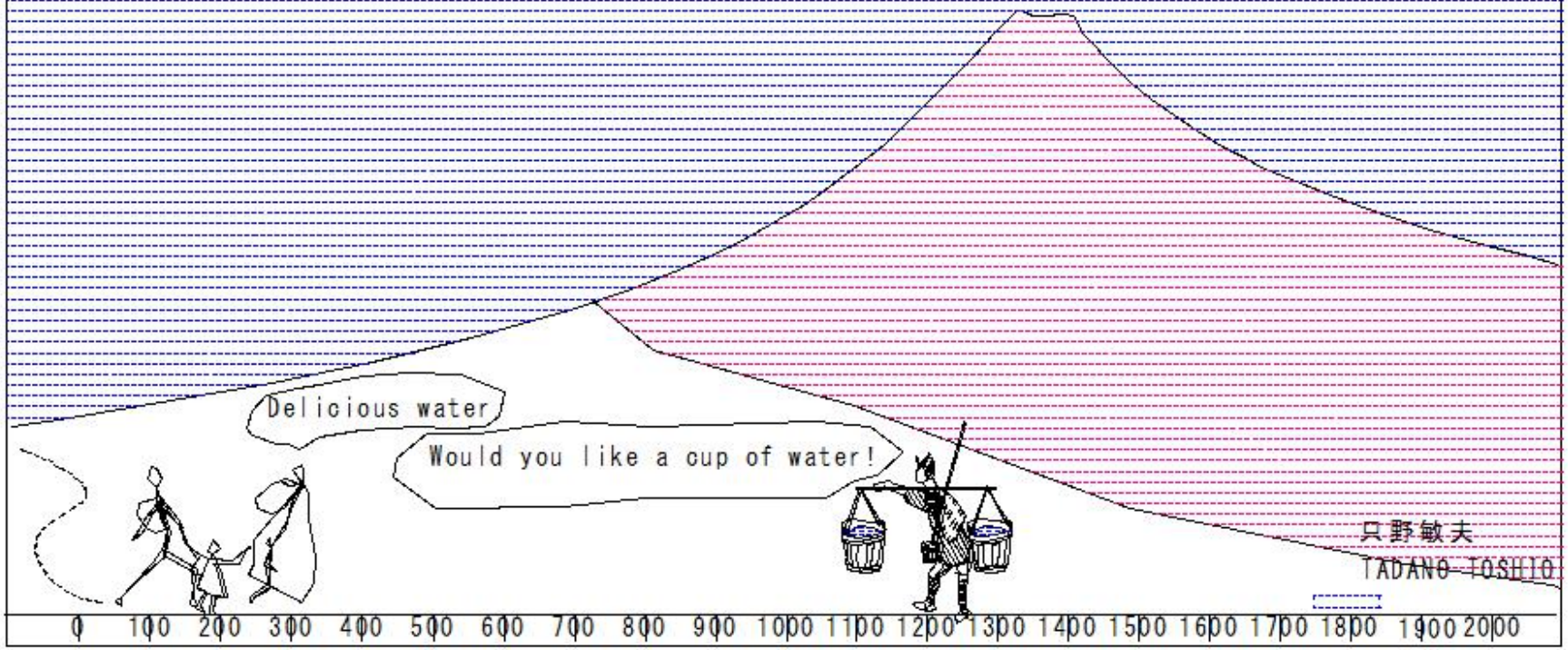
(32)Heritage(Illustration) in Africa(He401-710)

葛飾北斎（かつしか ほくさい） Katsushika Hokusai
「凱風快晴」 Fine Wind, Clear Morning
富嶽三十六景 Thirty-six Views of Mount Fuji



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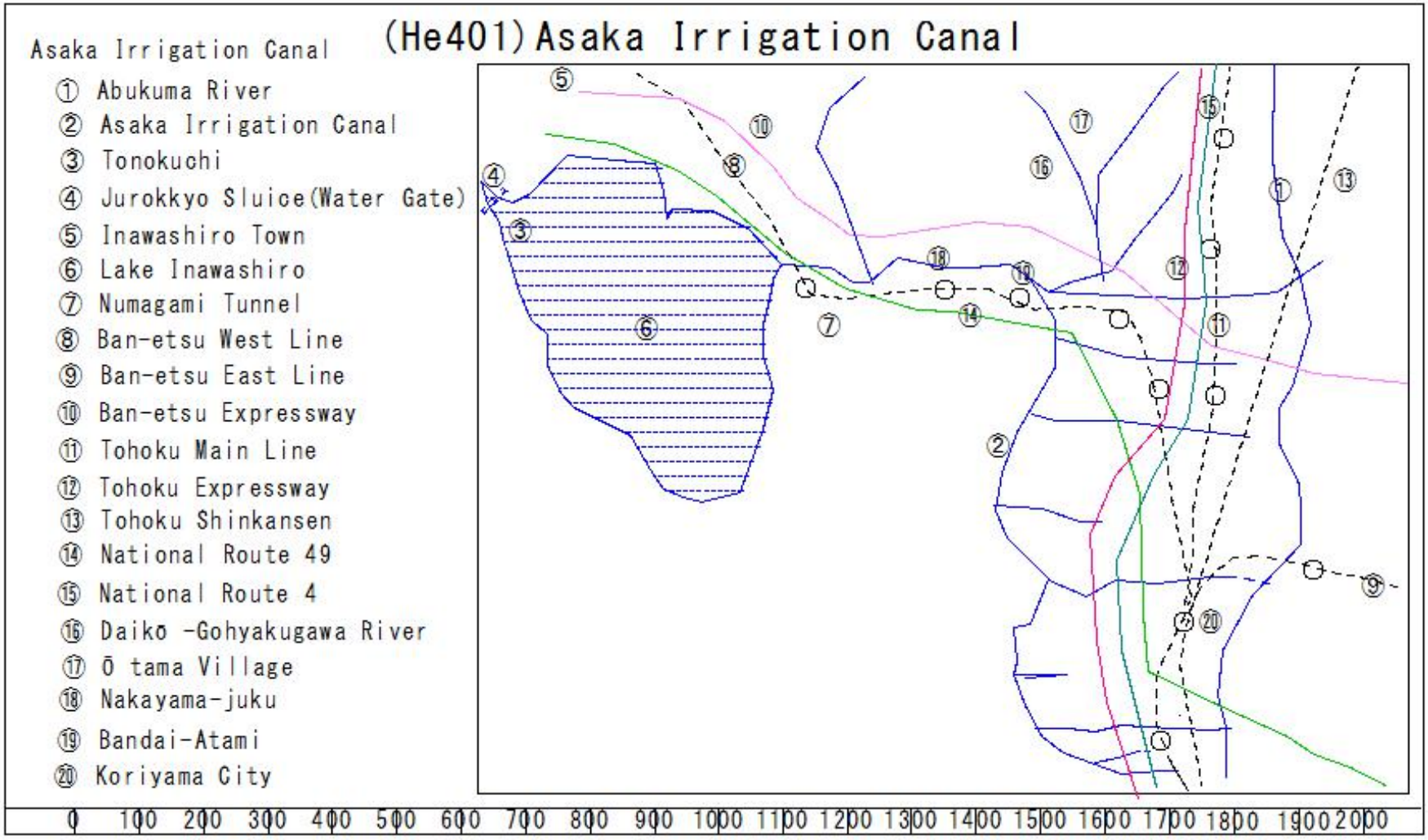
(He401) Asaka Irrigation Canal



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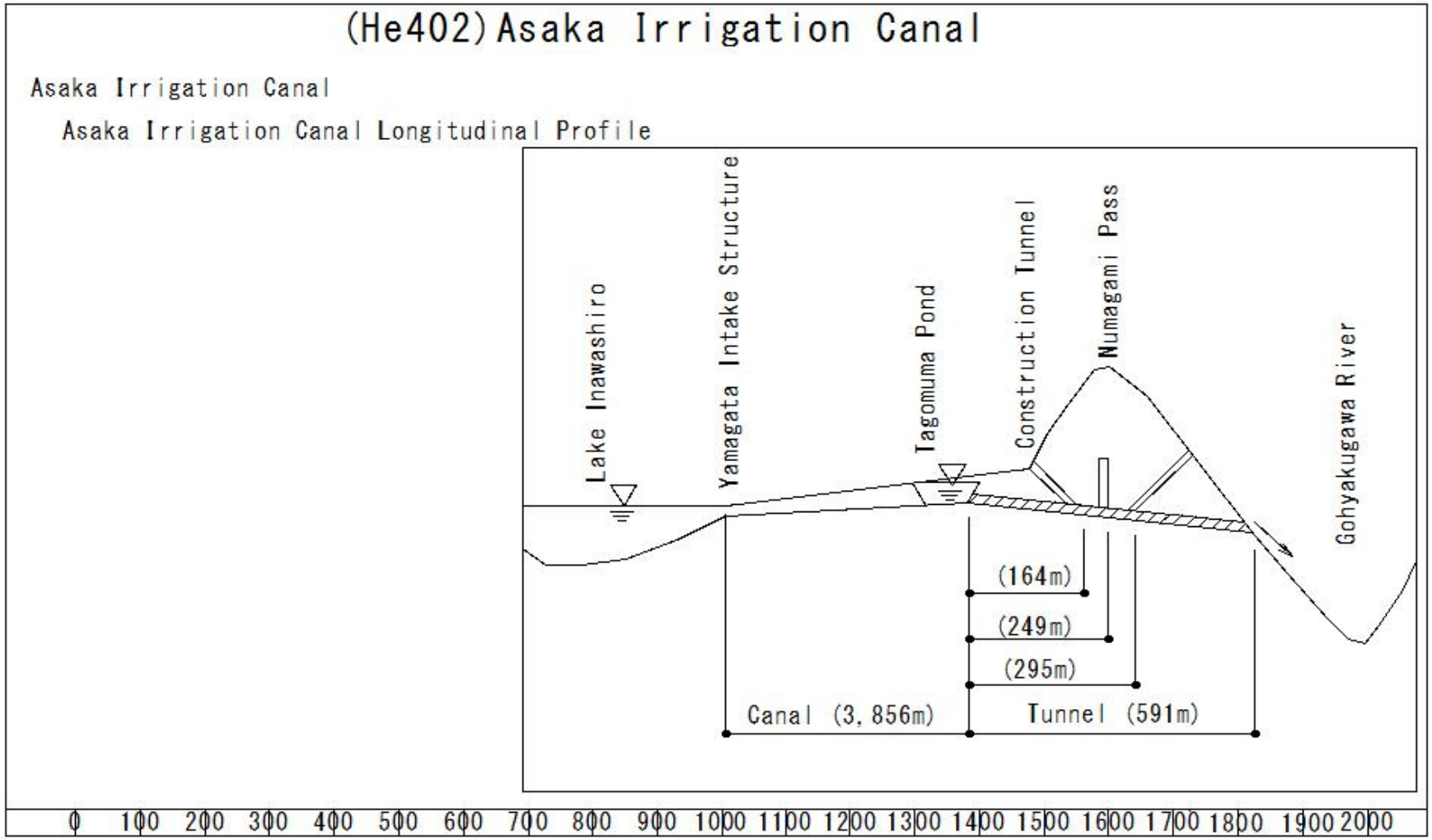
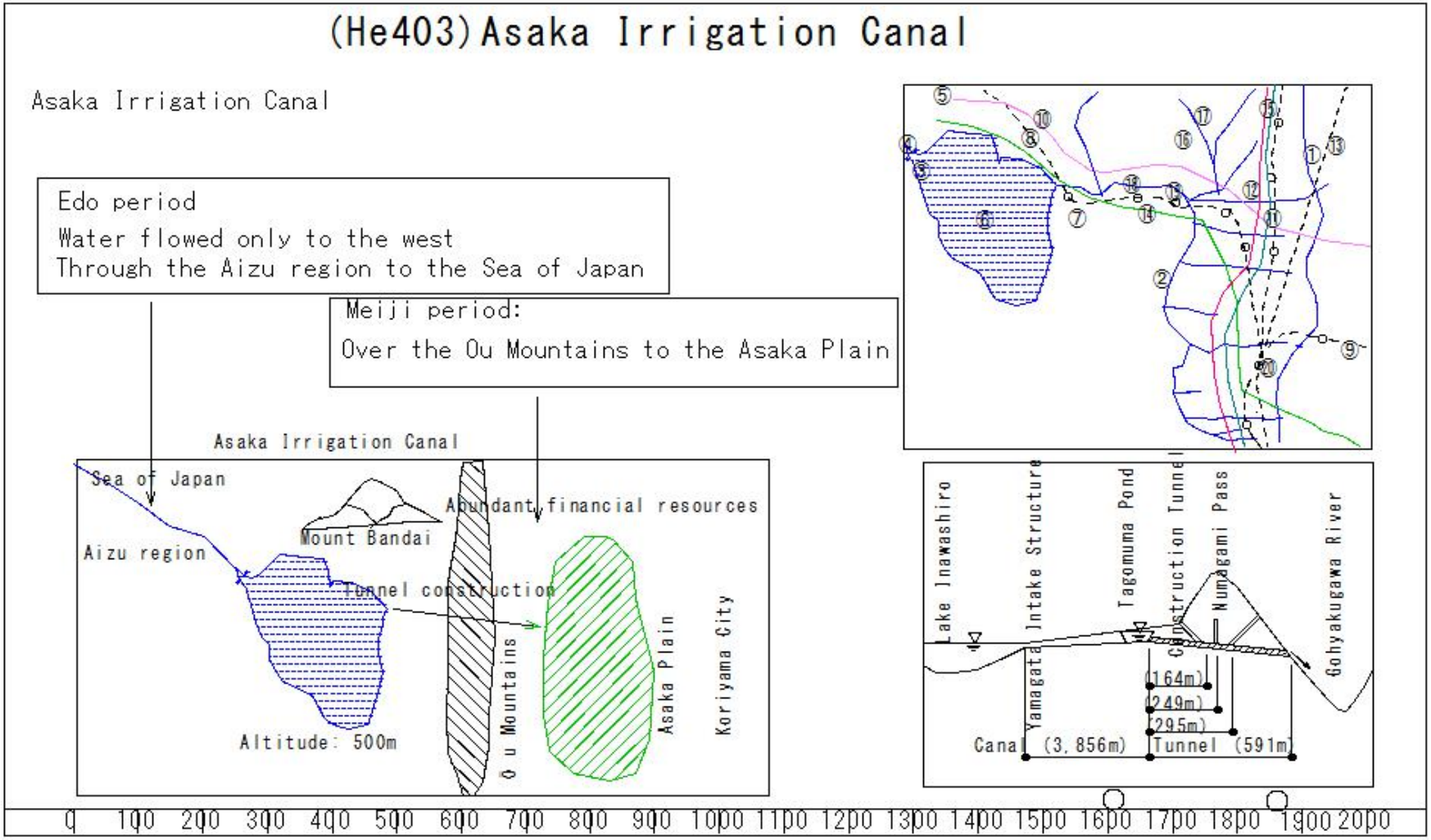


(He403) Asaka Irrigation Canal



(He404) Asaka Irrigation Canal

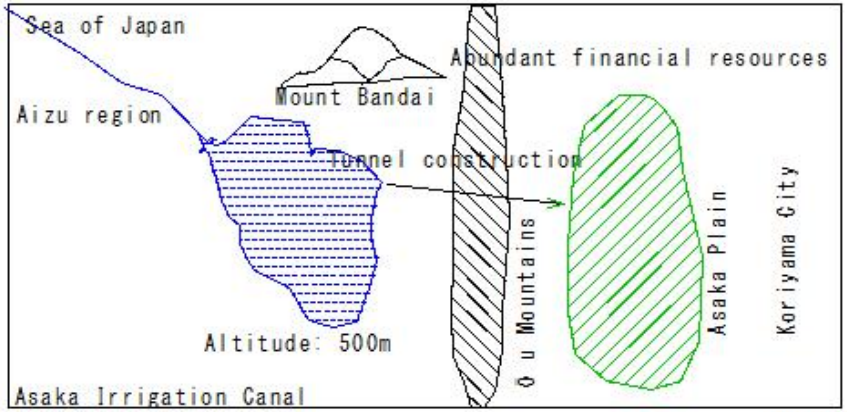
(He404)Asaka Irrigation Canal

Asaka Irrigation Canal

1876 (Meiji 9)

Toshimichi Okubo decides to proceed with land reclamation and irrigation canal construction.

A Dutch engineer, Van Dorn, conducts the survey.

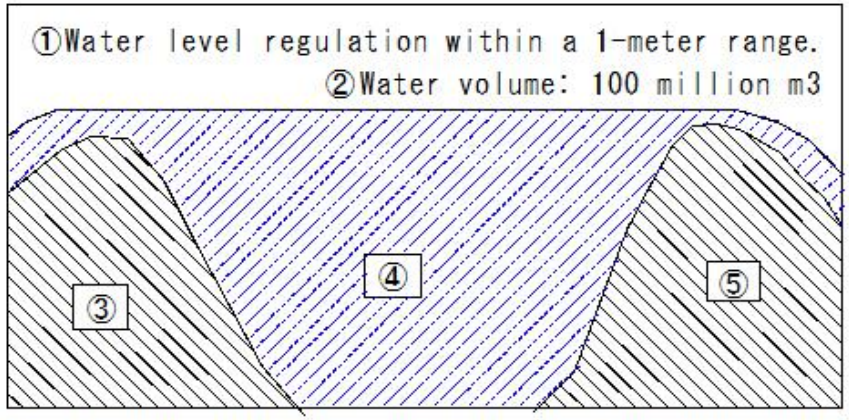


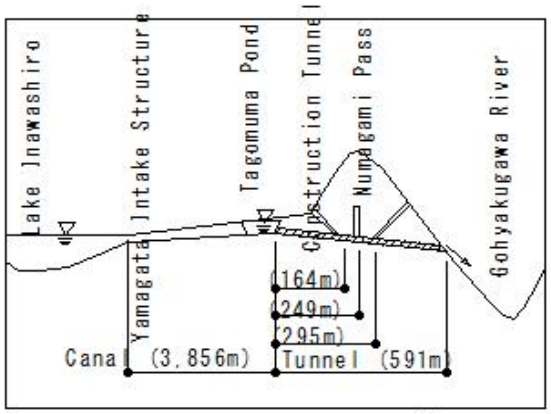
He403

③Ensures water flow at the western outlet.

④The dam will function to store water during heavy rains and release it during droughts.

⑤New water intake from the east.





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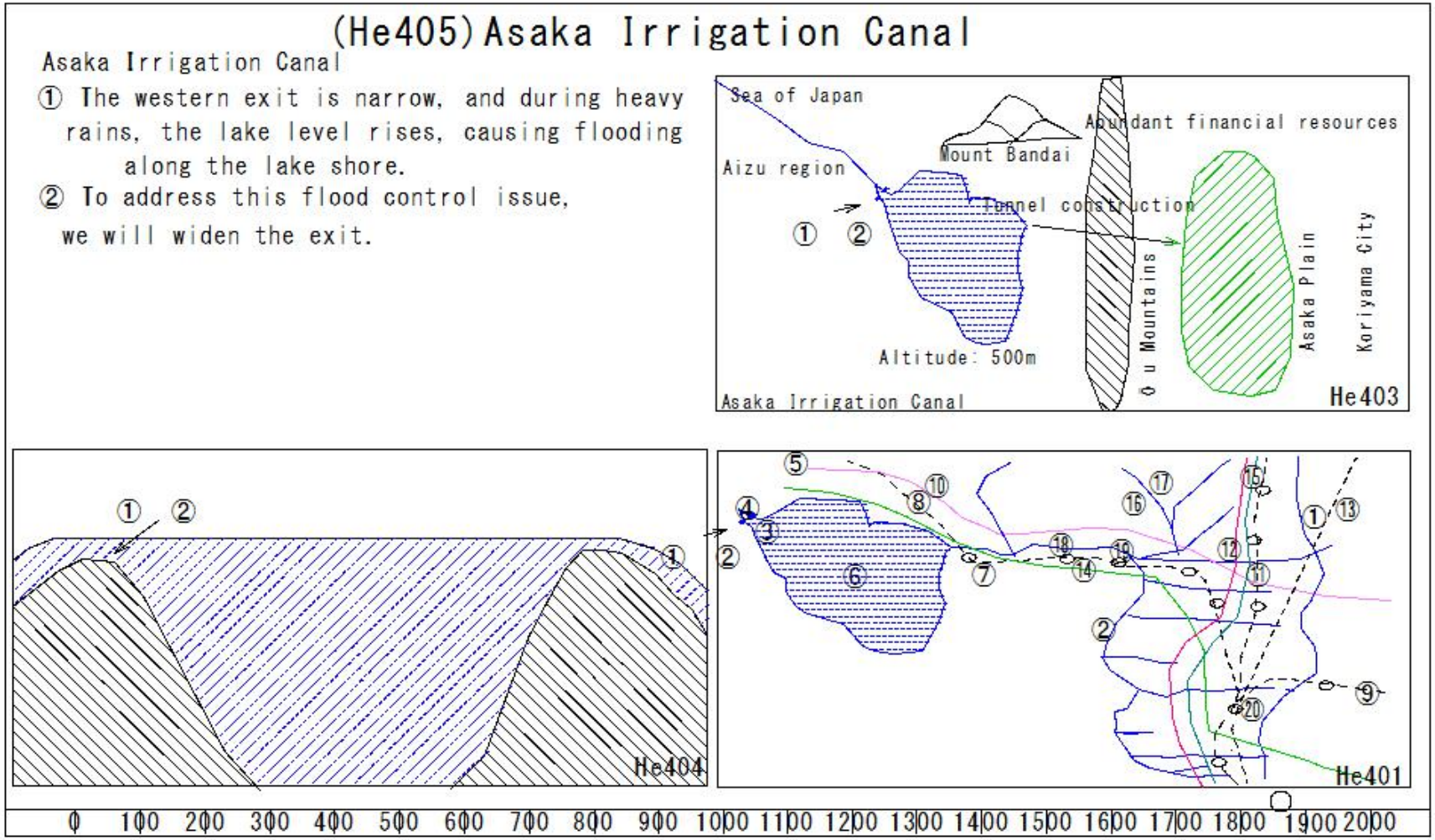
(He405) Asaka Irrigation Canal



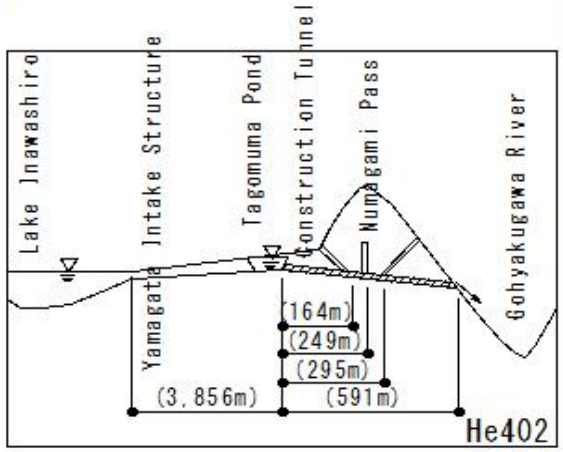
(He406) Asaka Irrigation Canal

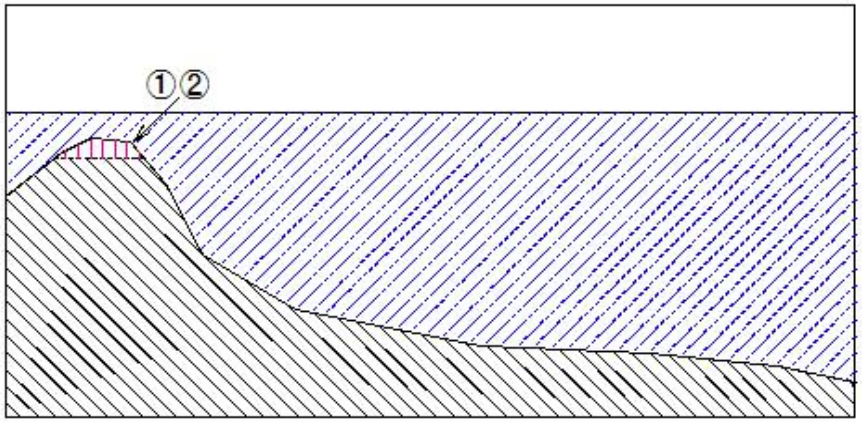
(He406) Asaka Irrigation Canal

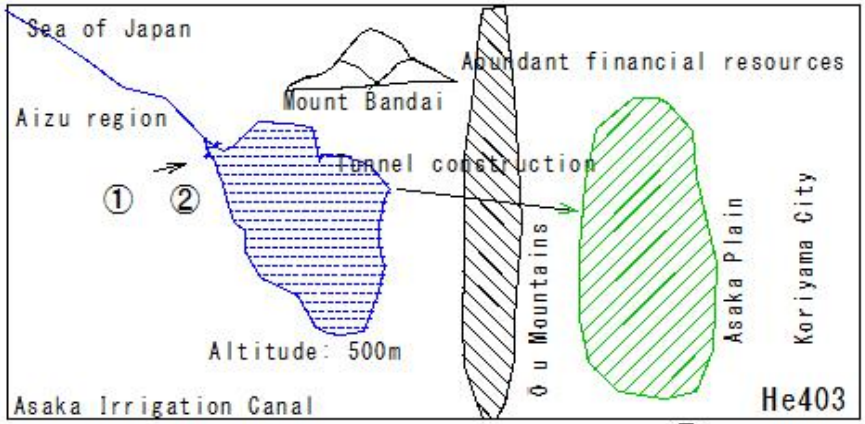
Asaka Irrigation Canal

① During periods of low water levels, the lake level drops, causing water to cease flowing from the western outlet.

② To address this, we will excavate the riverbed at the outlet by 60cm to ensure that water continues to flow even when the water level drops.







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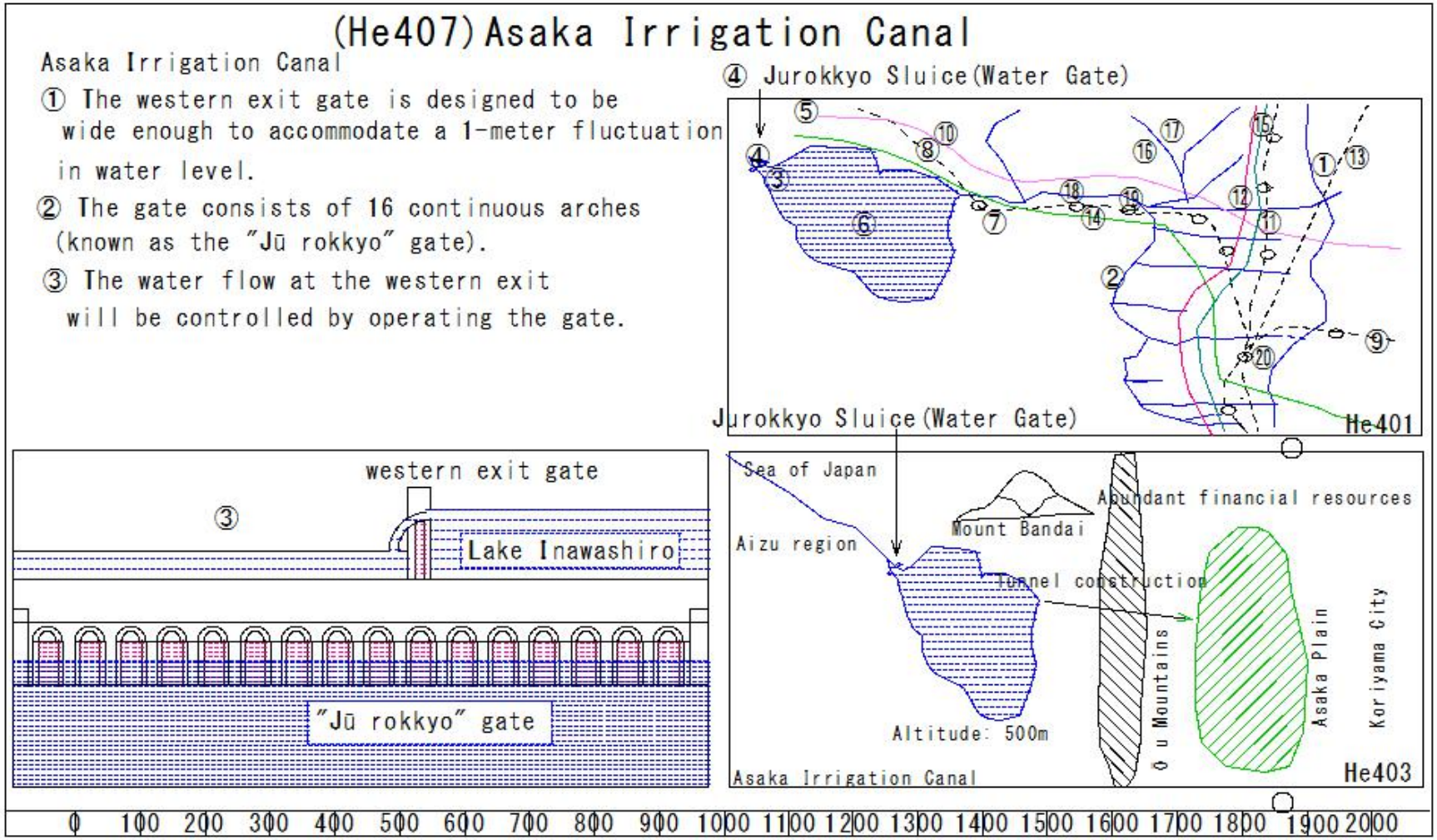
(He407) Asaka Irrigation Canal



(He408) Asaka Irrigation Canal

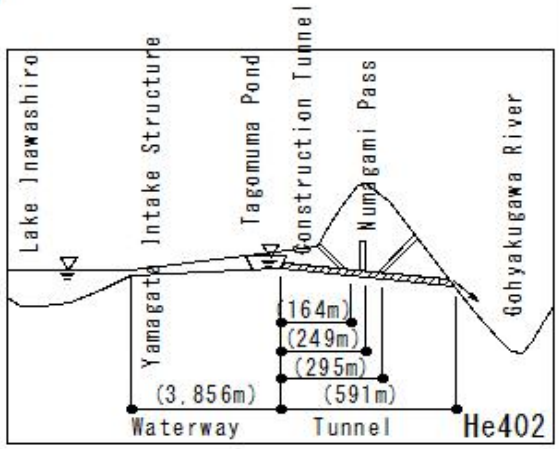
(He408) Asaka Irrigation Canal

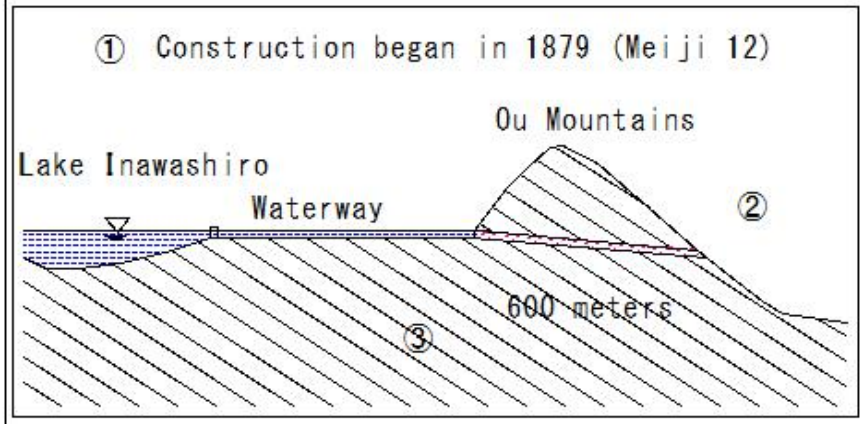
Asaka Irrigation Canal

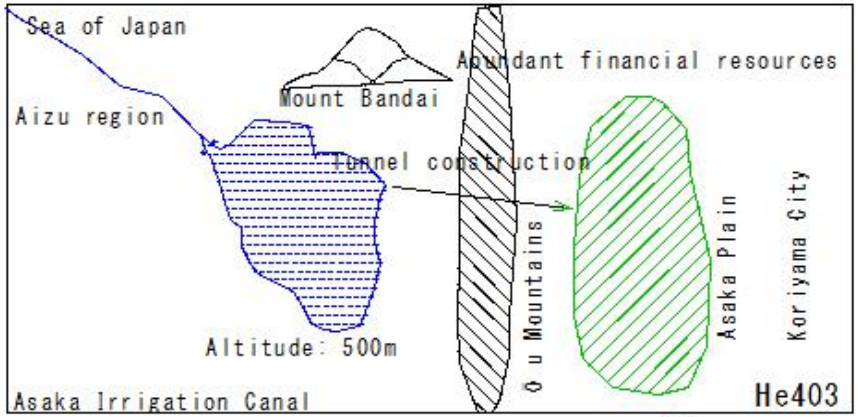
① Construction began in 1879 (Meiji 12) as the first national government-funded project.

② The 600-meter-long tunnel, piercing through the Ou Mountains, was a very difficult project to complete.

③ The project was successfully completed using the latest foreign technologies, such as dynamite and steam pumps for draining water.







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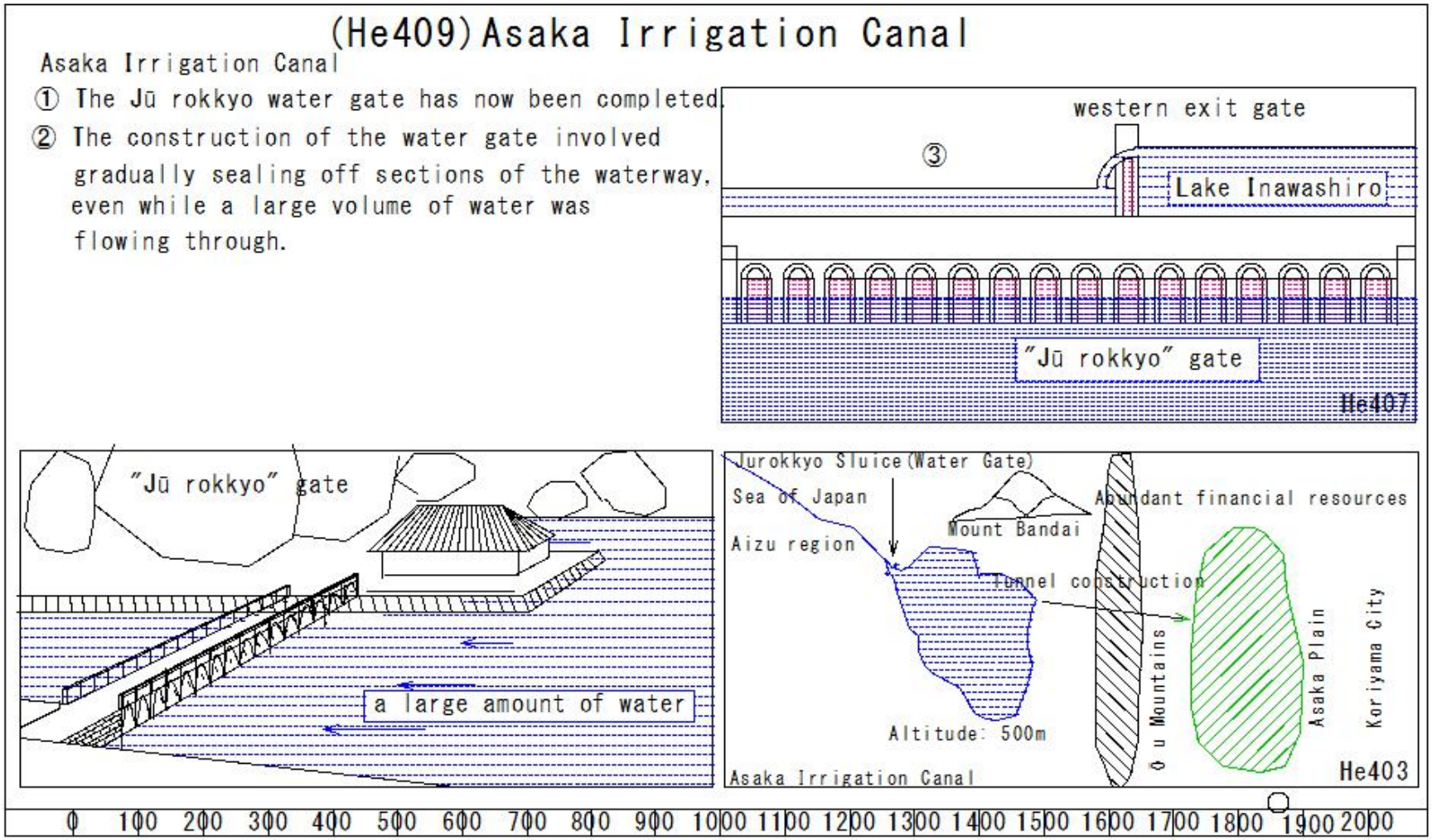
(He409) Asaka Irrigation Canal



(He410) Asaka Irrigation Canal

(He410)Asaka Irrigation Canal

Asaka Irrigation Canal

① Labor contributions from the Aizu region and the relocation of samurai families from nine different domains across Japan

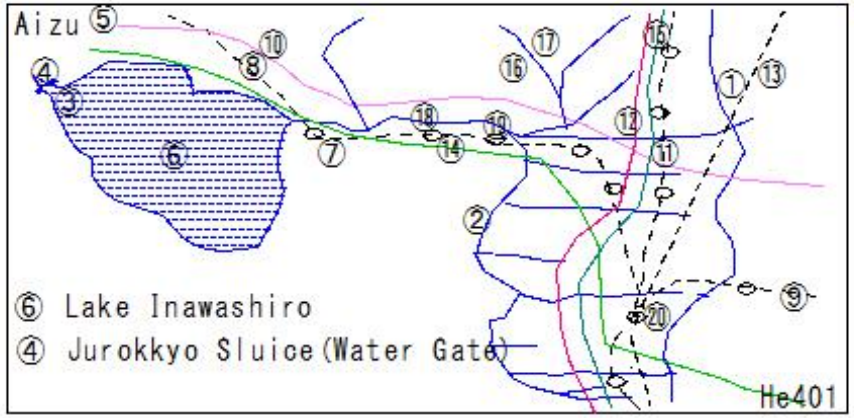
② Construction of the entire project, including a 120km canal

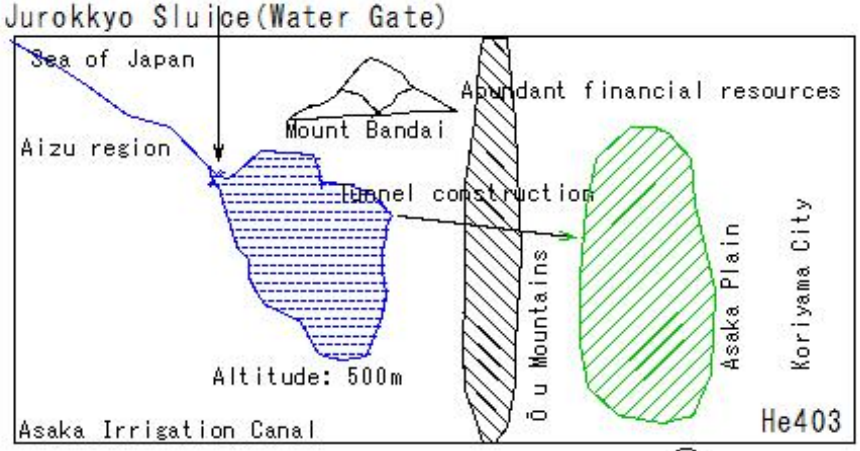
③ Completed in 1882 (Meiji 15)

④ The Asaka Plain transformed into a vast rice paddy field

⑤ Koriyama City became the top rice-producing region in Japan

⑥ The success of the Asaka Irrigation Canal had a significant influence on later projects such as the Biwa Lake Canal





0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

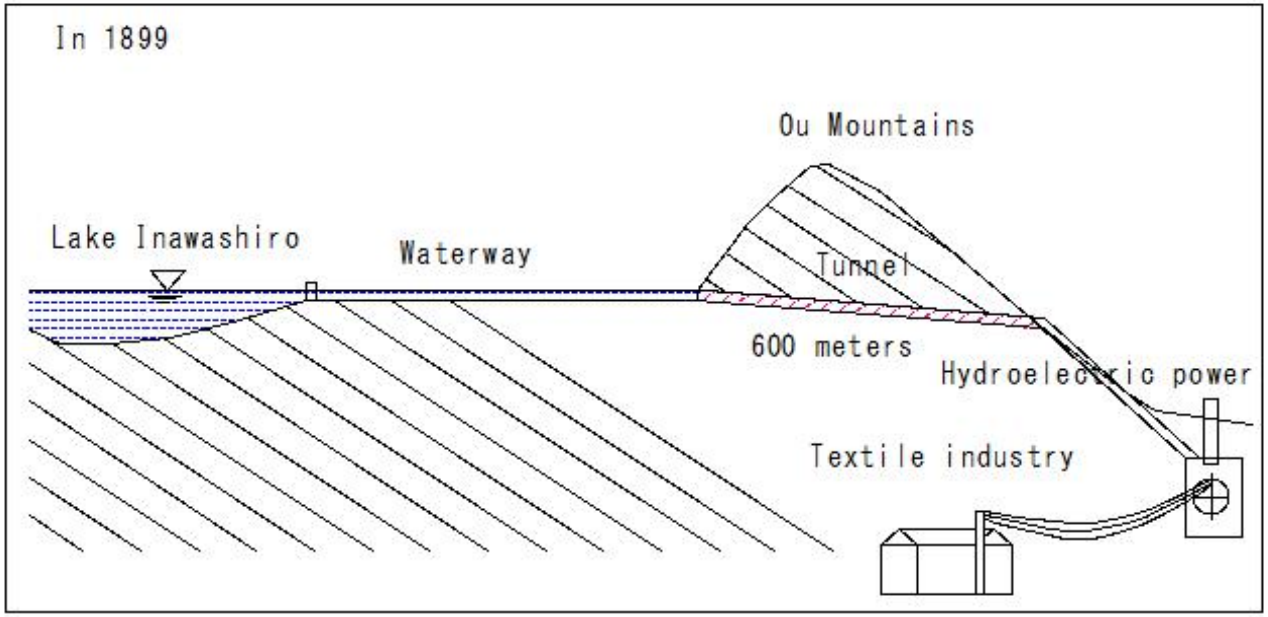
(He411) Asaka Irrigation Canal

(He411)Asaka Irrigation Canal

Asaka Irrigation Canal

① In 1899, hydroelectric power generation using the area's elevation became possible.

② Industrialization, particularly in the textile industry, progressed, and the city flourished.



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(He412) Asaka Irrigation Canal

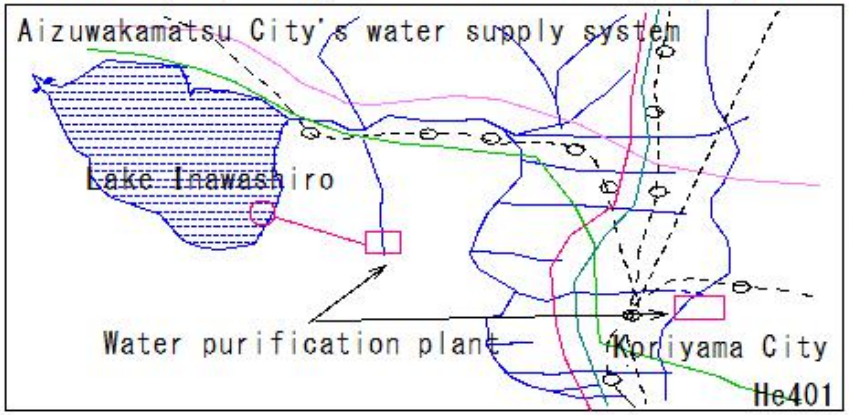
(He412) Asaka Irrigation Canal

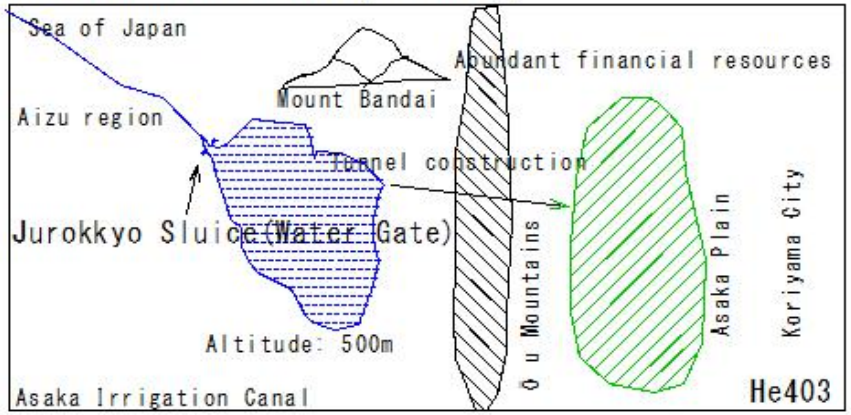
Asaka Irrigation Canal

1. In 1912 (Meiji 45), a modern water supply system was established in Koriyama City, using the Asaka Canal as its water source.
2. Currently, water is drawn from Lake Inawashiro via a dedicated water intake tower and tunnel to the water treatment plant.
3. The water quality of Lake Inawashiro remains excellent even today, and the water is also used for the water supply system in Aizuwakamatsu City to the west.

Aizu

In 1912 (Meiji 45), a modern water supply system was established in Koriyama City,





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(He413) Asaka Irrigation Canal

(He413) Asaka Irrigation Canal

Asaka Irrigation Canal

1. 1879 (Meiji 12)

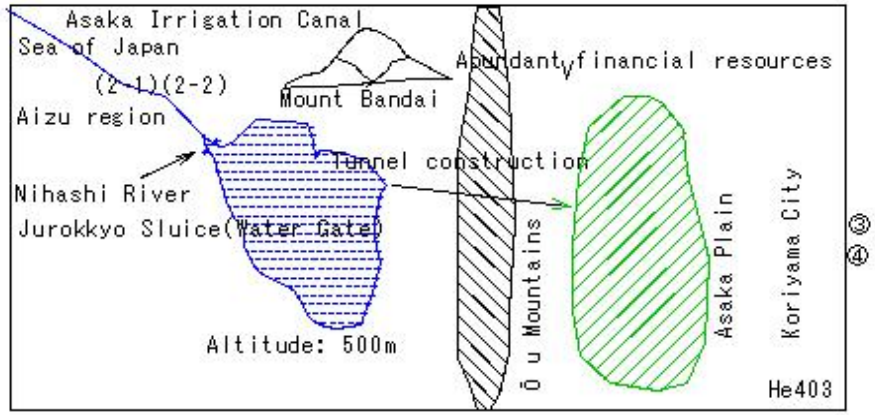
(2-1) Initially, the project started on the opposite side of the intake point of the Asaka Canal, passing through the Aizu region,

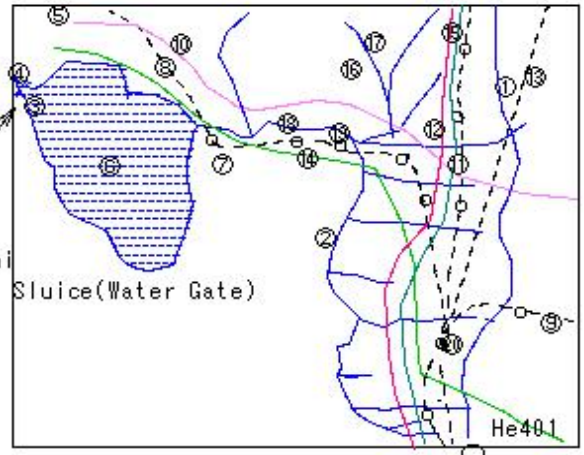
(2-2) and involved the construction of the Jurokkyo Sluice(Water Gate) on the Nihashi River, which flows into the Sea of Japan.

3. This water gate was designed to regulate the flow of water from Lake Inawashiro into the Nihashi River at Jurokkyo Sluice(Water Gate) location,

4. to maintain the water level of Lake Inawashiro,

5. to serve as an irrigation water intake facility for the Tonoguchi and Futo irrigation systems in the Aizu Plain.





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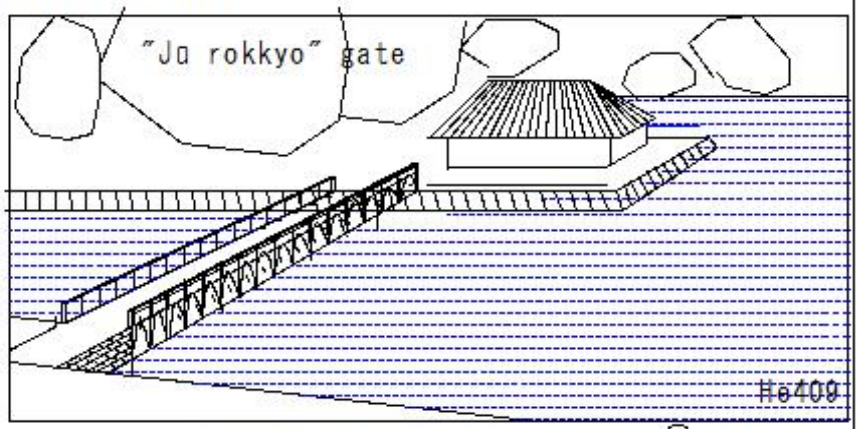
(He414) Asaka Irrigation Canal

(He414)Asaka Irrigation Canal

Asaka Irrigation Canal

1. Construction work took place from 6:00 AM to 6:00 PM (spring and summer).
2. Workers had only one day off per month.
3. It was a government-led project.
4. The government did not directly employ the workers;
5. instead, it contracted out each section of work through bidding to private companies.
6. Workers were required to sign strict contracts, including having a guarantor,
7. and strict work rules were enforced.
8. The project was completed in a short period of three years.
9. There were few accidents (only two fatalities),
10. which speaks to the excellent management system of that time.
11. Farmers volunteered as "volunteer laborers."
12. They came from various villages, some more than 10 km away, carrying hoes and shovels.
13. The major construction project at To guchi was completed in just one year,
14. thanks to the support of the local residents.
15. In 1880, when the Sixteen Bridges were completed, 60,000 to 70,000 residents attended the opening ceremony.



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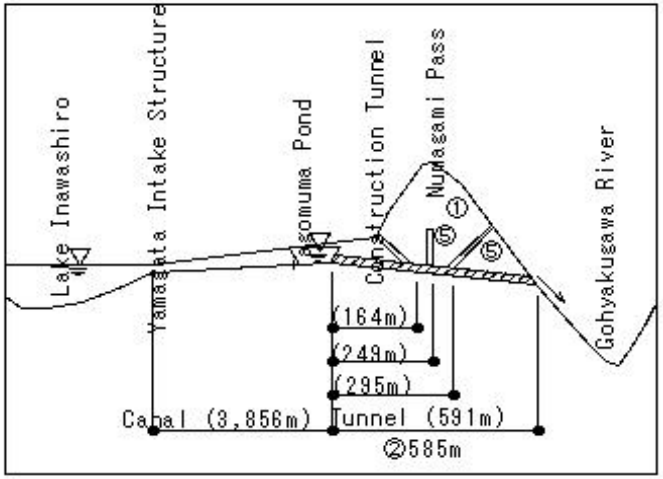
(He415) Asaka Irrigation Canal

(He415) Asaka Irrigation Canal

Asaka Irrigation Canal

① Water diversion tunnel to the Asaka Plateau
② The Numagami Tunnel construction project was 585m in length
③ Clayey soil, hard bedrock on steep slopes, and groundwater seepage due to soft ground conditions
④ Ventilation, groundwater pumping, and material transport
⑤ Inclined shafts (sloping tunnels) and vertical shafts (vertical tunnels) were constructed for work access
⑥ (In mining terminology, "manpo" refers to a tunnel or shaft.)



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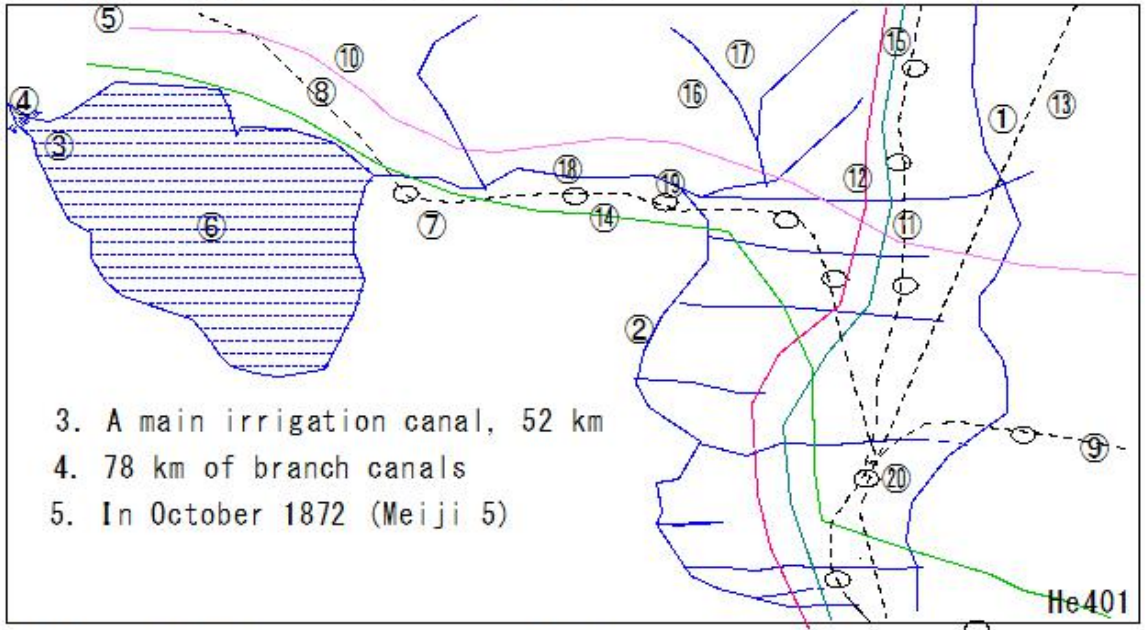
(He416) Asaka Irrigation Canal

(He416)Asaka Irrigation Canal

Asaka Irrigation Canal

1. The construction project shifted to building an irrigation canal to water the Asaka Plain.
2. Dozens of tunnels were dug, and aqueducts were constructed.
3. A main irrigation canal, 52 km long, was completed.
4. Additionally, 78 km of branch canals were also completed.
5. In October 1872 (Meiji 5), the canal opening ceremony took place.
6. The farmers rejoiced.

① Abukuma River
② Asaka Irrigation Canal
③ Tonokuchi
④ Jurokkyo Sluice(Water Gate)
⑤ Inawashiro Town
⑥ Lake Inawashiro
⑦ Numagami Tunnel
⑯ Daikō -Gohyakugawa River
⑰ Ō tama Village
⑱ Nakayama-juku
⑲ Bandai-Atami
⑳ Koriyama City



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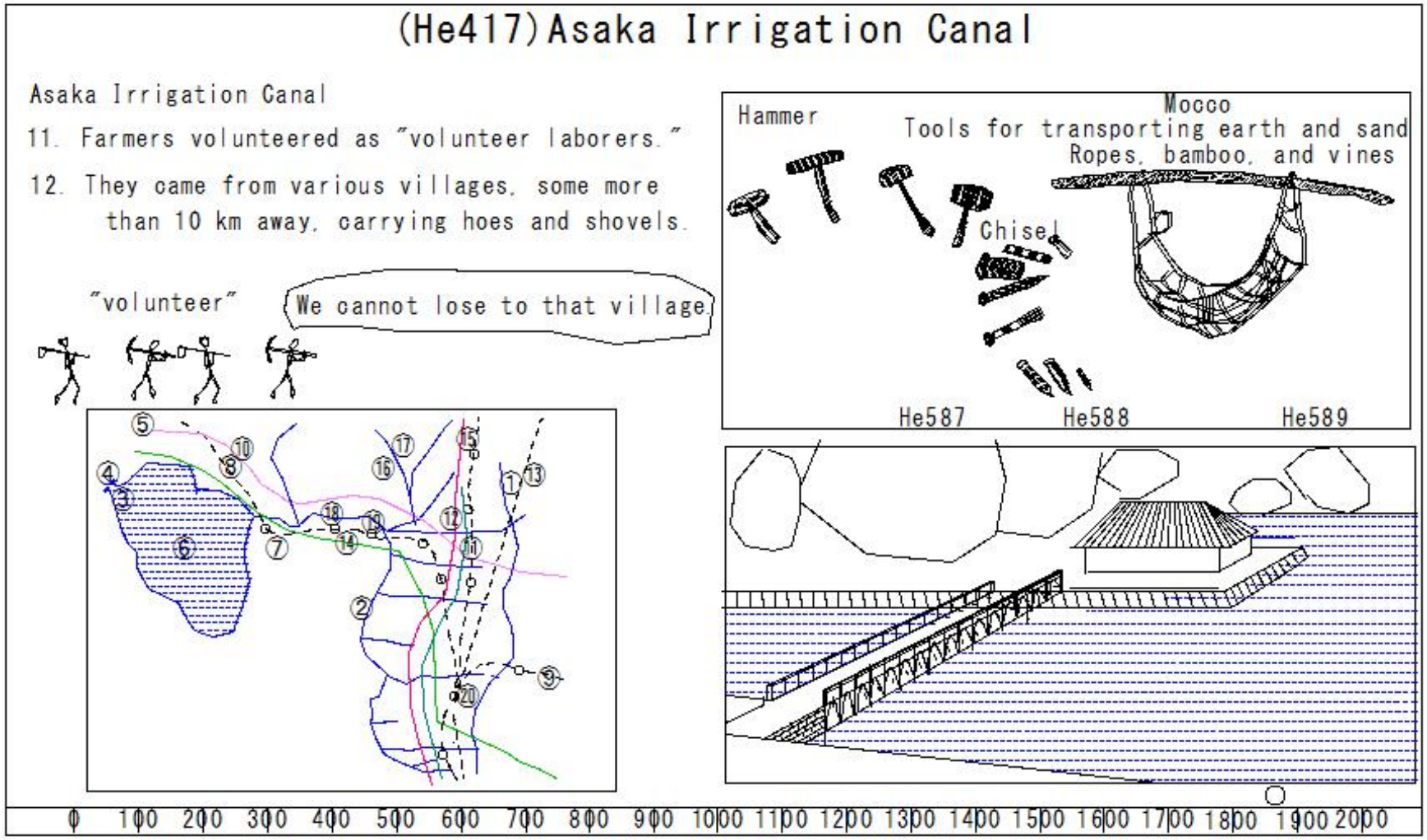
(He417) Asaka Irrigation Canal



(He418) Asaka Irrigation Canal

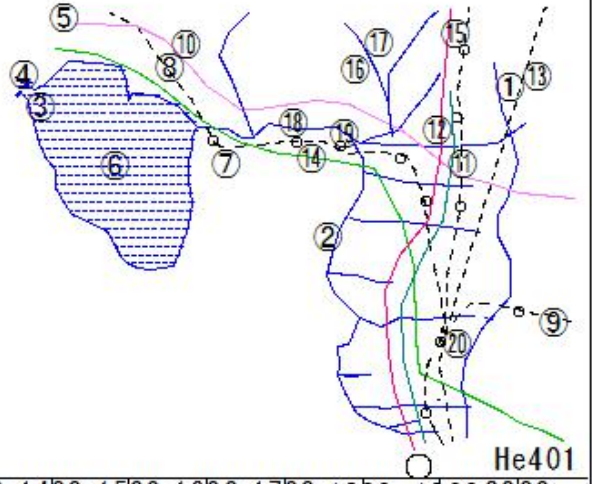
(He418) Asaka Irrigation Canal

Asaka Irrigation Canal

Asaka Irrigation Canal-related facilities
(Selected as a Civil Engineering Heritage Site by the Japan Society of Civil Engineers in 2002)

① One of the three major irrigation canals built by the Meiji government
② Diverted water from Lake Inawashiro across the Ou Mountains for irrigation and land reclamation in the Asaka Plain
③ A project that served as the driving force behind the development of modern Koriyama City
④ The symbolic Sixteen Bridges Water Gate
⑤ The irrigation canal and power plant facilities are valuable examples of modern civil engineering heritage.

① Abukuma River
② Asaka Irrigation Canal
③ Tonokuchi
④ Jurokkyo Sluice(Water Gate)
⑤ Inawashiro Town
⑥ Lake Inawashiro
⑦ Numagami Tunnel
⑧ Ban-etsu West Line
⑨ Ban-etsu East Line
⑩ Ban-etsu Expressway
⑪ Tohoku Main Line
⑫ Tohoku Expressway
⑬ Tohoku Shinkansen
⑭ National Route 49
⑮ National Route 4
⑯ Daikō -Gohyakugawa River
⑰ Ō tama Village
⑱ Nakayama-juku
⑲ Bandai-Atami
⑳ Koriyama City



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(He419) Asaka Irrigation Canal

(He419) Asaka Irrigation Canal

Asaka Irrigation Canal

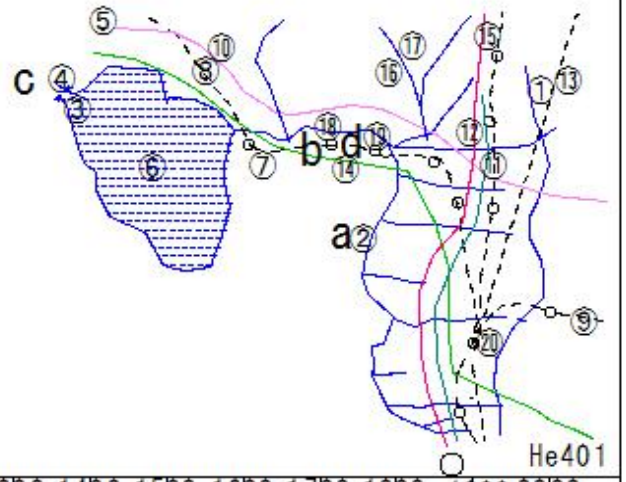
a Irrigation canal: Completed in 1882 (Meiji 15)

b Numagami Power Plant canal: Completed in 1882 (Meiji 15)

c Sixteen Bridges Water Gate: Completed in 1914 (Taisho 3)

d Marumori Power Plant: Completed in 1921 (Taisho 10)

① Abukuma River
② Asaka Irrigation Canal
③ Tonokuchi
④ Jurokkyo Sluice(Water Gate)
⑤ Inawashiro Town
⑥ Lake Inawashiro
⑦ Numagami Tunnel
⑧ Ban-etsu West Line
⑨ Ban-etsu East Line
⑩ Ban-etsu Expressway
⑪ Tohoku Main Line
⑫ Tohoku Expressway
⑬ Tohoku Shinkansen
⑭ National Route 49
⑮ National Route 4
⑯ Daikō -Gohyakugawa River
⑰ Ō tama Village
⑱ Nakayama-juku
⑲ Bandai-Atami
⑳ Koriyama City



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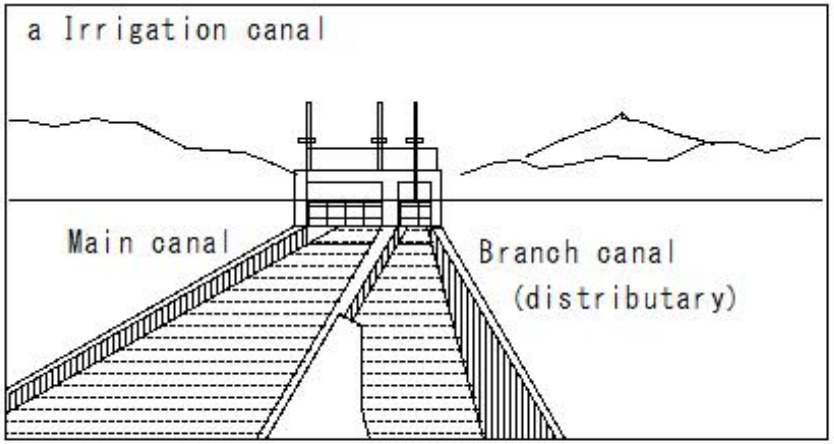
(He420) Asaka Irrigation Canal

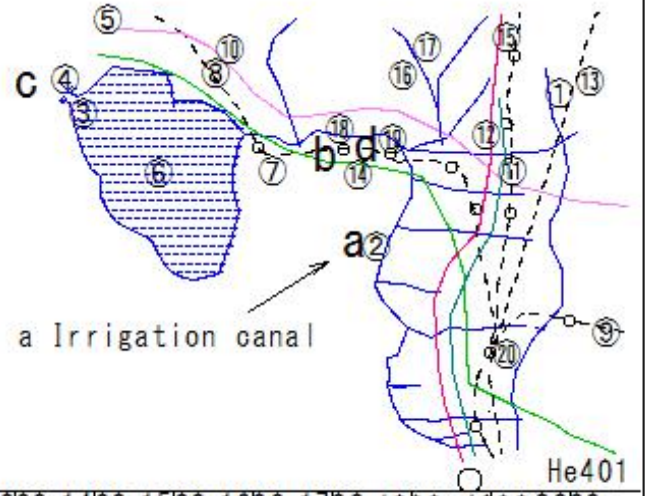
(He420) Asaka Irrigation Canal

Asaka Irrigation Canal

a Irrigation canal: Completed in 1882 (Meiji 15)

1. The irrigation canal extending beyond the Asaka Irrigation Bridge (including over 40 tunnels)
2. Constructed between 1881 and 1882 (Meiji 14-15)
3. The total length of the main and branch canals (including distributaries) of the Asaka Irrigation System is approximately 130 km.
4. It irrigated approximately 3,800 hectares of paddy fields in the Asakano Plain (including some existing paddy fields).





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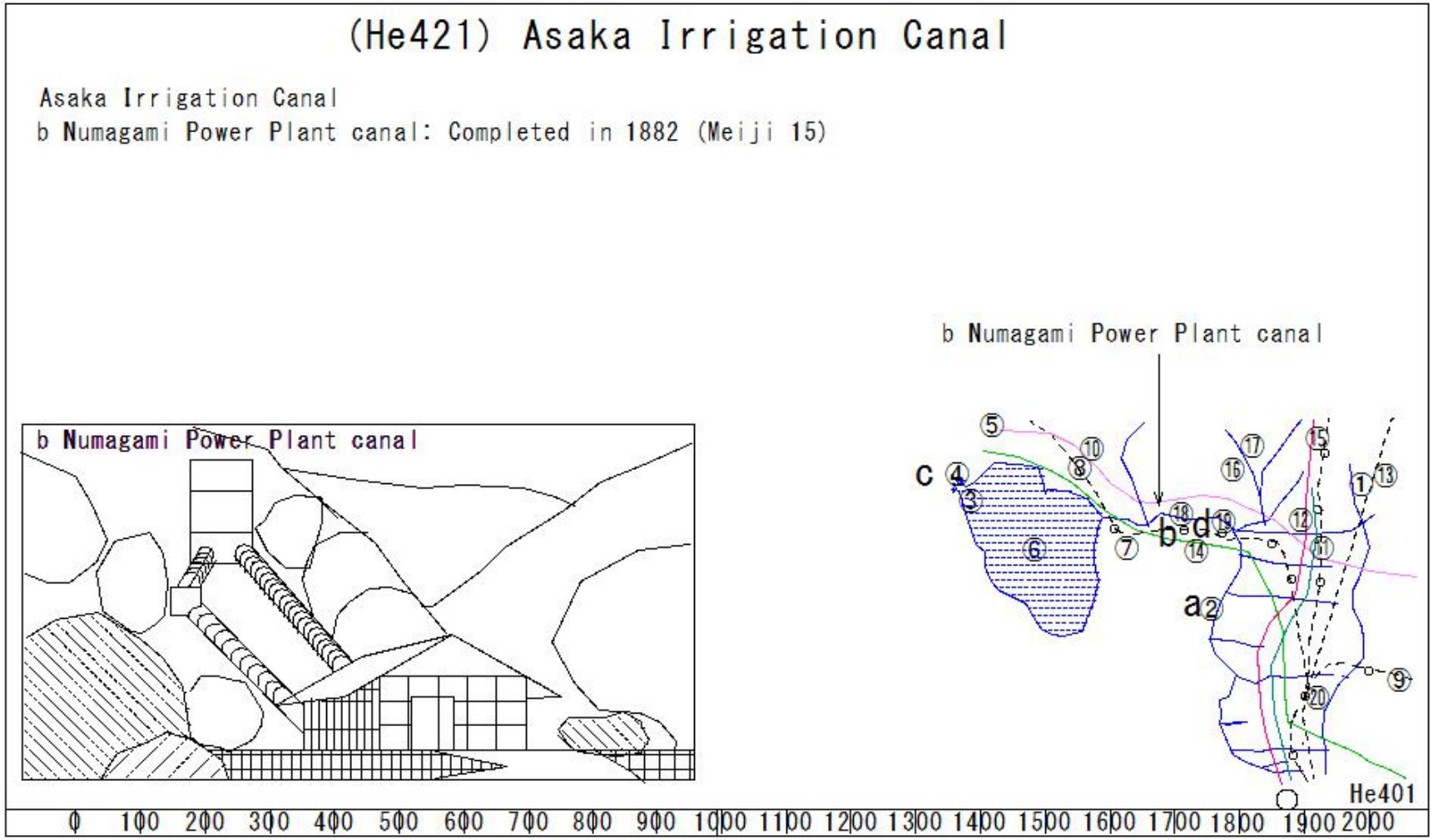
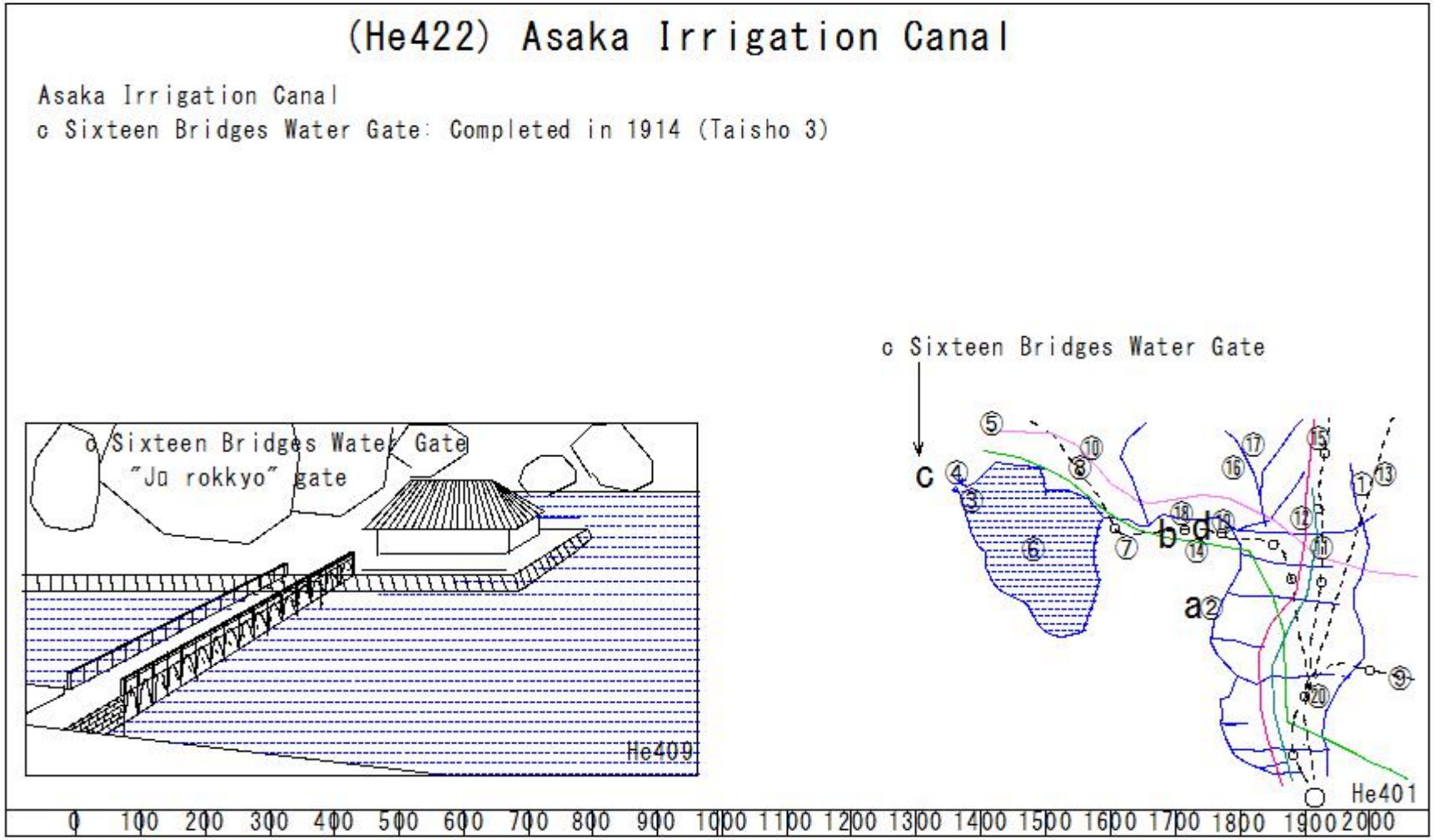
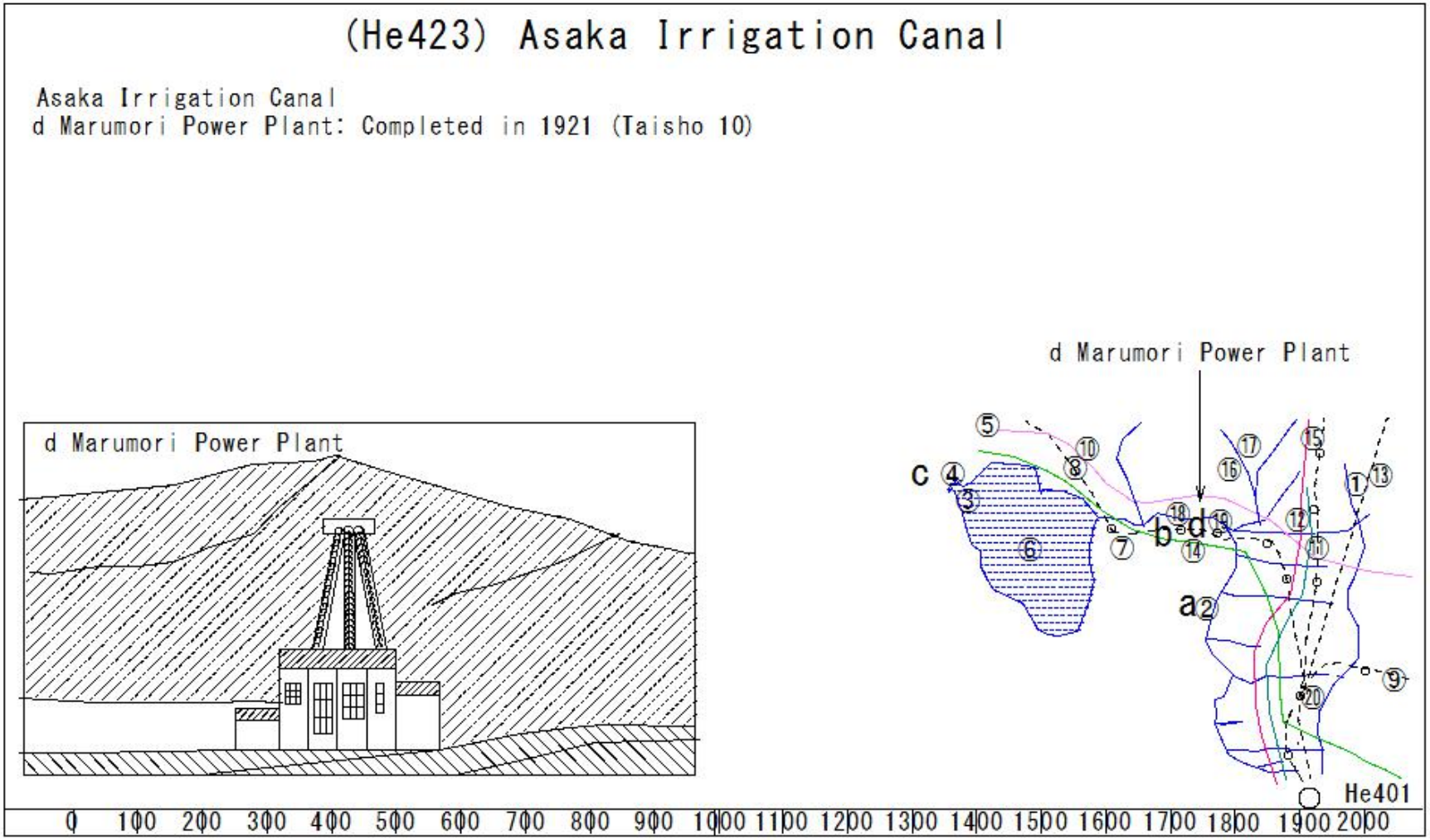
(He421) Asaka Irrigation Canal



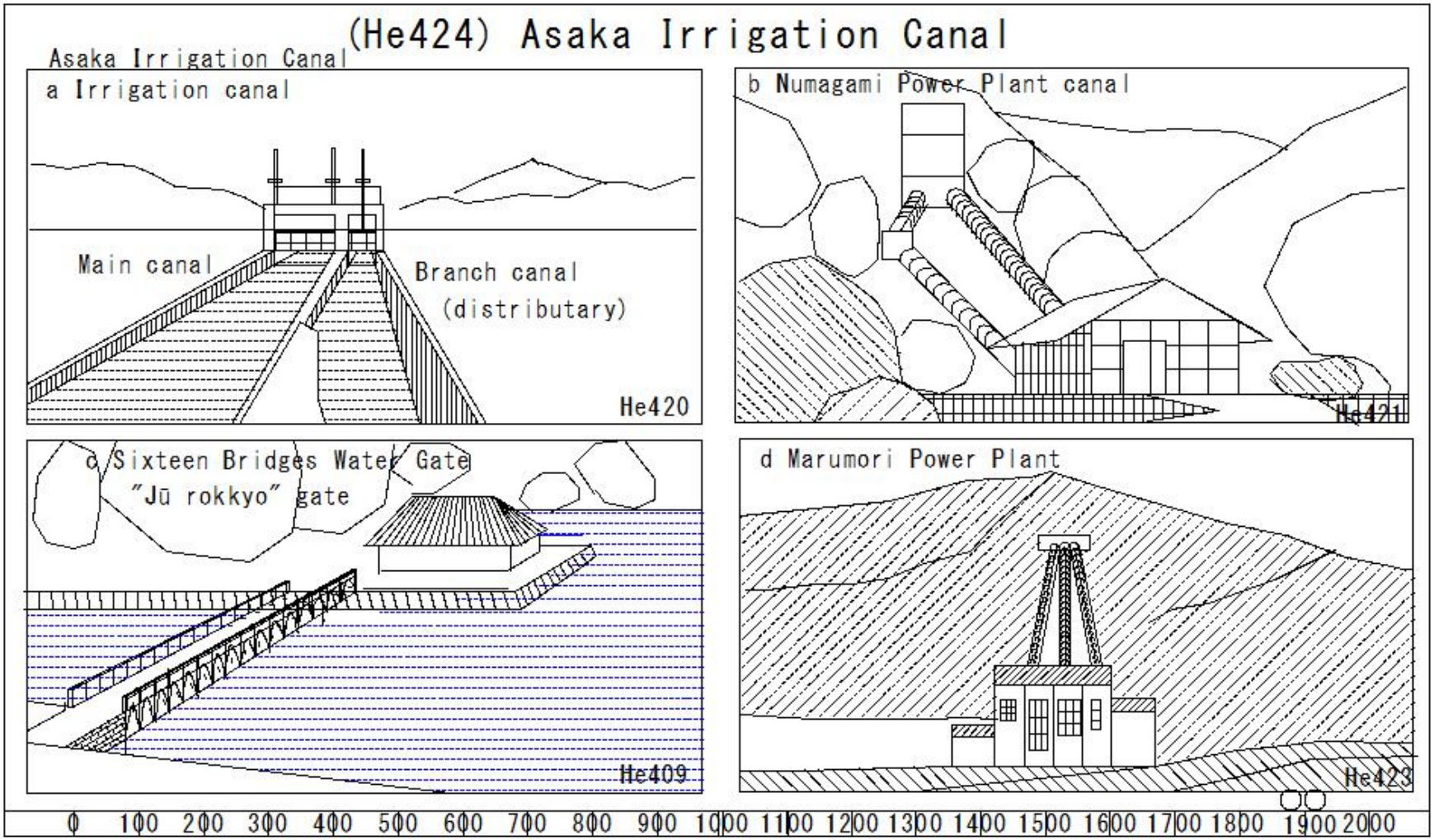
(He422) Asaka Irrigation Canal



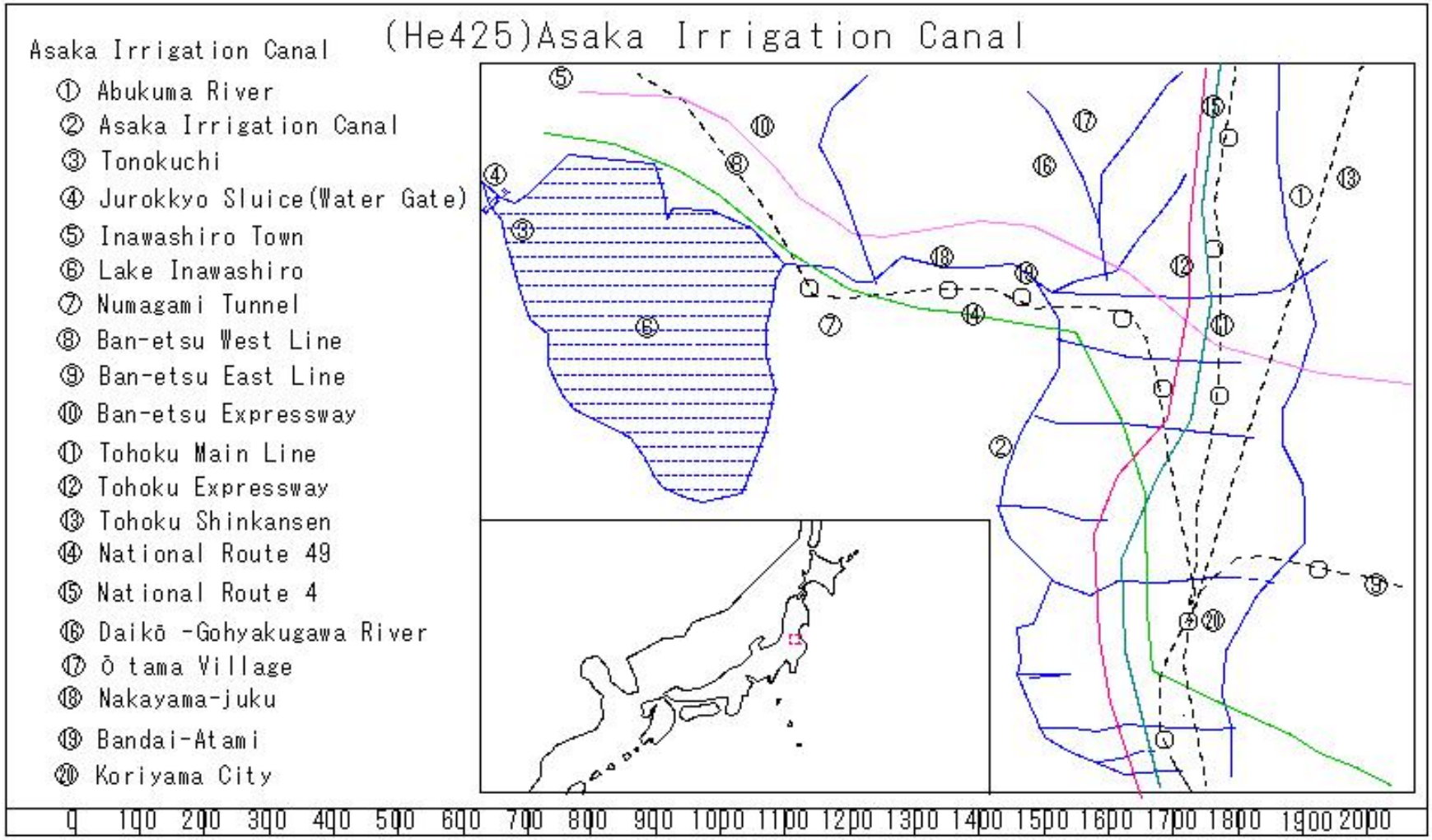
(He423) Asaka Irrigation Canal



(He424) Asaka Irrigation Canal



(He425) Asaka Irrigation Canal



(He426) Asaka Irrigation Canal

(He426) Asaka Irrigation Canal

Asaka Irrigation Canal

1. In planning the Asaka Irrigation Canal, ensuring an adequate water supply for the Aizu region was a key consideration.
2. A major issue was determining where to route the canal across the Ou Mountains to supply water to the Asaka Plain.
3. To ensure an adequate water supply for the Aizu region, the level of the water intake near the old sluice gate bridge was lowered,
4. a new 16-Bridge Sluice Gate was constructed to regulate the water level.
5. Regarding the location of the tunnel through the Ou Mountains, three routes were considered: Numagami Pass, Saiki Pass, and Mimori Pass, which were surveyed by Hisateru Kobayashi and local leaders at the time.
6. Based on the survey results by Ichiro Minami of the Ministry of Home Affairs' Bureau of Industrial Promotion (Meiji 9-10)(1876-1877), the Numagami Pass route was chosen.
7. The reasons for this were that the Numagami Pass route had a shorter mountain slope compared to the Saiki and Mimori Pass routes, thus significantly reducing construction time and costs,
8. the topography of the planned development area, with higher ground to the north and lower ground to the south, allowed for natural flow to cover the entire area.
9. According to the final plan, the Asaka Irrigation Canal (originally called the Inawashiro Lake Irrigation Canal) would have an intake point in the Yamagata area on the northeastern side of Lake Inawashiro, as shown in the diagram, and
10. a tunnel (approximately 580m) would be dug through the slopes of Mount Numagami to deliver water to the Asaka Plain.

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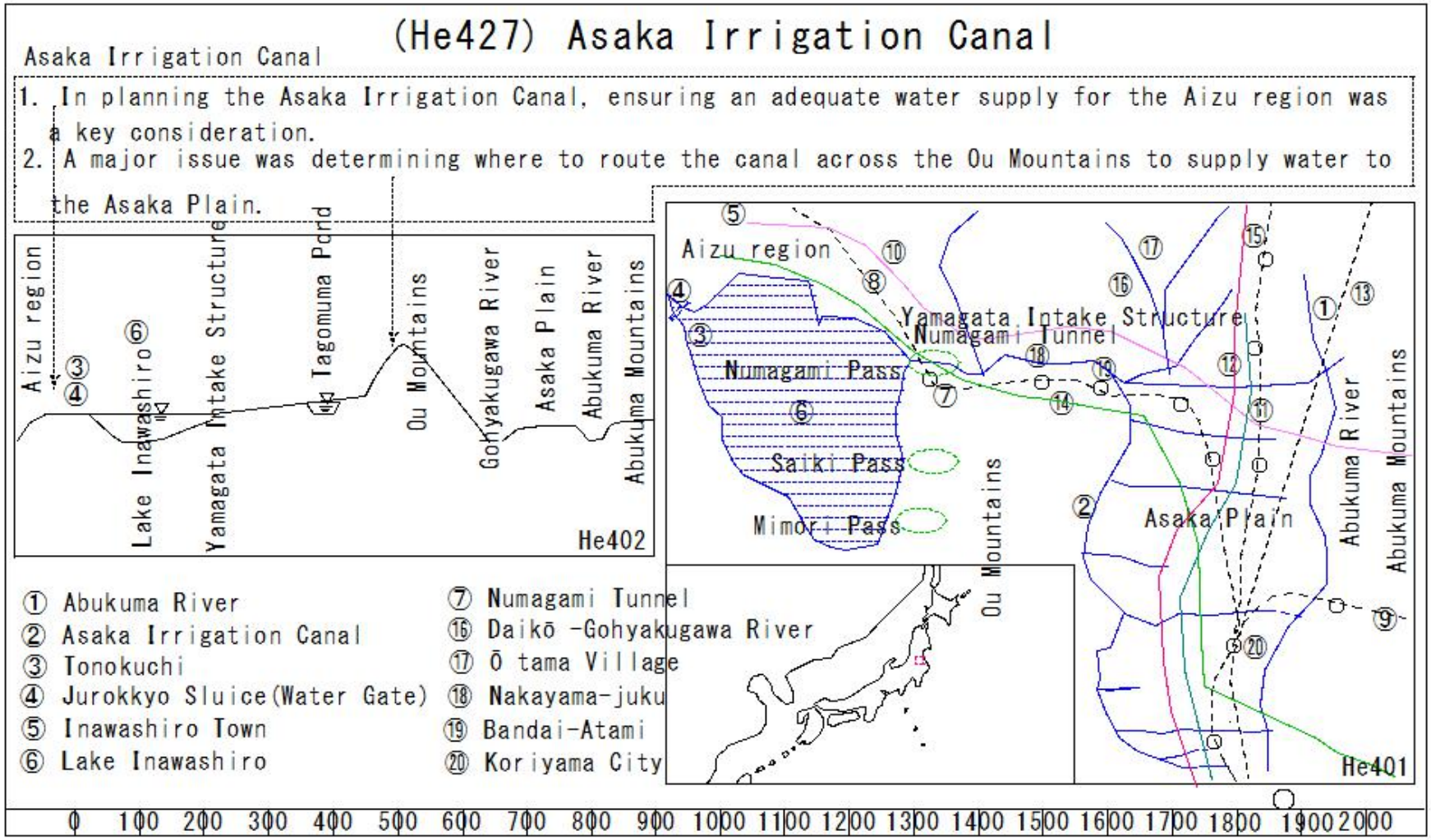
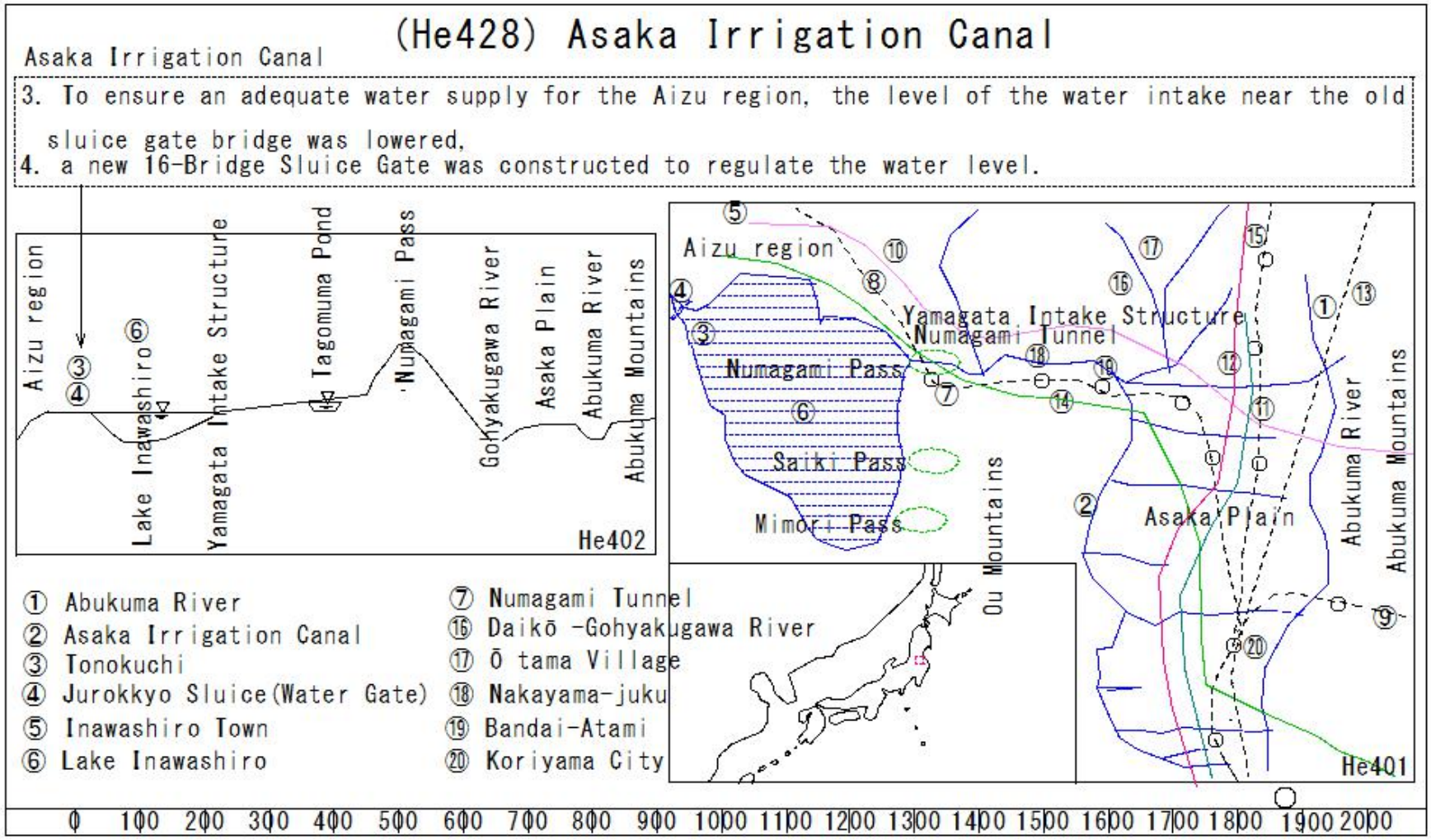
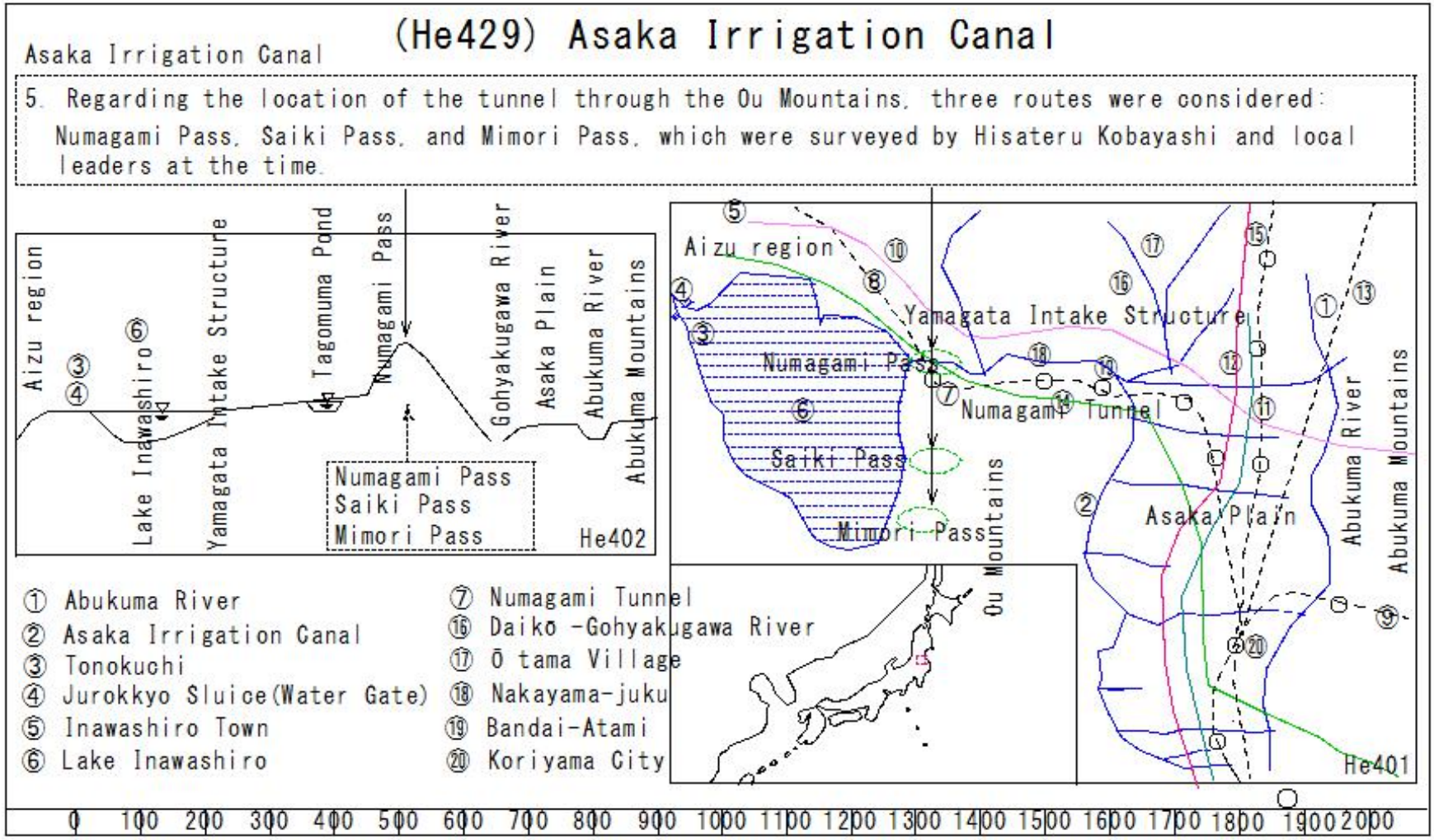
(He427) Asaka Irrigation Canal



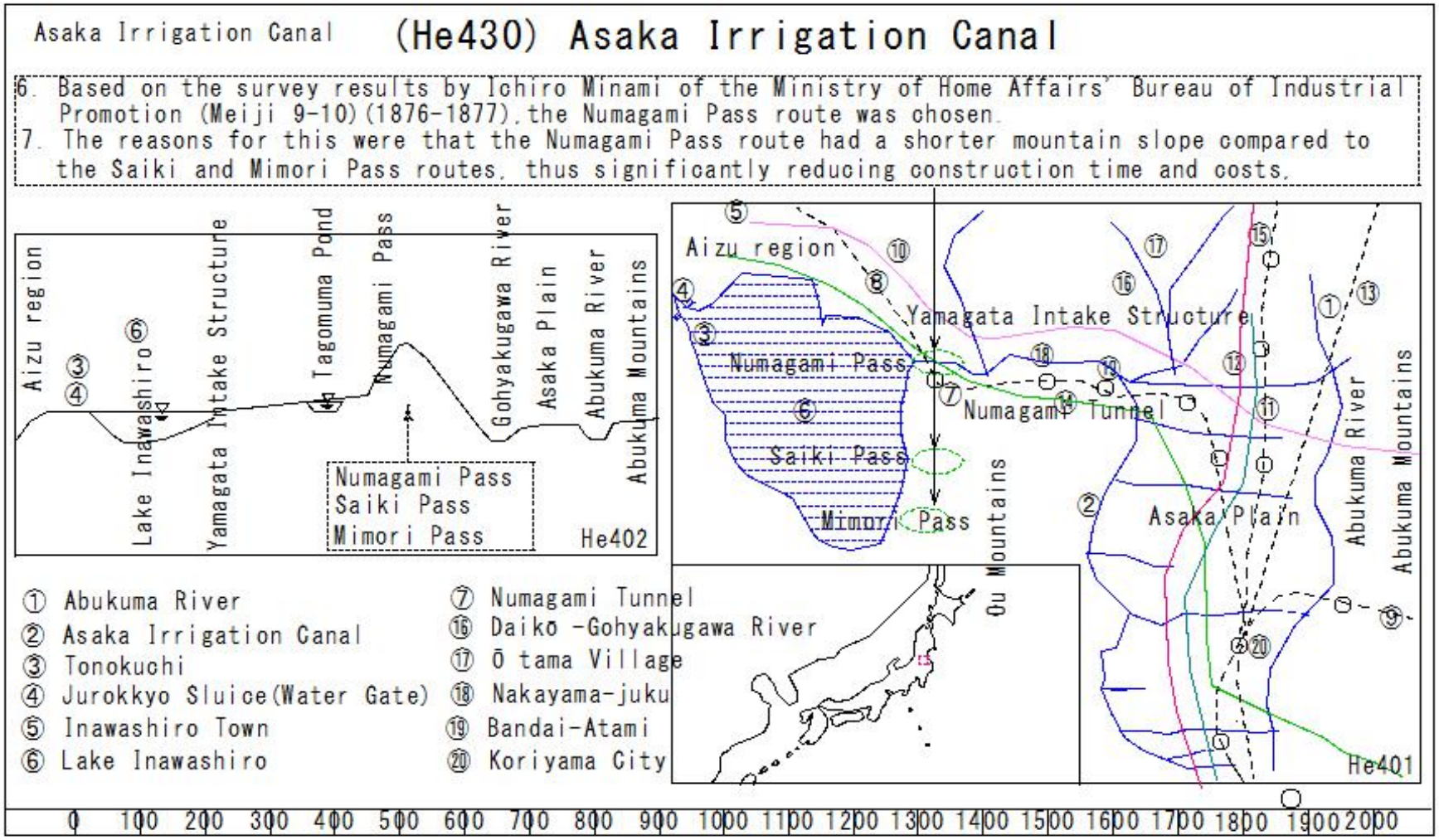
(He428) Asaka Irrigation Canal



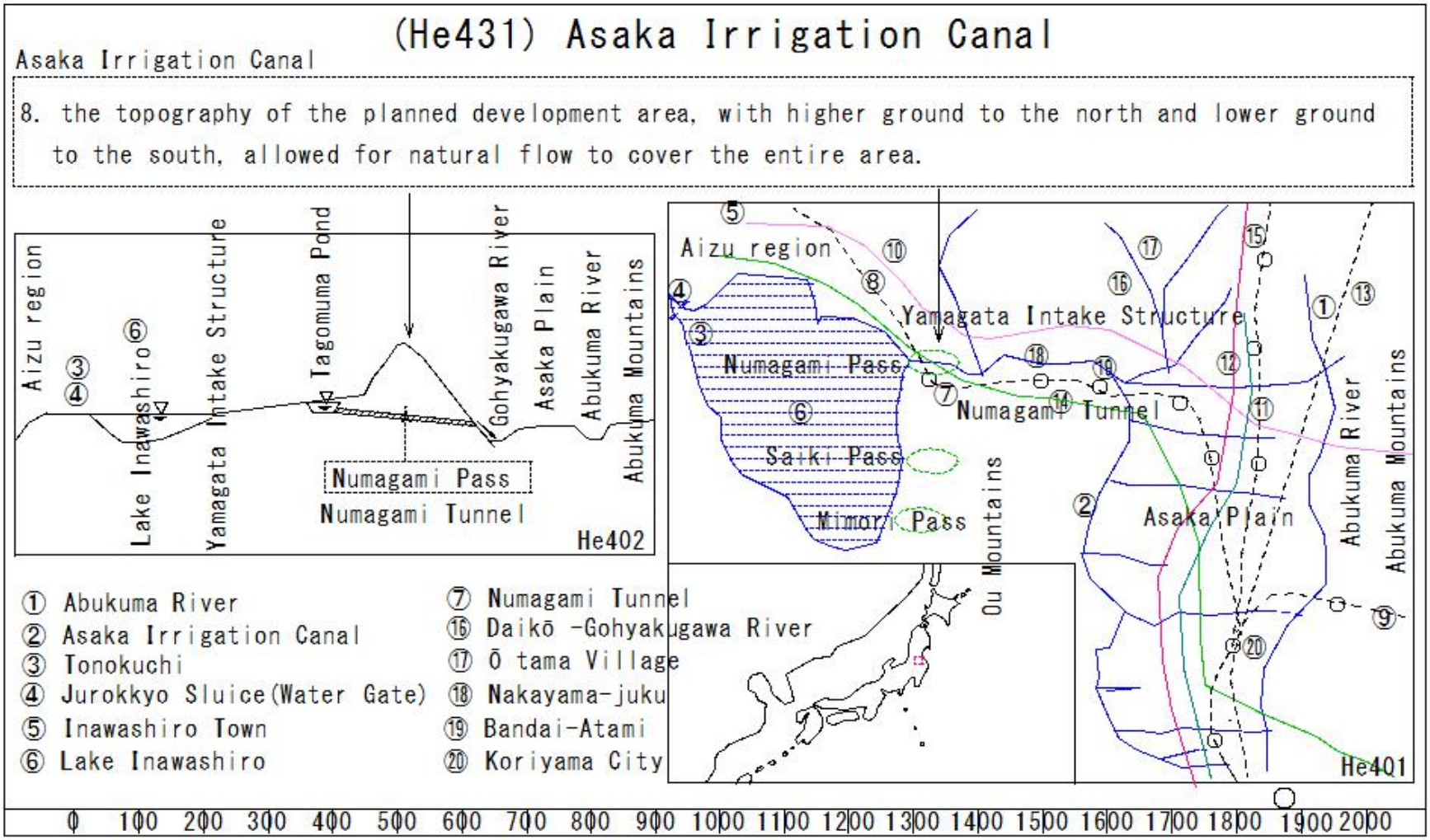
(He429) Asaka Irrigation Canal



(He430) Asaka Irrigation Canal



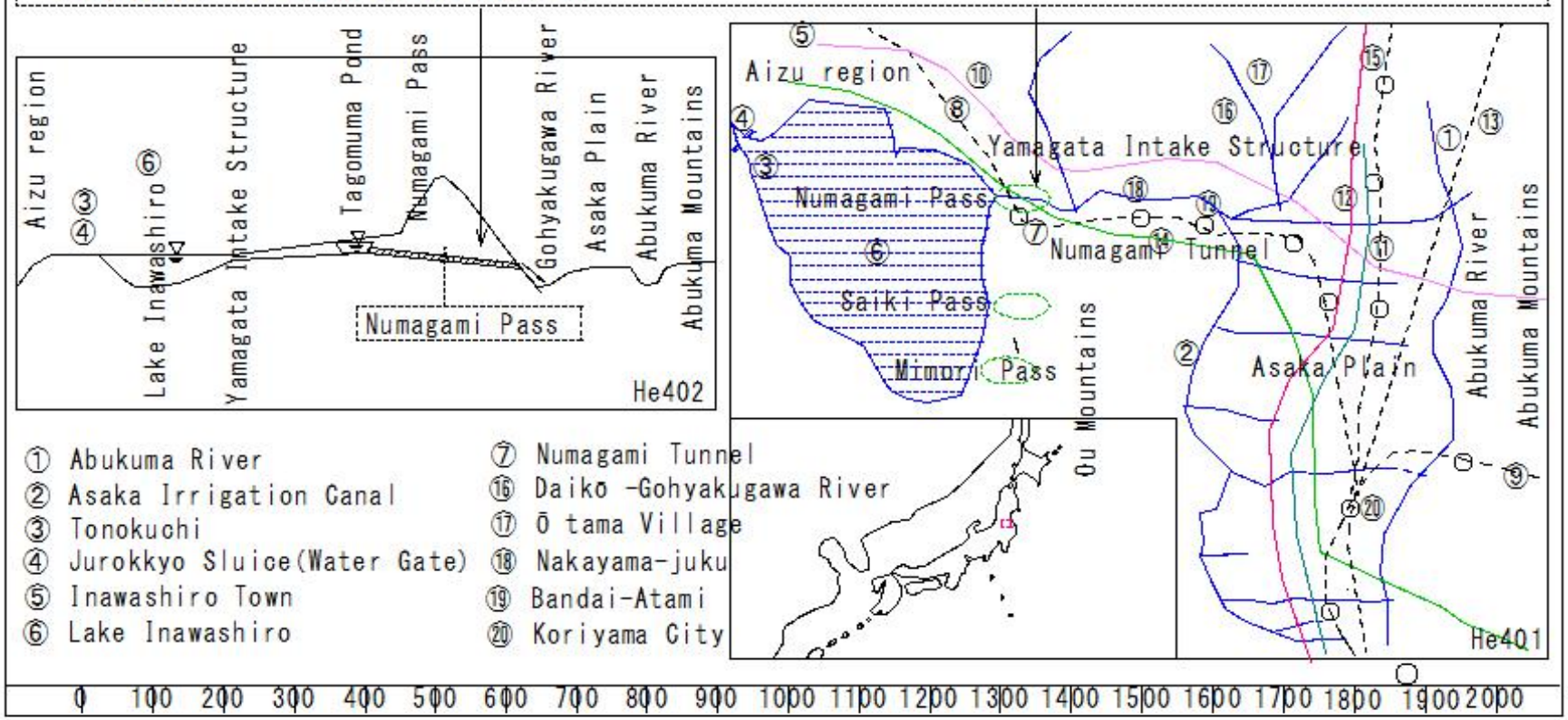
(He431) Asaka Irrigation Canal



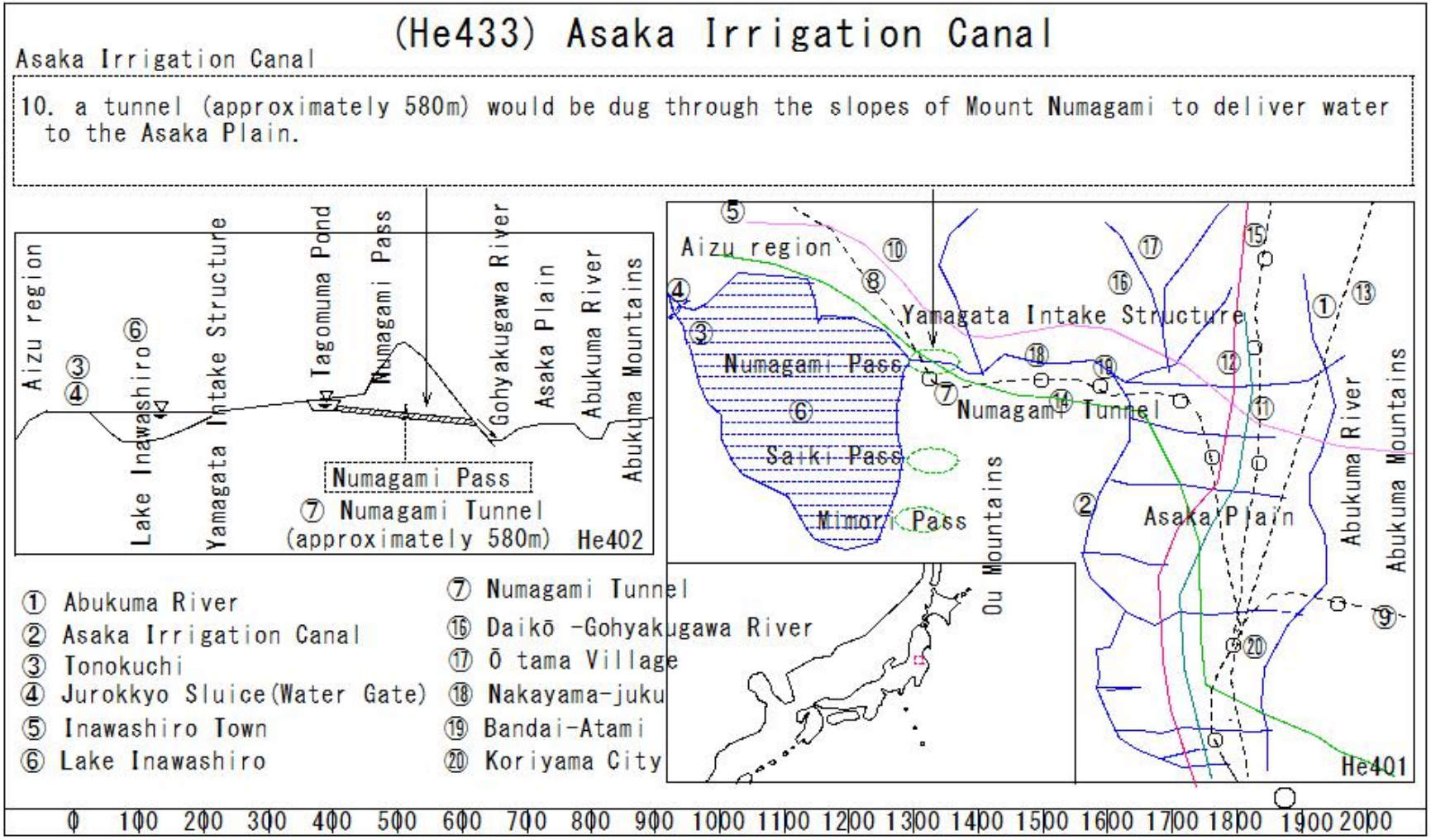
(He432) Asaka Irrigation Canal

Asaka Irrigation Canal

9. According to the final plan, the Asaka Irrigation Canal (originally called the Inawashiro Lake Irrigation Canal) would have an intake point in the Yamagata area on the northeastern side of Lake Inawashiro, as shown in the diagram.



(He433) Asaka Irrigation Canal

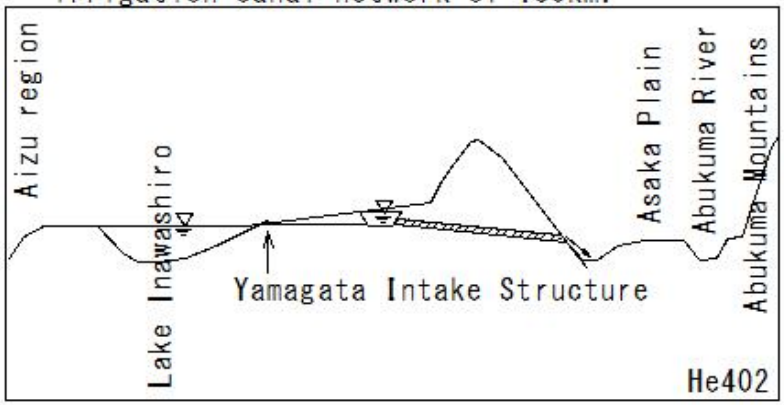


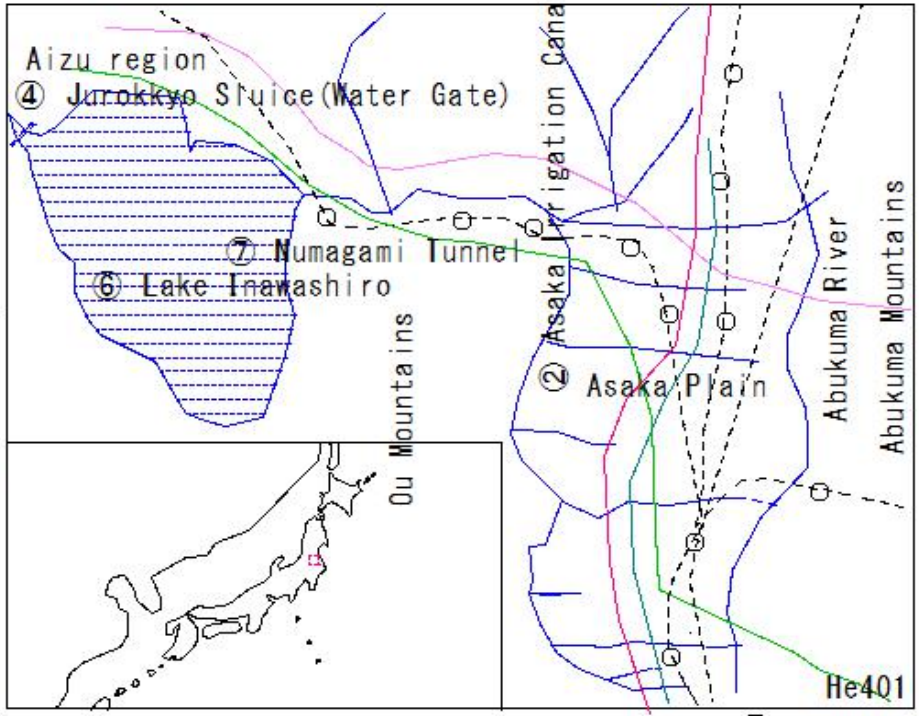
(He434) Asaka Irrigation Canal

(He434) Asaka Irrigation Canal

Asaka Irrigation Canal

1. The irrigated area is approximately 3,800 hectares.
2. An intake gate was constructed in the Yamagata district.
3. A tunnel (approximately 580m long) was built on the slope of Numagami Mountain.
4. By August 1872 (Meiji 5), the 16-Bridge Sluice Gate
5. along with over 40 other tunnels, including the Numagami Tunnel,
6. 52km main canal,
7. 7 branch canals totaling 78km, were completed, resulting in a total irrigation canal network of 130km.





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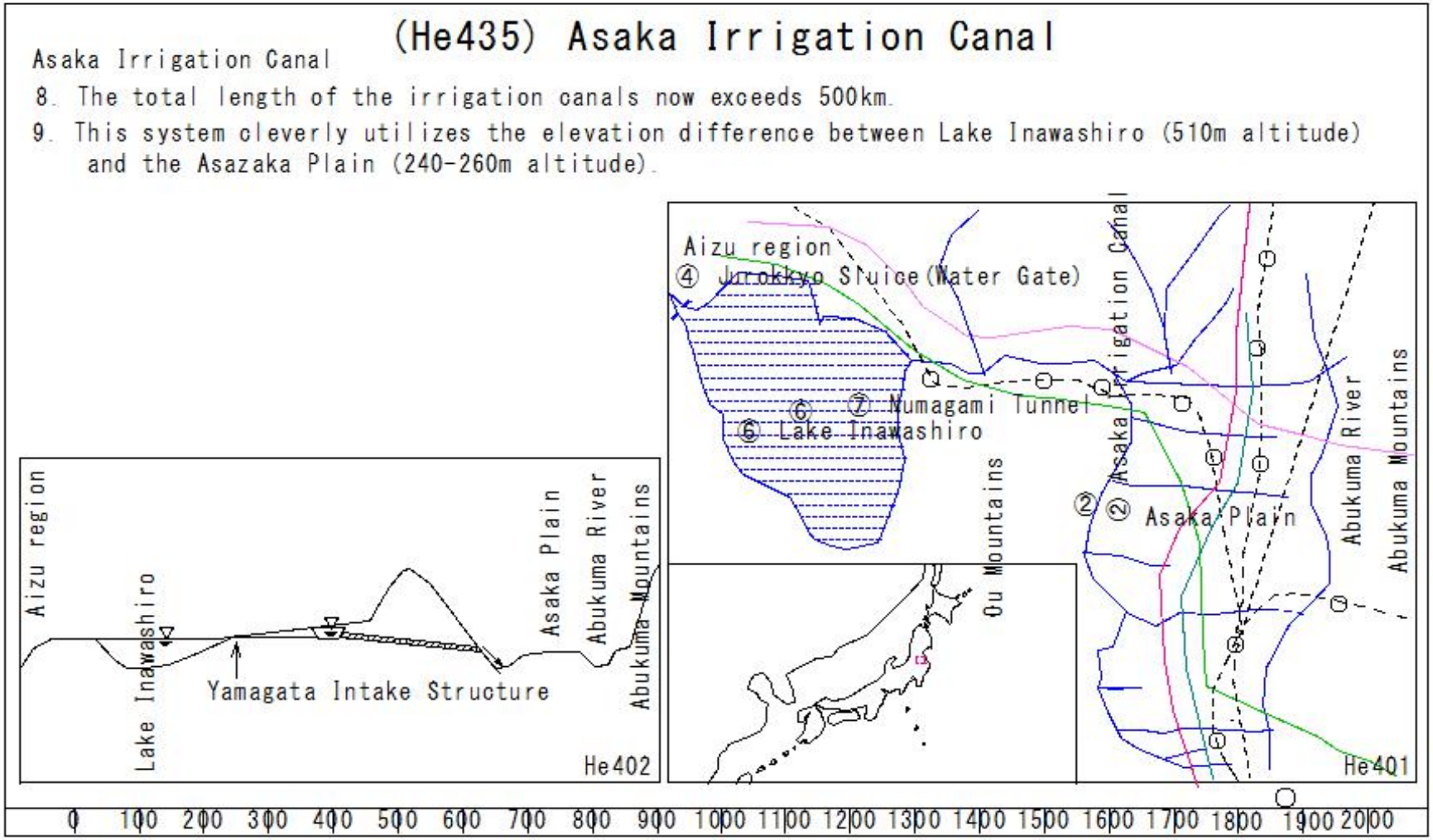
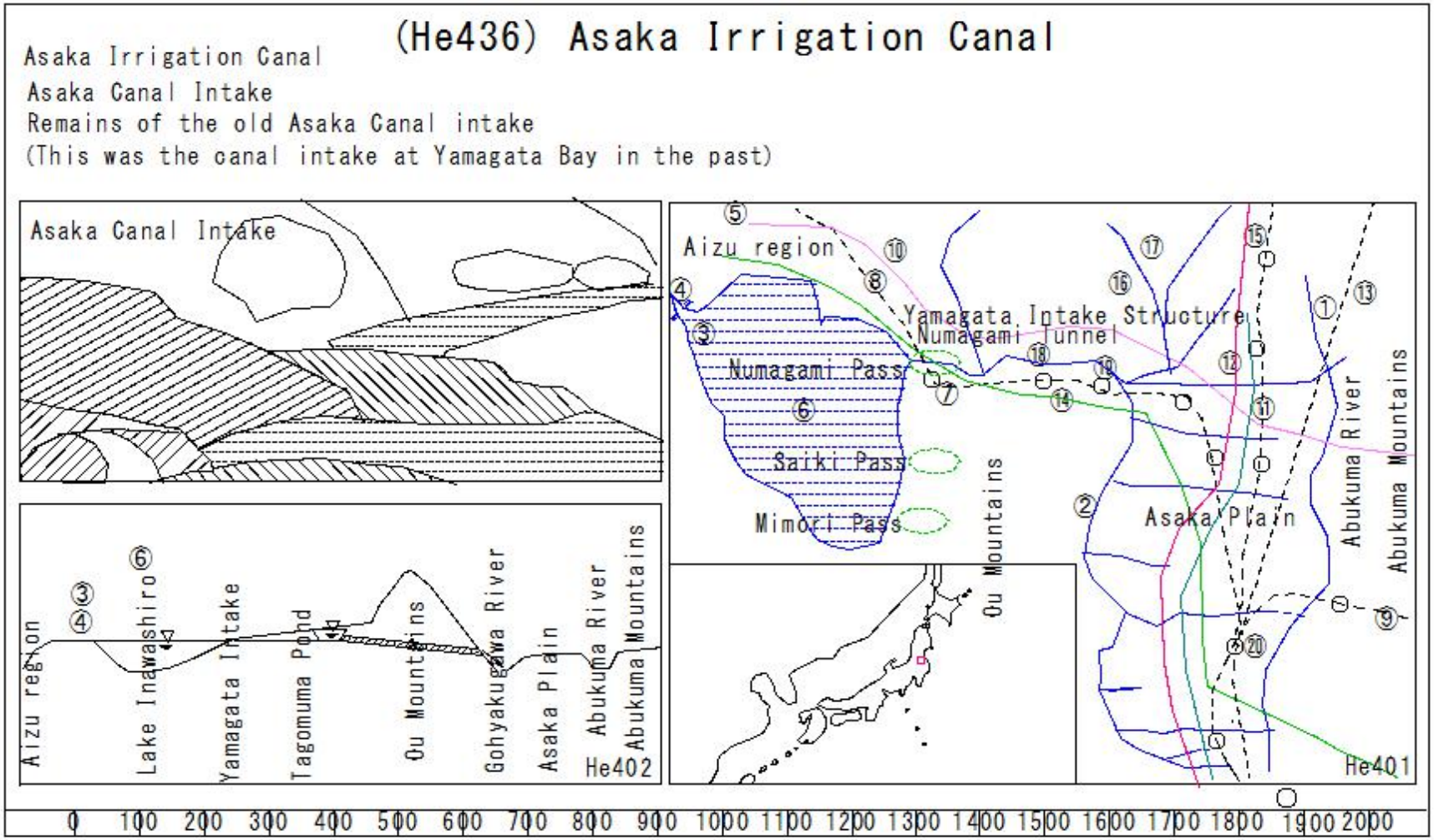
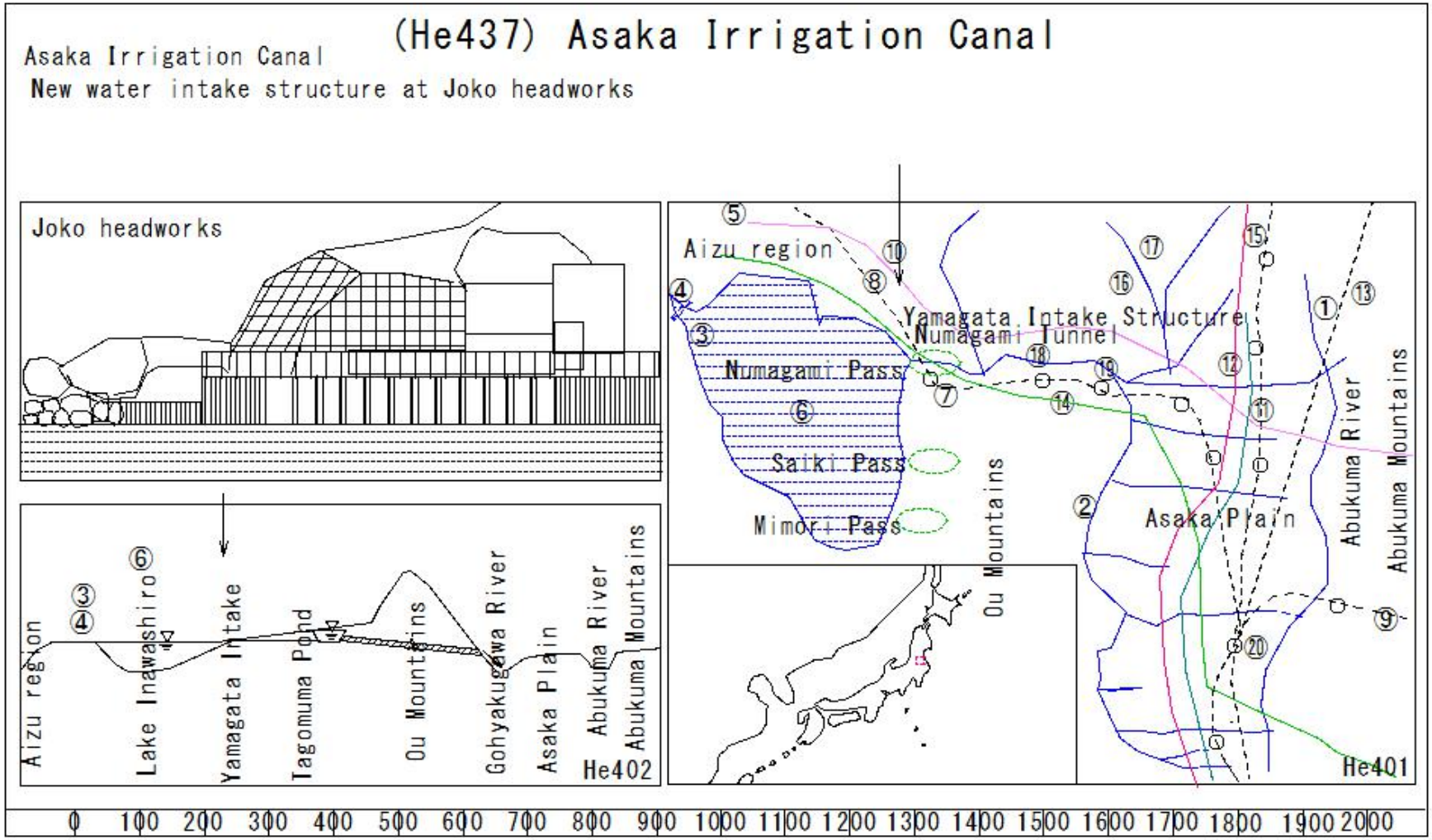
(He435) Asaka Irrigation Canal



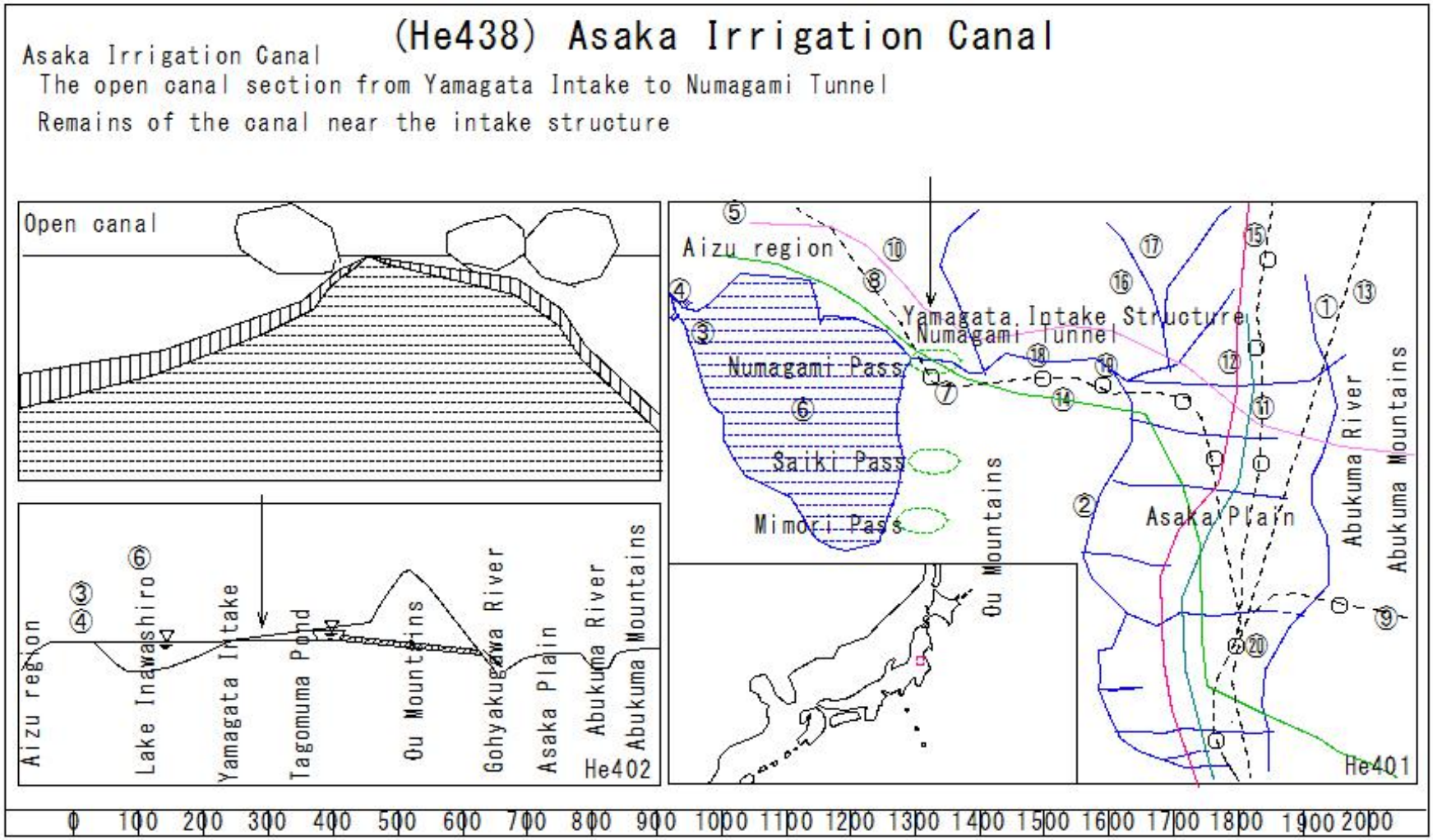
(He436) Asaka Irrigation Canal



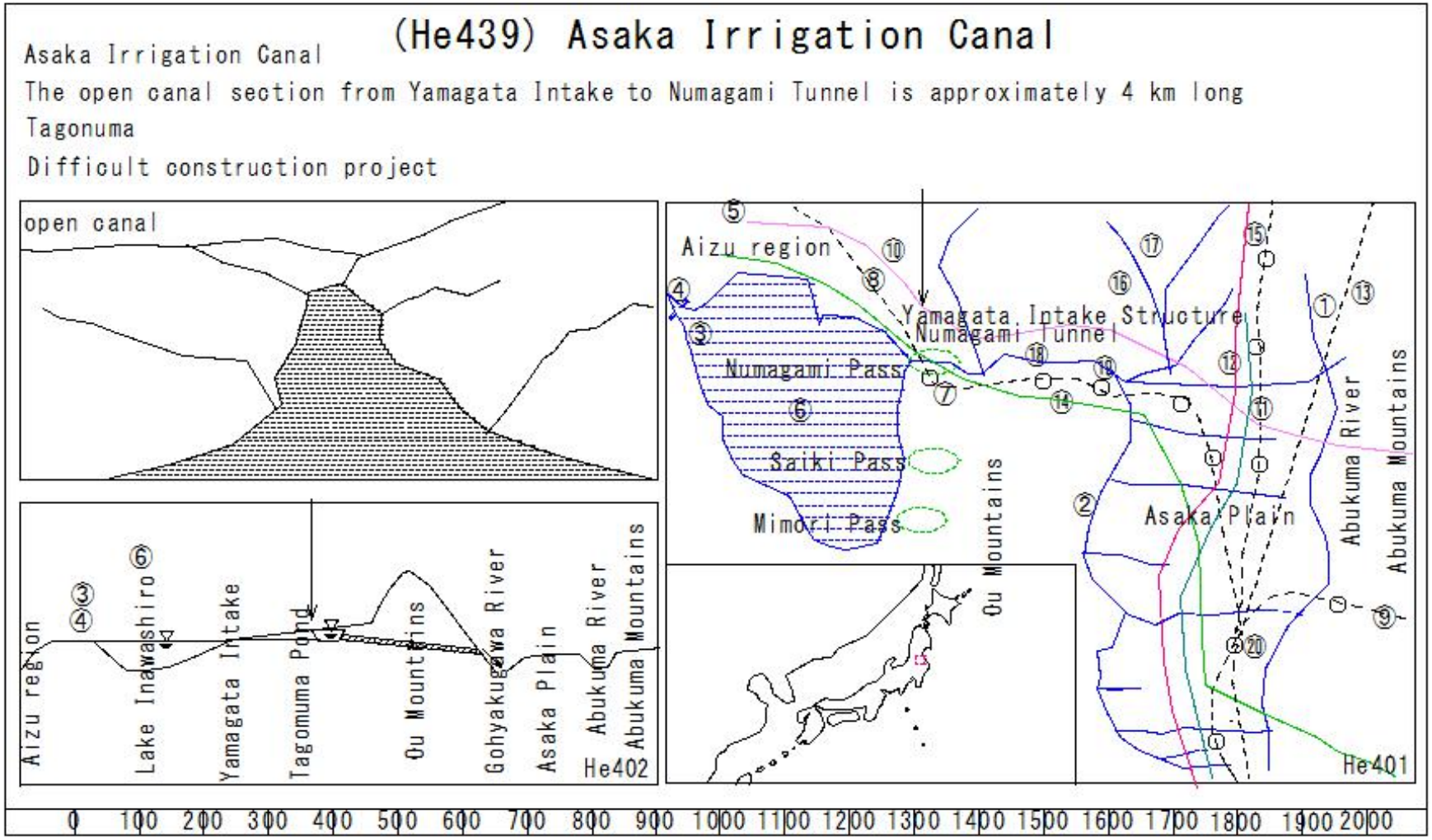
(He437) Asaka Irrigation Canal



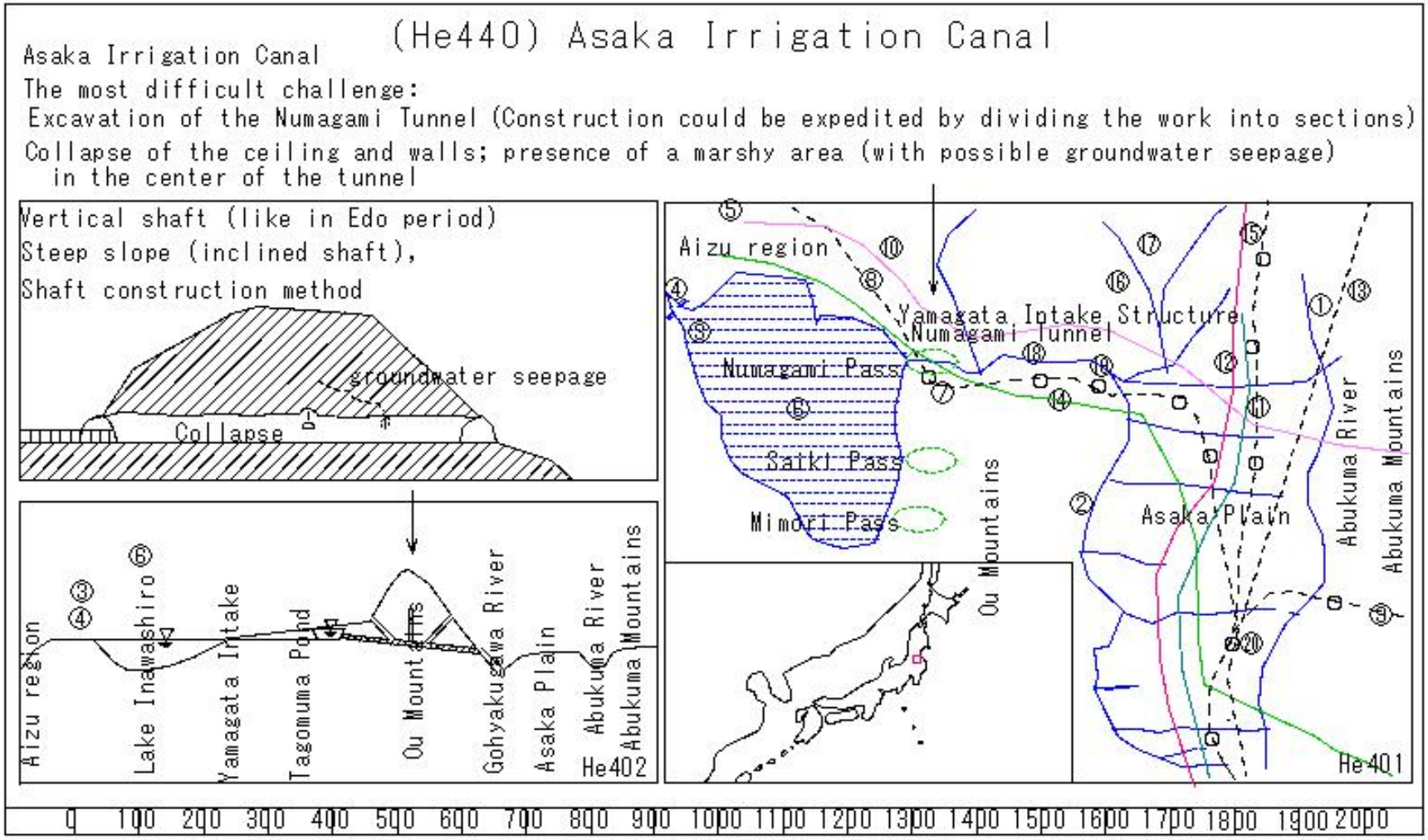
(He438) Asaka Irrigation Canal



(He439) Asaka Irrigation Canal



(He440) Asaka Irrigation Canal



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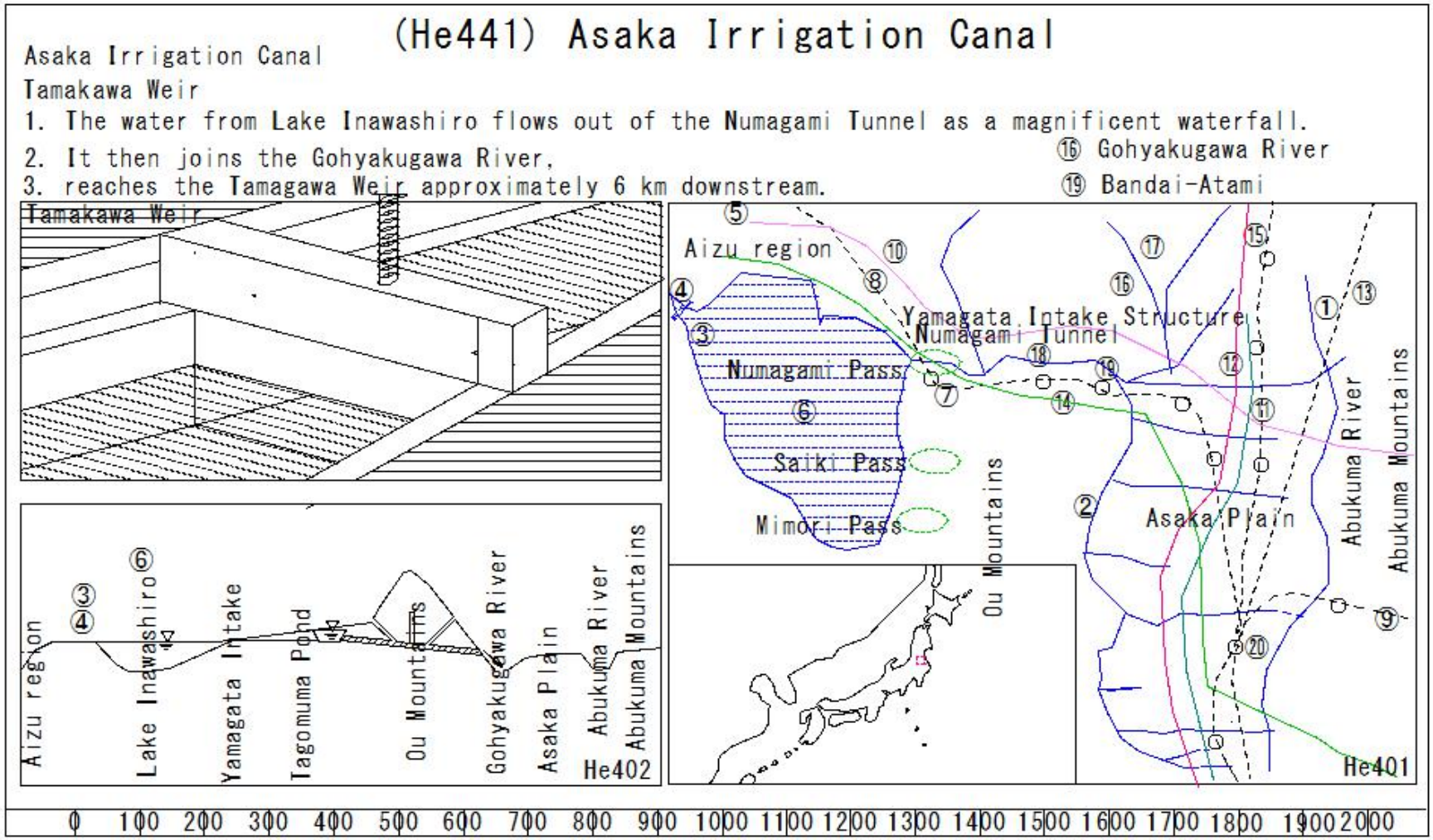

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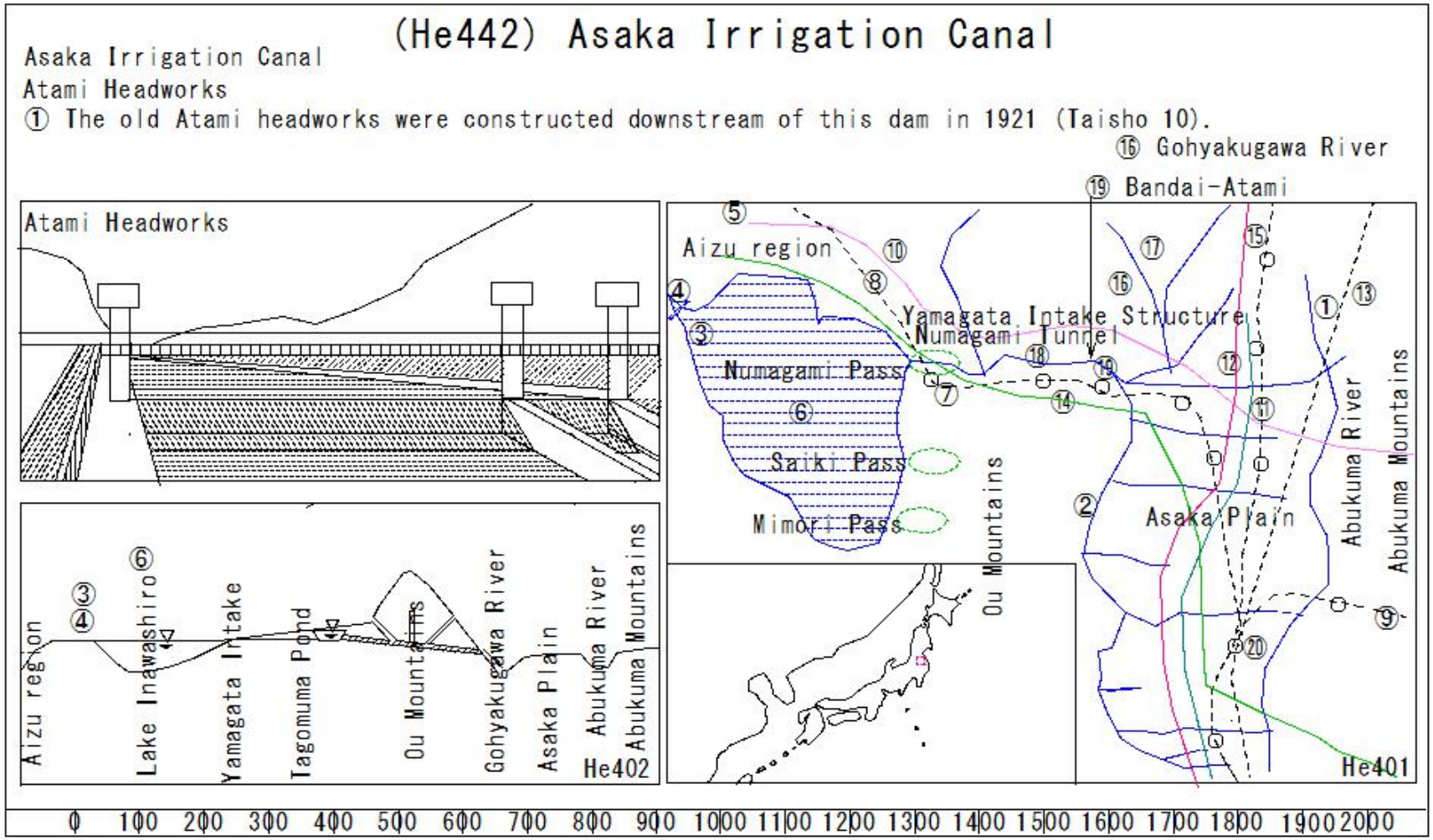
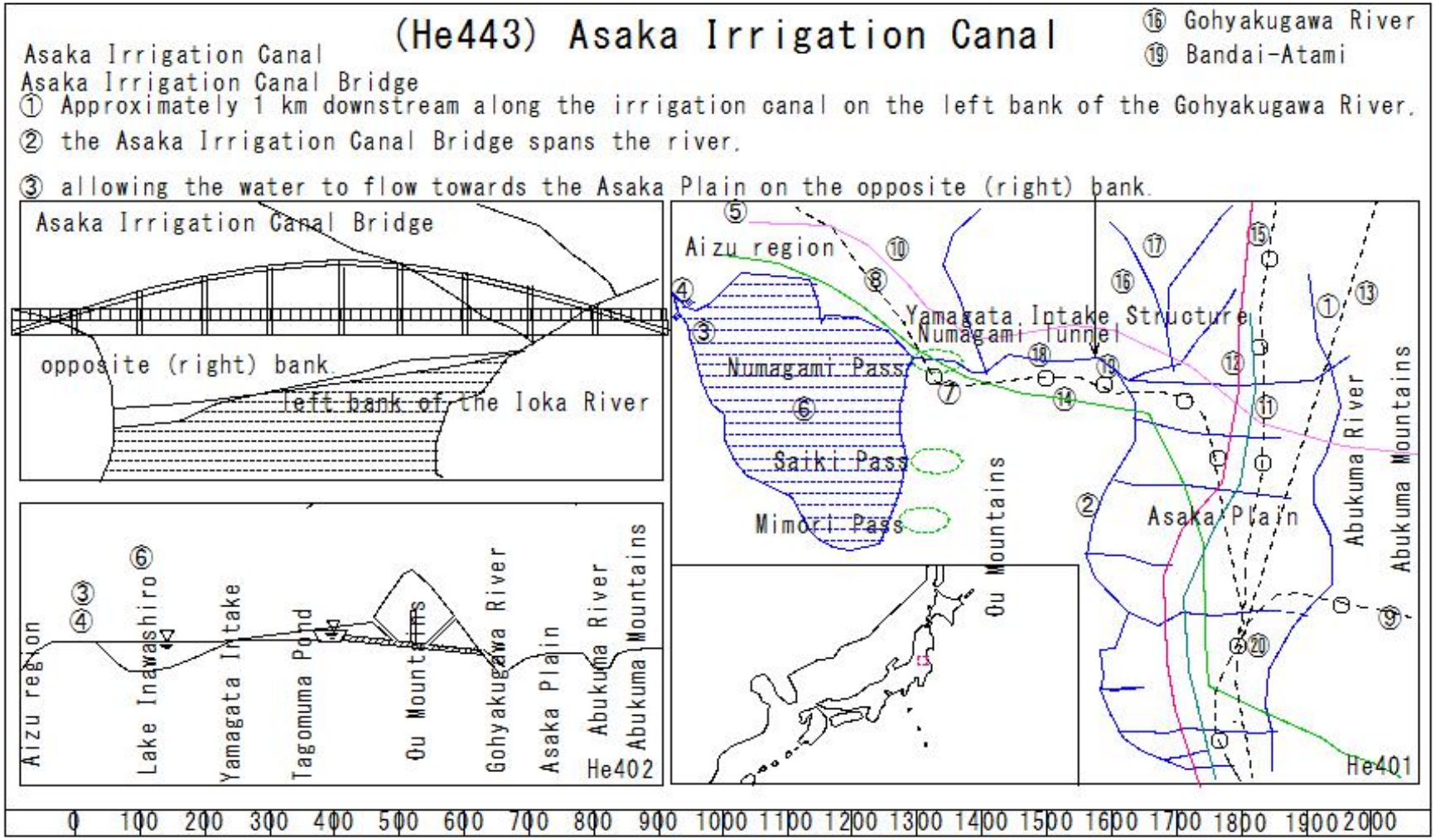


(He443) Asaka Irrigation Canal



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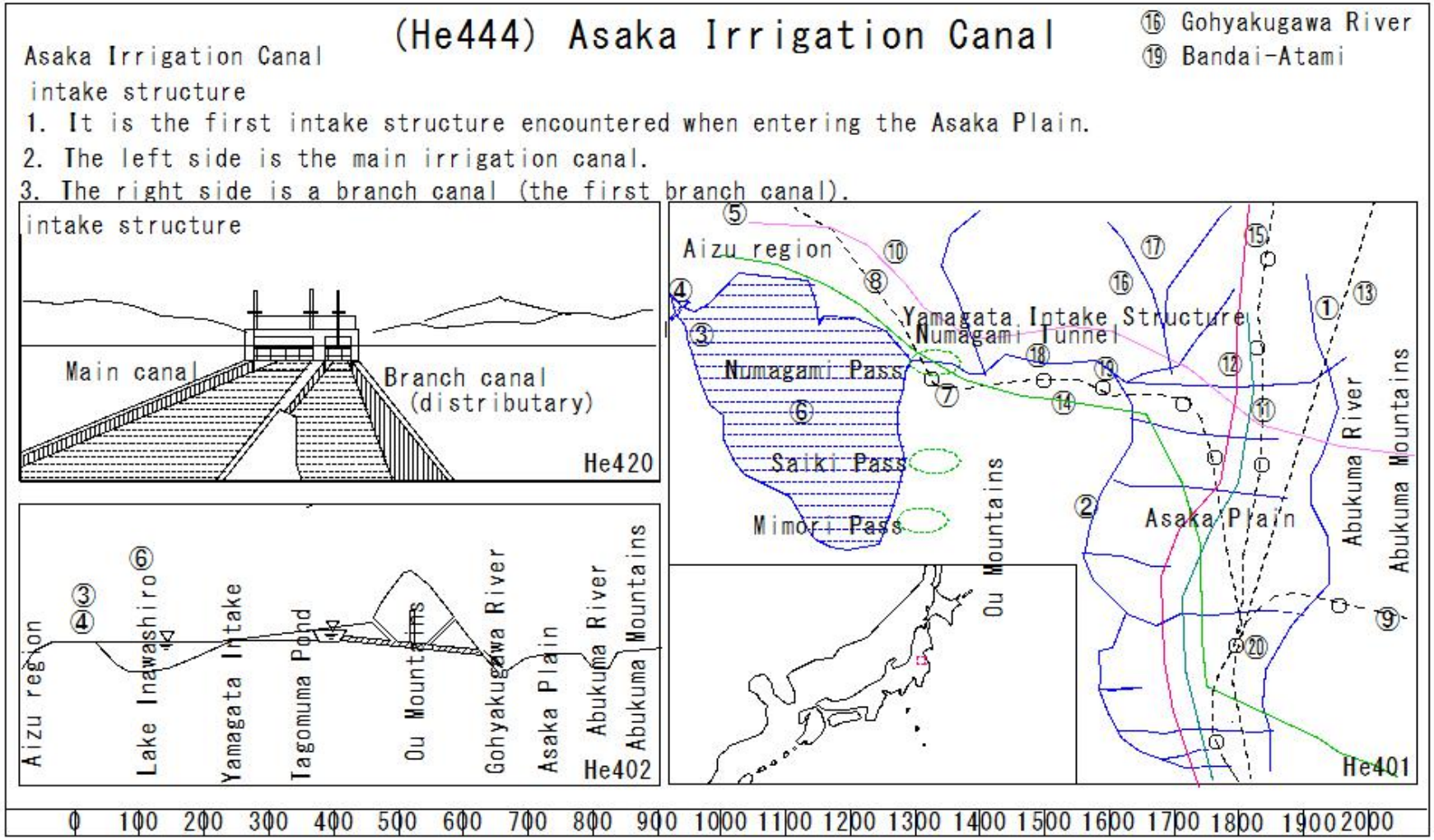

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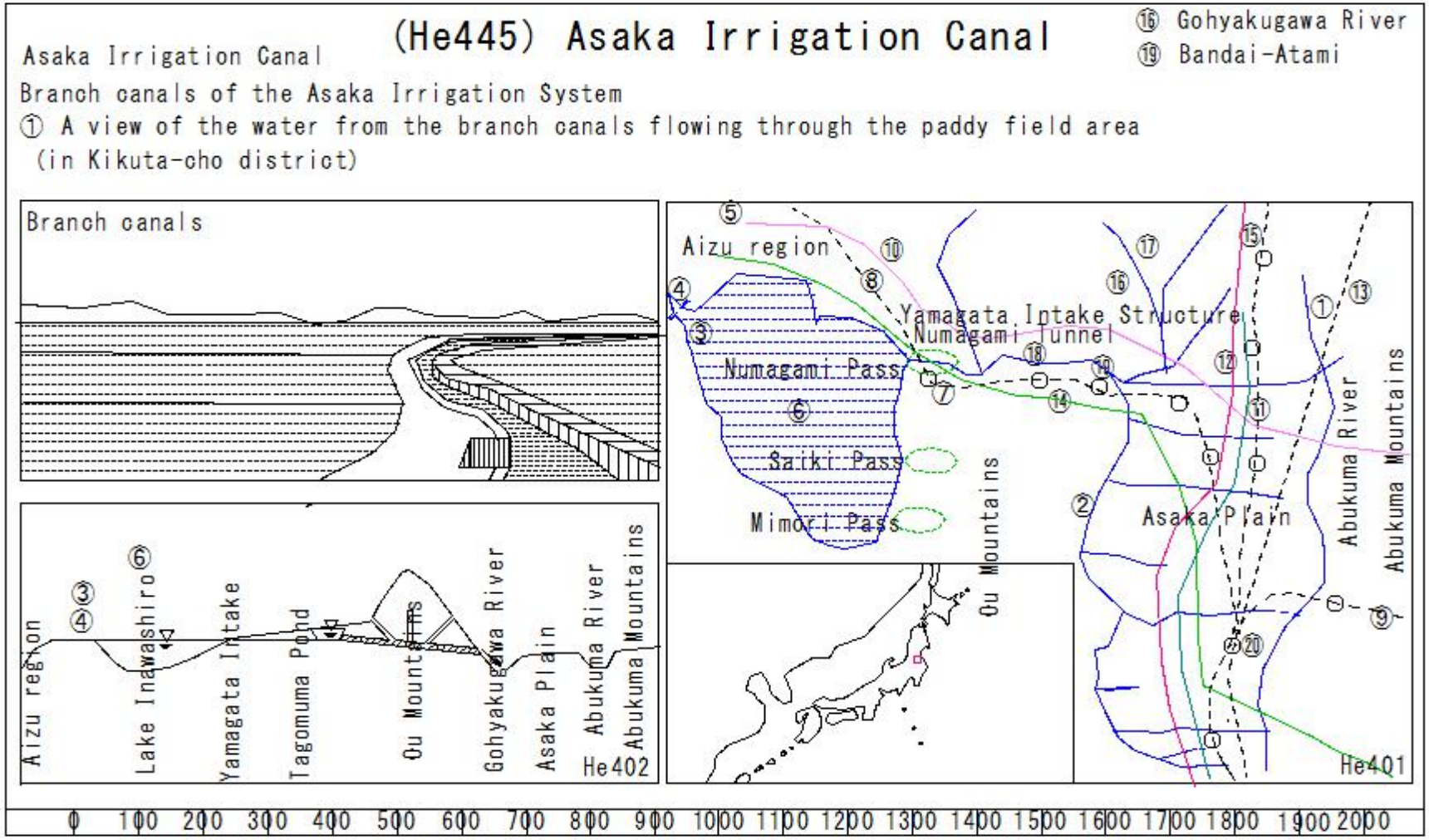

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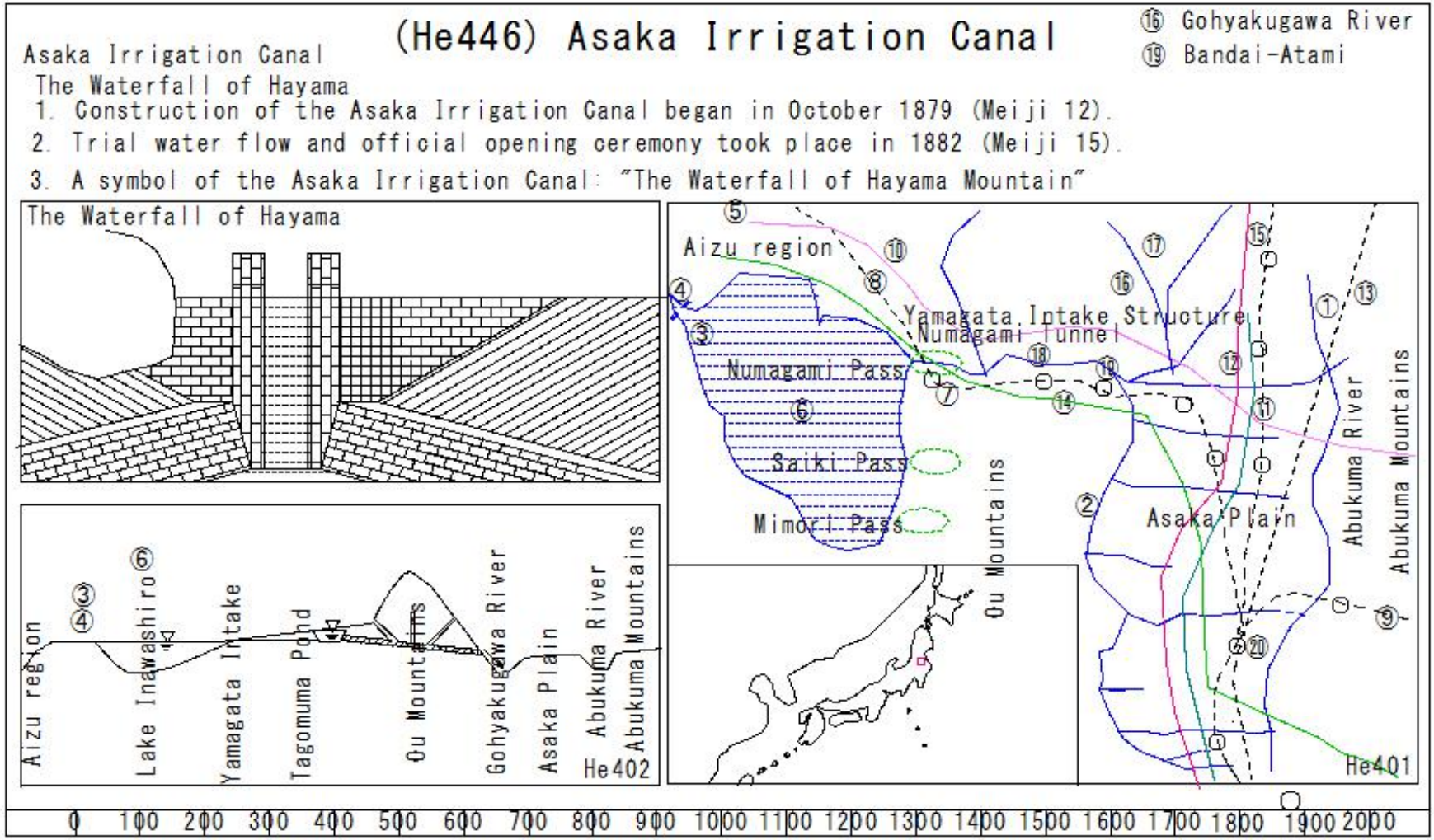
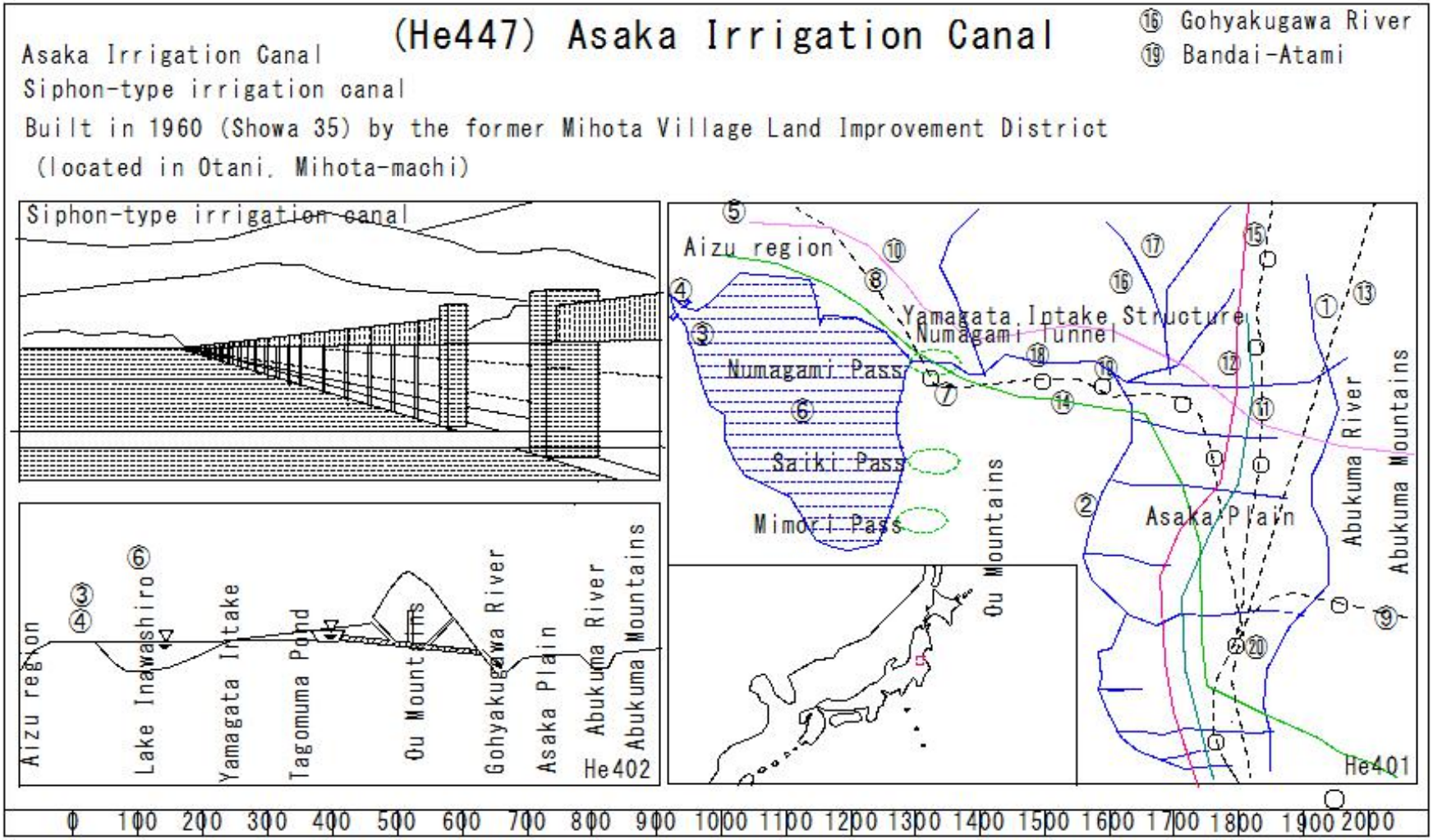
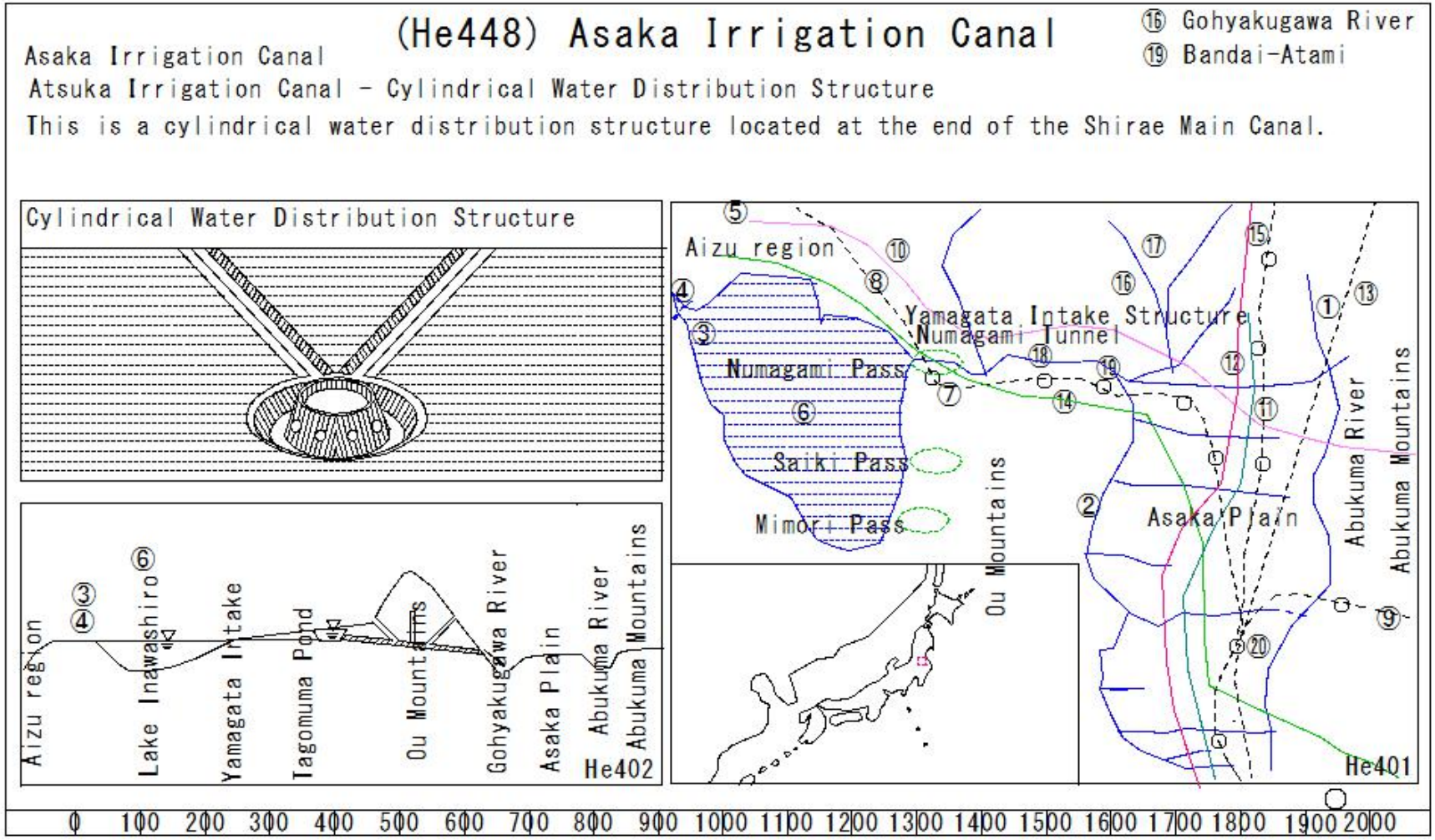


(He447) Asaka Irrigation Canal



(He448) Asaka Irrigation Canal



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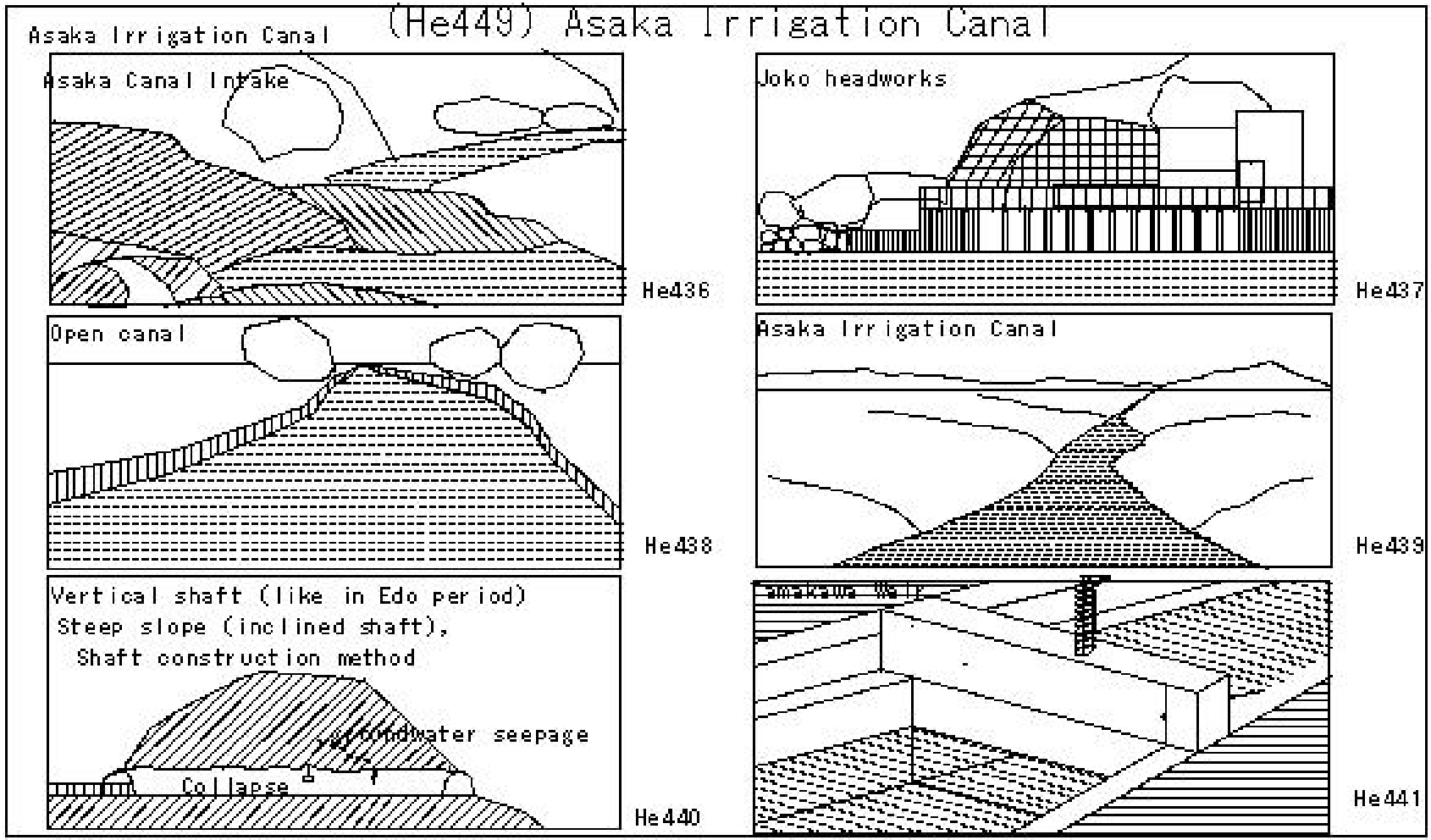
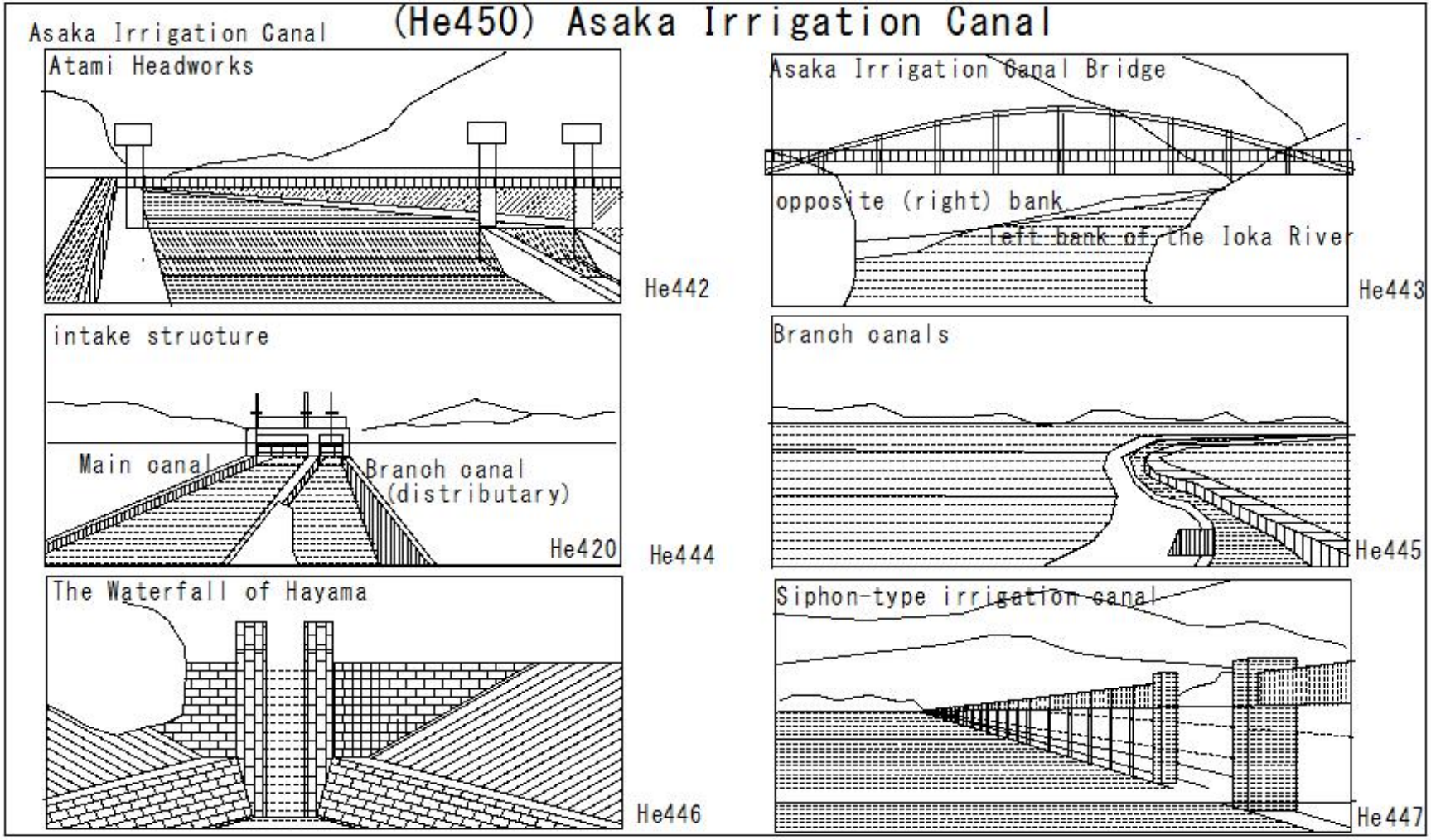
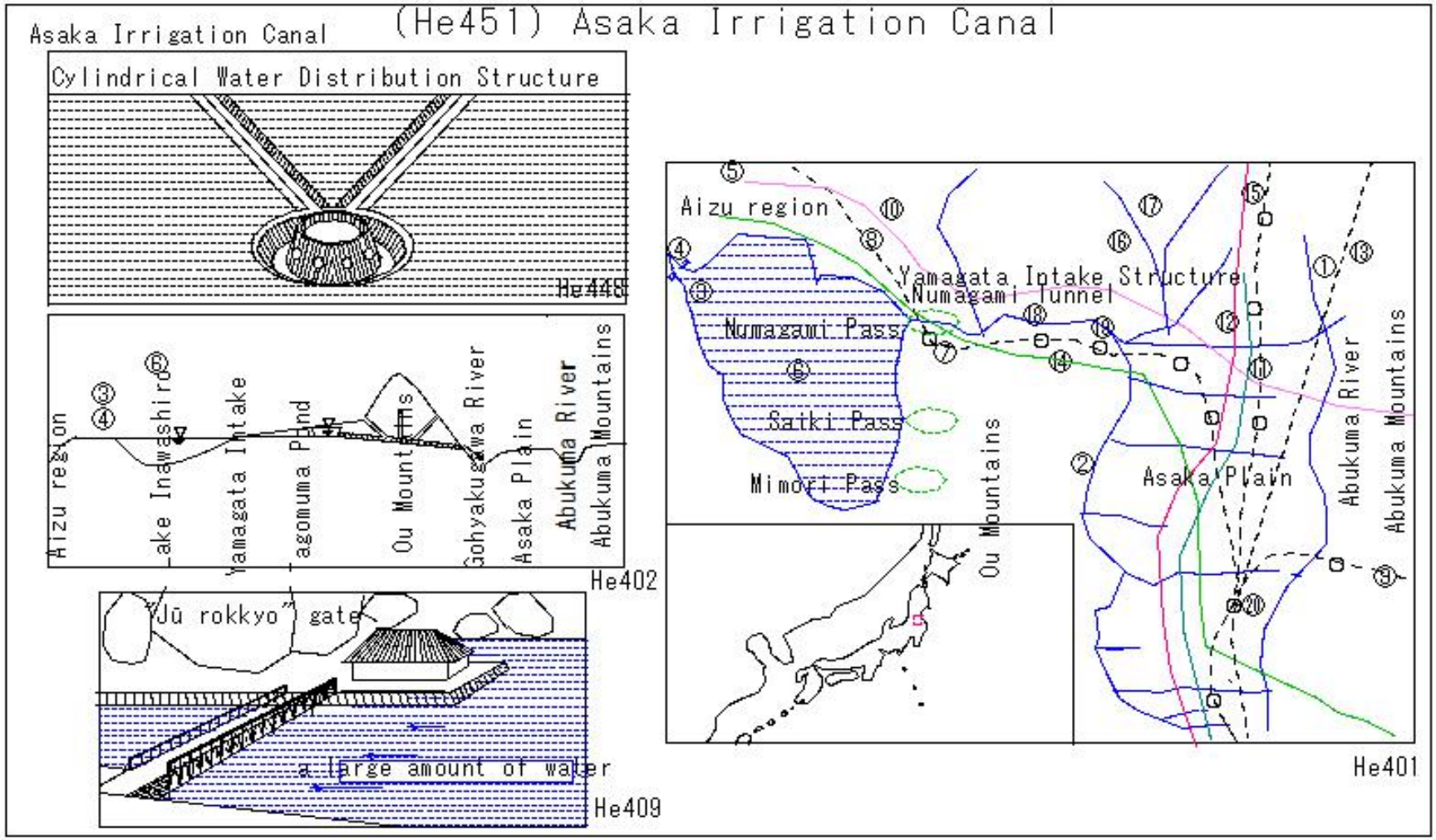


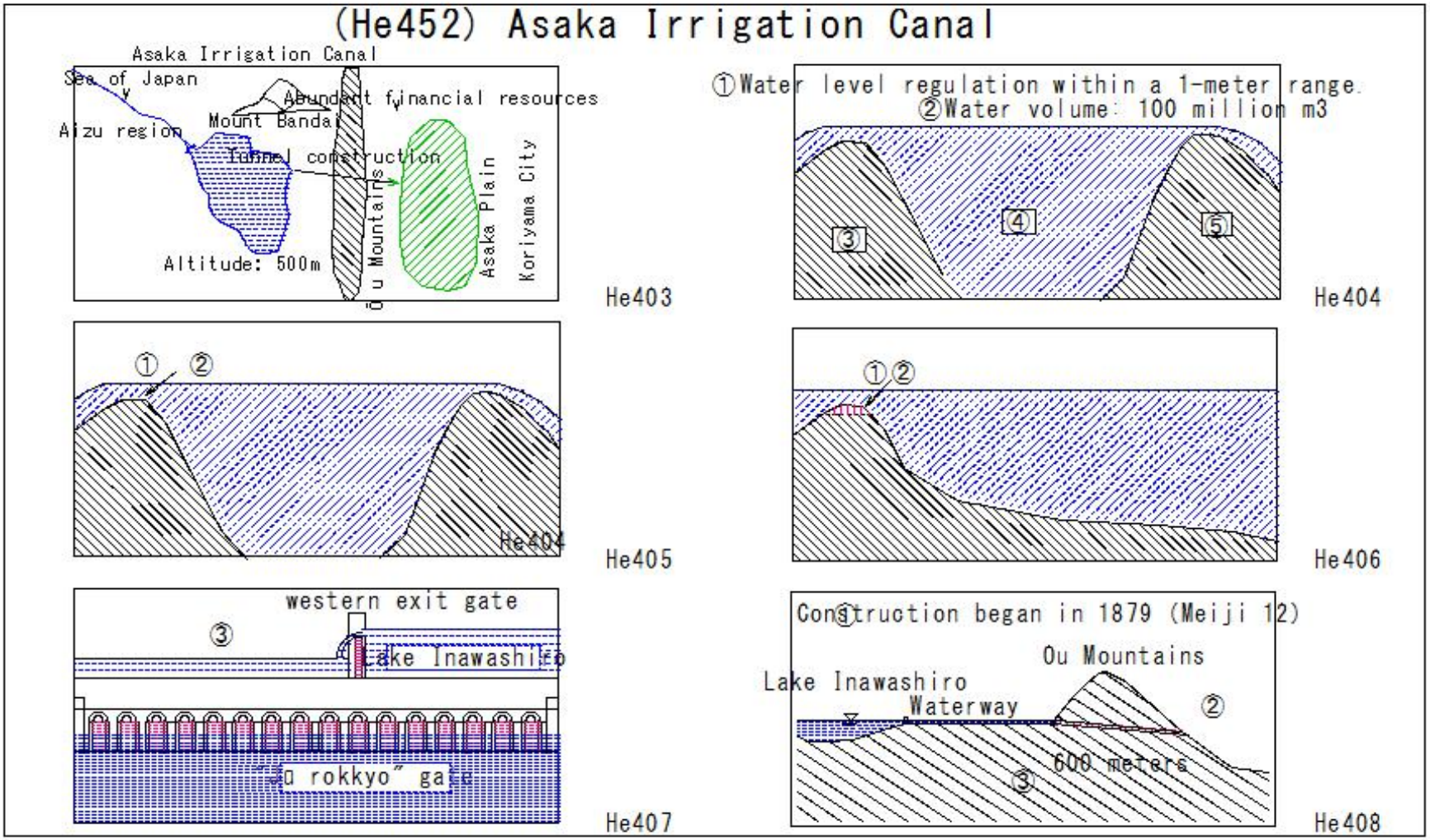
(He450) Asaka Irrigation Canal



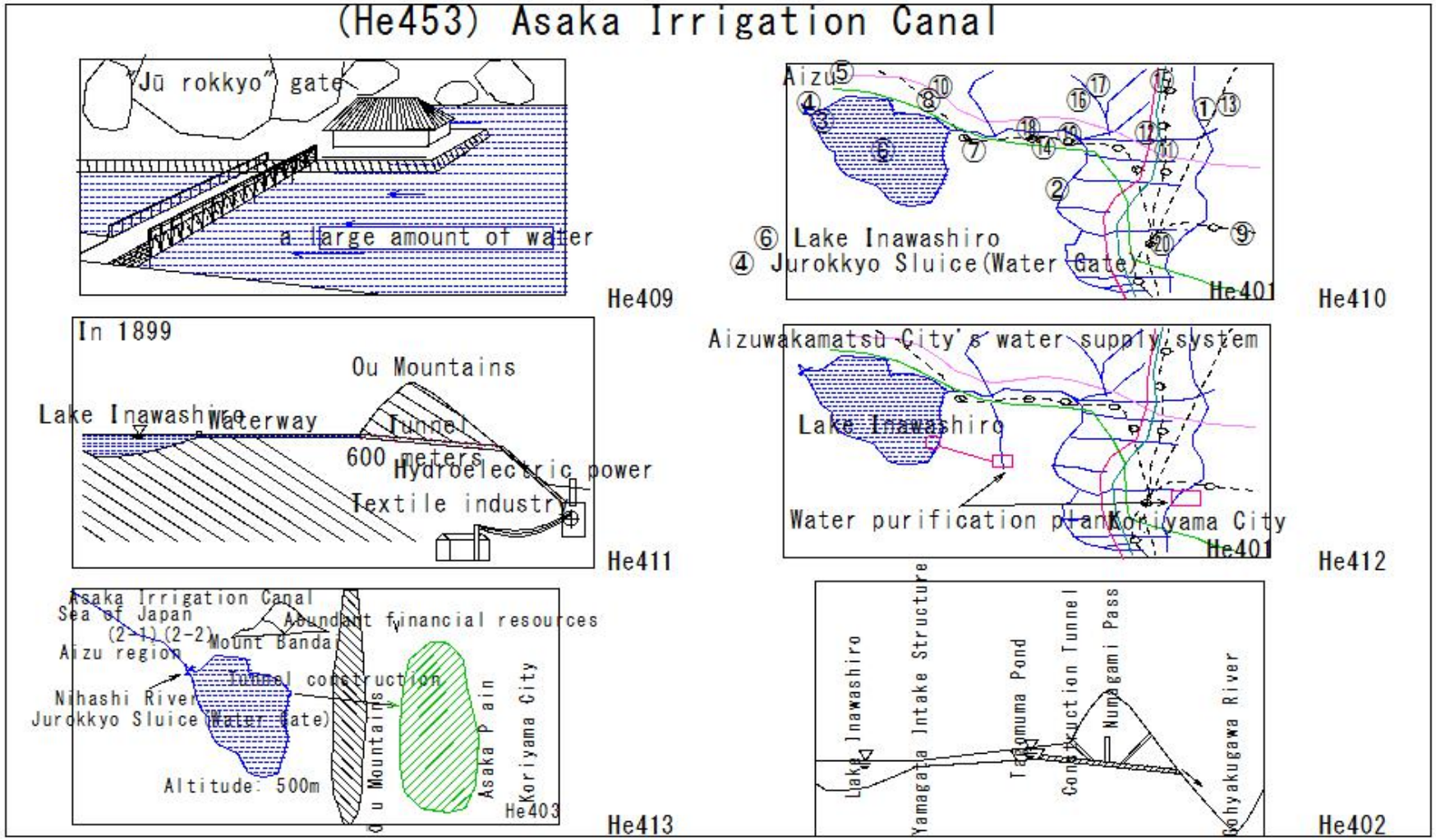
(He451) Asaka Irrigation Canal



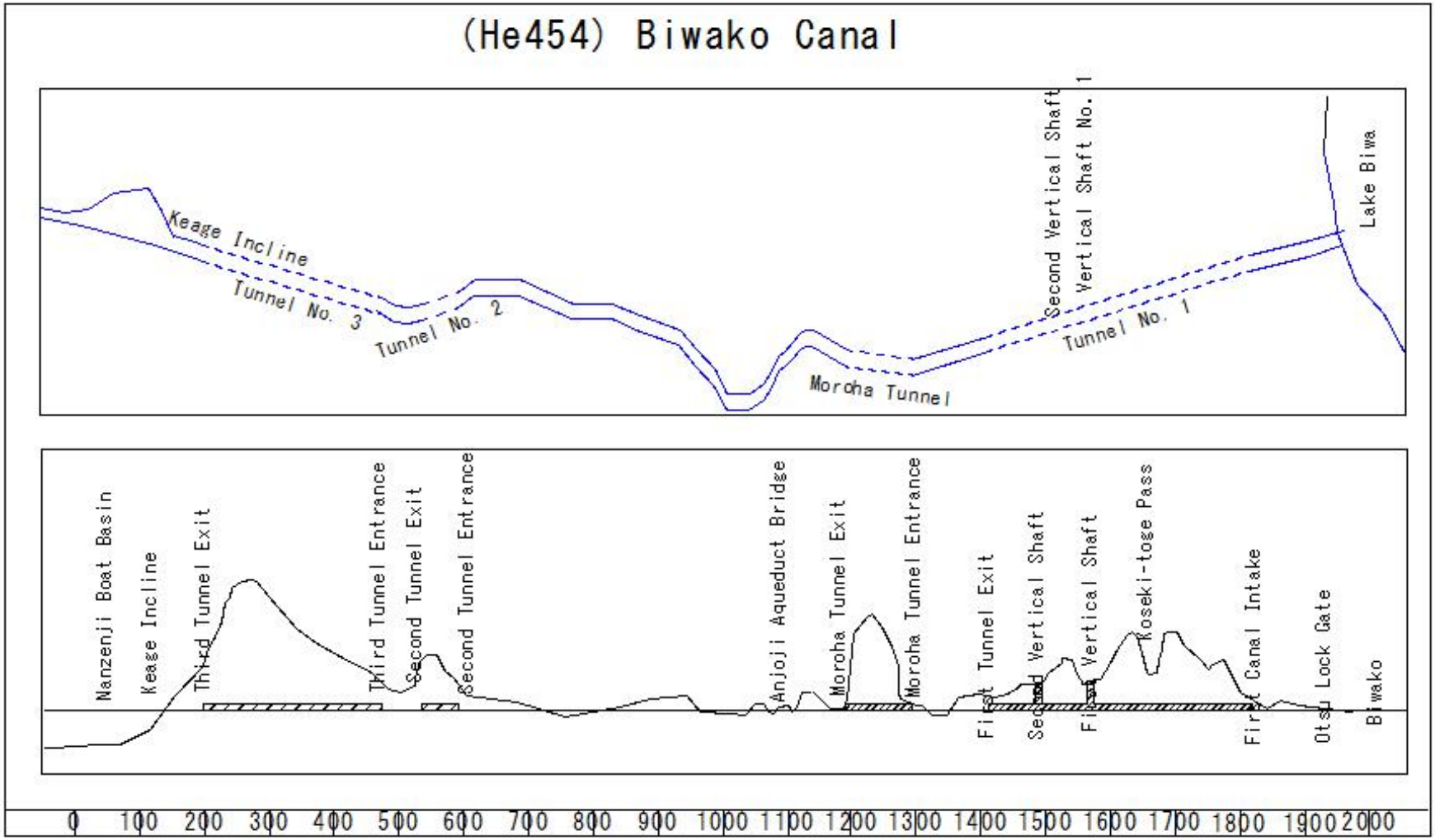
(He452) Asaka Irrigation Canal



(He453) Asaka Irrigation Canal



(He454) Biwako Canal



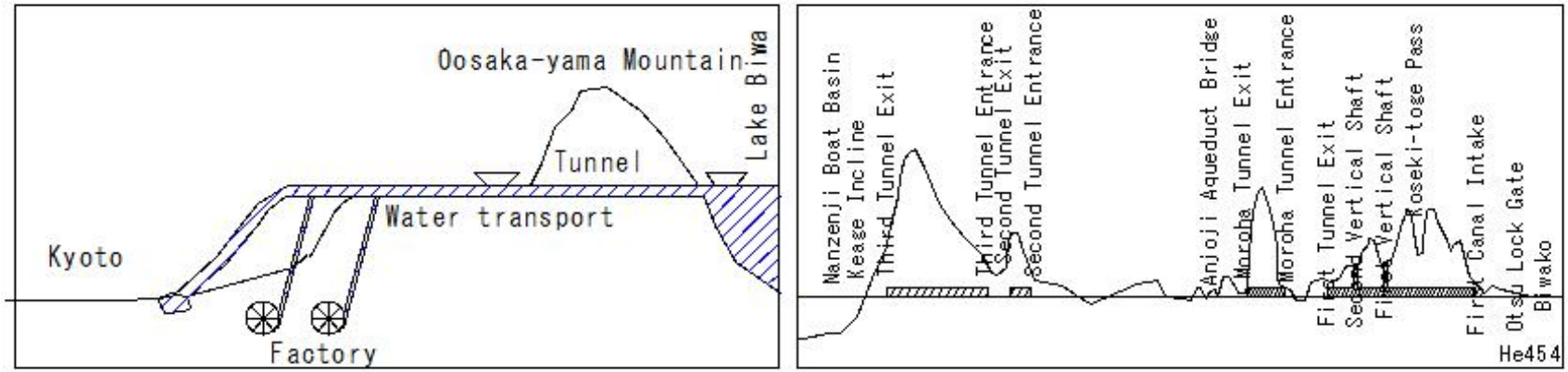
(He455) Biwako Canal

(He455) Biwako Canal

① Kyoto's water supply comes from Lake Biwa, transported via the Biwako Canal, which was built over a century ago.

② When the capital was moved to Tokyo during the Meiji era, Kyoto's industries declined, and its population halved.

③ The governor of Kyoto Prefecture, Kokudo Kitagaki, conceived a plan to revitalize Kyoto by constructing a canal from Lake Biwa to bring water, using the water power to run mills and factories to promote the distribution of goods through water transport.

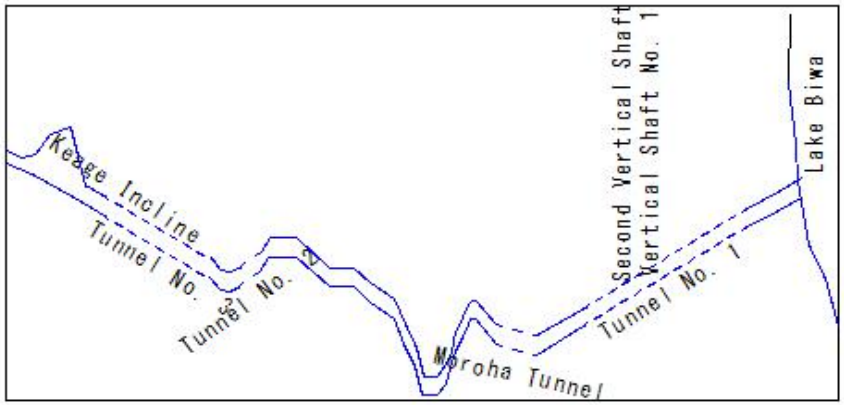


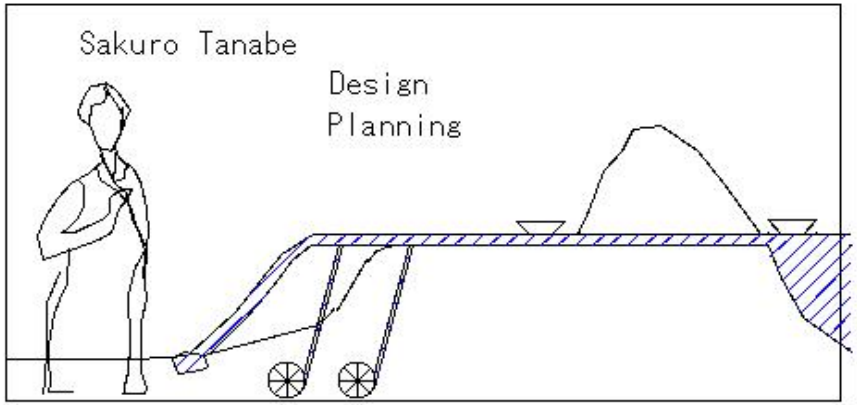
(He456) Biwako Canal

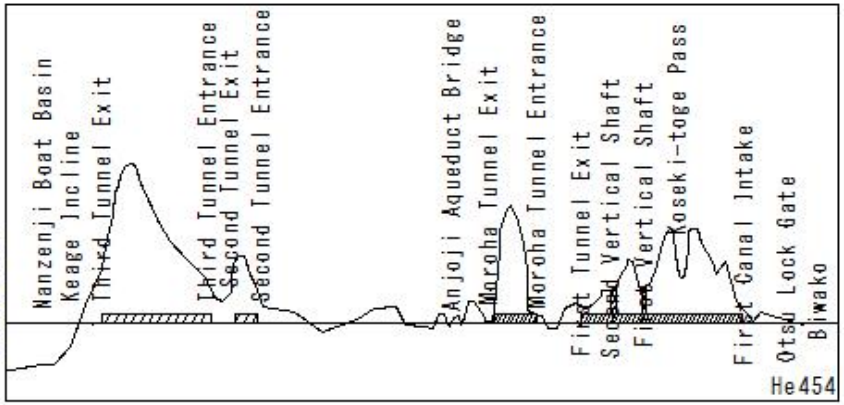
(He456) Biwako Canal

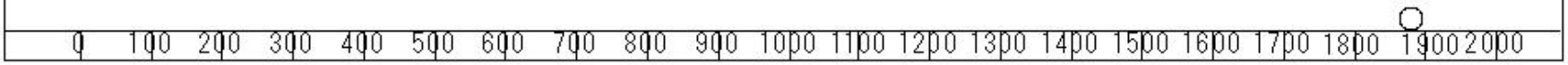
1. We entrusted the design to Sakuro Tanabe, who was only 21 years old.

2. He had already demonstrated his remarkable planning skills in his final thesis project on the Biwa Lake Canal.

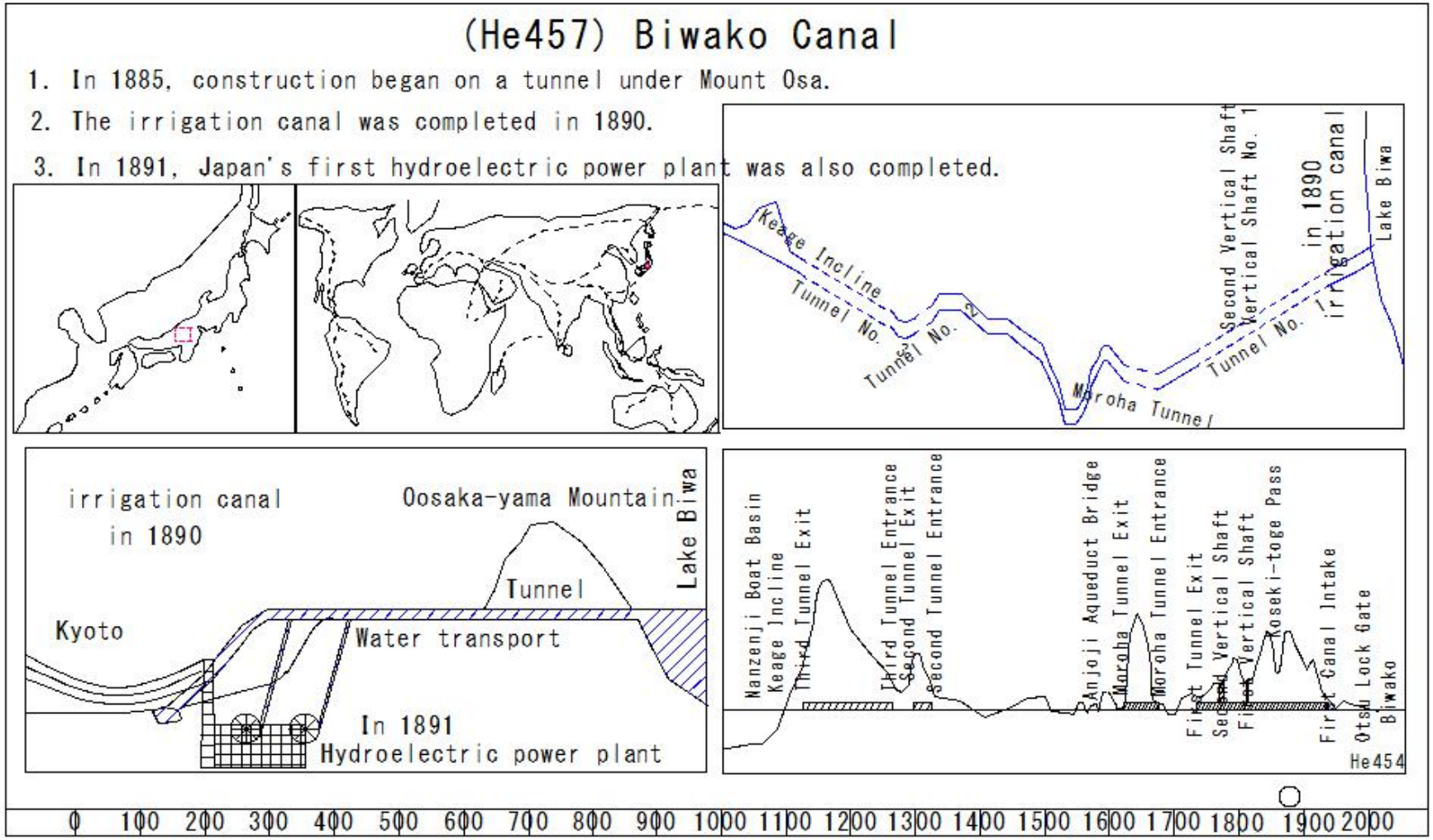




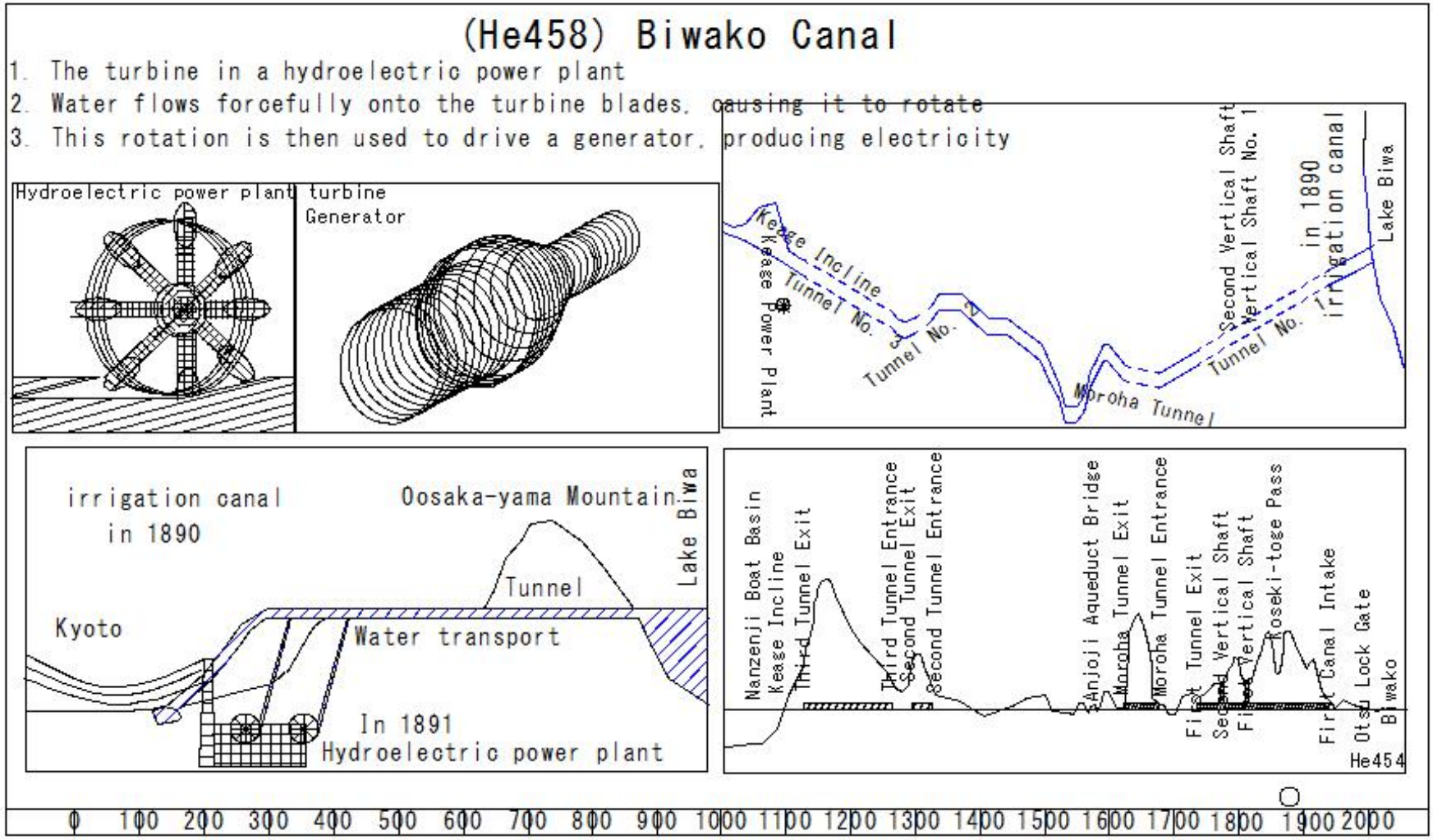




(He457) Biwako Canal



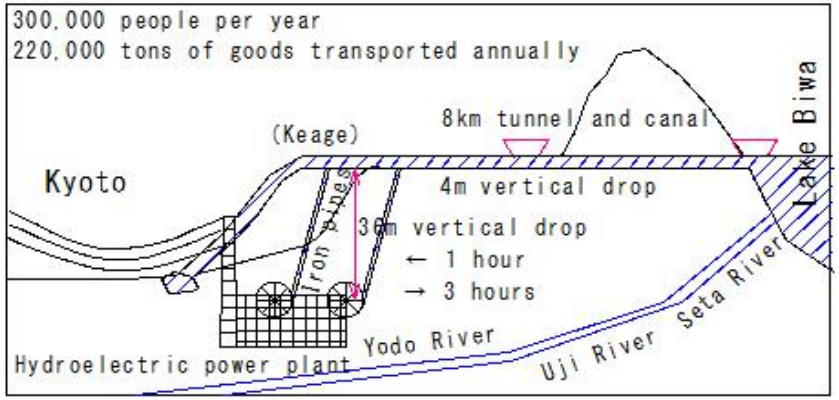
(He458) Biwako Canal

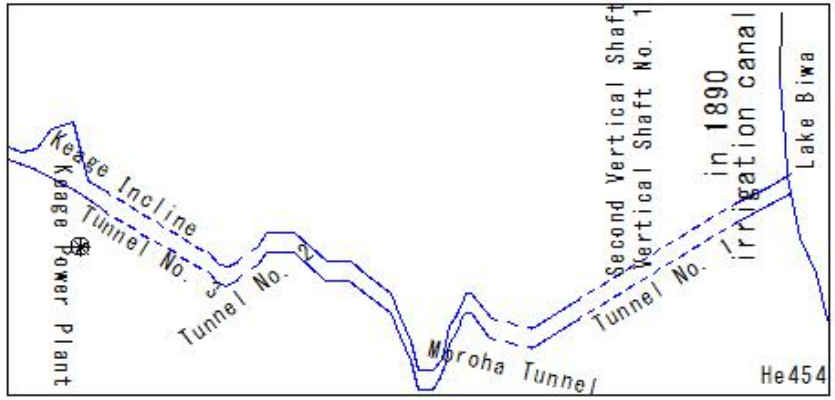


(He459) Biwako Canal

(He459) Biwako Canal

1. The water from Lake Biwa flows through the Seta, Uji, and Yodo rivers, eventually reaching areas far from the center of Kyoto.
2. On the other hand, the Biwako Canal carries water from Lake Biwa to Keage, near the center Kyoto, over a distance of 8km, with a total drop of only 4m, using a combination of tunnels and canals.
3. Boats travel along this canal, reaching Keage from Lake Biwa in just one hour.
4. However, traveling upstream from Keage takes three hours.
5. At its peak, it is said that the canal transported 300,000 people and 220,000 tons of goods annually.
6. Furthermore, the water transported by the canal then flows rapidly through iron pipes, dropping 36m to generate hydroelectric power.





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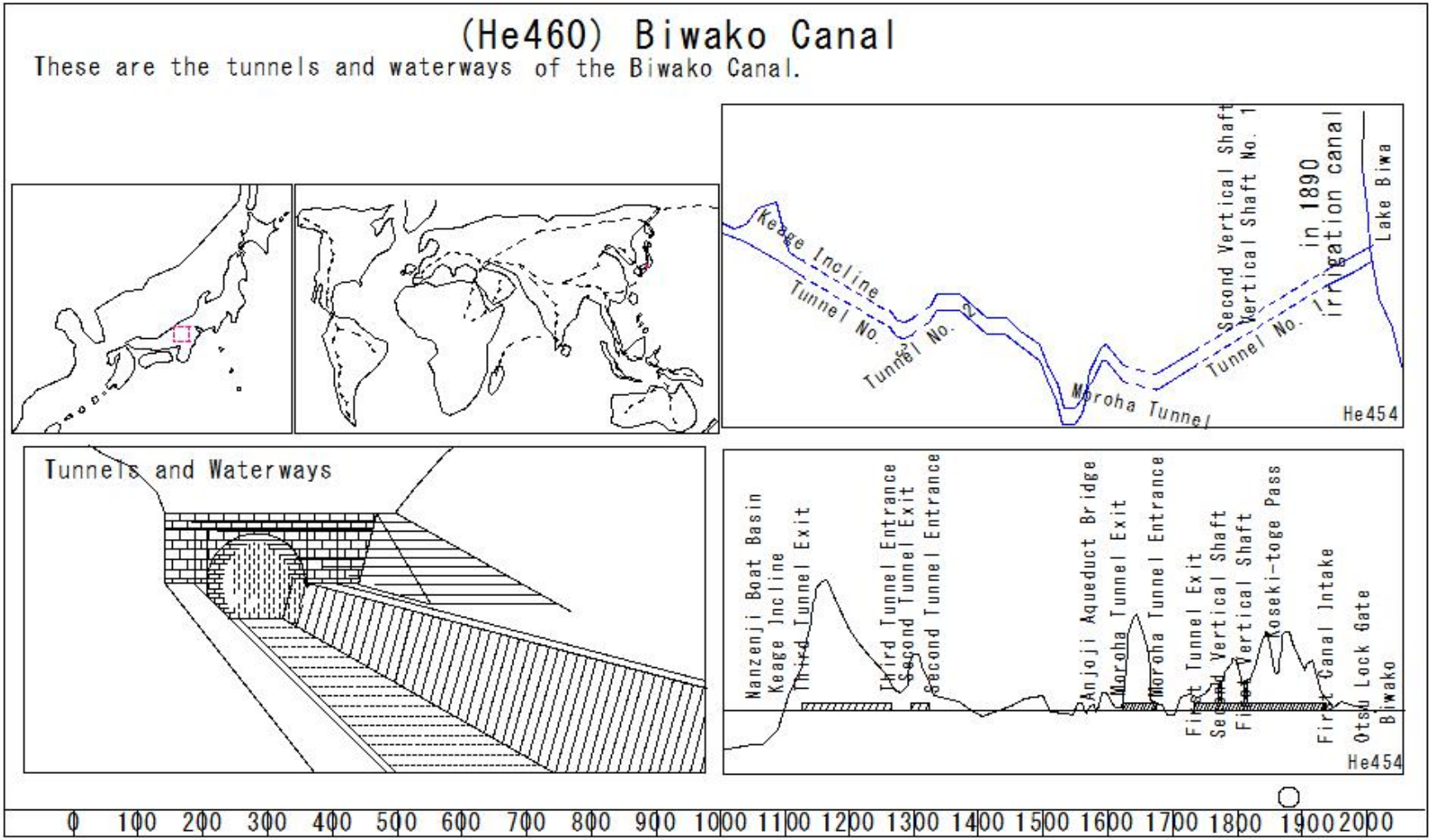
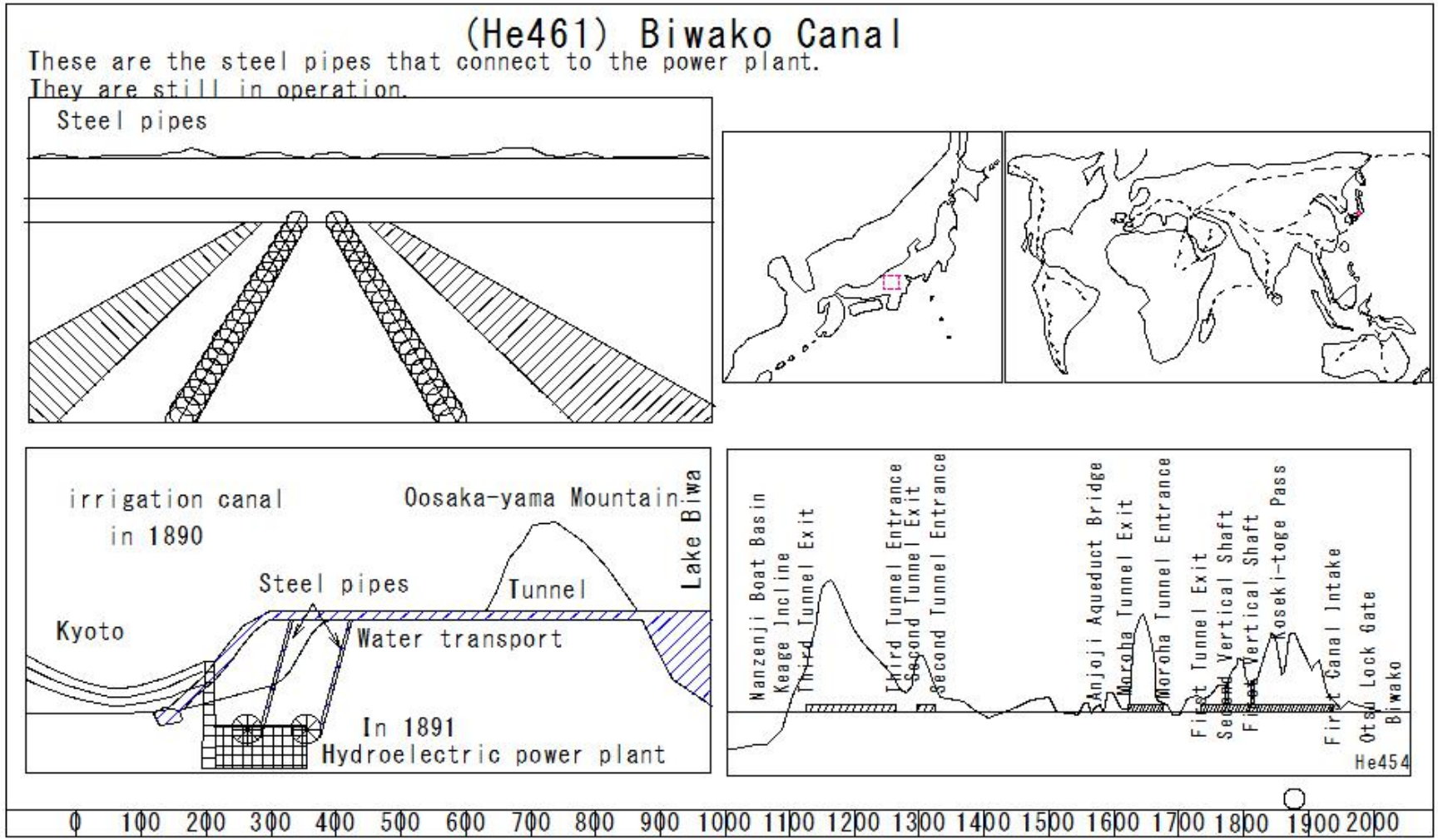
(He460) Biwako Canal



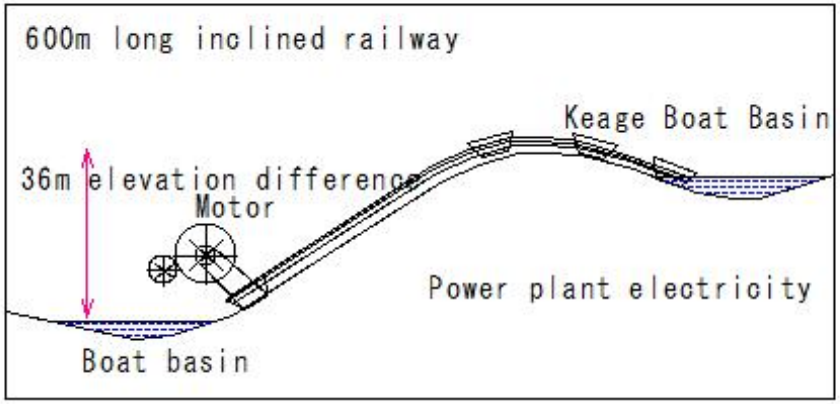
(He461) Biwako Canal

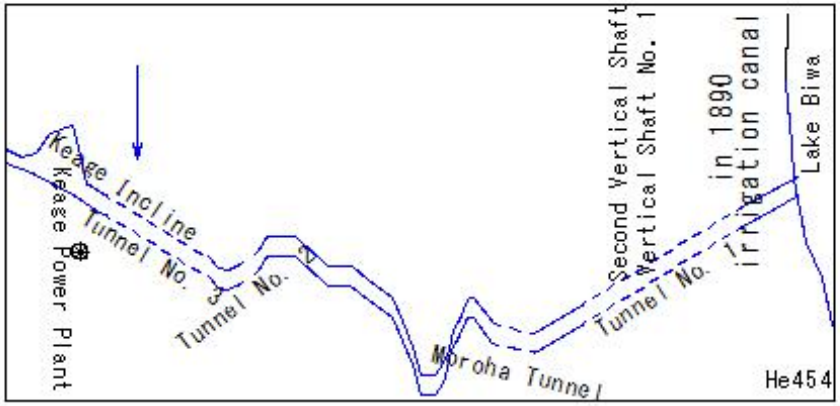


(He462) Biwako Canal

(He462) Biwako Canal

1. The boats were transported up and down the 36m elevation difference by a cable car system, which at the time was the longest in the world at 600m in length.
2. The power to pull the cable was supplied by electricity from a power plant.
3. This electricity was used not only for textile production (such as Nishijin silk weaving), lighting (streetlights and house lights), but also for Japan's first streetcar system.



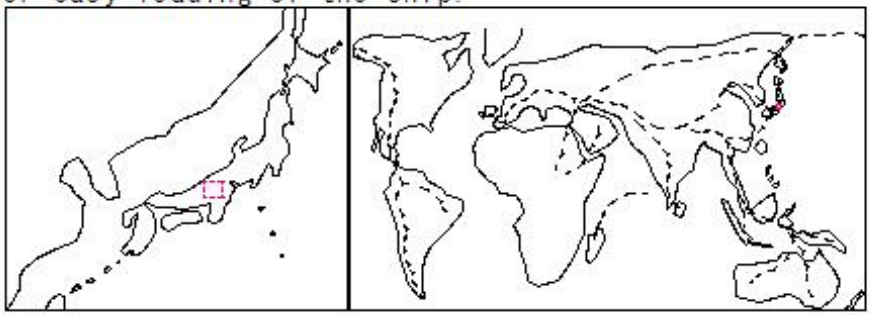


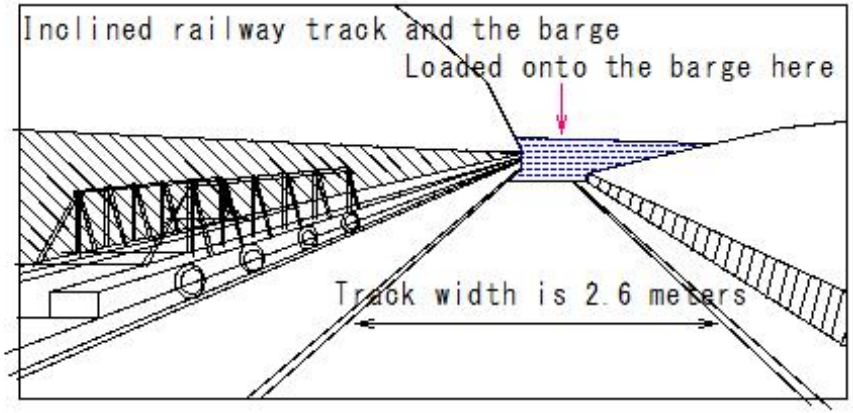
0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

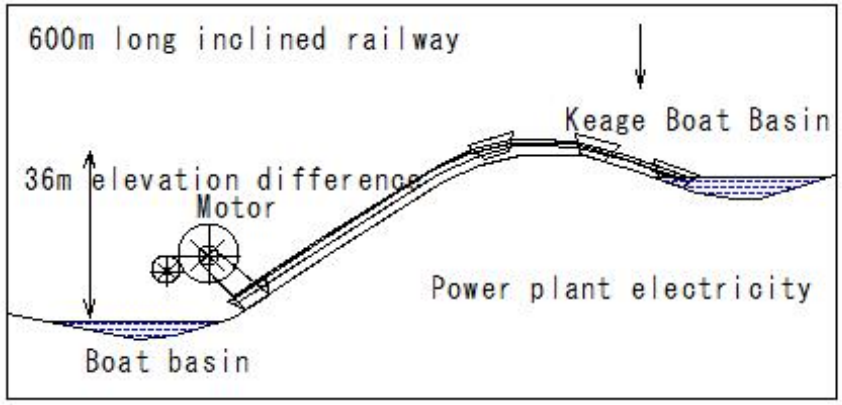
(He463) Biwako Canal

(He463) Biwako Canal

1. This is a view of the inclined railway track and the barge.
2. Ships arriving from Lake Biwa are loaded onto the barge here.
3. The barge can submerge underwater, allowing for easy loading of the ship.
4. The track width is 2.6 meters, more than twice the width of a standard railway track, ensuring stable transport of the ship.





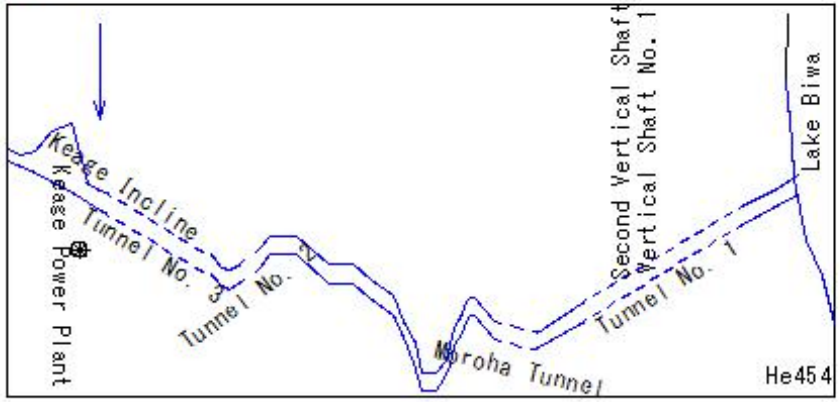


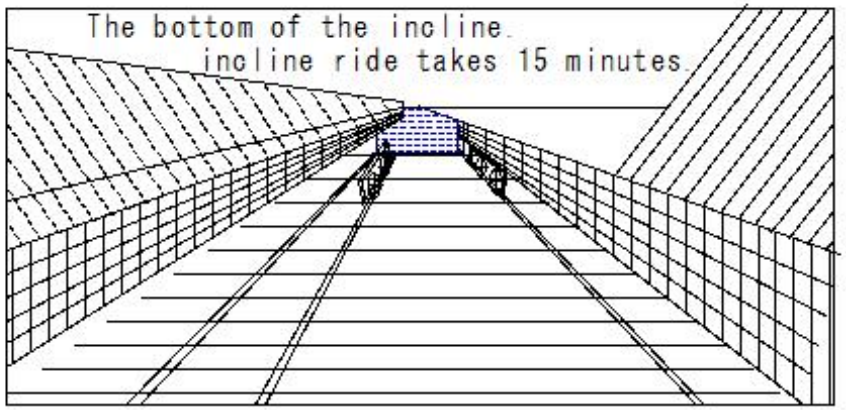
0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

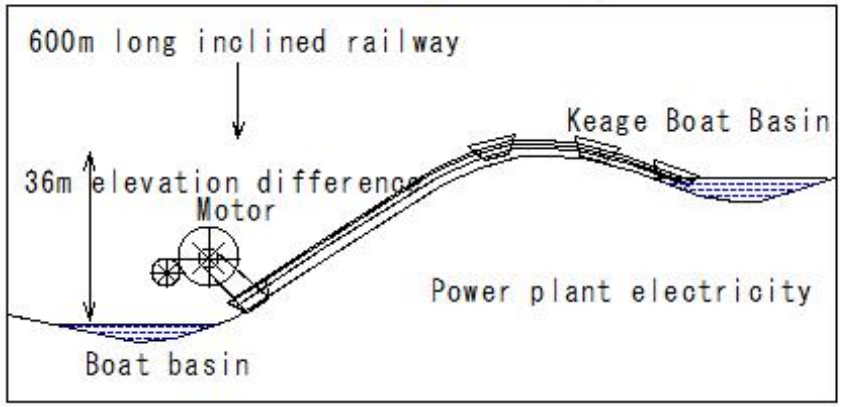
(He464) Biwako Canal

(He464) Biwako Canal

1. This is the final stop at the bottom of the incline.
2. The platform lowers into the water, allowing ships to easily dock.
3. The incline ride takes 15 minutes.





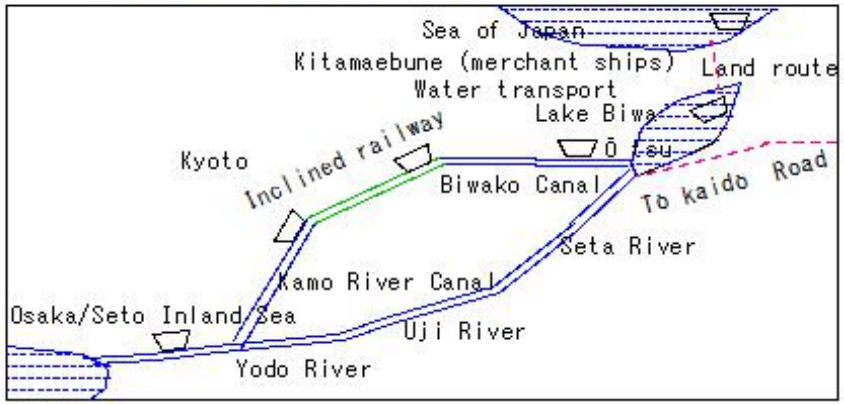


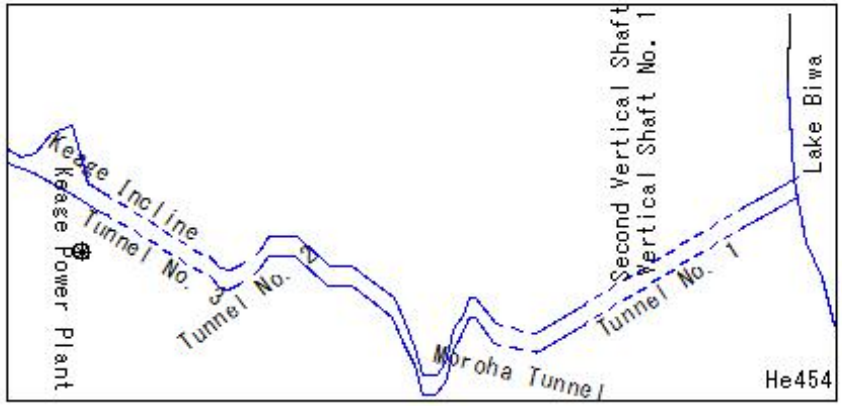
0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He465) Biwako Canal

(He465) Biwako Canal

1. With the construction of the Biwako Canal, the flow of goods shifted to a waterway system centered on Kyoto.
2. Goods transported by ships from the Sea of Japan (via ships like the Kitamae-bune) would first arrive at Lake Biwa by land, and then travel by boat to Otsu.
3. Goods transported along the Tokaido Road would also arrive in Otsu.
4. From Otsu, these goods would travel by boat through the Biwako Canal and the inclined plane to reach Kyoto.
5. From Kyoto, the Kamo River Canal, built to connect the Biwako Canal and the Uji River, allowed goods to travel further downstream along the Uji River and Yodo River, reaching Osaka and the Seto Inland Sea.
6. A reverse route was also available.



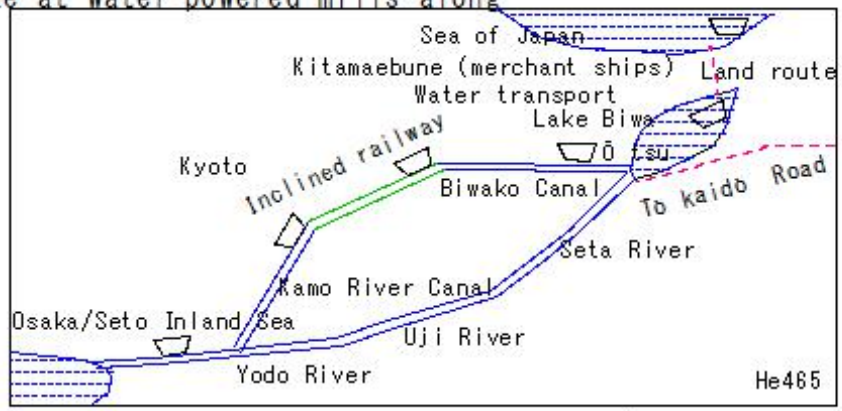


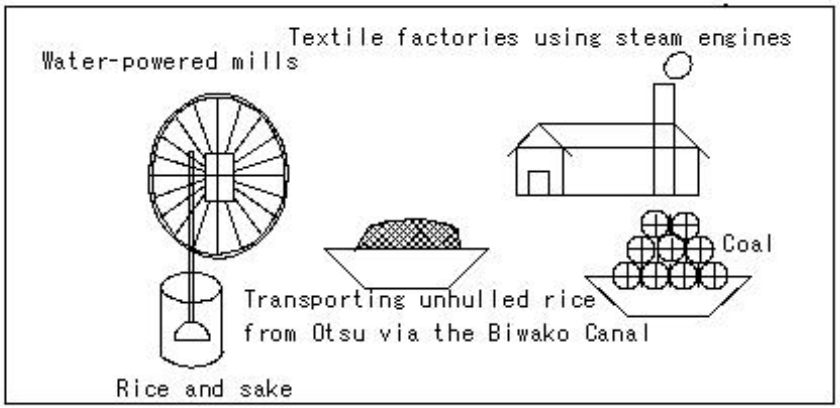
0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

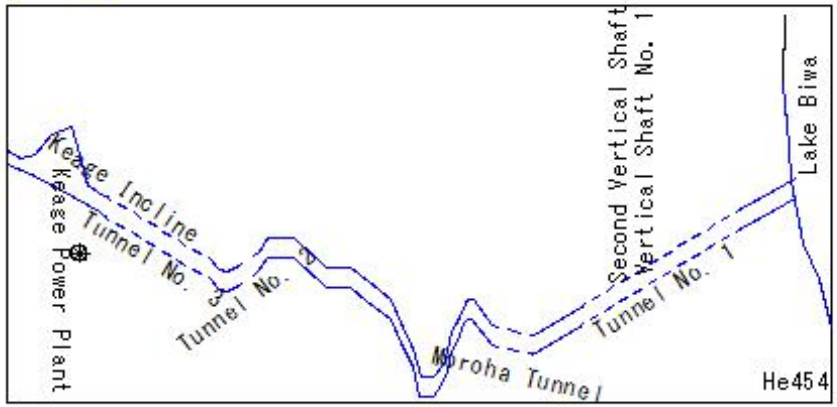
(He466) Biwako Canal

(He466) Biwako Canal

1. In Kyoto, unhulled rice was transported from Otsu via the Biwako Canal, and then processed into polished rice the canal and used to make sake at water-powered mills along
2. Large quantities of coal were transported by ship, and many textile factories using steam engines were also operating.





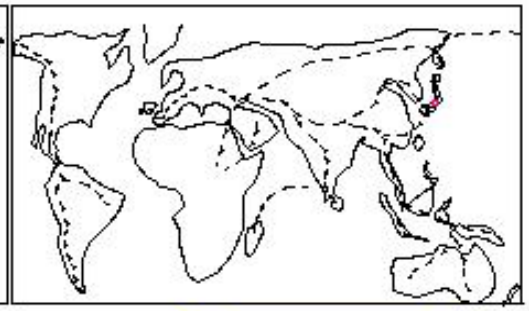


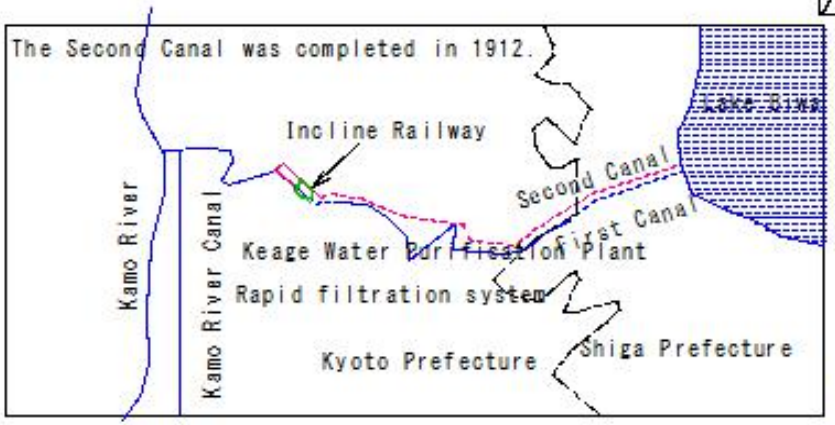
0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

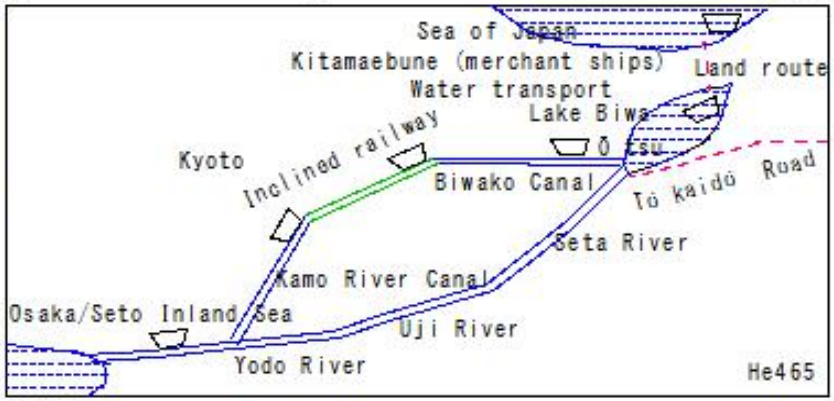
(He467) Biwako Canal

(He467) Biwako Canal

1. The Second Canal was completed in 1912. It carried twice the amount of water from Lake Biwa to Keage via an all-tunnel route, where it merged with the First Canal.
2. The total flow rate increased to 2 million cubic meters per day.
3. Some of this water was then drawn at the Keage Water Purification Plant, which became Japan's first modern water purification plant using rapid filtration technology.







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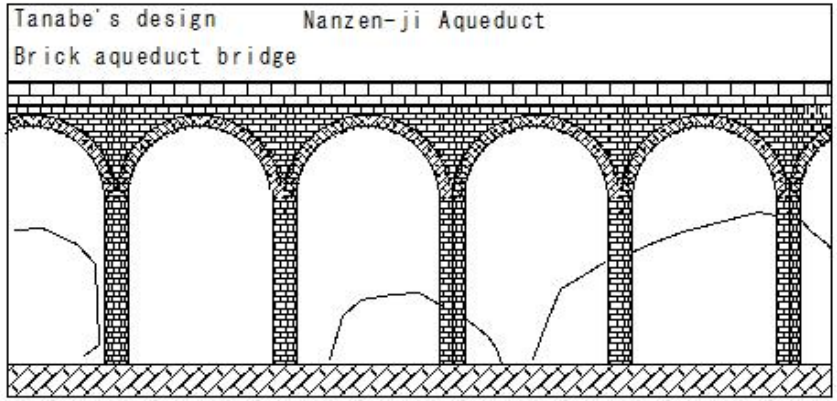
(He468) Biwako Canal

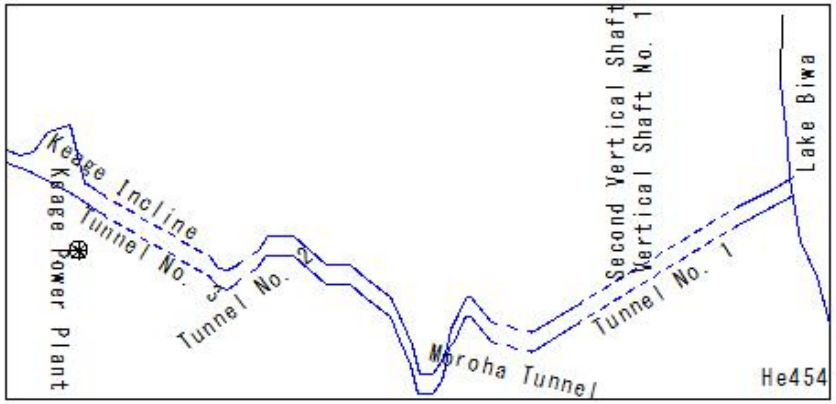
(He468) Biwako Canal

① Subsequently, many more water purification plants were built.

② Power plants were also expanded, and the water supply was used for irrigation and fire prevention, supporting the development of Kyoto and continues to play an important role even today.

③ The Nanzen-ji Aqueduct, a brick aqueduct bridge designed by Tanabe, through which a branch canal from the main canal flows, conveys the history of the canal system to people today.





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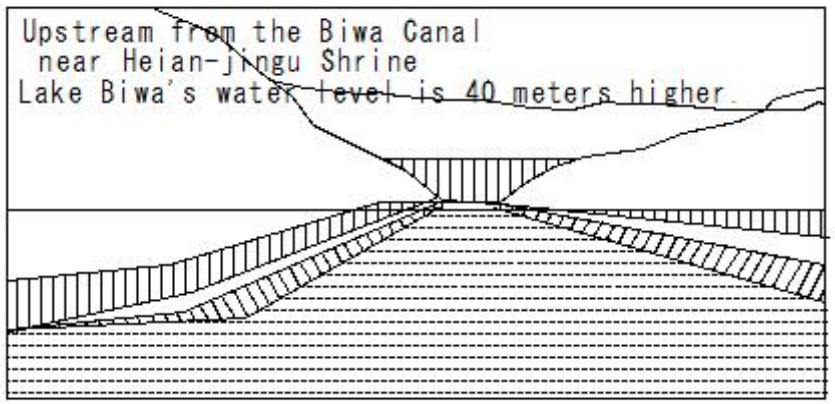
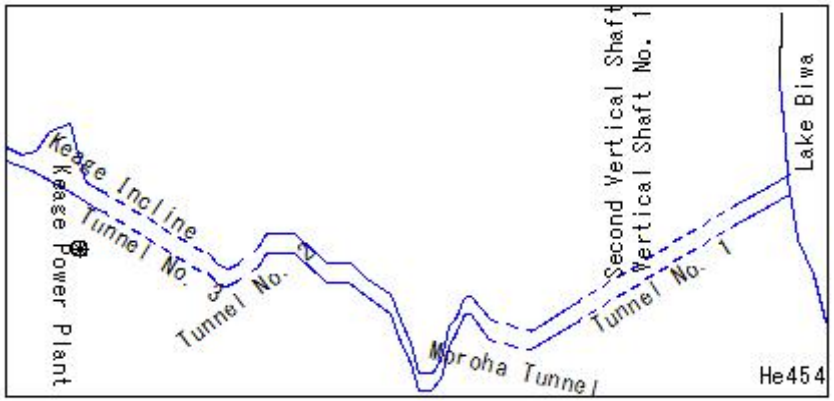
(He469) Biwako Canal

(He469) Biwako Canal

1. Upstream from the Biwa Canal near Heian-jingu Shrine
2. Lake Biwa is located beyond the mountains, and its water level is 40 meters higher.





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(He470) Biwako Canal

(He470) Biwako Canal

① Biwako Dam (Water level monitoring)

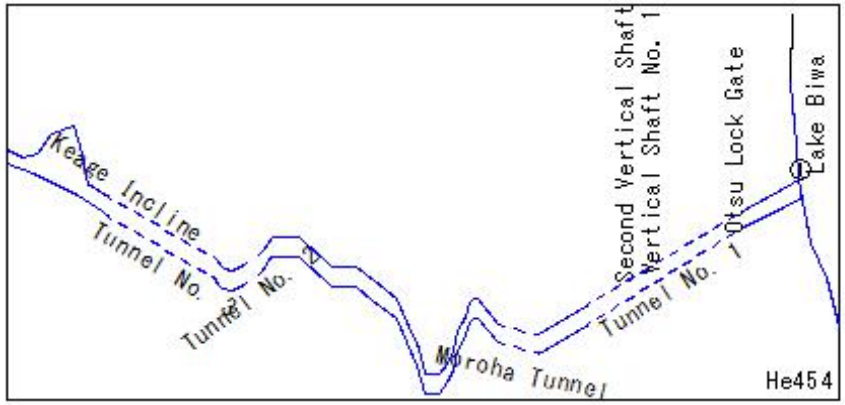
① This is the entrance to the First Canal from Lake Biwa.

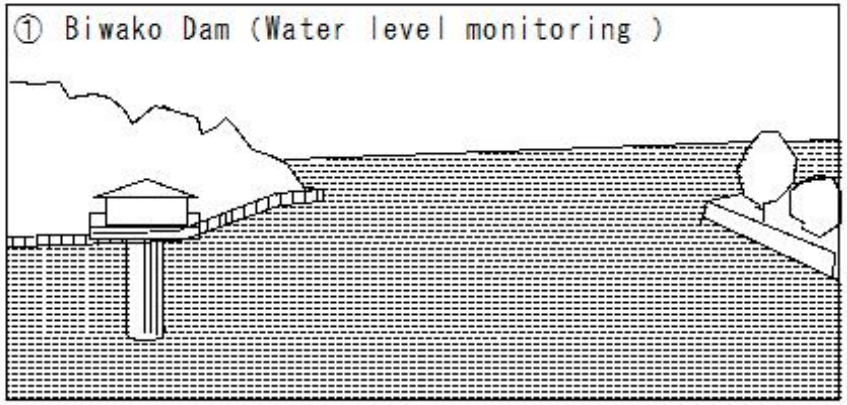
② There are two sections of the dam: the First Dam and the Second Dam.

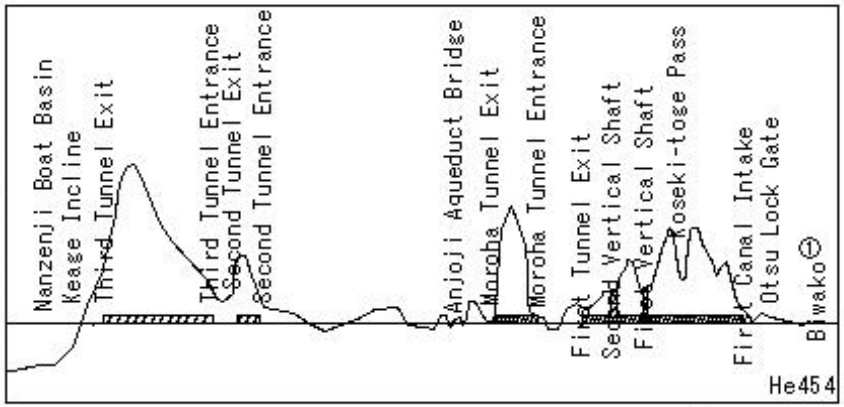
③ Prior to the commencement of construction of the First Canal,

④ a water level gauge was installed in August 1881 (Meiji 14)

⑤ Water level monitoring of Lake Biwa began.







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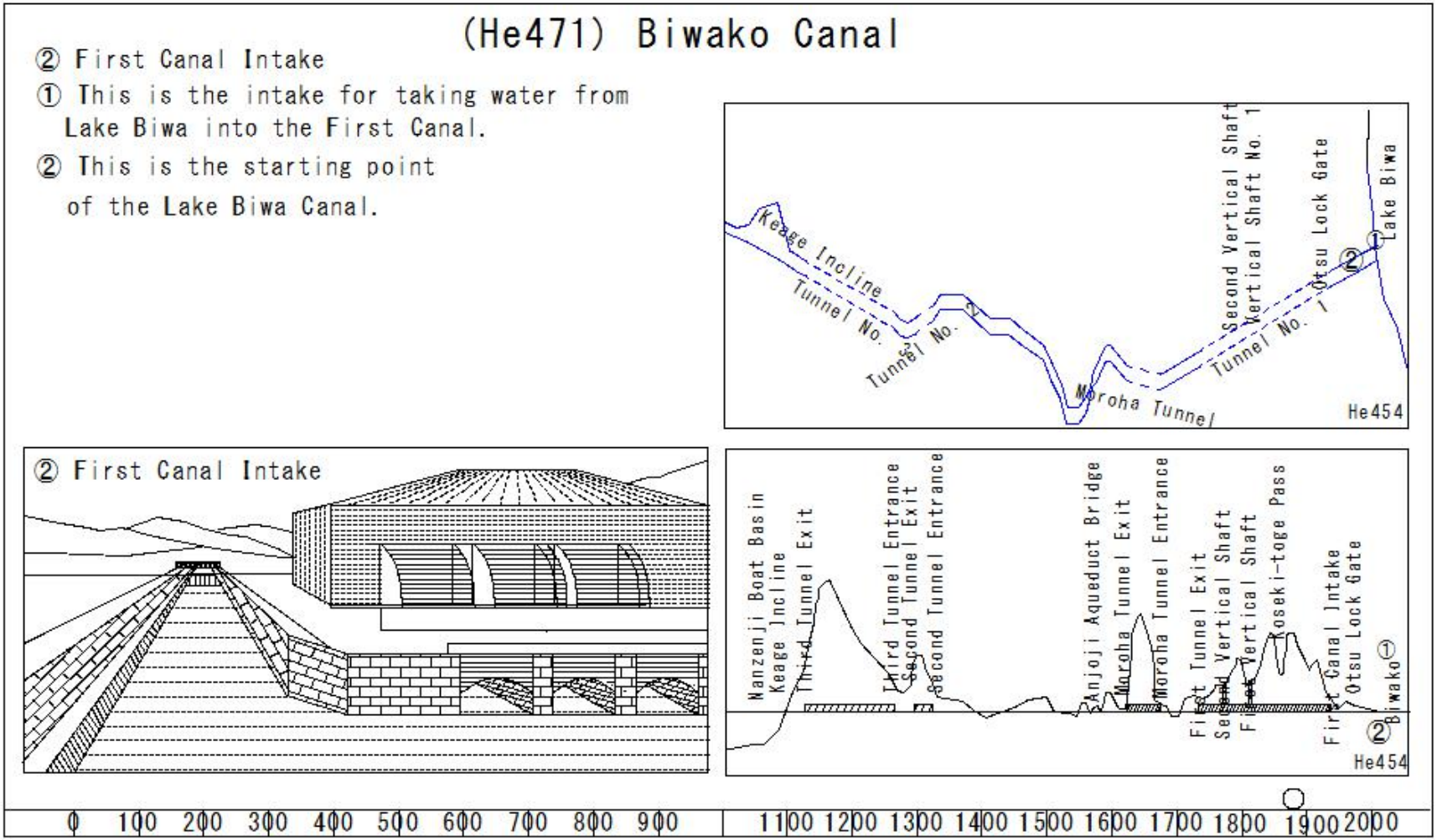
(He471) Biwako Canal



(He472) Biwako Canal

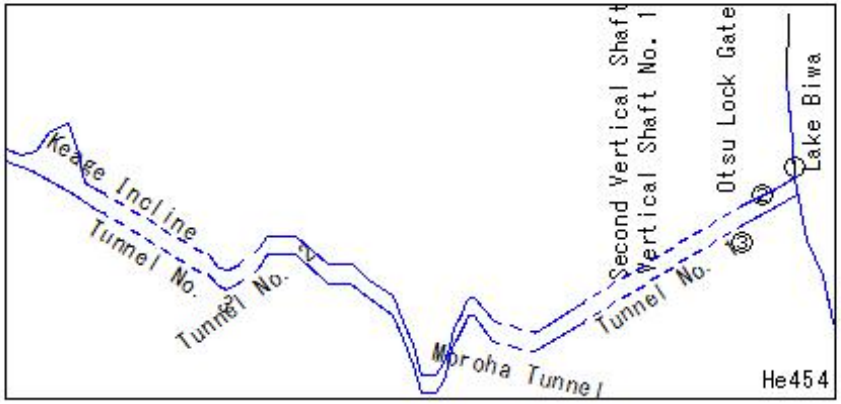
(He472) Biwako Canal

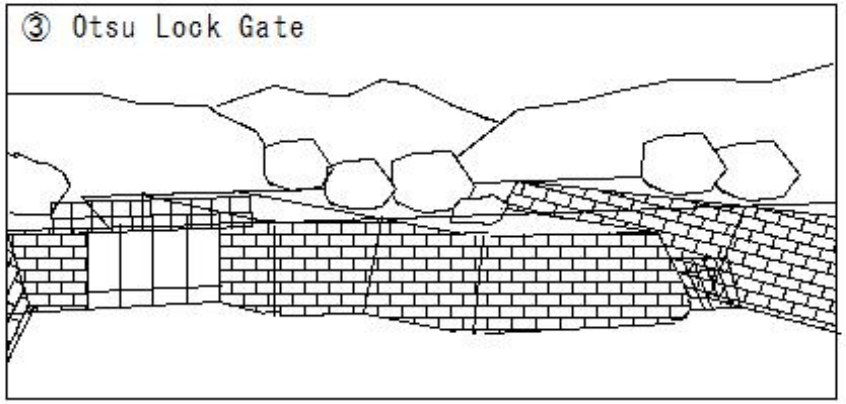
③Otsu Lock Gate

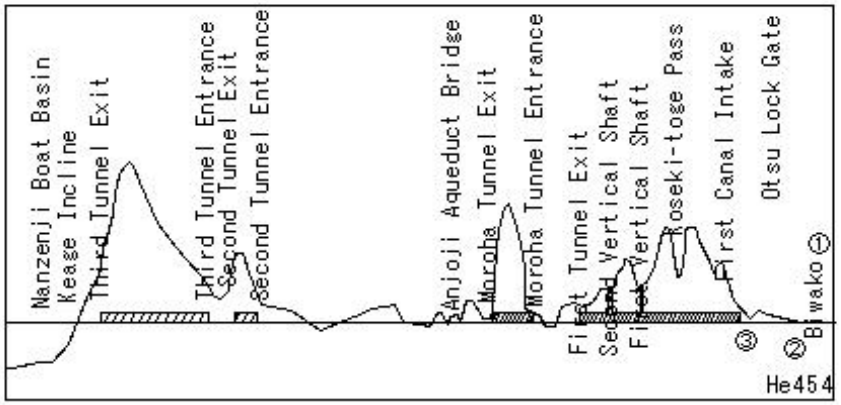
① This structure serves to open and close the sluice gate, allowing boats to pass through and regulating the water level.

② Originally, the gate was made of wood, and it was opened and closed manually by four people.

③ The original handles used to operate the gate are still preserved.







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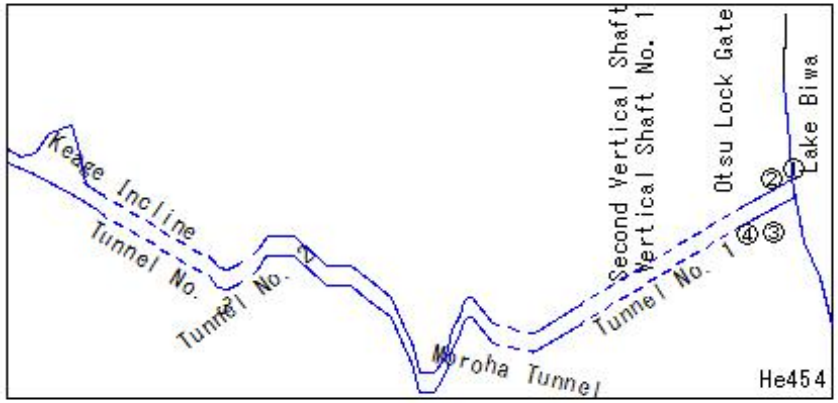
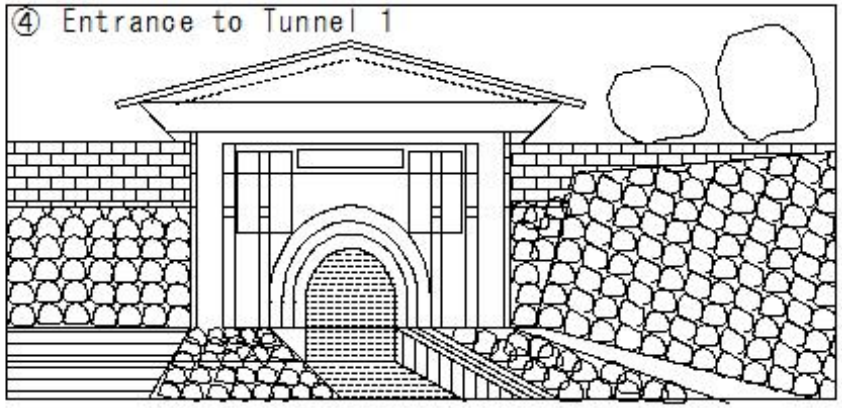
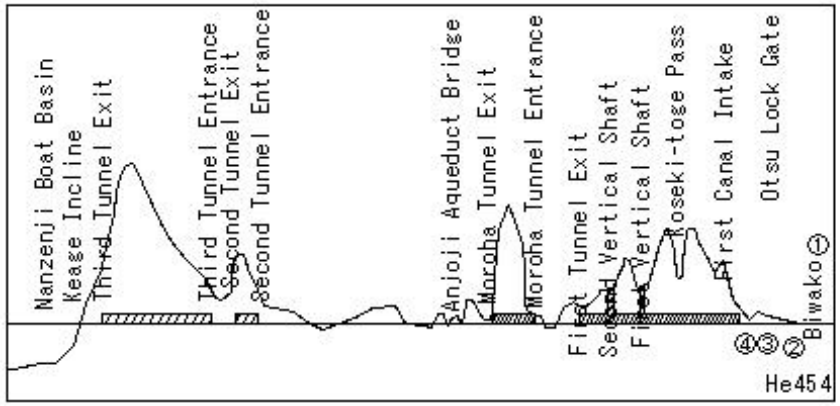
(He473) Biwako Canal

(He473) Biwako Canal

④ Entrance to Tunnel 1
① Tunnel 1
② This is the first tunnel in Japan to be built using the vertical shaft method, with a total length of 2,436 meters.







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(He474) Biwako Canal

⑤ First Shaft

(He474) Biwako Canal

① To dig a 2,436-meter-long tunnel,

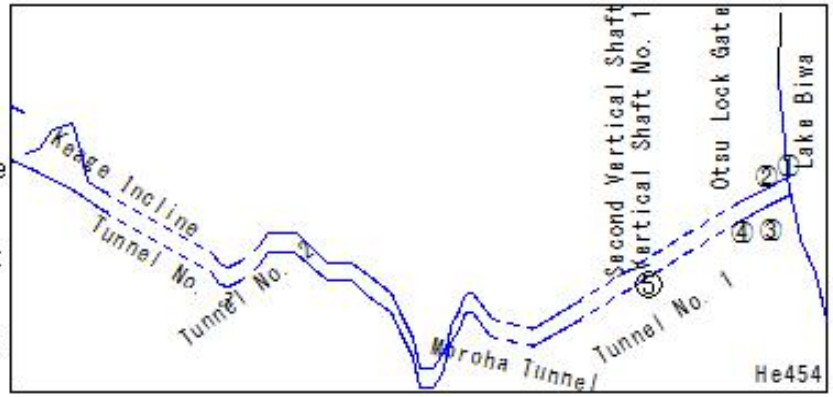
② digging from both sides of the mountain,

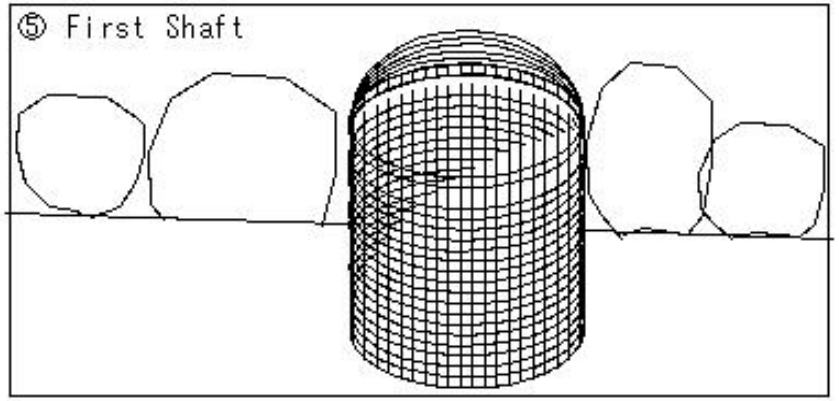
③ A vertical hole was dug from the top of the mountain,

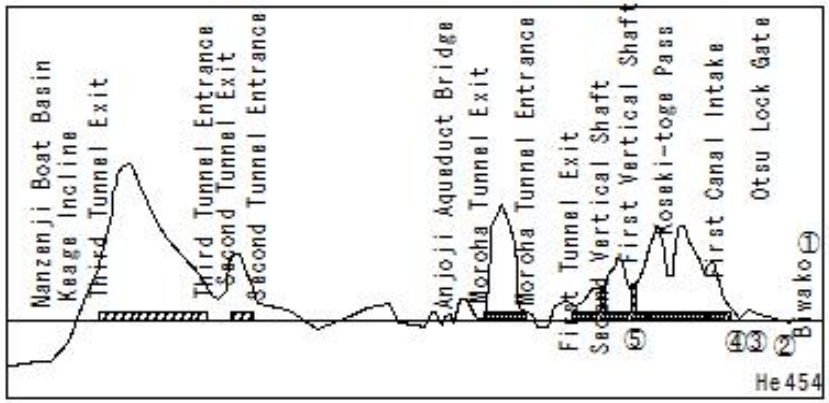
④ hen digging from both sides from there, a "shaft method" was adopted for the first time in Japan to speed up construction.

⑤ However, construction was hampered by hard rock and large amounts of spring water.

⑥ The shaft, measuring 5.5 meters in diameter and 47 meters deep above ground, was completed.







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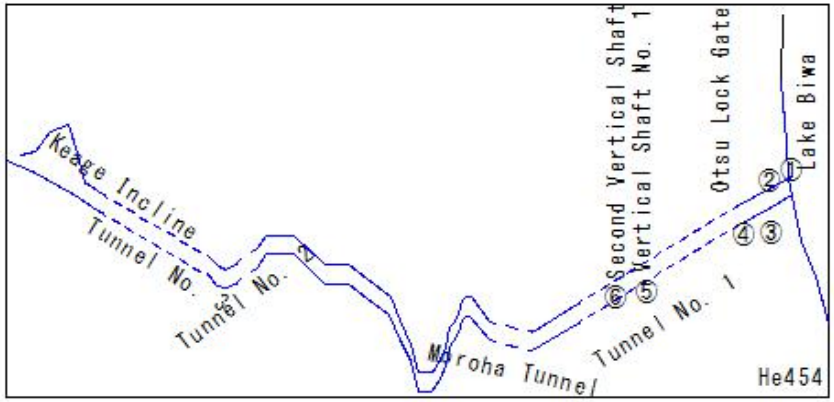
(He475) Biwako Canal

(He475) Biwako Canal

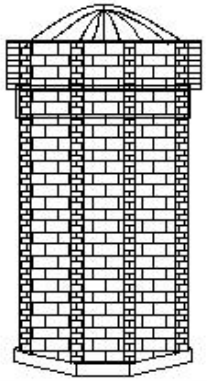
⑥ Second Shaft

① This is a shaft located in the First Canal.

② The Second Shaft was built for lighting and ventilation.



⑥ Second Shaft



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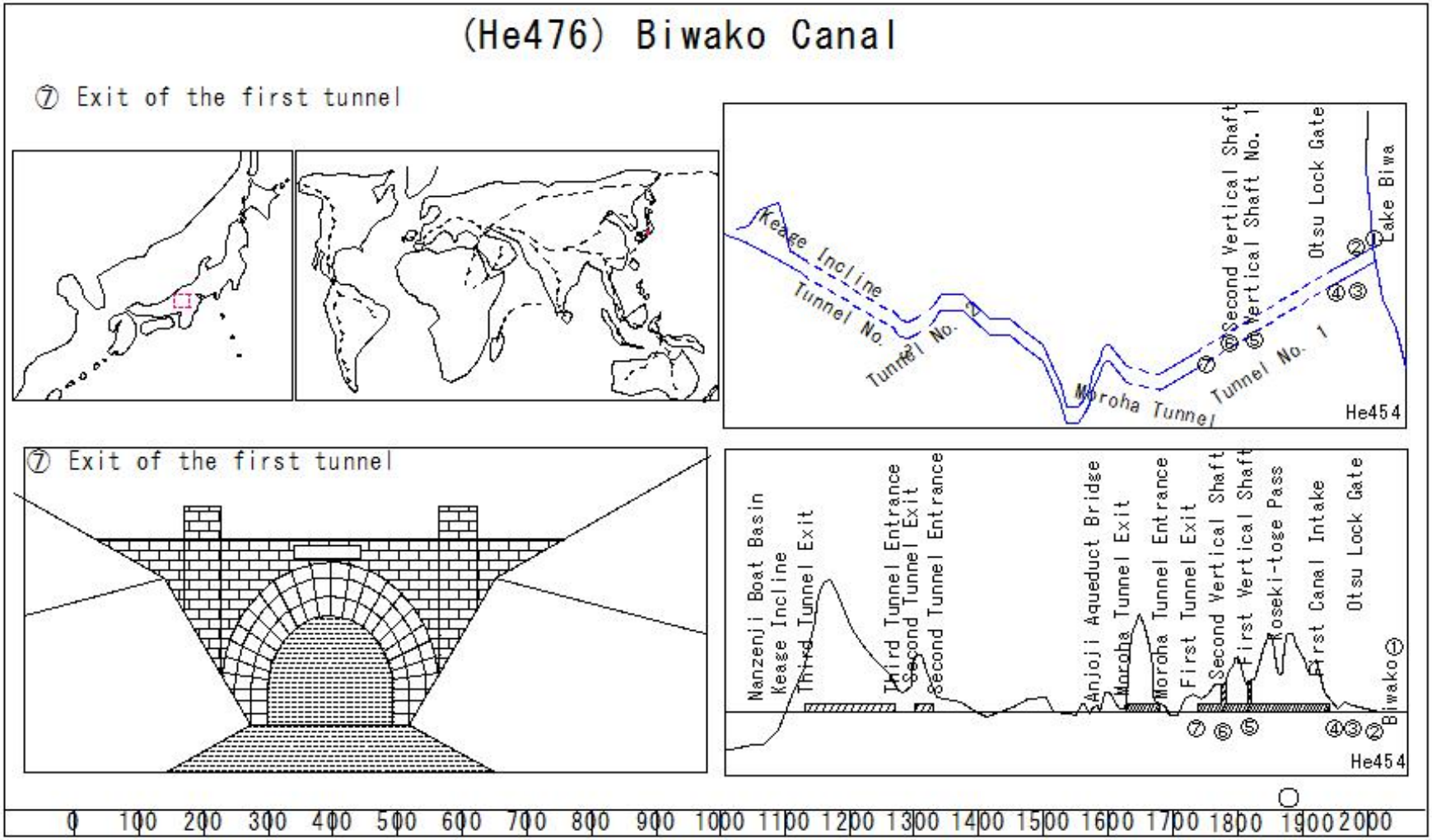
(He476) Biwako Canal



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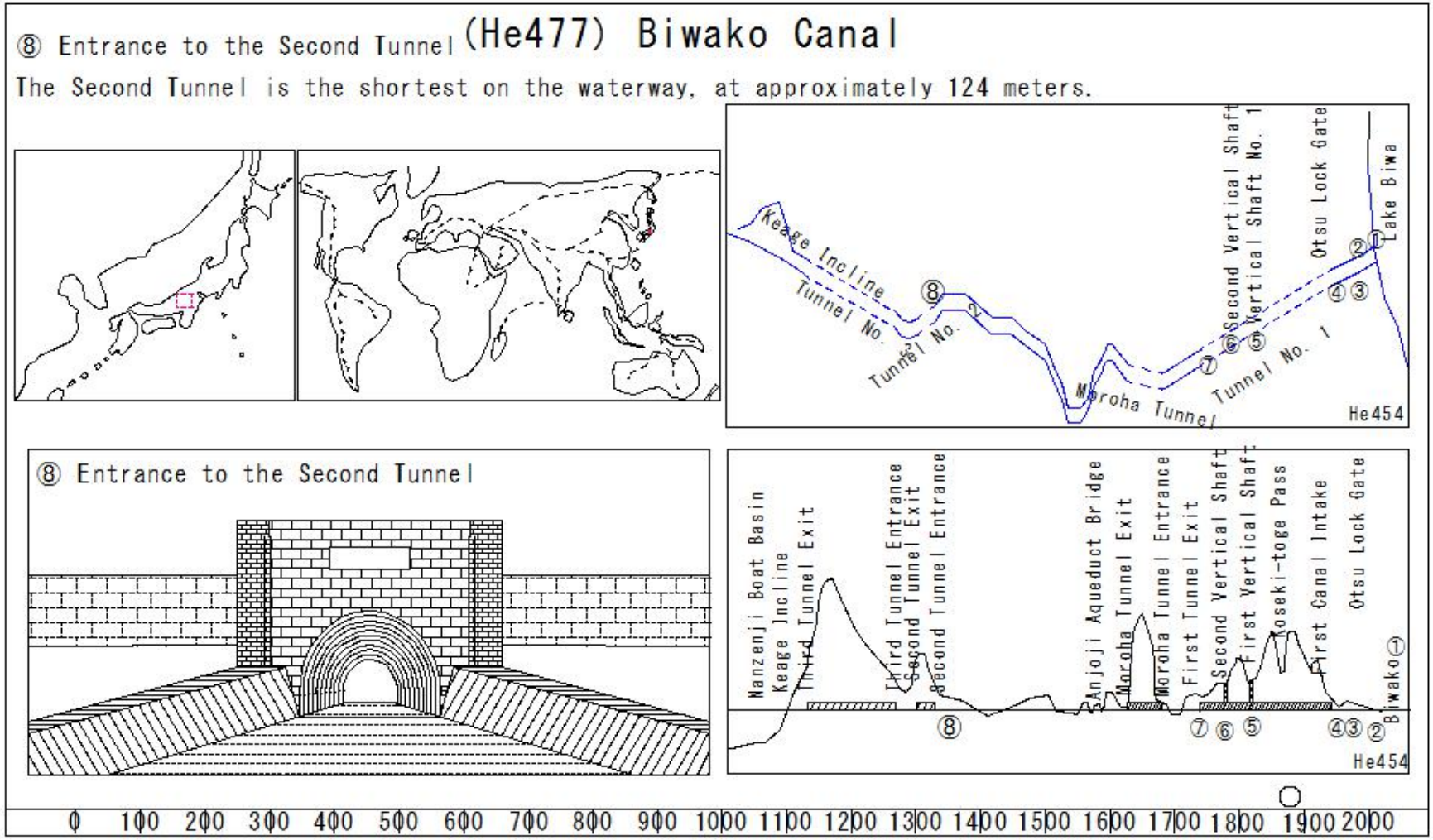

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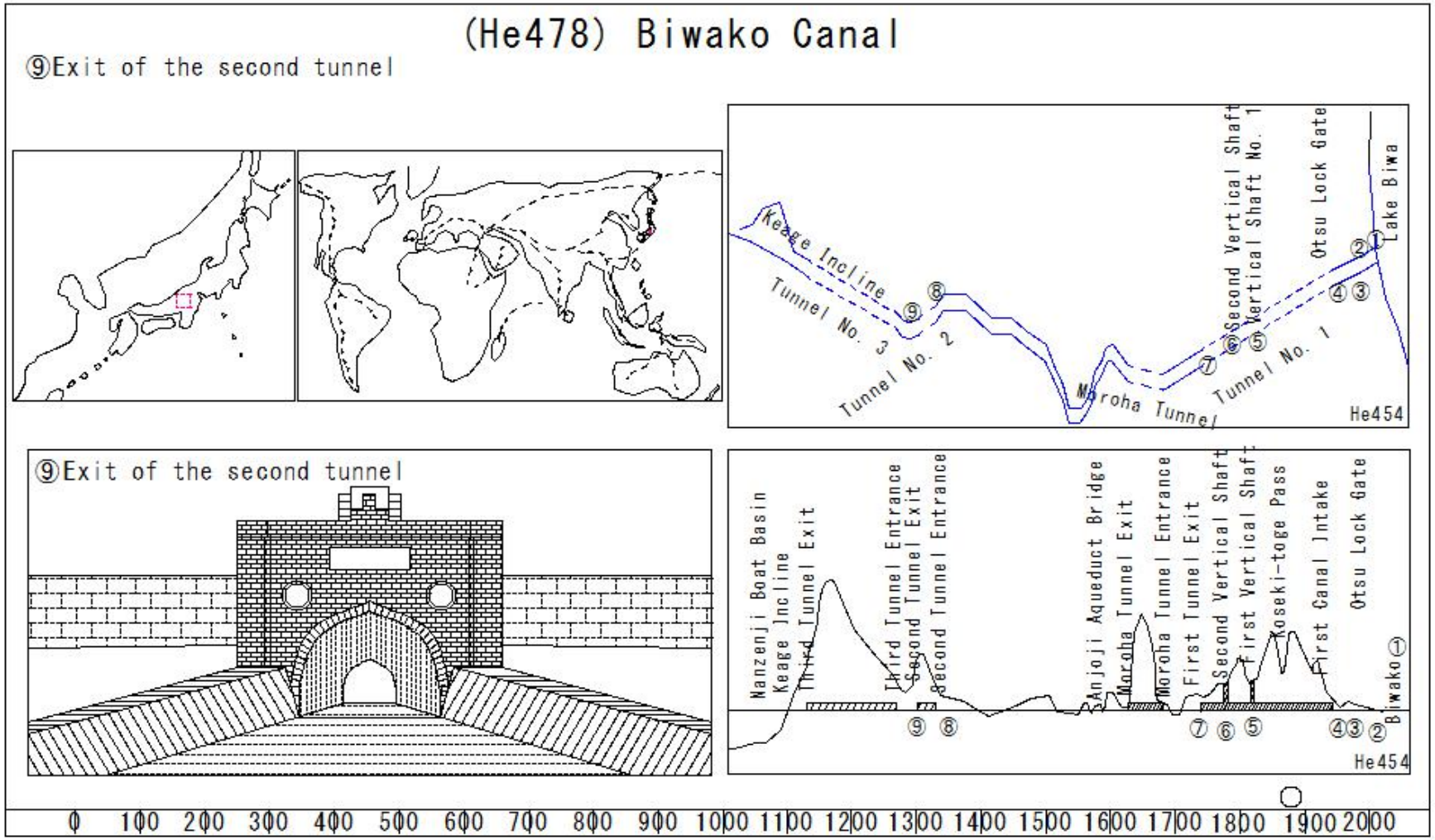

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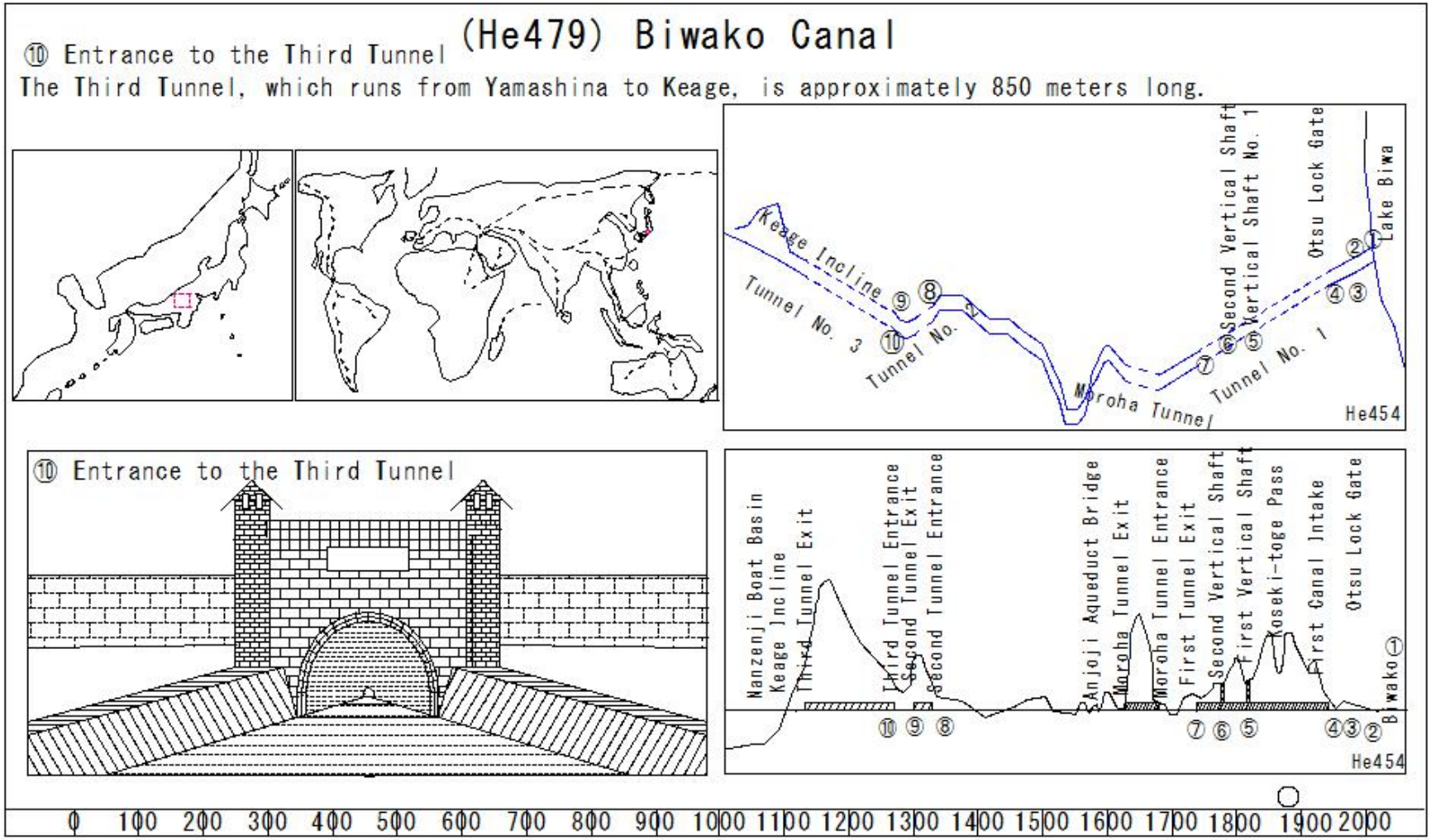
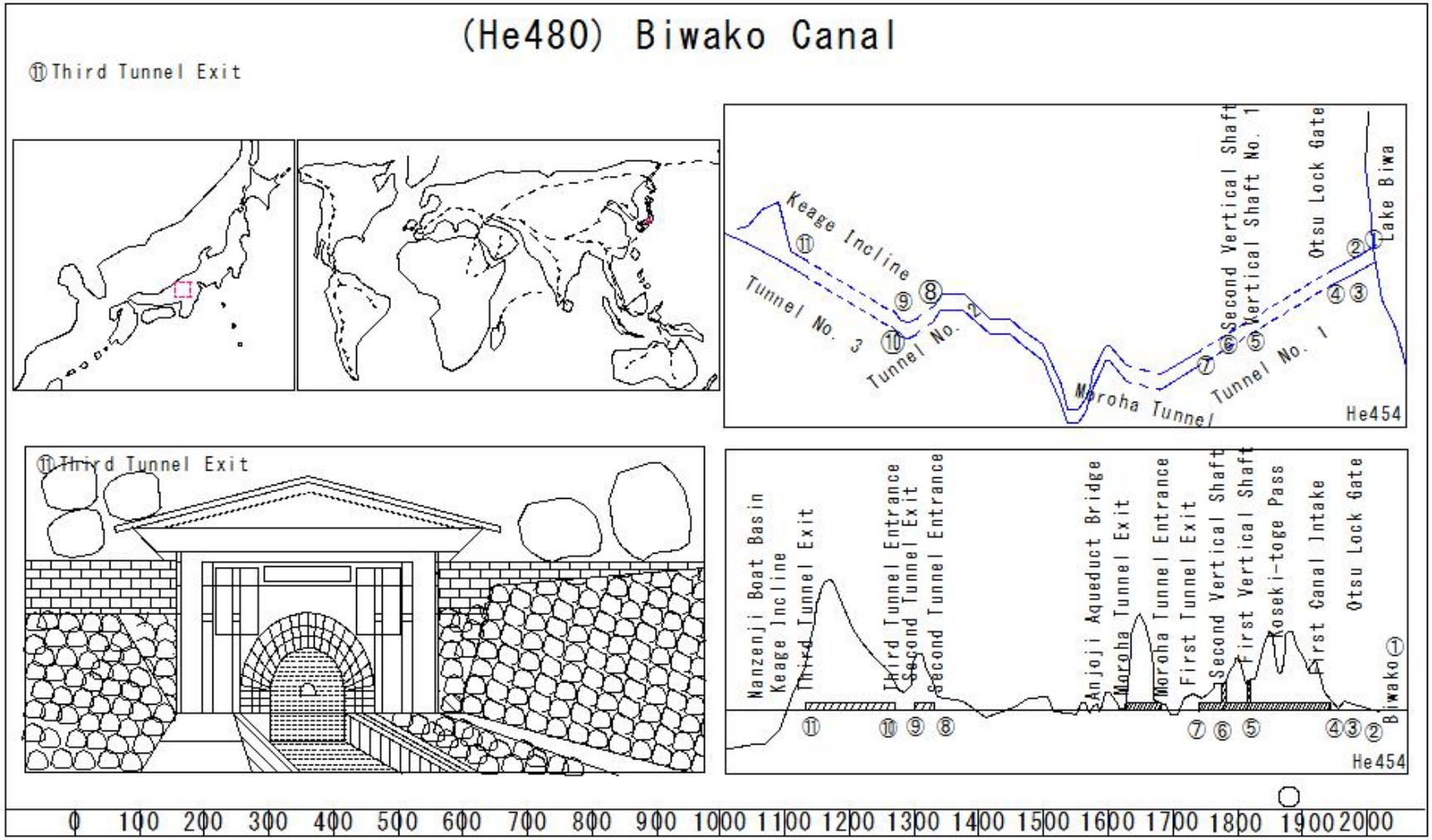
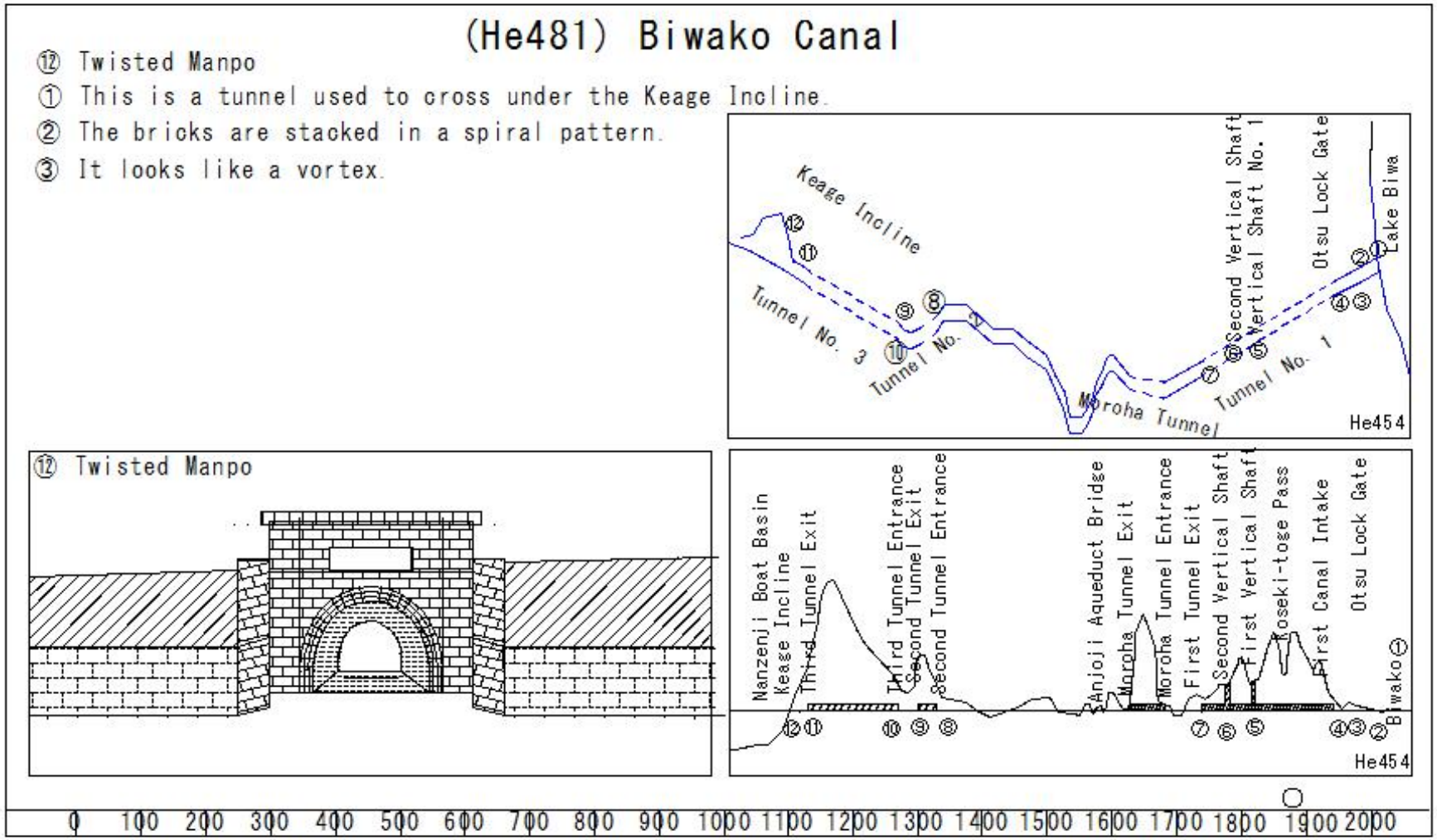


(He480) Biwako Canal



(He481) Biwako Canal



(He482) Biwako Canal

(He482) Biwako Canal

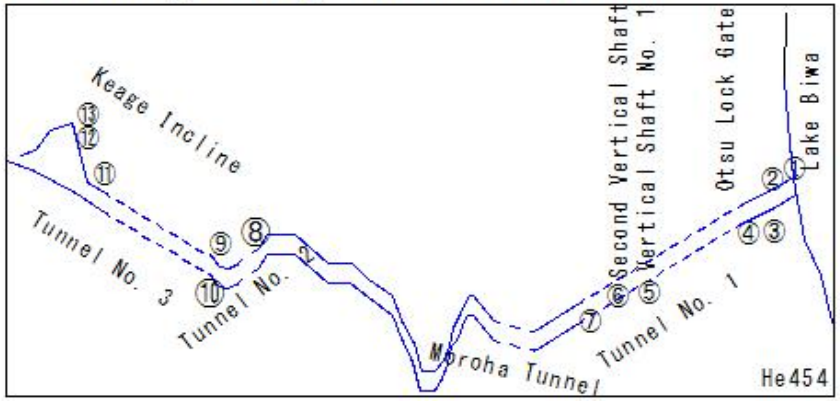
⑬Keage Incline

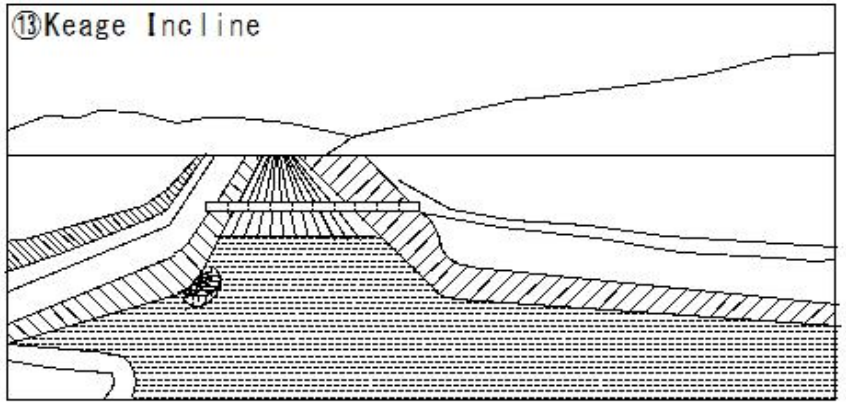
① This incline railway was built to transport boats arriving at Keage Boat Reservoir down the slope to Nanzenji Boat Reservoir without having to unload them.

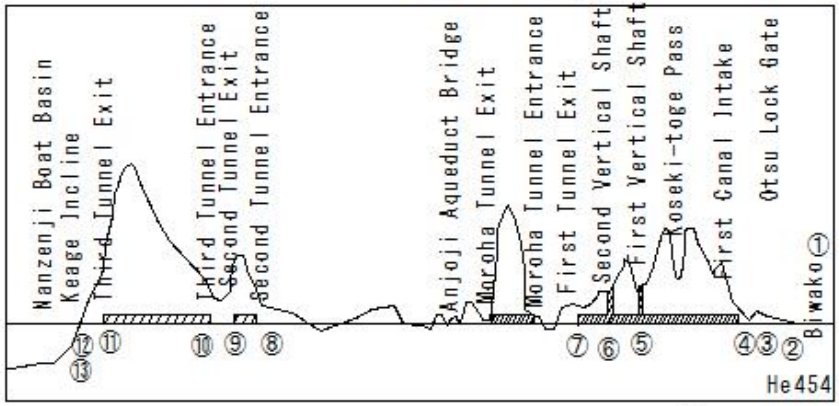
② This incline railway was built to transport boats on carts up and down the slope.

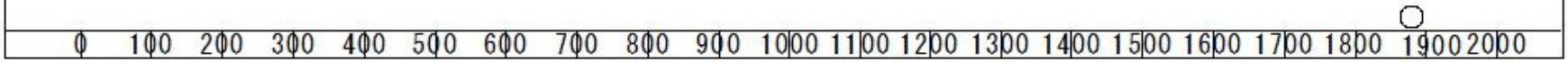
③ It was approximately 582 meters long from Keage Boat Reservoir to Nanzenji Boat Reservoir.

④ It overcame a drop of approximately 36 meters in elevation.









(He483) Biwako Canal

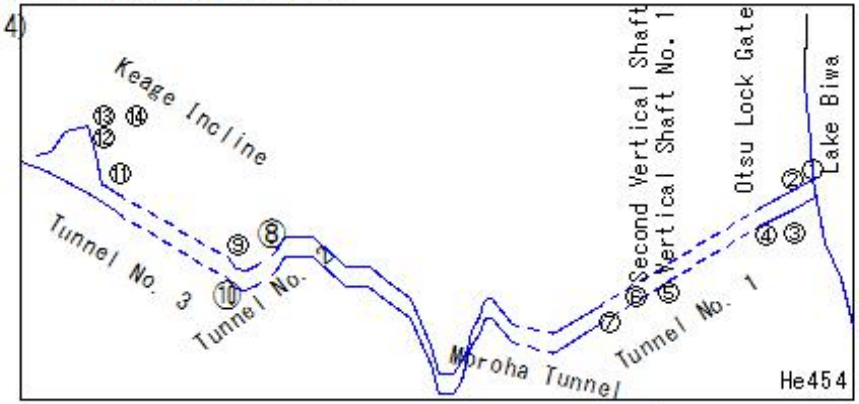
(He483) Biwako Canal

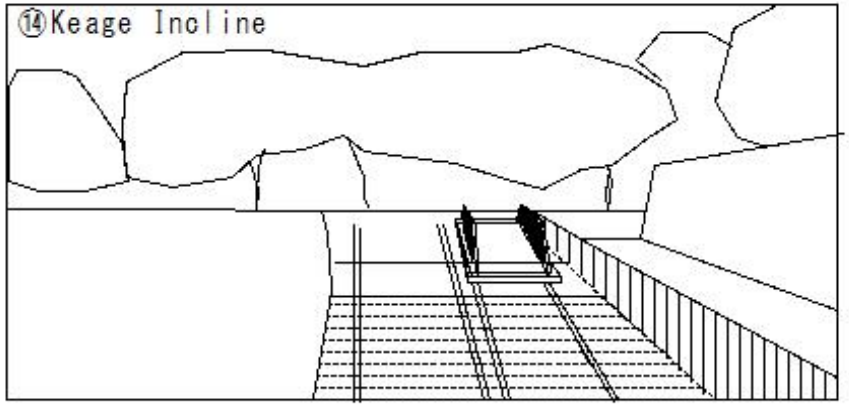
⑭Keage Incline

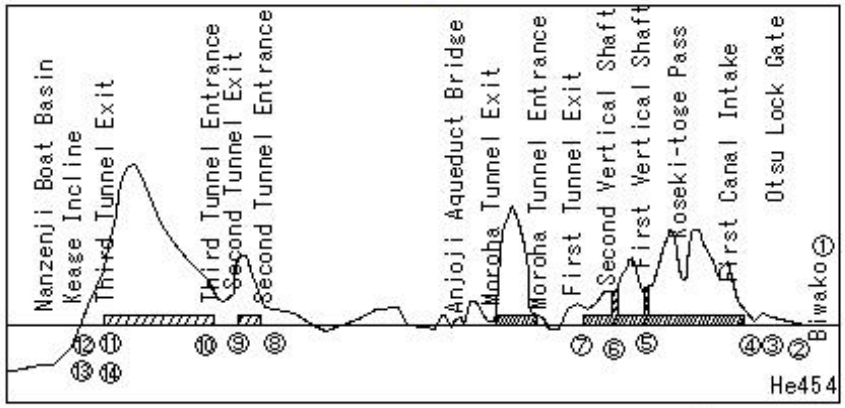
⑤ It allowed boats to pass through in approximately 10 to 15 minutes.

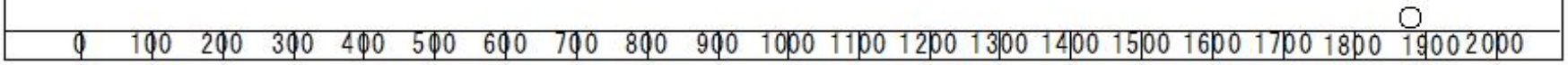
⑥ It began commercial operation in 1891 (Meiji 24) using electricity from the Keage Power Plant.

⑦ The incline ceased operation after its final run in 1948 (Showa 23).

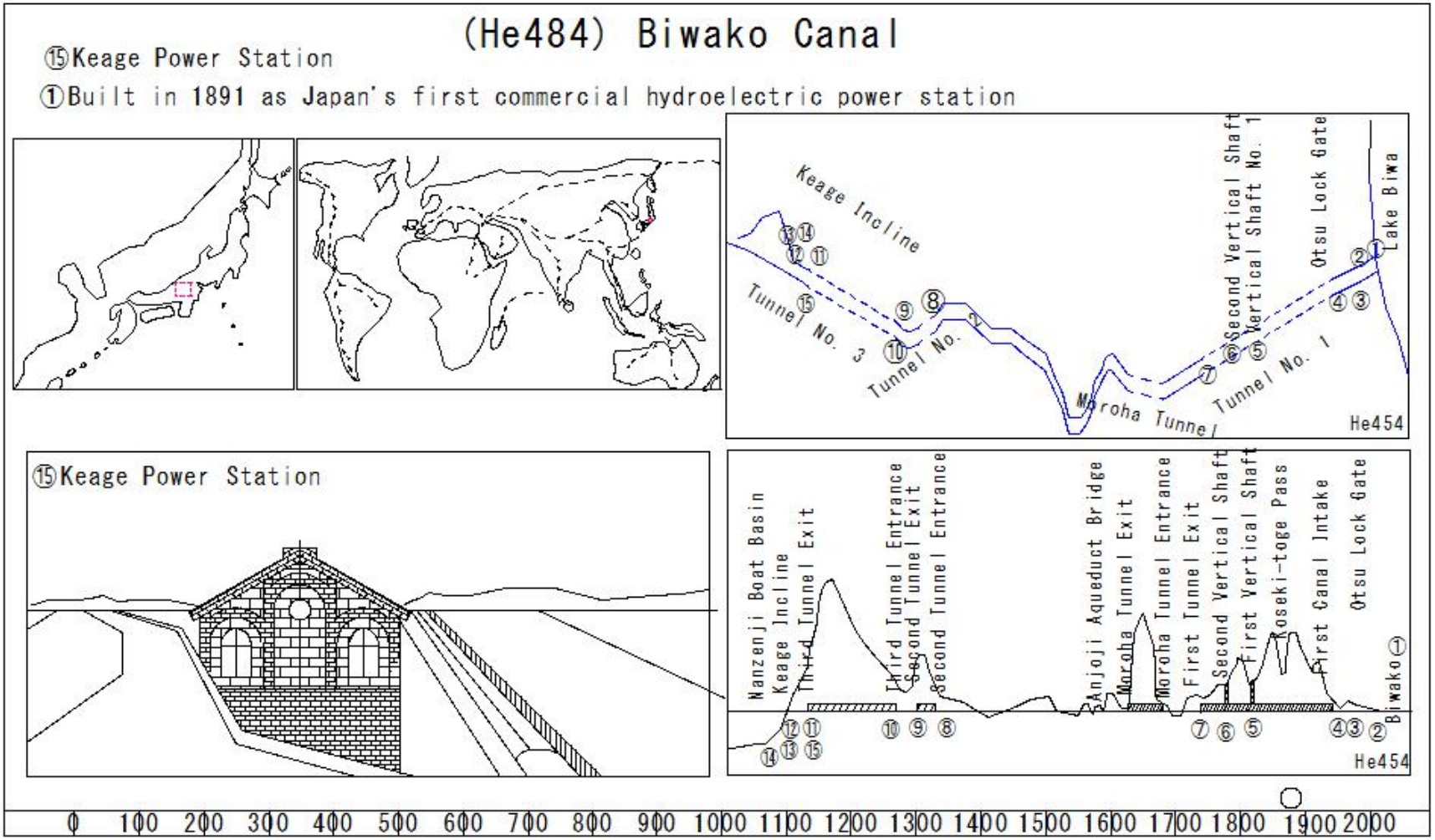




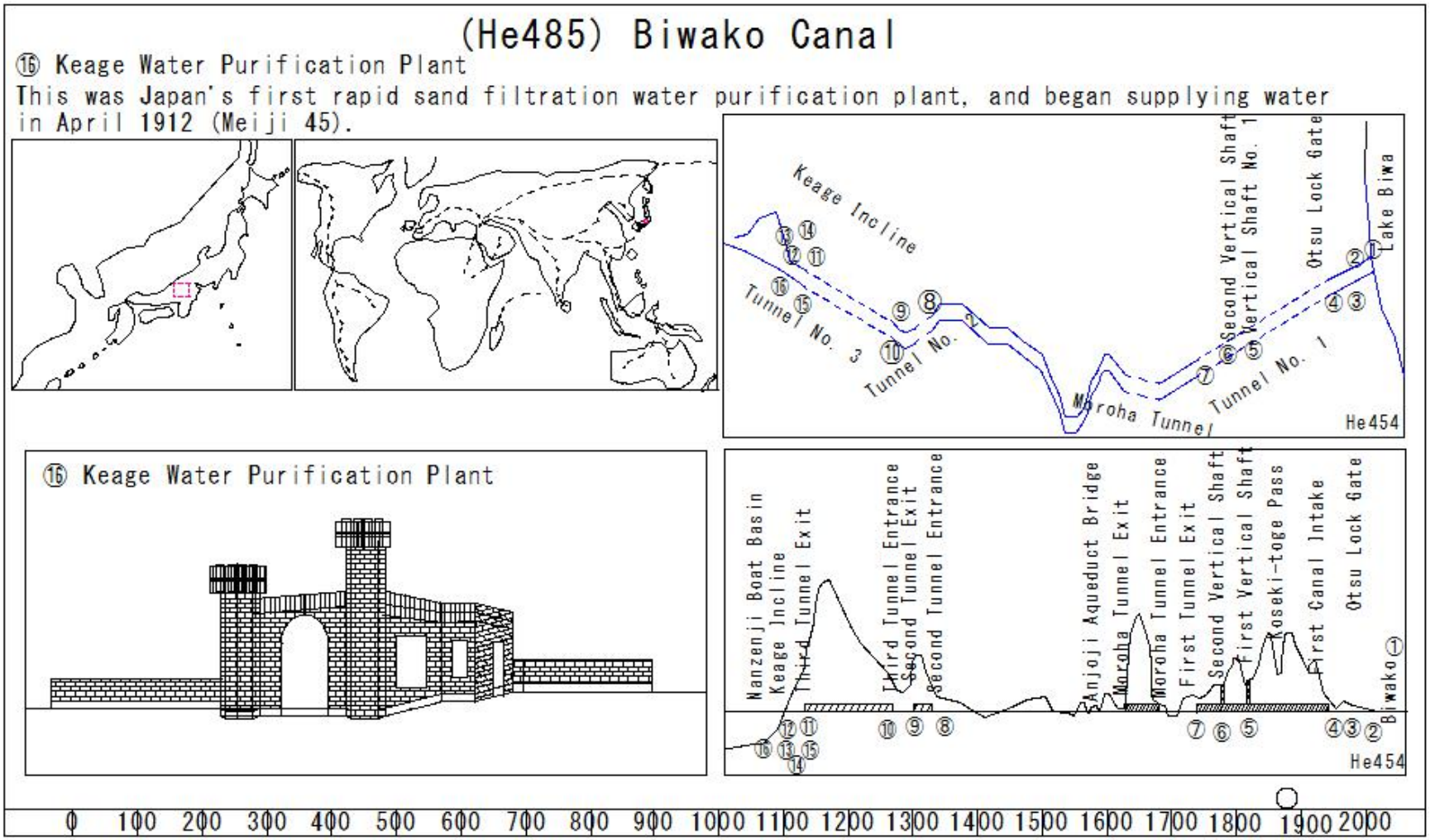




(He484) Biwako Canal



(He485) Biwako Canal



(He486) Biwako Canal

(He486) Biwako Canal

⑰ Nanzenji Boat Reservoir

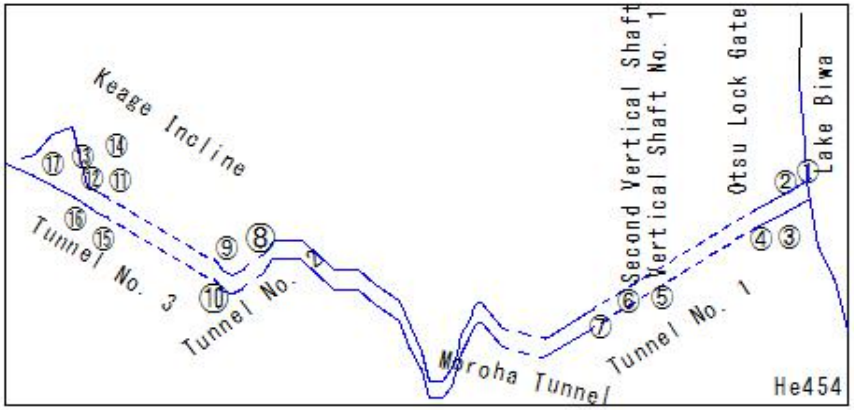
① A boat reservoir located near Nanzenji Temple.

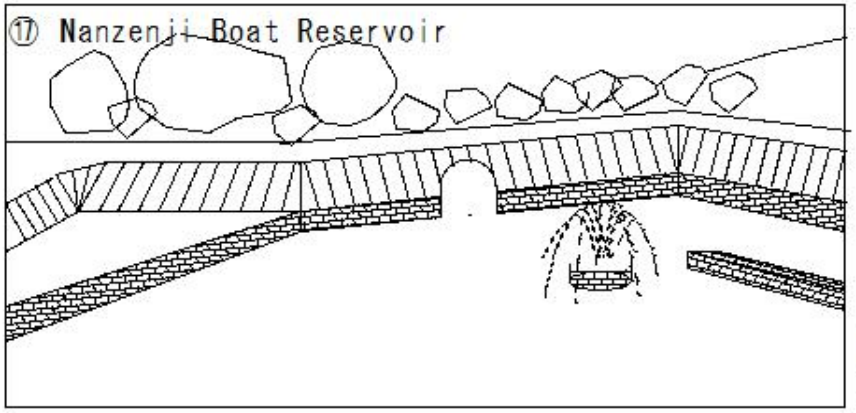
② A mooring point

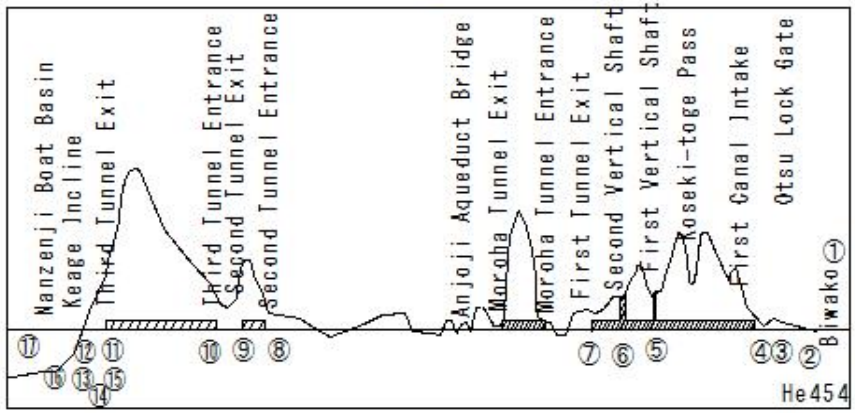
③ A place for loading and unloading luggage and for boatmen to rest

④ Located downstream of the Keage Incline

⑤ The starting point of the Oto Canal







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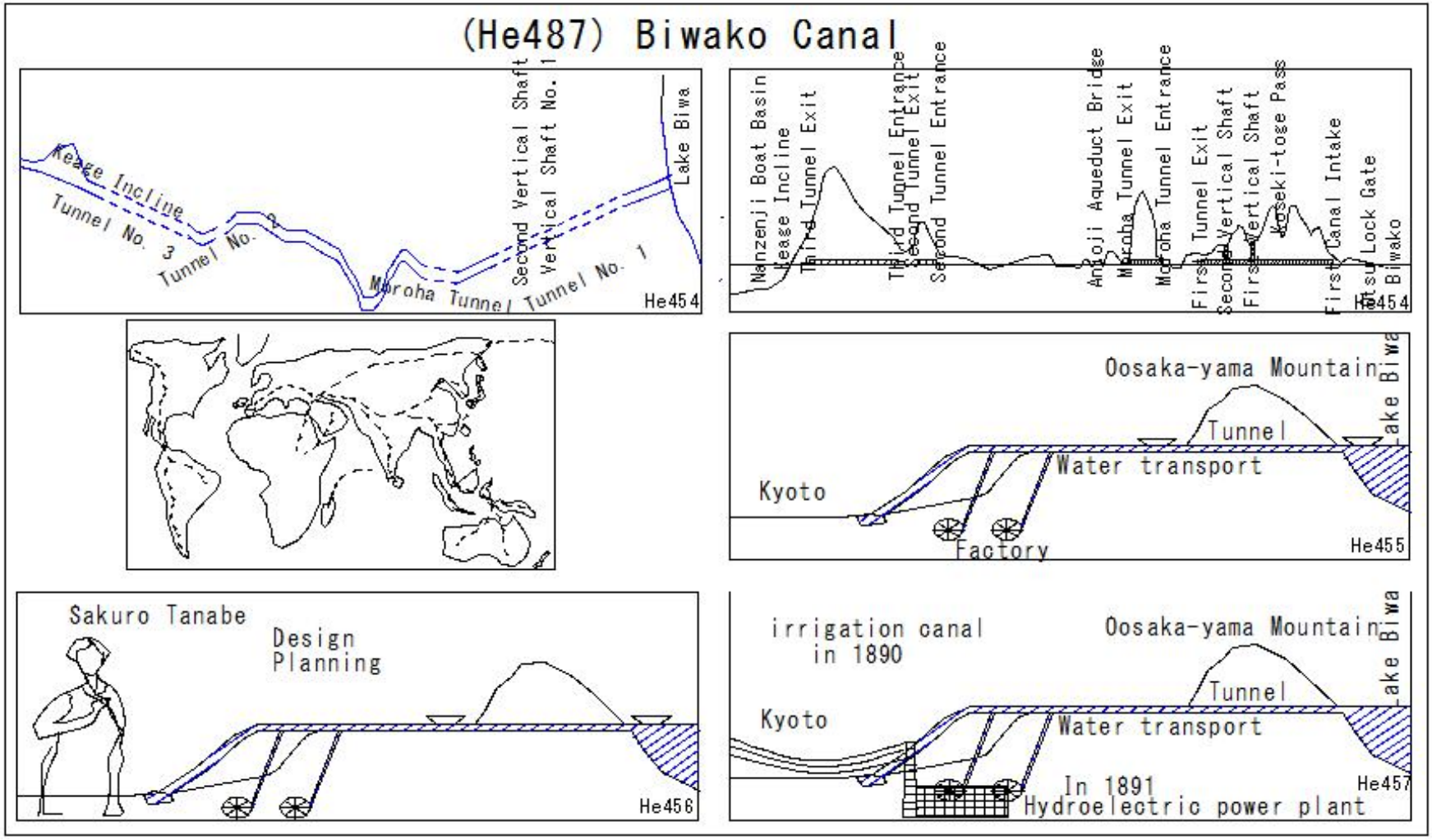
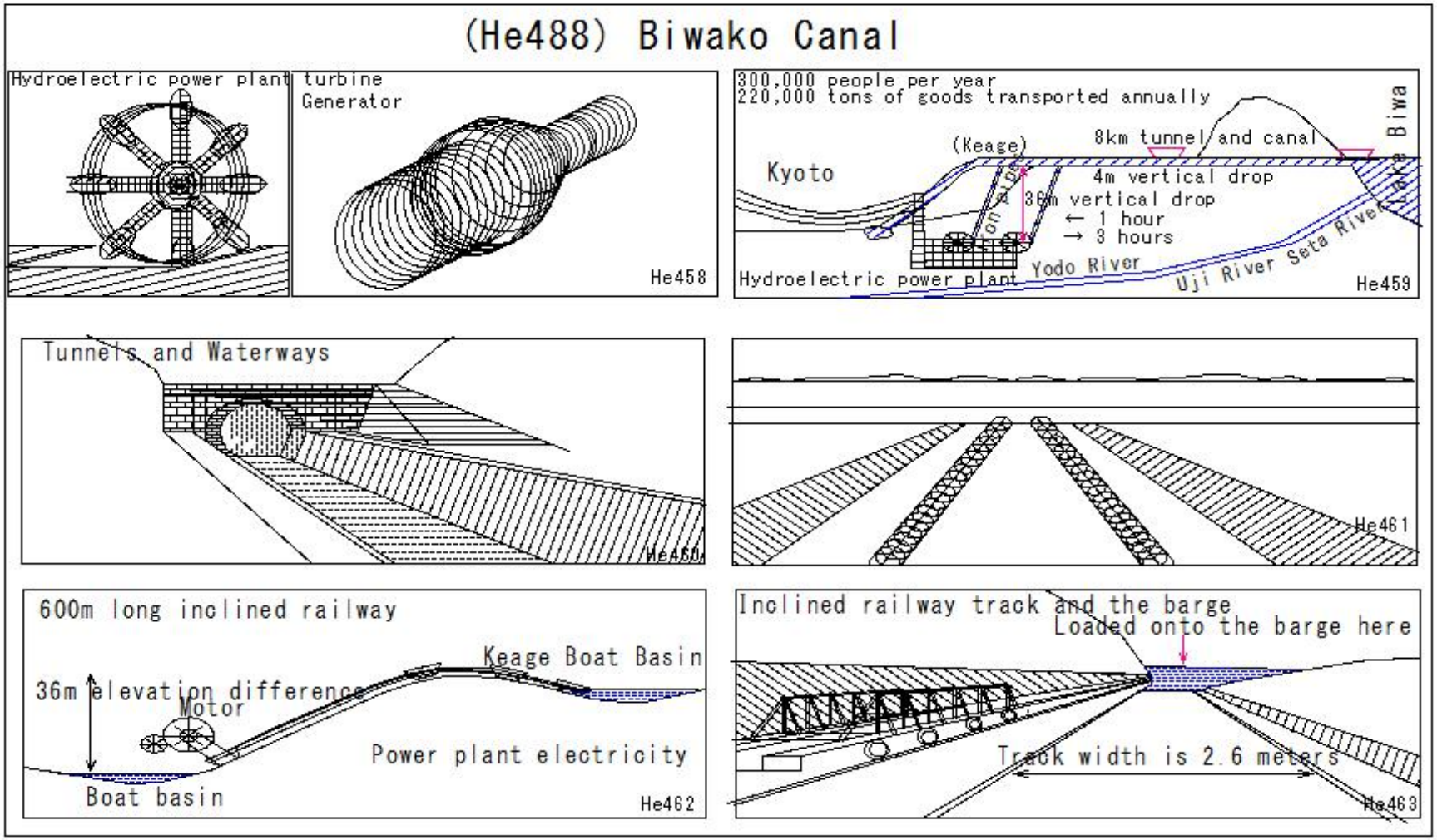
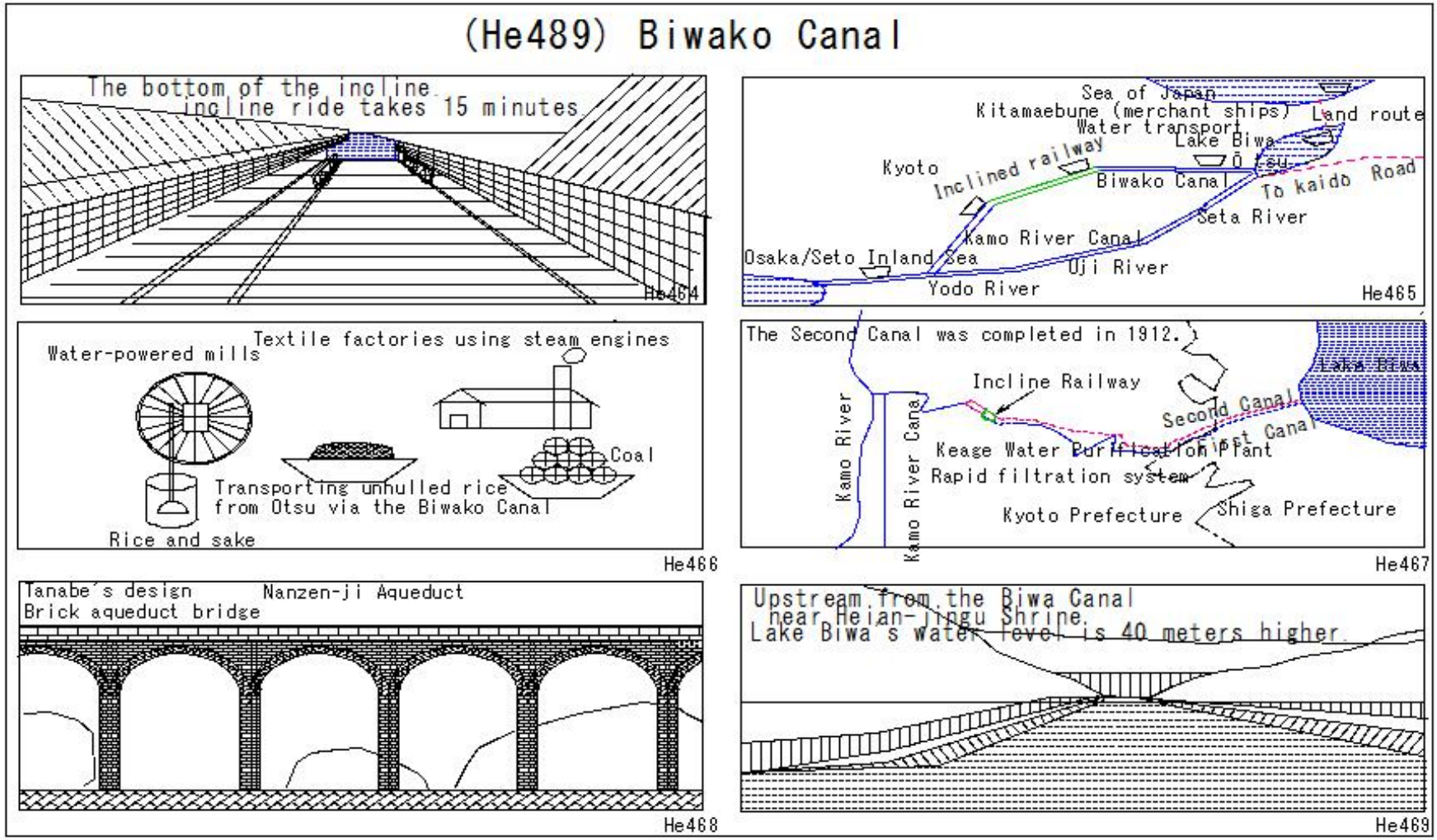
(He487) Biwako Canal



(He488) Biwako Canal



(He489) Biwako Canal



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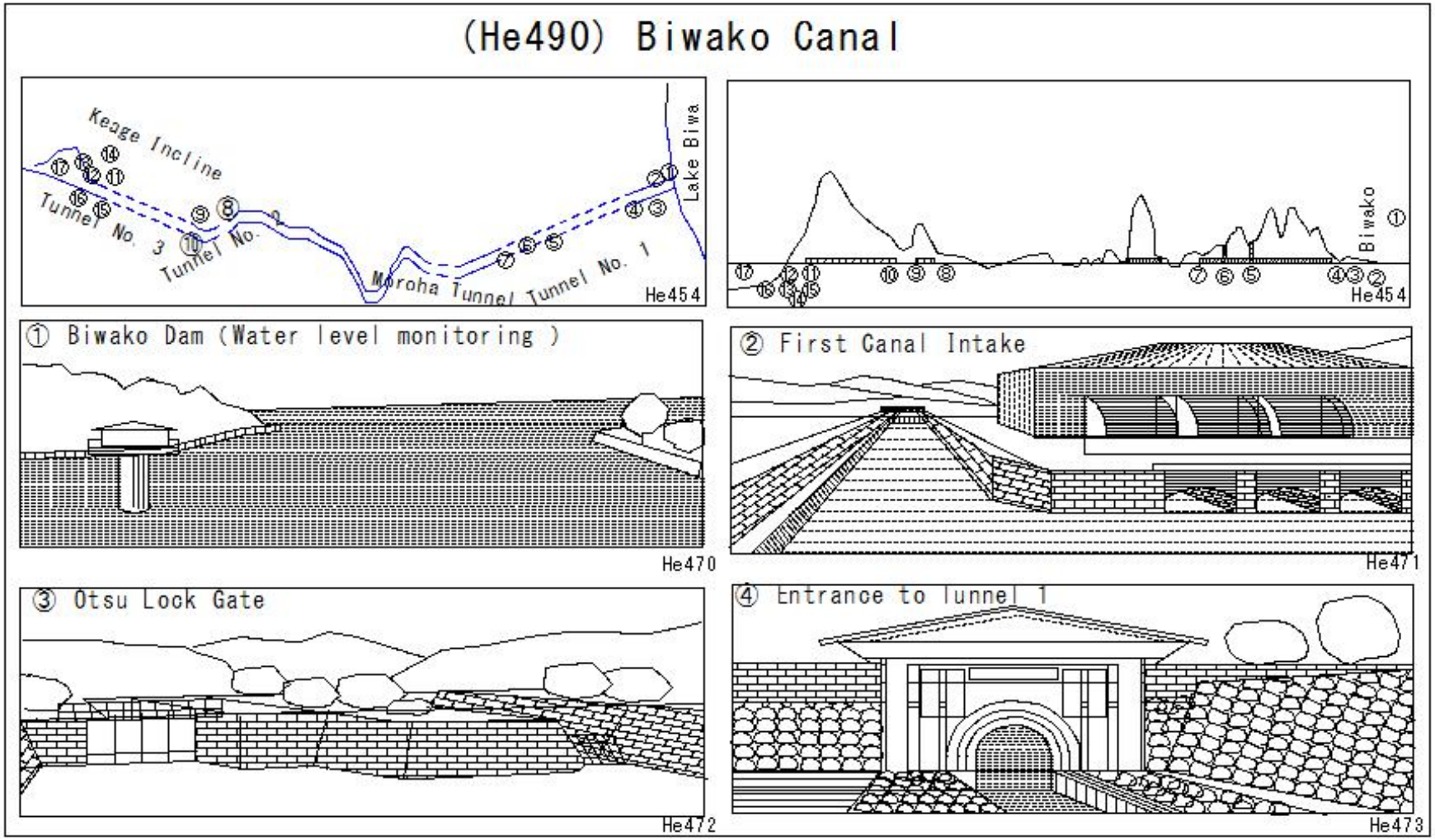

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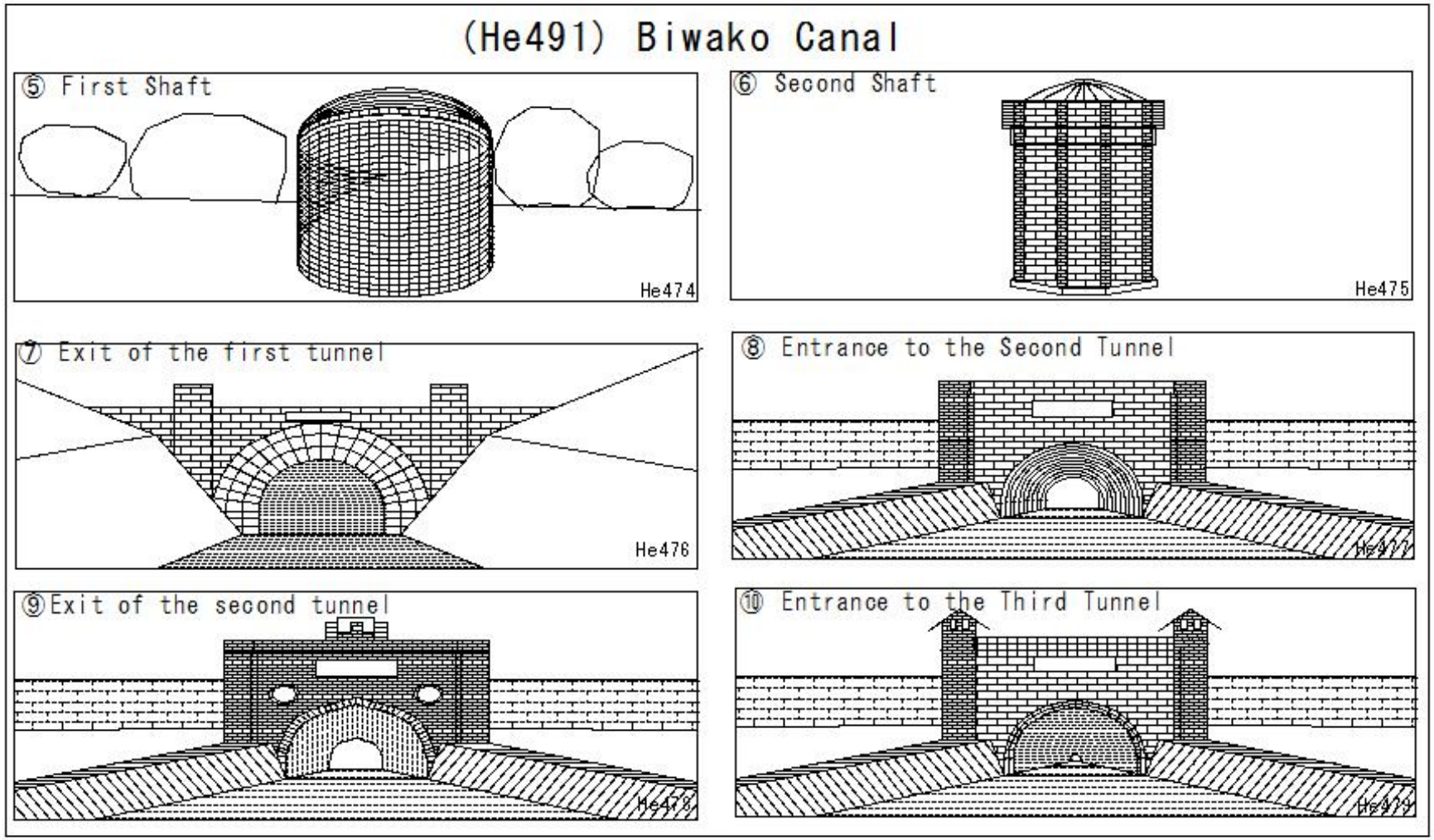

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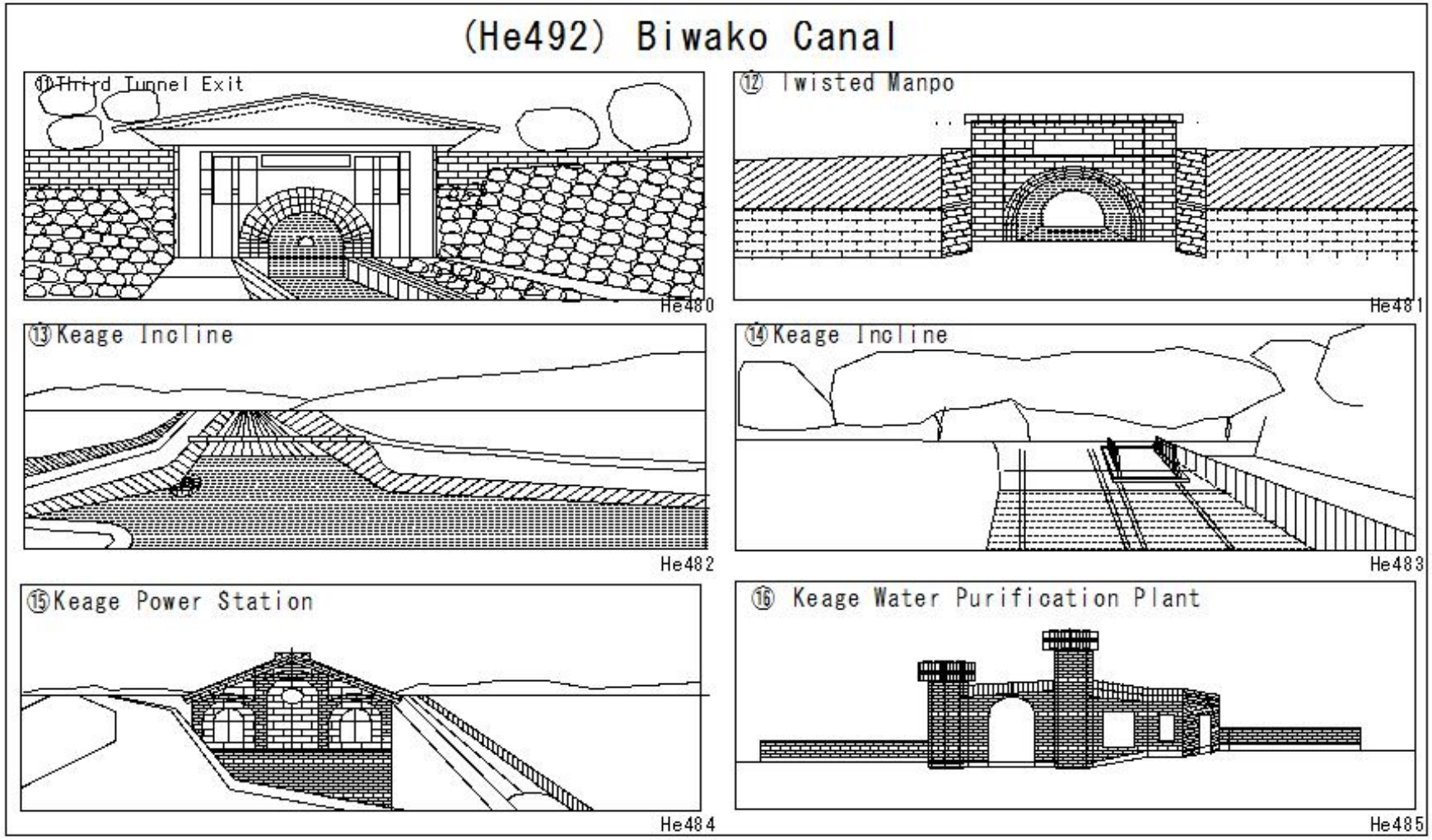

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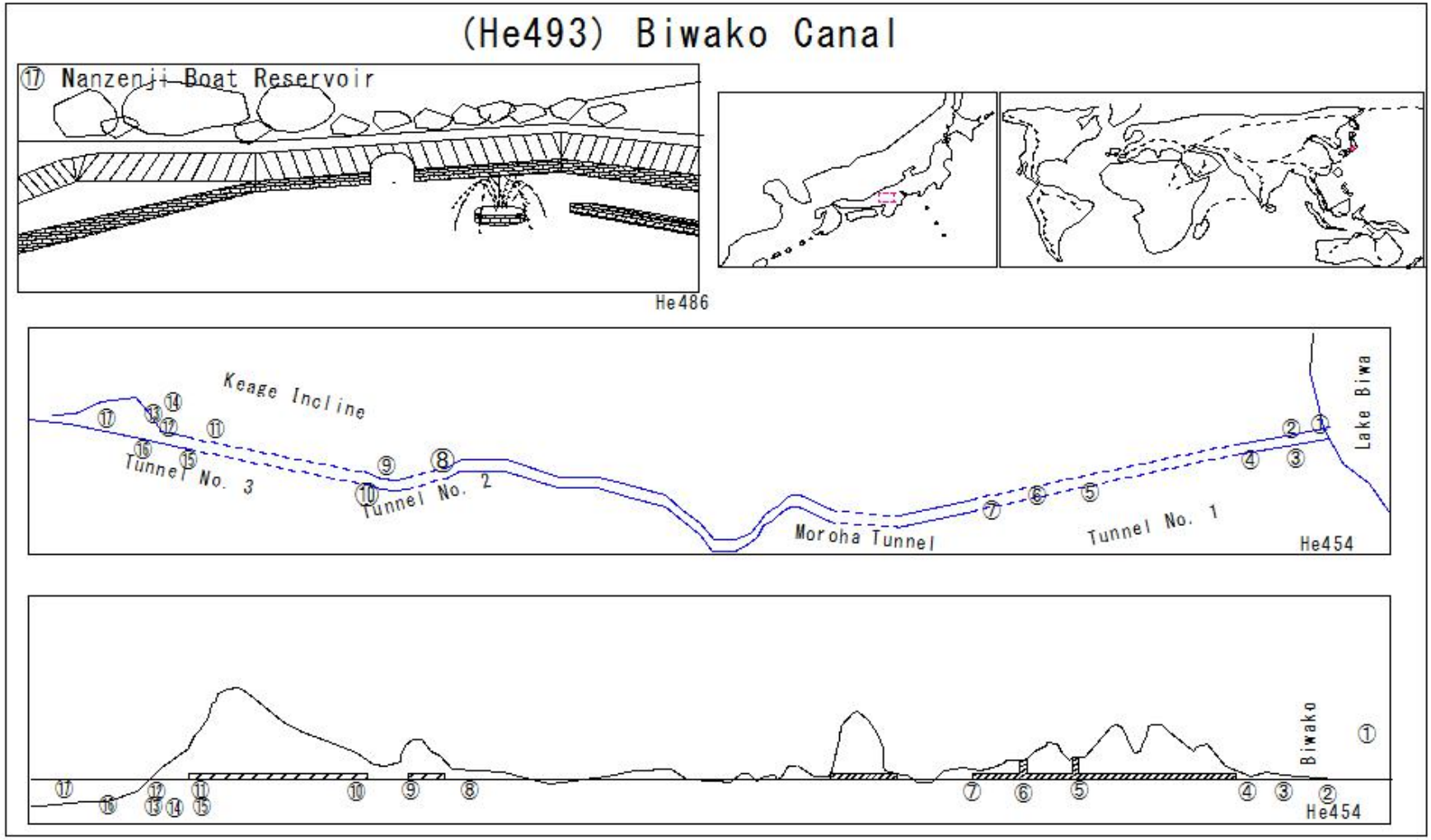
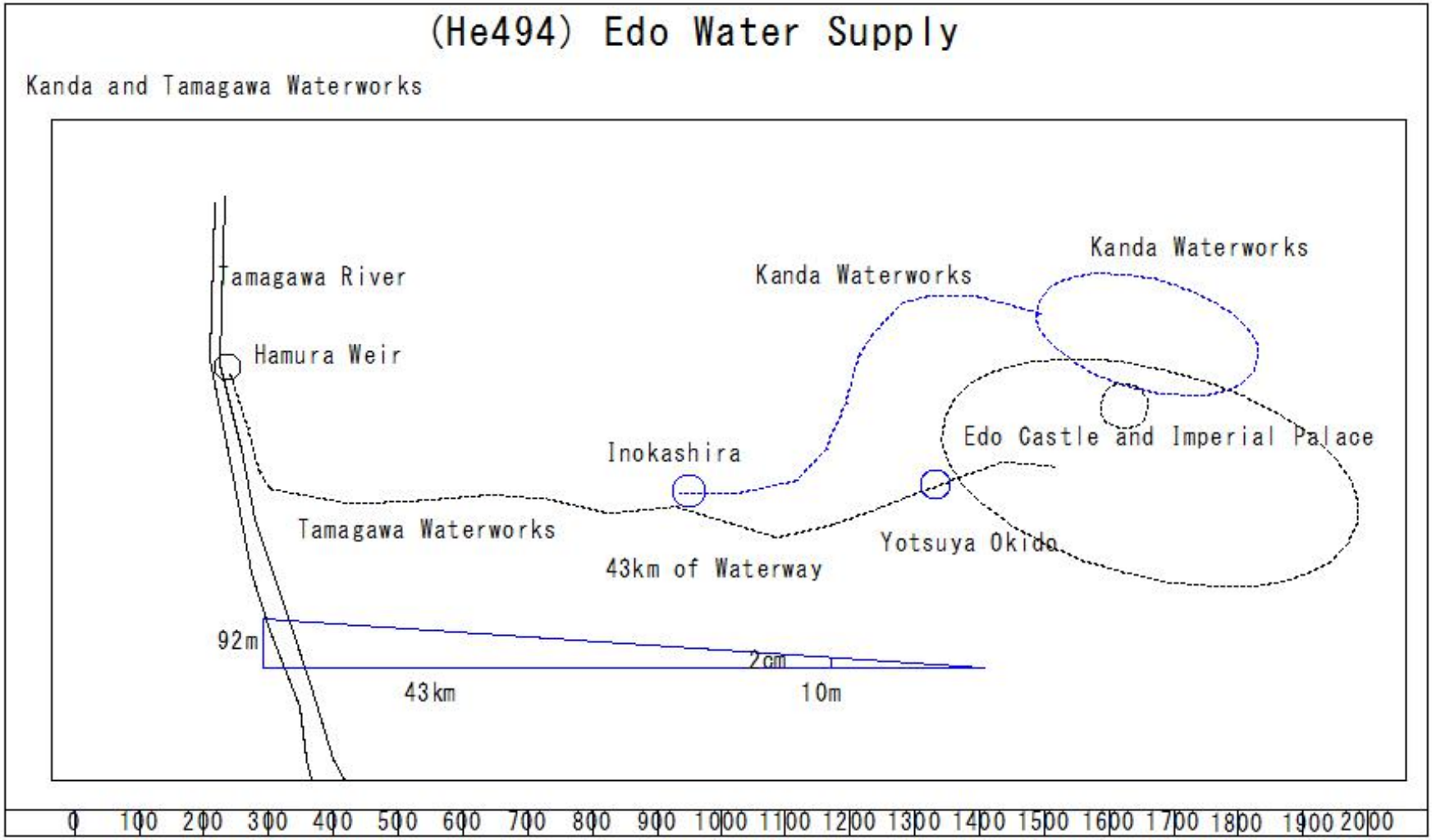


(He494) Edo Water Supply



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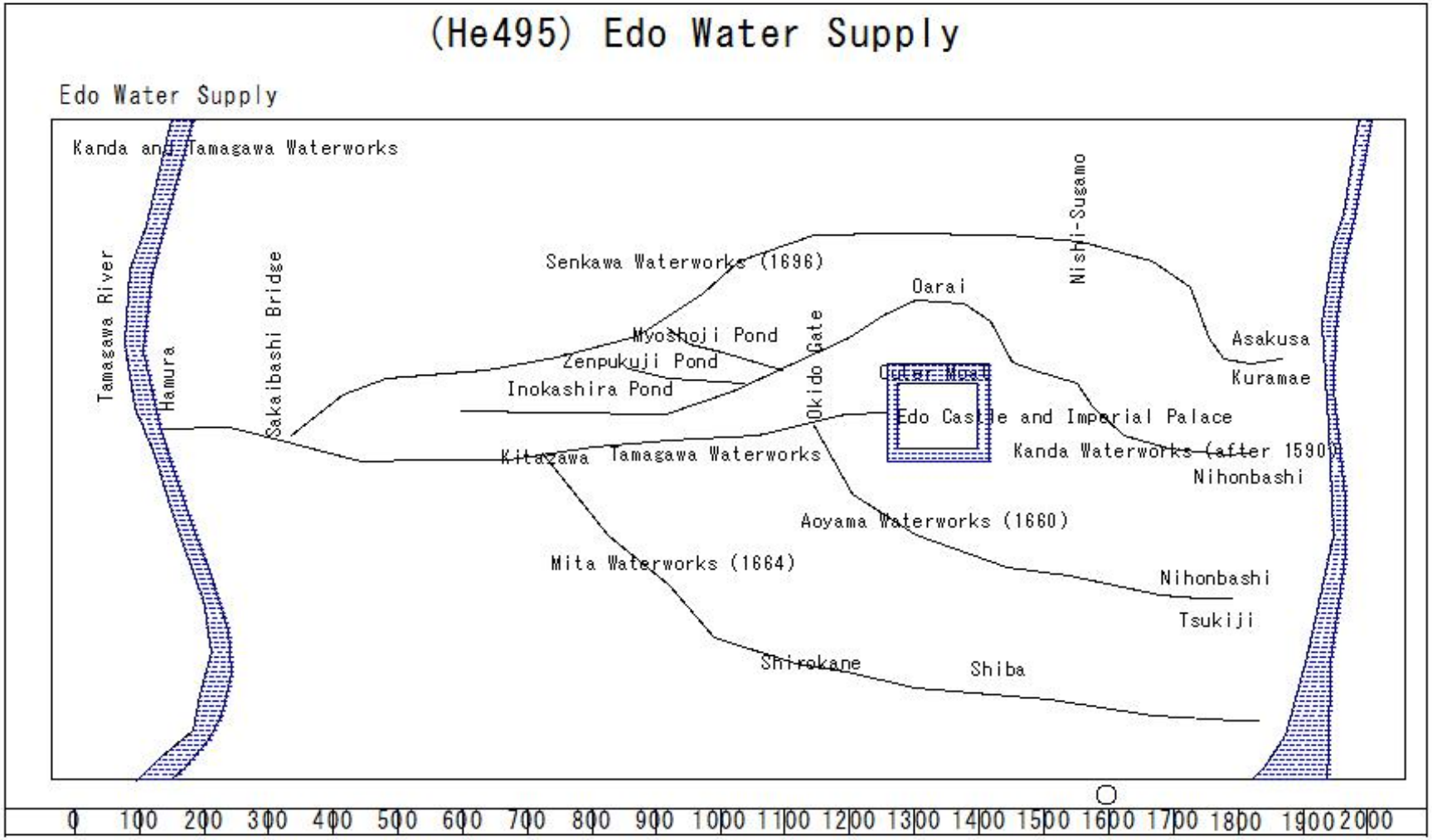

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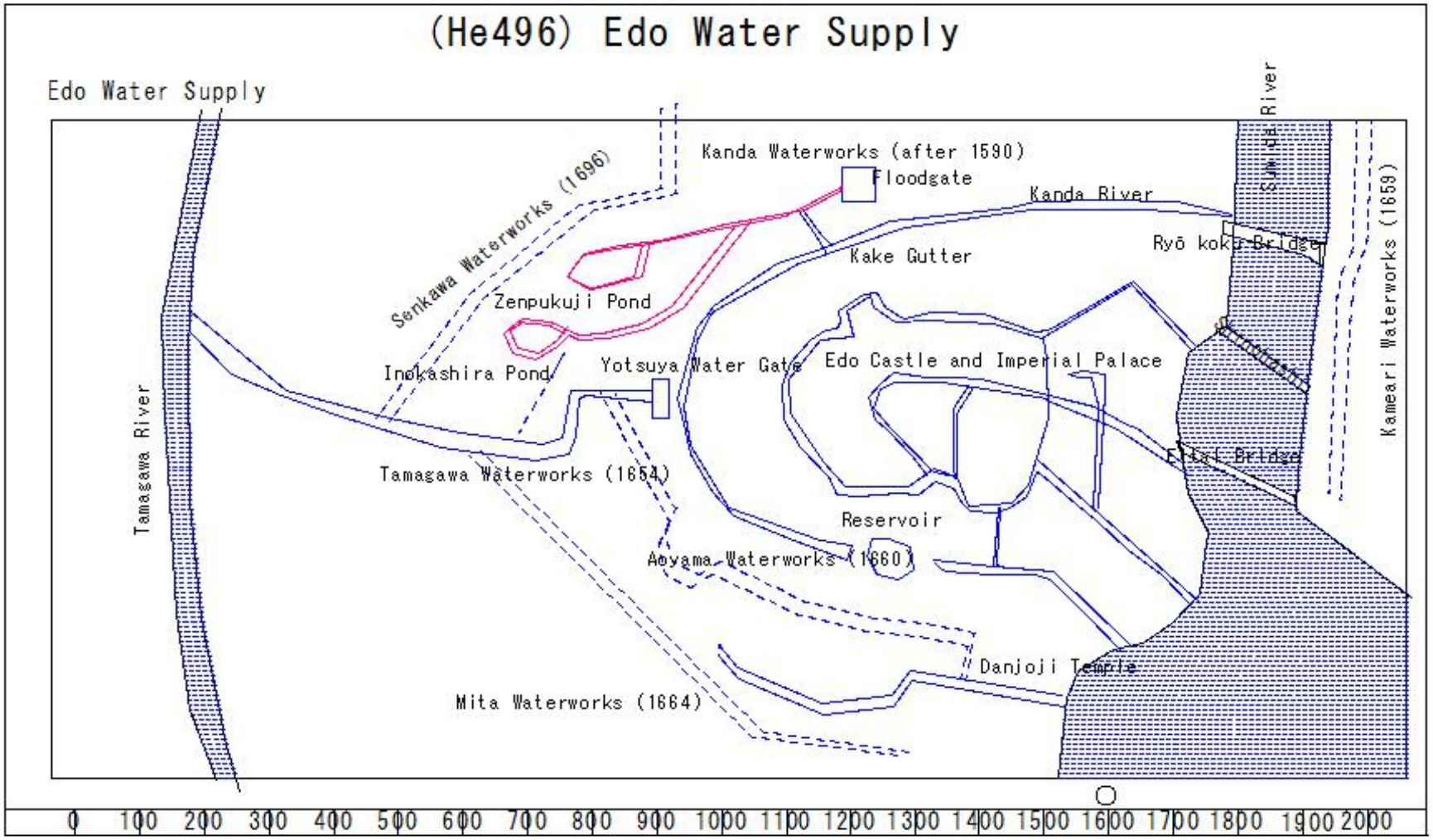

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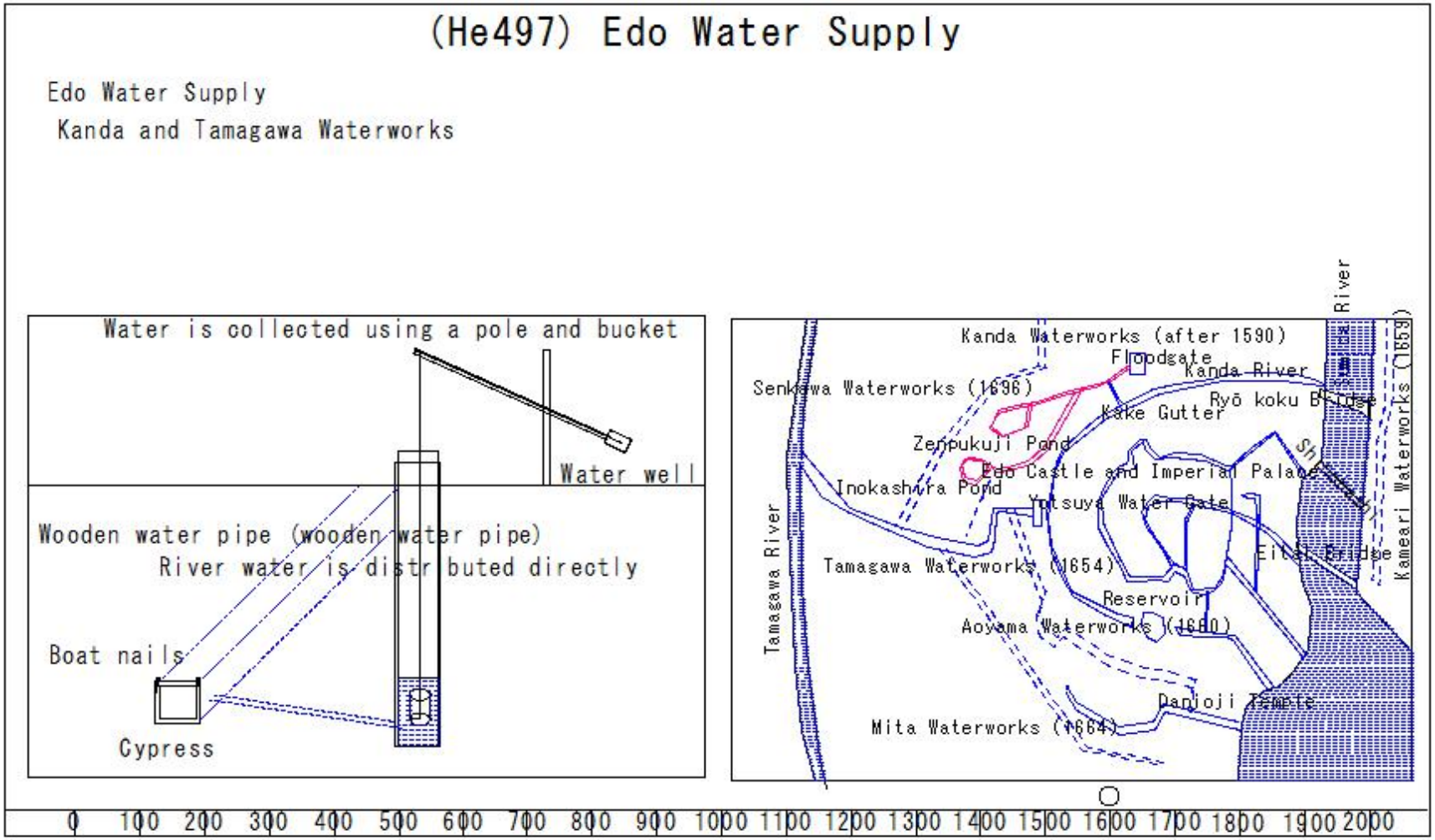

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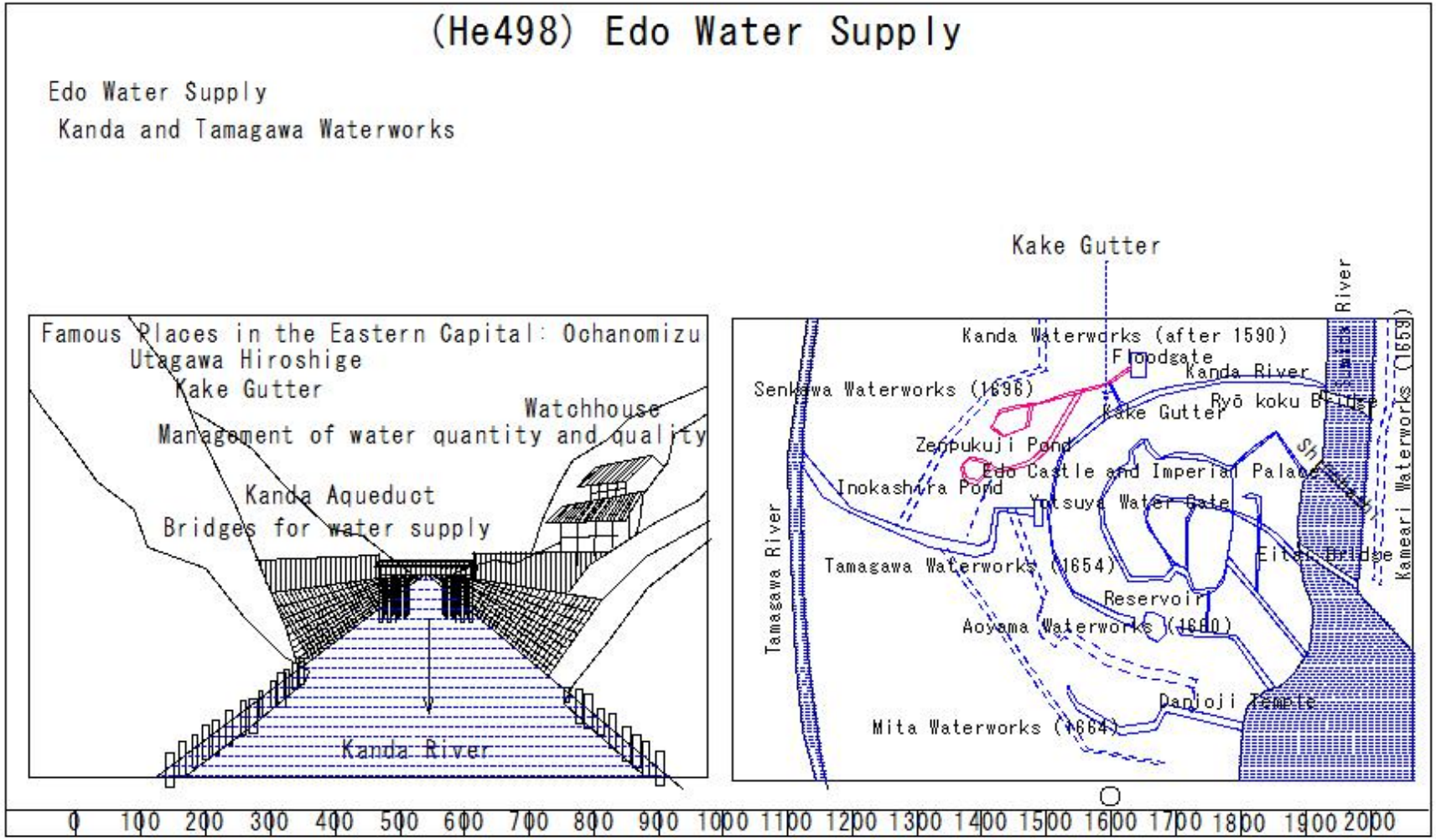


(He499) Edo Water Supply

(He499) Edo Water Supply

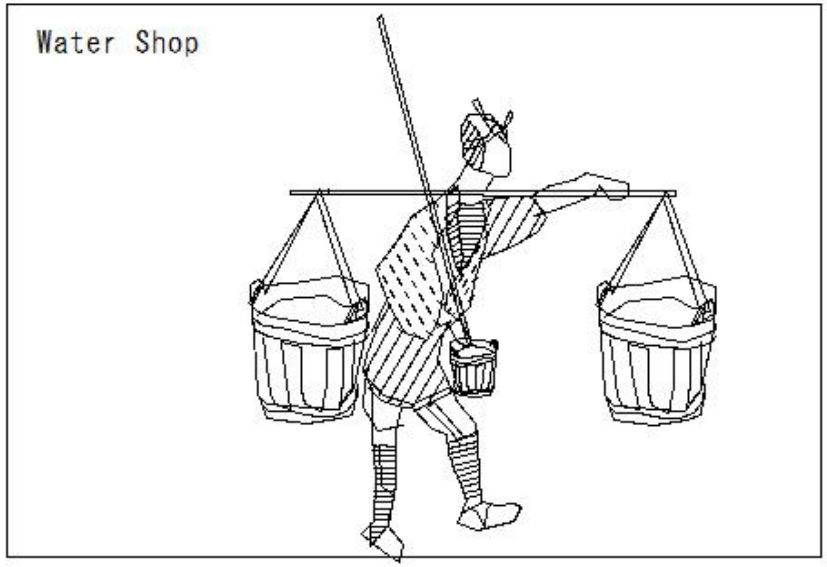
Edo Water Supply

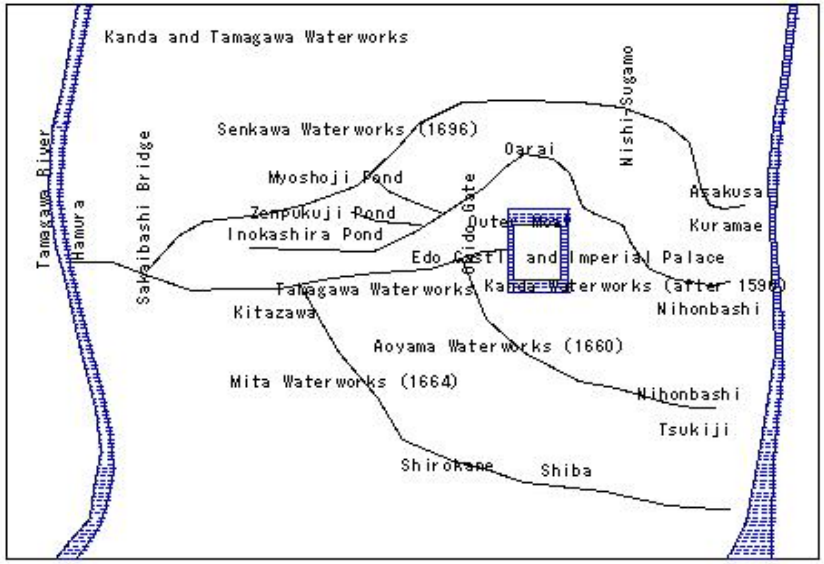
Water Shop

① They filled buckets with water from upstream and carried them on a pole.

② They delivered water to places without it.

③ They paid the same price as natto for a cup of water.





0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

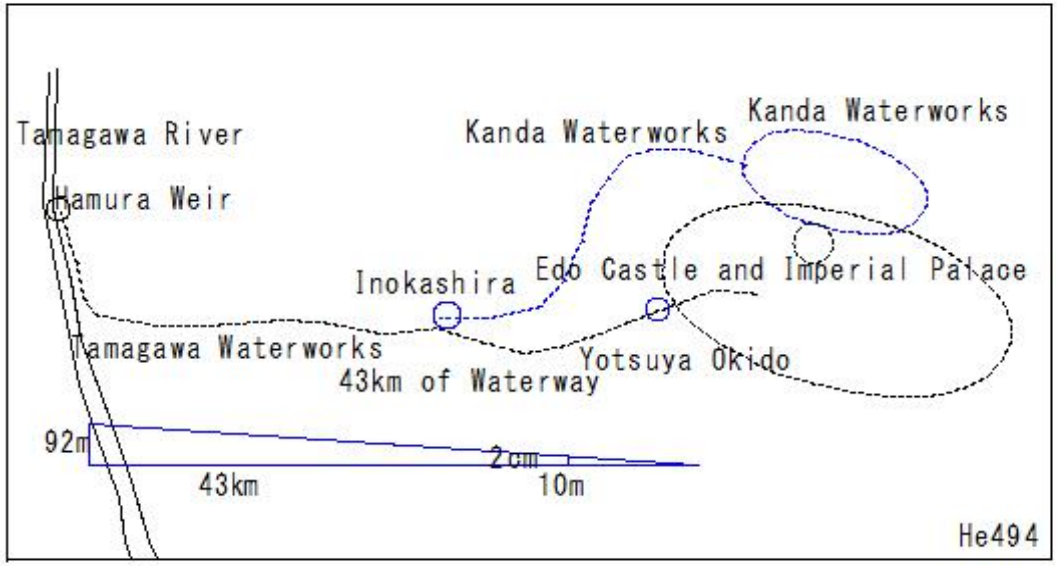
(He500) Edo Water Supply

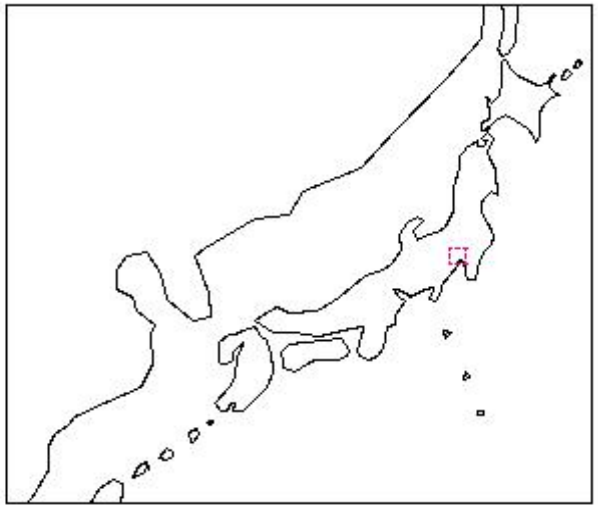
(He500) Edo Water Supply

1886

Drinking Water Test Results

Water Supply Wells	Not drinkable	Drinkable
3,416 tested out of approximately 8,000	43%	57%
Dug Wells (Groundwater)	Not drinkable	Drinkable
3,489 tested out of approximately 45,000	62%	38%





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(He501) Edo Water Supply

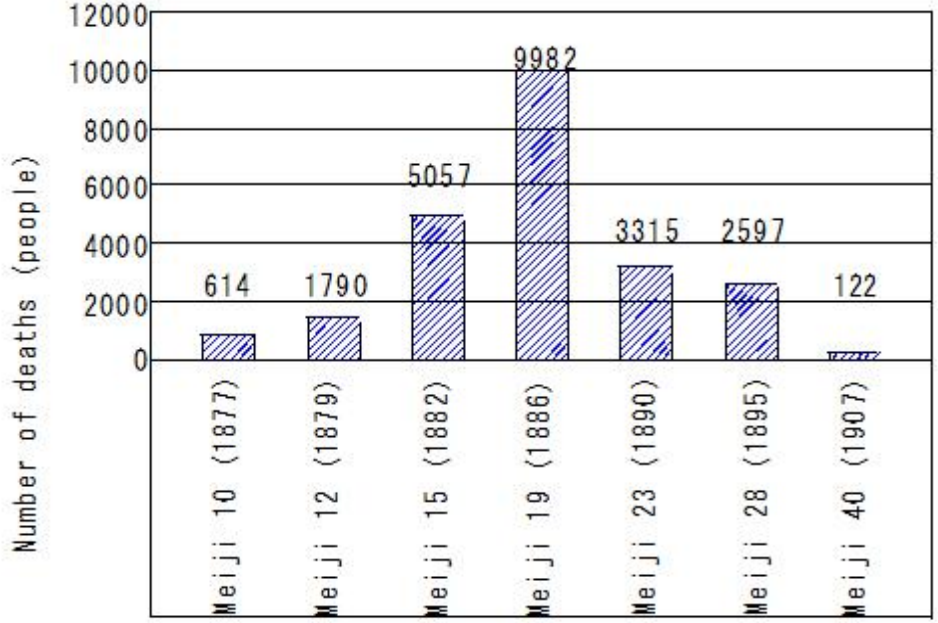
(He501) Edo Water Supply

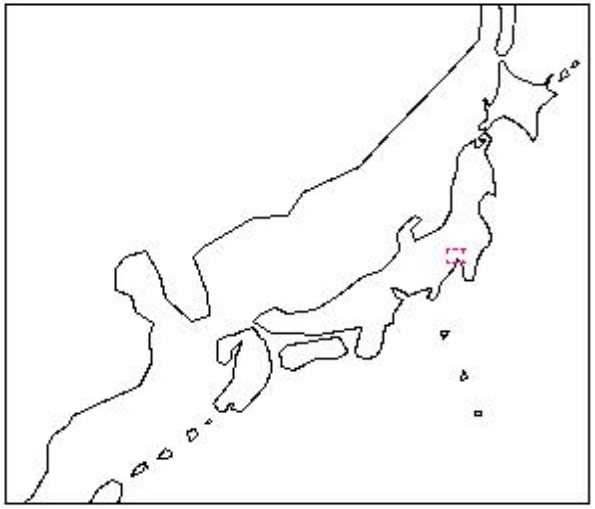
1886

Drinking Water Test Results

Water Supply Wells	Not drinkable	Drinkable
3,416 tested out of approximately 8,000	43%	57%
Dug Wells (Groundwater)	Not drinkable	Drinkable
3,489 tested out of approximately 45,000	62%	38%

He500





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(He502) Edo Water Supply

(He502) Edo Water Supply

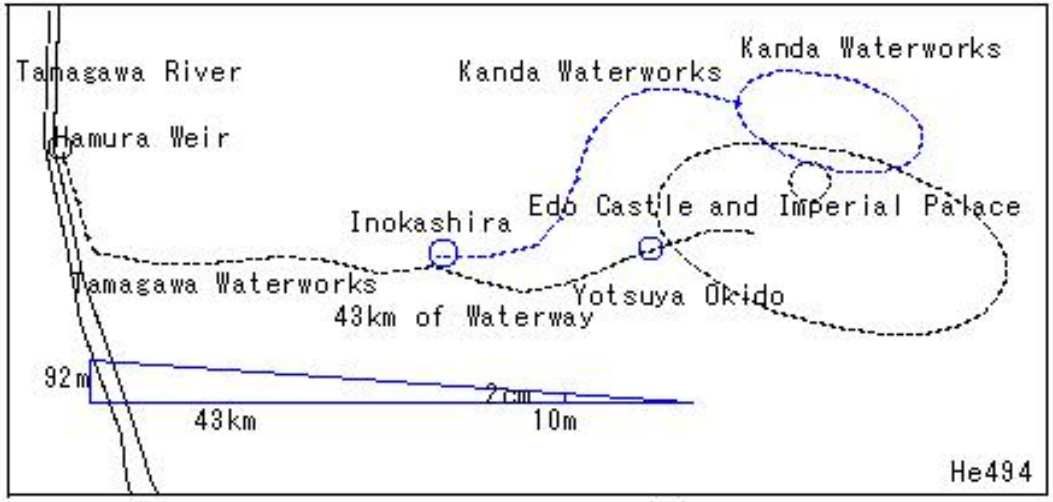
① The area was reclaimed land from reclaimed coastal marshes.

② In case of wells were dug, saline water was often found, making securing drinking water a problem from the start.

③ In 1590, the Kanda Waterworks (which evolved from the original Koishikawa Waterworks) was established, Japan's first water supply system, with its source at Inokashira Pond.

④ In 1654, the Tama River Waterworks was opened, stretching 43 kilometers from Tama River to its floodgates in Yotsuya.

⑤ It created what was arguably the world's best water supply system, surpassing that of London at the time.



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(He503) Edo Water Supply

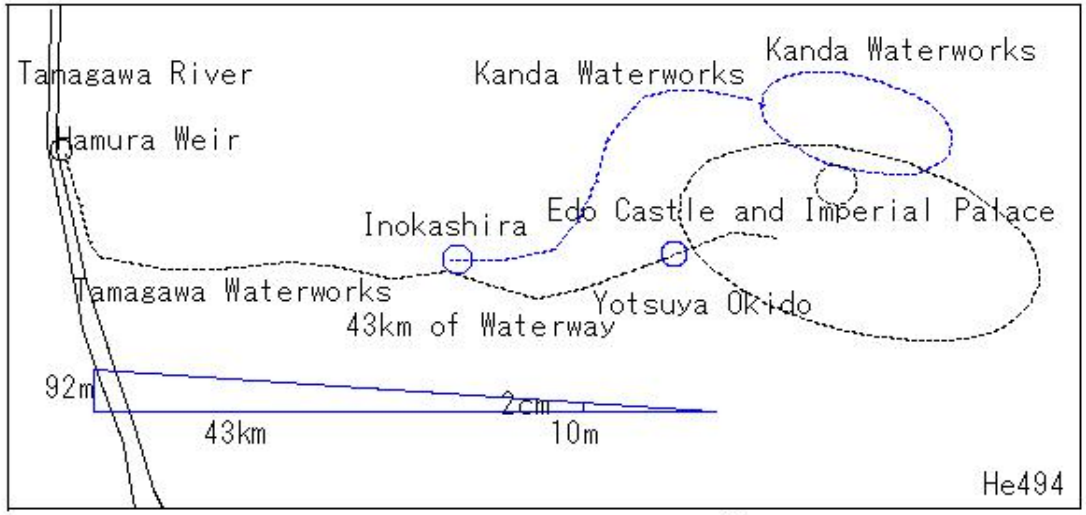
(He503) Edo Water Supply

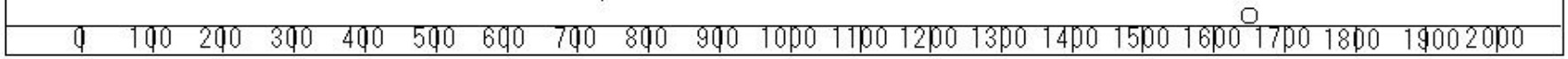
⑥ It used a "gravity flow" system, transporting water solely by elevation change, without the use of pumps.

⑦ The Tama River Waterworks stretched 43 kilometers from its source to its floodgates.

⑧ The elevation difference of only 92 meters demonstrates the advanced technology behind the system.

⑨ Four other waterworks were subsequently opened: Kameari, Aoyama, Mita, and Senkawa. However, these four were abolished in 1722.





(He504) Edo Water Supply

(He504) Edo Water Supply

① The waterworks did not reach directly the following areas:

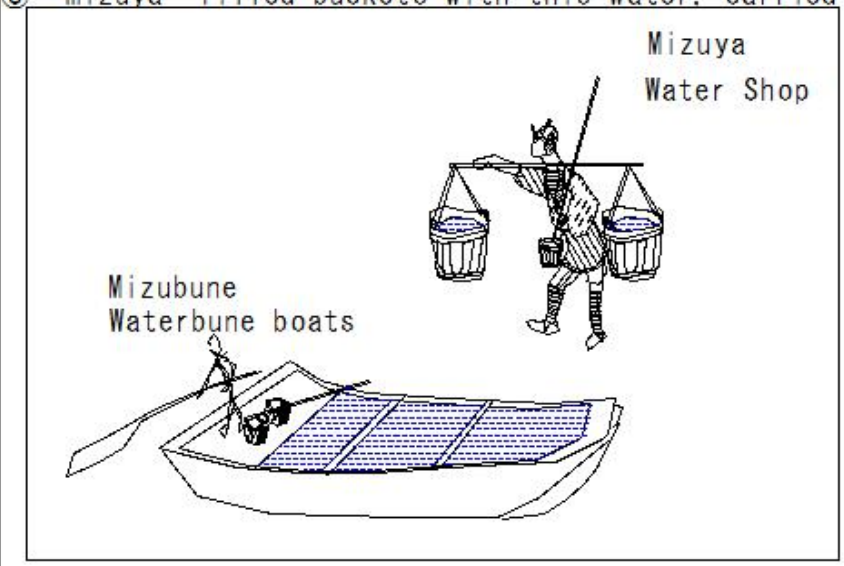
② Areas on the opposite bank of the Sumida River, such as Honjo and Fukagawa.

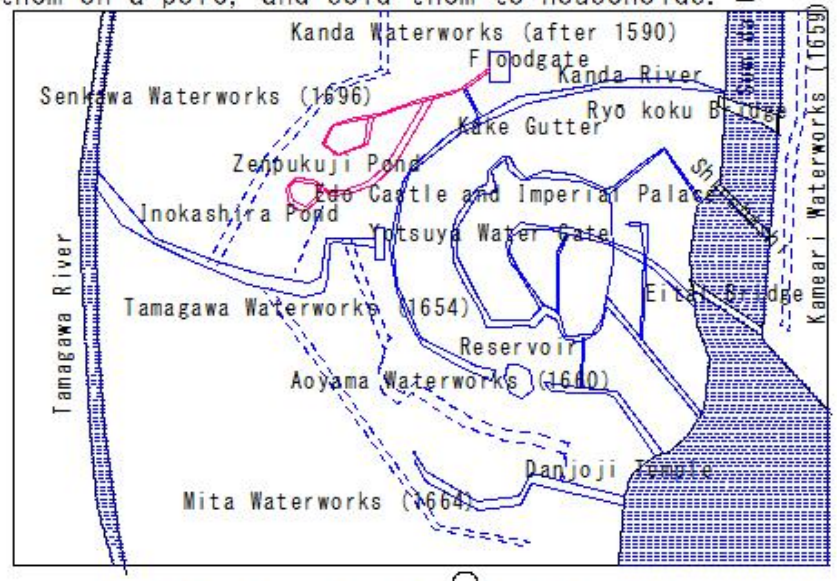
③ Water was transported here by "mizuya" and "mizubune."

④ Surplus water from the waterworks was released near Zenikamebashi Bridge, near the moat of Edo Castle.

⑤ With permission from the shogunate, this water was collected in waterbune boats and transported across the Nihonbashi River to the opposite bank of the Sumida River.

⑥ "mizuya" filled buckets with this water, carried them on a pole, and sold them to households.





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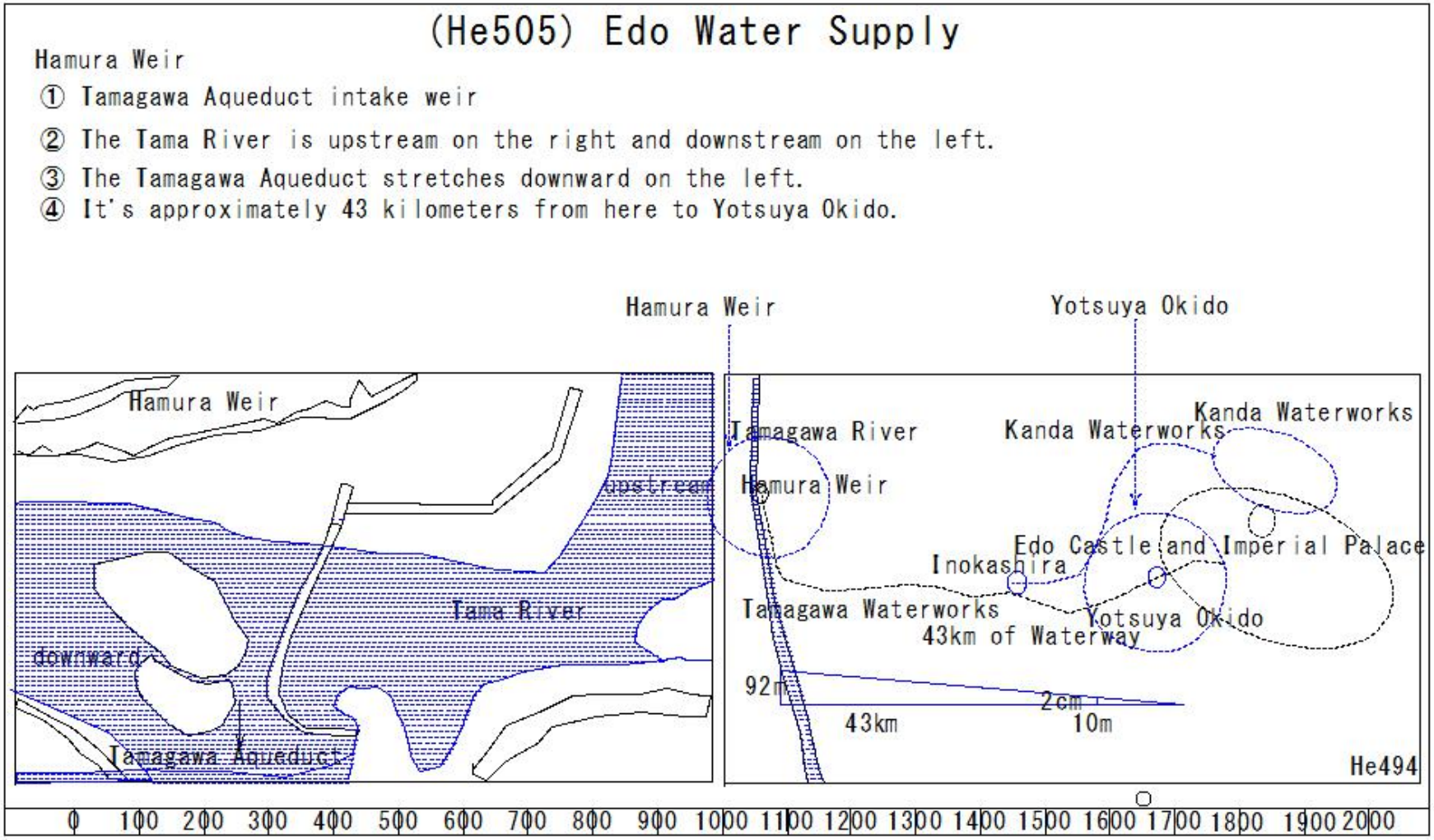
(He505) Edo Water Supply



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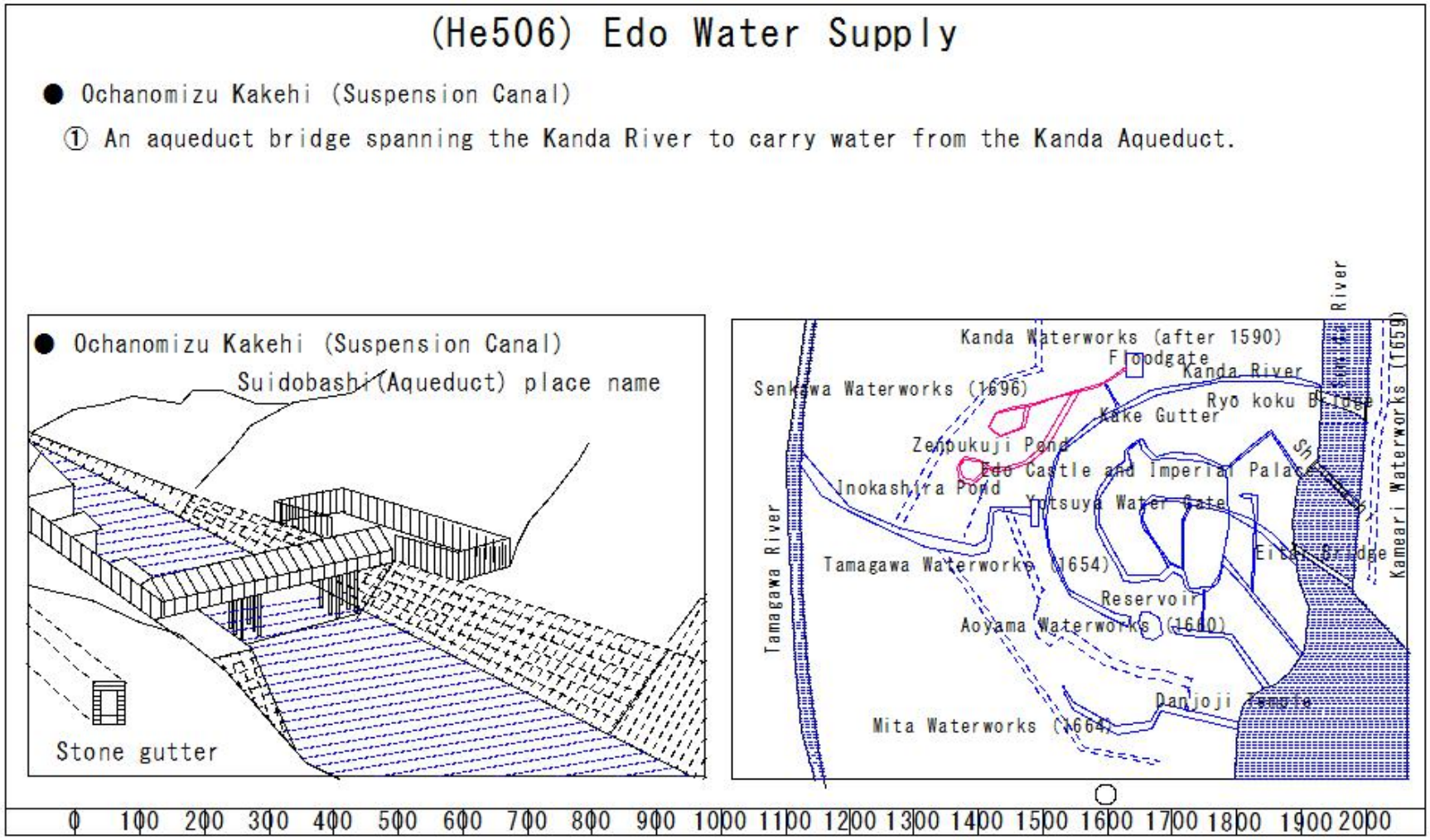

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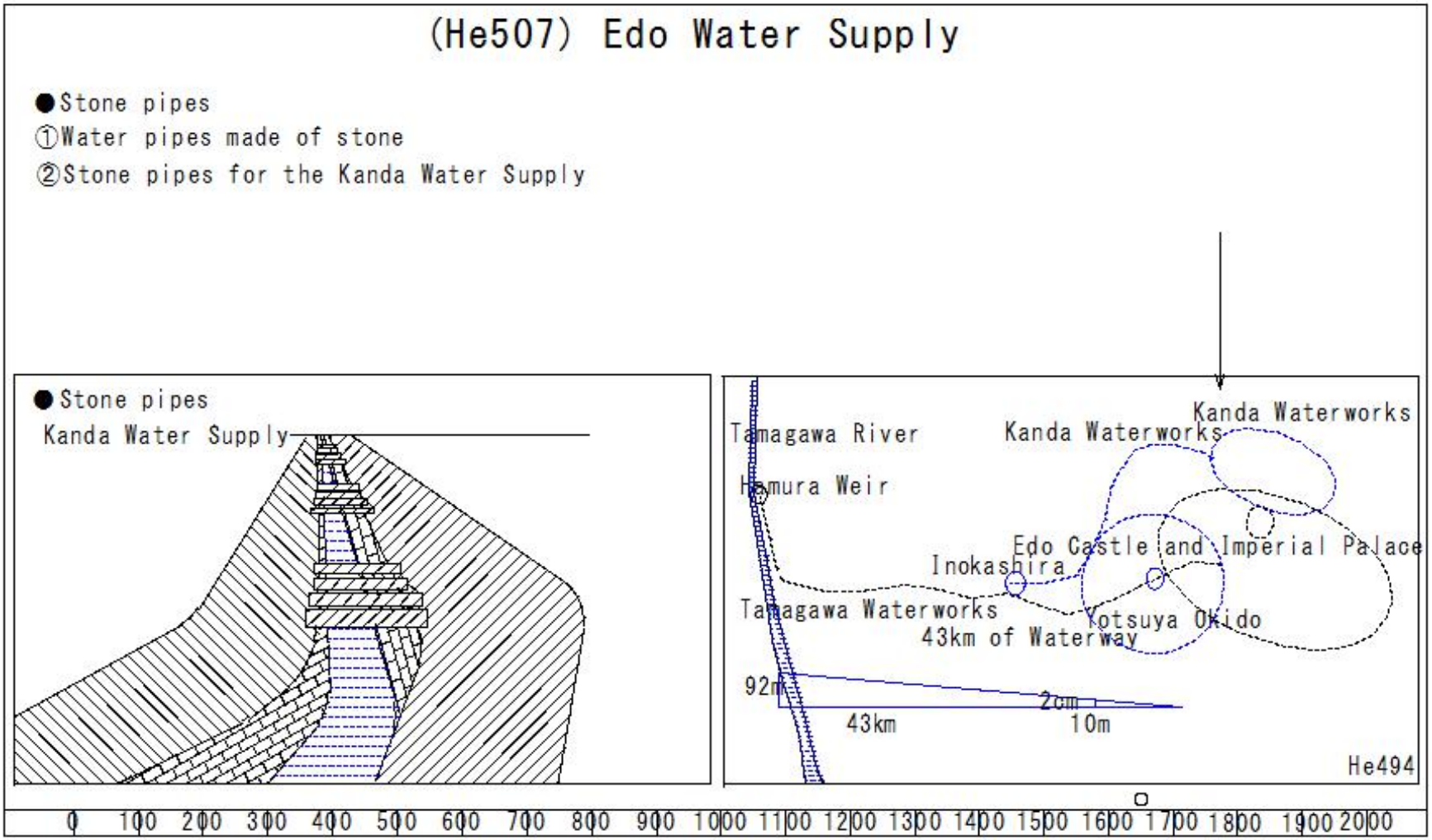
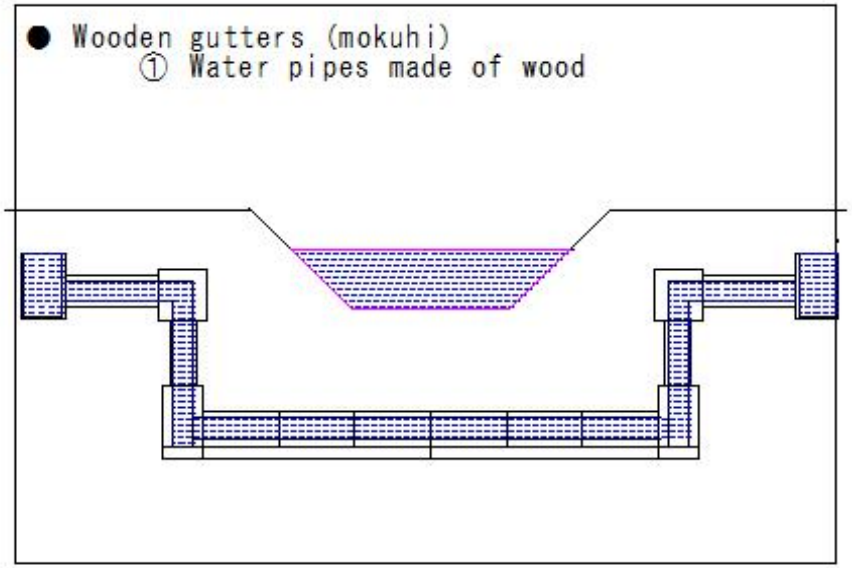


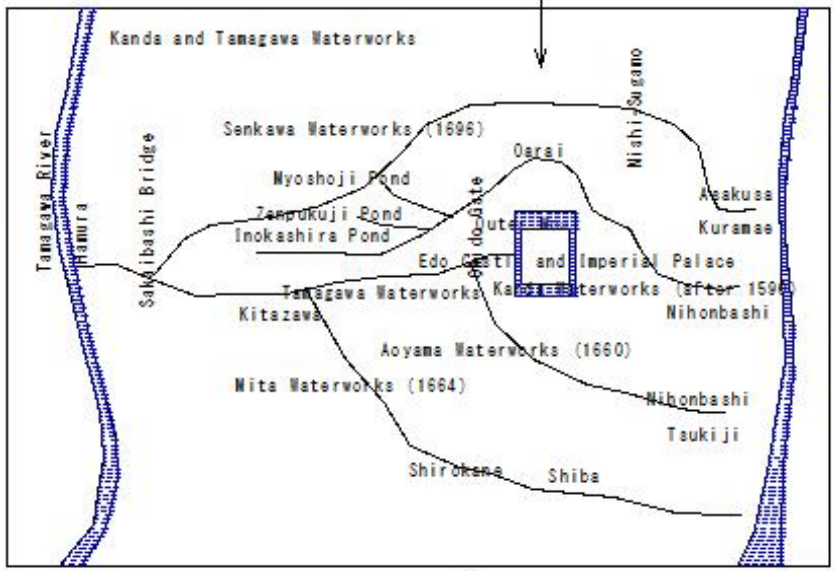
(He508) Edo Water Supply

(He508) Edo Water Supply

- Wooden gutters (mokuhi)

① Water pipes made of wood
② Works like the reverse of a siphon
③ Uses atmospheric pressure to flush water from high elevations down to lower elevations
④ Then raises it back up to higher elevations
⑤ Wooden gutters are very airtight
⑥ Located on the site of the former Tokyo Metropolitan Government Building in Marunouchi





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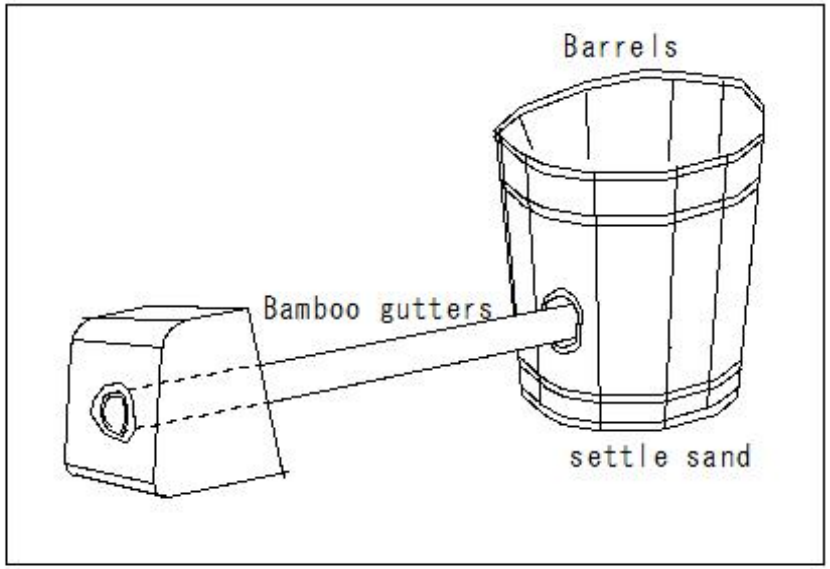
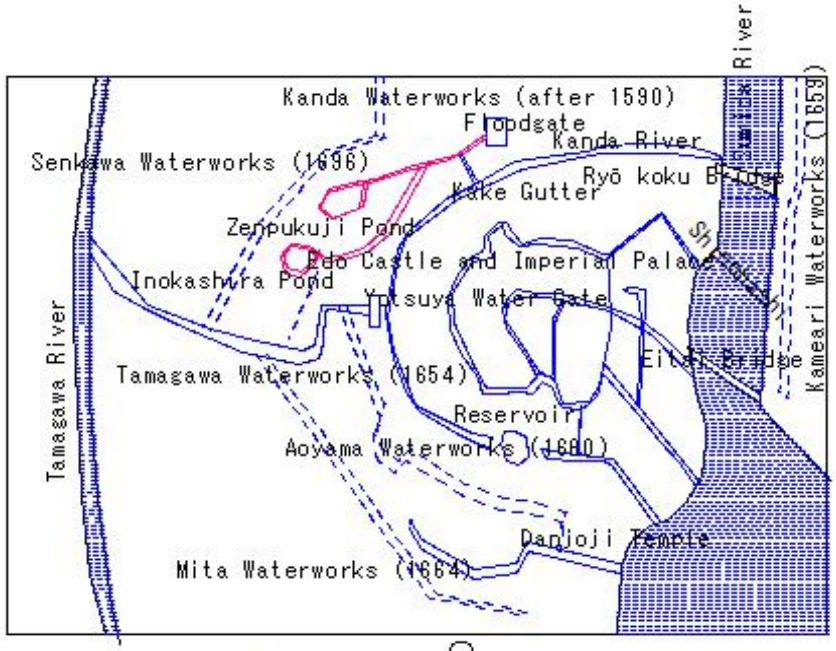
(He509) Edo Water Supply

(He509) Edo Water Supply

① Bamboo gutters are water pipes made by hollowing out bamboo nodes.

② Barrels were used to settle sand and other contaminants mixed in with the water.





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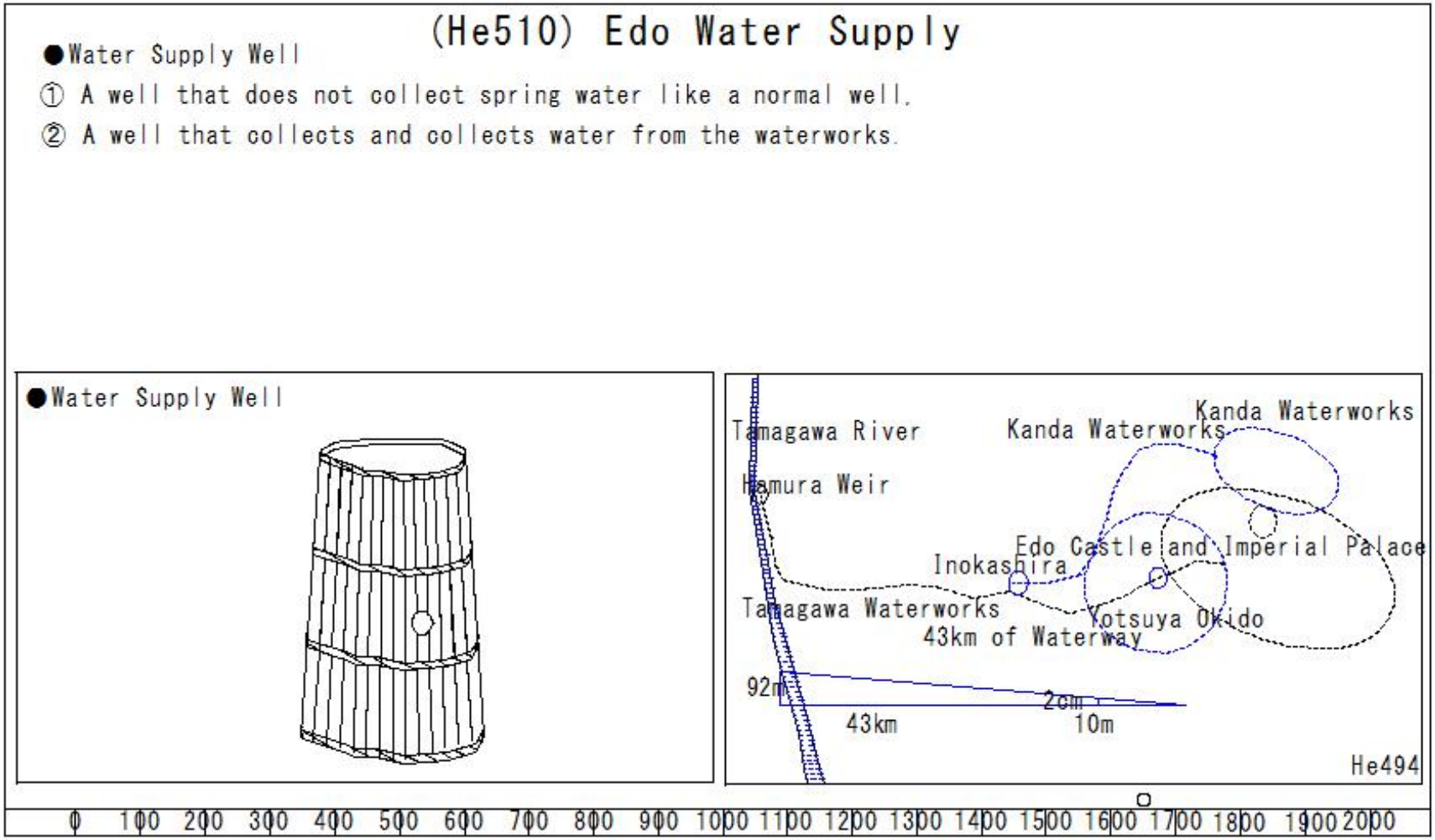
(He510) Edo Water Supply



(He511) Edo Water Supply

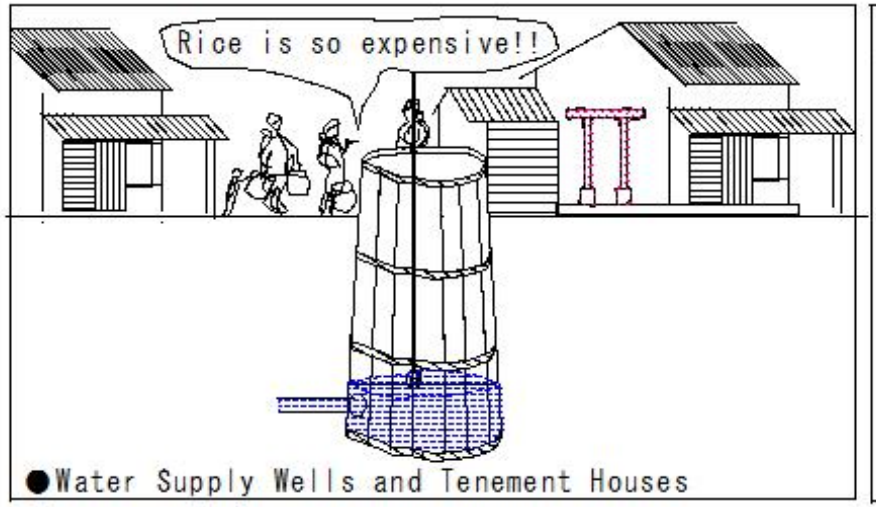
(He511) Edo Water Supply

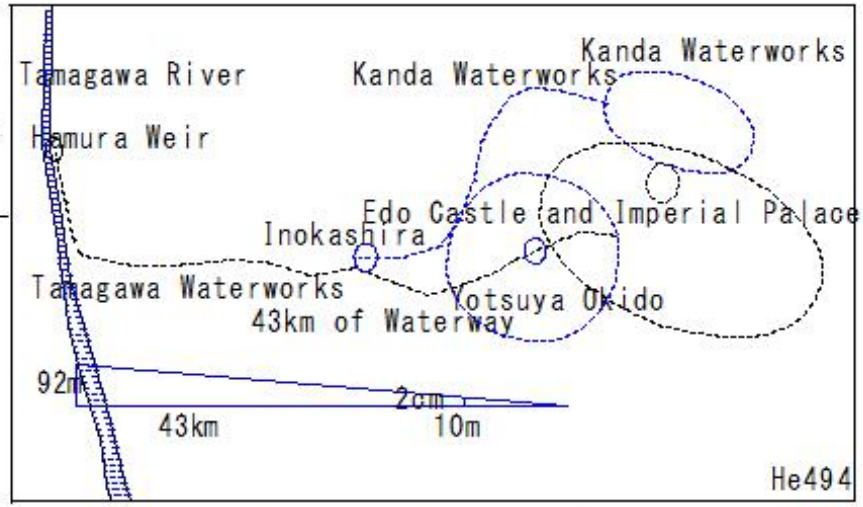
●Water Supply Wells and Tenement Houses

① Many Edo townspeople lived in tenement houses.

② Tenement houses always had a shared well.

③ Water was pumped up using a pole and bucket.





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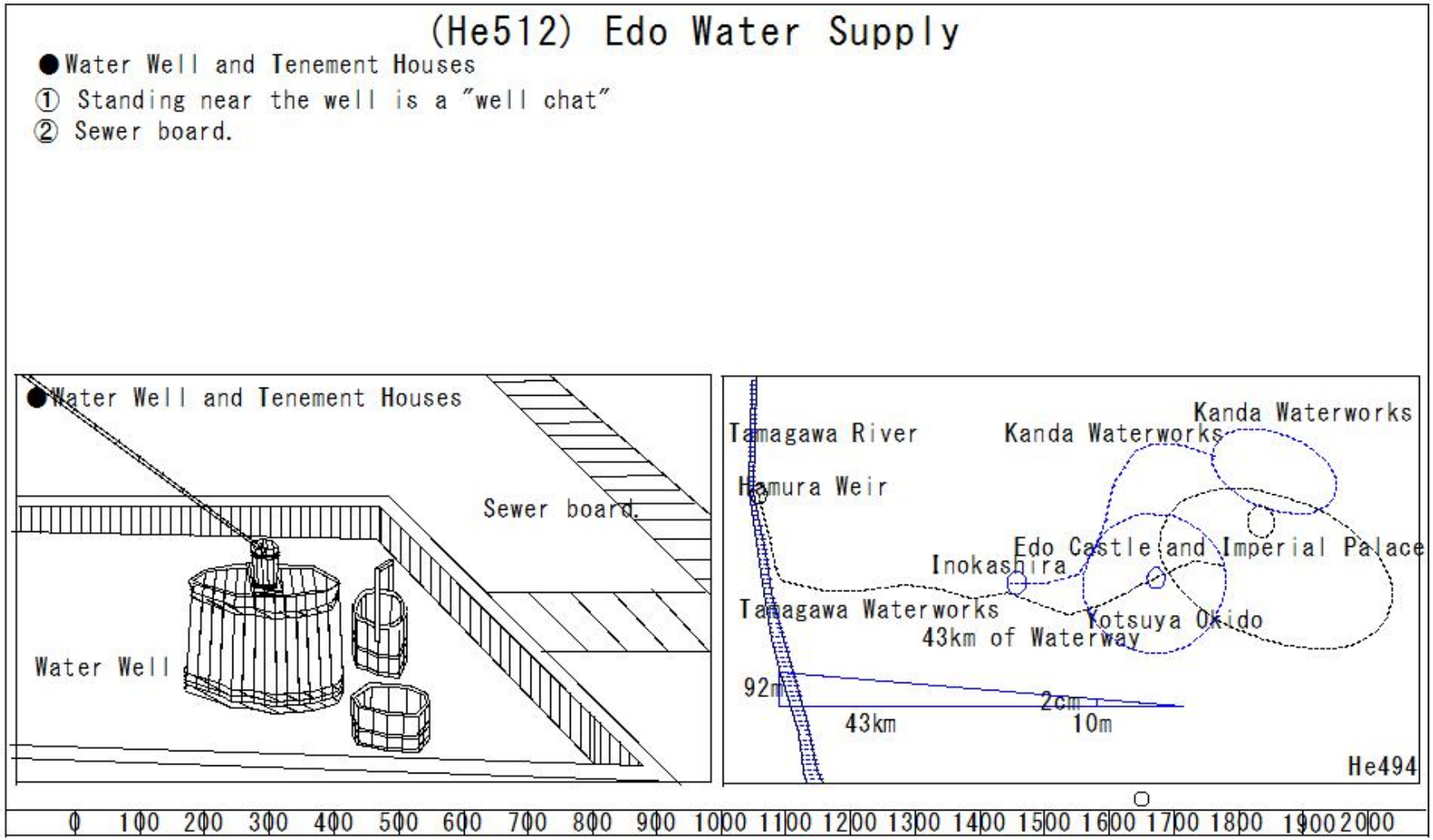
(He512) Edo Water Supply



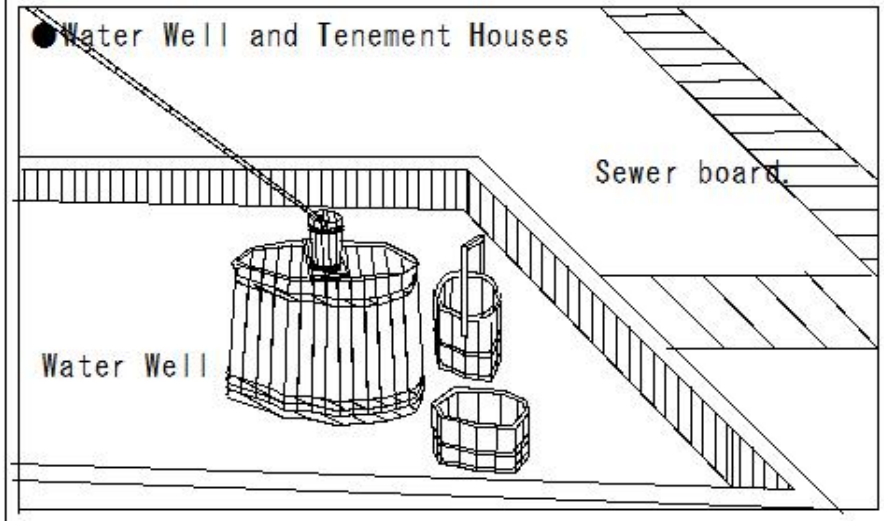
(He513) Edo Water Supply

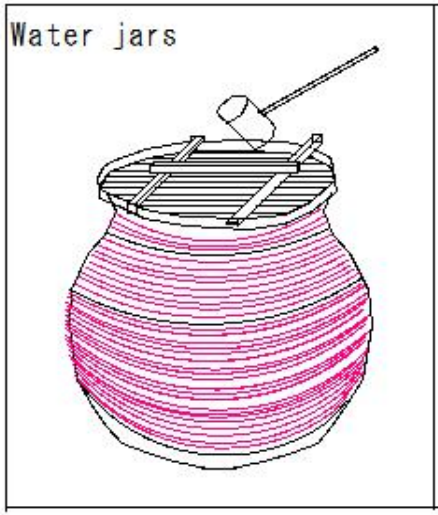
(He513) Edo Water Supply

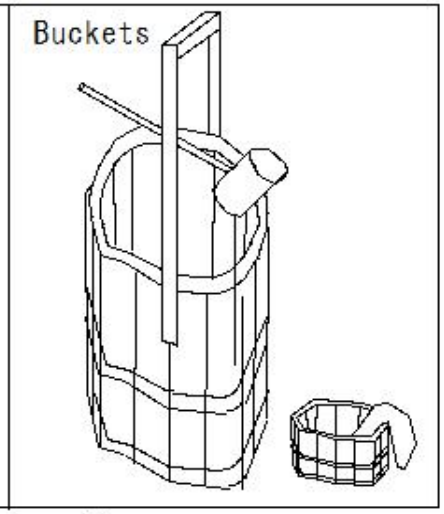
●Water jars and buckets

① Water pumped from a water supply well

② It was transferred to a water jar or bucket and kept indoors.







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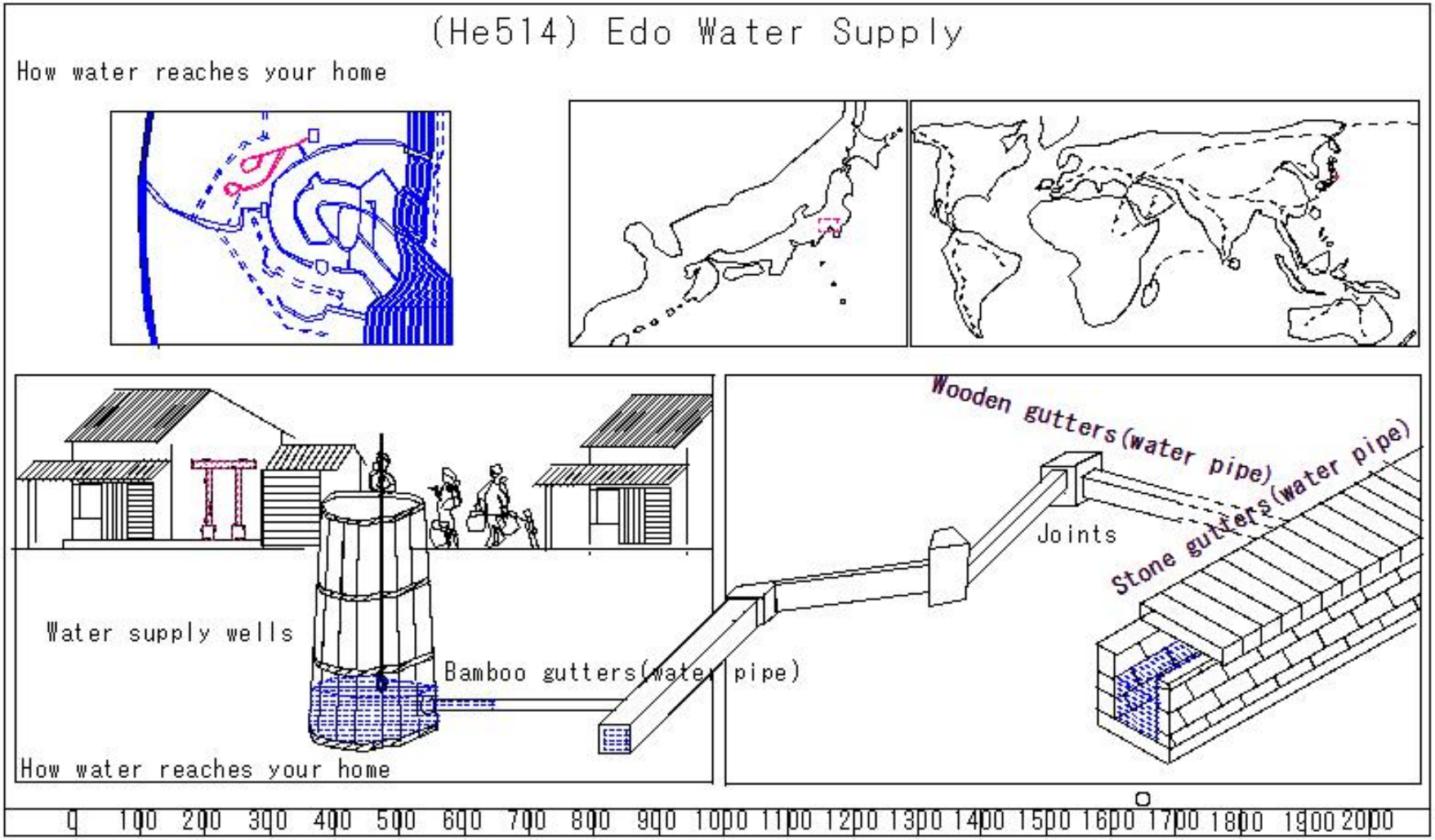
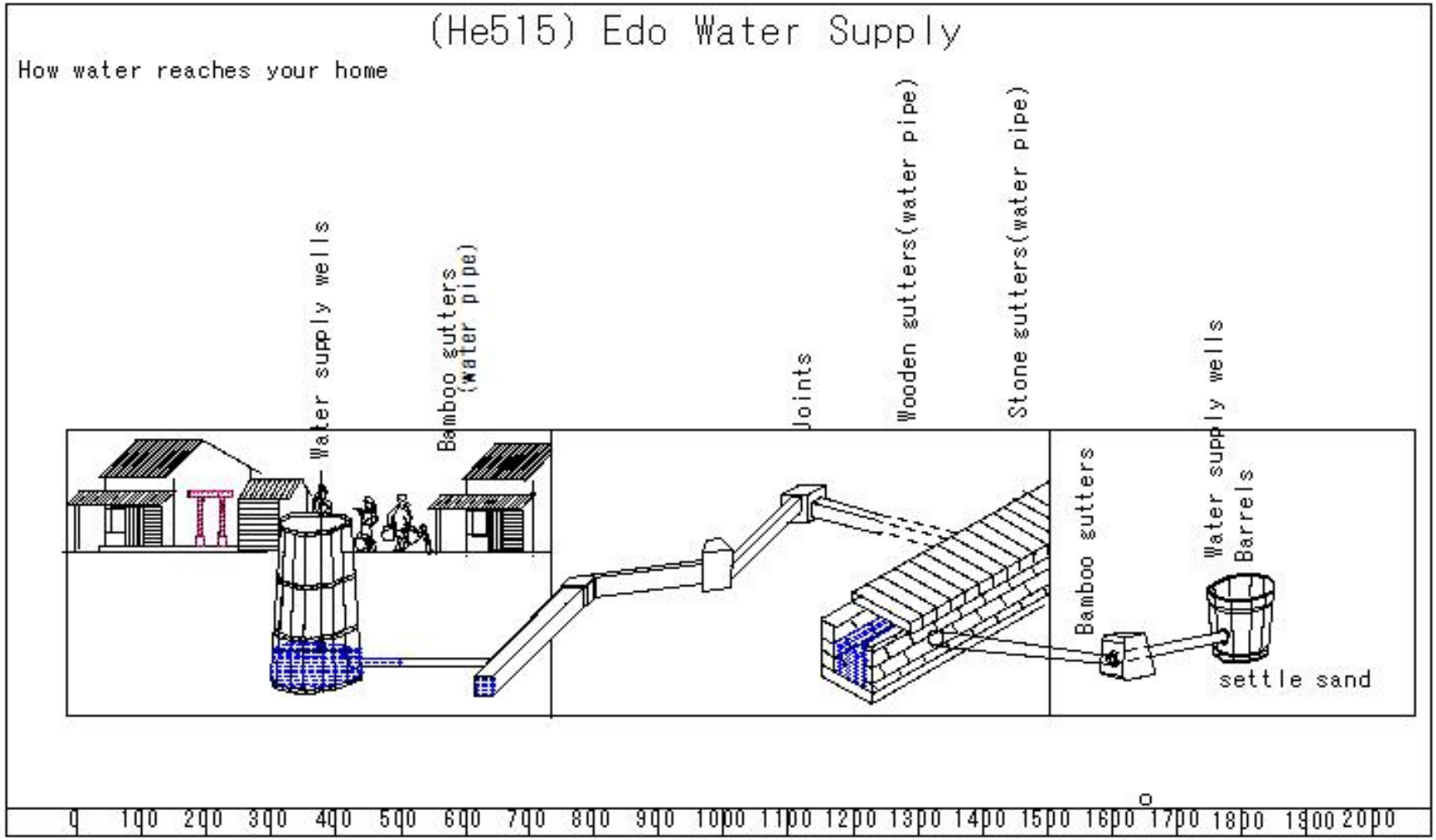
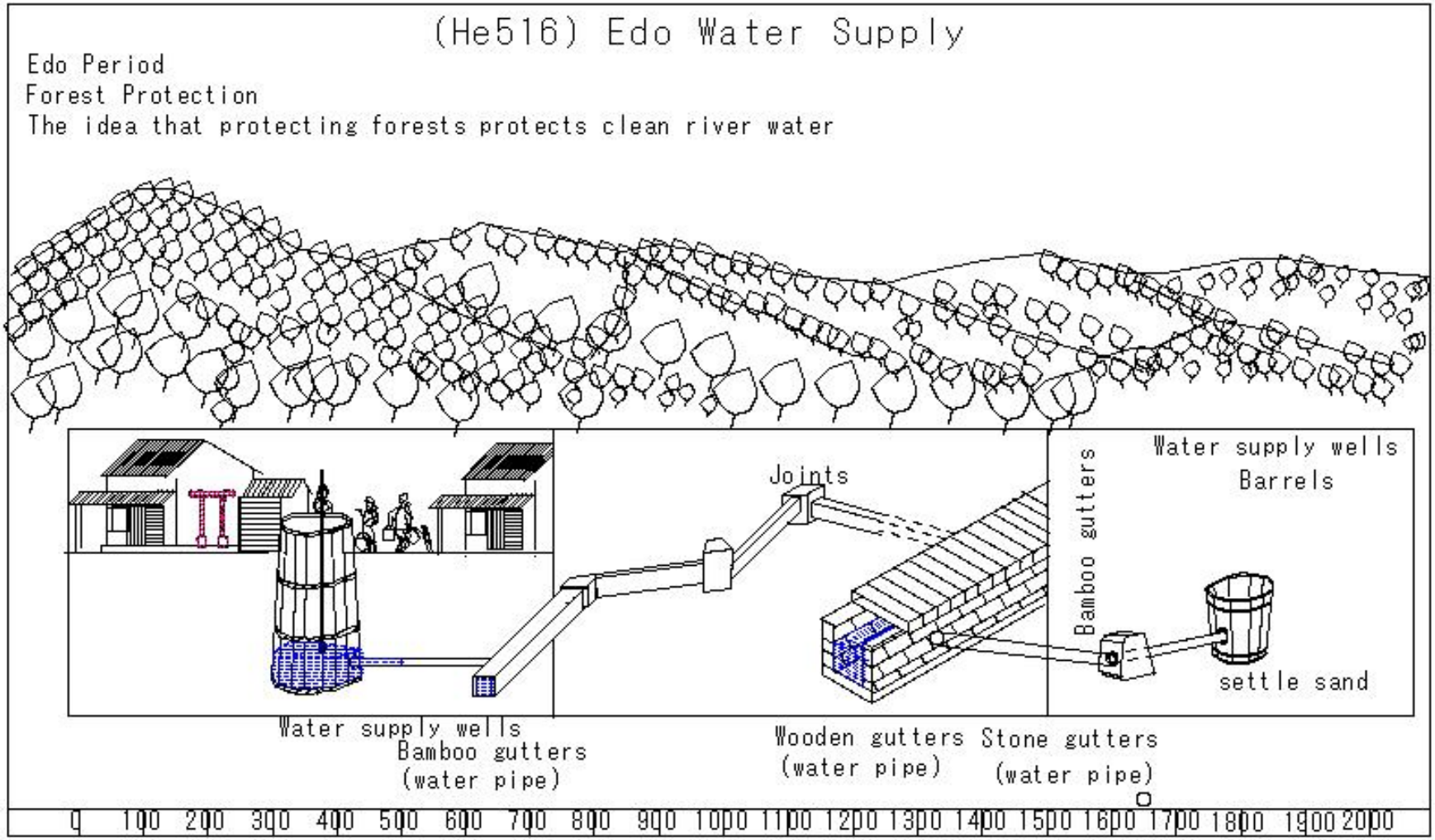


(He515) Edo Water Supply



(He516) Edo Water Supply

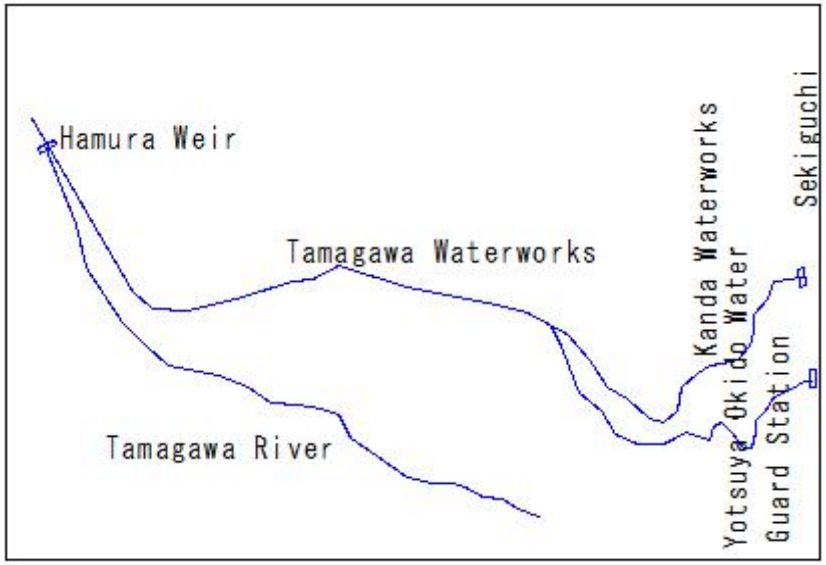


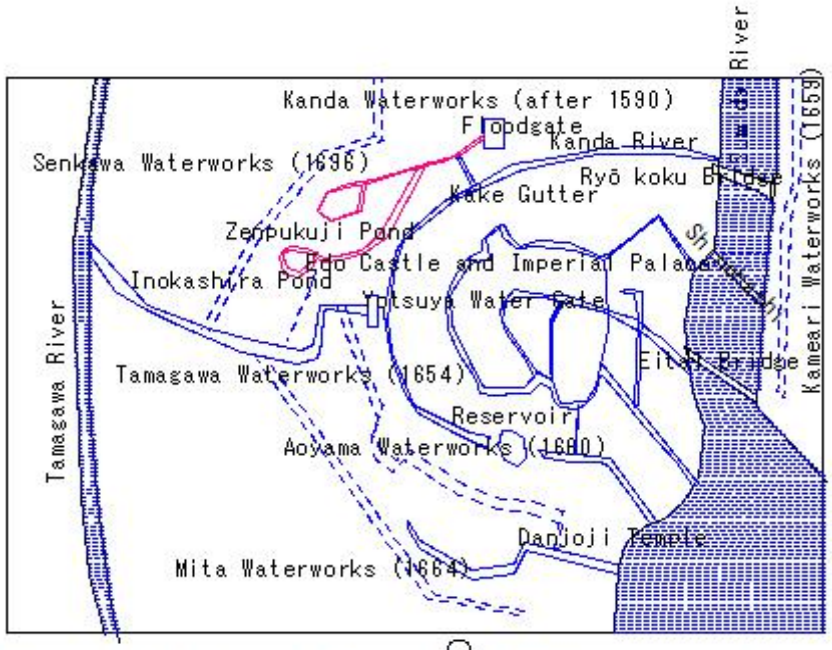
(He517) Edo Water Supply

(He517) Edo Water Supply

The waterworks was not only used by Edo citizens, but also diverted upstream for agricultural use and drinking water in rural areas.

Water fees: Villages paid gold or rice to the shogunate.





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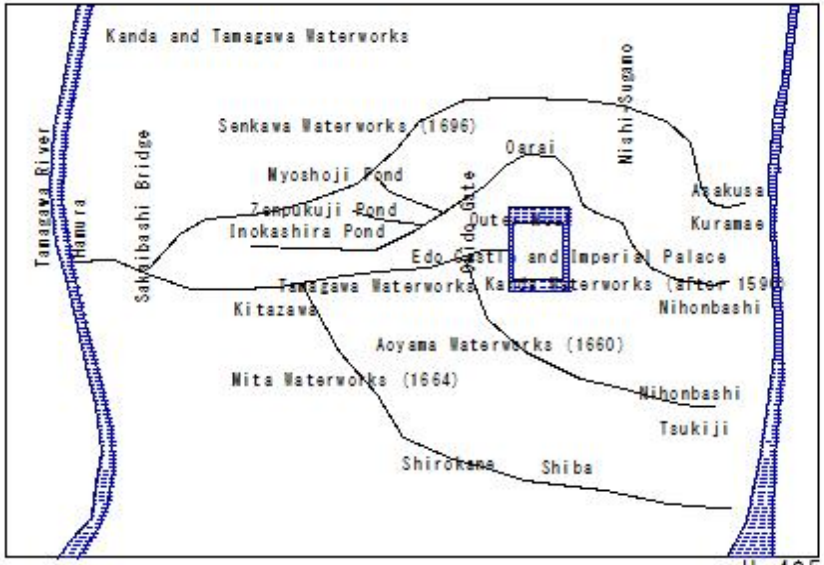
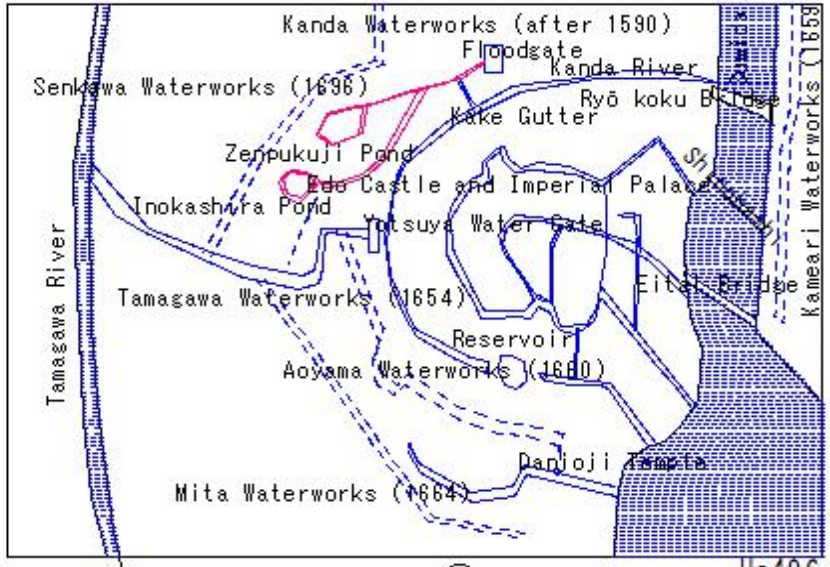
(He518) Edo Water Supply

Six Waterworks of Edo

Name	Year Completed	Water Source	
Kanda Waterworks	1590 (Tensho 18)	Inokashira Pond (Spring Water)	
Tamagawa Waterworks	1654 (Shoo 3)	Tamagawa River	*1722 (Kyoho 7):
Honjo Waterworks	1659 (Manji 2)	Kawarasone Reservoir	Four waterways abolished
Aoyama Waterworks	1660 (Manji 3)	Diverted from Tamagawa Aqueduct	
Mita Waterworks	1664 (Kanbun 4)	Diverted from Tamagawa Aqueduct	
Senkawa Waterworks	1696 (Genroku 9)	Diverted from Tamagawa Aqueduct	



He495



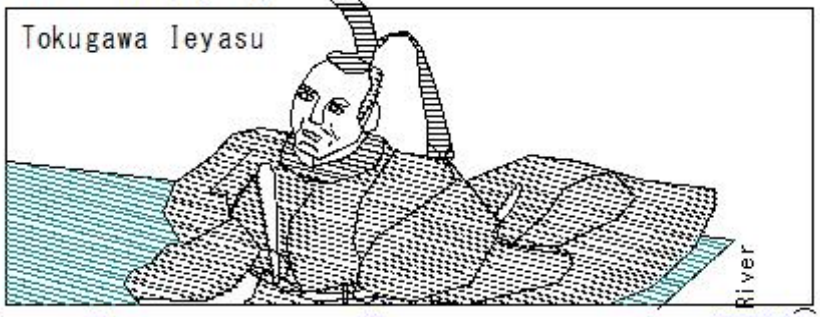
He496

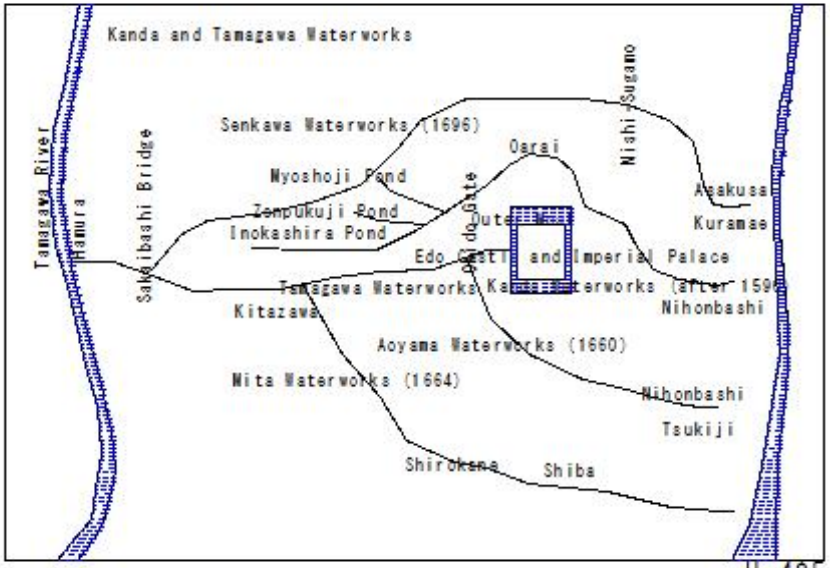
0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

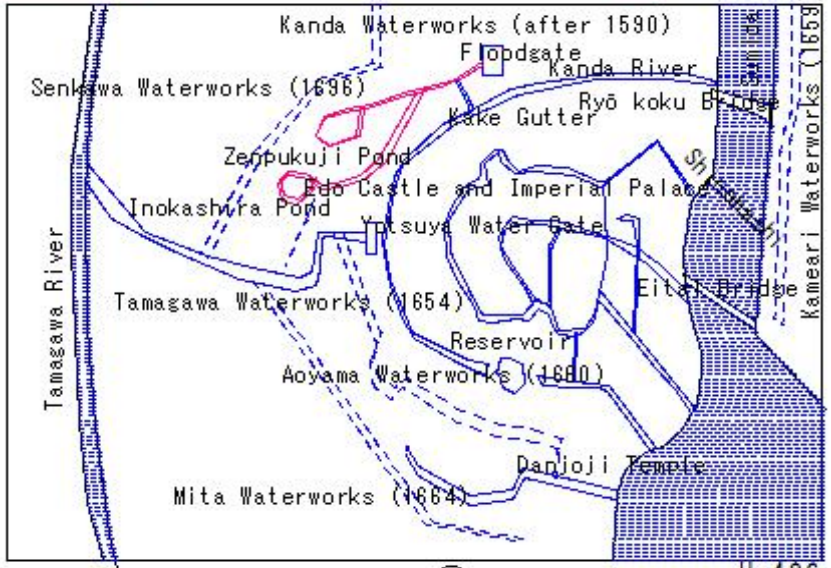
(He519) Edo Water Supply

(He519) Edo Water Supply

When Tokugawa Ieyasu entered Edo in 1590,
he began work on building castles and towns,
as well as establishing a water supply system,
which was a vital lifeline.







He495 He496

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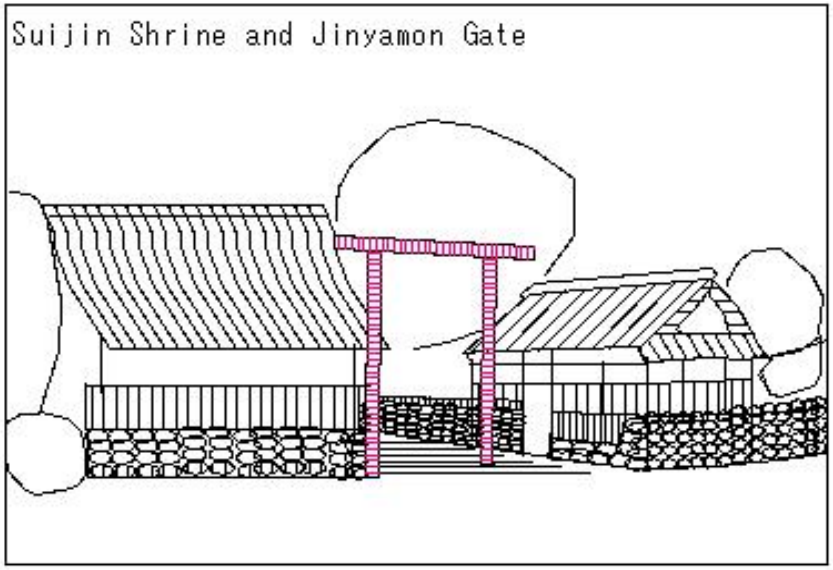
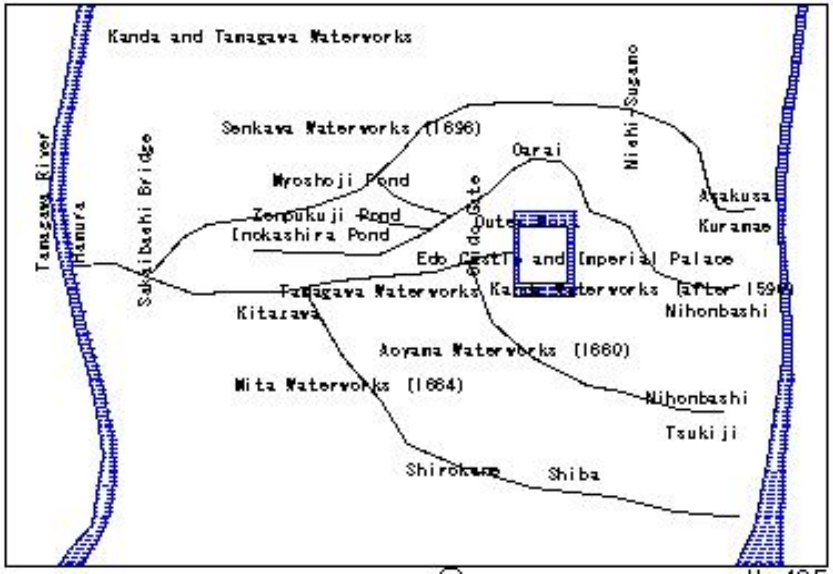
(He520) Edo Water Supply

(He520) Edo Water Supply

Suijin Shrine and Jinyamon Gate

① Suijin Shrine and Jinyamon Gate (right) Jinya (a branch office of the government that manages the water supply) was located at the Tamagawa Water Supply intake point.





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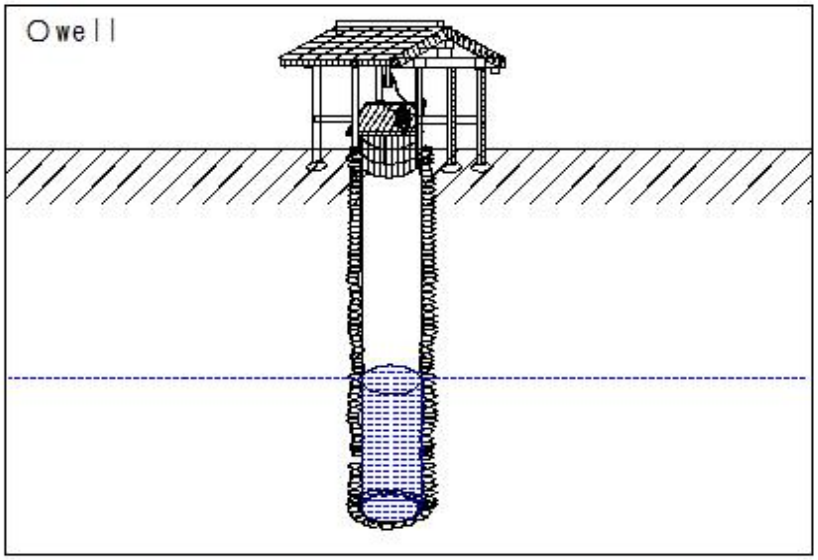
(He521) Edo Water Supply

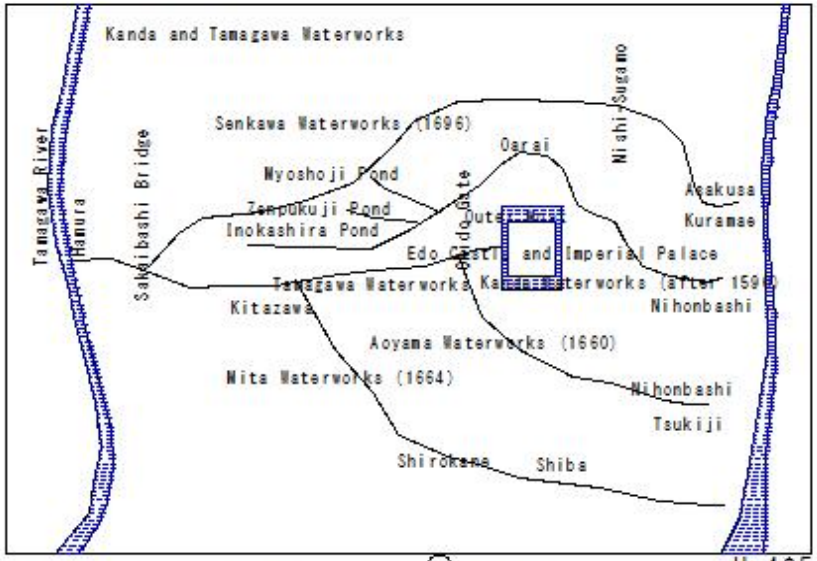
(He521) Edo Water Supply

○well

① Even in mountainous areas or highlands far from rivers or ponds, there are places where groundwater springs up when you dig the ground.

② People dug up such water veins and used them as wells.





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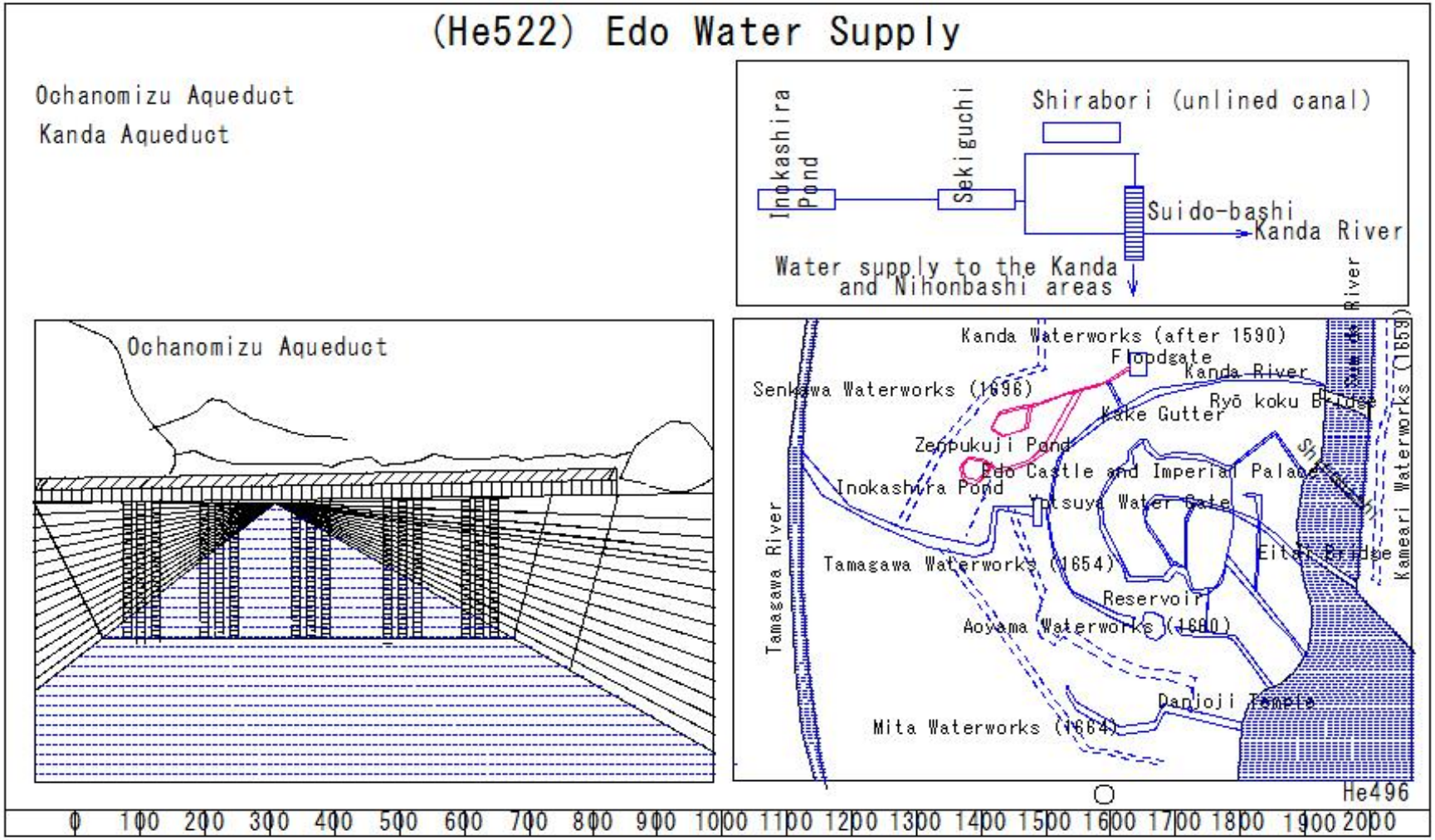
(He522) Edo Water Supply

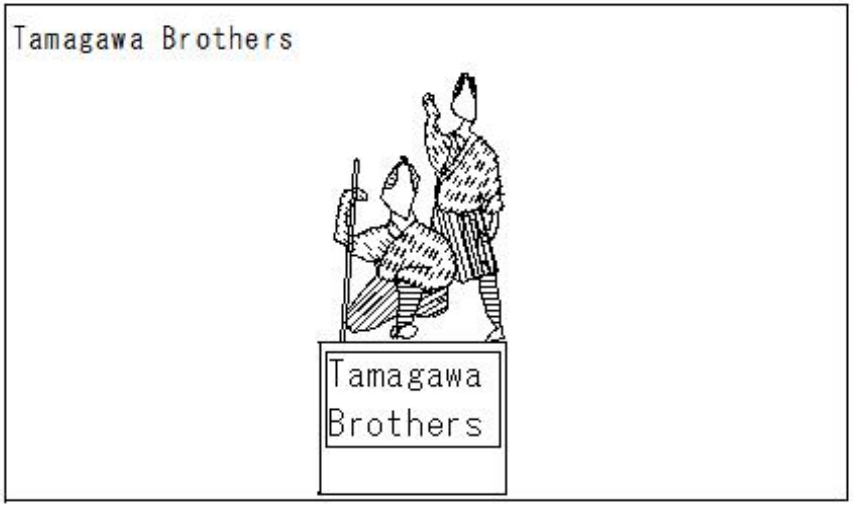


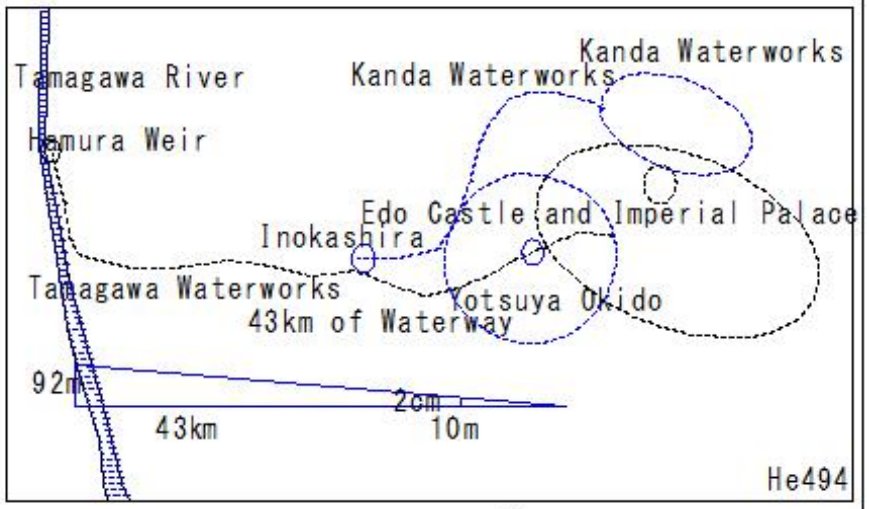
(He523) Edo Water Supply

(He523) Edo Water Supply

Tamagawa Brothers

They oversaw the construction of the Tamagawa Canal from 1653 to 1654.





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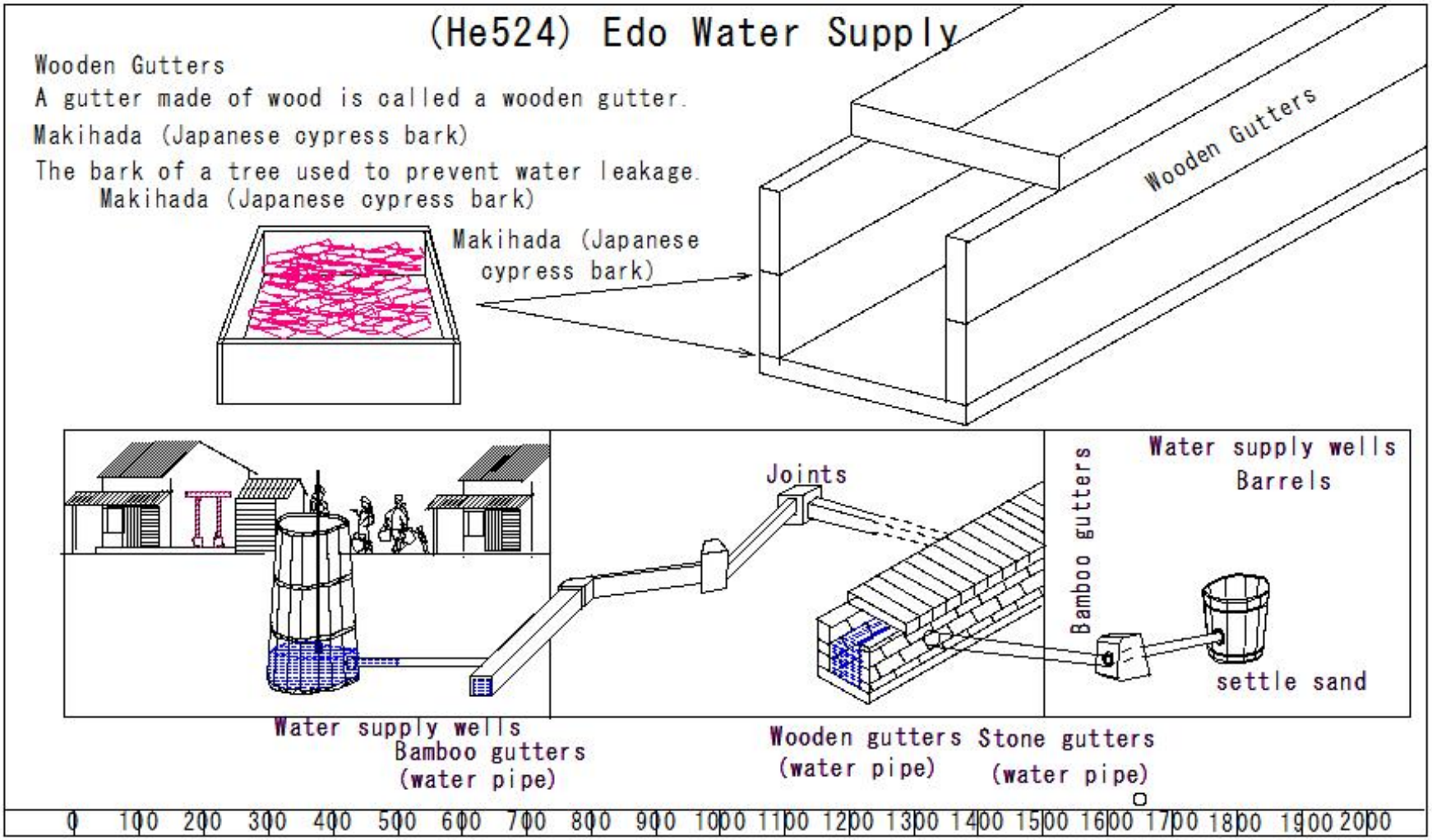
(He524) Edo Water Supply



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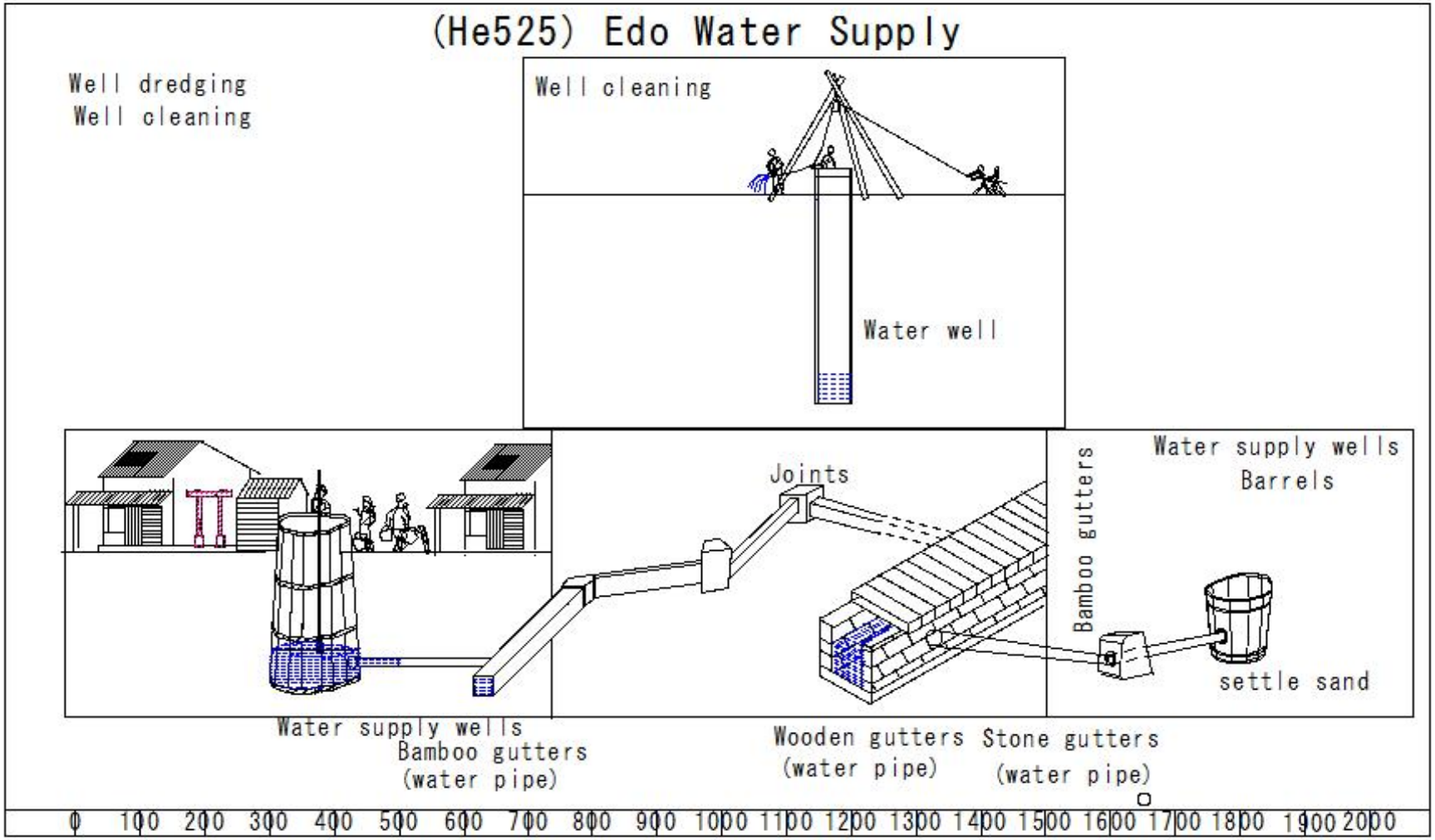

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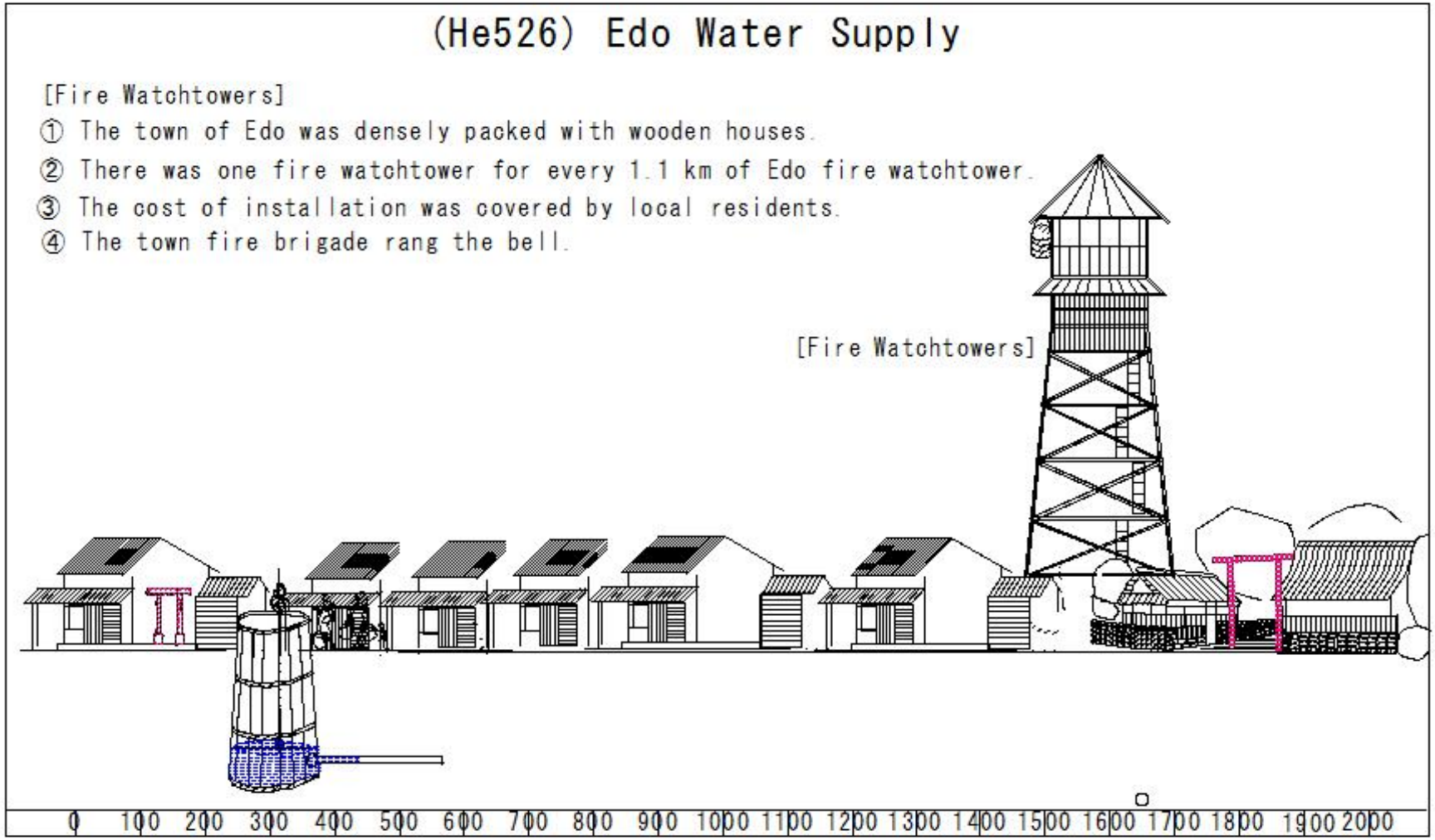

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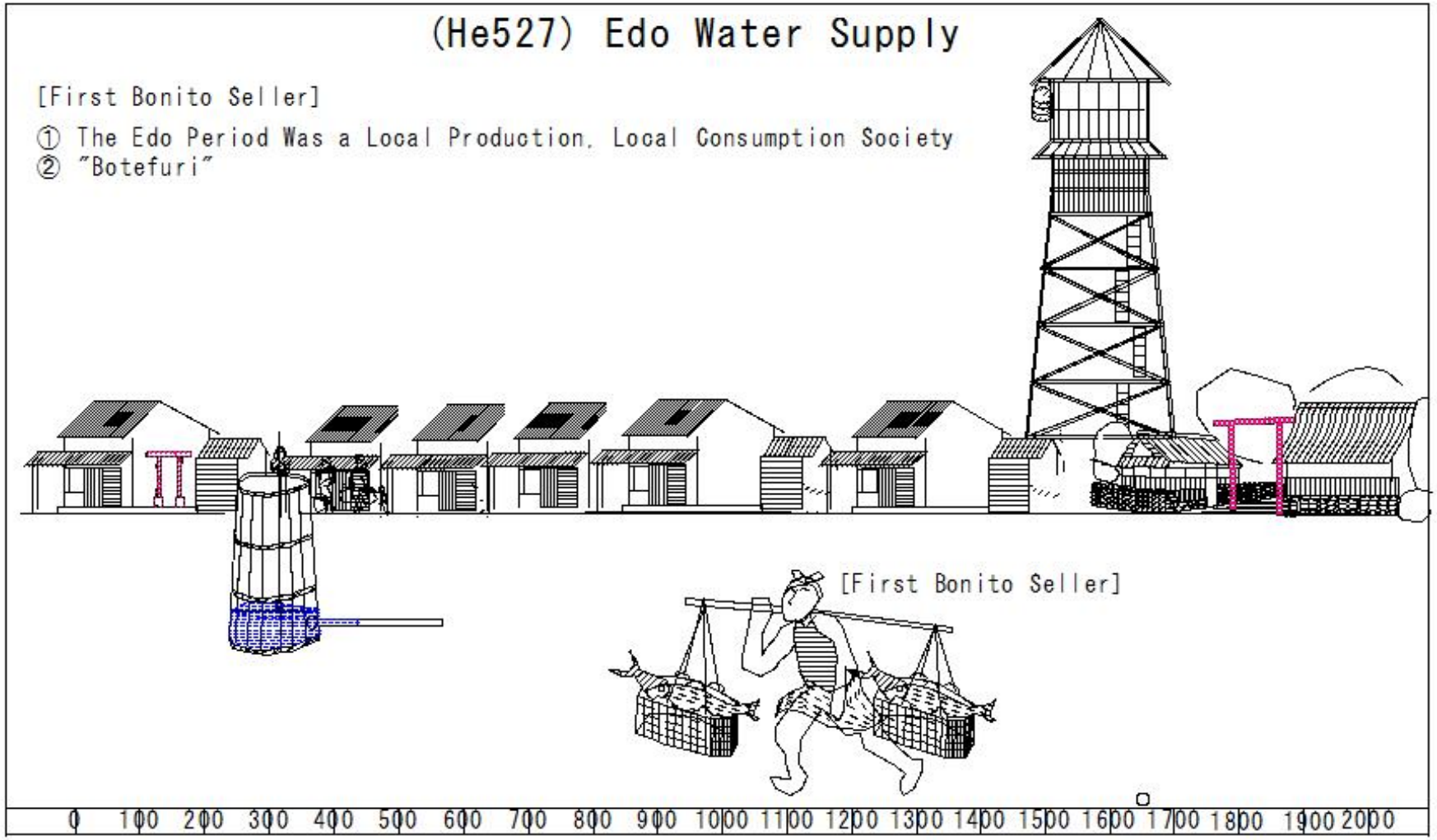

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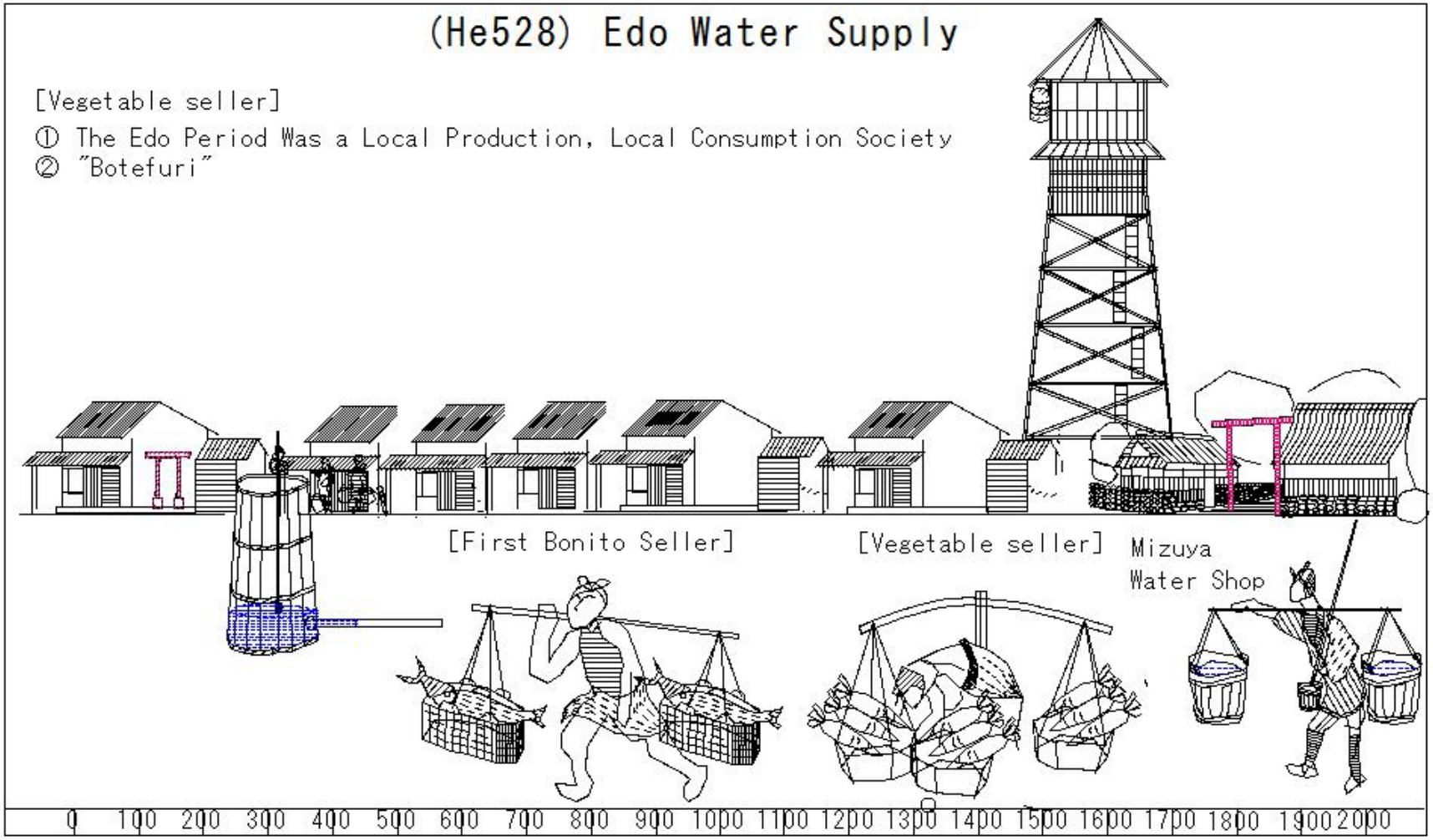

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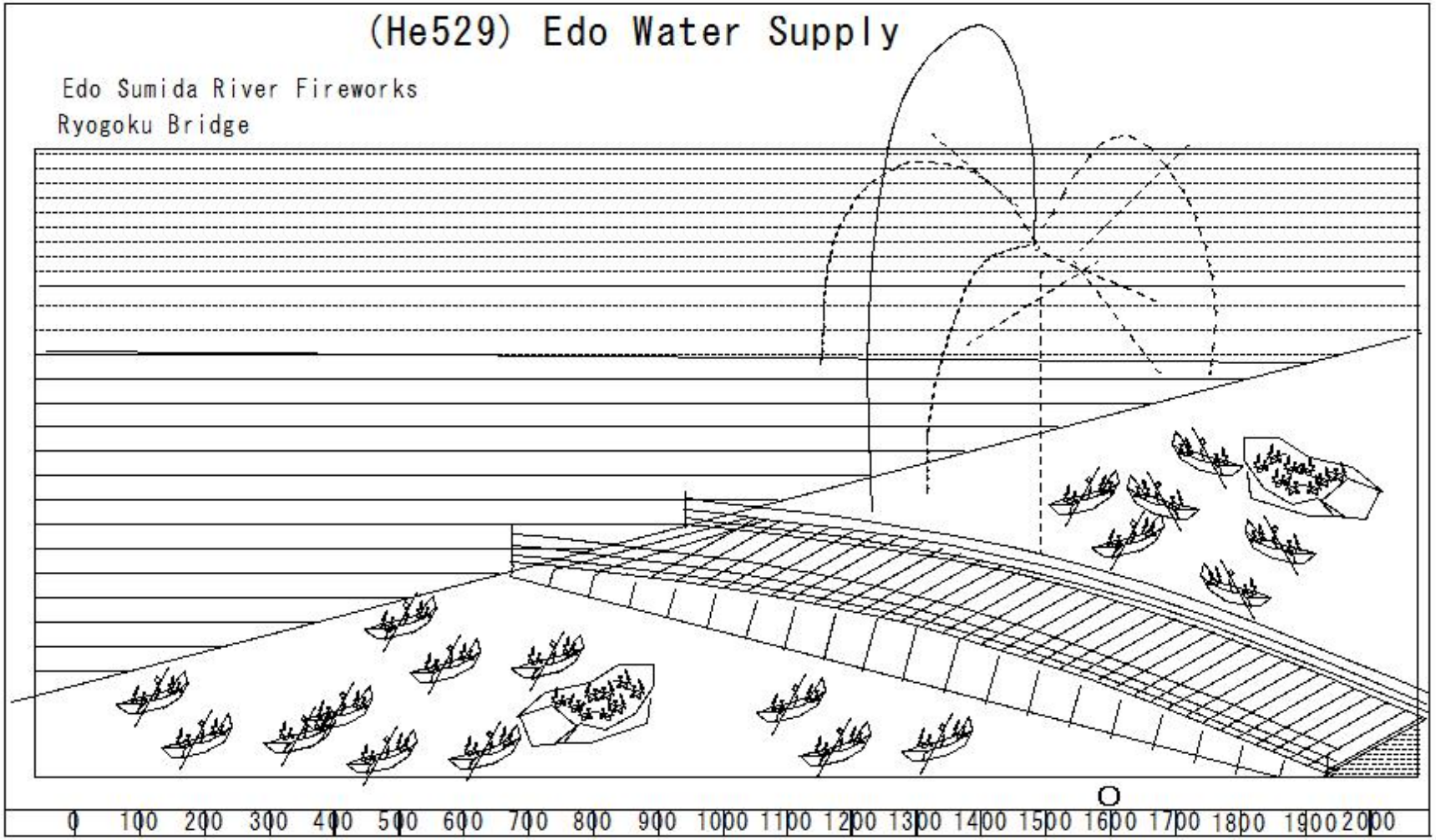

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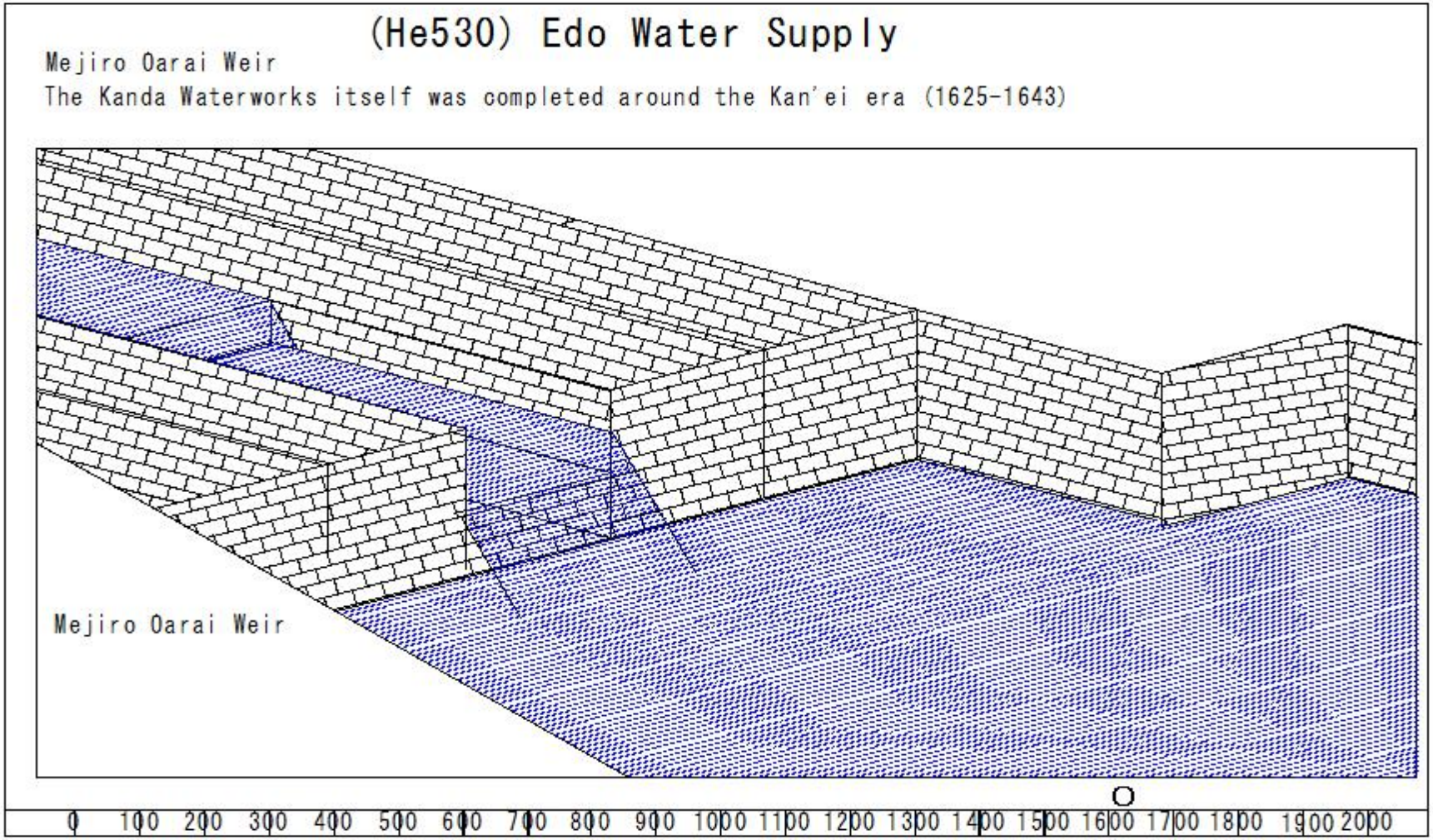

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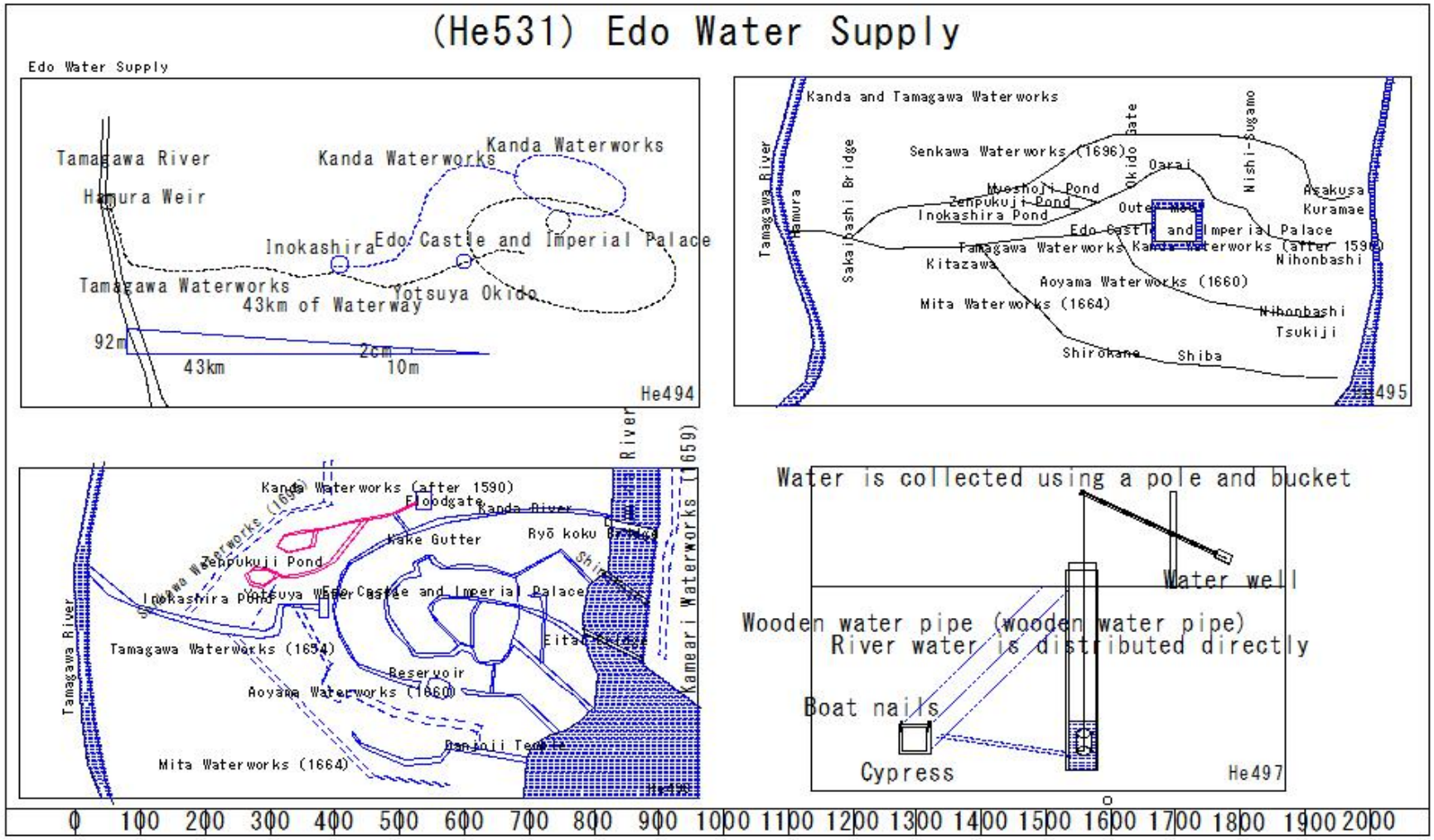

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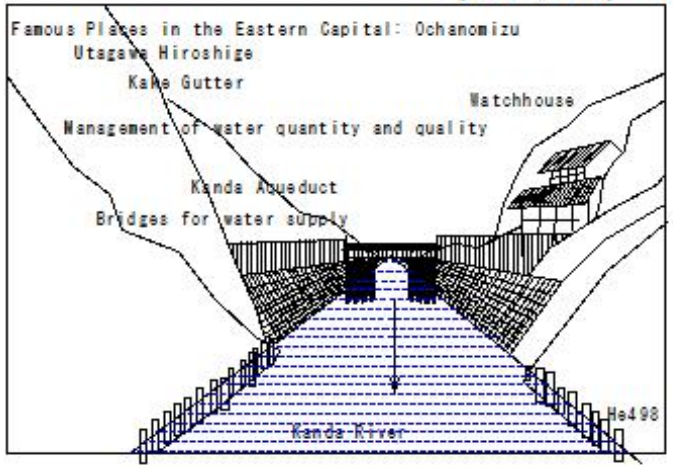
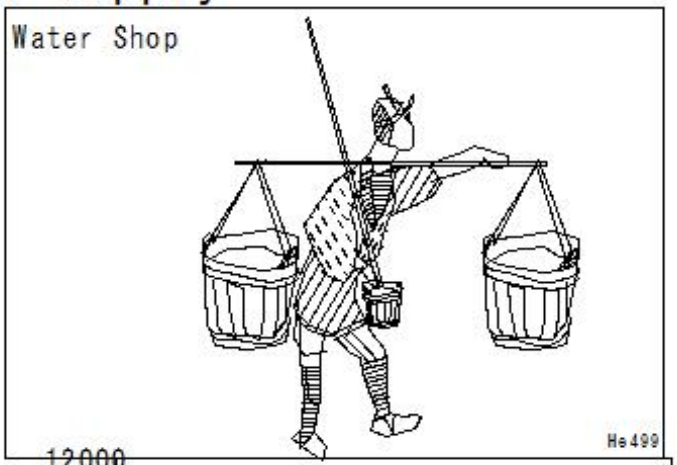


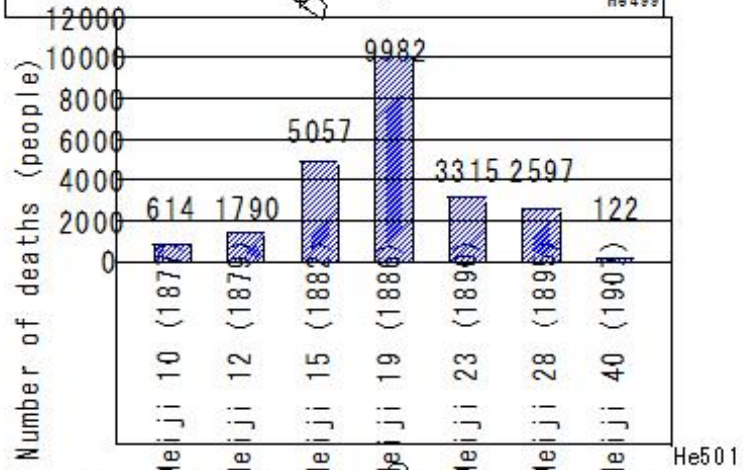


1886

Drinking Water Test Results

Water Supply Wells	Not drinkable	Drinkable
3,416 tested out of approximately 8,000	43%	57%
Dug Wells (Groundwater)	Not drinkable	Drinkable
3,489 tested out of approximately 45,000	62%	38%

He500



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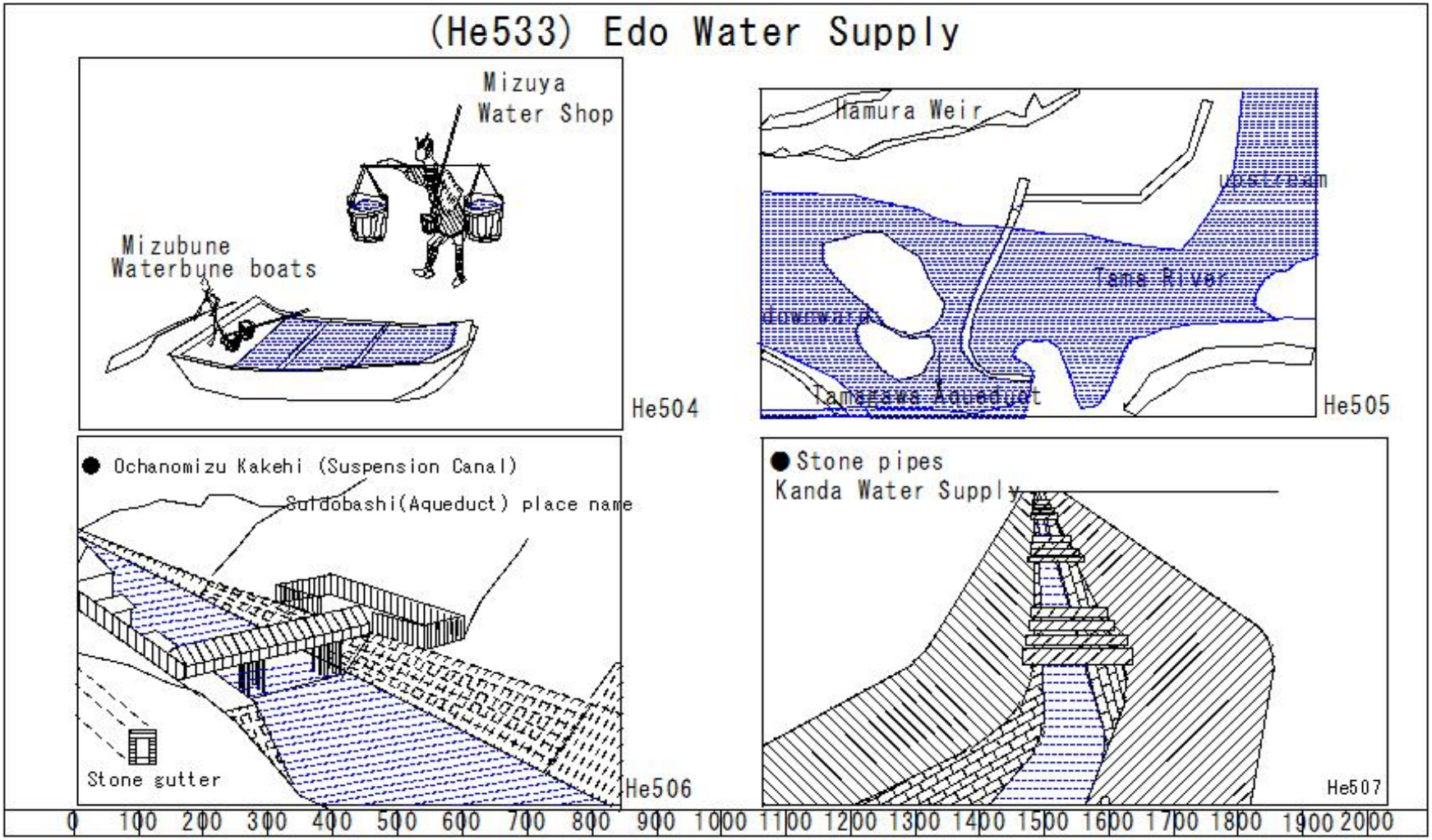

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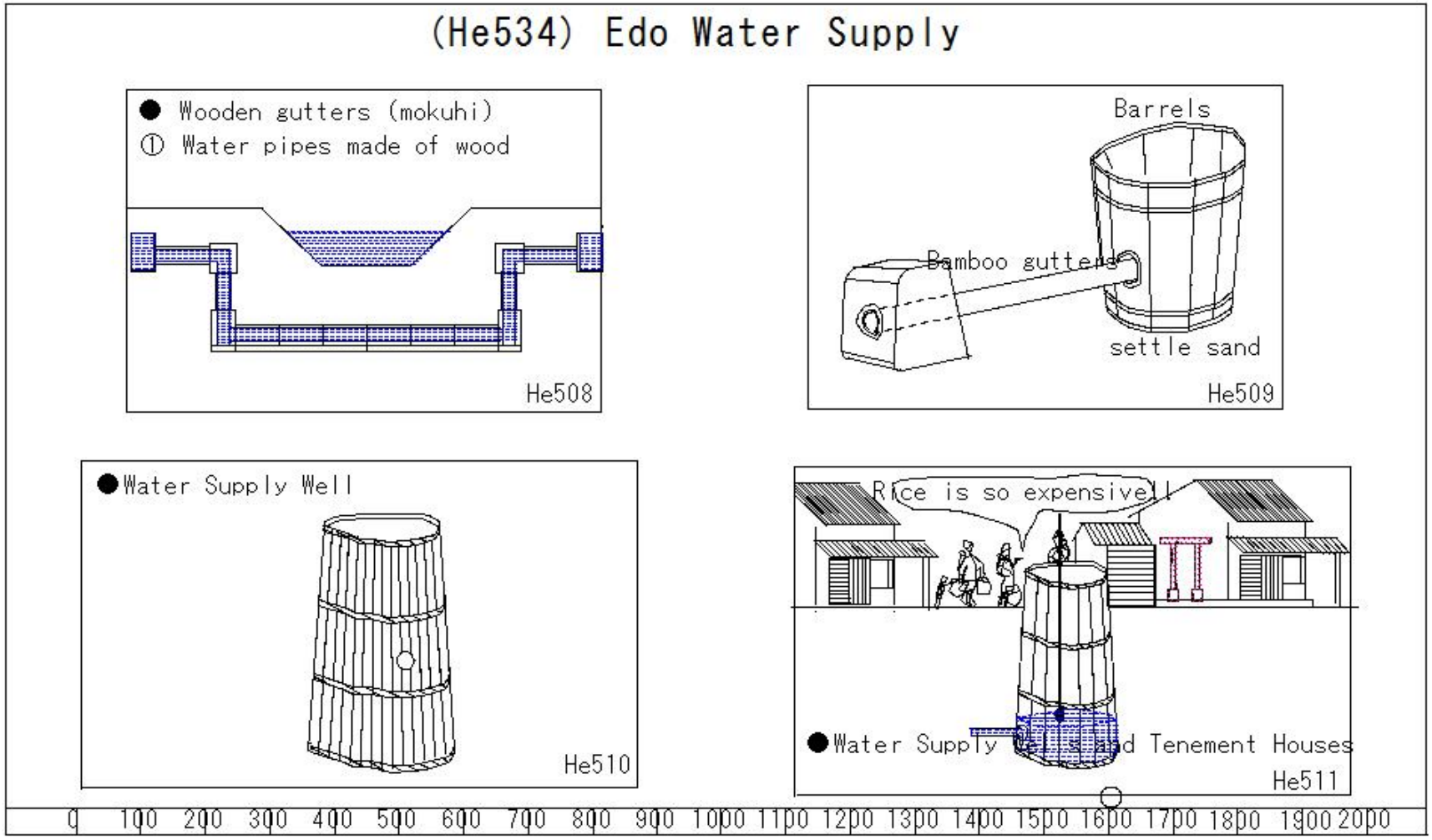

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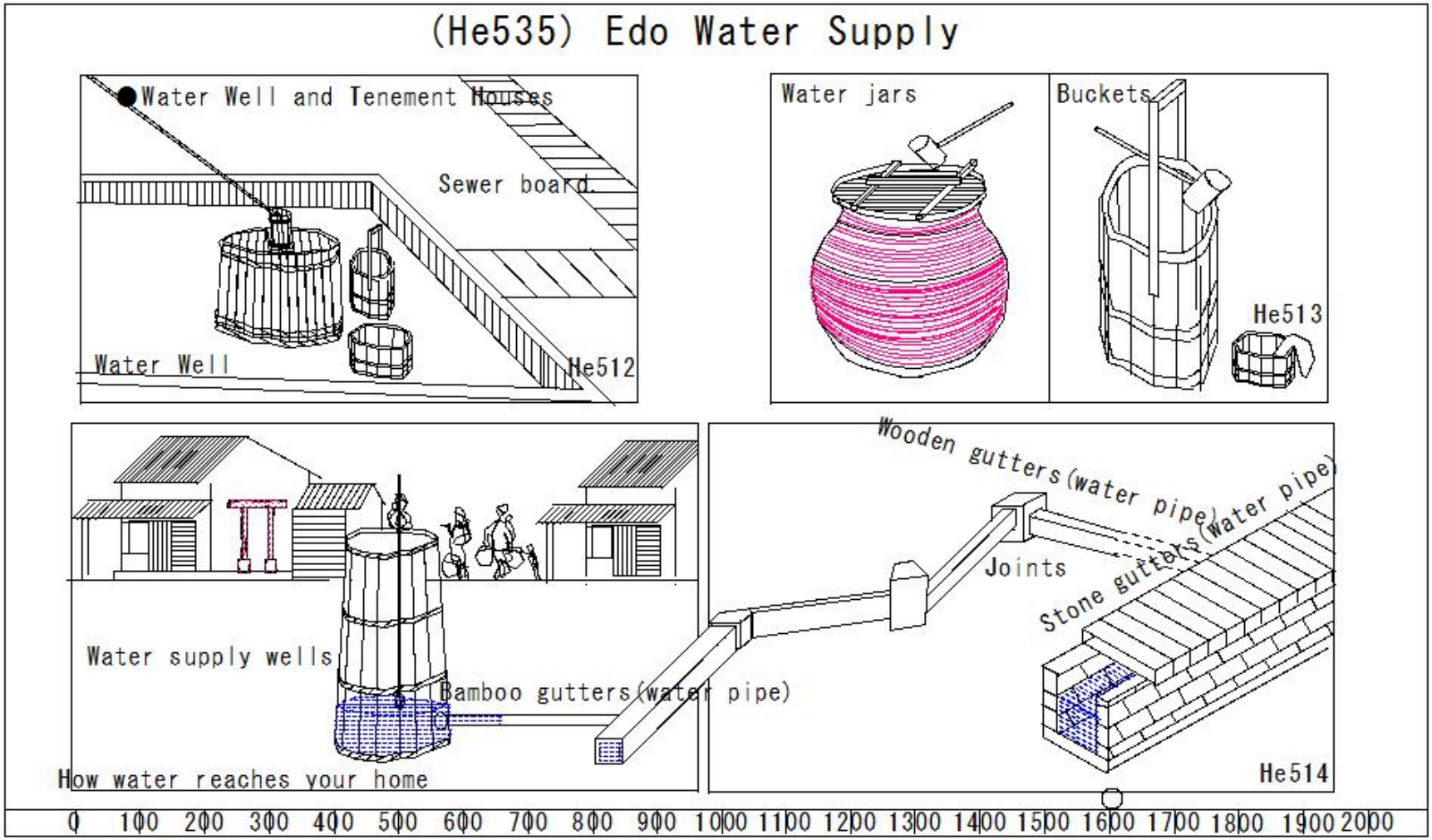

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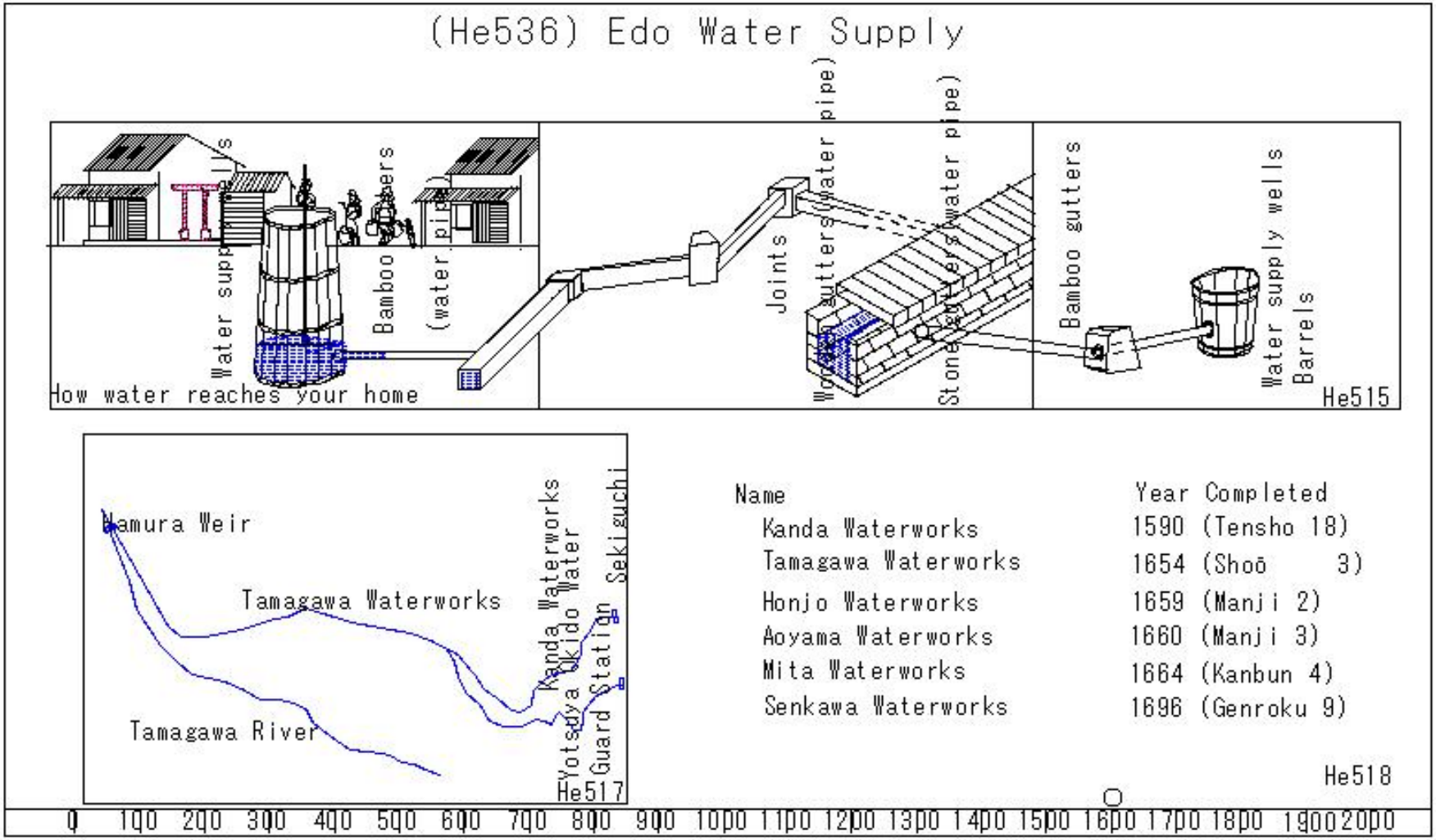

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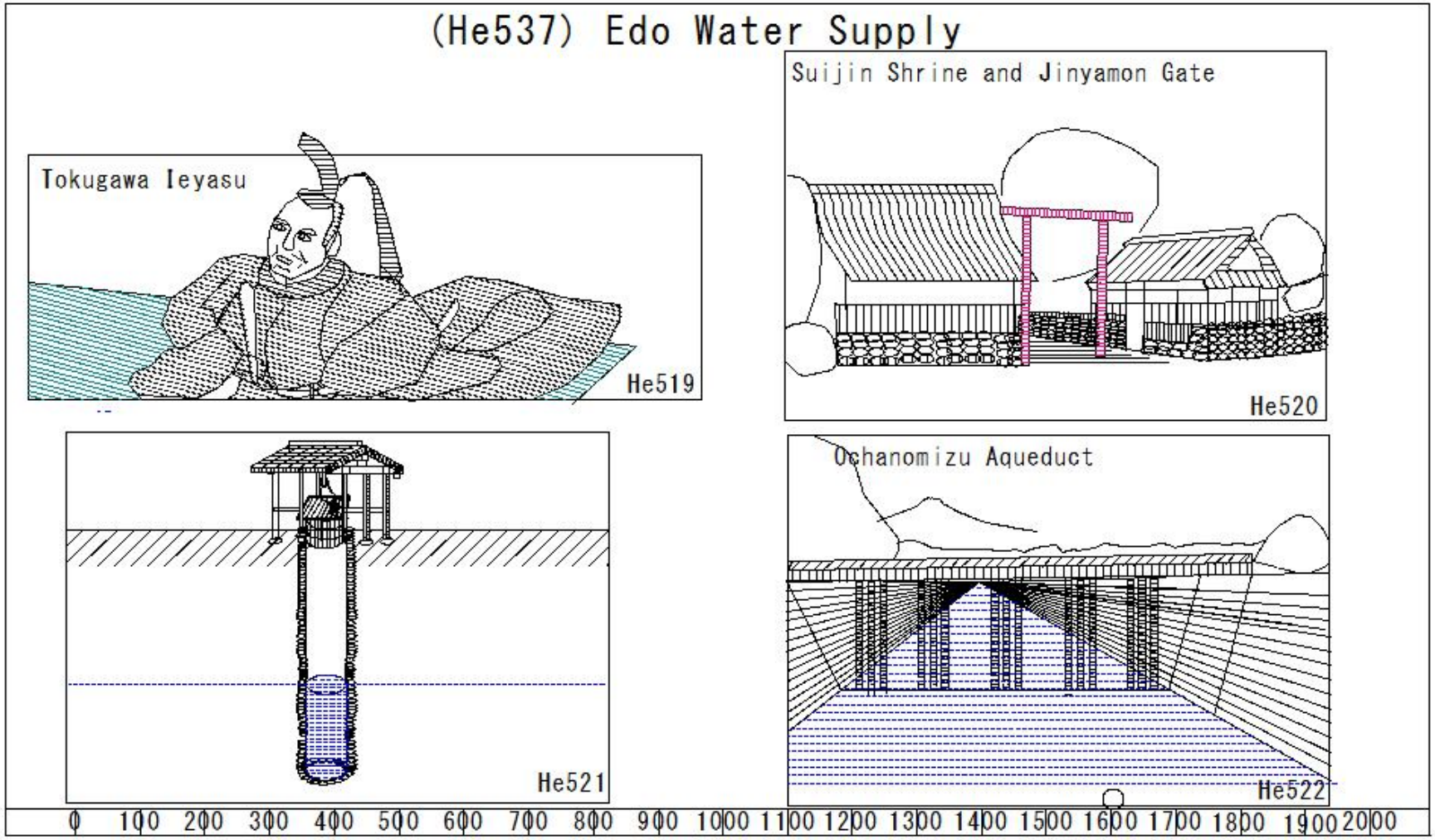

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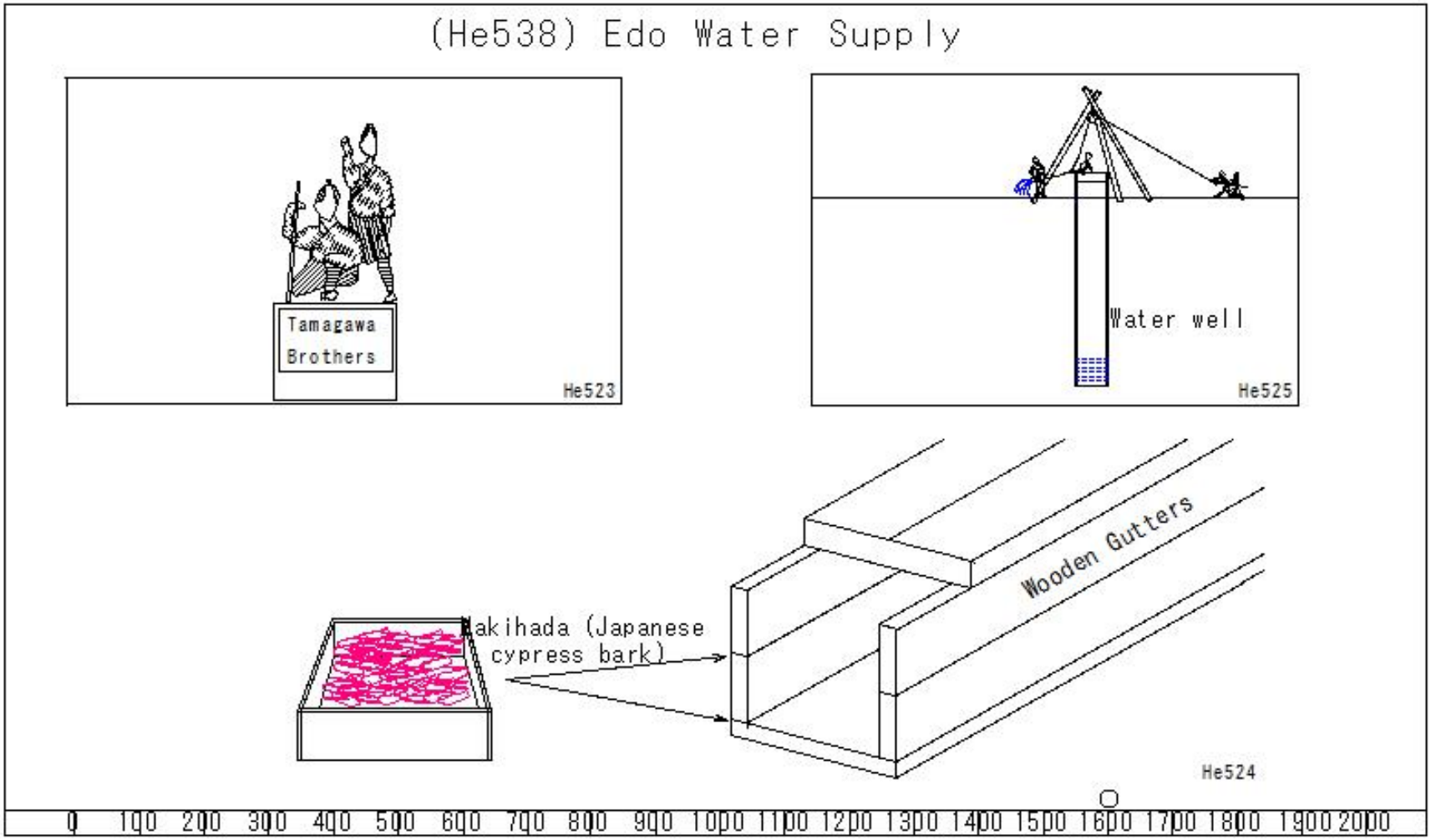

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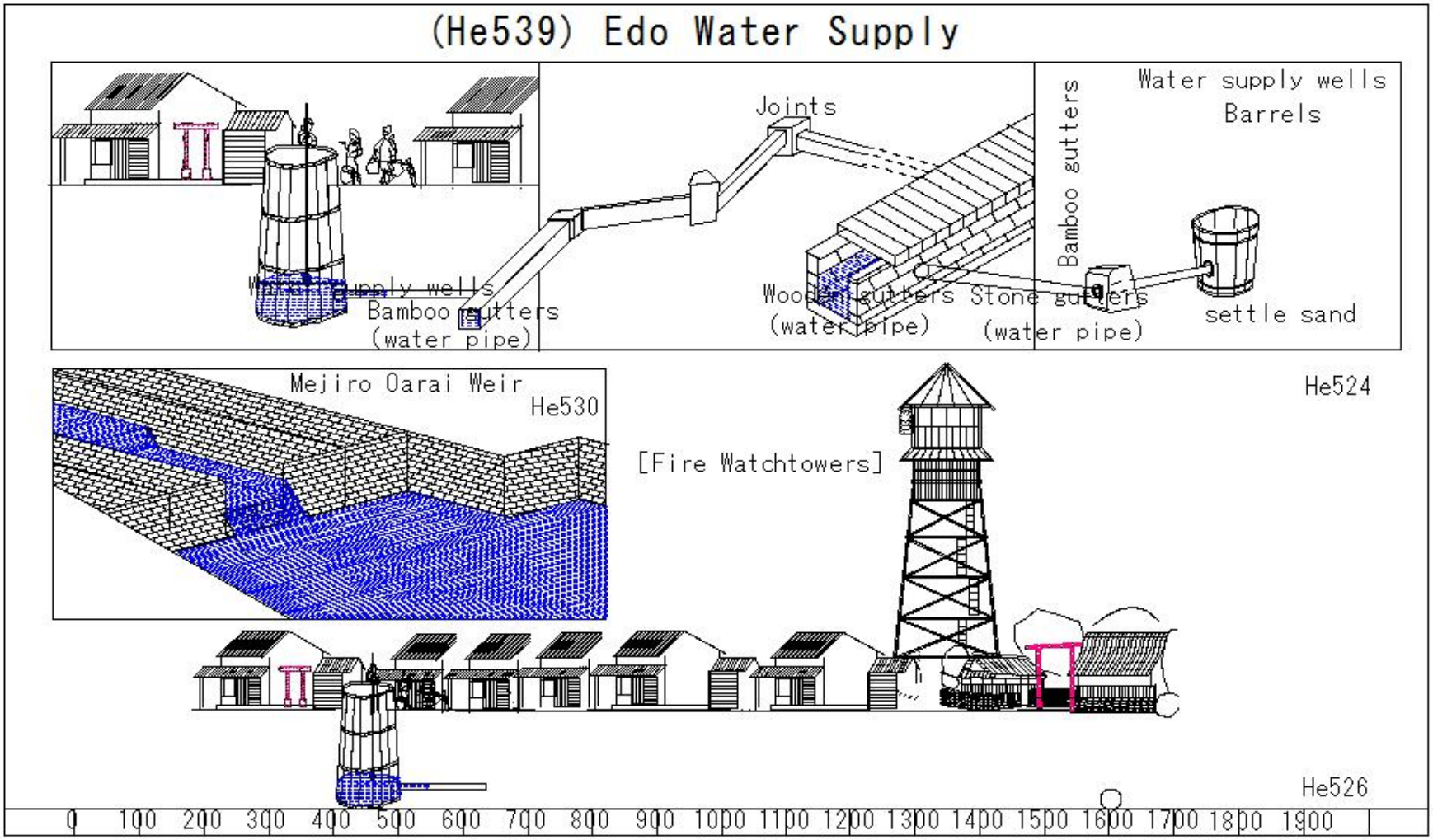

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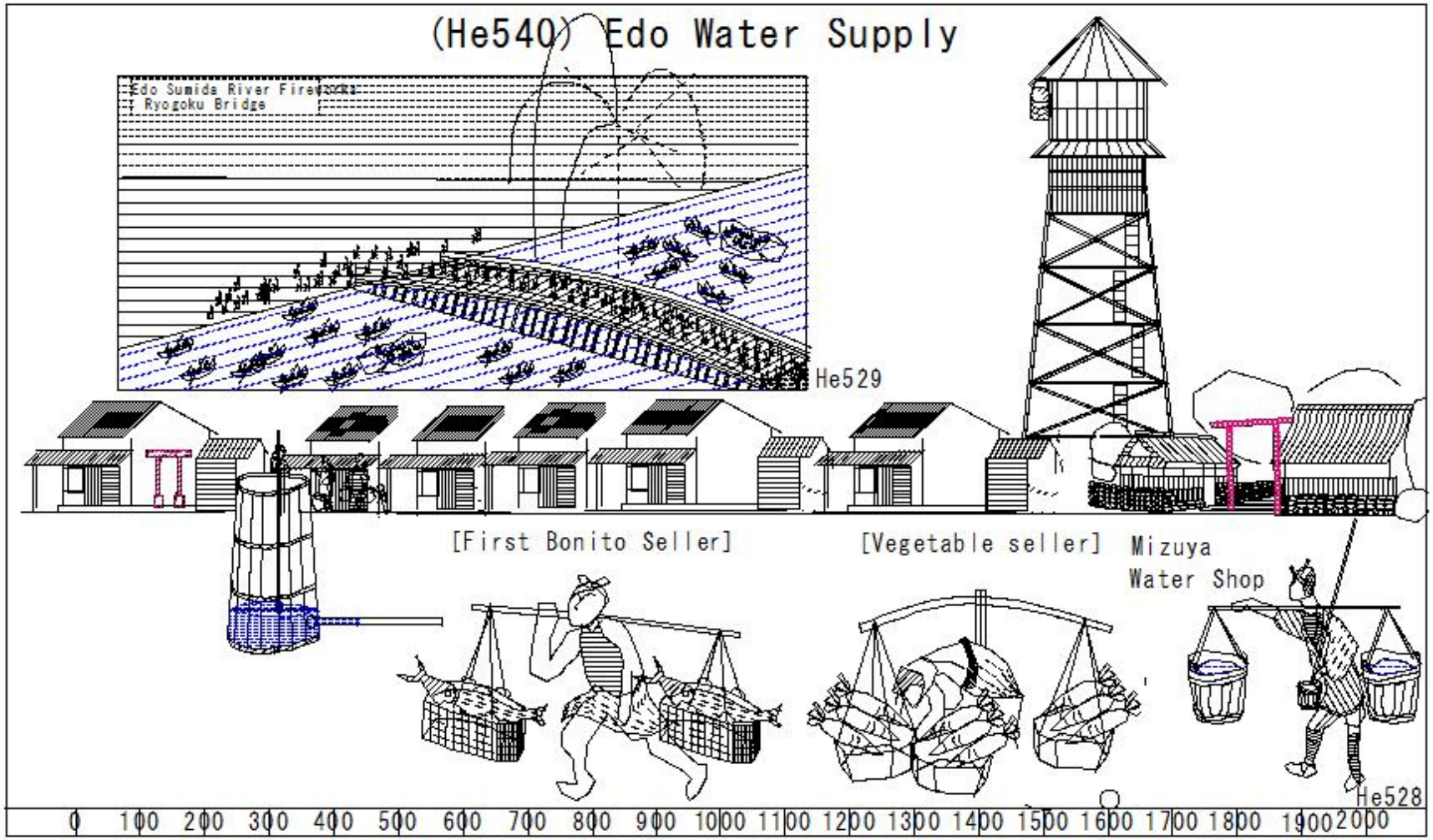
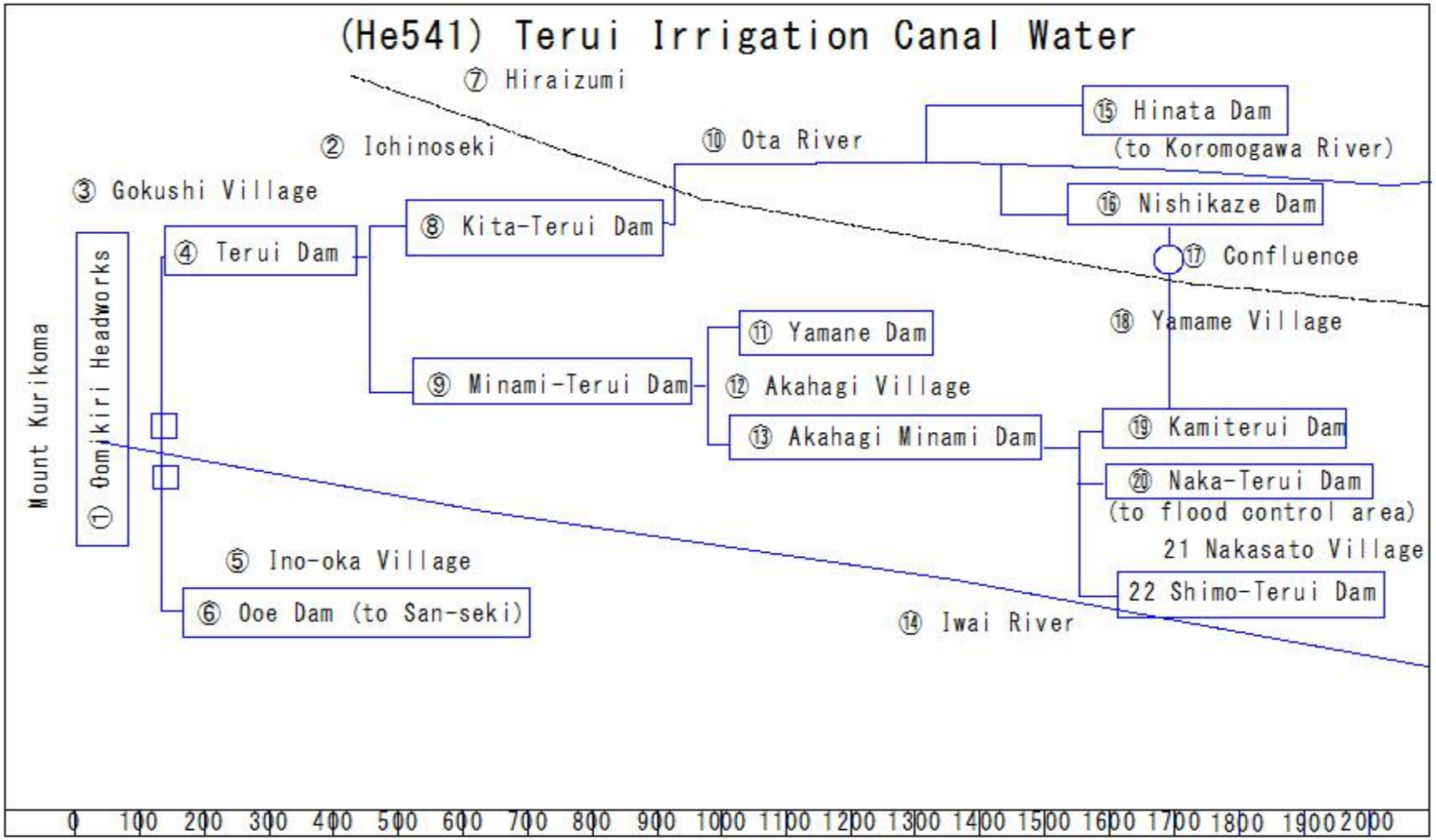


(He541) Terui Irrigation Canal Water



(He542) Terui Irrigation Canal Water

(He542) Terui Irrigation Canal Water

① Terui-zeki Irrigation Canal

② Built in the upper reaches of the Genbikei Gorge on the Iwai River in Iwate Prefecture

③ A collective term for three artificial canals (waterways) with a total length of 64 kilometers, originating from the Oshimekiri Headworks and flowing through Ichinoseki City and Hiraizumi Town.

④ Excavated for irrigation purposes by Terui Taro Takaharu, a vassal of Fujiwara Hidehira.

⑤ Completed by his descendant, Terui Taro Takayasu.

⑥ The Kita-terui-zeki Canal, which flows through Hiraizumi Town and empties into the Koromo River, not only serves as an irrigation canal,but also

⑦ serves as the water source for the Motsu-ji Pure Land Garden, a component of the World Heritage Site "Hiraizumi: Architecture, Gardens and Archaeological Sites Representing the Buddhist Pure Land."

⑧ The Minami-terui-zeki Canal and the Oe-zeki Canal were completed by the Ichinoseki Domain during the Edo period.

⑨ They still supply water to 1,073 hectares of rice paddies in the grain-producing areas of Ichinoseki City and Hiraizumi Town.

0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He543) Terui Irrigation Canal Water

(He543) Terui Irrigation Canal Water

① Terui Weir
② Excavated in 1185 (Bun'ei 1)
③ A water conduit for filling ponds at four temples based on Hiraizumi culture and Pure Land Buddhism.
④ Developed into the excavation of the Terui Weir Irrigation Canal.
⑤ During the Oshu Fujiwara clan's time, rice paddies were primarily watered from natural sources such as small rivers and streams.
⑥ During the Oshu Fujiwara clan's time, Hiraizumi's population was approximately 100,000.
⑦ Rice paddy development was an urgent need.
⑧ Water intake from natural sources limits the amount of land that can be cultivated.
⑨ Farmers in dire straits due to water shortages.
⑩ This was Terui Taro Takaharu, a vassal of Fujiwara Hidehira.
⑪ Takaharu considered drawing water from the abundant Iwai River,
⑫ the riverbed of the Iwai River was carved deeper and lower than the plains.
⑬ It was necessary to create a system to draw water from the upstream part of the river.
⑭ Takaharu meticulously walked the Iwai River and decided on the path of the dam.
⑮ In 1185, 27 years after the plan was first conceived, construction began. In 1189 (Bun'ei 5), with the fall of the Fujiwara clan,
⑯ In 1208 (Shogen 2), Takaharu's descendants, Terui Taro Takayasu and Ogisho Shoji, used their own funds to dig a hole weir (aqueduct tunnel) across the Iwai River in the villages of Itsukushi and Inooka.
⑰ Subsequently, the weir was repeatedly constructed (extended) and renovated by various individuals and rulers, including Osaki Sobezaemon, Kashiwara Kiyozaemon, Kashiwara Shinjuro, and Chiba Han'emon.
⑱ In the 1600s, it supported the development of rice paddies in the region, irrigating Nakazato Village and Hiraizumi.

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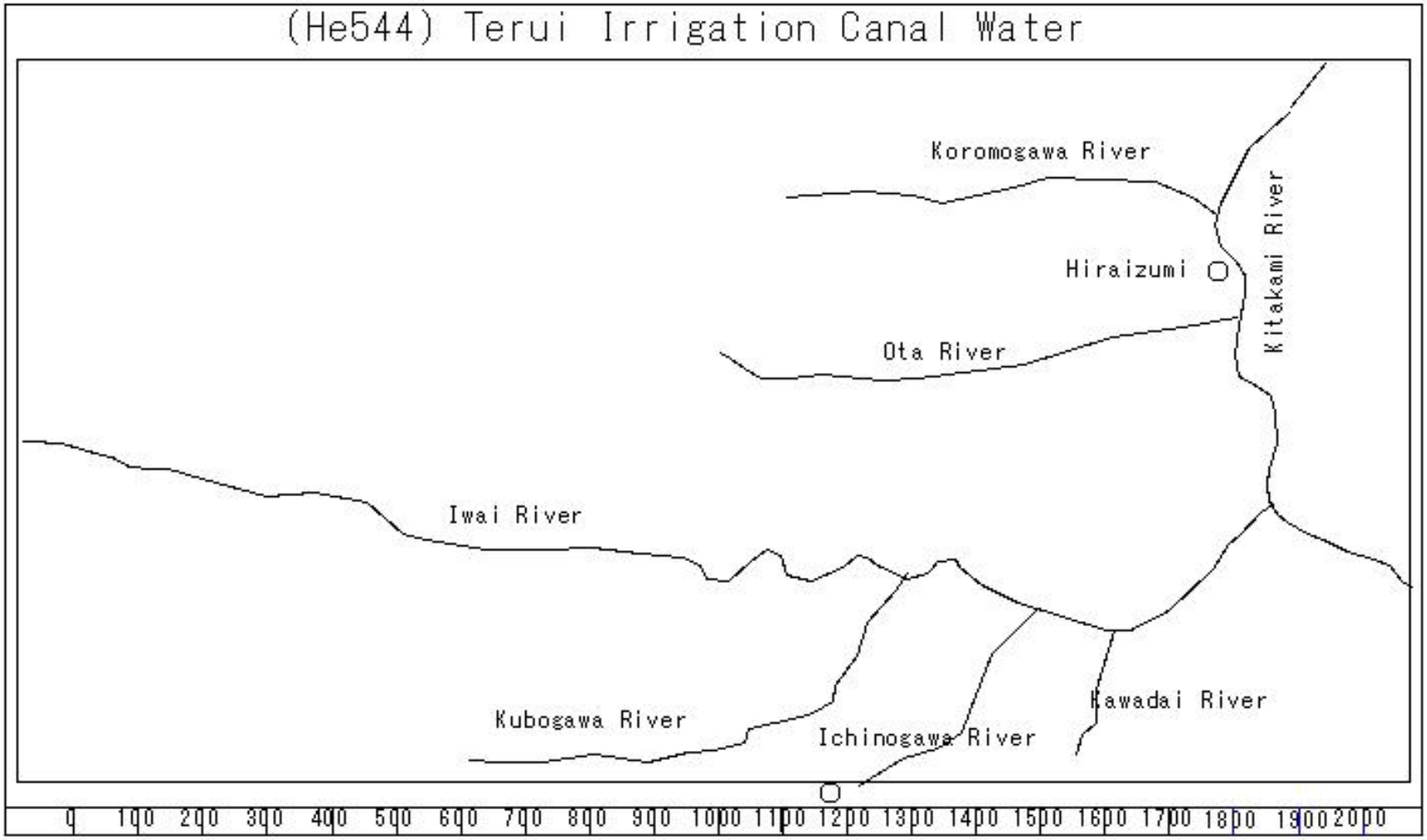
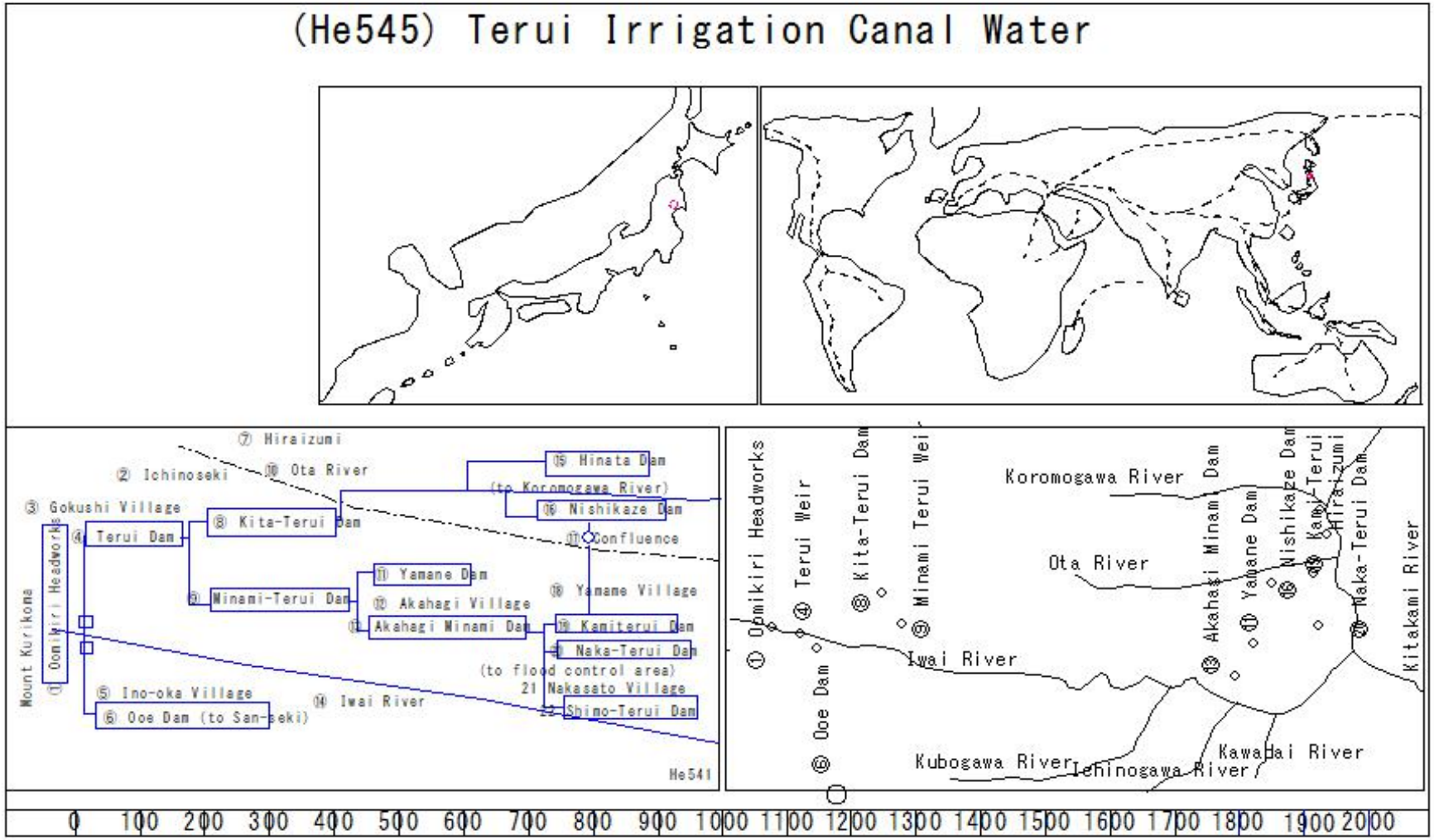
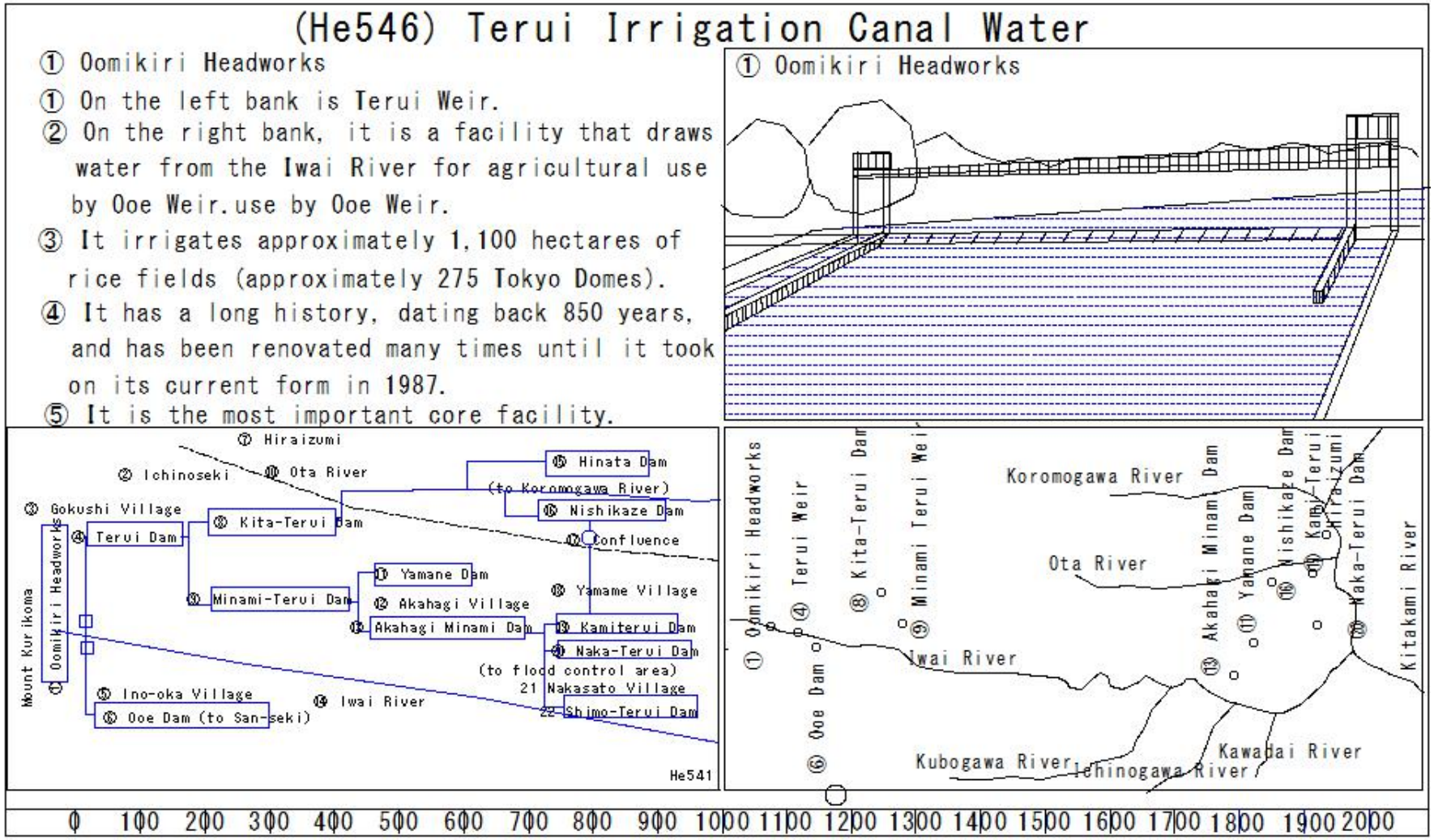
(He544) Terui Irrigation Canal Water



(He545) Terui Irrigation Canal Water



(He546) Terui Irrigation Canal Water



(He547) Terui Irrigation Canal Water

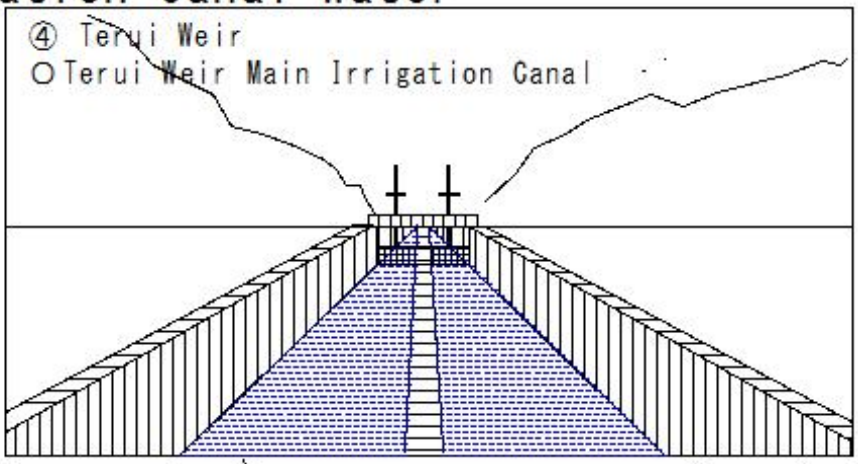
④ Terui Weir

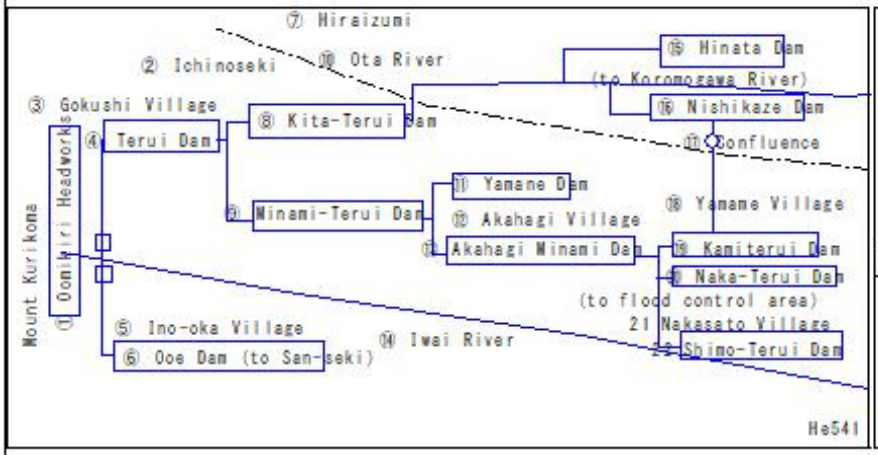
○Terui Weir Main Irrigation Canal

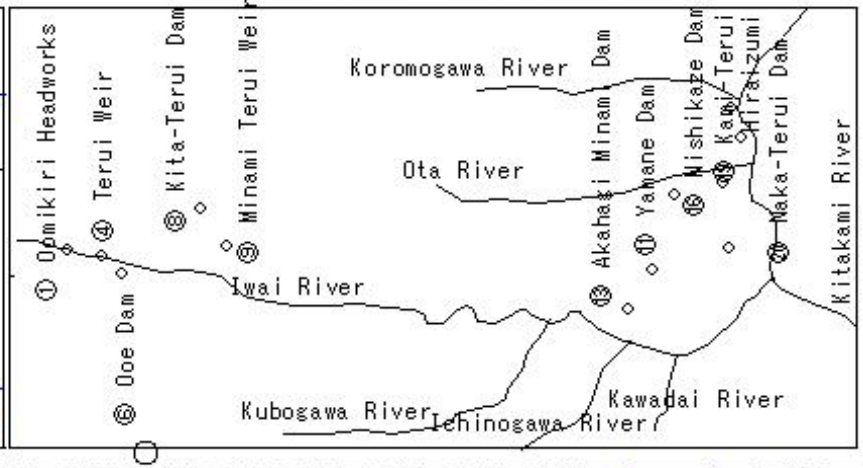
① This canal flows 1,778.8 meters from the Oshimekiri Headworks to the Sasabeira North-South Diversion Works.

② The canal is constructed using masonry.

③ Facilities include the Terui Weir Tunnel and the Yamaguchi Sand Settling Basin.







0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He548) Terui Irrigation Canal Water

⑥ Ooe Dam (to San-seki)　Ooe Seki Main Canal

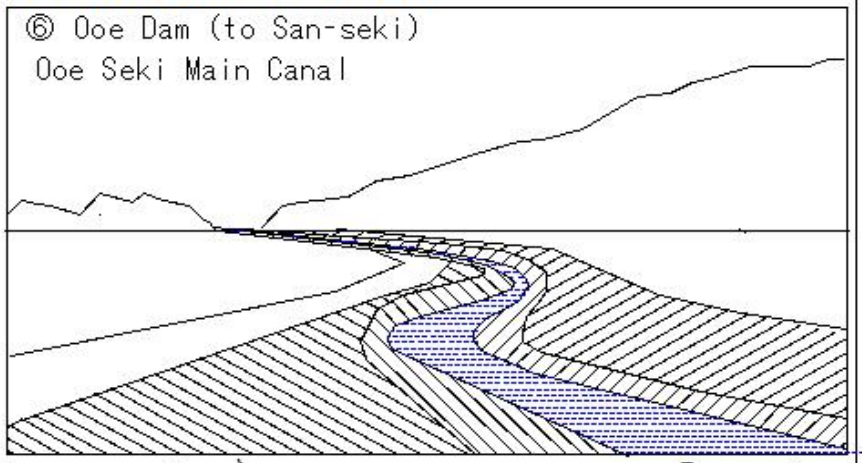
① This is a waterway that flows 16,275.65m from the Oshimekiri Headworks to Tsuriyama in Ichinoseki City.

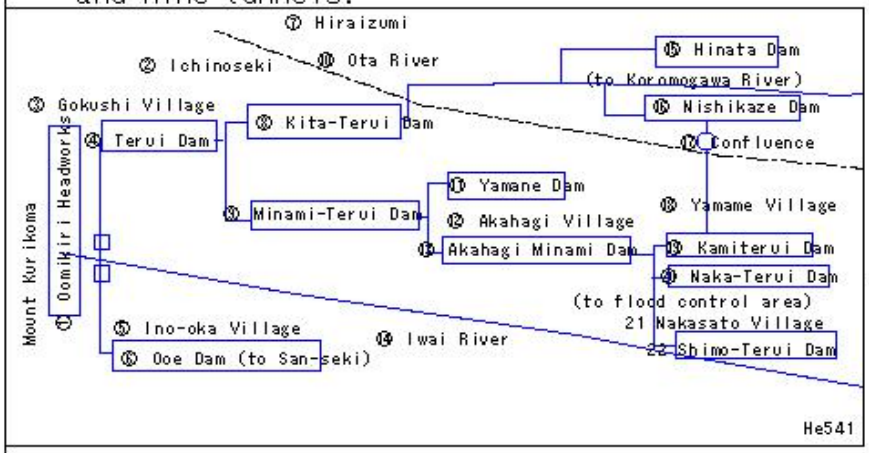
② It irrigates rice fields in Genbi Town (left bank of the Iwai River) and Hagisho.

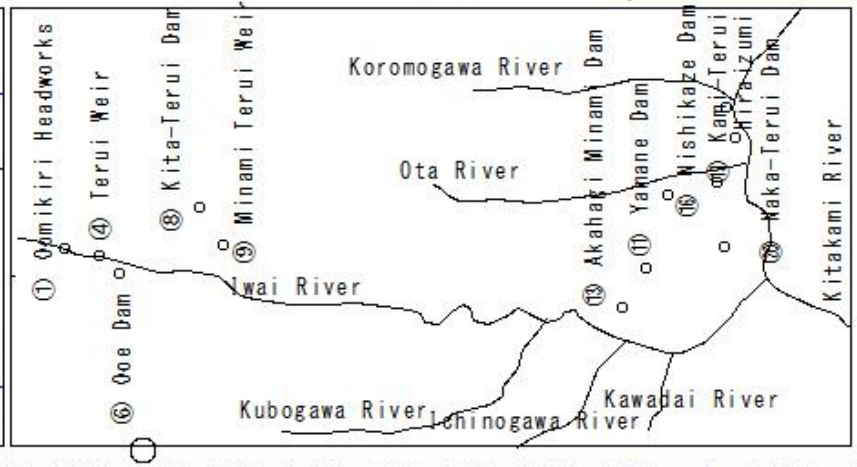
③ The waterway's structure was constructed in the 1940s.

④ Most of it is made of concrete.

⑤ Five siphons, one water pipe bridge, and nine tunnels.







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(He549) Terui Irrigation Canal Water

⑧ Kita-Terui Dam
Kitaterui Weir Main Irrigation Canal

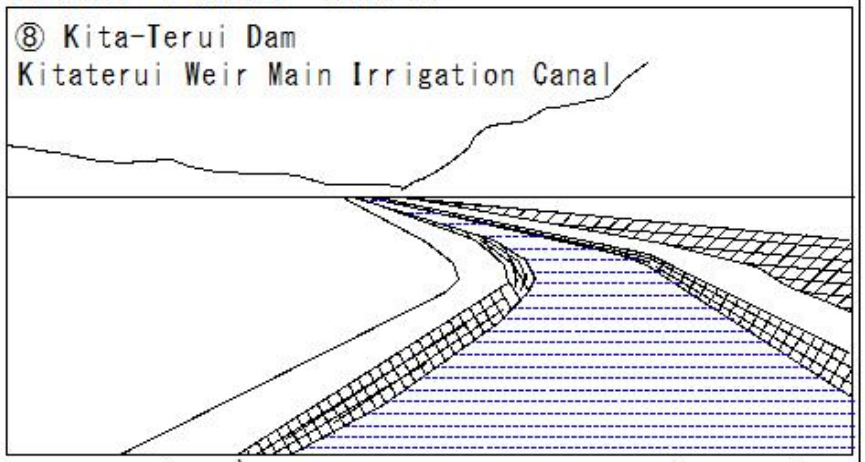
① This is a canal that flows 3,297.65m from the Sasabeira North-South Diversion Works to inject water into the Ota River in Hiraizumi.

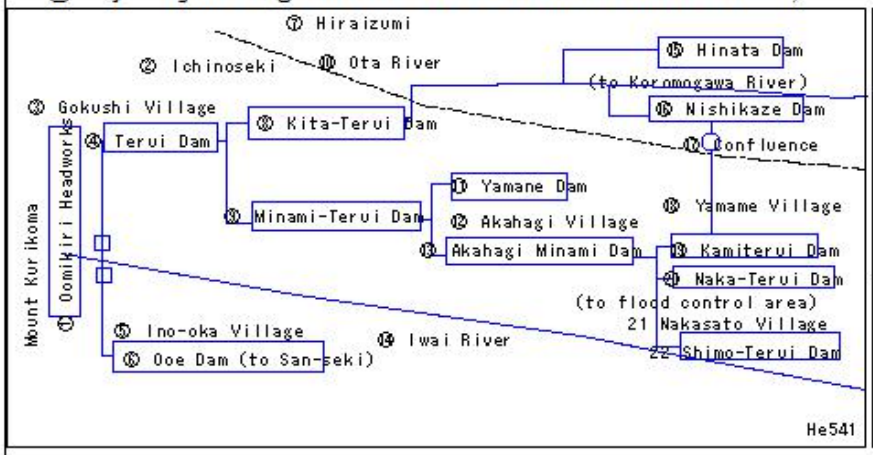
② The canal's structure is mostly masonry.

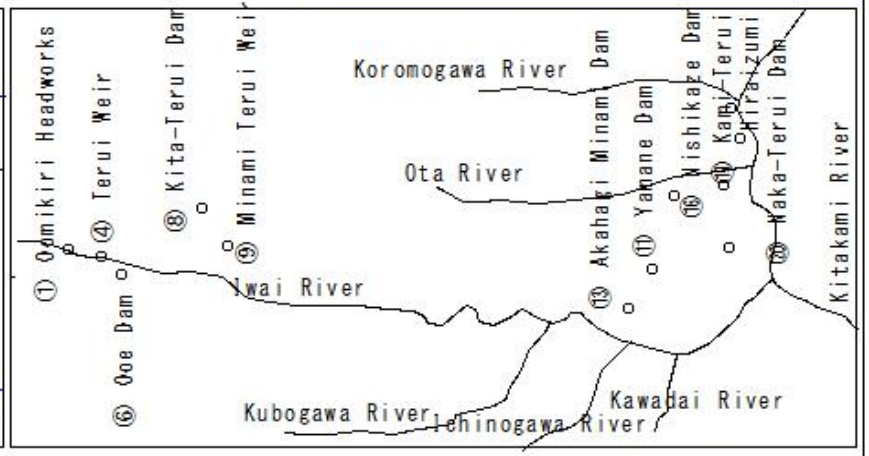
③ Its distinctive cross-section measures 2m x 3m, making it quite deep.

④ Although the Ota River in Hiraizumi has a limited water volume,

⑤ by injecting water from the Kamiterui Weir,







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(He550) Terui Irrigation Canal Water

⑨ Minami Terui Weir

Minami Terui Weir Main Irrigation Canal

① A canal that flows 4,233.3m from the Sasabeira North-South Diversion Works to the Takada West Diversion Works.

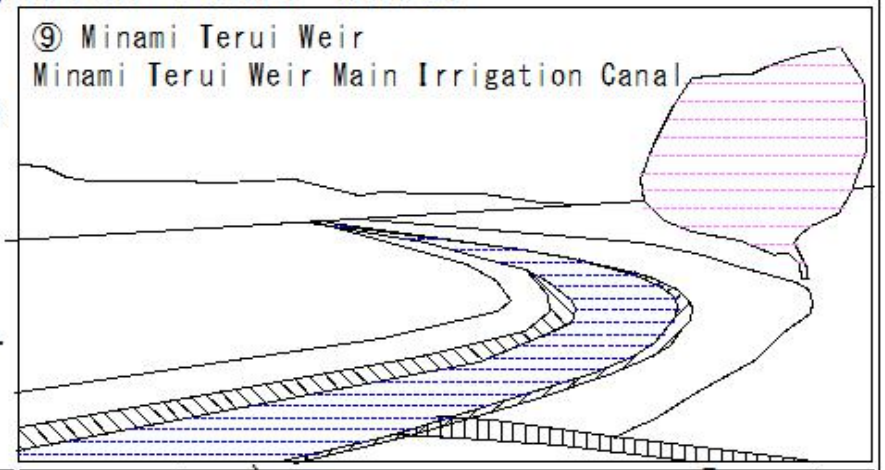
② Half of it is a mountainside canal.

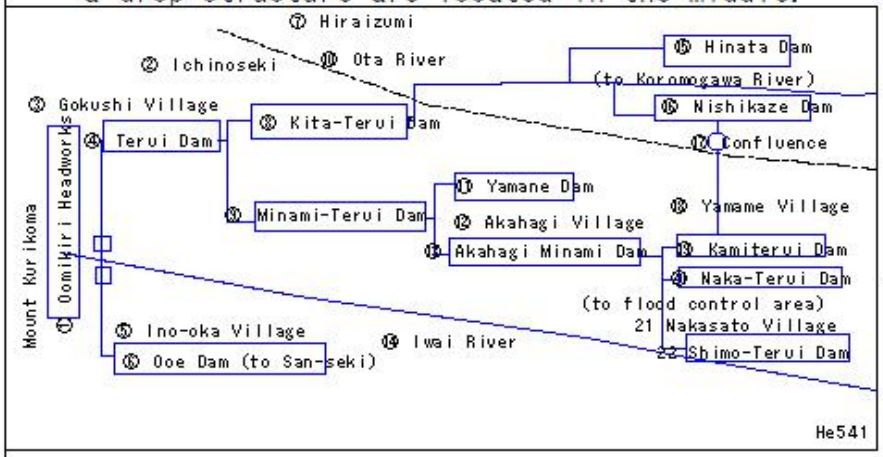
③ Half of the canal is made of masonry,

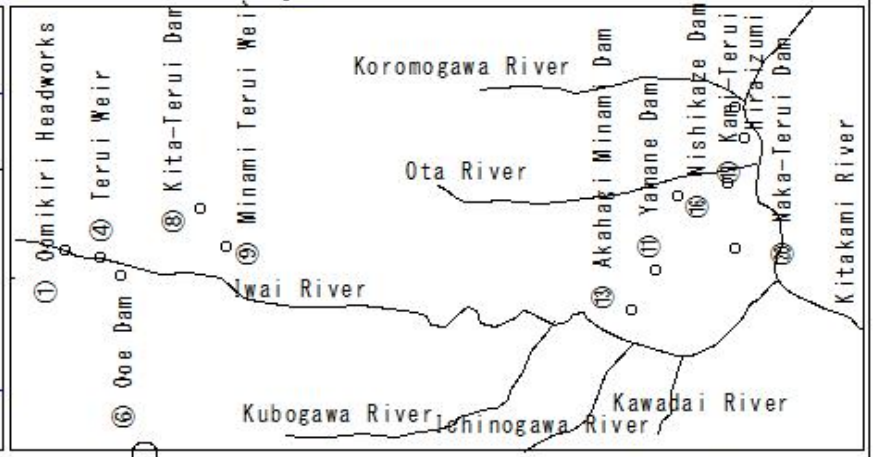
④ The other half is made of three-sided concrete.

⑤ The cross-section is 2-4m wide and 2-4m high.

⑥ Facilities such as a fertilizer siphon and a drop structure are located in the middle.







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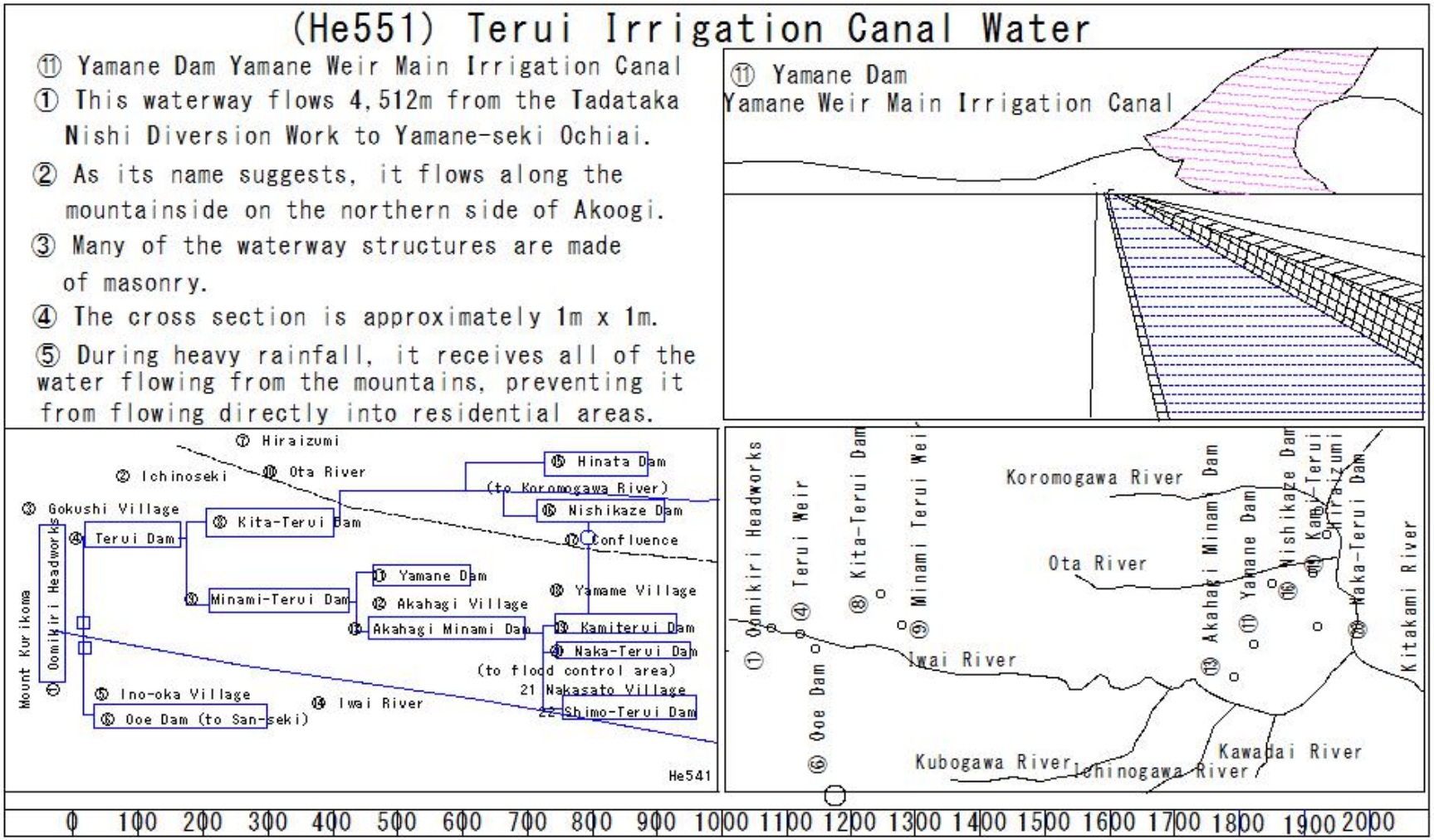
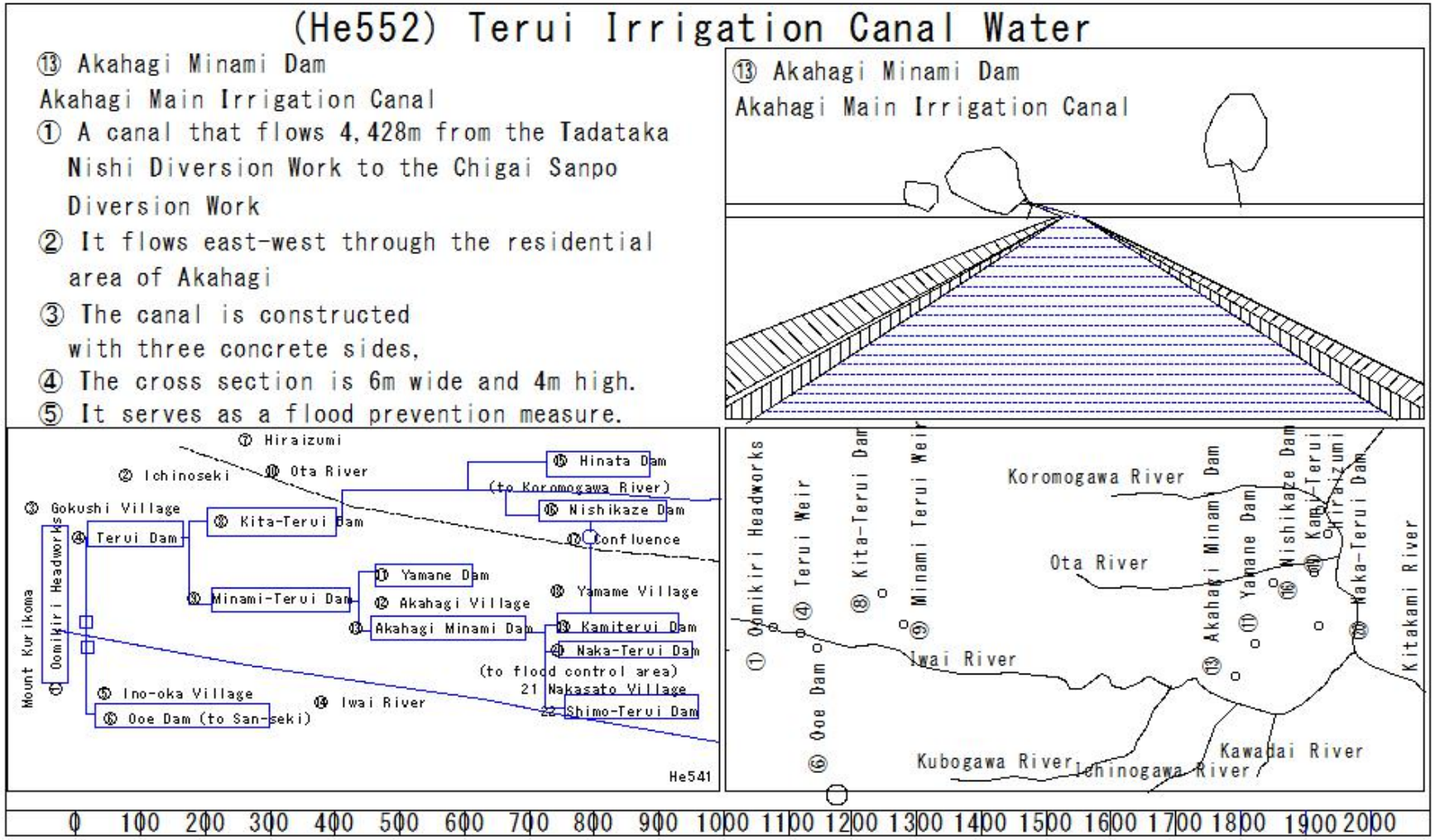
(He551) Terui Irrigation Canal Water



(He552) Terui Irrigation Canal Water



(He553) Terui Irrigation Canal Water

⑯ Nishikaze Dam

Nishikaze Weir Main Irrigation Canal

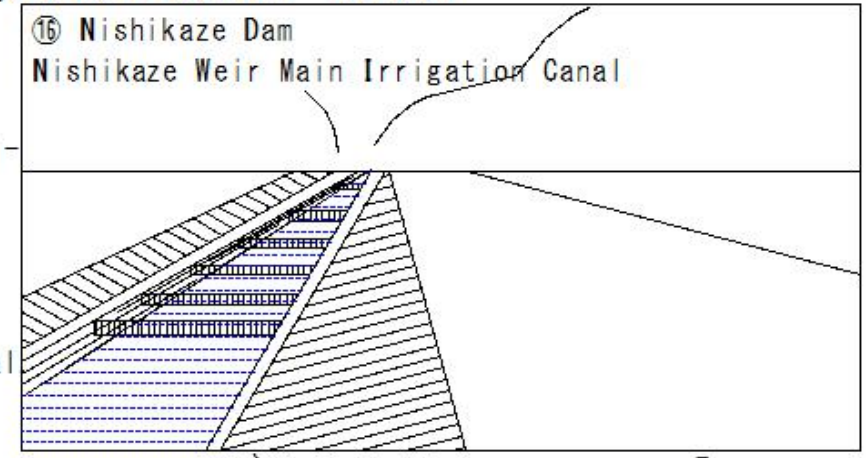
① This is a 4,732m canal that runs from Shimokaya Headworks to the confluence with Kami-Terui Weir in Takada, Hiraizumi Town.

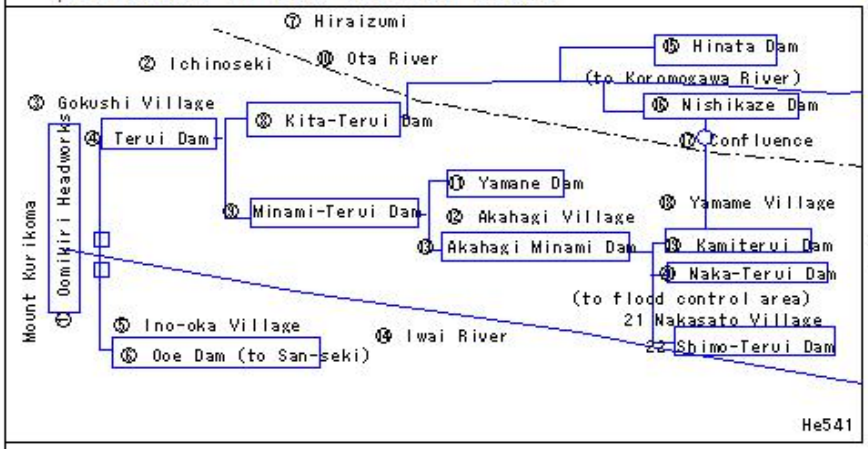
② It flows along the foothills south of the Ota River.

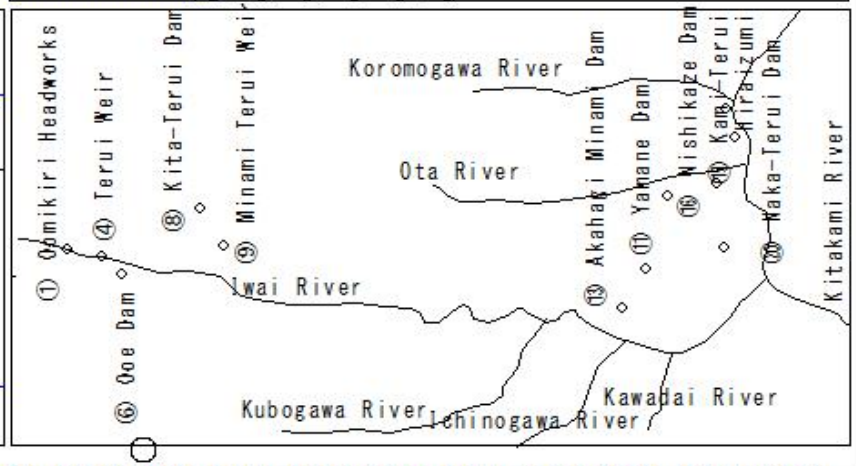
③ It confluences with Kami-Terui Weir.

④ The canal's structure is a concrete/earthen canal

⑤ The earthen canal is pristine and has been preserved in its natural state.







0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He554) Terui Irrigation Canal Water

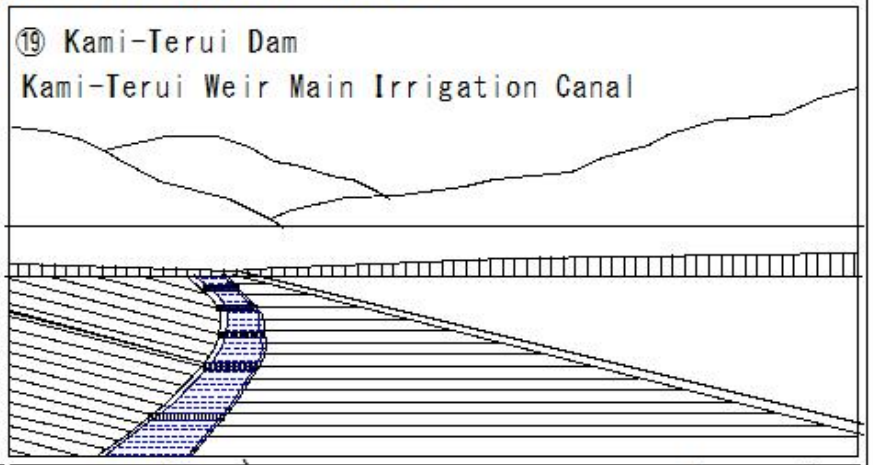
⑲ Kami-Terui Dam

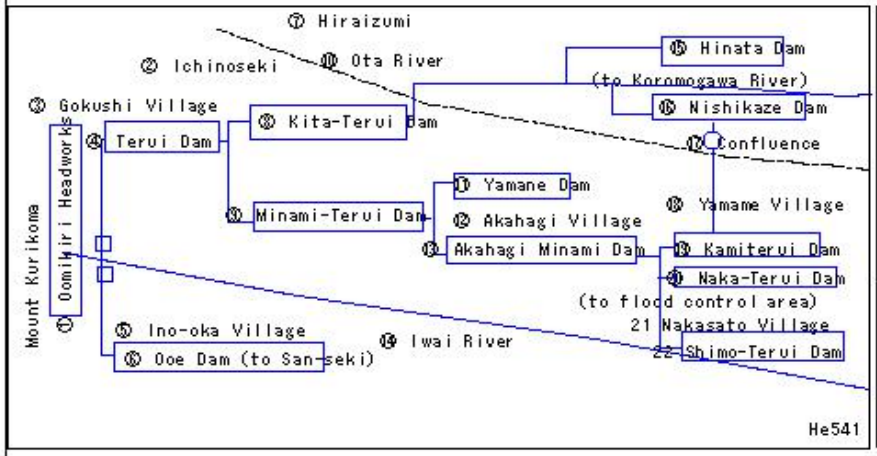
Kami-Terui Weir Main Irrigation Canal

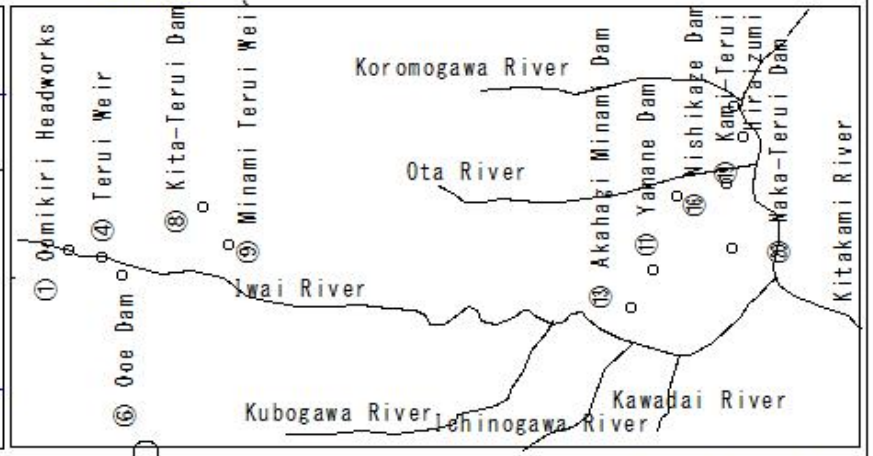
① A 6,074m waterway that flows from the Chisan-Way Diversion Works to the north-south confluence with the Nishikaze Weir.

② It flows along Mt. Ranbaiyama in Nakazato and joins Hiraizumi Town.

③ The waterway is structured with a box culvert, arch culvert, and tunnel.

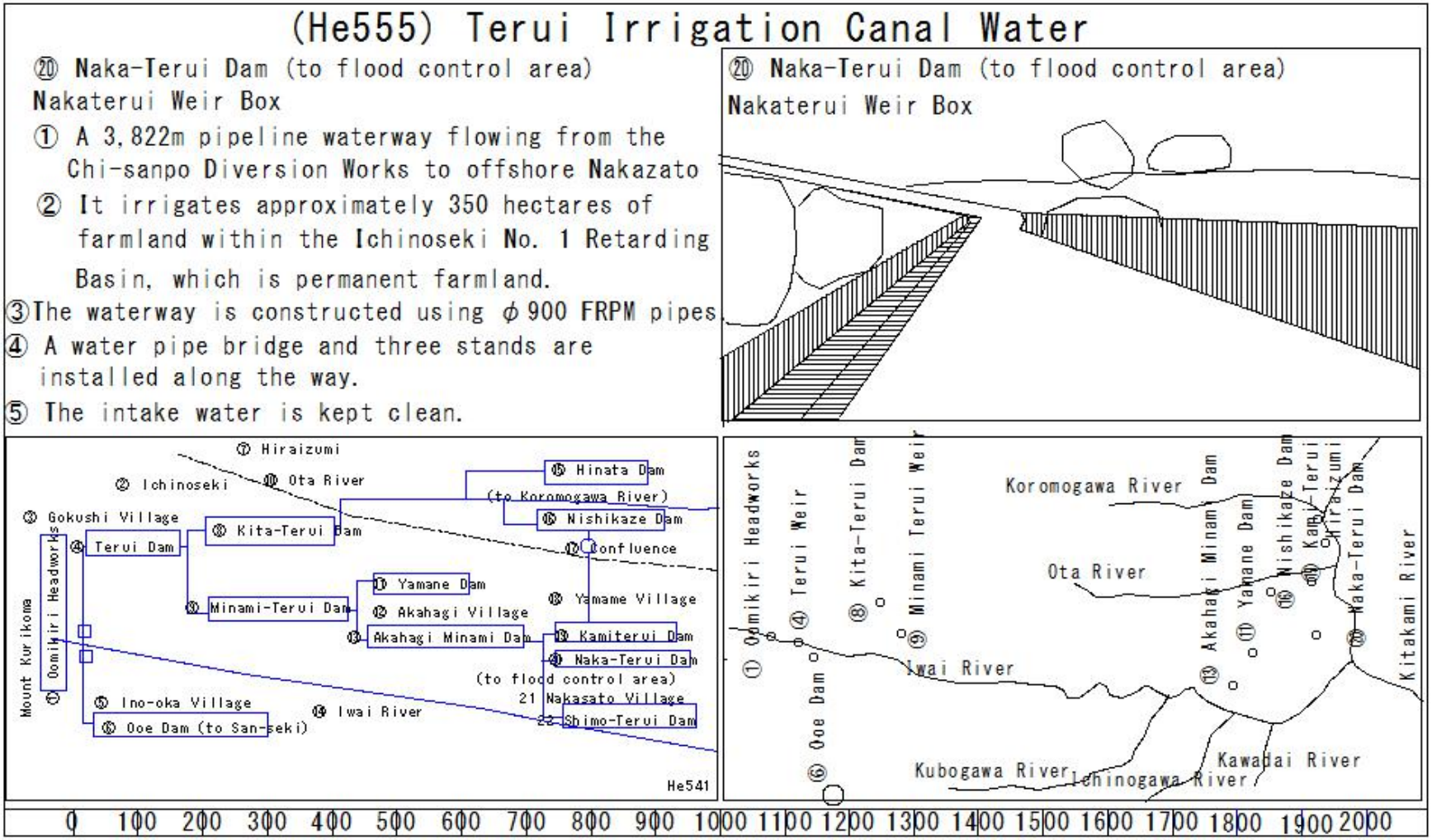






0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He555) Terui Irrigation Canal Water



(He556) Terui Irrigation Canal Water

(He556) Terui Irrigation Canal Water

①a Oomikiri Headworks

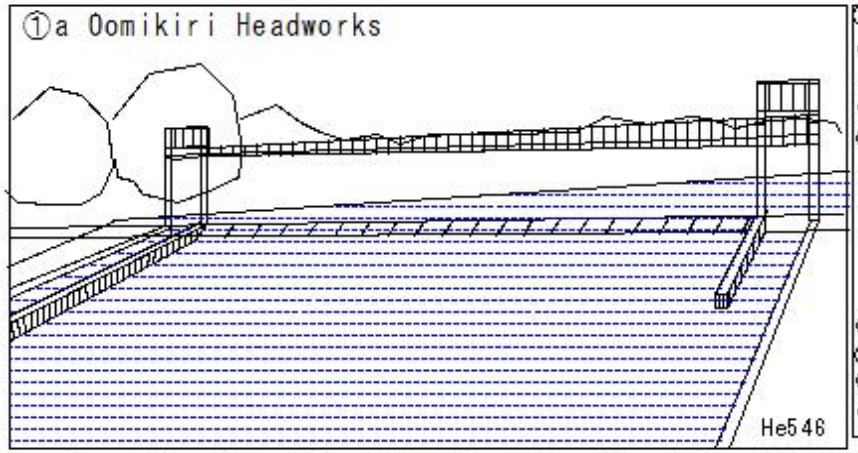
① On the left bank is Terui Weir.

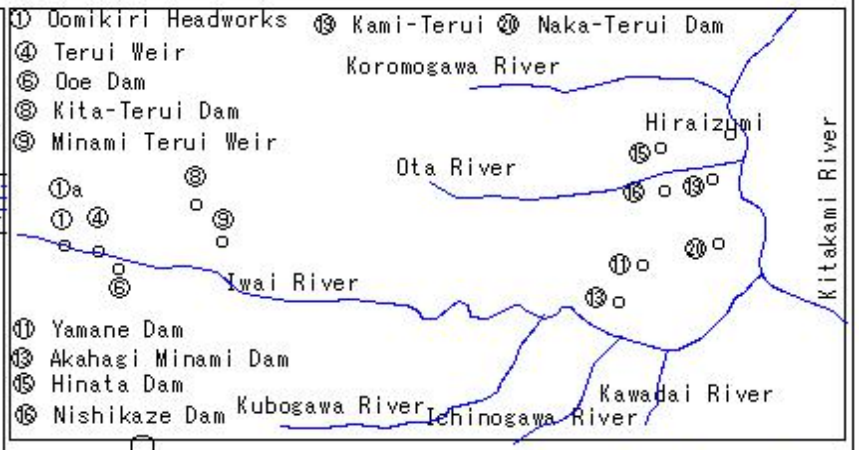
② On the right bank, it is a facility that draws water from the Iwai River for agricultural use by Oe Weir.

③ It irrigates approximately 1,100 hectares of rice fields (approximately 275 Tokyo Domes).

④ It has a long history, dating back 850 years, and has been renovated many times until it took on its current form in 1987.

⑤ It is also the source of the Terui Weir and Oe Weir, which have a total length of 63 km.





0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He557) Terui Irrigation Canal Water

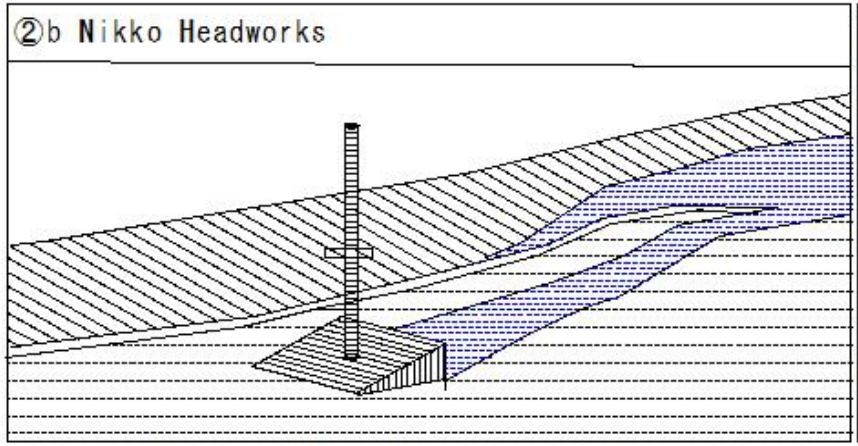
(He557) Terui Irrigation Canal Water

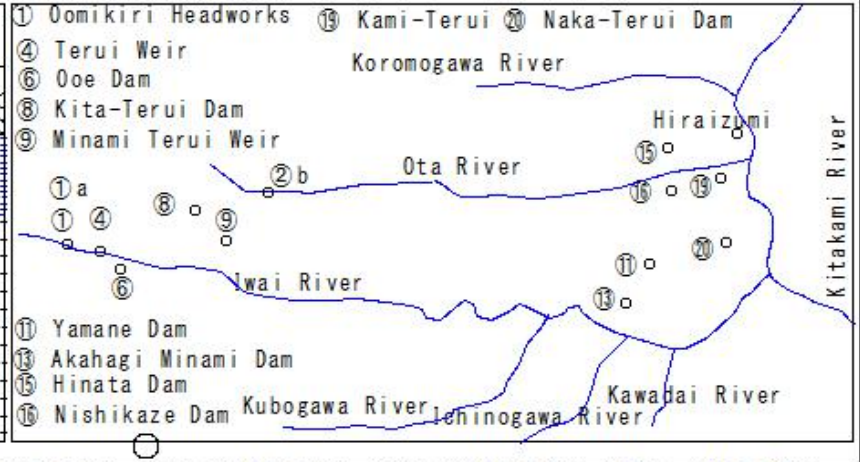
②b Nikko Headworks

① Water is taken from the Ota River downstream of Himemachi Falls into the Hinata Weir,

②Which irrigates the rice fields along the left bank of the Ota River in Hiraizumi Town.

③It took on its current form in 1993.





0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He558) Terui Irrigation Canal Water

(He558) Terui Irrigation Canal Water

③c Shimokaya Headworks

① Water is taken from the Ota River (downstream of the Nikko headworks) to the Nishikaze Weir.

② It irrigates rice fields along the right bank of the Ota River in Hiraizumi Town.

③ The date of construction is unknown.

④ It has been destroyed many times due to disasters, etc.

⑤ Repairs have been carried out each time to extend its life.

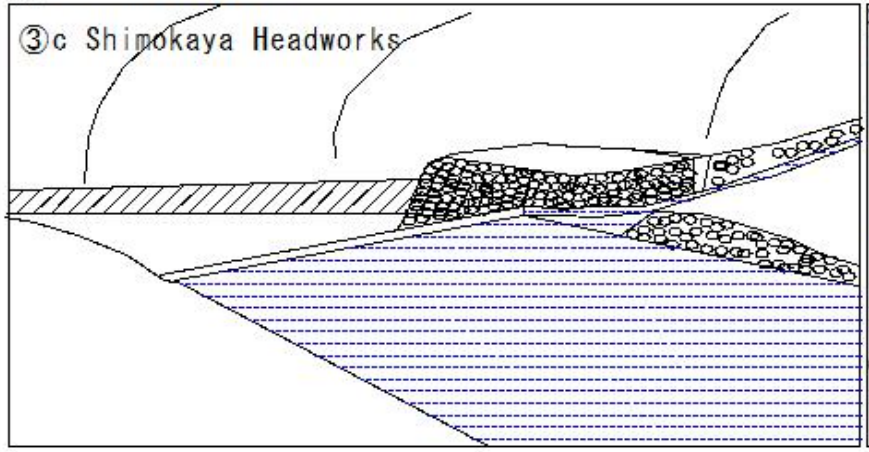
①a Oshimekiri Headworks

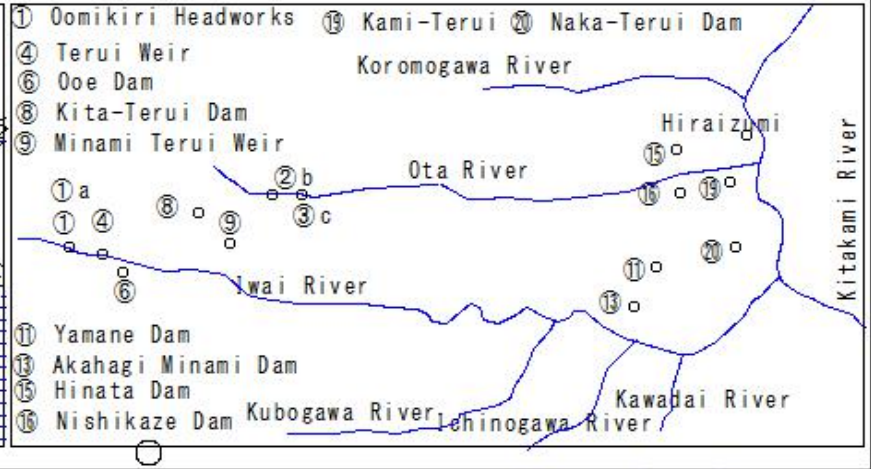
②b Nikko Headworks

③c Shimokaya Headworks

④d Fujihashiri Headworks

⑤e Kutsu Headworks





0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He559) Terui Irrigation Canal Water

(He559) Terui Irrigation Canal Water

④d Fujihashiri Headworks

① A portion of the Oe Weir, which draws water from the Oshimekiri headworks, is pumped into the Kubo River.

② Water is then drawn into the Sai-Oe Weir, irrigating rice fields along the right bank of the Kubo River in Hagisho, Ichinoseki City.

③ The date of construction is unknown, and the weir has deteriorated significantly.

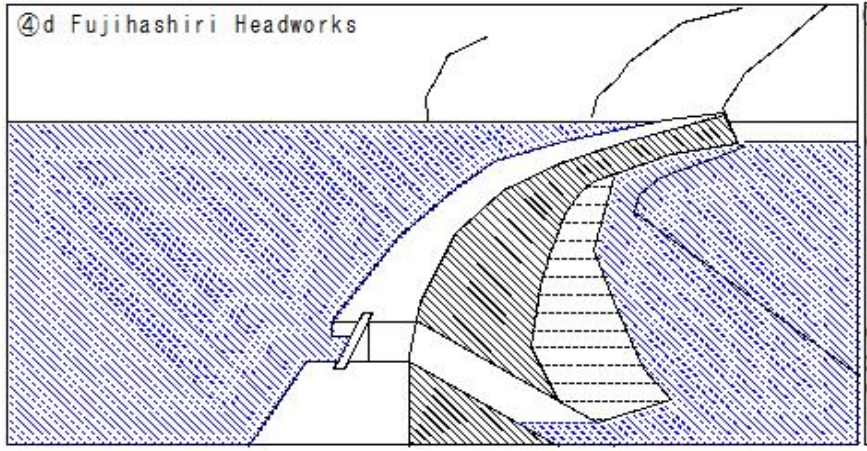
①a Oshimekiri Headworks

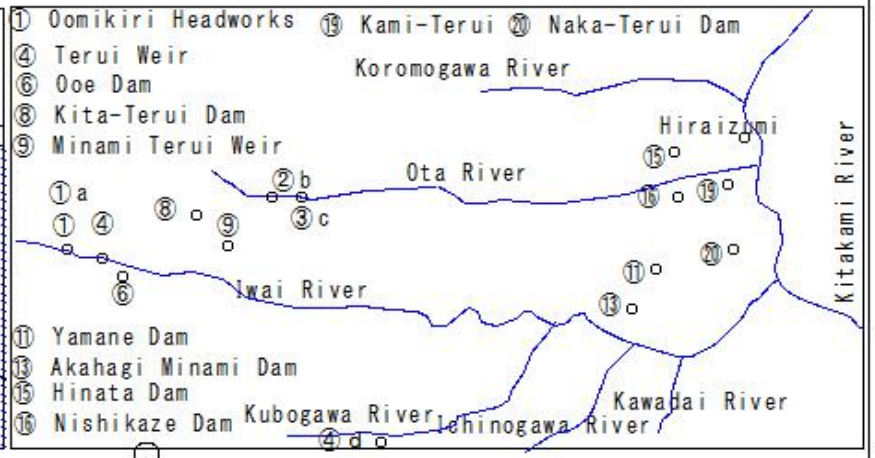
②b Nikko Headworks

③c Shimokaya Headworks

④d Fujihashiri Headworks

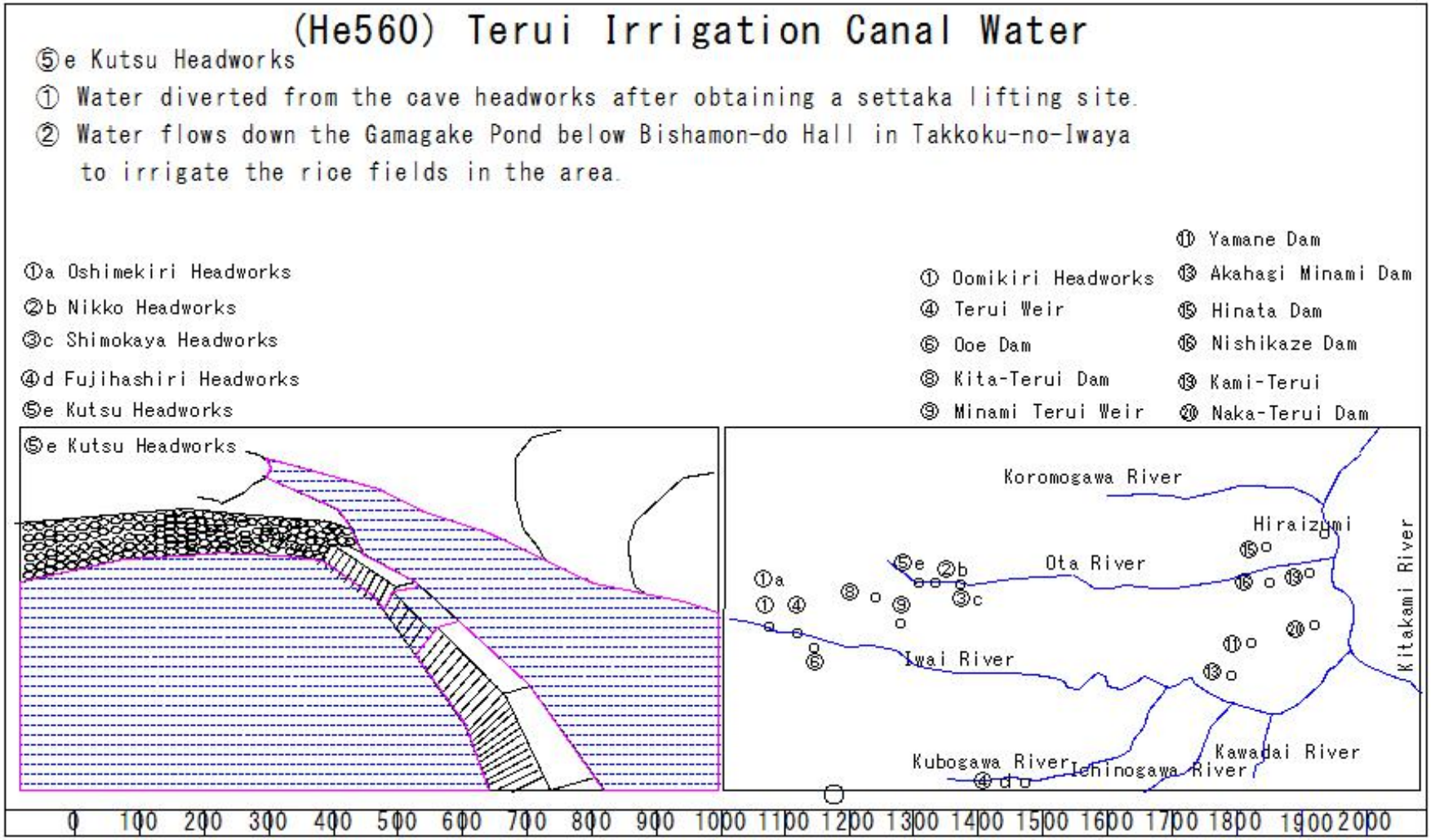
⑤e Kutsu Headworks



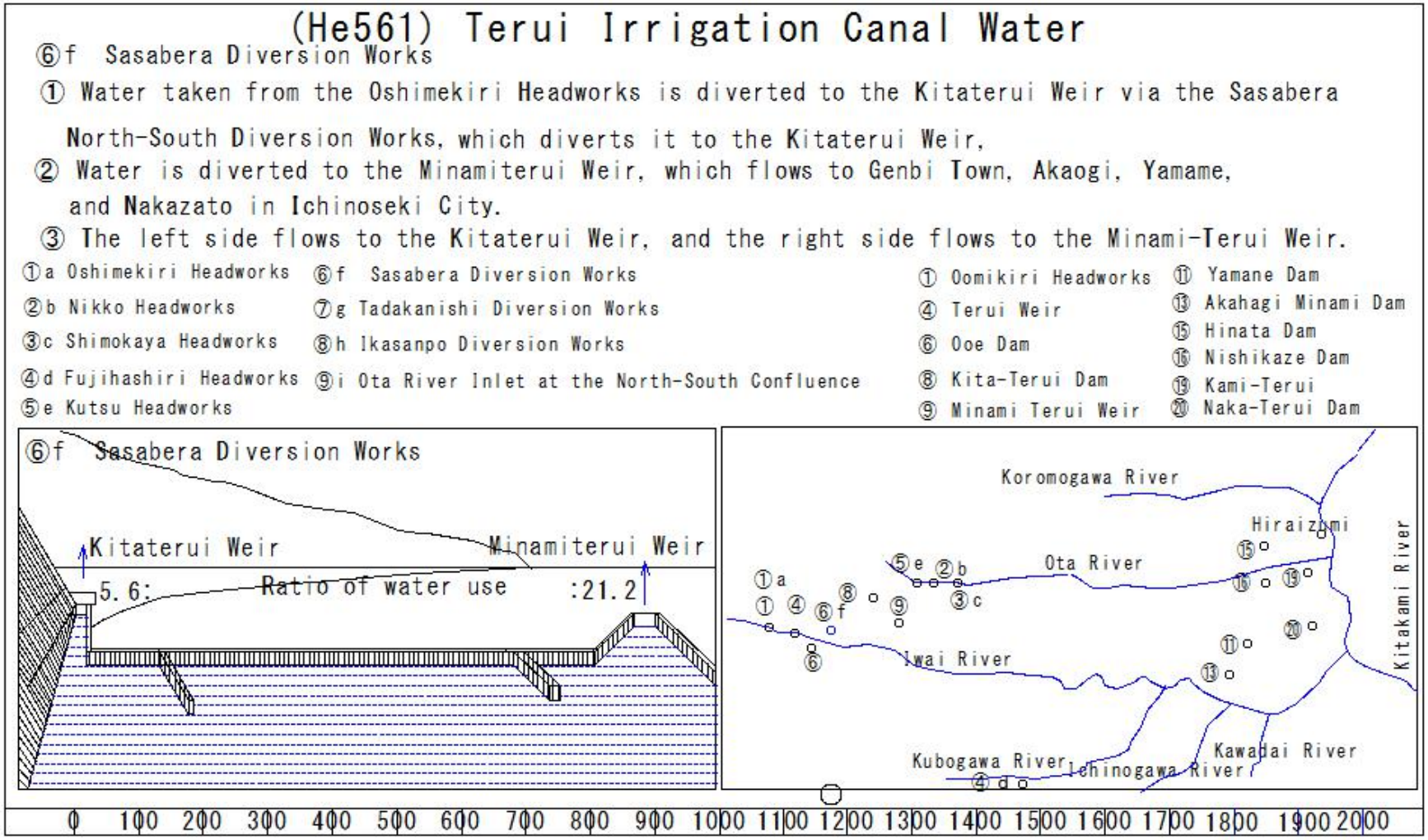


0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He560) Terui Irrigation Canal Water



(He561) Terui Irrigation Canal Water



(He562) Terui Irrigation Canal Water

(He562) Terui Irrigation Canal Water

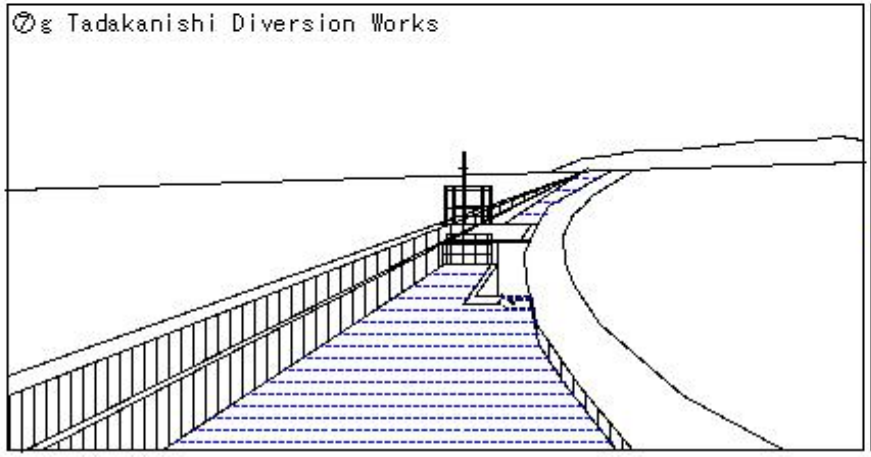
⑦g Tadakanishi Diversion Works

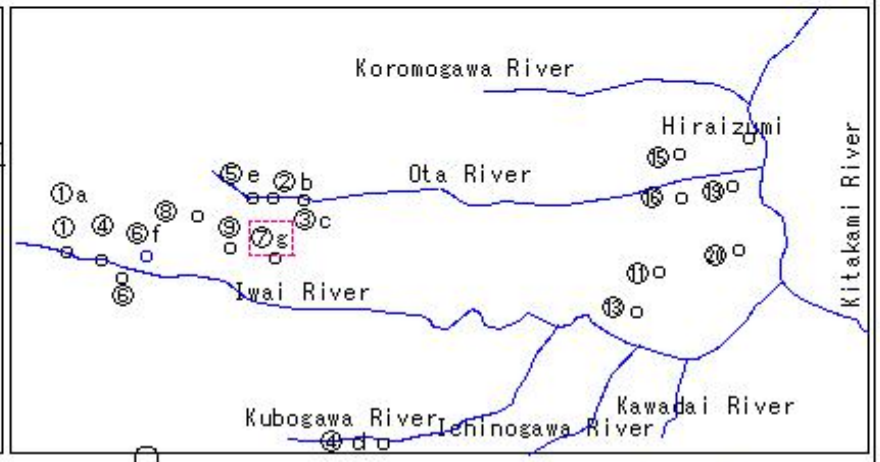
① Minami Terui Weir, which receives water from the Sasabera North-South Diversion Works, diverts water to the Yamane Weir and Akaogi Main Line at the Tadakanishi Diversion Works.

② The left side of the photo is to the Yamane Weir. The right side is to the Akaogi Main Line.

①a Oshimekiri Headworks
②b Nikko Headworks
③c Shimokaya Headworks
④d Fujihashiri Headworks
⑤e Kutsu Headworks
⑥f Sasabera Diversion Works
⑦g Tadakanishi Diversion Works
⑧h Ikasanpo Diversion Works
⑨i Ota River Inlet at the North-South Confluence

① Oomikiri Headworks
④ Terui Weir
⑥ Ooe Dam
⑧ Kita-Terui Dam
⑨ Minami Terui Weir
⑪ Yamane Dam
⑬ Akahagi Minami Dam
⑮ Hinata Dam
⑯ Nishikaze Dam
⑲ Kami-Terui
⑳ Naka-Terui Dam





0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He563) Terui Irrigation Canal Water

(He563) Terui Irrigation Canal Water

⑧h Ikasanpo Diversion Works

① The Akaogi Main Line, diverted at the Sasabera Diversion Works, is diverted at the Chi-sanpo Diversion Works into three waterways: the Kami, Naka, and Shimo-Terui Weirs.

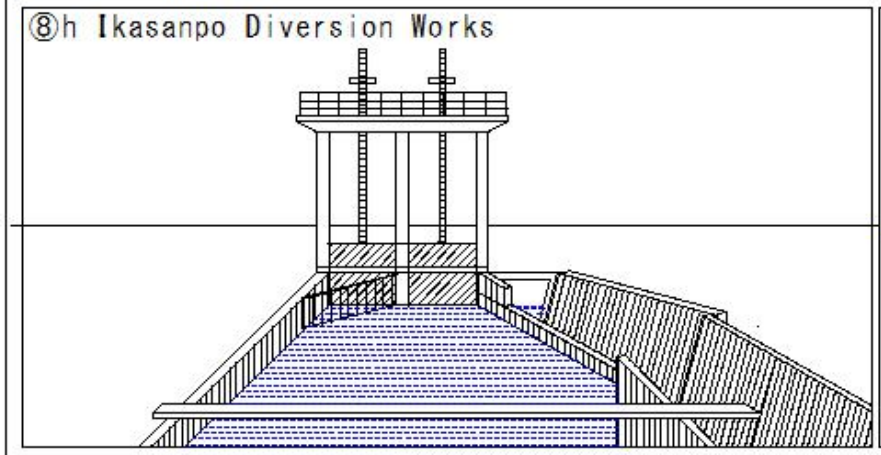
② The Kami-Terui Weir flows toward Nakazato and Hiraizumi,

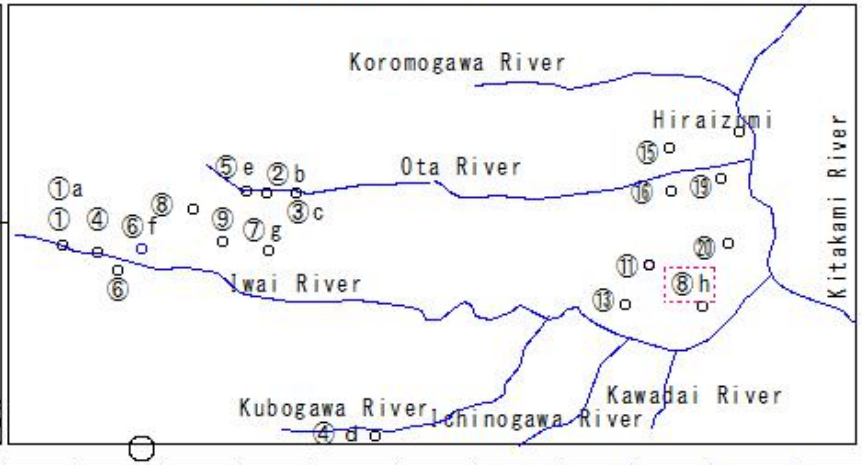
③ The Naka-Terui Weir flows into the Ichinoseki Retarding Basin,

④ The Shimo-Terui Weir flows into the Iwai River.

①a Oshimekiri Headworks
②b Nikko Headworks
③c Shimokaya Headworks
④d Fujihashiri Headworks
⑤e Kutsu Headworks
⑥f Sasabera Diversion Works
⑦g Tadakanishi Diversion Works
⑧h Ikasanpo Diversion Works
⑨i Ota River Inlet at the North-South Confluence

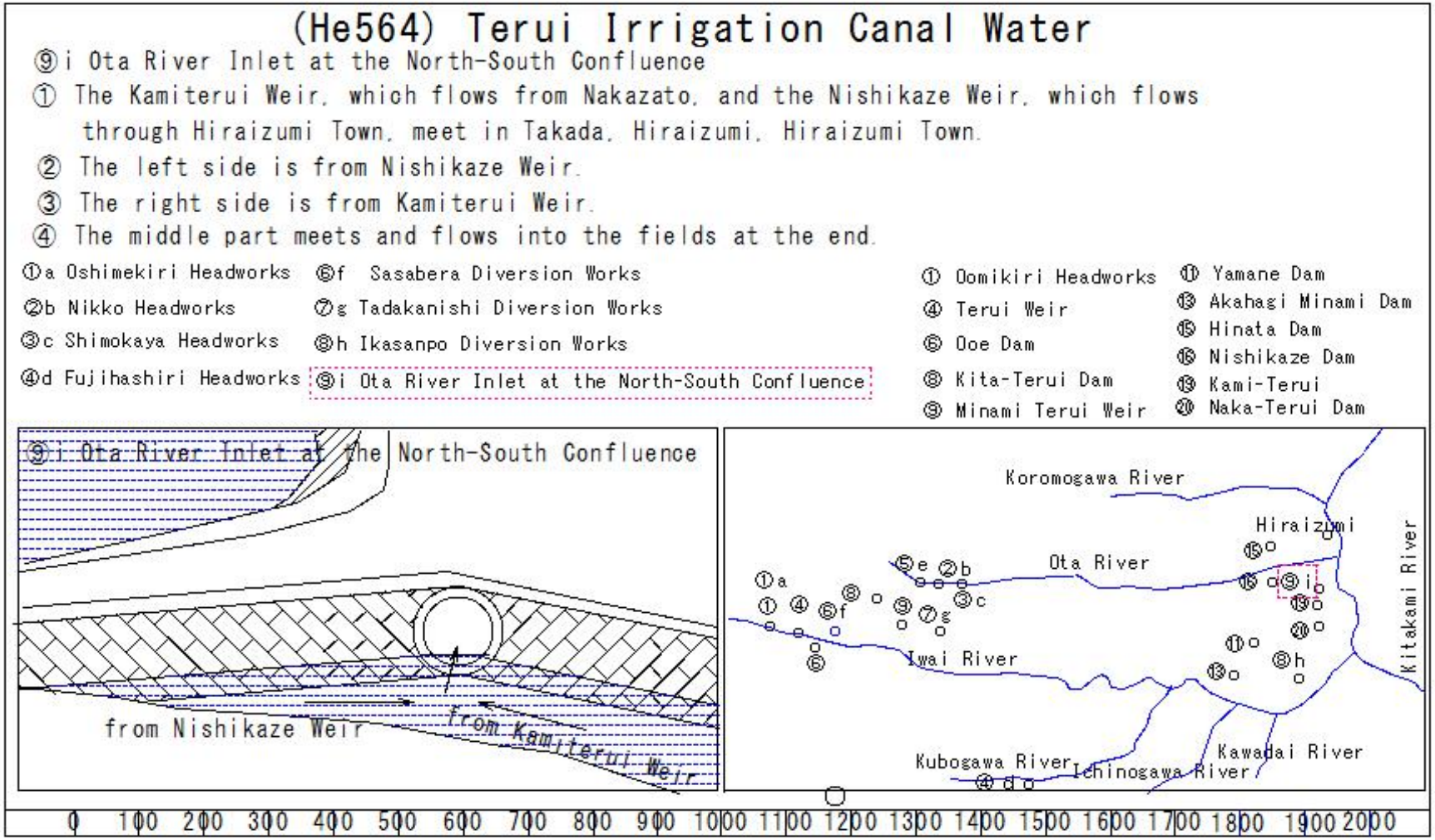
① Oomikiri Headworks
④ Terui Weir
⑥ Ooe Dam
⑧ Kita-Terui Dam
⑨ Minami Terui Weir
⑪ Yamane Dam
⑬ Akahagi Minami Dam
⑮ Hinata Dam
⑯ Nishikaze Dam
⑲ Kami-Terui
⑳ Naka-Terui Dam



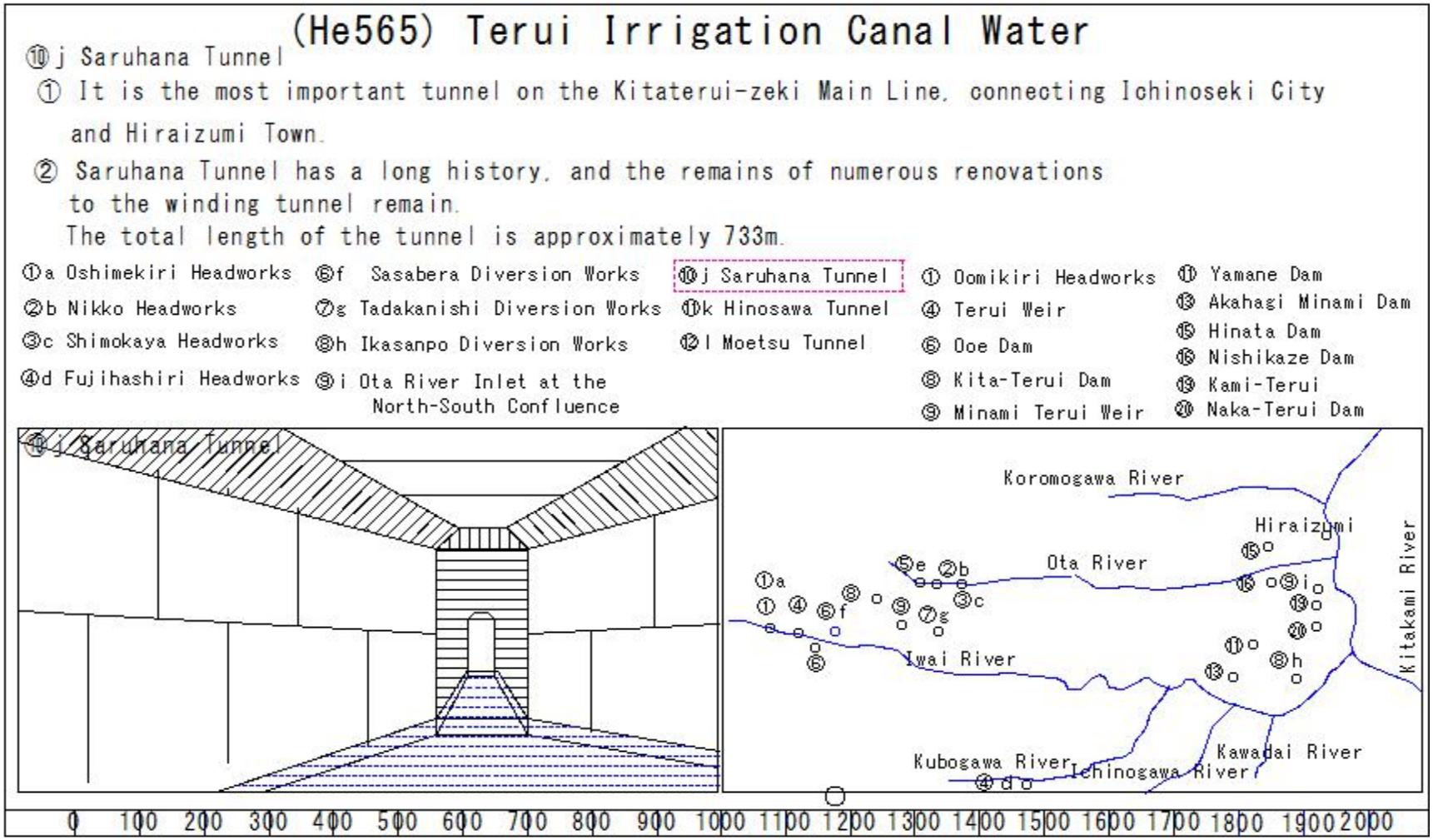


0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He564) Terui Irrigation Canal Water



(He565) Terui Irrigation Canal Water



(He566) Terui Irrigation Canal Water

(He566) Terui Irrigation Canal Water

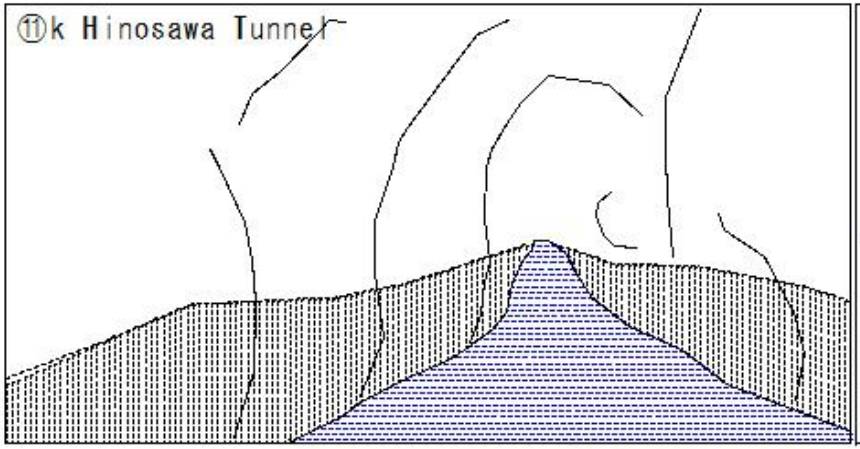
⑪k Hinosawa Tunnel

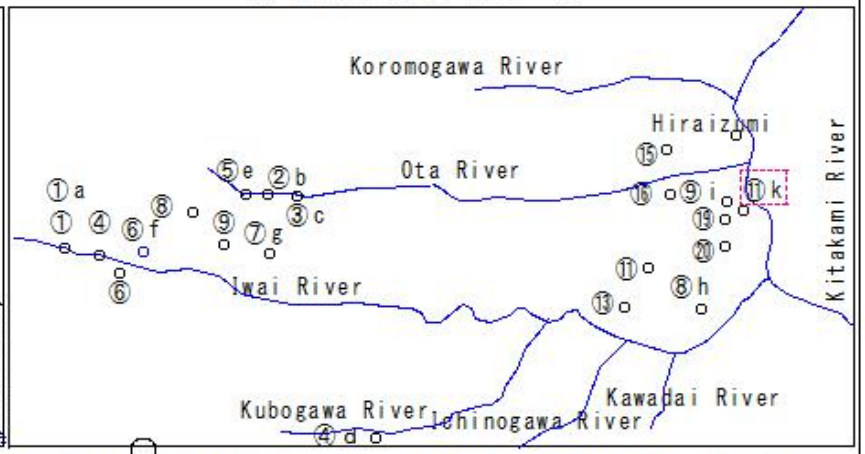
① This tunnel is located downstream of the Kami-Terui-Seki Main Line and is said to have been built approximately 400 years ago.

② It is the oldest unlined tunnel.

③ The tunnel is approximately 147m long.

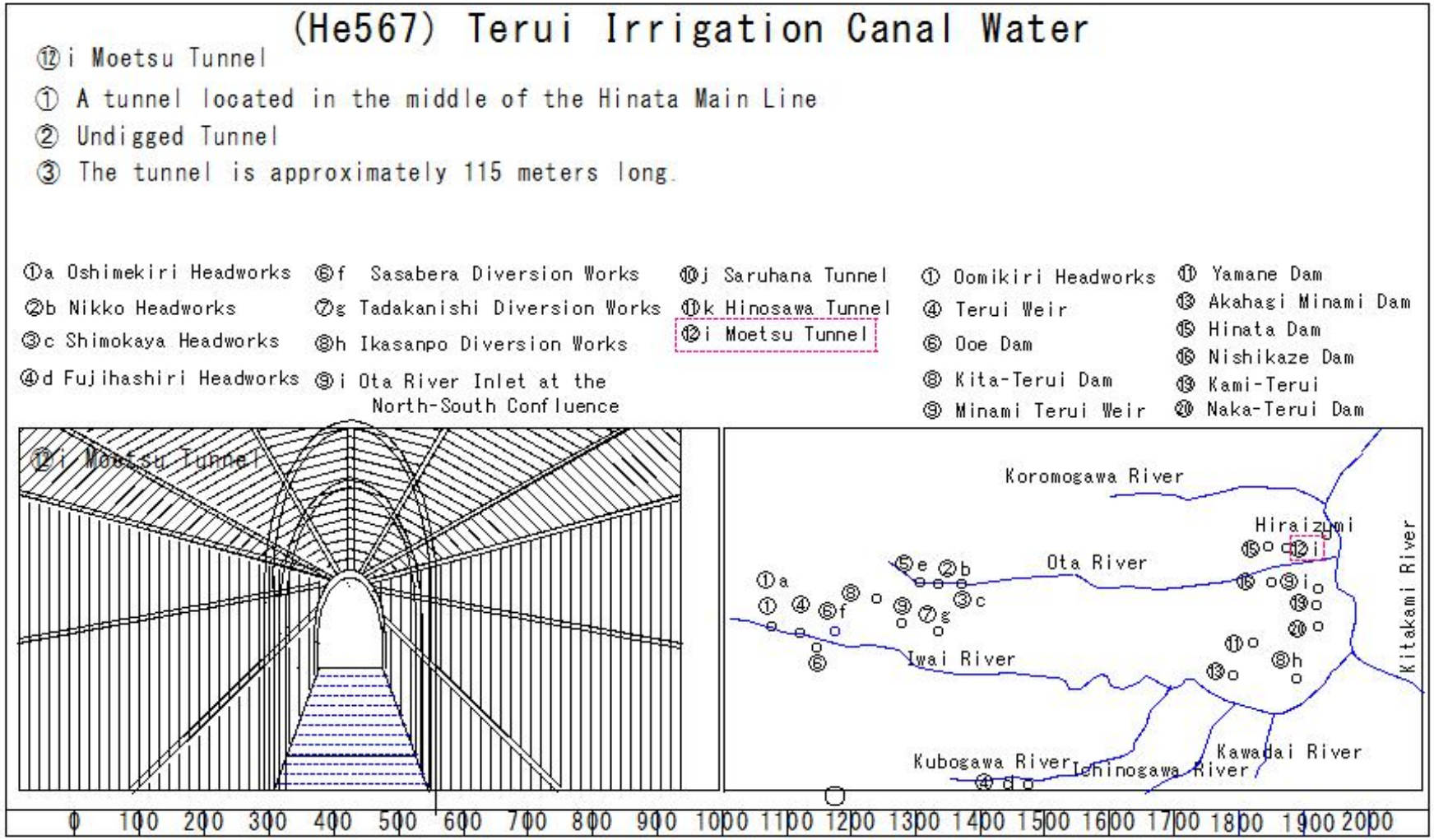
①a Oshimekiri Headworks
②b Nikko Headworks
③c Shimokaya Headworks
④d Fujihashiri Headworks
⑥f Sasabera Diversion Works
⑦g Tadakanishi Diversion Works
⑧h Ikasanpo Diversion Works
⑨i Ota River Inlet at the North-South Confluence
⑩j Saruhana Tunnel
⑪k Hinosawa Tunnel
⑫l Koshigo Tunnel
① Oomikiri Headworks
④ Terui Weir
⑥ Ooe Dam
⑧ Kita-Terui Dam
⑨ Minami Terui Weir
⑪ Yamane Dam
⑬ Akahagi Minami Dam
⑮ Hinata Dam
⑯ Nishikaze Dam
⑲ Kami-Terui
⑳ Naka-Terui Dam





0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He567) Terui Irrigation Canal Water



(He568) Terui Irrigation Canal Water

(He568) Terui Irrigation Canal Water

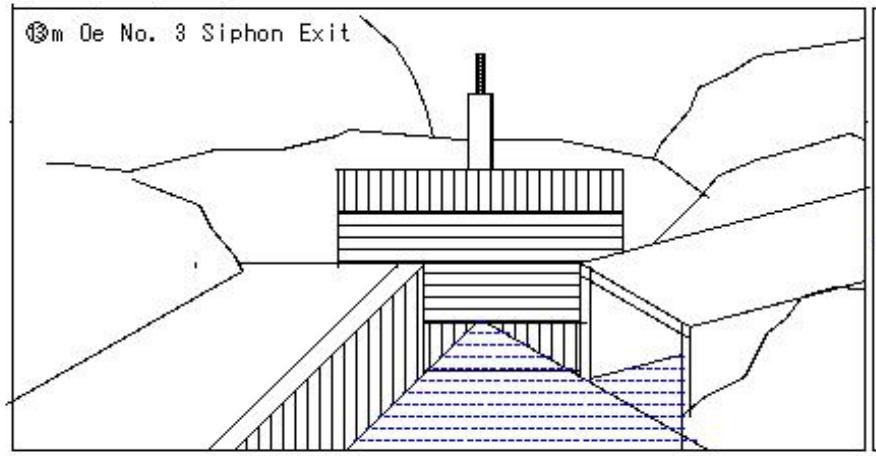
⑬m Oe No. 3 Siphon Exit

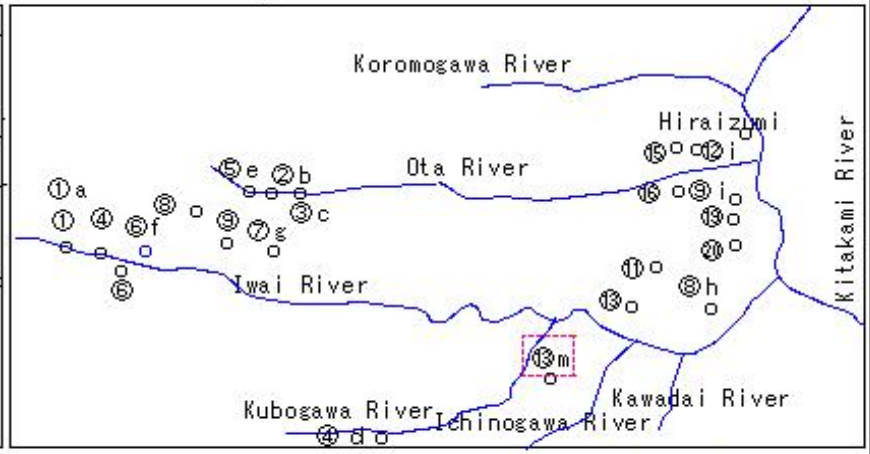
① Siphon No. 3, the core facility of Oe Weir, is an inverted siphon waterway with 1,027 meters of buried 700 mm diameter Rockler pipe.

② There is also a water pipe bridge that crosses the Kubo River midway through Siphon No. 3.

③ This is the outlet of Siphon No. 3.

①a Oshimekiri Headworks
②b Nikko Headworks
③c Shimokaya Headworks
④d Fujihashiri Headworks
⑤o Toyouryo Siphon
⑥f Sasabera Diversion Works
⑦g Tadakanishi Diversion Works
⑧h Ikasanpo Diversion Works
⑨i Ota River Inlet at the North-South Confluence
⑩j Saruhana Tunnel
⑪k Hinosawa Tunnel
⑫i Moetsu Tunnel
⑬m Oe No. 3 Siphon Exit
⑭n Oezeki Water Supply Pipeline Bridge
① Oomikiri Headworks
④ Terui Weir
⑥ Ooe Dam
⑧ Kita-Terui Dam
⑨ Minami Terui Weir
⑪ Yamane Dam
⑬ Akahagi Minami Dam
⑮ Hinata Dam
⑯ Nishikaze Dam
⑲ Kami-Terui
⑳ Naka-Terui Dam





0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He569) Terui Irrigation Canal Water

(He569) Terui Irrigation Canal Water

⑭n Oezeki Water Supply Pipeline Bridge

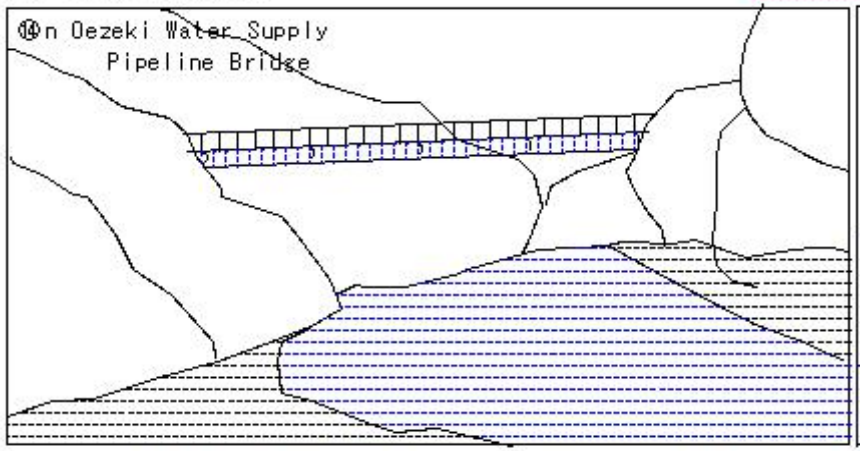
① The Oe Weir Water Pipe Bridge crosses the Kubo River at the Oe Weir No. 3 Siphon.

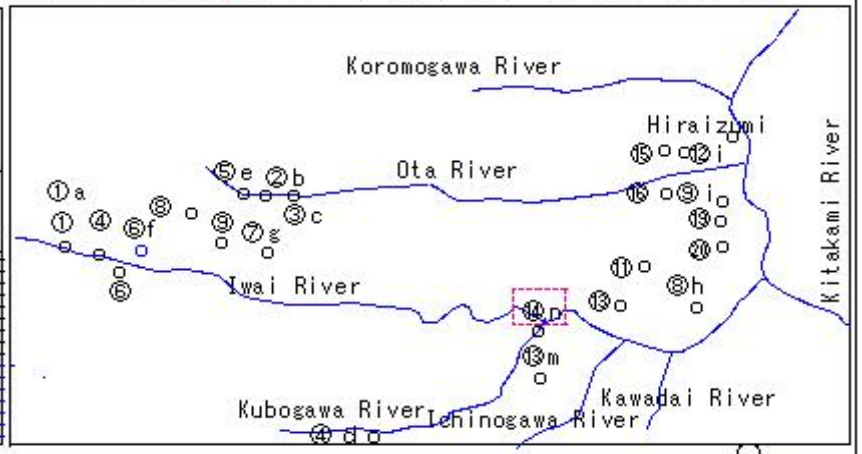
② The diameter of the water pipe bridge is 700 mm and it's 114 m long.

③ This water pipe bridge was built in 1964 as part of the major renovation of the Oe Weir.

④ It was built by shortening part of the Oe Weir to ensure a stable supply of irrigation water to the rice fields at the end of the line.

①a Oshimekiri Headworks
②b Nikko Headworks
③c Shimokaya Headworks
④d Fujihashiri Headworks
⑮o Toyouryo Siphon
⑤f Sasabera Diversion Works
⑦g Tadakanishi Diversion Works
⑧h Ikasanpo Diversion Works
⑨i Ota River Inlet at the North-South Confluence
⑩j Saruhana Tunnel
⑪k Hinosawa Tunnel
⑫i Moetsu Tunnel
⑬m Oe No. 3 Siphon Exit
⑭n Oezeki Water Supply Pipeline Bridge
① Oomikiri Headworks
④ Terui Weir
⑥ Ooe Dam
⑧ Kita-Terui Dam
⑨ Minami Terui Weir
⑪ Yamane Dam
⑬ Akahagi Minami Dam
⑮ Hinata Dam
⑯ Nishikaze Dam
⑲ Kami-Terui
⑳ Naka-Terui Dam





0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He570) Terui Irrigation Canal Water

(He570) Terui Irrigation Canal Water

⑮o Toyouryo Siphon

① It connects Genbi Town and Akaogi on the Minami Terui Weir main line.

② In 1994, a mountainside waterway (785m) was constructed using an inverted siphon to bypass a deep valley deep in the cliffs.

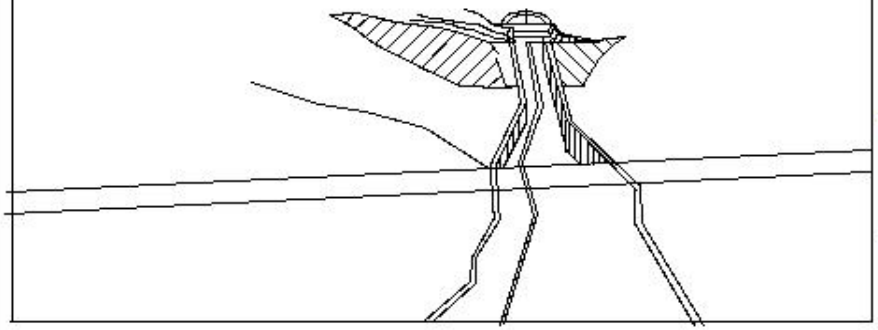
③ The inverted siphon created a shortcut by avoiding sections prone to landslides.

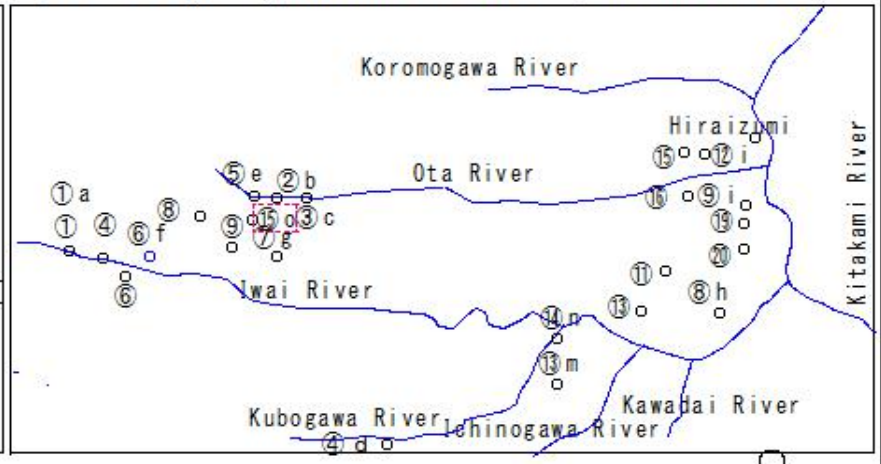
④ The siphon is made of φ1100mm ductile pipe.

①a Oshimekiri Headworks
②b Nikko Headworks
③c Shimokaya Headworks
④d Fujihashiri Headworks
⑮o Toyouryo Siphon
⑥f Sasabera Diversion Works
⑦g Tadakanishi Diversion Works
⑧h Ikasanpo Diversion Works
⑨i Ota River Inlet at the North-South Confluence
⑩j Saruhana Tunnel
⑪k Hinosawa Tunnel
⑫i Moetsu Tunnel
⑬m Oe No. 3 Siphon Exit
⑭n Oezeki Water Supply Pipeline Bridge
① Oomikiri Headworks
④ Terui Weir
⑥ Ooe Dam
⑧ Kita-Terui Dam
⑨ Minami Terui Weir
⑪ Yamane Dam
⑬ Akahagi Minami Dam
⑮ Hinata Dam
⑯ Nishikaze Dam
⑲ Kami-Terui
⑳ Naka-Terui Dam

⑮o Toyouryo Siphon

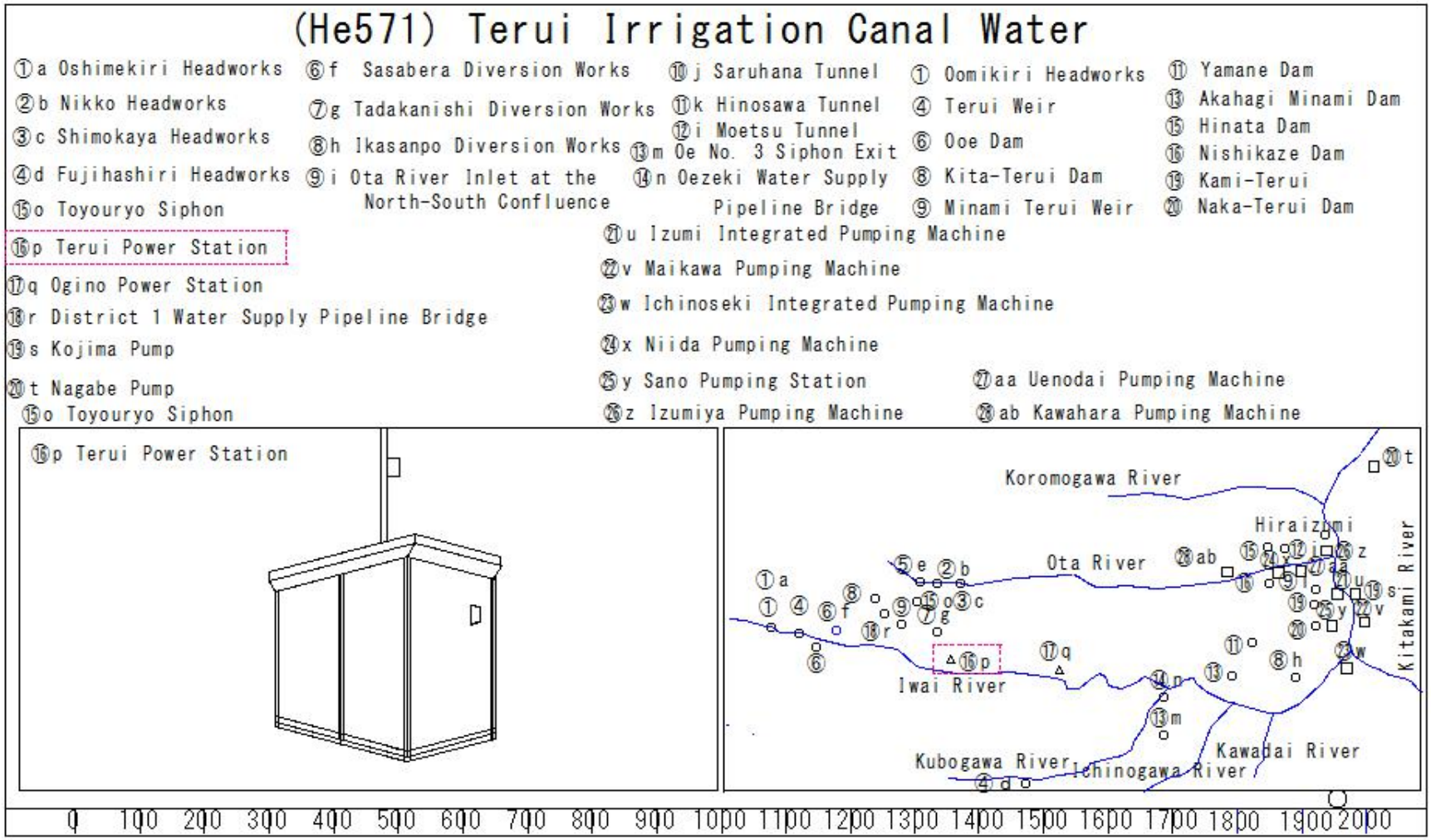
⑤ Its length is 196m, with a maximum elevation difference of approximately 22m.



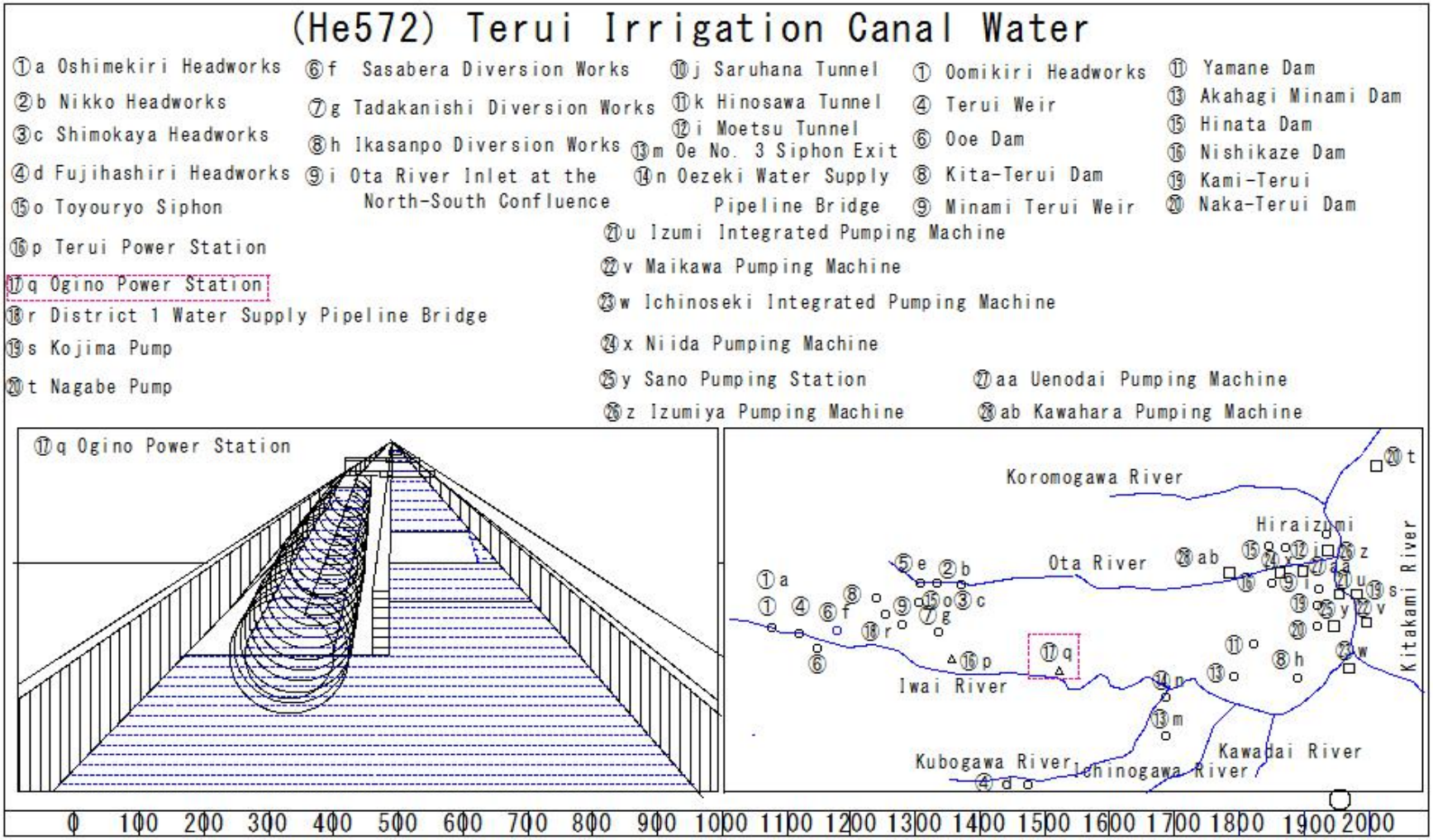


0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

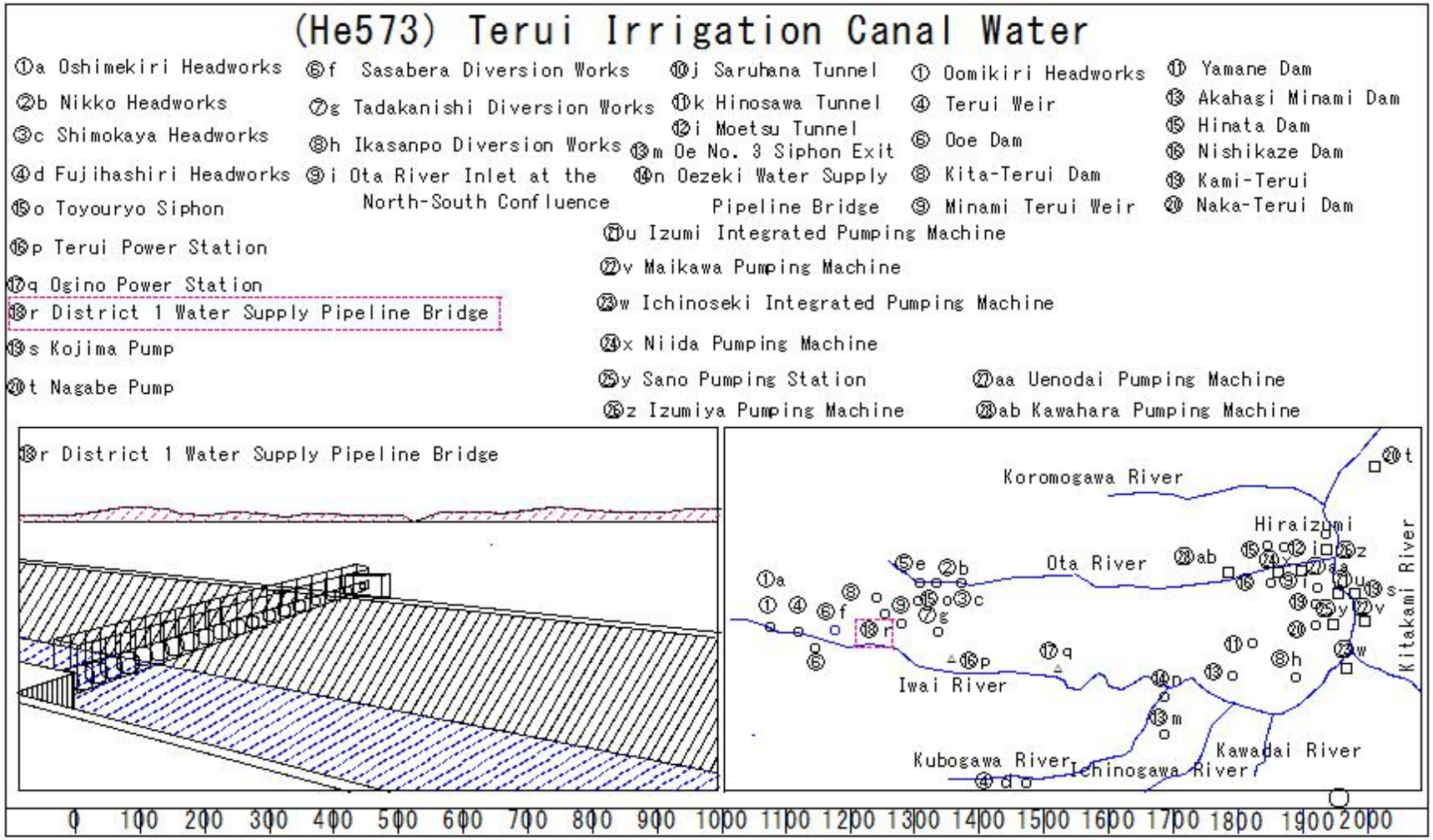
(He571) Terui Irrigation Canal Water



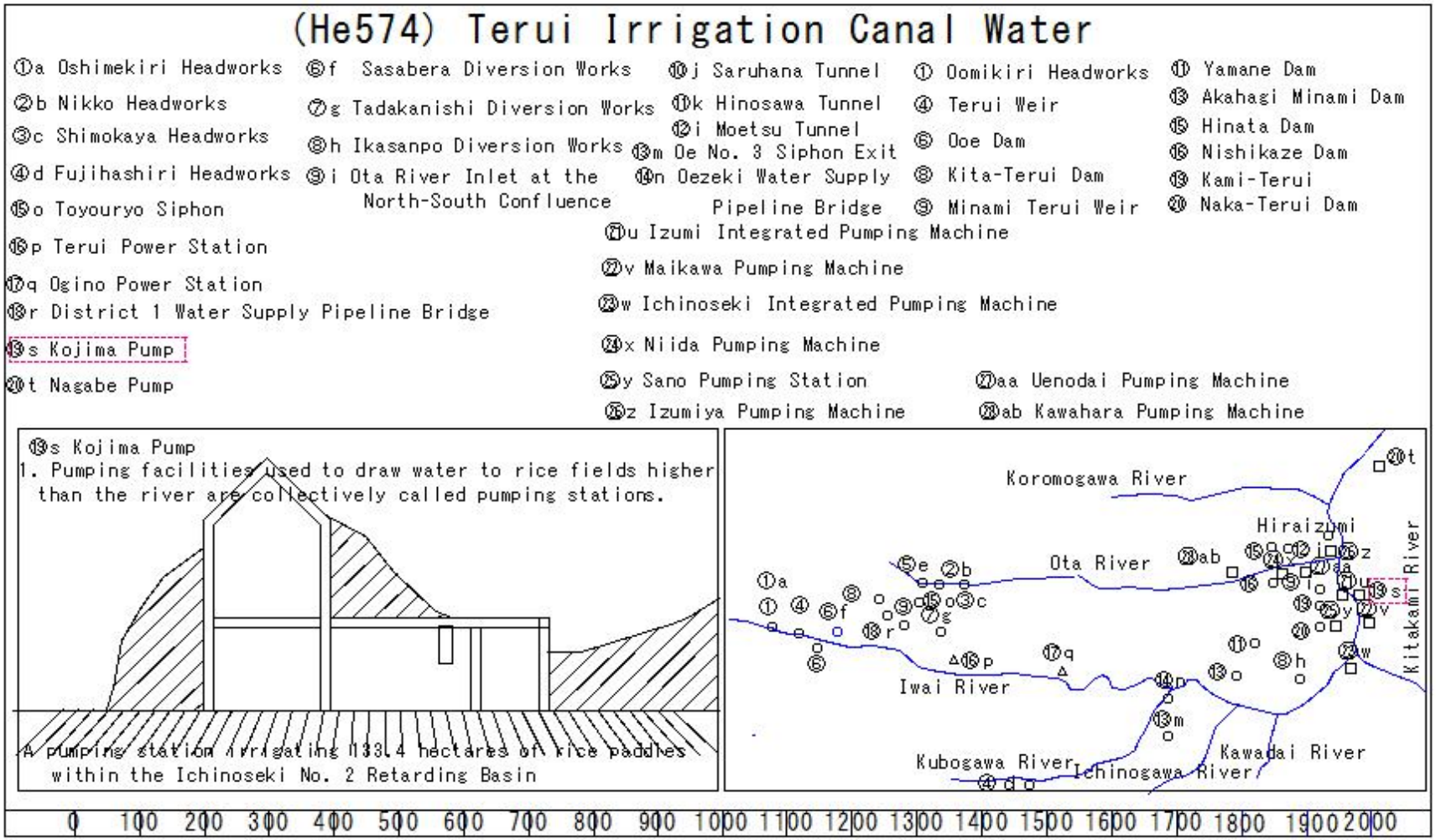
(He572) Terui Irrigation Canal Water



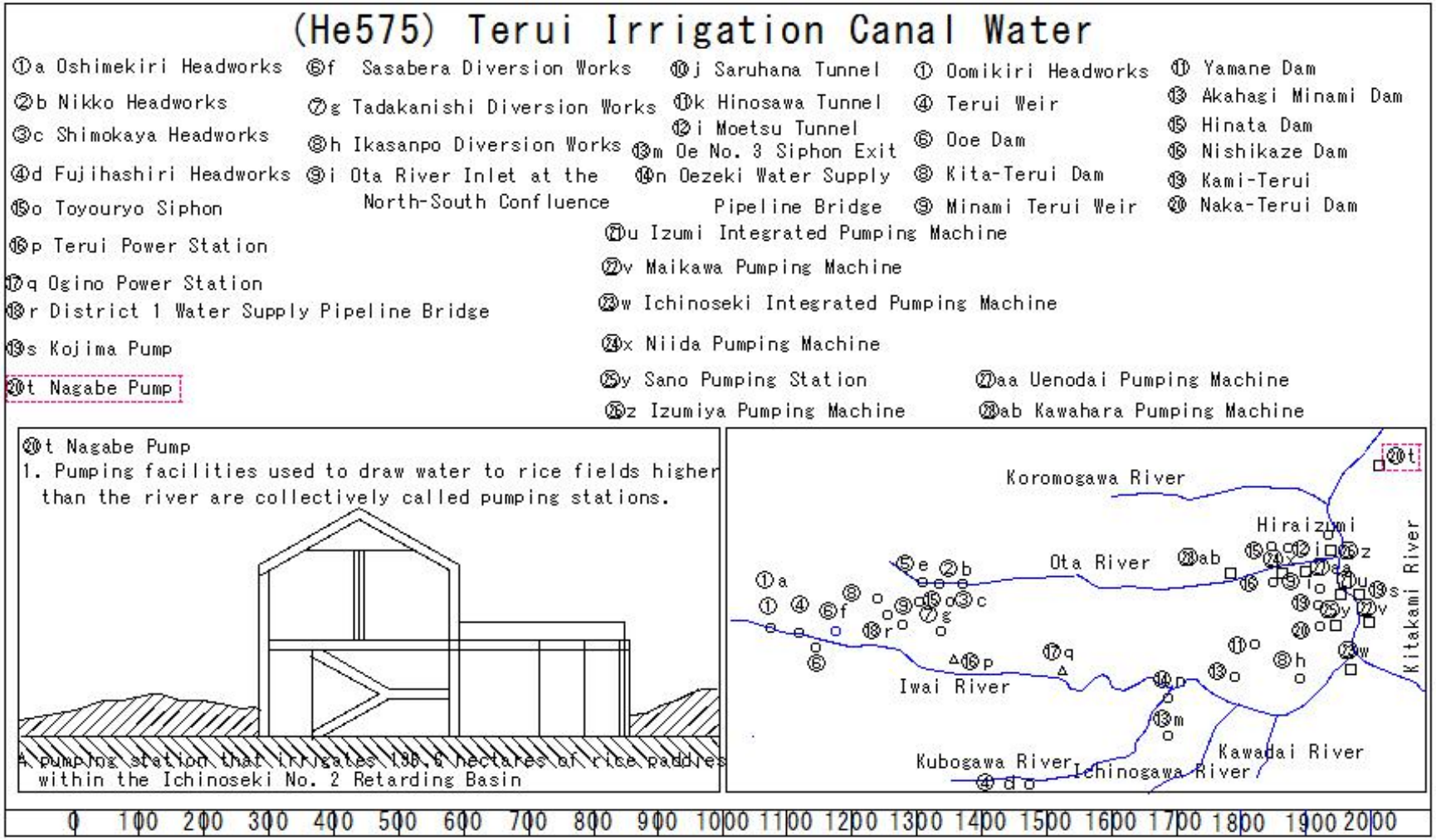
(He573) Terui Irrigation Canal Water



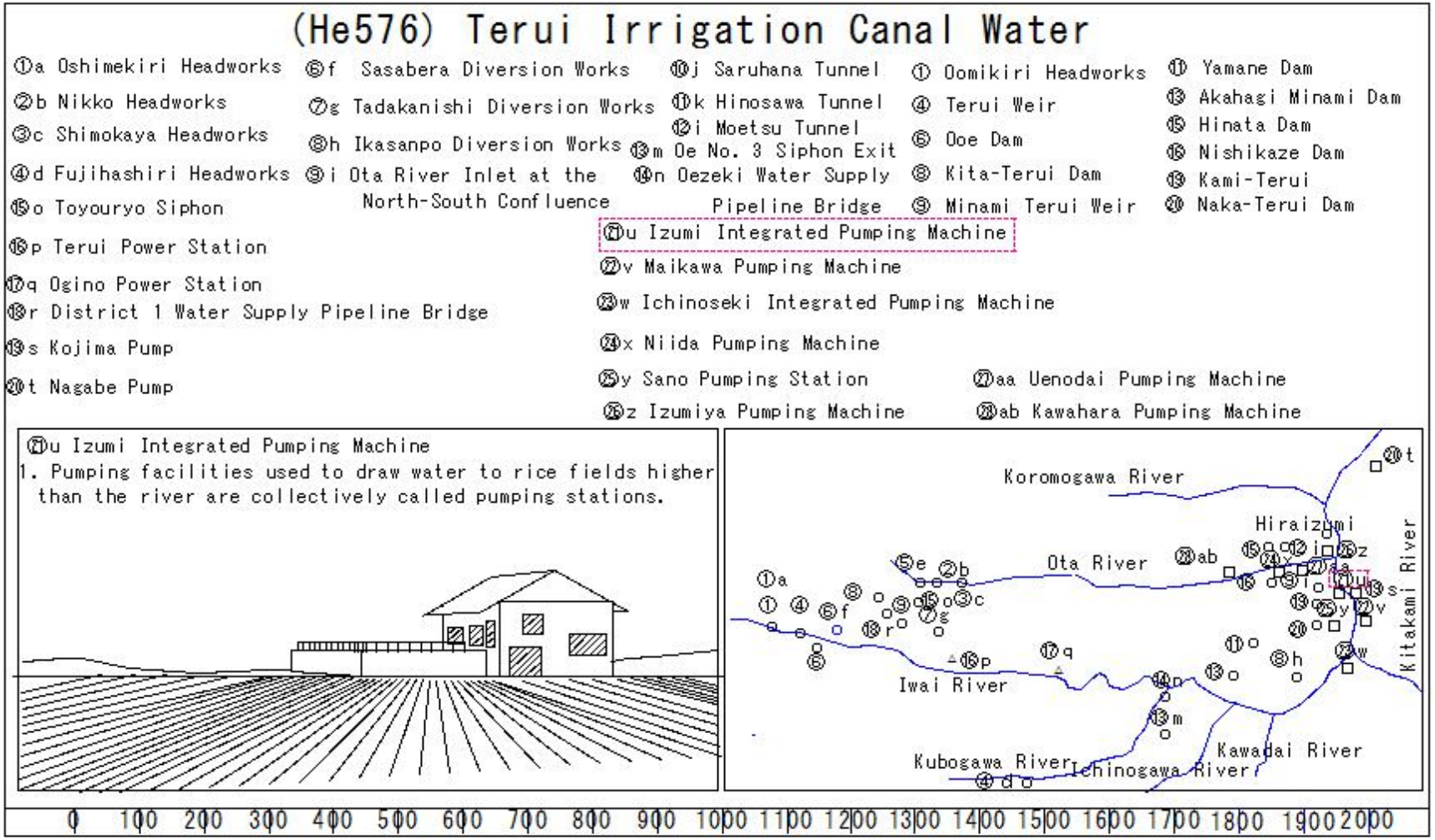
(He574) Terui Irrigation Canal Water



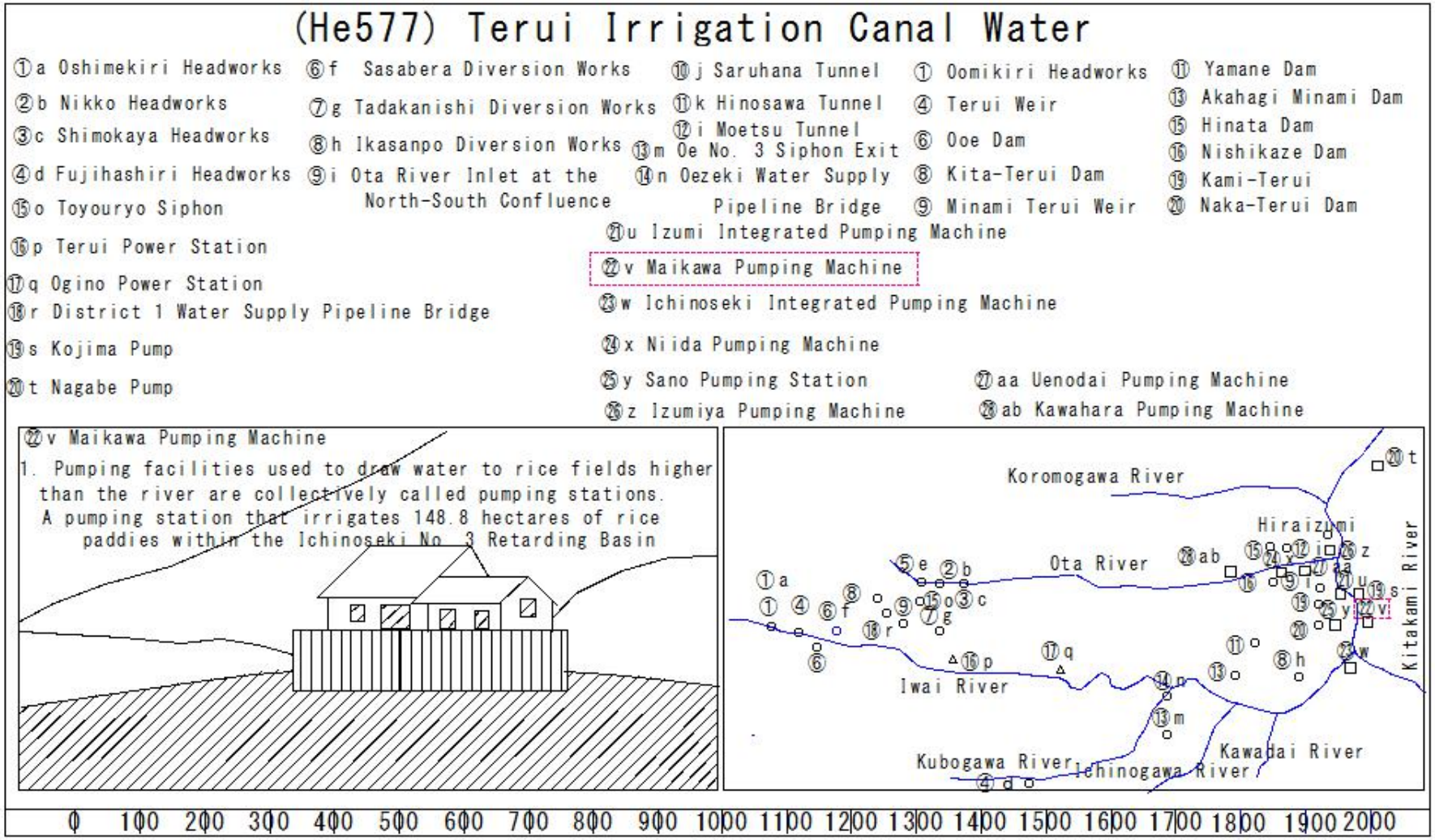
(He575) Terui Irrigation Canal Water



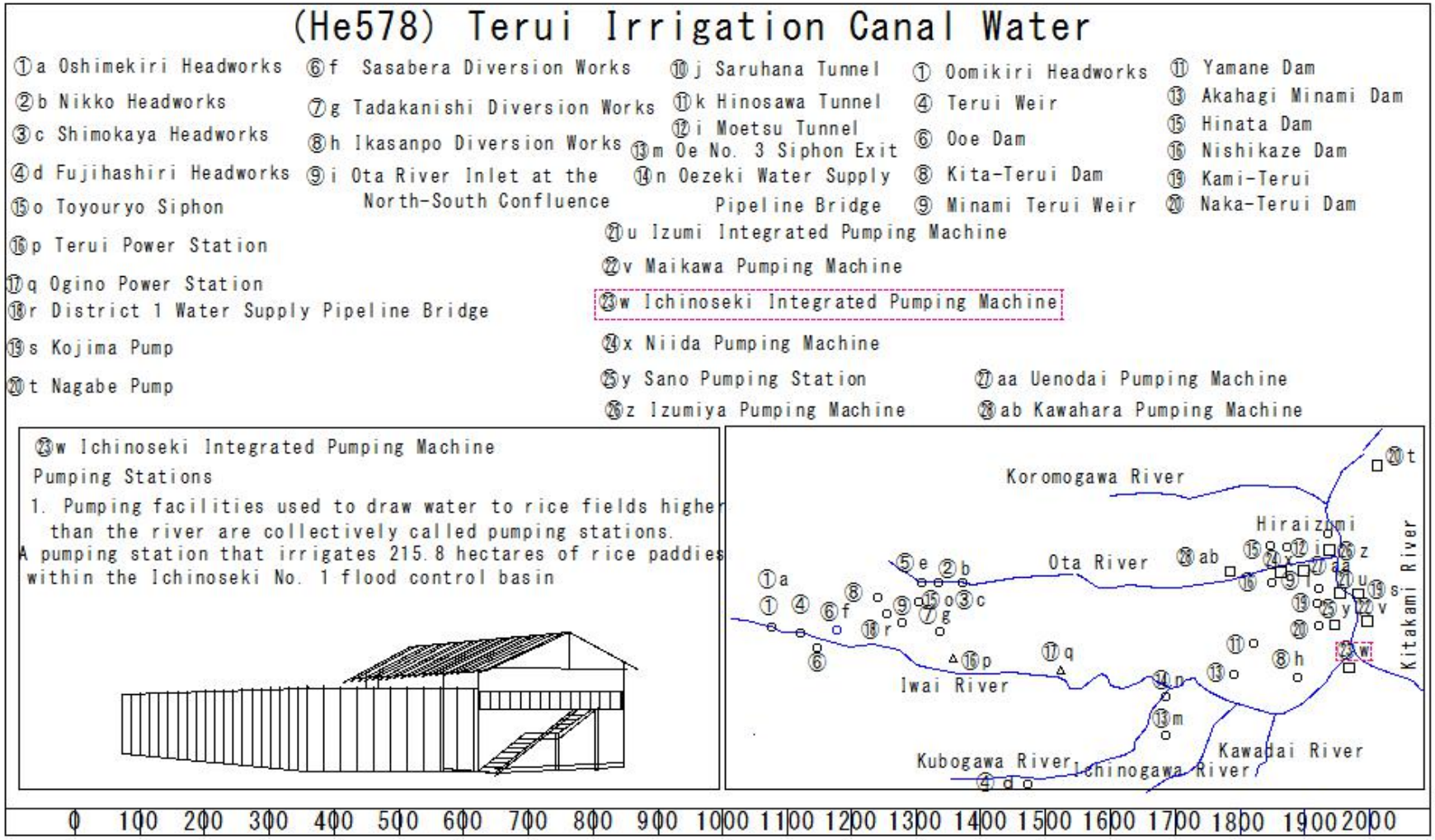
(He576) Terui Irrigation Canal Water



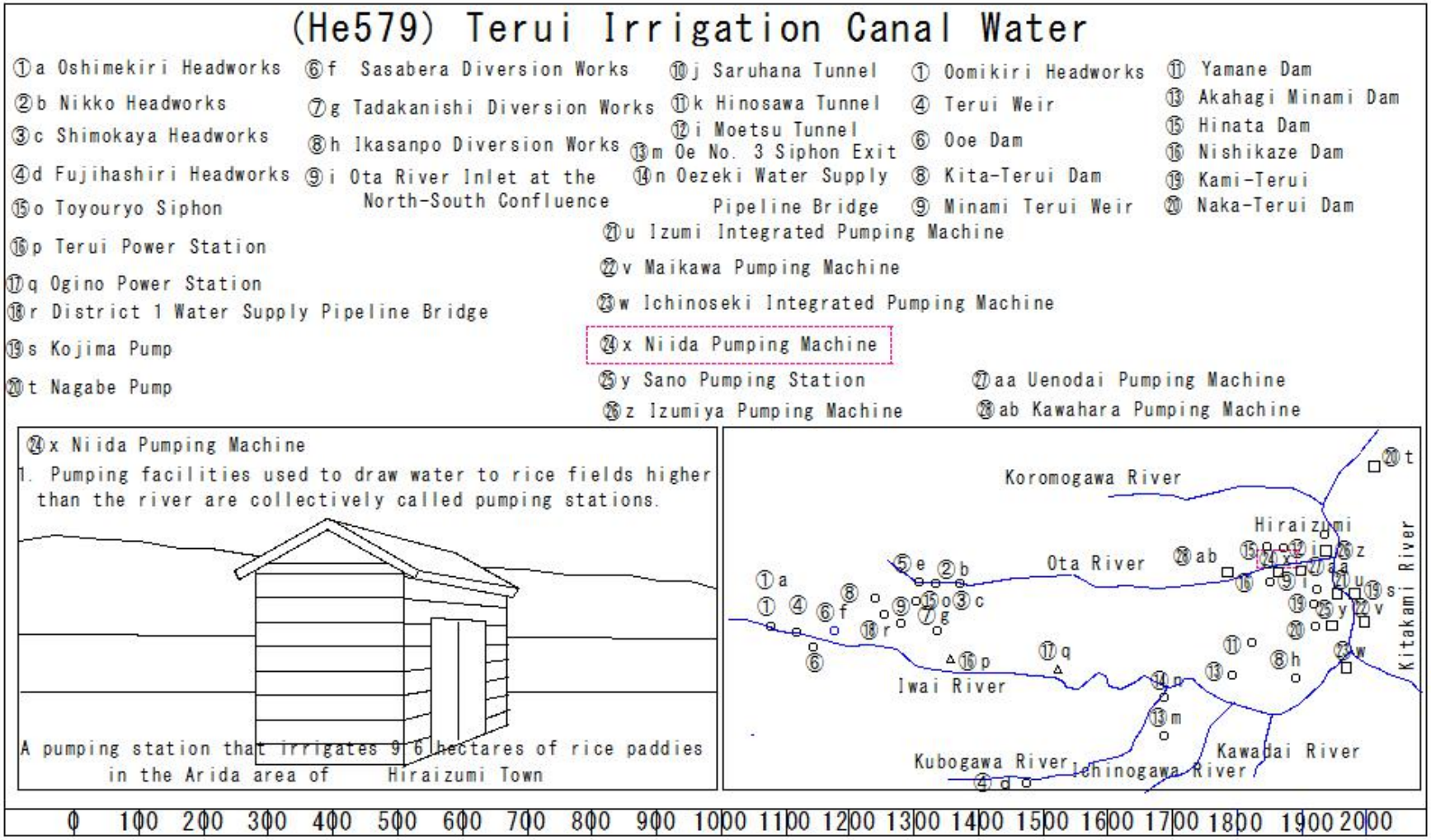
(He577) Terui Irrigation Canal Water



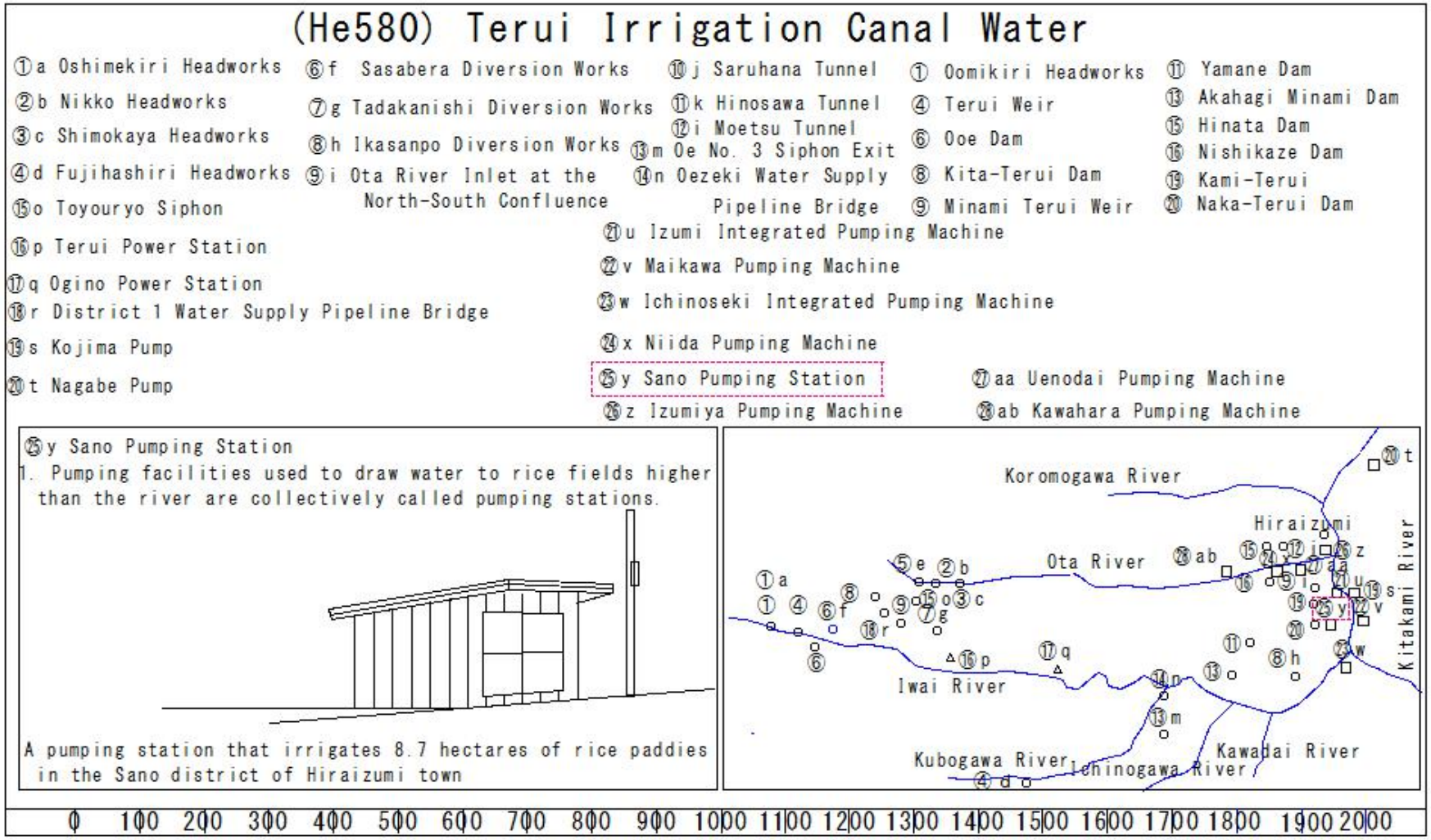
(He578) Terui Irrigation Canal Water



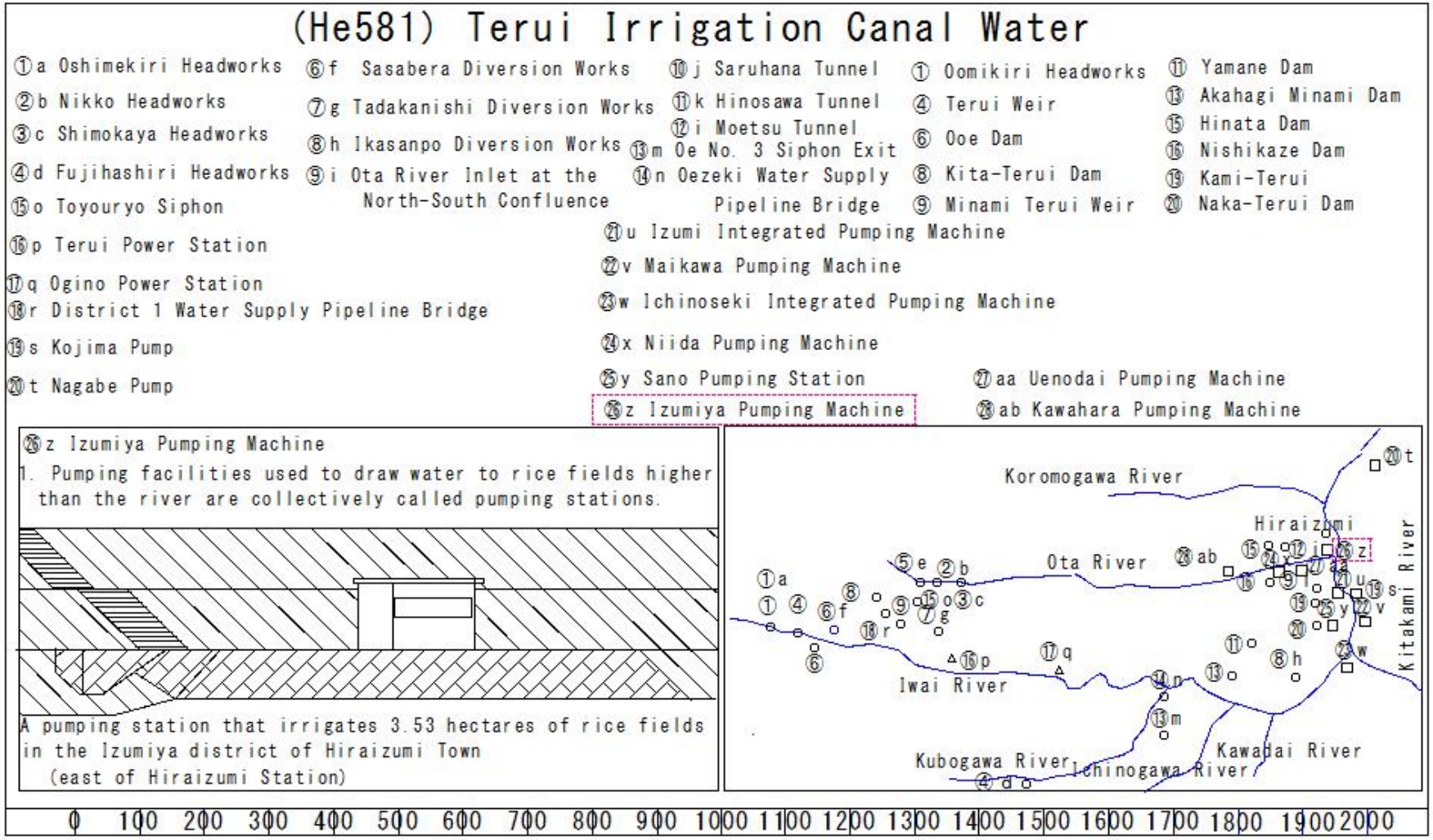
(He579) Terui Irrigation Canal Water



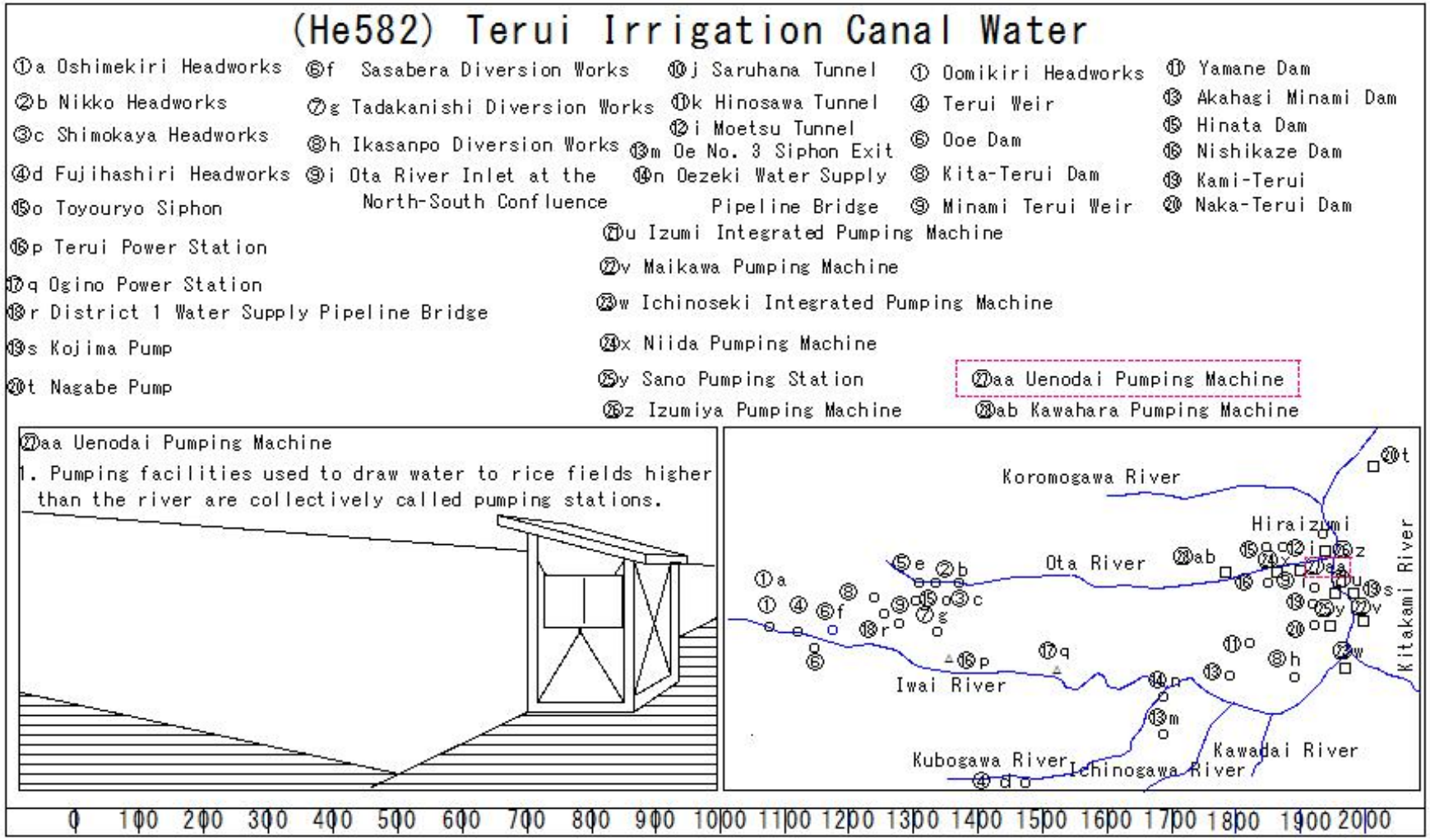
(He580) Terui Irrigation Canal Water



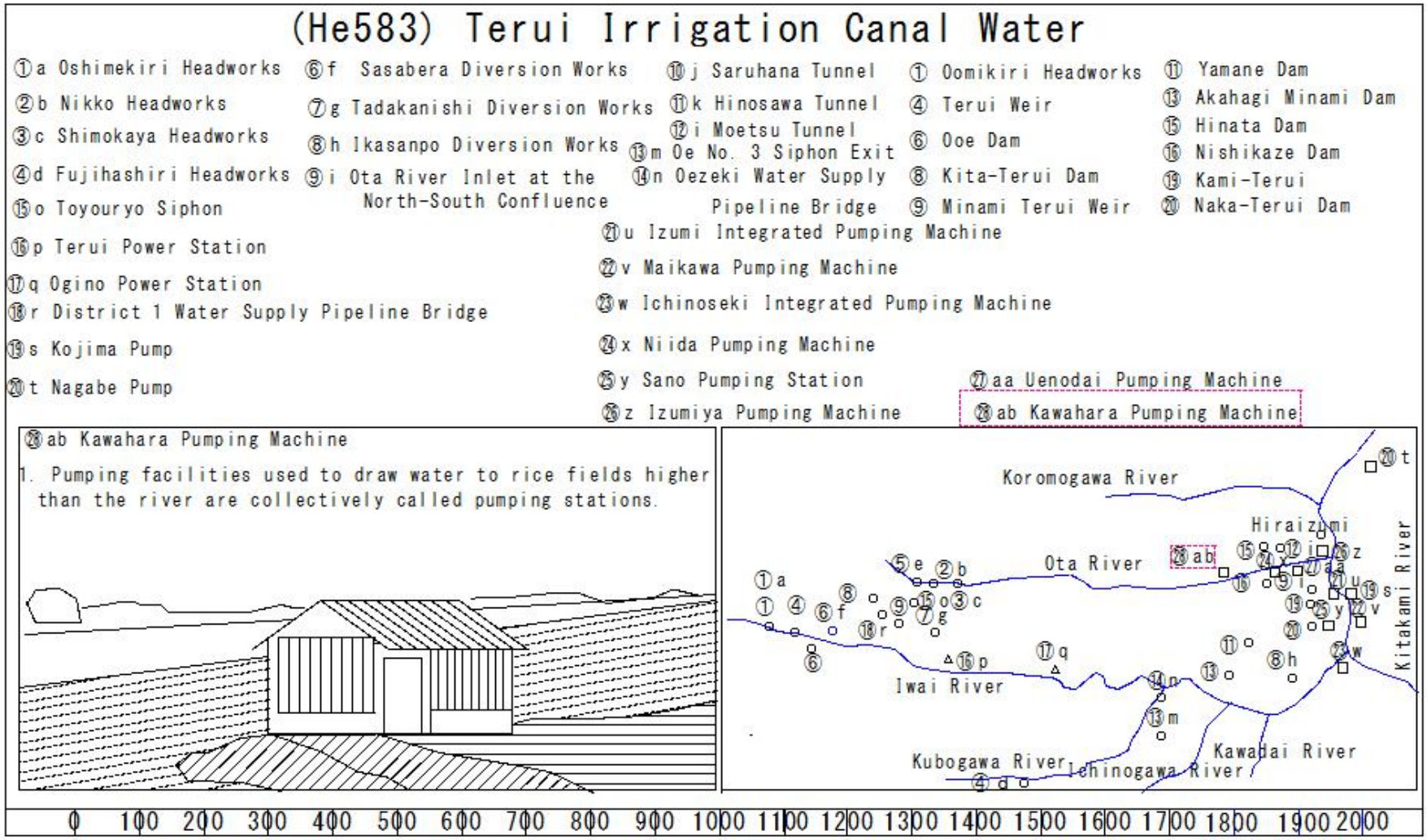
(He581) Terui Irrigation Canal Water



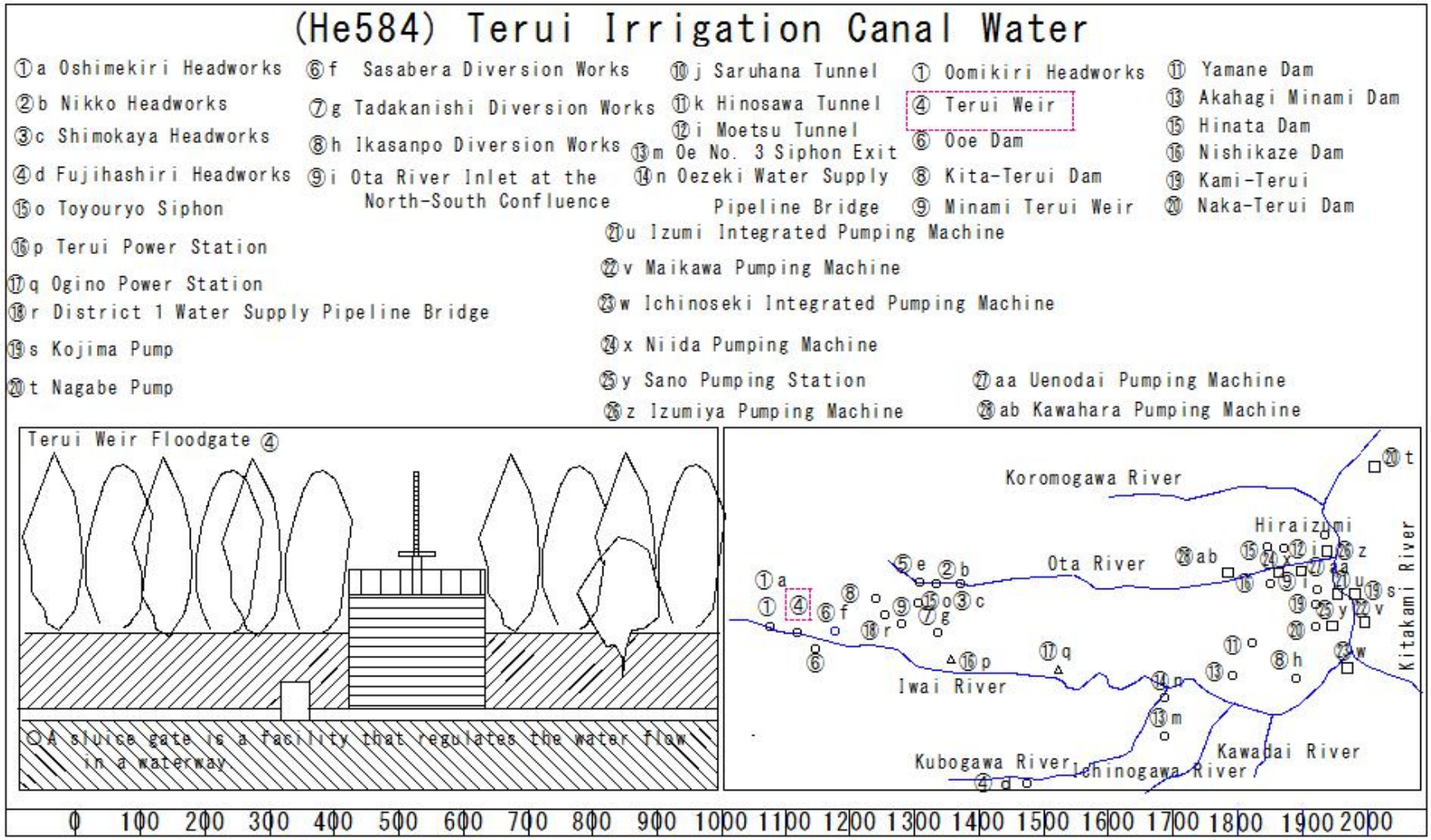
(He582) Terui Irrigation Canal Water



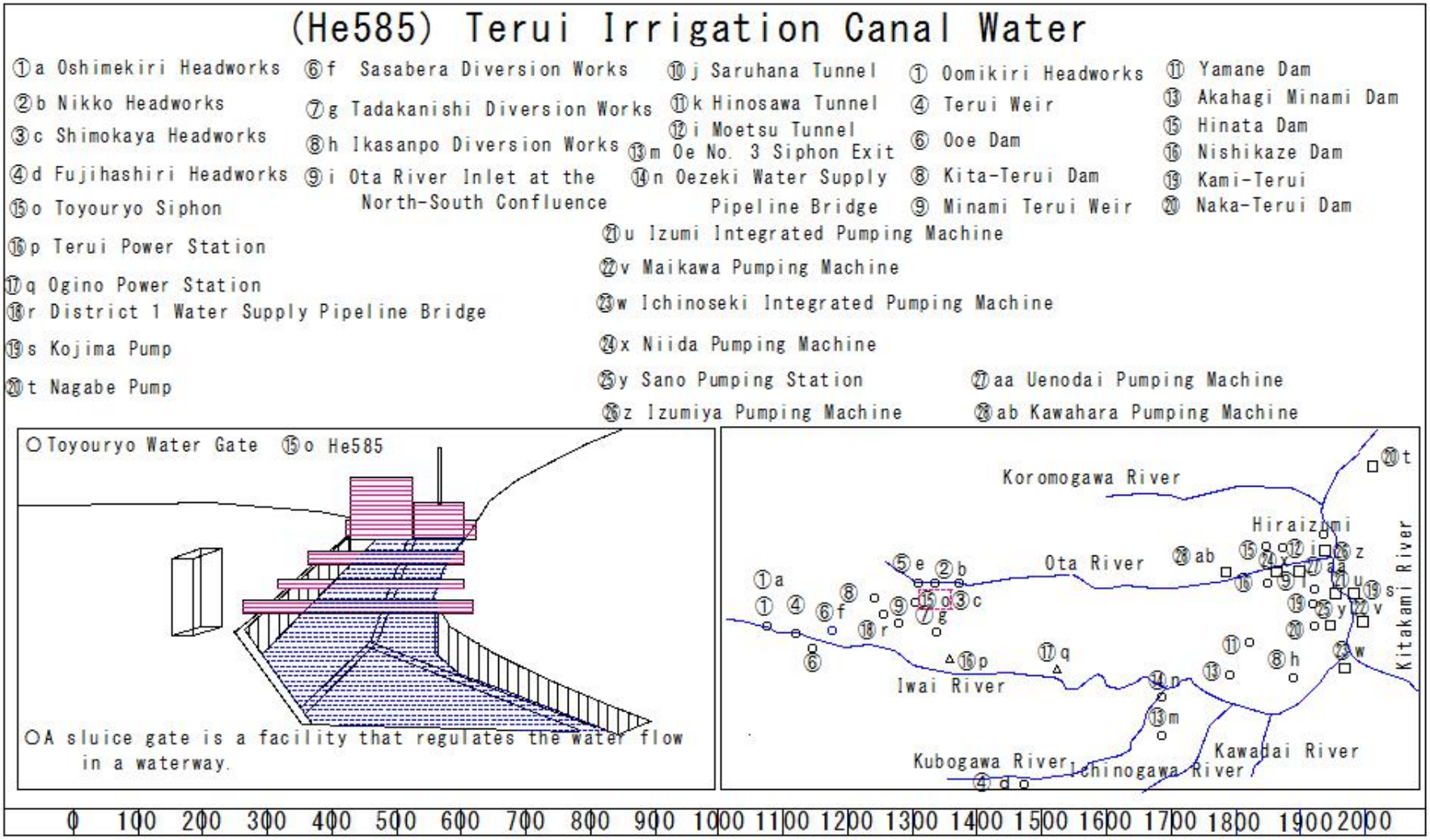
(He583) Terui Irrigation Canal Water



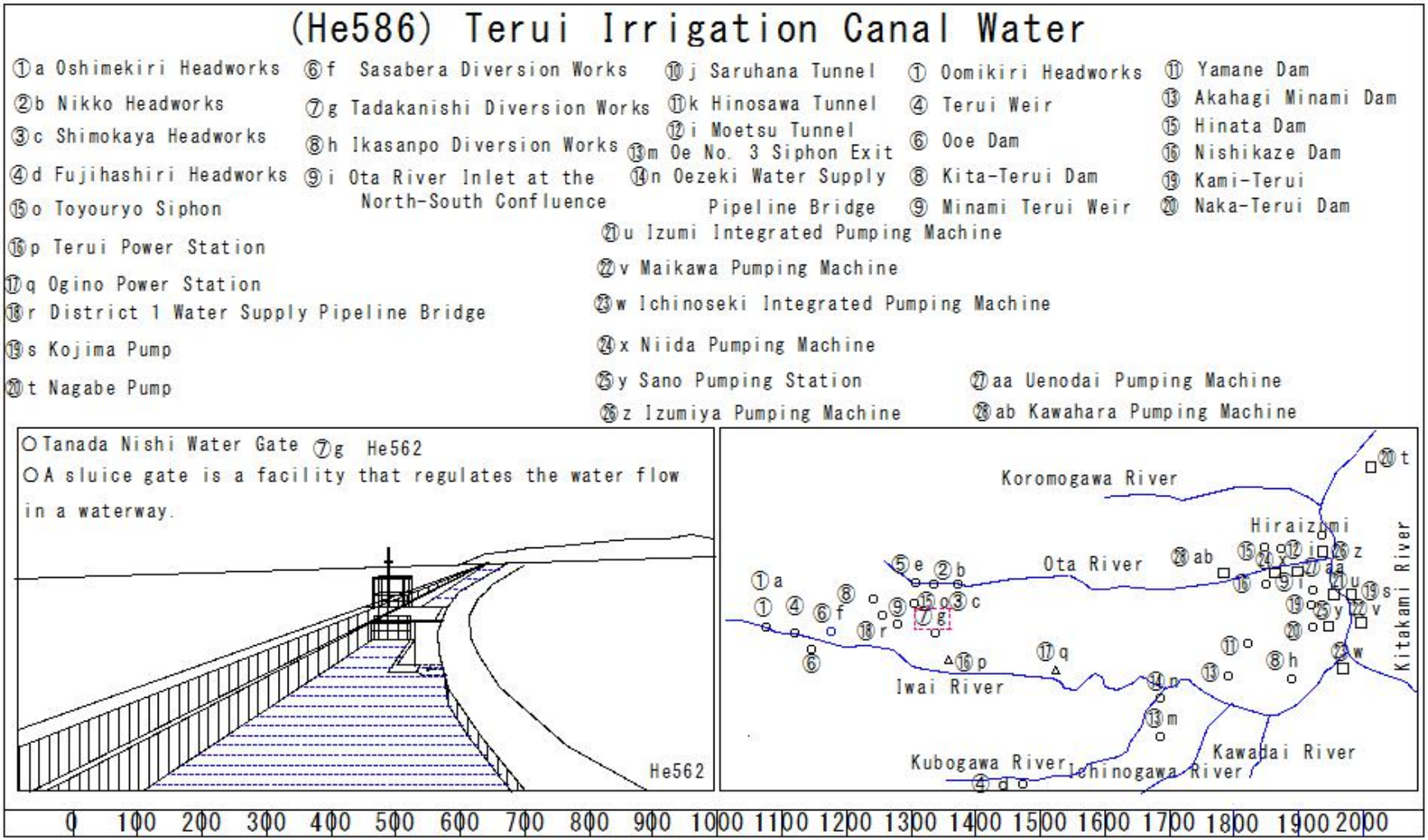
(He584) Terui Irrigation Canal Water



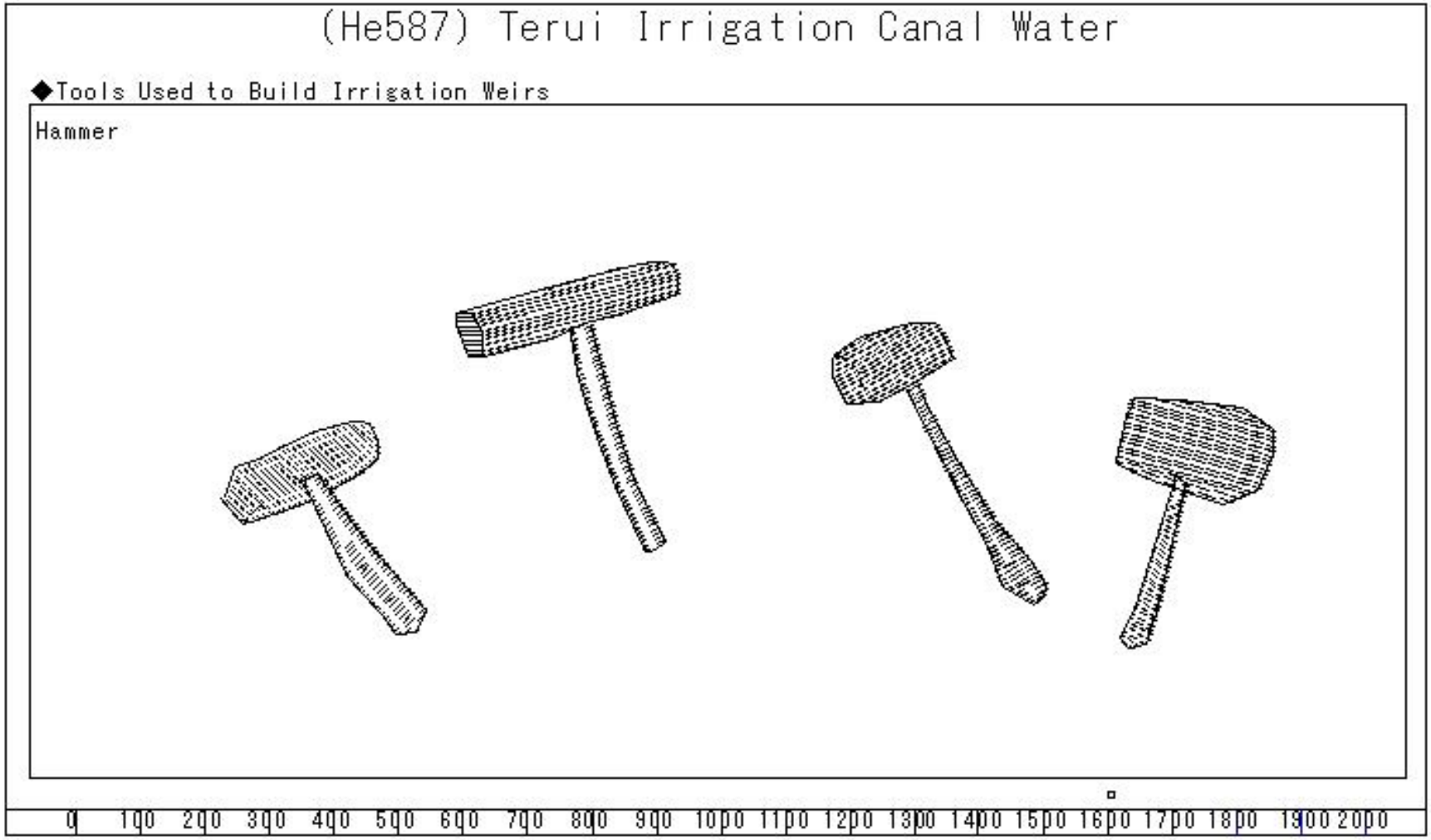
(He585) Terui Irrigation Canal Water



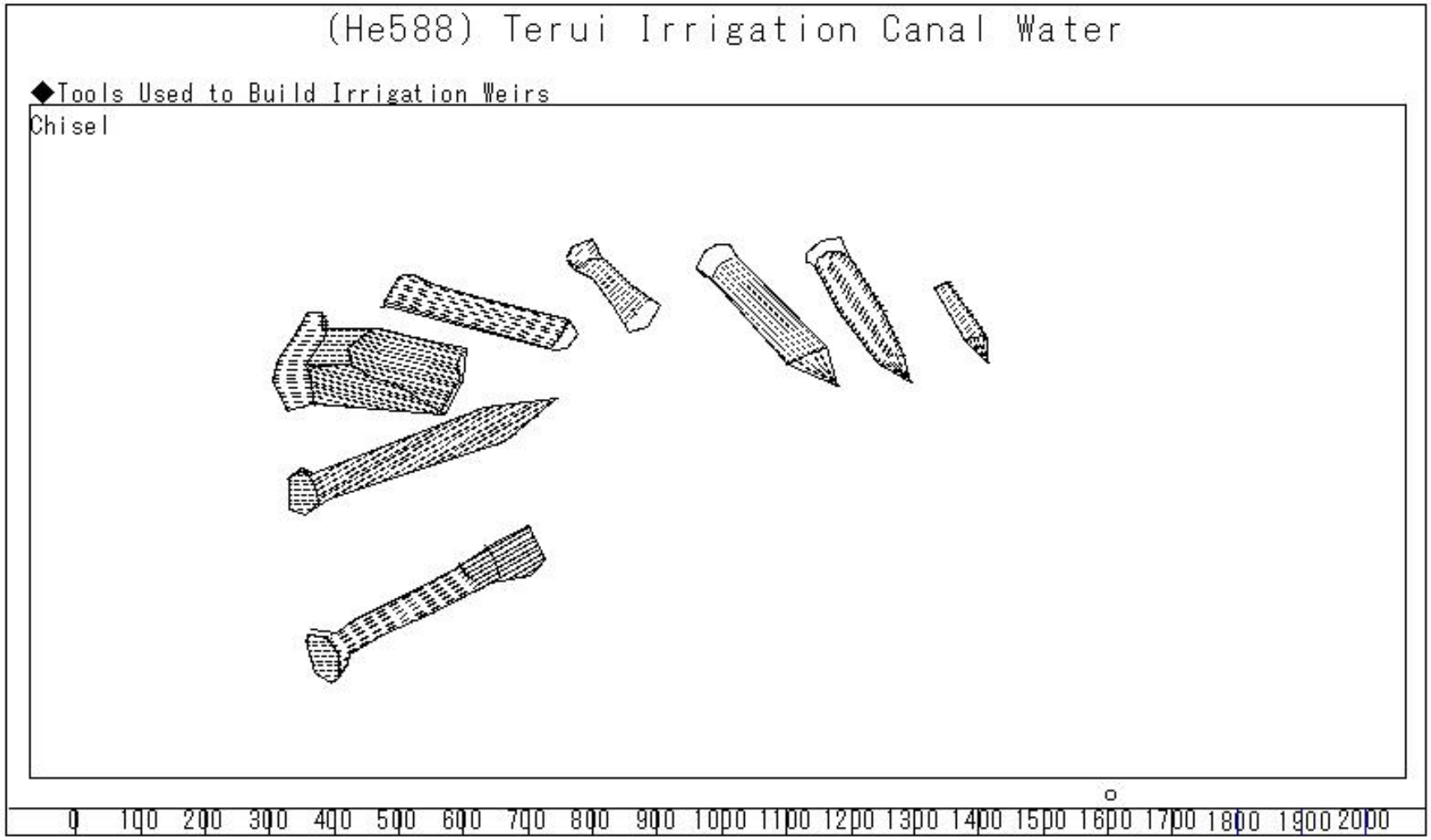
(He586) Terui Irrigation Canal Water



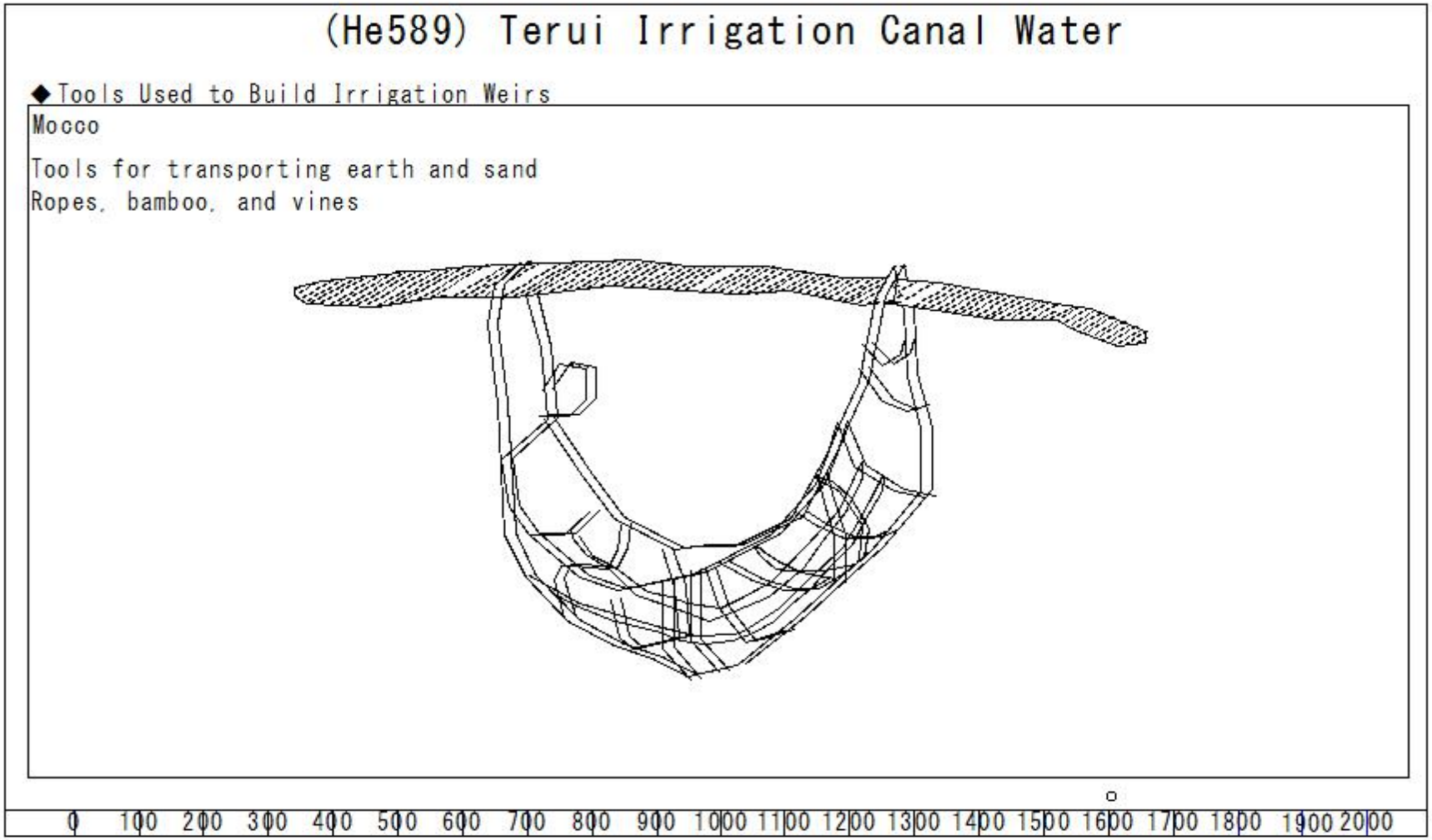
(He587) Terui Irrigation Canal Water



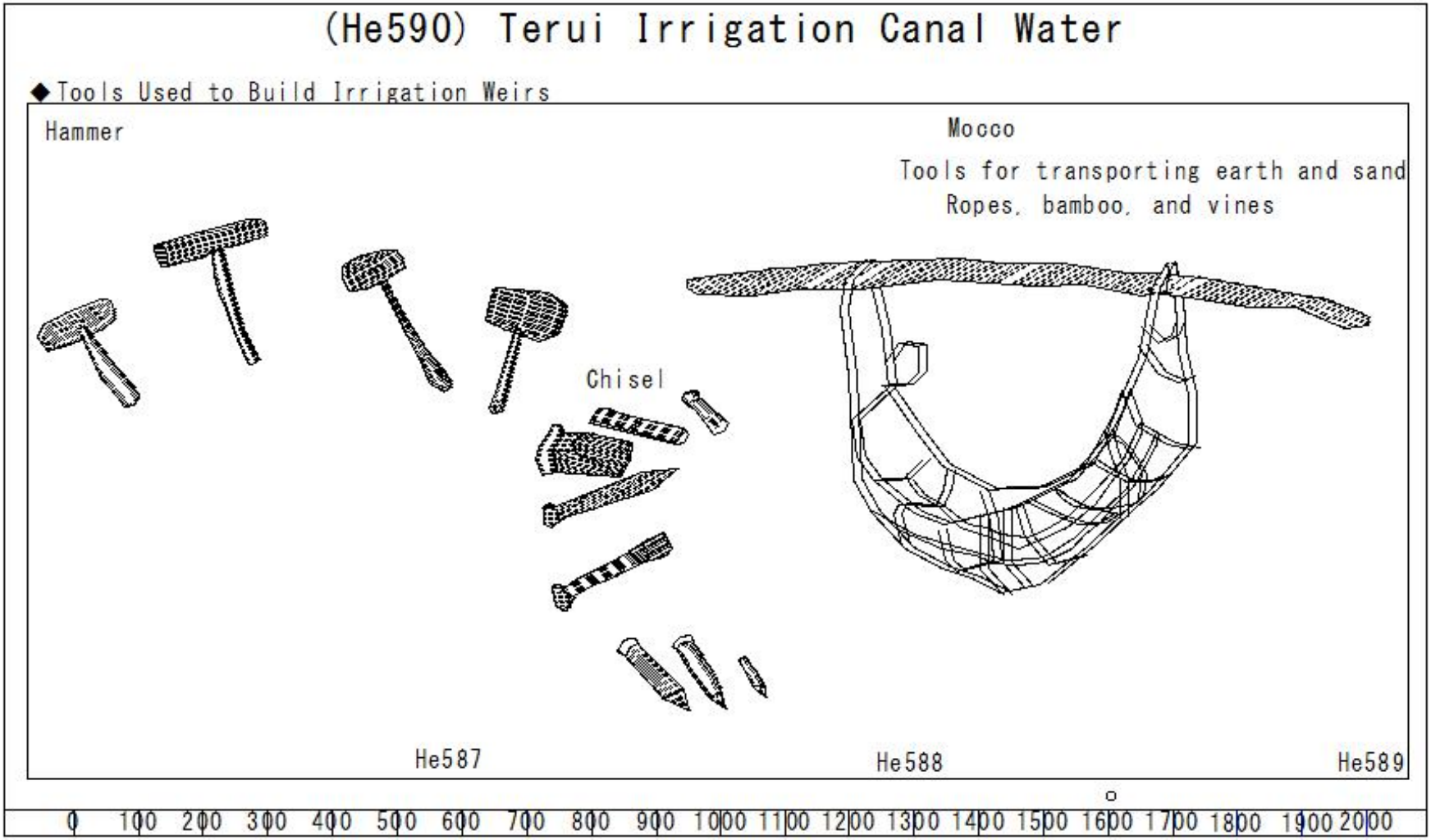
(He588) Terui Irrigation Canal Water



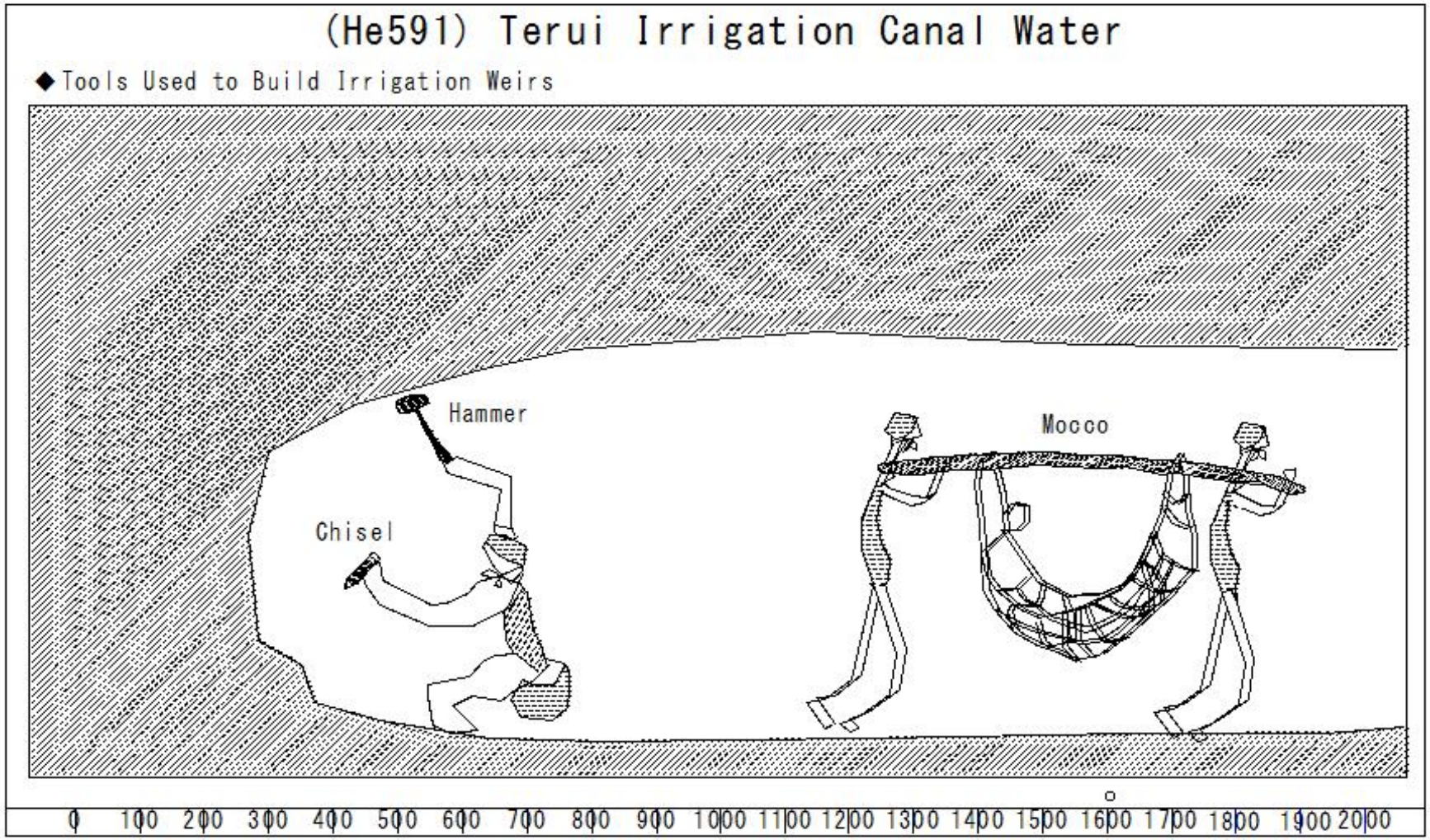
(He589) Terui Irrigation Canal Water



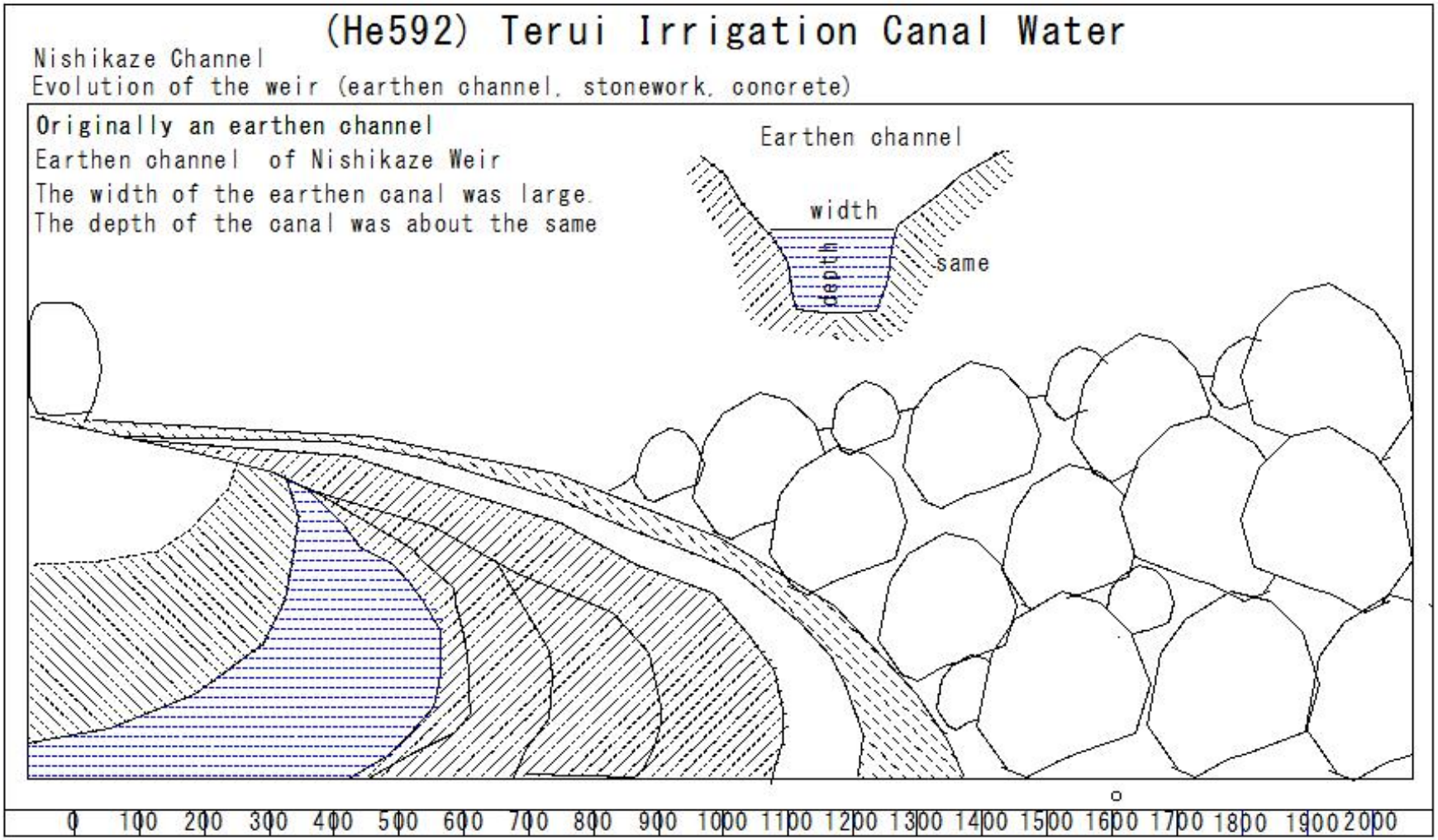
(He590) Terui Irrigation Canal Water



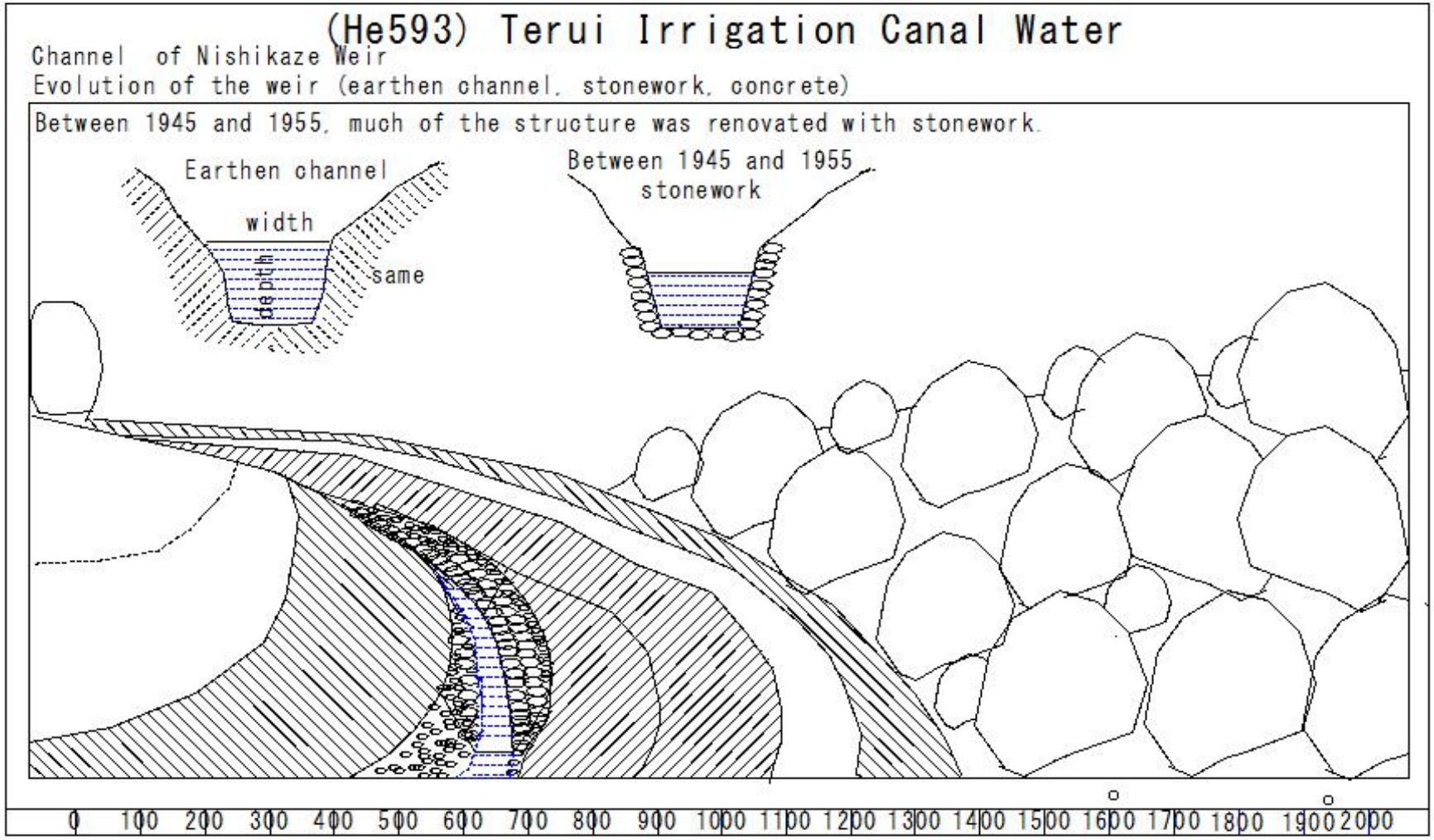
(He591) Terui Irrigation Canal Water



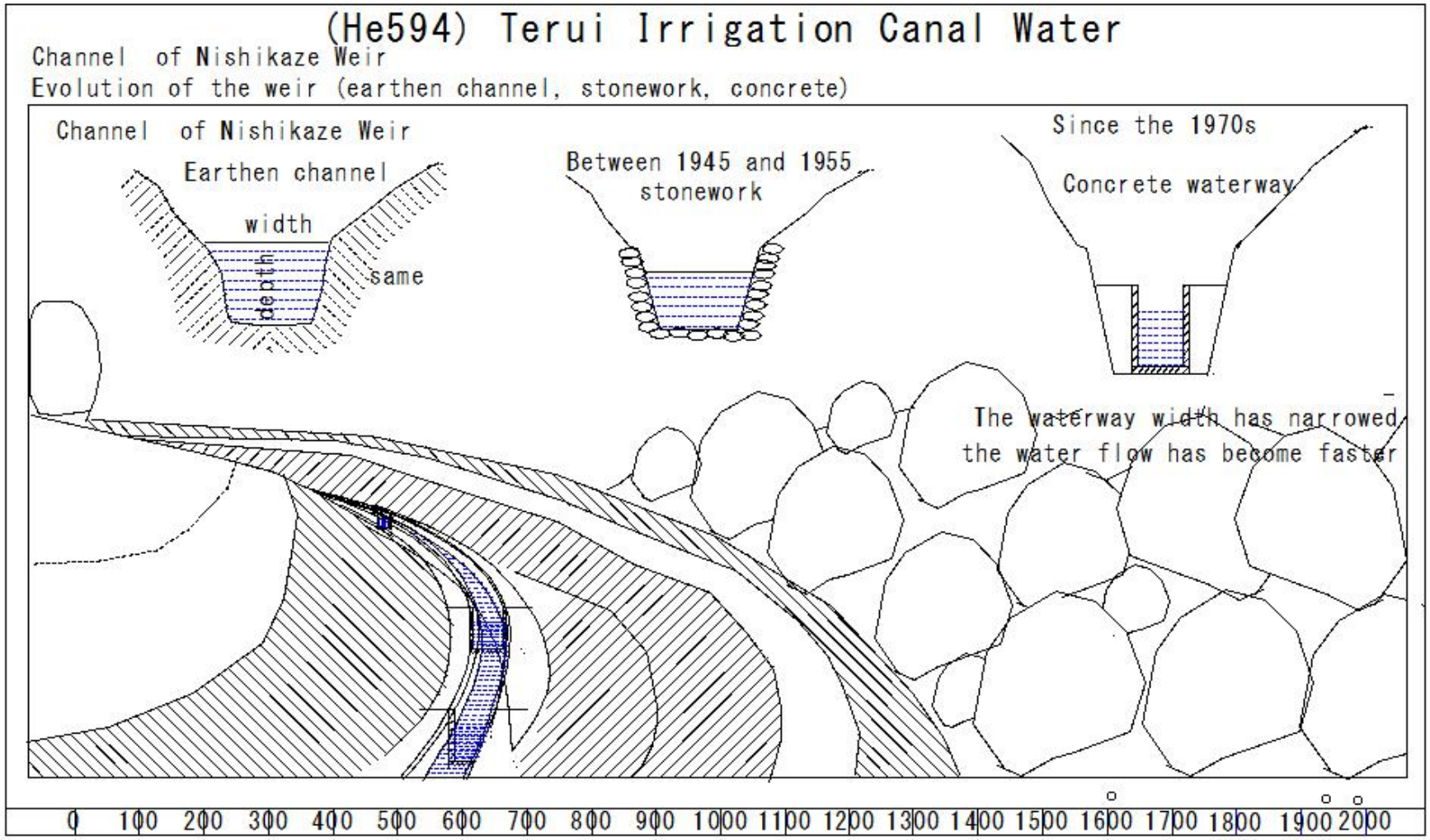
(He592) Terui Irrigation Canal Water



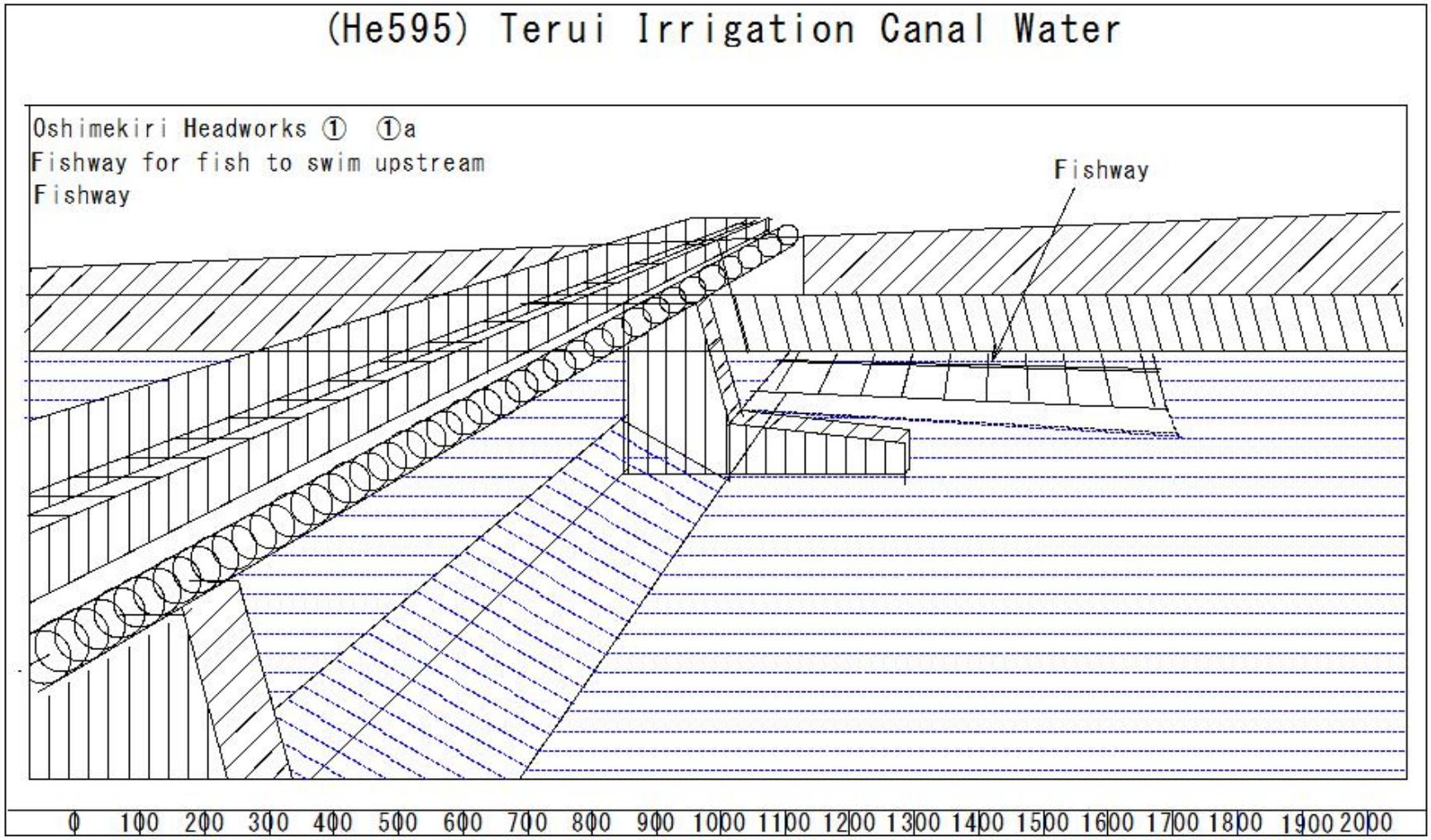
(He593) Terui Irrigation Canal Water



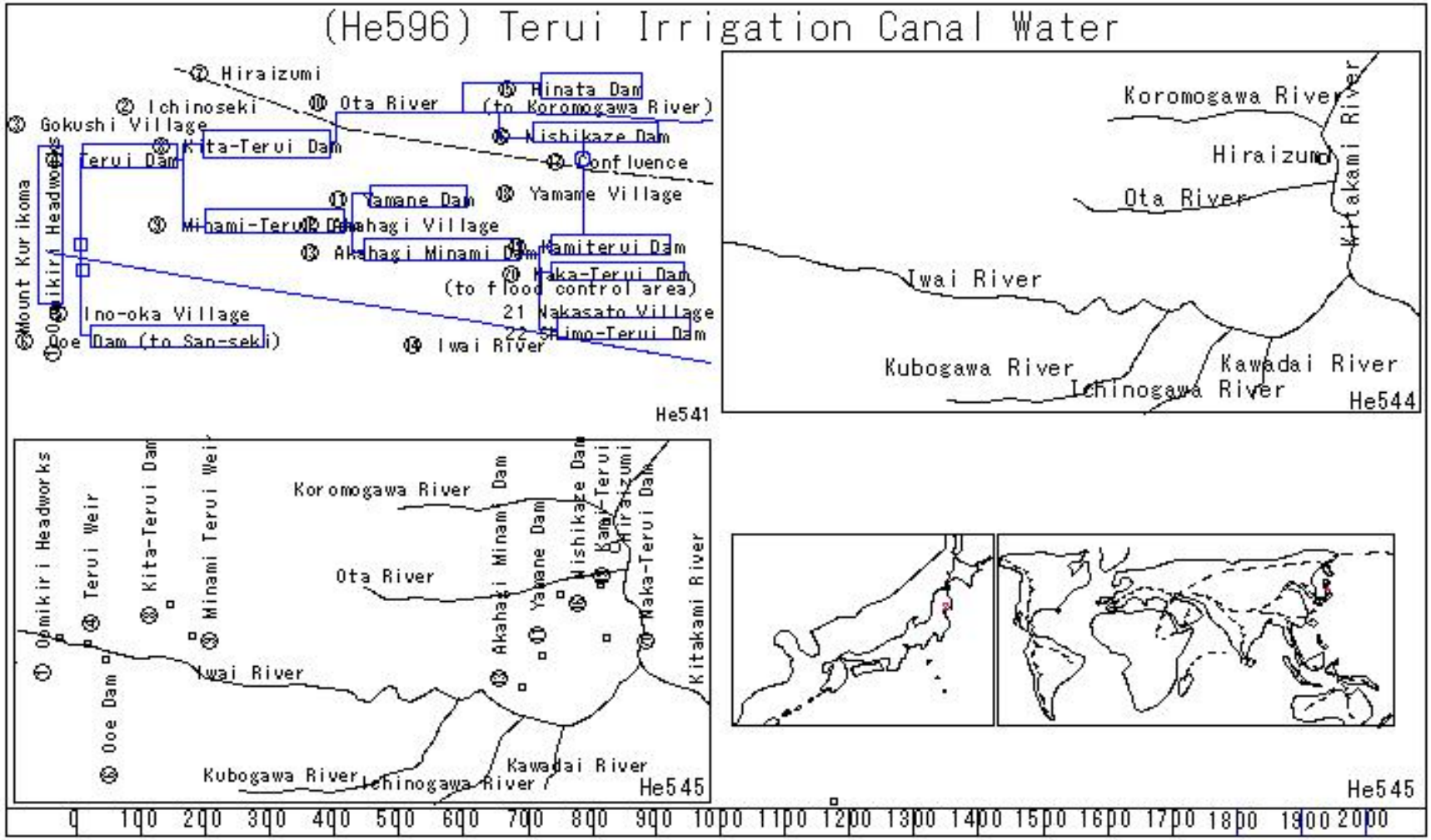
(He594) Terui Irrigation Canal Water



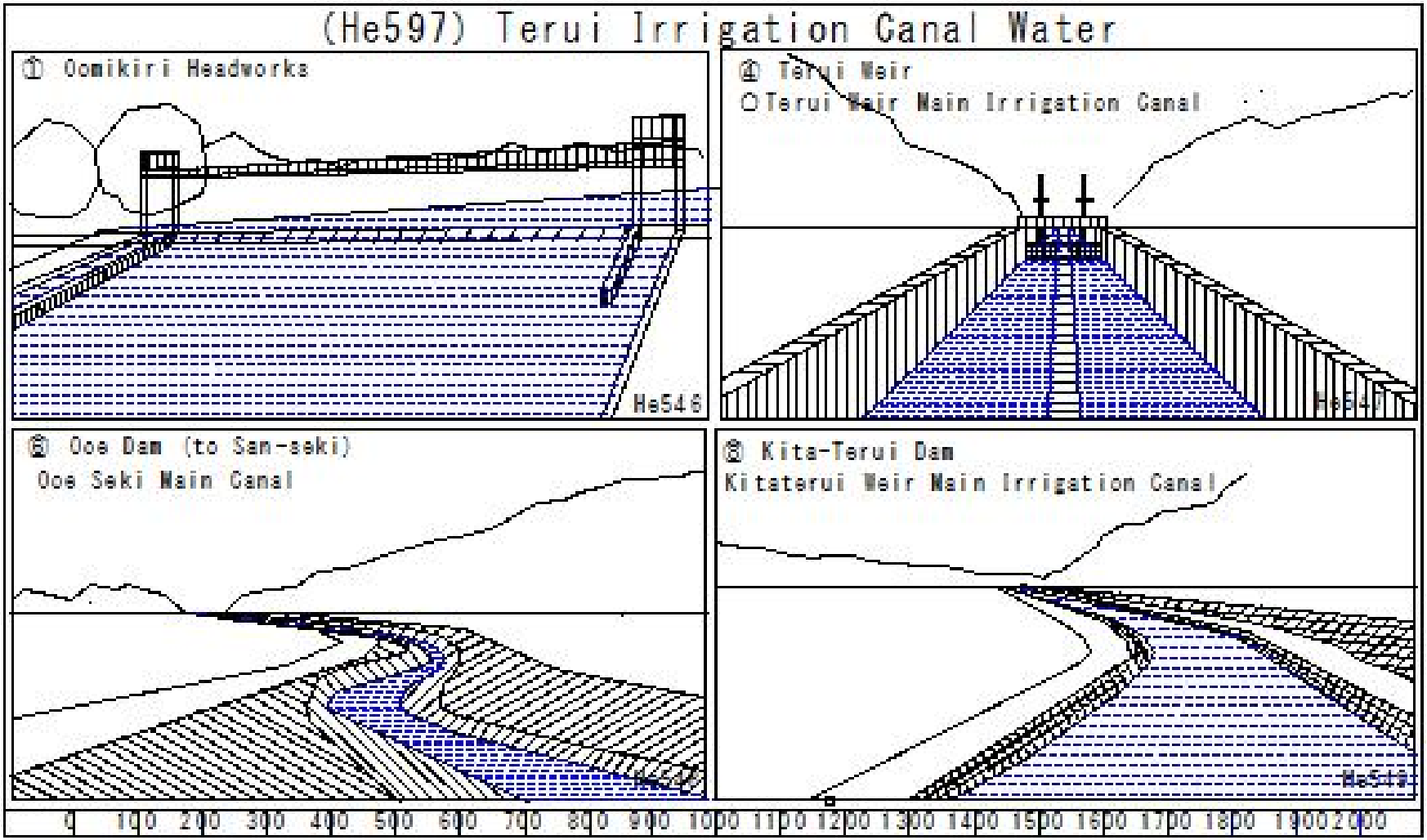
(He595) Terui Irrigation Canal Water



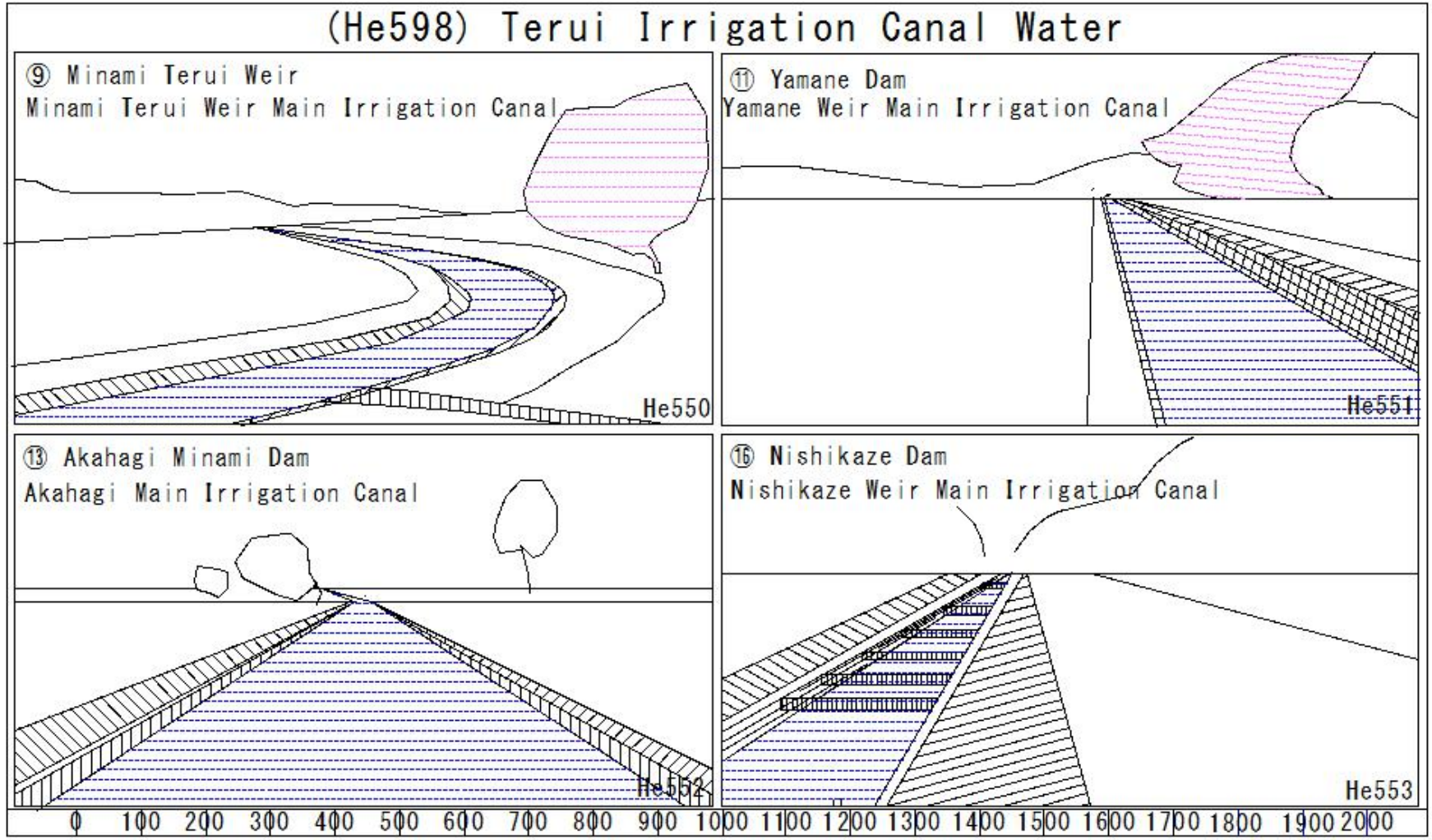
(He596) Terui Irrigation Canal Water



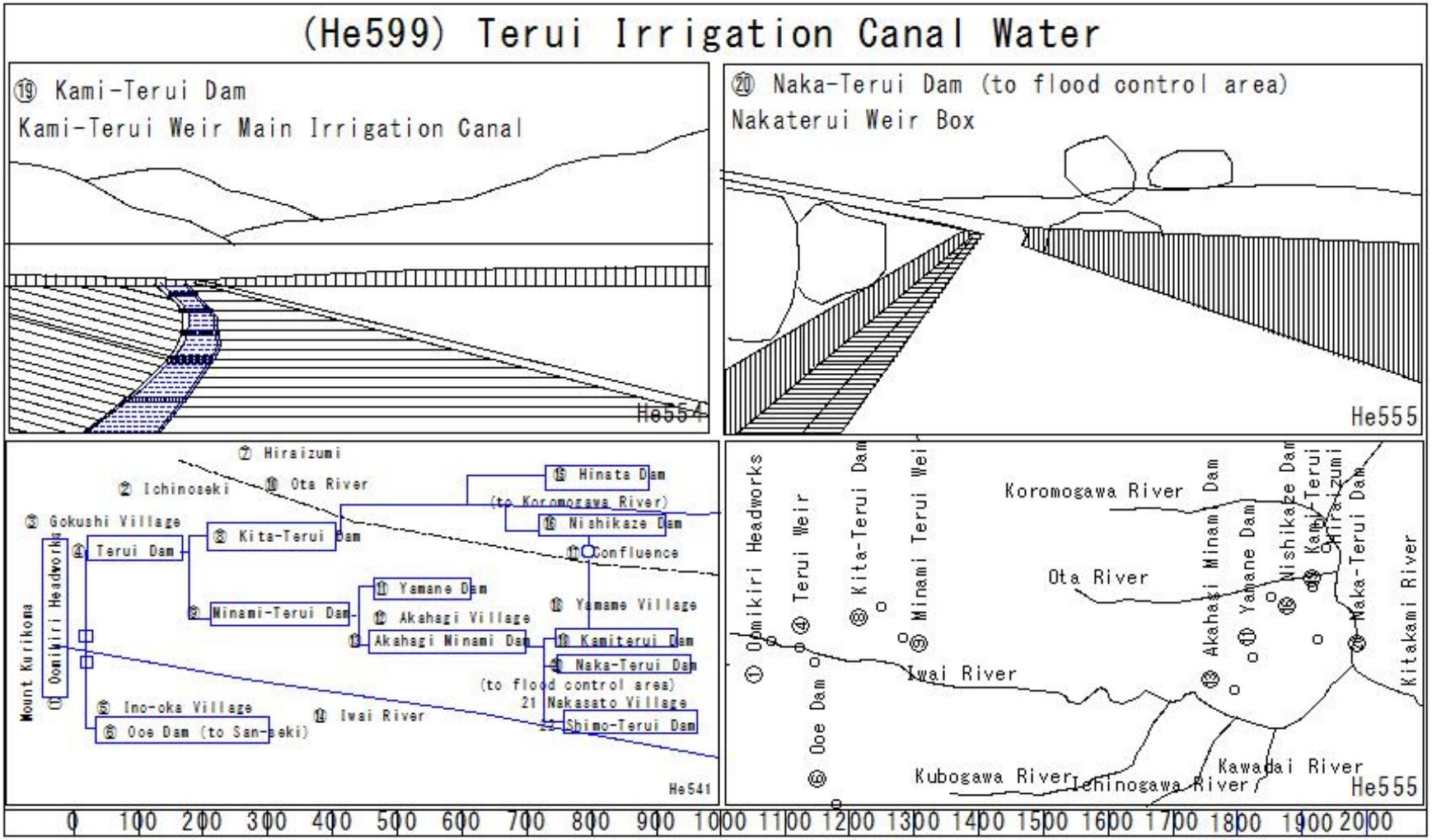
(He597) Terui Irrigation Canal Water



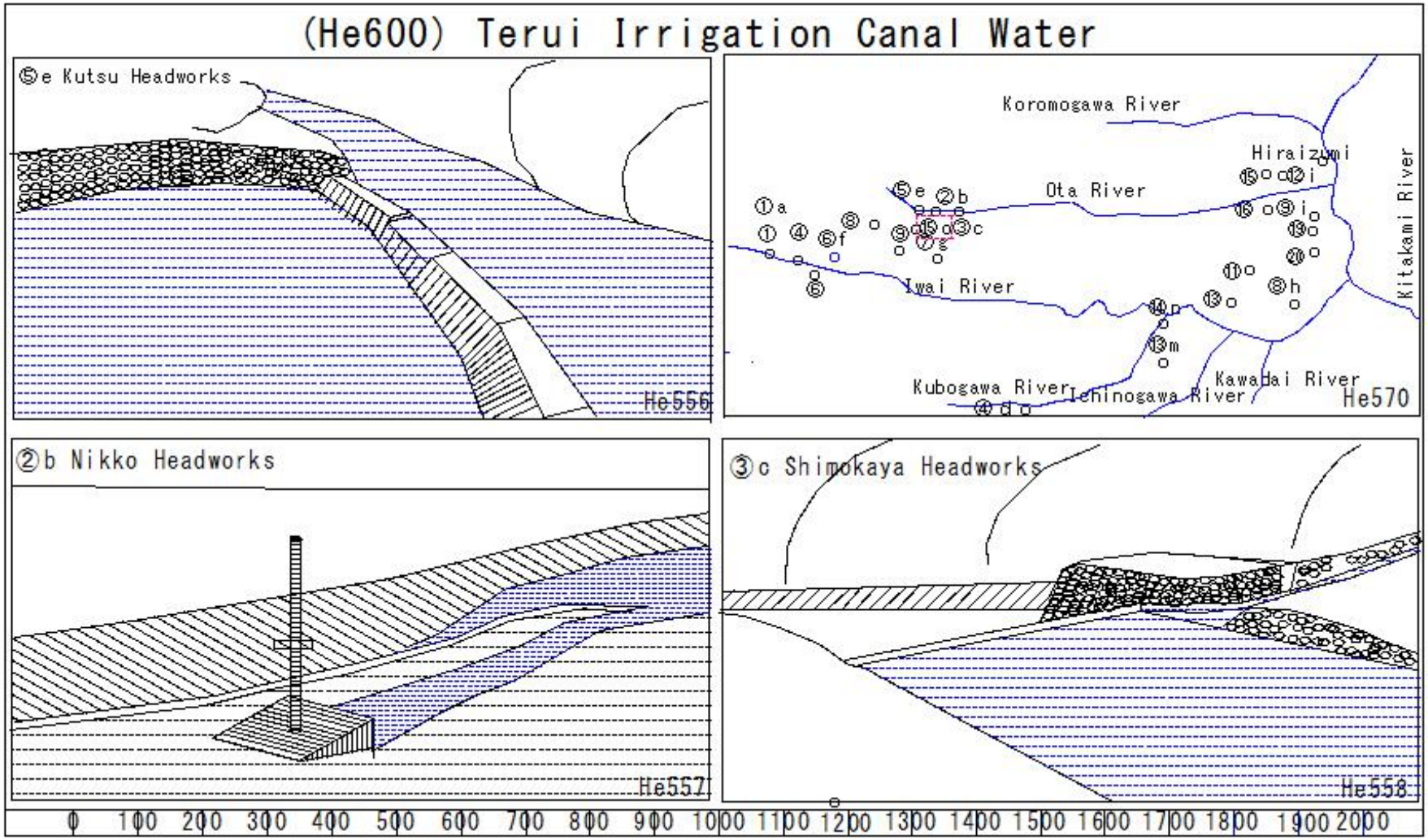
(He598) Terui Irrigation Canal Water



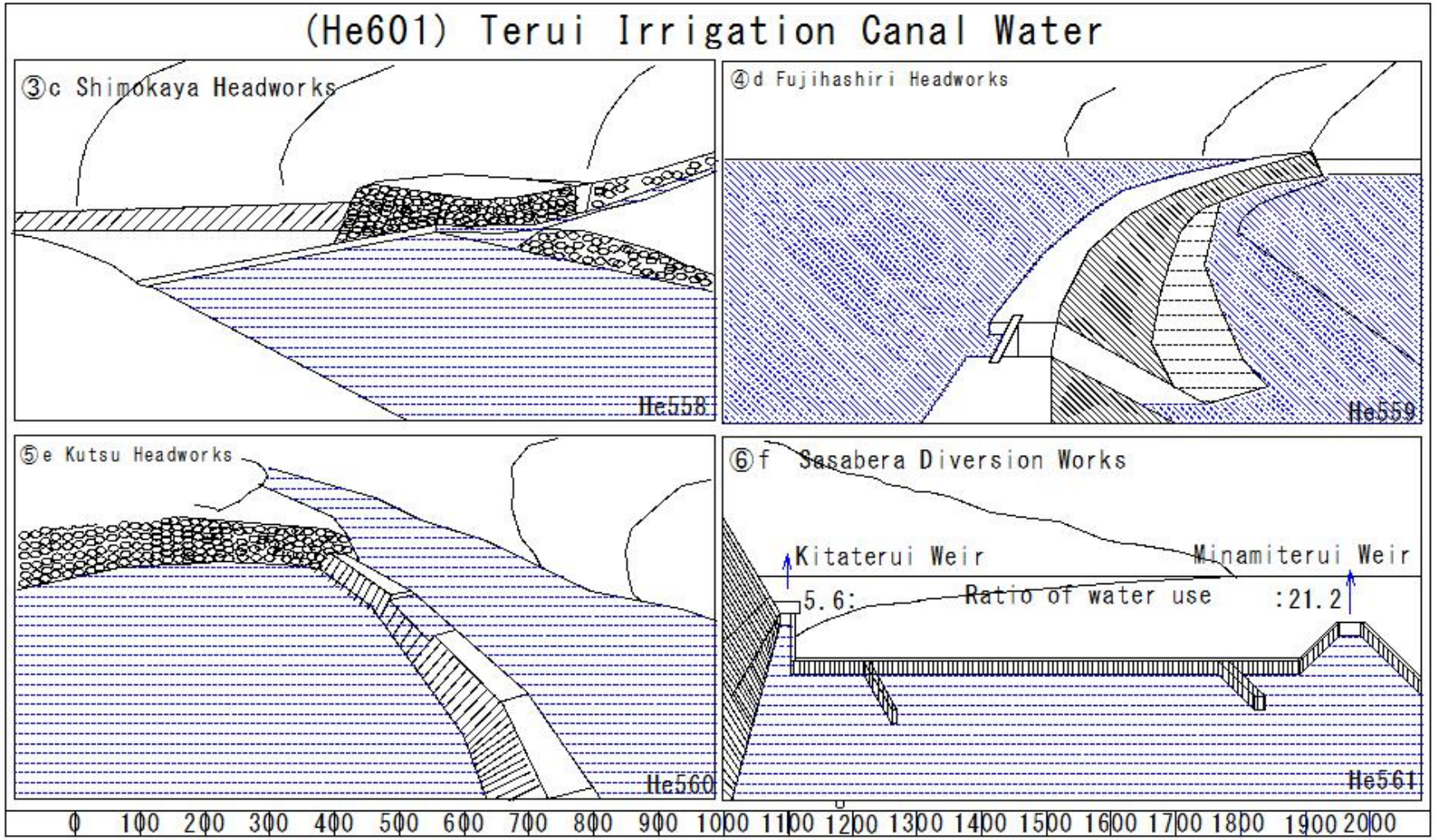
(He599) Terui Irrigation Canal Water



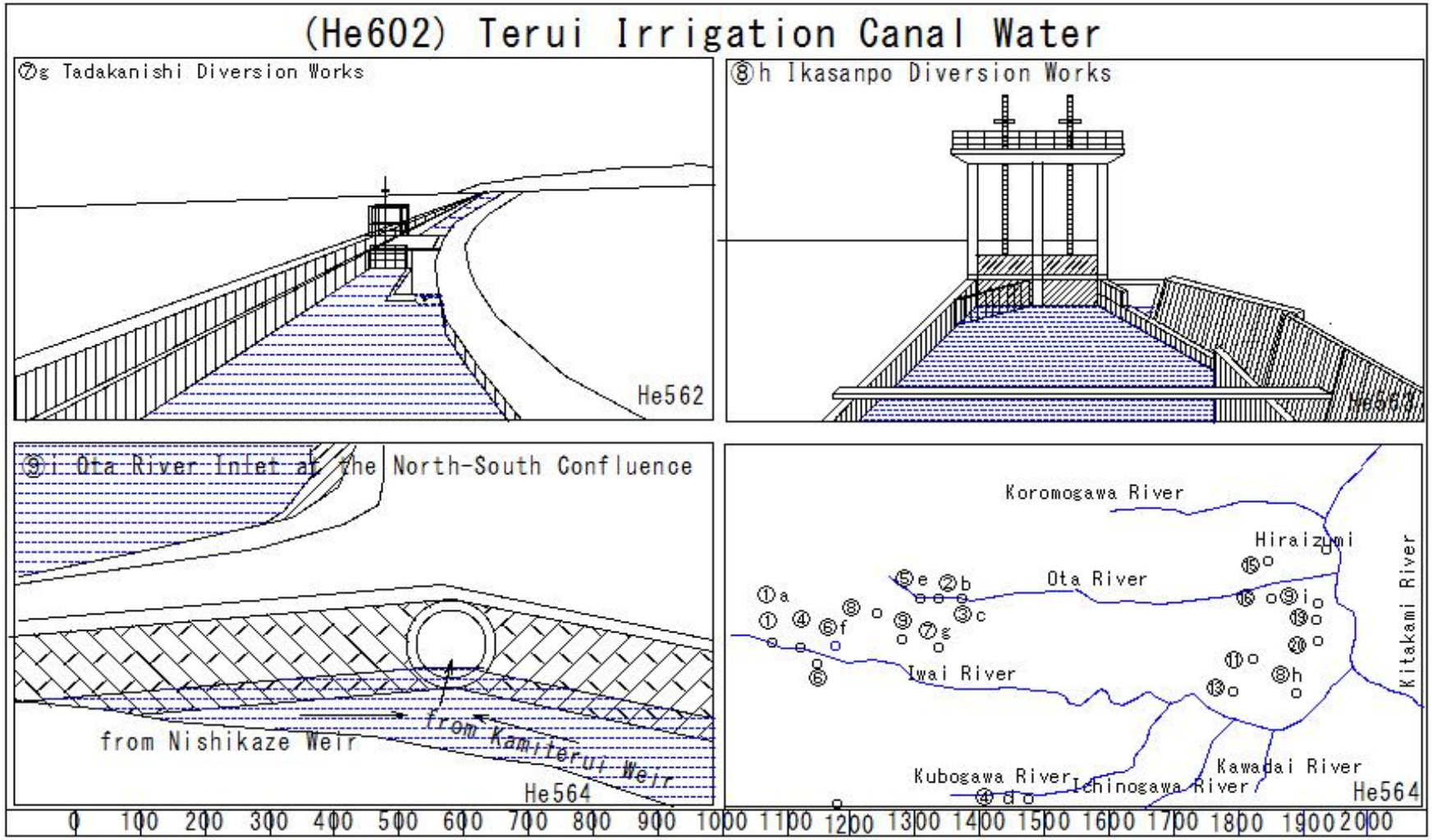
(He600) Terui Irrigation Canal Water



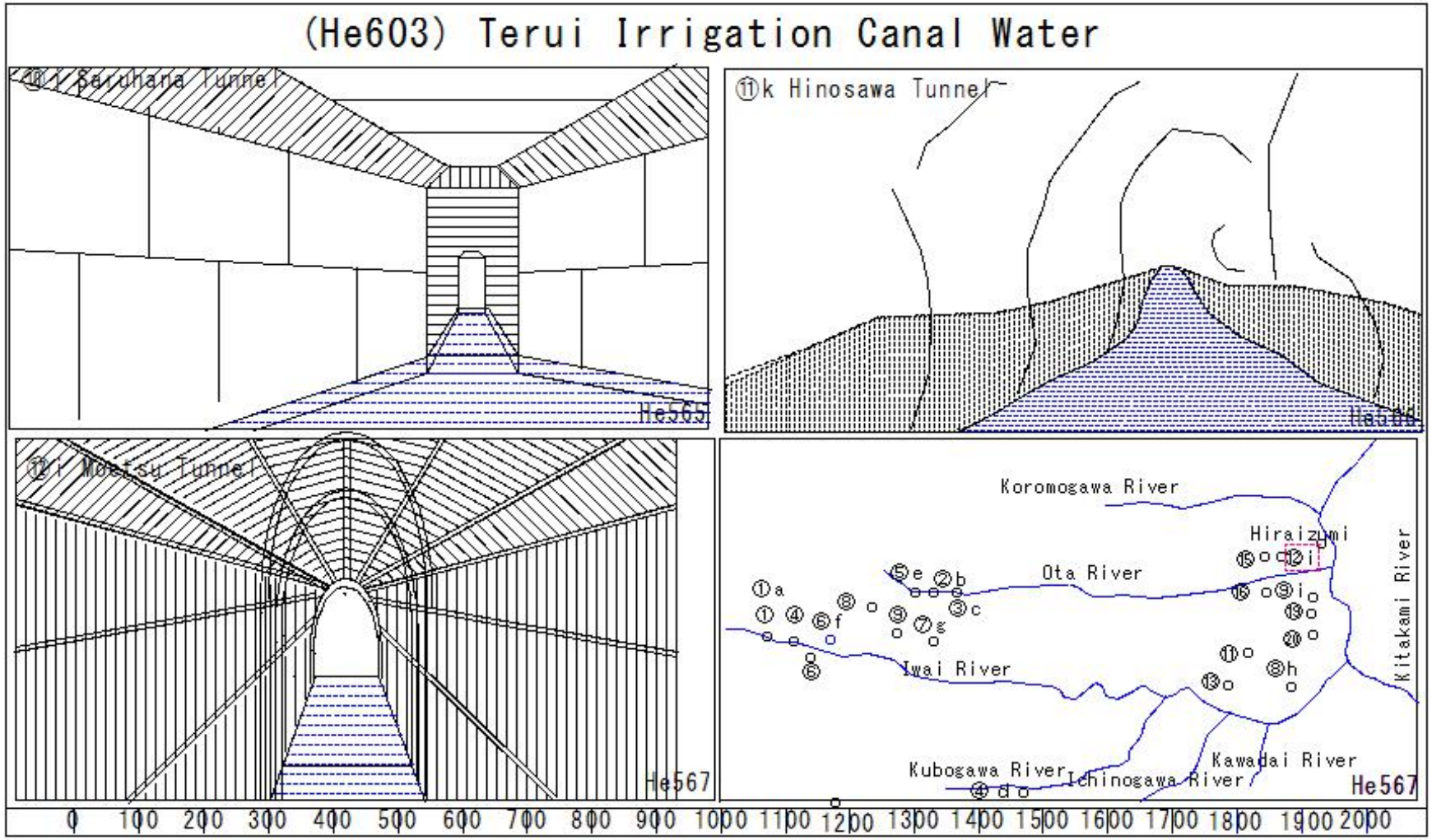
(He601) Terui Irrigation Canal Water



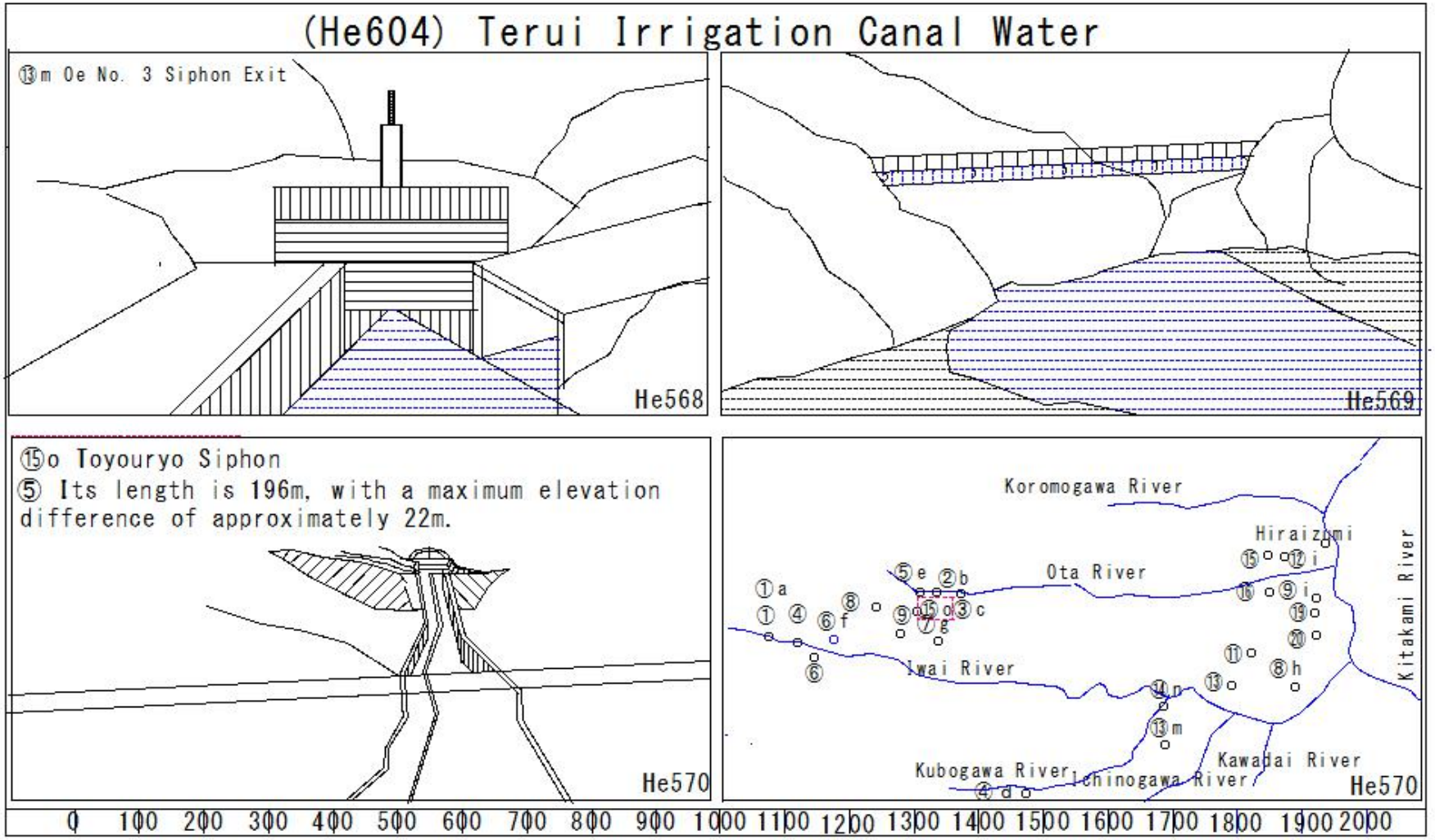
(He602) Terui Irrigation Canal Water



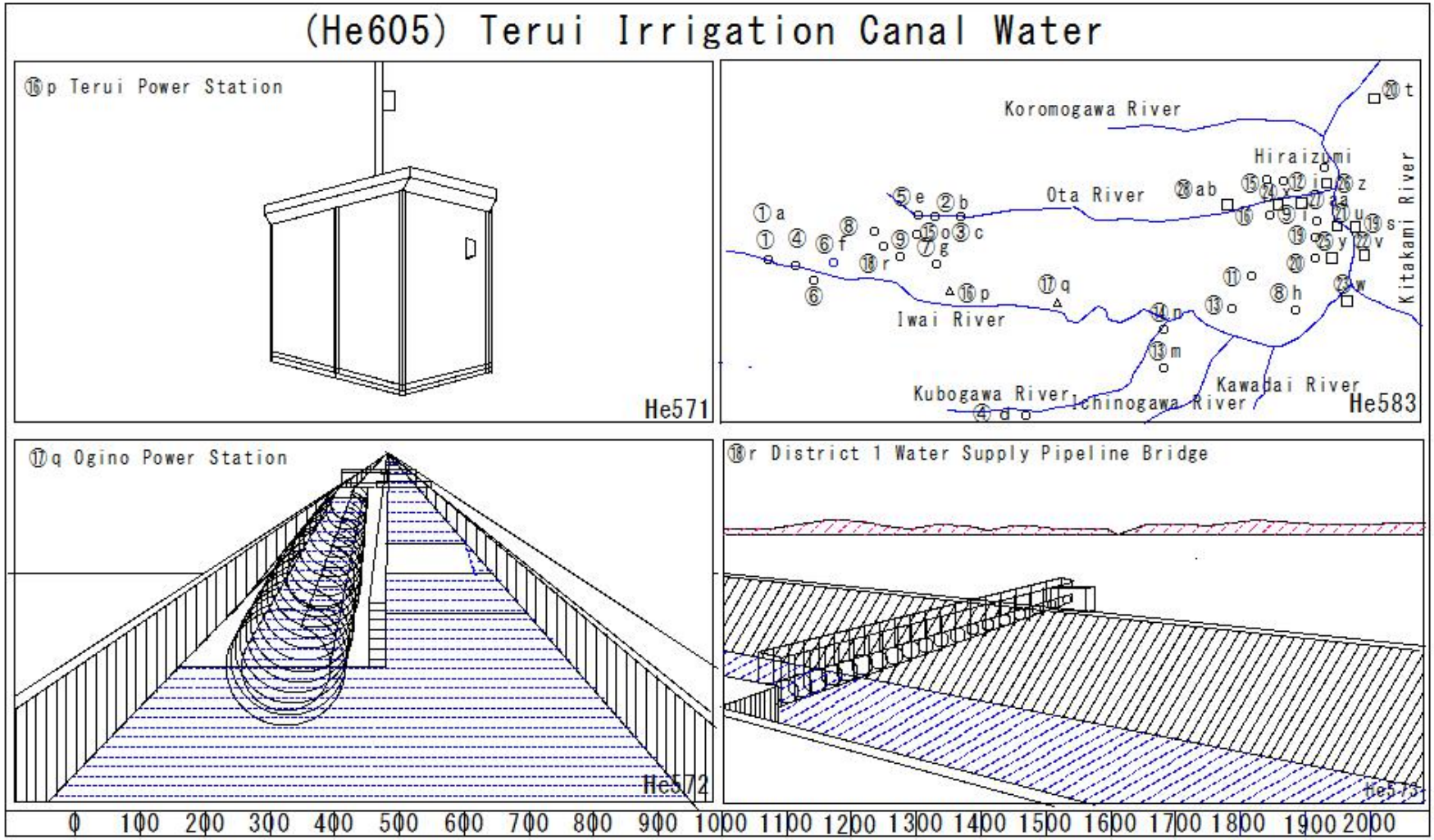
(He603) Terui Irrigation Canal Water



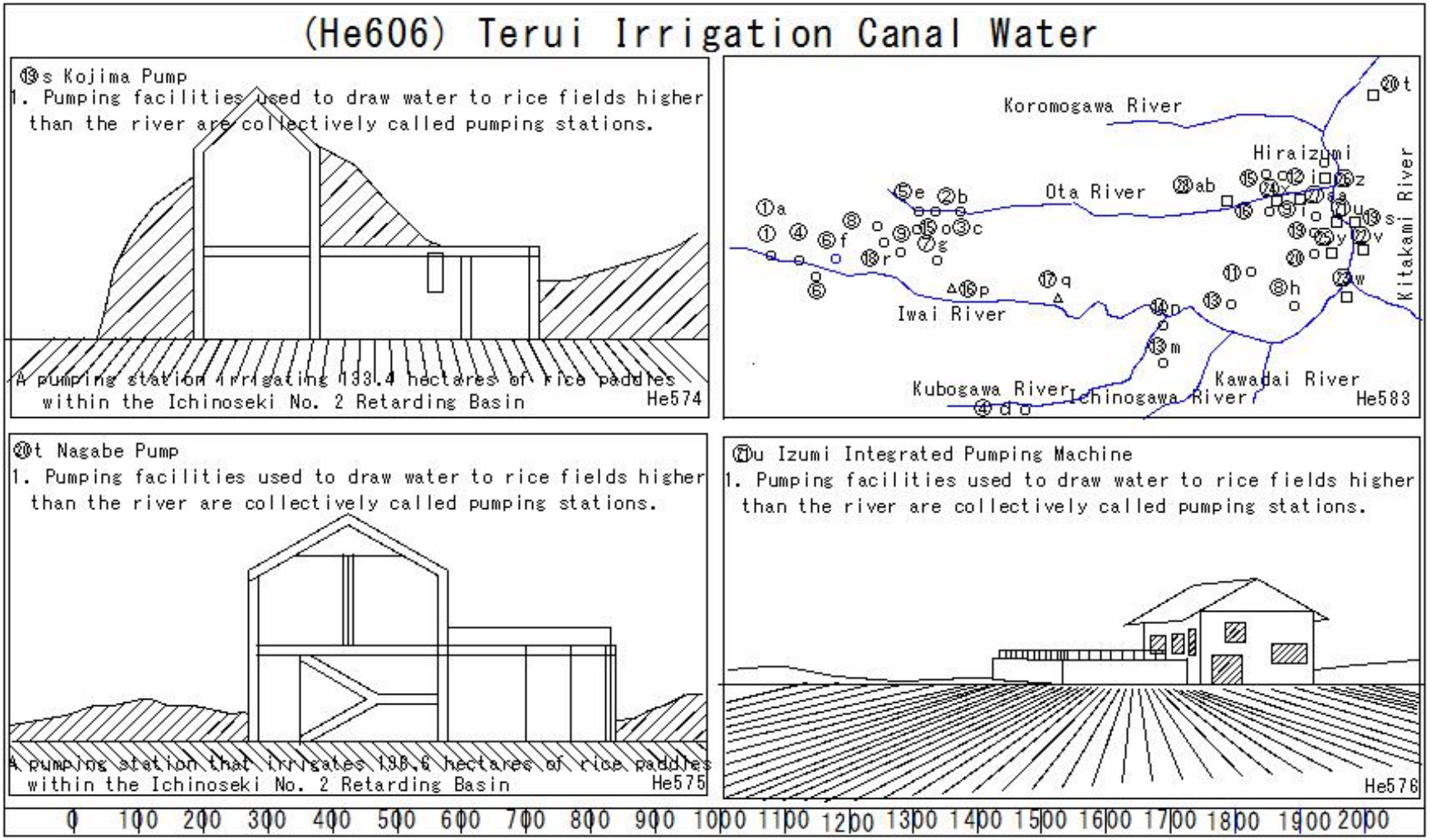
(He604) Terui Irrigation Canal Water



(He605) Terui Irrigation Canal Water



(He606) Terui Irrigation Canal Water

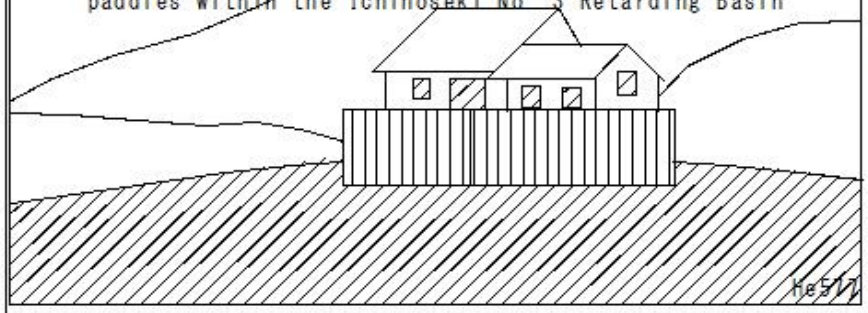


(He607) Terui Irrigation Canal Water

(He607) Terui Irrigation Canal Water

㉒v Maikawa Pumping Machine

1. Pumping facilities used to draw water to rice fields higher than the river are collectively called pumping stations.
A pumping station that irrigates 148.8 hectares of rice paddies within the Ichinoseki No. 3 Retarding Basin

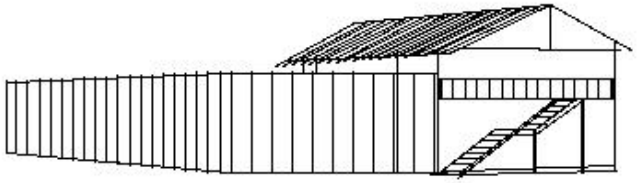


He577

㉓w Ichinoseki Integrated Pumping Machine

Pumping Stations

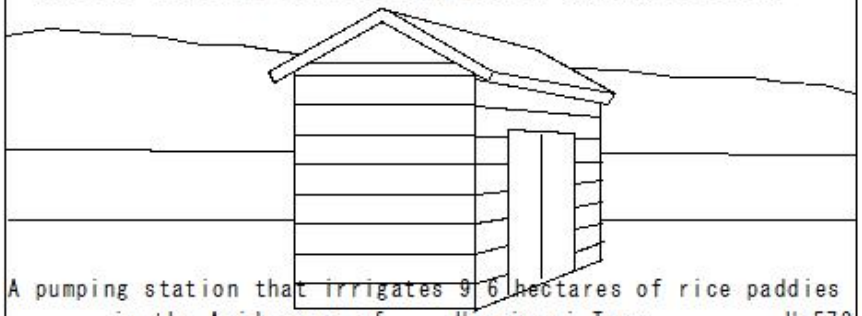
1. Pumping facilities used to draw water to rice fields higher than the river are collectively called pumping stations.
A pumping station that irrigates 215.8 hectares of rice paddies within the Ichinoseki No. 1 flood control basin



He578

㉔x Niida Pumping Machine

1. Pumping facilities used to draw water to rice fields higher than the river are collectively called pumping stations.

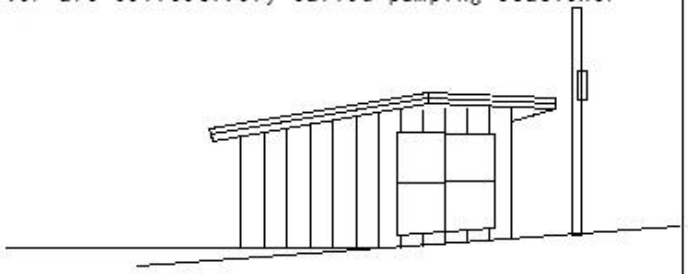


A pumping station that irrigates 9.6 hectares of rice paddies in the Arida area of Hiraizumi Town

He579

㉕y Sano Pumping Station

1. Pumping facilities used to draw water to rice fields higher than the river are collectively called pumping stations.

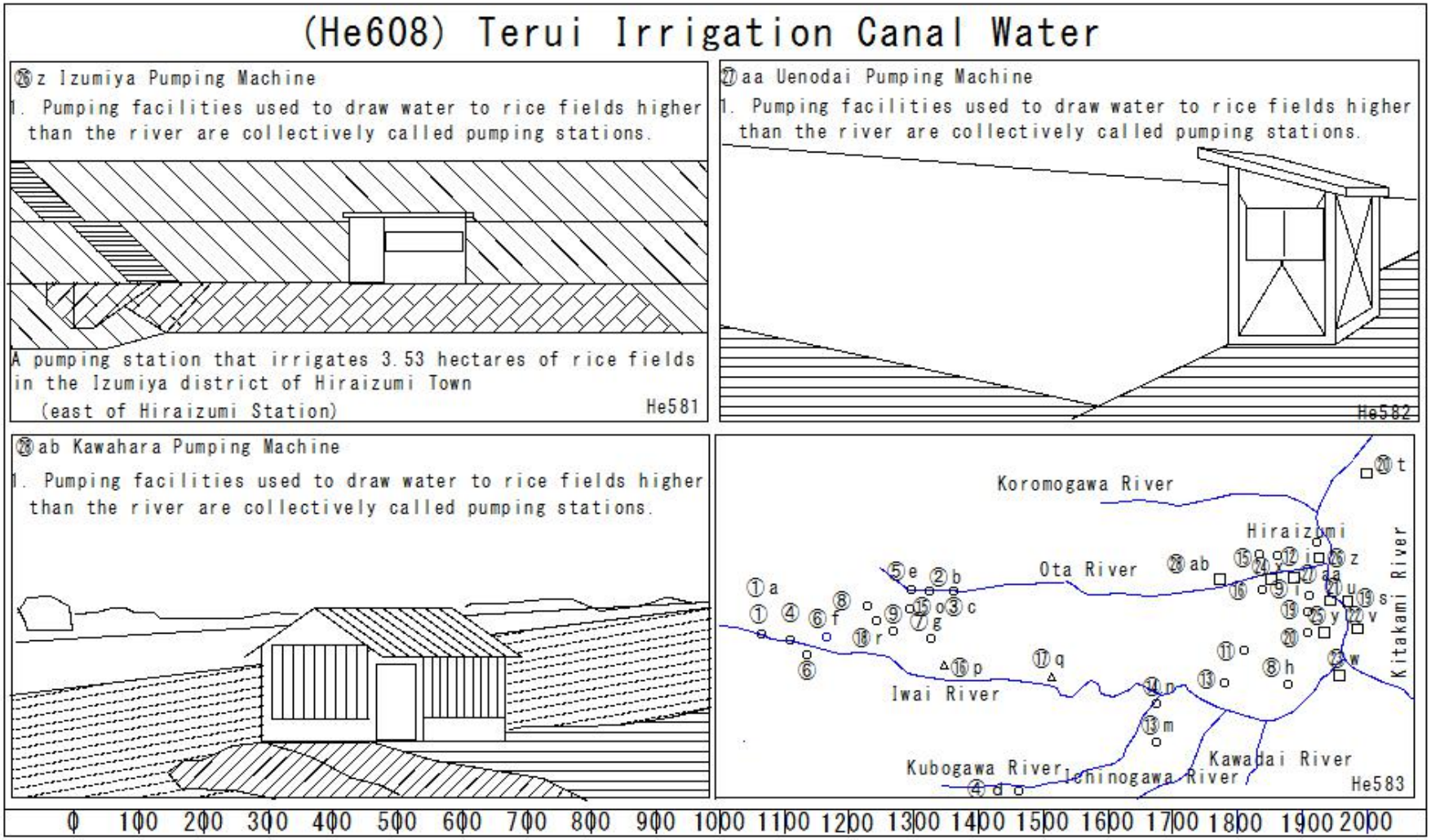


A pumping station that irrigates 8.7 hectares of rice paddies in the Sano district of Hiraizumi town

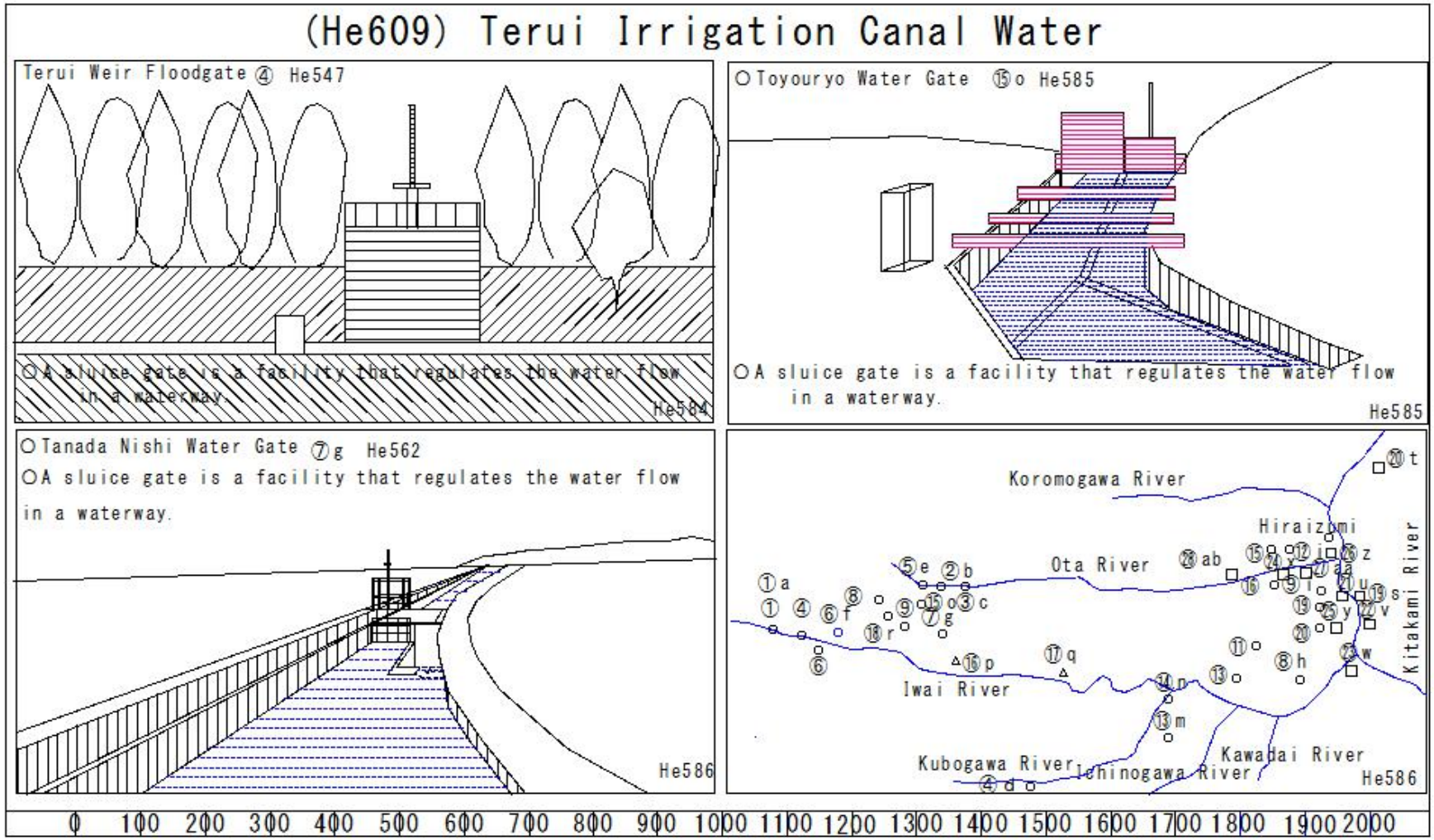
He580

0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

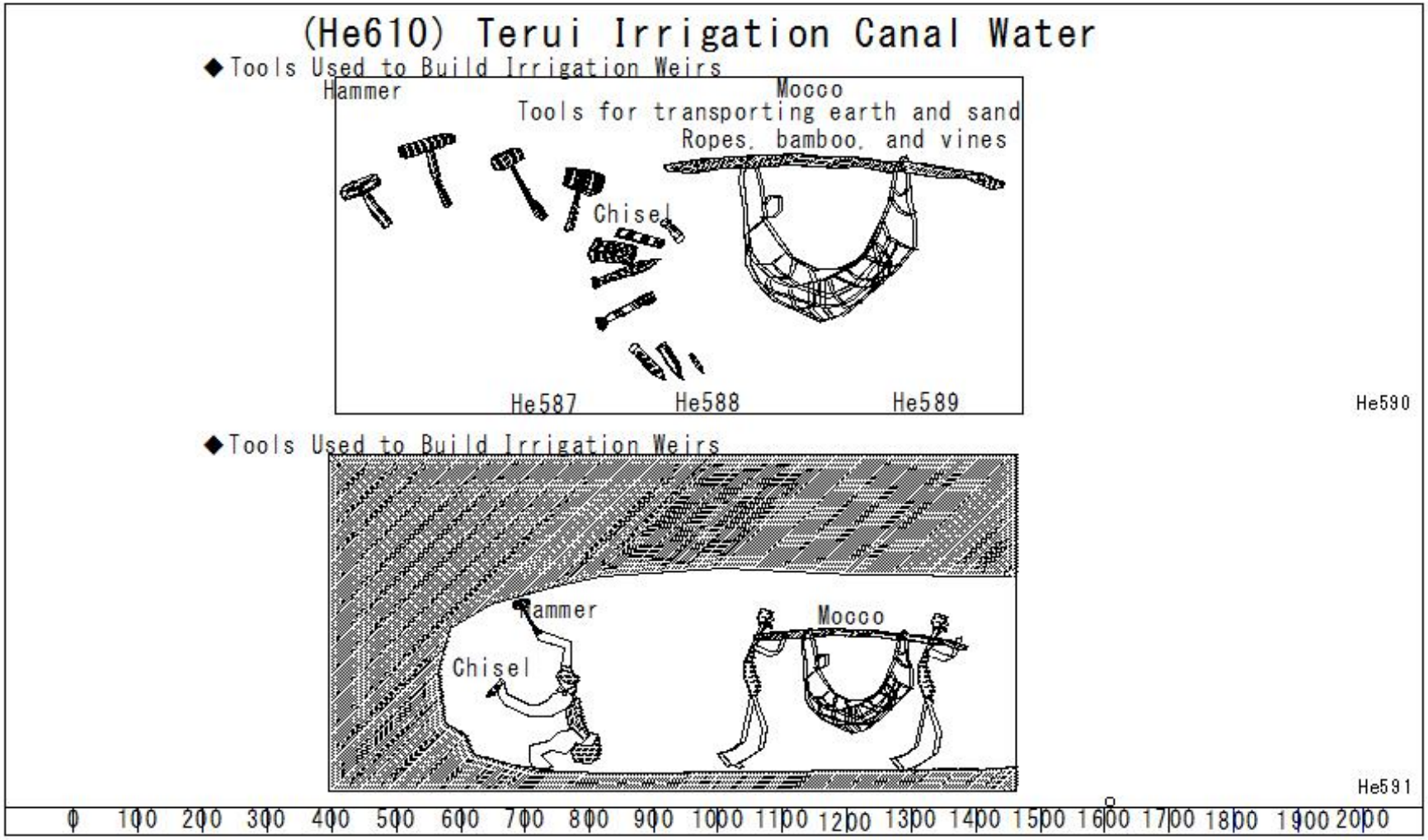
(He608) Terui Irrigation Canal Water



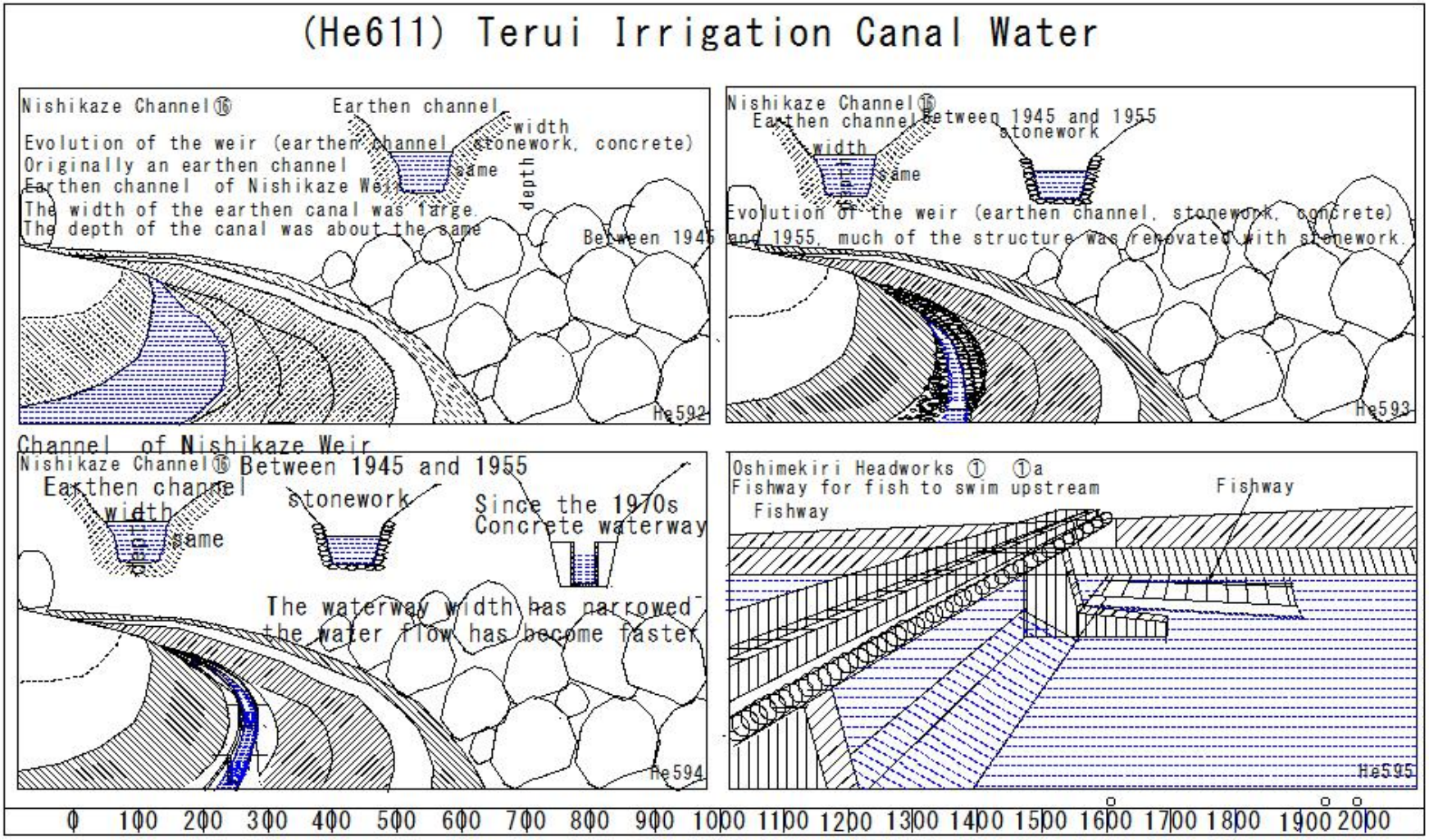
(He609) Terui Irrigation Canal Water



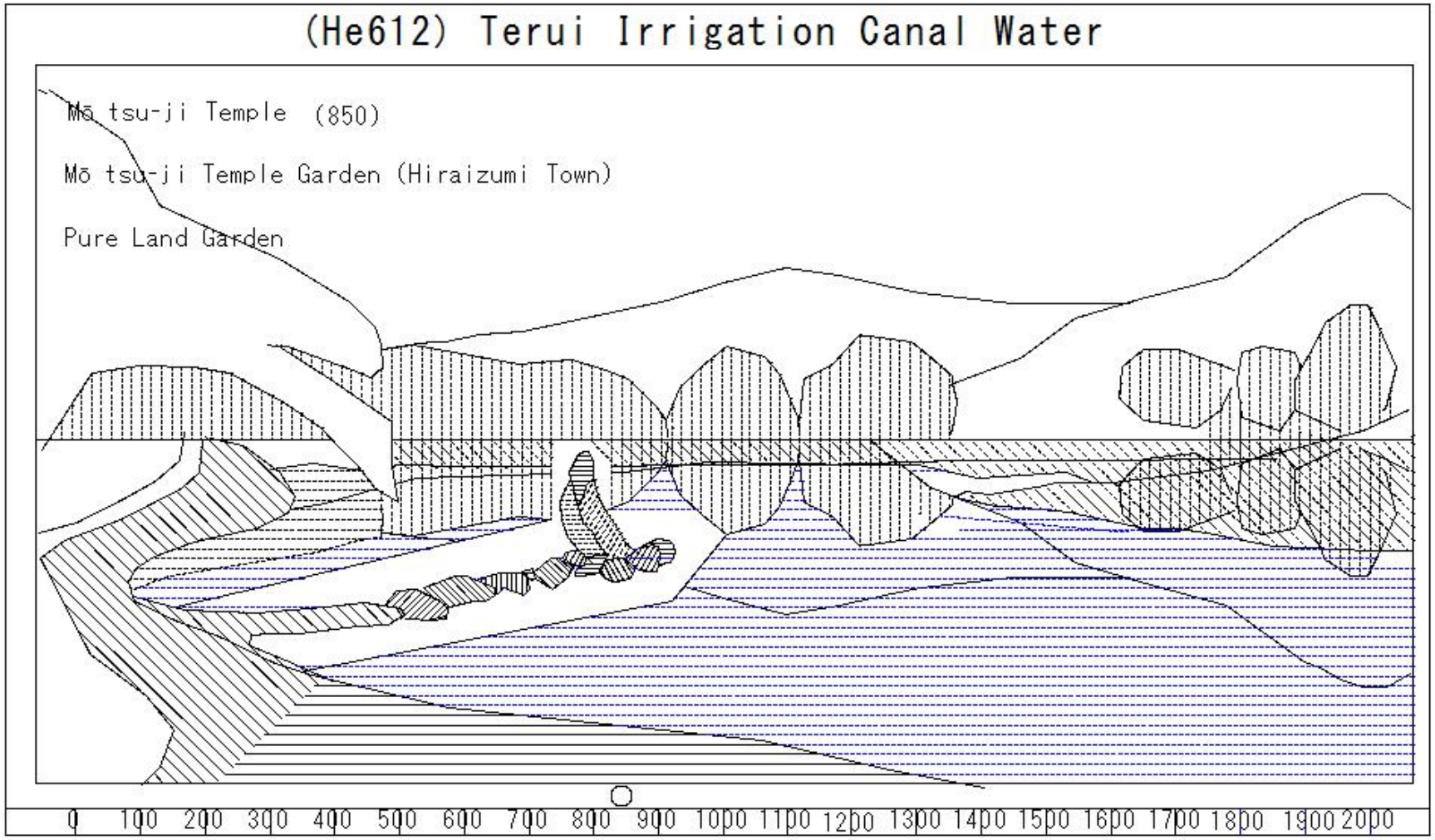
(He610) Terui Irrigation Canal Water



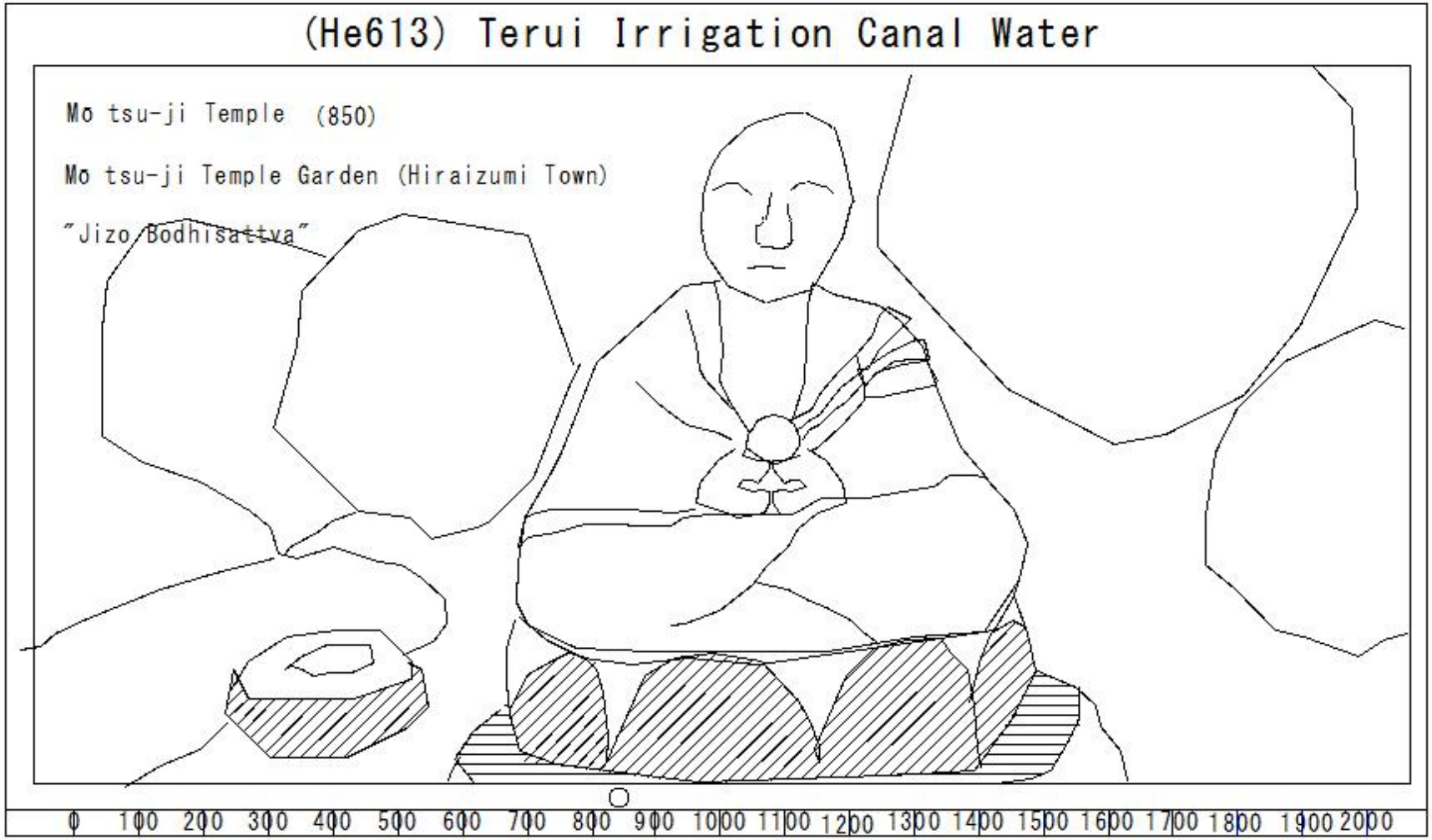
(He611) Terui Irrigation Canal Water



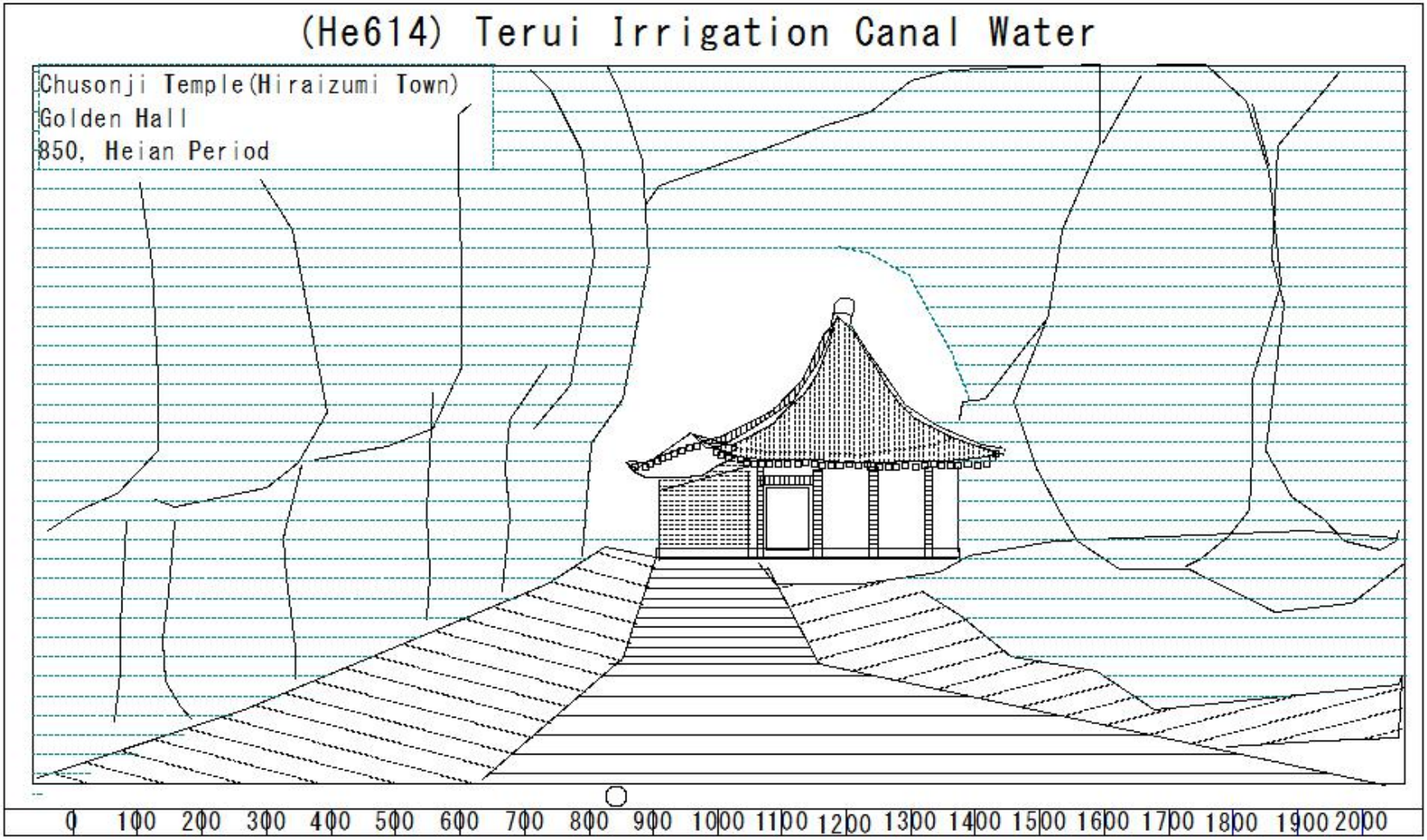
(He612) Terui Irrigation Canal Water



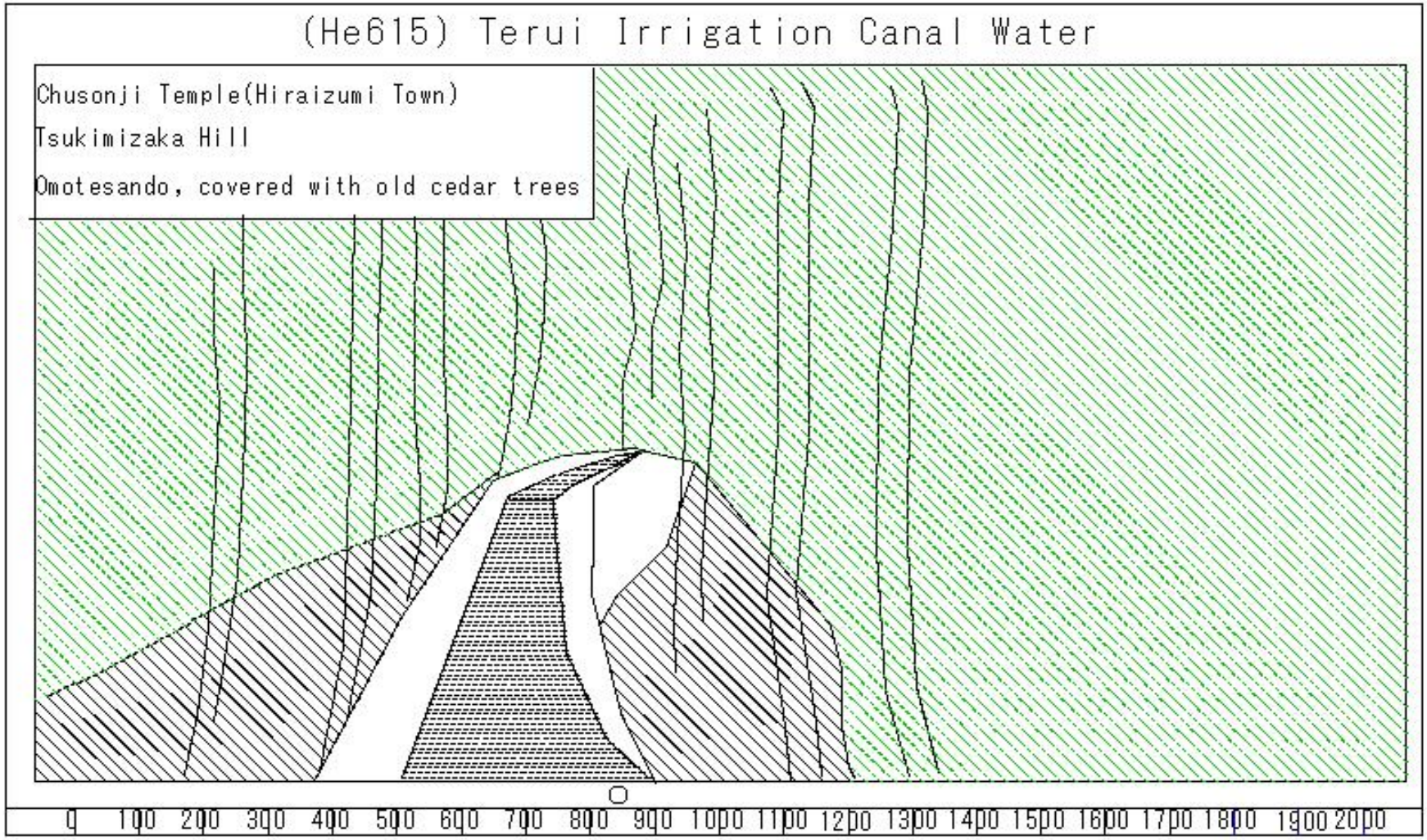
(He613) Terui Irrigation Canal Water



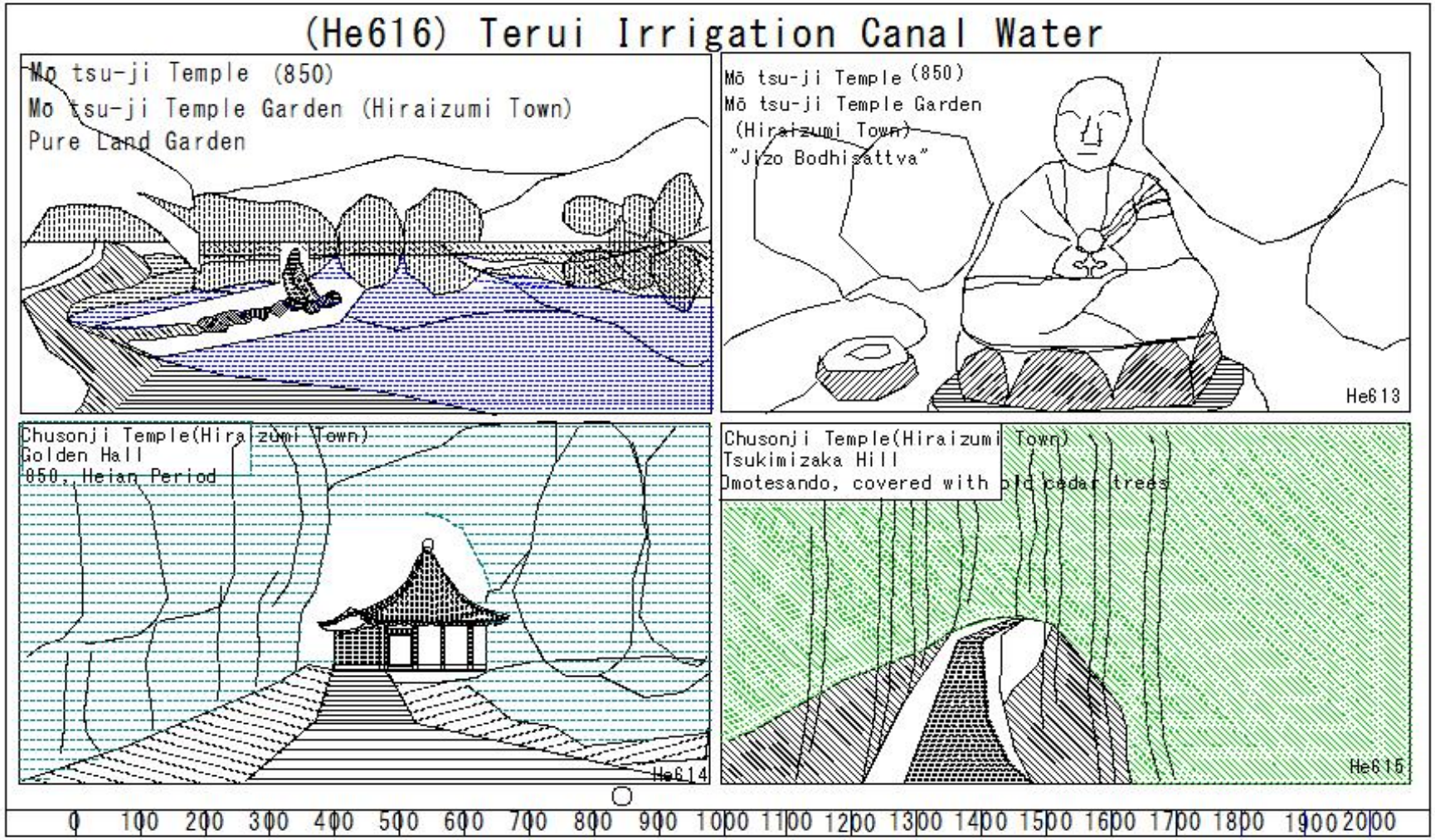
(He614) Terui Irrigation Canal Water



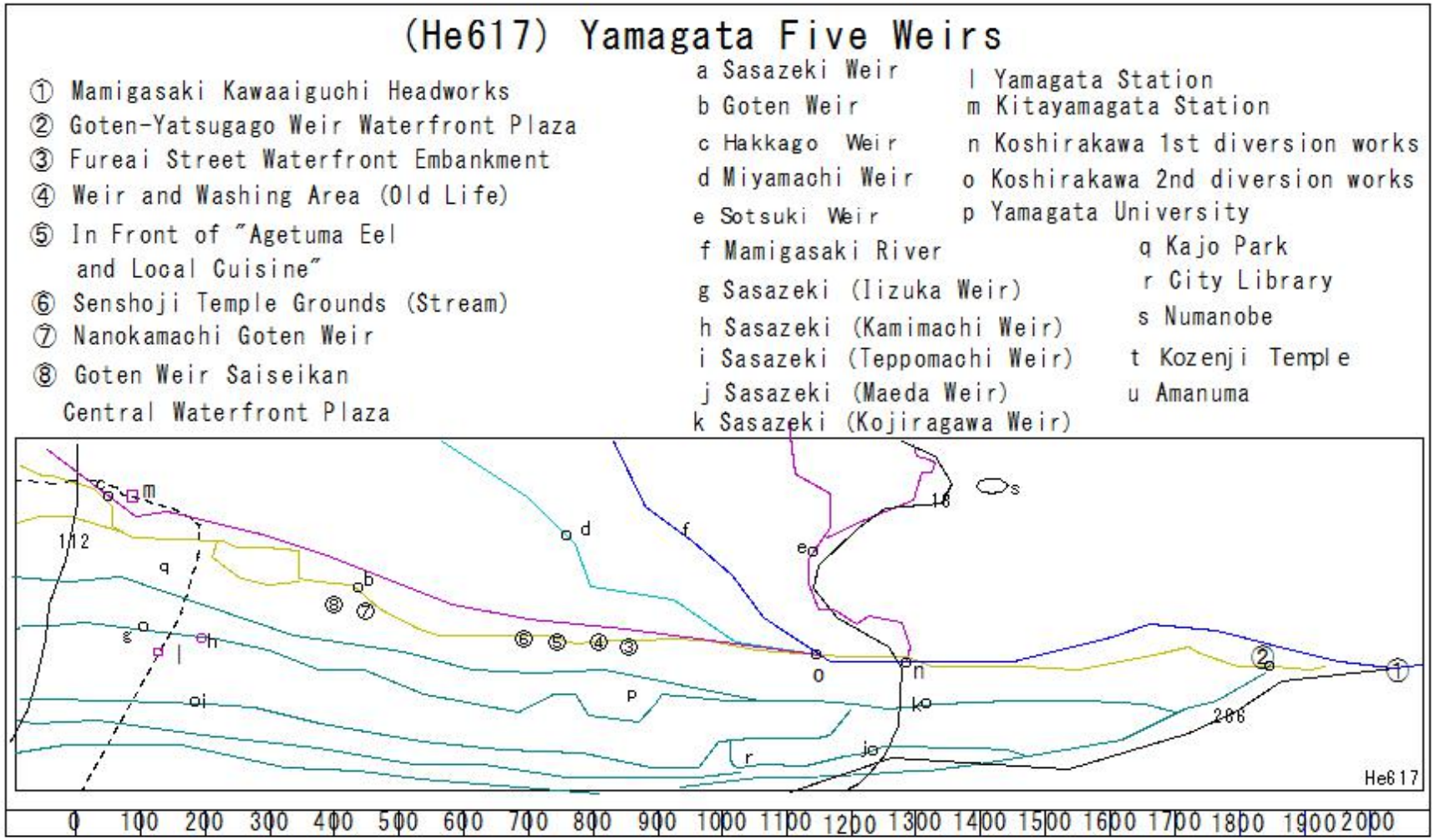
(He615) Terui Irrigation Canal Water



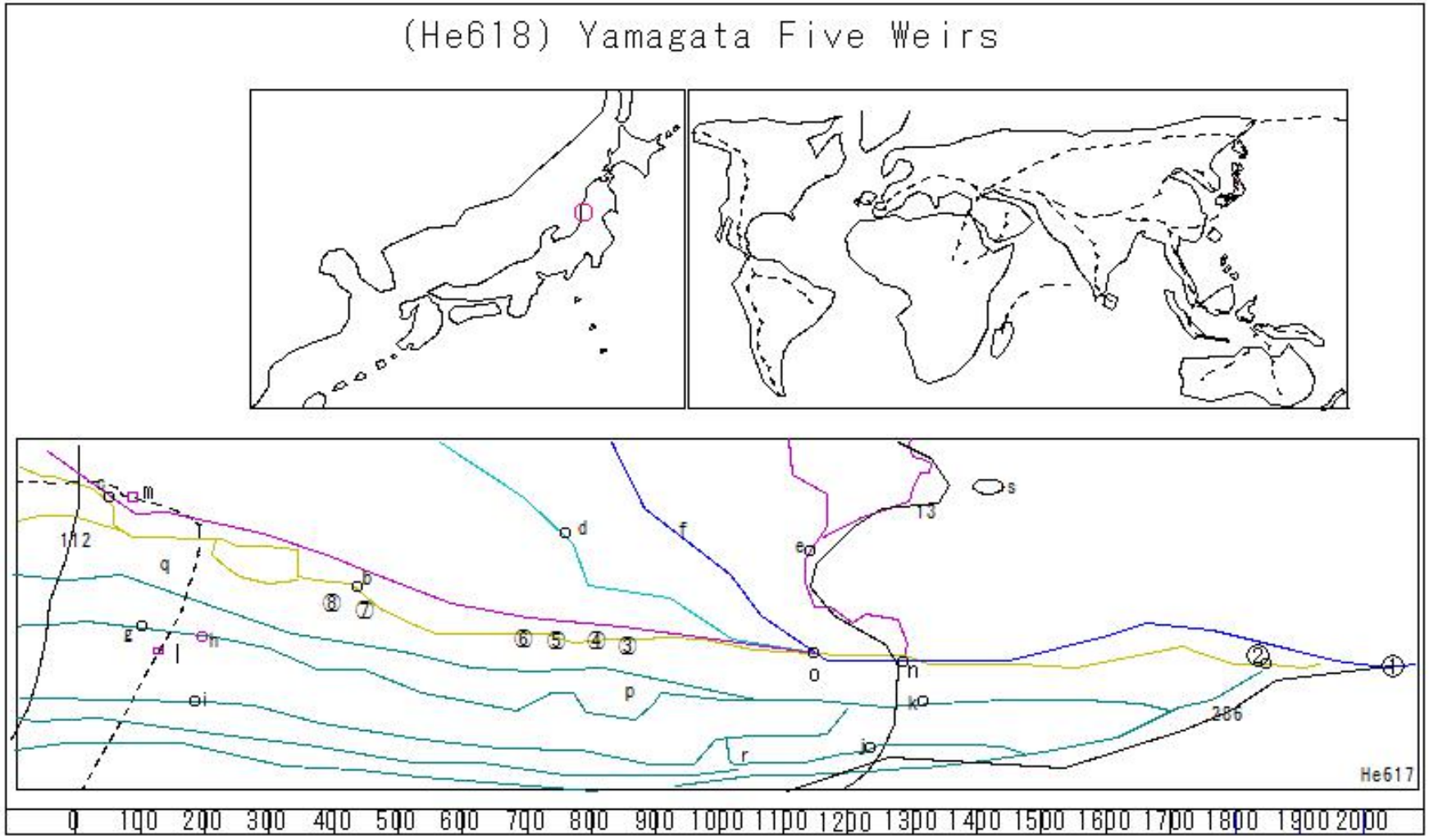
(He616) Terui Irrigation Canal Water



(He617) Yamagata Five Weirs



(He618) Yamagata Five Weirs



(He619) Yamagata Five Weirs

(He619) Yamagata Five Weirs

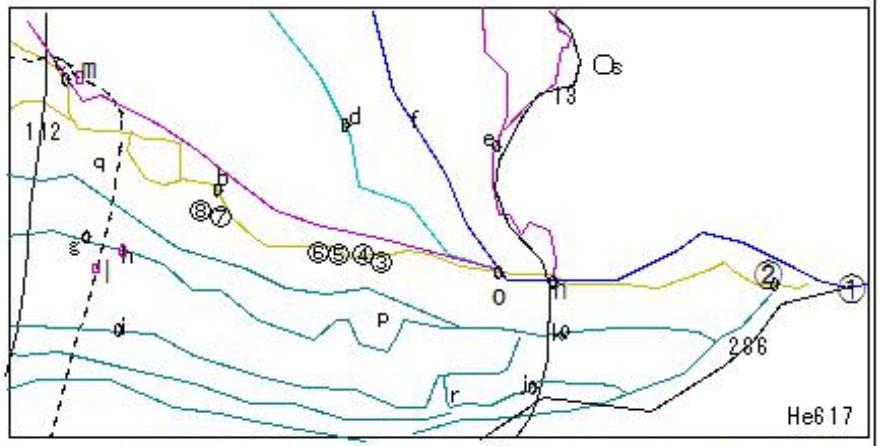
Yamagata Five Weirs

a This is the collective name for the five weirs (waterways) that flow through Yamagata City: Sasazeki, Gotenzeki, Yatsugagozeki, Miyamachizeki, and Sogetsuzeki.

b They are said to have been constructed by Torii Tadamasa, the lord of the Yamagata domain, in 1624 (the first year of the Kan'ei era) during the Edo period.

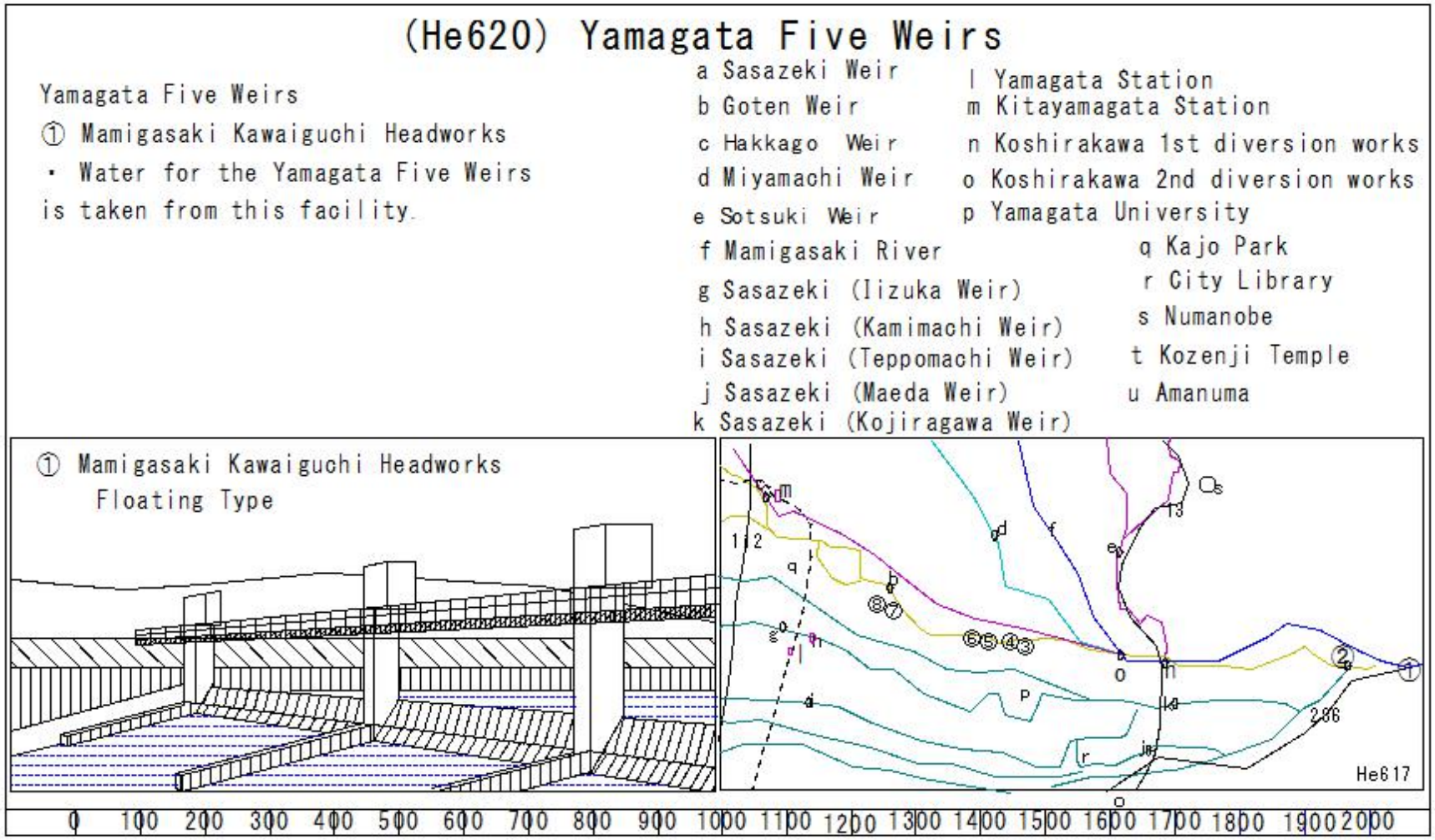
a Sasazeki Weir
b Goten Weir
c Hakkago Weir
d Miyamachi Weir
e Sotsuki Weir
f Mamigasaki River
g Sasazeki (Iizuka Weir)
h Sasazeki (Kamimachi Weir)
i Sasazeki (Teppomachi Weir)
j Sasazeki (Maeda Weir)
k Sasazeki (Kojiragawa Weir)

l Yamagata Station
m Kitayamagata Station
n Koshirakawa 1st diversion works
o Koshirakawa 2nd diversion works
p Yamagata University
q Kajo Park
r City Library
s Numanobe
t Kozenji Temple
u Amanuma



0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He620) Yamagata Five Weirs



(He621) Yamagata Five Weirs

(He621) Yamagata Five Weirs

Yamagata Five Weirs

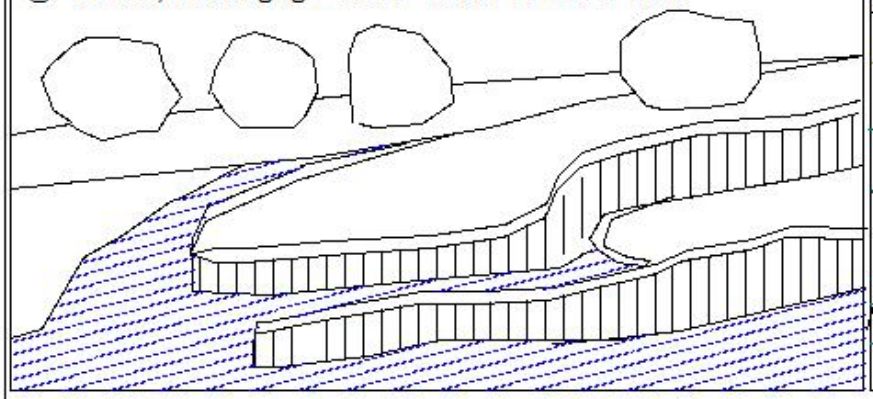
② Goten/Yatsugago Weir Waterfront Plaza

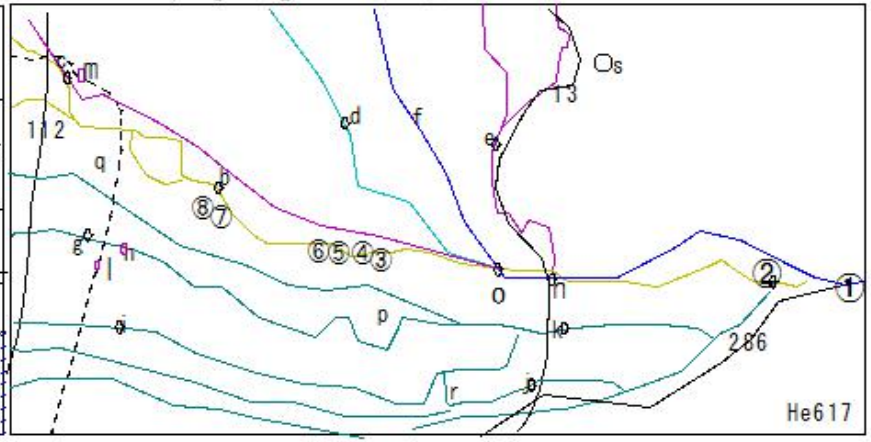
This plaza utilizes the water from the Yamagata Five Weirs and is designed for water play and other activities.

a Sasazeki Weir
b Goten Weir
c Hakkago Weir
d Miyamachi Weir
e Sotsuki Weir
f Mamigasaki River
g Sasazeki (Iizuka Weir)
h Sasazeki (Kamimachi Weir)
i Sasazeki (Teppomachi Weir)
j Sasazeki (Maeda Weir)
k Sasazeki (Kojiragawa Weir)

l Yamagata Station
m Kitayamagata Station
n Koshirakawa 1st diversion works
o Koshirakawa 2nd diversion works
p Yamagata University
q Kajo Park
r City Library
s Numanobe
t Kozenji Temple
u Amanuma

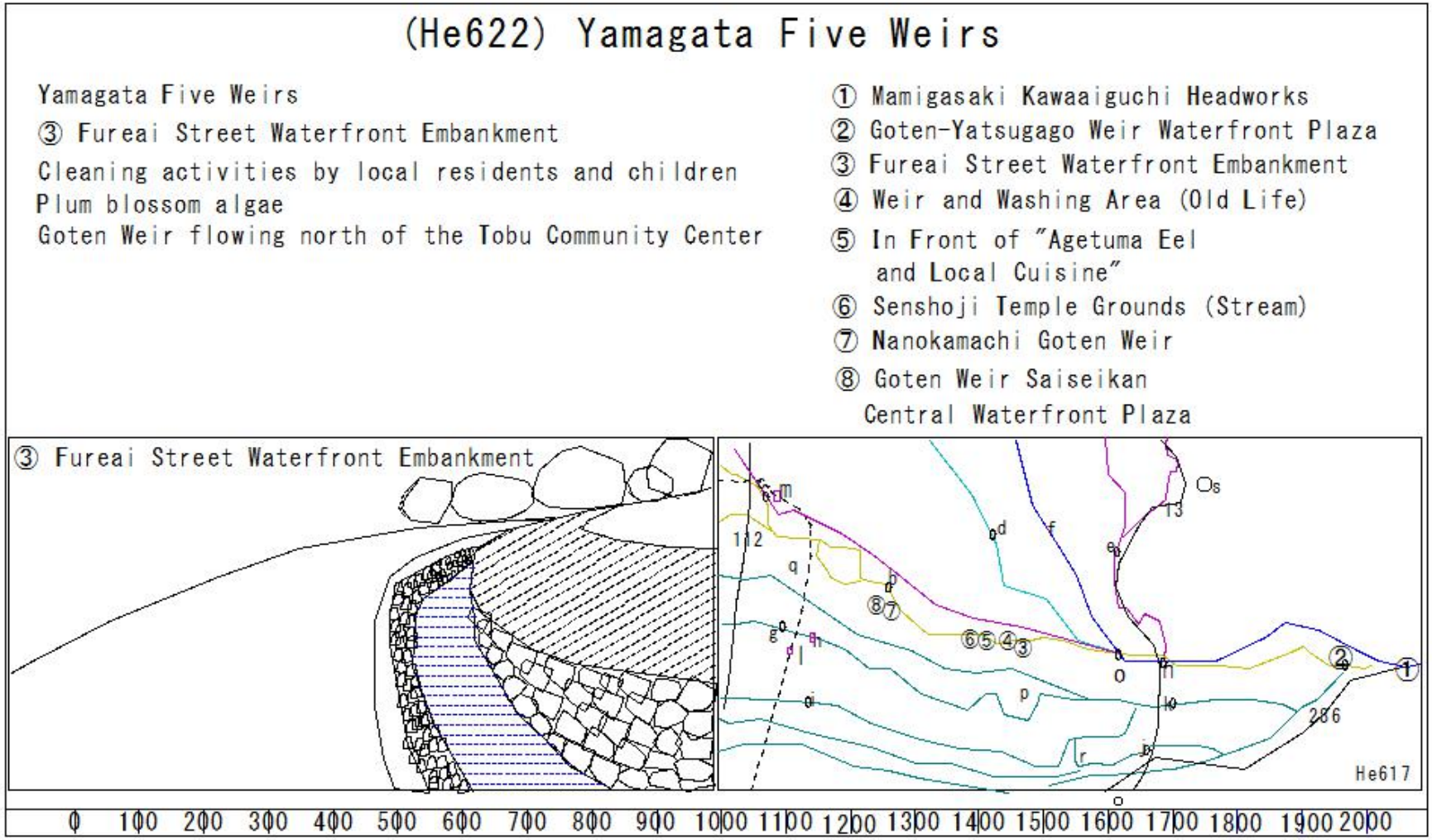
② Goten/Yatsugago Weir Waterfront Plaza





0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

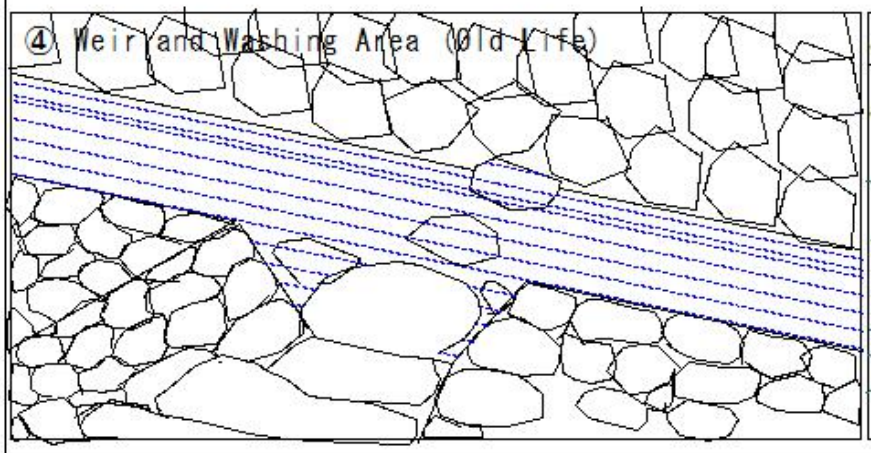
(He622) Yamagata Five Weirs

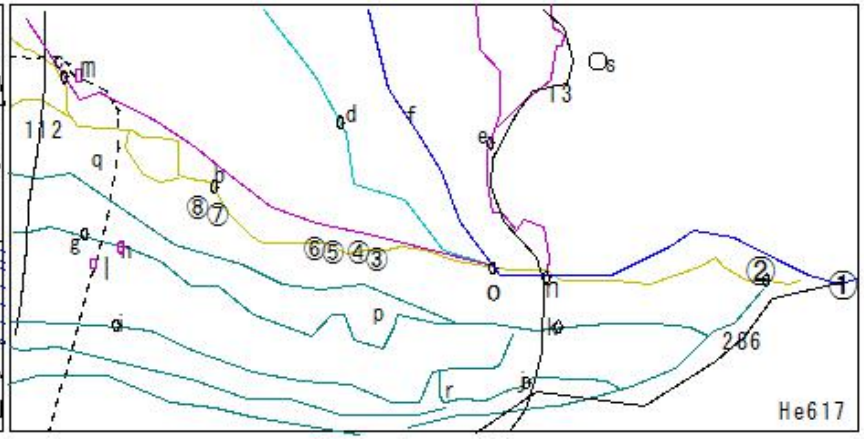


(He623) Yamagata Five Weirs

Yamagata Five Weirs
④ Weir and Washing Area (Old Life)
Stone steps leading down to the weir
Water used for daily use such as washing dishes

① Mamigasaki Kawaaiguchi Headworks
② Goten-Yatsugago Weir Waterfront Plaza
③ Fureai Street Waterfront Embankment
④ Weir and Washing Area (Old Life)
⑤ In Front of "Agetuma Eel and Local Cuisine"
⑥ Senshoji Temple Grounds (Stream)
⑦ Nanokamachi Goten Weir
⑧ Goten Weir Saiseikan
Central Waterfront Plaza





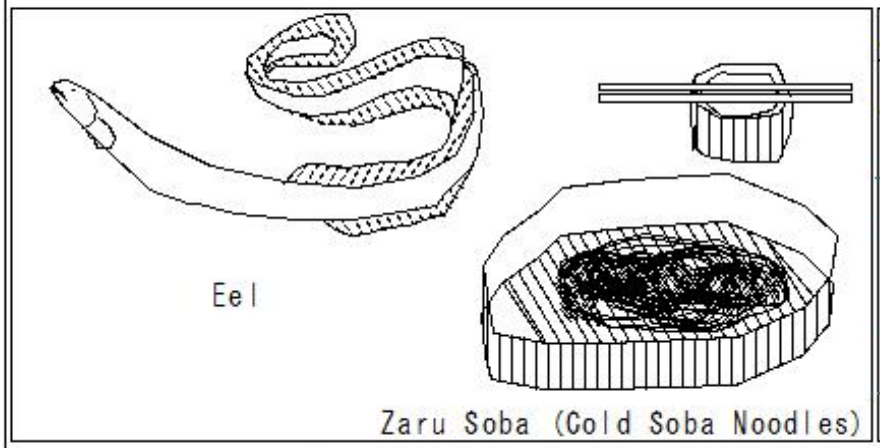
0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

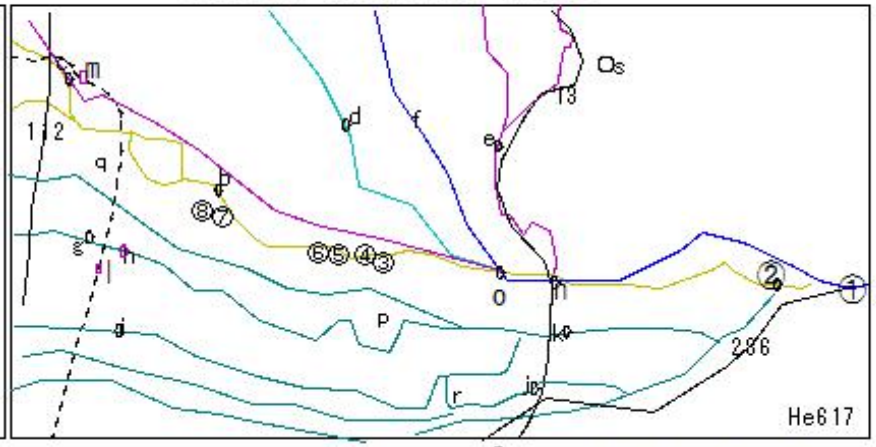
(He624) Yamagata Five Weirs

(He624) Yamagata Five Weirs

Yamagata Five Weirs
⑤ In Front of "Agetuma Eel and Local Cuisine"
Goten Weir
Eel and Local Cuisine

① Mamigasaki Kawaaiguchi Headworks
② Goten-Yatsugago Weir Waterfront Plaza
③ Fureai Street Waterfront Embankment
④ Weir and Washing Area (Old Life)
⑤ In Front of "Agetuma Eel and Local Cuisine"
⑥ Senshoji Temple Grounds (Stream)
⑦ Nanokamachi Goten Weir
⑧ Goten Weir Saiseikan Central Waterfront Plaza





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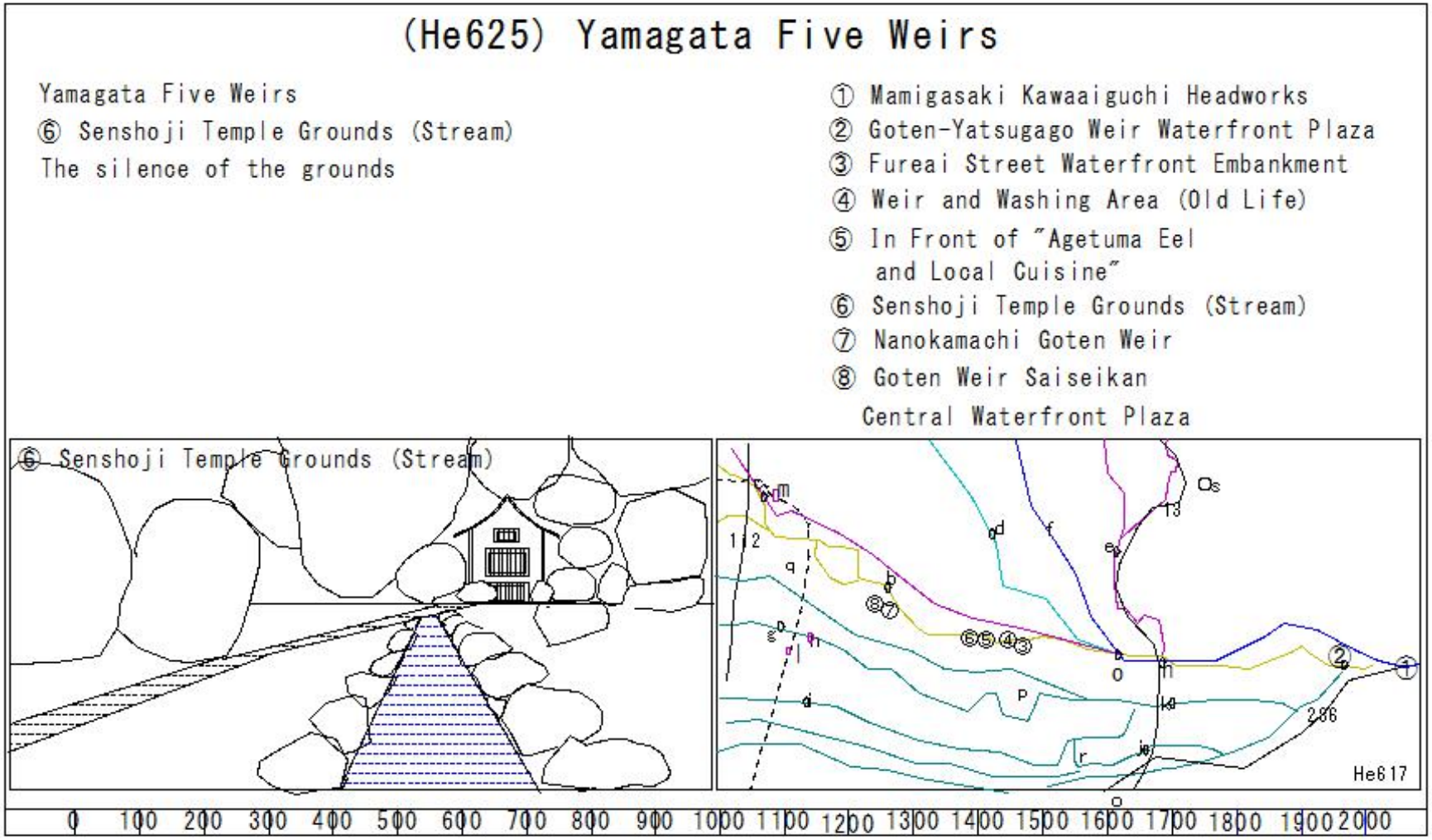
(He625) Yamagata Five Weirs



(He626) Yamagata Five Weirs

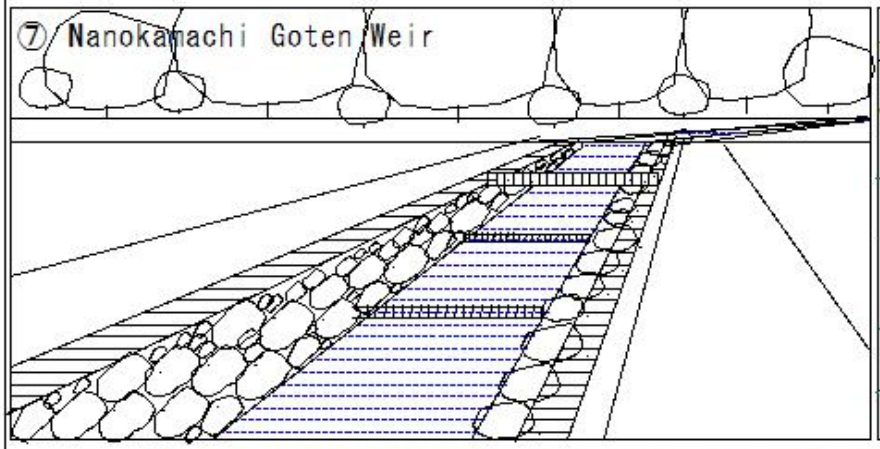
(He626) Yamagata Five Weirs

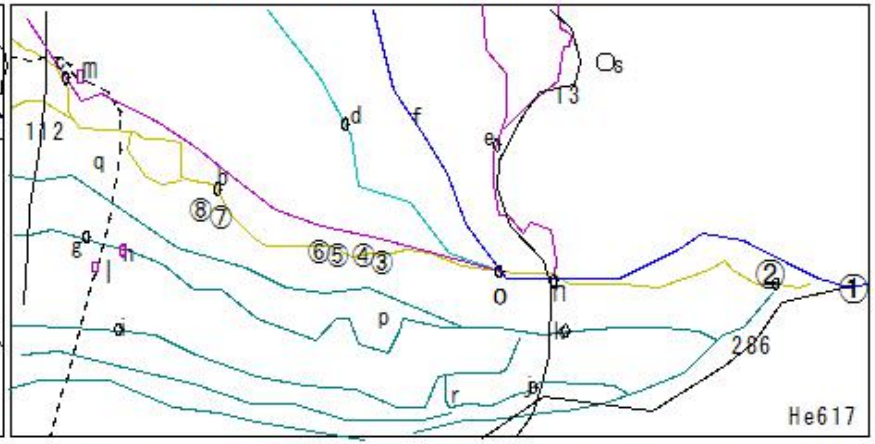
Yamagata Five Weirs

⑦ Nanokamachi Goten Weir

The green moss peeking through the stonework creates a refreshing atmosphere.

① Mamigasaki Kawaaiguchi Headworks
② Goten-Yatsugago Weir Waterfront Plaza
③ Fureai Street Waterfront Embankment
④ Weir and Washing Area (Old Life)
⑤ In Front of "Agetuma Eel and Local Cuisine"
⑥ Senshoji Temple Grounds (Stream)
⑦ Nanokamachi Goten Weir
⑧ Goten Weir Saiseikan Central Waterfront Plaza





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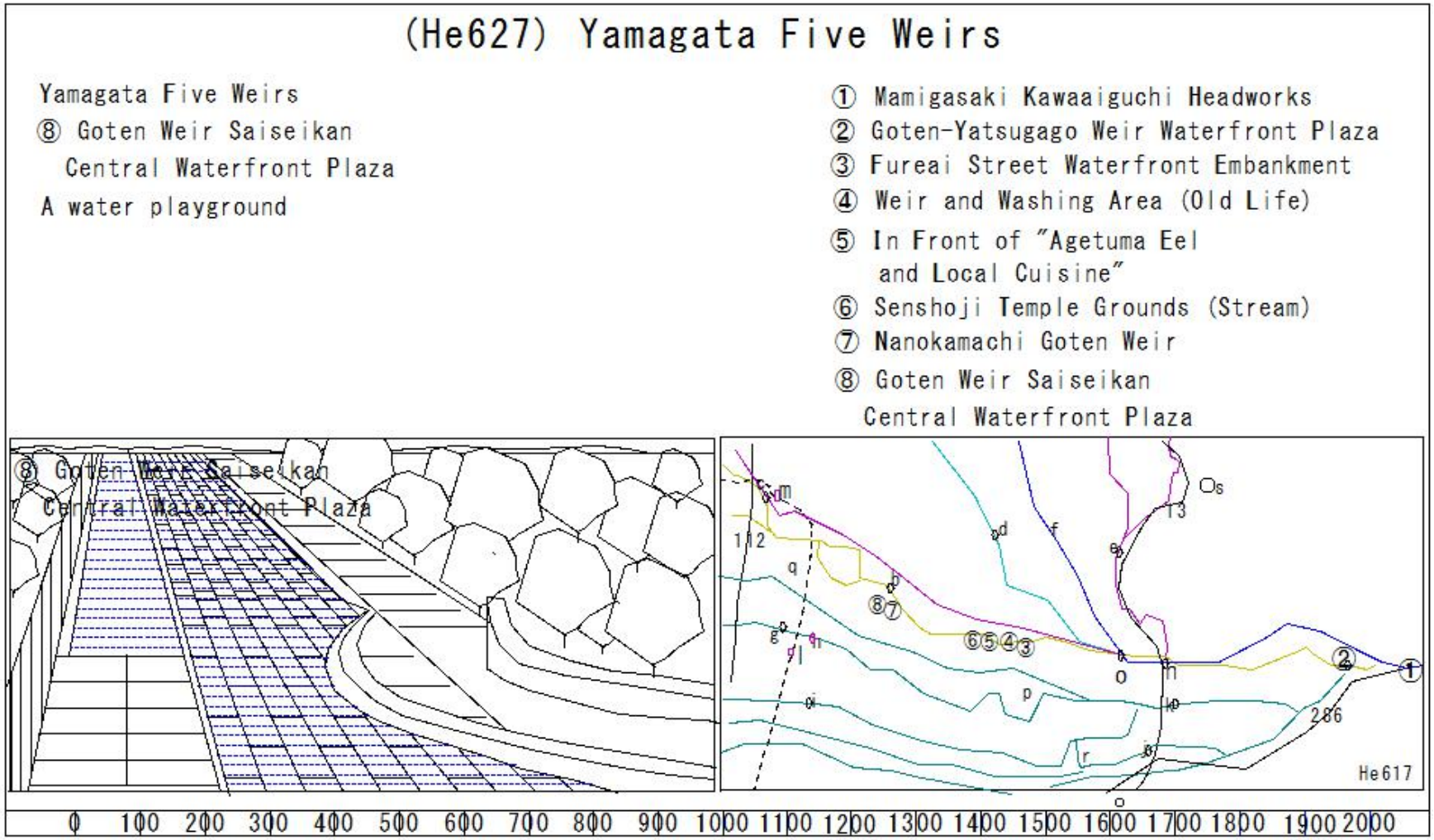
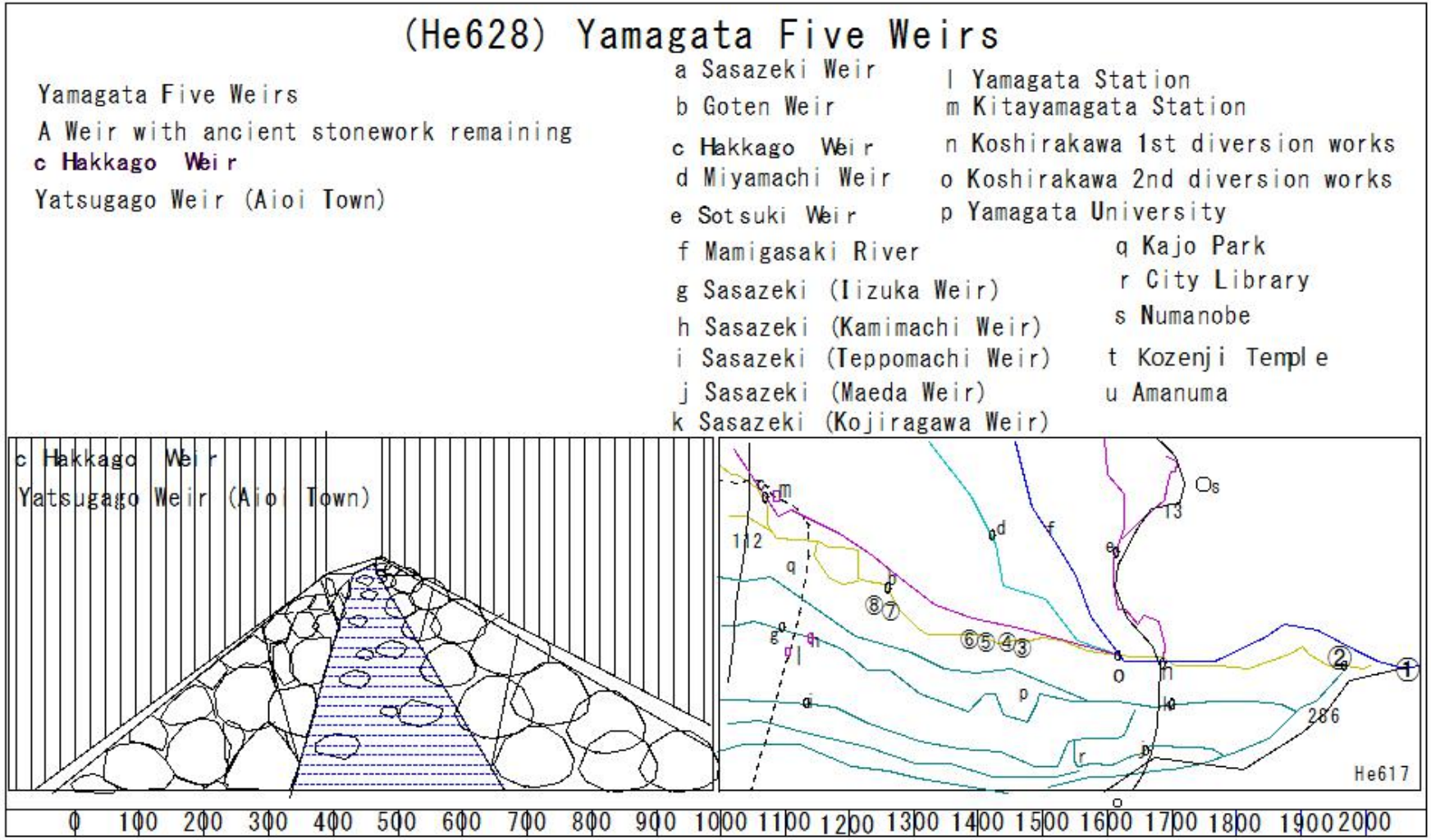
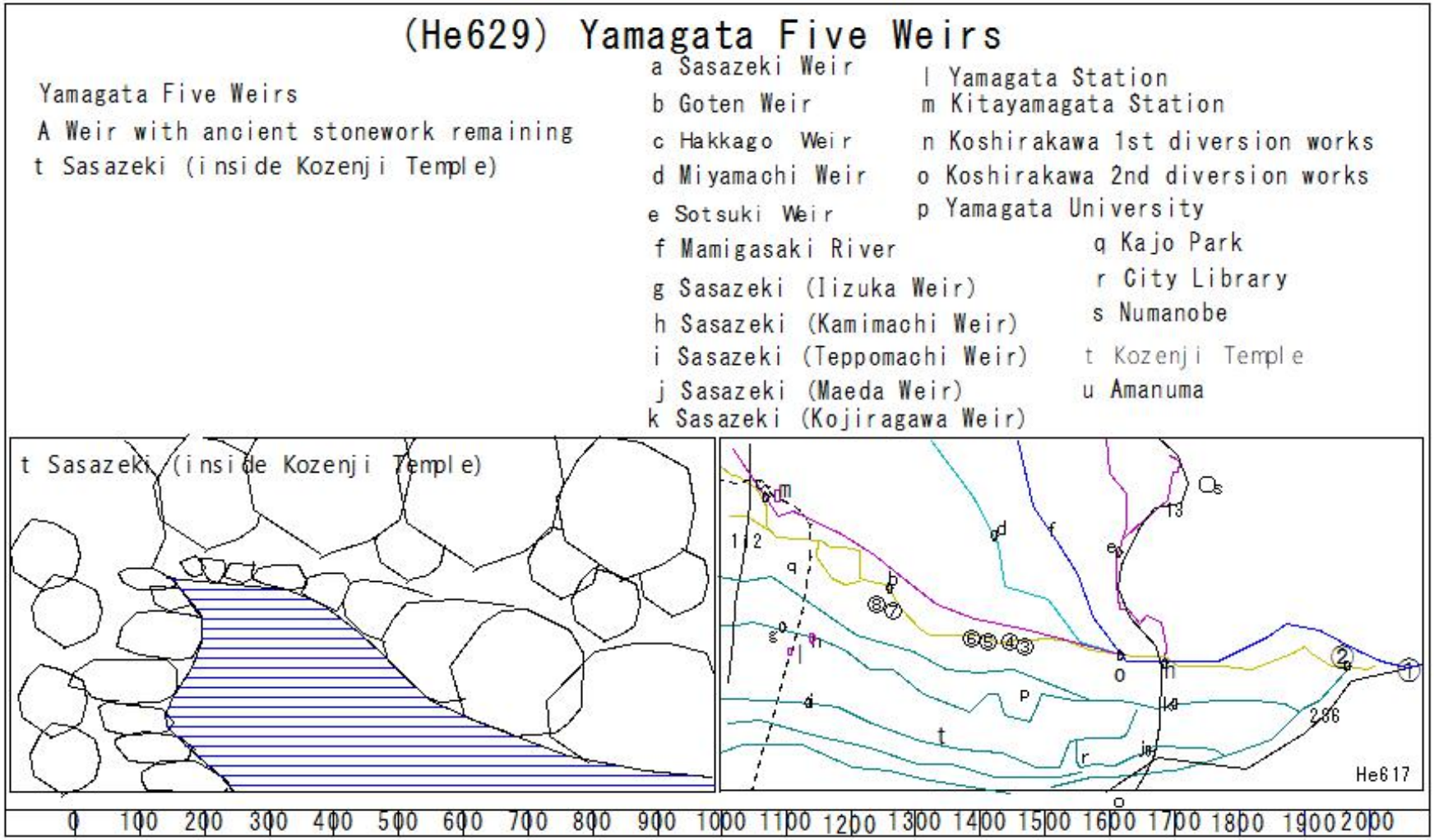
(He627) Yamagata Five Weirs



(He628) Yamagata Five Weirs



(He629) Yamagata Five Weirs



(He630) Yamagata Five Weirs

Yamagata Five Weirs

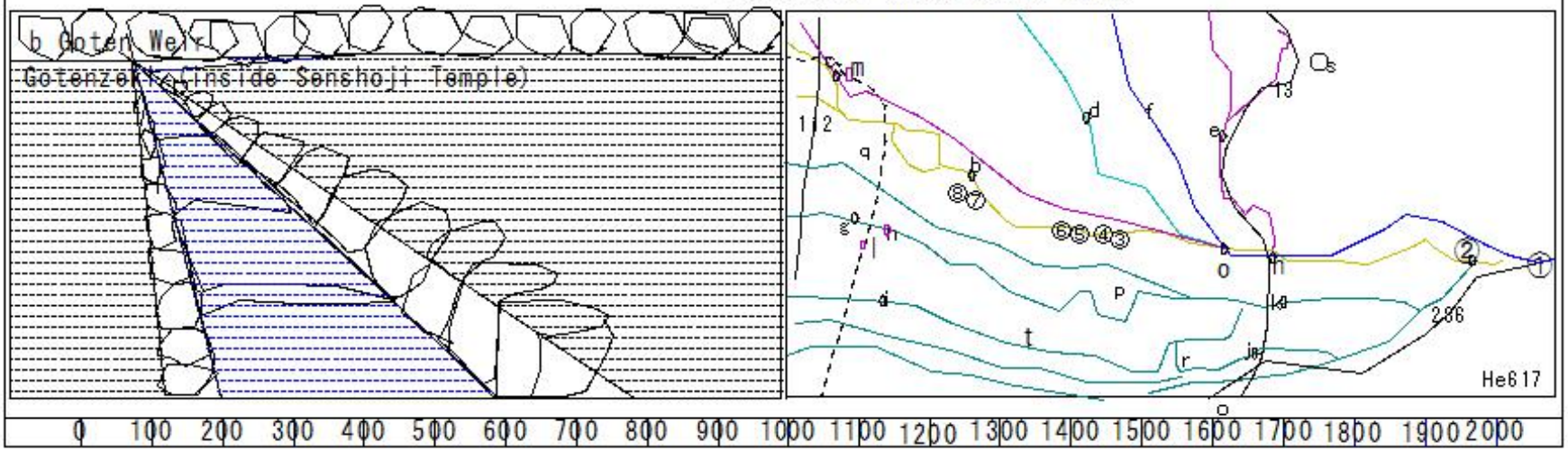
A Weir with ancient stonework remaining

b Goten Weir

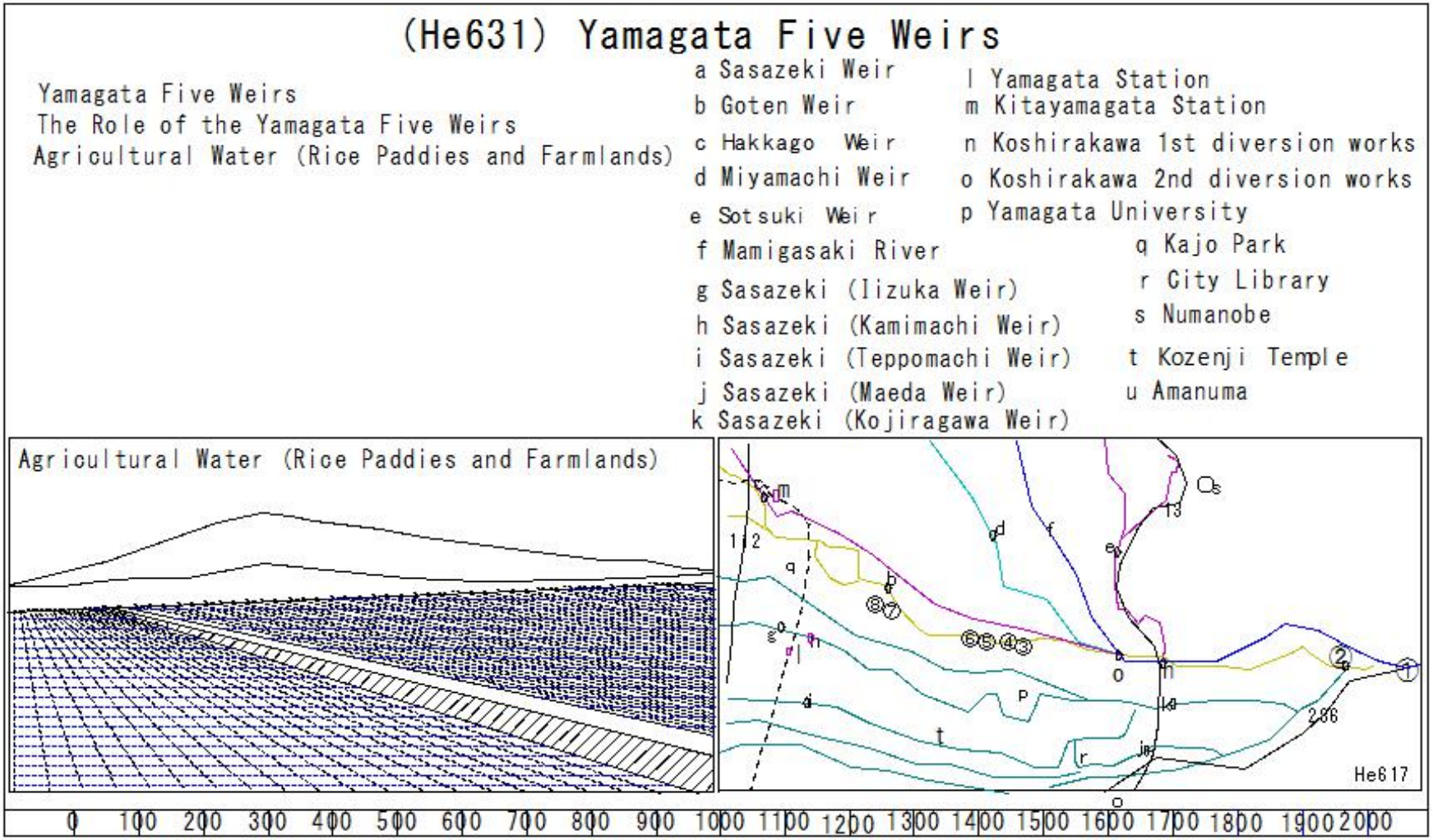
Gotenzeki (inside Senshoji Temple)

a Sasazeki Weir
b Goten Weir
c Hakkago Weir
d Miyamachi Weir
e Sotsuki Weir
f Mamigasaki River
g Sasazeki (Iizuka Weir)
h Sasazeki (Kamimachi Weir)
i Sasazeki (Teppomachi Weir)
j Sasazeki (Maeda Weir)
k Sasazeki (Kojiragawa Weir)

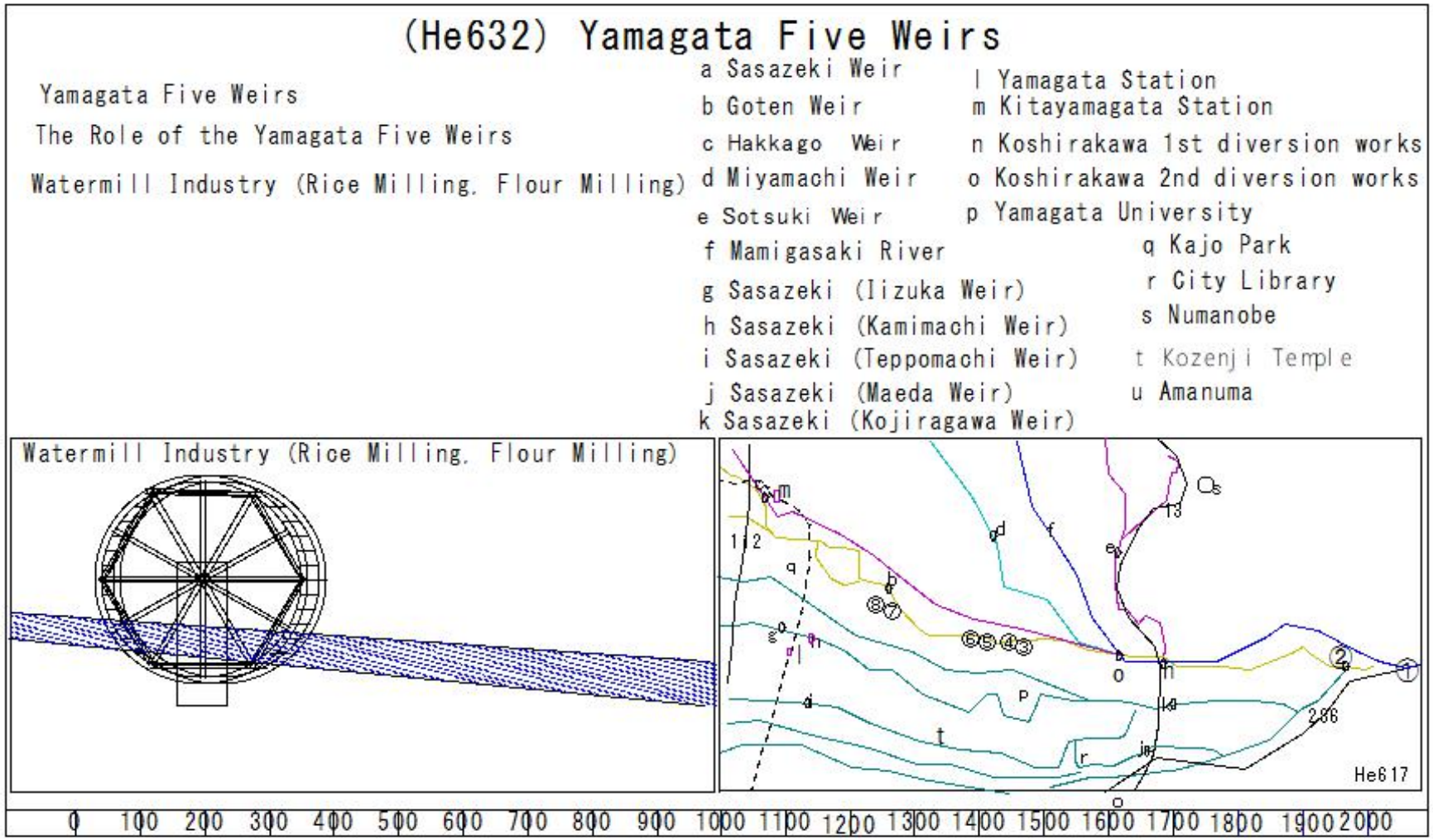
l Yamagata Station
m Kitayamagata Station
n Koshirakawa 1st diversion works
o Koshirakawa 2nd diversion works
p Yamagata University
q Kajo Park
r City Library
s Numanobe
t Kozenji Temple
u Amanuma



(He631) Yamagata Five Weirs



(He632) Yamagata Five Weirs



(He633) Yamagata Five Weirs

(He633) Yamagata Five Weirs

Yamagata Five Weirs

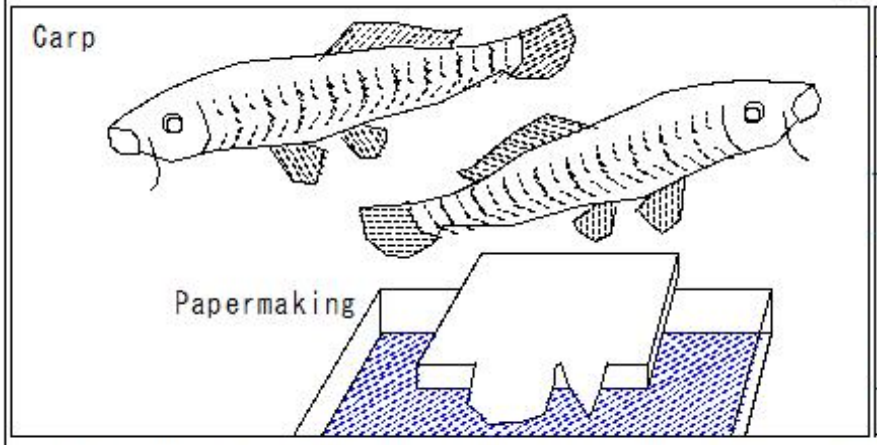
The Role of the Yamagata Five Weirs

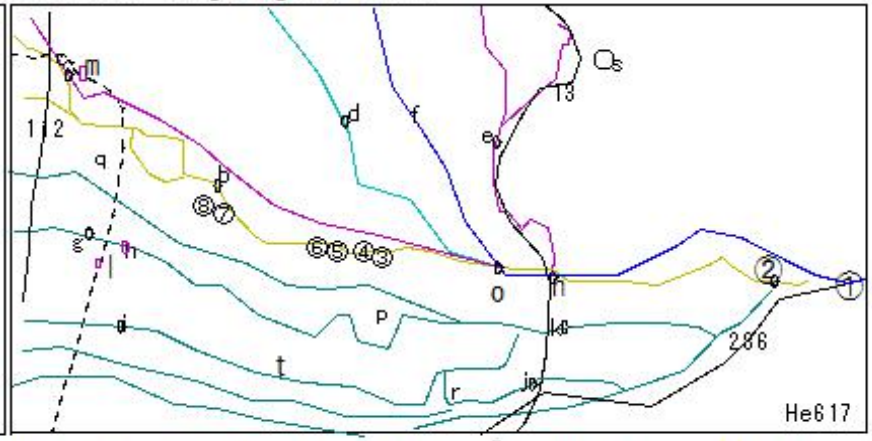
Carp and Eel Restaurant

Dyeing Shop, Papermaking

a Sasazeki Weir
b Goten Weir
c Hakkago Weir
d Miyamachi Weir
e Sotsuki Weir
f Mamigasaki River
g Sasazeki (Iizuka Weir)
h Sasazeki (Kamimachi Weir)
i Sasazeki (Teppomachi Weir)
j Sasazeki (Maeda Weir)
k Sasazeki (Kojiragawa Weir)

l Yamagata Station
m Kitayamagata Station
n Koshirakawa 1st diversion works
o Koshirakawa 2nd diversion works
p Yamagata University
q Kajo Park
r City Library
s Numanobe
t Kozenji Temple
u Amanuma





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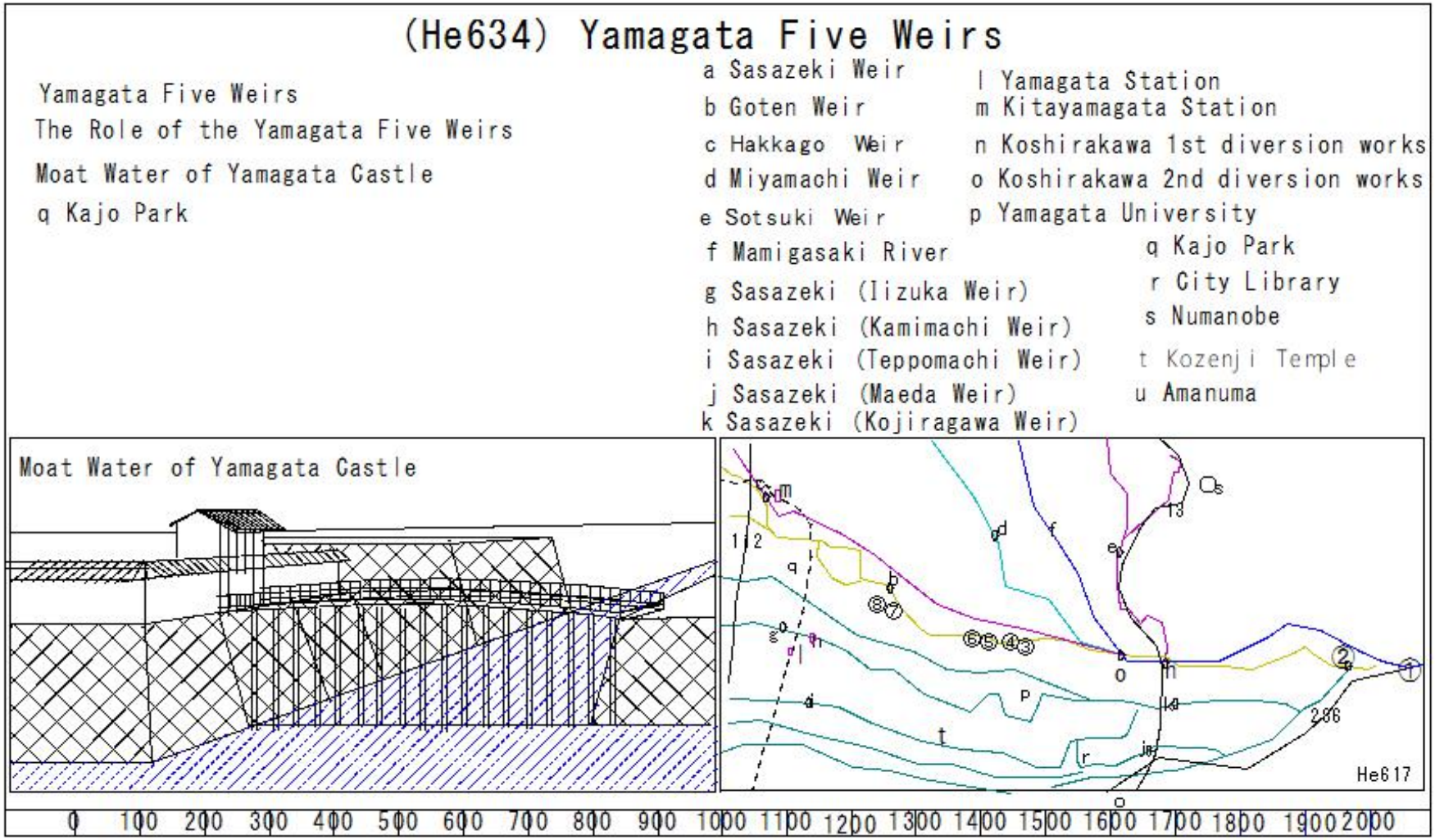
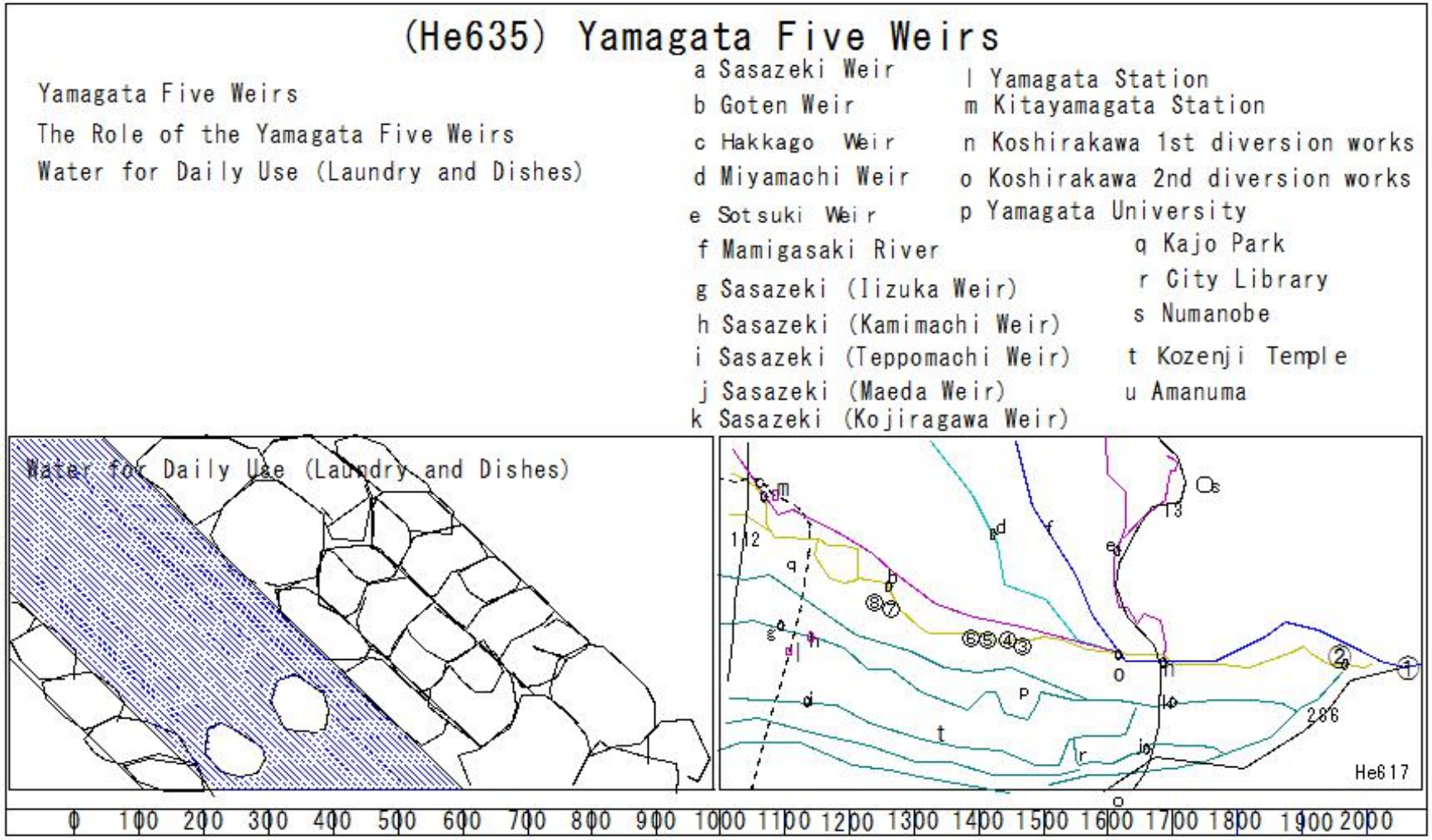
(He634) Yamagata Five Weirs



(He635) Yamagata Five Weirs



(He636) Yamagata Five Weirs

Yamagata Five Weirs

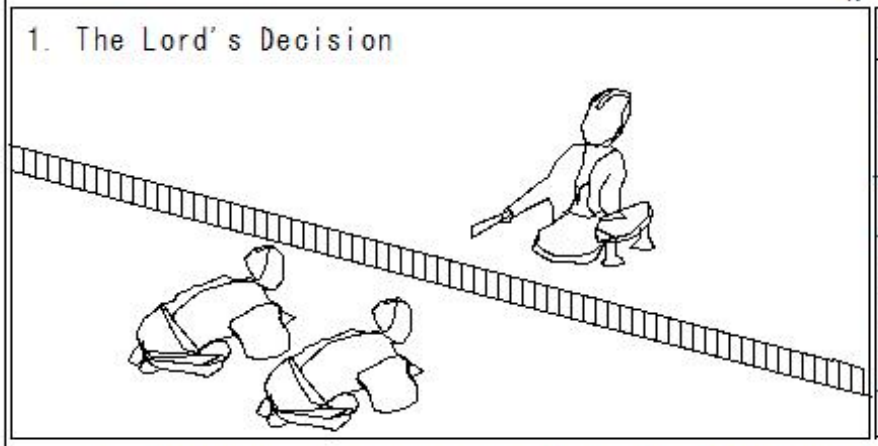
The Construction of the Yamagata Five Weirs

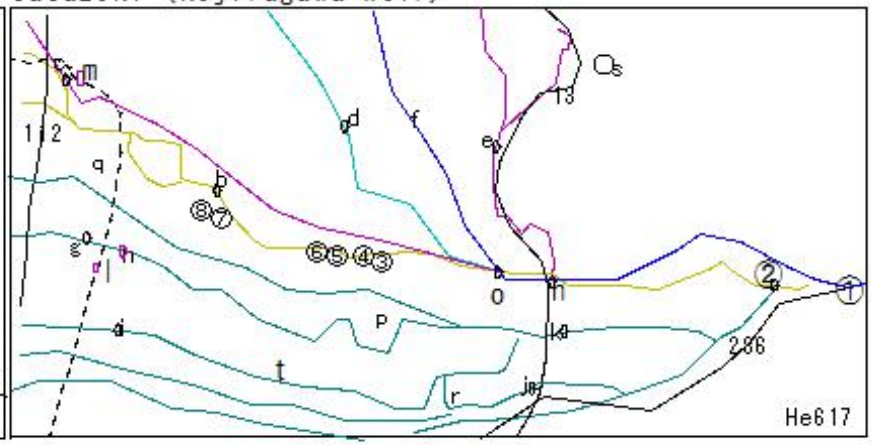
1. The Lord's Decision

The lord ordered the construction of a weir by diverting the flow of the Mamigasaki River.

a Sasazeki Weir
b Goten Weir
c Hakkago Weir
d Miyamachi Weir
e Sotsuki Weir
f Mamigasaki River
g Sasazeki (Iizuka Weir)
h Sasazeki (Kamimachi Weir)
i Sasazeki (Teppomachi Weir)
j Sasazeki (Maeda Weir)
k Sasazeki (Kojiragawa Weir)
l Yamagata Station
m Kitayamagata Station
n Koshirakawa 1st diversion works
o Koshirakawa 2nd diversion works
p Yamagata University
q Kajo Park
r City Library
s Numanobe
t Kozenji Temple
u Amanuma

1. The Lord's Decision





0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He637) Yamagata Five Weirs

(He637) Yamagata Five Weirs

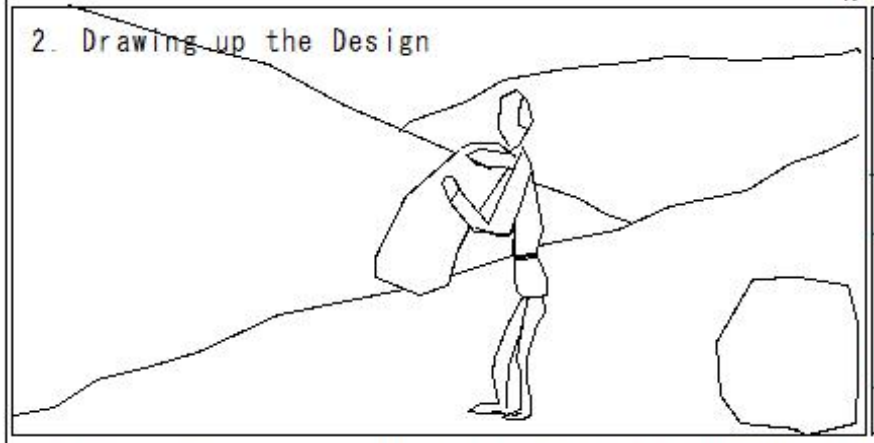
Yamagata Five Weirs

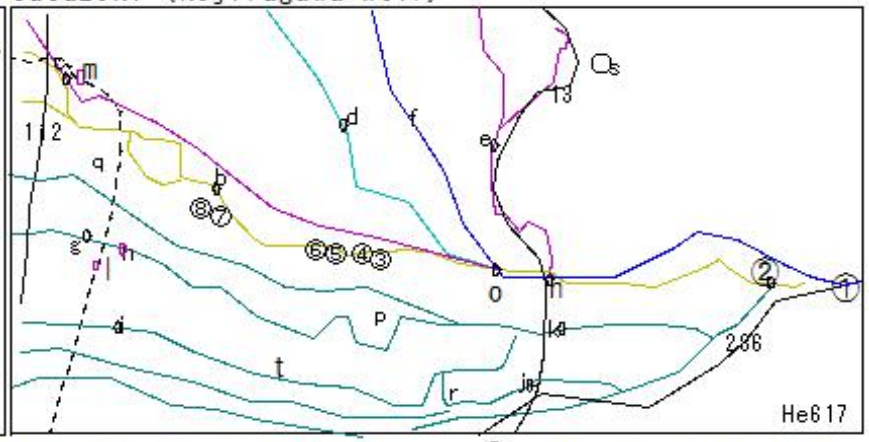
The Construction of the Yamagata Five Weirs

2. Drawing up the Design

The location of the weir was decided through site surveys and discussions.

a Sasazeki Weir
b Goten Weir
c Hakkago Weir
d Miyamachi Weir
e Sotsuki Weir
f Mamigasaki River
g Sasazeki (Iizuka Weir)
h Sasazeki (Kamimachi Weir)
i Sasazeki (Teppomachi Weir)
j Sasazeki (Maeda Weir)
k Sasazeki (Kojiragawa Weir)
l Yamagata Station
m Kitayamagata Station
n Koshirakawa 1st diversion works
o Koshirakawa 2nd diversion works
p Yamagata University
q Kajo Park
r City Library
s Numanobe
t Kozenji Temple
u Amanuma





0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He638) Yamagata Five Weirs

(He638) Yamagata Five Weirs

Yamagata Five Weirs

The Construction of the Yamagata Five Weirs

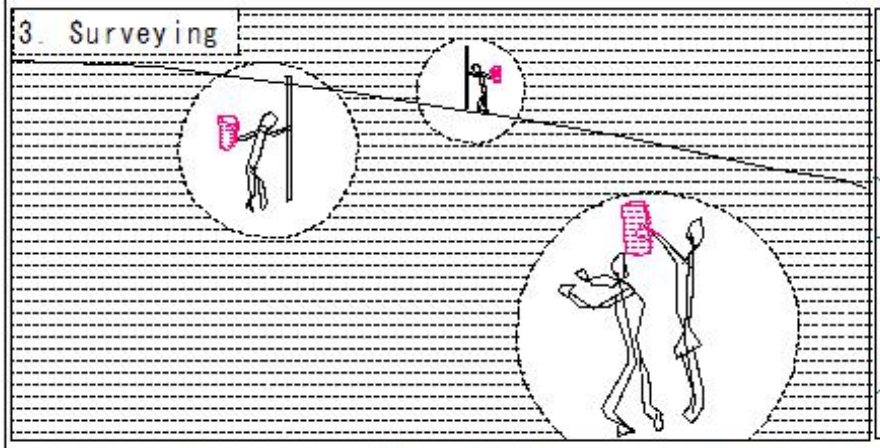
3. Surveying

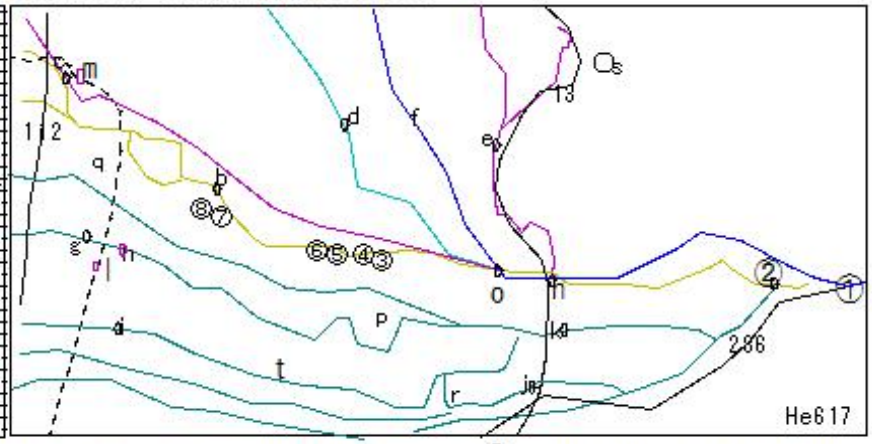
Goten Weir (Senshoji Temple)

To check the elevation of the land, we measured the height at night with lanterns.

a Sasazeki Weir
b Goten Weir
c Hakkago Weir
d Miyamachi Weir
e Sotsuki Weir
f Mamigasaki River
g Sasazeki (Iizuka Weir)
h Sasazeki (Kamimachi Weir)
i Sasazeki (Teppomachi Weir)
j Sasazeki (Maeda Weir)
k Sasazeki (Kojiragawa Weir)

l Yamagata Station
m Kitayamagata Station
n Koshirakawa 1st diversion works
o Koshirakawa 2nd diversion works
p Yamagata University
q Kajo Park
r City Library
s Numanobe
t Kozenji Temple
u Amanuma





0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He639) Yamagata Five Weirs

(He639) Yamagata Five Weirs

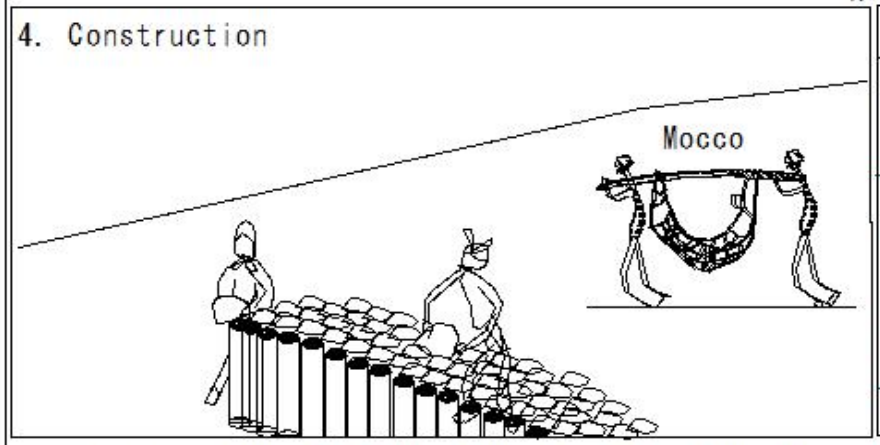
Yamagata Five Weirs

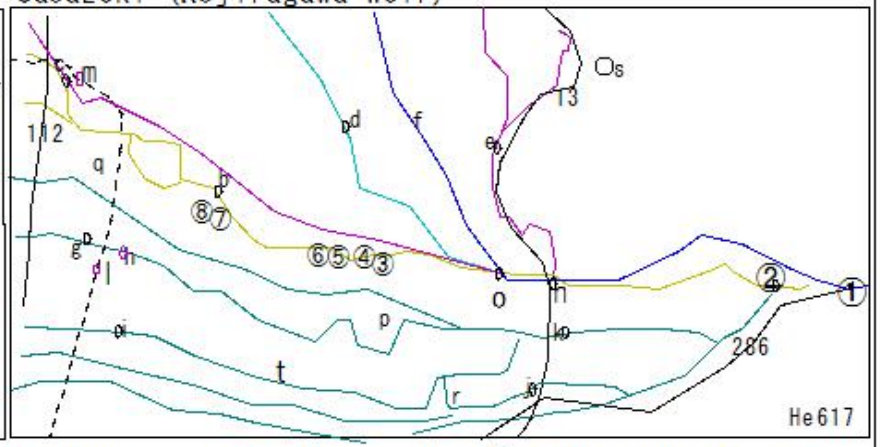
The Construction of the Yamagata Five Weirs

4. Construction

Stones were transported from upstream of the Mamigasaki River using "mokko" (railroad sleds) to create a waterway.

a Sasazeki Weir
b Goten Weir
c Hakkago Weir
d Miyamachi Weir
e Sotsuki Weir
f Mamigasaki River
g Sasazeki (Iizuka Weir)
h Sasazeki (Kamimachi Weir)
i Sasazeki (Teppomachi Weir)
j Sasazeki (Maeda Weir)
k Sasazeki (Kojiragawa Weir)
l Yamagata Station
m Kitayamagata Station
n Koshirakawa 1st diversion works
o Koshirakawa 2nd diversion works
p Yamagata University
q Kajo Park
r City Library
s Numanobe
t Kozenji Temple
u Amanuma





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(He640) Yamagata Five Weirs

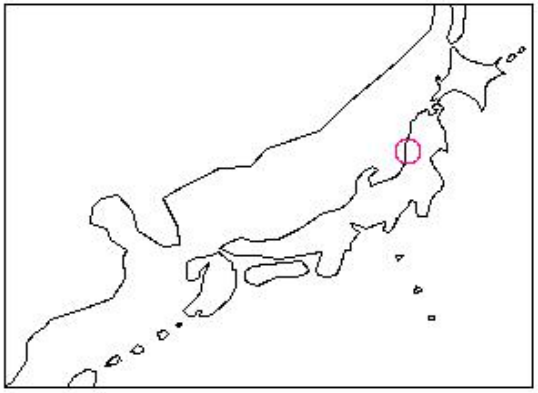
(He640) Yamagata Five Weirs

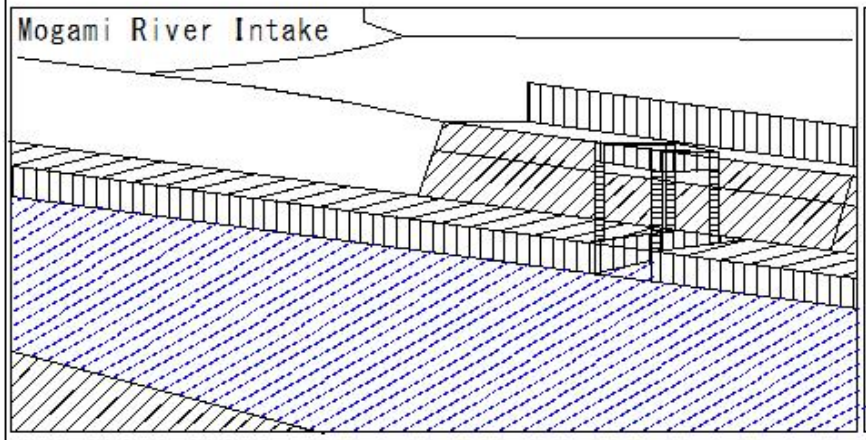
Mogami River Midstream Agricultural Irrigation Project
Mogami River Intake

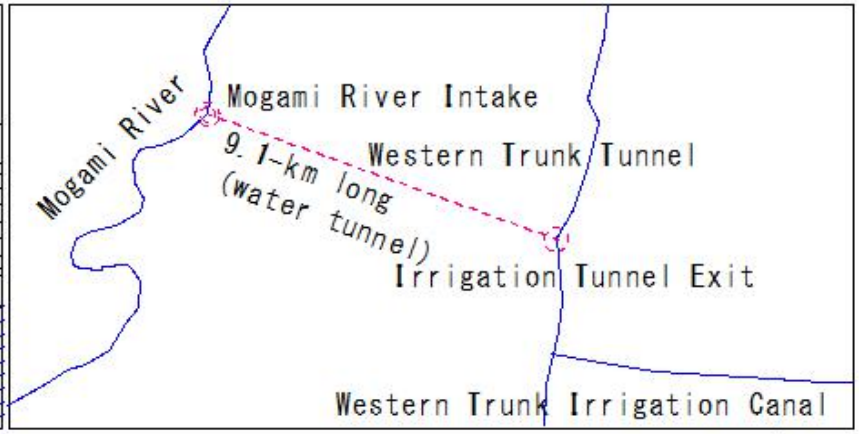
Western Trunk Tunnel
Irrigation Tunnel Exit

Many rice paddies in Yamagata City use water from the Mogami River.
A 9.1-km long "water tunnel" (Western Trunk Tunnel) was constructed in the mountains western Yamagata City.

Western Trunk Irrigation Canal
1986







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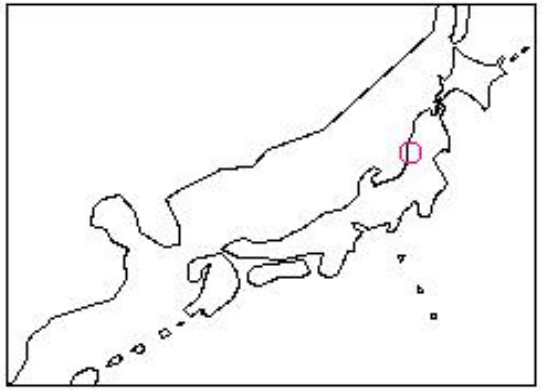
(He641) Yamagata Five Weirs

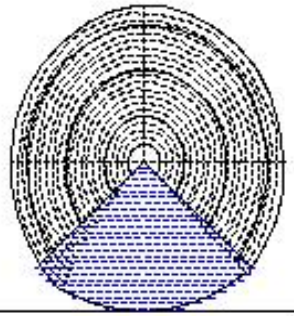
(He641) Yamagata Five Weirs

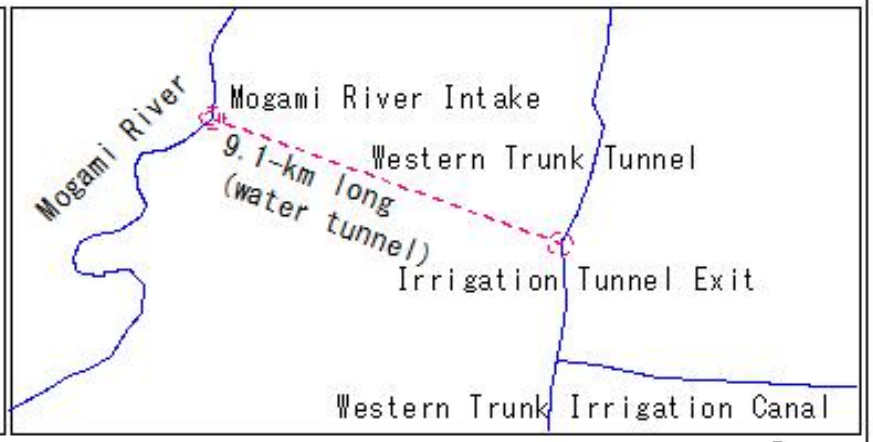
Mogami River Midstream Agricultural Irrigation Project
Mogami River Intake
Western Trunk Tunnel
Irrigation Tunnel Exit

Many rice paddies in Yamagata City use water from the Mogami River.
A 9.1-km long "water tunnel" (Western Trunk Tunnel) was constructed in the mountains western Yamagata City.
Western Trunk Irrigation Canal
1986



Western Trunk Tunnel
A 9.1-km long "water tunnel"





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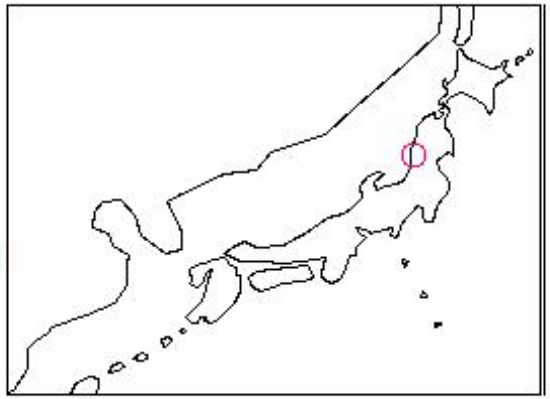
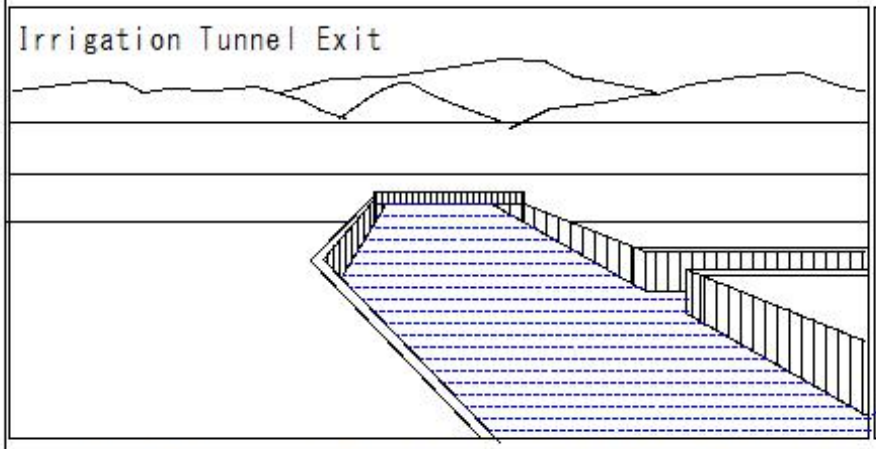
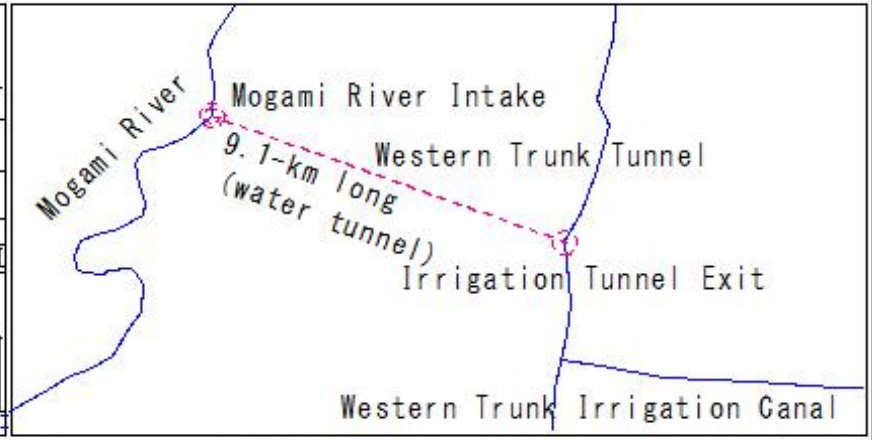
(He642) Yamagata Five Weirs

(He642) Yamagata Five Weirs

Mogami River Midstream Agricultural Irrigation Project
Mogami River Intake
Western Trunk Tunnel
Irrigation Tunnel Exit
Many rice paddies in Yamagata City use water from the Mogami River.
A 9.1-km long "water tunnel" (Western Trunk Tunnel) was constructed in the mountains western Yamagata City.
Western Trunk Irrigation Canal
1986







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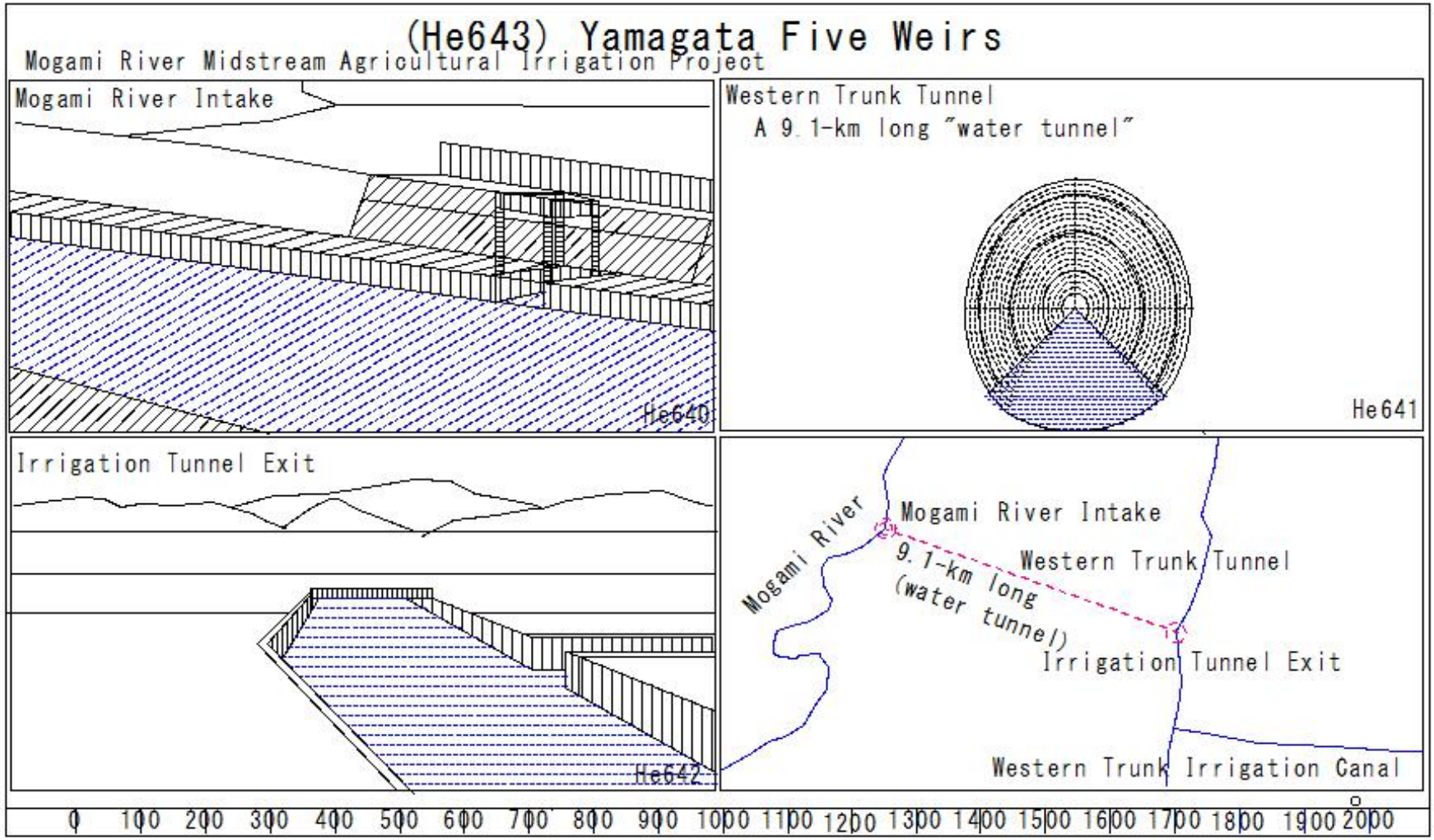
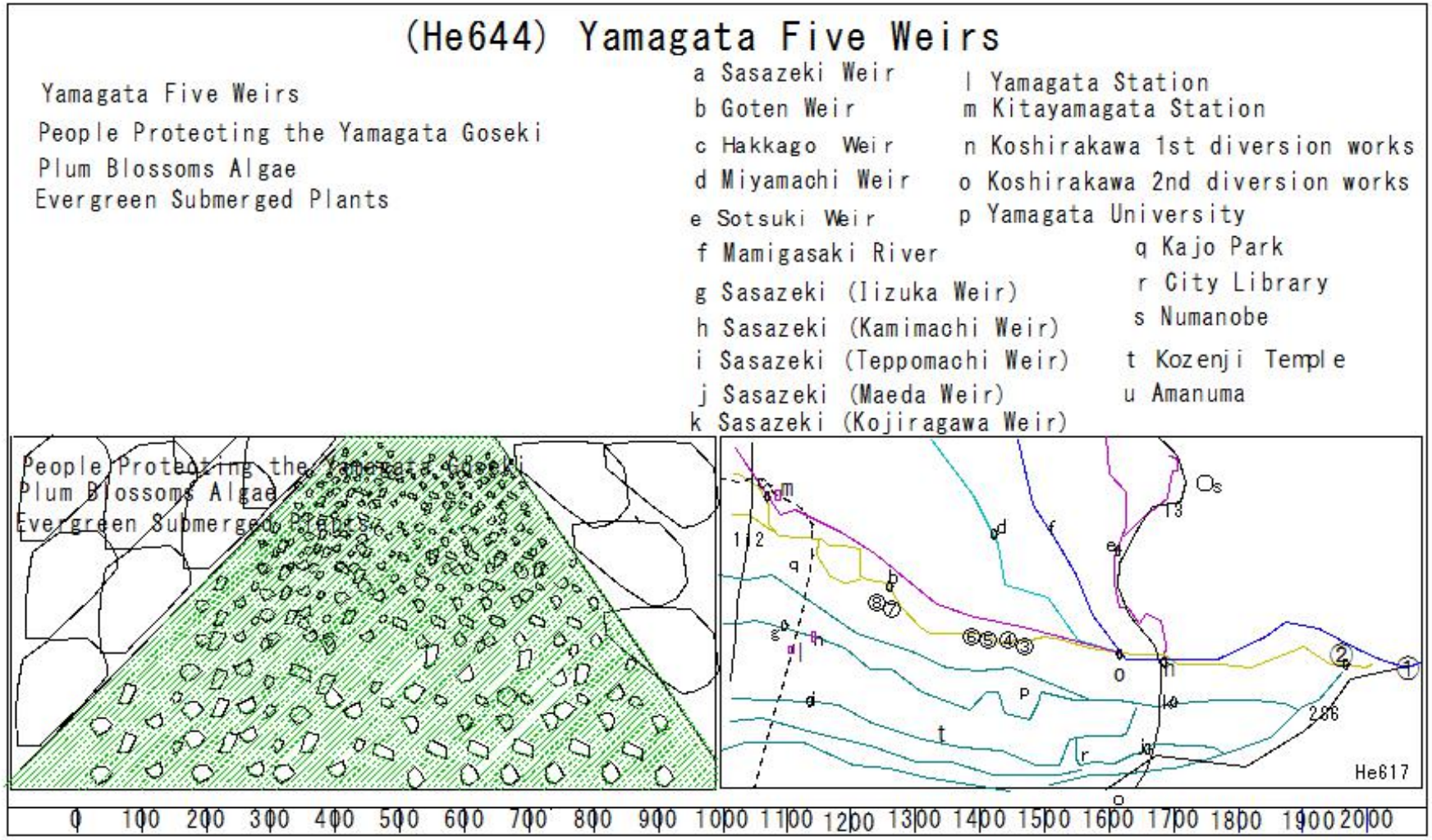
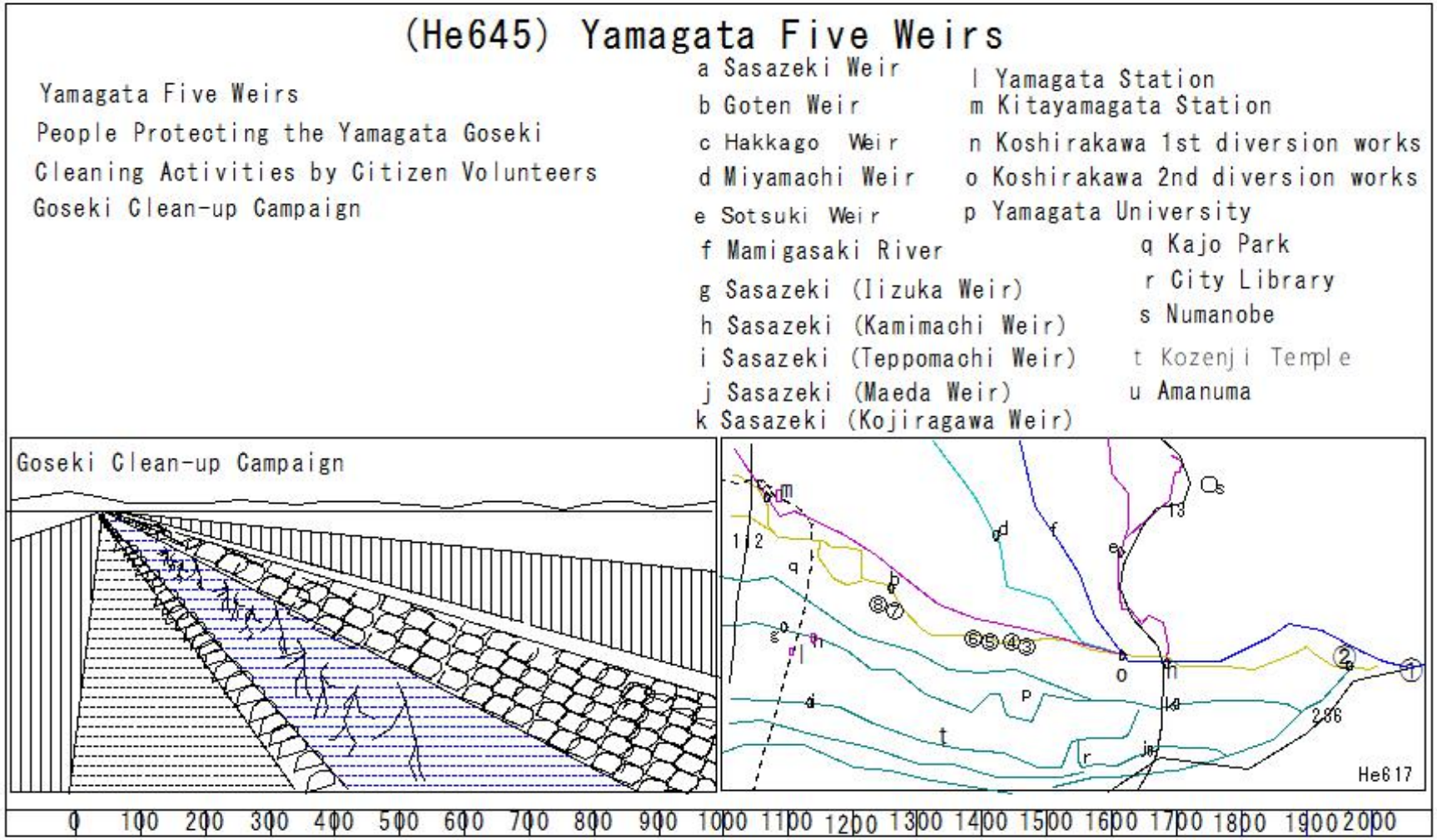
(He643) Yamagata Five Weirs



(He644) Yamagata Five Weirs



(He645) Yamagata Five Weirs



(He646) Yamagata Five Weirs

(He646) Yamagata Five Weirs

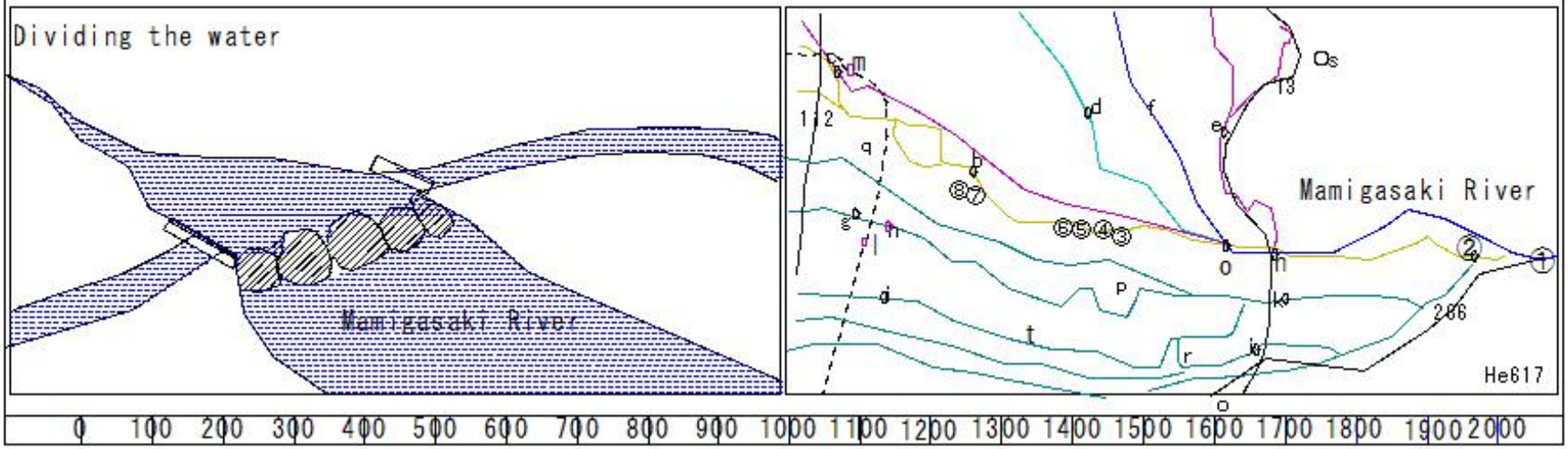
Yamagata Five Weirs

① Farmers use the water from the Mamigasaki River efficiently by "dividing the water."

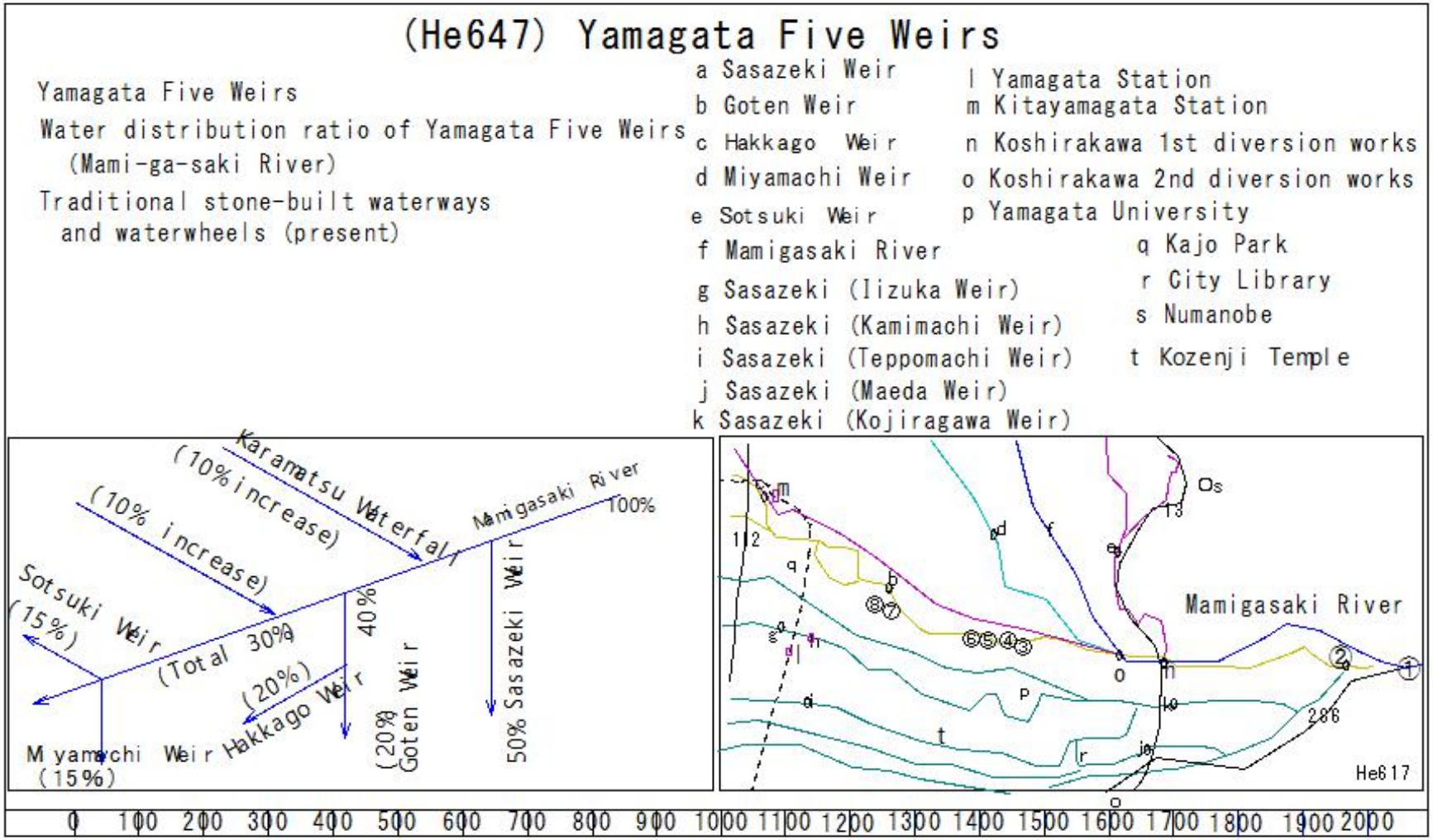
Avoiding water disputes

Mamigasaki River

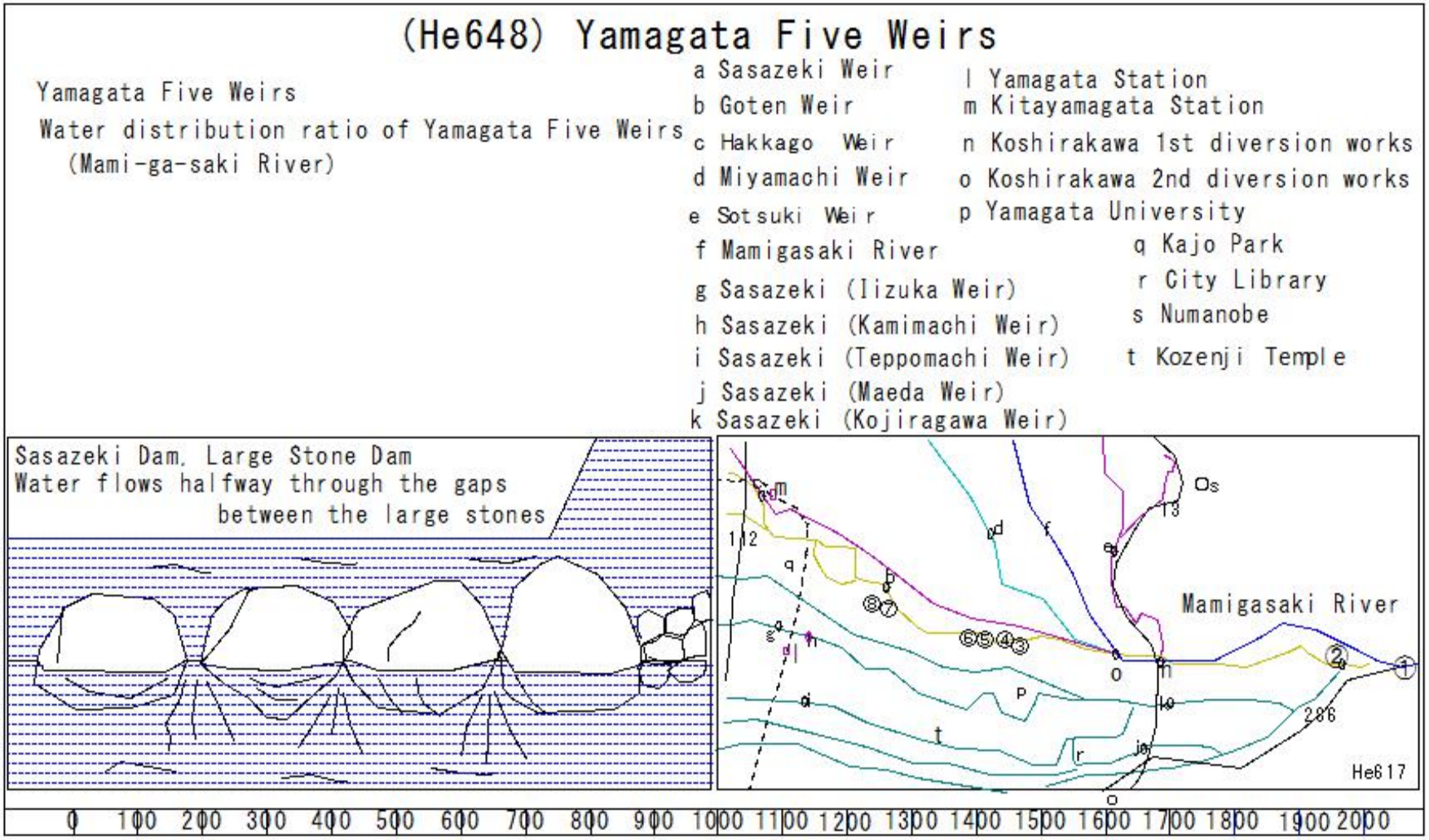
Dividing the water



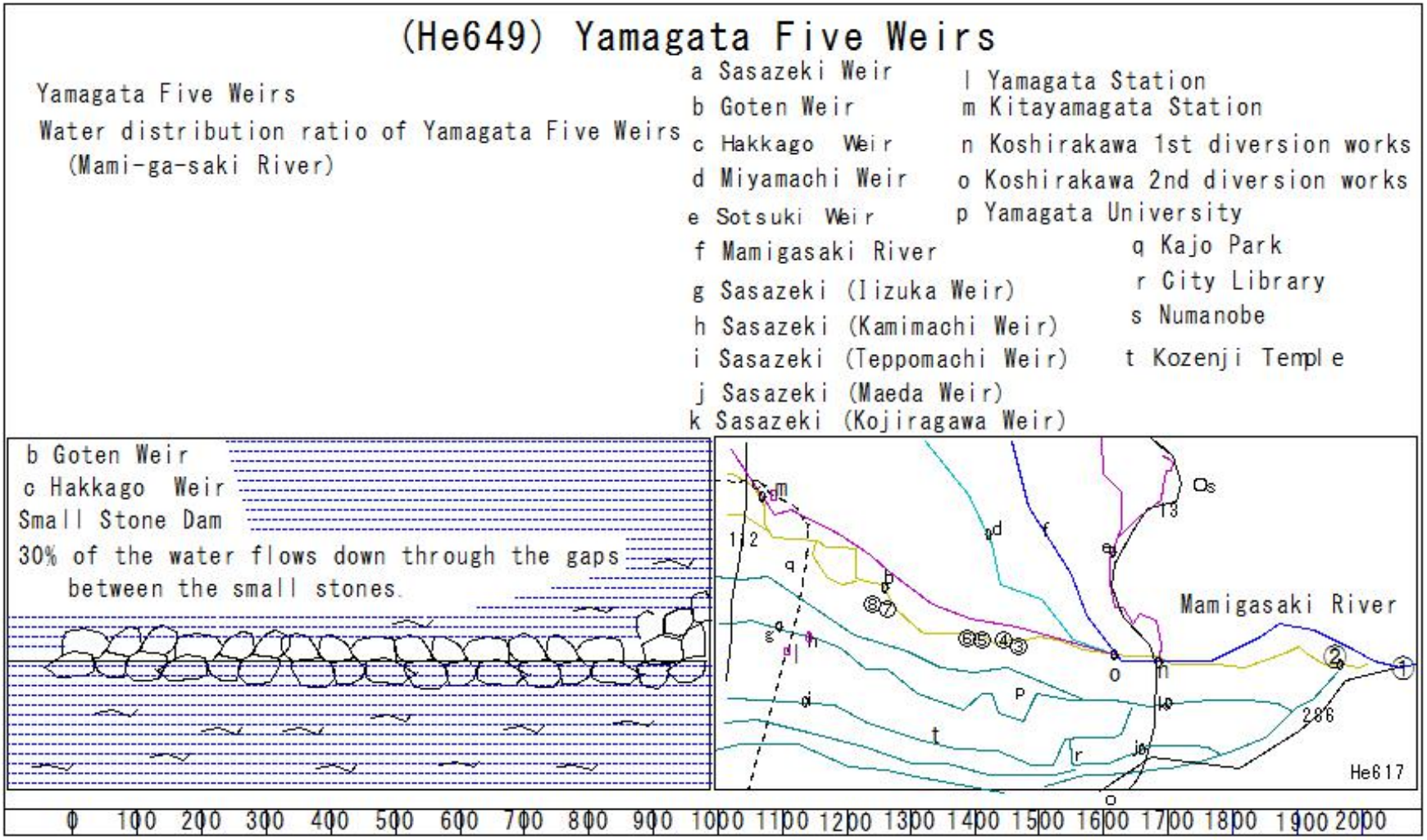
(He647) Yamagata Five Weirs



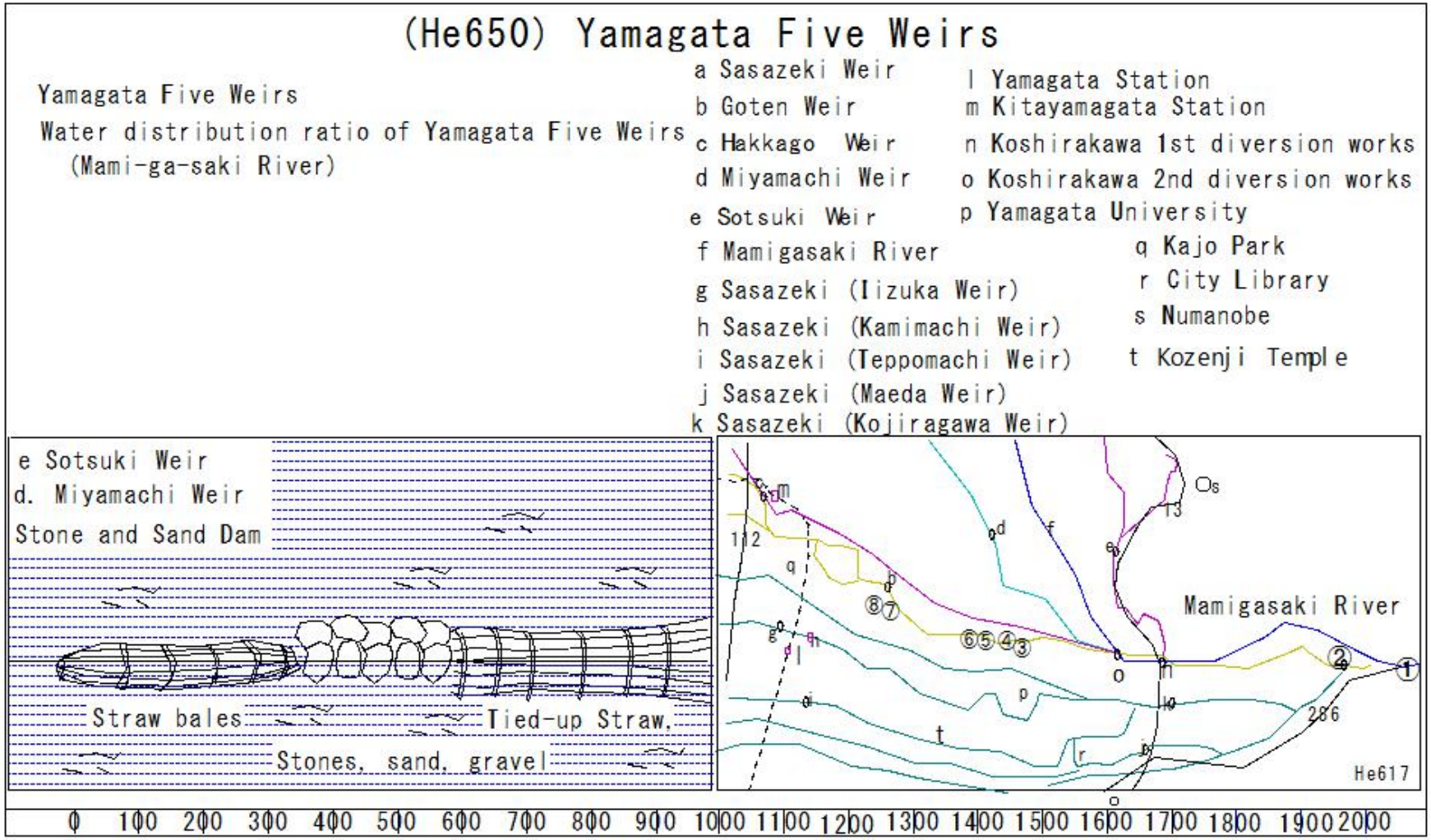
(He648) Yamagata Five Weirs



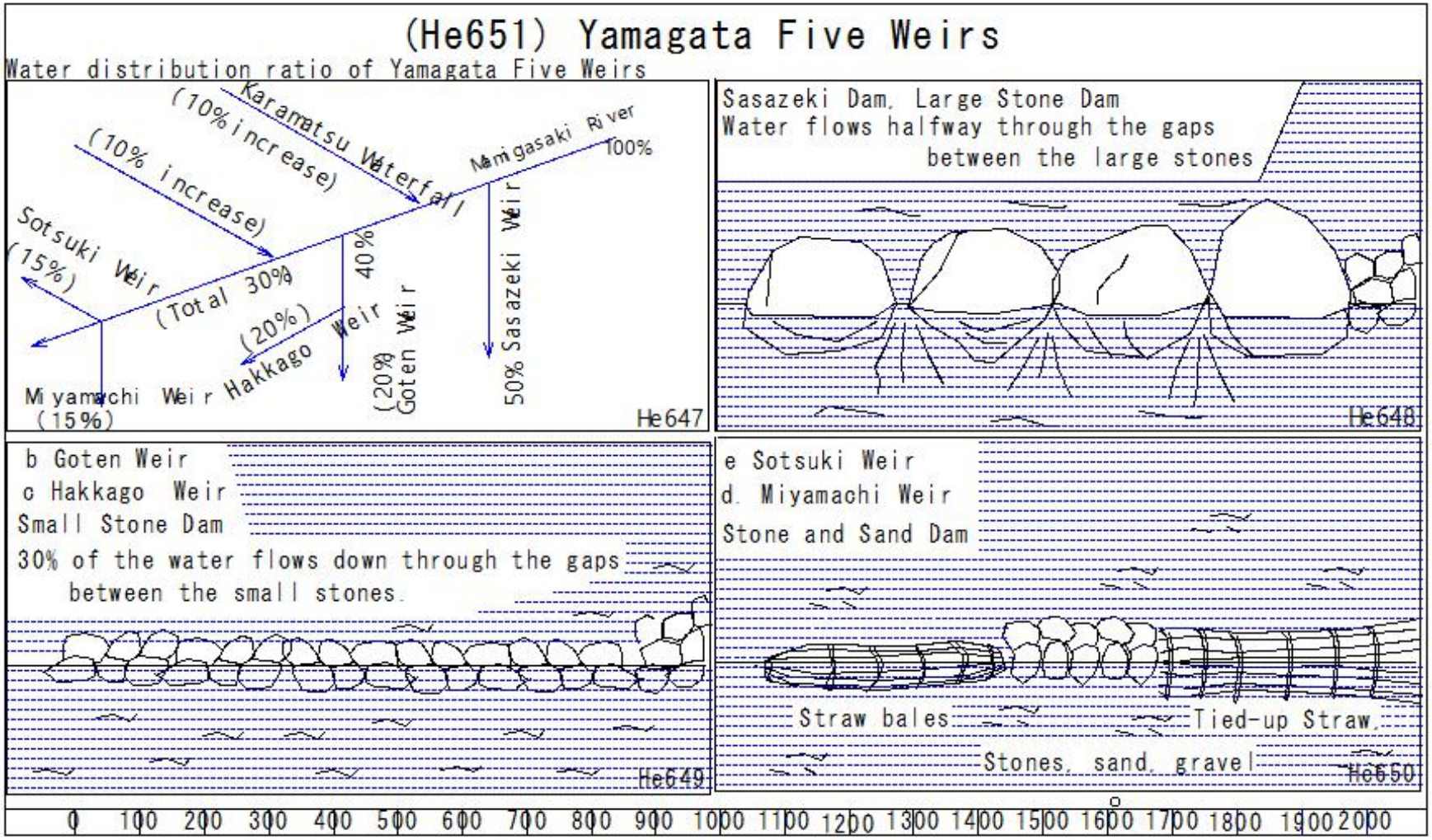
(He649) Yamagata Five Weirs



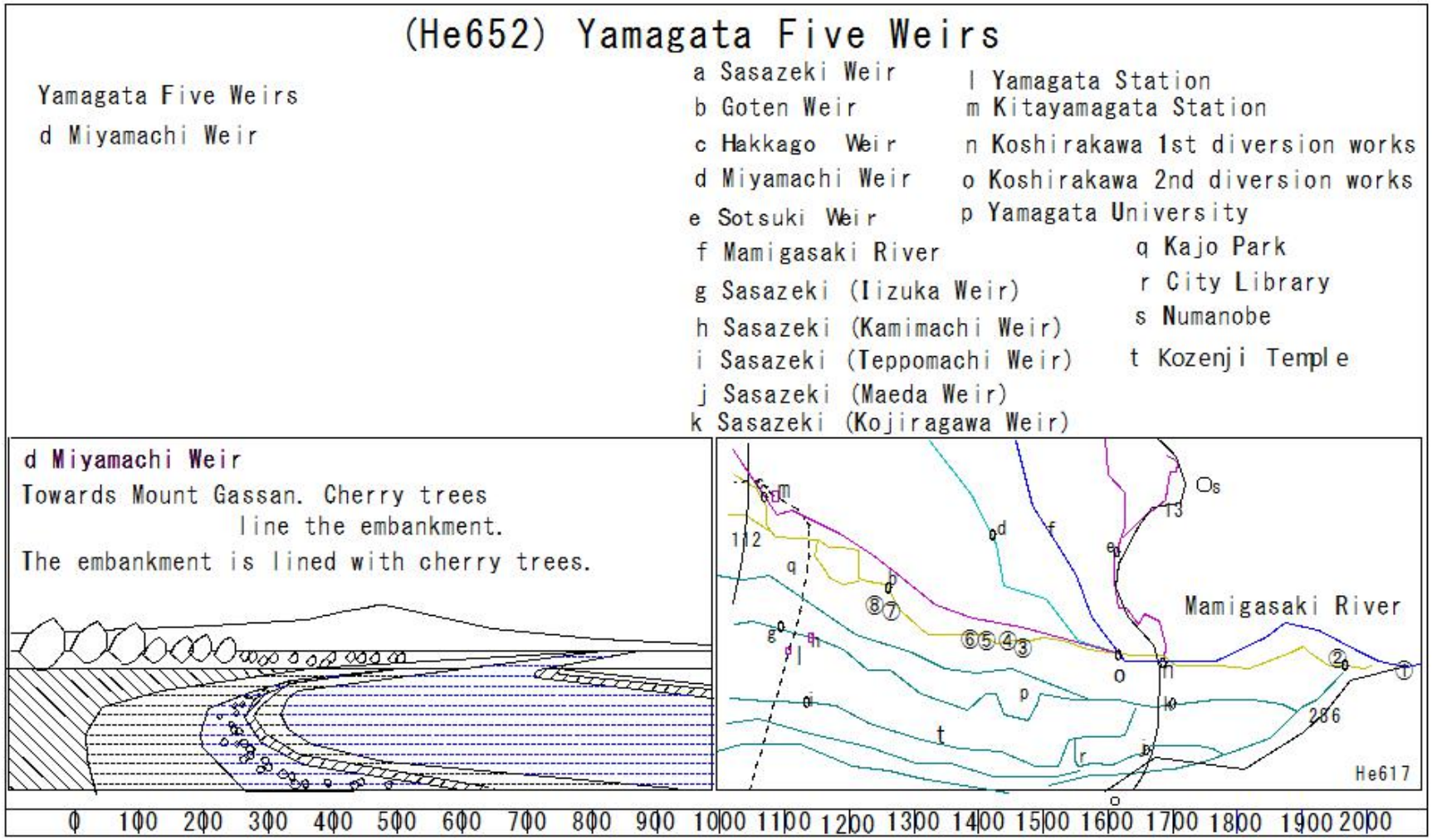
(He650) Yamagata Five Weirs



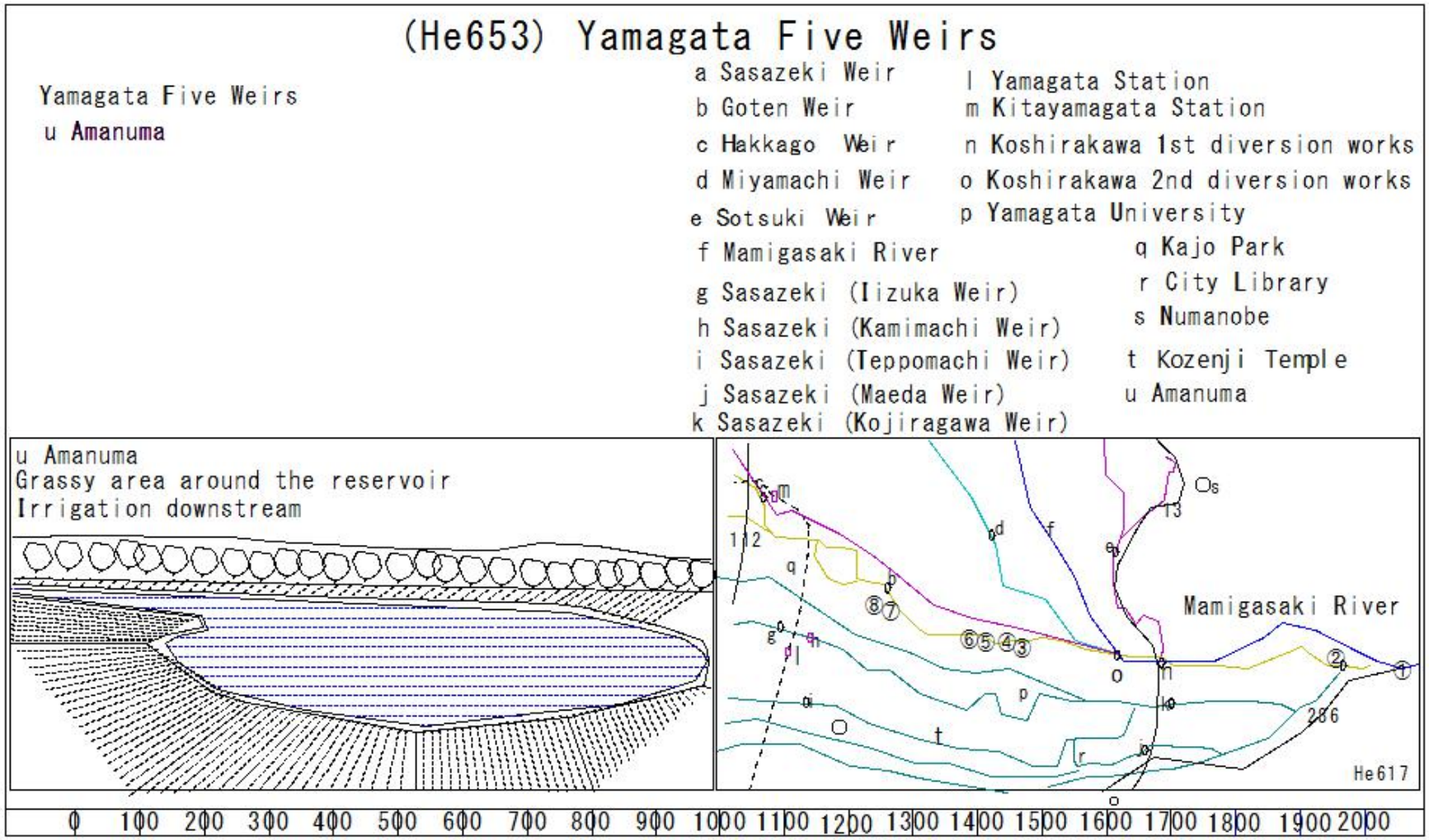
(He651) Yamagata Five Weirs



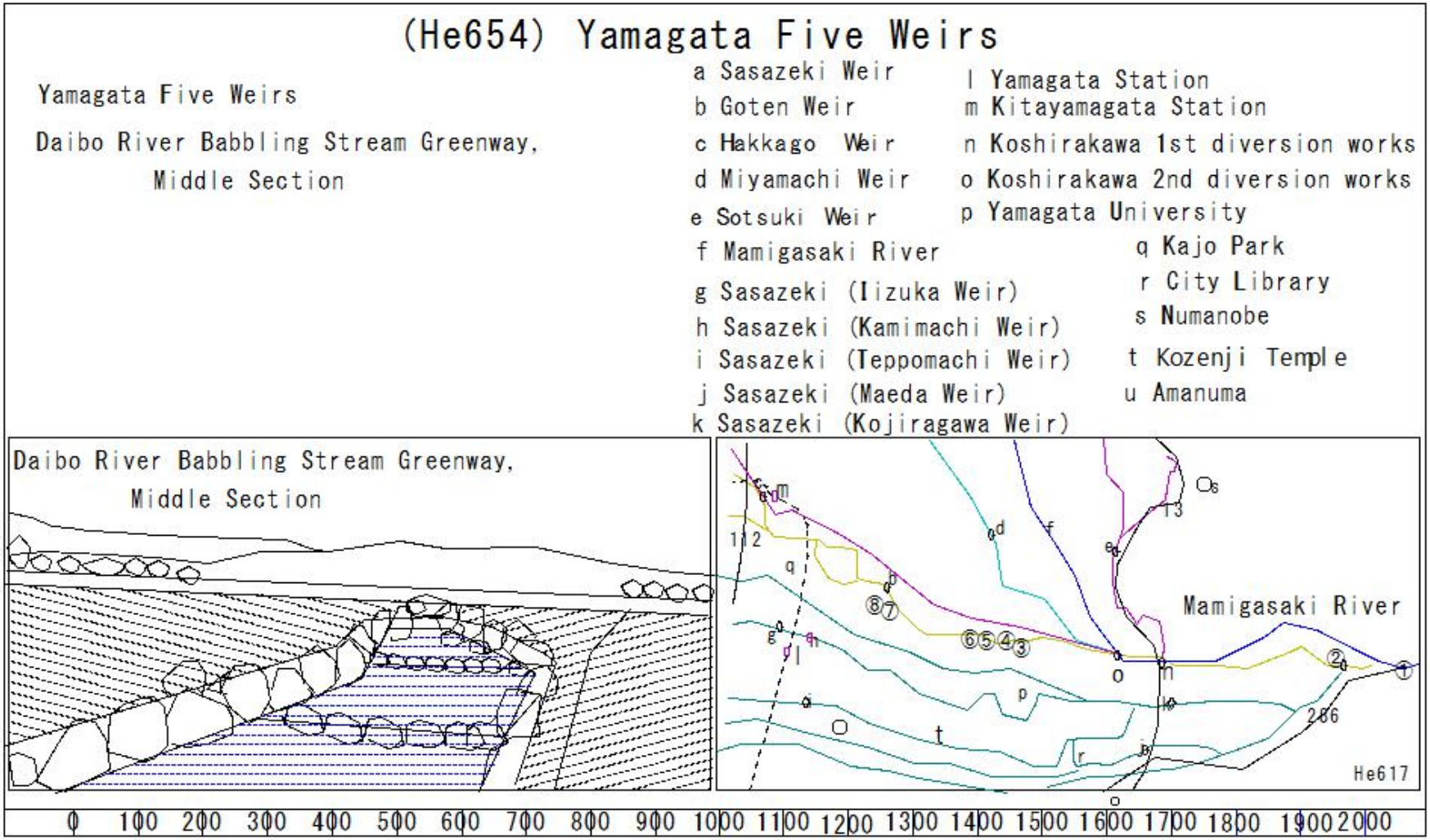
(He652) Yamagata Five Weirs



(He653) Yamagata Five Weirs



(He654) Yamagata Five Weirs



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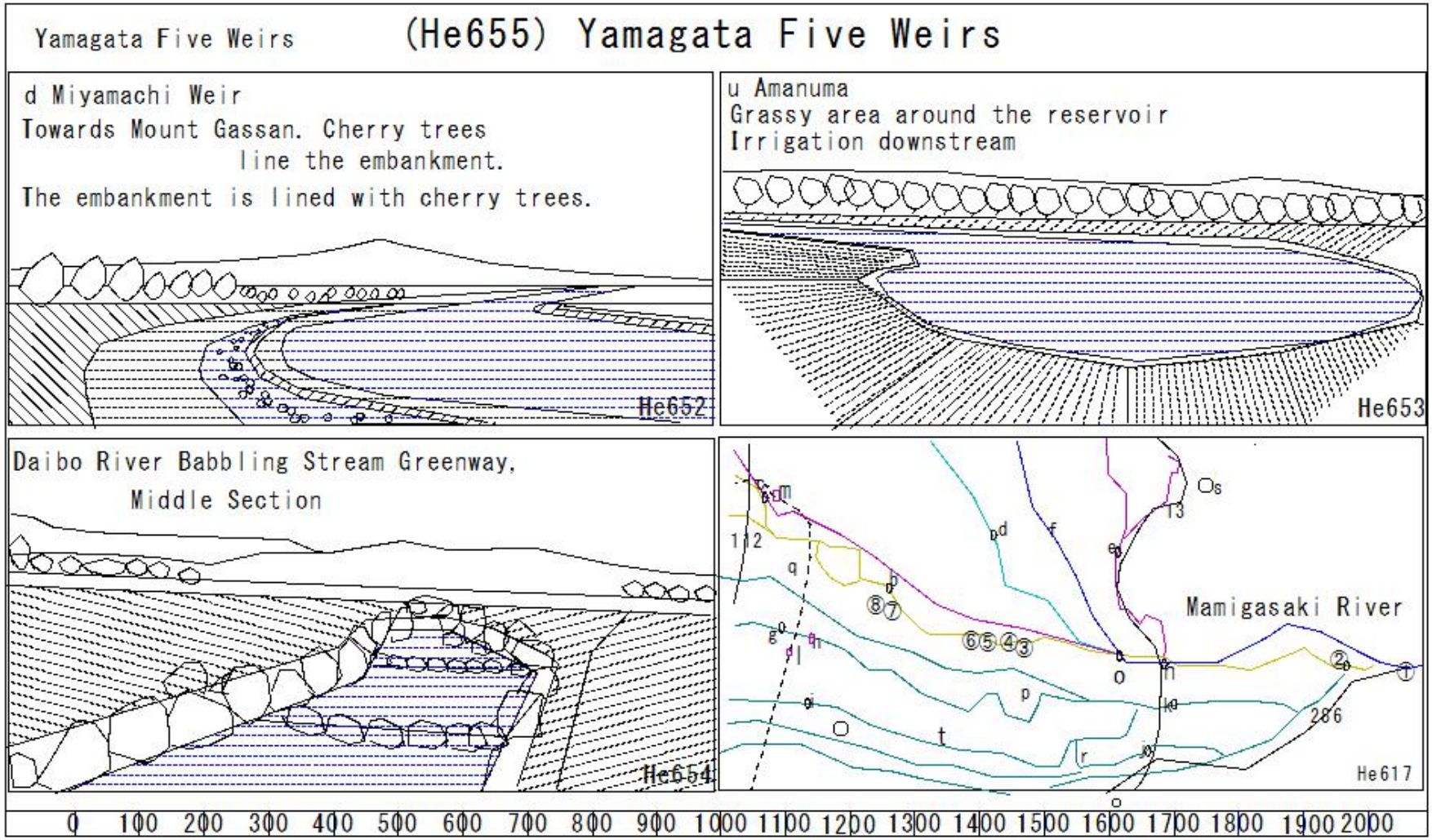

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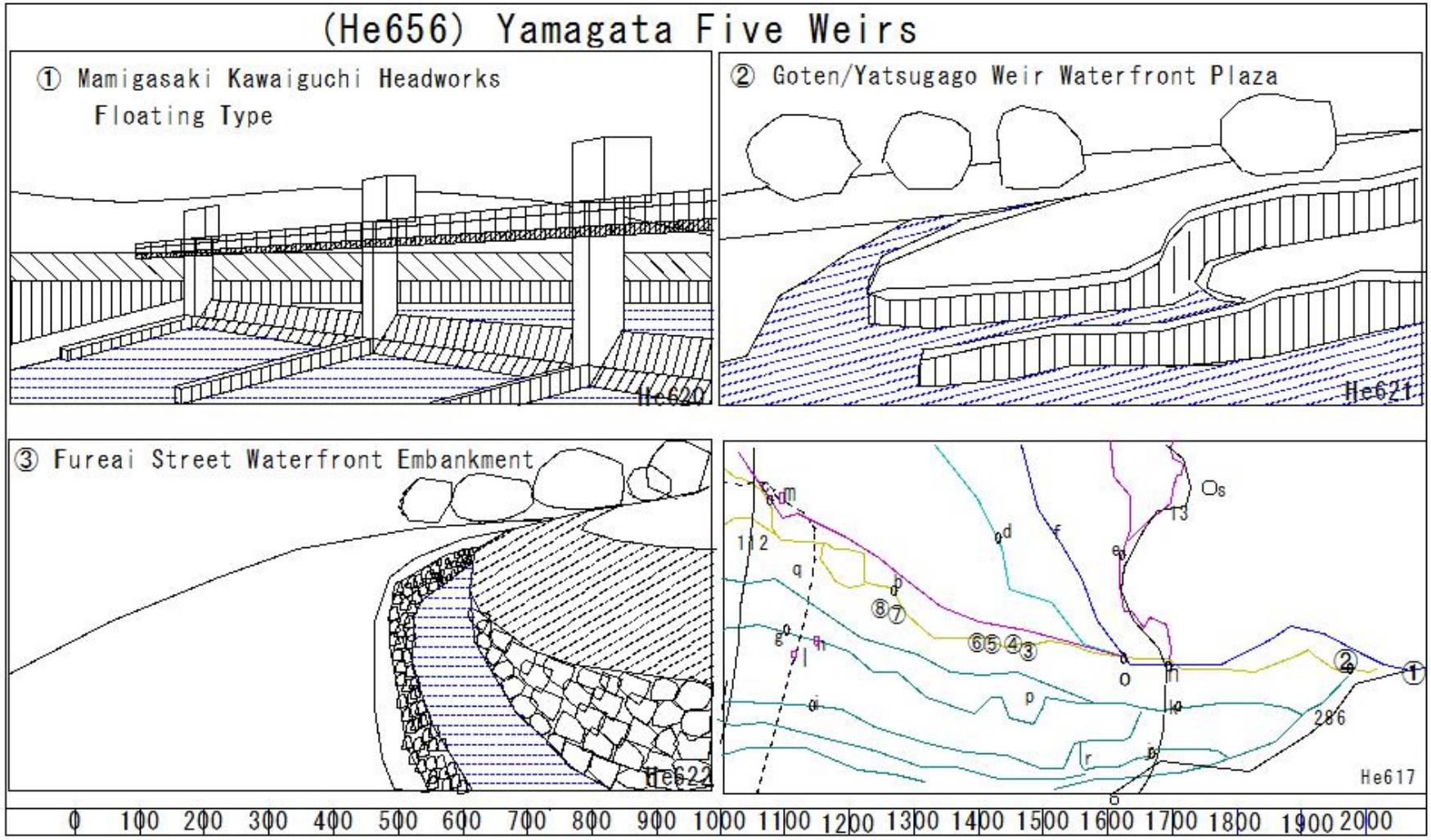

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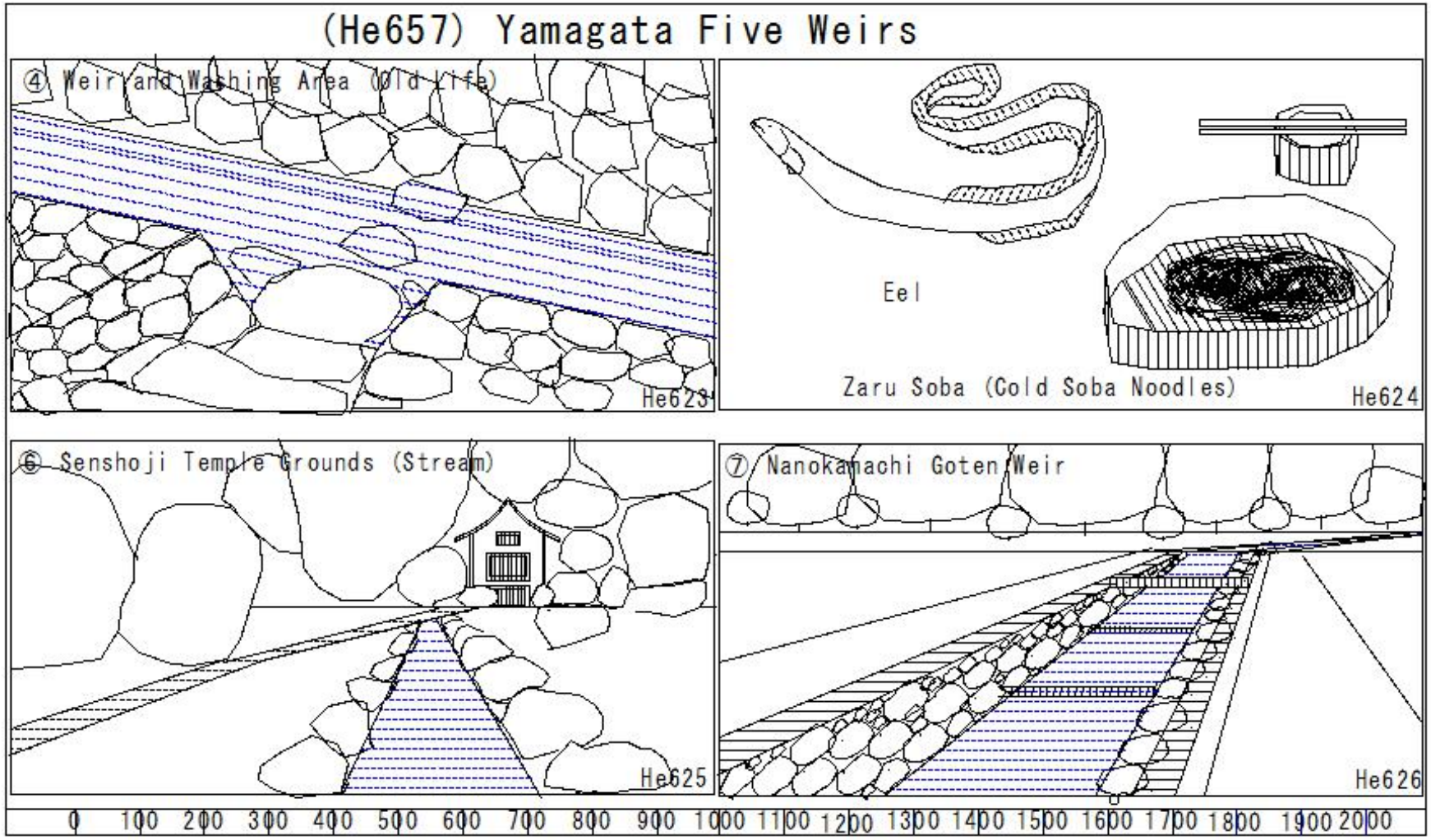

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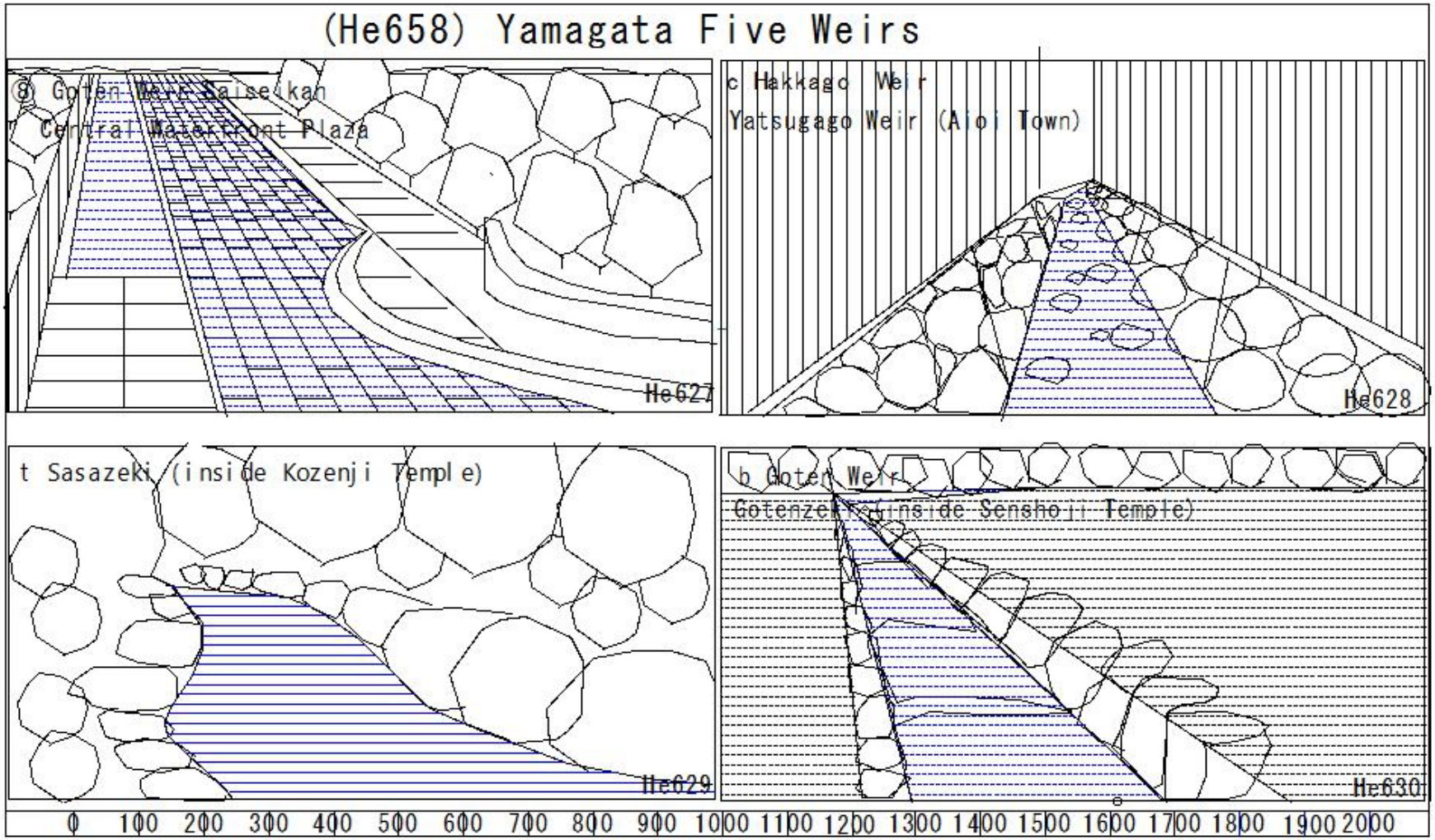

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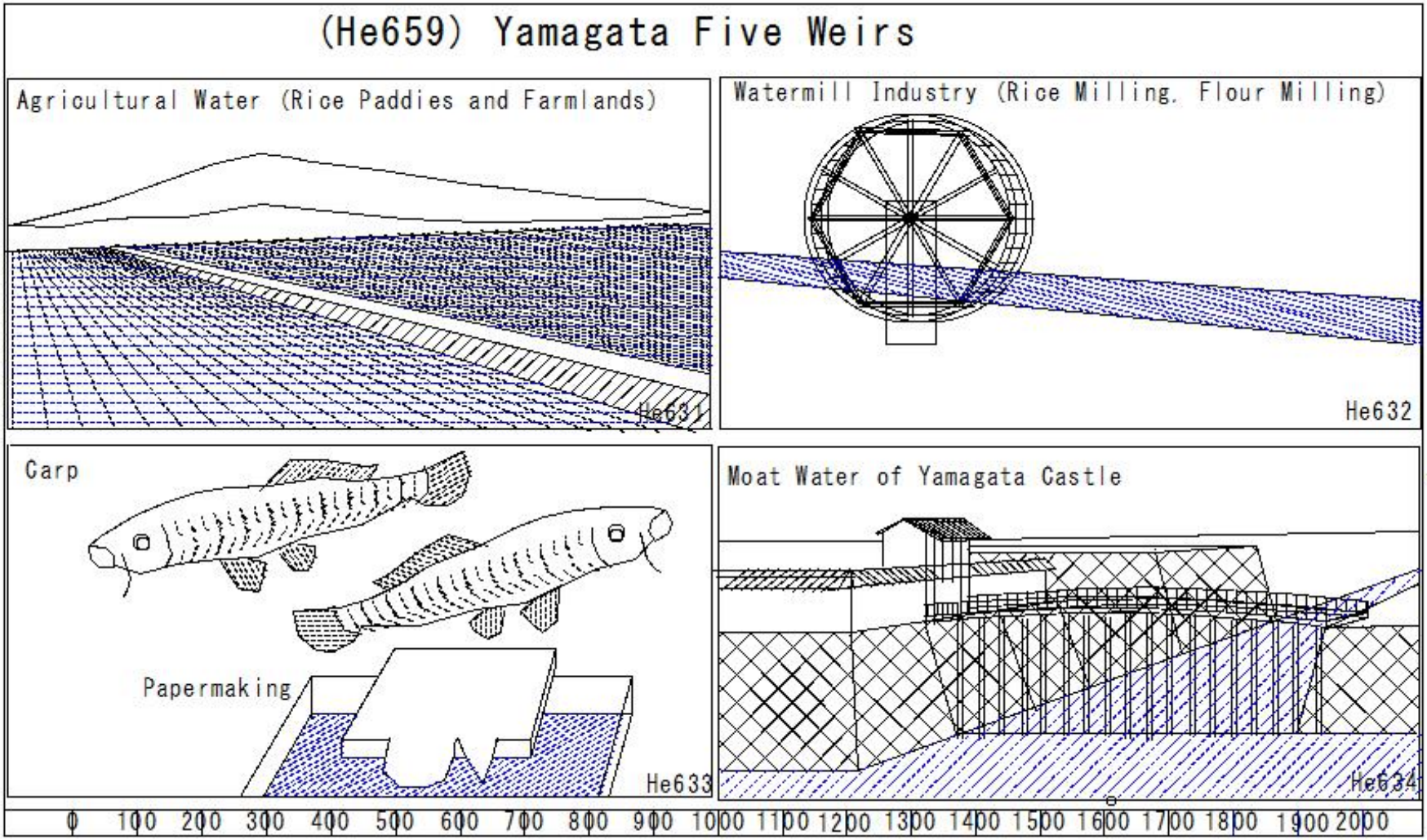

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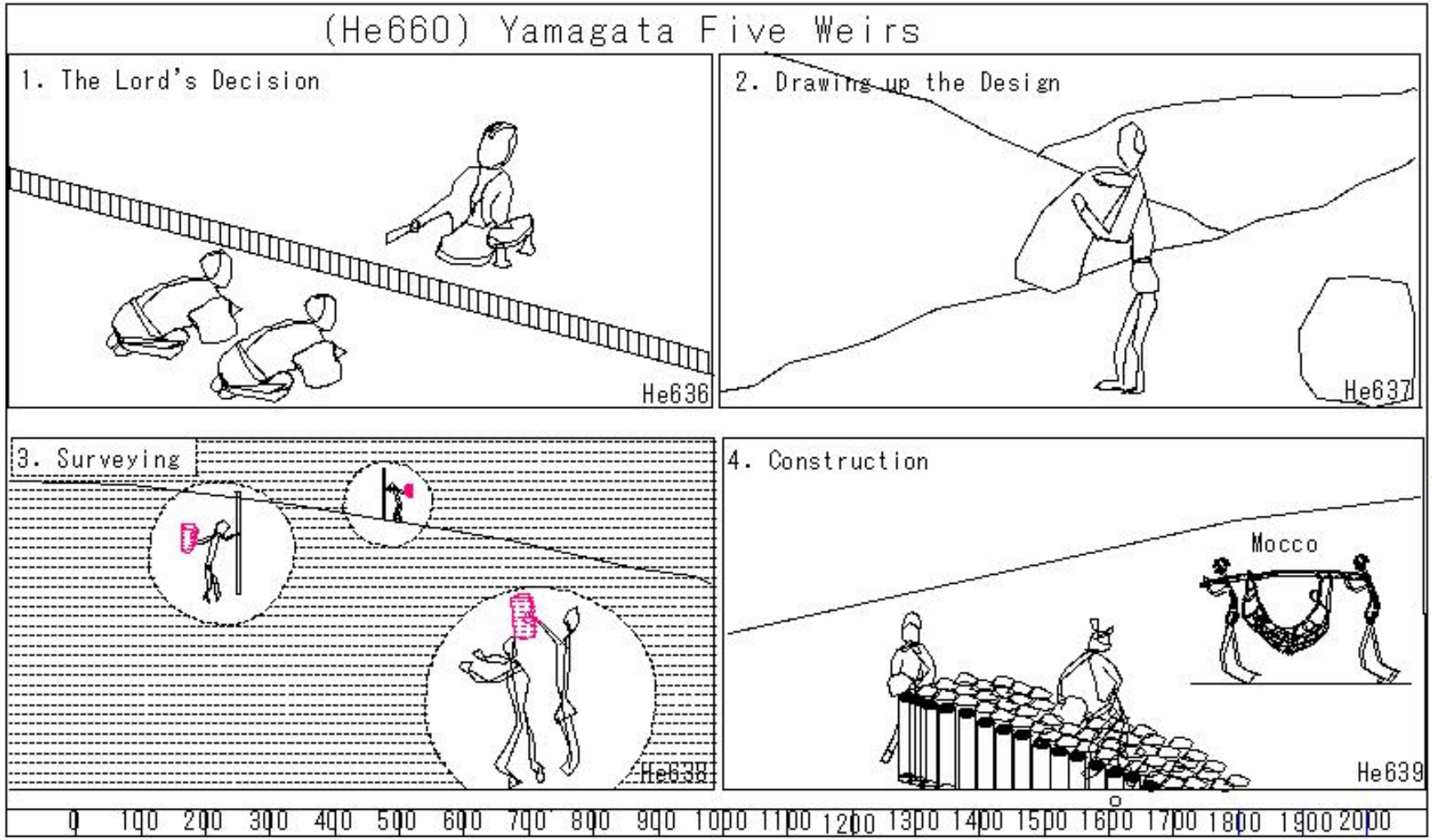
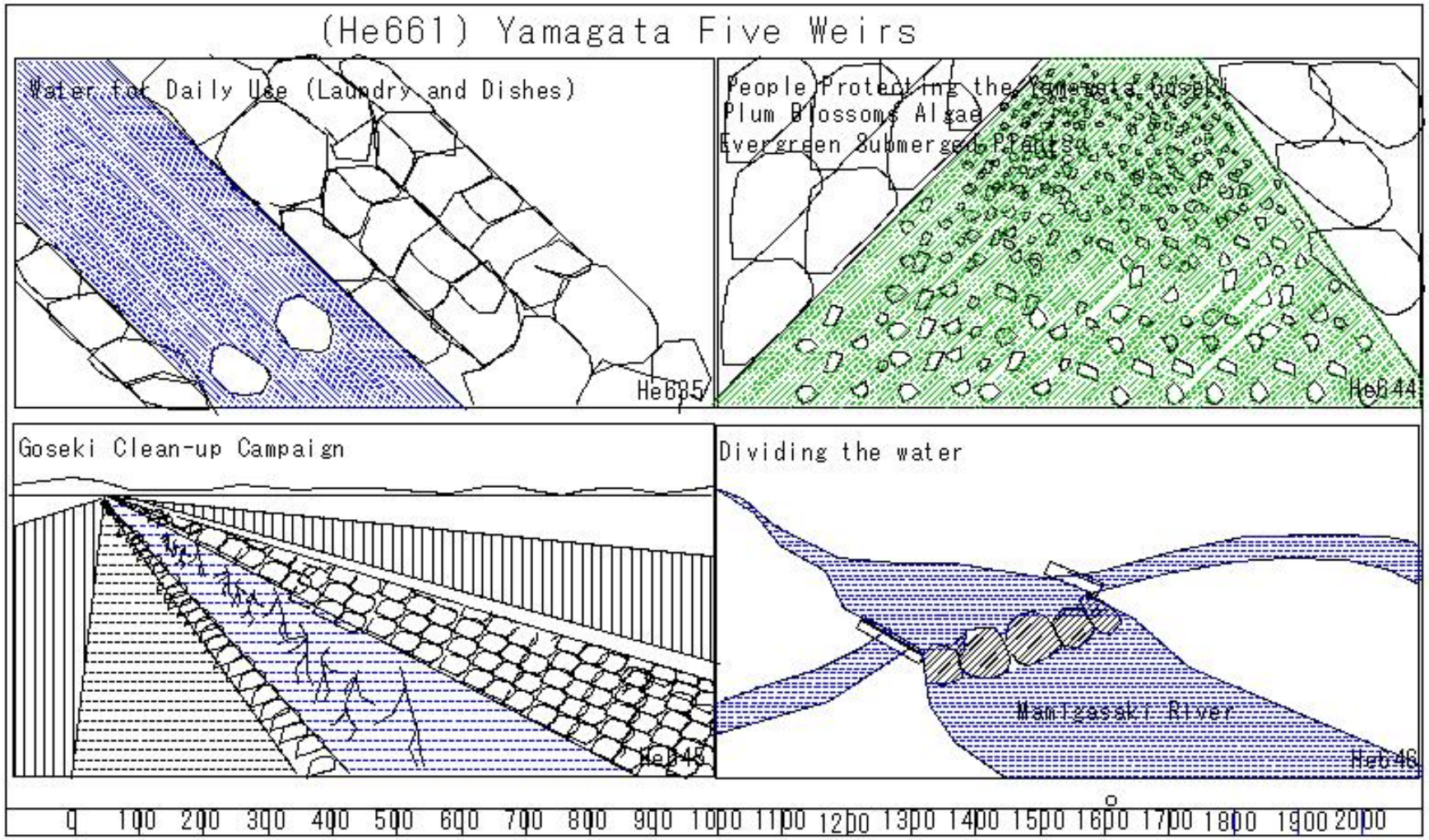


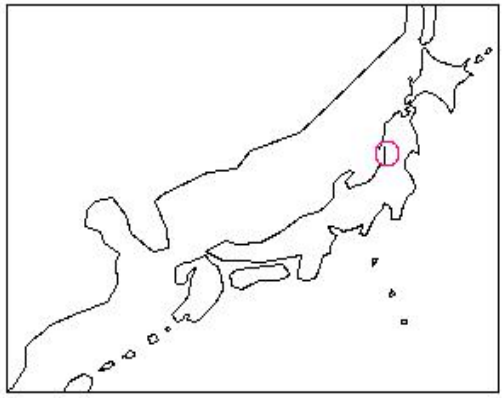
(He661) Yamagata Five Weirs

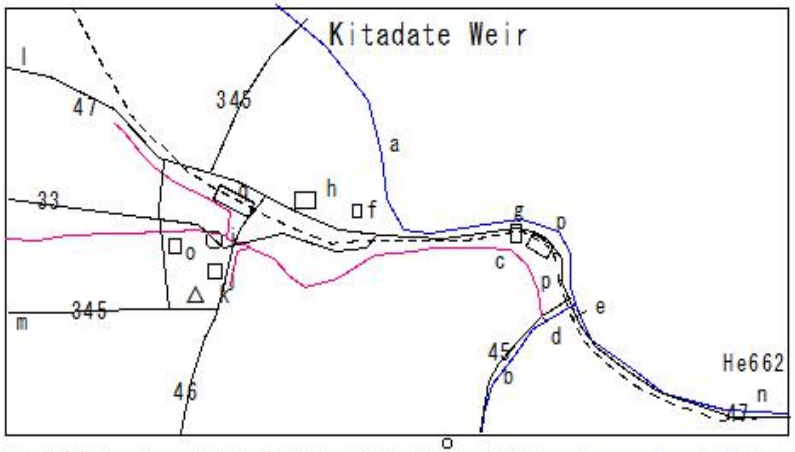


(He662) Kitadate Weir

(He662) Kitadate Weir

a Mogami River
b Tachiayazawa River
c Kitadate Weir
d Kitadate Headworks
e Samidare Weir
f Kiyokawa Hachiro Memorial Museum
g "Aokura no Fuchi" Stone Monument
h Direct Sales Windmill Market
i Tateyama Park (Karikawa Castle Ruins)
j Kitatate Shrine
k Windome Tachikawa (Windmill Village)
l To Sakata City
m To Tsuruoka City
n To Shinjo City
o Tachikawa Branch Office
p Kiyokawa Station
q Karikawa Station





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(He663) Kitadate Weir

(He663) Kitadate Weir

① Opened in 1612 by Kitadate Daigaku-no-suke Toshinaga

② This is a general term for the headworks and agricultural irrigation canals that draw water from the Tachiizawa River, a tributary of the Mogami River system in Shonai Town.

③ The area irrigated by the Kitadate Weir is located approximately 5 meters higher than the river.

④ Barren land with poor water utilization. Kitadate Daigaku-no-suke Toshinaga, lord of Karikawa Castle.

⑤ Ten years of research into rice paddy development.

⑥ A plan to draw water from the Tachiizawa River and construct agricultural irrigation canals.

⑦ Construction began in 1612.

⑧ High-precision surveying techniques, such as measuring elevation differences by lantern light in the dark of night, and accurate and meticulous design.

⑨ Approximately 7400 workers per day completed about 10 km of canals in a short period of only four months.

⑩ Approximately 5000 hectares of rice paddies were developed, and 46 villages were established.

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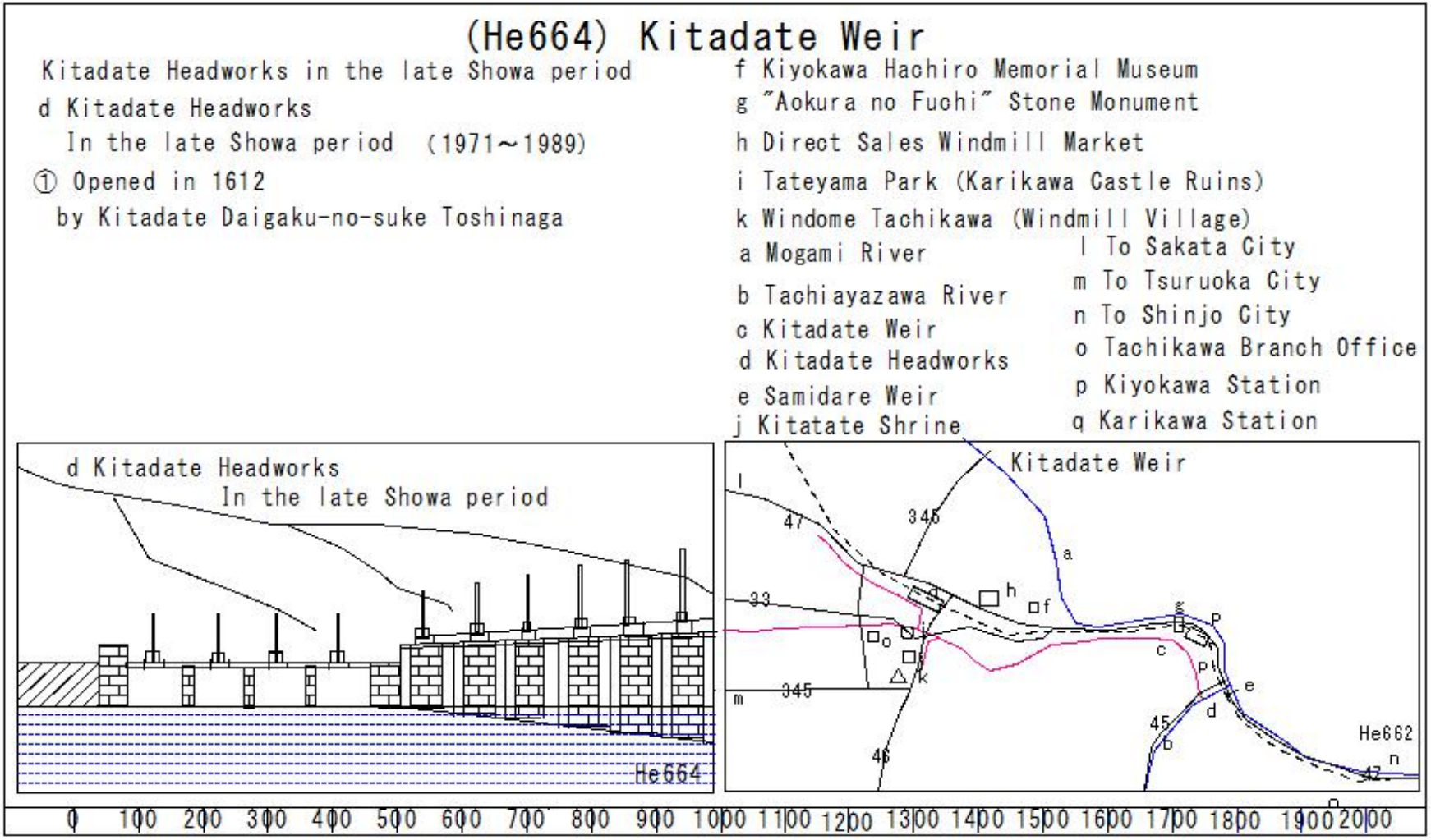
(He664) Kitadate Weir



(He665) Kitadate Weir

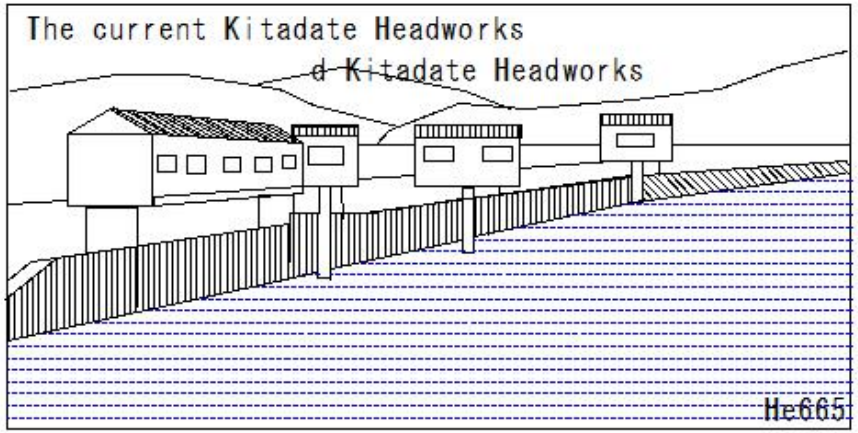
(He665) Kitadate Weir

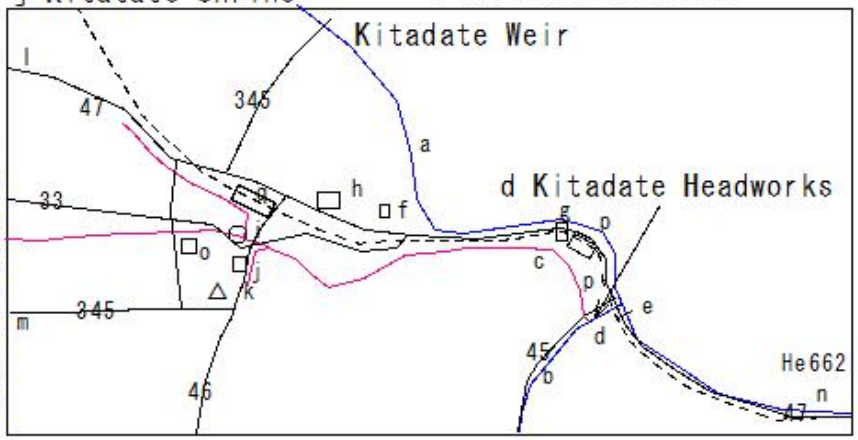
The current Kitadate Headworks
d Kitadate Headworks

② This is a general term for the headworks and agricultural irrigation canals that draw water from the Tachiizawa River, a tributary of the Mogami River system in Shonai Town.

③ The area irrigated by the Kitadate Weir is located approximately 5 meters higher than the river.

f Kiyokawa Hachiro Memorial Museum
g "Aokura no Fuchi" Stone Monument
h Direct Sales Windmill Market
i Tateyama Park (Karikawa Castle Ruins)
k Windome Tachikawa (Windmill Village)
a Mogami River
b Tachiayazawa River
c Kitadate Weir
d Kitadate Headworks
e Samidare Weir
j Kitatate Shrine
l To Sakata City
m To Tsuruoka City
n To Shinjo City
o Tachikawa Branch Office
p Kiyokawa Station
q Karikawa Station





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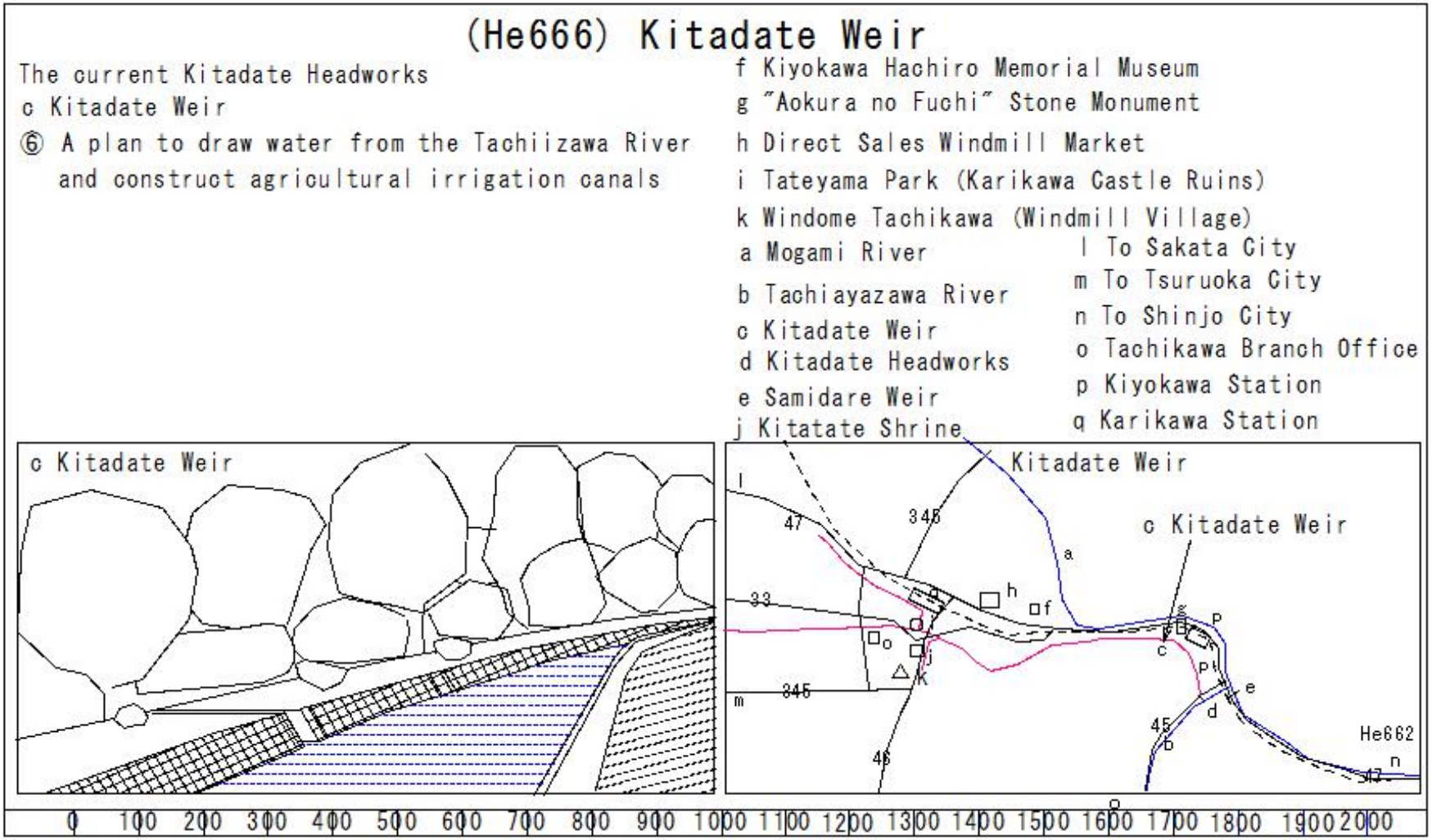
(He666) Kitadate Weir



(He667) Kitadate Weir

(He667) Kitadate Weir

Kitadate Daigaku-no-suke Toshinaga

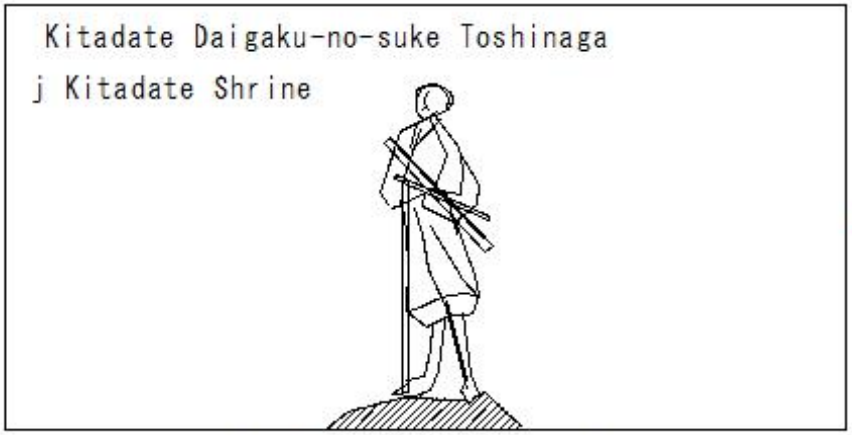
j Kitadate Shrine

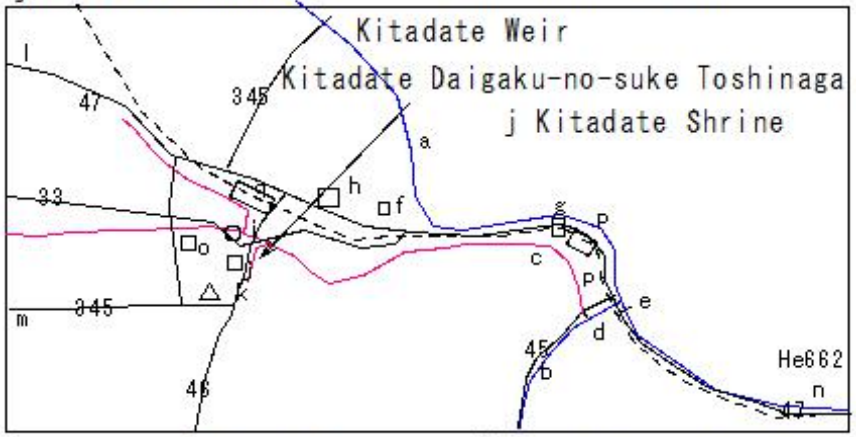
① Opened in 1612
by Kitadate Daigaku-no-suke Toshinaga

⑤ Ten years of research into
rice paddy development.

⑥ A plan to draw water from the Tachiizawa River
and construct agricultural irrigation canals.

f Kiyokawa Hachiro Memorial Museum
g "Aokura no Fuchi" Stone Monument
h Direct Sales Windmill Market
i Tateyama Park (Karikawa Castle Ruins)
k Windome Tachikawa (Windmill Village)
a Mogami River
b Tachiayazawa River
c Kitadate Weir
d Kitadate Headworks
e Samidare Weir
j Kitatate Shrine
l To Sakata City
m To Tsuruoka City
n To Shinjo City
o Tachikawa Branch Office
p Kiyokawa Station
q Karikawa Station





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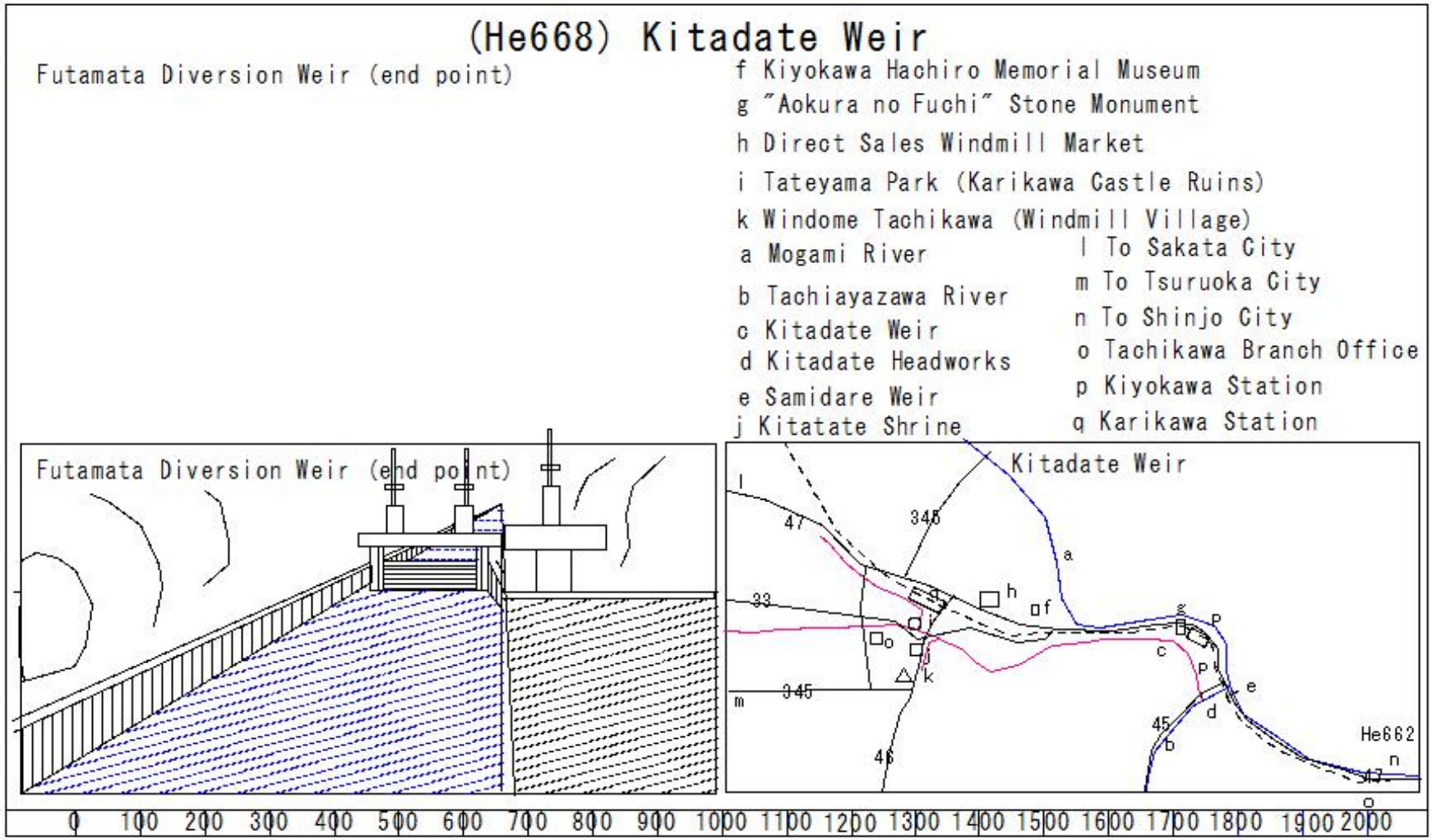
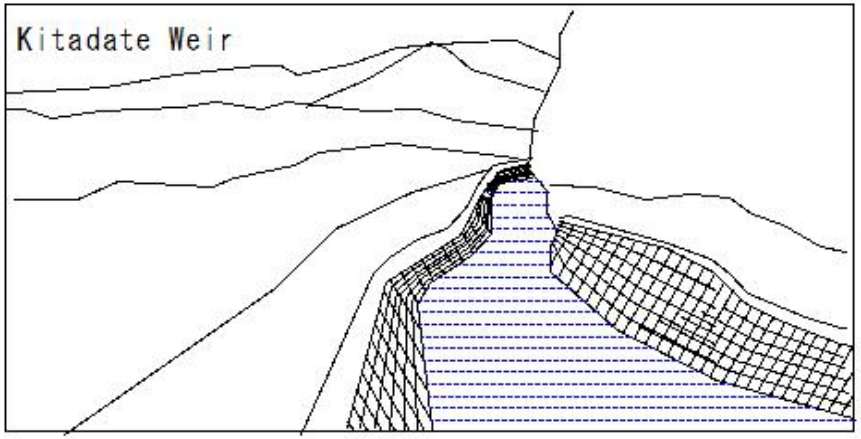
(He668) Kitadate Weir

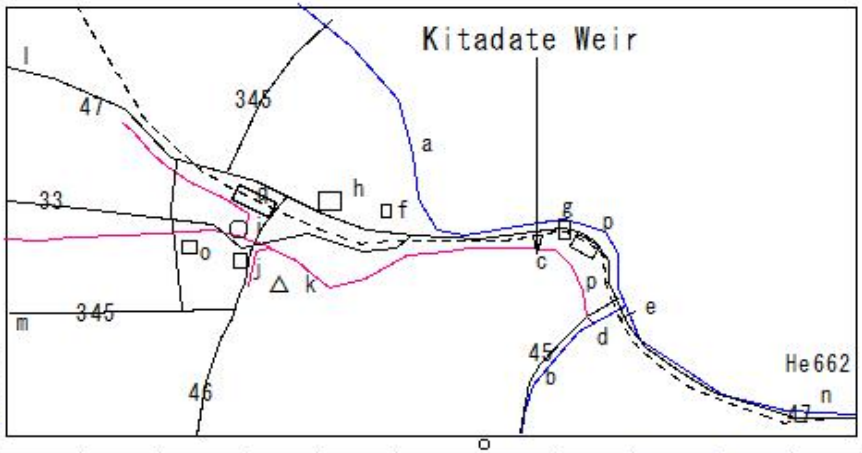


(He669) Kitadate Weir

(He669) Kitadate Weir

- Name: Kitadate Great Weir
- Location: Kiyokawa area, Shonai Town, Higashitagawa District, Yamagata Prefecture, and other locations
- Year of Commencement of Operation: 1612
- Irrigated Area (Beneficiary Area): 2,880 ha
- Waterway Length: 4.9 km (from Kitadate Headworks to Futamata Diversion Weir)
- Drainage Basin: Tachiayazawa River, Mogami River System
- Owner: Ministry of Agriculture, Forestry and Fisheries
- Administrator: Yamagata Prefecture
- Operator: Mogami River Land Improvement District





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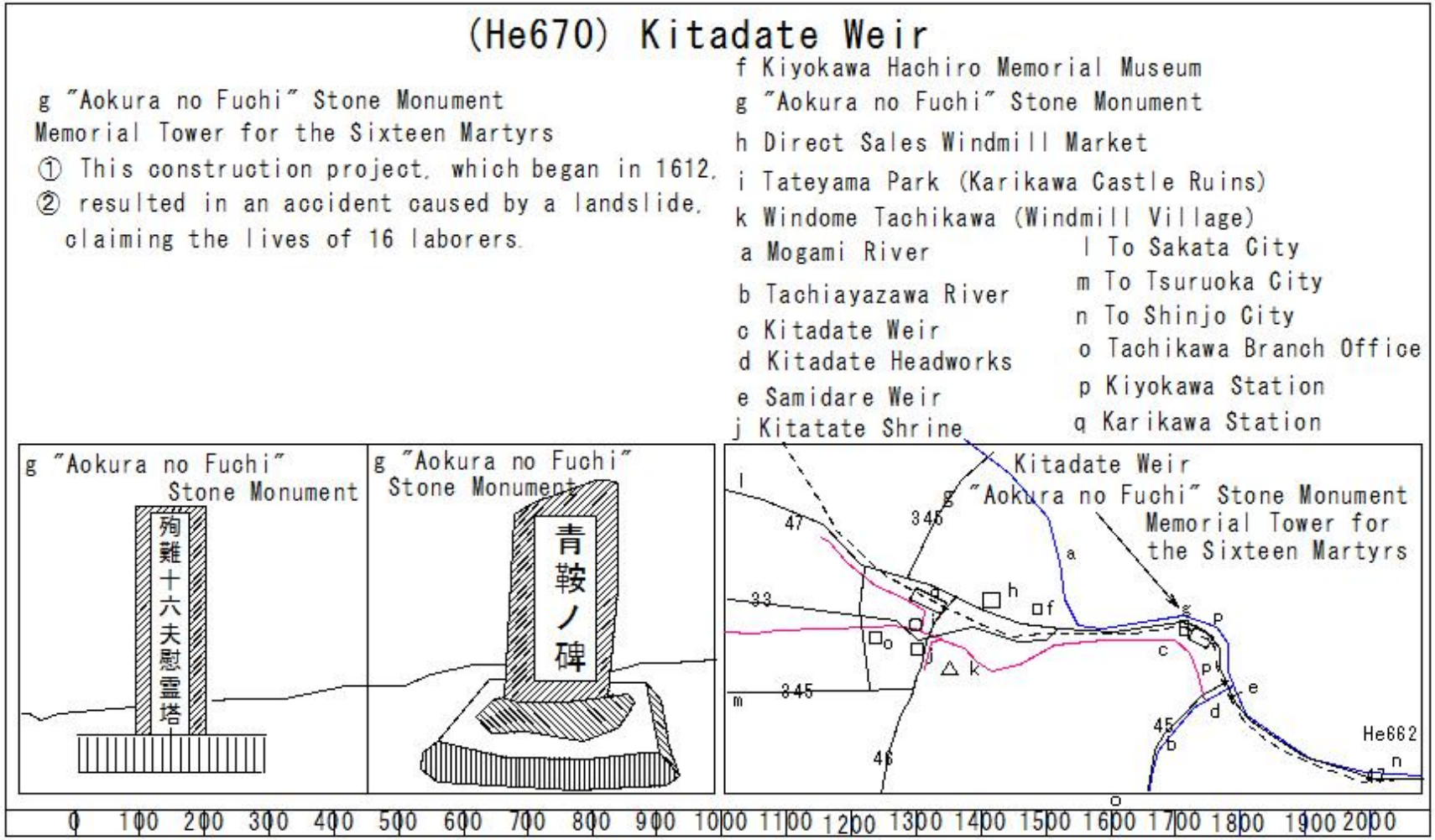
(He670) Kitadate Weir



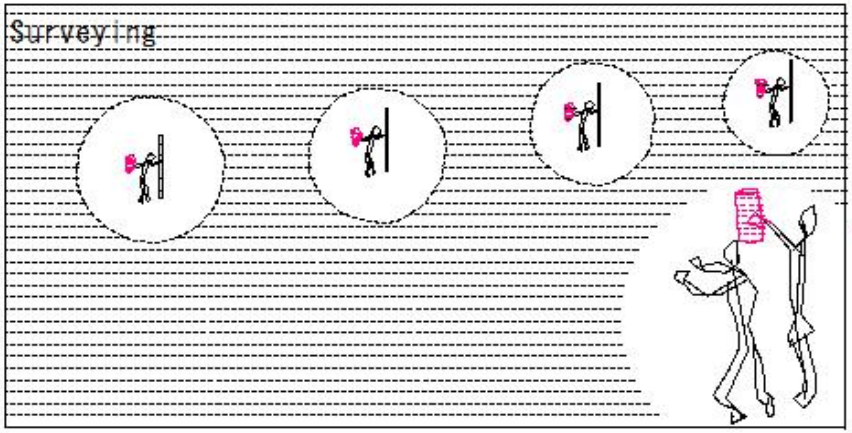
(He671) Kitadate Weir

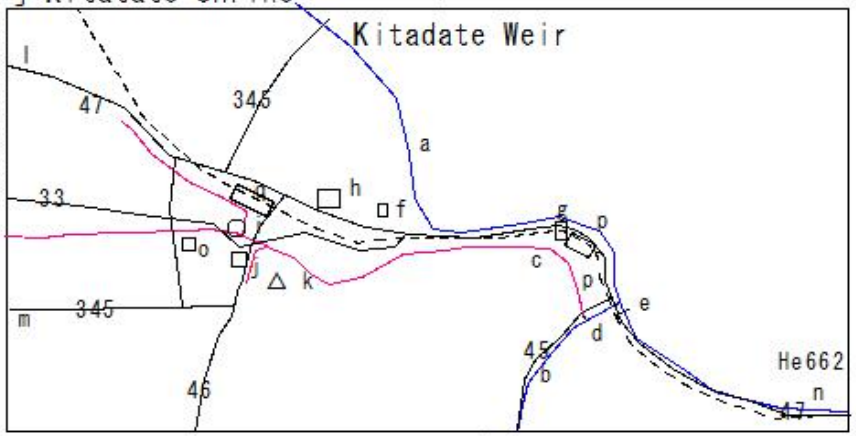
(He671) Kitadate Weir

① High-precision surveying techniques using lanterns to measure elevation differences in the dark of night.

② Accurate and meticulous design.

f Kiyokawa Hachiro Memorial Museum
g "Aokura no Fuchi" Stone Monument
h Direct Sales Windmill Market
i Tateyama Park (Karikawa Castle Ruins)
k Windome Tachikawa (Windmill Village)
a Mogami River
b Tachiayazawa River
c Kitadate Weir
d Kitadate Headworks
e Samidare Weir
j Kitatate Shrine
l To Sakata City
m To Tsuruoka City
n To Shinjo City
o Tachikawa Branch Office
p Kiyokawa Station
q Karikawa Station





0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He672) Kitadate Weir

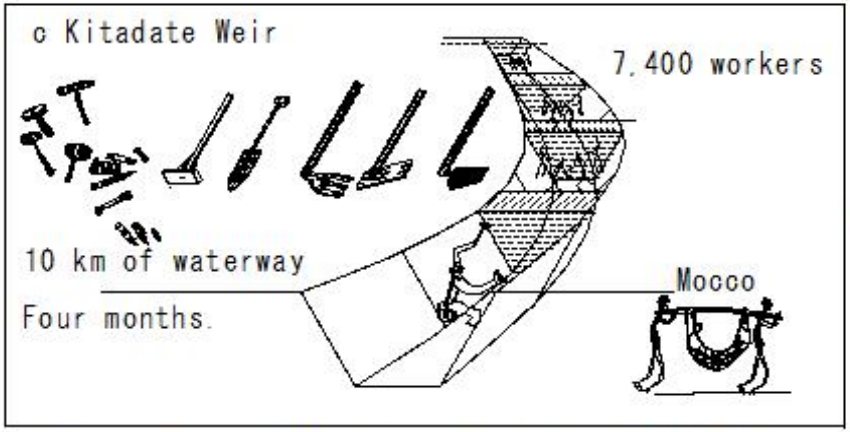
c Kitadate Weir

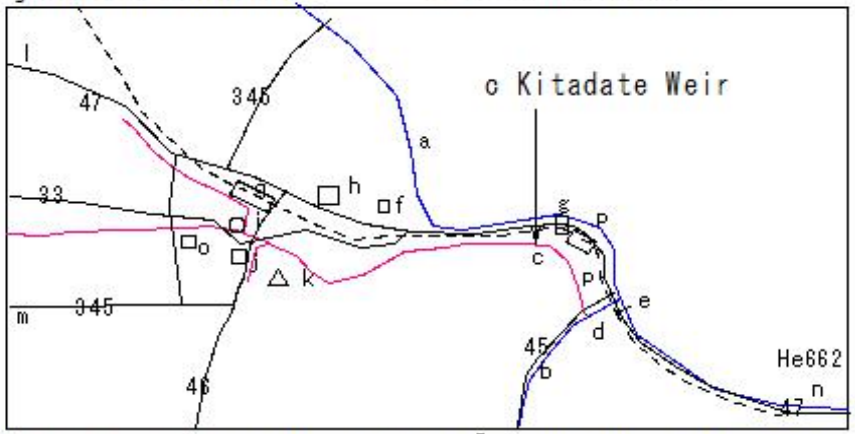
(He672) Kitadate Weir

① Approximately 7,400 workers were mobilized daily.

② Approximately 10 km of waterway was completed in a short period of four months.

f Kiyokawa Hachiro Memorial Museum
g "Aokura no Fuchi" Stone Monument
h Direct Sales Windmill Market
i Tateyama Park (Karikawa Castle Ruins)
k Windome Tachikawa (Windmill Village)
a Mogami River
b Tachiayazawa River
c Kitadate Weir
d Kitadate Headworks
e Samidare Weir
j Kitatate Shrine
l To Sakata City
m To Tsuruoka City
n To Shinjo City
o Tachikawa Branch Office
p Kiyokawa Station
q Karikawa Station





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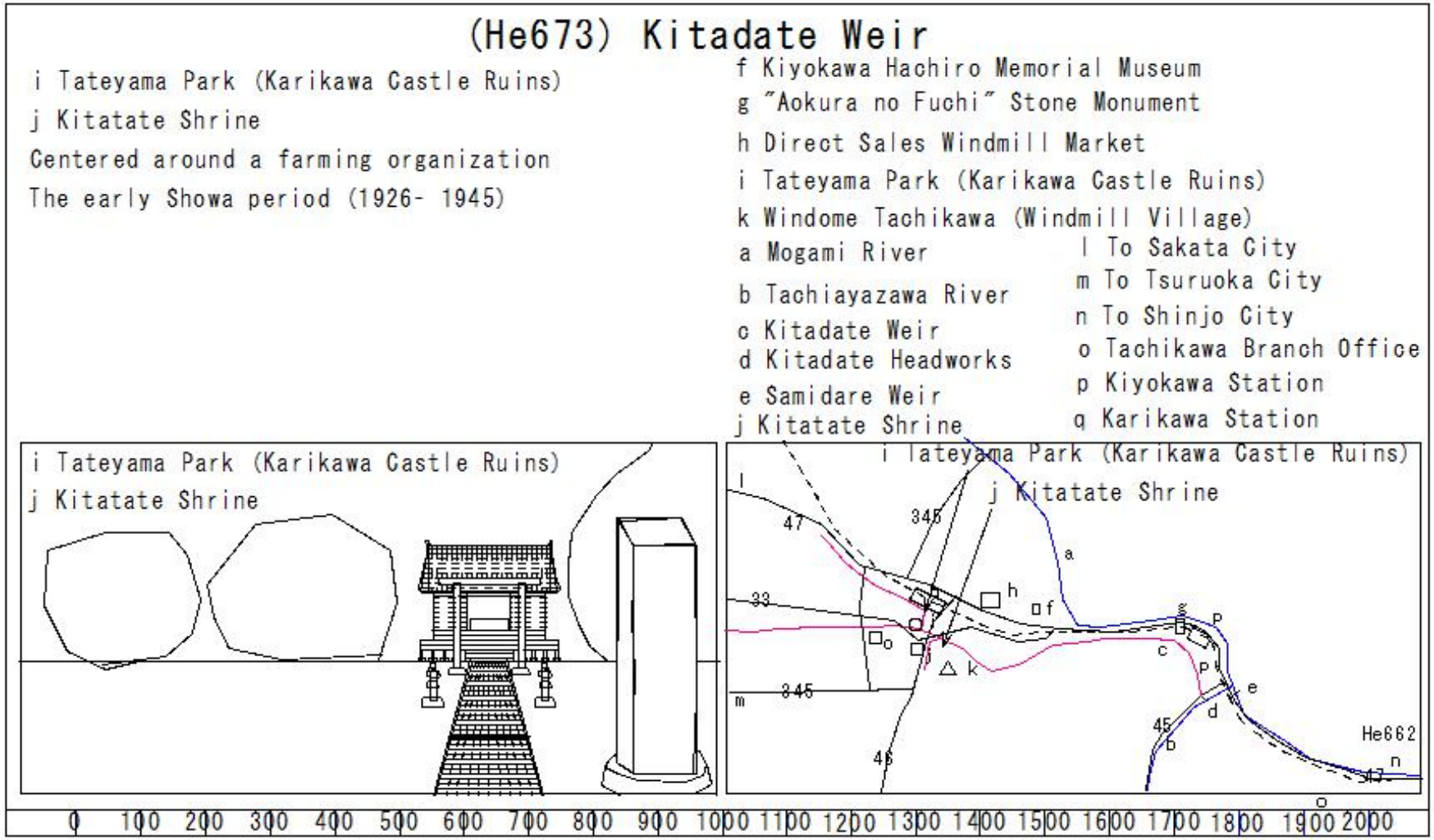
(He673) Kitadate Weir



(He674) Kitadate Weir

(He674) Kitadate Weir

j Kitatate Shrine
Annual Festival
Near the ruins of Karikawa Castle
Centered around a farming organization
The early Showa period (1926- 1945)

f Kiyokawa Hachiro Memorial Museum
g "Aokura no Fuchi" Stone Monument
h Direct Sales Windmill Market
i Tateyama Park (Karikawa Castle Ruins)
k Windome Tachikawa (Windmill Village)
a Mogami River
b Tachiayazawa River
c Kitadate Weir
d Kitadate Headworks
e Samidare Weir
j Kitatate Shrine
l To Sakata City
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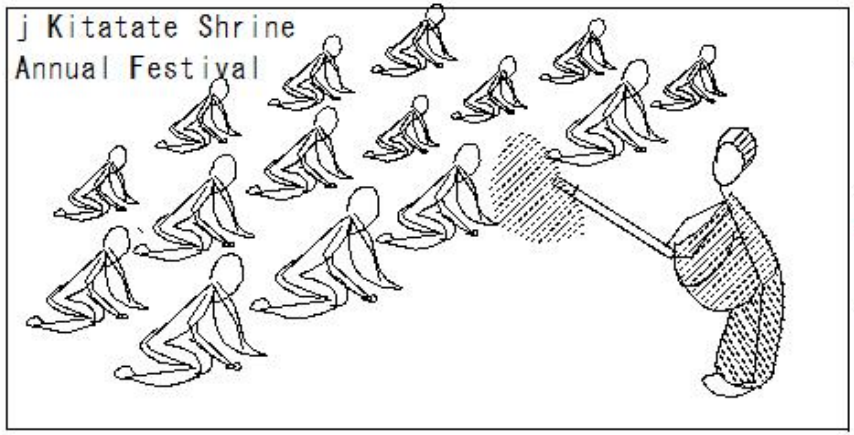
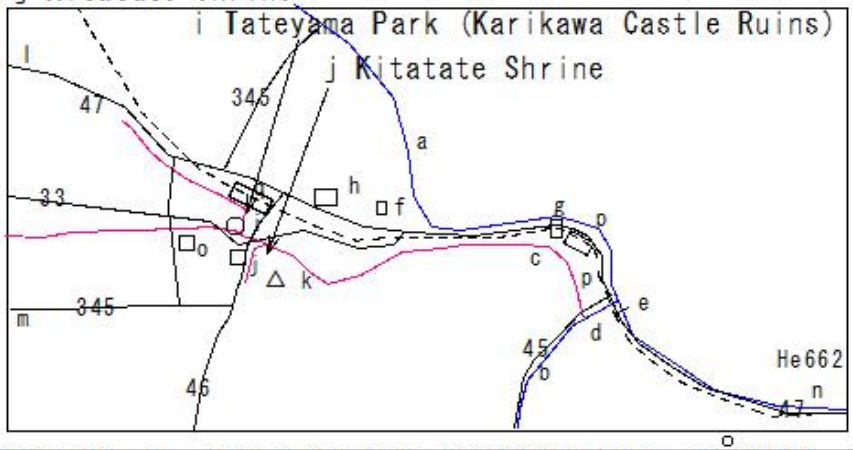
o Tachikawa Branch Office
p Kiyokawa Station
q Karikawa Station





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(He675) Kitadate Weir

(He675) Kitadate Weir

k Windome Tachikawa (Windmill Village)

Kiyokawa-dashi

The strong winds that blow along the Mogami River are called "Kiyokawa-dashi" and are listed as one of Japan's three worst winds.

National Wind Summit held.

Tachikawa Town (now Shonai Town) is known for its agricultural products.

f Kiyokawa Hachiro Memorial Museum
g "Aokura no Fuchi" Stone Monument
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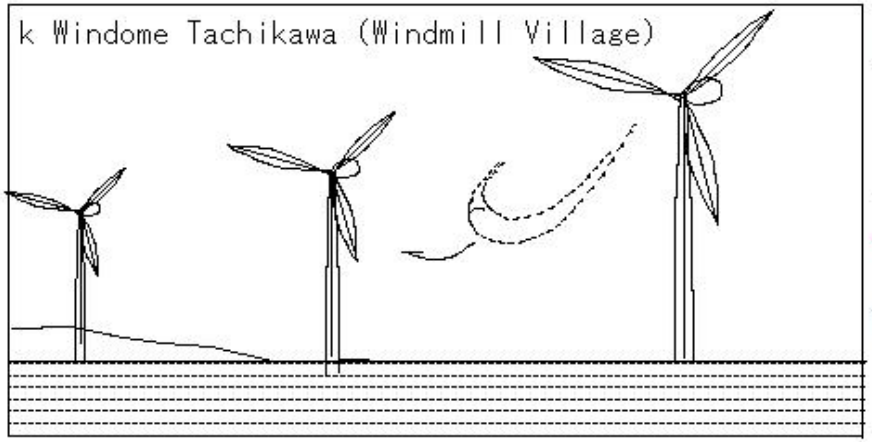
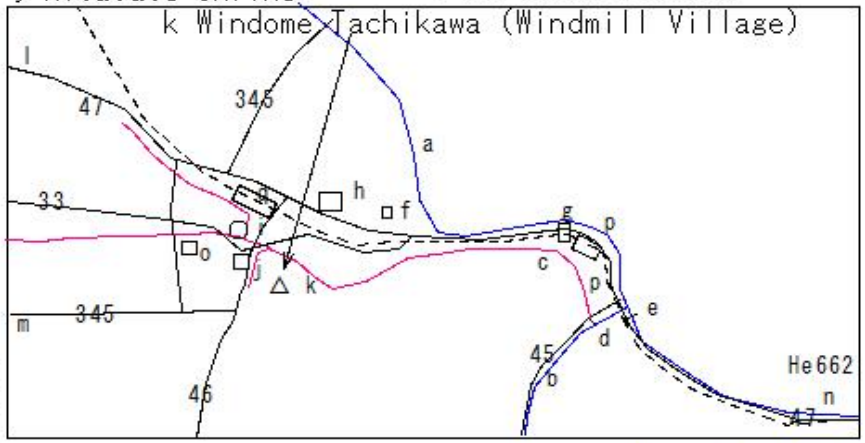
q Karikawa Station





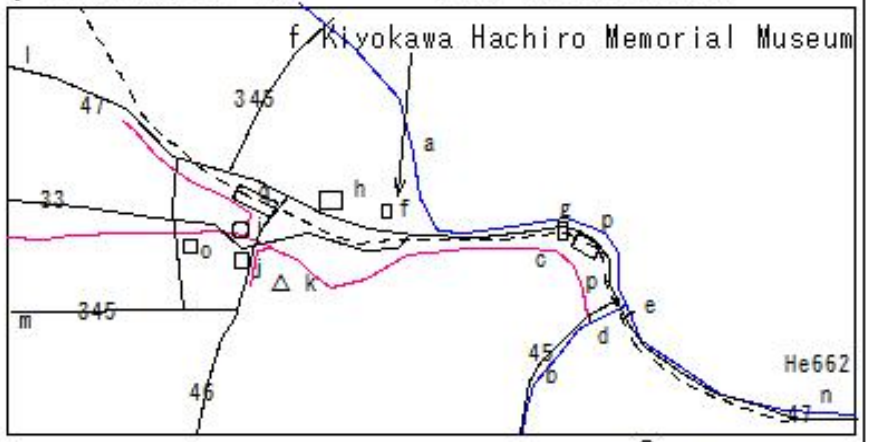
0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He676) Kitadate Weir

f Kiyokawa Hachiro Memorial Museum
Hokushin Itto-ryu (a school of swordsmanship)
Seigajuku (a school for literary
and martial arts instruction)
Patriots of the late Edo period

f Kiyokawa Hachiro Memorial Museum
g "Aokura no Fuchi" Stone Monument
h Direct Sales Windmill Market
i Tateyama Park (Karikawa Castle Ruins)
k Windome Tachikawa (Windmill Village)
a Mogami River
b Tachiayazawa River
c Kitadate Weir
d Kitadate Headworks
e Samidare Weir
j Kitatate Shrine
l To Sakata City
m To Tsuruoka City
n To Shinjo City
o Tachikawa Branch Office
p Kiyokawa Station
q Karikawa Station

f Kiyokawa Hachiro Memorial Museum
1830-1863



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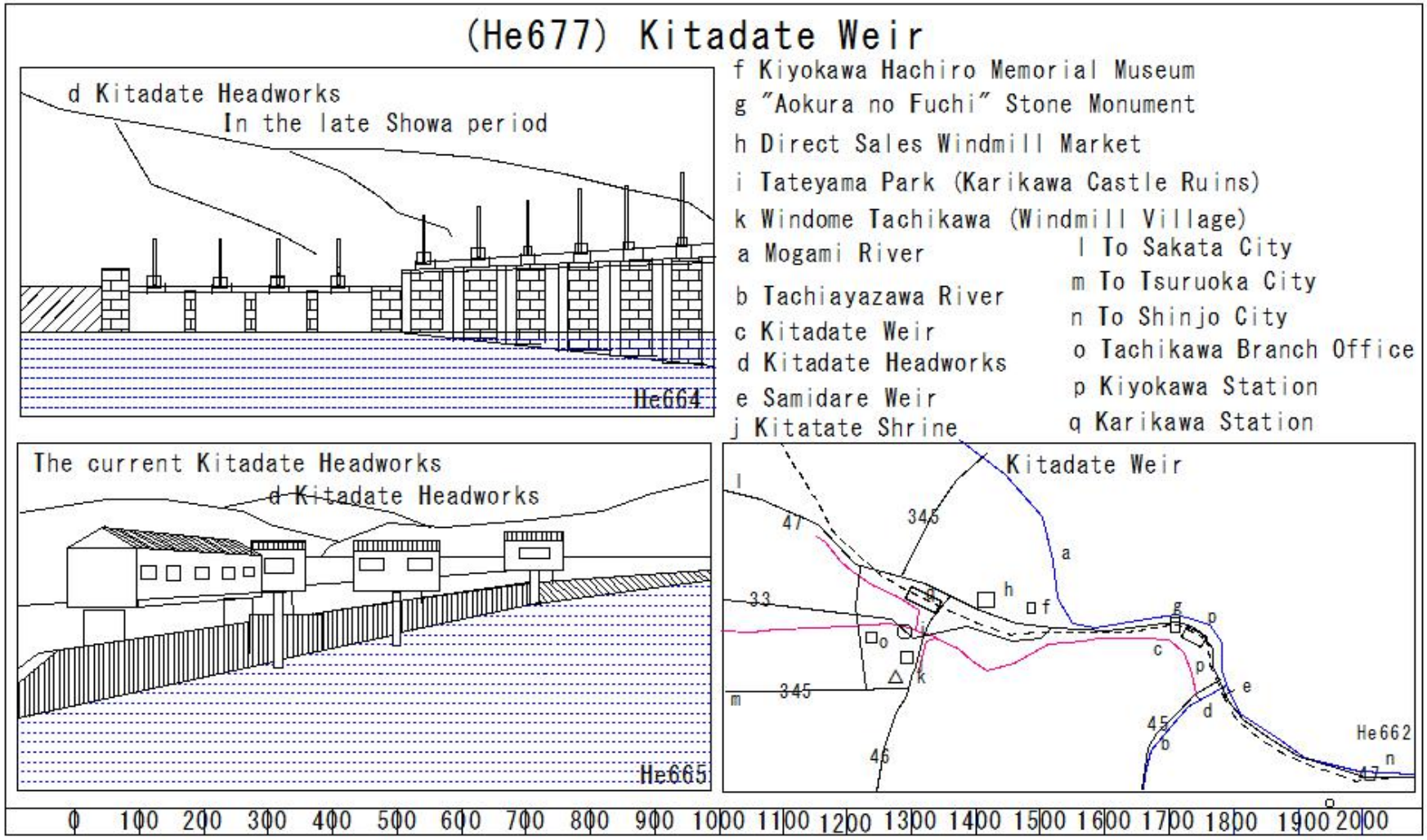
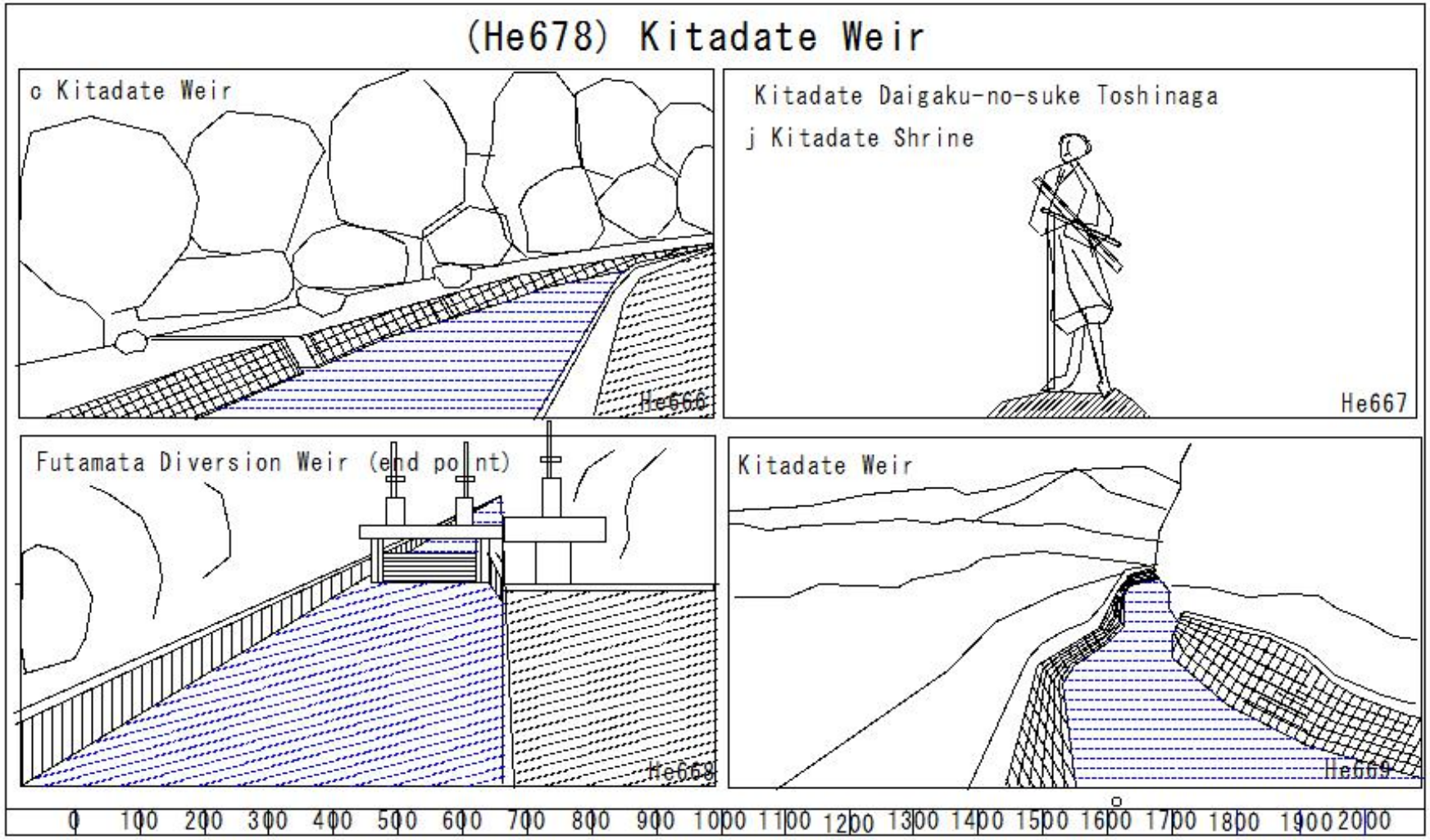
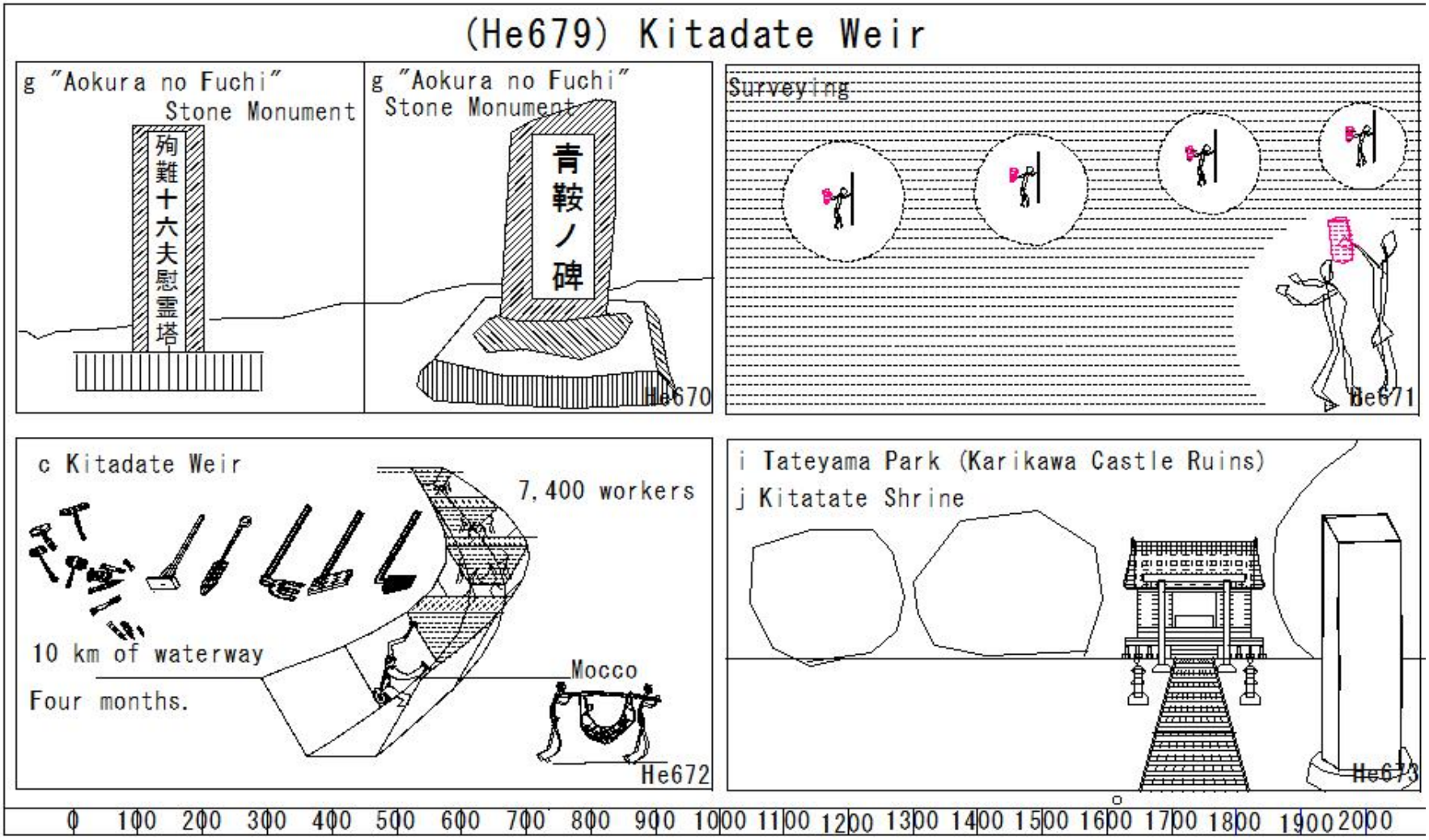
(He677) Kitadate Weir



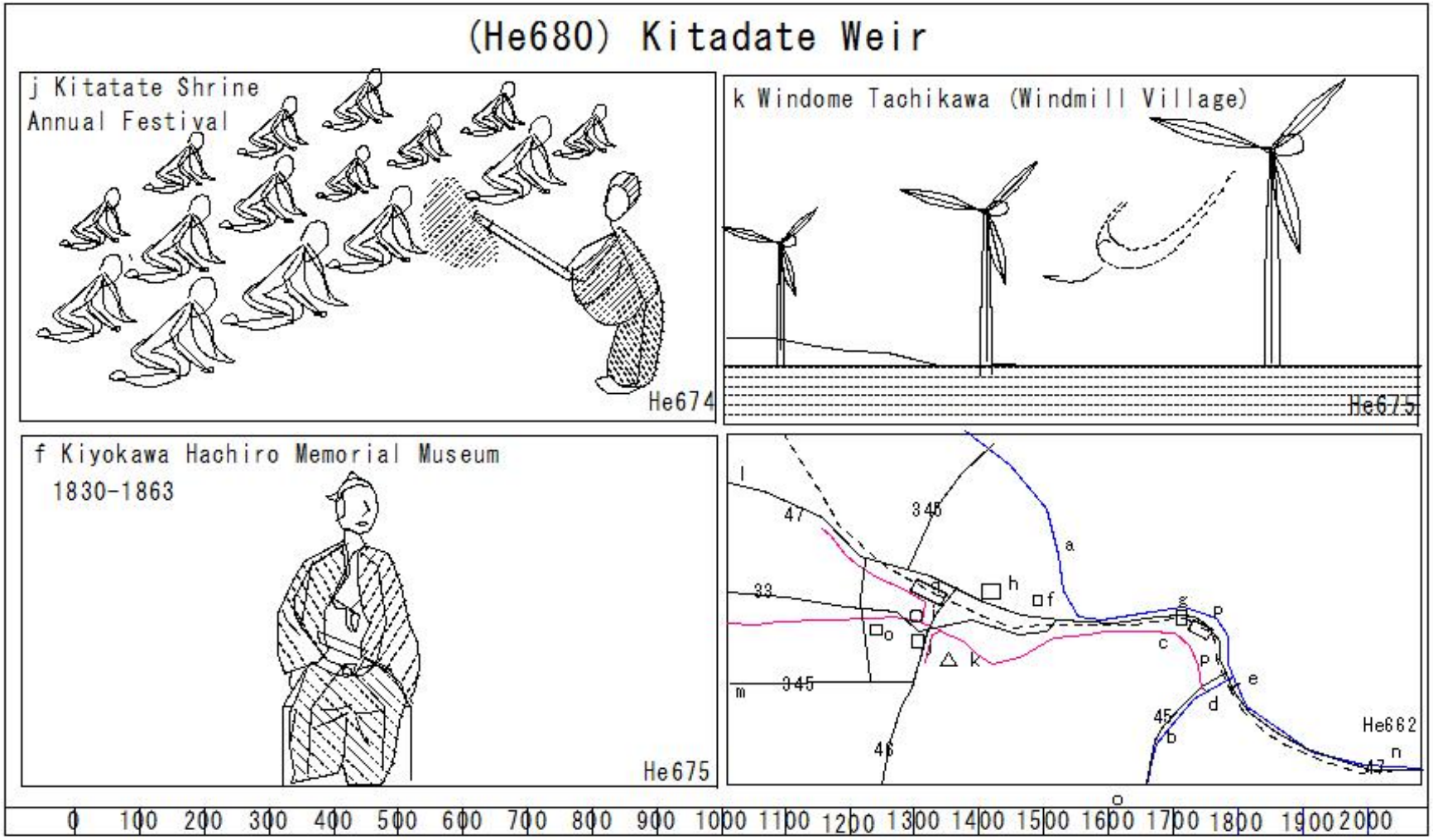
(He678) Kitadate Weir



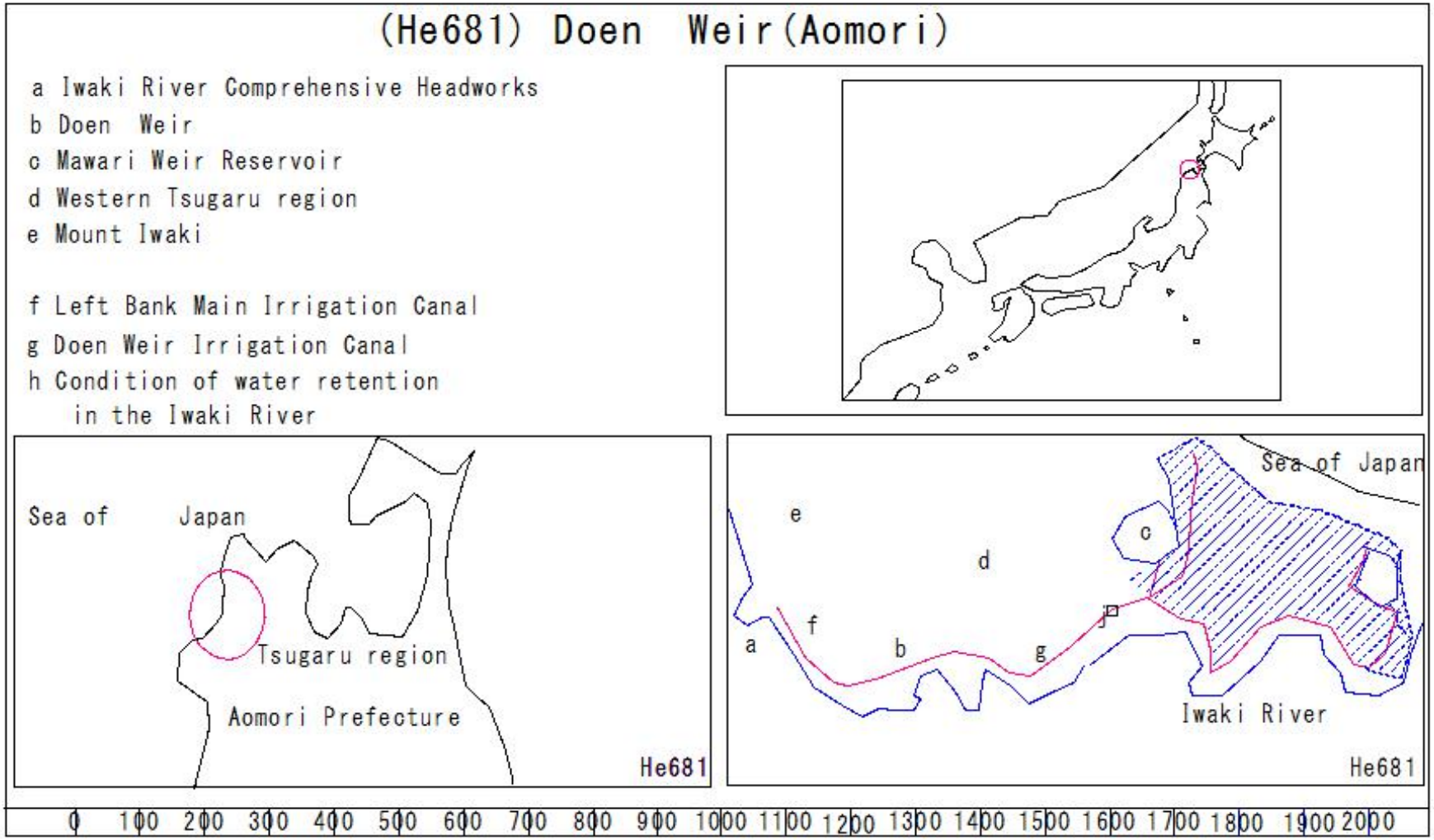
(He679) Kitadate Weir



(He680) Kitadate Weir



(He681) Doen Weir(Aomori)



(He682) Doen Weir(Aomori)

(He682) Doen Weir(Aomori)

① This region is a large wetland area at a low elevation.

② In 1644, headworks, reservoirs, and open channels were constructed for the purpose of developing rice paddies.

③ Currently, it supplies irrigation water to 8,300 hectares of farmland.

④ It contributes to the stability and development of regional agriculture and makes a significant contribution to the regional economy.

⑤ This facility is located in the lower reaches of the Iwakigawa River.

⑥ In the upper reaches, a weir with a structure that allows a large amount of water to overflow (stone weir) is installed.

⑦ In the middle reaches, a weir with a structure that allows a small amount of water to pass through (gabion weir) is installed.

⑧ In the lower reaches, a weir with a completely closed structure (bag weir) is installed.

⑨ It is designed to supply irrigation water to the lower reaches as well.

⑩ At that time, the local government, in order to alleviate water shortages in the lower reaches,

⑪ created and provided guidance on a manual regarding the structure and installation of the weirs (water intake).

⑫ The length of the open channel is 16 km.

⑬ At that time, surveying technology was limited, making it difficult to discern the elevation differences in flat areas.

⑭ Surveying was conducted using a method called "weir line survey," which involved tracing and connecting the flow paths of natural rivers.

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(He683) Doen Weir(Aomori)

(He683) Doen Weir(Aomori)

⑮ A gradient that allowed for water flow was secured.

⑯ After the installation of the facility, until around 1875, in order to maintain the regional water distribution order and repair the facilities,

⑰ a high-ranking official called the "Doen Weir Magistrate" was appointed,

⑱ ensuring thorough maintenance and water distribution management.

⑲ This ensured a stable supply of irrigation water.

⑳ Appropriate maintenance is carried out mainly by farmers' organizations.

㉑ The "Mawari Weir Reservoir," which was constructed at that time to supplement the water supply,

㉒ which was renovated as the beneficiary area expanded,

㉓ and now has the longest embankment length in Japan at 4,100 meters.

㉔ It continues to supply stable irrigation water even today.

㉕ A park that takes into account the landscape has been developed.

㉖ It is used as a place of relaxation for the people of the region.

0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

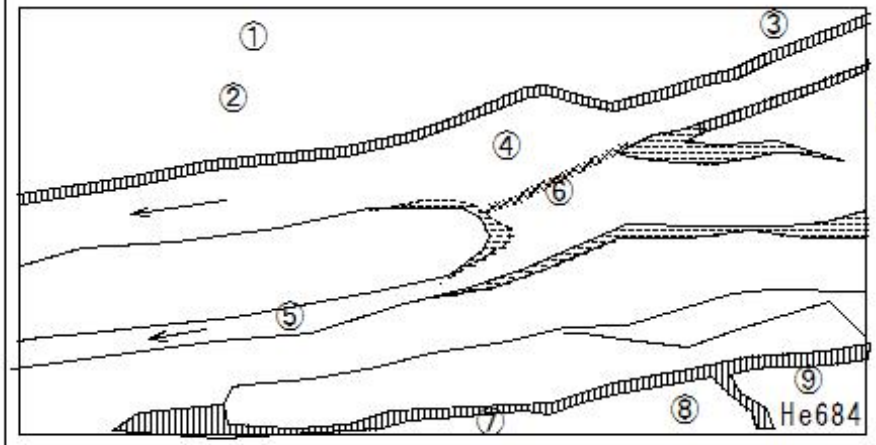
(He684) Doen Weir(Aomori)

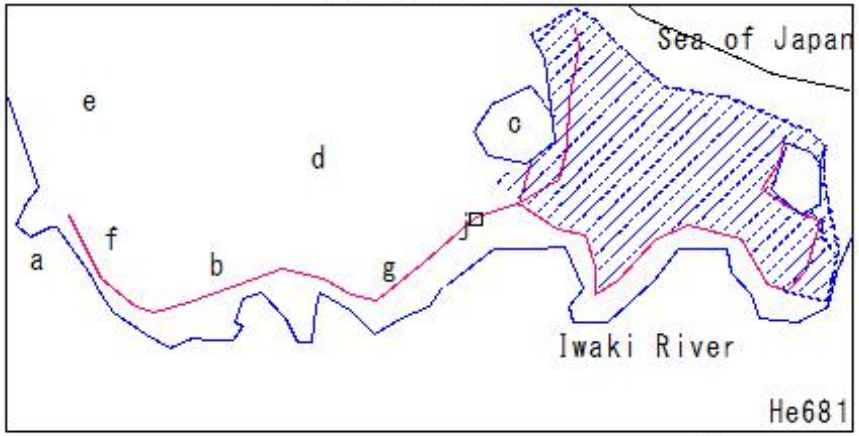
(He684) Doen Weir(Aomori)

① Iwaki River damming in 1917 (Taisho 6)
② Kawada, Kiyono-bukuro, Wado Village
③ Mukai-sotose
④ Iwaki River
⑤ Tsuchibuchi Weir
⑥ xxxx Weir and embankment
⑦ Nakatsugaru District
⑧ Commonly known as Sotose
⑨ Yachinaka

a Iwaki River Comprehensive Headworks
b Doen Weir
c Mawari Weir Reservoir
d Western Tsugaru region
e Mount Iwaki

f Left Bank Main Irrigation Canal
g Doen Weir Irrigation Canal
h Condition of water retention in the Iwaki River





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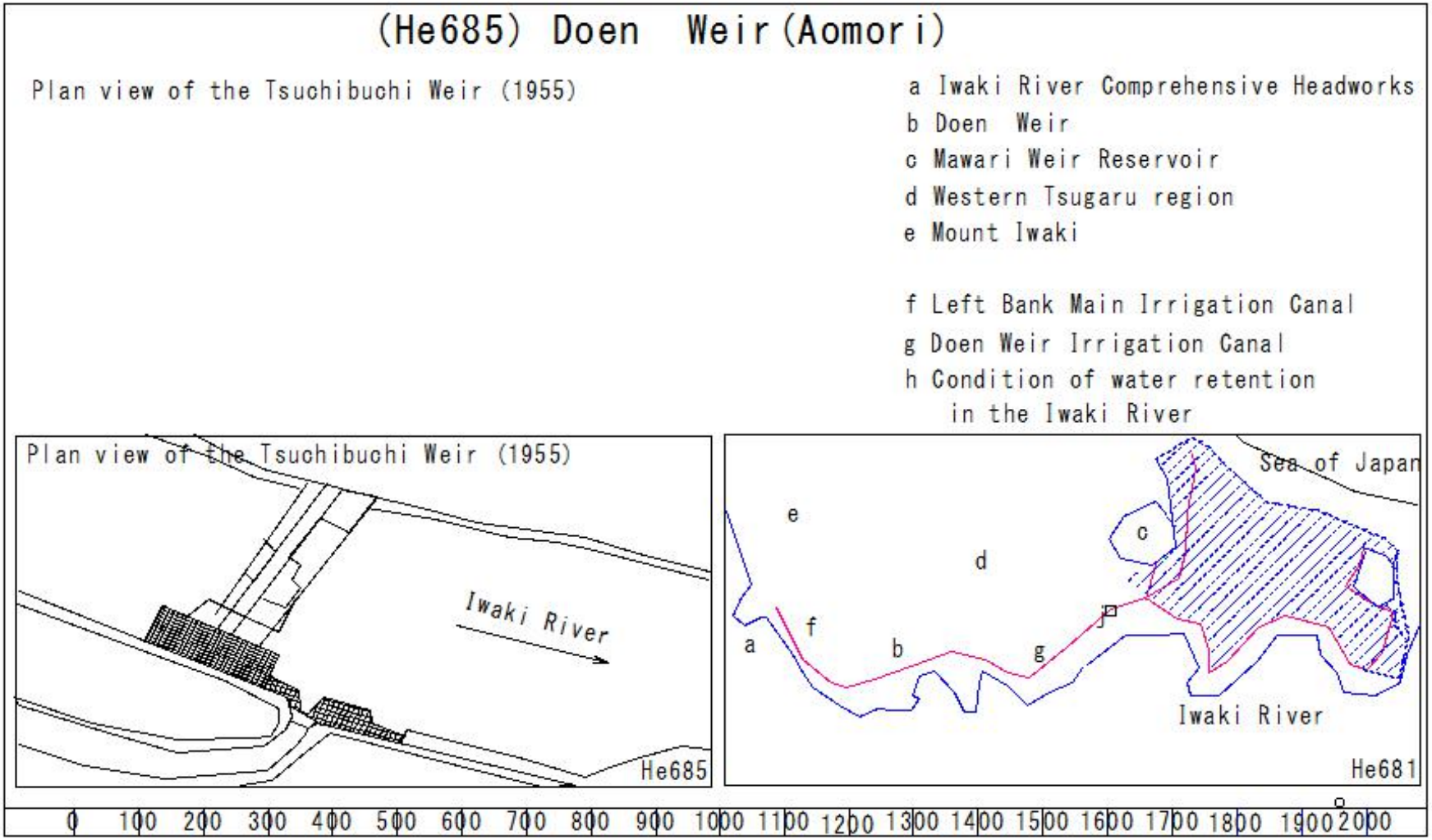
(He685) Doen Weir(Aomori)



(He686) Doen Weir(Aomori)

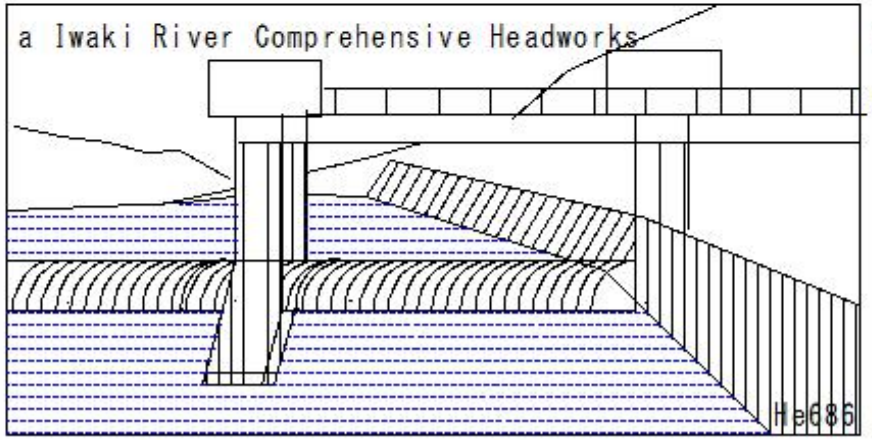
(He686) Doen Weir(Aomori)

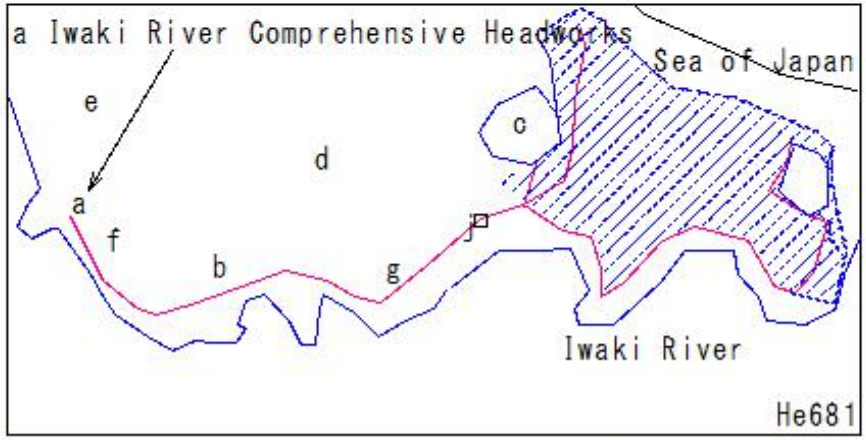
a Iwaki River Comprehensive Headworks

- Agricultural water abstracted at the Iwakigawa Integrated Headworks is transported to the Tsugaru Plain via the Iwakigawa Left Bank Main Irrigation Canal.

a Iwaki River Comprehensive Headworks
b Doen Weir
c Mawari Weir Reservoir
d Western Tsugaru region
e Mount Iwaki

f Left Bank Main Irrigation Canal
g Doen Weir Irrigation Canal
h Condition of water retention in the Iwaki River





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(He687) Doen Weir(Aomori)

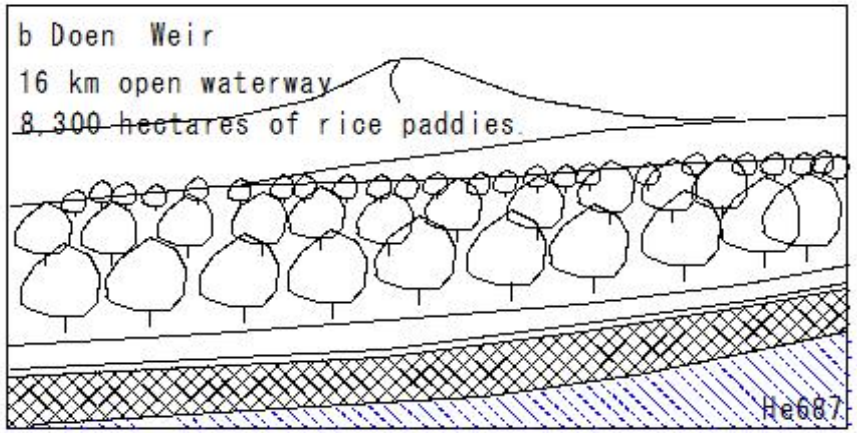
(He687) Doen Weir(Aomori)

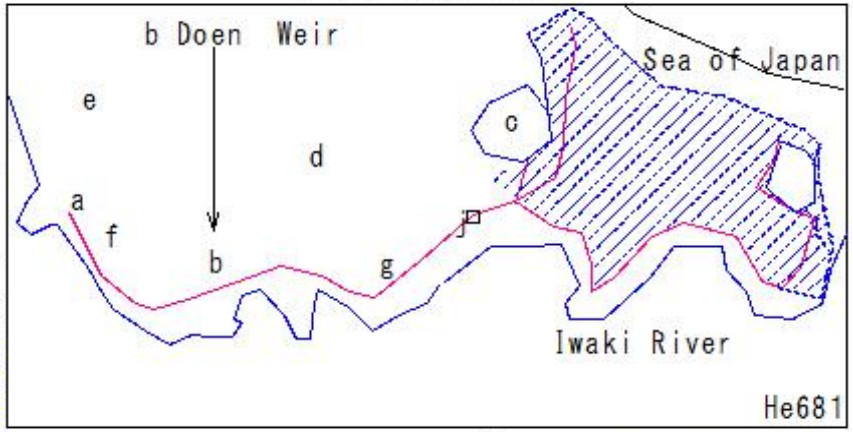
b Doen Weir

- An approximately 16 km open waterway supplying irrigation water to approximately 8,300 hectares of rice paddies.
- Resolution of poor drainage issues.
- Tsugaru Domain: "Tsuchibuchi Weir Magistrate"

a Iwaki River Comprehensive Headworks
b Doen Weir
c Mawari Weir Reservoir
d Western Tsugaru region
e Mount Iwaki

f Left Bank Main Irrigation Canal
g Doen Weir Irrigation Canal
h Condition of water retention in the Iwaki River





0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He688) Doen Weir(Aomori)

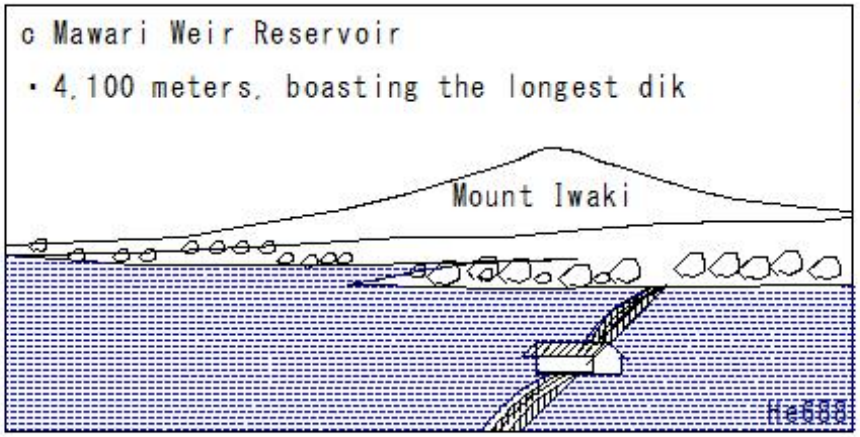
(He688) Doen Weir(Aomori)

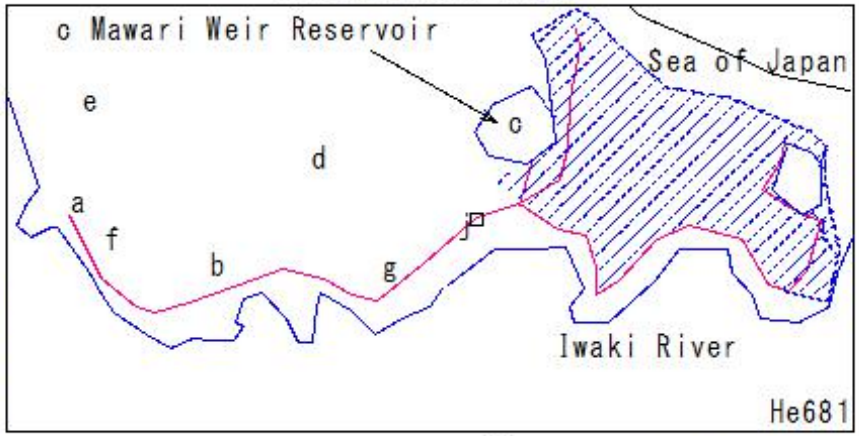
c Mawari Weir Reservoir

- It is a large-scale reservoir with a dike length of approximately 4,100 meters, boasting the longest dike in Japan.
- It offers a beautiful landscape reflecting Mount Iwaki.

a Iwaki River Comprehensive Headworks
b Doen Weir
c Mawari Weir Reservoir
d Western Tsugaru region
e Mount Iwaki

f Left Bank Main Irrigation Canal
g Doen Weir Irrigation Canal
h Condition of water retention in the Iwaki River





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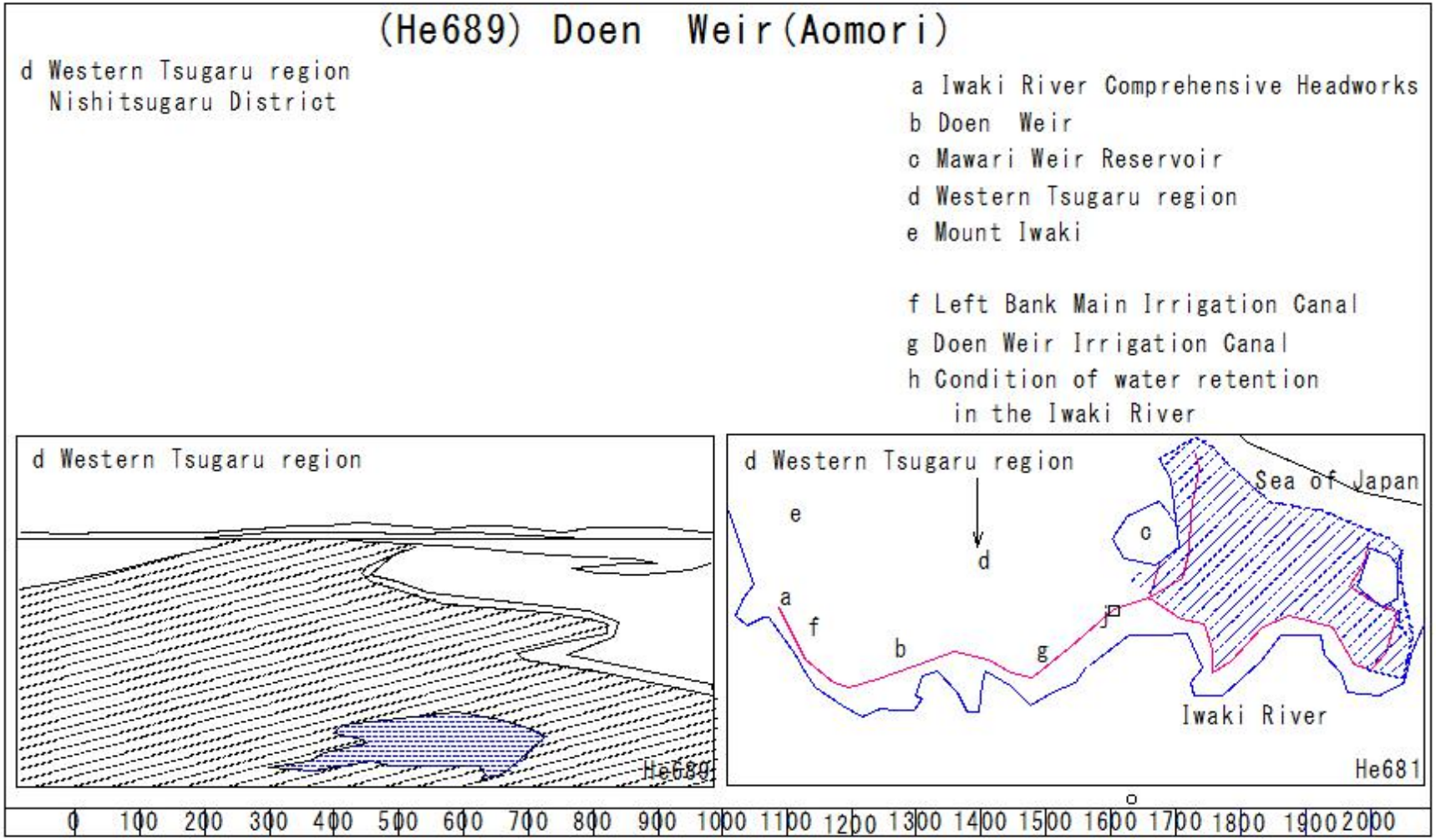
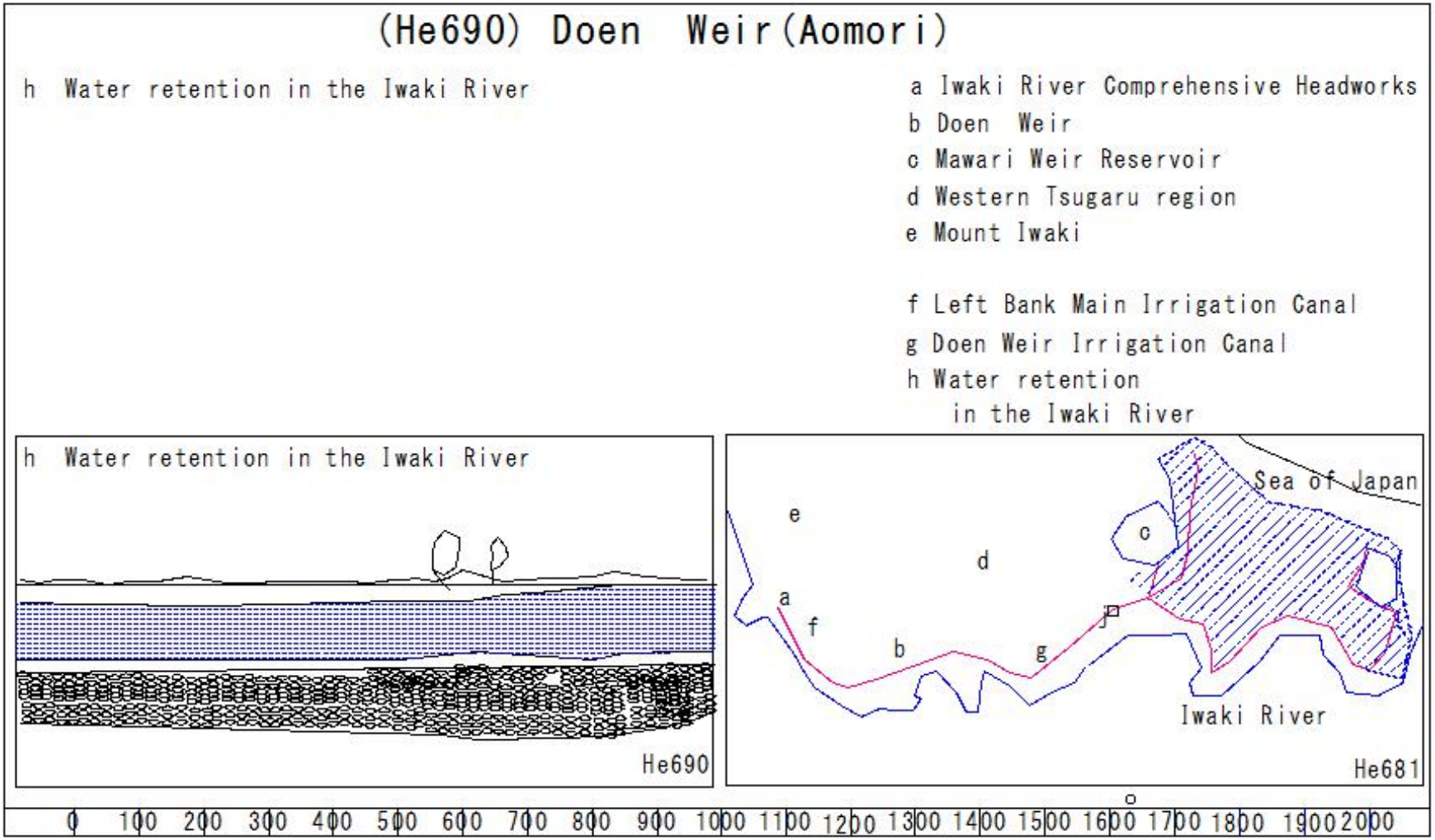
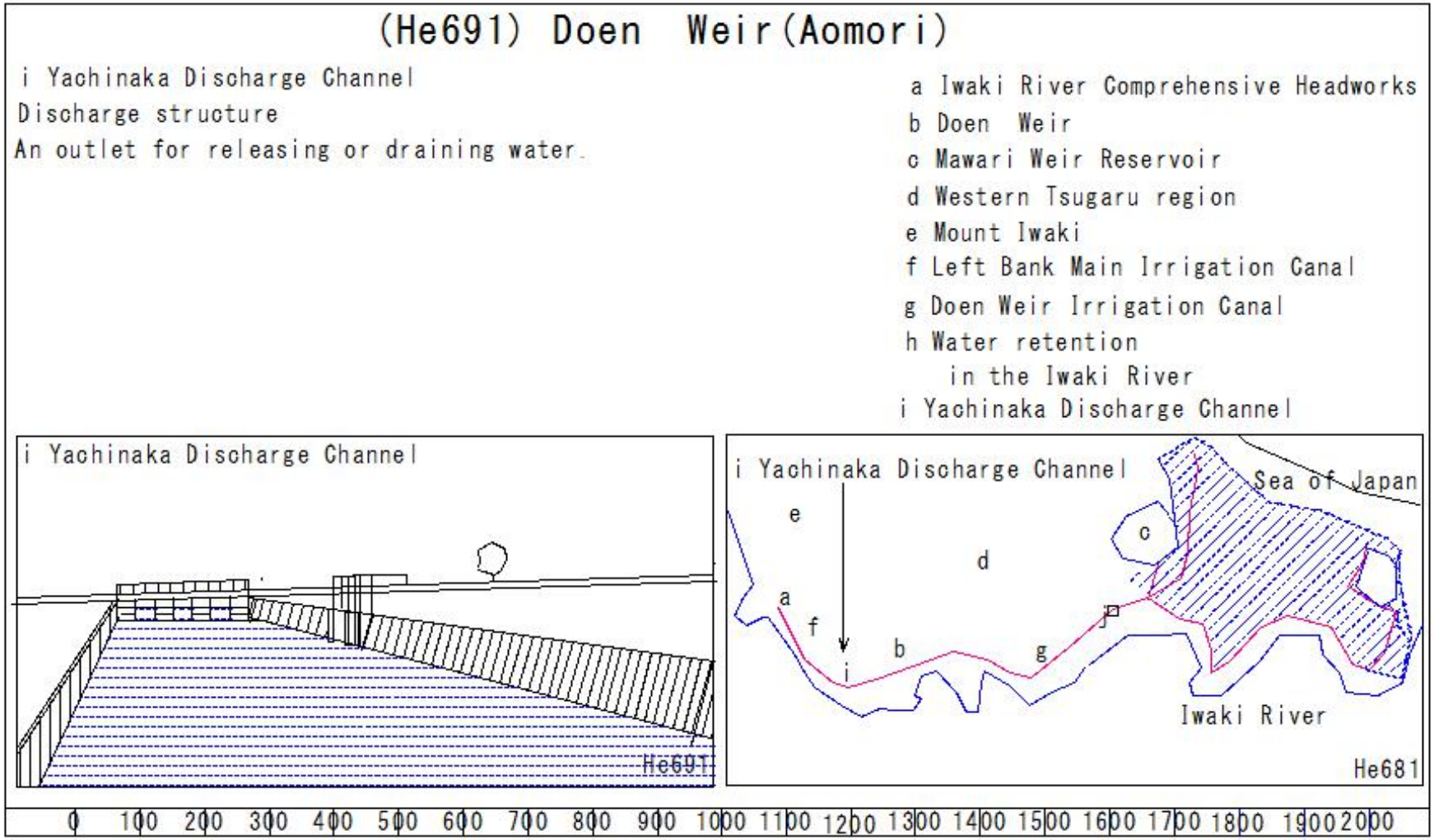
(He689) Doen Weir(Aomori)



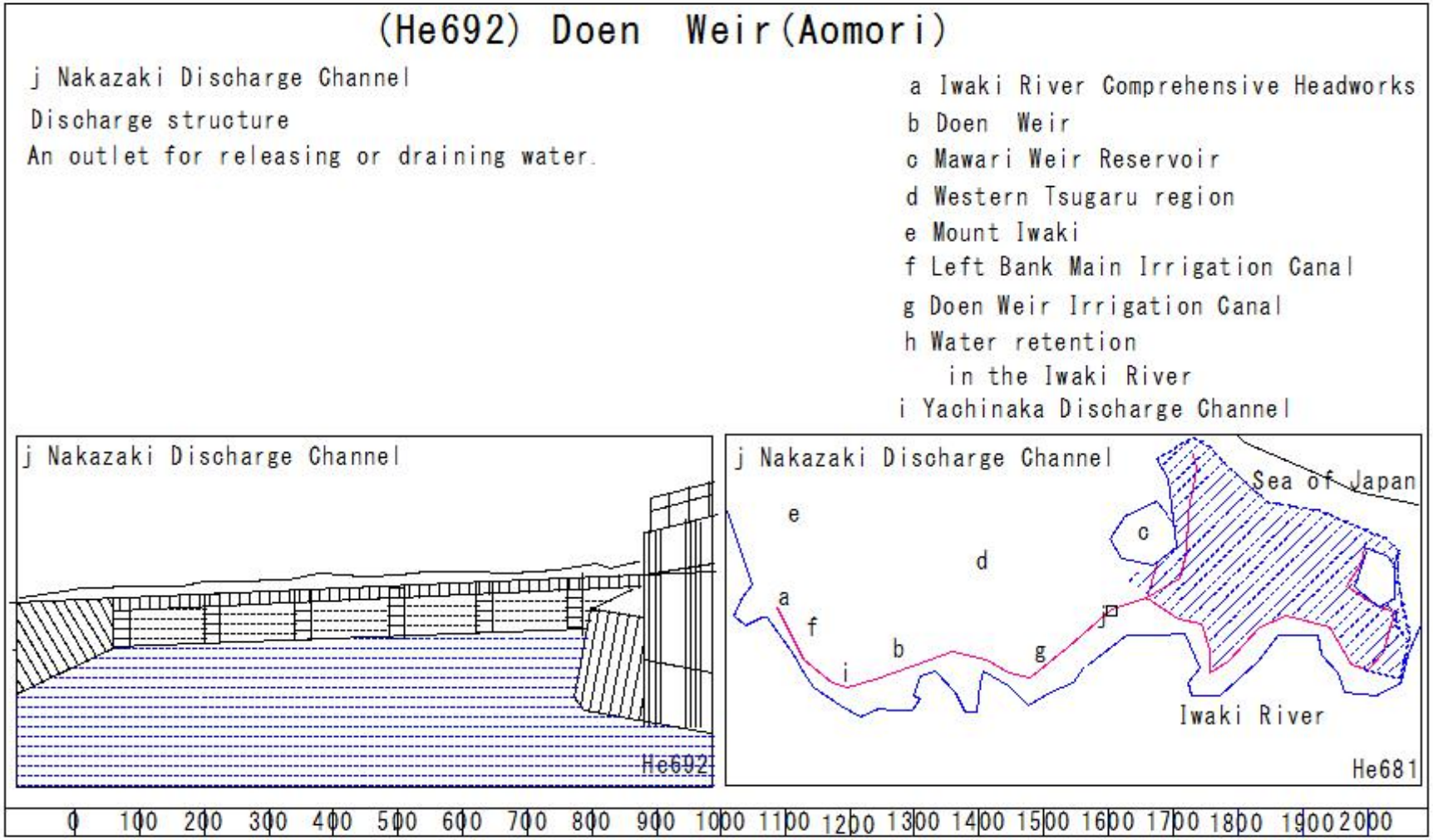
(He690) Doen Weir(Aomori)



(He691) Doen Weir(Aomori)



(He692) Doen Weir(Aomori)



(He693) Doen Weir(Aomori)

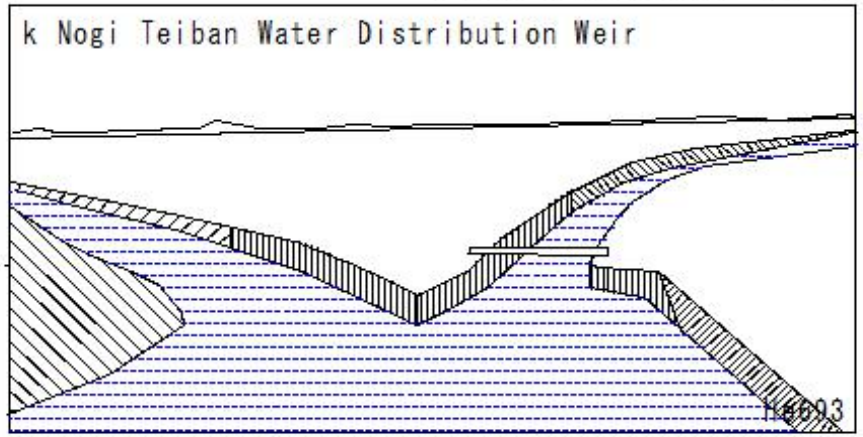
(He693) Doen Weir(Aomori)

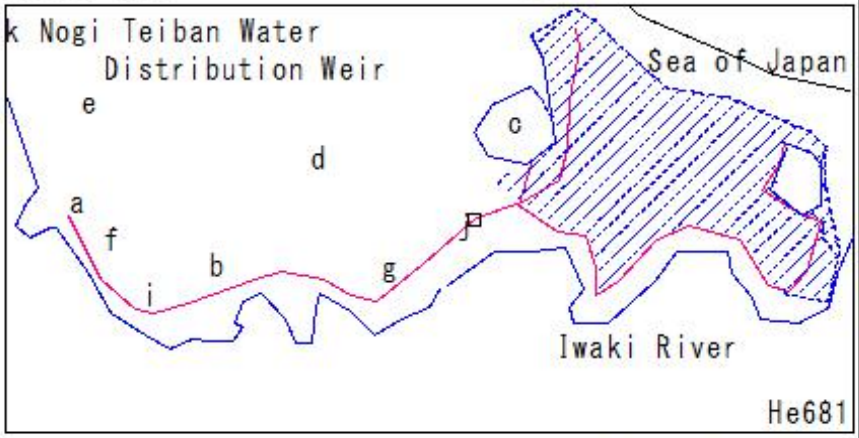
k Nogi Teiban Water Distribution Weir

A water diversion structure (bunsui-ko) :

- A water management facility that divides water flowing from a single irrigation channel into multiple channels,
- ensuring that the water is distributed fairly in a fixed ratio.

a Iwaki River Comprehensive Headworks
b Doen Weir
c Mawari Weir Reservoir
d Western Tsugaru region
e Mount Iwaki
f Left Bank Main Irrigation Canal
g Doen Weir Irrigation Canal
h Water retention in the Iwaki River
i Yachinaka Discharge Channel
j Nakazaki Discharge Channel
k Nogi Teiban Water Distribution Weir





0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He694) Doen Weir(Aomori)

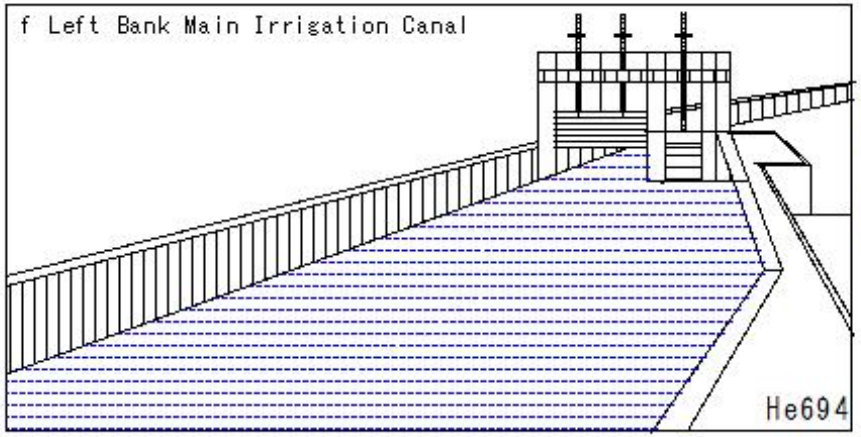
(He694) Doen Weir(Aomori)

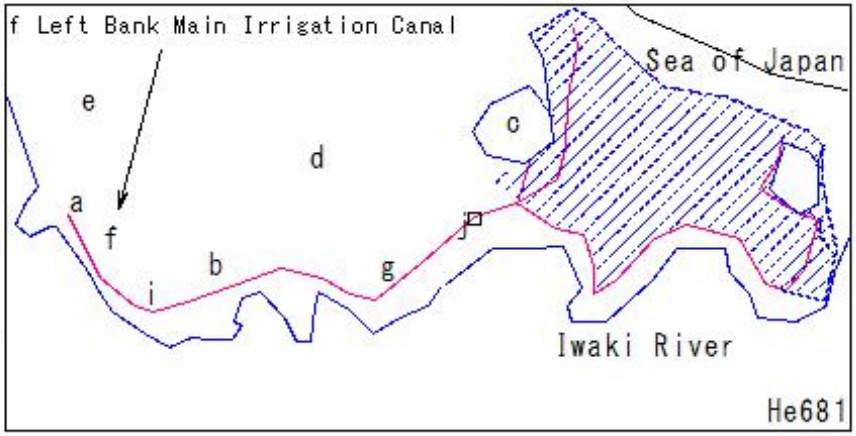
f Left Bank Main Irrigation Canal

Location: From Nyoraize area, Hirosaki City to Funamizu area, Hirosaki City

Length: 9,583m

a Iwaki River Comprehensive Headworks
b Doen Weir
c Mawari Weir Reservoir
d Western Tsugaru region
e Mount Iwaki
f Left Bank Main Irrigation Canal
g Doen Weir Irrigation Canal
h Water retention
in the Iwaki River
i Yachinaka Discharge Channel
j Nakazaki Discharge Channel
k Nogi Teiban Water Distribution Weir





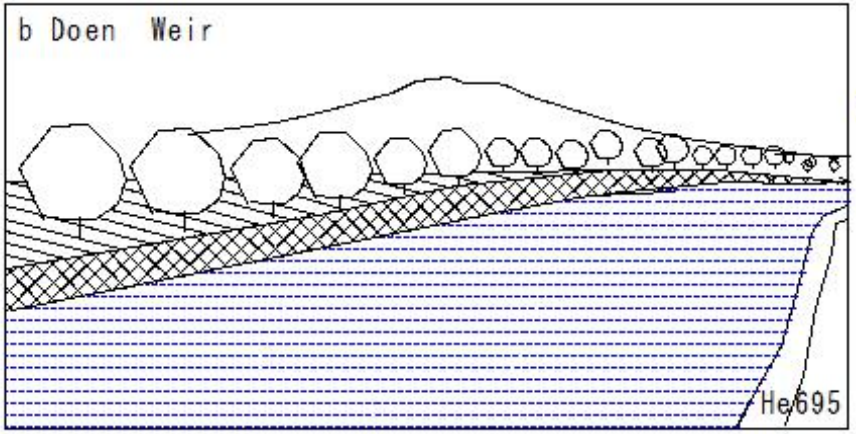
0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

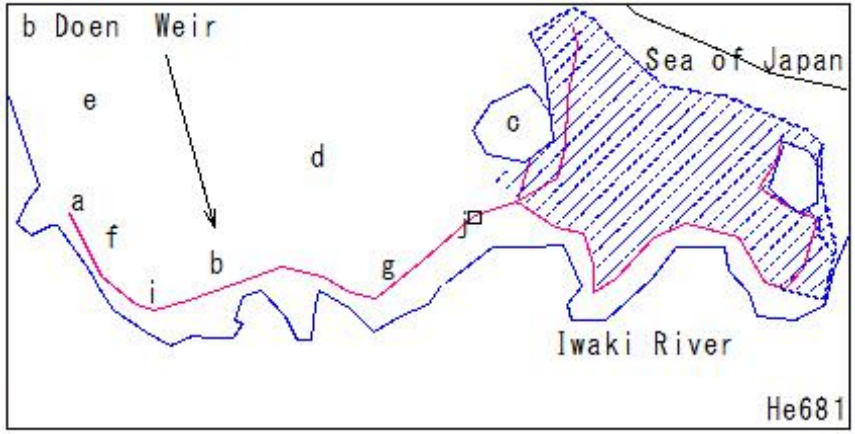
(He695) Doen Weir(Aomori)

(He695) Doen Weir(Aomori)

b Doen Weir
Location: From Funamizu area, Hirosaki City to Nogi area, Tsuruta Town
Project Name: West Tsugaru Area First Phase Agricultural Water Supply Project

a Iwaki River Comprehensive Headworks
b Doen Weir
c Mawari Weir Reservoir
d Western Tsugaru region
e Mount Iwaki
f Left Bank Main Irrigation Canal
g Doen Weir Irrigation Canal
h Water retention in the Iwaki River
i Yachinaka Discharge Channel
j Nakazaki Discharge Channel
k Nogi Teiban Water Distribution Weir





0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He696) Doen Weir(Aomori)

(He696) Doen Weir(Aomori)

r Higashimata Water Diversion Main Canal

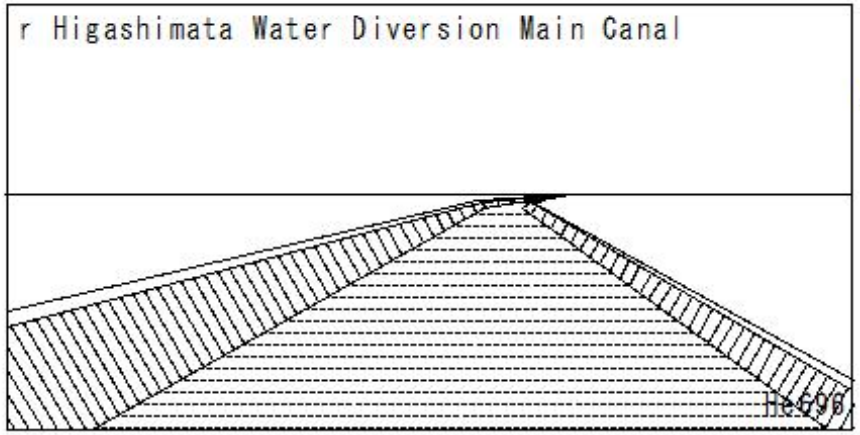
Location: Nogichi area, Tsuruta Town to Kuwanokida area, Kashiwa, Tsugaru City

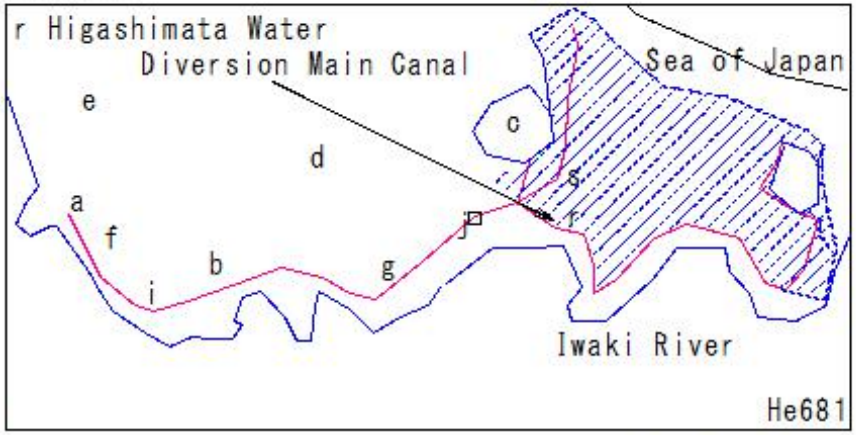
Project Name: National Iwaki River Left Bank Agricultural Water Utilization Project

Length: 5,187 meters

a Iwaki River Comprehensive Headworks
b Doen Weir
c Mawari Weir Reservoir
d Western Tsugaru region
e Mount Iwaki
f Left Bank Main Irrigation Canal
g Doen Weir Irrigation Canal
h Water retention in the Iwaki River
i Yachinaka Discharge Channel

r Higashimata Water Diversion Main Canal
s Nishimata Main Irrigation Canal
j Nakazaki Discharge Channel
k Nogi Teiban Water Distribution Weir





0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He697) Doen Weir(Aomori)

(He697) Doen Weir(Aomori)

s Nishimata Main Irrigation Canal

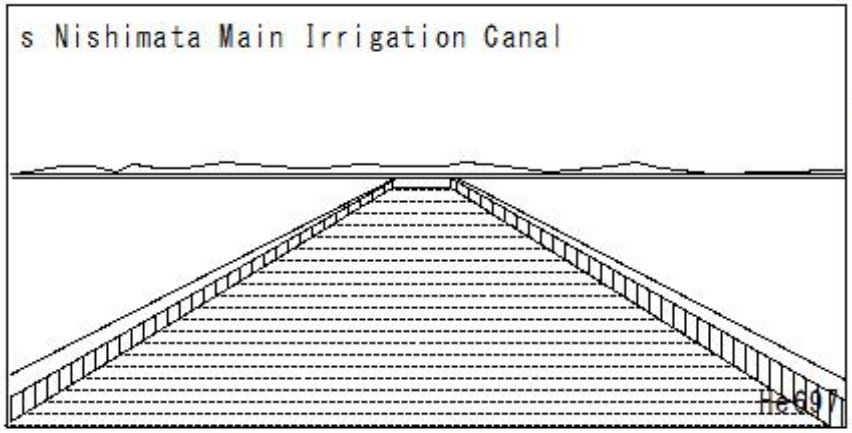
Location: Nogami, Tsuruta-cho to Mawaseki, Tsuruta-cho

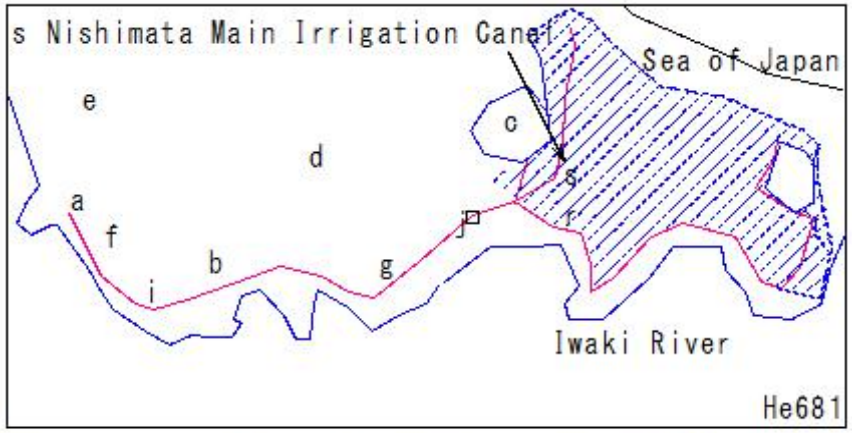
Project Name: National Iwaki River Left Bank Agricultural Water Utilization Project

Length: 2,646 meters

a Iwaki River Comprehensive Headworks
b Doen Weir
c Mawari Weir Reservoir
d Western Tsugaru region
e Mount Iwaki
f Left Bank Main Irrigation Canal
g Doen Weir Irrigation Canal
h Water retention in the Iwaki River
i Yachinaka Discharge Channel

r Higashimata Water Diversion Main Canal
s Nishimata Main Irrigation Canal
j Nakazaki Discharge Channel
k Nogi Teiban Water Distribution Weir





0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He698) Doen Weir(Aomori)

w National Shussei River Drainage Canal

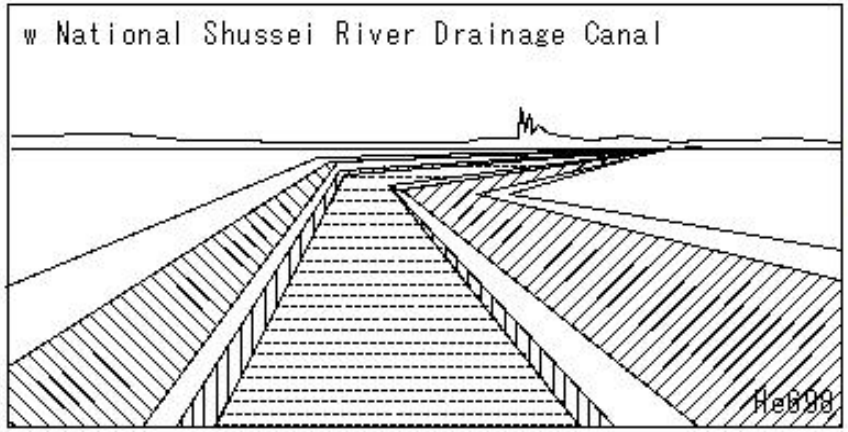
Location: Kizukuri Ashinuma, Tsugaru City to Chitose, Inagaki Town

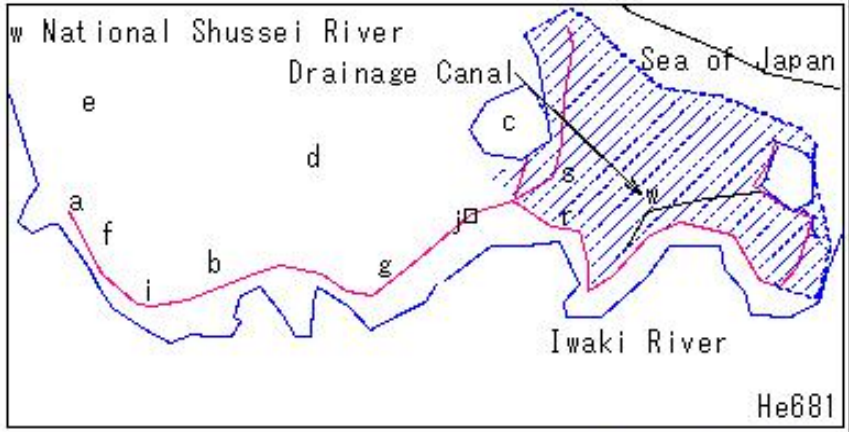
Project Name: National Iwaki River Left Bank Agricultural Water Supply Project

Length: 8,247 meters

w National Shussei River Drainage Canal
r Higashimata Water Diversion Main Canal
s Nishimata Main Irrigation Canal
j Nakazaki Discharge Channel
k Nogi Teiban Water Distribution Weir

a Iwaki River Comprehensive Headworks
b Doen Weir
c Mawari Weir Reservoir
d Western Tsugaru region
e Mount Iwaki
f Left Bank Main Irrigation Canal
g Doen Weir Irrigation Canal
h Water retention in the Iwaki River
i Yachinaka Discharge Channel





0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He699) Doen Weir(Aomori)

x National Furuta River Drainage Canal

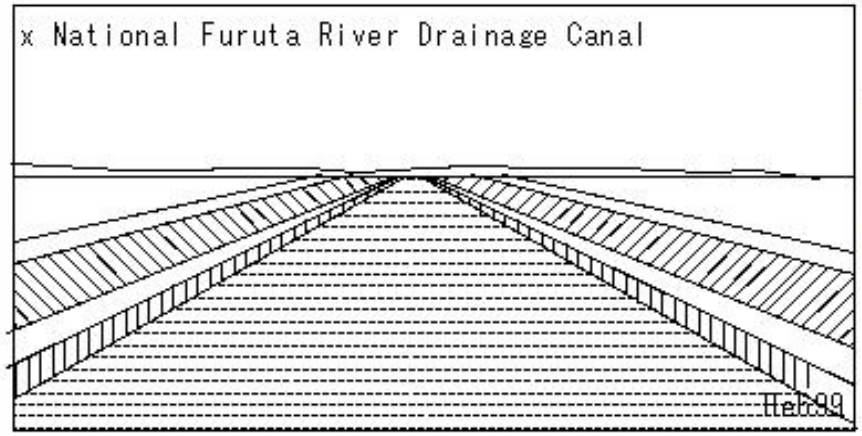
Location: Kizukuri Kashiwadamizubayashi to Kizukuri Oyu-machi, Tsugaru City

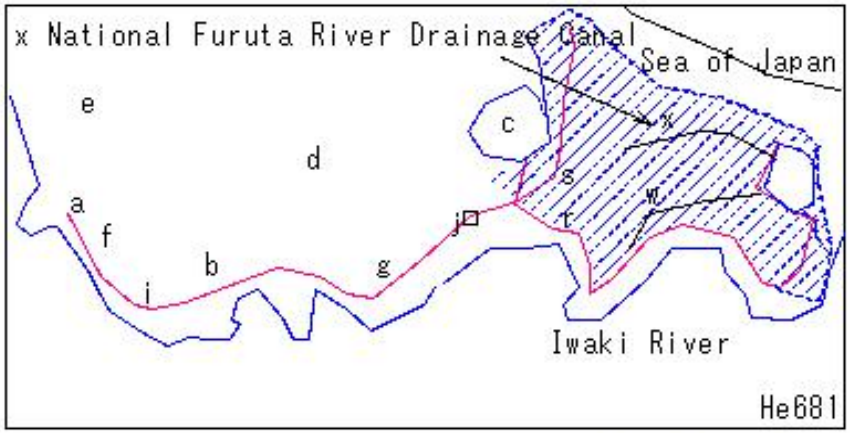
Project Name: National Iwaki River Left Bank Agricultural Water Utilization Project

Length: 8,264m

a Iwaki River Comprehensive Headworks
b Doen Weir
c Mawari Weir Reservoir
d Western Tsugaru region
e Mount Iwaki
f Left Bank Main Irrigation Canal
g Doen Weir Irrigation Canal
h Water retention in the Iwaki River
i Yachinaka Discharge Channel

w National Shussei River Drainage Canal
r Higashimata Water Diversion Main Canal
s Nishimata Main Irrigation Canal
j Nakazaki Discharge Channel
k Nogi Teiban Water Distribution Weir





0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He700) Doen Weir(Aomori)

(He700) Doen Weir(Aomori)

ac National Hasugawa Pumping Station

Location: Hiratsuka area, Kizukuri, Tsugaru City

Project Name: National Iwakigawa Left Bank Agricultural Water Utilization Project

Unit 1 (Horizontal-axis volute mixed-flow pump): 0.305 m³ /s

Unit 2 (Horizontal-axis volute mixed-flow pump): 0.305 m³ /s

w National Shussei River Drainage Canal

r Higashimata Water Diversion Main Canal

s Nishimata Main Irrigation Canal

j Nakazaki Discharge Channel

k Nogi Teiban Water Distribution Weir

a Iwaki River Comprehensive Headworks

b Doen Weir

c Mawari Weir Reservoir

d Western Tsugaru region

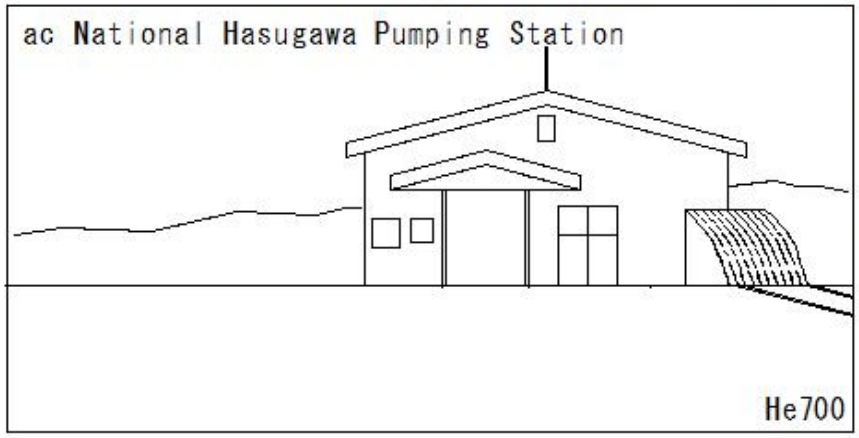
e Mount Iwaki

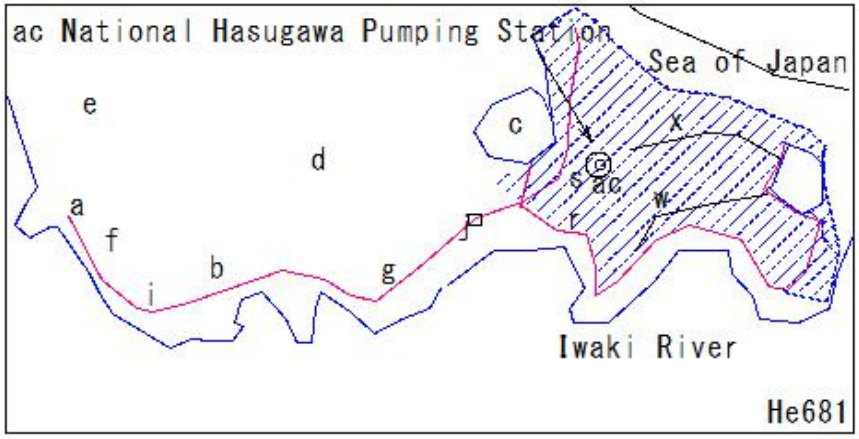
f Left Bank Main Irrigation Canal

g Doen Weir Irrigation Canal

h Water retention in the Iwaki River

i Yachinaka Discharge Channel





0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He701) Doen Weir(Aomori)

(He701) Doen Weir(Aomori)

ac National Hasugawa Pumping Station

Location: Hiratsuka area, Kizukuri, Tsugaru City

Project Name: National Iwakigawa Left Bank Agricultural Water Utilization Project

Unit 1 (Horizontal-axis volute mixed-flow pump): 0.305 m^3 /s

Unit 2 (Horizontal-axis volute mixed-flow pump): 0.305 m^3 /s

w National Shussei River Drainage Canal

r Higashimata Water Diversion Main Canal

s Nishimata Main Irrigation Canal

j Nakazaki Discharge Channel

k Nogi Teiban Water Distribution Weir

a Iwaki River Comprehensive Headworks

b Doen Weir

c Mawari Weir Reservoir

d Western Tsugaru region

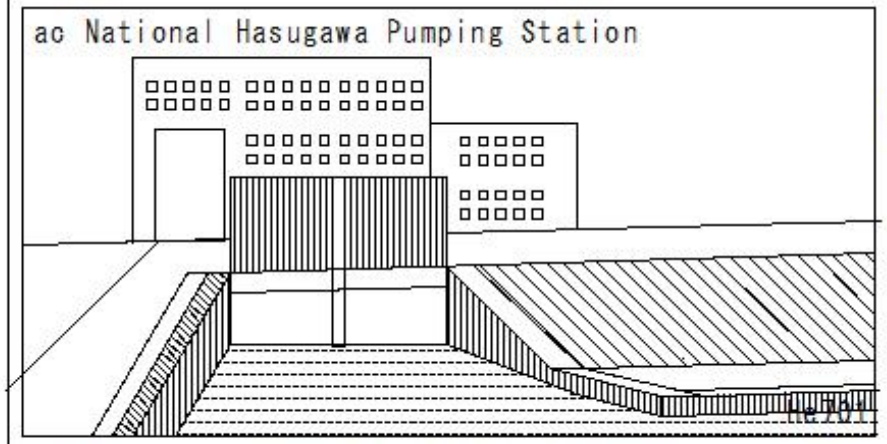
e Mount Iwaki

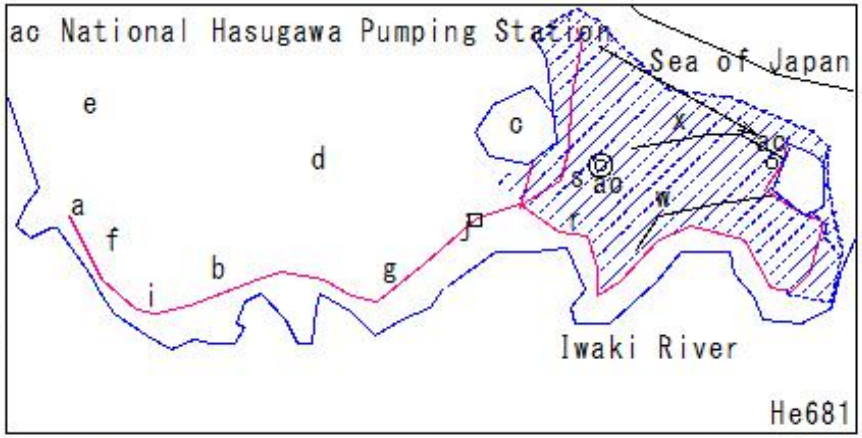
f Left Bank Main Irrigation Canal

g Doen Weir Irrigation Canal

h Water retention in the Iwaki River

i Yachinaka Discharge Channel





0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He702) Doen Weir(Aomori)

(He702) Doen Weir(Aomori)

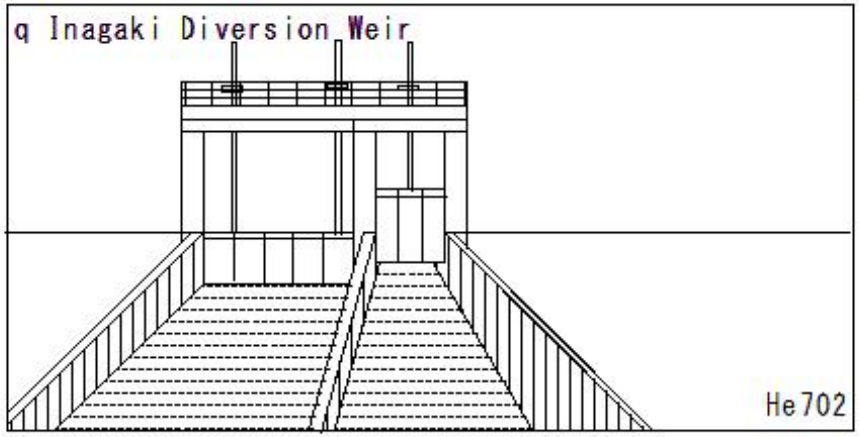
q Inagaki Diversion Weir

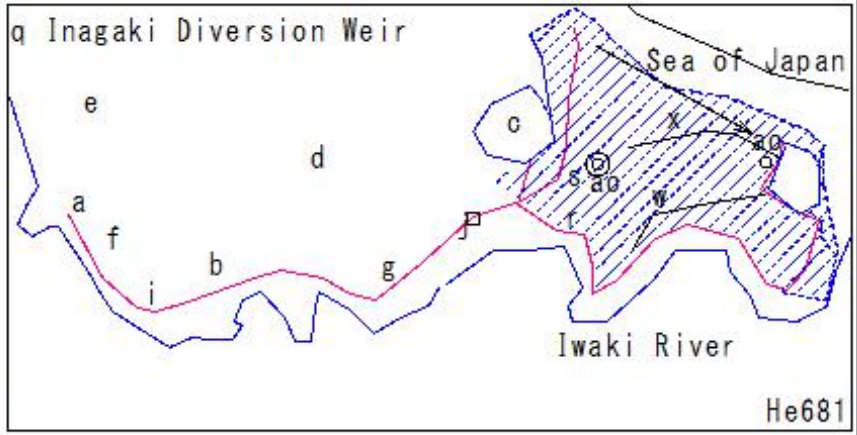
Location: Izuno-sato area, Kizukuri, Tsugaru City

Project Name: National Iwaki River Left Bank Agricultural Water Utilization Project

a Iwaki River Comprehensive Headworks
b Doen Weir c Mawari Weir Reservoir
d Western Tsugaru region
e Mount Iwaki
f Left Bank Main Irrigation Canal
g Doen Weir Irrigation Canal
h Water retention in the Iwaki River
i Yachinaka Discharge Channel

q Inagaki Diversion Weir
w National Shussei River Drainage Canal
r Higashimata Water Diversion Main Canal
s Nishimata Main Irrigation Canal
j Nakazaki Discharge Channel
k Nogi Teiban Water Distribution Weir





0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000

(He703) Doen Weir(Aomori)

(He703) Doen Weir(Aomori)

l Water Management Center

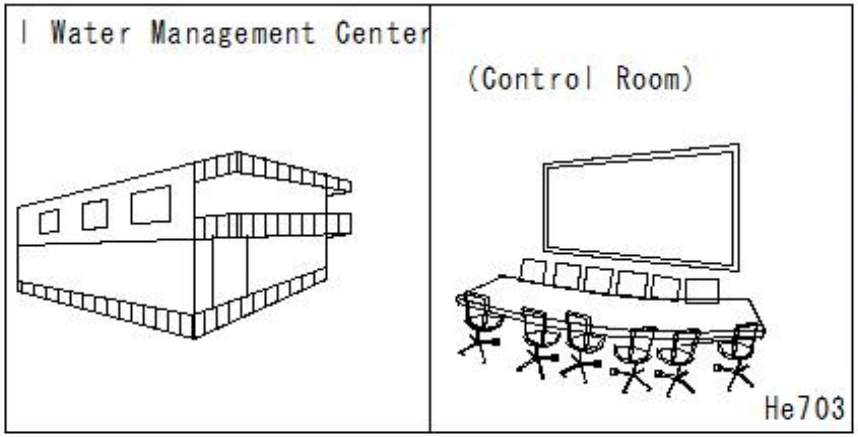
Water Management Center (Control Room)

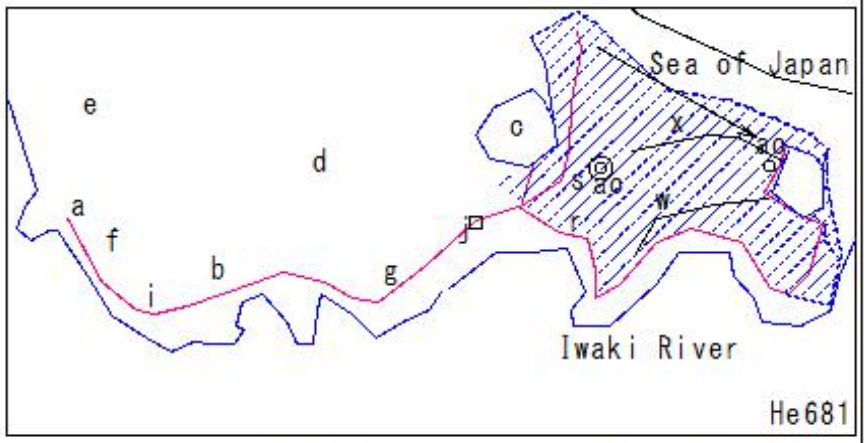
Location: Kizukuri Wakamiya, Tsugaru City

Project Name: National Iwaki River Left Bank Agricultural Water Utilization Project

q Inagaki Diversion Weir
w National Shussei River Drainage Canal
r Higashimata Water Diversion Main Canal
s Nishimata Main Irrigation Canal
j Nakazaki Discharge Channel
k Nogi Teiban Water Distribution Weir

a Iwaki River Comprehensive Headworks
b Doen Weir
c Mawari Weir Reservoir
d Western Tsugaru region
e Mount Iwaki
f Left Bank Main Irrigation Canal
g Doen Weir Irrigation Canal
h Water retention in the Iwaki River
i Yachinaka Discharge Channel





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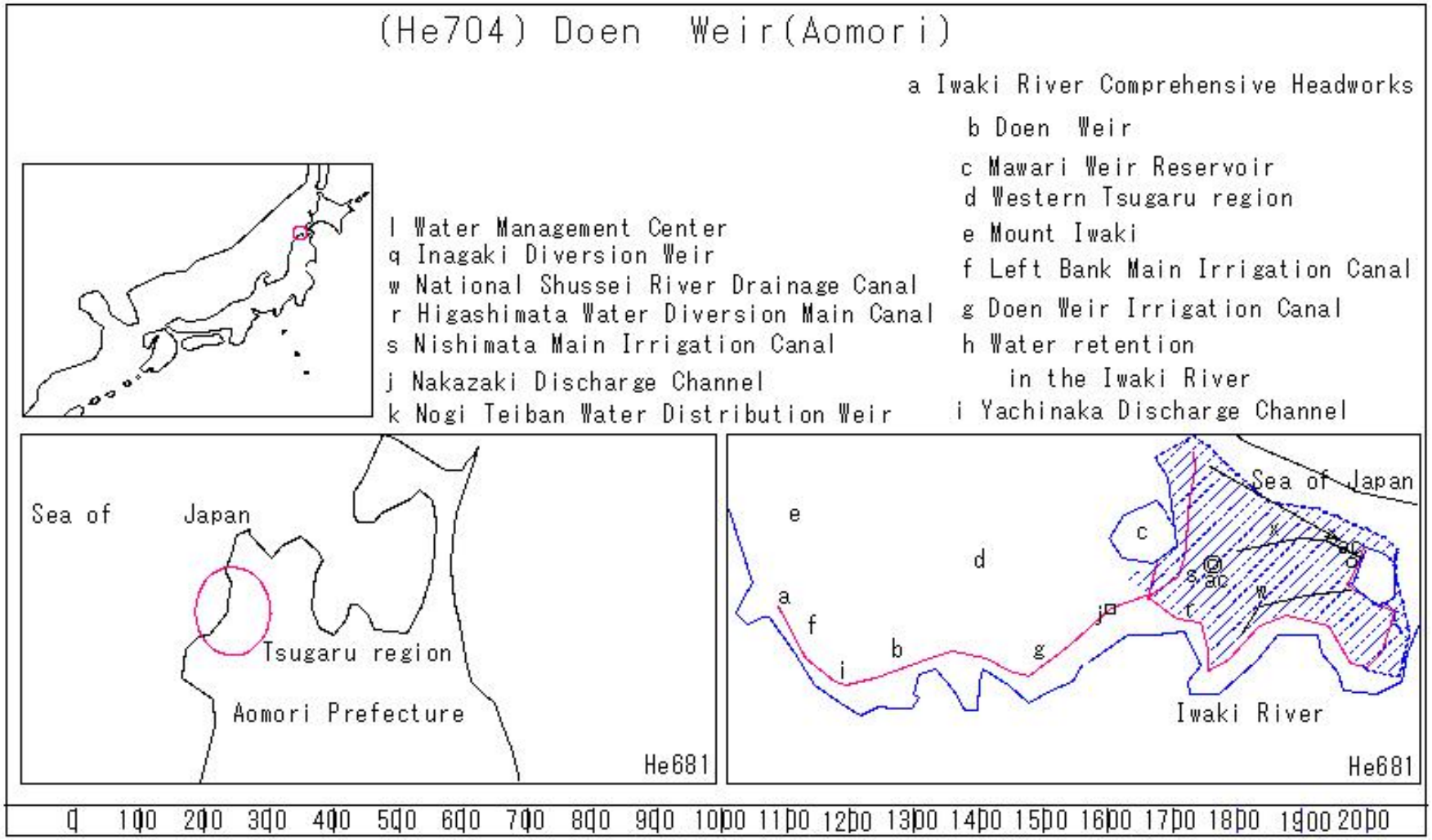
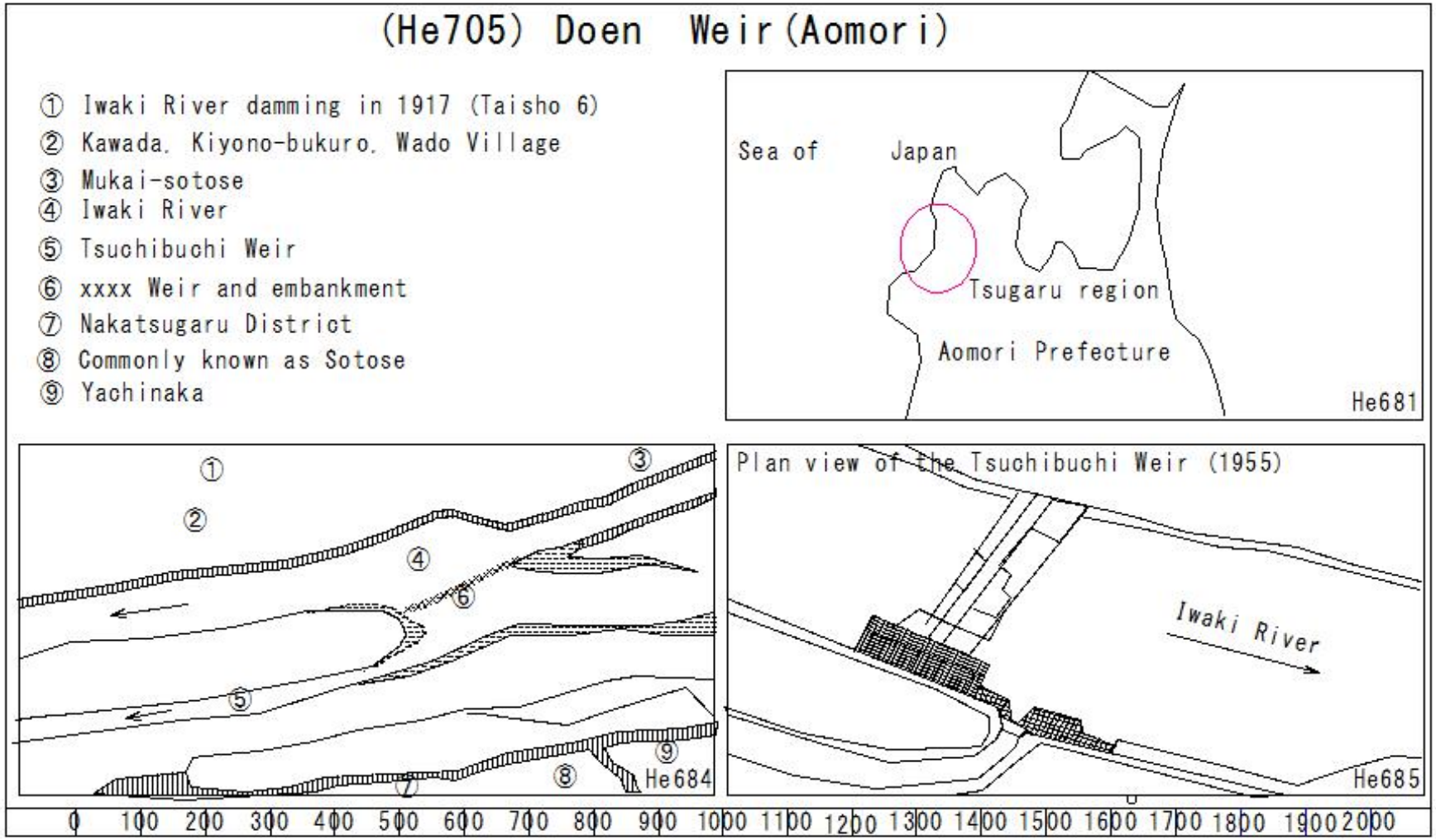
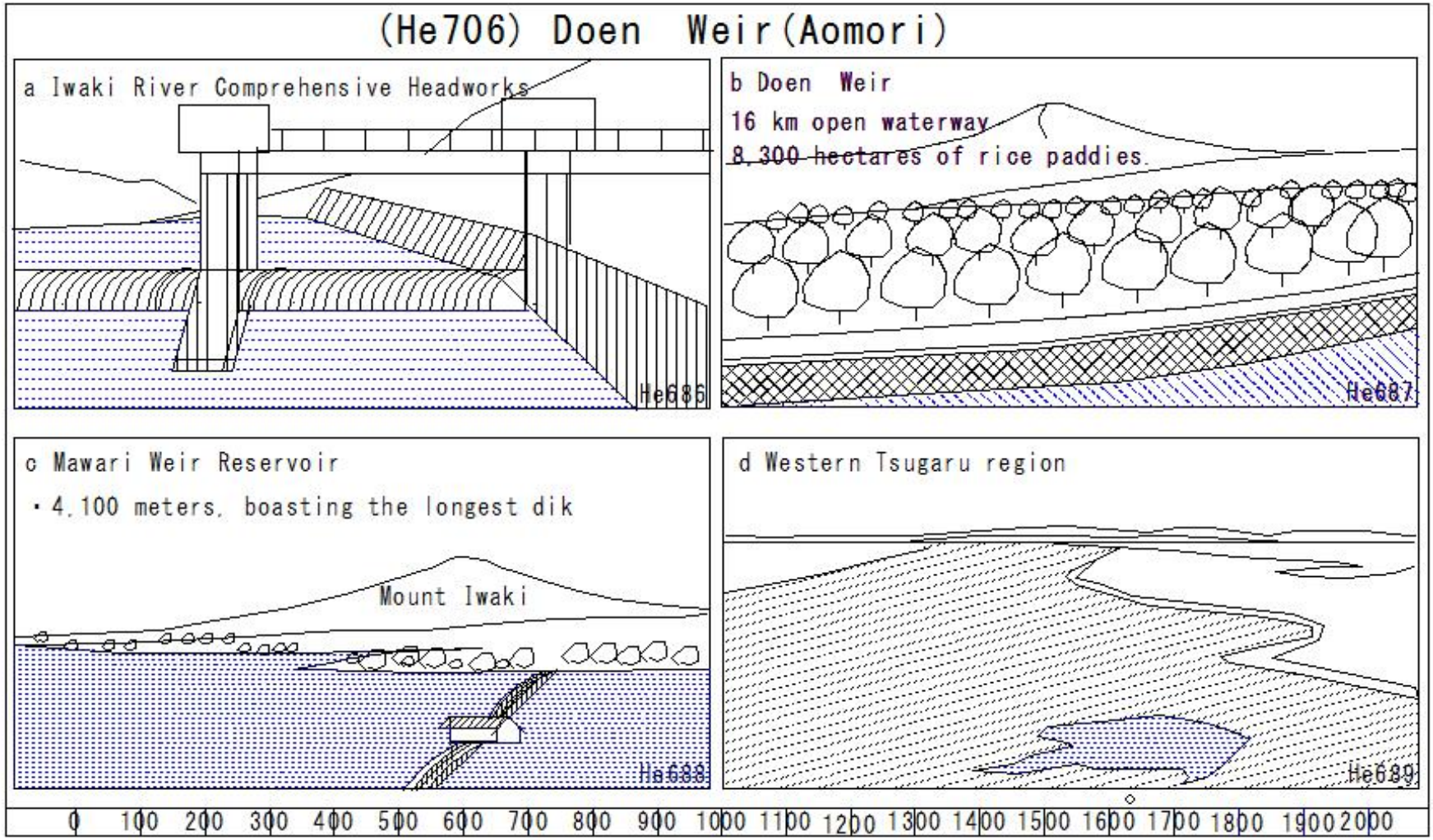
(He704) Doen Weir(Aomori)



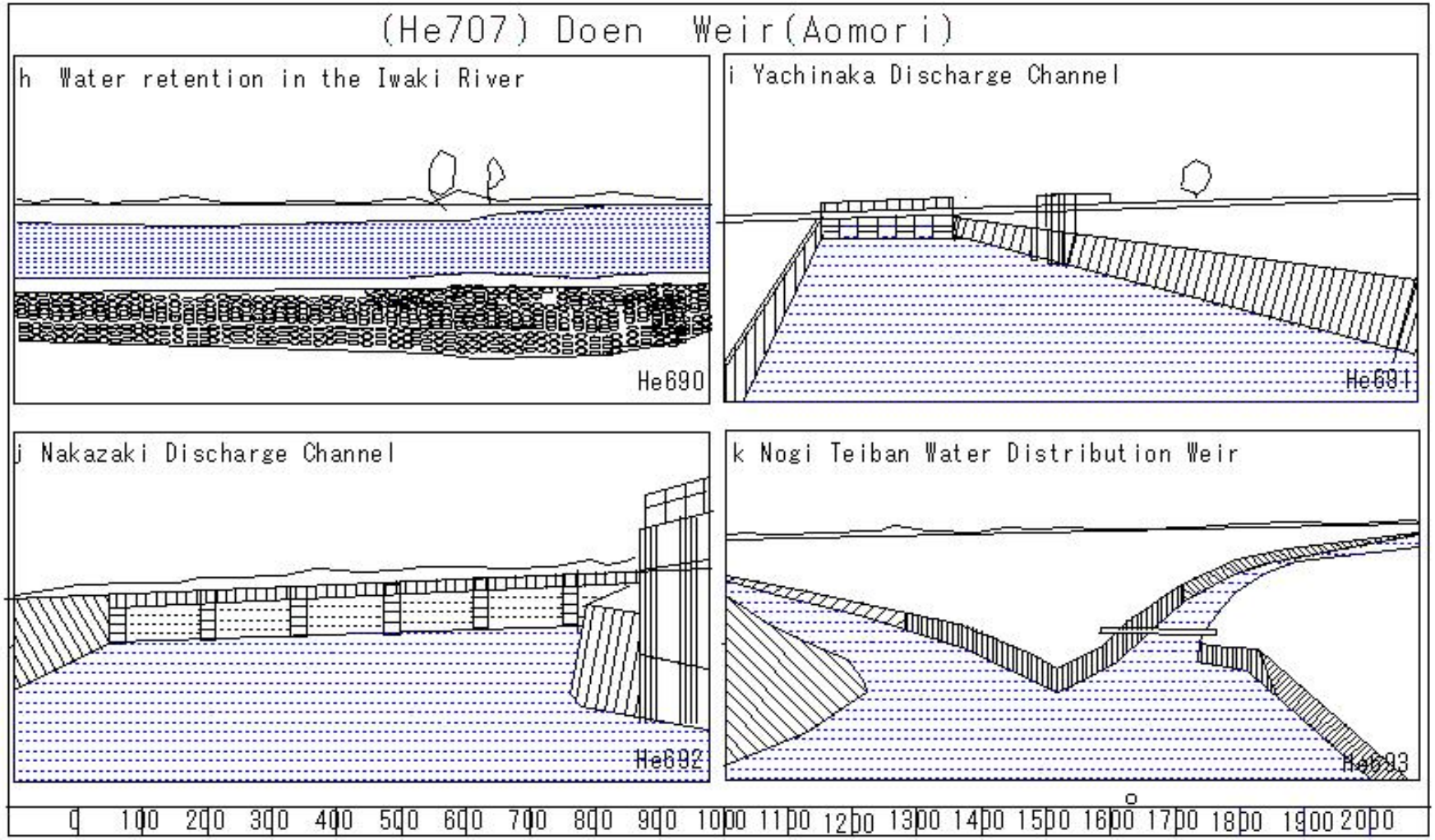
(He705) Doen Weir(Aomori)



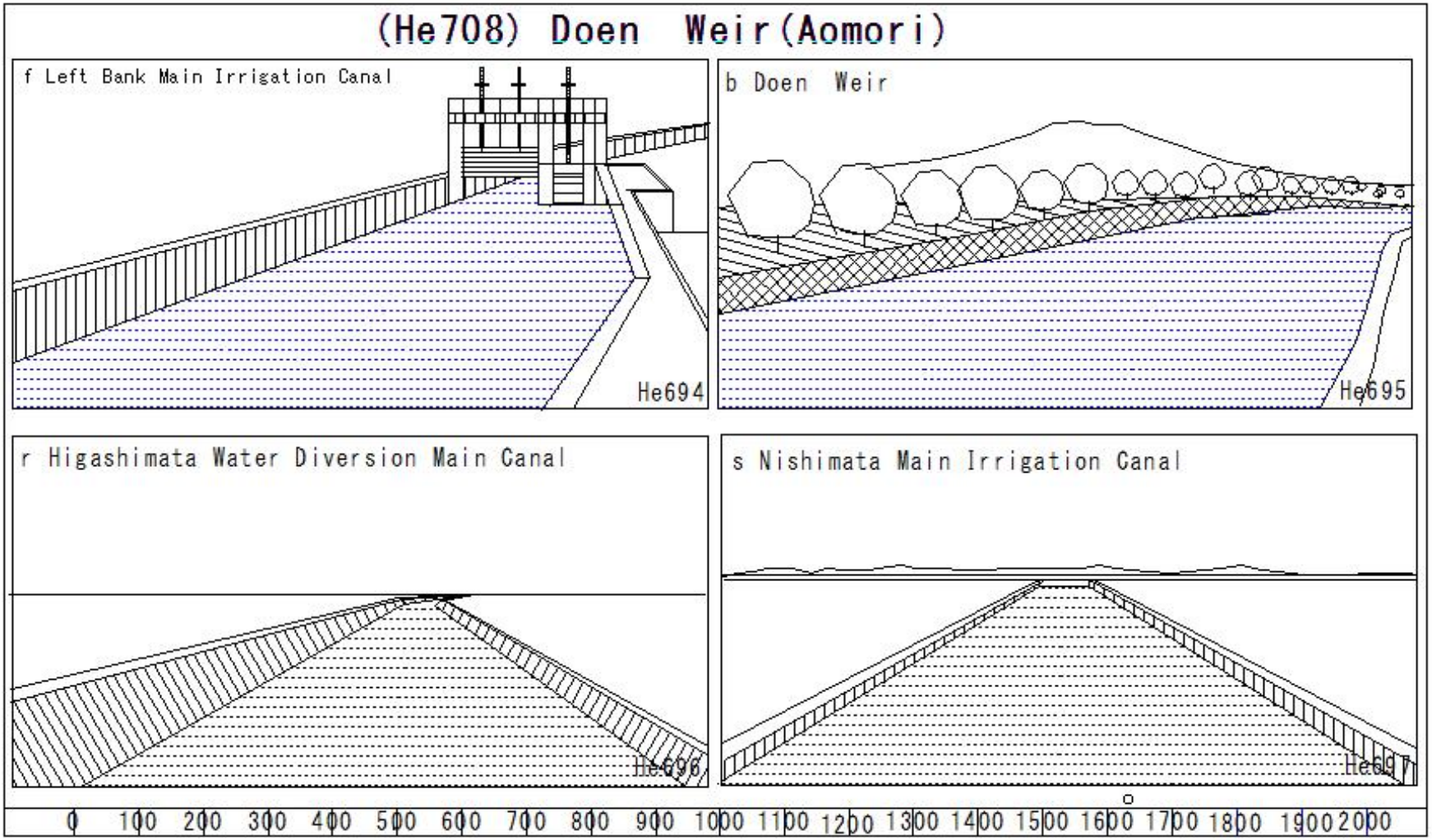
(He706) Doen Weir(Aomori)



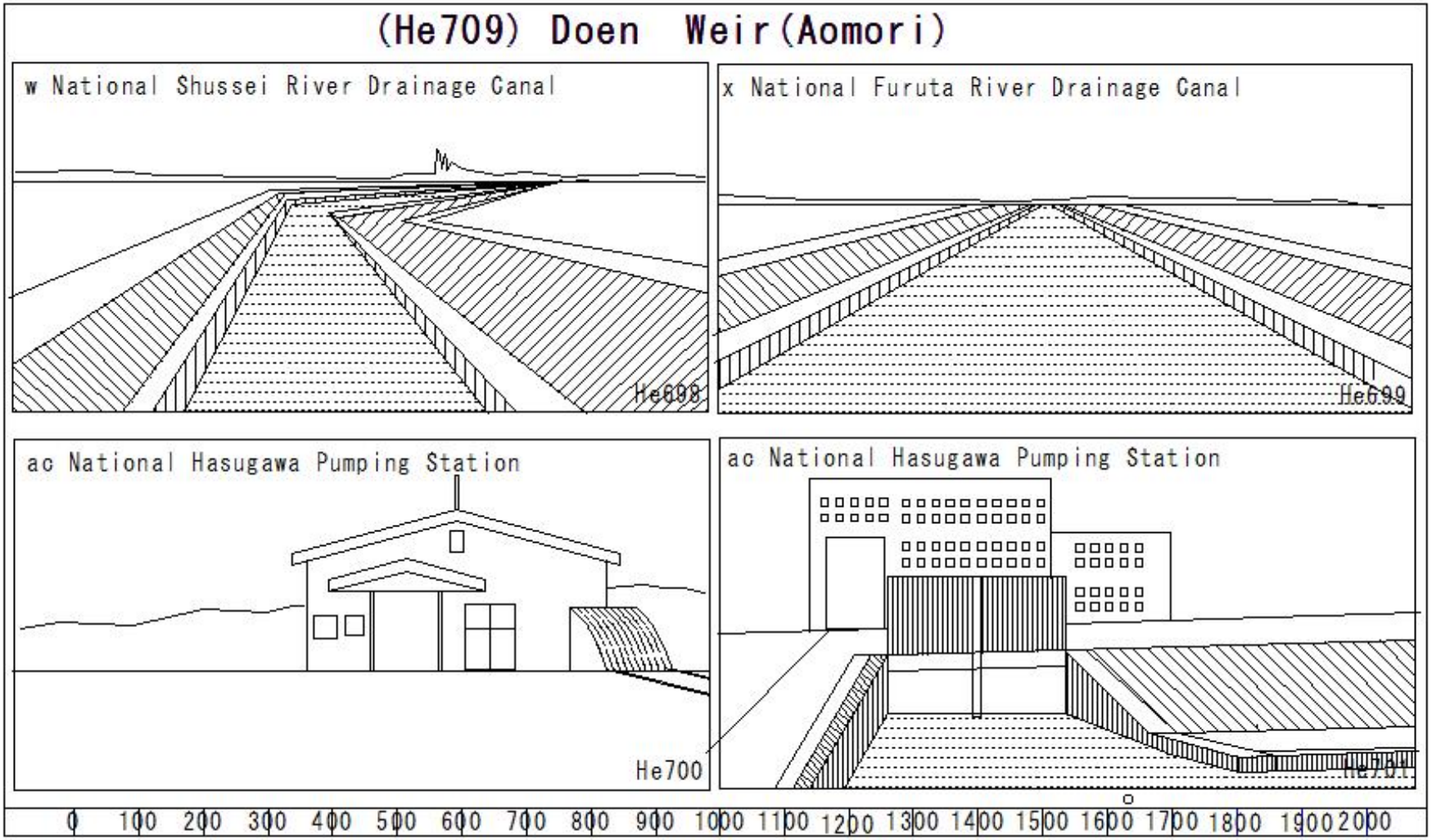
(He707) Doen Weir(Aomori)



(He708) Doen Weir(Aomori)



(He709) Doen Weir(Aomori)



(He710) Doen Weir(Aomori)