

Practical Efforts for Post-Disaster Reconstruction in the City of Ishinomaki, Miyagi

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Abstract.

During the UN World Conference on Disaster Risk Reduction (WCDRR), discussions on the topic of “designing for a safe and secure home and community” referenced to various case studies and challenges from the “Build Back Better” project (BBB). This paper introduces the several examples of the achievements by BBB carried out by the authors that became a part of the discussions.

1. Development of the towns with tsunami defense such as river and coastal levees and association of region-specific context and relationships to affected facilities with urban areas and marginal settlements within the framework of town and community building after the Great East Japan Earthquake
2. Designing of reconstruction plans achievable through coordination with institutions concerned and through consensus building with residents amid increasing number of reconstruction projects
3. Advanced level of maturation of plans gained through continuous collaborations
4. Creation of a place of exchanges as one process in recovery and the importance of information disclosure

Keywords: Build Back Better, post-disaster recovery and rehabilitation, stakeholders

INTRODUCTION

The Great East Japan Earthquake and Tsunami disaster hit eastern Japan on March 11th, 2011, in the extended regions over five hundred km of the coastline north to south, thoroughly destroying towns, villages, fishing harbors, and agricultural lands.

The city of Ishinomaki in the prefecture of Miyagi was affected with the greatest deal of human suffering by the disaster, which also physically damaged fishing villages, urban areas, and industrial infrastructures, complicating the situation and forcing the municipality to require physical support in all areas. The great deal of damages, lacking number of government personnel, increased importance of consensus-building with residents, and

ever-more complicated issues required integration and coordination of each project as well as the creation of the vision in designing the reconstruction plan.

In 2015, the Third UN World Conference on Disaster Risk Reduction (WCDRR) was held in the city of Sendai, another major city affected by the Great East Japan Earthquake. The conference was organized into three main segments: Intergovernmental, Multi-stakeholder and Public Forum. The Public Forum consisted of various symposiums, seminars and exhibitions which were held in venues throughout the city. This paper aims to introduce the background and achievements of the authors' approaches to the “Build Back Better” project (hereinafter simply referred to as “BBB project”) performed in the city of Ishinomaki, Miyagi, which was the base of a part of the discussion on the topic of “designing for a safe and secure home and community” in the public forum.

1. AN OVERVIEW OF THE CITY OF ISHINOMAKI AND A SUMMARY OF ITS RECONSTRUCTION PLAN

1.1. An Overview of the City and a Summary of Its Damage

The city of Ishinomaki is located approximately fifty km east to the city of Sendai, the major metropolitan city in the Tohoku region, and has the second largest population in the prefecture following Sendai. Old Ishinomaki merged with the six surrounding municipalities back in 2005, forming the present city shape consisting of a wide plain region on which the urban district is built and a peninsula with a ria shoreline profile, an intricate landscape where mountains touch ocean. The city centre of old Ishinomaki prospered as the connecting point of boat freight located at the river-mouth of the Kyu- Kitakamigawa River, or more precisely as a commercial and logistics hub in the early 17th Century. During the late 18th Century to the early 19th Century, the city prospered as a town with the fishing bank off the Kinkasan Island as its background. In more recent years, the city has also developed as an industrial town.

Towns in the peninsula, such as old Oshika and old Ogatsu, consists of many fishing villages called “Hama” – literally translated as “beach” –, which were closely associated with and shaped by fishing industries and its related industries, in the region.

The damages in Ishinomaki [1] are 3,178 deaths (i.e., approximately twenty percent of total number of deaths in the affected municipalities), 422 missing persons, 56,687 damaged houses, and approximately 73 km² of inundated area (i.e., approximately twenty percent of the entire prefecture). Although the inundated area is approximately 13.2 percent of the city’s entirety, approximately 76 percent of the houses in the city were affected, especially with the city centre being entirely flooded. Land subsidence was also caused in an extensive area. In Ayukawa Hama of the Oshika peninsula the subsidence of -120 cm was recorded. As to tsunami damages, while the waves were not high in the amplitude, the waves came deep into the urban area and reached more than 3 km inland from the coast, taking lives of many residents who did not evacuate. Fishing ports, industrial parks, and residential areas alongside the shoreline were completely washed and turned into a catastrophe by the tsunami. In the peninsula, deep, long-stretched harbors let waves elevate and destroy the villages on low-altitude, flat land. However, neighboring mountains enabled easy evacuations to higher grounds, and human damages were comparatively small. Residents could resume their work as long as they had access to boats. Therefore, despite the physical damages, this region was also found to be with a strong willingness for reconstruction from an earlier timing.

1.2. A Summary of the Basic Plans for Recovery

The concept of countermeasures to tsunami [2] takes the following approaches: 1) disaster risk reduction with evacuation being its core rather than physical defense against gigantic tsunami like the 2011 tsunami (Level 2, the largest scale tsunami, which occurs once in five hundred to one thousand years) and 2) disaster prevention measures including building of coastal levees against comparatively more frequent tsunami (Level 1, which occurs once in several decades to ten plus decades). In line therewith, the coastal-related bureaus led by Water and Disaster Management Bureau of the central government’s Ministry of Land, Infrastructure, Transport and Tourism (MLIT) laid out how to distinguish Level 1 and Level 2 tsunami and how to project amplitude of tsunami based on the height of past watermarks and simulations. Central Disaster Management Council then approved the resolution supporting the abovementioned, and each prefecture established the actual amplitude of Level 1 tsunami. As this decision laid out that Level 2 tsunami like the 2011 tsunami will not be defended against, it was emotionally difficult to be accepted by the disaster victims. Consequently, building of the defending facilities called secondary levees such as road embankments and disaster prevention green zones and use of high lands and inner

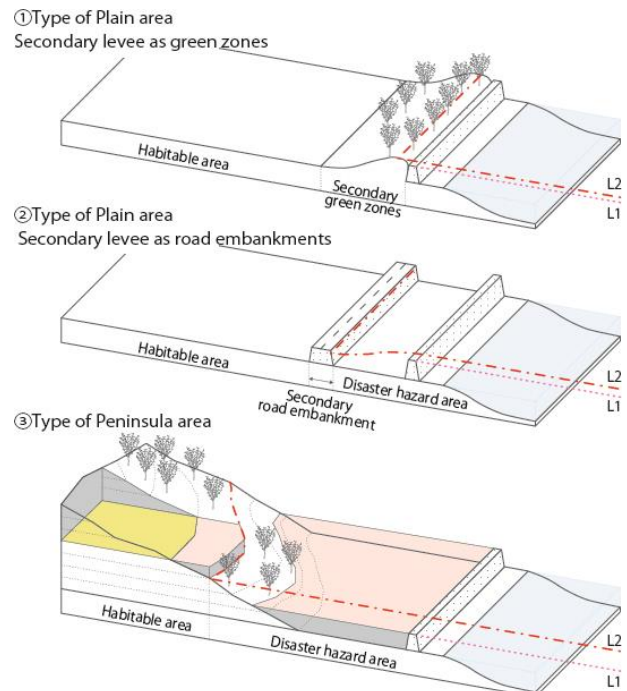


Fig1. Pattern Diagram of Tsunami Prevention

lands as residential areas for mass migration of residents were set as preconditions. Inside the disaster sites, areas designated as disaster-hazard areas, which are presumed to experience flooding of two meters or higher or water speed of two meters per second or faster based on Level 2 tsunami simulations, to place building restrictions.

1.3. A Summary of the Basic Plans for Recovery of the City of Ishinomaki

The basic recovery plans for urban areas involve two levels of defense in **Fig1**. The first is coastal and river levees, and the second is high road embankments and disaster prevention green zones (secondary levee). Main recovery and reconstruction projects involve projects for coastal levees, river embankment, evacuation routes and sites, public spaces, land readjustment projects, and disaster public housing projects.

In the peninsular areas, disaster prevention collective relocation projects have been planned to migrate the communities to a higher ground in **Fig1**. In terms of other major recovery projects, there are also plans for the construction of coastal levees, roads, and river embankments. The relocation destination of Hama communities (fishing villages) found across the peninsula will be the high grounds with the altitudes higher than the amplitude of Level 2 tsunami, and relocated communities will be built on locations with complicated geographical profiles characterized by a ria coastline.

2. THE BBB PROJECT FRAMEWORK

2.1. Ishinomaki's Reconstruction Planning Team

The first expert [3] colloquium to reflect expert opinions regarding recovery projects was held on May 15th, 2011, by the city of Ishinomaki. This colloquium, for which the Recovery Taskforce of the city's administrative office (its name at the time) served as its executive office, later developed into the "Ishinomaki Citizen's Committee for Basic Projects for Reconstruction" (hereinafter referred to as "Ishinomaki Citizen's Committee") [4] (in May to August, 2011). The city and Tohoku University entered into a comprehensive agreement concerning recovery through the mediation by Tohoku University members[5] who participated in this committee (on June 22nd, 2011). Aside from this line, the "Inquiry and Investigation into Urban Area Recovery Patterns" (June to December 3, 2011) was carried out by the MLIT's City Bureau, with Rehabilitation Division, Construction Department (its name at the time) acting as the executive office, and a council was created for management of its progress. These two councils were bound together by the "Steering Committee" [6]. Although the Steering Committee created drafts for the Ishinomaki Citizen's Committee, while contributing to the formulation of the "Ishinomaki Basic Recovery Plan" (November, 2011) [7], it also essentially served the role of debating recovery plans and later continued functioning in a different form then onward.

After its investigations were complete, the Steering Committee shifted its role to take over the functions of

the "Ishinomaki Revival and Town Building Council" (hereinafter referred to as the Town Council). Four Working Groups were established under this council: the Urban Areas Working Group (WG) to examine projects in the old Ishinomaki area; the Peninsula WG to examine projects in the peninsula; the Public Housing WG to examine recovery public housing projects; and the Disaster Prevention Planning WG to examine disaster prevention planning. Subcommittees were formed when those implementing the actual work is necessary; they dealt with complicated coordination of projects that various outside experts entered into the peninsula directly after the disaster, and it became challenging to coordinate with them, which included Japan Architect Association Tohoku Branch, Hokkaido University, etc. in the old town of Kitakami; General Corporation ArchiAid (a network of architects for recovery support) in the old town of Oshika; and Tohoku University Design Studio, Tokyo University of the Arts, and Nihon University in collaboration with ArchiAid in the old town of Ogatsu. The Peninsula WG was formed by incorporating these external actors as well and served as the role of a coordinator. This mechanism developed into the Ishinomaki Revival Town Building Promotion Council (hereinafter referred to as the Promotion Council) in Fig2, which is to perform project planning, information sharing, coordination of projects, and project progress management since 2013. The Urban Areas, Peninsula, and Public Housing WGs were allotted in the same way by the Town Council (the Disaster Prevention WG was abolished), with the participation of the national government (Reconstruction Agency and

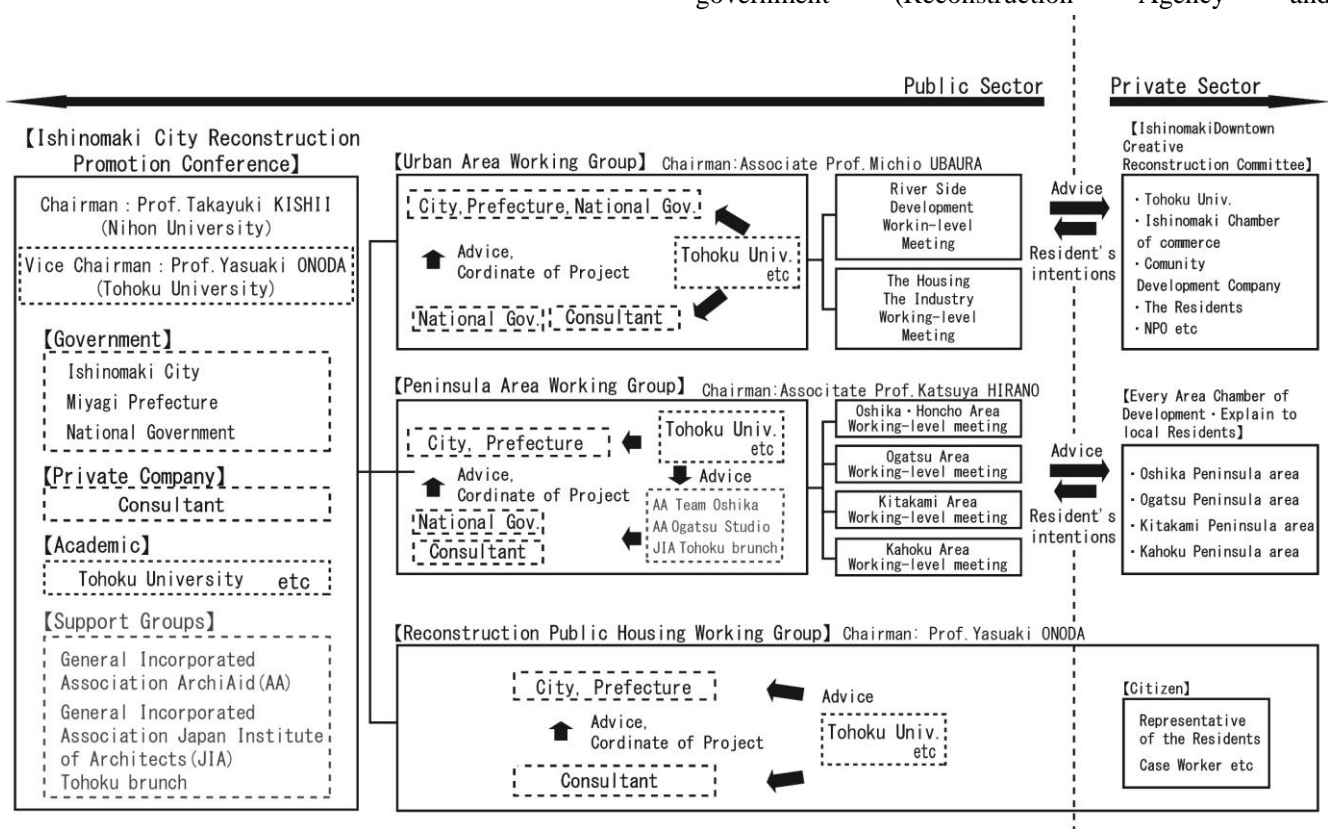


Fig2. Organization Structure of Council for Discussion on Recovery 2013

KITAKAMIGAWA-KARYU River Office, MLIT), Miyagi Prefecture (Eastern Public Works Office), relevant departments of the local government of Ishinomaki, consulting companies that have project contract, and outside experts.

2.2. Support Team of Tohoku University

Tohoku University team has provided Ishinomaki with the following two types of support. First is “practical application of disaster science”; and second is “acceleration of considered reconstruction projects.” The first is performed by integrating expert knowledge, from past earthquakes and support efforts of other municipalities after the Great East Japan Earthquake, and providing comprehensive and technical advice through the Ishinomaki Recovery Promotion Council, which was established in the city. Each of the affiliated WGs, and committees of people involved in actual implementation. The second type of support involves giving advice based on technical knowledge and coordinating between vertical and horizontal administrative divisions. This is because it is necessary to bring various recovery efforts together and implement high-quality formation of space, as various organizations simultaneously undertake recovery projects and they tend to be planned separately. Further, in addition to oral statements of opinion, experts from the three fields of architecture, civil engineer, and urban planner come together and devise alternative plans for projects. Planning coordination that goes beyond individual projects is a response to the fact that it is hard for consultants who are entrusted with tasks to consider overall situations, and also a reflection of the circumstances of areas struck by disaster, where opinions cannot be adopted unless they are made concrete. Specifically, designing of the plans for major facilities with consideration to the historical context (Section 3), assistance for central area reconstruction planning with consideration to the relationship between major facilities and migration to higher grounds (Section 4), and planning of and support for the establishment of the UN WCDRR satellite office (Section 5) have been carried out. These supports and assistance have been enabled by the framework agreement with the city of Ishinomaki and yielded from the information provided by and interviews with the city and residents and also from the collaborations among experts.

3. BBB PROJECT 1: INQUIRY INTO REDEVELOPMENT POTENTIAL OF BLOCK 11, 14, AND 15 IN DOWNTOWN ISHINOMAKI

3.1. An Overview of the Downtown Ishinomaki and a Summary of its Damages

This area is an important, historical area in central Ishinomaki. In the 17th Century, this area was a logistics and commercial hub located at the river-mouth of the Kyu-Kitakamigawa River and formed a unique landscape in **Fig3**. Prior to the 2011 earthquake and tsunami, no levee was built around this area due to the

nature of the city’s function and also due to its consideration to its historical context, allowing the area to be flooded over 2.0 m deep in the tsunami water. Adopting the tsunami-countermeasures concept, downtown Ishinomaki plans for river levees (T.P. + 4.5 m) based on the lessons learned from the tsunami. The city also set out its intention to build local fresh food markets and public housing in this area. As the non-existence of levees in the area had built close relationships between the riverside buildings and the river, the city, academia, and residents’ groups were preparing the plans for the new buildings accessible from the 1st floor on the downtown side and from the 2nd floor on the levee side, as the result of considerations to user’s mental connections to the river and to the ease of access for the users.



Fig3. Old drawing of the site [8]

3.2. Challenges before BBB Project’s Participation

Although this cognitive cancellation of levee height inside the buildings was a shared concept with BBB, interpretation of the conditions on site planning for new buildings was still unclear. The conditions included traditional, narrowly stretched sites, several pedestrian alley ways called “Yokocho” around the site, string of detached housing before the disaster, and most importantly, integration of the river into the townscape.

3.3. Alternative Proposals by BBB Project

The alternative proposal was drafted based on the following viewpoints, while maintaining the original project conditions planned by the city and its consultants, by integrating the viewpoints from civil engineering, architecture and urban planning.

- Succession of the historic townscape: an architectural plan that took advantage of the narrow site incorporated architectural configurations and traffic line planning into the new buildings to be built on top of the then segmented site that used to be occupied by several dozen buildings, while having taken into consideration the characteristics of the site in **Fig4**.
- Consistency with the neighboring sites: Being adjacent to roads and a tourist facility, this site is visible to many people. Having taken consideration the short buildings in the original site, BBB project proposed a short building design in **Fig5**.
- Downtown land use strategy: The planned site is outside of the walking distance from the city’s major traffic point, the railway station vicinity. BBB project emphasized the importance of public

transportation and its restructuring through rerouting of bus routes.

- Shared objectives among the stakeholders in the city: Shared challenges and visions led to the sharing of the direction.
- Continuous support: The architectural plan for the blocks 14 and 15, i.e., south side of the site, adopts the alternative proposal at its base and has been passed onto the working level team that has already broken ground as of September, 2015. Furthermore, the reconstruction project of for the Nishiutsumi Bridge, a neighboring infrastructure, has gone through the development of the plan through exchanges of views on its future use with residents and civil groups and also in cooperation with the prefecture government in Fig 6.

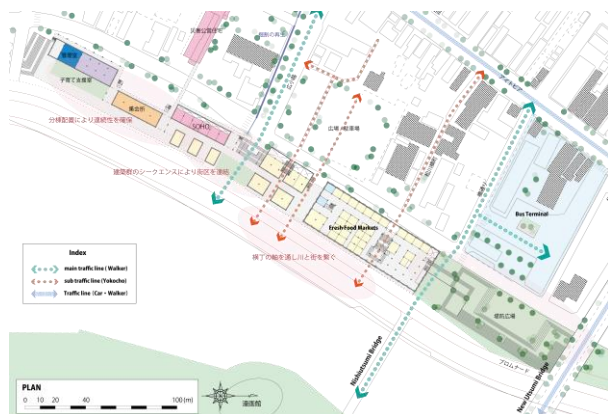


Fig4. Alternative Proposals Plan

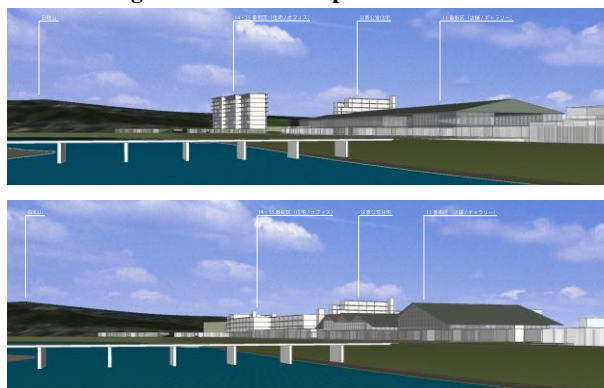


Fig5. The View from Bridge
Above: Original, Below: Alternative Proposals

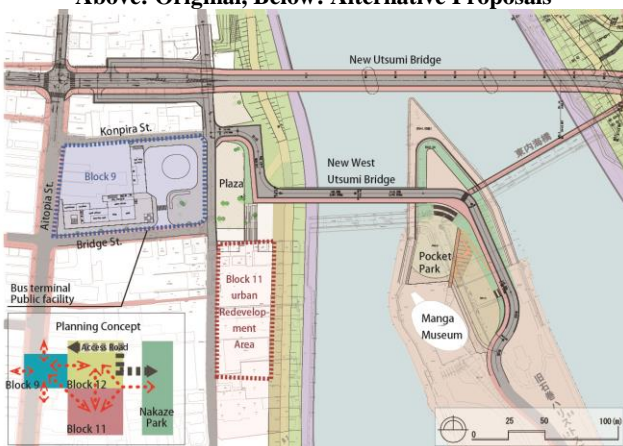


Fig6. Alternative Proposal of Nishiutsumi Bridge

4. BBB PROJECT 2: HUB AREA PLAN AND RELOCATION OF AYUKAWA DISTRICT IN THE OSHIKA PENINSULA TO A HIGHER GROUND

4.1. An Overview of Ayukawa Hama and A Summary of Its Damages

Ayukawa Hama is the largest fishing village in the Oshika Peninsula in Ishinomaki, Miyagi. Up until the 1970s, the village prospered with the whaling industry; today, however, tourism is rather an important industry for the village besides fishing. The 7.7 m tsunami heavily devastated the village's industries, commercial and tourist facilities, and houses at low elevations. The earthquake also caused 1.2 m scale land subsidence in this area.

4.2. Challenges before BBB Project's Participation

According to the reconstruction plan for Ayukawa drafted by a contracted civil engineering consultant, new, higher residential areas for the relocation would have been segmented into four areas with thirty to forty households in each areas. An opinion survey showed that seventy percent of the victims were willing to move to the western area, which was separated from the existing eastern residential area. This indicated that they did not find the reconstruction of the village center appealing. This breaking up of the community and separation between the old and the new residential areas would have casted a shadow over the future of the village. The isolation of the new residential area from the existing village functions, including the commercial and tourism industries as well as the current residential areas, would have decreased the sustainability of the town. Moreover, the TP + 6.0 m high coastal levee would have separated the harbor area from the residential area.

4.3. Alternative Proposals by BBB Project

Tohoku University team and the Y-GSA[9] Kazuhiro Kojima studio formulated an alternative plan by integrating viewpoints from civil engineering, architecture and urban planning.

In an effort to resolve the challenges, BBB project quickly pinned down the challenges, coordinated institutions concerned, drafted the alternative proposal, and set up the meetings with the group of resident representatives only in a one-month period since the unbalanced result of the initial opinion survey was revealed.

- Attractive new town center: A partial modification to the line of the then planned levee road separated the levee and the road to push the levee out into the sea to create a trapezoid-shaped land on which commercial facilities gathered. Moreover, the historical context of the area was taken into consideration by locating the intersection of the roads connecting the new commercial district and the residential areas on the Centuries Old- path to the shrine in the area. This plan was to locate all the

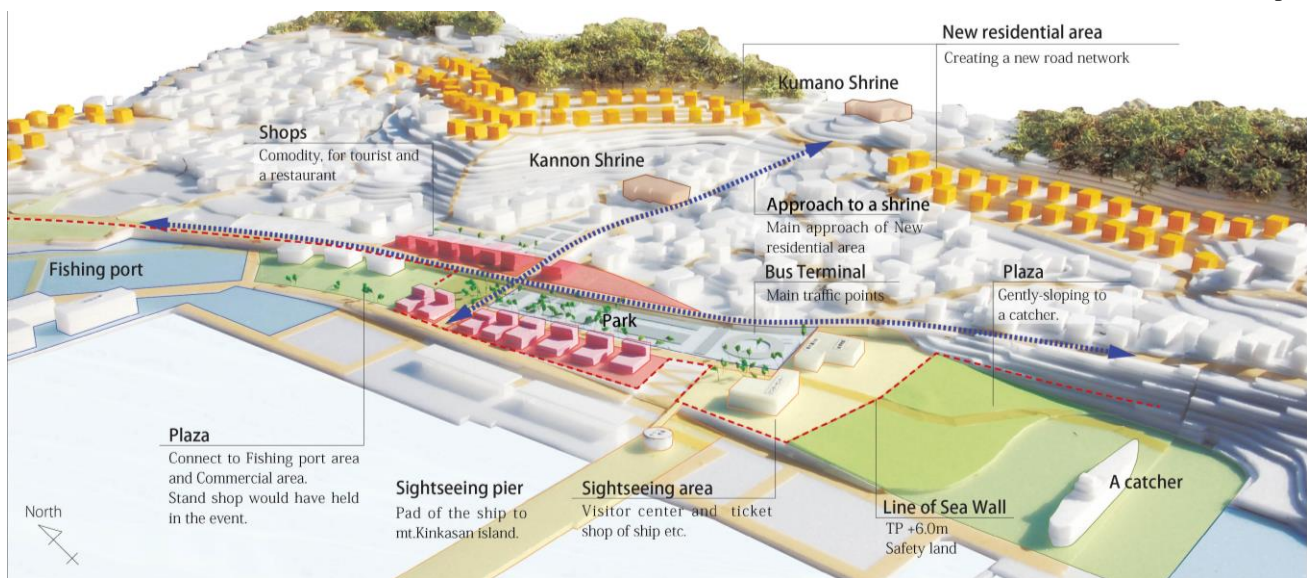


Fig7. Eastside of Ayukawa Hama 2013 [10]

commercial facilities inside the levees or in the areas safeguarded against Level 1 tsunami and to guarantee the medium- and long-term land use and asset value in **Fig 7**.

- Consolidation of land use: The newly developed residential establishments to the east of Hama were located in the vicinity of the existing residential area. New road network was also developed on the hillside.
- Levees that connect different land uses: Grounds with two different heights, such as the fishing port area (TP + 1.5 m) and the central area (TP + 6.0 m), are connected by two different types of open space in between. The northern slope reaching the fishing port was divided into several plains to form terraced fields for potential use for temporary stores and warehouses. The southern side reaching the sightseeing piers was designed as a gradual slope of grass area to attract visitors.

- Continuous support: In February to March of 2012 when the project was carried out, design requirements for levees and structural buildings were not fixed. Nevertheless, BBB project held an extensive study on designs with the master plan on its foundation. For instance, the design of the levees gave considerations to the land use of the southern side and its relationship with the surroundings and adopted a gradual slope landscape for the southern side, maximizing the spectacular sight of sunset into the ocean. At the same time, a creative idea to use a different structural type of levee to the north of the slope was also incorporated. The levees were equipped with functional stairs, one of which was located directly on top of the transitional line of the two different levee structures that increased the accessibility to and from the sightseeing piers and boats in **Fig 9**. The projects have since successfully been passed onto the practicing designers and construction contractors.



Fig8. Master Plan of Ayukawa hama
Left original idea, right blueprint idea

- All stakeholders [11] were involved in the undertaken consensus-building process with thoughtfulness.

Information sessions and one-on-one consultations held with the citizens on the alternative proposal yielded the result showing 45 percent of residents were willing to be relocated to the western and the remaining 55 percent were willing to be relocated to the eastern residential establishments in **Fig 8**.



Left: Original plan, Right: Alternative Proposals

5. BBB PROJECT 3: ISHINOMAKI INFO AND COMMUNITY CENTER

BBB project participated in and supervised this project from the designing of the master plan to the opening date of the facility. The Ishinomaki Community & Info

Center is a facility dedicated to publicizing the information about disaster recovery to the residents of Ishinomaki. This facility opened a few days before the day that marked the fourth year since the 2011 disaster. The mission of this project was to design the master plan as well as to reconsider the role that this facility plays.

In the master plan designing, BBB reconsidered the requirement for the facility specified by the city, which was little more than only sending information on reconstruction. In the process of the reconsideration, additional roles and values including offering “a place for exchanges among the citizens” were established because the disaster destroyed many public facilities that used to serve as the places for their activities. Furthermore, not only does this facility send out the information about the reconstruction efforts, it can also distribute the information regarding activities of government personnel, residents, and members of civil organizations involved in reconstruction efforts in some way to serve as the platform for these stakeholders.

In addition to providing the abovementioned information, the facility will also aim to contribute to the diversity of Ishinomaki. Its 2005 municipal mergers with one adjacent city and six adjacent towns expanded the city’s border to incorporate a large plain and a peninsula with ria coastline profiles, which then became affected by the disaster, leaving off with approximately 14,080 residents in the temporary housings found throughout the city as of June, 2014. In anticipation of the sharing of the information unique to the cultures of the old towns as well as of the wide distribution of information even to distant temporary housings, this type of information sharing center is planned to be established in each of the old municipalities to convey the region-specific appeals. The information posted in these facilities will also be posted in the city’s community halls and visitor centers.

These facilities will serve as the deliverer of the reconstruction information to the city’s citizens and also as their support while waiting for the constructions of other facilities.

The “main building” reached its building completion ahead of the other facilities in March, 2014, and was used for an excursion of UN WCDRR in **Fig 10**. The building has also been used by people from inside and outside of the city as well as by visitors from other parts of the country and from other parts of the world to date.



Fig10. Ishinomaki Info & Community Center

6. CONCLUSIONS

Below are the achievement in the three cases introduced in this paper:

1. Development of the towns with tsunami defense such as river and coastal levees and association of region-specific context and relationships to affected facilities with urban areas and marginal settlements within the framework of town and community building after the Great East Japan Earthquake
2. Designing of reconstruction plans achievable through coordination with institutions concerned and through consensus building with residents amid increasing number of reconstruction projects
3. Advanced level of maturation of plans gained through continuous collaborations
4. Creation of a place for information exchange as one process of recovery and the importance of information disclosure

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REFERENCES:

- [1] Ishinomaki city, “The Great East Japan Earthquake, Summary of the Damage in Ishinomaki city,” <http://www.city.ishinomaki.lg.jp/cont/10181000/8235/01.higai.pdf>, accessed August 31, 2014.’
- [2] Katsuya Hirano : Sorting out Issues Associated with Levee Development in the Tsunami Damage Sites and Their Solutions, Conference for Architecture and Infrastructure Environment, JSCE, No.9, 2013
- [3] Expert : Fumihiko Imamura (Tohoku University), Yasuaki Onoda, 2011.5.15, 2012.5.22

- [4] Chairman : Onoda Yasuaki, from 2011.6.14-2011.11. The number of meetings is eight.
- [5] Expert Member :Takayuki Kishii(Nihon University), Keiji Kitahara(Hirosaki University), Masahiro Osawa(Nihon University), Katsuya Hirano(Tohoku University)
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- [7] Chairman: Takayuki Kishi, Vice-chairman:Yasuaki Onoda, Urban WG chairman : Michio Ubaura, Peninsula WG chairman: Katsuya Hirano
- [8] The History of Ishinomaki, Publication The City of Ishinomaki
- [9] Yokohama Graduate School of Architecture
- [10] Model Made:Y-GSA KOJIMA KAZUHIRO Studio
- [11] The City of Ishinomaki officer and Miyagi Prefecture officer who are section of Embankment, Coastal levee, Road, Rehabilitation.



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