

## Measures pertaining to the fish inside the port of Fukushima Daiichi Nuclear Power Station (completion of the replacement of the net to prevent fish from leaving at the east sea wall, etc.)

- To prevent fish containing high cesium concentrations from escaping outside of the port, TEPCO has been implementing the following multilayered measures pertaining to the fish inside the port.
  - ✓ Improving environment of the port: covering the seafloor soil inside the port and reducing the amount of cesium flowing into the port (by removing rubble, paving, etc.)
  - ✓ Catching the fish in addition to keeping them in place : Along with installing multiple nets for preventing fish from leaving and gill nets, etc. inside the port to prevent fish from leaving that area, we have also been catching fish.
  - ✓ Monitoring: We continue to measure the cesium concentrations in fish caught inside the port and monitor its trends.
- In addition to existing measures, the following measures will be implemented going forward:
  - ① As a measure to improve the environment of the port, on January 18, 2023 a silt fence was additionally installed at the outlet for the drainage channel K to prevent the dispersion of cesium flowing into through the Units 1-4 intake open channel with rain water. On October 16, 2023, we started re-covering the seafloor at the bottom of this open channel. On February 19, 2024, we have also started laying of cover soil for the second layer.
  - ② On September 1, 2023 we completed fining the mesh sizes of the net (5cm to 2cm) to prevent the fish from leaving at the outlet of the Units 1-4 intake open channel.
  - ③ In light of the suspension of the shipping of black rockfish in February 2022, we have strengthened measures to prevent fish from leaving by using grill nets, etc., and to catch these fish. As additional countermeasures, we began constructions to replace the net to prevent fish from leaving at the east sea wall with steel pipe piles and a high durability net, and to extend this net so that it surrounds the vicinity of the Units 1-4 intake open channel on July 26, 2023.

< [Announced on September 27, 2022 \(updated on June 5, 2023\)\\*](#), and [June 26, July 24, October 13, 2023](#), and [February 29, 2024\\*](#)>

\*: Only in Japanese

- All construction to install steel pipe piles and high durability net in order to replace the net to prevent from leaving at the east sea wall was completed today.
- In addition to completing work to fining the mesh sizes of the net to prevent the fish from leaving at the Units 1-4 intake open channel outlet in September 2023, the completion of the aforementioned replacement construction has enabled us to further enhance measures to prevent the fish from leaving in the vicinity of the aforementioned open channel.
- Going forward, we will continue our construction to re-cover the seafloor of the Units 1-4 intake open channel with safety as the top priority while considering weather conditions, and strive to improve the port environment by measures pertaining to the fish inside the port.

# 1. The status of measures pertaining to the fish inside the port

- The status of measures pertaining to the fish inside the port is as follows:
  - ① Work to re-cover the seafloor of the Units 1-4 intake open channel began on October 16, 2023.
    - The sand overlaying (the first layer) to prevent sediment layer from lifting was completed on January 25, 2024.
    - The first layer has been laid and, we **started** soil overlaying (the second layer) **on February 19, 2024** after equipment switching etc. associated with material changes has been completed.
    - We aim to complete the re-covering of the seafloor during the first half of FY2024.
  - ② We **completed** fining the mesh of the nets (mesh size of 5cm to 2m) to prevent the fish from leaving at the Units 1-4 intake open channel on **September 1, 2023**.
    - Now that this work has been completed fish larger than the mesh size of the net will not be able to enter or leave the open channel.
  - ③ Replacement of the net to prevent the fish from leaving at the east sea wall **was completed today (March 4, 2024)**.
    - Completion of this construction has further enhanced measures to prevent the fish from leaving at the vicinity of the Units 1-4 intake open channel.
- We will continue initiatives to inspect the sediment inside the port, improve the water quality in the drainage channel K, prevent sand and soil from flowing into the port and improve the port environment as we strive to enhance the measures pertaining to the fish inside the port.

Measure	FY2023										FY2024	
	7	8	9	10	11	12	1	2	3	First half		
① Units 1-4 intake open channel seafloor re-covering construction	Preparations (including fieldwork)			▼ Commenced on October 16						▼ Soil laying commenced on February 19		
											▲ Sand laying completed on January 25	
② Fining the mesh of the nets to prevent the fish from leaving at the Units 1-4 intake open channel	Preparations		▼ Commenced on July 31									
											▲ Completed on September 1	
③ Replacement for the net to prevent the fish from leaving at the east sea wall	Steel pipe pile driving	Preparations		▼ Commenced on July 26								
	High durability nets installation	Preparations			▼ Commencement of net installation ancillary construction on October 5							
										▲ Completed on March 4		

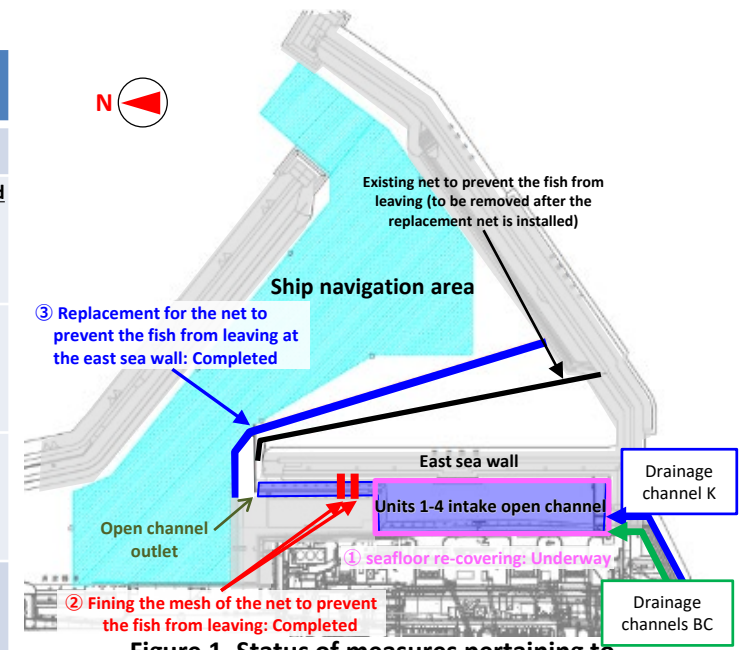


Figure 1. Status of measures pertaining to the fish inside the port

## 2. Replacement for the net to prevent the fish from leaving at the east sea wall(1/2)

- We have replaced the net to prevent the fish from leaving at the east sea wall with steel pipe piles and a high durability net (made from polyester monofilament), and we have extended this net so that it surrounds the vicinity of the Units 1-4 intake open channel.
- In addition to completing work fining the mesh of the nets to prevent the fish from leaving, we have been able to further enhance measures to prevent the fish from leaving in the vicinity of the aforementioned open channel.



Figure 2-1. The net surrounds the east sea wall and the Units 1-4 intake open channel



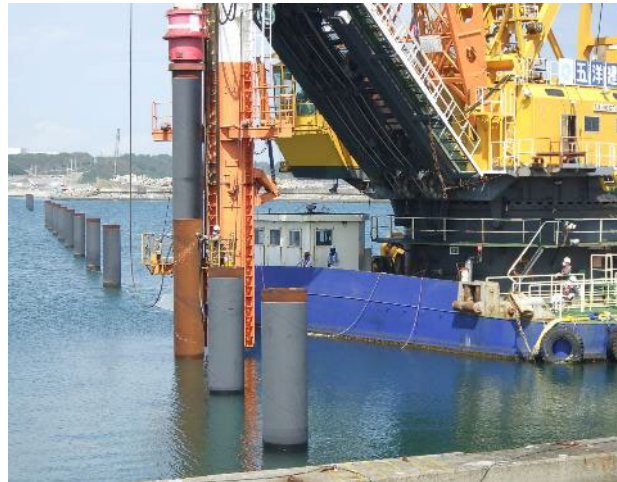
Figure 2-2. The net surrounds the outlet to the Units 1-4 intake open channel

Figure 2. Photos taken after the replacement for the net to prevent the fish from leaving (photo taken on March 4, 2024)

## 2. Replacement for the net to prevent the fish from leaving at the east sea wall(2/2)



**Figure 3. Steel pipe piles that were used (temporarily stored on site)**  
(Photo taken on June 8, 2023)



**Figure 4. Crane ship used to install the steel pipe piles**  
(Photo taken on September 19, 2023)



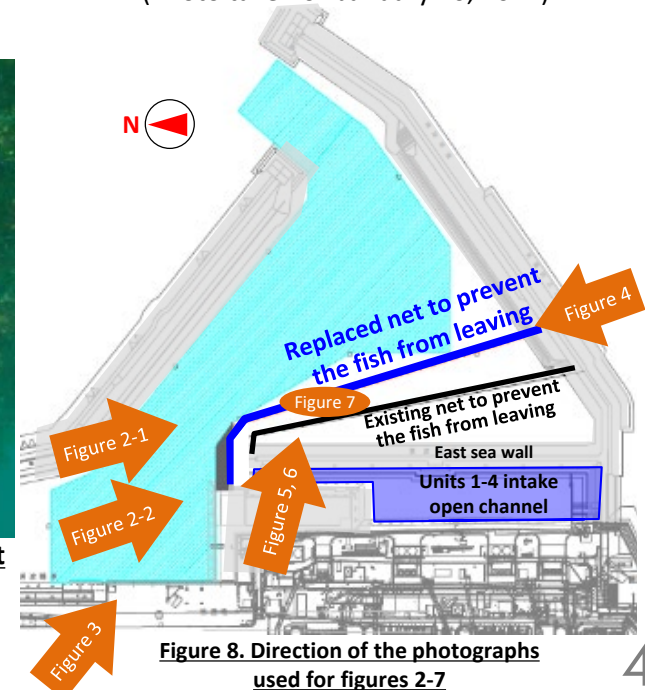
**Figure 5. Crane ship used to install the high durability net**  
(Photo taken on January 10, 2024)



**Figure 6. Workers installing the high durability net**  
(Photo taken on January 10, 2024)



**Figure 7. Divers attaching the high durability net to the steel pipe piles**  
(Photo taken on January 13, 2024)



**Figure 8. Direction of the photographs used for figures 2-7**

### 3. Status of construction to re-cover the seafloor of the Units 1-4 intake open channel

- Construction to re-cover the seafloor of the Units 1-4 intake open channel began on October 16, 2023.
- **The sand overlaying** (Approx. 30-50cm thick) for the first layer to prevent sediment from lifting up was **completed on January 25, 2024**.
- **On February 19, 2024, we started soil overlaying** (Approx. 20cm thick) for the second layer after equipment switching etc. associated with material changes has been completed.
- Since the commencement of this construction **we have seen no significant fluctuations in cesium concentrations in the seawater** around the vicinity of the outlet of the aforementioned open channel.
- We aim to complete construction during the first half of FY2024 and will move forward with construction while prioritizing safety and in accordance with weather conditions.

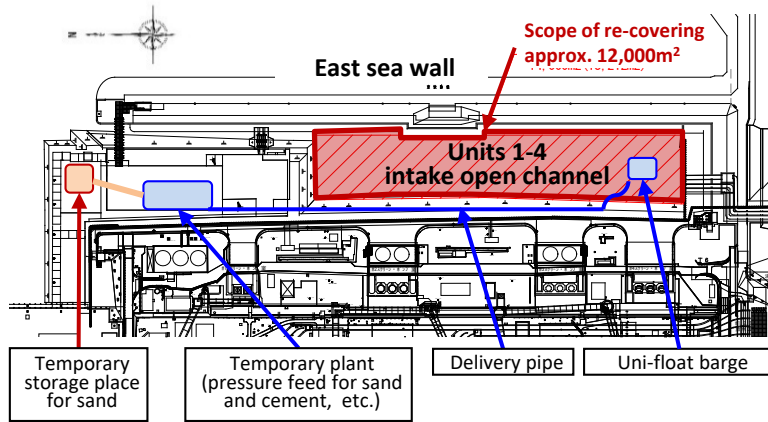


Figure 9. Overview of re-covering construction



Figure 10. Laying sand for the first layer using the uni-float barge

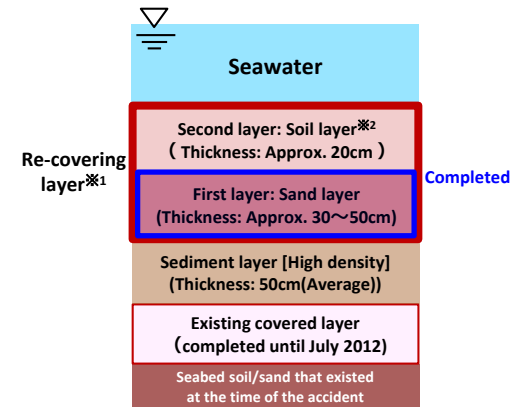


Figure 11. Layer details

※1 Re-covering layer specifications will be adjusted flexibly depending on the status of the work.  
 ※2 Covering with improved materials made of soil and cement

Details	FY2023						FY2024
	10	11	12	1	2	3	First half
Laying of cover sand (first layer)	▼ Commenced on October 16			▼ Completed on January 25			
				▼ Temporary plant replacement/uni-float barge refitting			
Laying of cover soil (second layer)					▼ Commenced on February 19		

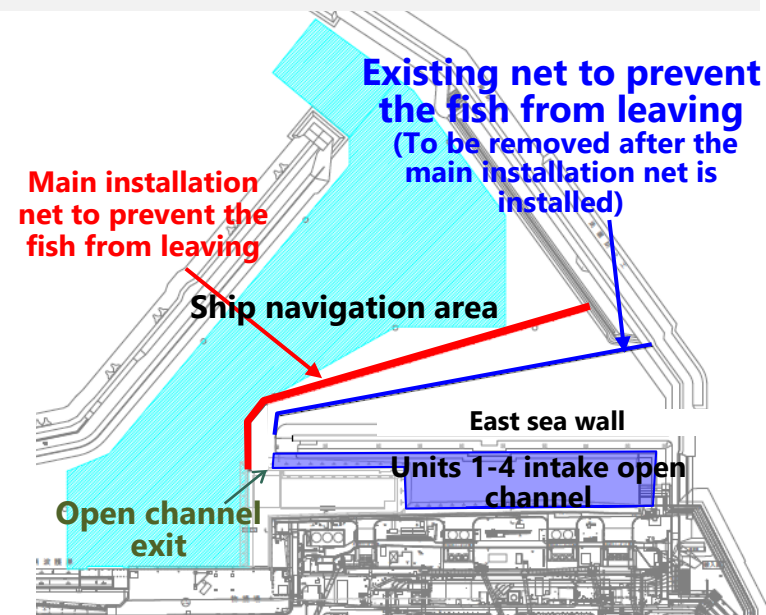
# for the net to prevent the fish from leaving at the East sea wall



- The net to prevent fish from leaving installed near East sea wall will be main installation by replacing with a permanent net made of steel pipe piles and strong and corrosion-resistant polyester monofilament nets, and extended to surround the Units 1-4 intake open channel exit to strengthen the measure to prevent fish from leaving from around the Unit 1-4 intake open channel. (The existing net to prevent the fish from leaving will be removed.)
- The net to prevent the fish from leaving will encompass an area as large as possible surrounding the Units 1-4 intake open channel exit while also ensuring that ships can pass safely through the port. The net will cover the full water depth in the area from the seafloor to sea level, and will be made with a small mesh size of around 4 cm.
- Because the net function can degrade due to various aging phenomena including corrosion due to seawater, damage in high waves, and sinking due to adhesion of marine organisms, it will be made with steel pipe piles and high durability netting.
- **Preparations are ongoing so that construction can begin in July. We aim to begin operation by the end of this year.**
- During construction, the current net to prevent the fish from leaving will be left in its place and other measures to prevent the fish from leaving such as maintaining the gill net at the port entrance and adding additional cage net near the sea wall will be implemented.

Table 1. Details of the main installation work for the net to prevent the fish from leaving at the East sea wall

Work overview	Type of work
① Steel pipe pile placement Pile diameter 1,000mm Length 18.0m×6 piles	Pile driving with a piling ship
② Steel pipe pile placement Pile diameter 900mm Length 17.3m×20 piles	
③ Installation of guiderails for the high durability nets 54 locations	Underwater welding by diving work
④ Attachment of wires for high durability nets Length 20m×27 sections between piles	Lifting work with crane barge
⑤ Attachment of high durability nets Width 20m× Height 9m×27 nets	Lifting work with crane barge and diving work performed simultaneously



**【Reference】 Main installation net to prevent the fish from leaving  
(Placement of the steel pipe piles/installation parameters  
of the high durability nets)**

**【Placement of the steel pipe piles (Diagram 2)】**

- Piles with a diameter of 1000 mm will be used for Area 1 where heavily affected by wave power from outside of the port, and piles with a diameter of 900 mm will be used for Area 2 that is less affected by wave power.

**【Installation parameters of the high durability net (Diagram 3)】**

- The net will rise above sea level by 1 m.
- The gap between the high durability nets and the steel pipe piles will be 3 cm, smaller than the net mesh size.
- The skirt of the net that will brush the seafloor will prevent any rock fish from escaping.

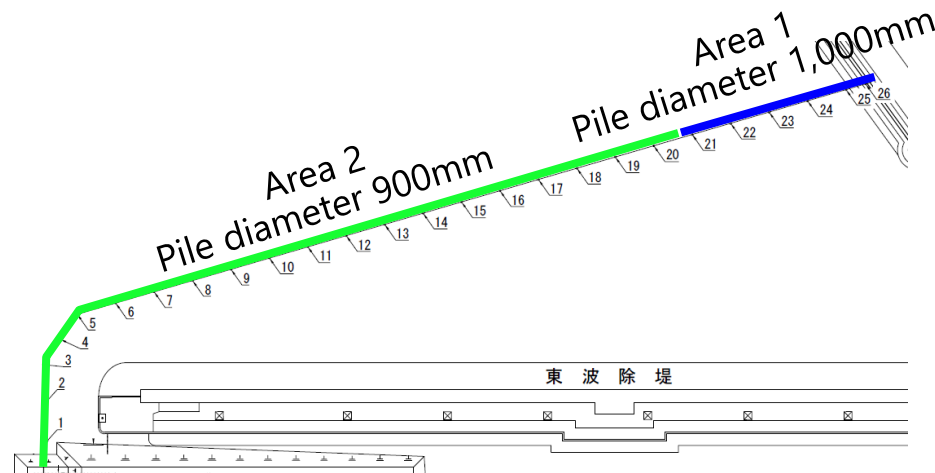


Diagram 2 Placement of the steel pipe piles

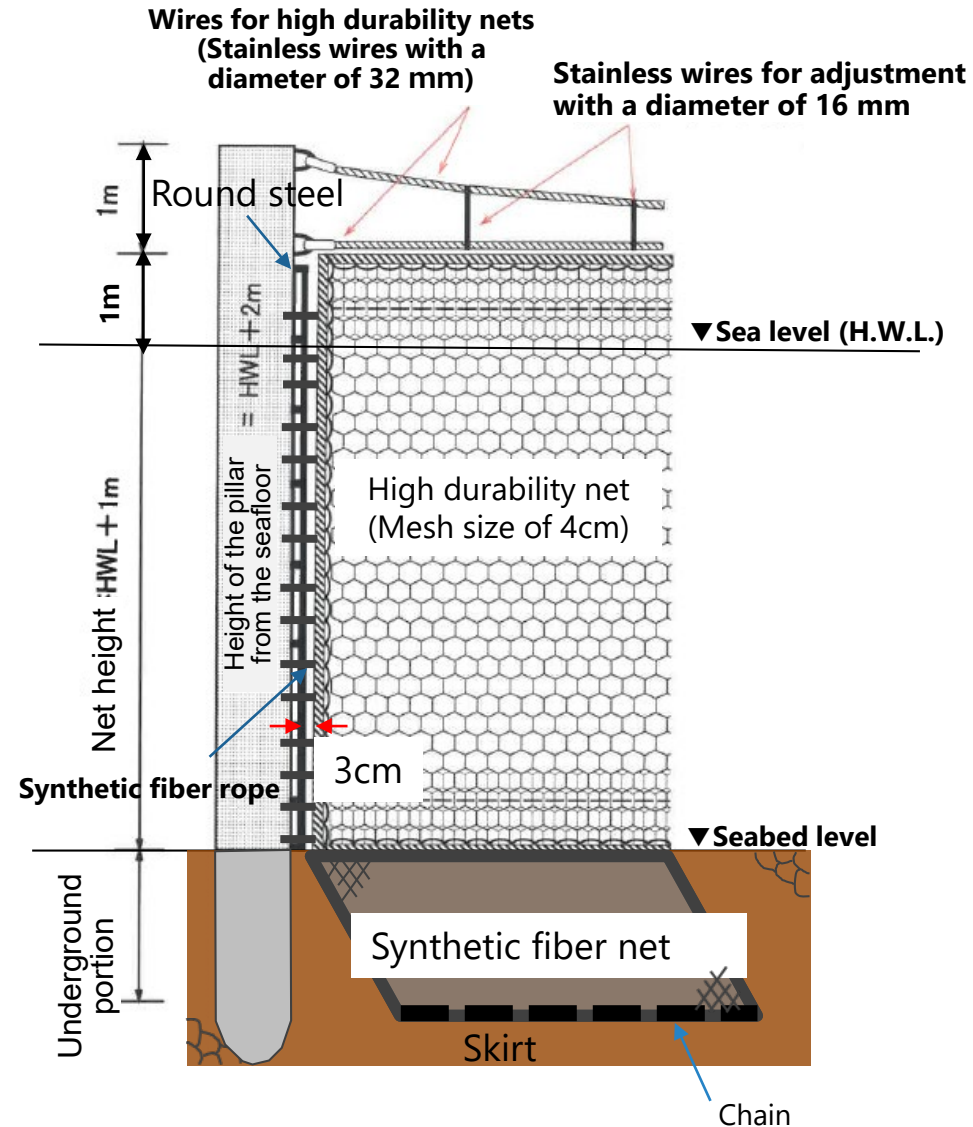


Diagram 3 Net installation

# [Reference] Main installation net to prevent the fish from leaving

## (Placement of steel pipe piles/attachment of high durability nets) **TEPCO**

### 【Placement of steel pipe piles】

- Steel pipe piles that will be the support for the high durability nets will be placed in front of the Eastern wave breaker at 20 m intervals using 50-ton piling ships
- To prevent the seawater from getting more cloudy during construction, steel pipe piles will be equipped with a lid designed to prevent increases in seawater turbidity.
- Once the steel pipe piles are in place, the attachment guiderails for the high durability nets will be welded on by divers.

### 【Attachment of high durability nets】

- Wires for attaching high durability nets will be lifted with a 250-ton crane barge and installed between the steel pipe piles.
- High durability nets will be lifted with a crane barge and bound to the wires and piles by a diver.
- During the construction work, gill nets keep placed at the port entrance and basket nets will be added near the breakwater.

### Lifting using a crane barge

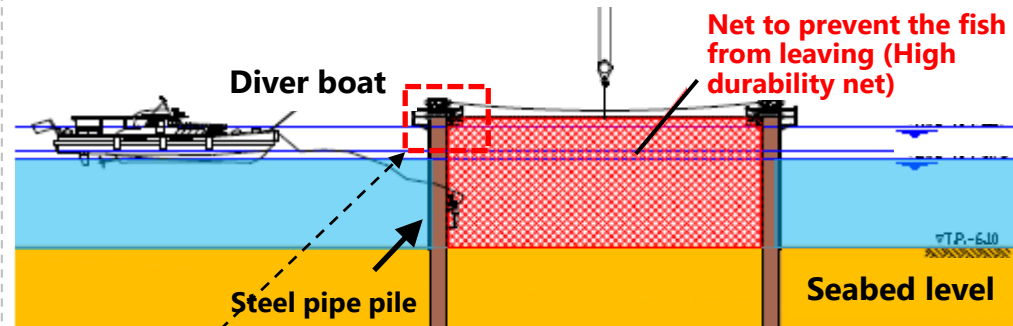


Diagram 6. High durability net attachment method

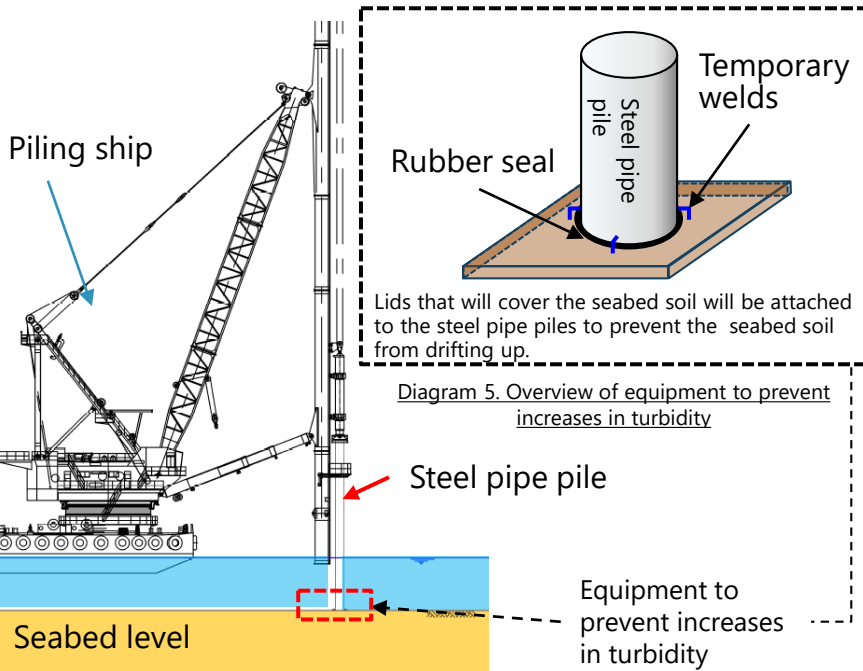


Diagram 5. Overview of equipment to prevent increases in turbidity

Diagram 5. Overview of equipment to prevent increases in turbidity

Diagram 4. Steel pipe pile driving method

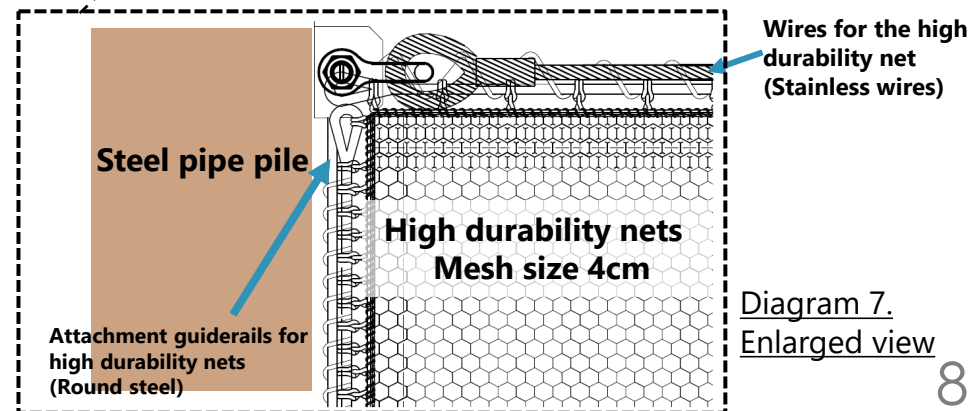


Diagram 7. Enlarged view