

## 2 | Sewer system

### Sewer system project during the time of the former five cities

The history of the sewer system in Kitakyushu City dates back to 1918 when the approval of the 1st stage sewer system project was obtained by the former Wakamatsu City. The preparation of the sewer system based on sewerage treatment as the modern sewer systems started in 1951 when the 2nd stage sewer system project in front of Kurosaki Station in the former Yahata City was approved. Thereafter, in the 3rd stage sewer system project in 1957, Kogasaki Sewage Treatment Plant (current Kogasaki Water Purification Plant) was approved as a simple sewage treatment facility.

#### Sewer System project in the former Moji City

The former Moji City was municipalized in 1899, earliest among the former five cities, and had thrived as a port of call for large vessels of foreign routes before World War II, however, the public sewer system was not yet constructed at the time of the five-city consolidation although the application for the approval had already been filed. The approval (drainage area: 147.5ha) was obtained in February 1963, which was just before the five-city consolidation, or the official inauguration of Kitakyushu City. Therefore, the public sewer system of the former Moji City was not realized, and the project was handed over to the new municipality.

#### Sewer System project in the former Wakamatsu City

Wakamatsu was municipalized in 1914. Four years later, in July 1918, the approval for the 1st stage sewer system project was obtained and the construction was started immediately. This was the 1st sewer system construction in Kyushu and the 11th in Japan as a government-approved construction based on the Sewerage Service Act proclaimed in 1900. However, it becomes the 2nd in Kyushu and the 14th in Japan if including those constructed in the Yokohama foreign settlement, Nagasaki and Shimonoseki before the proclamation of the Sewerage Service Act. The rain water and sewage combined system was adopted in the sewer system, and untreated water from the sewer system was directly discharged into the sea.

Thereafter, the work for the sewer system in Wakamatsu City had continued up to the 3rd stage in the middle of the 1930s. The total pipe length constructed during the 3 stages was 32,530m with a drainage area of 197.5ha, which covered approximately 30% of the urban area.

Then, the sewer system extension was constructed to the east of Meijimachi and to the south of Hamanbanmachi (current 1-chome and 2-chome of Honmachi). According to the history book of Wakamatsu City issued in 1937, the total pipe length was 9,345m with a drainage area of 24.8ha, while discharging sewage mainly to the south coast. However, the period and the outline of the construction are not described in the history book.



Trickling filter of Kogasaki Sewage Treatment Plant

6 sprinklers revolve and sprinkle sewage onto the filter bed with a diameter of 30m. The filter bed is made of cobblestone, crushed stones and sand piled up to 1.8m, in which microbes living therein purify sewage. Treated water was discharged into the Wariko River after the sterilization by chlorine. This photograph is of historic importance because Kogasaki was the only one using the trickling filter method after Tokyo City had adopted the trickling filter method in the first sewage treatment plant in Japan.

#### Sewer System project in the former Kokura City

There were some drain sewers in Kokura City, but they were not enough to be called a sewer system. There came a tide of public opinion requesting the construction of the sewer system in the latter half of the Taisho period, or the years around 1920. So, Kokura City requested Hachiro Kimishima, a professor from the Kyushu Imperial University, to carry out the investigation and to design the sewer system. Then, the city prepared the construction plan for sewer systems for all city areas

and filed the application. However, the government instructed them to reduce the construction range due to financial reasons, and the plan was approved for the area limited to the city center in 1925. In the following year, they obtained the approval for the construction and design and started the work in August, and the inauguration ceremony took place on April 2 in 1936.

Among the sewer systems constructed based on the Sewerage Service Act, the one in Kokura was the 3rd, following Wakamatsu and Oita in Kyushu. As it was a combined rain water and sewage system, untreated water from the sewer system was discharged into the sea and rivers.

The 1st stage project (with a drainage area of 71.2ha, a total pipe length of 29,625m, and a total construction cost of 944,000 yen) was launched in August 1926 and completed finally, 10 years later, in April 1936. The Sino-Japan War broke out in the following year, which resulted in the suspension of all sewer system constructions and extension projects in Japan. It was in September 1957, 20 years after the suspension, that Kokura City started the 2nd stage project with the drainage area of 382.3ha. In the project, the drainage canals of Mihagino and Komonji areas were for flood prevention.

#### Sewer System project in the former Yahata City

Yahata City started the 1st stage sewer system project in 1934. After World War II, it was expanded steadily to the 2nd stage in 1951, and the 3rd stage in 1957. During the 3rd stage, a sewage treatment plant conducting middle class water treatment by use of the trickling filter method was constructed in Kogasaki, and the inauguration ceremony was held just before the five-city consolidation. The sewer system and final sewage treatment plant could also accept human waste, and so was a revolutionary facility coming into operation for the first time in Fukuoka Prefecture.

#### Sewer System project in the former Tobata City

Tobata City launched the construction of the sewer system in 1958, under the municipal government of the mayor, Masamoto Shiraki. While major companies enjoyed their boom, Tobata City was the richest among the 5 cities in Kitakyushu. Thanks to the smaller city size, the construction made progress in a short time. Even during 5 years of the transition period after the five-city consolidation, the construction of pipes advanced rapidly.

In the beginning, sewage and rain water was discharged directly into Dokai Bay without any treatment. However, as there had been a future plan to install a final sewage treatment plant near the mouth of Sakaigawa River, pipes and drains were designed so as to connect to the final sewage treatment plant. For this reason, immediately after the Hiagari Sewage Treatment Plant (current Hiagari Water Purification Plant) had started its operations in 1970, the combined treatment of human waste and sewage became available.

### Sewer System project after the foundation of Kitakyushu City

#### Full-fledged preparation of sewer system

Kitakyushu City started full-fledged construction of the

sewer system in 1963, when the former 5 cities were integrated to start as Kitakyushu City. In July of the same year, the Kogasaki Sewage Treatment Plant started its operations as the 1st sewage treatment plant in the city. The treatment method at the Kogasaki Sewage Treatment Plant was changed to the activated sludge method in 1966. Thereafter, the construction of Hiagari Sewage Treatment Plant, which was the 1st plant built after the inauguration of Kitakyushu City, started in August 1968.

#### Completion of Fujita Pump Station

Fujita Pump Station started its operations in 1963, however, the rain water pump station was newly built to respond to the increase in rain water flow in recent years and to improve safety against flood damage. In order to prevent heavily polluted rain water from discharging into the rivers and sea, the rain water reservoir is equipped with the pump station for temporarily storing polluted water initially and conveying it to the sewage treatment plant after the rain stops.

After March 1968, when the transition period had ended, the sewer system projects were integrated, and the full-fledged construction was started starting with Hiagari in April. After the Hiagari Sewage Treatment Plant started its operations in April 1970, the Shimimachi and Kitaminato Sewage Treatment Plants (current Shin-machi and Kitaminato Water Purification Plants) started one after another in April 1972. In July 1974, as early as 6 years from the start of the project, the total pipe length of the public sewer system reached 1,000km. The coverage rate of sewer system in Kitakyushu City reached 50% in March 1977, and thereafter the sewer system in the city expanded rapidly.

#### Coverage of sewer system and improvement of water environment

In October 1979, the Sone Sewage Treatment Plant (current Sone Water Purification Plant) started its operations, with which the 5 sewage treatment plants using the activated sludge method started to cover all areas of the city.

In January 1982, when 13 years had passed since the start of the full-fledged construction work, the total pipe length of the public sewer system reached 2,000km. And, the coverage rate of the sewer system reached 80% in March 1986. Furthermore, the total pipe length of the public sewer system reached 2,500km with a further increase of 500km in November of the same year. Thereafter, in June 1989, the total pipe length of the public sewer system reached 3,000km as a result of the efforts to promote the project rapidly.

The coverage rate of the sewer system reached 90% in March 1991. Then, in April 1992, the city newly adopted the specific sewer system for environmental conservation and started to prepare the sewer system for the urbanization control area.

In line with the advance of the preparation, Dokai Bay which used to be called "the sea of death" and Murasaki River which had water quality like a "sewage canal" have improved significantly. The collaborative activities by the municipal government and citizens to improve the water environment received high evaluations from foreign countries as well. Kitakyushu City's activities to improve the water quality of Murasaki River through the construction of the sewer system, etc. won the 3rd Construction Minister's Prize (vivid sewer system award) in September 1994.

#### Near completion of sewer system (sewage system)

The coverage rate of the sewer system reached 95% in March 1996. Then, the project for improvement of combined sewer system for the Bachi River basin (branching sewer system) started in April 1997. In May of the same year, the project for making materials for cement from sewage sludge (effective use of sludge) started. In March 1998, the total pipe length of the public sewer system reached 3,500km. Then, in October of the same year, the rain water reservoir for the Kantake Pump Station was completed. Thereafter, in March 2005, 35 years after the start of the full-fledged construction

work, the "Emergency Plan for Improvement of the Combined Sewer System" was formulated, and the total pipe length of the public sewer system reached 4,000km as well. Then, in March 2006, the coverage rate of the sewer system reached 99.8%, when the preparation of the sewage system was almost completed, and in June of the same year, the Tobata Pump Station equipped with the rain water reservoir was completed.

Since the foundation of Kitakyushu City, 5 water purification plants in total, 34 pump stations, and the sewer pipes with a total length exceeding 4,400km have been prepared with an investment exceeding 700 billion yen thanks to understanding and cooperation from citizens and many other persons.

#### Diversification of roles of sewer system

In the early years, the sewer system projects focused on the improvement of living environment, prevention of flood, and conservation of water quality in public water areas, however, keeping pace with the arrival of the recycling-oriented society thereafter, which promotes energy saving as well as resource recycling, the new activities have been carried out, for example, power generation by digestion gas and the collaborative technology development with private companies to use sludge as materials for cement. Furthermore, Kitakyushu City has made pioneering efforts to provide technological cooperation to foreign countries facing environmental issues similar to those once experienced by Kitakyushu City in the past.

In recent years, on the basis of the proposal given by Kitakyushu Sewer System Policy Review Committee in October 2001, "Future Concept of Sewer System of Kitakyushu City in the 21st Century", the city has strengthened the activities for ensuring citizens' safe, secure and comfortable living, such as "renovation and renewal" of aging facilities and "measures against earthquakes", etc., in addition to existing activities. Further, the city has made significant efforts regarding the "improvement of the combined sewer system" for the conservation of water quality in the rivers and sea and "arrangement of waterfront environment" in harmony with the river development for creating better global environment.

However, the changes in the environment surrounding people's lives has increasingly become obvious on a global scale in the forms of global warming, depletion of resources, and deterioration of water circulation, etc. In such a difficult time, since the sewer system has the functions of circulating and recycling resources and energy, such as water and sludge, which will help realize the sustainable recycling-oriented society, it has become necessary for us to make the best of these functions.

#### Visions of sewer system and activities toward becoming the World Capital of Sustainable Development

On the other hand, the society is going to change drastically due to the low birth rate, aging population, decreasing population, and changes in the industrial structure, etc. Under such social circumstances, Kitakyushu City drew up a plan in December 2008, titled "Vigor from Kitakyushu!" as the new "basic concept and master plan", and decided to start the future urban development in accordance with this plan. Also in the sewer system project, it is requested to realize "the world's environmental capital" and "technological capital in Asia" held up as the city brand and to carry out new measures contributing to the creation of low-carbon society as an environmental model city. To this end, the city has formulated the "Kitakyushu City Sewer System Vision" which stipulates the principles for the activities for the sewer system to be implemented in the future with the planning period from FY 2010 to FY 2020.

In this vision, the basic concept "Aiming for a Comfortable Water Circulating City" and the following 3 goals are stipulated.

From now on, Kitakyushu City will share the resolution lying in the basic concept of this vision with all citizens and promote the activities collaboratively with the citizens to realize the "Comfortable Water Circulating City".