a) Handling Area

The existing market has a space of 144m^2 for the handling area and 128m^2 for the processing area. It is necessary to have enough space to manage both the small fish landing and to take out the fish from the cold storage, which the vendors have kept overnight, at the same time, by the opening time of the market, which is seven (7) a.m. in the morning. The following calculation of the required space is made based on the field survey results to accommodate the above operation.

- Number of fish boxes landed simultaneously : 15 boxes
  from three (3) fishing boats 5 boxes/boat
- Splashing ice after weighting for one fishing boat : 5 boxes
- Delivery from the cold storage 50 boxes/5 deliveries : 10 boxes

  30 boxes

Table 2-5 shows the required floor area for handling area.

Table 2-5 Required Floor Area for Handling Area

Item	Details	Approximate Area (m^2)
Fish Box Space	2.5m×1.2m (for 5 boxes); aisle width: 0.45m each side (2.5 + 0.45×2)×(1.2 + 0.45×2)×6	39
Weighing Space	2m×2m (including space for scales = 1.0×1.0m)	4
Opening Area of Cold Storage Door	1.2m×9m	11
Passageways	Approximately 2m wide to allow the travelling of a platform car	44
Auction Area	20 participants 0.7m×0.7m	10
Total		108

As detailed in Table 2-5, the required floor area is 108m^2 (9m×12m). Fig. 2-6 shows the layout.

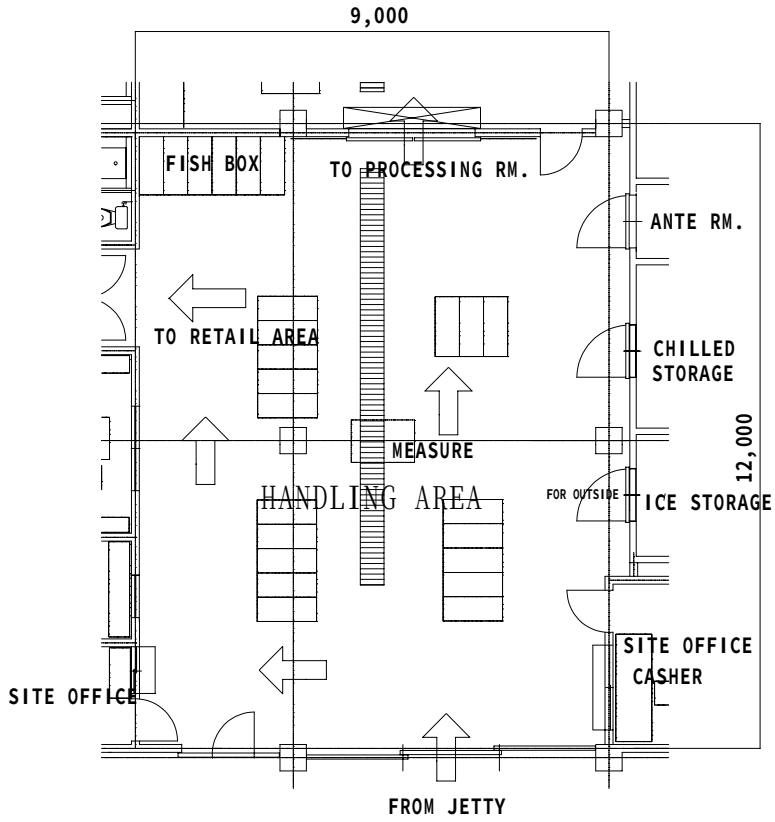

Fig. 2-6 Handling Area

Placing the measure at the center and making space for the fish boxes in the middle of the handling area, 2m wide aisle should be saved for the passage to the retail area, and on the other side, passage to the processing area, passing the ice storage, chilled storage and anteroom, should be saved. The space of the handling area can be decreased from 144m^2 to 108m^2 based on the field survey results.

b) Processing Area

The landing of medium-size fish is concentrated in the two (2) hours from three (3) to five (5) p.m. The purchase of landed fish by NKFM Corporation, therefore, takes place at this time. The purchased fish needs to be processed to maintain the freshness of the fish. A processing area is, therefore, necessary to conduct such primary processing. Given the daily fish purchase volume of NKFM Corporation of 0.5 – 1.0 ton, the necessary floor space to process this volume of fish is planned.

The field survey found that it takes approximately three (3) minutes to descale and gut a Kingfish or common dolphin of 8kg in weight. Accordingly, 375 minutes are required to descale and gut 1.0 ton of fish (1,000kg/8kg × 3 min = 375 min).

To complete this work in three (3) hours (180 min) from three (3) to six (6) p.m., an hour before the end of the opening hours when cleaning starts, at least two (2) workers (375 min ÷ 180 min = 2.08)

are required. The planned space will, therefore, be able to accommodate two (2) processing tables, a water tank for fish washing, a fish box space and an empty fish box space.

Table 2-6 Required Floor Area for Processing Area

Item	Details	Approximate Area (m^2)
Fish Box Space	2.5m×1.2m (for 5 boxes); work space width: 0.45m (2.5 + 0.45×2)×(1.2 + 0.45×2)	7
Fish Washing Space	1 water tank: 1.5 m×0.75m; work space width: 0.45m	6
Processing Space	Table: 1.8m×0.75m×2 Work space: 1.8m×1.2m×2	7
Door Space	1.2m×9m	11
Empty Fish Box Stacking Space	Space for some existing 100 fish boxes (12 rows; 8 in one stack): 0.5m×1.2m×12; work space: 7m×1m	14
Existing Facilities (Ice-Making Machine; Power Room)	3m×6m	18
Passageways	Some 2m wide; total length: approximately 23m	46
Total		109

Two (2) working tables and fish washing tank will be place in the center of the processing area, and 1.2m working space around the table is necessary. Space for fish boxes and equipment shelf will be placed at either side of the wall and on the other side, 2m wide aisle will be arranged for access to the cold storage, chilled storage and freezer. This will lead to the newly-built processing and hygiene testing building.

Since the work at the processing area is not complicated, the space of the processing area can be decreased from the present space of 120m^2 to 109m^2.

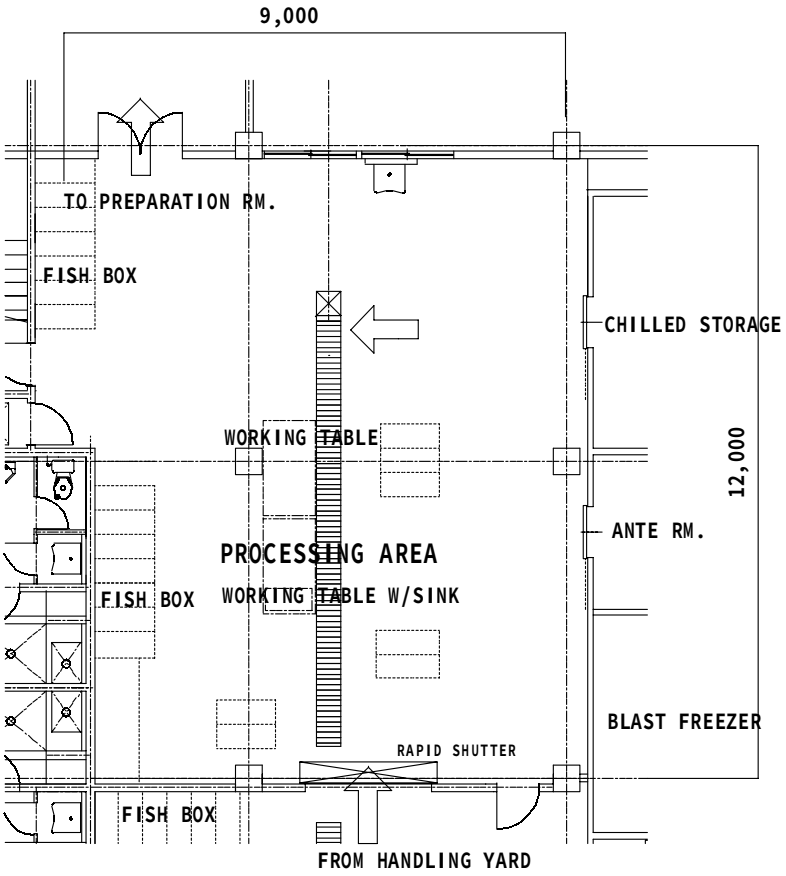

Fig. 2-7 Processing Area

c) Offices

- Office (I): Market Manager's Office

  An office desk of 0.8m×1.5m and a chair will be placed in the center of the room with two (2) additional chairs facing the desk. A filing cabinet will be placed on the back wall. According to the Standard Floor Areas (Architectural Institute of Japan, ed., Collection of Building Design Data), the standard floor area for this type of room is 15 – 25m^2. In view of the fact that the function of this office is similar to that of the market manager's office currently located on the first floor, the planned floor area is 16m^2.

- Office (II): Secretary's Office

  The secretary's office will be located adjacent to the market manager's office. The recommended size of a secretary's office serving one secretary varies depending on the type of business. According to the afore-mentioned Standard Floor Areas, the recommended size is 9 – 20m^2. The planned floor area of the secretary's office is 14m^2 to accommodate an office desk of 0.8m×1.2m, a chair and a filing cabinet.

d) Job Office

Job office (I) and (II) will be arranged on both sides of the handling area, facing the entrance. Job office (I) is usually built next to the handling area, however, considering the convenience, it is planned to be built next to the job office (II). In order to manage the storage, a counter will be placed in front of the handling area. The planned floor area will be $3m \times 2m = 6m^2$, accommodating chairs and shelves. The size of the office will be the same as the existing.

The market floor Job office (II) will be used to handle cash at its existing location. As such, no changes will be made in regard to its floor area under the Project. Moreover, no new partitions will be introduced. The floor area is $18m^2$ with 2 space of $3 \times 3.5 = 10.5m^2$ and $3 \times 2.5 = 7.5m^2$.

e) Locker Room

As the existing lockers for vendors are highly deteriorated, the existing lockers are planned to be replaced with the new lockers of the same type in approximately the current position.

f) Separate Toilets/Shower Rooms for Men and Women

The toilets/shower rooms serving market vendors serve 26 vendors in the retail area, four (4) administrative staff members and approximately five (5) workers in the sorting area and processing area. Of these 35 persons, approximately 30 are men. Some ten (10) workers, excluding administrative staff members, have a custom of taking a shower and changing their clothes after their day's work because of directly handling fish. Some of them wash their clothes before returning home. While the scale of the toilet/shower facilities will be kept to a minimum, two (2) urinals are planned due to their prospective use by fishermen.

Considering these conditions, toilet and shower facilities will be planned as follows.

For men : one (1) bowl, two (2) urinals shower facility : one (1) booth

For women : one (1) bowl shower facility : one (1) booth

Each shower booth will be equipped with a clothing shelf, a washing sink and a small booth to store cleaning equipment. The floor area will be, $11.2m^2$ for toilet (men) and $5.28m^2$ for shower room (men). For women, $8.74m^2$ for toilet and $5.28m^2$ for shower room.

g) Space of Refrigeration/Cold Storage/Ice-making Facilities

The existing refrigeration / cold storage / ice-making facilities are not reusable due to superannuation of machinery and panels. New facilities suitable to the Project shall be provided.

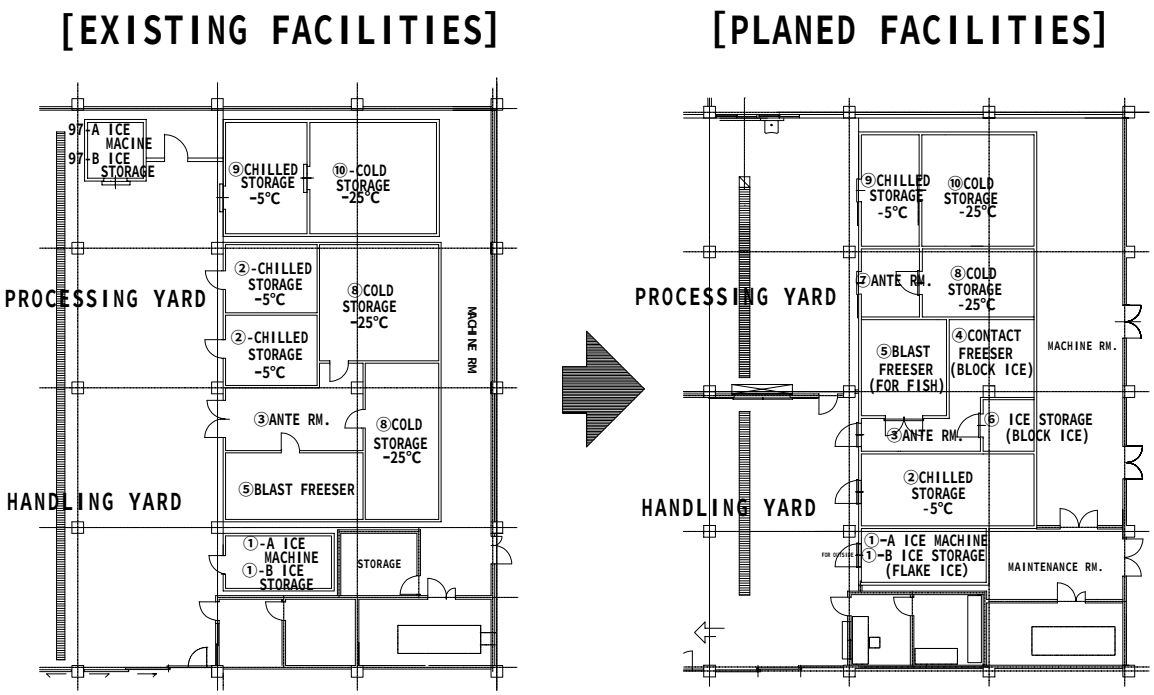

Fig.2-8 Renovation Plan for Ice-Making Machine and Cold Storages

Table 2-7 Outline of the Refrigerating Equipments

Ice Making and Cold Storages	Remove and Dissection	Install as New	Note
①-A Ice-making machine	2 ton/day flake type ice 2 units	2 ton/day flake type ice 2 units	
①-B Ice storage	W2,300×D4,500×H2,300	W2,400×D5,700×H2,600 0～-5℃	For fish sales and local distribution
② Cold Storage	W3,100×D4,000×H2,300	W3,100×D7,650×H2,600 -5℃	Stock for distribution quantity control
③ Anti room	W3,000×D6,000×H2,300	W1,800×D5,300×H2,600	
④ Contact Freezer	————————	W3,650×D4,000×H2,600	For block ice
⑤ Burst Freezer	W3,000×D6,000×H2,300	W4,075×D4,000×H3,500	For fish
⑥ Ice Storage	————————	W2,450×D2,350×H2,600 0℃～-5℃	For block ice
⑦ Ante- Room	————————	W3,125×D2,700×H2,600 15℃	
⑧ Cold Storage	W6,700×D3,400×H2,300 W4,900×D4,900×H2,300	W3,125×D4,950×H2,600 -25℃	For processed fish stock (long period)
⑨ Cold Storage	W4,900×D3,600×H2,300	W4,900×D2,700×H2,600 -5℃	For processed fish stock (short period)
⑩ Cold Storage	W4,900×D5,600×H2,300	W4,900×D4,950×H2,600 -25℃	For material fish stock (long period)
⑪ -A Ice Making Machine	1ton /day flake type 2 units	————————	Installed in 1997
⑪-B Ice Storage	W2,700×D2,700×H2,300	————————	Installed in 1997

（note）W：Width D：Depth H：Height（in mm）

Based on the results of survey, Ice-making machine (⑪-A), flake ice making machine of Ice storage (⑪-B) shall be abolished to install and Contact freezer (④) and Ice storage (⑥) will be installed instead. Two (2) rooms of Cold storage (-5℃ ②) and Cold storage (-25℃ ⑧) are integrated to one (1) room respectively.

⑤ Rehabilitation of Equipment

a) Electrical Equipment

The transformer of 500KVA supplying power to the existing fish market and shops and stores around the bus-terminal is now operating with a surplus of 135KVA. Since the electrical requirements of the new facilities of the Project are estimated at 120KVA, the electricity supply is covered with this surplus.

The distribution board of the existing fish market, being placed in the field office near the jetty, shall be replaced due to expected capacity shortage. Also the trunk line between the distribution board and the transformer shall be re-laid.

・Electric Outlet

Following the replacement of illuminators at the retailing area and processing area and the change of layout of rooms, the location of outlets will be changed, resulting in entire rewiring.

The luminous intensity of each room is as follows.

Retailing area and processing area	300 Lux
Handling area, locker room, and passage	200 Lux
Office and general room	300 Lux

・Power equipment

Electrical power is supplied to the refrigeration/cold storage/ice-making facilities and the pumping equipment/draining pump.

・Telephone

The existing telephone switchboard shall be renewed. Telephone line laying work shall be conducted between the office in the fish market and the processing area of the new facility and the Fishery Division office on the first floor in the new facility.

b) Water Supplying Equipment

Following the change of layout of selling counters in the retailing area, the renovation of the handling/processing area, and the improvement of toilet/shower room, the branch pipes from the 75mm water main and water supplying equipment shall be entirely replaced.

c) Drainage Equipment

At present, waste water produced by handling or processing of fish and washing of the floor is discharged directly to the sea around the jetty, not being led to the public sewerage. This method is changed in the Project and entire waste water in the facility is led to the public sewerage after independent treatment.

Following the change of the layout of the retailing area, handling area, and processing area, the existing drainage way also shall be entirely renovated. The water way shall be made of concrete, being covered by stainless steel grating lid, and both ends of its bottom are curved with 30mm semi diameter to make cleaning easy. A dust basket of stainless steel made is placed on the catch basin, and a grease trap is installed before the drainpipe so that the load of the septic tank may be reduced.

d) Air Conditioning/Ventilating Equipment

・Air conditioning equipment

Air conditioning equipment shall be installed in the office (I), office (II) of the ground floor, job office, and new office room. The processing area has a separate-type air conditioner for business use, and each office room has a separate-type air conditioner individually from the viewpoint of energy-saving.

・Ventilating equipment

Ventilating fans are placed in all rooms except the retailing area with enough natural ventilation. Only the salt dried fish corner has a forced ventilating equipment to remove foul smell.

e) Fire-Fighting Apparatus

The existing superannuated fire detector shall be rehabilitated or removed. The new area housing the processing/hygiene testing facility shall be provided with the heat sensing equipment and necessary wiring.

f) Refrigeration / Cold Storage / Ice-making Equipment

Since SVG has no regulation to control the refrigeration equipment, the design of the equipment and refrigerant system is not regulated. In the Project the "High Pressure-Gas Regulations" of Japan will be applied.

In selecting the machinery and apparatus, interchangeability, easiness of maintenance, and durability shall be given priority.

Flon has been long utilized as refrigerant due to its safety and stability, but is now regulated internationally as major cause of destruction of the ozone layer. Having no alternative agent today, use of Hydro Chloral Flour Carbon (HCFC) Flon, which will be prohibited by 2030 through gradually reduction of utilization from 2004 by the Montreal Protocol of 1992, will be unavoidable. Since the equipment using ammonia gas has difficulties due to safety, initial costs, possibility of selection of equipment, Flon R-22 gas shall be used in the Project.

Design conditions of refrigeration/cold-storage/ice-making equipment are as follows;

- ・Ambient temperature 33℃ (DB), 27℃ (WB)
- ・Humidity 80%
- ・Refrigerant R-22
- ・Raw water City water water temp. +28℃
- ・Cooling method Water cooling method

Table 2-8 shows the specification of the refrigeration / cold storage / ice-making equipment.

Table 2-8 Specifications of Refrigeration/Cold Storage/Ice-making Equipments

Facilities	Insulation Panel Size	Equipment	Cooler	Compressor	Evaporative Condenser & Receiver unit
①-A Ice making Machine		Flake ice making machine 2 units Type : automatic flake ice-making machine Capacity : 2ton /day 0.4KW×400V×50Hz Raw water pump: 0.1KW×400V×50Hz Accessory : ice level meter, ice ducts		Compressor 2 units Type : separate type single reciprocal compressor Motor : 11KW×400V×4P×50Hz 1,450Rpm Capacity : 10,550Kcal/HR (TC35℃/TE-24℃) Accessories : Oil separator, Oil heater, Pressure switch, Pressure meter, Thermometer	Evaporative condenser & Receiver unit (1) 2 units For Ice making machine and cold storage (Chilled) Capacity : 20RT Fan : φ500×0.75KW×4P 400V, 50Hz 2units Cooling water pump : φ500×0.75KW 2P400V×50Hz Receiver :300A×L1,000 Copper tube Accessories : Presser gauge & switch
①-B Ice Storage	W2,400 D5,700 H2,600 -5℃		Cooler unit 1unit Type: sealing hanger type Cooing coil :Aluminum fin Cooling area ：30m^2 Fan unit φ400×0.2KW 4P 400V 50Hz 2units Defrost type : water spray 40lit/min	Compressor 2 units Type : separate type single reciprocal compressor Motor : 7.5KW×400V×6P×50Hz 970Rpm Capacity : 9240Kcal/HR (TC35℃/TE-20℃) Accessories : Oil separator, Oil heater, Pressure switch, Pressure meter, Thermometer	
② Cold Storage	W3,100 D7,650 H2,600 -5℃		Cooler unit 2 units Type: sealing hanger type Cooling coil : Aluminum fin Cooling area : 30m^2 Fan unit φ400×0.2KW 4P 400V 50Hz 2units Defrost type : water spray 40lit/min		
③ Anteroom	W1,800 D5,300 H2,600 15℃		Cooler unit 1unit Type: sealing hanger type Cooling coil : Aluminum fin Cooling area :15m^2 Fan unit φ400×0.2KW 4P 400V 50Hz 1 unit Defrost type : off cycle		
④ Contact Freezer	W3,650 D4,000 H2,600 -35℃	Contact freezer 1 unit Type : 2 cylinder R-22 Dry expansion type Capacity : 540kg/shift×2 shifts /day=1,080kg (6kg/PAN×10pc/shelf×9 shelves=540kg) Oil presser gears : Oil cylinder, Oil pump, Valves Pan : 6kg type SUS. 220 pcs		Compressor 1 unit Type : Separate type double compression reciprocal compressor Motor : 15KW×400V×4P×50Hz 1,450Rpm Capacity : 14,000Kcal/HR (TC35℃/TE-40℃) Accessories : Oil separator, Oil heater, Pressure switch, Pressure meter, Thermometer	Evaporative condenser & Receiver unit (2) 1 unit For Freezer and Cold storages Capacity : 30RT Fan : φ500×0.75KW 4P, 400V, 50Hz, 2units Water pump : φ500×0.75KW 2P400V×50Hz Receiver : 300A×L2,400
⑤ Blast Freezer	W4,075 D4,000 H3,500 -35℃	Blast freezer Type : Floor type cooling units Capacity : 1 ton/day 12kg/pan × 15pans/trolly × 6units =1,080kg Fan : φ500×0.75KW 4P 400V 50Hz×3 units Trolleys : 1,200×920×1,890 6 units	Cooler unit 1unit Type : Floor fix type Cooling coil : Aluminum fin Cooling area : 14.5m^2 Fan unit : φ500×0.75KW 4P 400V 50Hz×3units Defrost type : Water spray type 150l/min	Compressor 1 unit Type : Separate type double compression reciprocal compressor Motor : 15KW×400V×4P×50Hz 1,450Rpm Capacity : 10,600Kcal/HR (TC35℃/TE-40℃) Accessories : Oil separator, Oil heater, Pressure switch, Pressure meter, Thermometer	
⑥ Ice Storage	W2,450 D2,350 H2,600 -5℃～-10℃		Cooler unit 1unit Type : Ceiling hanging type Cooling coil : Aluminum fin Cooling area : 20m^2 Fan unit : φ400×0.2KW 4P, 400V, 50Hz 1 unit Defrost type : water spray 35lit/min		
⑦ Ante Room	W3,125 D2,700 H2,600 15℃		Cooler unit 1 unit Type : Ceiling hanging type Coil : 5/8C 1,220TAL fin FP:8 Cooling area : 15m^2 Fan : φ400×0.2KW 4P, 400V, 50Hz 1 unit Defrost : OFF cycle		
⑧ Cold Storage	W3,125 D4,950 H2,600 -25℃		Cooling unit 1unit Type : Ceiling hanging type Coil:5/8C 1,220TAL Fin FP:8 Cooling area ：36m^2 Fan：φ400×0.2KW 4P 400V 50Hz 1unit Defrost :Water spray 150lit/min	Compressor 1 unit Type : separate type single compression reciprocal compressor Motor:11KW×400V×4P×50Hz 970Rpm Capacity : 9,180Kcal/HR (TC35℃/TE-24℃) Accessories : Oil separator, Oil heater, Pressure switch, pressure meter, Thermometer	
⑨ Cold Storage	W4,900 D2,700 H2,600 -5℃		Cooling unit 1unit Type : Ceiling hanging type Coils:5/8C 1,220TAL fin FP:8 Area : 30m^2 Fan : φ400×0.2KW 4P, 400V, 50Hz 2 units Defrost : Water spray 40lit/min		
⑩ Cool Storage	W4,900 D4,950 H2,600 -25℃		Cooling unit 1 unit Type : Ceiling hanging type Coil:5/8C 1,220TAL fin FP:8 Cooling area:40m^2 Fan : φ400×0.2KW 4P 400V 50Hz 2 units Defrost : Water spray 51lit/min	Share with ⑧	

⑥ Construction Materials Plan

Natural and other conditions to be taken into consideration are as follows.

- The facilities constructed at the vicinity of the sea are subject to salt damage.
- The climate is hot and humid with heavy rain.
- Almost all of the construction materials can be procured locally except furniture.
- The term of works is restricted due to a grant aid project of Japan.

a) Roof

The field survey revealed that the 15 years old roof is covered with rotten shingles, which are worn off in places due to hurricanes. Sheathing roof boards are also rotten at the base with some leaky places.

Roofing materials and sheathing roof boards shall be removed, and the clay tile roofing with asphalt roofing under 18mm plywood placing shall be applied.

b) Exterior Finishing

The exterior of the existing building is architectural concrete finishing on pillars, beams, and concrete rain-water gutter-cum-eaves, and its wall is local produced stone hanging.

Since the renovation of waterproofing work of eaves, and change of the openings of the exterior wall will be conducted in the Project, entire painting of the exterior will be necessary to keep the unification of the whole building. Pillars, beams, and eaves shall be painted with synthetic resin emulsion paint, and the stone hanging of the wall shall be washed out.

c) Interior Finishing

・Floor

The floor of the retailing area, handling area, and processing area shall be painted with epoxy resin appropriate to the foods handling facility, instead of the existing concrete finishing. The rise shall be curved with 30mm semi diameter.

・Ceiling/Wall Finishing

The ceiling and wall of the retailing area, handling area, and processing area shall be finished hardly with soil, water proof backing and coating.

Table 2-9 Finishing Plan

Room	Floor	Base	Wall	Ceiling	Remarks
Retail/ Cleaning Area	Epoxy resin Paint/concrete steel trowel	Epoxy resin Paint/mortal steel trowel	Mortal steel trowel/acrylic resin paint	Calcium silicate Board/ acrylic resin paint	
Dry salt/ Ice Shop	Ditto	Ditto	Ditto	Ditto	
Handling Area	Ditto	Ditto	Ditto	Ditto	
Processing Area	Ditto	Ditto	Ditto	Ditto	AC/ventilation Working table with sink
Locker Room (1)(2)	Vinyl sheet/ Concrete steel Trowel	Ditto	Vinyl paint/ Mortar steel Trowel	Acoustic board	
Office (1)(2)	Ditto	Ditto	Ditto	Ditto	
Job office (1)(2)	Ditto	Ditto	Ditto	Ditto	
Toilet (M)(F)	50×50mm Mosaic tile	———	150×150mm Ceramic tile	Cement board/ Vinyl paint	
Shower/Washing space(M)(F)	Ditto	———	Ditto	Ditto	
Area of Refrigeration / Ice-making Facilities / Panel Area	Concrete Steel trowel Covering insulation panel	———	———	———	
Staircase	Concrete Steel trowel	Vinyl paint	Emersion paint Mortar steel Trowel	Acoustic board	
Connecting Passage	Vinyl sheet/ Concrete steel Trowel	Vinyl sheet/ Concrete steel Trowel	Ditto	Ditto	
New Office	Ditto	Ditto	Ditto	Ditto	
Office (1)(2)(3)(4)	———	———	Emersion paint on adjusted surface	Emersion paint on adjusted Surface	
Toilet (M)(F)	50×50mm Mosaic tile	———	150×150mm Ceramic tile	Cement board/ Vinyl paint	

2) Processing /quality control laboratories

① Outline of the Facility

Table 2-10 Outline of the Construction

Facilities	Contents (Quantity & Size)		Construction Items
Processing・quality control laboratories Floor area Ground floor 336m^2 First floor 324m^2 Total 660m^2			・Reinforced Concrete (RC) Structure 2 Story Foundation : RC Direct foundation Roofing : Iron structure Clay tile finish partly Wall : Concrete block ・Pluming, sanitary, air conditionings, etc. ・Electric supply line to main lighting, power outlet, telephone, fire alarm
Ground Floor	1. Preparation room	34.2m^2	Fish washing, defrosting, sorting, etc.
	2. Processing room	50.0m^2	Filleting, skinless filleting
	3. Smoking room	4.0m^2	Smoking
	4. Packing room	30.0m^2	Wrapping, Vacuum packing, carton packing
	5. Packing materials storage	15.0m^2	Store packing materials
	6. Handling room	27.0m^2	Preparation, sorting outlet for distribution
	7. Clean access room	19.4m^2	Preparation for entering clean work area
	8. Quality Control room	9.0m^2	Make monitoring sample
	9. Product store	15.7m^2	Sale productions
	10. Locker room	13.5m^2	Place for changing uniform
	11. Toilet for men and women	12.8m^2	
	12. Cold storage / Freezer /Ice making facility		
	⑪ -A Ice making machine	2tons/day Flake ice making machines	
	⑪-B Ice storage	W1,400×D3,200×H2,600	-5℃ for processing and distribution
	⑫ Cold storage	W2,700×D2,700×H2,600	-5℃ for fresh production
	⑬ Blast freezer	W2,600×D3,200×H3,275	-35℃ for fish
	⑭ Cold storage	W2,700×D2,700×H2,600	-25℃ for frozen products
First Floor	1. Wet laboratory	40.0m^2	Bacteria check for food and facility condition
	2. Preparation room	6.2m^2	Install draft chamber, autoclave
	3. Dry laboratory	25.0m^2	Test nutrition contents and hazardous contents
	4. Preparation room	6.2m^2	Install draft chamber
	5. Data room	18.7m^2	Test data keeping and display
	6.Chief engineer's room	15.8m^2	For chief lab. technician

Facilities		Contents (Quantity & Size)	Construction Items
First floor	7. Lab. technician's room	11.4m²	For Lab. Technician
	8. Meeting room	74.5m²	For extension, training education work of fisheries related things
	9. Kitchenette	4.5m²	Tea serve for visitors and staffs
	10. Machinery room	6.8m²	For refrigeration equipment
	11. Toilet for men and women	22.4m²	For Visitors and staffs
	12. Entrance hall & Corridor	45.0m²	For Visitors and staffs

② Planning

When an area for carrying in of materials or preparation work is provided apart from the existing processing area, the scale of the facility will become too large, and the function may overlap with the existing facility. Materials, therefore, shall be supplied from the adjacent existing processing area so that the common use of the facilities may be attained.

The new facilities will be totally independent from the other buildings apart from receiving the supply of raw materials and zoning based on the concept of HACCP will be introduced to ensure the production of safe food. Moreover, an efficient processing system will be introduced based on the following features while taking the utilisation of the existing processing equipment into consideration.

- The entire processing facilities will be air-conditioned to ensure a supply of clean water and to prevent qualitative degradation during processing work.
- Zones which are liable to contamination will be clearly separated from those zones which must remain clean.
- An automatic door will be introduced between adjoining zones to avoid cross-contamination.
- A clean access room will be set up to enhance the cleanliness of workers.
- The floor will be slightly sloping towards the drainage ditch for easy drainage. In addition, the floor will be coated with a material which is easy to clean and which it is hard for dust and rubbish to cling to.
- Equipment which is liable to corrosion will be avoided and equipment which is made of stainless steel will be considered. The use of wooden products will be avoided as much as possible and the use of plastic products will be considered instead.

②-1 Ground Floor

a) Preparation Room

This will be a pre-treatment room for processing materials to be supplied by the existing facilities and space for the washing, defrosting, sorting and grading of fish and for the sprinkling of flake ice over the fish to maintain freshness will be provided.

The initial preparation work of fish delivered to the preparation room will commence immediately after the start of the day's work and will involve three (3) to four (4) workers in charge of processing. Should defrosting be required, the necessary arrangements will be made before commencing preparations for the work to following in the processing room.

In order to make a space to work from both sides, two (2) stainless tables (1.8×0.75) will be placed in the center of the preparation room and a sink (1.2×0.6m) will be placed by the wall.

The preparation room will be made as a quasi-clean zone served by air-conditioning preserving temperature at 23℃ and the number of bacteria under fifty (50). A door opening/closing device will be added to a standard door at the boundaries of the processing room and packing room.

Table 2-11 Required Floor Area for Preparation Room

Item	Details	Approximate Area (m^2)
Washing and Defrosting Space	Water tank for washing and defrosting: 1.4m×0.9m; work space: 1.4m×1.2m	3
Processing Space	Table: 1.8m×0.75m×2; work space: 1.8m×1.2m×2×2 (both sides of each table)	3 9
Temporary Fish Box Stacking and Flake Ice Storage Space	Fish boxes for processing: 20 boxes (4 rows with 5 each)	3
Passageway		29
Connecting Corridor from Existing Facilities		17
Total		64

As shown in Table 2-11, the planned floor area for the preparation room is 64m^2, including connecting corridor space of 17m^2.

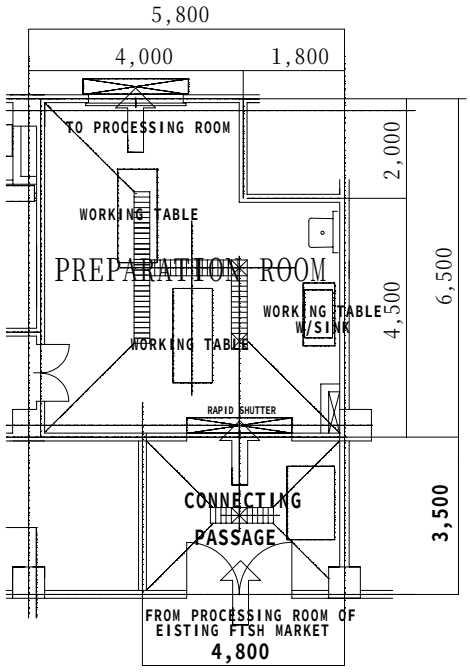

Fig. 2-9 Layout of Preparation Room

b) Processing Room

The processing room will handle fish which has been descaled and gutted. The actual work here will be primary processing, including skinning and cutting in round slices. Three (3) workers will be employed in the processing room, i.e. two (2) for processing and one (1) for transporting.

Table 2-12 Required Floor Area for Processing Room

Item	Details	Approximate Area (m^2)
Mobile belt conveyer	1.8×0.75m×2 units (Conveyer) 0.9×0.75m×2units (working table) Working space 1.2×(1.8+0.75)m×2 units	3 1.5 6.5
Temporary fish box storage	2.0×2.0m	4
Meat remover	Meat remover 0.72×0.75m Working space 1.2×1.2m	1 1.5
Sink	1.2×0.75m Working space 1.2×0.75m	1 1
Cabinet space	1.2×1.8m×2 units	4
Working table	For replacement knives and chopping boards 1.8×0.75m×2 units	3
Smoking area	2.0×2.0m Working space 2.0×1.2m	4 2.5
Corridor	Corridor and space needed for opening/closing the door	21
Total		54

A mobile belt conveyor will be placed in the center of the room and will be sandwiched by two (2) stainless steel work tables (1.8m×0.75m each). These tables will be accompanied by smaller stainless steel work tables (0.9m×0.75m) on both sides. On a side wall, a sink (1.2m×0.75m) and a meat remover (0.72m×0.75m) will be placed side by side. On the opposite wall to the sink and the meat remover, two (2) cabinets (1.2m × 1.8m) for miscellaneous processing tools (knives and replacement chopping boards, etc.) will be placed. A stainless steel work table (1.8m×0.75m) will be placed next to the cabinet. A smoking machine area (2.0m×2.0m) will be set up by the wall to enable the external discharge of smoke. The planned layout will allow the placing of a cooking utensil table by a wall.

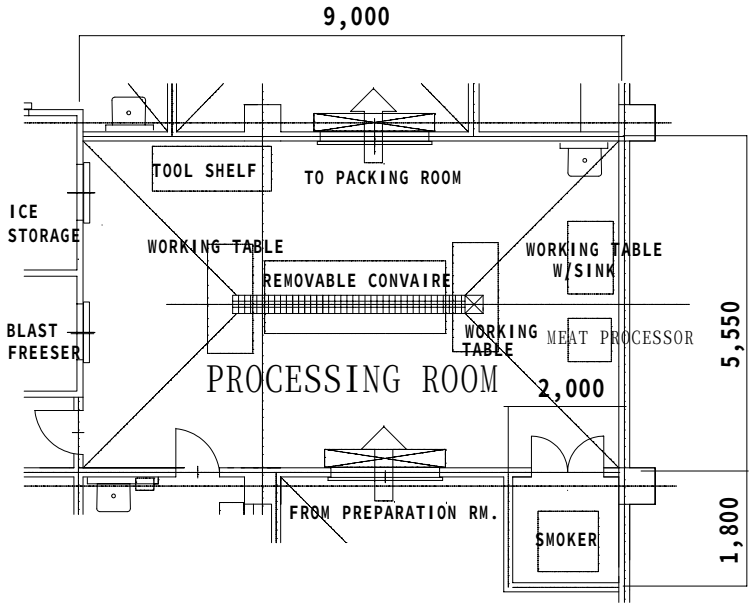

Fig. 2-10 Layout of Processing Room

c) Packing Room/Packing Materials Storage

A range of work, including film wrapping, vacuum packing, sealed packing and boxing into cardboard boxes, will be conducted in this area by two (2) workers. A work table (1.8m×0.75m), a vacuum packing machine (1.3m×0.6m) and a heat sealer (0.5m×0.5m) will be placed side by side. The planned total floor area, including space for a utensils table by a wall, is 30m^2 (5m×6m).