

## Component Part No. 3-1 of the “Sites of Japan’s Meiji Industrial Revolution” Conservation, Restoration, Presentation and Public Utilization Plan for the Nirayama Reverberatory Furnaces (Area 3 Nirayama) (Abstract)

Izunokuni City drew up a Conservation, Restoration, Presentation and Public Utilization Plan for Nirayama Reverberatory Furnaces (hereinafter referred to as “Plan”) in FY 2016 and 2017, which became a source of “Conservation Work Programme” pursuant to Recommendation b) in Decision: 39 COM 8B. 14 as adopted by the World Heritage Committee at its 39<sup>th</sup> session in 2015. The Plan comprises detailed measures for the conservation, restoration, presentation and public utilization of the component part of the “Sites of Japan’s Meiji Industrial Revolution: Iron and Steel, Shipbuilding and Coal Mining” (hereinafter referred to as “Sites of Japan’s Meiji Industrial Revolution”). This document provides an abstract of the Plan.

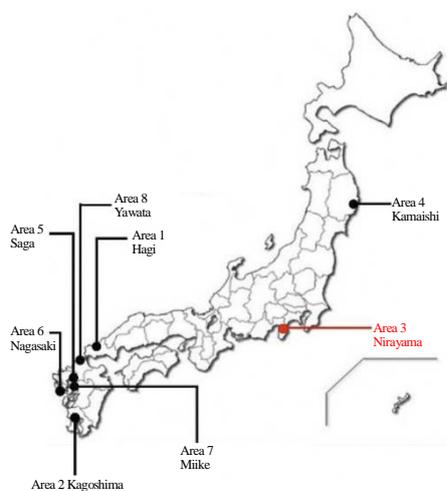


Figure 1. Location of Area 3 Nirayama

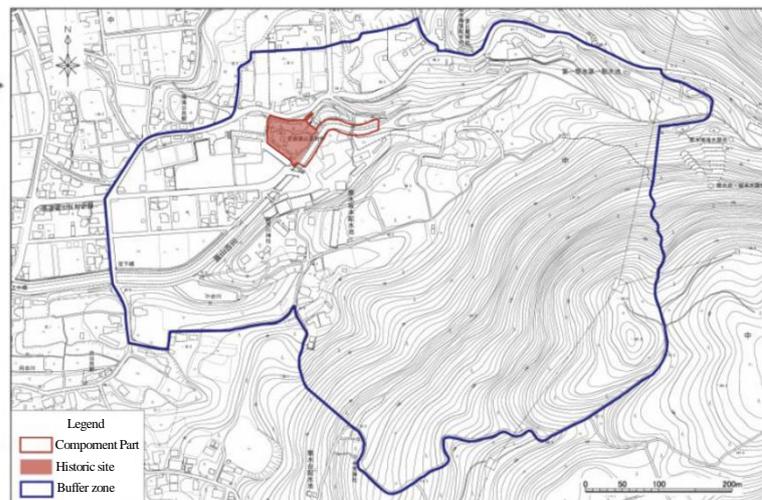


Figure 2. Scope of the Plan

### 1. Vision

Izunokuni City envisions the Nirayama Reverberatory Furnaces as a space that symbolizes and embodies Japan’s quest to introduce modern iron-making technology at the end of the Edo period. To realize this Vision, the city will strengthen preservation, carry out necessary conservation and restoration work, and promote public use from four perspectives: preserve, inform, enhance and utilize.

The Nirayama Reverberatory Furnaces is the component part corresponding to the first of three stages reflecting the Outstanding Universal Value of the Sites of Japan’s Meiji Industrial Revolution. This stage extended from the 1850s through the early 1860s, the end of the Edo period. The furnaces attest to the intensive experimentation in iron and steel making during that period. The process of historical changes and developments, while focused on the operational period during the end of the Edo period, has its starting point in 1842, when Egawa Hidetatsu began research for construction, and continues through the shutdown of operations and through subsequent maintenance and repairs conducted to date by Izunokuni City in partnership with the Government of Japan, Shizuoka Prefectural Government, local residents, and other stakeholders.

It is important for visitors that the facility embodies the quest to introduce modern iron-making technology at the end of the Edo period. Izunokuni City will conduct necessary work for conservation, restoration, presentation and public utilization to realize the future envisioned for the Nirayama Reverberatory Furnaces. This work will be carried out from the following four perspectives.

➤ **Preserve:** Step up preservation of symbolic reverberatory furnaces and related facilities

The existing furnaces are a valuable testament to the spread of modern iron-making technology and serve as a symbol representing the process of historical changes and developments of the Nirayama Reverberatory Furnaces. Preserving and reinforcing their materials and structure will therefore be indispensable to realizing the future envisioned for them. To preserve the furnaces for future generations, Izunokuni City will endeavor to maintain their structure, including the steel truss on the wall exterior that was installed during later conservation and restoration work to ensure seismic integrity. For this purpose, the city will study from an authenticity standpoint conservation and restoration methods that accord top priority to preserving the bricks as they were at the time of construction, and factor those findings into the conservation and restoration.

For facilities and other features around the furnaces that existed at the time of operations, the city will identify and preserve the remains by investigating historical document and other records and by conducting an excavation survey.

➤ **Disseminate:** Foster an understanding of industrial systems related to cannon manufacturing among visitors by visual means

Izunokuni City will foster an understanding of industrial systems related to cannon manufacturing by showing how the existing furnaces and related facilities that remain underground were functionally integrated with the river area that supplied water for power (see Figure 4). To that end, vegetation will be thinned and the surrounding environment otherwise improved to allow easy observation of the design and structure of the furnaces. The guidance center (see Figure 5), Egawa Residence<sup>1</sup> and furnaces will also provide information and explanation that complement each other.

➤ **Enhance:** Maintain and improve the landscape so that people understand how it looked as a cannon factory

To help visitors picture the facilities as they were during operations and deepen their appreciation of their construction at the current site, Izunokuni City will provide information and explanation on the facilities' environs from multiple vantage points. It will also maintain scenic views and conduct any necessary arrangement and improvement of surrounding landscape with the understanding and support of local residents.

➤ **Utilize:** Use the site sustainably as a community symbol and center

Registration of the Nirayama Reverberatory Furnaces as the component part of the World Heritage property has given them more attention than ever before. To ensure that this situation continues, however, it is vital that the entire community around the component part understand the Outstanding Universal Value of the World Heritage property including Nirayama Reverberatory Furnaces and deeply appreciate its meaning and importance. Based on that understanding, Izunokuni City will implement measures to sustainably use the component part, not only in terms of its historical and cultural symbolism for the community, but also as a center for promoting the area and disseminating information.

## 2. Policy

Izunokuni City has set the policy consisting of following six items to actualize the above Vision.

### (1) Conduct exploratory research

Izunokuni City will survey historical document and other records and also do excavation surveys to understand and shed light on industrial systems related to cannon manufacturing. It will also survey visitors to determine their impact on the component part, and conduct monitoring to identify changes over time.

Studies and tests needed to select the appropriate restoration methods for the furnaces, which will require periodic and continual repair, will also be conducted in a systematic manner.

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<sup>1</sup> **Egawa Residence**, located 1.7 kilometers directly north of the Nirayama Reverberatory Furnaces, belonged to the Egawa family, which served as governors of Nirayama for generations under the Edo Shogunate, including Hidetatsu Egawa, who oversaw the construction of the Nirayama Reverberatory Furnaces. The building is therefore important for a deeper understanding of the furnaces.

**(2) Preserve, reinforce, and stabilize the furnaces and the archaeological remains in terms of material, substance, and structure**

Izunokuni City will undertake the necessary repairs based on due consideration for expert opinion, findings from necessary exploratory research, and other factors in accordance with any material degradation and structural instability that monitoring reveals.

**(3) Illustrate and explain the industrial systems on cannon manufacturing in the component part and the Area**

To foster an understanding of industrial systems related to cannon manufacturing, Izunokuni City will set up appropriate pathways through the component part and its surroundings and provide explanation of the overall system and connections and roles between its individual elements, while also directing visitors to the Egawa Residence.

Efforts will be made to systematize the information provided. Explanatory boards for the component part, including underground archaeological remains, will employ a consistent design and format to more effectively communicate the functions and roles of each constituent element. Explanatory boards that show signs of aging will be replaced.

In addition to improving existing ground displays that indicate site features, the city will also make effective use of the findings of various exploratory studies by displaying or indicating on the ground surface locations and scales of any underground archaeological remains, etc., they reveal.

So visitors can more deeply understand the mutual links between the reverberatory furnaces and the exhibits and commentary at the nearby guidance center, the city will supplement information provision through explanatory boards and displays of archaeological remains, while providing additional explanation via local guides.

**(4) Arrange and improve the landscape from the standpoint of scenic view**

Izunokuni City will maintain and enhance the surrounding landscape, with a focus on areas along the access route (see Figure 5) in the buffer zone, and facilitate appropriate arranging of the landscape on private land.

It will set up vantage points so people can get an overall picture of the area around the reverberatory furnaces and industrial systems related to cannon manufacturing. Monitoring will be conducted at these vantage points to identify changes in the viewing landscape and devise arranging of the surrounding landscape and other measures.

**(5) Utilize the Furnaces as a cultural resource and source of information dissemination in the Area**

Izunokuni City will strive to build conservation awareness among local residents through various means, such as by holding symposiums, publicizing and holding explanatory meetings on excavation surveys and restoration work. The city, working with the relevant governmental agencies, will also support local residents to voluntarily take part in information dissemination activities.

The city will endeavor to expand opportunities and functions so that the component part and the nearby guidance center together constitute a place of learning. It will use the location to disseminate information about the many cultural and tourist facilities located in the city, thereby contributing to people staying overnight to sightsee.

The city will improve management and conservation capabilities by providing training and other sessions for all relevant stakeholders, including local guides and city representatives

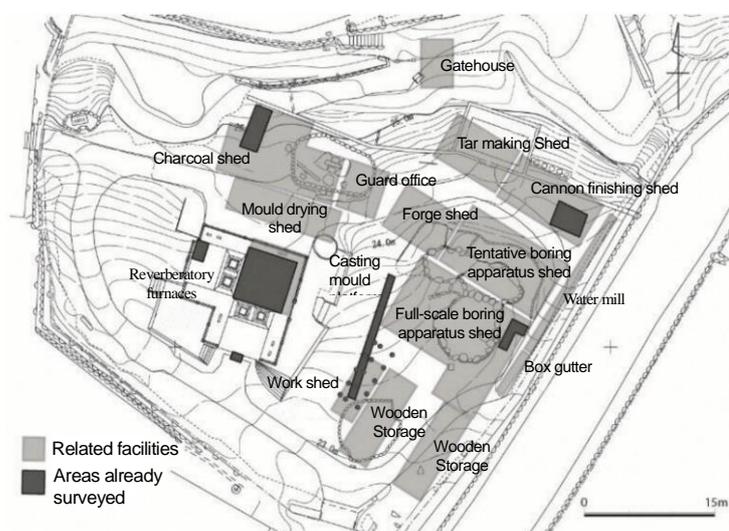


Figure 3. Ground plan showing locations of related facilities created from old pictures and areas excavated in past surveys

who handle such operations on a regular basis.

#### **(6) Implement projects**

Izunokuni City will undertake conservation, restoration, presentation and public utilization based on shared policies under a unified organizational structure for all of the Sites of Japan's Meiji Industrial Revolution, while executing the program through sufficient cooperation among the relevant city departments.

The city will continually evaluate and revise the program and undertake optimization improvements to ensure that the program proceeds efficiently and effectively.

### **3. Methods**

#### **(1) Investigative studies**

##### **(a) Historical document surveys**

Izunokuni City will continue its survey of collections of historical documents, photographs, and pictures related to the Nirayama Reverberatory Furnaces. It will publish and widely disseminate research findings in a survey report and incorporate them into future projects for its conservation, restoration, presentation and public utilization.

##### **(b) Excavation surveys**

Izunokuni City will conduct excavation surveys to collect information on underground archaeological remains and artifacts to check their locations against the old pictures, as well as to improve understanding of industrial systems related to cannon manufacturing and industrial systems overall. For this purpose, the city will prioritize confirming the surrounding archaeological remnants of the full-scale boring apparatus shed and tentative boring apparatus shed, which played the important roles of hollowing out the cannon barrels in the manufacturing process (see Figure 3).

##### **(c) Studies concerning furnace repairs**

Izunokuni City will assess the extent of deterioration of each constituent element through monitoring.

Old photos from the time of construction revealed that the outer wall bricks of the chimney were plaster coated for protection. The necessary verification experiments with samples and other means will be conducted to determine whether plaster coating can be applied when restoring the furnaces in the future.

##### **(d) Visitor surveys**

Izunokuni City will conduct surveys to assess the impact of visitors on the component part, their satisfaction with the parking lot (see Figure 5) and conveniences, their level of understanding of the component part and its contribution to the Outstanding Universal Value of the World Heritage property, and the extent to which they venture to other facilities in the city, such as the Egawa Residence.

##### **(e) Monitoring**

Izunokuni City will periodically assess the condition of the component part and its buffer zone using monitoring charts that comprehensively and systematically aggregate current information.

The city will present the monitoring results as an annual report to the National Committee of Conservation and Management for Sites of Japan's Meiji Industrial Revolution following confirmation and agreement from the Nirayama Conservation Council.

#### **(2) Conservation and restoration of buildings and archaeological remains**

##### **(a) Conservation and restoration of constituent elements that contribute to the Outstanding Universal Value**

###### **(i) Reverberatory furnaces**

Based on the extent of current deterioration of the exterior bricks of the chimney, Izunokuni City will conduct and complete within six year conservation and restoration as an urgent measure that prioritizes deteriorated parts.

When undertaking the above urgent conservation and restoration work for outer areas of the chimney where there is considerable deterioration, the city will replace materials to the minimum extent possible by, for example, removing just the deteriorated parts of the brick surface and using methods such as inlaying the cavity with

molded new materials. For interior bricks and masonry, it will make repairs as needed after analyzing the results of surveys to date.

The city will undertake the subsequent phases of conservation and restoration work as appropriate based on full consideration of the best approaches to maintaining the structure and conserving the original bricks and in light of survey and research results (including results from trials of plaster coating on the outer brickwork of chimneys) and of the possibility of future improvements in conservation techniques.

**(ii) Underground archaeological remains**

The archaeological remains of the casting platform, an excavation of which by Izunokuni City (Nirayama Town at the time) in 1988 confirmed the side walls and what was left of the floor surface, were fragile wood of which only a little was left, and should be kept as it is in the ground.

If future excavation surveys confirm underground archaeological remains of facilities expected to have existed at the time of operations based on the historical document, such facilities should be properly conserved, with a planar display of the locations and scales of underground archaeological remains set up on the ground surface.

**(iii) River area**

Izunokuni City, which manages the nearby river, will conduct appropriate repairs of any damages identified through monitoring.

In the event of major damage from a disaster or for other reasons, the city will undertake restorations with materials and material qualities that are in keeping with the scenery and which ensure that the revetment is strong.

**(b) Conservation and restoration of the elements closely related to the constituent elements contributing to the Outstanding Universal Value**

Previous surveys have confirmed the structural integrity of the reinforced steel frames outside the reverberatory furnaces and chimney canopies. Given signs of some paint peeling and rust, however, Izunokuni City will perform the required conservation and restoration within six years.

**(3) Presentation and public utilization of the Furnaces emphasizing entire industrial system**

The following items, (a) through (g), will generally be performed by Izunokuni City.

**(a) Zoning**

The city will carry out zoning of the component part (see Figure 4) and its vicinity to more effectively facilitate public utilization that fosters an understanding of industrial systems related to cannon manufacturing. Methods of public utilization suitable to the outline and features of each zone are shown in Table 1.

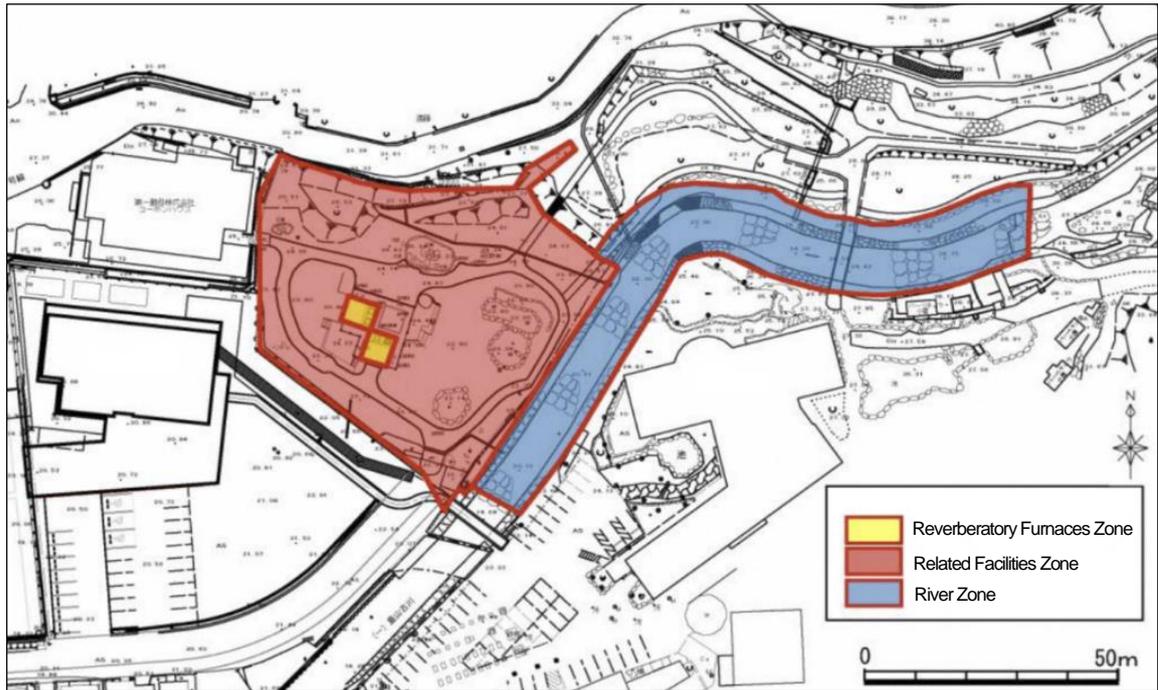


Figure 4. Zoning map

Zone name	Zone outline and features	Methods of public utilization
Reverberatory Furnaces Zone	Zone where furnaces are located	Preserve (through maintenance, conservation and restoration) valuable furnace remains, which survive in nearly complete condition. Publicly disclose all surveys, repairs, and other activities to the extent possible. Examples: Implement and disclose surveys and repairs
Related Facilities Zone	Zone where cannon manufacturing-related facilities existed	Build facilities designed to foster visitor understanding and actively undertake improvements of structures, etc., that are incompatible with the constituent elements contributing to the Outstanding Universal Value. Publicly disclose all excavation surveys to the extent possible. Examples: Planar display of the locations and scales of the underground archaeological remains, remove trees and pond
River Zone	Zone that supplied water for turbines to hollow out cannon barrels	Create environment that fosters understanding of role played by the river zone in industrial systems related to cannon manufacturing. Install paths and directional signs to guide visitors to the northeast park where they can see how the position of the river relates to that of the World Heritage component part (designated as a National Historic Site). Examples: Install explanatory and directional signs

Table 1: Outlines and features of zones and methods of presentation and public utilization

**(b) Path planning**

To manage visitor entry and effectively facilitate an understanding of the industrial system related to cannon manufacturing, the paths for the traffic of visitors to the component part and environs will be as follows (Figure 5).

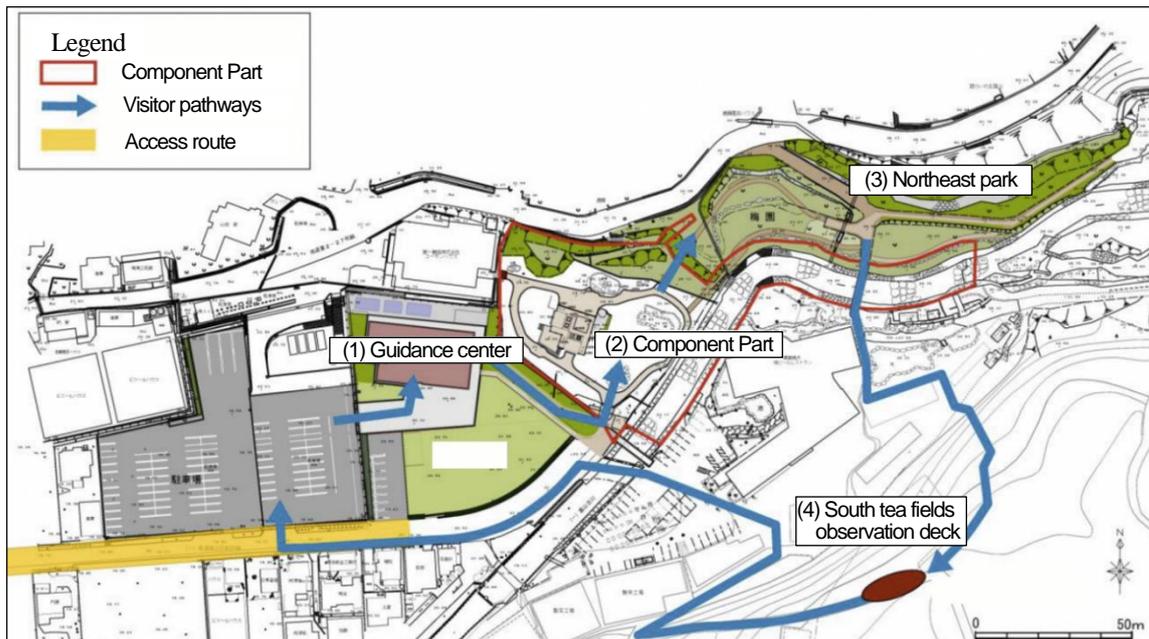


Figure 5. Paths

(1) Guidance center =>(2) Component Part area =>(3) Northeast park =>(4) South tea fields observation deck

**(c) Topography and environmental improvements**

The pond on the east side of the component part did not exist at the time of operation of the industrial systems related to cannon manufacturing and thus bears no connection to them; it will therefore be removed in conjunction with an excavation survey. All other existing topographical features will be preserved, not including minimal changes needed associated with excavation surveys needed for activities of conservation, restoration, presentation and public utilization and with the installation of displays indicating locations and scales of underground archaeological remains.

In principle, existing water supply and drainage facilities will be used under proper maintenance and management.

**(d) Arranging landscape and planting vegetation**

In principle, there will be no new tree planting.

The city will continue to maintain trees that shield and provide green cover for surrounding artificial structures.

At the same time, trees that compromise the visual wholeness between the National Historical Site and the river will be cut down to prevent interference with views of the furnaces from the northeast park, for example.

**(e) Guidance and explanatory boards**

The city will maintain, manage, repair, and update existing guidance and explanatory boards and exhibits so visitors can move easily along paths and better understand the component part. New explanatory boards will be set up that profile the Sites of Japan's Meiji Industrial Revolution and shows the positioning of the Nirayama Reverberatory Furnaces therein, among other information.

Exhibits that display archaeological remains newly revealed by excavations and historical document surveys will be installed by more effective methods on the conditions that such archaeological remains are properly protected.

**(f) Management and convenience facilities**

The city will review the number and locations of existing benches as needed. There will be no new toilets to augment those in the guidance center.

For the observation space about 1.2 meters above ground near the furnaces, the city will install an enclosure or similar facilities needed to ensure safe and comfortable viewing for visitors.

**(g) Exhibition facilities**

To disseminate consistent information on how the 23 component parts of the Sites of Japan's Meiji Industrial Revolution reflect the course of Japan's industrialization and the role the Nirayama Reverberatory Furnaces played within that course, exhibitions and displays based on the shared exhibition plan proposed by the Government of Japan will be added to the guidance center, with consideration also given to securing a dedicated exhibition space by expanding the existing building or other means. The results of future historical document and excavation surveys will be conveyed in an effective and easy-to-understand manner by making use of panel displays, IT, and other media.

**(4) Arrangement and improvement for the buffer zone from the standpoint of scenic view**

Izunokuni City will maintain an attractive landscape and clear views of the component part from the approach road (access route shown in Figure 5) and the parking lot. The city will also encourage local residents to perform arrangement of the landscape such as planting trees and construct, expand, and modify buildings and structures in ways that harmonize with the component part and its environs.

The guidance center, lawn areas, and the northeast park adjacent to the component part also need to be maintained to ensure attractive views, as these lie along the visitor paths.

With regard to private commercial facilities and their premises on the other side of the river southeast of the component part, the city will work through adequate dialogue to build consensus with the owners on appearances, outdoor advertisements, etc., to ensure attractive landscape, and encourage proper installations, maintenance and improvements.

In other parts of the buffer zone, the city will restrict unordered development and conserve, maintain, and improve the landscape by, for example, encouraging the planting of trees and construction, expansion, and modification of buildings and structures in ways that harmonize with the component part and its environs. Regarding signboards and outdoor advertising, etc., the city will work through adequate dialogue to increase understanding and build consensus with the owners and managers on the purpose and significance of creating an attractive landscape, and encourage them to perform installations, maintenance, and improvements properly according to specific standards.

**(5) Utilization of the Furnaces as cultural resource and center for disseminating information in the Area**

**(a) Utilization of guidance center**

In addition to providing information through exhibitions and video, Izunokuni City will also make effective use of indoor space and the front lawn area to foster visitor understanding and disseminate the latest research results.

The city will encourage repeat visits by local residents and other people by providing experiential learning opportunities and holding events.

It will also promote the site's function and role as a disseminator of information on the many cultural and tourist attractions in the city.

**(b) Approach to engagement with local community**

The city will build awareness among local residents about conservation, restoration, presentation and public utilization of the component part, seek their active involvement, and promote capacity building. For this purpose, it will actively provide information through various media, hold symposia and field briefings, foster and support various organizations, and hold casting workshops in collaboration with schools, among other activities.

**4. Project implementation**

**(1) Order of priorities**

The schedule for implementing the projects based on the vision and the policy consisting of six items and methods for materializing that vision described in 1 through Section-3 above, as well as the order of priority for such projects, are as follows.

Izunokuni City will designate the 20 years that begin with FY 2017 and end around FY 2036 as the projects implementation period. This period comprises a short term (within six years), medium term (around six years), and a

long term (around eight years). The periods and specific schedule of projects to be implemented in each term are described below (Table 2). It should be noted that conservation and restoration of the reverberatory furnaces will be given highest priority among all projects for conservation, restoration, presentation and public utilization within the component part, and this is to be completed in the short term (within six years).

Next on the order of priority is the installation of displays, etc., that aid visual understanding of the industrial system related to cannon manufacturing. All historical document and excavation surveys and installation, etc., of guidance and explanatory facilities will be started in stages in the short term (within six years) and completed in the medium term (within 12 years).

- Short term (within six years): Period for completing conservation and restoration of the reverberatory furnaces, beginning surveys and other projects necessary for the installation of facilities to aid visual understanding of industrial system related to cannon manufacturing, and implementing any other projects that need to be commenced immediately.
- Medium term (around six years): Period for completing surveys and other projects necessary for the installation of facilities to aid visual understanding of industrial system related to cannon manufacturing, and implementing any projects begun in the short term that need to be continued.
- Long term (around eight years): Period for implementing any projects begun in the short and medium terms that need to be continued.

Category	Project	Short term (2017-2022)	Medium term (2023-2028)	Long term (2029-2036)
Investigative studies	Historical document surveys	████████████████████		
	Excavation surveys	████████████████████		
	Studies concerning furnaces' repairs	████████████████████		
	Visitor surveys	████████████████████		
	Monitoring	████████████████████		
Conservation and restoration of structures and ruins	Furnaces' repairs	████████████████████		
	Repair reinforced steel frame and canopy	████████████████████		
Illustration of industrial systems	Pond removal		████████	
	Tree removal		████████████████	
	Repair and install guidance and explanatory boards	████████		
	Set up planar display indicating the locations and scales of the underground archaeological remains			████████████████
Scenic landscaping	Maintain and improve landscape	████████████████████		
Use as cultural resource and guidance center	Use guidance center	████████████████████		
	Involve community	████████████████████		

**(2) Review of the implementation schedule** Table.2 Projects schedule

Izunokuni City will conduct detailed verification and analysis of the state of progress of projects being implemented in each project term at a point when the term is approaching completion. It will then carefully examine projects that are appropriate to extend into the subsequent term and, upon examining said term, will make necessary revisions to the content and procedure of projects in that term.

**(3) Implementation structure**

Since the implementation schedule laid out in this Plan is integral to conserving and managing the Nirayama Reverberatory Furnaces, Izunokuni City will advance the projects through closer collaboration with local residents under the same conservation framework determined in the Nirayama Reverberatory Furnaces Conservation and Management Plan that constituted a part of the Nomination Document for World Heritage inscription in 2015 (Figure 6).

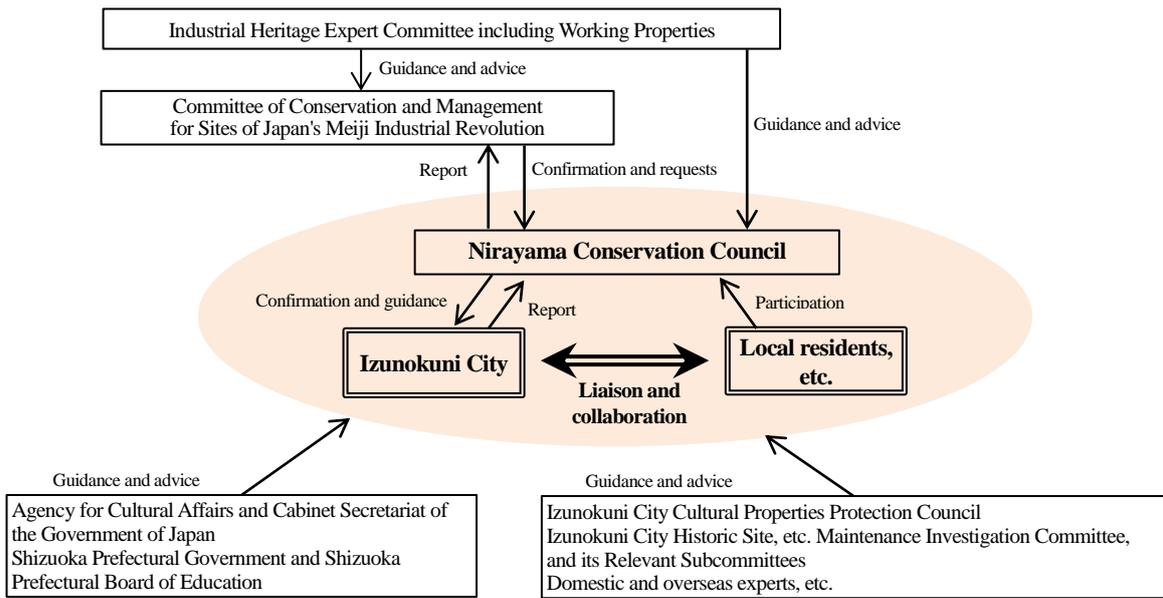


Figure 6. Implementation structure of projects

**(4) Other matters**

The city has carried out conservation and restoration work, etc. for the Nirayama Reverberatory Furnaces by securing necessary funds\* making use of various subsidy programs available in FY2016 and FY2017, the first two years following inscription of the property on the World Heritage List. To ensure the smooth implementation of the project, it plans to continue such efforts to secure necessary funds in partnership with relevant institutions.

\* Approximately 485 million yen was spent in FY2016 (including the amount spent for establishment of a guidance center) and 18 million yen has been budgeted for FY2017 (including the amount earmarked for plan making), both including costs incurred or earmarked for the presentation and public utilization of the component part, but excluding the cost for day-to-day maintenance.



Figure 7. Conceptual drawing of the component part and its vicinity at completion of medium term (end of FY 2028)