

For functional improvement of school facilities for disaster prevention

～Investigative research report on disaster prevention capability at school facilities when utilized as an emergency evacuation site～



August 2007

(Partial addition made in July 2008)

National Institute for Educational Policy Research - Japan  
Educational Facilities Research Center

“Investigative research on disaster prevention capability at school facilities when utilized as emergency evacuation site” Workshop



## Preface

The role that school facilities should play in case of disasters such as large-scale earthquakes is to first and foremost ensure the security of the students and teaching staff during the disaster. Because school facilities are required to be utilized as emergency evacuation sites for the community residents, these facilities must be built to be quakeproof and be equipped to allow displaced people to live temporarily.

It is widely known that school facilities have been utilized by a number of evacuated local residents when large-scale earthquake occurred such as the Hanshin-Awaji Great Earthquake and Med-Niigata Prefecture Earthquake. On the other hand, many evacuated people felt inconvenient and uncomfortable while living in the school facilities just because of the fact that school facilities were originally designed to be used as educational facilities and not as evacuation facilities. Therefore, it is important for all local disaster prevention personnel and school designers to learn from the past and use these lessons in future planning.

With these perspectives the National Institute of Educational Policy/Center of Research for Educational Facilities has established a workshop named “Investigative research of disaster prevention capability at school facilities when used as emergency evacuation sites” in April 2006. This workshop focuses on measures to improve the functionality of school facilities used as evacuation sites after a large-scale earthquake. The workshop members are organized by observers from the Cabinet Office, Ministry of Internal Affairs and Communications, Ministry of Education, Culture, Sports Science and Technology, Ministry of Health, Labor, and Welfare, and Ministry of Land, Infrastructure, Transportation and Tourism. Experts in the areas of architecture, disaster prevention, and a supervisor from local public authorities also participated in the workshop. During a year long process, we have verified the lessons learned from the previous large-scale earthquakes, identified current disaster prevention capability at school facilities, and considered concepts and measures to improve school facilities’ disaster prevention functions. We are now presenting this report as the final product of our workshop.

In Chapter 1, the report talks about the necessity of functional improvement for disaster prevention at school facilities and also the shape of evacuation area by decree.

In the chapter 2, the report talks about conditions that have actually been experienced by evacuees at school facilities when used as a shelter. It also references a result from an investigation about disaster prevention capability at school facilities that are designated for sites.

In the chapter 3, it shows basic ideas on how to improve disaster prevention capability at school facilities and measures to respond the issues that are mentioned in the chapter 2. It reports to promote measures to improve disaster prevention capability. In the chapter 4, the report sites detailed case examples on measures that have already been implemented to improve disaster prevention by local public authorities based on the information obtained from the site survey and inquiry survey.

In addition, surveillance results are compiled in this report in regard to process to establish the emergency evacuation site at school facilities in the aftermath of the Noto Peninsula Earthquake that occurred on 25 March 2007. We conducted an inquiry survey to Wajima municipal office staff, school staff, and representatives of evacuees from the disaster area to research on how the support operations were practically facilitated.

Although we published the report for the purpose to promote improvement of disaster prevention capability focusing on public elementary and lower secondary schools when utilized as emergency evacuation site at a time of disaster, we assume that it is also useful to refer for consideration of ways to obtain necessary functions to support at occurrence of disaster when national universities and private schools are required to be utilized as emergency evacuation sites.



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## Chapter 1 Condition of school facilities designated as emergency evacuation site

### 1. Necessity to enhance the disaster prevention capability of school facilities

“Securing the safety and comfort” of people’s everyday lives is fundamental and it is also a major challenge for the central government. In accordance with the Basic Law of Anti-Disaster Measures, various response plans for a large-scale earthquake are being prepared such as The Large Scale Earthquake Countermeasures Act (\*1) and countermeasures against earthquake disaster (\*2). Evacuation plans (\*3) for occurrence of vertical earthquake in metropolitan area were considered at the special panel of Central Disaster Prevention Council. Evacuation plans (\*4) for local residents who need special care were considered at the Cabinet Office. According to the research (\*5) of The Fire Defense Agency in The Ministry of Public Management, Home Affairs, Posts and Telecommunications (hereinafter called “Fire Defense Agency”), at the end of the fiscal year of 2006, 60% of public facilities designated as disaster prevention sites are school facilities. School facilities are required to be utilized as evacuation sites, therefore school facilities must play a critical role as evacuation facilities during a disaster.

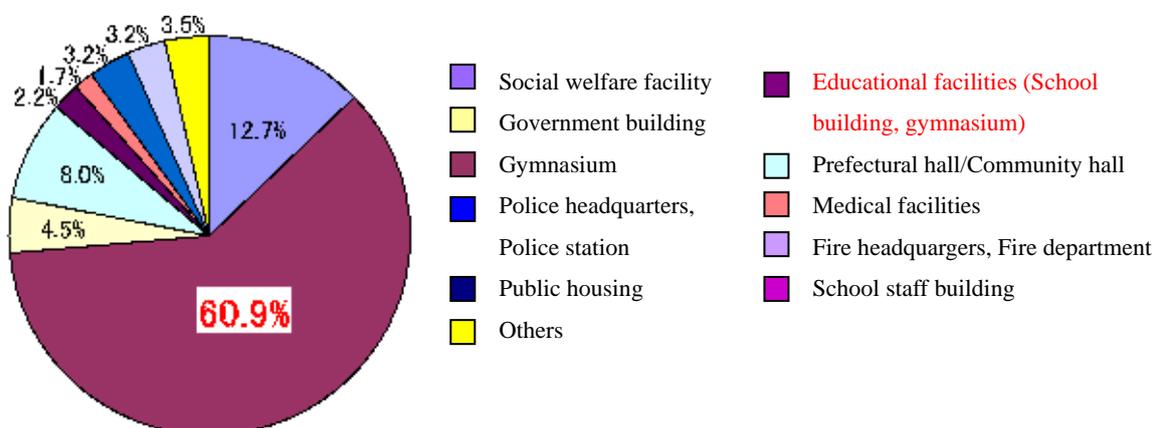


Figure 1-1 Ratio of public facilities designated as disaster evacuation site (as of end of FY 2006)

Fire Defense Agency, Protection of lives and assets, Disaster Prevention Department, Disaster Prevention Section “Report on promoting earthquake-resistance reinforcement of public facilities to become disaster prevention facilities” (March 2007)

In fact, many school facilities have played important roles as evacuation facilities for the local population after previous large-scale earthquakes.

\*1 The Large Scale Earthquake Countermeasures Act (Law No. 73 of 15 June 1978), Emergency improvement measures for earthquake in area under intensified measures against earthquake disaster

Act on Special Measures concerning National Fiscal Support on Improvement Project. (Law No. 63 of 28 May 1980), The Earthquake Countermeasures Act (Law No. 101 of 16 June 1995), Act on Special Measures for promoting earthquake resistance concerning East-Nankai and Nankai Earthquake (Law No. 92 of 26 July 2002), Act on Special Measures for promoting earthquake resistance concerning oceanic trench earthquake surrounding Japan Trench and Chishima Trench (Law No. 92 of 26 July 2002)

\*2 Countermeasures against earthquake disaster (March 2005), Countermeasures against metropolitan vertical earthquake (April 2006), General principals of countermeasures against Kokai earthquake (May 2003), General principals of countermeasures against East-Nankai and Nankai Earthquake (December 2003), General principals of countermeasures against metropolitan vertical earthquake (September 2005), General principals of countermeasures against oceanic trench earthquake surrounding Japan Trench and Chishima Trench (February 2003) and etc.

\*3 Expert panel on evacuation measures at occurrence of metropolitan vertical earthquake (Established by Central Disaster Prevention Council on 21 April 2006)

\*4 As for evacuation measures for people who need support at disaster, the Cabinet Office has been conducting “Investigative commission on measures of information transmission and evacuation support for the elderly during concentrated downpour” since October 2004, “Investigative commission on evacuation measures for people who need support at disaster” since September 2005, “Investigative commission on cooperation between welfare and disaster prevention concerning evacuation of people who need support at disaster” since July 2006, and “Council on evacuation plan for people who need support and information transmission plan at disaster” since June 2006.

\*5 Report on conditions of earthquake resistance reinforcement at public facilities as disaster prevention center  
[http://www.fdma.go.jp/html/new/191115\\_houkoku/191115\\_bk00.pdf](http://www.fdma.go.jp/html/new/191115_houkoku/191115_bk00.pdf)

After The Mid Niigata Prefecture Earthquake in 2004, 600 public facilities were utilized by over 100,000 evacuees. Of this, 118 schools were utilized by 40,000 evacuees.

These school facilities functioned as emergency evacuation sites and played various roles as main support bases to collect and disseminate information as well as distribute food and life support supplies. However, these facilities weren't equipped with adequate disaster prevention functions required for evacuation facilities such as seismic resistance capability, a satisfying number of toilets, sufficient water and electricity, and also appropriate condition for people's temporary living spaces. Therefore it was insufficient to house the evacuees comfortably. These conditions were criticized by different groups of people in the aftermath of earthquake which lead to the existing disaster prevention capability of school facilities designated as evacuation facilities to be discussed by the Diet.

In a response to these social requirements, the areas that have been struck or are likely to be struck by a large-scale earthquake are being proactive in improving emergency disaster prevention capability at school facilities and writing a manual for the operation of evacuation facilities. However, those areas that have never been struck by a large-scale earthquake are still taking it slow.

Our country is prone to earthquakes. Considering that a large-scale earthquake could happen at anytime and anywhere the enhancement of the disaster prevention capability of school facilities utilized as evacuation sites is an important issue for our country hereafter.

## 2. Evacuation site from a legal standpoint

There are two major acts regarding evacuation facilities. The first act is The Basic Law on Natural Disaster that provides the basics for disaster prevention measures. The other act is The Disaster Relief Act that describes emergency relief activities for a large-scale earthquake.. The Basic Law on Natural Disaster (\*6) provides that the national government shall formulate basic disaster prevention plan (\*7) and describes the basic measures for disaster prevention, disaster emergency relief activities, and disaster recovery efforts. Based on the basic disaster prevention project, local public authorities formulate and execute a specific disaster prevention plan (\*8) for the local community. Local public authorities are required to follow concerning establishment of the evacuation facility listed in The National Basic Measures for Disaster Preventions. (\*9)

- Local public authorities shall designate evacuation sites beforehand and disseminate these locations upon obtaining the agreement of the manager of a public facility such as a public park, community center, or school.
- Designated locations shall maintain adequate ventilation, lighting and others for the operation of an evacuation facility.
- Facility improvements for a water storage tank, water well, portable toilets, sleeping mats and communication devices are necessary. The capability to accept physically challenged people (\*10) shall be addressed. Communication devices such as a television and radio will be provided so that evacuees can obtain necessary information.
- Pre-positioned stocks such as food, water, an emergency generator, medicine, kitchen equipment, and blankets that are required for evacuees temporary life in shelter shall be located at a designated site or near-by location,.
- Local public authorities shall disseminate any necessary knowledge regarding the operation and management of evacuation facilities to local residents.

Local public authorities are required to provide a shelter facility (\*12) by The Disaster Relief Act. (\*11) Public notice of The Ministry of Health, Labor and Welfare as relating law states that an evacuation facility is “shelter for people who are victims or potential victims of a disaster” and “In principle, existing buildings such as schools and community centers are utilized”. (\*13) Furthermore, buildings designated for use as a shelter will be anti-seismic and fire resistant. These buildings will also barrier-free (\*14) if at all possible.

As stated here, basic requirements for evacuation facilities are outlined in the Act. Local public authorities formed respective provision stating the definition and layout of evacuation facilities that were determined depending on the differences of the regional conditions. (Reference material 1)

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\*6 The Basic Law on Natural Disaster (Act No. 223 of 15 November 1961)

\*7 The Basic Law on Natural Disaster Section 34

\*8 The Basic Law on Natural Disaster Section 40(1), Section 42(1)

\*9 Basic disaster prevention plan (Central Disaster Prevention Council settlement on July 2005) Part 2 Countermeasure against disaster, Chapter 1 Prevention of disaster, Section 2 Preparation for prompt and smooth disaster relief plan, recovery and reconstruction from disaster 5 Evacuation and shelter activities (2) Evacuation site

\*10 Any person who requires comprehensive support at disaster including obtaining necessary information for a prompt and accurate evacuation and evacuate to a safe area to protect from disaster. In general, it indicates elderly, disabled, foreigner, infant, and pregnant woman.

\*11 Disaster Relief Act (Act No. 118 of 18 October 1947)

\*12 Disaster Relief Act Art. 23, Para. 1, Item 1

\*13 Ministry of Health, Labor and Welfare notification (Notification No. 144 of 31 March 2000) “Standard of rescue level, method, length of time, and reimbursement of actual expense according to the Disaster Relief Act” Art. 2, Para. 1, Item 1

\*14 Guidelines of emergency rescue activity at a large-scale disaster Announcement of Ministry of Health, Labor, and Welfare, Social welfare agency, chief of protection section No. 122 of 30 June 1997 (Revision of 20 March 2002, No. 0320001) (Reference Material 2)

## Chapter 2 Current disaster prevention capabilities and conditions of the school facilities designated as evacuation facility

### 1. Past issues regarding disaster prevention capabilities at school facilities during major disasters

Various issues have occurred at school facilities that were utilized as evacuation facilities during the aftermath of large-scale earthquakes such as the Great Hanshin-Awaji Earthquake and The Mid Niigata Prefecture Earthquake. In this chapter we will look at four of these issues based on data obtained from previous large-scale earthquakes. The four subjects are (1) safety of the facilities, (2) Required capabilities for evacuees' life in shelter (3) Methods of evacuation facility operation, and (4) Prompt restart of school educational activities.

#### (1) Issues concerning safety of the facilities

##### 1) Damage of the building itself

There were school buildings that could not be used as an emergency evacuation facility because of the collapse of building itself caused by a lack of seismic resistance in the construction. There were reports of a large number of cracks in posts and beams, exposed rebar, slanted building by land sinkage.

#### Actual examples observed in the past earthquakes

- Damaged school was utilized for evacuation site without assuring its' safety capability.
- A school building that had already been utilized failed the expert's emergency safety check (\*15). Local residents who evacuated to the facility had to move to another evacuation facility

##### 2) Damage to the inside of the building, equipped devices, and furniture

Although the building itself wasn't damaged, utilization as evacuation facility was still disrupted because pieces of the ceiling fell or sank from classrooms and gymnasium (\*16), hallway floors sank or warped, broken windows and furniture either broke or fell apart. (Chart 2-1, 2-2)

#### Actual examples observed in the past earthquakes

- Gymnasium didn't qualify as an evacuation facility because the ceiling and lights either sank or pieces fell in.
- The escape routes were blocked because the building's entrance doors and connecting corridor where the students used daily were broken and also the automatic rolling fire doors shut down.
- Hazardous chemicals were scattered and could have started a fire.
- Heavy objects such as a safe, television, and piano fell or dropped. The site was very dangerous.
- The special classroom with a heating system couldn't be used because devices and furnishings were scattered on the floor.

\*15 Emergency safety check. To prevent from the secondary damages immediate after a large-scale earthquake, it is an evaluation for the risk of falling and breaking and judge the acceptability of affected building, the compound, and surrounding buildings

\*16 Indoor facility to do physical activities and usually indicates gymnasium, martial arts room and etc.

Chart 2-1 Damage condition of classroom and other areas  
(Kobe city)

	No. of school	No. of place
Fell ceiling sunk floor of classroom	51	306 (No. of classroom)
Fell ceiling and sunk floor of special classroom	68	201 (No. of classroom)
Fell ceiling of auditorium/gymnasium	143	1,001
Broken window glass	205	About 4,400 pieces
Closure of fire door	115	745
Unavailable connecting corridor	30	62
Unavailable entrance doors	31	85
Unavailable emergency staircase	9	14

Chart 2-2 Fell or dropped equipment and furnishing  
(Top 10 items) (Kobe city)

Equipment/Furnishing	Affected ratio (%)	No. of affected furnishing	No. of total furnishing
1. Fell bookcase in library	25.4	818	3,221
2. Fell bookcase	23.7	1,264	5,335
3. Dropped computer	19.9	597	3,007
4. Fell vault of important document	19.2	129	673
5. Fell locker of cleaning tool	18.7	1,287	6,865
6. Fell television	18.0	1,020	5,656
7. Fell pharmaceutical closet	15.4	117	762
8. Fell computer	12.0	361	3,007
9. Fell refrigerator	8.5	86	1,012
10. Fell OHP	7.6	219	2,892

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"Step to educational reconstruction and creation of Kobe after the Great Hanshin-Awaji Earthquake"

## (2) Concerns about necessary capabilities for evacuation facilities

### 1) Toilet and shower

Toilets which are an indispensable while living in a evacuation facility were unusable for a long period of time because of insufficient amounts of water and contamination. That imposed a heavy mental and physical burden on evacuated local residents. Unusable showers and bathing room also caused sanitation problems.

#### Actual examples observed in the past earthquakes

- Toilets were unusable because of a water shortage
- The backup water supply for the toilet system located in a rooftop swimming pool was gone because the earthquake caused a crack in the plumbing. Because evacuated residents were unable to use toilets, they had to use either an open sewage hatch or a large garbage bag as a toilet
- Toilets became unusable because how it got dirty too quickly to clean.
- Evacuated local residents had to dig a hole in the ground to use as toilet because there were not enough portable toilets
- Some evacuees tried not to eat or drink and got sick because they were afraid that they would not be able to use the bathroom.
- Since there was no electricity in the aftermath of earthquake, evacuees had to use the portable toilets outside in complete darkness. Some people were too scared to use it or had to use it with the door open
- Some children suffered from eczema because they were unable to take a shower or bath for three consecutive days.

## 2) Electricity, Water, and Gas

Considerable damage to the infrastructure of the facility such as electricity, water, and gas interfered with the daily lives of local residents and the operation of the evacuation facility caused various problems.

(Figure 2-1)

Kobe Board of Education  
 “Step to educational reconstruction and creation of Kobe after the Great Hanshin-Awaji Earthquake”

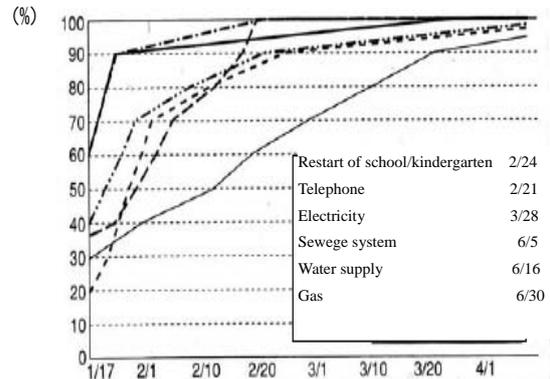


Figure 2-1 Recovery of infrastructure at school/kindergarten (Full recovery) (Kobe city)

## Actual examples observed in the past earthquakes

- Various support activities including medical treatment to the casualties were limited because of not having lights.
- Although a generator was provided 3 days after the earthquake, the circuit breaker was often tripped causing an electricity outage. This was a result of too many electric devices being used which caused the generator to overload.
- Because recovery of water supply system was delayed, drinking water support and water for toilet flush were insufficient. Restart of school educational activities was delayed because the recovery of water supply was delayed as well.
- Even after the water supply system near the school was repaired no water was offered to evacuees at school facilities due to the damage to the water tank on the schools rooftop.
- The sewage pipes in the school facilities were either too narrow or bent and often got clogged because many evacuees used the toilets at the same time.
- Dirt got into the cracks in the sewage pipes causing sewage water to back flush which caused further damage to the pipes and toilets to break.
- Broken gas pipes took the longest time among infrastructure to repair. Showers and baths were unavailable during this time.
- All the water, sewage, and gas pipes in school building and on school property were damaged by the earthquake because they were not seismic-proof. Even after the entire infrastructure in the surrounding community recovered, water and gas were still not available at the school.

## 3) Means of conveying information

There were communication problems between the school and members of the education board because of delays in restoring telephone lines or establishing temporary telephones. This also affected local residents within the evacuation facilities. Some schools did not have an adequate wiring for televisions even though this is one of the main sources of information for evacuees (Figure 2-2).

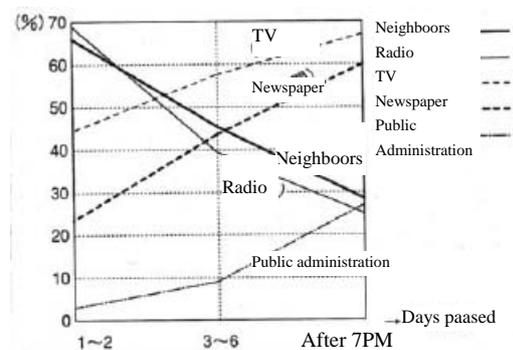


Figure 2-2 Means of obtaining information by residents (Kobe city)

Kobe Board of Education  
 “Step to educational reconstruction and creation of Kobe after the Great Hanshin-Awaji Earthquake”

### Actual examples observed in the past earthquakes

- The installment of temporary telephone lines in the evacuation facility was delayed and there were not enough existing telephone lines. This caused the lines got flooded and unavailable for use.
- Rooms provided for living space were not equipped with telephone lines or radios therefore evacuated residents had difficulty obtaining necessary information.
- Gymnasium did not have telephones and was located away from the school building that did have telephones. Telephone cables for extending lines from the school to the gymnasium were not available.
- In the aftermath of earthquake, portable handy microphone was used for emergency announcements due to electricity outage. However, the microphones could not contain enough power in the battery so the announcements were not heard by everybody.

In the aftermath of earthquake, it was difficult to communicate through cell phones as well as regular telephones but cell phone emails were connected without a problem.

#### 4) Indoor environment

Inadequate lighting, temperature control, and privacy in the rooms of the facility had a poor influence on evacuees both mentally and physically.

### Actual examples observed in the past earthquakes

- When the evacuation facility first opened many people were able to sleep in spite of the lighting in gymnasium. However, after numerous days passed the lighting became stressful and caused people to not be able to sleep. Having a blanket on the cold floor of the gymnasium wasn't enough to keep evacuees warm. .
- Many people came down with pneumonia because there was no heating system in the evacuation facility.
- The lack of privacy at gymnasium caused some people to get sick after a long period of time.

Chart 2-3 Comparison of the number of patients seen by a doctor when they did not have a heater versus when they did have a heater. (At The Great Hanshin-Awaji Earthquake)

(Consultation rate (%)=No. of the consulted/No. evacuee)

	Heater	1/24	1/25	1/26	1/27	1/28	1/30	1/31	2/1	2/3	2/4	2/5	2/6	2/7	2/8	2/9	2/10	2/11	2/12	2/13	(Date)
W Elementary school	No	9.2	7.7		7.2	7.4	11.0	10.8	11.7	10.0	11.1	10.2	10.7	12.3	15.0	10.2	9.2	11.6	10.8		(%)
X Lower secondary school	Yes	3.5	6.1		2.1	2.6	5.2	2.1				1.6	4.8	1.6	2.4	2.4	4.0	0.0	2.4	1.8	(%)
Y Kindergarten	Yes		10.4	12.6		9.8		5.8				3.9	3.3	1.7	2.5	2.5	6.8	0.0	1.7	1.7	(%)

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#### 5) Response to physical challenged people

Various issues occurred when evacuation facilities were not equipped with barrier-free facilities.

### **Actual examples observed in the past earthquakes**

- Some disabled victims did not evacuate because of the difficulties of living with many other people without having barrier free facilities.
- The second floor of school facilities was designated as evacuation facility but there was no ramp for disabled people to go up to the second floor and no multifunctional toilet on the second floor.
- It was difficult for the disabled and the elderly who have less physical strength in the legs and back to have a western style toilet.
- Elderly and disabled people needed assistance to use the toilet because there was no handrail in the bathroom.

### **(3) Concerns about how to operate the evacuation site**

#### **1) School facilities utilization project**

In the aftermath of the earthquake, school facilities were used as temporary evacuation facility for evacuees, the storage and distribution of supplies, the collection and transmission of information, rescue activities and other activities. However, issues about how to operate the evacuation facilities were discovered because the specific plans for how to use the facilities as an evacuation facility had never been discussed prior to the actual occurrence of the disaster.

### **Actual examples observed in the past earthquakes**

- Evacuated residents were confused by the fact that there was no designated area in school for them to go. The confusion made it impossible to operate the facility because evacuated residents were using the principal's office and teaching staff office where the facility was supposed to be operated from.
- The school staff was not notified beforehand of the location of the support supplies so it took longer to set up the evacuation facility.
- Emergency and supply vehicles could not even come close to the school because many evacuees arrived in their own vehicles.
- In the aftermath of earthquake, the gymnasium and classrooms were full of evacuated residents. Each person had a space as big as one blanket.
- Evacuees chose their own space as they arrived. The most comfortable places were taken first. People who needed special care arrived later and they had to take uncomfortable and inconvenient places such as upstairs or a staircase landing.
- Large amount of supplies arrived all at once making it difficult to find storage space.
- There was no space to separate supplies before distribution making it difficult to separate packages that were sent to individuals.

## 2) Structure of evacuation facility operation

Various issues were observed with operating an evacuation facility from the immediate aftermath of an earthquake as well as a prolonged operation. There was a confusion resulting from the fact that some affected residents had arrived at the school to evacuate themselves before the schools staffs had a chance to arrive. In Kobe, 90% of some school's staff arrived at the facility within 2 hours after the occurrence of the Great Hanshin-Awaji Earthquake. At that point, the evacuated residents had already settled in different areas of the school facilities. (Figure 2-3, 2-4)

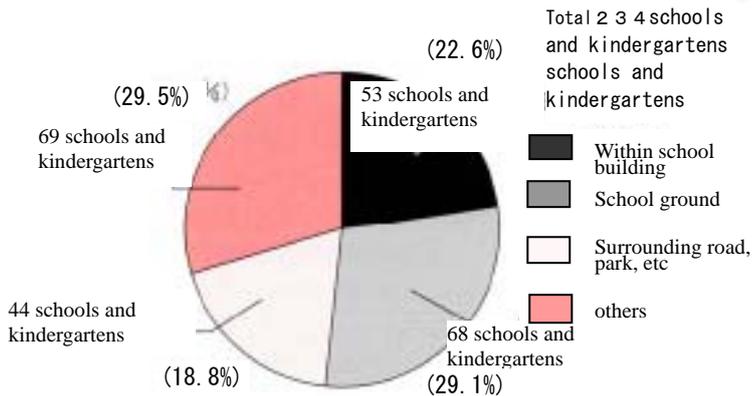


Figure 2-3 Residents had already arrived at schools and kindergartens when school staff arrived (Kobe city)

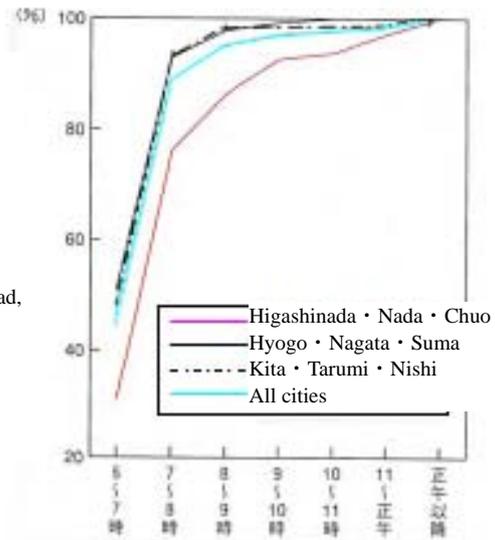


Figure 2-4, Time of the first school staff arrived at school (Kobe city)

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Within a week of establishing the evacuation facilities, some evacuees had organized self-governing systems at some of the evacuation facilities. They made rules to follow. On the other hand at the evacuation facilities where the school operation didn't work out, the evacuees' fatigue and frustration caused problems to occur.

### Actual examples observed in the past earthquakes

#### Initial period (The first several days after the earthquake)

- In some rare cases, a local resident who lived close to the school had been given the keys to the school to use in case of an emergency. The resident opened the doors of the school, so evacuation operation was started promptly. However, in most cases the affected residents evacuated to the school facilities before the school staff had arrived. At some schools local residents broke down doors and windows to get inside to evacuate themselves.
- The process to get permission to use school facilities as an evacuation site was vague therefore the establishment of evacuation facilities was delayed.
- It was difficult for evacuees to distinguish between the staff and the evacuees. The evacuation facility staff (local government office staff and school staff) didn't have any way to identify themselves by a name tag and the people did not know the staff before the disaster.

Intermediate and later periods (one week after the earthquake)

- One week after the earthquake, some evacuees wanted to be self-sustaining and organized their own governing systems at some of the evacuation facilities. On the contrary at some places evacuees totally relied on the evacuation facility operations and didn't try to help themselves.
- The supplies that evacuated residents needed kept changing as time went by. This caused new and different types of supplies to get requested so they were not always on hand when they were needed.
- Insufficient medical and mental care caused evacuees to experience symptoms such as colds, difficulty sleeping, and the deterioration of their own chronic diseases. Worries about the uncertain future and fatigue from a prolonged time in a shelter weighed heavily on their minds.
- Argument between evacuees and lost or stolen property were common.
- Crime prevention issues with outsiders, suspicious individuals' roaming, and religious solicitation were raised.

**(4) Concerns about the prompt restart of educational activities in the schools**

**Chart 2-4 Situation at school restart (Kobe city)**

( ) Accumulated total number

School facilities are primary places for education and therefore it is necessary to consider the prompt restart of educational activities even after establishment of an evacuation facility in a school. However, there were considerable difficulties with this process while evacuation operations got prolonged and there were many evacuated residents living in the school facilities. (Chart 2-4)

	Rate of restart	Kindergarten	Elementary school	Lower secondary school	High school/Higher professional school	Schools for blind and disabled children	Total
No. of school that was restarted 6 days after earthquake	39%	18 (18)	74 (74)	41 (41)	2 (2)	0 (0)	135 (135)
No. of school that was restarted 20 days after earthquake	71%	35 (53)	39 (113)	27 (68)	6 (8)	3 (3)	110 (245)
No. of school that was restarted 27 days after earthquake	87%	6 (59)	34 (147)	14 (82)	1 (9)	0 (3)	55 (300)
No. of school that was restarted 34 days after earthquake	98%	11 (70)	22 (169)	0 (82)	4 (13)	0 (3)	37 (337)
No. of school that was restarted 41 days after earthquake	100%	1 (71)	4 (173)	2 (84)	0 (13)	3 (6)	10 (347)

Kobe Board of Education "The Great Hanshin-Awaji Earthquake and School Education"

**Actual examples observed in the past earthquakes**

- As the evacuation facility operation got prolonged, more school children's parents requested for school restart.
- When the number of evacuated residents decreased in the school facilities, the people remaining tried to use more space in different areas. It was difficult to find enough space for classes to restart.
- School staff gave children the opportunity to communicate with the evacuated residents in the school facilities after educational activities had restarted.

There was a time when the evacuated residents and the school staff cooperated to secure enough space for school children to have a graduation ceremony.

## **2. Understanding the current condition of disaster prevention capability of school facilities and equipment**

### **(1) Summary of inquiry survey**

#### **1) How the survey was conducted**

The research was conducted with the cooperation of prefectural and municipal governments as well as the education committee. A nationwide survey was conducted about the planning and designing of school facilities to be used for community disaster prevention.

The survey was initiated on 1 May 2006 by sending questionnaires to The National Institute for Educational Policy Research, the disaster prevention departments of all prefectural and municipal government offices, and The Board of Education. Questionnaires asked about the disaster prevention capabilities at school facilities and what community disaster prevention support was considered in the school planning and designing of schools. Replies from all the prefectural and municipal government offices were sent back by end of June 2006. Research targets were public elementary, lower secondary, high schools, secondary education schools, and schools for special needs education. The questionnaires were summarized by prefecture, city, or town.

There was no precedent for survey on disaster prevention capabilities at school facilities. It was the first time to investigate the existing condition of disaster prevention by schools and consideration for community disaster relief support in the planning and designing of schools.

#### **2) Summary of the results from the survey on disaster prevention capability at school facility**

- The number of public school that is designated as evacuation sites is 33,670 that represent 89% of total number of public schools. The ratio by school type is 9.4% of municipal schools, 63% of prefectural high schools, and 23% of prefectural schools for special needs education.
- The current maintenance conditions at schools designated as an evacuation site do not meet the minimum for disaster prevention capability. . The summary shows more than half of schools are maintain toilets at gymnasium but only 27% of schools are equipped with emergency pre-positioned storage, 27% of schools are equipped with and maintain a water purifier, and 14% of schools are equipped with an in-house generator.
- 70% of prefectural governments and 59% of municipal governments have disaster response manuals for school facilities. One third of those schools' manuals address evacuation facility capability concerns.
- 53% of prefectural and 78% of municipal governments had rules for evacuation site operation already formulated and local government staffs are to play the role of the main operational staff.
- 17% of prefectural and 28% of municipal governments took all matters concerning use as evacuation site into the planning and designing of school facilities.
- Available financial support systems for school facility improvement to respond to disasters are offered by The Fire and Disaster Management Agency as well as other organizations including The Cabinet Office, The Ministry of Agriculture, Forestry and Fisheries of Japan, The Ministry of Economy, Trade and Industry, and The Ministry of Land, Infrastructure, Transport and Tourism. This is in addition to the school facility improvement support system offered by The Ministry of Education, Culture, Sports, Science and Technology. These support systems have been utilized but not frequently..
- This research summarized the existing disaster prevention capabilities at school facilities designated as evacuation sites nationwide for the first time. The summary also revealed that the designated schools are not sufficiently equipped with disaster prevention functions to serve as emergency evacuation sites.
- Future investigation is needed to gather more specific details to fully understand the actual conditions. The summary also needs to be analyzed to find out exactly what areas need to be improved to enhance the schools' disaster prevention capability. Regional differences should also be further considered.

**(2) Result of the survey on disaster prevention capability at school facilities**

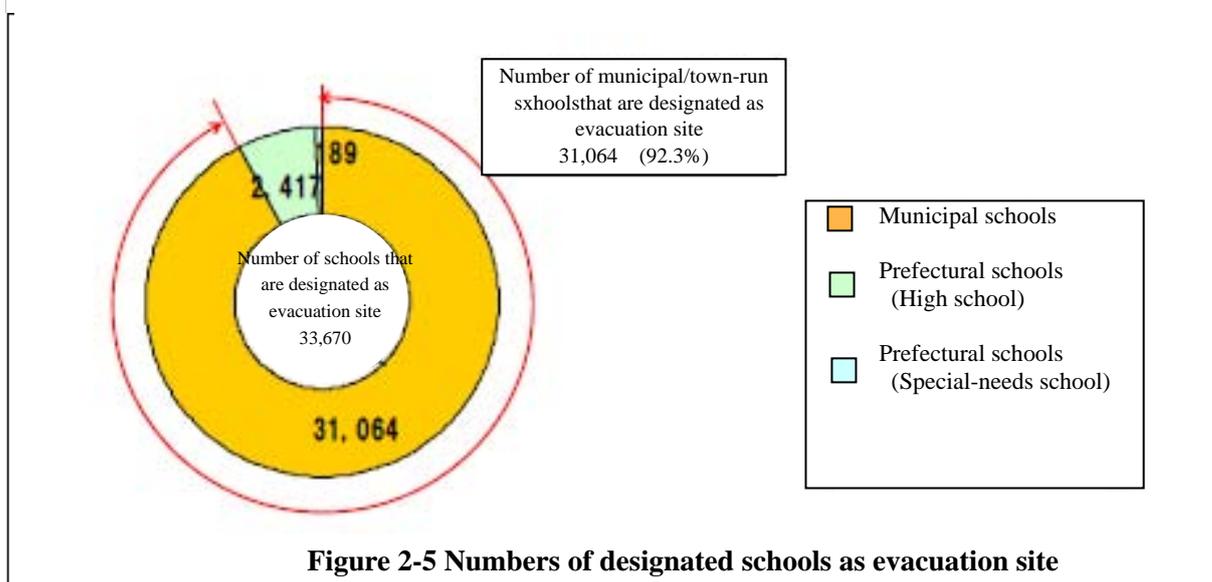
**1) Number of schools designated as emergency evacuation sites**

There are 33,670 public schools throughout the country that are designated as emergency evacuation site representing 89% of total public schools. 92% of the designated schools (31,064 schools) are municipal schools. **(Chart 2-5, Figure 2-5)**

By comparison, 94% of municipal schools are designated as evacuation sites, 63% of prefectural high schools and 23% of schools for special needs education are designated as evacuation sites. There are fewer prefectural schools designated as evacuation sites because of different terrain conditions and different concept for evacuation site by region.

**Chart 2-5 Numbers of designated schools as evacuation site**

Classification		Total number of schools	Number of schools designated as evacuation facility	Rate(%)
Municipal, town-run school		33,131	31,064	93.8
Prefectural schools	High school	3,843	2,417	62.9
	Special-needs school	821	189	23.0
Total		37,795	33,670	89.1



## 2) Current conditions of disaster prevention functions and equipment at school facilities designated as evacuation sites

Here are 5 basic capabilities in question that must be improved at school facilities designated as evacuation sites.

- Are there toilet facilities in the gymnasium that are to be mainly used for the evacuation area?
- Are toilet facilities accessible directly from outside?
- Is disaster prevention equipment and pre-positioned supply storage set up either within the school building or on the property?
- Are there water securing facilities? (water purification device on swimming pool, water storage tank, well water and etc )
- Is there an in-house generator in case of an electricity outage?

The survey found that half of the designated schools have toilet facilities in the gymnasium and toilets accessible from the outside. However only 27% of designated schools have storage space for disaster prevention equipment and pre-positioned supplies, 27% have a water purification device on swimming pools and a water storage tank, and 14% are equipped with an in-house generator. The survey concluded that the designated schools do not necessarily have all of capabilities required for an evacuation site. **(Chart 2-6)**

**Chart 2-6 Current conditions of disaster prevention functions and equipment at school facilities designated as evacuation sites**

Item	Municipal school			Prefectural school						Total		
	No. of school designated as evacuation facility	No. of school that own the facility	Rate(%)	High School			School for special needs			No. of school designated as evacuation facility	No. of school that own the facility	Rate(%)
				No. of school designated as evacuation facility	No. of school that own the facility	Rate(%)	No. of school designated as evacuation facility	No. of school that own the facility	Rate(%)			
Toilet at gymnasium	31,064	23,813	76.7	2,417	1,480	61.2	189	113	59.8	33,670	25,406	75.5
Outside toilet	31,064	18,510	59.6	2,417	1,730	71.6	189	96	50.8	33,670	20,336	60.4
Disaster prevention storage/Pre-positioned storage	31,064	8,633	27.8	2,417	443	18.3	189	49	25.9	33,670	9,125	27.1
Water storage tank, Water purifier	31,064	8,377	27.0	2,417	647	26.8	189	63	33.3	33,670	9,087	27.0
Self-power generator	31,064	4,092	13.2	2,417	404	16.7	189	119	63.0	33,670	4,615	13.7

Western style toilets for physically challenged people are in 32% of school gymnasiums and 20% of schools have the toilets accessible in outside areas. **(Chart 2-7)**

**Chart 2-7 Ratio of western style toilet in the gymnasium and outside**

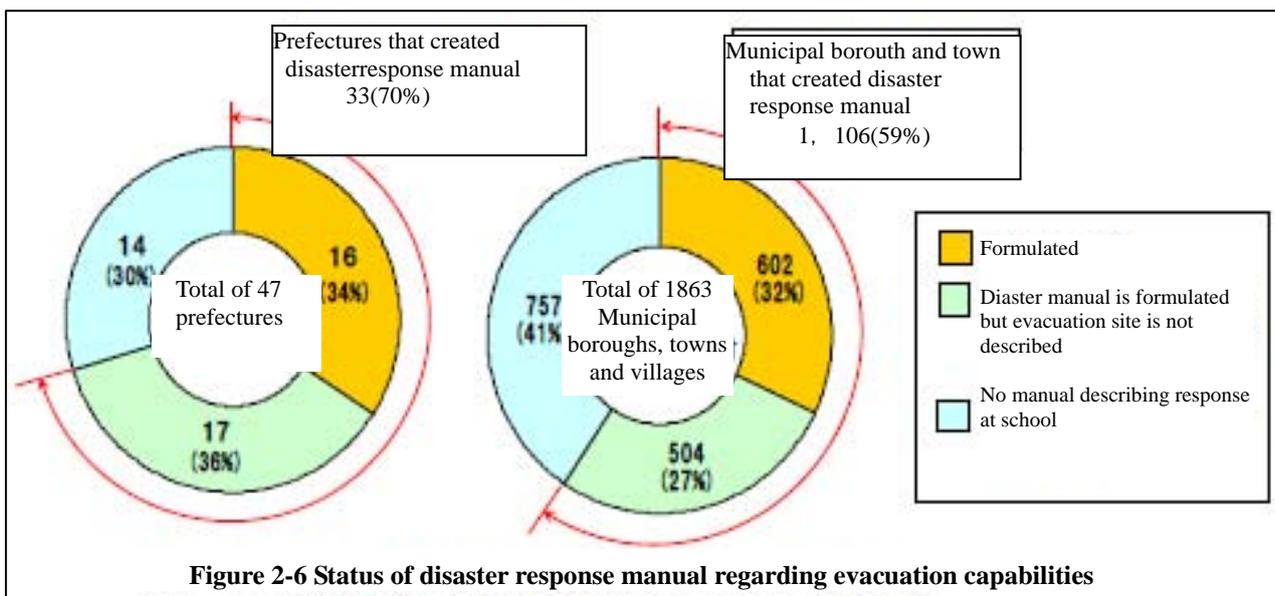
Item	Municipal school			Prefectural school						Total		
	No. of school that have toilet	No. of school that have western style toilet	rate(%)	High School			School for special needs			No. of school that have toilet	No. of school that have western style toilet	rate(%)
				No. of school that have toilet	No. of school that have western style toilet	rate(%)	No. of school that have toilet	No. of school that have western style toilet	rate(%)			
Toilet at gymnasium	23,813	7,250	30.4	1,480	696	47.0	113	92	81.4	25,406	8,038	31.6
Outside toilet	18,510	3,490	18.9	1,730	441	25.5	96	56	58.3	20,336	3,987	19.6

**(3) Result of the survey on projecting and designing school facilities to support the community by serving as evacuation sites**

Local governments were questioned about formulation of school disaster response manual and the plans and designs of school facilities concerning disaster prevention capability prior to the construction

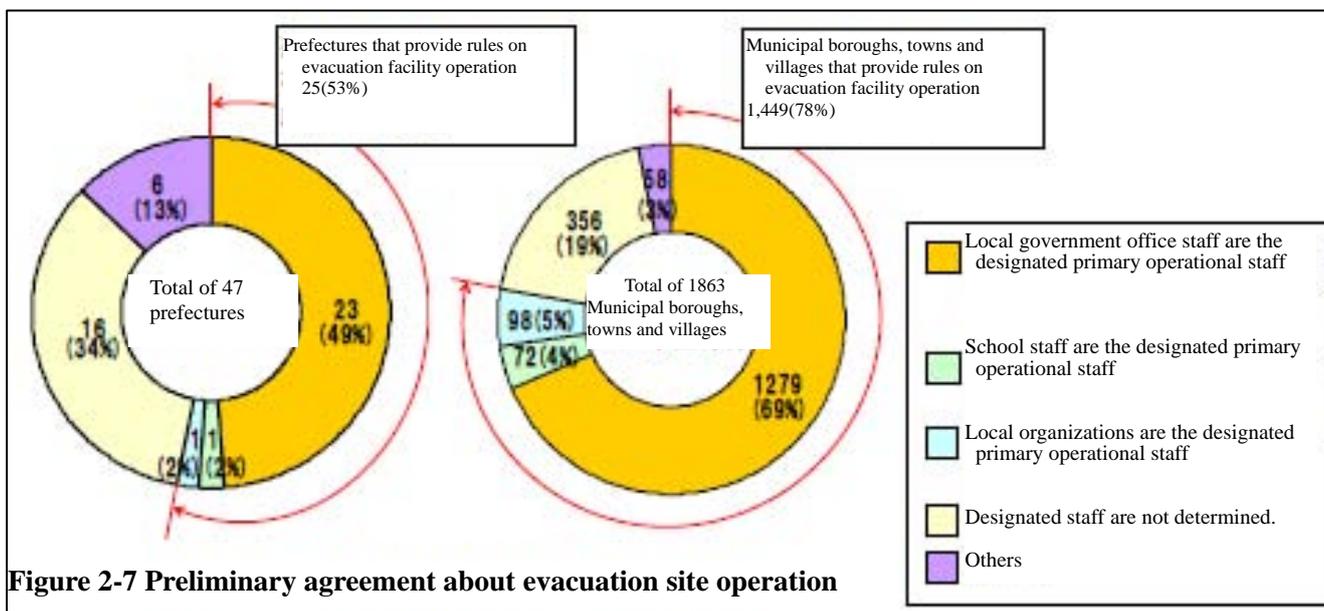
**1) Status of disaster response manual regarding evacuation capabilities**

70% of prefectural governments and 59% of municipal governments have disaster response manuals. Half of both governments' manuals were formulated containing necessary functions for evacuation site and that is 1/3 of the total number of regional governments. **(Figure 2-6)**



**2) Preliminary agreement about evacuation site operations**

Preliminary agreements on the primary operation of evacuation sites are completed at 53% of prefectural governments and 78% of municipal governments. In 49% of prefectural governments and 69% of municipal governments have planned to take the role of the primary operational staff at evacuation site. There is one prefectural school where the school staff conduct the primary operation of the evacuation site and there is one school that the primary operation is conducted by the local organizations. Primary operation of the evacuation site is handled by 4% of municipal schools staff and 5% of local organizations. (Figure 2-7)



### 3) Consideration of community support in the planning and designing of school facilities

When school facilities were planned and designed for construction, 17% of prefectural and 28% of municipal governments assumed for a secondary use of the schools as evacuation sites. In many towns and villages disaster prevention capabilities are established at all schools regardless of whether or not school is designated as evacuation site. In many prefectures disaster capabilities are established only at designated school facilities or if there is a request from the local community. (Figure 2-8)

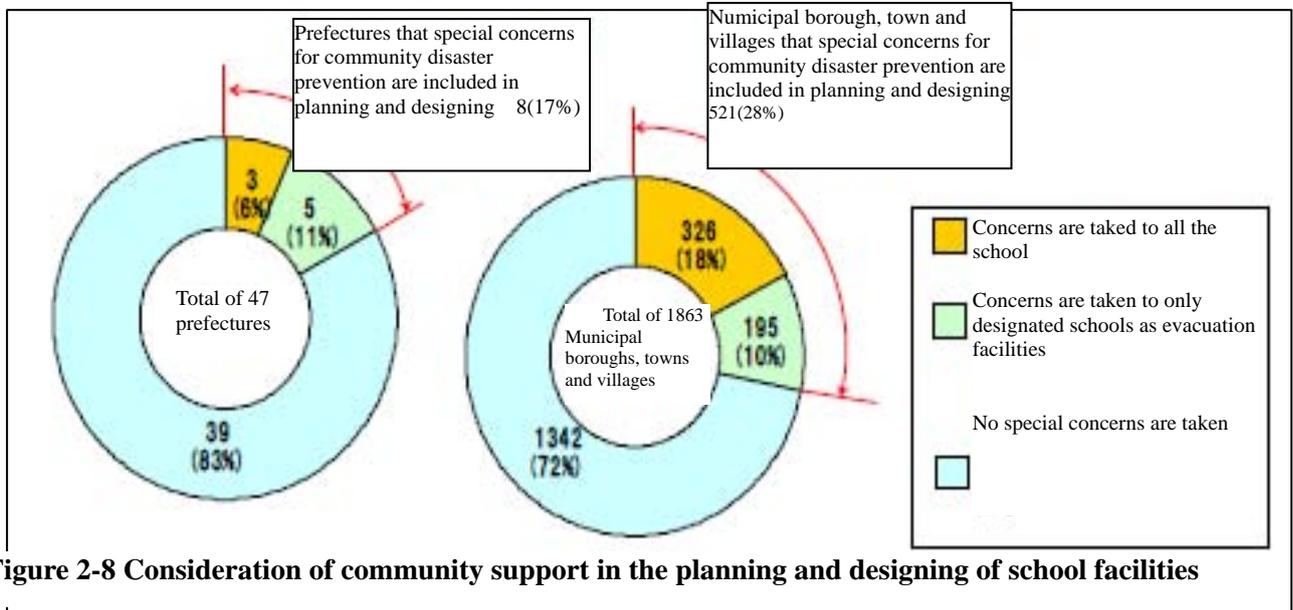


Figure 2-8 Consideration of community support in the planning and designing of school facilities

### 4) Steps taken for the planning and designing of school facilities for community disaster prevention support

The following questionnaires were given to local governments (8 prefectural governments and 521 municipal governments) who considered community disaster prevention support in the planning and designing of school facilities.

The most local governments discuss the matter with the disaster prevention section staff in local governments. The rest is to discuss the matter with the school staff, or the local community. (Figure 2-9)

Of the surveyed local governments, 1 prefectural government and 94 municipal governments have a designated separate area to evacuate physically challenged people.

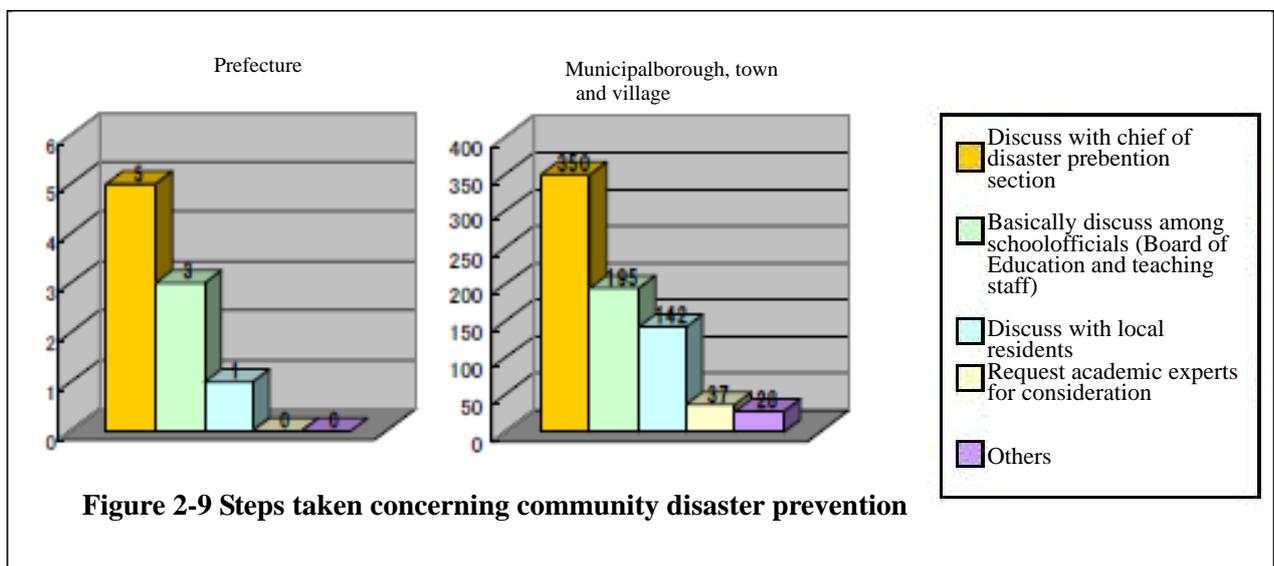


Figure 2-9 Steps taken concerning community disaster prevention

**5) Financial support systems that are available for the improvement of the disaster prevention capability at school facilities. (Multiple answers)**

One of the questions asked in the survey was about using the available financial support systems for the improvement of school facilities. Financial support systems for the improvement of school facilities to respond disasters are offered by The Fire and Disaster Management Agency and following organizations; The Cabinet Office, The Ministry of Agriculture, Forestry and Fisheries of Japan, The Ministry of the Economy, Trade and Industry, and The Ministry of Land, Infrastructure, Transport and Tourism. This is in addition to the support system for the improvement of school facilities offered by The Ministry of Education, Culture, Sports, Science and Technology. These support systems have been used only in a few cases. (Figure 2-10)

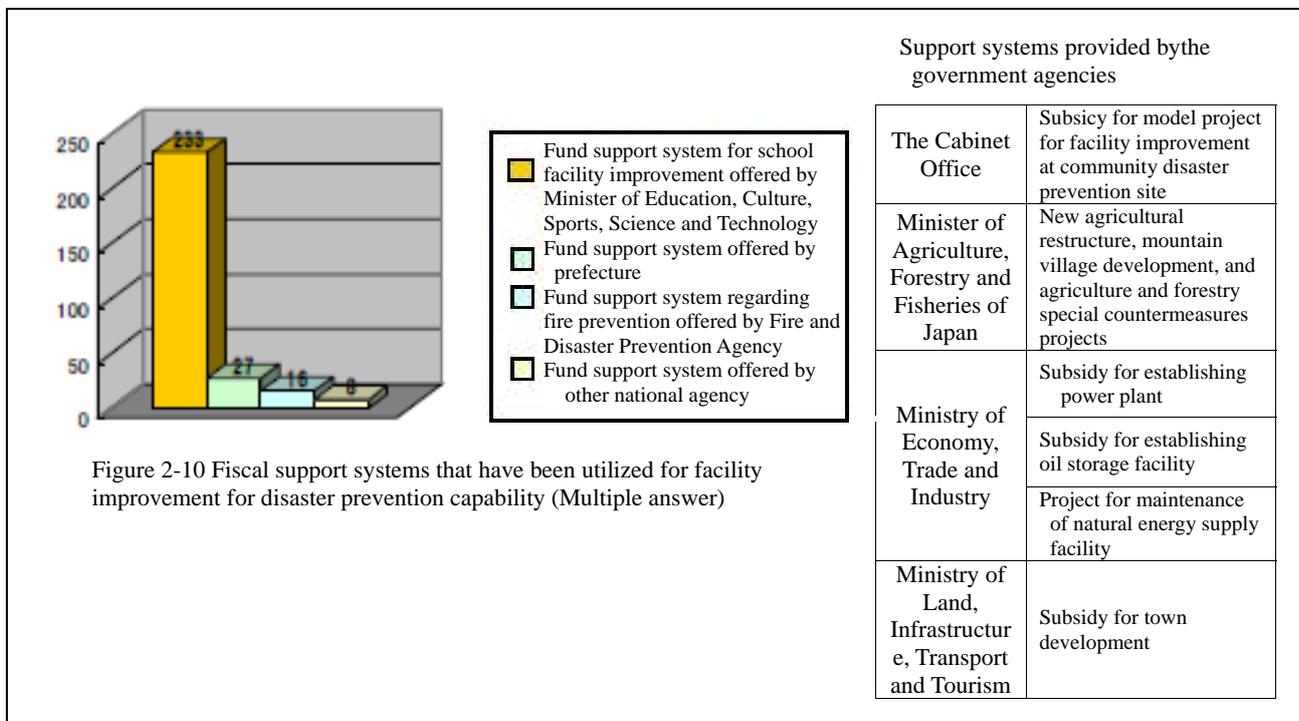


Figure 2-10 Fiscal support systems that have been utilized for facility improvement for disaster prevention capability (Multiple answer)

## **Chapter 3 Measures for the enhancement of disaster prevention capability at school facilities utilized as evacuation facilities**

### **1. Basic concept**

It is important for school facilities to enhance their disaster prevention capabilities for the functional improvement and facility operation in order to play a role of an evacuation site for the local community during a disaster.

After the Great Hanshin-Awaji Earthquake of 1995, The Ministry of Education, Science, Sports, and Culture in cooperation with academic experts started to research on disaster prevention structure at school facilities. (The results of their research are summarized in a report entitled “Repletion of disaster prevention structure at school facilities”. (\*17) The report was first published in November 1995. The second publication of the report was in September 1996. The report summarized the improvements necessary in the structure of school buildings designated as evacuation facilities.

In addition to the aforementioned findings, the research also identified the following 4 basic concepts for the improvement of disaster prevention capability at school facilities designated as evacuation sites. These concepts are based on the reviews of the issues that were observed in previous large-scale earthquakes, the results survey mentioned in Chapter 2, and existing guidelines concerning evacuation facilities. **(Reference material 2)**

- **Securement of seismic resistance for facilities**

**Schools must be safe as evacuation site for local residents.** The results of seismic resistance capability evaluations must be followed and the identified reinforcements or additional construction must be completed. The ceilings, interior and exterior materials, electrical equipment, and furnishings must also be constantly reinspected to ensure safety..

- **Functioning necessary capabilities for evacuation facility**

School facilities are required to be capable of performing all necessary functions to be used as an evacuation site. It is important to secure enough space for displaced residents to live temporarily as well as space for base operations. It is also necessary to have working toilets, electricity, water, gas, communication methods in case of infrastructure failure, maintain a sanitary indoor environment to keep evacuees healthy, and to provide appropriate support to physically challenged people by making buildings barrier-free.

- **Establishment of operational measures for evacuation facility**

There must be a specific operation plan that is understood by everyone to ensure the prompt restart of educational activities. An organized structure made up of a local government disaster prevention department, a member of the education committee, school, autonomous disaster prevention organization, and the local population is also necessary. It is important for everyone to know that there is an evacuation site operating manual on how to use a school facility as an evacuation site available for reference.

- **Prompt restart of school educational activities**

Prompt restart of school educational activities after a disaster is the first step for recovery to a normal life for the community. In order to ensure the prompt restart of educational activity plans to support the coexistence of shelter life and educational activity need to be included in the school facility utilization plan. It is important to have a transition plan beforehand so that teaching staff can focus on the educational activities.

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\*17 “Repletion of disaster prevention structure at school facilities”  
[http://www.mext.go.jp/a\\_menu/shisetu/bousai/06051221.htm](http://www.mext.go.jp/a_menu/shisetu/bousai/06051221.htm)

## 2. Specific measures for the enhancement of disaster prevention capability at school facilities

### (1) Making facilities earthquake-resistant as a safety measure

#### 1) Current earthquake-resistance capabilities of buildings

- According to The of Ministry of Education, Culture, Sports, Science and Technology, 62% of public elementary and lower secondary schools have earthquake-resistant buildings as of April 2008. (\*18) It reports that sufficient seismic reinforcement is not fully implemented. It is extremely important to ensure that schools are safe. Not only are schools a place of learning and where school children to spend most of their time during the day. Schools are also utilized as evacuation sites during disasters by the local populace. The following chart shows guidelines and manuals for seismic diagnosis and seismic reinforcement of school facilities. (Chart 3-1)

Chart 3-1 guidelines and manuals for seismic diagnosis and seismic reinforcement of school facilities

Publisher	Name	Date of publication
Ministry of Education, Culture, Sports, Science, and Technology	Manual of earthquake-resistance for school facilities RC construction for school building version (Revision 2003) Manual of earthquake-resistance for school facilities S construction for gymnasium version (Revision 2003)	March 2003
	Guidelines of promoting earthquake-resistance for school building	July 2003
	Standard of seismic resistance capacity evaluation at gymnasium	May 2006
	Quick learning of earthquake-resistance School facilities rising above earthquake -Case examples of earthquake-resistance measure-	September 2006
National Institute for Educational Policy Research Educational Facilities Research Center	Manual of earthquake-resistance quality rehabilitation at school facilities	December 2005
Foundation of Japan Disaster Prevention Building Association	Explanatory of standard seismic resistance capacity evaluation of existing steel frame concrete building (Revision 2001) Explanatory of guidelines of earthquake-resistance rehabilitation of existing steel frame concrete building (Revision 2001) Explanatory of standard seismic resistance capacity evaluation of existing steel frame concrete building/Handbook for applying to the guidelines of designing for rehabilitation (Revision 2001)	October 2001
	“Manual of earthquake-resistance rehabilitation for the exterior” for existing steel frame concrete building - Enforcement by framed steel brace-	September 2002
	Guidelines of seismic resistance capacity evaluation for existing wall brace cast steel frame concrete building Simple methods for seismic resistance capacity evaluation for existing steel frame wall concrete building	May 2003

#### 2) Safety of ceilings, other interior and exterior materials, electrical equipment, and furnishings

Even if a building structure isn't damaged by earthquake there is still a danger from damages caused to nonstructural materials and furnishings such as exterior walls falling down, ceiling materials and lighting equipment, window glass shattering, and falling electrical devices and furnishings can also harm people. It can also interfere with evacuation site operations.

\*18 The result of investigative research on status of rehabilitation for earthquake-resistance at school facilities  
[http://www.mext.go.jp/a\\_menu/shotouzyoseitaishin/index.htm](http://www.mext.go.jp/a_menu/shotouzyoseitaishin/index.htm)

- Therefore it is necessary to constantly inspect and manage school facilities for the possibility of drop, wreck, or fall of nonstructural materials.
- Large-spaces like a gymnasium are required to be reinforced especially for hanging ceiling fixtures and lighting. It was reported that an entire hanging ceiling fixture fell after a recent earthquake. Using double sided glass, wire-reinforced glass, or shatter-prevention film are effective methods to prevent windows from shattering.
- Effective measures to reinforce nonstructural materials are detailed in the following reports “Research report concerning seismic evaluation of nonstructural materials at school facilities” (March 2002) and “Examples of seismic evaluation of nonstructural materials at school facilities” (December 2005). **(Chart 3-2)** “Maintaining safe and comfortable school facilities” (March 2001 ) introduces points for daily maintenance and management of school facilities.

**Chart 3-2 Example countermeasures for the safety of interior materials and furnishings in school facilities.**

Case example	Example of countermeasures
Preventing ceiling material from dropping	Install bracing between wall, surface of poles and ceiling materials to close the clearance gap to stabilize the ceiling to prevent from shaking
Preventing window glass from breaking	Apply the anti-scattering window sheets with sealing material that can be taped on irregular shape of window frame
Preventing exterior wall material from falling off	Repair loosen surface-layer and cracks of exterior wall and
Preventing lights from dropping	Constant inspection for corrosion of metal parts Install bracing against shaking
Preventing equipment and furnishing from falling or dropping	Stablize air conditioner outdoor equipment Stablize television to the shelf against slipping out Stabilize book shelf and locker to ceiling or beam using parts

## (2) Necessary functions and capabilities of an evacuation facility

### 1) Space required in an evacuation facility

- It is necessary to secure enough spaces for evacuees’ temporary shelter life and site operation by utilizing the existing rooms in the school buildings.
- Spaces needed for evacuated residents are a living space, bathroom, changing room, shower, kitchen, and laundry room.

\*19 References for the reports and guidelines published by the Ministry of Education, Culture, Sports, Science and Technology and National Institute for Educational Policy Research and School Facilities Research Center are available at the following websites:

Guidelines of promotion for earthquake-resistance reinforcement at school facilities [http://www.mext.go.jp/a\\_menu/shisetu/bousai/taishin/0371501.htm](http://www.mext.go.jp/a_menu/shisetu/bousai/taishin/0371501.htm)

Reports published by Ministry of Education, Culture, Sports, Science and Technology [http://www.mext.go.jp/a\\_menu/shisetu/shuppan/main5\\_112.htm](http://www.mext.go.jp/a_menu/shisetu/shuppan/main5_112.htm)

Reports published by National Institute of Educational Policy Research, Educational facilities Research Center <http://www.nier.go.jp/shisetsu/html/04.html>

- Spaces required for site support operation are an office for the operation staff, working area for volunteers, meeting room, medical treatment room, food distribution area, break room, space for supply reception, storage, supply distribution area, and a space for a bulletin board for collecting and disseminating information.

## 2) Capabilities of necessary equipment

### [1] Toilet and shower

- The biggest issue is obtaining toilet facilities since a number of evacuees spend 24 hours at the evacuation facility.
- A Specific plan for the possible use of the water in the swimming pool and the water storage tank is necessary in case of a water outage.
- During times of disaster, it is desirable to make effective use of the toilet and shower facilities that were prepared for normal open school events.
- It is desirable to plan the necessary number of portable toilets, portable showers, the installation methods, location of installation, disposal of sewage, and drainage in case of a toilet and shower facility failure. **(Case example: Chapter 4, 1, (1))**
- When planning for toilet facilities and installation of portable toilet facilities, it is preferable to include lighting for use of toilet during the night.
- For installation of shower facilities at an evacuation site, it is preferable to consider equipment to generate heated water

### [2] Electricity, water, and gas

#### (General)

- It is necessary to deliberate specific measures to obtain infrastructure such as electricity, water and gas assuming the length of period until recovery.
- If plumbing systems are seismically reinforced, this will lower the possibility of damage and contribute to the continuation of infrastructure provision.

#### (Electricity)

- Electricity is usually repaired soon after a disaster. In case of an electricity outage, it is necessary to consider installing an emergency generator or using a portable generator.
- Lighting at night offers a great benefit to release evacuees' anxiety. It is necessary to consider using a temporary lighting system as needed. Also it is conceivable to installing a rechargeable lighting system equipped with solar batteries is also an option.
- It is desirable to obtain an adequate number of outlets and sufficient electricity in the gymnasium since this is where the majority of evacuees reside.

#### (Water)

- Depending on the intended purpose of water use (drinking, washing, and toilet) during a water outage, it is necessary to consider improvement of the water purifier on the swimming pool and plumbing systems as well as the use of a portable pumping device. **(Case example: Chapter 4, 1, (2))**
- It is conceivable to use stored rain water and well water in addition to the water storage tank and swimming pool as sources of water supply. **(Case example: Chapter 4, 1, (3))**

### **(Gas)**

- It is preferable to store a decent number of portable gas stoves to use for cooking until the gas supply is restored.
- There must be a plan on how to obtain propane gas and all the necessary devices prior to the disaster if propane gas is going to be used as an alternative method for heating water and cooking,

### **[3] Means for transmitting information**

- A means of transmitting information such as a telephone or a fax to communicate with pertinent organizations regarding site support operations at evacuation facility is indispensable. Priority telephone lines and regional disaster radio frequencies are required to be installed at designated school facilities. The use of cellular phones with email capability is conceivable since the cell phone signal is usually connected even during a disaster.
- Radio and television are important sources of information collection for evacuated residents. Telephones and the internet are required means of communication. Electrical outlets, television cables, telephones, and internet connections are prepared in the spaces where evacuated residents will use.
- It is desirable to make plans for in-house announcements and a bulletin board for communication between the evacuees and the staff.

### **[4] Indoor environment**

- It is necessary to provide evacuees with a healthy and sanitary indoor environment as a place to live temporarily..
- In case of the need to utilize a evacuation facility during the winter time, it is necessary to plan for heating using portable heating equipment. The heating plans need to include ventilation. It is effective to have styrofoam mattes to keep people off the cold floor. **(Case example: Chapter 4, 1, (4))**
- If an evacuation facility will be used during the summer, it is necessary to prepare fans and portable air conditioners. Curtains to block the sun should also be considered.
- Inside lights should be adjustable on illuminance or area controllable. It is also conceivable to use cardboards to make individual shades. If these capabilities are not available, it is preferable to come up with an alternate plan.
- When there are a large number of evacuees in an open area like a gymnasium, it is difficult for anyone to have privacy. This causes people to become more stressed the longer they stay. Cardboard can be used to create individual spaces. This will keep them warm during winter but it doesn't allow for air circulation during summer.
- It is desirable to plan for enough space, necessary tools, and user manuals to manage trash, trash collection, drainage from the kitchen and laundry, and hygiene control.
- It is desirable to make rules and designate smoking areas as necessary.

#### **[5] Support plan for physically challenged people**

- For a smooth reception of physically challenged people, school facilities need to have barrier-free reinforced facilities such as ramps and toilets for the disabled.
- Western style toilets are desirable. Toilets should not only be barrier-free they should have tables for changing diapers and clothes so that they are useful for other evacuees. (Case example: Chapter 4, 1, (5))
- It is possible that physically challenged evacuees would need to be separated from other people since they have other needs such as being able to control room temperature.

#### **[6] Pre-positioning necessary supplies**

It is necessary to store necessary supplies such as food, water, and items required for daily needs as an emergency response support immediate after the earthquake. The pre-positioned supplies are required to store in storage facilities near-by or on the property of school facilities. (Case example: Chapter 4, 1, (6))

### **3) Facility improvement as school facilities**

- When enhancing disaster prevention capabilities at school facilities as an evacuation site, it is desirable that the modifications also serve other purposes that contribute to the local community.

(Examples)

-The gymnasium should be multipurpose and include toilets, showers, changing rooms, and meeting room so that the area can be used as an open school facility for the local community and also as an evacuation site in case of disaster.(Case example: Chapter 4, 1, (7))

-To conserve natural resources, a rain water recycling system should be implemented for use of other than drinking water

- Installing an in-house generator and familiarizing the local community with its use promotes disaster prevention awareness. It can also be used for disaster prevention education.

It is important that any of the facility's equipment that might be used during a disaster needs to be used and inspected periodically during peace time.

### **4) Plans and designing of facilities to be used as an evacuation site**

- When building a new school or reconstructing an existing school building, the plans and designs should be prioritized for school education based on the "School Facility Improvement Guideline"\*. It is also desirable to take the fact that the school might be used as an evacuation site into consideration. (Case example: Chapter 4, 1, (8))

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\*20 The School Facility Improvement Guideline addresses the capabilities a facility must have in order to facilitate a diversified educational contents and methods in a school. [http://www.mext.go.jp/a\\_menu/shisetu/seibi/main7\\_a12.htm](http://www.mext.go.jp/a_menu/shisetu/seibi/main7_a12.htm)

(Examples)

- Locate the gymnasium next to school ground where local residents will be evacuated to during a disaster
- Plans for the outside of the school buildings should include paths for transporting supplies and parking.
- The location routinely used for an open school area should also be used for the evacuation of local residents.
- For planning purposes, it should be assumed that the school management offices will be used as the site support operations office during a disaster
- Have assumed areas for the use by physically challenged people and make the areas barrier-free.
  - Whether building a new room or remodeling an existing room it is always possible to make the room fit the desired purpose. Holding workshops (\*21) with local residents to incorporate their opinions into designing and planning of school facilities enables disaster prevention capabilities to be suitable to respective regional conditions. This is also an effective way to increase residents' disaster awareness. (Case example: Chapter 4, 1, (9))

### **(3) Establishing operational measures for evacuation facility**

#### **1) Planning how to use the school facilities**

- For a smooth evacuation of the residents and an effective use of the facilities, there must be a plan that explains how the school facilities will be used as an evacuation site during a disaster..
- The plan must provide sufficient space for evacuees to stay and for the staff to conduct site support operations in the school buildings, gymnasium, and athletic ground. It is also desirable to put the spaces in order to be available to evacuees.
- It is desirable to formulate an evacuation site operating manual together with the plan. School staff and all the other pertinent organizations need to have a good understanding of the plan and the manual.

#### **[1] Deciding how space will be used in the evacuation area**

- Generally, gymnasium is the living space for evacuees and ,if necessary regular classrooms and special classrooms will be used next. If special classrooms are utilized as living areas, it is necessary to ensure that there is no furniture or equipment that could possibly fall.
- Living space needs to be planned as each person gets enough space (wide enough for a person to be able to lay down with their belongings at their side: approximately 2-3 m<sup>2</sup>) with access aisles. It is necessary to determine how many people will be in each room.
- It is effective to put all furniture (desks and chairs) together in several places and set aside. It is even better to have designated rooms to store furniture.

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\*21 \*Workshop Workshops are a way to solve problems that occurred in the community and to plan for various matters. Community residents participate in the workshop to discuss facility planning and community development.

- It is desirable to ensure the availability of existing vanity room, toilet, changing room, shower, kitchen, and laundry at times of disaster. It is also desirable to have designated spaces to setup temporary facilities as necessary.
- It is assumed to the school administration office, teaching staff office and school dispensary will be used for shelter operations, meetings, and medical treatment. These operational support offices should be located in one place and completely separated from evacuees' living spaces.
- Spaces for the distribution of supplies, transmission of information, and communication should be located in common areas such as the lobby, the entrance area of gymnasium, and the pilotis where both evacuees and non-evacuees have access to. On the other hand, separating the flow of people between evacuees and non-evacuees helps avoid confusion at supply distribution points.
- It is desirable to designate areas and to clearly separate temporary facilities, food distribution space, supply transport vehicles' route, and emergency vehicle's route before providing living space for evacuees.

## **[2] Ordering spaces in evacuation site**

- Considering that the number of disaster victim changes depending on the severity of the disaster and how much time has passed, a good way is put spaces in order and provide them in a phased manner.
- It takes more time for people who need special care to evacuate. Physically challenged people should be given priority and be given living spaces on floors that have entrances and are close to the toilet.
- The number of evacuees staying in the evacuation facility will decrease as time passes after the disaster. The evacuees' living space should be decreased in the same manner.

## **2) Cooperation between pertinent organizations**

- It is desirable to share plans on how to respond to a disaster among pertinent organizations such as the local government disaster prevention department, the board of education, the school an autonomous disaster prevention organization, and the local community in order for everyone to have the same understanding on the support structure for disaster prevention. For a smooth establishment of evacuation site, if private schools are designated as evacuation facilities, it is necessary to clarify the reporting procedures beforehand to ensure the evacuation goes smoothly.
- It is desirable to discuss measures to improve disaster prevention capability at evacuation facilities, the evacuation facility operation manual, and conduct a periodic facility operation drill that all follow the reporting structure used during a disaster. It is desirable that all pertinent organizations cooperate to facilitate the evacuation site operation during a disaster. (Case example: Chapter 4, 2, (10))
- It is necessary to cooperate with pertinent organizations as well as cooperation among school children and local residents while in an evacuation facility. It is desirable to conduct evacuation facility operating training and disaster prevention education for a smooth evacuation and shelter life during a disaster. This will increase self-help and mutual help awareness. (Case example: Chapter 4, 2, (11))

### **3) Writing an evacuation facility operation manual\***

- For evacuation facility operations to run smoothly, pertinent organizations must have discussions about the operating structure, operating methods, communication and assemble structure and self-disaster prevention organization. A practical operating manual explaining the reporting structure to include volunteer groups is necessary. For the time immediately after a disaster occurrence, first responder operations and practical means of evacuation facility operations for prolonged shelter life should be included in the manual.
- Training on how to operate the evacuation facility should be conducted periodically and be based on the evacuation facility operation manual. The manual should be reviewed as necessary for modification.<sup>3)</sup>

### **(4) The prompt restart of educational activities at school**

- Restarting educational activities at school facilities used as evacuation facility after a disaster is the first step for recovery and restoring normal life in the community.
- For the prompt restart of educational activity to occur, the children's activity space and the evacuees' living space must be separated.
- To restart school activities, it is important to have a transition plan that allows the teaching staff to focus on educational activities. This transition will be smoother if the discussion with pertinent organizations about sharing roles in the operation of evacuation facility has been conducted and stated in the evacuation facility operation manual.
- Depending on the conditions after disaster, open spaces for evacuees should be decreased systematically according to the school facility usage plan and taking required spaces such as classrooms, school grounds, and administrative offices back for school activities.
- It is necessary for all pertinent organizations to cooperate for the prompt restart of school educational activities and the closing of the evacuation facility. It is also desirable to make rules about use of evacuation facilities and to obtain the evacuees understanding and cooperation in regards to school education.

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\*22 When formulating an evacuation facility operating manual, please refer to the case examples taken from local government activities.  
(For example, Shizuoka prefecture has already formulated a manual on evacuation facility operation that can be referred to at this website;  
<http://www.e.quakes.pref.shizuoka.jp/>)

### 3. Promoting measures to enhance disaster prevention capability for school facilities

#### (1) Exploitation of various fiscal support systems

- In order to improve disaster prevention in the local community, pertinent ministries and agencies provide various kinds of fiscal support systems and some systems can be utilized for school facilities' disaster prevention reinforcement. It is desirable that local governments utilize the available systems to enhance disaster prevention capabilities at school facilities.
- It is necessary to share information regarding school construction projects between the local government disaster prevention department and the board of educations committee as a combined project for the purpose of requesting a budget.
- The Foundation for General Autonomous Community Center provides autonomous disaster prevention organizations with subsidies to purchase tools, equipment, and supplies. Some prefectural governments also provide a subsidization system for supply acquisition. It is desirable to utilize these available subsidy systems. (chart 3-3, Reference material 3-1, 3-2)

**Chart 3-3 Major national subsidy systems for improvement of community disaster prevention facilities**

Agency	In charge	Name of system	Target	Contents
Ministry of Education, Culture, Sports, Science and Technology	Facility Support Department	Cost for public school facilities improvement	Local government (Prefectures and municipal borough, town, and village)	New or expanding construction of building Reconstruction of building Seismic reinforcement of building Facility improvement in outdoor educational environment Large-scale remodeling (for aged building or quality improvement of building) construction or reconstruction of school swimming pool for seismic reinforcement
Fire and Disaster Prevention Agency	Fire prevention and medical emergency section	Disaster prevention project bond	Local government (Prefectures and municipal borough, town, and village)	Facility improvement to enhance disaster prevention capabilities at evacuation facilities
		Subsidy for Fire Disaster prevention Facility Improvement	Local government (Prefectures and municipal borough, town, and village)	Earthquake-resisting water tank, pre-positioned storage
Ministry of Land, Infrastructure, Transport, and Tourism	Building Guidance Division	Housing and building remodeling project for earthquake-resistance	Local government (Prefectures and municipal borough, town, and village)	Rehabilitation for earthquake-resistance
	Town Development Promoting Department, Urban Comprehensive Project Promoting Office	Subsidy for Town Development	Local governments (Municipal boroughs, towns, and villages)	Community disaster prevention facility: Earthquake-resisting water storage tank, pre-positioned storage, information transmitting facility, broadcasting facility, power generation facility, drainage recycling facility and cost for disaster prevention seminar and emergency evacuation training
	Sewage system project section	Emergency earthquake-resistance improvement project for sewage system	Local government (Prefectures and municipal borough, town, and village)	Project for earthquake-resistance and manhole toilet system
Foundation for self-governing general center	—	Self-governed disaster prevention organization promoting support project	Self-governed disaster prevention organization, women's disaster prevention organization and it's group organization in town, ward and village	Improvement of facilities or equipment that are necessary for community disaster prevention activities

#### (2) Improvement of disaster prevention capabilities simultaneously with either initial or expanding construction or large-scale rehabilitation

- It is a good opportunity to enhance disaster prevention capabilities at school facilities when conducting initial or expanding construction or large-scale rehabilitation. Local government should take this opportunity without hesitation. In order to do so, it is necessary to include capabilities that require enhancing in the planning and designing of school buildings. The specific ideas stated in the previous chapter should be included in the planning and designing if they are required by regional conditions.
- During recent years, countermeasures for earthquakes at school facilities that were built before implementation of The Seismic Design Standard have caused the biggest issues. Local governments are conducting seismic reinforcement projects for those schools. This is also a good opportunity to include disaster prevention rehabilitation in the reinforcement project. During the initial planning and designing for a seismic reinforcement project, it is desirable to have sufficient discussion for enhancing disaster prevention capabilities to include safety measures to prevent falling ceiling materials, equipment needed for the facilities such as toilets and a heating device.

### **(3) Providing information of exemplary advanced project**

- In some local areas adequate reinforcement projects have been already been started or completed. Among the completed projects, there are many advanced projects that can be referred to by other local governments.
- However, the information about the advanced projects that have been completed is not necessarily available for other local governments or school management staff in a timely manner. Therefore social links among pertinent ministries, agencies, and local governments on a routine basis would help them in obtaining the necessary information when they need it. They should also disseminate the information that they obtained to their pertinent organizations.

### **(4) Understanding the condition of disaster prevention capabilities**

- The Central government should spread notification among local governments on need for disaster preventing rehabilitation of school facilities. The central government should constantly be aware of disaster prevention and disseminates information to local governments from now on. The government should identify the reasons that any schools have not improved their disaster prevention capabilities and come up with a plan so the school can make any necessary improvements.



## Chapter 4 Examples of project that enhance disaster prevention capability that can also be used as an educational activity

Projects for enhancing disaster prevention capabilities have already been started in some local communities. Some of these projects are worth being referred to by other local governments. In chapter 4, 11 case examples of completed projects for school facilities are discussed in the results of the inquiry survey on rehabilitation for disaster readiness and have been suggested to other local governments. Eleven projects were picked up and introduced in this chapter with the summaries of on-site hearing survey.

### ((List of completed projects))

#### 1. Example of a project for enhancing disaster prevention capabilities (Facility)

(1) Subsidy for “Project for urgent sewerage improvement against earthquake” provided by The Ministry of Land, Infrastructure, Transport and Tourism was utilized to establish temporary toilets with connection to a public sewerage pipe. .... [Kobe-shi, Hyogo prefecture]

(2) An emergency water supply system was installed on the swimming pool to supply drinking water and other essential daily needs in case of a disaster.

..... [Yoshinogawa-shi, Tokushima prefecture]

(3) Utilizing water well for disaster response to supply water for daily needs and drinking water.

..... [Chofu-shi, Tokyo]

(4) For disaster that could occur in winter, the gymnasium floor was installed with a heating system using the air duct underneath the gymnasium floor.... [Sabae-shi, Fukui prefecture]

(5) Multifunctional toilets were installed during reconstruction and large-scale rehabilitation of school buildings. .. [Koriyama-shi, Fukushima prefecture]

(6) Disaster prevention storages were established at elementary and lower secondary schools designated as a broader evacuation site based on the local government comprehensive plan.

.....[Tajimi-shi, Gifu prefecture]

(7) Rooms that could be used as office during a disaster were equipped in gymnasium.

.....[Honjo elementary school, Kobe-shi, Hyogo prefecture]

(8) A reconstruction project at a lower secondary school focused on disaster prevention capability required for an evacuation site

.....[Higashi lower secondary school, Nagaoka-shi, Niigata prefecture]

(9) Local residents participated in workshops and discussed a school building reconstruction project to enhance disaster prevention capability

.....[Oyaguchi elementary school, Itabashi-ku, Tokyo]

#### 2. Examples of project for enhancing disaster prevention capabilities (Operation)

(10) Evacuation site operating drill with local residents, teaching staff, and local government staff participating. ....[Nerima-ku, Tokyo]

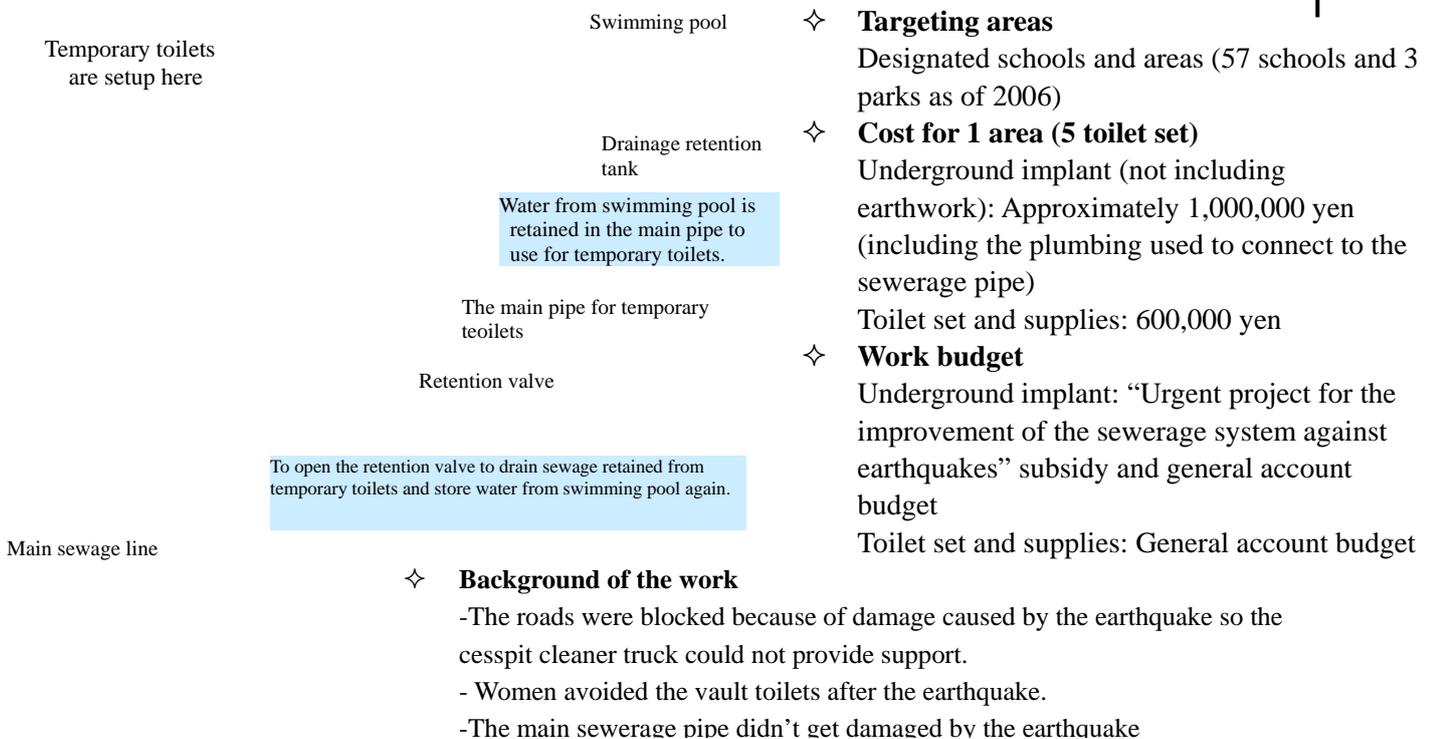
(11) Implementation of disaster education during comprehensive learning class .

..... [Jonai lower secondary school, Shizuoka-shi, Shizuoka prefecture]

1. Examples of projects for enhancing disaster prevention capabilities (Facility)

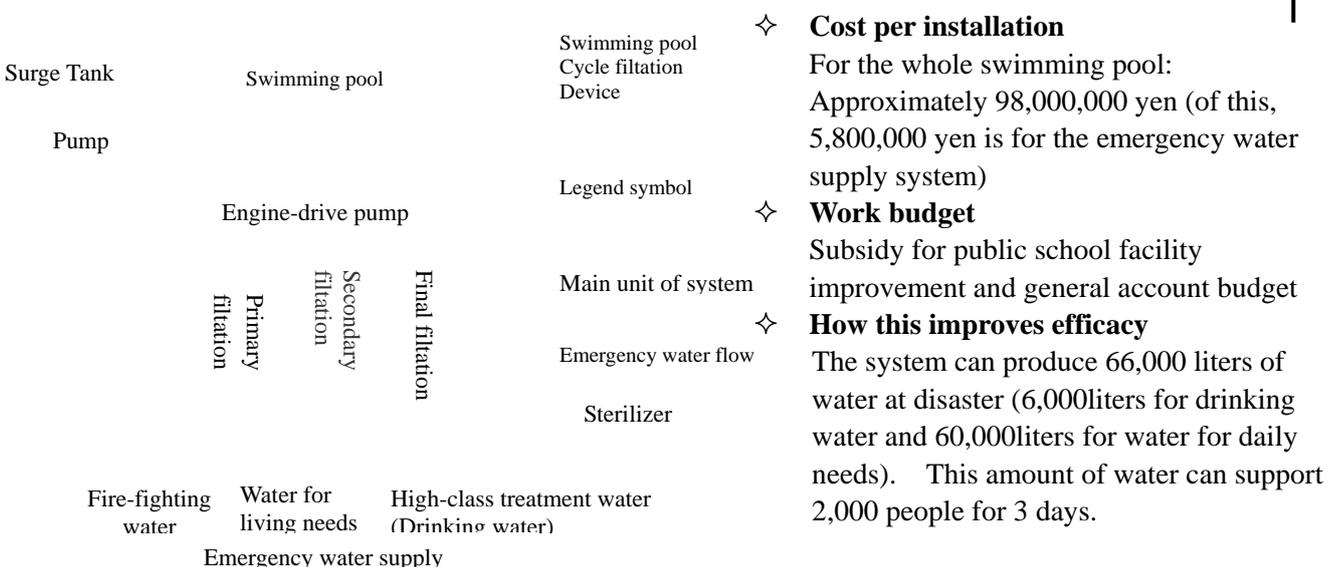
(1) Subsidy for “Urgent project for the improvement of the sewerage system against earthquakes” provided by The Ministry of Land, Infrastructure, Transport and Tourism was utilized to establish temporary toilets with a connection to a public sewerage pipe .....[Kobe-shi, Hyogo prefecture]

- A manhole cover can be removed during a disaster to set up portable toilets and sectional covers to make temporary toilets. When not in use, it works just like a regular manhole cover.
- There are 5 portable toilet sets per evacuation site in Kobe. (4 western style toilets and 1 multifunctional toilet)



(2) An emergency water supply system was installed on the swimming pool to provide water for daily needs and drinking water in case of a disaster. .... [Yoshinogawa-shi, Tokushima prefecture]

- In addition to the remodeling of the old swimming pool, a disaster emergency water supply system was installed.
- The disaster emergency water supply system is activated during the annual emergency evacuation drill conducted by autonomous disaster prevention organizations to help the disaster awareness of local residents.



(3) Utilizing well water for disaster response to supply daily needs and drinking water

[Chofu-shi, Tokyo]

- As a part of intensification of evacuation facility a water well has been established at every elementary and lower secondary schools in Chofu city after the Great-Hanshin Earthquake.
- A water purifier is stored in the school pre-positioned storage so that both well water and swimming pool can be used simultaneously in case of a disaster.



Supply water for living needs from water well utilizing water purifier



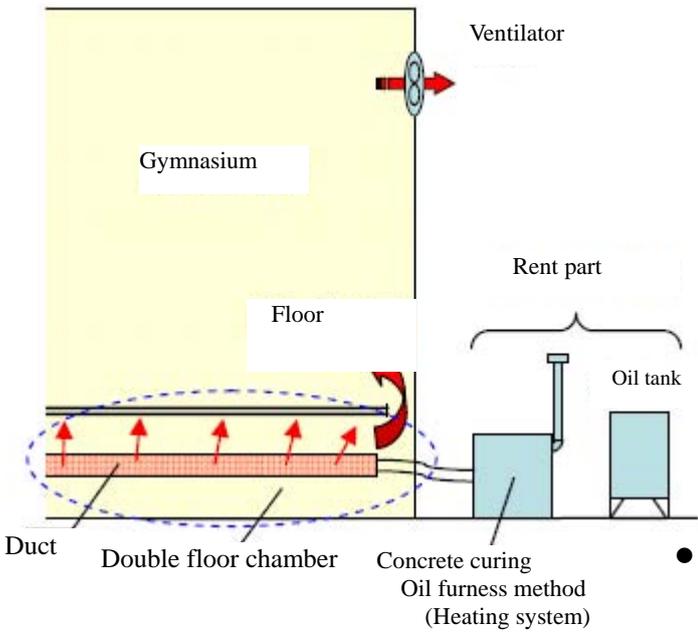
Training to purify water of swimming pool utilizing water purifier

- Improvement status
  - Coverage: 28 Public elementary and lower secondary schools (25 schools are completed)
- Cost for installation: 5,500,000 yen for each well  
Contract fee for pre-inspection: 2,200,000 yen  
Well installation work: 3,300,000 yen
- Work budget
  - General account budget
- Condition for starting the installation
  - Installation is only started after a boring survey confirms the water source
- Improvements in efficiency
  - 500 liter of water per hour can be supplied. (The well water quality will also be inspected to ensure that it is safe).
- Plans for future improvements

(4) For disaster that could occur in winter, the gymnasium floor was installed with a heating system using the air duct underneath the gymnasium

- During the remodeling of gymnasium, floor heating device was installed in the arena to create a livable facility at disaster occurrence during winter.

System structure diagram



◇ Background of the work

- Intellectuals reported that evacuees suffered from the cold when they were temporarily housed in the school gymnasium. A floor heating system was suggested for the evacuees' health and sanitation at times of disaster.

Cost to installing and operating the improvement

-Installation cost 2,400,000 yen for heated draft duct work and generator work

-Operating cost at disaster (per day)

30,000 yen for kerosene oil

30,000 yen for lease

Work budget

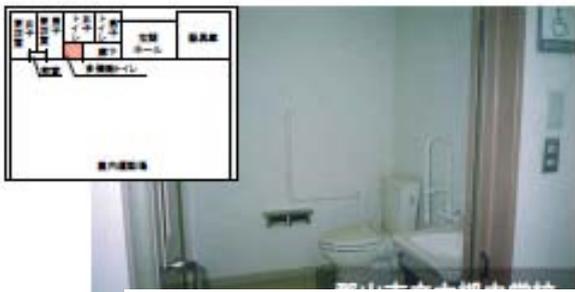
General account budget

- Plans for future improvement

It is projected to be installed when public elementary and lower secondary schools' are remodeled.

(5) Multifunctional toilets were installed during the remodeling and large-scale rehabilitation of school buildings. ....[Koriyama-shi, Fukushima prefecture]

- When a school building or gymnasium is newly constructed or expanded, or a large-scale rehabilitation is planned, multifunctional toilets are also installed. Gymnasiums that are planned to be used as an evacuation facility are equipped with multifunctional toilets.



Koriyama Otsuki Lower Secondary School

Koriyama Municipal Mihoda Lower Secondary School



- Reason for the improvement

Based on "The 4<sup>th</sup> comprehensive basic plan", barrier-free improvement at school facilities are conducted as an annual project in Koriyama city. Multifunctional toilets are installed in the school buildings of 19 elementary schools and 8 lower secondary schools, in the gymnasium of 11 elementary schools and 10 lower secondary schools as of June 2006.

- Work budget

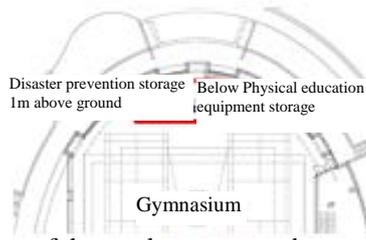
Subsidy for public school facility improvement and general account budget

- Improvement in efficiency

Not only are the school facilities used in case of disaster, it is also utilized by children daily and local residents during an open school day for it's east accessibilities.

(6) Based on the municipal general plan, disaster prevention storages sites were established at elementary and lower secondary schools designated as broader evacuation sites .....[Tajimi-shi, Gifu prefecture]

- Based on the 5<sup>th</sup> comprehensive plan, Tajimi city established disaster prevention storage locations at designated areas at evacuation sites
- Whenever a disaster prevention storage location is established, local disaster prevention groups train on using the rescue support equipment.



Part of the newly constructed gymnasium is utilized for pre-positioned storage of disaster relief supplies



Training on equipment designed to push up a collapsed house

- Tajimi city the 5<sup>th</sup> comprehensive plan (Establishment of disaster prevention storage sites)  
General plan: Establishment of disaster prevention storage sites for equipment and related supplies at all designated evacuation sites  
2006: 2 schools and 1 gymnasium  
2007: 2 schools  
2008: 1 school and 1 citizen hall  
2009: 1 school and 1 community center
- Cost of improvement  
Disaster prevention storage building: 370,000 yen per a set of 4 storages  
Relating supplies: 8,350,000 for 3 locations
- Work budget: General account budget



Pre-positioned storage of disaster relief supplies

(7) Rooms to be used as a disaster operation office at times of disaster were equipped in the gymnasium .....[Honjo elementary school, Kobe-shi, Hyogo prefecture]

- Based on the experience from the Great Hanshin-Awaji Earthquake, meeting rooms to be used as disaster countermeasures office at times of disaster were established in a part of the gymnasium building.
- Changing rooms and multifunctional toilets were also established and utilized at event of open school and PTA activities.



◇ Status of improvements  
Emergency telephones, FAX, copier, small kitchen, and refrigerator are prepared for use in the community disaster prevention countermeasures office at occurrence of disaster.

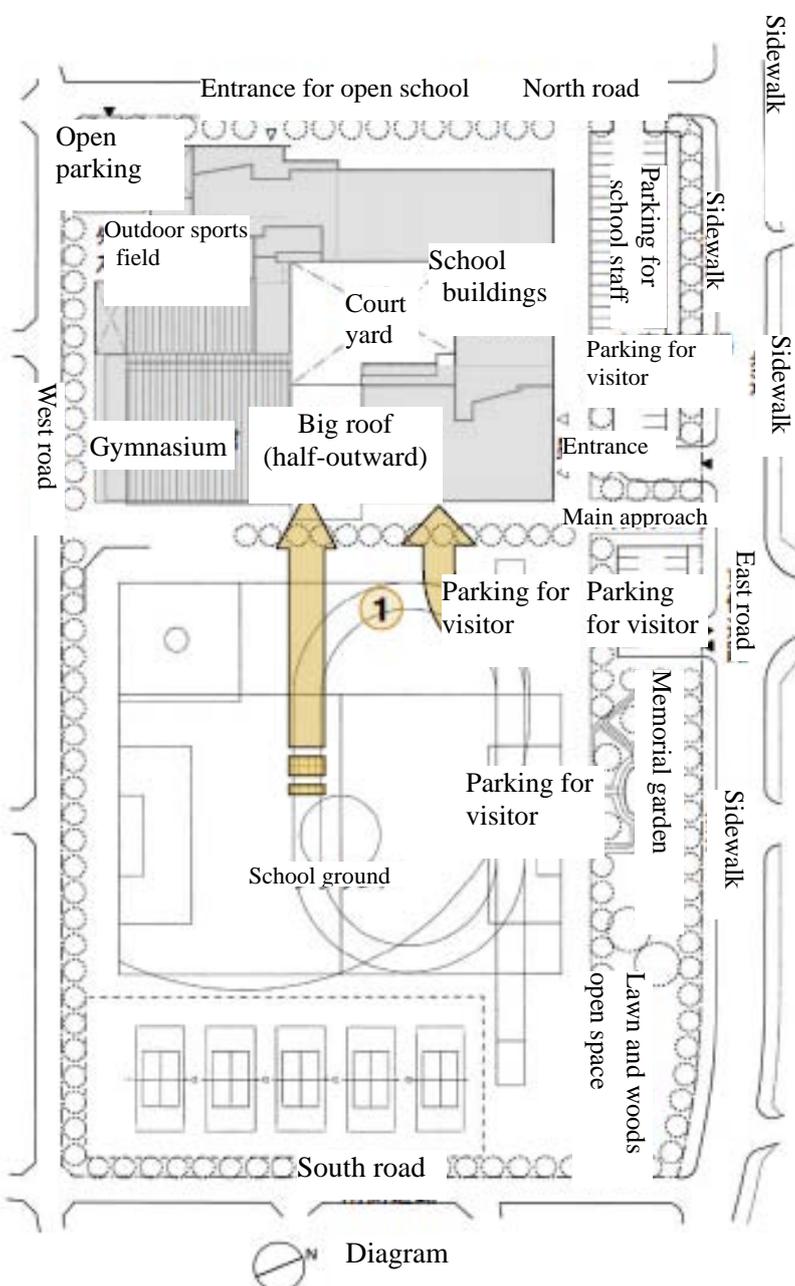
◇ Cost for improvement per location  
◇ Conducted at the same time of gymnasium reconstruction at a cost of 40,500,000 yen  
◇ Budget for work  
◇ Subsidy for public school facility improvement and general account budget

(8) Remodeling project for lower secondary school that is focused on the disaster prevention capability required for an evacuation site.....[Higashi lower secondary school, Nagaoka-shi, Niigata prefecture]

- When the old school building was remodeled, disaster prevention capabilities were improved at different places of school facilities that are designated as an evacuation site based on the experiences from the Mid Niigata Prefecture Earthquake.
- The same places that local residents utilize for open school days are designated as evacuation sites so that they are already familiar with the areas when they have to live temporarily.

### ○Background of improvement

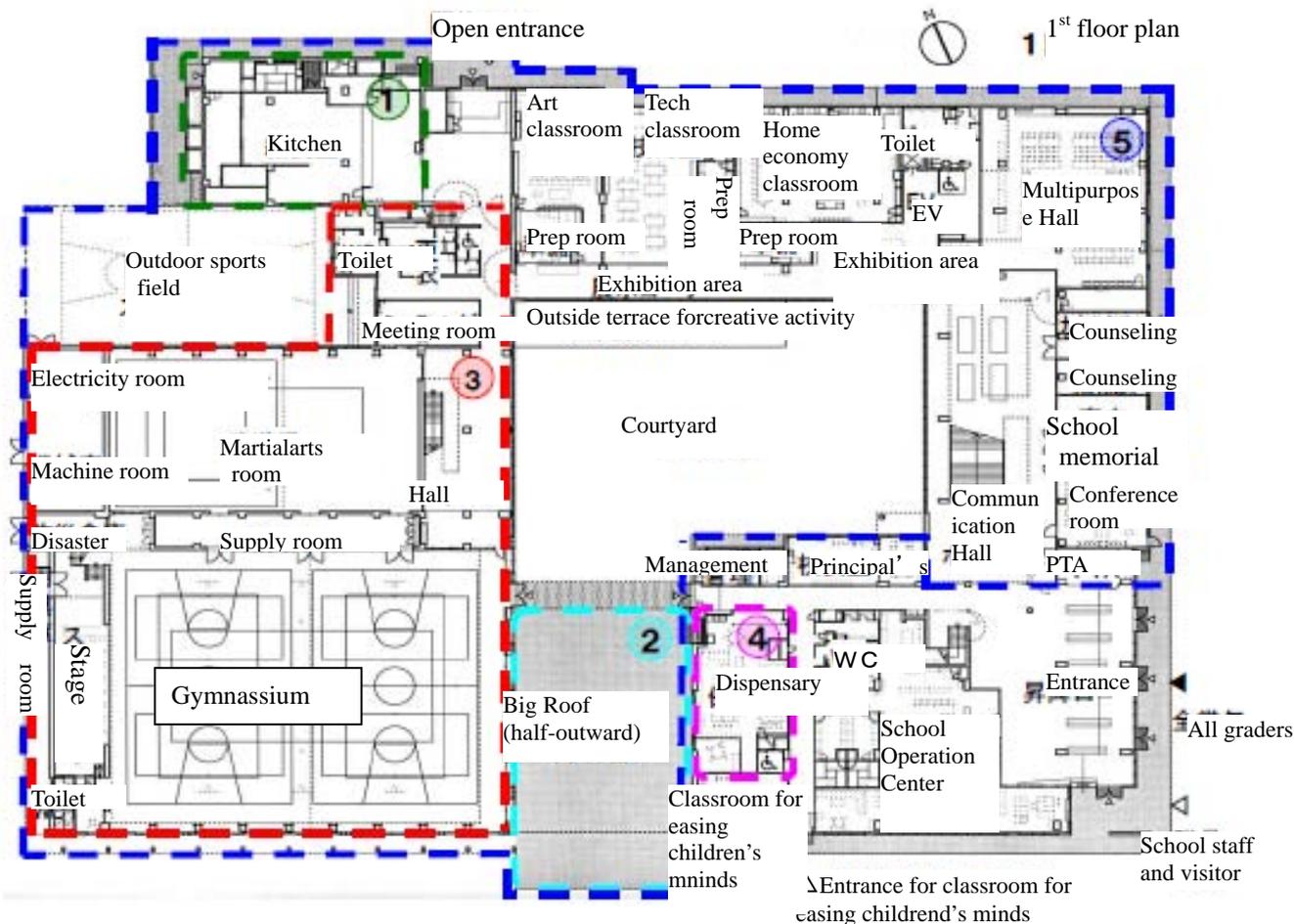
At Higashi lower secondary school in Nagaoka city the school teaching staff, PTA, school supporting group, and local residents have been planning an overall remodeling of school facilities since 2003 because of old buildings. The Mid Niigata Prefecture Earthquake of October 2004 occurred during the planning process and having the capability to serve as an evacuation facilities became the most important issue. Together with municipal office staff, the mentioned parties had multiple discussions. Planning the design of this project has been completed and the construction is scheduled to start in 2007.



Summary of the remodeling plan of Higashi lower secondary school in Nagaoka city (the design was completed in March 2007)

1. Lot area: 34,030 m<sup>2</sup>
2. Gross floor area: 10,959 m<sup>2</sup>
3. Structure: Reinforced concrete structure, partly steel structure
4. Number of floors: 3 story building
5. Number of class: 12 classes
6. Number of students: 409 students (as of January 2007)
7. Number of households in the school district: 7,800 households
8. Estimated number of evacuees: 2,400 persons (This is the number of people that school can hold using the gymnasium and a part of the school building)
9. Reference: There are many other public facilities in Higashi school district. There were 500 actual evacuees in the Higashi lower secondary school during the Mid Niigata Prefecture Earthquake.

① Inside and outside facilities allocated for use by evacuated residents  
 Rooms for evacuated residents are located on the first floor so that the distribution of supplies can be facilitated smoothly and evacuees who have difficulties walking will have easy access.



① Space for food distribution is located next to the area where evacuated residents stay. Locating the kitchen next to the gymnasium and outside sports field provides accessibility for the water supply vehicle and space available outside to locate cooking appliances for food distribution.

② The open space outside is covered with roof so that evacuation support can be conducted when it is snowing or raining. Since it is difficult to conduct evacuation support outside when the ground is covered with snow, an open space with a roof (Big roof) was established to have the necessary space to conduct this support during the

③ All of the necessary facilities and equipment are located close together to respond to the various requirements from evacuees.  
 -A heating system was installed in the martial arts training hall so that children and elderly could stay on a warm tatami matt floor.  
 -A Water tap is installed to draw drinking water from the water storage tank. Rain water is used for flushing toilets.  
 -Multifunctional toilets, toilets that are accessible from the outside, and changing rooms equipped with showers are established.  
 -The gymnasium which is the primary place for evacuees' to temporarily live is installed with television, telephones, and LAN connections.

④ Locating the school dispensary for smooth treatment activities  
 Locating the school dispensary for smooth treatment activities  
 The school dispensary is located next to the gymnasium and athletic ground for smooth first aid activity and ambulance accessibility

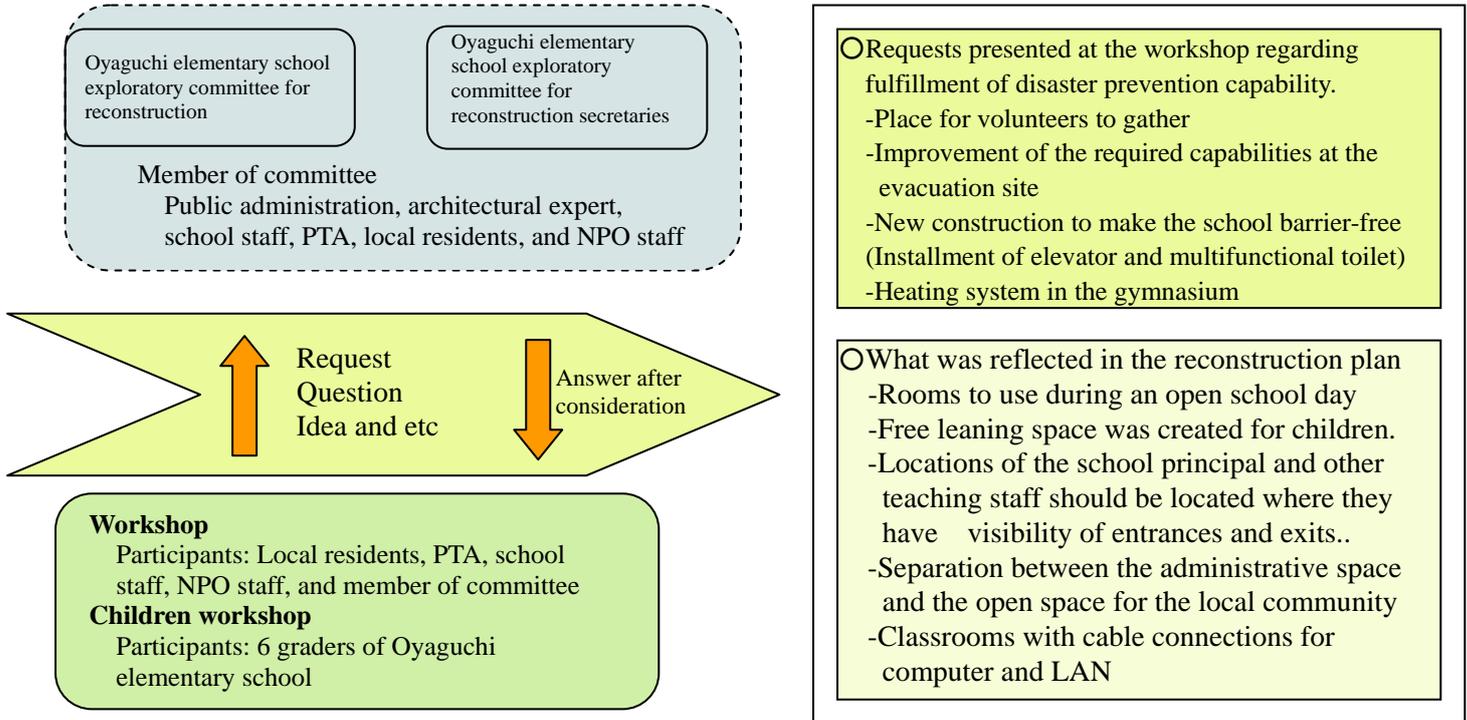
⑤ Enhancement of disaster awareness by familiarize spaces with local community  
 The same places that local residents utilize for open school days are designated as evacuation sites so that they are already familiar with the areas when they have to live temporarily.

(9) Local residents participated in workshops and discussed the remodeling of the school building project to enhance disaster prevention capability

... ..[Oyaguchi elementary school, Itabashi-ku, Tokyo]

- During the remodeling plan for Oyaguchi elementary school in Itabashi-ward, Tokyo, workshops were held with local residents and the school staff to exchange opinions. The opinions were reflected in the remodeling plan.
- The opinions will also be reflected in future remodeling plans for school facilities in Itabashi-ward.

○Relationship between rehabilitation planning committee and workshop



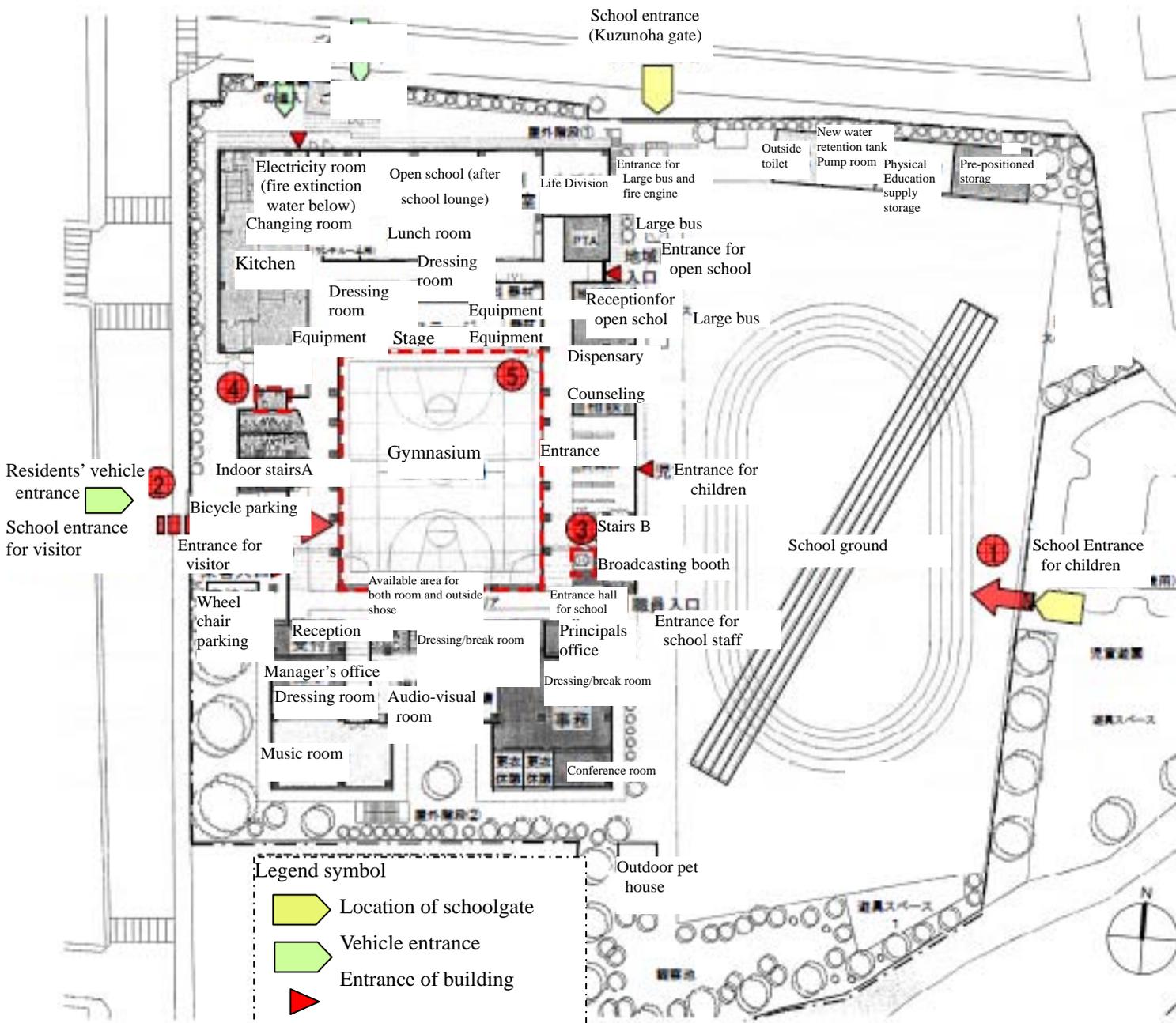
○Advantages and important points of workshop

1. Local residents, school staff, and school children became aware that they are part of the school by participating in the plans to remodel the school.
2. It enables problems to be found that the local government or architectural experts might have overlooked.
3. It takes a great deal of time for the remodeling to begin because the whole community discussions the remodeling.
4. It may cost more money to compile data and conduct briefings to fix problems that were brought up at the workshop.



○Items that were adopted from outcome of the workshop and implemented for the enhancement of disaster prevention taking opinions into the planning

1. Gate was established to open towards a park located next to the school athletic ground to allow local residents to enter in case of a disaster
2. The gymnasium was built on the 1<sup>st</sup> floor of building and located straight ahead of the main school gate to provide easy access to local residents and physically challenged people.
3. The floor was leveled at the primary entrance of school buildings to allow physically challenged people easy access.. An elevator was also provided for those people.
4. Multifunctional toilets were installed around the gymnasium area.
5. A heating system was installed in the gymnasium.
6. A place for volunteers to gather was established.

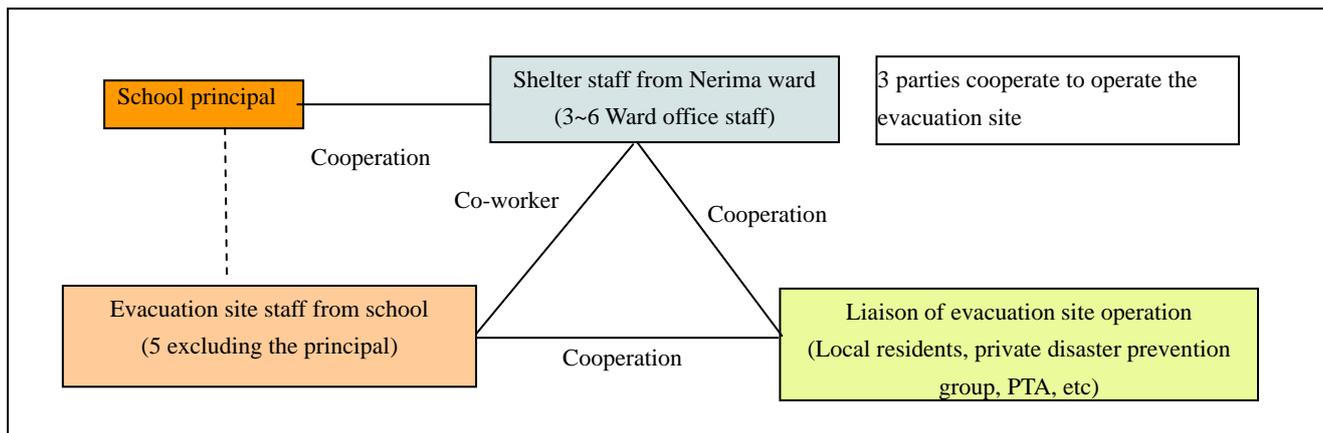


## 2. Examples of project for enhancing disaster prevention capabilities (Operation)

(10) An evacuation site operating drill with local residents, teaching staff, and local government staff was conducted.....[Nerima-ku, Tokyo]

- Narima ward government in Tokyo designated 103 public schools as disaster evacuation sites. Local residents in the respective school district cooperated to support the evacuation facility operation as operational liaisons.
- Residents in the respective school district planned and conducted evacuation facility operation training with the school teaching staff and the local government office staff.

### ○ Relationship between local residents, teaching staff, and local government office staff for evacuation site operation



### ○ History to establish evacuation site operation liaison meeting

- 1995-1997: At 103 public elementary and lower secondary schools in Nerima ward, a disaster prevention storage site using an extra classroom was established with the cooperation of board of education and school staff.  
It was necessary to organize the administrative support of the local residents in the school district.
- 1998: With cooperation by regional disaster prevention organization and the PTA, 50 support group organizations were established. Other districts started these organizations as well.
- 2000~: Disaster prevention training has been planned and conducted at each district. A disaster prevention manual was created.



School disaster prevention exercise (Cooking training)



School disaster prevention exercise (purifier operation training)

○ Roles of local residents at an evacuation site operation liaison meeting [Peace time]

<Peace Time>

- Holding a general assembly and lecture presentation for educational activities
- Creating operational manuals according to the regional characteristics at respective evacuation sites
- Inspection of pre-positioned stocks and supply equipment
- Conducting evacuation drill (general)
- Training on how to operate the equipment, water supply training, food distribution training, first aid training, evacuation escort training, etc.
- Revision of the evacuation site operation manual based on lessons learned from the training

[At disaster]

- Room assignment for evacuees
- Information dissemination and announcements in the evacuation facility
- Water and food distribution support
- Sanitation activity
- Support to restart school educational activities



Training for cooking and food distribution



Local residents evacuation route map exercise

○ Keys to start an evacuation site operation organization by local residents

1. Assign a local government office staff to each evacuation site to begin disaster prevention planning with the local community. (Local government office staff already participate in meetings and trainings held by the evacuation site operation liaison meeting)
2. Each school principal cooperate the activity as the administrative chief of the facility. (If the school principal is new and came from a different district, the principal should attend disaster prevention training)
3. Having the residents aware that they are the ones who conduct all the operations at the evacuation site. (Creating a supporting structure among the local residents as the primary operators of the evacuation site)

(11) Implementation of disaster education during comprehensive learning class (Project J)  
.....[Jonai lower secondary school, Shizuoka-shi, Shizuoka prefecture]

- Jonai lower secondary school in Shizuoka city facilitates disaster education by using a comprehensive learning class to teach disaster prevention skills and knowledge to promote over-all disaster prevention ability.
- The school held a forum inviting local residents to discuss a structure to support community disaster prevention. Also 453 students or 87% of the total students participated in community disaster prevention drill.

○ **What is Jochu project (Project J)?**

-It is assumed that the Jonai lower secondary school district is most likely to get damaged if the Tokai Earthquake occurs. Disaster prevention instruction is being provided in a class as well as starting a project that allows the local community take the initiative to focus on “protecting invaluable lives”..

-The school inspires the children to be enlightened about what to think and do during the process from how to get ready for an earthquake through the actual occurrence of an earthquake to recovery.

○ **3 objects and 7 issues for the project**

**In this project, there are 3 objects and 7 issues as shown below. (3 objects)**

1. Work together to “protect invaluable lives”
2. Realistic assumptions
3. Knowing confusion and difficulty at initial posture

(7 issues)

1. Keep quake damage to the minimum
2. Obtain enough knowledge and skills to endure the psychological panic
3. Try to bring out distinguishable roles and responsibilities for the individual, home, school, public organization, local organization, community, and society.
4. By providing mutual cooperation in a worst case scenario training (convoy system training), everybody should learn from it and be better prepared for a disaster.
5. Have a hands-on policy to be able to have a flexible response.
6. Self-protection is the best disaster prevention. Share ideas about how to best go through the disaster

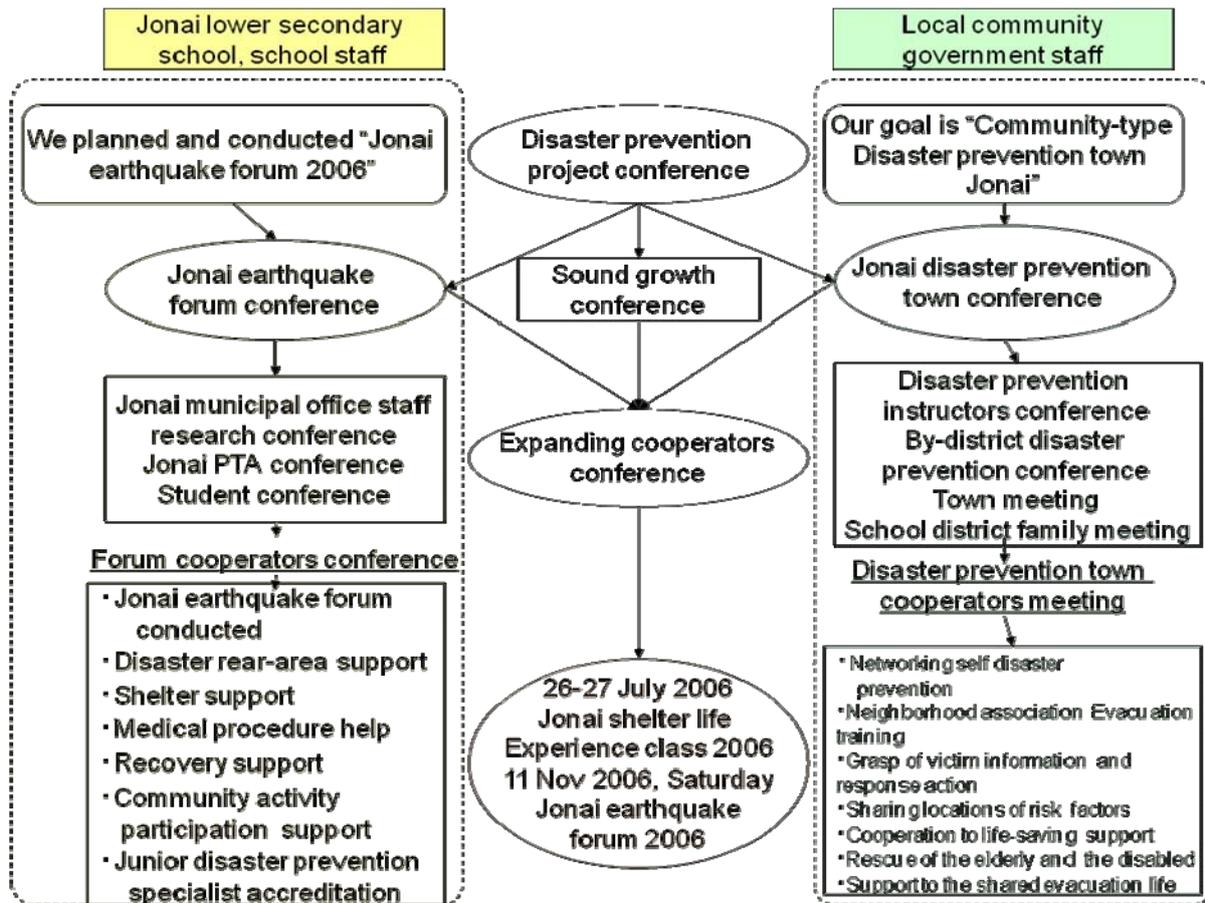


Rescue transport training



Evacuation facility replicate booth exhibition

○ Organization chart to promote Jochu earthquake project (conception picture)



○ Future activities of the project

Based on postulate “protect invaluable lives”, the school staff are considering volunteer activity by the students, early recovery of school capability as a center of the community, giving students instruction in order for a smooth and autonomous operation by local residents, and edification to students’ parents and local community.



## Reference Material Part 1

### I School facilities utilized as evacuation sites for the Noto Peninsula Earthquake

Noto Peninsula Earthquake, 2007

Earthquake occurred on 25 March 2007 at 9:42 (Magnitude 6.9)  
Maximum seismic intensity 6 upper (Nanao city, Wajima city, Anamizu city)

#### 【Summary of research in Wajima city】

##### **Situation at evacuation establishment**

-Among the 30 designated evacuation facility sites in Wajima city there was 1 school facility utilized as an evacuation site.

-Total number of evacuees at the peak was 2,662 persons. The maximum number of evacuees displaced at school was 270 persons.

-A village that was isolated by a massive landslide,. The Monzennichi elementary school was designated to accept the isolated people because the school was the closest location and had enough space that a decent number of people can stay.

##### **Actual conditions of disaster prevention capability at the school designated as an evacuation facility**

###### ◇ **Functions required for an evacuation facility**

-Since the gymnasium was not large enough for all the evacuated people, classrooms on the 1<sup>st</sup> floor had to be opened for the excess people's living.

-Once some of the evacuees were transferred to a different site the remaining evacuees were gathered in the gymnasium.

-Even though there was a toilet in gymnasium, water from the swimming pool was used due to a water outage.

-Temporary portable toilets were avoided due to aftershock and steps at the stool.

-Japan Self-Defense Force supported with a temporary bathing system in the nearby park They also provided transportation services to hotels and Japanese inns in the neighborhood.

-Cellular phones were utilized to communicate between the chief of evacuation site operations and the disaster countermeasures office.

-Local cable broadcasting in Monzen district was utilized to transmit information in the community.

-There was no television or cable connection in gymnasium. The installation took time so the newspaper was the only source to information during the work.

-There was no heating system in gymnasium so it was very cold. The situation improved after a company put styrofoam sheets on the floor.

-These styrofoam sheets were used to keep off the cold instead of creating partitions for privacy.

-The cold and not being able to properly wash hands contributed to an infectious gastroenteritis outbreak.

###### ◇ **About operation of evacuation site**

-The local government office staff resided in the evacuation site to operate the evacuation site. School staff took the roles of preparation, clean-up, and answering phone calls to cooperate.

-A smooth evacuation of people occurred after the earthquake because disaster prevention training had been conducted previously.

###### ◇ **Influence to school activity**

Evacuees living in the school on 5 April were moved to a nearby hotel contracted by the local government and then the evacuation facility was closed. A school entrance ceremony originally scheduled for 4 April was postponed to 9 April but there were minimal effects on other educational activities.

# **Research on school facilities that were utilized as evacuation sites at Noto Peninsula Earthquake**

## **1. Summary of research**

An earthquake with a magnitude of 6.9 occurred offshore of Noto Peninsula on 25 March 2007. The earthquake affected the center area of Noto in Ishikawa prefecture and caused houses to collapse and forced the local residents to be evacuated to evacuation sites. An investigation was conducted to research the process of how the evacuation site was established and how the school facility was actually utilized as evacuation facility.

The investigation was conducted at Wajima municipal elementary school that was the biggest and only evacuation site used. This was done by doing an on-site inquiry survey with representatives from the school and evacuated residents from the community on the conditions and responses that took place.

## **2. Positioning of evacuation sites in Wajima city and the process of establishing the site**

According to the Wajima City community disaster prevention plan, the community halls and the school grounds are designated as places for citizens to gather (temporary collection points) before designated evacuation sites get established for the reception of the affected people after an earthquake occurs. Public school gymnasiums serve as the actual designated evacuation sites.

It states in the community disaster prevention plan that the local government office will locate their staff at the evacuation site to conduct administrative and operational support under the cooperation of the facility administrative chief and chairperson of autonomous disaster prevention organizations. It also states that if any difficulties are experienced by physically challenged people while staying in the evacuation facility, the staff will provide an appropriate evacuation facility (the secondary evacuation facility) to move those people.

During this disaster, 30 evacuation sites were established in the area of Wajima City. Twenty of the sites were located in the Monzen District where the damage from the earthquake was considerable. The total number of evacuees at the peak was 2,662 persons. Three schools in the district that were used as evacuation sites were Monzen-Nishi elementary school, the gymnasium of Kawai elementary school, and Monzen-Higashi elementary school. The Kawai elementary school building had no heating system so the school was not used. Since the Monzen-Higashi elementary school was located close to where the municipal on-site disaster countermeasures headquarters was located, the school was utilized by the Japan Self-Defense Force for their cantonment area. Therefore the only school building that was actually used as an evacuation site was the Monzen-Nishi elementary school.

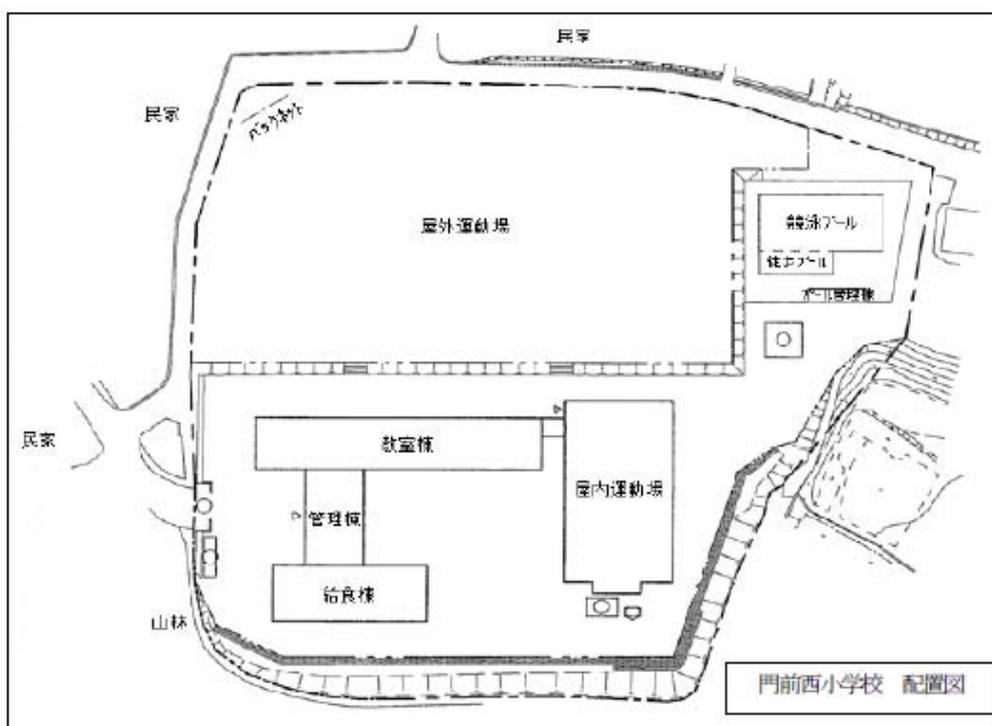
It was determined to establish an evacuation facility at Monzen-Nishi elementary school was chosen as the evacuation site for the people in the village that was isolated by a massive landslide since the school was located close to the village and it had enough space to accommodate a decent number of people.

After evacuation facilities were established, there was an outbreak of infectious gastroenteritis at Monzen-Nishi elementary school and Morooka community hall. The local government office designated Wajimasou governmental hotel, View Sunset and the Tsurugiji governmental hotel as secondary evacuation facilities. The local government welfare department evacuated physically challenged people into hospitals.

### 3. Evacuation facility at Monzen-Nishi elementary school

#### (1) Summary of Monzen-Nishi elementary school evacuation site

- Location: 1-123, Michishita, Touge, Monzenmachi, Wajima-shi
- Year of construction: 1983 for both the school building and the gymnasium
- Dates the evacuation site was in operation: From 25 March to 5 April 2007
- Maximum number of evacuees: 270 persons (from 26 to 27 March 2007)
- Ratio of evacuees who were 65 years or older: 70%
- Buildings used: Gymnasium (arena area 595 m<sup>2</sup>), 3 classrooms on the first floor of the school building (Aid station: examination room, waiting room, and treatment room), 3 classrooms on the second floor of the school building (After 2 April, one classroom was used as an isolation room for patients having infectious gastroenteritis)
- Status of operation: 1 medical treatment team (consisted of 1 doctor, 3 nurses, and 2 administrators) 2 public health nurses, 2 care workers, and 2 personnel from the local government office



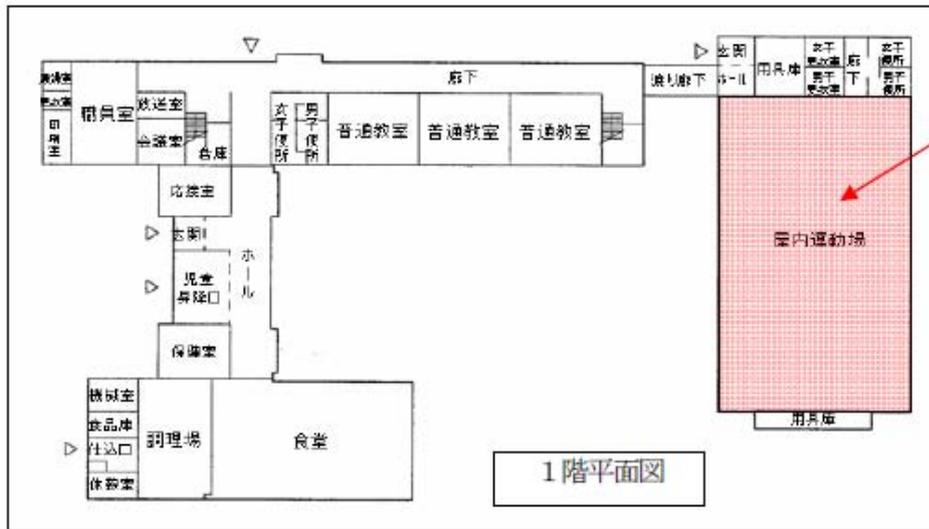
#### (2) Timeline of events from the opening to the closing of the evacuation facility at Monzen-Nishi elementary school

25 March, 9:42 Occurrence of the earthquake

10:00~ Vice-principal of Monzen-Nishi elementary school arrived. No evacuees had arrived yet.

14:30~ Upon notification of “a possible evacuation site operation”, all the school staff were notified using the contact information from the emergency roster. All the school staff arrived at the school by 16:00.

16:00 The local government disaster countermeasures headquarters ordered the school principal to establish an evacuation facility to accept 74 evacuees from the Fukami district and the Rokurogi district that were isolated due to a massive landslide. The school staff prepared to receive evacuees (moved chairs from inside the classrooms to the hallways, spread straw mats, and located 5 heaters) 74 residents from the Fukami district and the Rokurogi district arrived in a microbus that was provided by the local government.



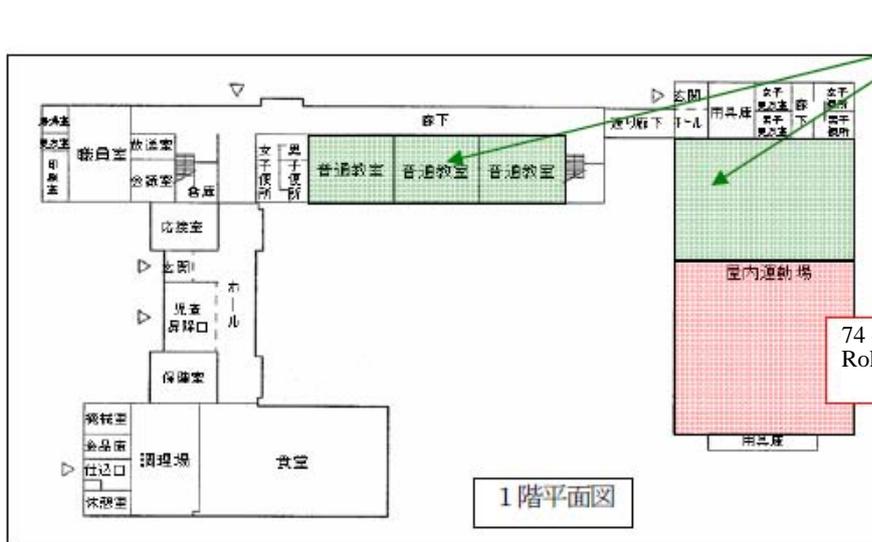
74 evacuees from Fukami and Rokurogi districts

26 March, Afternoon

A decision was made to evacuate the people in the Kaiso district to the Monzen-Nishi elementary school because a tsunami was predicted to hit the district.

Late afternoon

Completed the evacuation of 200 residents of the Kaiso district  
(Largest number of evacuees was 270 persons)



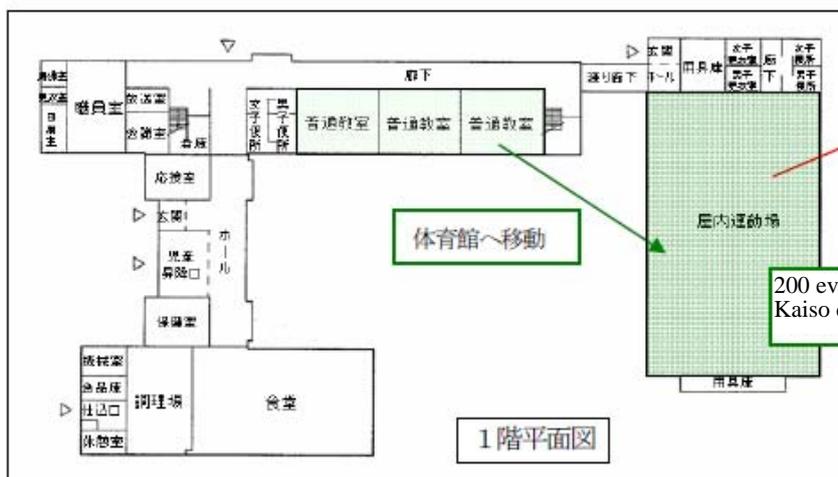
200 evacuees from Kaiso districts

※Excessed evacuees at gymnasium are housed in the classrooms

74 evacuees from Fukami and Rokurogi districts

28 March

74 persons of 34 households in Fukami district were moved to Agishi Community Hall



74 evacuees from Fukami and Rokurogi districts

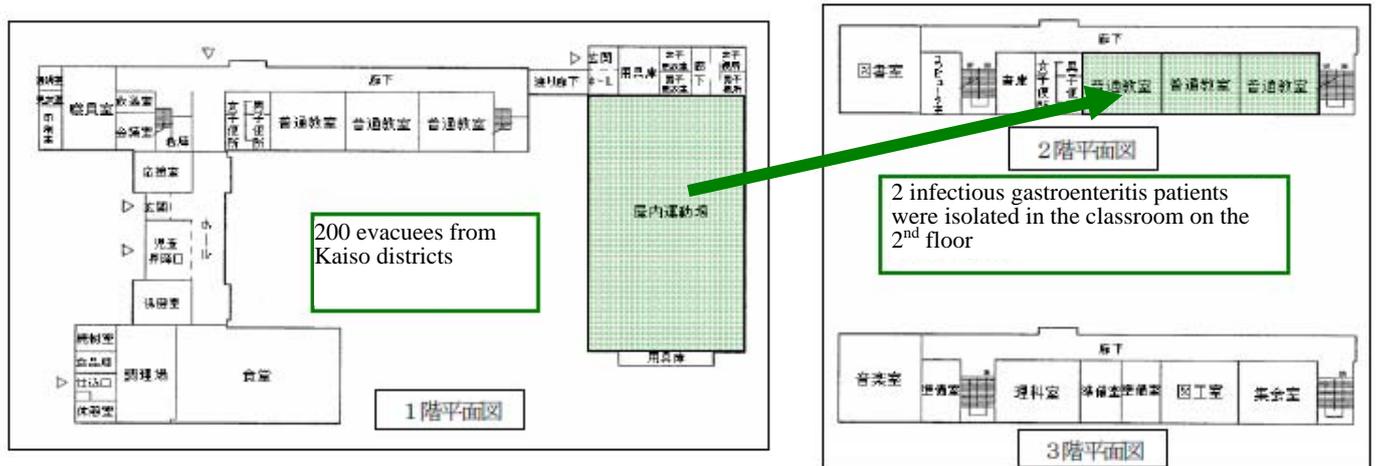
体育館へ移動

200 evacuees from Kaiso districts

2 April, about 20:00

Outbreak of infectious gastroenteritis

9 patients had diarrhea and were vomiting. They were moved to the classroom on the 2<sup>nd</sup> floor (Number of patient at peak was 11 persons)



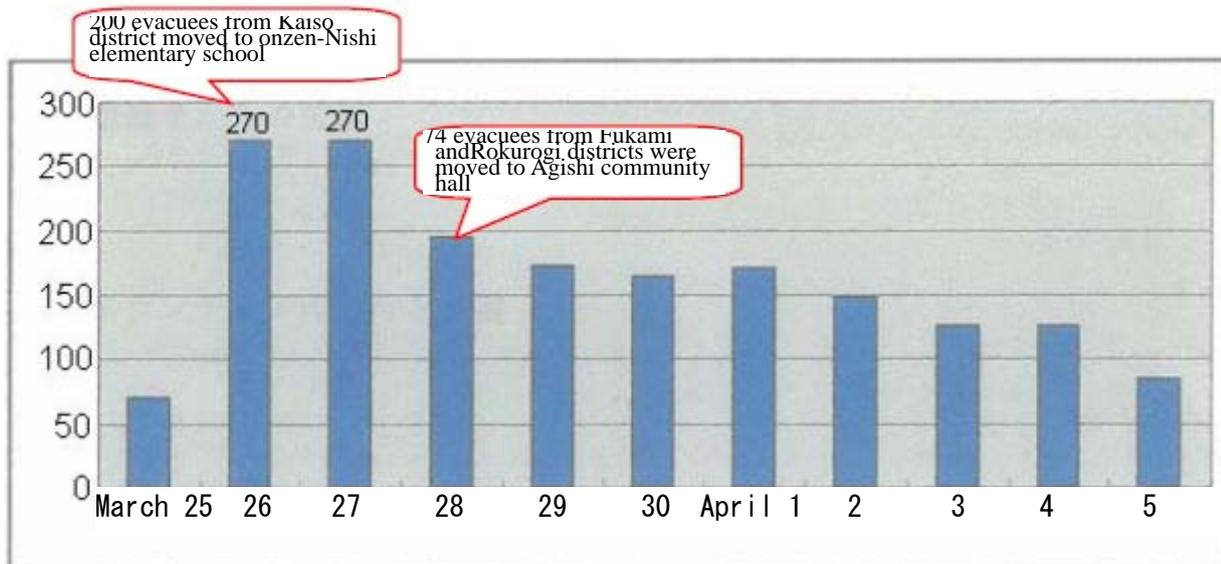
3 April, 11:00~ The school buildings, gymnasium, and surrounding area were sprayed for sterilization

5 April, 13:00~ 49 evacuees were moved to the secondary evacuation facility “View Sunset” so that school educational activities could restart. Transportation was completed by the late afternoon.

13:30~ The school buildings and the gymnasium were sterilized.

15:00 The evacuation site was closed

9 April School enrollment ceremony was conducted.



Shift of No. of evacuees at Monzen-Nishi elementary school

### **(3) Actual conditions of disaster prevention capabilities at Monzen-Nishi elementary school**

#### **1) Safety of the facility**

The Monzan-Nishi elementary school buildings and gymnasium were built in 1983 and meet the New Standard of Seismic resistance architectonics. There was minimal damage consisting of cracks in the concrete junction of the buildings and damage to the outdoor sumo training area. The gymnasium that was designated as evacuation facility in the community disaster prevention plan had no damage. It can be assumed that the ground is stable when compared with the Monzen-Higashi elementary school and the Monzen lower secondary school since there was less damage to the ground.

#### **2) Capabilities required for an evacuation facility**

##### **[1] Spaces used for evacuation area**

###### **{Living space}**

Classrooms were not planned to be used as evacuation areas. However when 200 residents from the Kaiso district arrived to the gymnasium that was already holding 74 residents from the Fukami and Rokurogi districts, some of the Kaiso district evacuees moved into the classrooms because of overcrowding. When 74 residents of the Fukami and Rokurogi districts moved to Agishi community hall, the rest of evacuees also moved to the gymnasium. It was difficult for the elderly people to move repeatedly.

According to the Wajima City community disaster prevention plan, Monzen-Nishi elementary school can hold 350 evacuees in the gymnasium (1.7 m<sup>2</sup> per person) but it was difficult to hold 270 evacuees (2.2 m<sup>2</sup> per person). Representatives of the disaster prevention department think that of the number of evacuees the school can hold needs to be revised.

School ground was used for parking space. Many evacuees stayed in their own cars because there was no heater or privacy in the gymnasium, as well as fear of an aftershock. Some people came to school only for meals.



**Look of evacuationsite at gymnasium**

###### **{Cooking space}**

The school kitchen was initially planned to be used for cooking. Most of the evacuated residents were assumed to go back to their houses to clean up so breakfast had to be provided before 6:00. The Japan Self-Defense Force and private vendors cooked with their own cooking appliances so the school kitchen was not used. The home economics classroom was used to make hot water. Food was cooked at one location and provided to 20 different evacuation sites in the city so containers for food distribution had to be acquired.



**Food distribution**

## ② Capability of required facilities

### {Toilet}

The Monzen-Nishi elementary school gymnasium has 4 urinals and 2 toilets for men and 3 toilets for women. All of the toilets in the gymnasium are Japanese style. There is one western style toilet each in the men's and women's bathrooms on the first floor of school building. Water to flush the toilets was delivered from the swimming pool by a bucket brigade until the water system was repaired.

The following portable toilets were installed; 15 Japanese style, 1 western style, 3 disabled stalls, 2 for inside. The portable toilets were avoided because they had stairs and fear of a possible aftershock. The western style toilets were not used as much as the Japanese style because the majority of the evacuees were elderly and they were used to using the Japanese style on a routine basis since this was the custom in the region.



**Look of temporary toilets setup**

### {Bathing}

The Japan Self-Defense Force established a temporary bath house at a park close to the school. After the water system was repaired, evacuated residents were transported by a shuttle bus to the community bath in the third sector enterprise hotel "View Sunset". A shuttle bus service was also provided when the evacuated residents were offered to use the hot spring water bath in Wakura hot springs.

### {Electricity, water, and gas}

Water from a water supply vehicle or bottled water was used from 25 to 30 March until the water system was repaired. The sewage system in Monzen-Higashi elementary school and Monzen lower secondary school areas were heavily damaged but there was no damage at Monzen-Nishi elementary school.

The Monzen-Nishi elementary school had no problems using gas power because their system was fueled by propane.



**Tank from small water supply vehicle was settled on the ground and refilled with water every morning  
Water was separated for drinking and washing (left: drinking, right: washing)**

**{Method of transmitting information}**

Cellular phones were used to communicate between the on-site staff of the local government office and the disaster countermeasures headquarters. Phone lines were disconnected in the immediate aftermath so a pre-existing cable broadcast was used to disseminate information to the community in The Monzen District.

In the Monzen-Nishi elementary school only the teaching staff room had a telephone. Therefore telephones only for outgoing calls were installed for the evacuees to use. Since the telephone in the teaching staff room was the only way to receive phone calls, the school staff was on phone duty standing by for incoming phone calls.

There were not so many announcements to make to the evacuees. However the evacuees were dispersed in gymnasium and classrooms so the phone duty staff had to go around to find someone if they received a phone call.

There were not many people who were able to bring a radio or television with them to the evacuation facility. Most people didn't bring anything with them so a newspaper distributed in the facility was the only source to obtain any updated information. Television was very important to provide breaking news after the earthquake but there was no cable or receiver for television signal in the gymnasium and it took a long time to install a television from scratch. The on-site staff of the local government made a comment that cable for a television should have been placed in gymnasium where the primary evacuation area is.

**{Heating}**

Although there were many community halls and meeting places that had heaters and tatami mats, the evacuation site of Monzen-Nishi elementary school did not have a heating system. In the beginning, it was still cold even though each person had a few blankets. Portable heaters were located but it was not enough to heat the whole gymnasium. The situation got better later on when a supporting vendor company offered Styrofoam sheets to spread on the floor. The supporting vendor company also installed a pipeline system to deliver hot water to heat the area up but it didn't work for the people who stayed away from the pipeline. The small floor windows were open for about 20 minutes in the morning for ventilation but it accelerated the coldness.



**Styrofoam sheets placed on the floor of gymnasium**

### **{Lighting}**

All the lights were turned off at 21:00 in the gymnasium. The on-site staff of the local government brought a small desk light from home to use as indirect lighting for people who needed to go use the toilet after the lights were turned off.

### **{Privacy and noise}**

Some evacuees suffered from lack of sleep because of the noise of people coming and going from the toilet after the lights were turned off. Also some people were woken up by the noise of the newspaper being delivered. Since most of evacuees were elderly and were already familiar with each other, they wanted to stay together in one area of gymnasium so privacy was not an issue. Cardboard partitions were not used for privacy because they would take up too much space and the elderly people felt insecure if they could not see what was going on in the gymnasium. After the number of evacuees in the gymnasium decreased, cardboard partitions were set up and allowed for privacy when changing clothes.

### **{Outbreak of infectious gastroenteritis}**

The cold and insufficient sanitary countermeasures were the most likely cause for the outbreak of infectious gastroenteritis. Infectious gastroenteritis caused intense diarrhea and severe vomiting. It took the younger people 3-4 days to recover and the elderly took a week to recover. The patients were isolated in a classroom on the 2<sup>nd</sup> floor to avoid the spread of the disease. School buildings and the gymnasium were sprayed for sterilization and people were instructed to wash their hands when they went in and out the evacuation facility.

### **{Others}**

A smoking area was designated outside the building and drinking alcohol was prohibited inside the facility. It was stressful because the media reporters often visited and sometimes they came inside to take pictures without permission bypassing the limit of media coverage.

### **{Response to physically challenged people}**

There was nobody who was in a wheelchair among the evacuees in Monzen-Nishi elementary school so there was no difficulty in supporting. The Wajima municipal government regularly kept track of elderly residents in the district and had a map showing houses where the elderly people lived called “Map of elderly and disabled residents”. The local government social workers visited those residents using the map after the earthquake to ensure their health condition and if necessary escorted them to hospital or evacuation site.

### **{Pre-stock of necessary supplies}**

Emergency supplies such as water, food and medicine are centrally stocked in Wajima city so that the inspection and control of supplies are conducted effectively. Therefore, there are not supplies stored at each evacuation site. The local government transported the necessary supplies to each evacuation site and distributed them with the help of the Japan Self-Defense Force and local volunteers. The prefectural government coordinated for the acquisition of supplies they did not have. Some vendor companies offered or volunteered to get the necessary supplies.



**Supplies sent to evacuation facility**

## **③ Operation of evacuation site**

### **{Structure of operation}**

The on-site staff of the local government office played a role in conducting the primary operation of the evacuation facility. The school teaching staff supported with preparation for establishing the facility, answering phone calls during the period of evacuation facility operation, and cleaning up after the closure. An operation office was not established but instead a corner of gymnasium with a desk and a chair performed an equivalent role.

It is assumed that the situation did not get to the point where an operational structure of evacuated residents needed to be established since the period of evacuation site operation was not very long.

### **{Accepting volunteers}**

In Wajima city, volunteers were accepted at the disaster countermeasures headquarters. 5-9 volunteers had served for cleaning at Monzen-Nishi elementary school from 30 March to 2 April. After 2 April, volunteer activities were limited in the evacuation facility due to an infectious disease outbreak.

### **{Disaster prevention drill}**

The Town of Monzen had never conducted a disaster prevention drill. Once they became a part of Wajima City, they conducted their first drill. Since the residents were already familiar with the evacuation methods the evacuation went smoothly.

The establishment and operation of the Monzen-Nishi elementary school evacuation facility went smoothly because of the appropriate responses by the evacuation site staff and the strong mutual relationship among the local community. However, the emergency site staff commented that it is important to create evacuation facility operations manual and to facilitate a drill for evacuation facility operation.

#### ④ [4] Restart of school educational activities

A decision was made in the beginning of April to postpone the school enrollment ceremony that was originally scheduled to take place on 4 April to 9 April. As a result the local government thought of a prompt restart of school education and evacuated residents' health first, evacuated residents were moved to the third sector hotel "View Sunset" on 5 April. Evacuated residents would rather stay in a hotel which allowed the evacuation center to close smoothly..

Once the facilities were closed, they were immediately sprayed for sterilization under the supervision of public health institute to ensure that no student got infected after school started.

Serving as an evacuation facility had a minimal impact on the school because of the previously detailed actions.

#### (Reference)

##### Summary of the 2007 Noto Peninsula Earthquake i (Meteorological Office)

1. Date and time of occurrence: 25 March 2007 about 9:42

2. Location of the epicenter: Offshore of Noto Peninsula

3. Depth of the epicenter: 11 km

4. Magnitude: 6.9

5. Intensity at each location (Intensity 5 lower and above)

Intensity 6 upper: Nanao, Wajima, Anamizu cities in Ishikawa prefecture

Intensity 6 lower: Shiga, Nakanoto, Noto cities in Ishikawa prefecture

Intensity 5 upper: Suzushi city in Ishikawa prefecture

Intensity 5 lower: Hakui, Houdatsushimizucho, Kahoku cities in Ishikawa prefecture

Toyama, Namerikawa, Himi, Oyabe, Imizu cities and Funahashi village in  
Toyama prefecture

Kariba village in Niigata prefecture

##### Damages caused by the earthquake in Wajima city

- Deaths and injuries in Wajima city: 1 Death, 111 Injured (as of 18 June 2007)
- Building damage in Wajima city: Complete/half collapse 1,512 buildings (11.43% of total)  
940 out of the 1,512 damaged buildings were in the  
Monzen district



## II School facilities utilized as evacuation sites for the Niigata Prefecture Chuetsu offshore Earthquake

The Niigata Prefecture Chuetsu Offshore Earthquake, 16 July 2007  
The earthquake occurred on 16 July 2007 at approximately 10:13 (Magnitude 6.8)  
Maximum seismic intensity 6 upper (Nagaoka, Kashiwazaki cities Kariya village in Niigata prefecture, and Iizunamachi in Nagano prefecture)

### 【Summary of research in Kashiwazaki city】

#### Summary of evacuation sites

- Thirty two designated evacuation sites out of a total of 82 sites in Kashiwazaki city were school facilities. Four out of the 32 sites were prefectural schools that establishers were different.
- The average time a school served as an evacuation site was 23 days and the longest was 41 days.
- Total number of evacuees at peak within the city was 11,000 persons. The maximum number of evacuees displaced at the school was 4,000 persons.

#### Actual conditions of disaster prevention capability at the school designated as an evacuation facility

##### □ Functions required for an evacuation facility

- The primary evacuating location at school was the gymnasium as the primary location evacuees were temporarily housed but other parts of the school were used for reasons other than living.
- Although damage to the toilets and sewerage system were minimal, the toilets were unusable because of a water outage.
- Additional lighting devices were acquired because there was no light in temporary toilets.
- A temporary bath house was provided by Japan Self-Defense Force. They also provided a transportation service for evacuees to go to take a bath at different locations offered for use in the surrounding area.
- Even though there was a shower room in gymnasium, it was not used by evacuees because the shower was not normally used.
- Infrastructure was restored in the order of electricity, water, and gas. The restoration caused food distribution to stop.
- Initially there was no telephone facility in the evacuation facility so the telephone in the teaching staff office was used. This caused the staff to be busy with taking phone calls and messages.
- Since the earthquake occurred in the summer,, measures against heat were considered such as installment of air conditioners and the distribution of drinks to prevent heat stroke.
- An outside transportation company was hired to sort and distribute supplies quickly because there was difficulty managing the storage area.

##### □ Operation of the evacuation site

- Staff from the local government office operated the evacuation facility on a daily rotating basis. They were backed up by the staff from both the prefectural and municipal government offices.
- The staff from the local government office was dispatched to operate the evacuation facilities at the prefectural high schools.
- Since the operation staff worked at a daily rotating basis, people complained that it was hard to distinguish who the operating staff were.
- The evacuated residents were not familiar with the operating staff so the self-help structure was not function effectively at the evacuation site.

##### □ Impact on school education

- The closing of evacuation sites was done primarily from the school facilities.
- The earthquake occurred just before the school's summer vacation started. The evacuation sites were completely closed by 31 August when the school's summer vacation ended. Therefore the impact on the school's educational activities was minimal.

# Research on school facilities that were utilized as evacuation sites after The Niigata Prefecture Chuetsu Offshore Earthquake

## 1. Summary of research

An earthquake of a 6.8 magnitude occurred offshore of the Joetsu/Chuetsu in Niigata prefecture on 16 July 2007. It had an observed intensity of 6 upper in Kashiwazaki, Nagaoka, and Kariba cities in the Niigata Prefecture. The earthquake caused the most damage in Kashiwazaki city where 28,000 building collapsed. At the peak over 11,000 residents were forced to live in school facilities or community centers. An investigation on how the evacuation facilities were utilized and its' conditions and responses was conducted. An inquiry survey was given to the local government disaster prevention representatives on 29 November 2007, 21 and 22 January 2008.

## 2. Location of evacuation sites in Wajima city and the process of how they were established (Facilities designated as evacuation sites)

The Kashiwazaki City community disaster prevention plan states that the athletic grounds and city parks are designated as “evacuation sites” and public facilities such as schools and community centers are designated as “evacuation sites”.

Public elementary and lower secondary schools are all designated as evacuation facilities. After a disaster has occurred, the gymnasium is to be used as the primary location so that school education doesn't get influenced by the facility operations. As for prefectural high schools and private colleges in Kashiwazaki city, the schools will be designated as an evacuation site upon making an agreement to use them.. When establishing an evacuation site, municipal elementary and lower secondary schools are primarily used. If the demand exceeds the provided space then prefectural schools are used.

**Chart 1 Facilities that are designated as evacuation facilities in the Kashiwazaki community disaster prevention plan**

		Designated number	
School facility	Municipal lower secondary school	39	50
	Prefectural high school	8	
	Private university	3	
Kindergarten		23	
Community center		28	
Other public facility		100	
Community facility		1	
Total		202	

Emergency supplies in Kashiwazaki city such as food, water, blankets, and portable toilets are dispersed in 7 different storages sites and schools. Generators and lighting equipment are stored in each community center so that they can be inspected.

### (Establishment of evacuation facility and the operational methods)

According to the manual for evacuation facility establishment and operation created by Kashiwazaki City, the local government office staff who lives nearby the designated school or community center (2 staff per 1 facility) will keep the keys to the facility.

When an earthquake with intensity over 5 lower occurs at night or on the weekend, the staff immediately goes to open the facility.

In principal, the operation of evacuation facility is conducted by the local government office staff. The local government office staff that keeps the keys to the facility will inspect the safety of the facility immediately after arrival and take control of the operation until another staff arrives for a shift change.

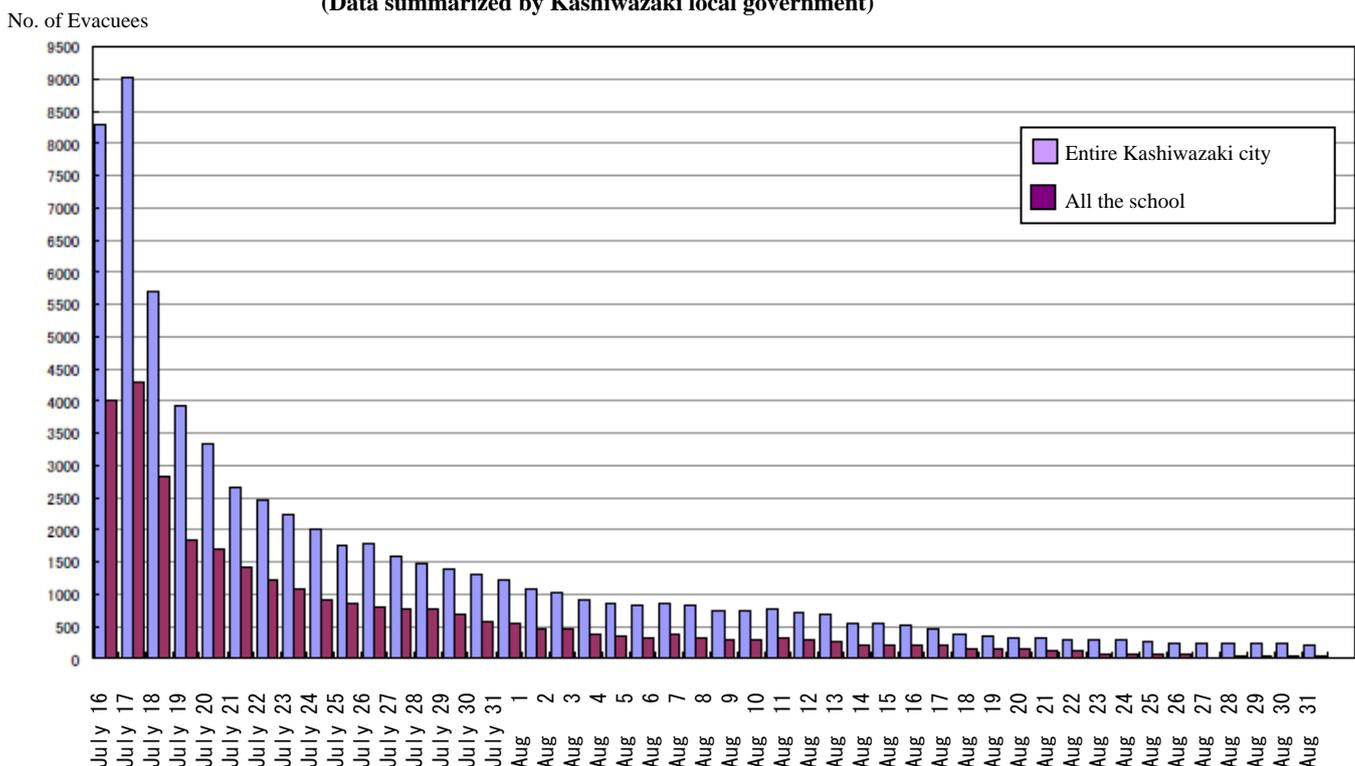
### 3. How evacuation facilities were established in Kashiwazaki City after the Niigata Prefecture Chuetsu Offshore Earthquake

When the earthquake happened, 82 designated sites were designated as evacuation facilities. There were 27 elementary and lower secondary schools, 4 prefectural high schools, and 1 public kindergarten used as evacuation facilities. An additional 4 prefectural high schools in the city were turned into evacuation facilities at the request of the local government office through the prefectural government disaster prevention section. The establishment of evacuation facilities was initiated once the local government office staff arrived at the prefectural high schools. Other than general evacuation facilities, 6 welfare evacuation facilities were established. Two of the facilities were established using one of the school buildings.

The residents of Kashiwazaki City had the option of evacuating to either a school or a community center. Many people had to change locations because the facility that they chose first was already full. There were 11,000 residents at most evacuated to the facilities. Out of the 11,000 evacuees 4,000 stayed in school facilities. The most number of people in the school gymnasium was 500. The closing of evacuation facilities at the school was facilitated preferentially while repairs were made to the infrastructure and temporary housed were being constructed.

The average duration of an evacuation facility operation in the city was 25 days and the maximum was 47 days. Among these, the average duration at school facilities was 23 days and the maximum was 47 days. The rest of evacuees were moved to Japanese-style inns rented by the local government by 31 August when all the evacuation facilities were closed.

**Figure 1 Change in No. of evacuees in Kashiwazaki city (Data summarized by Kashiwazaki local government)**



#### **4. Actual condition of the disaster prevention capabilities of the school facility evacuation site**

##### **(1) Safety of the facility**

There are 39 public elementary and lower secondary schools and 8 prefectural high schools in Kashiwazaki City that were designated as evacuation facilities. Although there were no school facilities extensively damaged by the earthquake, evacuation facilities at 2 elementary schools were closed due to uncertainty of the safety of the school buildings. One of the elementary schools had a possible floor sinkage in gymnasium and another elementary school had a window frame distortion that could have resulted in falling glass. The evacuation facilities were closed between 6 and 10 days after earthquake.

##### **(2) Functions required for an evacuation facility**

###### **1) Spaces to use as evacuation facility**

The gymnasium was utilized for evacuated residents at schools that were evacuation facilities. A facility operations office, a small spaces for the school nurse, staff room for evacuation operations, a break room for volunteers, a changing room and a breast feeding were needed in addition to a temporary living area for evacuees. Room assignments were determined depending on conditions such as easy access to the gymnasium or outdoors, availability to compartmentalize rooms so regular school activities would not be effected and so on. The gymnasium and the surrounding classrooms were utilized at a majority of the designated schools. Rooms that were assigned included a special classroom that had a lot of space available, a conference room, and a meeting room that did not have desks or chairs inside.

A place to use as storage space for food and a rescue supplies where they could be properly maintained and accounted for was also needed. Since the supplies were located in the hallway or on the gymnasium stage, some of the supplies were lost. Supplies were provided to local residents who were not staying in the evacuation site. Therefore, to avoid confusion, 2 separate distribution points were established. Furthermore, outside areas such as the school ground and schoolyard were used for temporary toilets and a bath house, as well as for the Japan Self-Defense Force to support with cooking and food distribution. An outside area with a roof top was used to transport supplies both in and out and for storage. The operation staff at the evacuation site sent a request through the local government disaster prevention section to the school principal who is also the chief of administration for use of these spaces.



**Gymnasium being utilized as evacuation facility**

## 2) Capability of necessary facilities

### [1] Toilet and bath

#### (Toilet)

Most of the school gymnasiums in Kashiwazaki City have toilets inside but toilets in some of the school gymnasiums were out of order due to either a lack of water or damage to the sewage system. Evacuees used the toilets without water by using water brought from the swimming pool or a water storage tank. Toilets that had damaged sewer pipes were not used to prevent the backflow of sewage. The sewage system was repaired quickly by using alternative plumbing. This was the result of a lesson learned from The Mid Niigata Prefecture Earthquake in 2006 where the repair of the sewage system was delayed.

The local or prefectural government coordinated with outside companies and leased 5-6 toilet stalls at each evacuation facility. Western style toilets were requested but there were not enough western style toilets to cover all the evacuation facilities at first. A toilet was located inside in a corner of the gymnasium or at the entrance of the building to provide easy access for disabled people. Alley lights were leased to provide lighting for the toilet stalls that did not already have it. The local government prepared hand-carrying toilets but the evacuees would not use them. There was no problem for the evacuees to go outside to use the toilets since it was summer time.

#### (Bath)

The Japan Self-Defense Force (JGSDF) deployed a temporary bath house at 27 school grounds in the city. They also provided a transportation service to facilities that offered evacuees a place to take a bath. Since it was summer time, it was possible to wipe the body with a wet towel. The frequency of the shuttle service to the local accommodation facilities was fewer when compared to the Mid Niigata Prefecture Earthquake. Not all of the schools in Kashiwazaki City had a shower room in gymnasium. Some school only had showers in the swimming pool building. Even though there was a shower room in the gymnasium, it was not frequently used because the evacuees were not familiar with how to use it.



Temporary bath that JGSDF deployed

## **[2] Infrastructure**

Because of the earthquake, 23,000 households suffered from power outages, 40,000 households suffered from water outages, and 30,000 households suffered from gas outages in Kashiwazaki City. Electricity was completely restored on 18 July (2 days after earthquake) and water was completely restored on 4 August (19 days after earthquake). Gas was the last utility to be restored and it was completely restored on 27 August. The gas took a long time restore because each household had to be visited by a gas engineer. The engineer had to open the gas cock to get it to work while simultaneously inspecting to make sure that there was not a gas leak. The complete recovery of infrastructure was the reason food was not distributed to anyone but evacuees.

## **[3] Methods of transmitting information**

After the earthquake, there were no problems with telephone lines. The internet cables were also not damaged so the on-site operational staff was able to send reports via email.

Because there is a nuclear power plant in Kashiwazaki City, each school and household is equipped with a wireless receiver for public announcements which the local government used to transmit announcements after the earthquake. The announcements were also made through outside speakers but they were hard to hear due to the noise caused by the Japan Self-Defense Force and the mass media. Announcements from the local government were also made by the local FM radio station as needed.

Communication between the evacuation facility operations staff and the local government countermeasures headquarters was made via private cellular phones. There was no common telephone or FAX in the gymnasium, so various kinds of phone calls came in to the telephones in the school teaching staff office. Since the school teaching staff office and gymnasium are not located together, the staff was busy taking phone calls and conveying messages. Later, telephone capability was established in the gymnasium.

Community centers and the local government office were equipped with intranet so they could communicate with each other. At this earthquake, the intranet was not used because the staff that the local government sent for site operation had not been trained on how to use the intranet and therefore did not know how to use it.

## **[4] Indoor environment**

### **{Coping with the heat and an appropriate indoor environment}**

The earthquake occurred in summer so counteracting the heat was a major concern. It was difficult to find any large air conditioners to lease quickly because they were already leased to campaign offices for the upcoming election. There were 96 air conditions (200V) donated by U.S. Forces. The air conditioners were installed in the evacuation facilities including Kashiwazaki elementary school. The temperature control was carefully considered because of the different body temperature between young and elderly people.

The air conditioners were not enough to control the heat so several ice pillars (50cm X 20cm X 20cm) were located in each evacuation facility. The ice pillars were not very effective in controlling the heat but they contributed a visual influence and were utilized to cool drinks. Chilled gel sheets and cool drinks were distributed to protect against heat stroke. Cloth curtains were installed over the windows in gymnasium to provide shade.

A local vending company donated partitions so that people could have some privacy but, they were not used because it would cause poor air circulation.

After the Mid Niigata Prefecture Earthquake 3 years ago, evacuated residents who drove to the evacuation facility and stayed in their vehicle developed pulmonary thromboembolism (also known as the economy class syndrome). This time the earthquake occurred in the summer so there was no problem for the people to get outside of their cars to walk around.

### **(Countermeasures against sanitary and health problems)**

Because it was summer a great deal of attention was paid to ensure that the facility was sanitary. A large amount of disinfectant donated for use and was distributed to each evacuation facility.

There was an issue with the sewage giving off a bad odor. Cooking by Japan Self-Defense Force and volunteers caused drainage and waste to soak into the ground and give off a bad odor. Over time, the sand on the ground was removed. Trash containers with a lid, strainers, and buckets were provided to take care of the leftover food.

At some evacuation sites, screen windows and mosquito-repellents were used to block mosquitoes and flies.

### **(5) Response plan for physically challenged people**

Initially the physically challenged people were evacuated to a designated evacuation facility. Several days after the earthquake, a welfare evacuation facility was established to better care for the physical symptoms, physical abilities, and the life style of the physically challenged. The welfare evacuation facility was operated by outside companies that provided a nursing service requested by the local government. The welfare evacuation facility was established within the school property of Kashiwazaki elementary school and Kashiwazaki prefectural high school.

### **(6) Acquiring and stocking supplies**

#### **(Food)**

The Japan Self-Defense Force cooked and distributed food using their own equipment so that the school kitchen did not have to be used.. Hardtacks were the first food to be distributed then bread and rice balls. A box meal was not provided because of concerns with sanitation during the summer. At some evacuation sites, the first meal was delivered at about 23:00.

Food was also provided to local residents who were not staying in the evacuation facility. Since food was distributed to residents both inside and outside shelter, this caused problems with distribution.



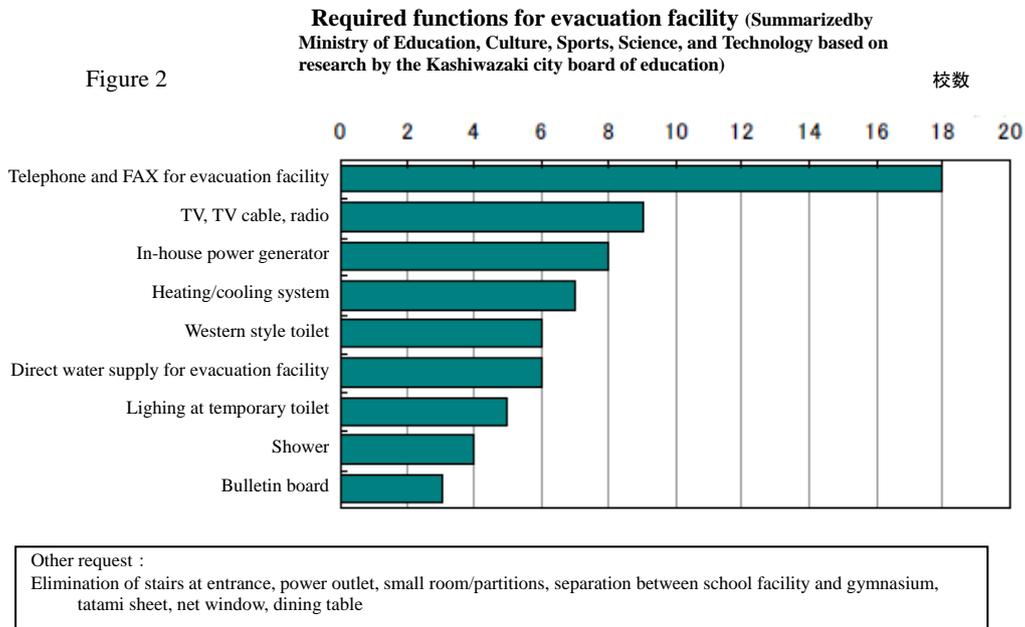
**Food was sent to evacuation facility**

**(Acquisition and distribution of supplies)**

The general public sent supplies to the evacuation facilities even though an announcement made on the internet told them the supplies would not be accepted. More storage areas were set up as the supplies increased and 15 storages areas were eventually set up. Since expeditious sorting and distributing supplies was not possible, the local government delegated the job (including shipment as necessary) to an outside transportation company. As a result, the distribution of supplies went smoothly, but balancing supply and demand was difficult. There were complaints that different kinds of supplies were available at different evacuation sites. The Japan Self-Defense Force was completely in charge of the delivery and distribution of supplies at each evacuation facility.

**3) Result of inquiry survey on necessary capabilities**

The Board of Education in Kashiwazaki city conducted an inquiry survey on capabilities that an evacuation site needed to have. The survey was given to the school staff at 22 public elementary and lower secondary schools where an evacuation facility was actually established. The most common response was that telephones and a FAX needed to be installed in the evacuation facility. Other common responses about what capabilities were necessary were a television, television cables, and in-house generator.



**(3) Operation of evacuation facility**

The staffs from the local government office will operate the evacuation facility according to the community disaster prevention plan in Kashiwazaki City. The staffs went to the evacuation facility closest to their home to establish the evacuation facility immediately after the earthquake. The whole city was damaged by the earthquake this time. Therefore a total of 82 evacuation facilities were established and it took a large number of local government staffs to conduct the operation. From the second day, the operation of evacuation facilities was facilitated with the cooperation of prefectural government staffs. Local government staffs worked 24-hour shifts. At some facilities, a briefing was given by the chief of operations, teaching staff, health nurse, and volunteers at shift change. Since the operation staff rotated on a day-by-day basis, people complained that it was hard to distinguish who the operating staffs were.

### **(Participation of school teaching staff in the evacuation facility operation)**

Immediately after the earthquake, the school teaching staff ensured the students' safety, psychological care, and school route safety. The school staff took a stance of supporting the local government staff in site operation. There was a necessity to enter the school teaching staff office to use the telephone and other devices so the school staff, including the principal and the vice-principal, stayed on 24 hour stand-by to respond to the requirement. As the operation of the site headed in the right direction, the teaching staff's overnight shift was gradually decreased.

### **(Evacuation facility at schools of different establisher)**

It was the first time that prefectural high schools were used as evacuation facilities. The prefectural high schools were utilized for the accommodation of volunteers (Kashiwazaki Tokiwa high school) and as the cantonment area for the Japan Self-Defense Force (Kashiwazaki Industrial high school). The local government and the prefectural high school rarely communicated on a daily basis. Figuring out how to communicate while the evacuation site was being established was confusing. Once the evacuation site was established, there was no significant confusion because the local government staff were sent to take the responsibility of operating the site.

### **(Health care administration)**

The prefectural health institute, being enhanced with health nurses from different prefectures, sent 2 health nurses to each evacuation facility. The health nurses worked on the prevention of injury and psychological care. The prefectural government also formed medical teams to visit each evacuation facility and the local community. The team focused on finding pulmonary thromboembolism, heat stroke and mental diseases. The team had their operational headquarters at "Genkikan" (welfare evacuation facility) and small bases at several locations in the city that local residents could visit. The conference room at Kashiwazaki elementary school was one of the bases.

### **(Self-governed disaster prevention organizations)**

The ratio of citizens organizing their own disaster prevention group immediately after the earthquake was 41%. Activities were all different by the group. It was when local population started to organize disaster prevention groups by each community with subordinate neighborhood associations underneath to work on disaster prevention activities locally by taking the experiences from the Mid Niigata Prefecture Earthquake. The administrative staff at community centers, who usually communicate with the residents on a daily basis, participated in the operation of evacuation facilities. The facility operation joined by the self-governed disaster prevention organizations went smoothly. The facility operation at schools were not able to utilize the self-governed disaster prevention organizations very well because there were a large number of people at school facilities and the local residents were not familiar with the local government staff who changed shifts every 24 hours.

### **(Accepting volunteers)**

The social welfare council established a volunteer center to manage the reception and dispatch of volunteers. There were a decent number of people who went directly to the evacuation facilities to provide help so it was difficult to figure out the actual number of volunteers and their activities. For the reason the volunteer center had a difficult time obtaining information on which evacuation center needed volunteers. There were some evacuation facilities that had too many volunteers and others did not have enough.

### **(Coping with the mass media)**

The influence of mass media is important in regards to providing various kind of information to a broad area. It plays an important role but as a result of broadcasting only certain evacuation facilities, rescue supplies were only sent to the evacuation facilities the media covered. Complaints were made by the other facilities.

In general, taking photographs from inside of the evacuation facilities was forbidden but some reporters did it anyway. Therefore the basic rules were made as “To take pictures of the back of evacuees is permitted but permission is required when taking a picture of face”. Taking pictures from the entrance was allowed but taking pictures from inside the facility was off limits”

### **(4) Impact on school education**

The earthquake occurred just before the start of the school’s summer vacation. The evacuation sites were completely closed by 31 August. Therefore the impact on school educational activities remained minimal. (The Mid Niigata Prefecture Earthquake occurred on October 3 years ago and it affected physical education classes)

The closure of evacuation sites was done primary from school facilities. As the number of evacuees decreased, the remaining evacuees were moved from the school to the community center. The local government rented rooms in Japanese style inns for the last of the evacuees to move to so that the evacuation centers could be completely closed on 31 August. Schools began to restart on 27 August. The starting ceremony for the second semester was put ahead a few days at some schools for the start of summer vacation. Utilized buildings were returned by recovered once the evacuation facilities had been closed and The Japan Self-Defense Force redeployed. Completely restoring the school ground as it was before the earthquake was difficult because heavy vehicles drove in and out the area. The ground tends to puddle after rain in the wake of the earthquake.

## 5. Summary of schools where the inquiry survey was conducted

### (1) Kashiwazaki elementary school evacuation facility

Address: 1-88, Gakkouchou, Kashiwazaki-shi

Summary of the facilities utilized: School building Reinforced concrete 4-story building, 7,629 m<sup>2</sup> Built in 1973 (Seismic reinforcement in 2002)

Gymnasium Steel structure one-story building, 1,261 m<sup>2</sup> Built in 1975 (Seismic evaluation in 2000 with a result of IS-score 0.8, q-score 0.5)

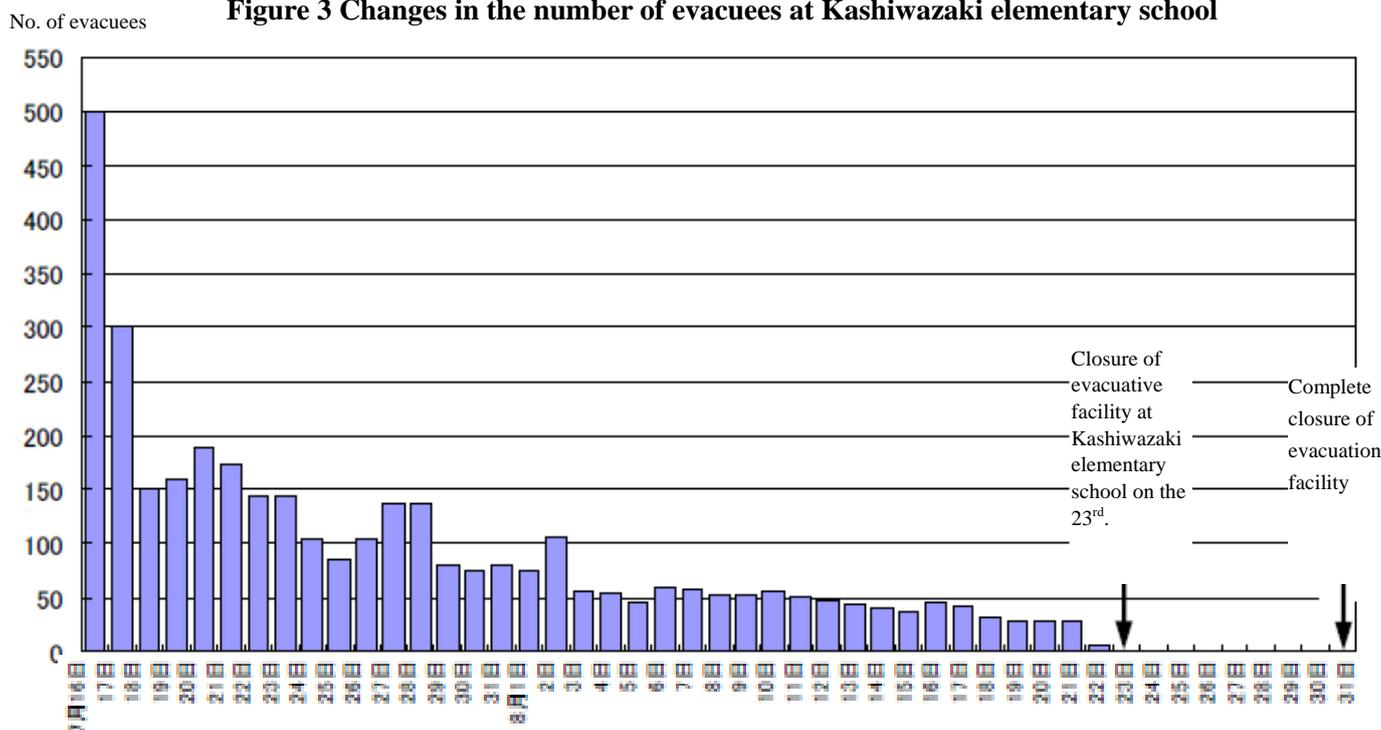
Duration of evacuation facility operation: 39 days (16 July to 23 August)

The maximum number of evacuees: 501 persons (16-17 July)

Damage condition by earthquake: Mild (Damage to the expansion joint and etc)

Distinctiveness of evacuation facility: Located in the center area of downtown. The building is surrounded by the Daiichi lower secondary school, Kashiwazaki high school city hall and other public facilities. The evacuation facility that was covered frequently by the mass media. The school is designated for use as a pre-positioned storage site in the community disaster prevention plan. A welfare evacuation facility was co-located

**Figure 3 Changes in the number of evacuees at Kashiwazaki elementary school**



### Conditions at evacuation facility

The school was unlocked by the vice principal who lives nearby and was the first person on the scene. The local government staff in charge of establishing the evacuation facility arrived five minutes later and 2 local residents had already evacuated to the school. The local government staff prepared the facility and the school vice-principal did a safety inspection. Damage to the school buildings was mild but a majority of lockers were broken.

The gymnasium was used for evacuees' living space. The school dispensary was used as a counseling room. The conference room was provided to the Japan Red-Cross to use as an aid station and a nurse station. The music classroom and library were used as break rooms for the operational staff and volunteers. The school parking lot was used by The Japan Self-Defense Force for the cooking and distribution of food and as a temporary bath house. Pilotis was used for supply storage and distribution. The school ground was used for The Japan Self-Defense Force to park the vehicles.



**Counseling room for easing minds**



**Utilization of pilotis**

On the first floor of the north school building a children's club and welfare facility for the aged were set up using excess classrooms. There were 10-16 beds were set up in these rooms and music classroom #1 for use as a welfare evacuation facility. The Meisho private kindergarten was temporarily closed due to the damage caused by the earthquake so the playroom and music classroom #2 were offered to use as a temporary kindergarten. There was also utilized as an entrance for the welfare facilities.

Meeting room #1 on the second floor was offered to ensure that the evacuated children have rooms to play in and study during summer vacation. A temporary living facility was established for 2 weeks with help from volunteers from The Jochi Educational University and local parents.

There were western style toilets in the mens and womens restroom, and also one for disabled people in entrance hall. There was no damage to the toilets or the sewerage system but water from the swimming pool next to gymnasium was used due to a water outage. Temporary toilets were expanded to 20 stalls the next day. Western style toilets were set up 4-5 days after the earthquake. Hand sanitizers were placed outside of the temporary toilets.



**Temporary toilet**



**Hands sterilization area**

To cope with the heat, 6 air conditioners donated by U.S. Forces were installed in the gymnasium and window curtains were installed for shade.

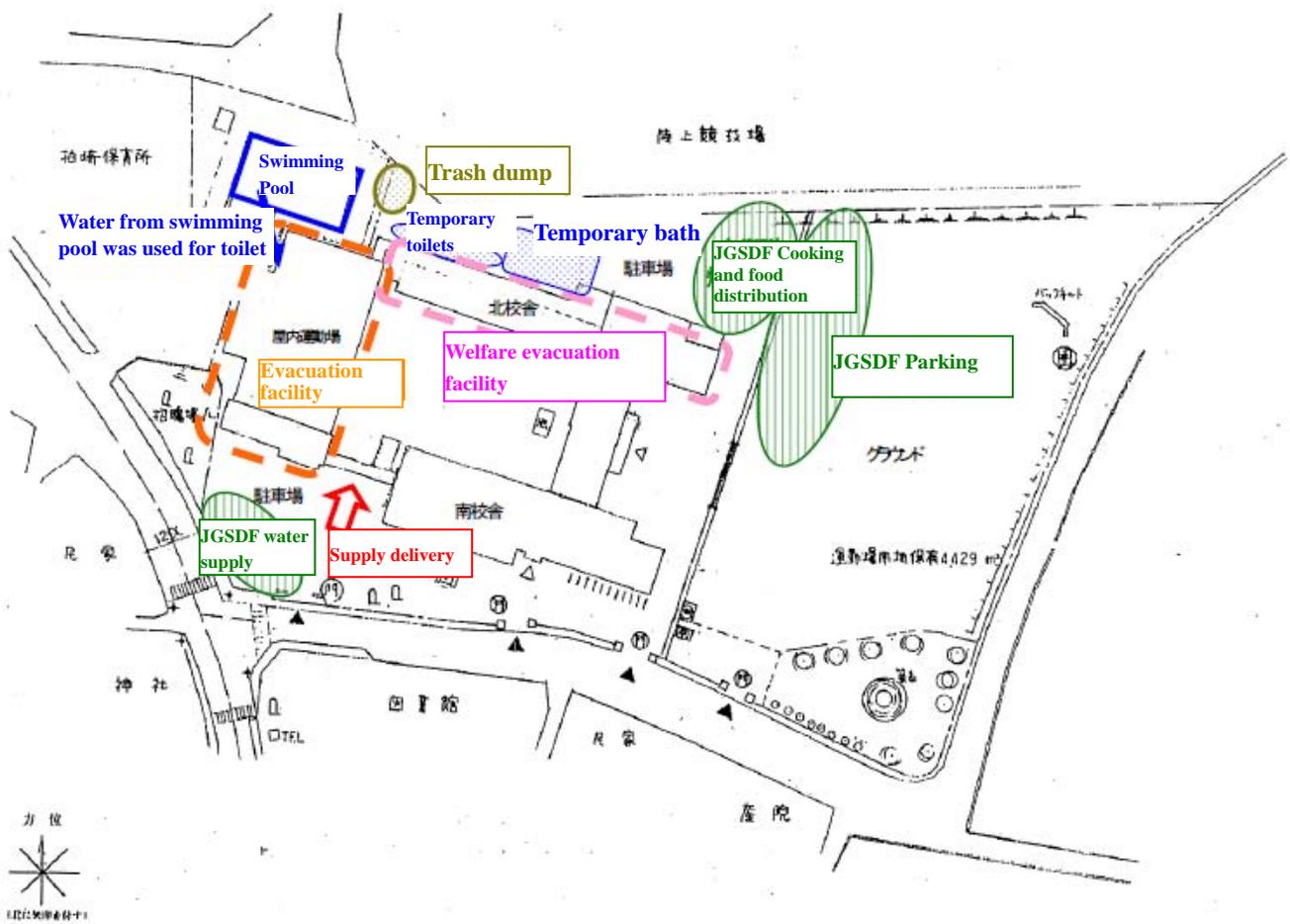


Figure 4 Layout of the evacuation site at Kashiwazaki elementary school



JGSDF vehicles on the school ground



Spaces for temporary bath and food distribution set up by JGSDF in north parking

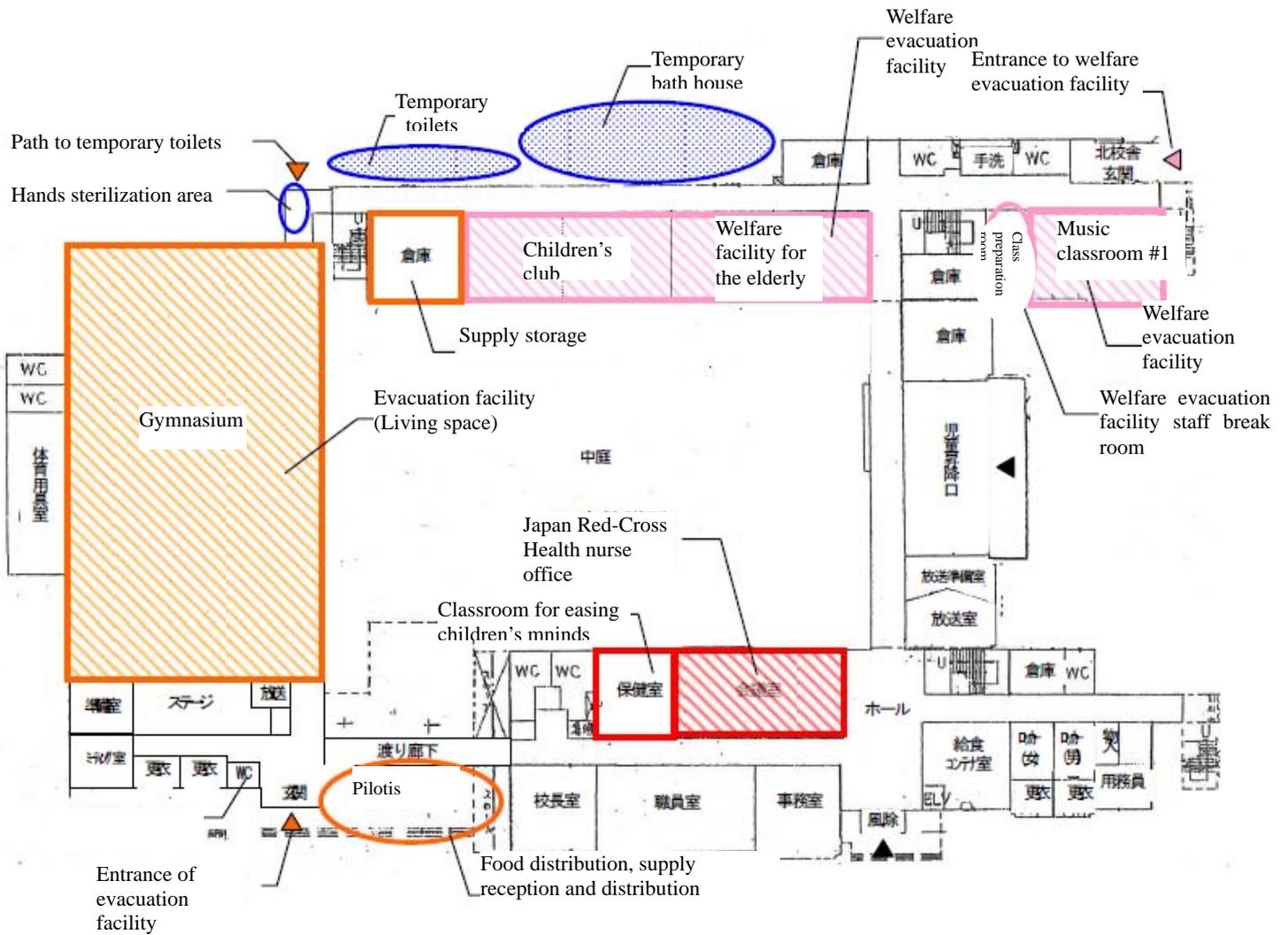


Figure 5 Layout of Kashiwazaki elementary school evacuation site (1<sup>st</sup> Floor)



Supplies piled up in the hallway



Supplies pile up in pre-positioned storage

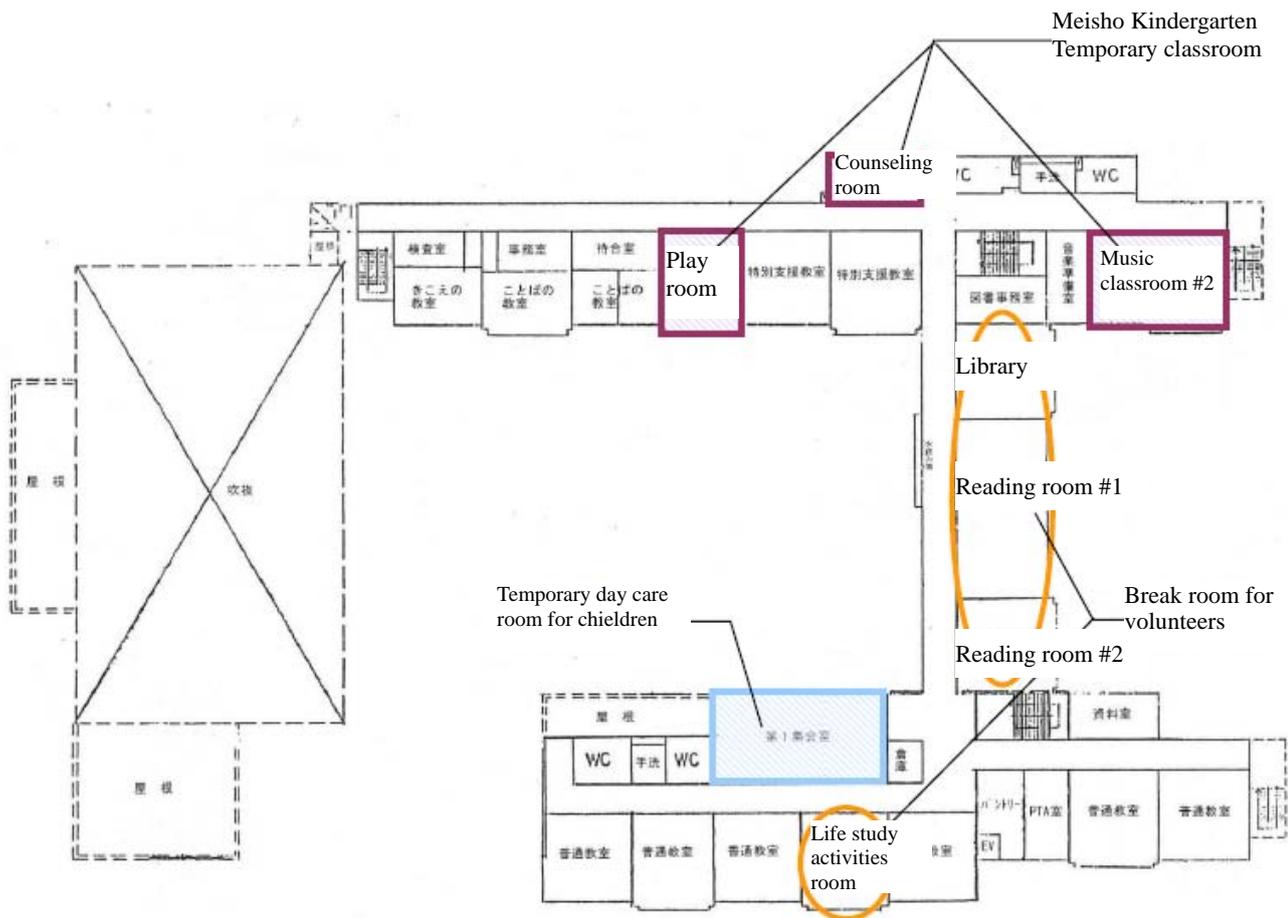


Figure 6 Layout of the evacuation facilities, 2<sup>nd</sup> floor of Kashiwazaki elementary school building



Temporary classroom of Meisho kindergarten





**Look of gymnasium**



**Tents in the ground**



**Entrance of evacuation facility**



**Look of lunch room**

Futada elementary school uses purification cistern merger processing system for drainage. The purification system did not get damaged but when the water in the storage tank was gone the toilets were not usable due to a water outage. Therefore use of the toilet was limited to just the disabled people and water from the swimming pool was used. When the water supply was restored on 23 July, the toilets in the gymnasium became usable.

Temporary toilets were installed before nightfall after the earthquake and cleaned once every other day. The temporary toilets were not equipped with lights. It took a long time to contract for lights to be installed in the temporary toilets.. Initially a light bulb was set up using in-house generator and later alley light was leased to light the whole toilets area. Hand-carrying toilets were not pre-positioned so they were obtained afterwards as a part of rescue supplies.

The Japan Self-Defense Force set up a temporary bath house on the school grounds on 19 July. In the beginning, it was separated by genders but later the usage was separated by time schedule. Water for the bath house was taken from Bessan River flowing nearby the school. There was left over bottled water from rescue supplies so it was used for face washing.



**Temporary bath that JGSDF deployed**

Immediately after the earthquake, a generator was contracted for temporary use on the first night due to a power outage. On the second day, a generator vehicle arrived and electricity was backed up only in the school building.

The disaster prevention public administration radio equipped in the school teaching staff office was broken. The radio was installed in the teaching staff office (for the school staff) and the gymnasium (for the evacuation site) after 3-4 days. Announcements that were transmitted through the public administration radio were also posted on the bulletin board as necessary.

Communication with the local government disaster prevention countermeasures headquarters was done initially by using the telephone in school teaching staff office. Temporary telephones for the evacuation facility were installed in the gymnasium on 22 July. The school television was set up in



**Cool air is blowing into gymnasium from air conditioning vehicle**

The evacuation facility operations were conducted primarily by the local government office staff. From the second night, “Futada elementary school evacuation facility planning meeting” was organized by the teaching staff, the person in charge of evacuation facility operation, the health nurse, and volunteers. They discussed the baths, toilets, food and other situations in the facility. The meeting was held daily and continued for 9 days.



Reception of evacuation facility



Look of volunteers cooking

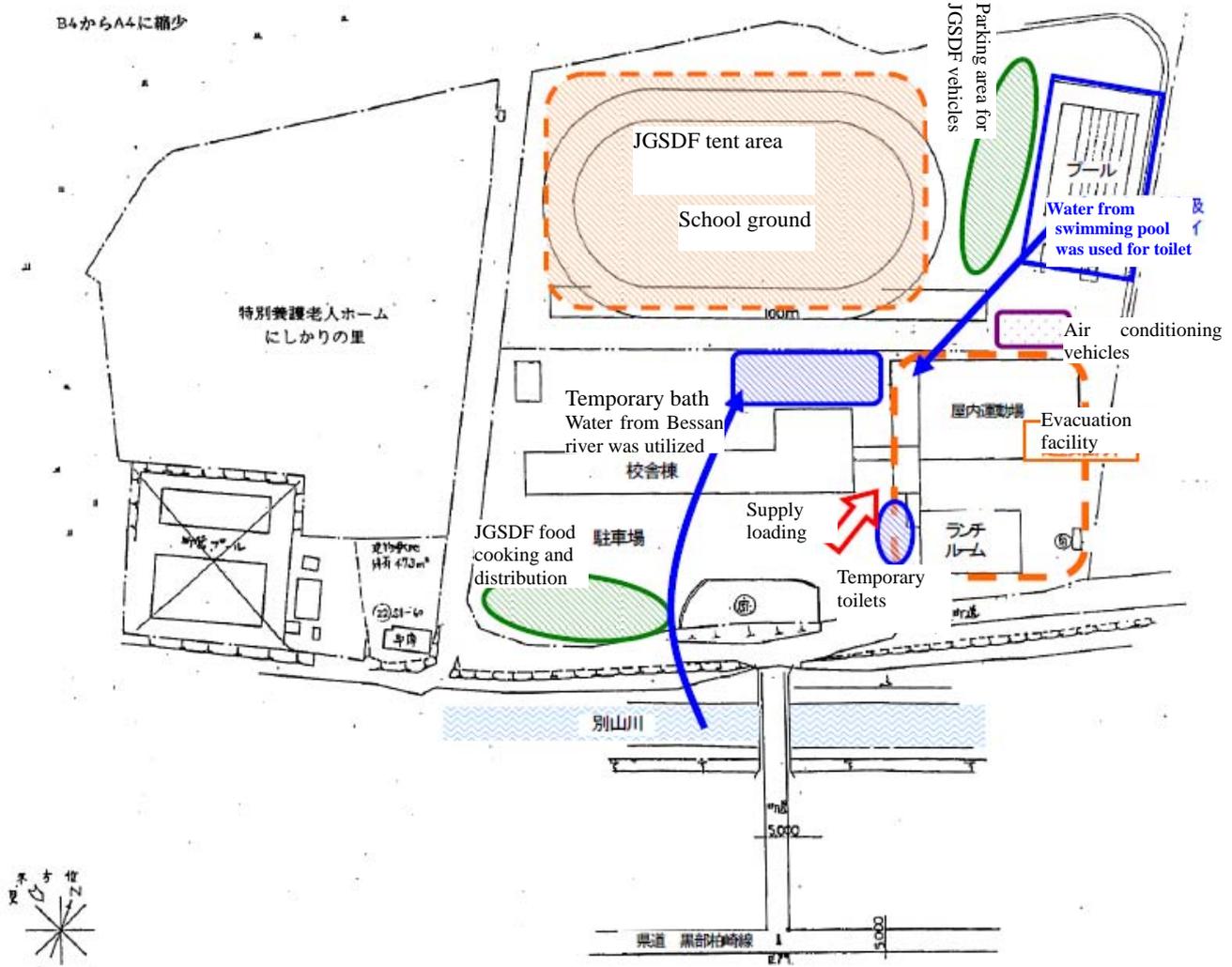


Figure 8 Layout of The Futada elementary school



Look of JGSDF cooking

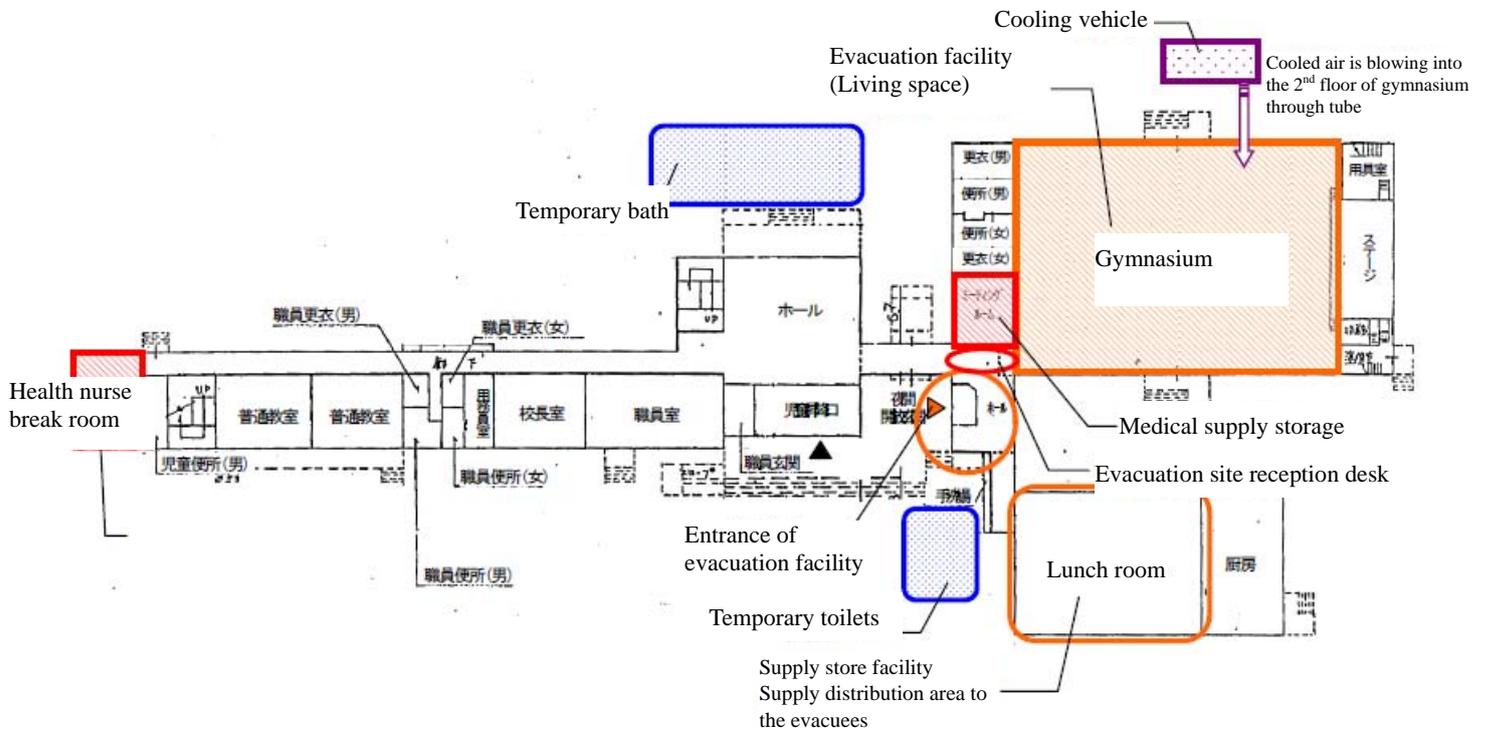


Figure 9 Layout of The Futada elementary school evacuation facilities

### (3) Daisan lower secondary school

Address: 1-2-20 Shin-Akasakacho, Kashiwazaki-shi

Summary of facilities used: Gymnasium Steel structure one-story building, 1,300 m<sup>2</sup>  
Built in 1990 (New Seismic Standard qualified)  
Martial Arts training hall Steel structure one-story building, 450 m<sup>2</sup>  
Built in 1998 (New Seismic Standard qualified)

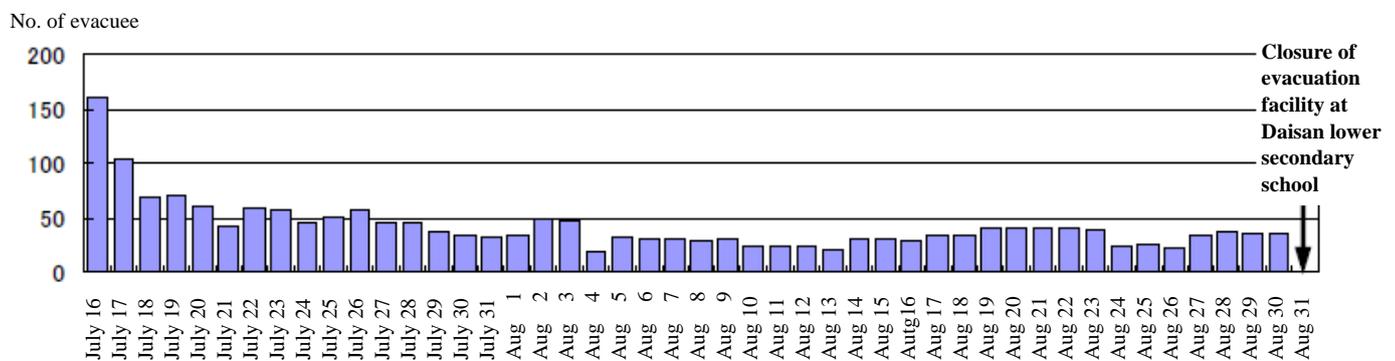
Duration of evacuation facility operations: 47 days (16 July to 31 August)

The maximum number of evacuees: 179 persons (17 July)

Damage caused by the earthquake: None

Distinctiveness of evacuation facility: Residents from a broad area where the evacuation directive was ordered were staying here. This was the only school that was used as an evacuation facility until 31 August with the longest duration of operation for 47 days.

**Figure 10 Changes in the number of evacuee at Daisan Lower Secondary school**



#### Conditions at the evacuation facilities:

School club activities were going on and teachers were present when the earthquake hit.

The gymnasium and martial arts room were provided for evacuees' living space. The evacuees gathered in groups by respective districts. As the number of evacuees decreased, evacuees who had been staying in the gymnasium were all moved to the martial arts room. This was so that the students could use the gymnasium for their club activities. The martial arts training hall had been used to unload rescue supplies so it was better to allow the evacuees to continue to stay here. Air conditioners were set up and the room was separated in several areas using tatami mats for evacuees to gather in one place by district to reduce discomfort. Moving the evacuees to the martial arts training hall was completed by 2 August.

There was no damage to the toilets or the sewerage system but due to a water outage, toilet water was delivered from the swimming pool by a bucket brigade. There was one lame evacuee but there were no western style toilets in the gymnasium. The toilet (western style with heated seat and bidet function) for the teaching staff located in the school building was offered for the disabled resident. There were 6 Japanese style and 3 western style temporary toilets set up. Since the western style toilets only had a cover around the toilet for privacy, they were not used very often.



Look of temporary toilets setup



Look of temporary western style toilets setup



There was no power outage and water recovery was made promptly because a water purification plant was located next to the school. Initially the telephone in the school teaching staff office was used and later a temporary telephone was installed in the gymnasium. However, the FAX in the teaching staff office had to be used until the evacuation facility was closed. A cellular phone company offered some cellular phones for the use during evacuation facility operations. The Japan Self-Defense Force arrived on the 17<sup>th</sup> and their supplies were also delivered. They began cooking and distributing meals on the 18<sup>th</sup>.

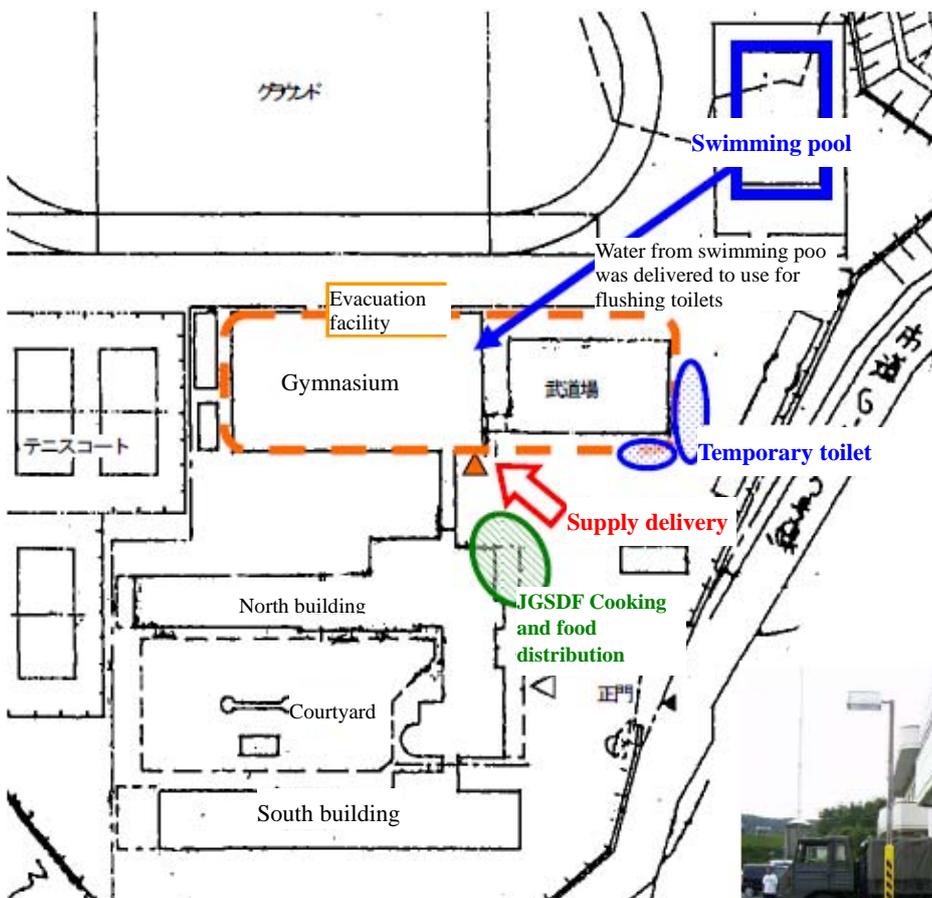


Figure 11 Layout of evacuation facilities at Daisan lower secondary school



Look of JGSDF cooking

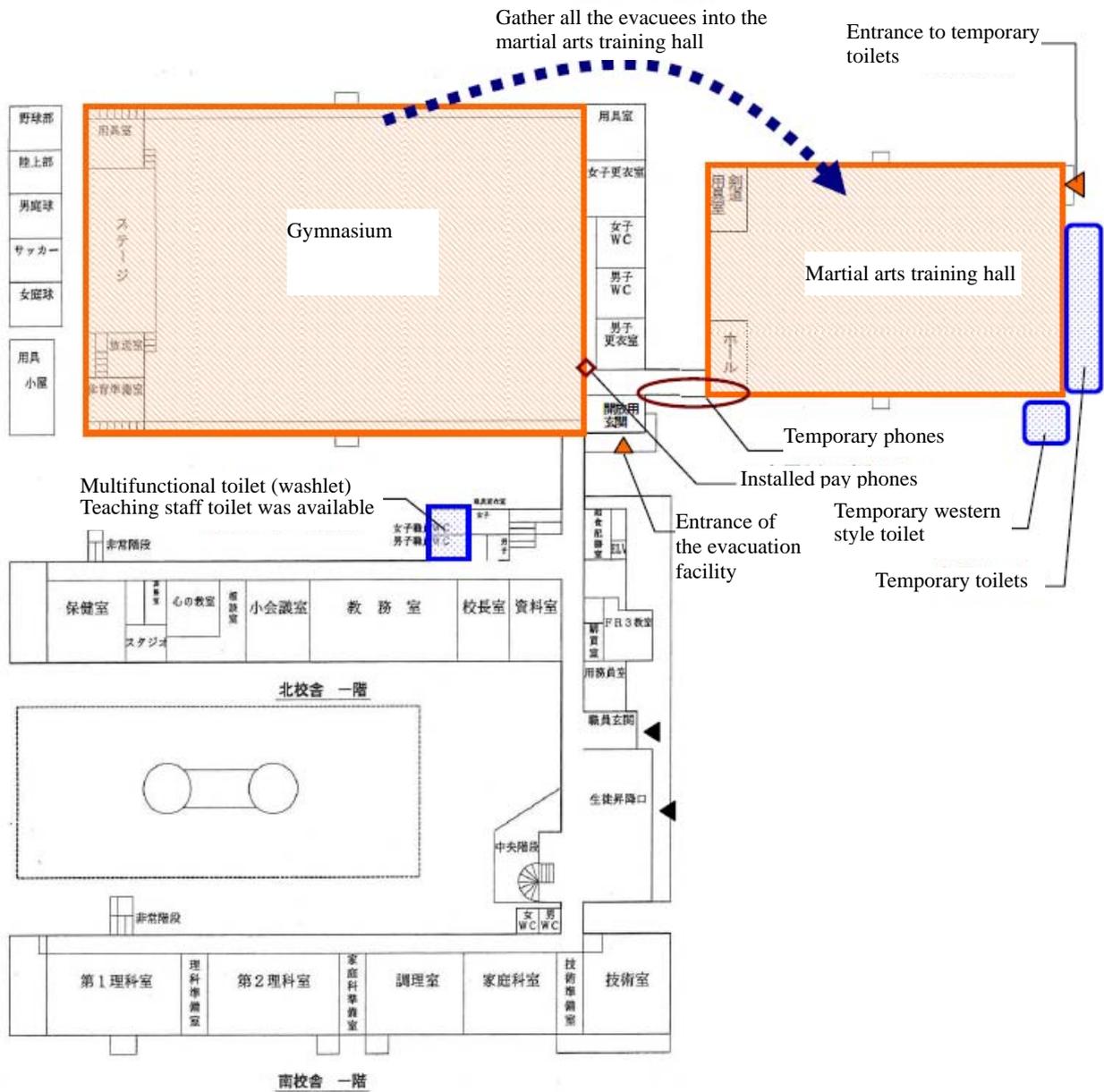


Figure 12 Layout of evacuation facilities at Daisan lower secondary school

#### (4) Kashiwazaki high school evacuation facility

Address: 4-1, Gakkoucho, Kashiwazaki-shi

Summary of the facilities used: Gymnasium Steel structure two-story building, 5,624 m<sup>2</sup>  
Built in 1962 (Old Seismic Standard qualified) (Seismic reinforcement in 2004)

Seminar house Wooden two-story building, 450 m<sup>2</sup>  
Built in 1992 (New Seismic Standard qualified)

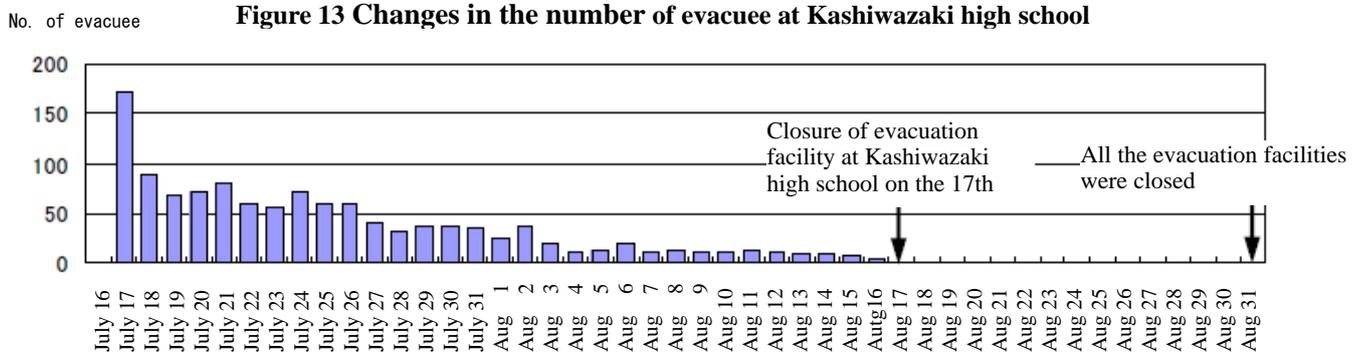
Duration of evacuation facility operation: 37 days (17 July to 17 August)

The maximum number of evacuees: 172 persons (18 July)

Damage caused by the earthquake: Mild (cracks in the walls, damage to the expansion joints, and damage to the water storage tank)

Distinctiveness of evacuation facility: This school was one of the prefectural high schools that was used as an evacuation facility. The school is located in the center area of the town. City hall, Kashiwazaki elementary school and Daiichi lower secondary school are neighboring. The seminar house located within the school property was used as a welfare evacuation facility.

**Figure 13 Changes in the number of evacuee at Kashiwazaki high school**



#### Conditions of evacuation facility:

When the earthquake hit there were 10 teachers, including the vice-principal that were present to supervise the club activities. Upon arrival of 2 staff members from the local government office, the evacuation facility was established.

Part of ceiling panels in the gymnasium were loosened by the quake. There was a net being put up underneath the ceiling so there the use of the facility as an evacuation site was not interrupted. Until the public government order to establish an evacuation in the late afternoon, the school staff had been conducting the safety inspection of school buildings.



**Ceiling net and loosen board in gymnasium**

The gymnasium (the second floor of the gymnasium building) was used for evacuees' living space, pilotis (ground floor of the gymnasium building) was used as to store supplies and the school yard was used to cook and distribute food. A smoking area was designated in the pilotis at the request of the evacuees.

A seminar house is located within the school property. The seminar house is a shared facility with the other prefectural high schools to use for a club training camp. A welfare evacuation facility was established at the seminar house on 20 July per the request of the prefectural government.

There was no damage at the toilets or the sewerage system but due to a water outage, the use of water facilities was banned and 4 temporary toilets were set up instead.

Fans were set up and utilized to keep the room cool because an air conditioner could not be installed on the second floor of the gymnasium. Since the gymnasium is higher than the ground and the location was close to the ocean, it was relatively drafty.

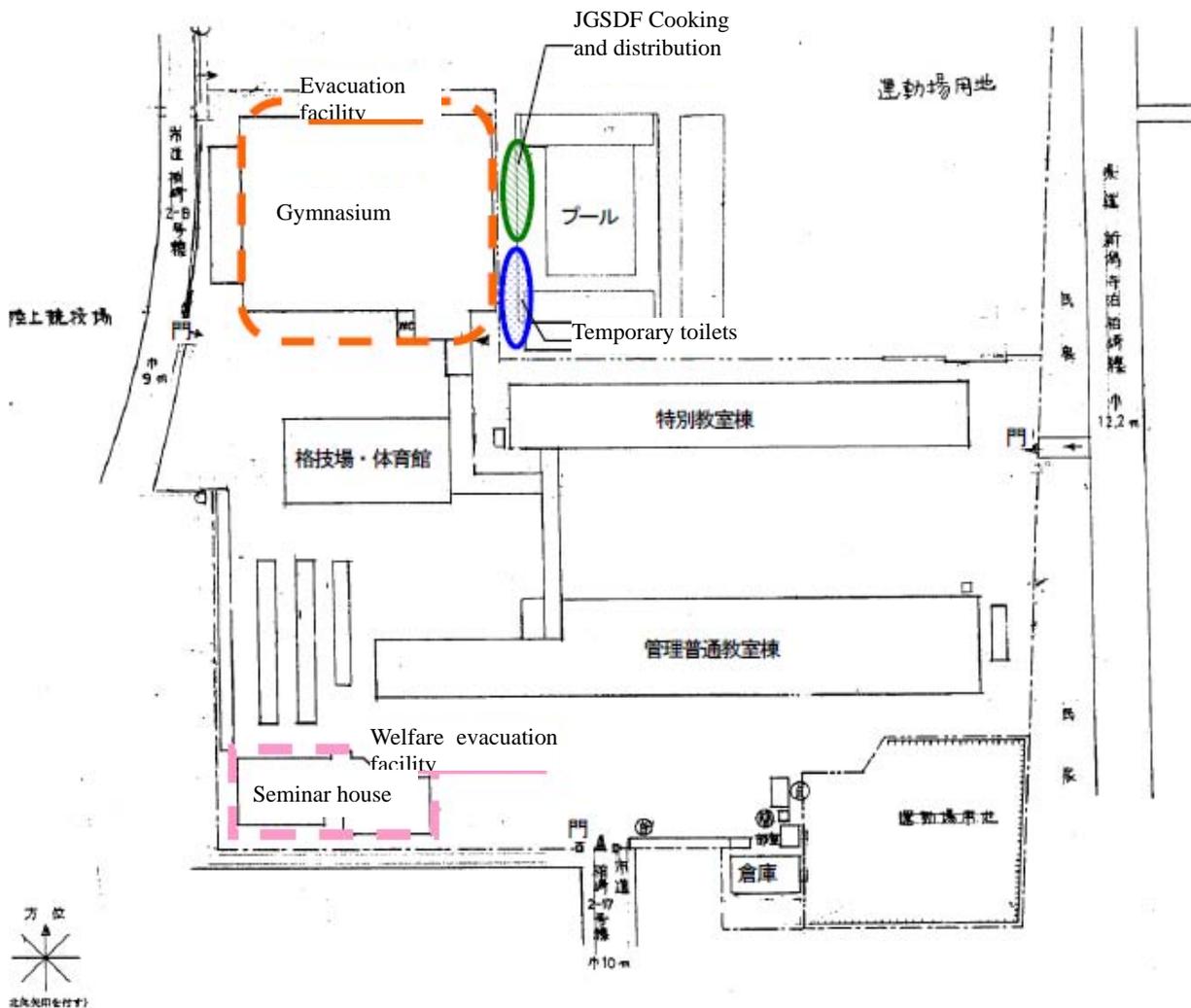
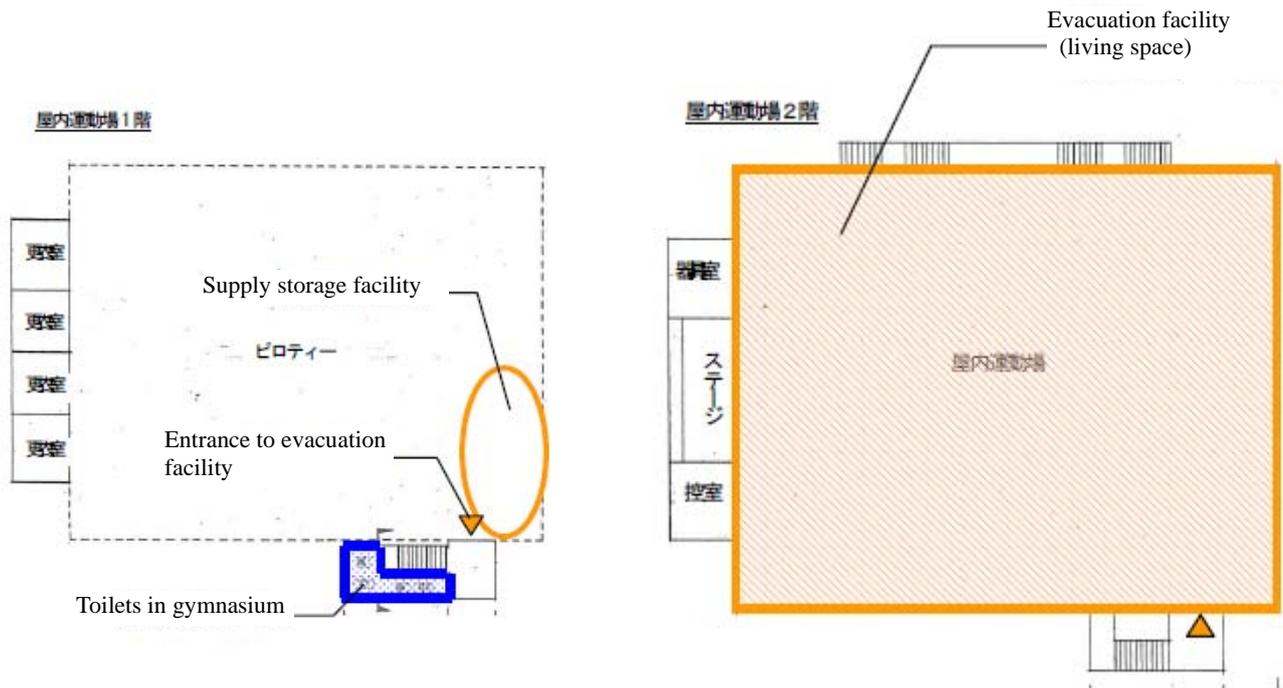


Figure 14 Layout of evacuation facilities at Kashiwazaki high school



**Figure 15 Layout of evacuation facilities at Kashiwazaki high school**

**(Reference)**

**Summary of the Niigata Prefecture Chuetsu offshore Earthquake in 2007 (Meteorological Office)**

1. Date and time of occurrence: 19 July 2007 at about 10:13
2. Location of the epicenter: Offshore of Jo-Chuetsu, Niigata prefecture
3. Depth of the epicenter: 17 km
4. Magnitude: 6.8 (Estimate)
5. Intensity at each location (over Intensity 5 upper)

Intensity 6 upper: Nagaoka, Kashiwazaki cities, Kariba village in Niigata prefecture, and Iizuna town in Nagano prefecture

Intensity 6 lower: Joetsu, Ojiya cities, Izumozaki town in Niigata prefecture

Intensity 5 upper: Sanjo, Tokaichimachi, Manami-Uonuma, Tsubame cities in Niigata prefecture  
Nakano, Iiyama cities, and Shinano town in Nagano prefecture

**Summary of the damages caused by the earthquake in Kashiwazaki city (as of 1 March 2008)**

- Human damage in Kashiwazaki city: 14 Deaths, 1,664 Injuries
- Building damage in Kashiwazaki city: Completely collapsed 1,113 households  
Large-scale half collapsed 675 buildings  
Half collapsed 4,372 households  
Partially destroyed 22,583 households

**Location of school facilities used as evacuation facilities**

- ★ Schools used as evacuation facility
- ★ Schools on-site survey was conducted
- Other schools





## Part II Reference Materials

### (Reference material 1) Classification and definition of evacuation facility in community disaster prevention plan

Local government	Year of revision	Name	Definition	Standard and concept of designation
Tokyo	2007	Evacuation site	Open spaces such as large-sized park, green space and etc that have a necessary dimensions to protect life of evacuees from extended fires or other threats that are occurred as a consequence of a larg-scale earthquake.	<ul style="list-style-type: none"> <li>• Evacuation to the designated site is instructed by the mayor of respective ward based on the district assignment plan which was formed by the assumption of people's rush after disaster</li> <li>• Evacuation site is required to have 1 m<sup>2</sup> per person in principal. That is available space for a resident considering radiant heat from the fire. The space is figured out by taking the projected number of evacuees with the size of the designated site after excluding buildings based on the district assignment plan.</li> </ul>
		Temporary collection point	Spaces where people can be safe such as school ground and precincts of temple and shrines. Local residents can meet temporarily to see how the situation changes, or residents get together once before proceeding further evacuation.	Temporary collection points require enough space to secure residents' safety, and the place shall be within the residents' livelihood sphere such as school ground, precincts of temple or shrine, park, green park, play ground of apartment complex
		Evacuation facility	Constructions such as school buildings and community centers to offer a temporary safe environment to people whose houses were subject to damage or destroy by the blaze, or whose houses are in danger of getting damaged.	a. It is designated by neighborhood association or school district. b. Constructions (school, community center) that are seismic reinforced and fire preteced, and steel framed are utilized c. Average number of evacuee in a room is 2 persons per room of size 3.3 m <sup>2</sup> .
		Secondary evacuation facility (Welfare evacuation facility)	Facilities such as social welfare facility or community center are designated by local governments to temporarily accept people who have difficulties staying at home or require medical or nursing care because of the damages after earthquake.	Utilizing constructions shall be seismis resisting, renovated for fire and barrier-free.
Shizuoka prefecture	FY2005	Broad area evacuation site	Broad area that enables both to ensure evacuees' lives from fire disaster in urban area and to have equipments established in the area to support with capabilitie of rescue and information provision	a. It shall be areas where there is no threat of massive fire in urban district, tsunami, or landslide. b. Distance to the evacuation site shall be within 3km. c. Open area dimension shall be over 10,000 m <sup>2</sup> d. Space shall be more than 2 m <sup>2</sup> per person.
		Temporary evacuation point	In evacuation required district, it is an intermediary point before getting to a broad evacuation site. The purpose of locating this facility is to ease people's anxiety and confusion and also to provide guidance for evacuation and necessary information. Disaster prevention storage and aid station are set up. It shall be the center of rescue activities in the community.	a. Location half way to a broad area evacuation site. b. Lengh of evacuation is within 1km. c. It has enough space more than 2 m <sup>2</sup> per person.
		Evacuation facility	Indoor place to accept people who lost living space due to disaster. The place is also used as a base of rescue and first aid activities.	The facility shall be constructed for disaster resistance. It shall have a cooling facility, be available to attach cooking function or be capable of food carrying-in service. It shall be able to provide about 3 m <sup>2</sup> per person and capable of accepting more than 100 people.
		Evacuation facility for the physically challenged	Indoor facility to accept elderly and physically challenged people who need special care and are determined to have difficulties staying in the regular evacuation facility.	Social welfare facility, etc
Kobe city	FY2006	Broad area evacuation site	Open spaces that have a necessary dimensions and structures to protect life and health of evacuees from massive fire occurred in urban district as a consequence of a larg-scale earthquake.	1. In principal, public area with decent open space 2. Open space of more than 10ha or safe place less than 10ha surrounded by constructions made of fire resisting or radiant heat blocking 3. Distance to the evacuation site shall be within 2km. 4. Space shall be more than 1 m <sup>2</sup> per person
		Temporary evacuation site	Emergency temporary evacuation site immediatly after earthquake	In principal, designated areas shall be school grounds and parks within the district. Depending on circumstances, indoor area shall be utilized.
		Collecting evacuation facility	Collecting evacuation facility after all the risk factors are cleared after earthquake.	Indoor space in elementary and lower secondary schools that are designated as evacuation facility. As necessary, outdoor space such as park shall also be appointed if tents are set up. Residents to accept in each evacuation facility shall be determined by school district and appropriate change shall be made accordingly.

**(Reference material 2) Statements concerning equipment of evacuation facility in existing guidelines  
Guideline of elementary school facility improvement (Abstract of statements relating to evacuation facility)  
Educational Facilities Project Department, Secretariat of Ministry of Education, Culture, Sports, Science and Technology  
(July 2007)**

Chapter 1 General Provisions	Section 1 Basic policy of school facility improvement		3 Facility improvement as the core of community for lifelong education and town development	As the most familiar public facility to the community residents, it is promoted actively to utilize the facility for lifelong education and town development. The facility shall be renovated for barrier-free and as necessary cooperate with other educational facilities and welfare facilities for the elderly, and play a core role of community disaster prevention. It is important to improve the facility to contribute for townscape and landscape.
	Section 2 Response to issues concerning school facility improvement	Part 2 Facility improvement for safe, cram-free, and graceful environment	3 Securement of earthquake resistance	(2) It is important to develop a plan to reinforce school facilities with necessary seismic resistance capabilities since school facilities are required to be utilized as emergency evacuation facilities for the local residents at times of disaster occurrence.
Chapter 3 Floor planning		Part 3 Gymnastic facility	1 Common items	(1) It is important that gymnastic facility contains necessary space for physical education class, sports events, and open school. It is also important to develop a plan of disaster prevention facility as necessary.
Chapter 4 Room planning		Part 3 Gymnasium and other facility	2 Gymnasium	(5) Preparing to use as evacuation facility in case of disaster, it is effective to develop a plan of toilet, changing room, pre-positioned storage and etc.
			3 Indoor swimming pool	(9) It is effective to develop a plan of water supply for use of fire prevention and flushing toilet in case of disaster.
		Part 6 Club house (Place for cooperation of parents or local residents)	4 Toilet and lavatory	(4) It is effective to develop a plan of toilet facility concerning use by evacuated residents in case of disaster.
Chapter 8 Facility designing		Part 1 Basic items	3 Functionality	(4) As necessary, it is effective to plan for improvement of water storage tank, swimming pool with water purifying capability, and in-house generator to secure water, electricity and toilet capability at times of earthquake or disaster occurrence.

**Guidelines for promoting barrier-free renovation of school facilities (Abstract relating to evacuation facility)  
Educational Facilities Project Department, Secretariat of Ministry of Education, Culture, Sports, Science and Technology (March 2004)**

Chapter 1 Basic concept of promoting barrier-free renovation of school facilities	1 Viewpoint of barrier-free renovation of school facilities	(5) Concerns to become emergency evacuation facility at times of disaster	It is required for school facilities to become emergency evacuation facilities at times of disaster occurrence, so planning and designing of the facilities are concerned for use by local residents.
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**Guidelines for promotion of earthquake-resistance of school building (Abstract relating to evacuation facility)  
Educational Facilities Project Department, Secretariat of Ministry of Education, Culture, Sports, Science and Technology (March 2004)**

Chapter 1 Basic concept of earthquake-resistance reinforcement for school facilities	1 Necessity of earthquake-resistance for school facilities	(2) Emergency evacuation site for local residents at disaster	School facility is the most familiar place for local residents. School facility is a place of learning and communication for school children and local residents, and it plays a role of emergency evacuation site at times of disasters. Therefore it is important to reinforce school buildings to function the necessary capabilities as evacuation facility.
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**Guidelines of emergency rescue activity at a large-scale disaster of Ministry of Health, Labor, and Welfare (Abstract of descriptions related to evacuation facility) Notification by Social welfare agency, chief of protection section No. 122 of 30 June 1997 (Revision of 20 March 2002, No. 0320001)**

Part 2 Conduct emergency rescue	1 Establishment of evacuation facility	(1) Designation of evacuation facility	a. It is assumed that a great number of local residents in the community will evacuate at disaster. Therefore it is important to ensure that the facility have enough space prior to the designation. b. Basically, facilities to designate as evacuation facilities shall be reinforced with earthquake-resistance, fire-resistance, and steel structure. If at all possible, facilities to be designated shall be public facilities where obstacles to interfere people's daily life are already eliminated and rehabilitated into barrier-free facilities such as public meeting house, school, welfare center, sports center, and library.
		(2) Clarification of the usage	b. As for designating schools as evacuation facilities, consideration for school facilities to be primary place for educational activities will be highly taken. Also, coordination with the Board of Education and other pertinent organizations shall be conducted beforehand understanding the fact that school facilities are used as evacuation site only temporarily.
			c. For this case, report on "Fulfillment of disaster prevention readiness at school" (February 1996) from "Cooperators meeting for fulfillment of disaster prevention readiness at school" has already been provided to the Board of Education. It is recommended to take the report as a reference.
		(4) Pre-positoned stock for evacuation facility	a. It is desirable to store supplies such as food, water, and items for daily use that will be urgently required in the designated evacuation facilities.
		(6) Securement of communication method	Radio, television, telephones, FAX, computers shall be installed in the evacuation facility to provide information to the evacuees, confirm each other's safety, and obtain information of other victims outside the evacuation facility. It is required to coordinate with volunteers to provide support to the physically challenged people by assisting to use the electrical devices for obtaining information. When the volunteers are assisting to physically challenged people with the electrical devices, the volunteers are required to show them various ways to obtain the necessary information.
		(7) Preparation of living circumstances at evacuation facility	b. If a prolonged evacuation period is assumed, a better living circumstance needs to be provided to evacuees by gathering evacuees to a certain area of school facility. It is preferable to improve evacuees' living circumstances by separated them in a small group and move them to small rooms, and as necessary, preparing the following items to secure privcy and provide temperature control capability and opportunities for bathing, and laundry. (a) Tatami mates, rag, carpet (b) Pertitions (c) Heating and cooling equipments (d) Washing machine, drying (e) Temporary bathing system, shower (f) Temporary toilet (g) Televition, radio (h) Portable kitchen, cooking tool (i) Other necessary equipments/tools
			c. When designating facilities as evacuation facilities where physical obstacles are not eliminated (barrier-free), temporary toilets, ramps and other necessary fuctions shall be established to proved physically challenged people with an easy accessibility.
			d. For an adequately functioned evacuation facility, it is required to have rules to control the sanitation and also prepare enough capacity for electricity.
		(9) Creation of manual for evacuation facility operatoin	a. For a smooth operation of evacuation facility, evacuation facility operation manual that clarifies the operation standard and methods is required to be formulated beforehand. Necessary supports (reference "Part 3 Support for physically challenged people at emergency rescue activity") for physically challenged people shall be described in the manual.
		(14) Prompt closure of evacuation facility	a. Since establishment of evacuation facility is only temporary, prompt restart of the primary function of the facility is required.
b. If the evacuation facilities were established at schools, prompt restart of educational activities will be promoted .			
Part 3 Support for physically challenged people at emergency rescue	3 Support plan at evacuation facility	(1) Elimination of physical barriers (Barrier-free implementation)	When designating facilities as evacuation facilities where physical obstacles are not eliminated (barrier-free), temporary toilets, ramps and other necessary fuctions shall be established to proved physically challenged people with an easy accessibility.
		(3) Designation of welfare evacuation facility	b. Basically, facilities to designate as welfare evacuation facilities shall be selected among centers for the elderly and schools for the special needs where reinforcement for earthquake-resistance, fire-resistance, steel structure and elimination of physical obstacles (barrier-free) have already been completed. Also project that has implemented in 2000 for remodeling communication space for community into disaster prevention facility within the property of designated evacuation site is promoted to utilize to improve as welfare evacuation facility.

**(Reference material 3-1) Fiscal support systems to utilize for disaster prevention capability enhancement at school facilities**

<b>Cost for public school facilities improvement</b>	
<b>In charge</b>	Ministry of Education, Culture, Sports, Science and Technology, Facility Support Department
<b>Contents</b>	<ul style="list-style-type: none"> <li>▪ New construction or reconstruction of building</li> <li>▪ Rehabilitation of building</li> <li>▪ Reinforcement of building for earthquake-resistance</li> <li>▪ Improvement of outdoor educational facility  <ul style="list-style-type: none"> <li>Examples: Improvement of facilities for disaster prevention(Green space for disaster prevention, Sprinklers, Water well, Emergency water storage tank, Water supply tank, Pre-positioned stock storage, outside toilets)</li> </ul> </li> <li>▪ Large-scale restructure (for aged building), large-scale rehabilitation (for aged building) Large-scale restructure (capability enhancement)  <ul style="list-style-type: none"> <li>Examples: Installment of LAN in school facilities, installation of air circulation system, remodeling of toilets, remodeling facilities for disabled children (slopes, elevator, toilets for the disabled)</li> </ul> </li> <li>▪ New construction, reconstruction and earthquake-resistance reinforcement  <ul style="list-style-type: none"> <li>Examples: Installing a water purifier to the swimming pool in outdoor, rooftop, or indoor.</li> </ul> </li> </ul>
<b>Funding rate</b>	New construction and reconstruction: $\frac{1}{2}$ (basis) Rehabilitation and large-scale remodeling project: $\frac{1}{3}$ (basis)
<b>Target</b>	Local government (Prefectures and municipal borough, town, and village)
<b>Remarks</b>	<ul style="list-style-type: none"> <li>▪ To solve the shortage of classroom, the central government will provide fund partially for new construction or expanding projects of school buildings, gymnasium, and dormitory.</li> <li>▪ Reconstruction means a project for rehabilitation of school buildings that were diagnosed to be in a structural dangerous condition</li> <li>▪ Subsidy for making safe and comfort school facilities will be funded for the project that local government developed and fits in the categories that are listed in the facility improvement plan.</li> <li>▪ Funding conditions are setup by the kind of works of the large-scale remodeling.</li> <li>▪ Cost for rehabilitation of swimming pool will be partially funded when the project includes the ground improvement work and installment of water purification system. The funding will not be provided if the ground improvement work is not planned or only portable water purifier is planned to be attached.</li> </ul>

<b>Disaster prevention project bond</b>	
<b>In charge</b>	Fire and Disaster Management Agency, Fire prevention and medical emergency section
<b>Contents</b>	<ul style="list-style-type: none"> <li>• Project for structural improvement of fire prevention</li> </ul> Examples: Improvement of disaster prevention facilities    Facility improvement to enhance disaster prevention capabilities at evacuation facilities ①Remodeling and rehabilitation of spaces for temporary living and storage for pre-positioned stock    ②Installment of toilets, shower, kitchen, and in-house generator    ③Water purifier installment at swimming pool and water well ①Setting up night lighting systems in the school ground Earthquake-resistance project for public facilities
<b>Funding rate</b>	Project for structural improvement of fire prevention : Money appropriated to project 75%, inclusion rate of the local grant tax 30% For the most promoted projects: Money appropriated to project 90%, inclusion rate of the local grant tax 50% Project for earthquake-resistance reinforcement at public facilities: Money appropriated to project 90%, inclusion rate of the local grant tax 50%
<b>Target</b>	Local governments (Prefectures and municipal boroughs, towns, and villages)
<b>Remarks</b>	The most promoted projects are ①facilities improved by fire companies②facilities improved with disaster prevention administration wireless digital method and nation-wide instant notification system (J-Alert) ③Fire prevention transmission/order facility (Concerning fire prevention widening)

<b>Subsidy for Fire Disaster prevention Facility Improvement</b>	
<b>In charge</b>	Fire and Disaster Management Agency, Fire prevention and medical emergency section
<b>Contents</b>	Earthquake-resisting water tank, pre-positioned storage, and etc.
<b>Funding rate</b>	Within 1/2 or 1/3 (partial increase of fund is possible)
<b>Target</b>	Local governments (Prefectures and municipal boroughs, towns, and villages)
<b>Remarks</b>	-Earthquake-resisting water tank and pre-positioned storage have to meet the standards that are described in the notification of standard funding list and in the appended table 3 in the grant summary of the subsidy for fire disaster prevention facility improvement (Example: Total floor space of pre-positioned storage must be more than 30 m <sup>2</sup> ) -Types of earthquake-resisting water tank that are applied for the funding are ground-based storage and purifier for drinking water installed storage -Subsidy is not funded if the total amount of all the fundings is less than 85,000,000yen for prefectures and government-designated cities or less than 8,500,000yen for municipal boroughs, towns, and villages.

<b>Housing and building remodeling project for earthquake-resistance</b>	
In charge	Ministry of Land, Infrastructure, Transport and Tourism Housing Administration Building Guidance Division Countermeasures against disaster for building office
Contents	Seismic resistance capacity evaluation of building, Remodeling project for earthquake-resistance (Example) Public high school facilities, private school facilities, public university facilities
Funding rate	<ul style="list-style-type: none"> <li>○Seismic resistance capacity evaluation <ul style="list-style-type: none"> <li>▪ Project that local government implements : Central government 1/3 <ul style="list-style-type: none"> <li>* For buildings on the side of emergency transportation road: Central government 1/2</li> </ul> </li> <li>▪ Project other than local government implements: 2/3 = Central government 1/3 + Local government 1/3</li> </ul> </li>   <li>○Rehabilitation for earthquake-resistance <ul style="list-style-type: none"> <li>▪ Project that local government implements : Central government 7.6% <ul style="list-style-type: none"> <li>* For buildings on the side of emergency transportation road (Over the fixed height)</li> </ul> </li> <li>▪ Project other than local government implements: 15.2% = Central government 7.6% + Local government 7.6%</li> </ul> </li>   <li>* For buildings on the side of emergency transportation road (Over the fixed height) <ul style="list-style-type: none"> <li>▪ Project that local government implements : Central government 33.3% <ul style="list-style-type: none"> <li>* For buildings on the side of emergency transportation road (Over the fixed height)</li> </ul> </li> <li>▪ Project other than local government implements: 66.6% = Central government 33.3% + Local government 33.3%</li> </ul> </li> </ul>
Target	Local governments (Prefectures and municipal boroughs, towns, and villages) (Indirect support through local government to private organization)
Remarks	<p>&lt;Earthquake-resistance rehabilitation&gt;</p> <ul style="list-style-type: none"> <li>○ District : DID district, nation-wide (Densely Inhabited District)</li> <li>○ Condition for approval : Building that has been certified based on the Special Law for promoting seismic-resistance rehabilitation or Building Standard Law</li> <li>○ Condition for dimension : Total floor space is more than 1,000 m<sup>2</sup> or the number of floor excluding basement floor is more than 3 stories.</li> <li>○ Amount of limit for funding: 47,300yen per 1 m<sup>2</sup>(Special construction method: 80,000yen per 1 m<sup>2</sup>)</li> </ul>

<b>Subsidy for Town Development</b>	
In charge	Ministry of Land, Infrastructure, Transport and Tourism, Town Development Promoting Department, Urban Comprehensive Project Promoting Office
Contents	Community disaster prevention facility (Outside structure) (Example) Earthquake-resisting water storage tank, pre-positioned storage, information transmitting facility, broadcasting facility, power generation facility, drainage recycling facility Cost for disaster prevention seminar and emergency evacuation training
Funding rate	About 40%
Target	Local governments (Municipal boroughs, towns, and villages)
Remarks	-The funding is provided for a project that is created basing on the town renewal and improvement project that local government developed (Effective period about 3-5 years). -It is necessary to specify in the improvement plans by showing the numerical purposes and indicators for the improving area. -Targets are road, park, community disaster prevention facility (basic project) and also project that is suggested by local government (suggested project). -Personnel cost for local government office staff when they conduct disaster prevention seminar and emergency evacuation training. -Subsidy is not funded if the total amount of all the fundings is less than 85,000,000yen for prefectures and government-designated cities or less than 8,500,000yen for municipal boroughs, towns, and villages.

<b>Emergency earthquake-resistance improvement project for sewage system</b>	
In charge	Ministry of Land, Infrastructure, Transport and Tourism, Sewage system project section
Contents	(1)Project for earthquake-resistance for facilities that are stated in the community disaster prevention plan (evacuation site or disaster prevention site) and plumbing system connecting the terminal treatment plant. (2) Project for manhole toilet system at the facilities that are stated in the community disaster prevention plan (evacuation site or disaster prevention site) (3) Project for pre-positioned storage or earthquake resisting water tank that is planned to be established at sewage facilities (limited to disaster prevention site or evacuation site that lot area is more than 2ha) that is stated in the community disaster prevention plan
Funding rate	1/2
Target	Local governments
Remarks	-Project to implement for earthquake-resisting sewage system in government-designated cities, seats of the prefectural government, and area requiring the implementation of enhanced earthquake preparatory measures with respect to an earthquake (based on the Large Scale Earthquake Countermeasures Act) -It is necessary to obtain agreement from the Ministry of Land, Infrastructure, Transport and Tourism by creating “Emergency improvement plan for earthquake-resisting sewage system” that includes summary of the targeted area and purpose of improvement. -Regarding to the (2) project, funding is provided for the structural object under the manhole that lot area of the facility is more than 1ha.

<b>Self-governed disaster prevention organization promoting support project</b>	
In charge	Foundation for self-governing general center
Contents	<p>Improvement of facilities or equipment that are necessary for community disaster prevention activities  (Example) Equipment for information and communication (portable radio system, portable radio)  Fire extinction supplies (fire prevention water tank, fire prevention outfit, helmet, etc)  Water prevention supplies (Rescue boat, rescue suit, rope, water prevention sheet, and etc)  Rescue and relief supplies (AED, tent, first-aid bag, blanket, portable bed, and etc)  Food and water supplies (Water supply tank, emergency water purifier, drinking water tank, and etc)</p> <p>Evacuation site and evacuating (Power generator, portable toilet, portable lighting device, sleeping bag, sectional shower and etc)  Disaster prevention education supplies (Simulated fire extinction training device, broadcasting equipment, assembling water tank, CPR training mannequin and etc)  Others (Portable equipment storage, snowplow, etc)</p>
Grant money	<p>a. Newly established self-governed disaster prevention organization  More than 300,000yen and less than 2,000,000yen</p> <p>b. Existing disaster prevention organization that has never received any funding  More than 300,000yen and less than 1,500,000yen</p> <p>c. Self-governed disaster prevention organization that does community comfort and safety station improvement project  More than 300,000yen and less than 1,000,000yen</p> <p>d. Project that other self-governed disaster prevention organization (including alliance) or local government provide or lend to self-governed disaster prevention organization  More than 300,000yen and less than 1,000,000yen</p>
Target	Self-governed disaster prevention organization, women's disaster prevention organization and it's group organization in town, ward and village or other alliance
Remarks	<p>-Improved facilities shall belong to a self-governed disaster prevention organization, not to local government.</p> <p>-Implementing project shall be unappropriated by national subsidy or locan government bond</p> <p>-Basically it shall not be facility or improvement that can be consumed or break in a short period of time.</p> <p>-The request shall be accepted up to 3 organizations per prefecture for the category of "a" stated in the "Grant money", up to 4 organizations per prefecture for the category of "b" and "c", and up to 6 organization per prefecture for the category of "d".</p> <p>-Since this project is funded out of the PR budget for lottery dissemination, a statement saying "This facility was improved bythe lottery dissemination fund" on posters, any adyvertisements or newsletters of organizations when the related facilities host events.</p>

**( (Reference Material 3-2) Relation between measures to enhance disaster prevention capability at school facilities designated as evacuation facilities and public fiscal support systems (Examples)**

Examples showing below are to refer public fiscal support systems by category of project. Examples can be referred to determine the most related system to fund a developing a project indicated in the “Specific measures to enhance disaster prevention capabilities for school facilities” in Chapter 3 in this report.

This examples are listed for practical convenience. It is requested to keep in mind of the primary purpose of each project when referring.

Since the list is only showing examples, there may be many other kinds of construction works that could be applied for the support systems, such as comprehensive improvement of a facility for community disaster prevention being projected based on the urban reconstruction plan, the whole school facilities are being newly constructed and large-scale rehabilitation is being conducted.

Each fiscal support system has conditions for funding. It is recommended to ask or consult with respective government agencies as well as referring the material 4-1.

Items stated as "specific measures" in this report	Examples of specific project for capability fulfillment	Available national fiscal support systems
(1) Ensuring safety at facility	Earthquake-resistance rehabilitation of building (reinforcement)  Seismic resistance capacity evaluation of building  Earthquake-resistance reinforcement of swimming pool	Cost for public school facilities improvement (Ministry of Education, Culture, Sports, Science and Technology) Disaster prevention project bond (Fire and Disaster Management Agency) Subsidy for Town Development (Ministry of Land, Infrastructure, Transport and Tourism) Housing and building remodeling project for earthquake-resistance (Ministry of Land, Infrastructure, Transport and Tourism) Housing and building remodeling project for earthquake-resistance (Ministry of Land, Infrastructure, Transport and Tourism)  Cost for public school facilities improvement (Ministry of Education, Culture, Sports, Science and Technology)
(2) Ensuring to have required capabilities 1. Toilet and shower  2. Electricity, water and gas  3. Information transmission methods  4. Indoor environment  5. Support for physically challenged people  6. Necessary supply stock	Toilet remodeling  Installment of toilet or shower  Improvement of manhole toilet system  Installment of lighting system in school ground  Installment of in-house power generator  Improvement of power plant  Earthquake-resistance improvement of water storage tank  Installment of water purifier to swimming pool  Improvement of disaster prevention water well  Installment of water purifier to swimming pool or water well  Improvement of unpurified water use and solar power facility Improvement of drainage recycling facility  Installment of LAN cable in school facilities  Disaster prevention public administration radio  Installment of air control system  Improvement of facility for barrier-free  Establishment of Japanese-style room  Improvement of pre-positioned storage facility	Cost for public school facilities improvement (Ministry of Education, Culture, Sports, Science and Technology) Disaster prevention project bond (Fire and Disaster Management Agency) Emergency earthquake-resistance improvement project for sewage system (Ministry of Land, Infrastructure, Transport and Tourism) Disaster prevention project bond (Fire and Disaster Management Agency) Disaster prevention project bond (Fire and Disaster Management Agency) Subsidy for Town Development (Ministry of Land, Infrastructure, Transport and Tourism) Subsidy for Fire Disaster prevention Facility Improvement (Fire and Disaster Management Agency) Disaster prevention project bond (Fire and Disaster Management Agency) Subsidy for Town Development (Ministry of Land, Infrastructure, Transport and Tourism) Cost for public school facilities improvement (Ministry of Education, Culture, Sports, Science and Technology) Disaster prevention project bond (Fire and Disaster Management Agency) Disaster prevention project bond (Fire and Disaster Management Agency) Cost for public school facilities improvement (Ministry of Education, Culture, Sports, Science and Technology) Subsidy for Town Development (Ministry of Land, Infrastructure, Transport and Tourism)  Cost for public school facilities improvement (Ministry of Education, Culture, Sports, Science and Technology) Disaster prevention project bond (Fire and Disaster Management Agency)  Cost for public school facilities improvement (Ministry of Education, Culture, Sports, Science and Technology)  Cost for public school facilities improvement (Ministry of Education, Culture, Sports, Science and Technology)  Subsidy for Fire Disaster prevention Facility Improvement (Fire and Disaster Management Agency) Disaster prevention project bond (Fire and Disaster Management Agency) Subsidy for Town Development (Ministry of Land, Infrastructure, Transport and Tourism)

Note: The examples are facility improvement related. For equipment and furnishings, please refer the material 4-1 “Self-governed disaster prevention organization project”

**(Reference Matirial 4) Questionnaires for actual condition survey on disaster prevention capabilities at school facilities**

Form 1-1 Inquiry survey on concerns for community disaster prevention during planning and designing of school facilities (For municipal borough, town or village)

Name of municipal borough, town or village:

Q1. Is a school response manual that includes concerns to be utilized as evacuation facility at a time of disaster formulated?

- a. Manual is formulated.
- b. School response manual at disaster excluding concerns to be utilized as evacuation facility is formulated.
- c. No school response manual at disaster is formulated

Q2. Is the operational structure for evacuation faciities already determined for the case that school facilities are used as evacuation facilities?

- a. The primary operation is conducted by local government office staff
- b. The primary operation is conducted by school staff
- c. The primary operation is conducted by local organizations
- d. The operational structure is not determined
- e. Others ( )

Q3. Are concerns for community disaster prevention such as evacuation facilities incorporated into the planning and designing of school facilities?

- a. The concerns are incorporated in the planning and designing whether or not the facility is designated as evacuation facility
- b. The concerns are incorporated only for the schools are designated as evacuation facility or when requested by the local community.
- c. Not incorporated

(Please answer if your answer was either a. or b. at Q3)

Q4. How are your concerns for local community in regard to disaster prevention considered while planning and designing of school facilities? (Multiple answeres allowed)

- a. Basically the consideration are discussed among school staff (including the board of education and the teaching staff)
- b. Consult with the chief of disaster prevention relating section in local government
- c. Discuss with local residents
- d. Request academic experts for consideration
- e. Others ( )

Q5. Are there designated spaces such as Japanese-style room or dispensary for physically challenged people to use in case of disaster that are separated from spaces for other evacuees?

- a. There are designated spaces in the school facilities that are for physically challenged people to use in case of disaster.
- b. There are no designated space in the school facilities that are for physically challenged people to use in case of disaster.

Q6. What are the fiscal support systems that your school has used when improving the facilities and equipment for enhancing disaster prevention capability? (Multiple answeres allowed)

- a. Subsidy concerning facility improvement at school offered by the Ministry of Education, Culture, Sports, Science and Technology
- b. Subsidy offered by prefectural government
- c. Support system related to fire-prevention by the Fire and Disaster Prevention Agency
- d. Support system offered by other government agency (Name of agency : , Name of support system )
- e. Other support system (Name of offering organization : , Name of support system )

Q7. Please introduce an example of disaster prevention capability improvement for school facilities

(Example)

Plumbing system to use water in the rooftop swimming pool for flushing toilets in case of disaster  
Prpane gas tanks are equipped to the kitchen as the secondary resource in case of city gas outage at disaster

Form 1-2 Inquiry survey on concerns for community disaster prevention during planning and designing of school facilities (For prefecture)

Name of municipality \_\_\_\_\_ Responsible Department \_\_\_\_\_ Responsible \_\_\_\_\_ e-mail \_\_\_\_\_

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Q1. Is a school response manual that includes concerns to be utilized as evacuation facility at a time of disaster formulated?

- a. Manual is formulated.
- b. School response manual at disaster excluding concerns to be utilized as evacuation facility is formulated.
- c. No school response manual at disaster is formulated

Q2. Is the operational structure for evacuation facilities already determined for the case that school facilities are used as evacuation facilities?

- a. The primary operation is conducted by prefectural government office staff
- b. The primary operation is conducted by school staff
- c. The primary operation is conducted by local organizations
- d. The operational structure is not determined
- e. Others ( \_\_\_\_\_ )

Q3. Are concerns for community disaster prevention such as evacuation facilities incorporated into the planning and designing of school facilities?

- a. The concerns are incorporated in the planning and designing whether or not the facility is designated as evacuation facility
- b. The concerns are incorporated only for the schools are designated as evacuation facility or when requested by the local community.
- c. Not incorporated

(Please answer if your answer was either a. or b. at Q3)

Q4. How are your concerns for local community in regard to disaster prevention considered while planning and designing of school facilities? (Multiple answers allowed)

- a. Basically the consideration are discussed among school staff (including the board of education and the teaching staff)
- b. Consult with the chief of disaster prevention relating section in local government
- c. Discuss with local residents
- d. Request academic experts for consideration
- e. Others ( \_\_\_\_\_ )

Q5. Are there designated spaces such as Japanese-style room or dispensary for physically challenged people to use in case of disaster that are separated from spaces for other evacuees?

- a. There are designated spaces in the school facilities that are for physically challenged people to use in case of disaster.
- b. There are no designated space in the school facilities that are for physically challenged people to use in case of disaster.

Q6. What are the fiscal support systems that your school has used when improving the facilities and equipment for enhancing disaster prevention capability? (Multiple answers allowed)

- a. Subsidy concerning facility improvement at school offered by the Ministry of Education, Culture, Sports, Science and Technology
- b. Subsidy offered by prefectural government
- c. Support system related to fire-prevention by the Fire and Disaster Prevention Agency
- d. Support system offered by other government agency (Name of agency : \_\_\_\_\_ , Name of support system \_\_\_\_\_ )
- e. Other support system (Name of offering organization : \_\_\_\_\_ , Name of support system \_\_\_\_\_ )

Q7. Please introduce an example of disaster prevention capability improvement for school facilities

(Example)

Plumbing system to use water in the rooftop swimming pool for flushing toilets in case of disaster  
Prpane gas tanks are equipped to the kitchen as the secondary resource in case of city gas outage at disaster

(Reference Material 5) List of background materials

Category of materials	Name of material	Author, editor, date
Collected records	Getting over the earthquake disaster ~A decade of creative reconstruction of education and the next step to tomorrow~	Hyogo prefecture, the board of education (March 2005)
Collected records	The Great Hanshin-Awaji Earthquake Steps to renaissance and creation of education in Kobe	Kobe city, the board of education (January 1996)
Collected records	Record of reconstruction from the Great Hanshin-Awaji Earthquake Vol. 1~Vol.3	Foundation of Hyogo prefecture 21st century Hyogo creation association Vol.1 March 1997 Vol.2 March 1998 Vol. 3 March 1999
Collected records	Record of Kobe as affected area from the Great Hanshin-Awaji Earthquake	Association of conveying lessons from Kobe 1.17 May 1996
General biblio	Research on evacuation site at the Great Hanshin-Awaji Earthquake	Shiro Kashiwabara, Jun Ueno, Takao Morita Osaka University Publication Group January 1998
Collected records	School education of Ojiya city and the Mid Niigata Prefecture Earthquake -How schools and the board of education reacted and got over-	Ojiya city, Niigata prefecture, the board of education March 2005
Report	Report of research for actual situation of disaster prevention related organization's activities at the Mid Niigata Prefecture Earthquake	The Cabinet Office March 2005
Collected records	Verification of disaster Learn from experiences of being the victim and disaster response	Nagaoka city, Niigata prefecture 2005
General biblio	the Mid Niigata Prefecture Earthquake -Did the crisis management of neighborhood association function?-	Edition of Nagaoka city countermeasures against disaster headquarters Publication of Gyosei Co., Ltd. 15 July 2005

Investigative research on disaster prevention capabilities at school facilities  
designated as evacuation facilities

11 April 2006

29 March 2007 Partially modified

National Institute for Educational Policy Research

1 Purpose

School facilities are expected to be used as emergency evacuation facilities at times of disasters. However, according to the past experiences of being used as evacuation site, it has been pointed out that school facilities are not sufficiently equipped with required capabilities as evacuation facilities.

With this situation in mind, necessary disaster preventing capabilities shall be clarified and the enforcement measures shall be considered for enhancing disaster prevention capabilities at school facilities.

2 Investigative research matters:

( 1 ) Actual conditions and issues for disaster prevention capabilities at school facilities designated as evacuation facilities

( 2 ) Consideration of promoting measures for disaster prevention capabilities at school facilities

( 3 ) Others

3 Research methods

The investigative research was cooperated by the academic experts listed on the attachment.

4 Period of implementation of research

From 11 April 2006 to 31 March 2008

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(Attachment)

Research collaborators for the investigation on disaster prevention capabilities at school facilities designated as evacuation facilities

(Committee)

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Education Committee

○ Akihiko Watanabe

Director of Toyohashi Science and Technology University Engineering Education  
International Cooperation Center

Professor of Architectural Engineering

(Alphabetical order ○Mark: Organizer of research conference)

(Observers)

Policy Controller, Cabinet Office (Disaster Prevention Division)

Fire and Disaster Management Agency Protection of lives/Disaster prevention Department, Disaster prevention

Division

Ministry of Land, Infrastructure, Transport and Tourism Housing Administration Building Guidance Division

Ministry of Health, Labor, and Welfare Community Relief Division Administration section

Ministry of Education, Culture, Sports, Science, and Technology Minister's Secretariat Educational Facilities

Planning

Department Educational Facilities Planning Division

Officials from the National Institute for Educational Policy Research who took charge of the research are listed below.

Hiroyuki Tanzawa

Director of Educational Facilities Research Center (Until 10 July 2006)

Koichi Shinpo

Same as above

(From 11 July 2006)

Seiichirou Yamamoto

General Researcher of Educational Facilities Research Center

Shinji Takeuchi

Plans Section of Educational Facilities Research Center