

# City as an Accumulation of Reconstruction

## Planning History of Kamaishi, a City Constantly Hit by Disasters, Mainly Tsunami

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### Abstract

Kamaishi in Iwate Prefecture has suffered devastating damage on several occasions, including the 1896 Meiji Sanriku tsunami, the 1933 Showa Sanriku tsunami, the 1945 naval bombardment during W.W. II and the 2011 Great East Japan Earthquake. It has recovered each time. The purpose of this paper is to organise the history of reconstruction planning and urban development in Kamaishi and to identify the characteristics of Kamaishi's landscape and urban space in terms of disaster and reconstruction. As a result, temples, shrines and public facilities have been moved and new infrastructure has been developed repeatedly after each disaster in the Kamaishi area in modern times. These have generated a landscape typical of Kamaishi, centred on wide streets that form a vertical axis connecting the coast and the highlands, and have been accumulated as the history of the land in each place. The urban space of Kamaishi has been woven into the will to evacuate through repeated experiences of disaster and reconstruction. In the reconstruction after the Great East Japan Earthquake, new layers and facilities were added for commercial recovery and residential reconstruction, but the underlying tone was aimed at building a network of evacuation routes.

### Keywords

Tsunami, Evacuation, Reconstruction Planning, Tōhoku

### How to cite

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## INTRODUCTION

Since Japan is one of the world's most disaster-prone countries, its urban planners have used its frequent recovery periods as opportunities to prepare and improve the built and natural environmental formations. In particular, the current urban and community spaces in the cities and settlements along the Sanriku coast, where tsunamis strike regularly, have been repeatedly reshaped after tsunami damage and reconstruction. The term reconstruction planning can refer to planning activities to improve and modify urban areas and settlements in anticipation of future disasters and restoring them after a disaster. Thus, reconstruction planning is essential to developing the present-day cities and settlements along the Sanriku coast.

The Sanriku coast was struck by the Great East Japan Earthquake of 11 March 2011 (magnitude 9.1 Mw), causing the largest tsunami since 869 (magnitude 8.9 Mw). In the modern period alone, the Sanriku coast was hit by the 1896 Meiji Sanriku tsunami, the 1933 Showa Sanriku tsunami, and the 1960 Great Chilean earthquake and tsunami. All caused extensive damage requiring the areas to be rebuilt. In addition to tsunamis, the region has repeatedly experienced large urban fires and endured naval bombardments during WWII.

This paper's subject, the eastern part of Kamaishi City (the 'Iron City') in Iwate Prefecture (hereafter, Kamaishi), is one of the leading industrial cities on the Sanriku coast. The Kamaishi area, a narrow, flat area between steep hills and the inner bay, has experienced numerous disasters and reconstructions. The iron and steel industry fuelled the modernisation of Kamaishi, developing factories and residential areas outside Kamaishi's centre area. At its peak in 1960, Kamaishi's population was close to 90,000, but the numbers declined in tandem with the collapsing iron and steel industry. By February 2011, just before the Great East Japan Earthquake, the population had fallen below 40,000. Also vital to the city are its fishing and fish-processing industries, centred on Kamaishi Port, which has long flourished as a good natural port with a large commercial area and residential areas. The vast lagoon near the mouth of the Kasshi River between the bay and city was used exclusively by steel companies throughout the modern period, mainly as a logistics and storage space.

The Kamaishi area has suffered devastating damage on several occasions, including the Meiji Sanriku tsunami, the Showa Sanriku tsunami, the naval bombardment during WW II and the Great East Japan Earthquake [Table.1]. It has recovered each time. Of all the cities and settlements on the Sanriku coast, Kamaishi has probably suffered the most frequent and destructive large-scale disasters. Consequently, Kamaishi's continual need to rebuild has strongly guided its reconstruction planning.

The purpose of this paper is to organise the history of reconstruction planning and urban development in Kamaishi and to identify the characteristics of Kamaishi's landscape and urban space in terms of disaster and reconstruction. The history of reconstruction planning from disasters in the cities and settlements along Sanriku coast has been published in a coherent research work, such as Okamura (2017) and Aiba et al. (2019), after the Great East Japan Earthquake. However, all of them focused on relatively small villages and towns, and none of them have revealed the planning history of cities such as Kamaishi, which is an exception in Sanriku,

in a chronological manner. For Kamaishi, Nakajima (2012a,b) provides an overview of the history of reconstruction planning, but does not deal with the recovery from the Great East Japan Earthquake. The novelty of this paper lies in the fact that it provides a diachronic overview of the history of reconstruction planning in Kamaishi from the Meiji period to the present.

## SETTLEMENT PATTERNS IN KAMAISHI DURING THE PRE-MODERN PERIOD

The opening of the eastbound shipping route to Japan's capital city of Edo in 1670 rapidly promoted the commercialisation of marine products along the Sanriku coast and developed Kamaishi into an area with a robust fishing port.<sup>1</sup> A valuable source of information on Kamaishi's pre-modern development is the Kamaishi Minato Ezu (designated as a cultural property of Kamaishi City) [Figure.1], which depicts mid-19th century Kamaishi and was handed down from the Sekiōzenji temple. The map shows the Nanbu clan's government office in charge of taxation of marine products on a hill to the east in Daimura (terrace village) and the precincts of Sekiōzenji temple, founded in 1652–1655, to the west in Sawamura (stream village), flanked by steep mountains. The village followed a linear form, with private houses lining the streets along the coast and along the streets stretching in the direction of the stream.

Kamaishi's location made it a critical land transport hub. It sprang up at the junction of the Kamaishi-kaidō Road that connected Morioka, the capital of the Nanbu clan, with the coastal region, and the Hama-kaidō Road, which connected the villages of the Sanriku coast. The street depicted in the Kamaishi Minato Pictorial Map was also part of the Hama-kaidō Road. The Hama-kaidō Road went upstream towards the neighbouring town. At the entrance to the stream was a *kōsatsuba* (government bulletin board), around which the Sawamura red-light district spread. The frontal approach to the Sekiōzenji temple, which ran parallel to the street of the red-light district, was busy. The *satomiya* (worship building) of the Osaki Shrine was established along this road near the coast in 1699. After the Meiji era, both the Sekiōzenji temple and the government office were relocated to the west, but the basic pattern of streets incorporating this wide-area road network in the early modern period has continued into the present day. In contrast, there was no urbanisation in the west, with only the Yakushidō temple, which was rebuilt in 1786, sitting on the hillside. The lagoon near the mouth of the Kasshi River (Nakabanko) was not used, and there were two routes from the Hama-kaidō Road: bypassing it and crossing the river or landing by ferryboat.

The name of disaster	Population of the Kamaishi area at the time.	Number of people killed or missing due to tsunami and bombardment
1896 Meiji Sanriku tsunami	5274	3323
1933 Showa Sanriku tsunami	23946	30
1945 naval bombardments	-	516
1960 Great Chilean earthquake and tsunami	-	0
2011 Great East Japan Earthquake	6971	229

**Table 1.** Disaster damages in the Kamaishi area. Sources: Editing Committee of the History of Kamaishi City, *Kamaishi Shishi Tsūshi*, Kamaishi City, 1977 and Kamaishi City, *Kamaishishi Fukkō Machizukuri Kihon Keikaku: Scrum Kamaishi Fukkō Plan*, Kamaishi City, 2011



Fig. 1. Kamaishi Minaot Ezu

## ASPECTS OF URBANISATION SINCE THE MEIJI ERA AND THE MEIJI SANRIKU TSUNAMI

Kamaishi's modern era began with iron. The introduction of Western-style blast furnaces in the mid-19th century slowly took root until around 1890, when many ironworks were built to meet the growing domestic demand for iron. Kamaishi developed into one of the leading ironworks in the country, and the town experienced a rapid increase in population. Kamaishi also became an important fishing base as a good port located in the middle of the emerging Sanriku fishing area, and fish-processing factories and shipping wholesalers lined the streets.

Kamaishi's industrial development since the Meiji era (1868–1912) and the resulting increase in population significantly influenced the town development. The early overcrowding in the central area and the frequent large fires that led to the urban area's westward expansion were of particular importance. After the Sekiōzenji temple at the heart of Kamaishi's bustle was destroyed by fire, it was moved in 1887 to Ōtadagoe in the western part of the area. The Kamaishi Elementary School, which opened in 1873 on a lease of part of the Sekiōzenji temple, was also destroyed by fire in 1883 and temporarily relocated nearby, then eventually moved west in 1896. These relocations triggered urbanisation in the western part of the area. In the late Meiji period, Senjuin Temple (relocated and built in 1907) and Hōjuji temple (built in 1907) were built on high ground on the cape of the mountain. As was the case with Yakushidō temple, which was established early, religious and public facilities were built next to streams (Sawamura style) and on mountain capes (Daimura style) with views of the sea, before private houses. These facilities promoted the subsequent development of low-lying areas.

Kamaishi was severely damaged by the 1896 Meiji Sanriku tsunami, which killed 60% of the population in the area. One reason was that people's houses were densely built from the coast to the mountainside, and the streets were narrow, making evacuation difficult. In the recon-

struction, three streets parallel to the coastline were clearly defined: Kaigan-dōri, Chūō-dōri, and Yamate-dōri. The reconstruction project widened Kaigan-dōri Street and Yamate-dōri Street to 2 ken (3.6 m) and Chūō -dōri Street to 6 ken (approximately 11 m). It also included building a connector between Kaigan-dōri Street and Yamate-dōri Street.<sup>2</sup> The urban plan called for Chūō-dōri Street and Yamate-dōri Street to run from the original town centre to Ōtagoe, where the Sekiōzenji temple was located. However, the Meiji Sanriku tsunami highlighted some issues caused by urbanisation (notably, overcrowding and sprawl). Therefore, the reconstruction plan developed the necessary infrastructure (i.e. street network) for a town with a larger population.

Unfortunately, the Osaki Shrine worship building, which was presumably completely washed away by the Meiji Sanriku tsunami, was rebuilt on the same site. After it was again completely washed away by the next Showa Sanriku tsunami, it was finally moved to a higher location. Although the Sekiōzenji temple and the primary school had been relocated before the Meiji Sanriku tsunami to slightly higher ground, they were still in the danger zone between the areas that were inundated and not inundated during tsunamis. However, after the Meiji Sanriku tsunami, the Senjuin and Hōjuji temples were relocated to safer, higher locations, no doubt influenced by the disaster's destructiveness. Overall, the extent of the damage caused by the Meiji Sanriku tsunami led Kamaishi to relocate temples and public facilities away from the vulnerable centre, accelerating the westward expansion and the development of new shopping streets and urban areas.

## THE SHOWA SANRIKU TSUNAMI AND MODERN URBAN PLANNING

Kamaishi was severely damaged by the 1933 Showa Sanriku tsunami. The tsunami was less powerful than the Meiji Sanriku tsunami. However, the city's population had increased significantly between the Meiji (5,274) and Showa (23,946) tsunamis, and so many more commercial and residential buildings were damaged. After the Showa Sanriku tsunami, the Urban Planning Division of the Ministry of Home Affairs drew up a full-scale reconstruction plan and a report [Figure.2].

According to the Ministry of Home Affairs report, the reconstruction plan for Kamaishi stated that "Kamaishi Port is U-shaped within Kamaishi Bay. Wave heights and impact forces were relatively low; however, the large city borders a port, so the tsunami caused fires. The number of damaged houses was the largest in the Sanriku region, at 1,632. However, because its economic activities were inseparable from the port's functions, there was no alternative but to rebuild it in its original location. Therefore, a plan was made to organise and expand the street network, and street restoration projects were carried out in areas where houses had been washed away, while houses that did not need to be along the coast were relocated to sites in the mountainous areas behind. In the port areas, tsunami-proof buildings were constructed."<sup>3</sup> The basic principle of the project was to restore the original site. The street restoration project emphasised the vertical axis in the direction of the mountains by widening existing streets and building new ones. In particular, the street where the worship building of the Osaki

Shrine had been located, Bashomae Street, became Kamaishi's widest street at 20 m, forming one east–west axis. Two other longitudinal axes, one 12 m wide and the other 8 m wide, were envisaged as firebreaks. Both these sections were planned to extend over the Chūō-dōri street to Yamate-dōri Street, with 9 m fire prevention zones along each roadside. The vertical axis served as an evacuation route towards mountainside and a fire prevention zone—useful at any time, not just in the event of a tsunami. Their urban planners used the tsunami recovery as an opportunity to solve urban planning issues.

Even before the Meiji Sanriku tsunami, Kamaishi had considered constructing Yamate-dōri Street in the Hamachō area but was unable to do so because the mountains were too close to the town. Therefore, the city built a new path on the high ground of the steep hillside as an emergency evacuation route. In Yoshida Hatsusaburo's famous bird's-eye view of Kamaishi after the reconstruction from the Showa Sanriku tsunami [Figure.3], this newly built path is called Memorial Road. The newly-widened vertical axis with its designated building lines was connected to the Memorial Road, which came to be known as the 'evacuation road' that saved many lives during the Great East Japan Earthquake.

The reconstruction plan also called for relocating many houses to higher ground. It identified four sites in the Kamaishi area as candidate housing sites; three were actually developed, although two of these sites are now empty, with no houses. The central site, Takahatayama, was not used for housing but as the new site of the relocated Osaki Shrine, which was damaged along the coast. Although the city had previously relocated temples and public facilities, this was the first planned relocation of houses in Kamaishi's history. The earlier relocations to the newly urbanised higher ground in the western part of the area before the Showa Sanriku tsunami probably influenced the reconstruction plan. Adding fill, elevating roads, and additional urbanising were also planned in Nakabanko, using these as embankments.



Fig. 2. Kamaishi Machi Fukko Toshikeikakuzu [Reconstruction Plan], 1934

Various planning maps suggest that the building lines were designated in the reconstruction plan after the Showa Sanriku tsunami and the streets were to be widened or newly constructed up to Gakkō-mae-dori Street, where the primary school and town hall were located in the western part of the city. However, the reconstruction plan also showed a planned street network for the urban area west, making it the first Kamaishi street plan to cover the entire urban area. The reconstruction after the Meiji Sanriku tsunami set out three parallel streets running roughly east-west (Kaigan, Chūō and Yamate). Perpendicular to these were Gakkō-mae-dori and two streets in front of the Sekiōzenji temple gate and Yakushidō temple gate to create vertical axes.

In 1943, Kamaishi drew up its first urban planning road plan based on the City Planning Act. Unfortunately, its intentions to realise the reconstruction plan after the Showa Sanriku tsunami were derailed by the war; naval bombardments destroyed the urban area before the plan could be implemented. The complete plan was never realised, and Nakabanko continued to be used exclusively as a storage site by the Japan Iron & Steel Company, a state-owned company established in 1934.

## COMPLETION OF THE POST-WAR RECONSTRUCTION PROJECT

Kamaishi burned to the ground after being thoroughly barraged by naval gunfire on 14 July and 9 August 1945. The post-war reconstruction land-readjustment project was conducted throughout the Kamaishi area. The street reorganisation for the west included in the post-Showa Sanriku tsunami-reconstruction plan began again, as did the street network reconstruction in the east. The streets were widened according to the reconstruction plan after the Showa Sanriku tsunami were widened still further in Bashomae. The city developed the street in front of Sekiōzenji temple as Aoba-dōri Avenue, a park street that became a symbol of the reconstruction. These two wide streets and the street in front of Yakushidō temple were added as vertical axes, which were designated as first-class streets with widths over 29 m. In addition, the area in front of the Sekiōzenji temple gate, the hill where Yakushidō temple was located, and the hill in Daimura where the first government office was once located were planned as a park or a playground. Tenjin Park, adjacent to elementary and junior high schools, was also constructed through the land-readjustment project. Osaki Shrine, which was relocated from the coast after the Showa Sanriku tsunami, was relocated to higher ground west of the stream, farther from the coast. The hill where the Osaki Shrine was originally located was turned into a park.<sup>4</sup>

The reconstruction plans drawn up after the Meiji Sanriku and Showa Sanriku tsunamis included strengthening the vertical axes for expedited evacuation and disaster-prevention against ordinary fires. These were realised through post-war reconstruction planning [Figure.4]. In addition to shrines, temples and other public facilities, parks and playgrounds as new public infrastructures were added to the land use of the highlands and the middle reaches of the streams.



Fig. 3. Yoshida Hatsusaburo's Kamaishi Chōkanzu [bird's-eye view], 1930's

Since then, Kamaishi has reclaimed much of the port area along the coast and constructed reinforced-concrete fishing-related facilities; a concentration of public, cultural, and accommodation facilities near Aoba-dōri Avenue; shopping and amusement streets; and large factories on the border between Nakabanko and the city centre. However, there has been no change in the basic composition of the landscape created by the post-war reconstruction projects.

## KAMAISHI AREA IMMEDIATELY BEFORE THE GREAT EAST JAPAN EARTHQUAKE

Evacuation maps posted on the streets of Kamaishi until just before the Great East Japan Earthquake emphasised the vertical axis for evacuation (towards the mountains).<sup>5</sup> This vertical axis, together with the landmark shrines, temples, and public facilities located at the middle reaches of the streams and near the mountains, created a characteristic view of Kamaishi towards the mountains. The structures on higher ground (e.g. temples, shrines, public facilities, evacuation roads, parks and playgrounds) were consistently promoted in citizens' daily lives as public spaces with scenic views and friendly atmospheres. They have become a major landscape feature of Kamaishi. They also became major evacuation sites.

The designated primary evacuation sites for tsunami disasters were the precincts of Senjuin temple and Hōjuin temple established in the Meiji period; the elementary and junior high schoolyards; the Hamachō evacuation road constructed after the Showa Sanriku tsunami; Higashimae Toigasawa, built as a relocation site; the former Kamaishi Second Elementary School (later Ōwatari Elementary School, now Kamaishi Elementary School) which opened in 1935; Yakushi, Daimura, and Osaki parks; and the grounds of Osaki Shrine, which were constructed as part of the post-war reconstruction project and other development projects during that period.<sup>6</sup> Most of these evacuation sites were created in the modern era based on the experiences of disasters.

However, one major influence on Kamaishi's reconstruction history is the lagoon near the mouth of the river, usually called Nakabanko. It has long been used exclusively as a distribution and storage area by steel companies. Some reconstruction plans considered urbanising it, but nothing was ever deemed practical. Just before the Great East Japan Earthquake, the city again discussed plans to develop Nakabanko to revitalise the Kamaishi area, but no specific development was ever undertaken.



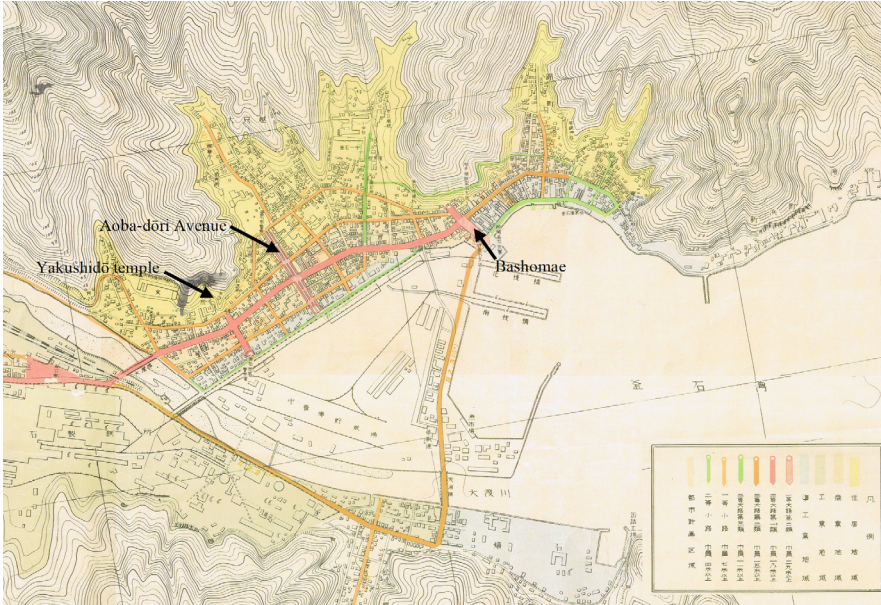


Fig. 4. Kamaishi Toshikeikakuzu [city planning map], 1949

The construction of tsunami breakwaters in Kamaishi Bay began in 1978 as a project under the direct control of the national government to cope with future tsunamis. The world's deepest breakwater, which was raised to a maximum depth of 63 m using the caisson method, was completed in 2009. Although the breakwater was destroyed by the Great East Japan Earthquake two years later, experts suggested that it played a major role in tsunami attenuation and has been restored in 2018.<sup>7</sup>

## DAMAGE AND RECOVERY AFTER THE GREAT EAST JAPAN EARTHQUAKE

The Kamaishi area was devastated by the Great East Japan Earthquake on 11 March 2011. After the disaster, the recovery planning team compared three options: inland relocation, bulking up and relocation, and on-site restoration. After a series of dialogues with the affected people, they decided on a policy of on-site restoration emphasising on safety on the basis of evacuation and economic recovery. The Grand Design for the Reconstruction was formulated based on three concepts: revitalisation of liveliness, housing reconstruction, and disaster mitigation. It included reorganising shopping areas, defragmenting residential areas, three projects to drive urban recovery, the green belt concept at the waterfront, and vertical and horizontal axes to strengthen the network of linked evacuation routes [Figure.5]. The plans were realised over a period of 10 years.<sup>8</sup>

As the land-readjustment project for reconstruction had already been implemented in the post-war period, the project was not a land-readjustment project for reconstructing the affected urban area but a tsunami-reconstruction and disaster-prevention project. It acquired land to form a base for tsunami disaster-prevention planning, razing some blocks and rebuilding others with disaster-resistant public housing. The city formed a network of evacuation routes for disaster mitigation by creating a green belt with disaster-prevention functions and landscape, environmental conservation, and recreation functions. The greenbelt also connected the lowland areas by the sea with the hillside parks and evacuation roads developed after the Showa Sanriku tsunami. Additionally, as a traction project, the city opened a large commercial building in an underused corner of Nakabanko and used it as a commercial nucleus. To provide access to Nakabanko from the town side, they built a new viaduct over the Koshi River and a connection road between Nakabanko and the main street (Ō-dōri street). They also built a civic hall and an information exchange centre between the shopping facility and the main street continuity of the square space.<sup>9</sup>

Kamaishi's reconstruction after the Great East Japan Earthquake added new elements to the previous reconstruction plans while retaining their best ideas. The emergency evacuation sites (primary evacuation sites) were reviewed after December 2011 and several Kamaishi area sites were de-designated: the Ōtadagoe Park (Aoba playground) and precincts of Sekiōzenji temple, which were located in a low position and in the flood zone. In line with the progress of the reconstruction projects, additional evacuation sites were de-designated in 2017 and 2020.<sup>10</sup>

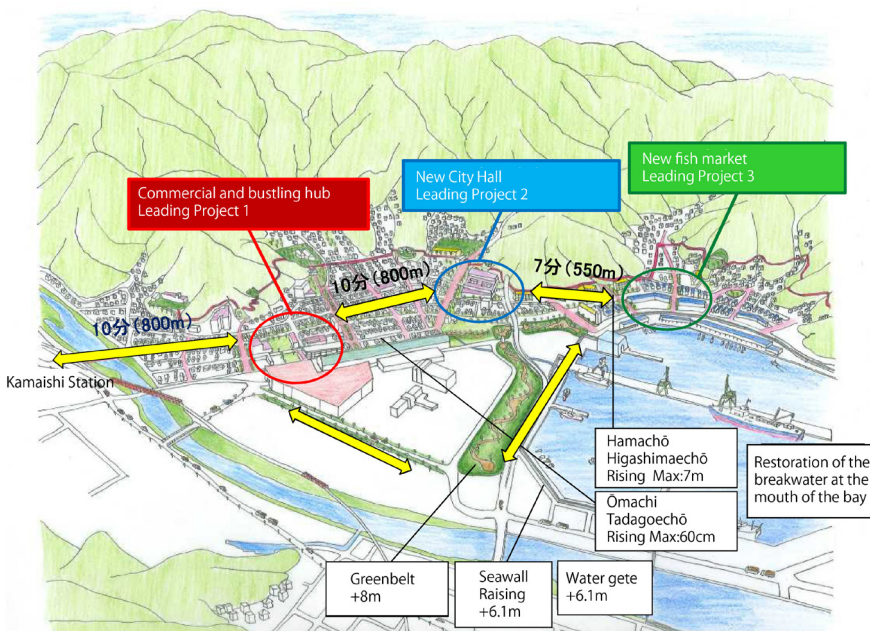


Fig. 5. Kamaishi Tobu Chiku Mahizukuri no Hōkōsei [Diretion of Mahizukuri in Kamaishi Area]

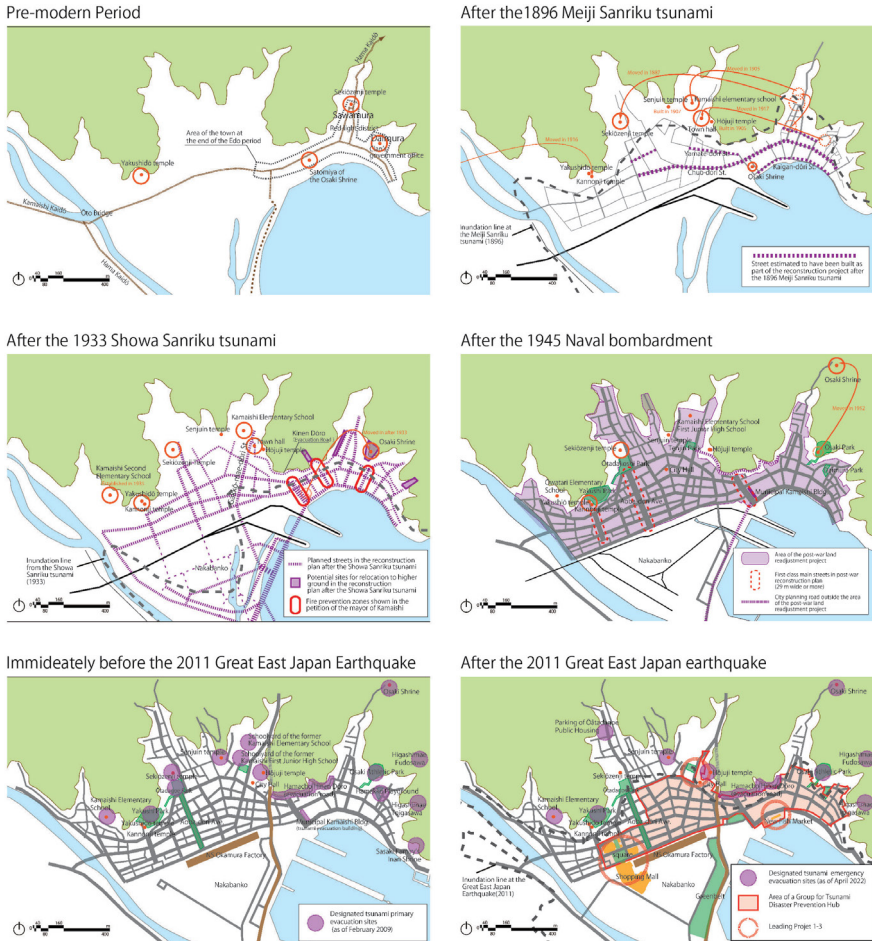


Fig. 6. Accumulation of Reconstruction in Kamaishi

## CONCLUSION

In the Kamaishi area in modern times, temples, shrines and public facilities have been moved and new infrastructure has been developed repeatedly after each disaster. These have generated a landscape typical of Kamaishi, centred on wide streets that form a vertical axis connecting the coast and the highlands, and have been accumulated as the history of the land in each place. In particular, at the time immediately before the Great East Japan Earthquake, many of the places designated as primary evacuation sites for tsunami disaster were places developed by reconstruction planning and other projects after previous disasters. In the Great East Japan Earthquake, some evacuation sites were inundated by the tsunami, but many of them accepted people and saved their lives. The urban space of Kamaishi has been woven

into the will to evacuate through repeated experiences of disaster and reconstruction. In the reconstruction after the Great East Japan Earthquake, new layers and facilities were added for commercial recovery and residential reconstruction, but the underlying tone was aimed at building a network of evacuation routes. It is feared that these intentions for urban space will be forgotten over time and the meaning of place will be lost. Planning history research has the role of constantly uncovering the intentions behind places, preparing for the next disaster and providing a foundation for reconstruction, in order to prevent such a situation if possible. This is also the reason why this paper deciphers the memory of disaster and reconstruction as an extraordinary event in the everyday landscape of Kamaishi.

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### DISCLOSURE STATEMENT

No potential conflict of interest was reported by the author.

### NOTES ON CONTRIBUTOR

**Naoto Nakajima** is an associate professor at the University of Tokyo. He specialises in urban design, urban theory and urban planning history. He chaired the 18th IPHS Yokohama Conference.

### ENDNOTES

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## IMAGE SOURCES

Fig. 1 Sekiōzenji temple.

Fig. 2 City Planning Division of the Ministry of Home Affairs, *Sanriku Tsunami niyoru Higai Chōson no Fukkō Keikaku Hōkokusho* [Report on the reconstruction plans of Towns and Villages Damaged by Sanriku tunami], 1934.

Fig. 3 Privately owned.

Fig. 4 National Archives of Japan.

Fig. 5 Website of Kamaishi City. [[https://www.city.kamaishi.iwate.jp/docs/2018042300062/file\\_contents/2018042300062\\_www\\_city\\_kamaishi\\_iwate\\_jp\\_fukko\\_joho\\_fukko\\_torikumi\\_ayumi\\_detail\\_\\_\\_\\_icsFiles\\_afeldfile\\_2015\\_02\\_27\\_20140623-092237.pdf](https://www.city.kamaishi.iwate.jp/docs/2018042300062/file_contents/2018042300062_www_city_kamaishi_iwate_jp_fukko_joho_fukko_torikumi_ayumi_detail____icsFiles_afeldfile_2015_02_27_20140623-092237.pdf).]

Fig. 6 Original.

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City as an Accumulation of Reconstruction