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Evolution of the City Wall and Trench System in Zhaoqing Duanzhou from the Song Dynasty to the Republican Period

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Abstract: **The ancient city wall of Zhaoqing was constructed during the Song Dynasty and has been preserved to this day, embodying rich historical and cultural significance. This study adopts the research methodology of urban morphology, utilizing a combination of literature, various types of maps, and fieldwork to approximately reconstruct the spatial layout and evolution of Zhaoqing Prefecture's city wall and trench system over multiple periods from the Song Dynasty to the Republican era. This morphological framework serves as a foundation for further exploration, preservation, and revitalization of the historical and cultural heritage of the prefectural city.**

Keywords: **Zhaoqing Prefecture; City Wall; Wall and Trench; Urban Morphology.**

I. INTRODUCTION

City walls and trenches are significant elements in the morphology of ancient Chinese cities, and today, they serve as vital components of many cities' historical and cultural heritage and landscape. City walls were essential facilities in ancient cities, playing roles in restricting, regulating, and guiding urban spatial development, while trenches were auxiliary structures complementing the walls in both engineering and functionality. Studying the evolution of the city wall and trench system as a whole provides valuable insights into the transformation of urban spatial morphology. Zhaoqing, a nationally recognized historical and cultural city, is a key birthplace of Lingnan civilization. The ancient city wall of Zhaoqing was constructed during the Song Dynasty and has been preserved to this day, bearing rich historical and cultural significance. Systematically examining the historical evolution of Zhaoqing's ancient city wall and trench system holds practical value in exploring the heritage of Zhaoqing Prefecture, advancing cultural heritage protection, and promoting its revitalization and utilization.

Studies by Huang (2010), Xu (2011), and Guo and Yang (2018) explored the ancient commercial, cultural, and recreational spaces in Zhaoqing Prefecture, including references to the city walls and trenches of Zhaoqing. Among these studies, Zhang Zhizheng, using archaeological materials, conducted detailed examinations of the construction date of Zhaoqing's ancient city wall (Zhang, 2017), its auxiliary structures (Yang & Zhang, 2020), and the development and decline of its trench system (Zhang, 2018). These studies provide valuable insights for this paper. However, previous research has given limited attention to the systematic nature, interconnections, and mechanisms behind the evolution of the wall-trench system. Building upon prior research, the author uses large-scale maps and adopts the research methodology of urban morphology to reconstruct the basic forms of Zhaoqing's city wall and trench at various cross-sections over an extended period. This approach offers significant reference value for comprehensively understanding the evolution of Zhaoqing's wall-trench system.

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II. CONSTRUCTION AND SCOPE OF THE SONG DYNASTY EARTHEN CITY WALL

The construction of the city wall of Zhaoqing Prefecture began during the Song Dynasty. In April of the fourth year of the Huangyou reign (1052), Nong Zhigao, who had gained increasing power in Guangyuan Prefecture, initiated a rebellion in Guangxi. He subsequently captured Yongzhou (now Nanning), then moved downriver, besieging Guangzhou in September before returning to Yongzhou (Du, 2012). In the fifth year of the Huangyou reign, Nong Zhigao was defeated by an army led by Di Qing and was eventually killed in the Kingdom of Dali.

Although the unrest was quickly quelled, the Nong Zhigao incident prompted the Song court to adjust its governance strategy for the Lingnan region. One aspect of this strategy was the widespread construction of city walls in important administrative centers in the area. Wang Anshi believed that one key reason Nong Zhigao was able to advance so rapidly was the lack of walled cities in the south (Zhang & Li, 2016). On May 23 of the fifth year of the Huangyou reign, "an edict was issued to construct and repair fortifications at strategic points, with other constructions to proceed gradually" (Xu, 1957, p. 7472). This led to a wave of city wall constructions along the Xijiang River basin, connecting the southwestern region during the Huangyou era, with cities such as Guangzhou, Zhaoqing, and Deqing successively building city walls. On October 29 of the fourth year of the Huangyou reign, an imperial edict was issued to Guangzhou's governor Wei Guan and Guangdong's transport commissioner Yuan Jiang: "All defenses must not be treated with negligence. If the people are not temporarily strained, they cannot enjoy long-term peace. As for the fortifications in Guangzhou, efforts should be made to enlist both Han and tribal households as well as able-bodied men to complete the repairs" (Xu, 1957, p. 7472). In the sixth year of the Huangyou reign, Deqing, which previously had no fortifications, began construction of a subsidiary city wall during Nong Zhigao's rebellion, with a height of one zhang, a thickness of eight chi, and a circumference of 230 zhang, with trenches dug on three sides and a main gate opened to the south, allowing only for government offices (Lu, 2009, p. 75).

The construction of Zhaoqing's city wall during the Song Dynasty was a response to this historical context. The earliest record of Zhaoqing's fortification appears in the *Zhaoqing Prefecture Gazetteer* from the Wanli period, which notes, "The city wall of Zhaoqing Prefecture was built during the Huangyou period of the Song Dynasty in response to the rebellion of Nong Zhigao, and the earthen wall contained only government offices" (Zheng, 2009, p.184). Here, the character "乃" likely contains a transcription error and should be read as "反" (in response). As for the exact year of Zhaoqing's construction, no precise records exist, only mentioning "during Huangyou". Zhang Zhizheng suggests it was the fifth year of Huangyou (Zhang, 2017). However, based on the sequence of events surrounding Nong Zhigao's rebellion, the Song court's fortification edicts, and the construction timelines for Guangzhou, Deqing, and other cities, the likely period for Zhaoqing's construction falls between the fifth and sixth years of Huangyou. Other than Guangzhou, which expanded an existing inner city wall, most other cities along the Xijiang River were building their walls for the first time as a defensive measure; due to the urgency, the walls were small in scale.

Regarding the scope of the Song Dynasty's earthen city wall in Zhaoqing, the *Prefecture Gazetteer* only describes it as "containing only government offices". However, using urban morphology to compare historical maps and street patterns suggests that the likely area of the earthen wall was bounded by the present-day Fuzheng Street and the North City Wall (see Figure 2), aligning with the description of "only government offices". The irregular convex shape of Fuzheng Street reflects an accumulated urban form shaped by historical layers of construction. Comparing maps from the Ming Dynasty (see Figure 1), we see that this form already existed, while the East Gate and West Gate streets were straight paths, indicating that these streets and gates were likely established during the construction of the brick wall, while the earlier convex form of Fuzheng Street was a remnant of the original shape. In the Ming and Qing periods, Fuzheng Street mainly housed the government offices and associated institutions. It likely traces the original earthen wall's path; when the wall was expanded, the old wall was removed, creating an irregular street, while the straight East and West Gate streets extended from existing urban spaces. This configuration has remained to this day.

During the Song period of the earthen city wall, the construction was rushed, and no trenches were excavated. However, the earthen wall was likely surrounded on its west, south, and east by a body of water, with the eastern water connected to the Xijiang River. The southern wall of the Song Dynasty earthen city wall formed an irregular convex shape, likely shaped by the surrounding water. When the walls were later expanded, some of this water was enclosed within the walls, forming an internal trench system by connecting water channels. By the Republican period, numerous ponds and natural waterways (see Figure 3) remained within and around the city.

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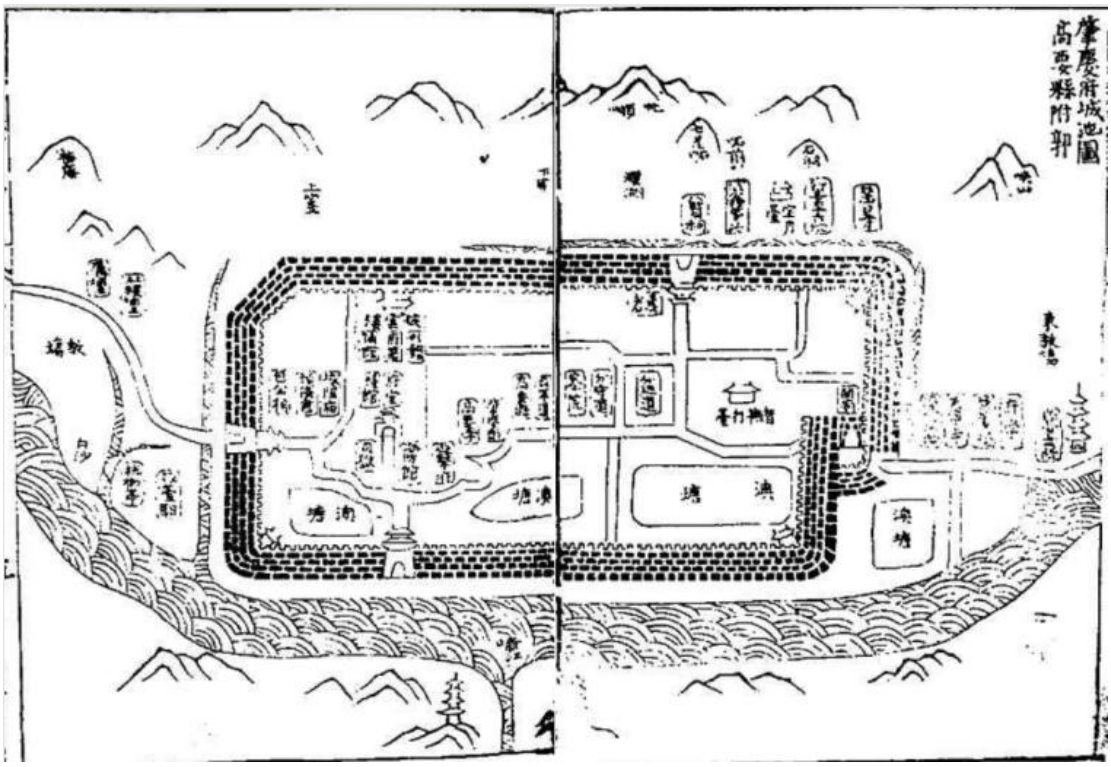

Figure 1: Map of Zhaoqing Prefecture City Pool during the Chongzhen Era, sourced from the Zhaoqing Prefecture Gazetteer of the Chongzhen period.

Figure 2: Diagram of the Song Dynasty Zhaoqing Earthen City Wall Boundaries, based on a self-drawn interpretation overlaid on satellite imagery.

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Figure 3: Diagram of Pond and Waterway Distribution within and around the Prefecture City during the Republican Period, based on the Gaoyao County Street Map from the same era.

III. EXPANSION OF THE SONG DYNASTY CITY WALL, OUTER TRENCH, AND ANCIENT HARBOR

Another significant event impacting the construction of Zhaoqing's city wall and trench during the Song Dynasty was the enthronement of Zhao Ji, also known as Emperor Huizong of the Song. In the eighth year of Yuanfeng (1085), Zhao Ji was titled Prince of Suining Prefecture; in the third year of Shaosheng (1096), he was promoted to Prince of Duan; and in the third year of Yuanfu (1100), he ascended the throne following the death of Emperor Zhezong. With Zhao Ji's ascension, the political status of Duanzhou rose, thereby granting it the opportunity to expand its city walls and rebuild them as brick fortifications. In the third year of Yuanfu, Duanzhou was elevated to the rank of Xingqing Army; in the third year of Zhenghe (1113), it was further promoted to a prefecture. In the first year of Chonghe (1118), Xingqing Prefecture was renamed Zhaoqing Prefecture, with Huizong personally inscribing the name "Zhaoqing Prefecture" on a horizontal plaque, which the then-governor Gu Ge mounted on a platform before the Zhaoqing Prefecture office (Zheng, 2009).

The likely period for the expansion of Zhaoqing Prefecture's city wall was the first year of Chongning (1102). The *Zhaoqing Prefecture Gazetteer* from the Wanli period attributes the wall's construction to the third year of Zhenghe, or "Zhenghe Guisi", with Governor Zheng Dunyi overseeing the project: "In Zhenghe Guisi, Governor Zheng Dunyi began construction on a stone wall, encircling 871 zhang, standing 2 zhang high, 1 zhang thick, with its southern side facing the Yangtze River" (Zheng, 2009, p. 185). Successive gazetteers have generally accepted this account. However, the *Gaoyao County Gazetteer* from the Daoguang period questions the accuracy of this date based on an inscription by Zheng Dunyi in the Stone Chamber (Zhang, 2017).

The inscription in the Stone Chamber, now known as the Seven Star Rock Cliff Inscription, reads: "Since the enthronement of Prince Duan, the subsidiary principality has been elevated to a commandery. Upon my appointment to office by imperial mandate in the summer of the Xinsi year, I arrived in late spring of the Renwu year with my family to explore the area – Zhenyang Zheng Dunyi" (Cao et al., 1998, p. 68). According to the *Daoguang Gazetteer*, this inscription suggests that Zheng Dunyi served as prefect of Duanzhou in the Xinsi year of the Jianzhong Jingguo era (1101). Since this inscription was penned by Zheng himself, it carries significant historical weight. The inscription also notes, "On the Stone Chamber cliff is an inscription by Zhang Jian, a Song official in the fourth year of Chongning", which implies that Zheng had left office four years earlier, meaning Zheng could not have been overseeing construction in Duanzhou in the third year of Zhenghe. Therefore, either the attribution of the official or the construction date is in error, though the *Daoguang Gazetteer* provides no conclusion due to limited historical records (Han, 2009, pp. 160-161).

Archaeological discoveries have provided compelling evidence to clarify this ambiguity. In 2015, as excavation of the Zhaoqing Prefecture city wall progressed, bricks were uncovered with inscriptions bearing phrases such as "First Year of Chongning", "Renwu", and "Issued by Imperial Edict", supporting the Chongning date. Building upon this evidence, Zhang Zhizheng further argued that it was indeed in the first year of Chongning that Zheng Dunyi, the military commissioner of Xingqing Army, expanded the brick wall (Yang & Zhang, 2020). Additional records from the

Geography of Victory of the Song Dynasty describe, "Zheng Dunyi, a native of Zhenyang, served under the reign of Emperor Renzong and governed Zhaoqing Prefecture, building the outer city wall of the prefecture, and authored 'A Record of the City Construction' and 'Ode to the Tower of Cloud-Stepping'" (Wang, 2012, p. 2344). This suggests that Zheng's involvement in overseeing construction is likely accurate, and the discrepancy in the *Zhenghe* dating was likely an error; the expansion of the wall likely occurred in the first year of Chongning, a discovery to which Zhang Zhizheng made a notable contribution (Yang & Zhang, 2020).

The expansion in the first year of Chongning held significant importance for Zhaoqing's urban development, establishing the basic spatial boundary of Zhaoqing's city walls that later construction centered on, including supplementary structures and wall repairs. The expanded Song Dynasty brick wall had four main gates: the East Gate, named Songchong; the West Gate, named Zhenxi; the South Gate, named Duanxi; and the North Gate, named Chaotian. In the first year of the Hongwu era, Provincial Director Huang Benchu supervised the restoration of the fortifications, renaming Songchong as Zhengdong Gate and Zhenxi as Jingxing Gate. In the sixteenth year of Chenghua, after extensive repairs in the early Chenghua period, Prefect Li Su renamed the gates: the East as Qingyun, the West as Jingxing, the South as Nanxun, and the North as Chaotian (Chen, 2009, p. 327). These names and the city wall's boundary became standardized and were used throughout subsequent dynasties.

To enhance the military defense function of the city wall, the Song Dynasty trench construction included the excavation of an outer trench. However, "the wall perimeter measured 871 zhang, while the trench measured only 458 zhang" (Chen, 2009, p. 326). This discrepancy suggests that the trench may not have encircled the entire city, which would reduce its defensive capability, a situation that seems illogical. Thus, it is likely that the trench utilized existing ponds and natural waterways to form a continuous protective moat. This inference is further supported by the observation of remaining ponds around the northern part of the city wall during the Republican era, indicating that there were likely more such ponds around the Song Dynasty city wall, which could have served as natural defensive waterways.

In addition, an ancient harbor remained undeveloped to the east of the city. Zhaoqing, situated near the Xijiang River, relied on this harbor as a vital shelter from winds and waves. "The county, bordered by the river, serves as a transport route for ships and boats, facing fierce waves that resemble towering mountains, often resulting in shipwrecks. The ancient harbor to the east of the city provided shelter from such dangers" (Zheng, 2009, p. 185). Due to sedimentation from river deposits and human activities, the ancient harbor gradually silted up, eventually forming land: "Long neglected, it has become blocked and now is a flat land. In less than two tides, sand and silt accumulate, grounding boats" (Ma, 2009, p. 322). To maintain the harbor's navigational function, periodic dredging was necessary, "initiated by Prefect Qin" and "annually requiring the labor of local people" (Ma, 2009, p. 322). In the sixth year of Qiandao (1170), Prefect Cao Zong implemented a new system, allocating several acres of land in the harbor area for revenue to fund annual dredging costs (Chen, 2009, p. 327), establishing a stable funding source for maintenance.

With its long history, the ancient harbor east of the city served as an ideal shelter for ships, promoting commercial development in eastern Zhaoqing and influencing the city's spatial layout. Although the harbor eventually succumbed to sedimentation and was absorbed into the trench system, its surroundings remained Zhaoqing's most prosperous commercial district. Additionally, a large number of ponds, as part of the inner trench system, remained in the city's northwest and south. These ponds inside the city wall were possibly connected to the ancient harbor, suggesting the widespread presence of ponds within and around the prefectural city. By the Chongzhen period of the Ming Dynasty, the harbor area was abandoned, while the ancient harbor largely silted up, becoming part of the outer trench of the Ming era: "From Shuibu Head at the East Gate to the area in front of Tianning Temple, connecting the inner trench to the river – this was its original location" (Chen, 2009, p. 327), an area that corresponds with the present-day Ningnan Road.

IV. ENHANCEMENT OF THE CITY WALL AND INNER-OUTER MOAT SYSTEM DURING THE MING AND QING DYNASTIES

The scale of the Zhaoqing Prefecture city wall remained unchanged during the Ming and Qing Dynasties, but its auxiliary structures were significantly improved. Additions such as moon gates, watchtowers, gate towers, and corner towers enhanced the wall's defensive capabilities. The most impactful modification to the wall's form was the construction of

moon gates for the main gates. However, historical records do not provide an exact date for the construction of the moon gates. According to the *Kangxi Gaoyao County Gazetteer*, "In the fourteenth year of Chongzhen (1641), Inspector Zhang Jingxin and County Magistrate Xiao Qi funded major repairs to the city walls, raising the height by three feet and five inches and reconstructing the four moon gates. The original design of the four moon gates consisted only of perimeter walls without passageways, but they were rebuilt at this time to match the city wall's height and thickness, and the roadway was widened to match" (Tan, 2009, p. 44). This indicates that the moon gates were constructed before the fourteenth year of Chongzhen (1641). Reviewing previous records on gate construction, the only extensive gate-building occurred during the Chenghua period. "In the first year of Chenghua, 810 watchtowers were added to the city wall; in the third year, Piyun Tower was rebuilt at the northwest corner of the wall; in the fourth year, the South Gate Tower was built, followed by the East and West Gate Towers and four corner towers in the fifth year… Later, Assistant General Yang Guang built the North Gate Tower" (18, pp. 43-44). This suggests that the moon gates were likely constructed during the Chenghua period. In the fourteenth year of Chongzhen, the walls were raised, and the moon gates were rebuilt according to the wall's standards, with widened roads connecting the inside and outside of the walls via the moon gates. By the late Qing period, each of the four moon gates measured as follows: east gate at 10.5 zhang in length, south gate at 13.5 zhang, west gate at 23.5 zhang, and north gate at 25.2 zhang (Ma, 2009, p. 320).

During the Chenghua period, extensive repairs and improvements were made to the city wall. In the first year of Chenghua (1465), 810 watchtowers were added to the city wall, giving the wall a perimeter of about 2800 meters, with an average watchtower spacing of 3.5 meters, resulting in high construction density. In the sixth year of Zhengde (1511), Prefect Cheng Gao undertook repairs on the watchtowers. By the seventh year of Jiajing (1528), Assistant Li Xiang and Prefect Zheng Zhang dismantled the watchtowers and replaced them with battlements. In the eighth year of Shunzhi (1651), "buildings on the outer city were dismantled at four-foot intervals to add battlements" (Ma, 2009, pp. 317-318). Thus, the defensive structure of Zhaoqing's city wall transitioned from dense watchtowers to battlements. Watchtowers were effective for defense during wartime but required extensive maintenance and were vulnerable to weather damage. In contrast, battlements enhanced the wall's defensive capabilities with a more durable structure.

The primary Qing-era enhancement to the wall's defense was the construction of artillery platforms. In the eighth year of Shunzhi (1651), "General Xu Erxian and Prefect Zhang Zhibi added six artillery platforms on the wall, with 27 artillery rooms and 148 bunkers facing Longding Ridge" (Ma, 2009, p. 318). To further bolster defense, a water city and artillery platforms were also built. Located on both sides of the southern city wall, the water city extended "from the city walls along the river to the water's edge, measuring 12 zhang to the east and 14.5 zhang to the west, with a height of 1 zhang 2 chi and a width of 8 chi" (Ma, 2009, p. 318), connecting the southern city wall with the gap leading to the Xijiang River. The water city housed two artillery platforms. In the third year of Daoguang (1823), "Governor Ruan Yuan ordered the construction of two artillery platforms outside the South Gate, along with walls and towers, overseen by County Magistrate Han Jifei" (Ma, 2009, p. 318).

During the Ming Dynasty, Zhaoqing Prefecture established a drainage system composed of inner and outer moats, a structure built up over generations based on the city's topography and hydrological environment. During the Tianshun era, Prefect Huang Yu dredged the moat, creating a system of outer, inner, and west moats. The outer moat started from outside the West Gate, circled the city to the north, then turned east, crossing the bridge at the North Gate, before heading south to the East Gate. The west moat was located on the west side of the city, "drawing water from the Jiang River through the stone mouth near the West Gate and serving as a sheltered harbor for government boats" (Chen, 2009, p. 327), likely due to its proximity to the prefectural offices. The outer and west moats were positioned outside the city walls, while the inner moat was within the walls, divided into upper and lower sections. "Beginning within the West Gate, a small water channel flows south along the Nanmen Street, reaching the Qingjun Pavilion before expanding into the upper moat. The channel then passes through the Tangjitou Street, where it narrows and becomes the lower moat, which then exits the city to join the outer moat and discharge into the river" (Chen, 2009, p. 327). Tangjitou Street served as the dividing point between the upper and lower moats. The phrase "where it narrows" indicates a significant drop in elevation between the two sections.

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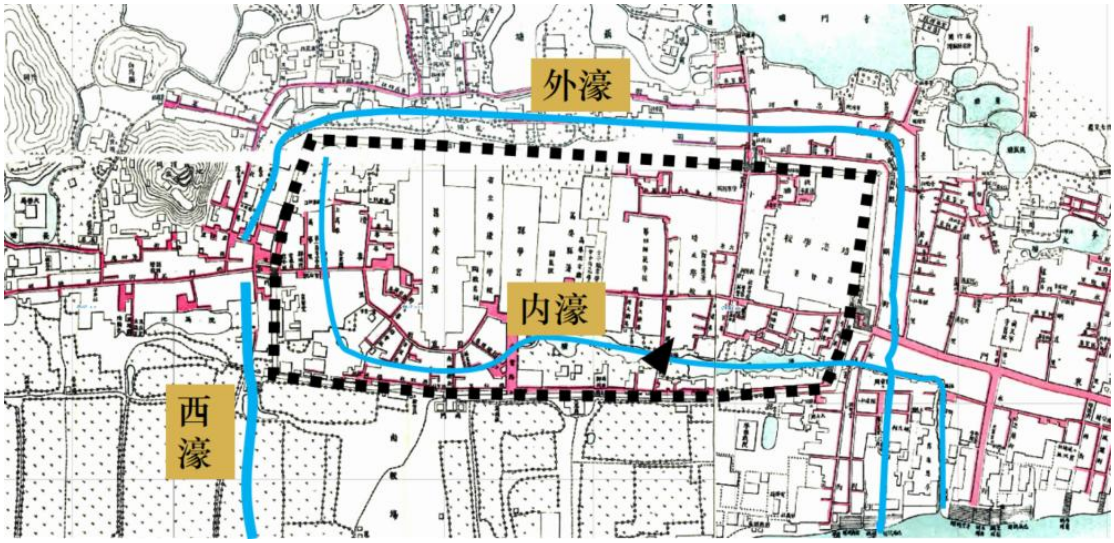

Figure 4: Distribution Diagram of Ming Inner and Outer Moats, redrawn based on the Gaoyao County Street Map from the Republican period.

Feng shui principles also influenced the spatial planning and management of the moat system by Ming officials, leading to disruptions in the continuity of the outer moat during the Wanli period. In the thirty-seventh year of Wanli (1609), "Prefect Chen Lian, considering that the prefectural seat's dragon vein extended from the west, ordered construction to block and reinforce the vein, dividing the northern moat into two sections" (Chen, 2009, p. 327). As the prefectural city was situated on a range of hills stretching from the northwest to the southeast, these hills were thought to form the city's dragon vein. The outer moat, however, passed through a low point in the hills to the northwest, which was considered detrimental to the preservation of this vein. Consequently, the outer moat was split into two parts to maintain the integrity of the dragon vein, thereby "nurturing the vein". This modification is clearly reflected in maps from the Chongzhen period, where, as shown in Figure 1, the northwest corner of Zhaoqing Prefecture's outer moat appears divided into two sections.

With the development of the economy and society, bustling marketplaces emerged in the eastern and western corners of the city walls. The location of these markets, positioned between the city wall and moat, complicated moat management. During the Tianqi period, Prefect Xia Yingtai relocated the markets. "Initially, the outer street of the East City was at the foot of the wall, but Prefect Xia Yingtai moved it to the edge of the moat, north of the North Gate. The West City outer street was also at the foot of the wall, which Xia moved to the edge of the moat, reaching the new foundations behind Piyun Tower and stopping at the North Gate. Thereafter, cultural prosperity gradually increased, and scholars and residents praised his virtues" (Chen, 2009, p. 327). This action was associated with cultural and intellectual flourishing in the city of Duan, illustrating the relationship between feng shui concepts and street space planning.

V. RESTORATION AND EVOLUTION OF THE INNER AND OUTER MOAT SYSTEMS FROM THE QING TO REPUBLICAN PERIODS

In the early Qing period, the outer moat was reconnected. "In the fourth year of Shunzhi, General Luo Chengyao dredged the outer moat, starting from the Shuibu Head at the East Gate, then extending north, turning westward to the Shuibu at the West Gate, with a width of 1.5 zhang and a depth of 1 zhang, encompassing a circumference of 972 zhang" (Tu, 2009, p. 166). In the eighth year, "General Xu Erxian ordered the outer moat to be deepened by a width of 8 chi and depth of 6 chi, encircling the city from the east, west, and north" (Tu, 2009, p. 166). The inner and outer moats were thus restored, using the natural terrain and water sluices to create a coordinated water management system. This system had both military and flood-prevention value for Zhaoqing Prefecture. Although "over time, residences encroached on and built over the moat" (Liang, 2009, p. 46), narrowing the waterway, successive officials prioritized moat management. By the late Qing to Republican periods, the moat system was barely maintained, though its layout and scale had changed significantly.

Firstly, the outer moat was divided into two channels: “One branch extended southeast from the East Sluice, reaching the riverbank, while the other flowed north from the North Sluice, splitting into two – one channel ran directly to Shangnietang, and the other veered east and south to Zhengdong Road, discharging into the Xijiang River” (Liang, 2009, p. 46). The moat west of the city and west of the North Gate could no longer serve as a moat, leaving only a series of disconnected ponds. In contrast, the outer moat to the east formed two channels. One channel exited from the North Sluice, passed through the old city moat, and reached Zhengdong Road outside the East Gate, while the other ran eastward from the East Sluice and flowed south near Ying’en Pavilion into the Xijiang River.

Secondly, the inner moat, although constrained by “narrow channels prone to silt accumulation and impeded flow", maintained its original path. “Starting in the northwest corner within the city, there was a moat pond called Wanying Pond, which served as the source. The water flowed south through Qingtai Alley, crossed Central Road, entered Fuzheng Road, headed southwest, merged with two smaller ponds, then turned eastward, passing through Bao’an Alley and Jixing Lane before reaching South Road and exiting past Zhongshan Memorial Hall. It merged into a large pond known as the Upper Moat in historical records. From there, the channel narrowed at Tangjitou, dividing into two paths, north and south. The south path connected with the Upper Moat, crossed Tangjitou to the east, forming another large pond known as the Lower Moat, which extended east to the East Sluice. The north path flowed toward Tangjitou and headed north across Central Road. There was also a tributary that exited the Upper Moat to the north, circled west of Datangxi Alley, then turned east to merge with the main flow of Central Road, entered Zhongya Lane, and twisted north to reach the North Sluice” (Liang, 2009, p. 46).

The moat’s water management function relied on topography and water sluices to control circulation, preventing flooding within the city. The layout of the inner and outer moats is described above. Two sluices regulated the water flow: the East Sluice near the southeastern corner of the wall connected the Lower Moat with the outer moat, and the North Sluice, located near the western side of the North Gate, had a higher elevation. Under normal conditions, water from the inner moat drained through the East Sluice into the outer moat. In cases of flooding, the East Sluice could reverse flow, requiring the sluice to be “closed to prevent external water from entering". As water levels rose in the inner moat and ponds, they would flow north through the inner moat toward the North Sluice, discharging into the Shangnietang in the northern city or exiting via the outer moat. If the Jingfu Weir broke, both the East and North Sluices would be closed, and the city walls would act as a temporary dam, blocking floodwaters and protecting the city from submersion (Liang, 2009, p. 46).

The water spaces within the moat were public resources, often facing a “tragedy of the commons” in use and maintenance. The cramped interior space of the city walls led residents and merchants to occupy moat spaces, and residents along the banks exacerbated siltation by dumping garbage and cultivating land near the moat. The outer moat was “largely occupied by the people, with densely built shops, houses, and back alleys on both sides, narrowing the space to the point of being impassable, often filled with rubble and filth” (Liang, 2009, p. 46). Conditions in the inner moat were similarly problematic, if not worse, as it was more prone to siltation. “The inner moat was often covered, winding and twisting through residential structures, with sections running underneath people’s beds and stoves, inaccessible to anyone unfamiliar. Originally a public asset, over time it was encroached upon, built over, and sometimes damaged, resulting in narrower channels that easily accumulated silt, hindering water flow” (Liang, 2009, p. 46). By the late Qing to Republican periods, both the length and width of the outer moat had diminished considerably: “In historical records, the outer moat was 458 zhang in length, 1 zhang deep, and 10 zhang wide, or sometimes noted as 1.5 zhang wide and 1 zhang deep; current measurements reveal a width of barely 4 to 5 chi in some places, with a depth of less than 1 zhang” (Liang, 2009, p. 46).

To maintain proper flow in the moat, effective management and periodic dredging were essential. During the Ming and Qing periods, dredging was typically conducted when walls were being constructed, moats were being excavated, or silt buildup became problematic. “The left drainage channel of the inner moat north of the city was blocked over time by construction above it. In the thirty-eighth year of Wanli, Prefect Jiang Zhongnan removed structures and dredged it, leaving an inscription. In the second year of Chongzhen, County Magistrate Zhang Mingxi dredged it again” (Chen, 2009, p. 327). In the seventh year of Kangxi, “Governor Zhou Youde dredged the inner moat, running from Tangjitou through Zhangya Alley to exit the city and connect with the outer moat, ultimately discharging into the river” (Tu, 2009, p. 166).

By the Republican period, moat management had become increasingly specialized, with dedicated agencies and funds established to oversee it. In the fourth year of the Republic (1915), when the Jingfu Weir collapsed, causing severe flooding and damage to the city walls, Luo, the military governor of Zhaoyang, ordered local officials to establish a bureau and allocated 10,000 yuan to repair the city wall and deepen the moat. In the fifth year of the Republic, the Zhaoqing City Moat Repair Office was established, tasked with managing the moat and "allocating 500 yuan annually from the Jingfu Weir's fish pond tax revenue for maintenance". However, as the office also assumed the costs of demolishing the city wall, building roads, and constructing slopes, funds became insufficient. In the twenty-third year of the Republic, the government decided to clear the moat system and established a City Moat Clearing Committee. The committee raised over 3,000 yuan by selling public assets, such as the Ma Wang Temple, with an additional 300 yuan contributed by County Magistrate Ma Bingqian. "The clearing work proceeded from the East Sluice to the south, from outside the North Gate to the inner moat starting at Tangjitou and ending at the North Sluice. Narrow sections were widened, protrusions were leveled, collapsed walls were rebuilt, and buildings that severely encroached on the moat were partially dismantled. Consequently, water flow in the moat became unobstructed, alleviating flooding issues" (Liang, 2009, p. 47). This restoration successfully revived the drainage function of the outer moat to the east and the northern section of the inner moat.

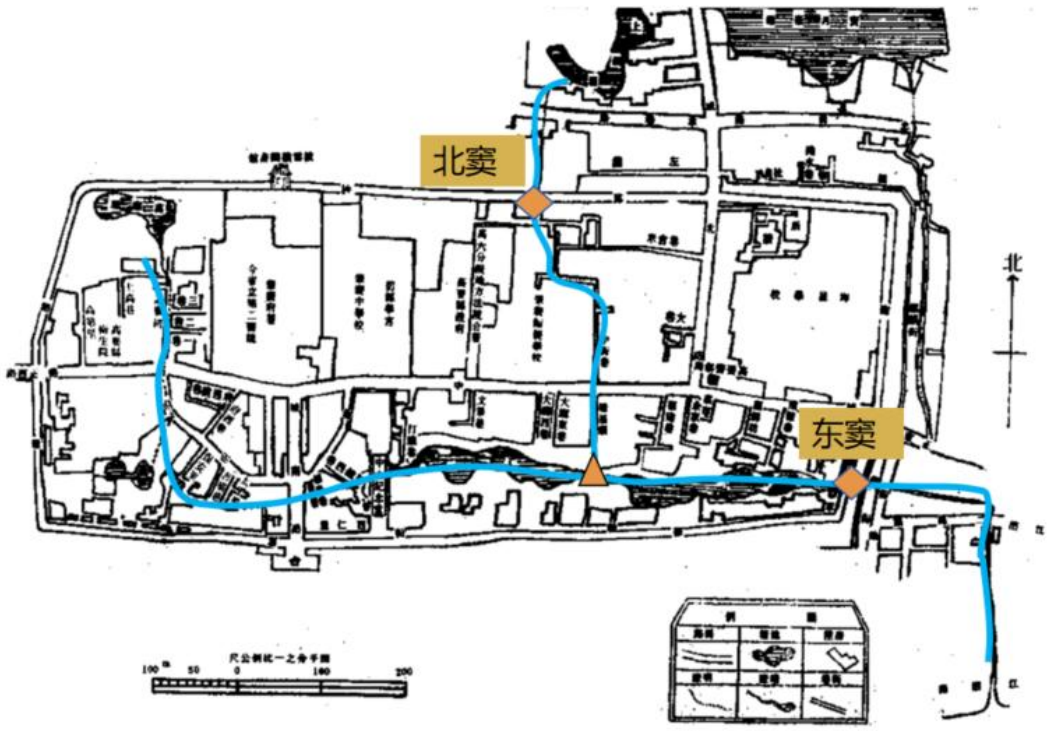

Figure 5: Diagram of Zhaoqing Prefecture City's Inner Moat and Sluice Locations, redrawn based on the Gaoyao County Inner and Outer Moat Map from the Republican period.

VI. INTRODUCTION

This study, utilizing urban morphology, has combined literature, various maps, and fieldwork to reconstruct the spatial form and evolution of Zhaoqing Prefecture's city wall and trench system across multiple periods from the Song Dynasty to the Republican era. This reconstruction has yielded new insights into the development of Zhaoqing's city wall and trench system.

During the Song Dynasty's earthen wall period, the city wall was located within the current Fucheng Park, covering an area approximately enclosed by today's Fuzheng Road, Qingtai Alley, Zhaoqing Middle School (junior division), and the North City Wall—slightly larger than the present-day Fucheng Park. At this time, the wall lacked a trench, but large,

undeveloped water areas to the east, south, and west of the wall restricted its construction, resulting in a convex shape and serving as a natural defense.

During the Song brick wall period, the city wall's perimeter matched the current ancient city wall, establishing the basic framework for later generations. A trench was excavated during the construction of the brick wall, connecting to natural ponds, forming a moat around the city. Additionally, an undeveloped ancient harbor still exists near today's Ningnan Road to the east of the city, serving as a natural harbor for boats. This harbor provided an economic benefit, shaping the eastern commercial district.

In the Ming and Qing periods, additional defensive structures were built, including moon gates, watchtowers, gate towers, corner towers, artillery platforms, and water defenses, enhancing the wall's military functions without major alterations to its shape. The moat system underwent extensive clearing and improvements during the Ming Dynasty, resulting in an inner and outer drainage system. In the Qing Dynasty, based on the existing Ming moat system, sluices were installed to leverage the terrain for drainage and flood control. Although residents encroached on the moat space over time, the inner and outer moat systems were maintained until the Republican period, with specialized agencies and dedicated funding established for their upkeep.

The ancient city wall of Zhaoqing remains the city's most significant cultural heritage asset, preserving extensive historical resources within and around the old city, providing abundant cultural resources for the revitalization of the prefectural city. While the ancient city wall has withstood the test of time, the moat has largely disappeared due to urbanization. Nonetheless, as an integral part of the prefecture's historical culture, the moat warrants further attention. This paper has traced the evolution of the city wall and trench system, reconstructing the spatial forms of Zhaoqing's city wall and trench from the Song Dynasty to the Republican era, thereby providing a morphological framework to guide further exploration, preservation, and revitalization of the historical and cultural heritage of Zhaoqing Prefecture.

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Guangdong Provincial Youth Innovation Talent Project for General Higher Education: "Research on the Evolution and Revitalization of the Spatial Morphology of Zhaoqing Prefecture from the Song Dynasty to the Republican Era from a GIS Perspective" (Project Number: 2023WQNCX075).

Zhaoqing University Institutional Research Project: "Study on the Spatial Morphology Evolution of Zhaoqing Prefecture from the Song Dynasty to the Republican Era" (Project Number: FW202302).

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