A case of public landscape design for a small city - Dali Erhai Ecological Corridor manhole covers beautification project

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Abstract. Manhole covers are one of the most important public facilities in cities. They are the first choice for public landscape renovation in many small and medium-sized cities because of their low cost of renovation and quick results. Many cities around the world have manhole cover cultures, with more widely used and successful cases in Japan. At present, there is no systematic manhole cover culture in China. This study explores the practicality of manhole covers as a public landscape design for small cities from design, art form and material techniques of the Dali Erhai Ecological Corridor manhole covers landscaping project, which has the value of being widely used and promoted.

1 Introduction

The Dali Erhai Ecological Corridor project was successfully awarded the 2022 Landezine International Landscape Award. The project covers a landscape area of approximately 400,000 square meters and 30 kilometers of sewerage network, including more than 8,000 manhole covers. The Dali Erhai Ecological Corridor manhole covers beautification project has beautified 200 quadripartite manhole covers and 845 electric and sewage manhole covers. These manhole covers are on both sides of the pedestrian corridor and the visible part of the pedestrian path in the green area. The design is based on the characteristics of the environment, and the corresponding cultural content is selected. By combining spray-painting and aluminum painting to improve the ground landscape of the Dali Erhai Ecological Corridor, the project created a public art space that integrates with nature. Unlike other municipal constructions, the Erhai Ecological Corridor emphasizes the integration of ecology, cultural landscape and nature.

2 Methods and Materials

This study used the field survey method to research and investigate the area around the Erhai Lake, which was divided into two parts: firstly, to determine the number and type of manhole covers that need to be beautified; and secondly, to go deeper into the Erhai area to understand the local culture and environment. In addition, we combined practical research and design to explore the materials that need to be used for manhole covers to ensure their functionality, including wear-resistant features and warning features, as well as specific methods for beautification design. There are two main methods, one is the production of cast bronze relief manhole covers and the other is the production of painted manhole covers.

3 Design content of the Dali Erhai Ecological Corridor manhole covers beautification project

Dali is a national historical and cultural city, and an important city in the development of tourism in Yunnan. In 2018, the Yunnan Provincial People's Government issued the policy of "to gradually build Dali into a central city in western Yunnan that drives regional development, an ecologically pleasant city with beautiful mountains and clear water, an international first-class tourist resort city, and a civilized and harmonious model city of ethnic unity" [1]. In 2022, the Dali Prefecture Government announced the developmental concept of "highlighting the overall value of Dali's history and culture and shaping the city's appearance and ethnic characteristics" [2]. In accordance with the policy and the concept, the cultural content of the Dali Erhai Ecological Corridor Project's manhole covers beautification was chosen to incorporate elements of the regional culture into the local culture and its connotations. For example, for the manhole covers adjacent to the sea, birds and fish from the Erhai region are chosen as the main themes; the selection of themes on both sides of the main road and green areas within the village area is based on regional ethnic culture, such as Bai Zharan patterns, embroidery patterns of the hereditary ethnic groups of Dali Prefecture, etc.; the Erhai introduction QR-codes are displayed in sections throughout the corridor. The details are as follows:
3.1 Ethnic cultural elements, traditional motifs of various ethnic groups in the Erhai region

Traditional ethnic motifs are an accumulation of ethnic and folk cultural beauty, with rich and heavy human emotions and intuitive culture. They express the aspirations for beauty and a celebration of life. In this section, the design creates ethnic illustrations in a modern painting language based on the habits of the hereditary ethnic groups living in villages in different areas around the Erhai Sea. The designers also use traditional cultural motifs from regional cultures such as the Bai culture on architecture, clothing and handicrafts as design sources. For example, the paper-cutting patterns come from the handicrafts of villagers living in villages in the Erhai region, the Bai ethnic people. They are good at cutting out the animals and plants according to their imagination, representing their aspiration for a better life. At the same time, this is also a reflection of the love of life and beautiful things about the people living in the Erhai area (Fig. 1).

3.2 Fauna and flora, birds and fishes of the Erhai region.

In recent years, Dali has continued to promote the protection of the Erhai lake and implement of ecological restoration projects (Fig. 2) [3]. The effective restoration of mudflats, wetlands and other areas of aquatic vegetation in the Erhai lake has provided a good habitat for waterfowl, while becoming an important wintering ground for migratory birds [4]. According to statistics, there are 18 orders, 42 families and 263 species of birds in Erhai area; 4 orders, 9 families and 28 species of amphibian reptiles; 4 orders, 7 families and 30 species of fishes [5], and 23 families, 38 genera and 52 species of aquatic vascular plants [6]. In order to better showcase the rich flora and fauna of the Erhai region, the design of these manhole covers includes the theme of the flora and fauna of the Erhai region.

3.3 Eco-protection symbols from around the world;

The document The 14th Five-Year Plan for Ecological and Environmental Protection in Dali Prefecture shows that the environmental management of the Erhai lake has achieved good results, but will remain as an important work to continue to promote. In order to further implement the protection of the Erhai lake and to mobilize public awareness of protection, the ecological and environmental protection symbols of various countries around the world have been added to our design.

3.4 Erhai Ecological Corridor logo

The logo for the ‘Erhai Ecological Corridor’ incorporates the Three Pagodas, a landmark of Dali, and incorporates the geography and landscape of Dali in the design, which is a very representative design. As a result, the logo of the Erhai Ecological Corridor was also incorporated into the design of the manhole covers in shallow relief.

3.5 Others

To enrich its design, the manhole covers also use other motifs with traditional Chinese cultural characteristics, including the 12 zodiac signs and the 24 solar terms. To further emphasize the inclusive and international nature of Dali's culture, we have also used iconic architectural and cultural motifs from around the world.
carbon paint has excellent surface dust and stain and has good anti-fouling properties. Fluorocarbon paint also has excellent hydrophobicity (maximum water absorption rate less than 5%) and extremely small friction coefficient (0.15-0.17) [10]. It does not stick to water and has good anti-fouling properties. Its carbon coating has extremely low surface energy, so surface dust can be self-cleaned by rainwater. The paint film also has maintenance-free and self-cleaning weather resistance, good corrosion resistance and hard friction coefficient. Aluminum is rigid and strong, with good weather resistance and corrosion resistance. Fluorocarbon paint has excellent weather resistance, good corrosion resistance and hard paint film. It also has maintenance-free and self-cleaning properties. Its carbon coating has extremely low surface energy, so surface dust can be self-cleaned by rainwater [9]. It also has excellent hydrophobicity (maximum water absorption rate less than 5%) and extremely small friction coefficient (0.15-0.17) [10]. It does not stick to dust and stain and has good anti-fouling properties.

### 5.2 The craft of painted manhole covers

The main material used for the painting manhole covers is aluminum, fluorocarbon paint in rich colors and protective varnish, and the painting process is a combination of spraying and drawing [8]. Aluminum is light, rigid and strong, with good weather resistance and corrosion resistance. Fluorocarbon paint has excellent weather resistance, good corrosion resistance and hard paint film. It also has maintenance-free and self-cleaning properties. Its carbon coating has extremely low surface energy, so surface dust can be self-cleaned by rainwater [9]. It also has excellent hydrophobicity (maximum water absorption rate less than 5%) and extremely small friction coefficient (0.15-0.17) [10]. It does not stick to dust and stain and has good anti-fouling properties.

### 6 Conclusions

In China, many small cities lack planning in the early stages of construction. Most places do not have independently designed public spaces, or these spaces are designed earlier with functionality in mind and no consideration for aesthetics. Moreover, the design of public landscapes in small cities is faced with economic constraints and design difficulties. Therefore, optimisation and beautification are good solutions. The ultimate aim of public landscaping in small cities is to be beautification project.

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<td>3</td>
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create comfortable living spaces and to integrate nature and the environment into the city and people's lives, giving them a sense of beauty and driving the city's vitality. As one of the most livable cities in China, Dali's beautiful natural environment is already well recognized. The manhole covers beautification brings an artistic effect to the green landscape of the ecological corridor. The manhole covers beautification project for the Dali Erhai Ecological Corridor is therefore of relevance as a case study in the design of public landscapes in small cities. In terms of economic investment and public acceptance by the city, it has a wide application and promotion value.

References
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