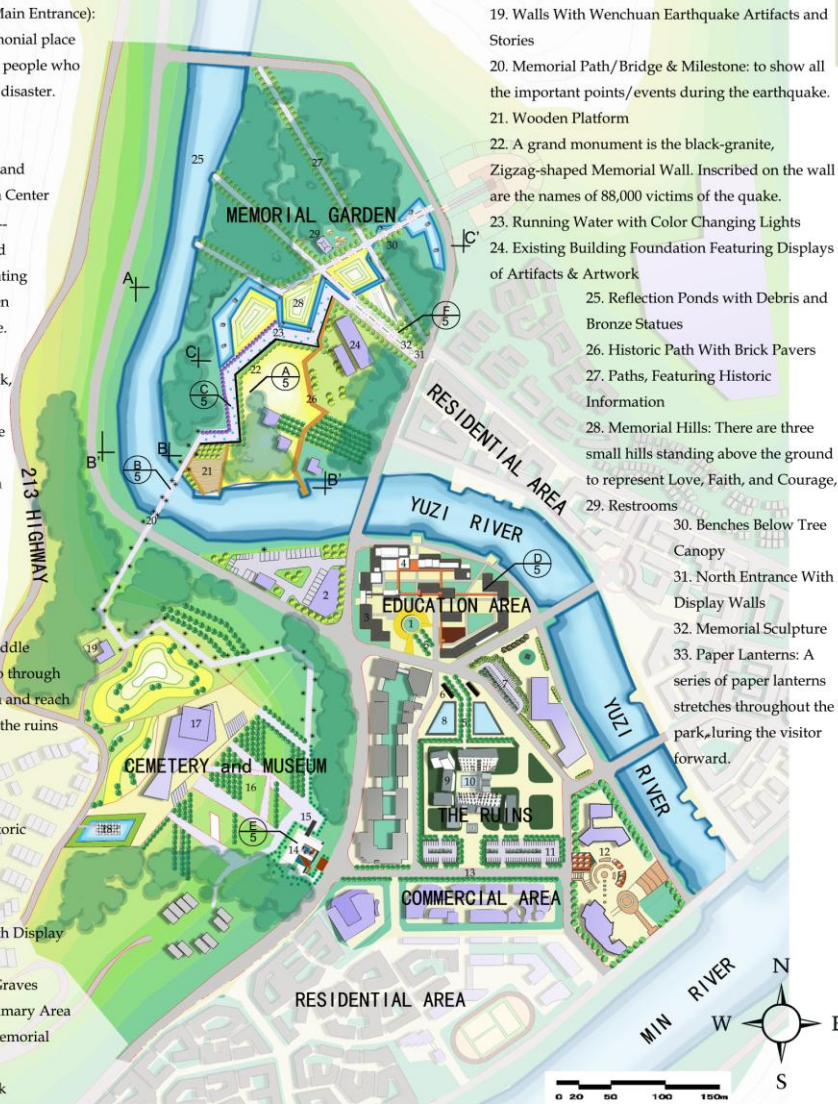
29. Restrooms

30. Benches Below Tree Canopy

31. North Entrance With Display Walls

32. Memorial Sculpture

33. Paper Lanterns: A series of paper lanterns stretches throughout the park, luring the visitor forward.



MASTER PLAN

5.12 EARTHQUAKE MEMORIAL PARK DESIGN

(YINGXIU, CHINA)

LANDSCAPE DEPARTMENT OF WASHINGTON STATE UNIVERSITY
SPOKANE, WASHINGTON

DESIGNER: Linjun Yang

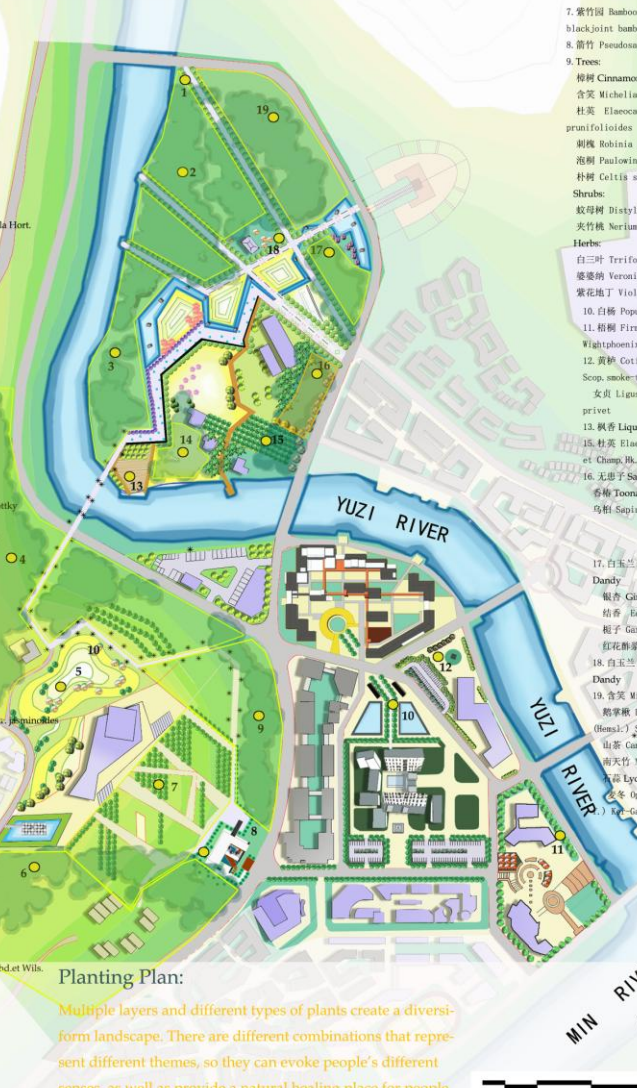
INSTRUCTORS: David Wang, Bob Scarfo, Jolie B. Kaytes

汶川 5.12

Wenchuan Earthquake

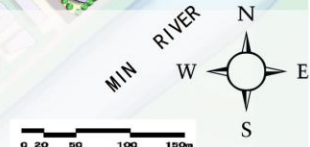
A PLACE OF LIVING MEMORIES

1. 梓树 *Zelkova serrata* (Thunb.) Makino
2. 女贞 *Ligustrum lucidum* Ait.glossy privet
影弯石楠 *Calluna vulgaris* / Heather,ling
梓树 *Zelkova serrata* (Thunb.) Makino
枫香 *Liquidambar formosana* Hance
乌桕 *Sapium sebiferum* (Linn.) Roxb.
苦楝 *Melia azedarace* L.
无患子 *Sapindus mukorossi* Gaertn.
重阳木 *Bischofia polycarosa* (Levl.) Airy-Shaw
黄桷 *Cotinus coggygia* Scop.
3. Trees:
水杉 *Metasequoia glyptostroboides*
垂柳 *Salix babylonica* L.weeping willow
龙爪槐 *Sophora japonica* Linn. var. *japonica f. pendula* Hort.
枫栎 *Pterocarya stenoptera* C. DC.
乌桕 *Sapium sebiferum* (Linn.) Roxb.
香樟 *Toona sinensis* (A. Juss.) Roem.
- Shrubs:
木芙蓉 *Hibiscus mutabilis* Linn.
梔子 *ardenia jasminoides* Ellis var. *jasminoides*
糯米条 *Abelia chinensis* R. Br.
枫香 *Liquidambar formosana* Hance
椴木 *Kerria japonica* (Linn.) DC. f. *japonica*
- Herbs:
山麦冬 *Liriope spicata* (Thunb.) Lour.
石蒜 *Lycoris rosea* Traub et Moldenke
鸢尾 *Iris tectorum* Maxim.
4. Trees:
榿树 *Quercus aliena* Blume var. *aliena*
马尾松 *Pinus massoniana* Lamb. var. *massoniana*
苦槠 *Castanopsis sclerophylla* (Lindl. et Planch.) Schottky
樟树 *Cinnamomum camphora* (L.) Presl
南酸枣 *Choerospondias axillaris* (Roxb.) Hill
榿木 *Quercus acutissima* Carr. var. *acutissima*
小叶榿 *Quercus chenii* Nakai
- Shrubs:
木芙蓉 *Hibiscus mutabilis* Linn.
梔子 *ardenia jasminoides* Ellis var. *jasminoides*
冬青 *Ilex guangnanensis* C. J. Tseng ex Y. R. Li
忍冬 *Lonicera japonica* Thunb.
- Herbs:
山麦冬 *Liriope spicata* (Thunb.) Lour.
石蒜 *Lycoris rosea* Traub et Moldenke
络石 *Trachelospermum jasminoides* (Lindl.) Lem. var. *jasminoides*
5. 白玉兰 *Magnolia heptapeta* (Buchoz) Dandy
茶花 *Rhododendron camelliflorum* Hook. f.
金樱桃 *Hypericum bellum* L.
6. Trees:
樟树 *Cinnamomum camphora* (L.) Presl
女贞 *Ligustrum lucidum* Ait.glossy privet
梓树 *Zelkova serrata* (Thunb.) Makino
棠梨 *Koelreuteria paniculata* Laxm.
鹅掌楸 *Liriodendron chinense* (Hems.) Sarg.
桂花 *Osmanthus fragrans* (Thunb.) Lour.
香樟 *Toona sinensis* (A. Juss.) Roem.
臭椿 *Allanthus altissima* (Mill.) Swingle
重阳木 *Bischofia polycarosa* (Levl.) Airy-Shaw
- Shrubs:
粉团蔷薇 *Rosa multiflora* Thunb. var. *cathayensis* Rehd. et Wils.
冬青 *Ilex guangnanensis* C. J. Tseng ex Y. R. Li
紫荆 *Cercis chinensis* Bunge
珊瑚子 *Elaeagnus davidii* Franch.
映山红 *Rhododendron simsii* Planch.
- Herbs:
鸢尾 *Iris tectorum* Maxim.
白三叶 *Trifolium repens* L.
红花酢浆草 *Oxalis corymbosa* DC.



7. 紫竹园 Bamboo Garden: *Phyllostachys murro-blackjoint bamboo*
8. 箭竹 *Pseudosasa japonica* Maki
9. Trees:
樟树 *Cinnamomum camphora* (L.) Presl
含笑 *Michelia skimmeriana* Dunn
杜英 *Elaeocarpus prunifolioides* Hu var. *prunifolioides*
刺楸 *Robinia pseudoacacia* Linn.
泡桐 *Paulownia fortunei* (Seem.) Hems.
朴树 *Celtis sinensis* Pers.
- Shrubs:
蚊母树 *Distylium chinense* (Fr.) Diels
夹竹桃 *Nerium indicum* Mill.
- Herbs:
白三叶 *Trifolium repens* L.
婆婆纳 *Veronica henryi* Yamazaki
紫花地丁 *Viola philippica* Cav.
10. 白栎 *Populus lasiocarpoplular*
11. 栎树 *Firmiana simplex* (L.)
Wightphoenix-tree
12. 黄桷 *Cotinus coggygia*
Scop. smoke-tree
女贞 *Ligustrum lucidum* Ait.glossy privet
13. 枫香 *Liquidambar formosana* Hance
14. 杜英 *Elaeocarpus chinensis* (Gardn. et Champ.) F. ex Benth.
16. 无患子 *Sapindus mukorossi* Gaertn.
香樟 *Toona sinensis* (A. Juss.) Roem.
乌桕 *Sapium sebiferum* (Linn.) Roxb.
17. 白玉兰 *Magnolia heptapeta* (Buchoz) Dandy
银杏 *Ginkgo biloba* L.maiden-hair tree
结香 *Edgeworthia chrysantha* Lindl.
梔子 *Gardenia jasminoides* Ellis
红花酢浆草 *Oxalis corymbosa* DC.
18. 白玉兰 *Magnolia heptapeta* (Buchoz) Dandy
19. 含笑 *Michelia szechuanica* Dandy
鹅掌楸 *Liriodendron chinense* (Hems.) Sarg.
山茶 *Camellia japonica* L.
南天竹 *Nandina domestica* Thunb.
冬青 *Lycoris rosea* Traub et Moldenke
冬青 *Abies japonica* (Linn.) P. G. Su.

Planting Plan:
Multiple layers and different types of plants create a diverse landscape. There are different combinations that represent different themes, so they can evoke people's different senses, as well as provide a natural healing place for people.



PLANTING PLAN

5.12 EARTHQUAKE MEMORIAL PARK DESIGN

(YINGXIU, CHINA)

LANDSCAPE DEPARTMENT OF WASHINGTON STATE UNIVERSITY
SPOKANE, WASHINGTON

DESIGNER: Linjun Yang

INSTRUCTORS: David Wang, Bob Scarfo, Jolie B. Kaytes

汶川 5.12

Wenchuan Earthquake

A PLACE OF LIVING MEMORIES



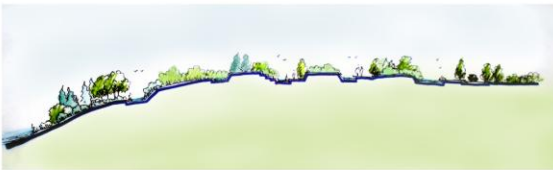
A - A' SECTION PLAN



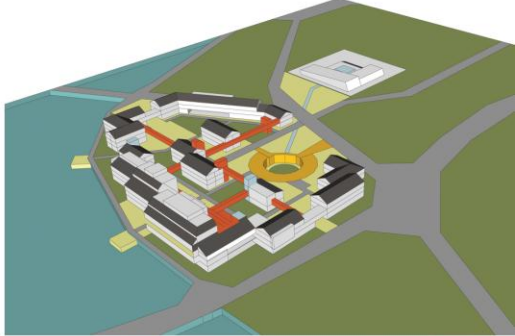
A VIEW LOOKING TOWARD MEMORIAL WALLS



B - B' SECTION PLAN



C - C' SECTION PLAN



B VIEW LOOKING TOWARD MEMORIAL BRIDGE

C LIGHTS and RUNNING WATER

D EARTHQUAKE MUSEUM & THE RUINS



E VIEW LOOKING TOWARD THE VISITOR CENTER



F NORTH ENTRANCE

SECTION and PERSPECTIVE PLAN

5.12 EARTHQUAKE MEMORIAL PARK DESIGN

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Case Study Checklist

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