

Photo-1.2(5-1) Sea Bottom Situation (1)

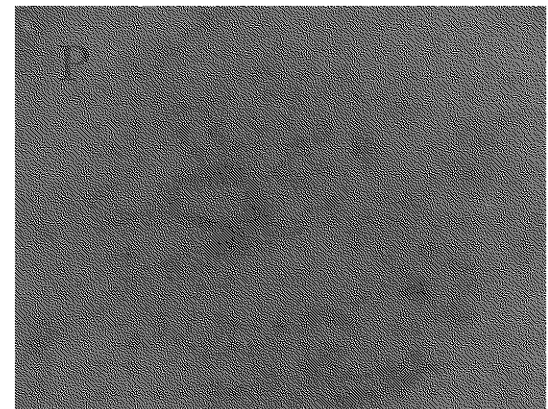
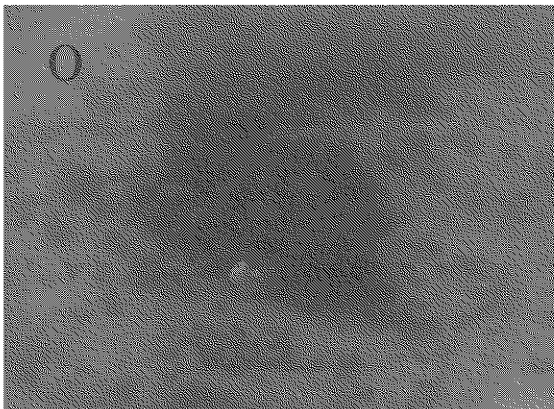
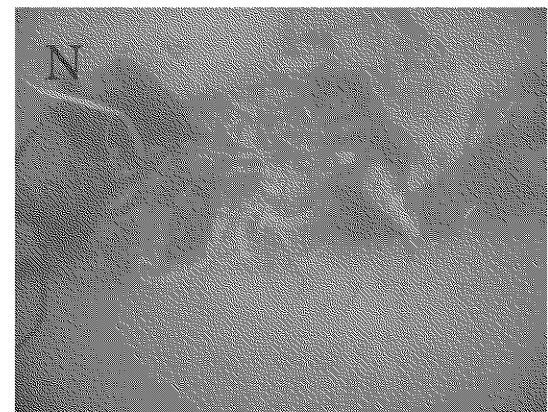
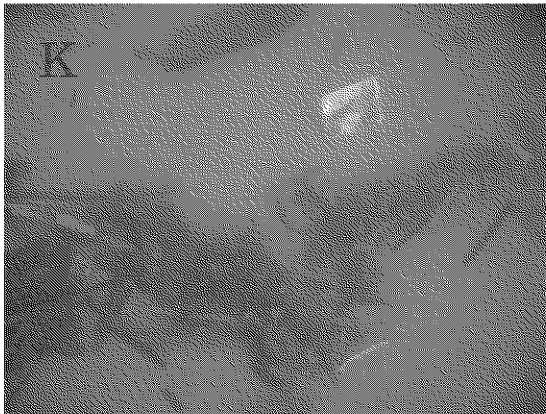
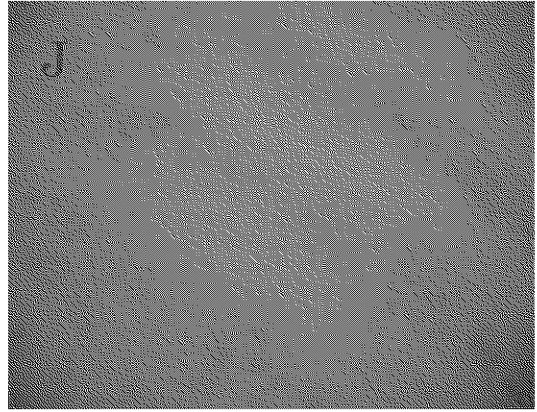
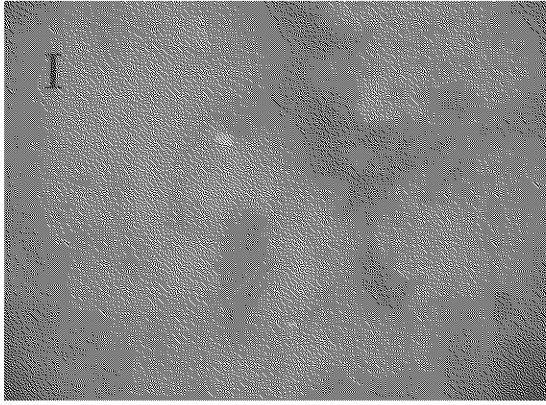


Photo-1.2(5-2) Sea Bottom Situation (2)

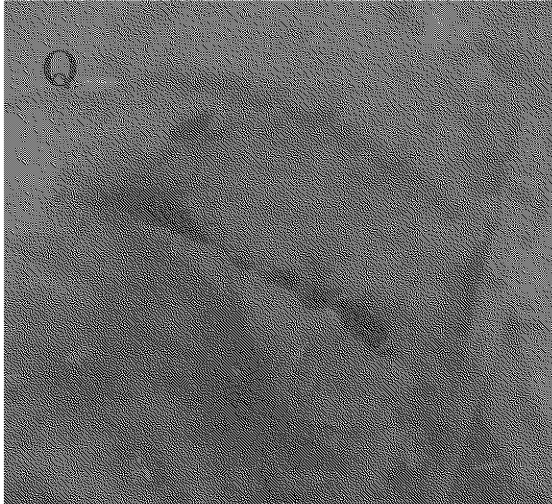


Photo-1.2(5-3) Sea Bottom Situation (3)

(10) Earthquakes

Caribbean countries are belonged to Caribbean Tectonic Earthquake belt and the past earthquake records around Nevis Island obtained from Nevis Disaster Management Department shows below.

- 1) April, 1690: Magnitude 7.5 (Depth of earthquake center 35km)
- 2) From 1900 to 2005: Magnitude 6.5 (Depth of earthquake center 70km)

The earthquake load is considered for the design for facilities since the Nevis Island is influenced by earthquake.

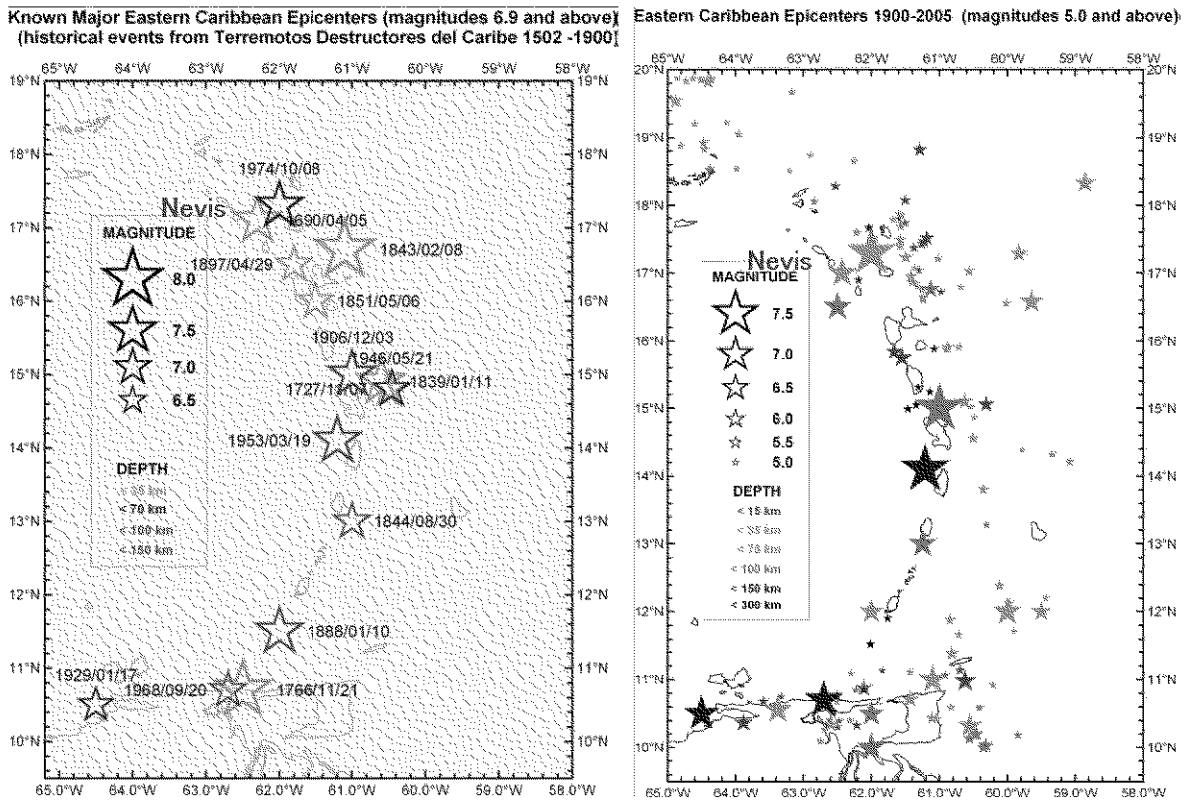


Figure-1.2(17) Earthquake Records (1500 to 2005)

1-3 Environmental Social Consideration

(1) Scoping Results

As this project is ranked as category “B” in “JICA Guide Line for Environmental Social Consideration, April 2004”, IEE has been executed together with the NIA. The result is shown in Table-1.3(1)

Table-1.3(1) Scoping Results

Likely Impact		Rating	Reasons
Social Environment (including Gender and Children’s right)			
1	Involuntary Resettlement	D	Although a part of project site is currently under private ownership, nobody lives in the project site.
2	Local Economy such as Employment and Livelihood, etc	D	Negative impacts such as decrease of fish landing volume at other landing sites will not be expected at this stage, because the project does not aim for the integration of Charlestown and other landing sites.
3	Land Use and Utilization of Local Resources	B	<p>There are two existing fishing gear lockers at the project site. These should be demolished.</p> <p>The public enjoys running on the beach and swimming in the sea on the south of project site. About 60m (10%) of the beach out of total seashore length of about 600 m in Gallows Bay is to be vanished by reclamation in this project. Therefore, there were adverse opinions from the public in the stakeholders meeting for seashore conservation. The Government of NIA has explained against adverse opinion that the beach occupied by the New Fisheries Center is only 10% and the right or wrong of this project is to be judged by EIA result to be executed by Department of Physical Planning of NIA. As the adverse opinion from the public may be possible during EIA execution, the rating was judged as “B”</p> <p>Project site becomes an access road to connect beach and road at present. It is ideal to secure access to beach from hinterland in the Environmental Protection Law of the country.</p>
4	Social Institutions such as Social Infrastructure and Local Decision - making Institutions	D	No local decision - making Institutions exists.
5	Existing Social Infrastructures and Services	D	The existing Fisheries Center is located near project site. and presently run by Cooperatives and the function will be transferred to the New Fisheries Center.
6	The Poor, Indigenous and Ethnic people	D	No squatters, Indigenous and Ethnic people to be consider are not existed.
7	Misdistribution of Benefit and Damage	D	Negative impacts such as decrease of fish landing volume at other landing sites will not be expected because the project does not aim for the integration of Charlestown and other landing sites. Therefore, the possibility to decrease fish landing volume in other landing sites will be minor and negative impact to the consumers in each landing site is less possible.

	Likely Impact	Rating	Reasons
7			The New Fisheries Center will be opened for all fishermen in Nevis Island, so the conflict among these fishermen will not be expected although the gap of fisheries infrastructure widens.
8	Cultural heritage	D	No cultural and historical heritage exists at project site.
9	Local Conflicts of Interest	D	There is a private fish processing company (G.C. Enterprise) in mountain side of Charlestown. There is a possibility of the conflict if the consumers will gather to the New Fisheries Center which is more convenient facility by this project. However, G.C. Enterprise is operated mainly for the export of conch and lobster tying up with fish landing site in Jessup. Therefore, the impact by this project is minor.
			This project site is bordered with the site for Waterfront Re-development Plan aiming the construction of shopping mall for the tourists. NASPA that manages re-development land can clearly separate between port area and fishing port area by this project and the current congested utilization shall be resolved. With this, the impact by this project shall be minor.
10	Water Usage or Water Rights and Communal Rights	D	No impacts are expected. Refer to 15 concerning Groundwater.
11	Sanitation	C	Sanitary condition likely to be worse if inadequate waste water treatment system for residual dross, blood water and etc. from fish processing room was taken.
			There is a possibility of the conflict if other improper treatment system is installed against common system in Nevis Island where cesspool system is used for toilet.
12	Hazards (risk) Infectious Diseases such as HIV/AIDS	D	This project does not construct large scale structures and the number of labors is small therefore, the impact is minor.
Natural Environment			
13	Topography and Geographical Features	C	A part of coastal zone is disappeared by land reclamation.
14	Soil Recession	D	In order to avoid a change of current, pipe pile type jetty is planned and stone revetment is considered to protect hinterland in this project therefore, the impact by soil recession shall be minor.
15	Groundwater	C	There is the private company (Nevis Spring Water Company; NSW) manufacturing spring water at back side of Bath Bogs Protected Area. This area is a wet land located at alluvial fan of Mt. Fountain where water vein exists in its underground. As pile driving work and reclamation work are executed in lower ground than the well of this NSW company, the impact on water vein shall be minor.
16	Lake and river Situation	C	There is a small river on the south of the beach. However, as it is located at about 300m south from the project site, the possibility of impact is minor. Lake does not exist.
17	Coastal zone	B	A part of coastal zone is disappeared by land reclamation. There were adverse opinions from the public in the stakeholders meeting for seashore conservation. NIA has explained against adverse opinion that the beach occupied by the New Fisheries Center is only 10% and the right or wrong of this project is to be judged by EIA result to be executed by Department of Physical Planning of NIA. As the adverse opinion from the public may be possible during EIA execution, the rating was judged as "B"

	Likely Impact	Rating	Reasons
18	Flora, Fauna and Biodiversity	B	<p>The wet land located near project site is named Bath Bogs Protected Area as the habitat of water birds and other animate beings. There is no buffer zone at the border between this protected area and the existing oil tank (currently not used) and the fence becomes the border line. This protected area does not protect special species but the protected area aiming habitat protection of avian species due to the wet land and 28 species of birds were confirmed and it becomes the nesting site.</p> <p>There is a possibility that habitat area is disordered by interfusion of reclaimed soil into wet land, improper dumping of waste, noise and vibration and etc. And the wet land is likely to be contaminated if waste water inflows to wet land by improper water treatment or improper dumping of waste are done during operation. However, there is 100 m distance from project site to the protected area therefore, the impact will be minor if the impact items are well controlled. It will be important to select construction machine considering noise and vibration during construction period. Basically, the impact during construction period is temporal one. And as dredging and excavation works are not included in this project, construction waste is not produced therefore, the impact will be small.</p> <p>Habitats for marine species are decreased because water area is turned to reclaimed land by the project. However, a ship has grounded by hurricane "OMAR" in 2008 and although stone jetty was constructed for clearance of sunken ship, dirt and stone materials of the stone jetty has inflowed to Gallows Bay shore at the time of hurricane in 2009. As the result of diving survey, although bare sea alga out of marine species was confirmed between rocks, almost no marine species at the project area. Only a few numbers of starfishes and sea urchins and 20 to 30 young fishes of mullets and snappers were confirmed. There found no soft coral that may be influenced by turbidity. Like this, as there are almost no marine species in the coastal area in front of the beach, the impact shall be minor.</p> <p>Negative impacts for marine species likely to occur at construction stage because of turbid water. However, same as the above, the impact is considered to be minor.</p> <p>Negative impact for marine turtle likely to occur at construction stage. According to the information from local NGO, Nevis Turtle Group, marine turtles were observed at the beach in Gallows Bay in the past. The habitat of marine turtle was not confirmed during survey period. According to the representative of Nevis Turtle Group, there is no habitat of marine turtle in Gallows Bay at present nor egg laying place. The area where egg laying or inhabitation of the turtles have been observed were Lovers Beach (108, Herbert's Beach(8), Cotton Ground(1) located at north side of Nevis Island in 2008. Therefore, the impact on the turtle shall be minor.</p>
19	Meteorology	D	<p>Handling volume of fresh fishes at the New Fisheries Center will be only about 102 ton and no meteorological impacts are expected.</p>
20	Landscape	B	<p>The project site has a border with the site for Waterfront Re-development Plan which plan to construct shopping mall.</p>

Likely Impact		Rating	Reasons
21	Climate Change	C	Protection of Globe Warming shall be considered.
Pollution			
22	Air Pollution	D	Basically, as present fishing activity is not planned to be expanded more, the increase of exhausted gas is not possible by the increase of vehicles during operation.
23	Water Pollution	C	The impact is minor since steel pipe pile type jetty structure which is not influenced on the change of current is planned.
			There is a possibility of water contamination if the water to process fishes and toilet is discharged to sea without treatment in this project.
			There is a possibility to inflow dirt and sand to seawater at the time of land filling.
24	Soil Contamination	D	There is a possibility of water contamination since this project site is made by reclamation if construction debris and waste are disposed to sea.
24	Soil Contamination	D	As it takes about 100 m to Bath Bog Protected Area from the project sit, reclamation sand shall not inflow to the protected area. As the result execution of environmental chemical analysis for peat layer existed underground of the project site, soil contamination was not confirmed.
25	Waste	C	Construction debris or garbage from labors is produced during construction period.
			During operation, waste like process residual dross from fish processing room is produced.
26	Noise and Vibration	B	Although, there is about 50 m distance between the project site and households, negative impacts of noise and vibration on the households near project site by moving of construction vehicles and heavy machines during construction period will be expected.
27	Ground Subsidence	B	As the result of boring investigation, soft peat layer was found with about 3m thickness. Due to this, consolidation settlement is possible in reclamation area. Crack or settlement shall be generated by the long-term settlement if the exterior area will be paved by concrete.
28	Offensive Odor	C	There is a possibility that odor is generated if improper treatment for residual dross from fish processing room is done.
29	Bottom Sediment	C	There is possible bottom sediment if rubbish or residual dross of fisheries processing room from the New Fisheries Center are discharged to sea without treatment.
30	Accident	C	As neighboring area of project site is one-way traffic and always congested, there is a possibility of traffic accident if construction vehicles pass through during construction period.

Rating;

A: Serious impact is expected,

B: Some impact is expected,

C: Extent of impact is unknown,

D (or No Mark): No impact is expected. IEE/EIA is not necessary.

(2) Countermeasure and Mitigation

Mitigation measures for negative impacts in Table -1.3(1) are shown in Table-1.3(2).

Table-1.3(2) Assumed impacts and the mitigation measures

Likely impacts/Rating		Assumed impact items	Mitigation measures
3	Land Use and Utilization of Local Resources	B <p>There are two existing fishing gear lockers at the project site. These should be demolished.</p> <p>About 60m (10%) of the beach out of total seashore length of about 600 m in Gallows Bay is to be vanished by reclamation in this project.</p> <p>Project site becomes an access road to connect beach and road at present. It is ideal to secure access to beach from hinterland in the Environmental Protection Law of the country.</p>	<p>22 new fishing gear lockers shall be planned by this project.</p> <p>The reclamation area has been decreased from original 2,400m² to 2,009m² by reducing the number of fishing gear lockers (from 27 to 22) and the area of one locker (from 2.5m x 2.5 m to 2m x 2m). With these reductions, beach disappearance shall be minimized.</p> <p>The approach is secured by making promenade at the backside of revetment as well as public access in this project.</p>
11	Sanitation	C <p>Sanitary condition likely to be worse if inadequate waste water treatment system for residual dross, blood water and etc. from fish processing plant was taken.</p> <p>There is a possibility of the conflict if other improper treatment system is installed against common system in Nevis Island where cesspool system is used for toilet.</p>	<p>Concerning residual dross such as fish scale and gut is removed by strainer at water discharging process and collected by Solid Waste Management Authority and recycled to fertilizer by the Ministry of Agriculture. And a proper water treatment facility (purifying tank) is planned for treating blood water and its impact will be minor.</p> <p>Execution of periodical monitoring for waste water from the New Fisheries Center after completion of facilities is planned.</p> <p>According to the hearing from Environmental Health Service Division, cesspool system means to take sludge content accumulated in the bottom of pool and purifying structure is the same as common septic tank therefore, it will not be the problem. It is rather important to sustain its treatment capability with less than 20 mg/l which is the discharging standard in Japan by periodical maintenance management after operation of facilities. And, it is also important to check discharging water from the New Fisheries Center by periodical water quality inspection.</p>
13	Topography and Geographical Features	C <p>A part of coastal zone is disappeared by land reclamation.</p>	<p>The reclamation area has been decreased from original 2,400m² to 2,009m² by reducing the number of fishing gear lockers and the area of one locker. With these reductions, beach disappearance shall be minimized.</p> <p>The plan is considered that the reclamation alignment will not be largely moved to seaside than the shoreline of existing revetment.</p>

Likely impacts/Rating		Assumed impact items	Mitigation measures
15	Groundwater	C There is the private company (Nevis Spring Water Company) manufacturing spring water at back side of Bath Bogs Protected Area. This area is a wet land located at alluvial fan of Mt. Fountain where water vein exists in its underground. As pile driving work and reclamation work are executed in lower ground than the well of this NSW company, the impact on water vein shall be minor.	Water Quality inspection of NSW well after completion shall be executed. Discharging water from the New Fisheries Center shall be periodically monitoring.
16	Lake and River Situation	C There is a small river on the south of the beach. However, as it is located about 300 m off south from the project site, the possibility of impact is small by the implementation of this project. Lake does not exist.	Execution of monitoring for river water after completion of facilities. Discharging water from the New Fisheries Center shall be periodically monitoring.
17	Coastal Zone	B A part of coastal zone is disappeared by land reclamation. There were adverse opinions from the public in the stakeholders meeting for seashore conservation.	The reclamation area has been decreased from original 2,400m ² to 2,009m ² by reducing the number of fishing gear lockers and the area of one locker. With these reductions, beach disappearance shall be minimized.
18	Flora, Fauna and Biodiversity	B There is a possibility that habitat area is disordered by interfusion of reclaimed soil into wet land in Bath Bogs Protected area, improper dumping of waste, noise and vibration and etc. And the wet land is likely to be contaminated if waste water inflows to wet land by improper water treatment or improper dumping of waste are done during operation.	The operation of construction machines on Sunday and at night during construction period shall be prohibited. Low noise and vibration type construction machines shall be used. Aeration septic tank to meet with the discharging standard of BOD 20mg/L. Discharging water from the New Fisheries Center shall be periodically monitoring.
20	Landscape	B The project site has a border with the site for Waterfront Re-development Plan which plan to construct shopping mall.	This plan shall consider the landscape of Waterfront Re-development Plan and people's trend line, as well as the landscape of Nevis traditional building which stones is used in wall of the New Fisheries Center and install balcony at second floor.
21	Climate Change	C Protection of Globe Warming shall be considered.	The equipment to be saved electricity and water shall be selected.
23	Water Pollution	C There is a possibility of water contamination if the water to process fishes and toilet is discharged to sea without treatment in this project. The inflow of dirt and sand to seawater is likely at the time of land reclamation and jetty construction. There is a possibility of water contamination since this project site is made by reclamation if construction debris and waste are disposed to sea.	Aeration septic tank to meet with the discharging standard of BOD 20mg/L. Discharging water from the New Fisheries Center shall be periodically monitoring. Silt fence shall be installed.

Likely impacts/Rating		Assumed impact items	Mitigation measures
25	Waste	C Construction debris or garbage from labors is produced during construction period. During operation, waste like process residual dross from fish processing room is produced.	Concerning construction waste soil, the Government of NIA shall prepare the disposal area and transport it. Concerning discharged water from the construction site, simple toilets shall be installed and the private company will periodically collect by vacuum wagon. Concerning construction debris and waste shall be transported periodically to waste disposal area located at southeast of the island by Solid Waste Management Authority of NIA.
26	Noise and Vibration	B Although, there is about 50 m distance between the project site and households, negative impacts of noise and vibration on the households near project site by moving of construction vehicles and heavy machines during construction period will be expected.	The operation of construction machines on Sunday and at night during construction period shall be prohibited. Low noise and vibration type construction machines shall be used.
27	Ground subsidence	B As the result of boring investigation, soft peat layer was found with about 3m thickness. Due to this, subsidence is possible in reclamation area.	Building is supported by pile foundation. The revetment is filled with stones waiting the subsidence once after constructed and the coping concrete shall finish with certain height calculating long term subsidence. The surface shall be rolling compaction finish by mechanically stabilized crushed stone or lawn finish. After long term subsidence is completed concrete pavement is going to be executed by the NIA. Flexible joints are installed to bend sections of water supply and power supply pipes calculating long term subsidence. The monitoring for ground subsidence is also executed after facilities completion by the NIA.
28	Offensive Odor	C There is a possibility that odor is generated if improper treatment for residual dross from fish processing room is done.	These are periodically carried to agricultural field by the Ministry of Agriculture and recycled as fertilizer.
29	Bottom Sediment	C There is possible bottom sediment if rubbish or residual dross of fisheries processing factory from the New Fisheries Center are discharged to sea without treatment.	Concerning residual dross such as fish scale and gut is removed by strainer at water discharging process and collected by Solid Waste Management Authority and recycled to fertilizer by the Ministry of Agriculture. And a proper water treatment facility (Aeration septic tank) is planned for treating blood water and its impact will be minor. Execution of periodical monitoring for waste water from the New Fisheries Center after completion of facilities is planned.
30	Accident	C As neighboring area of project site is one-way traffic and always congested, there is a possibility of traffic accident if construction vehicles pass through during construction period.	Accident with general vehicles can be avoided restricted traffic of general vehicles by policeman or traffic controller during construction period. Construction vehicles shall be prohibited to pass through urban area at the time of congestion or commuting time to school in the morning and at the evening.

(7) Study for Project Site Alternatives

There are 7 landing sites in Nevis Island of which Charlestown was lead to final conclusion as most appropriate one after the study of alternative site. In view of natural environment, the land of Charlestown is used as port area, residential area and etc. While, the other landing sites are natural sandy beach although there are some landing sites equipped with jetty facilities, almost undeveloped conditions as the situation of land usage. And in view of social environment, Charlestown has the most landing volume and the number of fishermen out of all landing sites and there is a terminal for the regular ferry from St. Kitts Island and the project site neighboring the terminal, so the location has the most physical advantage to sell fresh fishes to ferry passengers. Under the zero option that the project will not be implemented, the negative impacts shall be avoided that are assumed when the project is implemented. However, while current inefficient operation or fisheries distribution shall not be improved the people in Nevis Island will continuously suffer the long-term negative impacts such as the valuable foreign currency for the imports of marine products due to the shortage of domestic marine products.

Chapter 2
Contents of the Project

Chapter 2 Contents of the Project

2-1 Basic Concept of the Project

2-1-1 Relation between National Development Plan and the Project

Relationship Diagram between this project and “Strategic Objectives of National Development Plan” and “Fisheries Development Plan” is shown in Figure-2.1.1(1). This project aims for 1) Construction of fisheries infrastructure at the base of fish landing site, 2) Improvement of distribution to supply hygienic and fresh marine products and these are met with the policy of National Development Plan.

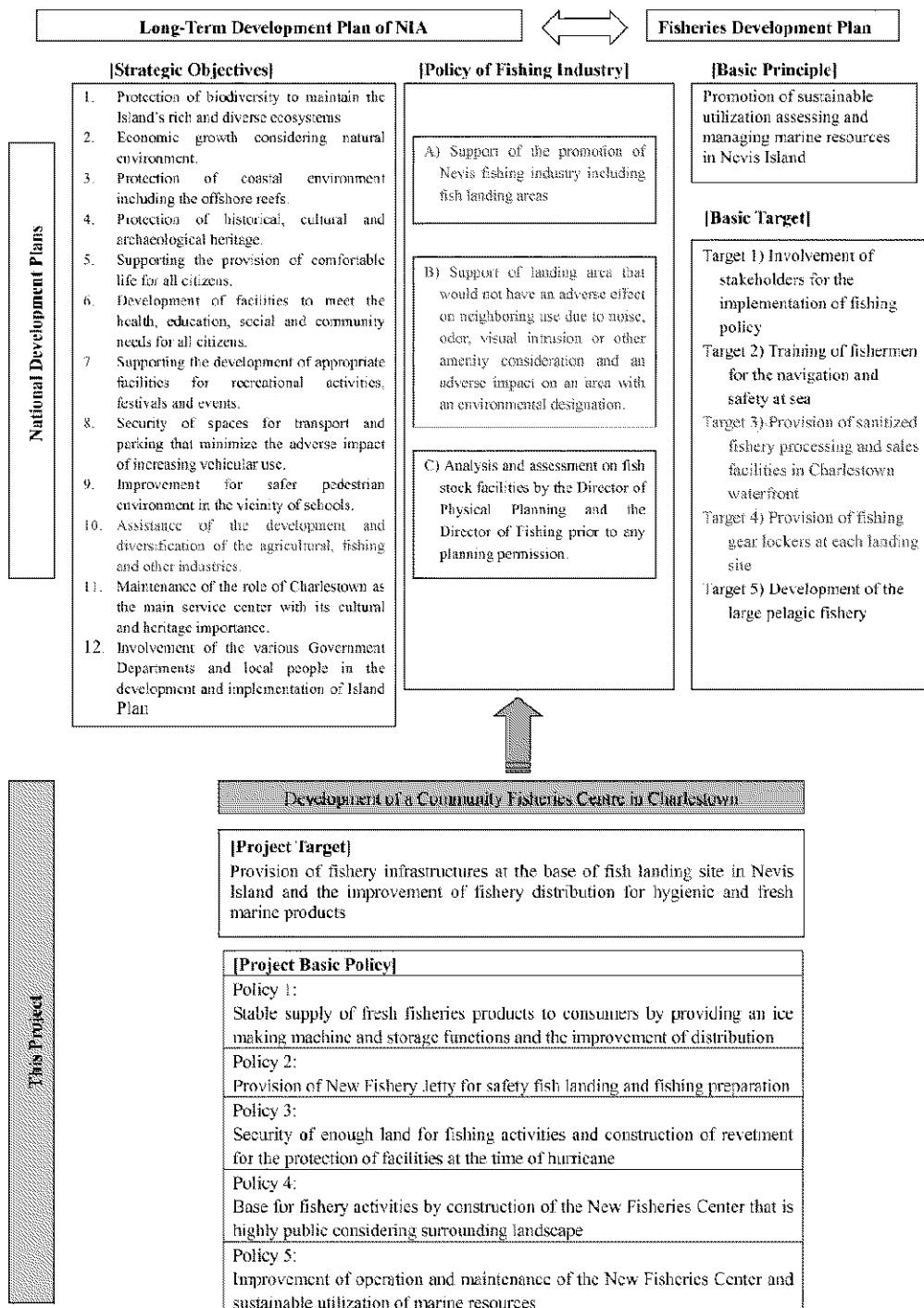


Figure-2. 1.1(1) Relation between National Development Plan and the Project

2-1-2 Project Description

(1) Problems and Issues in Project Site

1) Problems and issues of fish landing sites in Nevis Island

- (a) Loosing freshness and harvest loss after fish catch due to no ice supply facility and storage facilities and the fishery activity is limited to the coastal fishing by day fishing.
- (b) As each landing site was born naturally without any special facilities and the management function is still poor, therefore, the accurate distribution volume can not be collected due to the poor supporting function for fish landing.
- (c) Fishes are sold on an irregular base and the stable supply to consumers has not been done.
- (d) In order to purvey the demand of domestic marine products frozen fish and processed fish are relied on the import. (Foreign Currency Outflow)

2) Problems and issues at project site in Charlestown

- (e) Charlestown is the largest consuming place in Nevis Island however, the existing Fisheries Center is not just about functioned and the immediate sales after fish catch is forced to fishermen in order not to loose freshness after catch where the project site has no function to store fresh fishes. And, the impact of sea swell is continued about a week when hurricane is attacked and the fishery activities are limited during the period and distribution function of fresh fish is also went down.
- (f) Big users like hotel, restaurant and super market can not stably purchase marine products from Charlestown landing site since there is no storage function of fresh fishes nor the stable sales volume.
- (g) Safe and efficient landing and preparation works can not be done at the existing fishery jetty of Charlestown as the length of the Existing Fishery Jetty is short and it is easy to be influenced with waves from offshore and reflected wave from revetment. Therefore, the tourist jetty at the ferry dock is utilized.
- (h) At present, fish landing activity in Charlestown is done around port area however, the existing facilities can not be used in the long run due to the Waterfront Re-development Plan including the existing Fisheries Center.
- (i) Marine products after landing around project site are sold on the road under the scorching sun although the sales on road is basically prohibited and proper hygienic and quality control are not done.
- (j) As there is no shadow nor resting facilities for fishermen and local residents (consumers) on the Fishery Jetty or around the sales area.
- (k) Emergency evacuation is done for fishing boats to use boat trailer from the beach before hurricane hit however, it is heavy burden for fishermen to rent it with fee since there are no public boat trailers.
- (l) As the existing ground level of project site is lower than the existing revetment and the ground level of hinter land, discharged rain water is concentrated at the time of heavy rainfall.
- (m) There is a little space being necessary for fishery activities in the hinterland of Charlestown

landing site therefore, car parking and street sales of fresh fish are forced on road. And only two fishing gear lockers are available therefore, most of fishermen are forced to transport fishing gears to their home by pick-up truck.

- (n) There is no assembly hall for the general meeting of Cooperatives, fishery training work, fisheries extension workshop, enlightenment and etc. in Charlestown landing site therefore, the utilization of Red-Cross Office in the town is obliged to use for these assemblies.

3) Problems and Issues of Existing Fisheries Center

[Hard Issues]

- (o) The existing Fisheries Center has been constructed by CIDA (Canadian International Development Agency) in 1986 and the ageing problem is significant since 25 years have been passed.
- (p) The entrance of sales booth is located at site being distant from road where is bad ventilated and no air-conditioned. Therefore, there is stuffy, exclusive and gloomy atmosphere and causes not to be visited by consumers.
- (q) As the tourist jetty in front of the existing Fisheries Center is not exclusively used for fishery activities but for tourists in the season, it is lack of a convenience for fish landing. And, in addition to the narrow receiving entrance, it has a traffic line that must pass through sales booths congested with consumers when fishes are transported to the fish processing room.
- (r) The fish processing room is narrow and there is no cold storage. And, the existing cold storage has been deteriorated and only chaste freezers with limited frozen capacity.
- (s) Fresh fish sales volume is quite small and fish sales table is not used at all by fishermen.
- (t) Sales for fishing gears actually use as storage of goods since the sales space is too narrow.
- (u) Regular conference for board meeting of Cooperatives is held using integrally with the sales space for fishing gears due to the narrow space.

[Operational Issues]

- (v) The existing Fisheries Center is closed on Saturday in which day have more fish landing volume and it is not convenient for both fishermen and consumers.
- (w) Fishermen have no merit to handle fishes in the existing Fisheries Center where fish volume to be able to hand is small.
- (x) Adequate fishes are not secured for its processing due to the lack of frozen and chilled storing capacity as well as financial leeway.
- (y) The attractive operation for consumers is not done since the species and the volume of fishery stock are small.
- (z) The existing Fisheries Center is loosing big money and there is no management now under the situation that a secretary acts for a manager's work who resigned in July, 2010.

(2) Project Target

Consumers are to be able to get fresh and hygienic marine products easily.

(3) Objects of the Project

This project aims to construct New Fisheries Center as the base facility for artisanal fisheries in Charlestown for the promotion of the work efficiency of sales and distribution status for marine products in Nevis Island and fishermen and for supplying hygienic and fresh marine products to people and tourism industry in Nevis Island.

(4) Project Site

Charlestown, Nevis Island, Saint Christopher and Nevis.

(5) Project Components

1) Japanese side

- (a) Construction of new fishery jetty
- (b) Construction of revetment
- (c) Land reclamation for new fisheries center
- (d) Construction of new fisheries center
- (e) Construction of fishing gear lockers
- (f) Construction of work shop
- (g) Construction of storage for large fishing gears and toilet
- (h) Procurement of equipment
- (i) Soft Component for maintenance and operation of new fisheries center

2) The Nevis Island Administration (NIA) side

- (a) Land acquisition for project site
- (b) Execution of EIA, acquisition of environmental permission and approval of facilities construction
- (c) Security of temporary yard near project site
- (d) Security of dumping area for waste soil generated during construction period
- (e) Utilization of tourist jetty for fish landing during construction period
- (f) Removal of a power pole near project site
- (g) Removal of existing two fishing gear lockers located back side of project site
- (h) Provision of electricity, water and telephone line to project site
- (i) Installation of fuel supply facility and fire hydrant
- (j) Installation of fence and gate around project site
- (k) Procurement of repair equipment and tools at work shop for repairing outboard engine (work shop building is included in Japanese side)
- (l) Planting lawn and its maintenance in exterior area
- (m) Monitoring and countermeasures against secondary consolidation settlement after the completion
- (n) Installation of general furniture and fixtures such as desks and chairs
- (o) Collection and treatment for sewage, rubbish and etc. after completion of facilities

- (p) Security of personnel and budget for maintenance and operation of facilities
- (q) Taking care of sedimentation and erosion generated around civil facilities after the completion
- (r) Tax exemption
- (s) Payment for bank commission

(6) Responsible Agency

Responsible Ministry:

Ministry of International Trade, Industry, Commerce, Agriculture,
Marine Resources, Consumer Affairs and Constituency Empowerment,
Federal Government,
Saint Christopher and Nevis

Implementation Agency:

Ministry of Agriculture, Lands, Housing, Co-operatives and Fisheries,
Nevis Island Administration (NIA) (Ministry of Agriculture for short)

2-2 Outline Design of the Japanese Assistance

2-2-1 Design Policy

2-2-1-1 Study on the Requested Component

(1) Requested component from the NIA

Table-2.2.1(1) List of Requested Component from the NIA

No.	Requested component	Priority (Minutes)	Study Result	Remarks(Spec. etc)
1	Main fisheries building as New Fisheries Complex			Considering landscape
1-1	High hygiene standard fish processing, handling and selling facilities	A	O	
1-2	Cold storage(Chest freezer: 3 tons, refrigerator: 0.5 tons)	A	O	Freezer 3 tons Insulated room 0.5 tons
1-3	Administration quarter	A	O	
1-4	Laboratory quarter (wet and dry usage)	B	X	Utilization of open space of fish processing room
1-5	Store rooms	A	O	
1-6	Other utility quarters (Air conditioning, etc.)	B	O	Excluding direct selling booth by fishermen
1-7	Ice making unit	A	O	1.5 tons/day
1-8	Workshop for engine repair and maintenance	B	O	Building only
1-9	Space for fuel station	A	O	Space only
1-10	Fishing gear shop	A	O	
2	Water tank and related supply system			
2-1	10 ton capacity (cistern type) tank with powered supply pipe, etc.	A	O	

3	Waste Treatment Installation as sanitary device			
3-1	Holding tank	A	O	
3-2	Drains/Drainage System	A	O	
4	Gear Lockers			
4-1	(8'x8') 27 units	A	O	22 units only
5	Equipment			
5-1	Ice boxes (insulated box) @100 litre capacity 30pcs	B	O	
5-2	Lab material assorted as appropriate 1lot	B	X	
5-3	Scales for weighing Large type 2pcs, Small type 2pcs	B	O	
5-4	Engine flushing tank 1 unit	B	O	
5-5	Emergency generator	A	O	Ancillary of building
5-6	Equipment for fish processing(Additional) 1) Processing Table 2) Band Saw 3) Tray and vacuum package machine 4) Mixer/ Grinder 5) Automatic Patty Machine 6) Borne removing machine	A B A B B B	O X O X X X	Reusing existing one Premature Premature Premature
5-7	Air Compressor for diving tank	B	O	
5-8	1 boat trailer (additional)	B	O	
6	New Fishery Jetty			
6-1	Fish landing jetty	A	O	
6-2	Complete with mooring fender system and bollards, lighting units and water pipe lines	A	O	
6-3	Navigation light	A	X	
7	Shore Protective Work as Sea Defense Structure			
7-1	Shore line revetment	A	O	
8	Land Reclamation	A	O	
9	Exterior Works			
9-1	Car parking lot	A	O	
9-2	Pavement interior the site premises for new complex	A	O	Mechanically stabilized crushed stone or lawn finish
9-3	Lighting	A	O	
10	Technical Assistance (Soft Component)			
10-1	Maintenance and operation for Fisheries Center	A	O	

Priority A: Essential function to meet with the aim (First priority)

Priority B: Basically it is considered to be necessary but wait for final judgment after study (Second priority)

O : Including the project X : Excluding the Project

(2) Study on the requested component

1) Civil Facilities

(a) New Fishery Jetty

As the existing fishery jetty is short with the length of about 20m, safe and effective landing and preparation for fishing are not properly done due to the profound influence to mooring fishing boats by wave. And, wooden deck of the jetty is damaged by hurricanes hit during August to

November every year. Therefore, fishing boats use the tourist jetty. As this tourist jetty is the port facility and it is used by tourist boats transferred from cruise ship mooring offshore in high season, the mooring of fishing boats is restricted to use. And, the port area is to be sectionalized with a port function and a fisheries function under the Waterfront Re-development Plan by the NIA in the near future. Jetty slab, mooring deck and connection between piles and beams of this tourist jetty have been severely damaged by hurricane "EARL" which hit during the survey period. As stated, it leads to a high necessity and an urgency of the new fishery jetty.

(b) Revetment

It is necessary facility to protect facilities at land filling project site. Concerning facilities planning, the first priority is to protect the project site and consider the usage for the people living behind the revetment.

(c) Land Reclamation

As the project site is located at beach and water area of Gallows Bay where is neighboring to the port area, land reclamation is necessary when implement this project. It calls special attention on the retreat of shore line during hurricane season and the peat layer which is soft ground in seashore and sea bottom ground with about 3 m thickness.

2) Architectural Facilities

(a) Main Fisheries Building as New Fisheries Complex

The existing Fisheries Center is about 100 m off from the fishery jetty for fish landing and the locational condition is not good what is worse, it is deteriorated since 25 years have passed after construction. And, as long-term utilization can not be expected due to the Waterfront Re-development Plan, the necessity and the urgency to construct the New Fisheries Center is very high.

The New Fisheries Center is the core facility of this project to handle, process, sell fresh fishes and store marine products caught and include following functions.

- a) Fish landing from fishing boats and preparation for fishing
- b) Direct sales of fresh fish by fishermen
- c) Fisheries processing product sales
- d) Ice supply
- e) Fuel and water supply
- f) Storage of fishing gears, outboard engine and etc.
- g) Repair of outboard engine
- h) Sale of fishing gear
- i) Air filling for scuba tanks
- j) Facility management
- k) Furnishing places for fishermen's training and conference

(b) Direct Sales Booth by Fishermen

This is the booth to sell fresh fishes directly to general consumers by fishermen themselves and the plan is to make relocate the street sellers into this center. And, at the same time, as primary processing of fresh fishes (scaling and gutting) by cleaner is done on the street, such space is also necessary.

(c) High Hygiene Standard Fish Processing, Handling and Selling Facilities

This is the space for purchasing fishes to sell by the New Fisheries Center, processing and selling by direct management of the Center and consist of entrance, fish receiving room, fish processing room, processed fish sales booth, and locker room. Present sales conformation in the existing Fisheries Center shall be transferred to the New Fisheries Center. And, there install showcases to display fishes for consumers in processed fish sales booth. Existing freezer for drinks and chest freezers for fish shall be moved from the existing Fisheries Center.

(d) Cold Storage

As cold storage facilities (refrigerator and freezer) of the existing Fisheries Center are lack of its capacity and the fish purchase is obliged to adjust at present, the NIA has requested strongly. Freezer is necessary to store for a long time freezing fresh fishes after processed. Refrigerator is necessary to store cold fresh fishes processed for a few days for sales however, judging from actual condition of distribution of marine products and the cost for maintenance and operation, it shall be insulated room by ice.

(e) Administration Quarter

This is administration space to operate the center consisting of manager room, secretary/accounting room, other managing staff room, kitchen, toilet and others. And a room for Cooperatives is also allocated. Conference room is necessary for regular meeting of New Fisheries Center, regular meeting for Cooperatives, place for fishermen's education and training.

(f) Laboratory Quarter (Wet and Dry Usage)

This space was requested to be used for safety inspection and sensory test when ciguatera toxins is generated but the open space in fish processing room shall be applied for it and exclusive laboratory space shall not be planned.

(g) Store Rooms

Store room is used for storing material and fish boxes, equipment, cleaning things, chairs and tables in conference room and others.

(h) Other Utility Quarter (Air conditioning and etc.)

Air conditioner is allocated to administration room, conference room, fish receiving room, fish processing room, processed fish sales booth and fishing gear shop and ventilating fan is installed

at direct sales booth by fishermen, storage for large fishing gears, toilet and machine room.

(i) Ice Making Unit

Ice for fishing is not used for trap fishing to catch reef fish and net fishing to catch coast pelagic fish. Ice is only used for trawling and long line fishing in Johns Bay and New Castle. In order to supply hygienic and fresh fishes to consumers, hotel, restaurants and super market, ice for fishing and distribution is inevitable to be used. And, ice storage room shall also be equipped for effective storage of produced ice.

(j) Work Shop for Engine Repair and Maintenance

Currently, simple repair work of outboard engine is done under a tree at back side of project site. This facility is considered to be necessary as basic infrastructure to support fishermen however in this project, only work shop building is planned. Ministry of Agriculture intends to lease the space for private company.

(k) Space for Fuel Station

As one of incentive to use the New Fisheries Center, Ministry of Agriculture is to plan a subsidy for fuel supply to fishing boats. Therefore, it is indispensable to secure place for fuel tank and the sales space for the New Fisheries Center although the installation of fuel tank and fuel supply facility is asked to local oil company.

(l) Fishing Gear Shop

Cooperatives sell fishing gears and material with discount in the existing Fisheries Center and the same function shall be transferred to this center.

(m) Water Tank and Related Supply System

As tap water in Nevis Island is hard water including high in calcium and not good for making ice, rain water tank is necessary to effectively utilize rain water to the utmost extent. And, in preparation for empty at the time of dry season, other tank to receive tap water is also planned. Purification unit shall be furnished to use tap water for making ice.

(n) Waste Treatment Installation as Sanitary Device

(i) Holding Tank (Sewage Tank)

As the result of discussion with the NIA, septic tank with proper purifying facility is planned in stead of sewage tank of old style to clean up.

(ii) Drains/Drainage System

Drainage water facility from urban area is already there in outside of project site. Rain water in project site shall be conserved in water storage tank however, a facility to properly drain rain water at the time of heavy rain is necessary. And, sea water overtopped revetment at the time of

hurricane hit is also necessary to drain properly. Drainage structure along with outside of project site is heavily deteriorated and unable to hold vehicles load coming into project site therefore, its restoration is necessary.

(o) Gear Lockers

Fishing gears, outboard engine, safety tools and others are carried back to each fisherman's home and store after fishing every time and it is a burden for fishermen. Therefore, fishing gear lockers are necessary to place those equipment and tools.

(p) Exterior Works (Car parking, Pavement, Lighting for Security)

Project site is made by land reclamation of seashore. Exterior facilities are necessary for New Fisheries Center as ancillary works. Practically, car parking, inner road, rain water drainage, lighting, repair of existing water drain structure shall be planned. Although, these are listed as civil work in the requested component but these correlate deeply with architectural work and they are planned as architectural facilities.

3) Equipment

(a) Ice Boxes

There are many fishermen who have no ice box since the time for fishing and its sales is short in pot fishing. The ratio of fishermen who use no ice at all is about 40%. However, dissemination of ice is definitely necessary to constantly supply quality fresh fishes and the adoption of rental ice box is necessary to improve ice usage ratio after catch.

(b) Lab Material Assorted as Appropriate 1 lot

Test contents in this center are the sensory test (fresh fish appearance, color, odor, tactile impression and other tests for freshness judgment) and the ciguatera toxins test. It is confirmed that the equipment is not specially needed in the sensory test and commercially available test kit is used in the ciguatera toxins test. Laboratory equipment and kit as necessary shall be supplied by the NIA and this shall be out of scope in this project.

(c) Scales for Weighing

These are inevitable as equipment to use when fresh fishes are purchased and sell them in this center and according to the measuring volume, two kind of measuring apparatus shall be furnished.

(d) Engine Flushing Tank

New Castle where many fishermen use fishing gear lockers furnish engine flushing tank and it is utilized as cleaning work before storing outboard engines to lockers. As this project does include the installation of fishing gear lockers and it is inevitable to clean outboard engine before the storing, the supply of the engine flushing tank is considered to be necessary.

(e) Emergency Generator

Power supply in Nevis Island is relatively stable though blackout for a few hours to a few days

is occurred frequently including planned outage at the time of hurricane. It was suffered 20 hours power off when hurricane "EARL" hit in August 2010 during survey period of this project. Blackout has been occurred when like this hurricane has hit so self power supply to ice making machine and others is inevitable to maintain the center function. This emergency generator is planned as a part of architectural facility.

(f) Equipment for Fish Processing

The NIA aims for utilization diversion from the demersal fish which catch volume is big to pelagic fish which has large room for further development. It intends to stimulate consumer's demand and strengthen the sales of value added products by providing pelagic fish as processed product which has originally low value as the fresh fish. Requested equipment for fish processing are processing table, band saw, tray and vacuum package machine, mixer/grinder (mincing machine), automatic patty machine, borne removing machine (automatic fillet machine) and they reflect above intention strongly.

Processing table and vacuum packaging machine requested can be adopted since it is necessary to maintain and expand the function of this center. However, other equipment which aim for mass production are to be properly furnished as part of future activity based on long term view and regard as out of scope from this project according to the following reasons.

- (i) Although the request to have added value on marine processed products is understandable, this project shall put emphasize on the resolution of problems of the existing Fisheries Center, relocation from street vending to hygienic indoor sales and stable supply of marine products to consumers.
- (ii) Incidental fisheries processing equipment are considered to be too early for the marine products market in Nevis Island which the main is fresh fish distribution should induce after the New Fisheries Center is functioned smoothly.

And, as the band saw has just purchased by the existing Fisheries Center in May, 2010, it is excluded from the project. While, it is considered to be appropriate to adopt the sales table when fishermen sell fish by themselves in the New Fisheries Center.

(g) Air Compressor for Scuba Tank

Scuba is often used for conch and lobster catch and spear fishing. Fishermen engaged in diving by scuba are doing fishing every time coming up Jessup and get scuba tanks with full air in the morning and return them and land conch and lobster after fishing. The cost of the full air tank is EC\$16.00/cylinder and it is set off from the expense of landed products.

The NIA has strongly requested to include this equipment with the following reasons.

- (i) About 30 members of Cooperatives are engaged in diving by scuba. However, since only one private fish processing company (G.C. Enterprise) owns air compressor, fishermen make the contract to sell their catches only to G.C. Enterprise.
- (ii) It shall be possible to sell conch and lobster to the New Fisheries Center by fishermen if the air compressor is provided in the Center.

- (iii) Diving equipment such as scuba tank and regulator shall be purchased by the NIA and let them out to fishermen.

As the result of survey is shown below, since fishing conchs and lobsters by diving is occupied by G.C. Enterprise which owns air compressor to rent the scuba tanks to fishermen and make fishermen supply their catches, there is a negative effect that no newcomers can get into the fishing, therefore, it is considered to be appropriate to include this air compressor into this project. And, as G.C. Enterprise handles the export of conch and the New Fisheries Center does not handle up to the export, it is considered that the possibility to depress private business is minor by the provision of this air compressor.

- (i) Diving shop (Scuba Safari) at the hotel in Jones Bay owns air compressor other than G.C. Enterprise in Nevis Island. However, because the air filling fee is EC\$20.00/cylinder which is more expensive than EC\$16.00/cylinder of G.C. Enterprise, the location is at Jones Bay where is far from Charlestown and this is for only leisure diving of tourists and not filling for fishermen, G.C. Enterprise is still in monopoly situation.
- (ii) As the result of hearing survey from full time fisher member of the Cooperatives, many fishermen wish to newly enter into the fishing if air compressor is installed in the New Fisheries Center.
- (iii) Department of Fisheries is planned to induce license system for the dive fishing in view of the sustainable utilization of marine resources taking occasion to install this equipment.

(h) Boat Trailer

As there is no port facility such as a breakwater to be safely evacuated from extreme waves generated by hurricane in Nevis Island, fishermen make their fishing boats evacuate onto land at the time of hurricane. In this case, small boat like 20ft length can be rolled up on wooden skid however it takes a method to be hoisted by truck crane owned by private company, transport to home and store there for larger size boats. As the cost of this truck crane is US\$100.00 per one time and the same cost is necessary when returns to water, fishermen owe heavy burden. At present, Four Seasons Hotel owns two boat trailers but it is confirmed that the NIA has no boat trailer to be rented for fishermen. Therefore, in order to protect fishermen's possession by quick evacuation a boat trailer is necessary and it is considered to be appropriate to be adopted in this project.

4) Soft Component (Technical Assistance)

Soft component has been requested by NIA side as to the operation and maintenance of the New Fisheries Center. Fishermen can be possible to sell fresh fishes directly to consumers and the center in the facility by the completion of this project and the provision of New Fisheries Center. However, it shall be inevitable that the operation and maintenance works shall be properly executed in the New Fisheries Center since the existing Fisheries Center is not well functioned due to the design defects, facility deterioration, the operation management and etc.. It is necessary to transfer the operation and management technique for the New Fisheries Center being adoptable considering present handling system of marine products since there is no enough knowledge as to

the operation and maintenance of the New Fisheries Center in Nevis Island.

2-2-1-2 Design Policy

(1) Project Basic Policy

This grant aid cooperation aims to solve the problems on the sales and distribution conditions of marine products and the work efficiency of fishermen in Nevis Island. In order to conduct the Soft Component on the facilities and equipment related with fisheries landing and distribution, making out the operation and maintenance plan of New Fisheries Center that is conducive for their smooth operation and maintenance and etc. the plan was made based on the following policies.

Table-2.2.1(2) Project Basic Policy

Basic Policy 1	Stable supply of marine products with high freshness to consumers by inducing an ice making and cold stage function and the improvement of distribution
Facilities and Equipment	Ice making machine, storage facility, direct sales booth by fishermen, sales booth for processed fishes
Output	<ol style="list-style-type: none"> 1) It will be easier to buy quality marine products for consumers without time binding. 2) It will be easier to buy certain volume of marine products periodically for big users like hotels, restaurants and super markets. 3) It will be possible to buy marine products right after hurricane hit and the impact to the distribution of marine products will be lightened. 4) Keeping freshness of marine products can be possible and lightened the impact of fish value loss. 5) It contributes to get out from dependence on import of frozen and processed fishes. 6) It contributes to the development of offshore pelagic fishing which is in National Development Plan in addition to coastal fishing by using ice when fishing boats are in operation.

Basic Policy 2	Construction of a jetty for fish landing for safe landing and preparation works by fishermen
Facilities and Equipment	Fishery jetty
Output	<ol style="list-style-type: none"> 1) Congestion between fishing boats and tourists boats can be avoided and the safety is secured by the separation of port facilities and fishing port facilities. 2) The jetty utilization rate will be improved by the improvement of safety in landing preparation works through the lightened impact of swells and reflected waves from revetment.

Basic Policy 3	Security of necessary land for fishing activities by the reclamation work and protection of hinterland and facilities at the time of hurricane by the construction of revetment can be attained
Facilities and Equipment	Land reclamation, New Fisheries Center, fishing gear lockers, revetment, retarding basin, drainage facility
Output	<ol style="list-style-type: none"> 1) Minimum necessary land can be secured by land reclamation in Charlestown fish landing site and basic facilities (New Fisheries Center, Fishing gear lockers and etc.) as fishery base in urban district of Nevis Island can be provided. 2) Important hinterland can be maintained by constructing revetment, retarding basin, drainage facility considering situation of overtopping at the time of hurricane.

Basic Policy 4	Base for fishery activities can be established by the construction of New Fisheries Center which is easier for consumers and fishermen to access and is highly public considering surrounding landscape
Facilities and Equipment	Promenade (backside of revetment), gazebo, inside sales booth(marine products and fishing gears), fishing gear lockers, toilet, public access road, car parking lot
Output	<ol style="list-style-type: none"> 1) Fishery base which contributes to tourism and resident can feel familiarity with it can be possible by integrated construction of adjoining port facilities, landscape in the Waterfront Re-development Plan and promenade. 2) Hygienic sales of marine products by fishermen will be possible not under the scorching sun but inside of building. And, consumers can buy marine products without time binding and the access to New Fisheries Center can be easier by providing car parking lot. 3) Street parking near project site can be mitigated by providing car parking lot. 4) Bath Bogs Protected Area can be maintained by providing green zone and car parking space which can be buffer zone between Bath Bogs and project site. 5) Promenade can be provided by securing access from main road to beach. 6) Fishery infrastructure is intensively provided and the convenience for facility utilization will be improved.

Basic Policy 5	Sustainable utilization of marine resources is promoted not only by proper operation and management of the project facilities but also the assessment and the management of marine resources including educational campaign for fishery related people
Facilities and Equipment	Administration quarter (Manager, Desk worker/Accountant), Conference room
Output	<ol style="list-style-type: none"> 1) Sustainable control of fishery resources can be possible with figuring out the landing volume and sales volume and collected basic data for the resources control. 2) In addition to the maintenance of facilities and equipment at the project site and quality control of marine products become possible. 3) Training and education activities for fishery related people and fishery work shop can be executed easily.

(2) Policy for natural environmental condition

- a) Influence mitigation to Bath Bogs Protected Area neighboring to the project site shall be considered. (maintaining a certain distance from Bath Bogs by installing like public access road as buffer zone)
- b) Reclamation shall be the size so that the loss area of natural seashore shall be small as possible.
- c) Trying influence mitigation of topographic change of the existing seashore, reclamation alignment and structure system which do not make beach erosion around the project site shall be selected.
- d) Facilities design shall be conducted well considering consolidation settlement by peat layer of the project site.
- e) Facilities shall be constructed considering wave overtopping at the time of hurricane.
- f) Seismic force was considered in design since the earthquake was recorded in the past there.

(3) Policy for social environmental condition

- a) Sand beach at the project site is used as a place of relief for citizens therefore, public access road shall be planned to be an approach to sea not so as to loose accessibility to waterfront.
- b) Reclamation structure shall be planned not to affect to private mineral water manufacturer like by closing existing underground water vein.
- c) Reclamation alignment, revetment structure, reclamation ground level shall be planned so as to have familiarity with the existing port area and harmonization with Waterfront Re-development Plan. (a sense of togetherness in view of landscape, familiarity on usage to be accessible smoothly and etc.)

(4) Policy for construction condition, procurement information or special market condition and business custom

1) Licensing system concerning project implementation

EIA procedure and development (architectural) approval are necessary for the project implementation in Nevis Island. The NIA has promised to obtain development approval before the commencement of construction works finishing EIA procedure by the necessary time.

2) Standard for civil design

Design standards for fishing port and port facility do not exist in Saint Christopher and Nevis. Therefore, the design of structures is done in conformity with American ASTM, British BS and etc. which correspond to Japanese JIS.

This project shall apply to Japanese “Handbook for Fishing Ports and Fishing Ground Design” and as the supplement, “Architectural Standard Common Specification and the Commentaries” which is Japanese design standard for port and harbor structures shall be applied.

3) Standard for architectural design

The architectural standard in Saint Christopher and Nevis uses St. Kitts and Nevis Building Code supervised by OECS (Organization of Eastern Caribbean States). This is considered to be

uniform criteria in Caribbean countries and it mainly covers design standard. Structural standard applies CUBiC (Caribbean Uniform Building Code) and seismic force is considered.

4) Others

Construction companies in Saint Christopher and Nevis do not own working vessels like crane barge, tag boat and etc. and construction machineries like large crane because of reduced demand of domestic construction at present. However, they have good network to other Caribbean countries and execute construction works leasing the cheapest construction machinery at the time of construction from Virgin Island, Puerto Rico, Barbados, Trinidad Tobago, and others. Most of the construction materials are imported from USA and other Caribbean countries. Concerning the equipment, as most of the companies in Saint Christopher and Nevis order it to American company (Miami) after confirming the order, no stock is available.

(5) Policy to use local company (Construction company, Consultant engineer)

Construction companies in Saint Christopher and Nevis own labors and construction machineries which are workable for common construction works as sub-contractor. However, Japanese or the third countries expert engineers are necessary for the work needed advanced technique like steel pipe pile driving. And, there is no local consultant engineers who can work for the design and supervision of port facilities.

(6) Policy for operation and maintenance

Operation and Maintenance Plan (draft) has been submitted to the study team on 7 September, 2010 from NIA and the policy on the operation and maintenance of the New Fisheries Center has been confirmed with as follows,

- a) As the management policy of the existing Fisheries Center is not properly decided, the operation is in deficit situation. Therefore, Fisheries Advisory Committee (FAC) shall be newly established as a superior organization of Cooperative's Board consisting of director of Department of Fisheries and representatives from NIA related organization.
- b) In order to improve the situation that the manager has resigned his office, FAC shall select a manager who has management capability.
- c) The operation to meet the needs with fishermen and consumers shall be executed improving the situation that the operation hours is short and the fish purchasing is not done on Saturday which landing is many.
- d) In order to improve the situation that fishermen find no merit to utilize the existing Fisheries Center and function it as the base of fishing activities of Nevis Island, the supports to fishermen by the NIA shall be executed. (by inducing provision of subsidized fuel or reduced price of ice)
- e) With the supports of above d), the potential fresh fish demand shall be evoked by reducing sales price of fishes of Nevis Island.
- f) In order to assist the operation fund for the New Fisheries Center at the operation start-up, the financial support by the NIA shall be executed. (for staff remunerations, fees for water, electricity and sewage treatment, maintenance fee for ice making and storage facilities)

(7) Policy for setting up quality of facilities and equipment

As hurricanes and earthquakes are generated in Nevis Island, their structures (specifications) have to consider the results of natural condition surveys. As to the building materials, locally purchasable materials shall be used as much as possible even if the prices are slightly higher considering its maintenance. And, the source of equipment shall be from Japan or the third countries like USA considering the quality and the maintenance.

(8) Policy for construction method, procurement method and construction period

1) Construction Method

As this project site is located closer to urban area, noises and vibrations shall be considered at the works using large construction machineries for the reclamation and piling works, revetment construction work and etc.

2) Procurement Method

Maintenance free equipment shall be selected its source comparing prices of Japan and the third countries. And, the equipment needed maintenance like fish processing machine shall be given its priority to the third countries like USA where is easy to obtain their spare parts after checking out the machine quality.

3) Setting up of construction period

For the setting up construction period, hurricane season and the existence of soft peat layer shall be considered. And, marine works shall be avoided during hurricane season. However, if it can not be helped the period shall be set out in plenty of time.

2-2-1-3 Daily Fish Landing Volume Plan

(1) Results of fish landing survey

1) Fish Landing Volume

Fish landing volume during the survey (16 days from 6 August to 21 August, 2010) is shown in Table-2.2.1(3). All the landing volume during the survey was 16,940 lbs with the breakdown of 9,949 lbs (58.7%) for fresh fish, 6,204 lbs (36.6%) for conch, 787 lbs (4.6%). Out of fresh fishes, Leaf fishes (Porgy, Grouper and etc.) occupy 39.6%, coastal pelagic fishes (Half-beak, garfish and etc.) are 18.7% and offshore pelagic fishes (Spanish mackerel, dorado, tuna and etc.) are occupied 0.4% only of the total.

Table-2.2.1(3) Landing Volume during survey

	Fish			Conch	Robster	Total
	Reef Fish	Pelagic Fish	Offshore Pelagic			
Landing Volume (lbs)	6,703	3,176	70	6,204	787	16,940
Ratio (%)	39.6	18.7	0.4	36.6	4.6	100.0

Source: Results of fish landing survey

Daily landing volume at each landing site is shown in Table-2.2.1(4) to Table-2.2.1(7). The summary is as follows. The landing volume includes conch and lobster.

	<Average Volume>	<Max. Volume>
Charlestown (CH):	114.1 kg (251.25 lbs)	374.6 kg (825 lbs)
Jessup (JE):	210.4 kg (463.44 lbs)	1,089.1 kg (2,399 lbs)
Cotton Ground (CG):	37.5 kg (82.56 lbs)	152.1 kg (335 lbs)
Jones Bay (JB):	56.6 kg (124.67 lbs)	255.1 kg (562 lbs)
New Castle (NC):	46.7 kg (102.81 lbs)	277.4 kg (611 lbs)
Long Haul Bay(LH):	0.9 kg (1.88 lbs)	13.6 kg (30 lbs)
Indian Castle (IC):	14.6 kg (32.13 lbs)	79.5 kg (175 lbs)

**Table-2.2.1(4) Daily landing volume during survey
[Fresh Fish + Conch + Lobster]**

Fish+Conch+Lobster		(lbs)							
		CH	JE	CG	JB	NC	LH	IC	Total
6 Aug	Fri	185	100	5	0	0	0	0	290
7 Aug	Sat	61	0	0	0	330	30	52	473
8 Aug	Sun	0	150	13	108	0	0	110	381
9 Aug	Mon	317	365	0	35	0	0	0	717
10 Aug	Tue	283	73	28	172	35	0	0	591
11 Aug	Wed	126	800	305	0	40	0	0	1,271
12 Aug	Thu	41	1,484	335	471	0	0	0	2,331
13 Aug	Fri	491	2,399	104	0	0	0	0	2,994
14 Aug	Sat	289	0	120	0	611	0	77	1,097
15 Aug	Sun	20	0	55	25	0	0	100	200
16 Aug	Mon	318	0	0	110	0	0	0	428
17 Aug	Tue	825	178	12	45	0	0	0	1,060
18 Aug	Wed	518	398	0	562	0	0	0	1,478
19 Aug	Thu	133	631	0	0	60	0	0	824
20 Aug	Fri	150	837	104	407	109	0	0	1,607
21 Aug	Sat	263	0	240	60	460	0	175	1,198
Total		4,020	7,415	1,321	1,995	1,645	30	514	16,940
Average		251.25	463.44	82.56	124.69	102.81	1.88	32.13	1,058.75
Maximum		825	2,399	335	562	611	30	175	2,994
Minimum		0	0	0	0	0	0	0	200

Source: Results of fish landing survey

Table-2.2.1(5) Daily landing volume during survey [Fish]

FISH		(lbs)							
		CH	JE	CG	JB	NC	LH	IC	Total
6 Aug	Fri	185	0	5	0	0	0	0	190
7 Aug	Sat	57	0	0	0	330	30	52	469
8 Aug	Sun	0	0	13	98	0	0	70	181
9 Aug	Mon	317	86	0	35	0	0	0	438
10 Aug	Tue	283	73	28	172	0	0	0	556
11 Aug	Wed	126	0	305	0	0	0	0	431
12 Aug	Thu	41	140	335	195	0	0	0	711
13 Aug	Fri	491	155	104	0	0	0	0	750
14 Aug	Sat	289	0	120	0	611	0	77	1,097
15 Aug	Sun	20	0	55	25	0	0	100	200
16 Aug	Mon	318	0	0	110	0	0	0	428
17 Aug	Tue	825	50	12	45	0	0	0	932
18 Aug	Wed	518	184	0	505	0	0	0	1,207
19 Aug	Thu	133	149	0	0	0	0	0	282
20 Aug	Fri	150	119	104	407	109	0	0	889
21 Aug	Sat	263	0	240	60	450	0	175	1,188
Total		4,016	956	1,321	1,652	1,500	30	474	9,949
Average		251.00	59.75	82.56	103.25	93.75	1.88	29.63	621.81
Maximum		825	184	335	505	611	30	175	1,207
Minimum		0	0	0	0	0	0	0	181

Source: Results of fish landing survey

Landing volume of fresh fishes at Charlestown (CH) is 4,016 lbs which is the largest and occupies 40.4%.

Table-2.2.1(6) Daily landing volume during survey [Conch]

Conch		(lbs)							
		CH	JE	CG	JB	NC	LH	IC	Total
6 Aug	Fri	0	100	0	0	0	0	0	100
7 Aug	Sat	0	0	0	0	0	0	0	0
8 Aug	Sun	0	150	0	10	0	0	0	160
9 Aug	Mon	0	275	0	0	0	0	0	275
10 Aug	Tue	0	0	0	0	0	0	0	0
11 Aug	Wed	0	650	0	0	0	0	0	650
12 Aug	Thu	0	1,139	0	276	0	0	0	1,415
13 Aug	Fri	0	2,144	0	0	0	0	0	2,144
14 Aug	Sat	0	0	0	0	0	0	0	0
15 Aug	Sun	0	0	0	0	0	0	0	0
16 Aug	Mon	0	0	0	0	0	0	0	0
17 Aug	Tue	0	128	0	0	0	0	0	128
18 Aug	Wed	0	192	0	0	0	0	0	192
19 Aug	Thu	0	452	0	0	0	0	0	452
20 Aug	Fri	0	688	0	0	0	0	0	688
21 Aug	Sat	0	0	0	0	0	0	0	0
Total		0	5,918	0	286	0	0	0	6,204
Average		0.00	369.88	0.00	17.88	0.00	0.00	0.00	387.75
Maximum		0	2144	0	276	0	0	0	2,144
Minimum		0	0	0	0	0	0	0	0

Source: Results of fish landing survey

Landing volume of conch at Jessup (JE) is 5,918 lbs which is the largest and occupies 95.4%.

Table-2.2.1(7) Daily landing volume during survey [Lobster]

Lobster									(lbs)
		CH	JE	CG	JB	NC	LH	IC	Total
6 Aug	Fri	0	0	0	0	0	0	0	0
7 Aug	Sat	4	0	0	0	0	0	0	4
8 Aug	Sun	0	0	0	0	0	0	40	40
9 Aug	Mon	0	4	0	0	0	0	0	4
10 Aug	Tue	0	0	0	0	35	0	0	35
11 Aug	Wed	0	150	0	0	40	0	0	190
12 Aug	Thu	0	205	0	0	0	0	0	205
13 Aug	Fri	0	100	0	0	0	0	0	100
14 Aug	Sat	0	0	0	0	0	0	0	0
15 Aug	Sun	0	0	0	0	0	0	0	0
16 Aug	Mon	0	0	0	0	0	0	0	0
17 Aug	Tue	0	0	0	0	0	0	0	0
18 Aug	Wed	0	22	0	57	0	0	0	79
19 Aug	Thu	0	30	0	0	60	0	0	90
20 Aug	Fri	0	30	0	0	0	0	0	30
21 Aug	Sat	0	0	0	0	10	0	0	10
Total		4	541	0	57	145	0	40	787
Average		0.25	33.81	0.00	3.56	9.06	0.00	2.50	49.19
Maximum		4	205	0	57	60	0	40	205
Minimum		0	0	0	0	0	0	0	0

Source: Results of fish landing survey

Landing volume of lobster at Jessup (JE) is 541 lbs which is the largest and occupies 68.7%.

2) Number of fishing boats

According to the survey, daily number of fishing boats landing at Charlestown was 3.5 boats on average and the maximum was 8 boats. And at Jessup, Cotton Ground and Jones Bay, the daily average was 7.6 boats and the maximum was 18 boats during 16 days survey period. Fishermen in these landing sites catch fishes at the same fishing ground as the fishermen of Charlestown and especially in case of fishing at the south side straits, as Charlestown is located on the way to their landing sites, it can be expected to land fishes from number of boats when the New Fisheries Center is constructed and is able to receive their catches.

Table-2.2.1(8) Number of Fishing Boats for Landing

Date in Aug.	Day	CH	JE	CG	JB	NC	LH	IC	Total
6th	Fri	2	1	2					5
7th	Sat	4				5	2	2	13
8th	Sun	1	1	1	3			1	7
9th	Mon	4	2	1	1				8
10th	Tue	3	2	2	2	1			10
11th	Wed	2	3	2		1			8
12th	Thu	3	6	2	3				14
13th	Fri	7	12	2					21
14th	Sat	6		2		7		2	17
15th	Sun	1		2	1			2	6
16th	Mon	2			3				5
17th	Tue	8	1	2	1				12
18th	Wed	2	4	2	3				11
19th	Thu	4	4	1		1			10
20th	Fri	1	4	2	4	4			15
21st	Sat	6		2	1	6		2	17
Total		56	40	25	22	25	2	9	179
Average		3.50	3.64	1.79	2.20	3.57	2.00	1.80	11.19
Maximum		8	12	2	4	7	2	2	21
Minimum		1	1	1	1	1	2	1	5

Source: Results of fish landing survey

[Operation ratio of fishing boat during survey period]

The comparison between the number of fishing boats in operation by the data of Department of Fisheries and the one during survey period is shown in Table-2.2.1(9). Comparing 126 boats shown in the data of Department of Fisheries, 55 boats to land fish which is 43.7% of the data by Department of Fisheries were counted during the survey period. While, the total number of fishing boats were 85 which is 43.7% of the data of Department of Fisheries. The survey was done in August, 2010 which is low season of fishing activity. According to the Department of Fisheries, June to November is called as low fishing season which is hurricane season with less tourists.

Table-2.2.1(9) Number of fishing boats in operation by Department of Fisheries and Survey

	CH	JE	CG	JB	NC	LH	IC	Total
Number of fishing boats which landed fish during survey period	15	7	2	5	11	2	4	55
Surveyed number of fishing boats	37	5	5	15	13	4	6	85
Data from Department of Fisheries	46	14	4	27	20	6	9	126

Source: Results of fish landing survey

3) Actual Distribution Conditions of Marine products

Most of Conch (6,204 lbs) and Lobster (787 lbs) which were landed during survey period (6 August to 21 August, 2010) were purchased by private company named G.C. Enterprise (GCE).

Table-2.2.1(10) shows the destination of each landing site for fresh fishes. The users for total fresh fishes landed volume, 9,929 lbs during survey period were street vendors of fishermen, 4,334 lbs (43.6%), restaurant, hotel, super market, 1,910 lbs (19.2%) in Charlestown, local consumption in New Castle, Long Haul Bay and Indian Castle, 1,594 lbs (16.1%) , GCE, 1,199 lbs (12.1%) , existing Fisheries Center, 692 lbs (7.0%) in order. Fresh fishes in Jessup were all purchased by GCE. And, 200 lbs of coastal pelagic fishes (Half-beak and Garfish) are sold at Basseterre in St. Kitts Island.

Table-2.2.1(10) Destination of Fresh Fishes in each Landing site

(lbs)

	Charlestown				Local Consumption	ST KITTS	Total
	Existing Fisheries Center	On the road	GCE (Private Sector)	Restaurant/Hotel /Supermarket			
CH	575	3,013	208	0	0	200	3,996
Ratio(%)	14.4	75.4	5.2	0.0	0.0	5.0	100.0
JE	0	0	956	0	0	0	956
Ratio(%)	0	0	100.0	0	0	0	100.0
CG	0	1,321	0	0	0	0	1,321
Ratio(%)	0	100.0	0	0	0	0	100.0
JB	117	0	35	1,500	0	0	1,652
Ratio(%)	7.1	0.0	2.1	90.8	0.0	0.0	100.0
NC	0	0	0	410	1,090	0	1,500
Ratio(%)	0	0	0	27.3	72.7	0	100.0
LH	0	0	0	0	30	0	30
Ratio(%)	0	0	0	0	100.0	0	100.0
IC	0	0	0	0	474	0	474
Ratio(%)	0	0	0	0	100.0	0	100.0
Total	692	4,334	1,199	1,910	1,594	200	9,929
Ratio(%)	7.0	43.6	12.1	19.2	16.1	2.0	100.0

Source: Results of fish landing survey

Destination of fresh fishes in project area (CH,JE,CG,JB) are shown in Table-2.2.1(11). It is assumed that 4,334 lbs handled by street vendors , 1,500 lbs by restaurant, hotel and super market and 692 lbs by existing Fisheries Center in Charlestown except GCE totaling 6,526 lbs will be handled by the New Fisheries Center.

Table-2.2.1(11) Fish Destination in Project Area (CH,JE,CG,JB)

(lbs)

	Charlestown				Local Consumption	ST KITTS	Total
	Existing Fisheries Center	On the road	GCE (Private Sector)	Restaurant/Hotel /Supermarket			
CH	575	3,013	208	0	0	200	3,996
Ratio(%)	14.4	75.4	5.2	0.0	0.0	5.0	100.0
JE	0	0	956	0	0	0	956
Ratio(%)	0	0	100.0	0	0	0	100.0
CG	0	1,321	0	0	0	0	1,321
Ratio(%)	0	100.0	0	0	0	0	100.0
JB	117	0	35	1,500	0	0	1,652
Ratio(%)	7.1	0.0	2.1	90.8	0.0	0.0	100.0
Total	692	4,334	1,199	1,500	0	200	7,925
Ratio(%)	8.7	54.7	15.1	18.9	0.0	2.5	100.0

Source: Results of fish landing survey

(2) Daily Landing Volume Plan

1) Calculation of Daily Landing Volume Plan

Daily landing volume of Charlestown, Cotton Ground and Johns Bay extracting from Table-2.2.1(5) is shown in Table-2.2.1(12). As Jessup has many fresh fishes for GCE, it is excluded from the calculation of landing volume plan. Taking average in the top 5 days (about 1/3 of 16 days survey period) of three landing sites, CH, CG, JB, daily landing volume plan is set as 750 lbs.

The ratio of number of fishing boats to land fish in the morning time against all numbers of fishing boats during survey period is calculated as 63 boats/107 boats = 58.9% (60%), it is assumed that 60% is sent to direct sales booth and 40% is sent to fish processing room out of said 750 lbs.

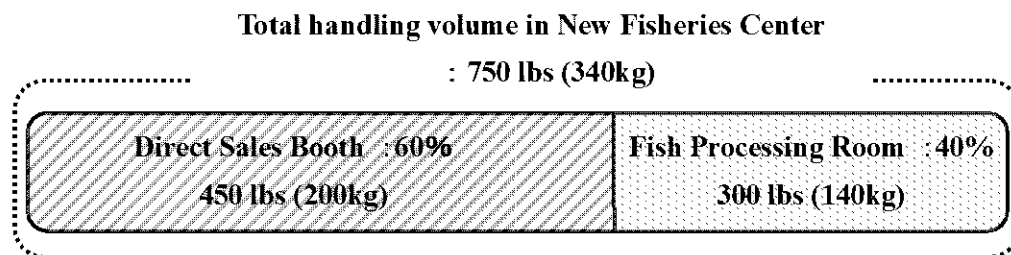


Figure-2.2.1(2) Details of Fish Landing Plan

Table-2.2.1(12) Daily Landing Volume in Project Area

FISH		CH	CG	JB	Total	Ranking	Top 5
6 Aug	Fri	185	5	0	190	12	
7 Aug	Sat	57	0	0	57	16	
8 Aug	Sun	0	13	98	111	14	
9 Aug	Mon	317	0	35	352	11	
10 Aug	Tue	283	28	172	483	7	
11 Aug	Wed	126	305	0	431	8	
12 Aug	Thu	41	335	195	571	5	571
13 Aug	Fri	491	104	0	595	4	595
14 Aug	Sat	289	120	0	409	10	
15 Aug	Sun	20	55	25	100	15	
16 Aug	Mon	318	0	110	428	9	
17 Aug	Tue	825	12	45	882	2	882
18 Aug	Wed	518	0	505	1,023	1	1,023
19 Aug	Thu	133	0	0	133	13	
20 Aug	Fri	150	104	407	661	3	661
21 Aug	Sat	263	240	60	563	6	
Total		4,016	1,321	1,652	6,989		3,732
Average		251.00	82.56	103.25	436.81		746.40
Maximum		825	335	505	1,023		1,023
Minimum		0	0	0	57		571

Source: Results of fish landing survey

Figure-2.2.1(3) to 2.2.1(4) show the relation between daily landing volume plan and landing volume.

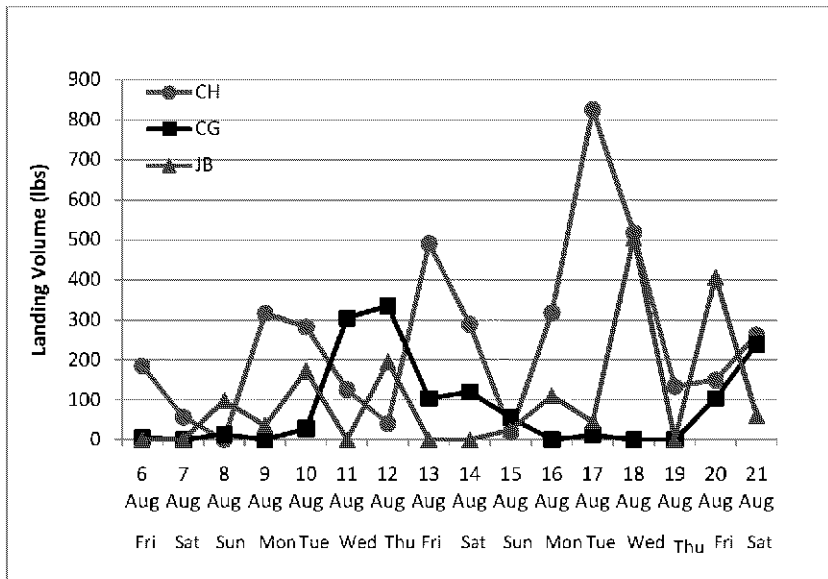


Figure 2.2.1(3) Landing volume in each landing site

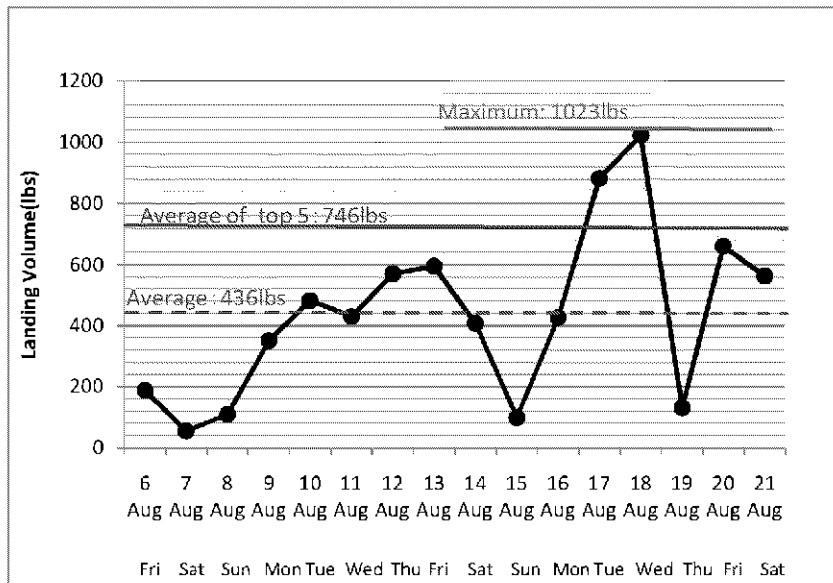


Figure-2.2.1(4) Daily Landing volume plan, maximum and average volume

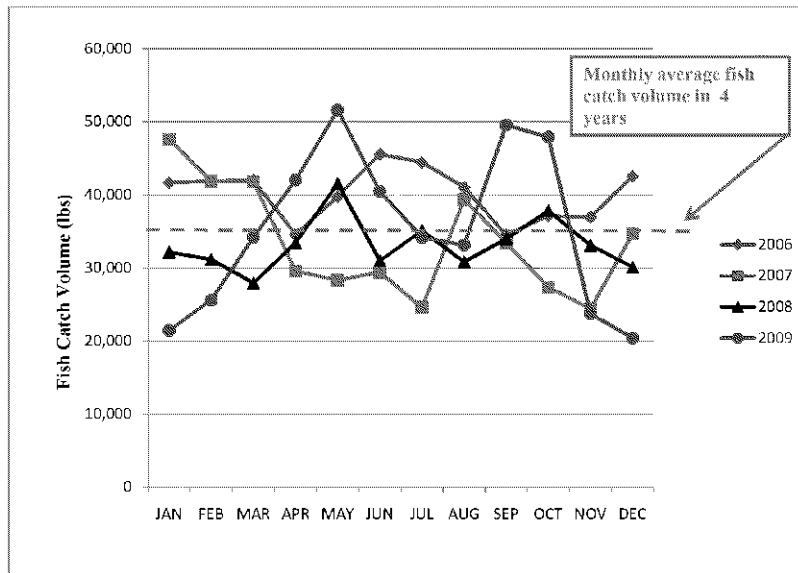
2) Fish Catch Statistic of Department of Fisheries and Fish Landing Volume Plan

Statistic of Monthly Fish Catch (except Conch and Lobster) of Department of Fisheries from 2006 to 2009 is shown in Table-2.2.1(13) and Figure-2.2.1(5).

**Table-2.2.1(13) Statistic of Monthly Fish Catch by Department of Fisheries
(except Conch and Lobster)**

	(lbs)												Total	Average
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC		
2006	41,665	41,875	41,975	34,575	39,775	45,545	44,470	41,055	34,520	37,145	36,925	42,560	482,085	40,174
2007	47,620	41,825	41,755	29,585	28,335	29,430	24,600	39,385	33,455	27,395	24,425	34,690	402,500	33,542
2008	32,165	31,165	27,930	33,450	41,530	30,990	35,115	30,820	33,990	37,820	33,105	30,105	398,185	33,182
2009	21,466	25,645	34,221	42,021	51,614	40,479	34,178	33,155	49,550	47,919	23,756	20,438	424,442	35,370
Average	35,729	35,128	36,470	34,908	40,314	36,611	34,591	36,104	37,879	37,570	29,553	31,948	426,803	35,567

Source: Nevis Department of Fisheries



**Figure-2.2.1(5) Monthly Statistic of Fresh Catch Volume by Department of Fisheries
(except Conch and Lobster)**

(a) Seasonal Variation by Statistic of Fish Catch Volume by Department of Fisheries

Monthly average fish catch volume in 4 years from 2006 to 2009 is 35,567 lbs. According to Figure-2.2.1(8), there is no trend toward clear seasonal variation, rather August is an average month of fish catch volume.

(b) Landing Volume Plan and Statistic of Fish Catch Volume by Department of Fisheries

Total fish landing volume of Nevis Island during survey period (6 August to 21 August, 2010) is 9,949 lbs according to Table-2.2.1(5) and the assumed landing volume to be handled by New Fisheries Center is 6,989 lbs according to Table-2.2.1(12). Therefore, it is assumed that the fish catch volume in August, 2010 one month is 18,654 lbs ($9,949 \text{ lbs} \times 30 \text{ days} / 16 \text{ days} = 18,654 \text{ lbs}$).

And, it is assumed that one month handling volume by New Fisheries Center is 10,200 kg judging from daily landing volume plan sets as 750 lbs ($22,500 \text{ lbs} = 750 \text{ lbs} \times 30 \text{ days}$). Total landing volume in Nevis Island for this one month is 32,029 lbs ($22,500 \text{ lbs} \times 9,949 / 6,989 = 32,029 \text{ lbs}$).

Therefore, 32,029 lbs which is total landing volume of Nevis Island for a month calculated from daily landing volume plan of New Fisheries Center is about 90% of 35,567 lbs which is monthly average volume of fish catch in 4 years from 2006 to 2009 and thus fish landing volume plan is considered to be appropriate.

2-2-1-4 Design Policy against Consolidation Settlement

(1) Consolidation Settlement Volume for Peat Layer

Consolidation settlement volume, settlement time and pre-load mound thickness for peat layer are shown in Table-2.2.1(14).

Where,

Primary Consolidation: big settlement generated at initial stage of consolidation

Secondary Consolidation: long term settlement which is special feature of peat layer

Pre-load mound necessary thickness: necessary mound height to apply load (pre-load) being equal to or more than the structures load to the ground in advance

Table-2.2.1(14) Consolidation Settlement Volume and Settlement Time

Facility	Primary Consolidation Settlement Volume	Primary Consolidation Settlement Time	Secondary Consolidation Settlement Volume	Secondary Consolidation Settlement Time	Pre-load mound necessary thickness
Fisheries Center	70~90 cm	199~220 day	Approx. 15 cm	2,000 days	9m
Gear Lockers	60~70 cm	199~220 day	Approx. 15 cm	2,000 days	6m
Revetment	40~45 cm	199~220 day	Approx. 15 cm	2,000 days	—
Other exterior	30~40 cm	199~220 day	Approx. 15 cm	2,000 days	3m

However, it is not realistic to mound 6 to 9 m at a narrow reclaimed land like project site. Therefore, pile foundation method is basically adopted for the New Fisheries Center, fishing gear lockers and other buildings. The exterior structures shall respond to uneven portion of consolidation settlement by embankment.

As total project site, 1 m thick embankment (M.S.L. +4m) is added after the reclamation up to M.S.L. +3.0m and is coped with the uneven portion between the pile foundation portion and other exterior portion. Actually, another about 15 cm is generated as the volume of secondary consolidation settlement at 2,000 days after completion of facilities.

(2) Concept at the time of reclamation

Figure-2.2.1(6) shows construction concept at the time of reclamation.

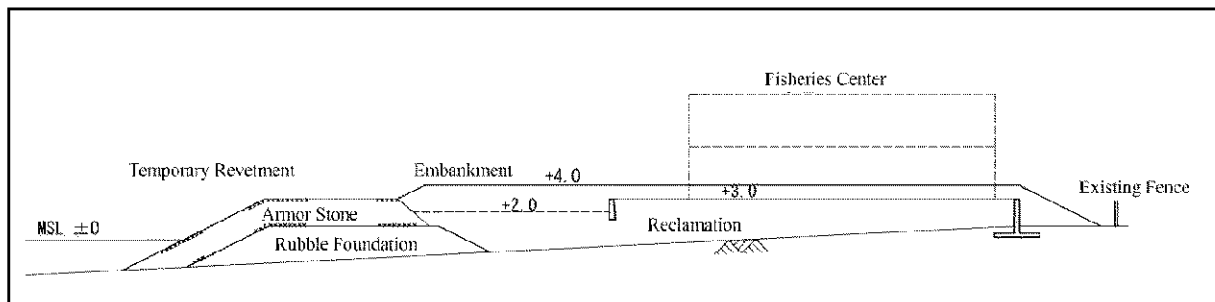


Figure-2.2.1(6) Construction Concept at Reclamation Works

(3) Countermeasures for land facility settlement

1) New Fisheries Center

Even if ground stability is planned by pre-load to total area, it is uneconomical that necessary pre-load becomes extremely big due to the second stories building. And, this is the main building and there is possible fear to be damaged by the influence of ground settlement on plumbing related with water and drainage facilities and the method shall be the pile foundation method by support piles considering these elements.

Considering plumbing route of various fixtures, plumbing work installing under ground of the New Fisheries Center shall have pit in order not to be influenced by ground settlement. Concerning plumbing installation inter-facilities, flexible joint in connection part is used for ground settlement.

2) Fishing gear lockers, Work shop, Toilet, Storage for large fishing gears, Septic tank

Loading per unit area for one story buildings and septic tank is small though as there is a possibility to generate unequal settlement by the primary consolidation, the foundation with bearing piles shall be planned. Especially, the septic tank is the key functional facility of sewage treatment and is considered to easily generate unequal settlement by vibration of blower and etc. when it is operated. And water supply and drainage facilities shall not be applied to fishing gear lockers since it is desirable that the connection of plumbing among facilities shall be lesser as possible.

3) Gazebo

Direct foundation shall be planned by mat foundation for Gazebo due to the wooden made.

4) Retaining wall around facilities

The retaining wall at land side around project site is reverse-T type and is supported by piles. Planned area is narrow and there is less space between the landside of the New Fisheries Center and retaining wall and there will be possible entanglement of bottom of retaining wall and pile head of the New Fisheries Center. Therefore, under ground beam of the Center is extended and install wall at the retaining wall position and the wall shall be soil retainer. A space between vertical wall and underground beams of the Center shall also be utilized as pit for plumbing works. As the level difference of seaside retaining wall is just 1 m only, gravity type for soil retainer is adopted.

5) Design for bearing pile

As bearing piles for buildings are driven to bearing stratum where exists underneath of peat layer, the subsidence shall not be generated. But it is predicted that the ground around piles are gradually sagged. On that occasion, as the load is added to down ward by friction against piles, the negative friction shall be added to design condition for the structural design. At the same time, the countermeasure for negative friction is considered using asphalt type material on the surface at the time of construction.

6) Pavement for exterior

Considering the secondary consolidation settlement after completion of facilities, rolling compaction finish of mechanically stabilized crusher stone is adopted for easy maintenance.

(4) Countermeasure for settlement of revetment

Rubble foundation and armor stone shall be constructed at the reclamation stage as temporally seawall. Volume of rubble foundation is estimated about 45cm as the primary consolidation settlement. After that, construction of the fishery jetty is commenced and the armor stone leveling and coping concrete works are implemented after 8 months which the primary consolidation is completed.

(5) Observation at the time of construction

For the observation of the settlement volume of primary consolidation after completion of reclamation, piezometer, inclinometer, differential settlement gauge, displacement pile and etc. are installed. And in order to confirm consolidation change of peat layer after the primary consolidation is completed a check boring is executed and laboratory tests for moisture content, shear strength, unit weight and etc. shall be conducted.

Table-2.2.1(15) Observation of Primary Consolidation

Observation Item	Purpose of Observation	Observation Equipment
1. Observation of Vertical Settlement	*Comparison with design settlement volume *Perception for final prediction of settlement volume and residual settlement volume *Index for prediction of destruction	*Surface settlement plate *Stratified settlement gauge
2. Observation of Horizontal Displacement	*Judgment index as to the settlement behavior and settlement volume *Index for prediction of destruction	*Surface displacement stake *Inclinometer
3. Observation of Pore Water Pressure	*Checking drainage of peat layer *Understanding of settlement volume *Checking acting load	*Pore water pressure meter
4. Confirmation of Consolidation Change of Peat Layer	*Checking increase of strength by consolidation *Checking moisture content	*Check boring after completion of consolidation and laboratory test

Figure-2.2.1(7) shows the location of observation equipment. As the figure shows the cross section of reclamation embankment is zoned widely by three areas.

First Area: Settlement is remarkable.

Second Area: Settlement, horizontal and vertical underground displacement is remarkable.

Third Area: Surface settlement and underground displacement are remarkable.

Settlement plates and displacement stakes which are installed at location of building facilities shall be removed at the time of construction and only the settlement plates for exterior portion shall be left and use for checking the secondary consolidation settlement after completion of facilities. Stratified settlement gauge, Pore water pressure meter and Inclinometer shall be put into ground and will not recover them except the inclinometer.

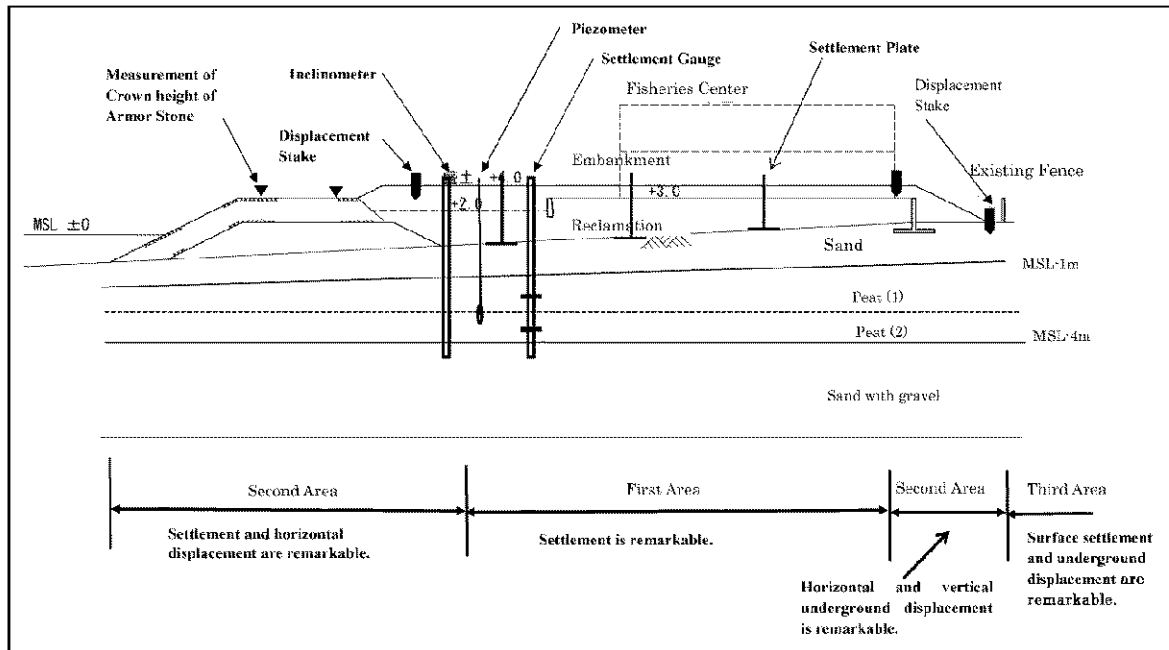


Figure-2.2.1(7) Location of Observation Equipment

(6) Request to the NIA for maintenance of the Secondary Consolidation

The exterior area after the primary consolidation completed generates the secondary consolidation settlement with about 15cm in 2,000 days (approx. 5.5 years). Therefore, the following correspondence in maintenance shall be requested to the NIA.

- a) Regular checking of plumbing for the settlement and replacement of flexible joint in case of big settlement
- b) Change pavement of exterior from mechanically stabilized crushed stone to concrete pavement for the convenience of vehicles passage after the secondary consolidation completion
- c) Monthly periodical observation of the secondary consolidation settlement volume after completion of construction (Comparison with calculation value for long term consolidation settlement volume and the actual one) shall be conducted.

For the above c), Japanese contractor shall execute the observation for the primary consolidation settlement and the analysis after completion of reclamation work. At that time, the technique of the observation for consolidation settlement and the analysis shall be transferred to engineers of Public Works Department of NIA.

2-2-2 Basic Design (Construction Plan/Equipment Plan)

2-2-2-1 Basic Plan for Civil Facilities

(1) Basic Policy for Civil Facilities

1) Fishery Jetty

- a) The design number of landing fishing boats and the landing volume per one day was set as 11 boats and 750 lbs respectively considering the peak landing day in a week.
- b) Jetty structure shall be designed considering critical wave height for fishing boat to use the jetty. And, it shall be steel pipe pile structure in order to minimize the influence to the coast by sand sedimentation, scouring and etc. due to the construction of structures.
- c) Jetty structure shall be designed considering influence of uplift pressure caused by hurricane waves.
- d) It is studied to set crown height of berth being easily accessible for fishing boats.
- e) The same utilization method of the tourist jetty and the existing fishery jetty shall be the basic thought and long time mooring function of fishing boat is not considered. Namely, fishing boats use the jetty for fish landings and preparation works and are not moored long time but anchored at offshore. The minimum scale landing berth is planned considering designed number of fishing boats, landing hours and the utilization rate.
- f) 4 small highly public boats are used as ferry to the boats anchoring offshore and the current utilization status is applied by planning preparation berth for mooring these small boats.
- g) Concrete curbs at the access part of the jetty shall be installed considering the safety.
- h) The installation of exterior light to jetty shall be planned for the safety of fishermen who commence working at early morning being still in dark.
- i) The installation of water tap on the jetty shall be considered for cleaning boat's deck and water supply to fishing boats.
- j) No trespassing for vehicles (pick-up truck etc.) to the jetty is planned considering the strength of grating made of reinforced plastic which will be installed on the jetty for reducing uplift pressure.

2) Revetment

- a) It is planned in front of reclamation land as wave protection for hinterland.
- b) Rubble mound revetment is planned considering landscape of existing Charlestown Ferry Dock and its Waterfront Re-development Plan where many tourists visit and it also be able to contribute to biotic diversity.
- c) The structure shall be slope-type revetment by rubble stones same as the existing coast considering the stability against waves and the construction cost.
- d) The backside shall be utilized as promenade considering existing traffic line and at the same time footstep is planned as an approach traffic line to sand beach from reclamation land.
- e) Reclamation ground height and parapet height shall be set out considering overtopping at the time of extreme storm waves like hurricane. And setback levee and retarding basin shall be planned so as to protect overtopping waves to the rear structures.

- f) The height of parapet shall be set so as not to provide an oppressive feeling for the users who can utilize these structures as bench function to be sat by people.
- g) The existing drainage which is installed along with the road at north side of the site is so deteriorated with cracks like the conditions that steel bars have been exposed to the surface.

3) Public Access

- a) It is legally required to secure the access road from main road to sandy beach under Environmental Protection Regulation and a highly public bare essential access road shall be planned.
- b) The public access road shall be planned to have green space and storage space for boat trailer and space for fuel supply facilities so as to be a buffer zone between reclamation land and Bath Bogs Protected Area and at the same time to be boat road for emergency evacuation from hurricane hit.
- c) It is also utilized as the access road from seashore to main road at the time of triathlon event which is held every March in Nevis Island.
- d) The access road should basically be paved by concrete however mechanically stabilized crushed stone finish shall be adopted considering the subsidence by secondary consolidation by peat layer after completion of facilities.

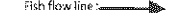
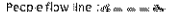
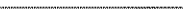
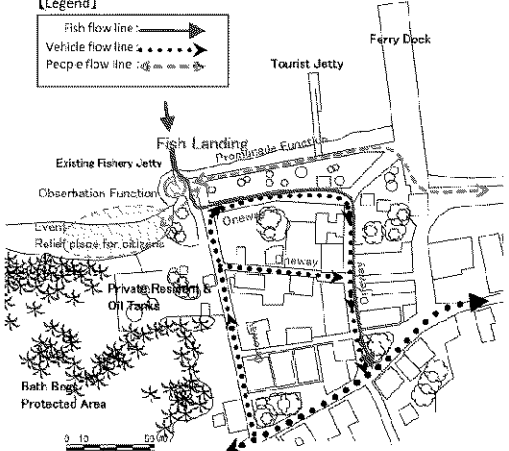


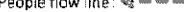
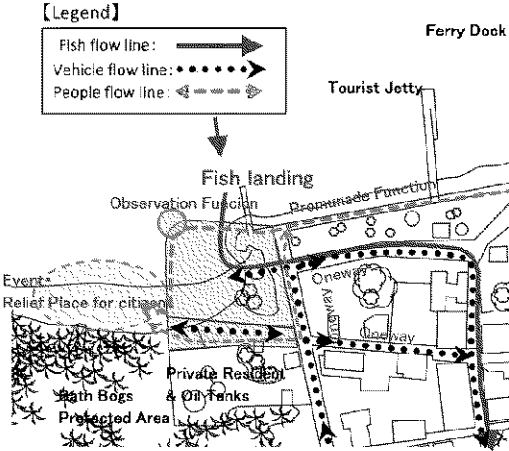
(2) Design of Civil Facilities

1) Layout Plan of Civil Facilities

(a) Flow Line Plan

Existing flow line around project site in Charlestown is as shown in Table-2.2.2(1) (left figure) and the flows of "Fish", "People" and "Vehicle" are defined. Fish flow is one way from main road and after purchasing fishes around the project site and return to main road through the existing Fisheries Center. It is important as people's flow line to have promenade along with alignment of existing revetment for resident people and tourists. This flow lines are used in future Waterfront Re-development Plan shall be constructed along with the backside of promenade. And the end of this promenade is located near the existing fishery jetty and utilized as observation spot by resident people. Therefore, the flow lines keeping recreational place for resident people and considering local activities by consistent utilization with existing flow lines shall be the basic.

Table-2.2.2(1) Flow Line Plan

Current utilization flow lines	Flow Line Plan
<p>[Legend]</p> <p>Fish flow line: </p> <p>Vehicle flow line: </p> <p>People flow line: </p> 	<p>[Legend]</p> <p>Fish flow line: </p> <p>Vehicle flow line: </p> <p>People flow line: </p> 
<p><Summary of current flow line></p> <ol style="list-style-type: none"> 1. Vehicle flow line is one way from main road. 2. Fishermen sell fishes on the road at the backside of the existing fishery jetty and fish flow line is also one way. 3. Promenade is constructed along with existing revetment as people's flow Line. 4. Sandy beach around the project site is utilized as the space for recreation of resident people such as triathlon event and sea bathing. 5. Fishermen and port related people for ferry park cars on road since there is no car parking area. 	<p><Basic Policy of Flow Line Plan></p> <p>Policy 1: Access plan in accordance with existing road traffic rules (compliance with one way).</p> <p>Policy 2: No street vendors are allowed.</p> <p>Policy 3: Existing promenade function shall be extended to the project site alignment and secure approach to sandy beach for resident people and tourists.</p> <p>Policy 4: Public access road is secured between reclamation land and Bath Bogs Protected Area to be buffer zone.</p> <p>Policy 5: Car parking area shall be studied to secure vacant land along with nearby public access road and existing access road if car parking space can not be secured within the project site.</p>

(b) Layout of Civil Facility

a) Fishery Jetty

Jetty shall be emplaced at most convenient place between the entrance of New Fisheries Center and fishing gear lockers so that the flow line among jetty, New Fisheries Center can be enhanced.

b) Revetment

Revetment shall be emplaced at water area of Gallows Bay and south side seashore area like surrounding and enclosing reclamation land as wave protection.

c) Promenade

Concrete apron shall be emplaced at backside of revetment for overtopping wave at the time of hurricane waves and it is effectively utilized as promenade at the time of normal waves so that the flow line can be liaised with the existing flow line. The width of apron needs 5 m as minimum considering the experience of hurricane "OMAR".

d) Public Access road

Public access shall be emplaced at backside of reclamation land so as to be buffer zone between Bath Bogs Protected Area and the project site. This public access becomes not only an access to beach for resident people but also it is utilized as urgent evacuation road for fishing boats at the time of hurricane. The buffer zone can be utilized as a storage site for boat trailers, car parking lot and space for fuel supply facilities.

2) Civil Engineering Plan

(a) Layout Plan

a) Number of Design Fishing Boats

4 landing sites, Charlestown (CH), Jessup (JE), Cotton Ground (CG) and Jones Bay (JB) out of 7 landing sites in Nevis Island are relatively closed each other and the distribution to Charlestown which is the biggest consumption area was confirmed. And, these fishermen are found cooperative for the construction of the New Fisheries Center in Charlestown judging from the result of questionnaire survey.

Therefore, design fishing boats in this project are counted at above 4 landing sites.

Site survey at each landing site has been executed during 2 weeks from 6 August to 21 August, 2010 in this study. The result is as shown below and 62 design fishing boats were confirmed however the activities of 4 boats out of 62 boats were not confirmed due to under repair etc. And, 4 small boats between jetty and offshore anchoring boats are not included in the 62 boats.

Table 2.2.2(2) Number of fishing boat at each landing site by site survey

		Landing site	Number of Boat	Under Repair	Total
Design Fishing Boat		Charlestown	33 (4)	4	37 (4)
		Jessup	5	0	5
		Cotton Ground	5	0	5
		Jones Bay	15	0	15
		Sub total	58 (4)	4	62 (4)
Not Eligible		New Castle	13	0	13
		Long Haul Bay	4	0	4
		Indian Castle	6	0	6
		Sub total	23	0	23
		Total	81 (4)	4	85 (4)

Remark: Figure in () shows ferry boat between jetty and offshore anchoring boats in Charlestown.
(small boats)

Source: Results of fish landing survey

b) Size of design fishing boats

(i) Boat length

Length of fishing boats according to the site survey is as shown below and its average is 7 m however, with the Table-2.2.2(3), 9 m is adopted as design boat length.

Table-2.2.2(3) Size of fishing boat in Nevis Island (Boat Length)

		Maximum length: 17m							
Boat length		4.1m~5.0m	5.1m~6.0m	6.1m~7.0m	7.1m~8.0m	8.1m~9.0m	9.1m~10.0m	10.1m以上	Total
1	Charlestown	2	12	14	6	2		1	37
2	Jessup		4	1					5
3	Cotton Ground	1	1	2	1				5
4	Jones Bay	1	2	2	4	3	3		15
	Sub total	4	19	19	11	5	3	1	62
5	New Castle		9	4					13
6	Long Haul Bay		2	1	1				4
7	Indian Castle	2	2	2					6
	Sub total	2	13	7	1	0	0	0	23
	Total	6	32	26	12	5	3	1	85

Remark: The average length of design fishing boats (1 to 4) is 7 m.

Source: Results of fish landing survey

(ii) Boat width

Width of fishing boats according to the site survey is as shown below and its average is 2 m and the maximum width of fishing boat is 4.3 m (1 boat).

Table2.2.2(4) Size of fishing boat in Nevis Island (Boat Width)

		Maximum width: 4.3m							
Boat Width		1.1m~1.5m	1.6m~2.0m	2.1m~2.5m	2.6m~3.0m	3.1m~3.5m	3.6m~4.0m	4.1m以上	Total
1	Charlestown	9	16	9	1	1		1	37
2	Jessup	2	3						5
3	Cotton Ground	1	4						5
4	Jones Bay	3	1	4	5	2			15
	Sub total	15	24	13	6	3	0	1	62
5	New Castle	5	6	2					13
6	Long Haul Bay	2	2						4
7	Indian Castle	1	4	1					6
	Sub total	8	12	3	0	0	0	0	23
	Total	23	36	16	6	3	0	1	85

Remark: The average width of design fishing boats (1 to 4) is 2.0m.

Source: Results of fish landing survey

(iii) Boat draft

Draft of fishing boats according to the site survey is as shown below and its average is 1 m however, in case that design draft is considered, it is necessary to take maximum draft figure 1.7m (1 boat) for safety sake.

Table-2.2.2(5) Size of fishing boat (Boat Draft)

Maximum Draft: 1.7m							
Draft		0.3m~0.5m	0.6m~1.0m	1.1m~1.5m	1.6m~2.0m	2.1m以上	Total
1	Charlestown	15	21		1		37
2	Jessup	4	1				5
3	Cotton Ground	3	2				5
4	Jones Bay	4	9	2			15
Sub total		26	33	2	1	0	62
5	New Castle	9	4				13
6	Long Haul Bay	4					4
7	Indian Castle	3	3				6
Sub total		16	7	0	0	0	23
Total		42	40	2	1	0	85

Remark: The average draft of design fishing boats (1 to 4) is 0.8 m (about1.0m).

Source: Results of fish landing survey

c) Setting up necessary berth length for landing

(i) Landing operation status

Landing operation status of fishing boats (58 boats) according to the site survey is as shown below. The total number of boat is 107 boats/2 weeks and the tendency is that the landing by about 10 boats/day on Tuesday, Friday and Saturday is done especially it is concentrated in 2 hours from 8 to 10 o'clock in the morning.

Therefore, it is necessary to reflect 9 boats in 2 hours into the project when setting up the berth length for landing and the number of berth.

Table-2.2.2(6) Landing operation status

Landing Hours	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Total
	6 Aug	7 Aug	8 Aug	9 Aug	10 Aug	11 Aug	12 Aug	13 Aug	14 Aug	15 Aug	16 Aug	17 Aug	18 Aug	19 Aug	20 Aug	21 Aug	
6:00 ~ 7:00																	0
7:00 ~ 8:00		1			1			1	1	1							5
8:00 ~ 9:00	2	2		1	2		1	2	5	1	2	6	2		1	4	31
9:00 ~ 10:00	2	1	1		1	1		3	1		1	3	1	1		3	19
10:00 ~ 11:00				2	1				2			1			1	1	8
11:00 ~ 12:00			1	1	1								3	1			7
12:00 ~ 13:00	1		2				1	1					5	1	4		13
13:00 ~ 14:00							1	2			2		1	1			7
14:00 ~ 15:00						1	1					1	1	1			5
15:00 ~ 16:00				1	1					1					1		4
16:00 ~ 17:00				1		1	1	1		1	1				1		7
17:00 ~ 18:00							1										1
18:00 ~ 19:00																	0
Total	5	4	4	6	7	3	6	10	9	4	6	11	11	6	7	8	107

Source: Results of fish landing survey

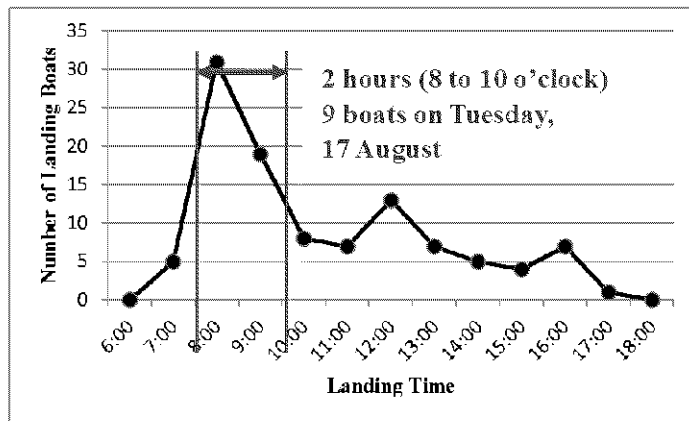


Figure-2.2.2(1) Landing operation status of fishing boats

(ii) Landing hours per one boat

Assuming landing hours per one boat in each landing site according to the site survey, it took 24 minutes as average in total Nevis Island.

The average landing hours in the design landing sites was also 24 minutes. However, in Charlestown and Jones Bay where jetty is provided as it took 16 to 22 minutes, the landing hours per one boat to be used in this project shall be considered as 20 minutes.

Table-2.2.2(7) Landing hours per boat of design fishing boats

Landing Site		Total number	Average landing hours per boat (minutes)
Design Site	1. Charlestown(CH)	175	16
	2. Jessup(JE)	52	36
	3. Cotton Ground(CG)	15	34
	4. Jones Bay(JB)	25	22
Average landing hours in design landing sites			24
Not eligible	5. New Castle(NC)	21	21
	6. Log Haul Bay(LH)	2	18
	7. Indian Castle(IC)	8	17
Average landing hours in not eligible sites			19
Total average landing hours			24

(iii) Existing landing facilities

Landing facilities currently utilized in Charlestown are tourist jetty and fishery jetty for fish landing as per shown in Figure 2.2.2(2). The deck with the length of 13 m (width 2m) in tourist jetty is used as landing facility (1 berth). And, there is another deck with the length of 14 m (width 2m) in the fishery jetty for fish landing as possible landing facility (2 berths). During site survey period, the utilization of 3 berths was confirmed at the same time when landing operations were concentrated.

And, the tourist jetty is basically port facility and the fish landing from fishing boats are prohibited. The total length of fishery jetty for fish landing is only 20m and it is influenced by waves and reflected waves from revetment and the frequency of use is low.

And repair works are necessary every year due to the influence of hurricane so August through November is difficult season to be utilized.

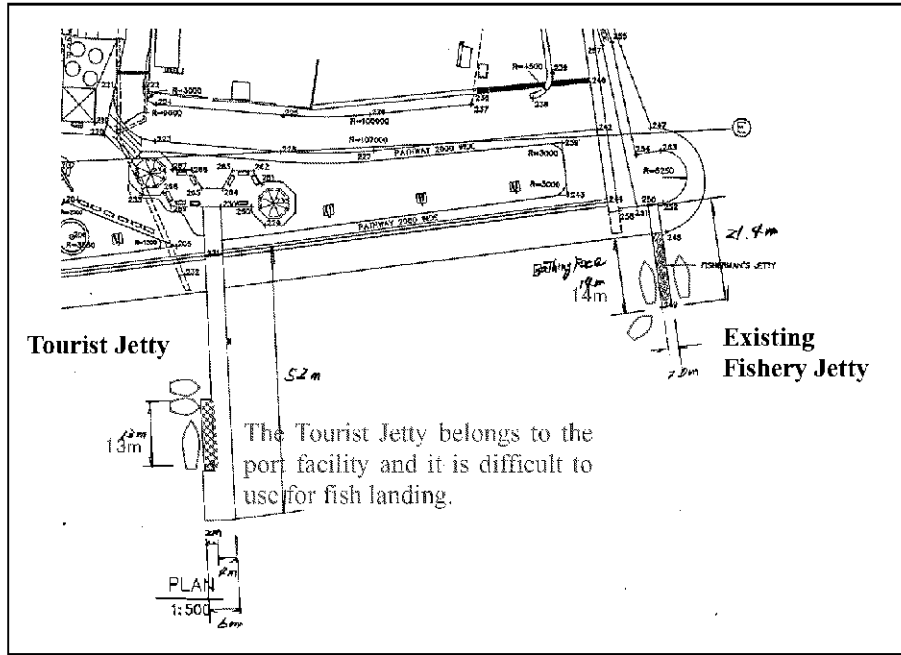


Figure-2.2.2(2) Existing Landing Facilities

(iv) Necessary length of landing berth

One berth length for landing sets up as 10 m since design boat length is 9 m as shown below. Design fishing boats utilize being parallel to berth.

$$\begin{aligned}
 L &= l + 0.15l \\
 &= 9\text{m} + 0.15 \times 9\text{m} \\
 &= 10.35\text{m} = 10\text{m}
 \end{aligned}$$

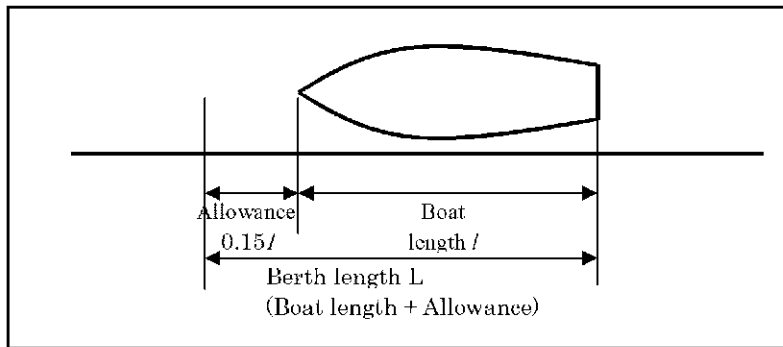


Figure-2.2.2(3) Parallel Mooring (Landing Jetty)

As tally in Table-2.2.2(6), the peak time is 2 hours from 8 to 10 o'clock and 9 boats are used when setting up necessary length of landing berth. Therefore, 2 berths are necessary with the calculation result below and the necessary length shall be 20m.

$$\begin{aligned}
 \text{Number of berth in landing berth} &= \sum \frac{N}{r} \\
 &= 9 \text{ boats} \div 6 \\
 &= 1.5 = 2 \text{ berths}
 \end{aligned}$$

N: Number of boats at the peak time (9 boats)

R: Number of Berth Rotation (6)

= Peak hours (2 hours) / landing hours per boat (20 minutes)

= 120 minutes / 20 minutes

= 6

d) Setting up necessary length of preparation berth (Mooring berth for small boats)

There are 4 small boats to connect jetty and fishing boats anchoring offshore in Charlestown. These boats were left by retired fishermen for current fishermen and the fishermen use these boats with free of charge for preparation work before and after fishing operation. And the preparation for fishing is commenced from 4 o'clock in the early morning. The sizes of small boats are 4.5 m of length, 1.5 m of width and 0.4 m of draft which is berthed alongside to berth.

In case that 2 small boats out of 4 are berthed at the same time, the berth length for preparation berth shall be 5m as shown below. Therefore, the necessary length for preparation berth shall be 10 m for 4 boats, 10m (= 5.0m x 2 berths).

$$\begin{aligned} L &= 0.5B + B + 0.5B + B \\ &= (0.5 \times 1.5\text{m}) + 1.5\text{m} + (0.5 \times 1.5\text{m} + 1.5\text{m}) \\ &= 4.5\text{m} = 5.0\text{m} \text{ (2 berths)} \end{aligned}$$

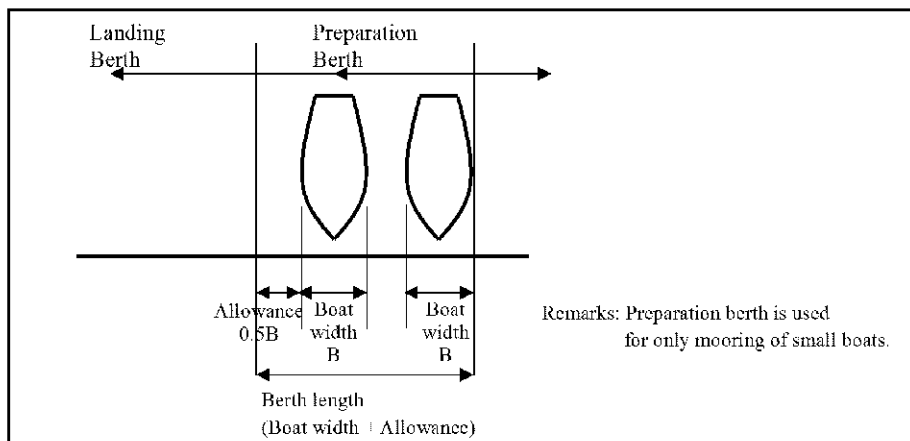


Figure-2.2.2(4) Longitudinal mooring of small boats (Preparation Berth)

e) Layout Plan of Jetty

Shape of jetty shall be “ I ” shape in view of safety in order not to receive lateral waves by fishing boats being berthed parallel to landing berth same as tourist jetty and fishery jetty. The length of tourist jetty for fish landing is about 20 m in length which is too short and the utilization frequency is less than the tourist jetty with the length of about 50m since it is influenced by waves due to the close location to the existing revetment in addition to the reflected wave from revetment.

Therefore, utilization condition of jetty in each water depth has been studied using wave frequency table. The relationship diagram between installation location and water depth of jetty is as per shown in Figure-2.2.2(5) and jetty length has been studied as 50 m which was the requested length and the same length of the tourist jetty. Mooring critical wave height sets up as

0.5 m from the result of hearing survey from fishermen and the frequency ratio of wave height being under 0.5 m has been calculated replaced by the operation ratio of fishing boats.

As the result, the frequency ratio under 0.5 m of operation critical wave height for fishing boats is estimated as 60 to 67% up to the depth of -4 m to -3m as shown in Table-2.2.2(8). It is ideal to set up berth location near about 15 m part from the head of jetty where the operation ratio will be high. And, this is in consistent with the berth utilization part of adjoining the tourist jetty. Based on the above study result, as Figure-2.2.2(6) shown, berth construction with landing berth in 10 m and preparation berth in 5 m total in 15 m is planned at both sides of jetty head. Location of installation is planned so as to secure necessary berth from jetty head. And, although the maximum boat length is 17 m in design fishing boats against the plan of 15 m berth (=landing berth 10m + preparation berth 5m), more than 2 m in length shall be short. However, as the fishing boat with the length of 17 m is only one, the short portion shall be set off by installing mooring ring at access part of jetty.

The width of jetty shall be 2 m at berthing part and 4 m at access part of the jetty referring to utilization method of existing tourist jetty. It is not considered that the vehicle such as pick-up truck does not go on the jetty.

**Table-2.2.2(8) Wave Height and Frequency Ratio of Operation in Jetty
(Critical Wave Height: 0.5 m)**

Depth (m) (Incl. tide level)	Frequency ratio (Operation Ratio) of Operation Critical Wave Height of Fishing boat under 0.5 m	Remarks (Location of New Fisheries Center)	
4.0	67%	Jetty head	
3.5	65%	Main jetty	
3.0	60%		
2.5	58%		
2.0	52%		
1.5	44%		
1.4	33%		
1.3	30%	Jetty tail	

Remark: Offshore wave height is obtained by coefficient by small amplitude waves theory.

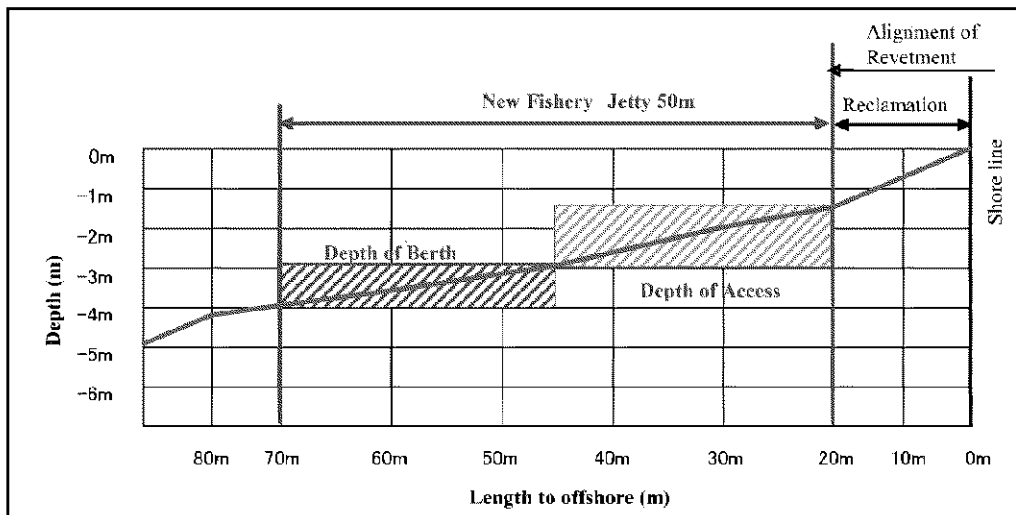


Figure-2.2.2(5) Sea Bottom Line and Location of New Fishery Jetty

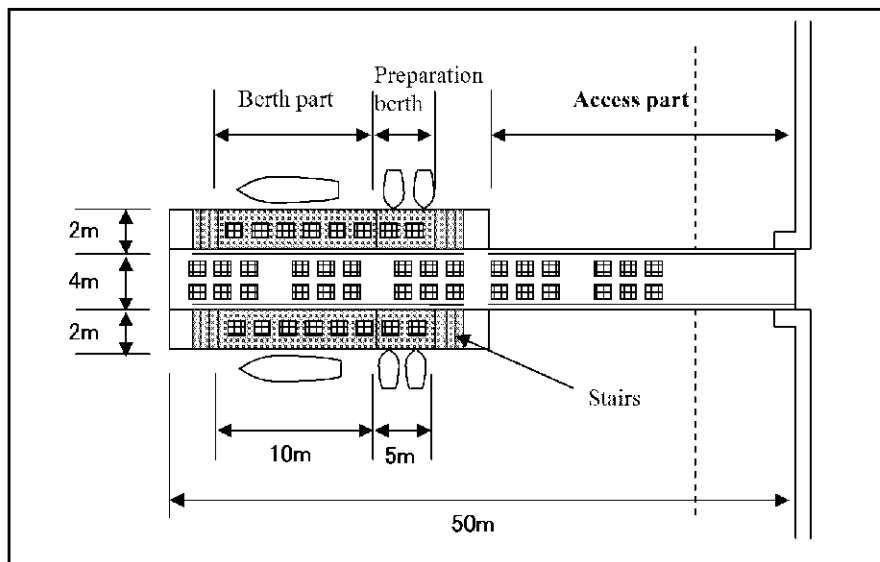


Figure-2.2.2(6) Image of New Fishery Jetty

f) Layout Plan of Revetment

The reclamation (including land formation) scale (area) is depended on building scale like the New Fisheries Center building, fishing gear lockers and etc. and land utilization program in the area in order to bring out high convenience and more advantage (profit) for fishermen, consumers and others by small scale reclamation. Revetment is necessary facility to protect project site and hinterland and the shape has been compared with three alternatives. These alternatives were studied to compare each feature in extreme logic and do not mean to decide out of 3 types.

With this, Type-B is good on land utilization aspect while Type-C is good on environmental aspect. Therefore, Type-C can diminish loss area of sandy beach by extending the alignment a little bit to offshore side. And planar curbing line is made at south side of revetment so that people are easy to observe landscape and mellowness is come up with an act.

Table-2.2.2(9) Comparison in each type of reclamation area (alternatives)

TYPE (Alternative)	Type-A (Requested)	Type-B	Type-C
Thought	This is requested plan to secure project site by reclamation and land formation in front of existing oil tanks. Alignment of revetment is allocated on the extension line of existing revetment.	Part of this type penetrates in Bath Bogs Protected Area but buffer zone and access road can be constructed. The revetment can be allocated on the extension line of existing revetment.	This is possible to have buffer zone and access road on the boarder of Bath Bogs although some of sandy beach will be lost same as requested plan. Alignment of revetment shall be curbed on the south edge.
Land Area	Standard	Standard (equivalent to Type-A)	Minimum
Land utilization grade	Better	Best	Good
Loss of sandy beach	Small	Large	Small
Impact to Bath Bogs Protected Area	The impact is considered to be minor but buffer zone can not be constructed.	Part of Bath Bogs Protected Area will be lost.	The impact is considered to be minor and further more buffer zone etc. can be constructed.
Buffer zone and Access road	Not possible	Possible	Possible
Planar Landscape	Consistency on landscape can be kept since alignment of revetment in port area is extended. As south edge part of revetment becomes sharp angle, artificial structures and natural sea shore is to be separated clearly.	Consistency on landscape can be kept since alignment of revetment in port area is extended. As south edge part of revetment becomes sharp angle, artificial structures and natural sea shore is to be separated clearly.	Consistency is kept by allocating revetment alignment being parallel with coastal line, existing road near entrance of project site. And, curb line is adopted at south edge of revetment so that mellowness is given to the boarder of artificial structures and natural beach.
Environmental Evaluation	Better	Good	Best

g) Layout Plan of Coastal Promenade (Apron)

Concrete apron shall be installed for overtopping waves at the time of extreme storm waves in backside of revetment and it is planned to accord that it is effectively used as promenade at the time of normal waves. The width of promenade (Apron) shall be secured minimum about 5 m considering overtopping situation at the time of hurricane “OMAR”.

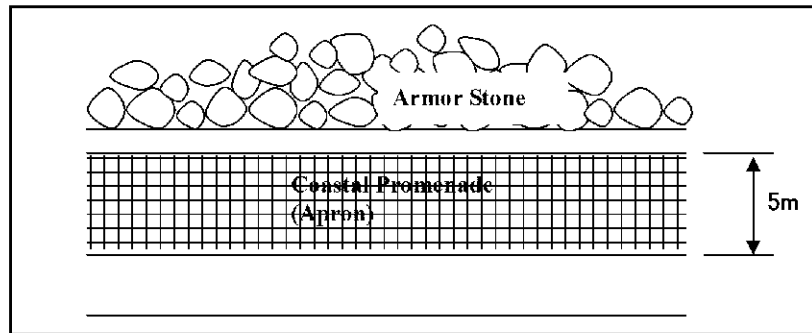


Figure-2.2.2(7) Image of Promenade

h) Layout Plan of Public Access

The area for reclamation in the project site shall be in front of Bath Bogs Protected Area and the land privately owned. Therefore, Public Access is going to be installed though this area is functioned not only as buffer zone at the construction period and facility operation but also as shown below, it is utilized as (i) land evacuation road for fishing boats, (ii) access road to beach and for common vehicles traffic. The width of public access shall be 8 m by 6 m two way road (3 x 2 ways) with 2 m margin as shoulder and sidewalk. In addition, place for boat trailer (one) which is newly adopting, car parking and fuel supply facilities are installed at the corner with the land privately owned.

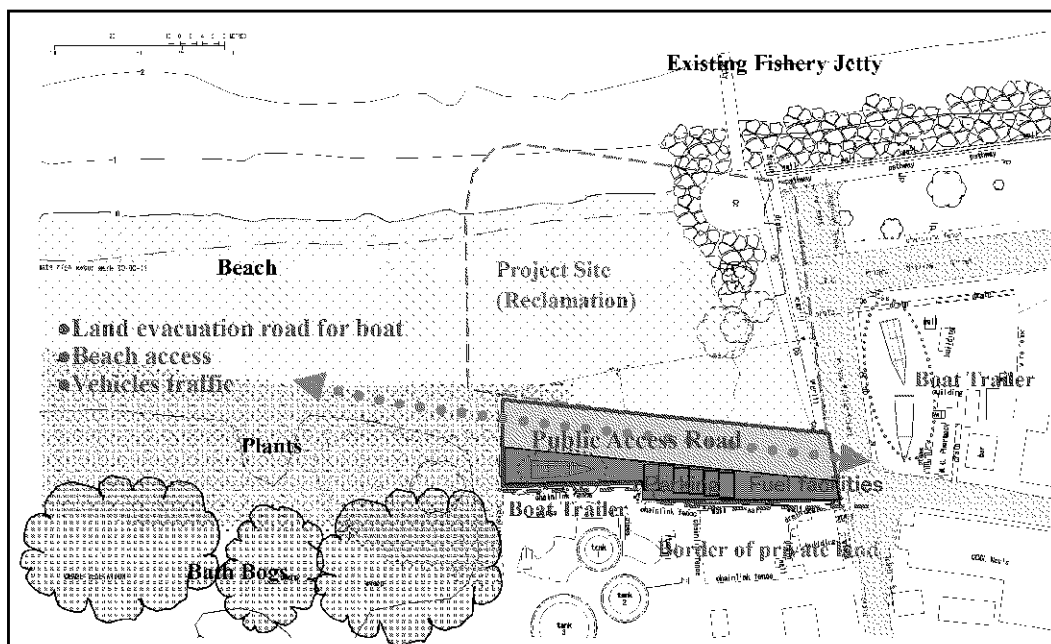


Figure-2.2.2(8) Image of Public Access

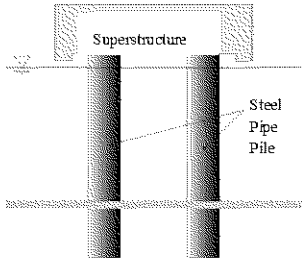
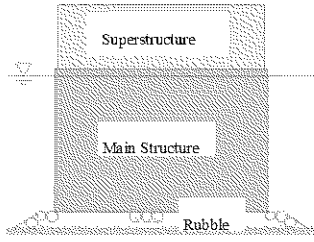
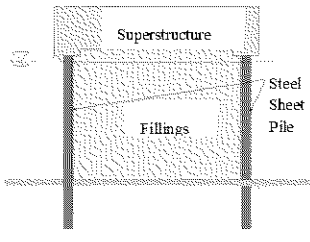
(b) Cross Section / Structural Plan

a) Structural and Cross Section Plan of Fishery Jetty

Frequency of swell waves (T=5~6 seconds, H= about 0.5m) is high although the project site is located at Caribbean Sea side and it is the situation that the safe landing works are not done at the existing fishery jetty. And, it was reported that the facilities adjoining the project site were heavily damaged at the time of extreme storm waves like hurricane “LENNY” and “OMAR”. Therefore, it is necessary to design structures being able to hold against the uplift pressure at the time of extreme storm waves. It is also necessary to consider coast geomorphic change. Therefore, “Permeable Pile Structure” shall be adopted as the structure of jetty which is considered to be best weighing the convenience, the construction method, the economic efficiency and the environmental consideration.

With the above, the jetty structure shall be permeable pile structure not so as to influence on geomorphic change of surrounding coast of the project site.

Table-2.2.2(10) Comparison with Jetty Structures

	(A) Permeable Pile Structure Type	(B) Impermeable Gravity Type	(c) Impermeable Steel Sheet-Pile Type
Structure			
Convenience	As wave is permeable it is easier to use due to the less influence of reflected wave.	It may be hard to use depending on boats size out of design boats by the generation of reflected waves by revetment.	Same as (B)
Construction Method	It will be marine work by barge and easy for safety management. And, the construction speed is comparatively fast.	Safety management is difficult due to the diving work. And the construction speed is comparatively slow.	Almost same as (A)
Economic Efficiency	Cheaper than (B)	It is necessary to widen width of jetty or improve land due to the existence soft layer.	Almost same as (B)
Environmental Consideration	Almost no turbidity during construction period is expected and sea bottom is also not disturbed. However, piling sound and vibration are generated. Influence on littoral drift is minor after construction.	Turbidity is generated at the construction period. Animate beings in the construction area are sacrificed. Influence on littoral drift is apprehensive. It will be possible geomorphic change of surrounding coast.	Same as (B)
Evaluation	Adopted		

Remark: The existing ferry terminal was expanded in 1995 and there is a report that coastal erosion has occurred at Pennies Beach after 1995.

(i) Structure of Berth (Landing Berth & Preparation Berth)

The berth height is set up 0.80 m the same as the existing fishery jetty. And as maximum draft of design boat is 1.7 m, the water depth of berth location is to secure deeper than -2.5 m considering 0.5 m margin depth setting up as critical utilization wave height. Therefore, grating by reinforced plastic shall be adopted at berth top slab in order to reduce the uplift pressure. And, fenders shall be installed sideways in front of frame of reinforced concrete of berth. And, exterior lighting shall also be installed for the preparation work starting from early 4 o'clock in the morning for early bird fishermen considering local utilization morphology.

(ii) Access Part Structure of Jetty

Access part of jetty is a part to connect between backside of the project site and berth part. And although the crown heights of existing ferry terminal and tourist jetty have been set up the same as the rear ground height as M.S.L.+2.0 m, Therefore, grating by reinforced plastic shall be adopted at berth top slab in order to reduce the uplift pressure.

The crown height of jetty shall be the same as ground level of the project site. And, concrete curbs shall be installed at the access part of jetty for the fall prevention of vehicles.

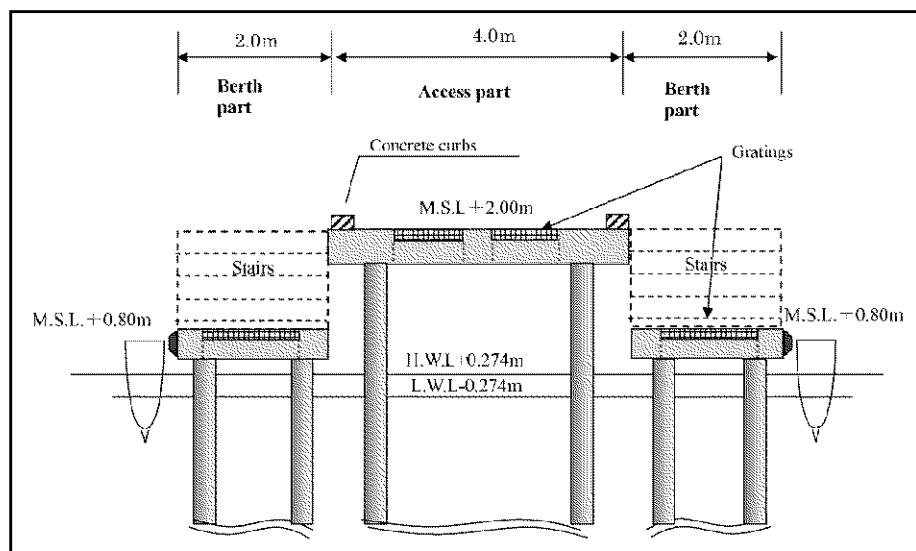


Figure-2.2.2(9) Image of jetty cross section

(iii) Structural Calculation of Jetty

Jetty structure shall be steel pipe pile type and the design criteria shall be set up as follows. Standard Cross-Section of Jetty is shown in Figure-2.2.2(10).

• Tide Level

- H.W.L. +0.27m
- M.S.L. ±0.00m
- L.W.L. -0.27m

- Size

Water Depth	M.S.L. -2.5m
Access part Height	M.S.L. +2.0m
Berth part Height	M.S.L. +0.8m
Width of Berth part	8.0m
Width of Access part	4.0m
Length	Berth Part 25.0m
	Access Part 25.0m

- Wave Condition

Design waves of Jetty is as follows,

Berth Part Design Wave Height	H=3.1m
Access Part Design Wave Height	H=2.4m
Period	T=14sec
Wave Direction	N93.4°W

- Soil Condition

As per soil investigation result

- Surcharge

Setting up as follows since vehicles approach is not considered into the jetty.

At the study of basic cross section: unconsidered

At the design stage of reinforcing bar arrangement:

Normal time:	5.0 N/m ²
Abnormal time:	2.5 N/m ²

- Design Boat

Artisanal fishing boat Length :9 m, Width : 2m, Draft :1.7m

- Boat Berthing Speed

$$V = 0.50\text{m/sec}$$

- Fender

Fenders for fishing port (100H) shall be installed.

- Bollard and Mooring Ring

Bollard and mooring ring shall be made of stainless steel.

- Design Seismic Coefficient

Horizontal Seismic Coefficient Kh=0.20

- Anti-corrosion Measure of Steel Pipe Pile

Heavy duty coating is done on pile top at splash zone
(shallower than M.S.L.-1.3m)

- Calculation Method of Uplift Pressure

The jetty is pier type jetty consisting of 2 blocks (berth part and access part) with one 25m block. The base is located near shoreline and the water depth is M.S.L.-2.5m even at the head. The case that swell waves under offshore wave size $H_0=12.4\text{m}$ and $T_0=14\text{s}$ affect on this jetty is studied.

The situation of tourist jetty near the project site attacked by hurricane waves was visually observed. Wave breaking situation so that superstructure of jetty can not be confirmed made the jetty almost submerged. As the size and shape of this jetty has no difference with the tourist jetty, it is assumed that the situation like visually observed shall be generated at the time of designed waves.

This jetty adopts permeable structure using gratings made of reinforced plastic at the superstructure part against this uplift pressure and intends to deduct the acting force.

And, berth part at the head of jetty has two tires deck structure and the space between two adopting beam structure makes less influence from waves. This jetty adopts structure so as to deduct action of uplift pressure by its structure and as this has less influence of waves in comparison with general jetty with beam-slab structure, $P=2 w_0H$ is considered to be appropriate as the calculation of uplift pressure.

And, berth part located at the head of jetty has double deck structure and the lower side is completely submerged at the acting time of wave pressure and it is considered that its uplift pressure strength is smaller than upper side. Therefore, the uplift pressure of lower side is estimated a little bit smaller adopting $P=1.5w_0H$. Secondly, wave height H which is used in the calculation of uplift pressure strength is calculated using significant wave height $H_{1/3}$ since as this jetty is located at the point where the water depth is below 0.5 times of equivalent deepwater wave height, it is considered to be too much to use the value of maximum wave height, H_{max} due to the bigger energy as current than water surface elevation as wave.

And, as it is considered to adopt grating used in floor slab which porosity is about 65%, the uplift pressure shall be considered uplift pressure of 50% value of occupied area for floor slab part (grating part).

With above, the uplift pressure acting to this jetty is as follows,

【Berth Part】

Lower side of upper beam $P_w=2.0w_0H_{1/3}$

Lower side of lower beam $P_w=1.5w_0H_{1/3}$

Grating part consider uplift pressure with 50% of occupied area

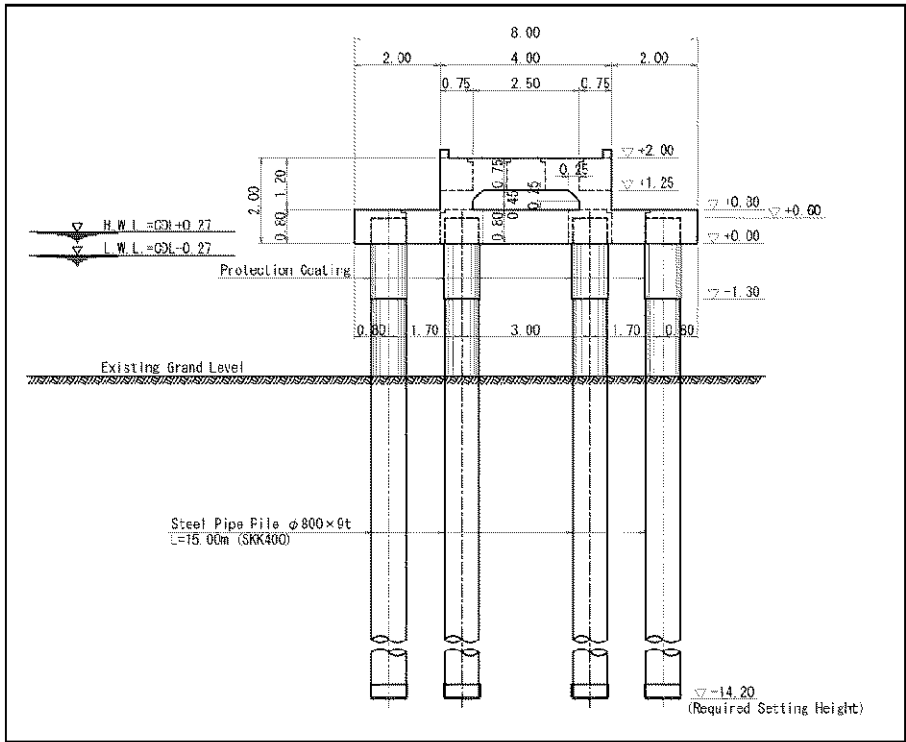
【Access Part】

Lower side of beam $P_w=2.0w_0H_{1/3}$

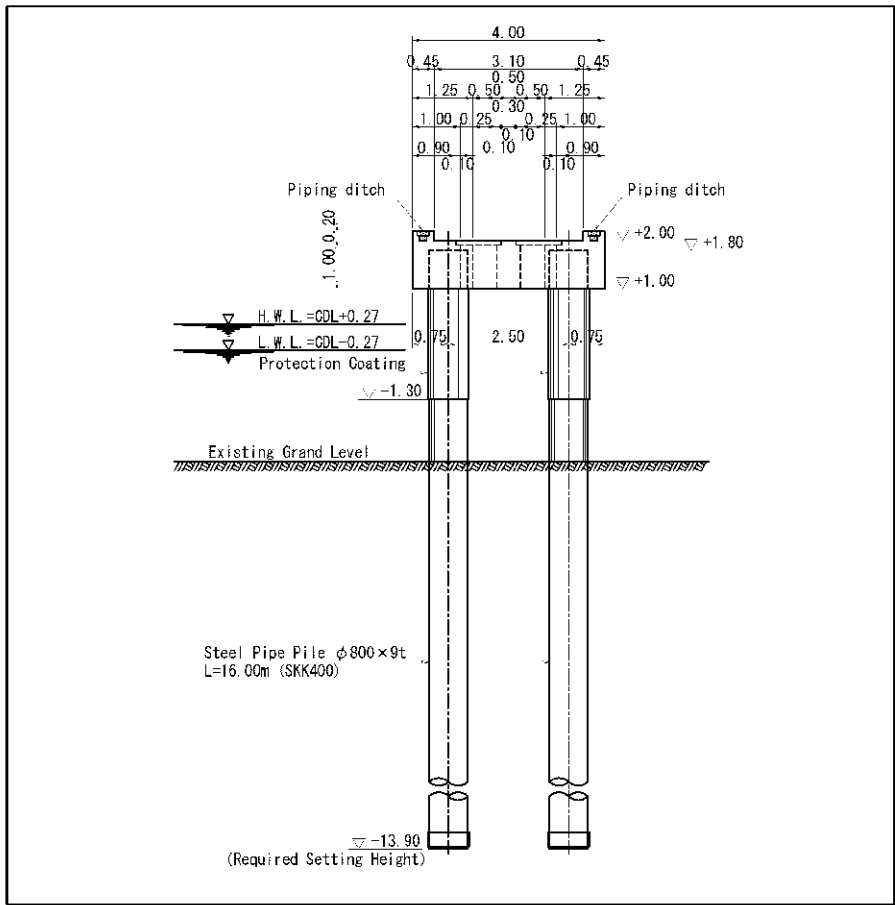
Grating part consider uplift pressure with 50% of occupied area

(iv) Ancillary Facilities of Jetty

Concrete curbs shall be installed on the Jetty for the safety (fall prevention) two lightings shall be installed so as to be able to work in the early morning and after dark. Fenders and mooring rings shall be installed. Two water taps for cleaning of upper part of jetty shall be installed.



[Berth part]



[Access part]

Figure-2.2.2(10) Cross Section of Fishery Jetty

b) Structural and Sectional Plan of Revetment

(i) Structural and Sectional Plan of Revetment

The Tourist Jetty which is neighboring to the project site and the existing revetment located at backside of Ferry Dock is made of rubble mound. Therefore, in this project as well, rubble mound revetment which has consistency with the existing revetment considering the landscape is planned.

Although the revetment of port area adjoining to the project site is rubble mound revetment and the crown height of its parapet is M.S.L. +2.0m and the crown height of rear ground is about M.S.L. +1.5m, rear structures were damaged by overtopping waves at the time of hurricanes hit. Therefore, the crown height of revetment and reclamation land shall set up from the calculation result of wave overtopping quantity.

And, using design wave sorted out in previous article, the crown height of parapet is desirable to be about M.S.L.+3.0m setting up allowable over flowing quantity ($q=0.01 \text{ m}^3/\text{m sec}$) referring to “Technical Standards and Commentaries for Port and Harbor Facilities in Japan” edited by Japan Port and Harbor Association. However, as the ground level of existing port area is M.S.L. +1.6 m, the difference shall be 1.4m. The height of parapet should low as much as possible in order to have a liberating effect and becomes friendly in view of landscape in case of utilization of rear revetment at the time of normal waves.

Consequently, the crown height of parapet sets up as M.S.L. +3.0m for reducing overtopping and the crown heights of project site at backside of revetment and coast promenade set up as M.S.L.+2.0m and install setback levee with 50 cm at the back. Retarding basin is installed in front of New Fisheries Center and fishing gear lockers in the reclamation land and the height of building foundation shall set up M.S.L. +3.0m.

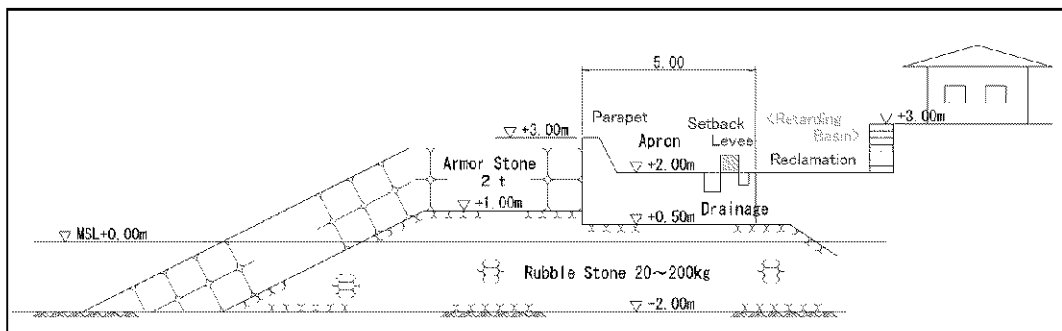


Figure-2.2.2(11) Image of Revetment

(ii) Weight Calculation of Armor Stone

Stability mass of armor stone for revetment shall be calculated by Hudson method. The design wave height uses the wave height at the toe of armor stone slope.

$$W = \frac{\rho_r \cdot H^3}{K_D \cdot \cot \theta \cdot (\rho_r / \rho_o - 1)^3}$$

Where,

W ; Stability mass of armor stone (t)

H ; Significant wave height (m) at water depth of toe of slope of armor stone

$$H = 2.5\text{m}$$

ρ_r ; Density of armor stone $\rho_r = 2.60 \text{ t/m}^3$

ρ_o ; Density of seawater $\rho_o = 1.03 \text{ t/m}^3$

θ ; Slope angle ($^\circ$) $\cot \theta = 2.0$

Kd ; Stability number of armor stone $Kd = 3.5$ (as 2 layers of rough surface)

$$\therefore W = \frac{2.60 \times 2.5^3}{3.5 \times 2.0 \times (2.60/1.03 - 1)^3} = 1.64\text{t}$$

Therefore, armor stone with 2 ton/piece shall be used. The crown width of armor stones shall 6.0m referring to the crown width of seawall of shown in Figure-2.2.2(12).

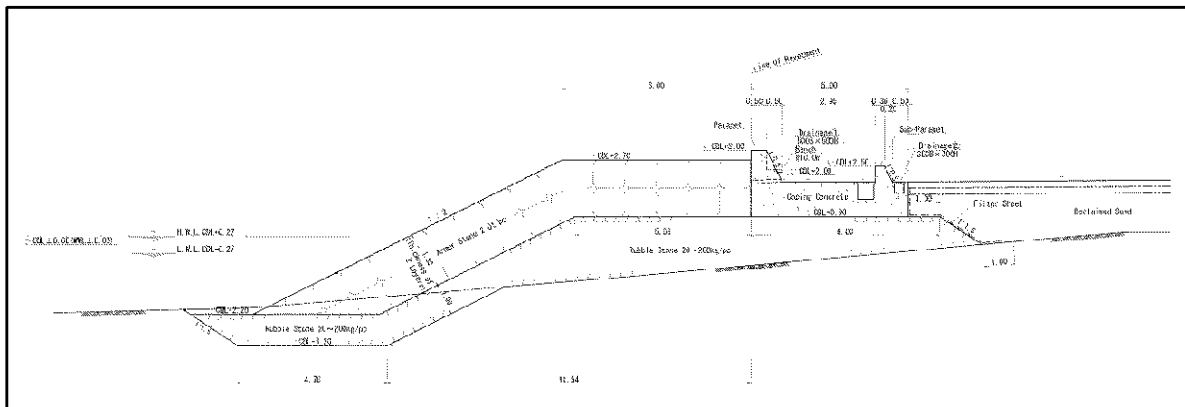


Figure-2.2.2(12) Standard Cross Section of Revetment

(iii) Study on Stability of Revetment

Soil of the project site is the bedding situation accumulated by surface sand layer, soft peat layer, sand gravel layer, hard layer from the surface in order. N value of peat layer out of these layers formations is small as 0 to 1 and it shows soft soil feature. In case of land reclamation, as sliding failure is anticipated at the peat layer, stability study for sliding failure of revetment was done on the following 2 cross sections.

- i) Temporary cross section of revetment at the time of reclamation (without coping concrete) with the rear reclamation height (M.S.L.+4.0m)
- ii) Completed cross section

The study result of sliding failure was satisfied with necessary safety ratio as shown in Table -2.2.2(11) and the stability both for temporary revetment at the time of reclamation and completed cross section were no problem.

Table-2.2.2(11) Safety Ratio of Sliding Failure

Cross Section	Safety Ratio (Fs)
Cross section of temporary revetment at the time of reclamation	1.49 > 1.1 OK
Completed cross section	1.57 > 1.2 OK

(iv) Improvement of Water Drain

Water drain has been installed along with north side road of the project site from urban area (length about 50m, width about 2m, depth about 1m) According to the site survey, concrete covers, side walls and gratings are heavily deteriorated and it can not be absorbed against vehicle load going into the New Fisheries Center. Therefore, it is considered to be appropriate to include the improvement of this water drain into civil works of this project.

2-2-2-2 Basic Plan for Architectural Facilities

(1) Basic Policy of Architectural Facilities

- a) Buildings in seashore have to be careful firstly on its wind pressure resistance and salt damage. It should be considered for lifting of roof sheet by strong wind as to the wind pressure resistance. It shall be possible to have coherence with the roof structure by using v-shaped steel sheet and select an acid-proof specification which is able to cope with salt damages. And, it is also effective for alleviation of roof load.
- b) There are many historic buildings around the project site which the finish of outer walls is stone pitching. Considering harmony with the surrounding, the outer wall of the New Fisheries Center shall be planned as stone pitching.
- c) Ground floor of the New Fisheries Center shall have spaces to have a consistent flow from the receipt to the process and sales of fish catch and the second floor has the space for facility management and the conference room.
- d) In the result of the soil investigation at project site, the existence of soft peat layer with approximately 3 m below the layer of surface beach sand (with the thickness of approximately 1 m) was confirmed. The peat layer is estimated as the primary consolidation settlement (settlement period is about 200 days) with 70 to 90 cm at the Fisheries Center Building. Therefore, all the foundation for building facilities shall be the pile foundation.
- e) Peat layer shall be sagged about 15 cm over about 2,000 days by secondary consolidation settlement after primary consolidation settlement. As the cracks may be generated on the concrete pavement of the exterior area, the finish of pavements for access road and around buildings shall be mechanically stabilized crusher stone (gravel paving). And, the retarding area in front of buildings shall be the lawn finish adopting strong request from the NIA and the government shall be obliged to grass and the maintenance works.

(2) Design of Architectural Facilities

1) Thought on Facility Landscape

There is a Waterfront Re-development Plan around Ferry Dock of Charlestown in Nevis Island and the elevation plan of buildings has consistency in view of landscape. As the buildings in this project are planned neighboring to the planned site of Waterfront Re-development Plan, the building structures standing on seashore should consider the landscape observing from seaside and desirable to have the elevation plan considering the consistency with the existing building structures and the above Re-development Plan. Roof finish of many buildings in Charlestown is steel sheet and the roof shapes are gables and hipped types. And, the depth of eaves is very short considering wind pressure at the time of strong wind. The finish of outer wall is mainly stone pitching. There equipped pedestrian deck in second floor. Most of the windows are balanced sash or with louver. In this project,

- a) Roof: V-shaped steel sheet and equip pedestrian deck with the same width eave
- b) Foundation & building structure: Reinforced concrete (RC)
- c) Outer Wall: Stone pitching finish on RC wall for ground floor and paint finish on mortar for second floor
- d) Window: As louver window is easy to trouble on movable part, double hung window shall be adopted.

2) Thought on Facilities Layout

It is assumed that waves are overtopped from the revetment at the time of hurricane. Therefore, it is necessary to raise the ground level of the facilities considering the overtopping. And, there plan retarding basin to temporary reserve overtopping seawater and try to stop the influent waves into facilities ground to a maximum extent. Discharged water from retarding water basin shall be natural one having slopes to north south side and sea side (west side). The facilities shall be arranged to landside only due to the retarding basin. Stairs instead of slopes shall be installed at the wall facing to retarding basin. Slopes shall be installed at orthogonal direction to seaside in order to prevent from going-up seawater to the land easily.

The New Fisheries Center is located in front of the fishery jetty to enhance the convenience of transportation of ice and fish. Consumers are waiting for the return of fishing boat under the scorching sun and purchase fishes closing about fishermen after landing in present Nevis Island. It is assumed that consumer's approach is facing to the New Fisheries Center from the road in front of land or from the retarding basin. Gazebo is planned as the rest area at retarding basin so that consumers can wait for the return of fishing boats being seated in gazebo. Retarding basin in front of the New Fisheries Center can offer a calm space for residents.

Sales booth which can sell fresh fishes directly by fishermen shall be installed on the observers' right from seashore and in left hand side, processed fish sales booth which can be purchased processed fishes. After purchasing fishes at direct sales booth by fishermen, removing scales and guts by cleaners can be possible.

Fishing gear lockers shall be planned at right hand side. And, engine flushing tank shall be equipped at outer wall of south side of the New Fisheries Center for cleaning outboard engine. Fishermen shall clean outboard engines in engine flushing tank after unsetting from fishing boat and store them in the lockers.

Flow line plan of fishermen, fishes, ice and consumers are shown in Figure-2.2.2(13).

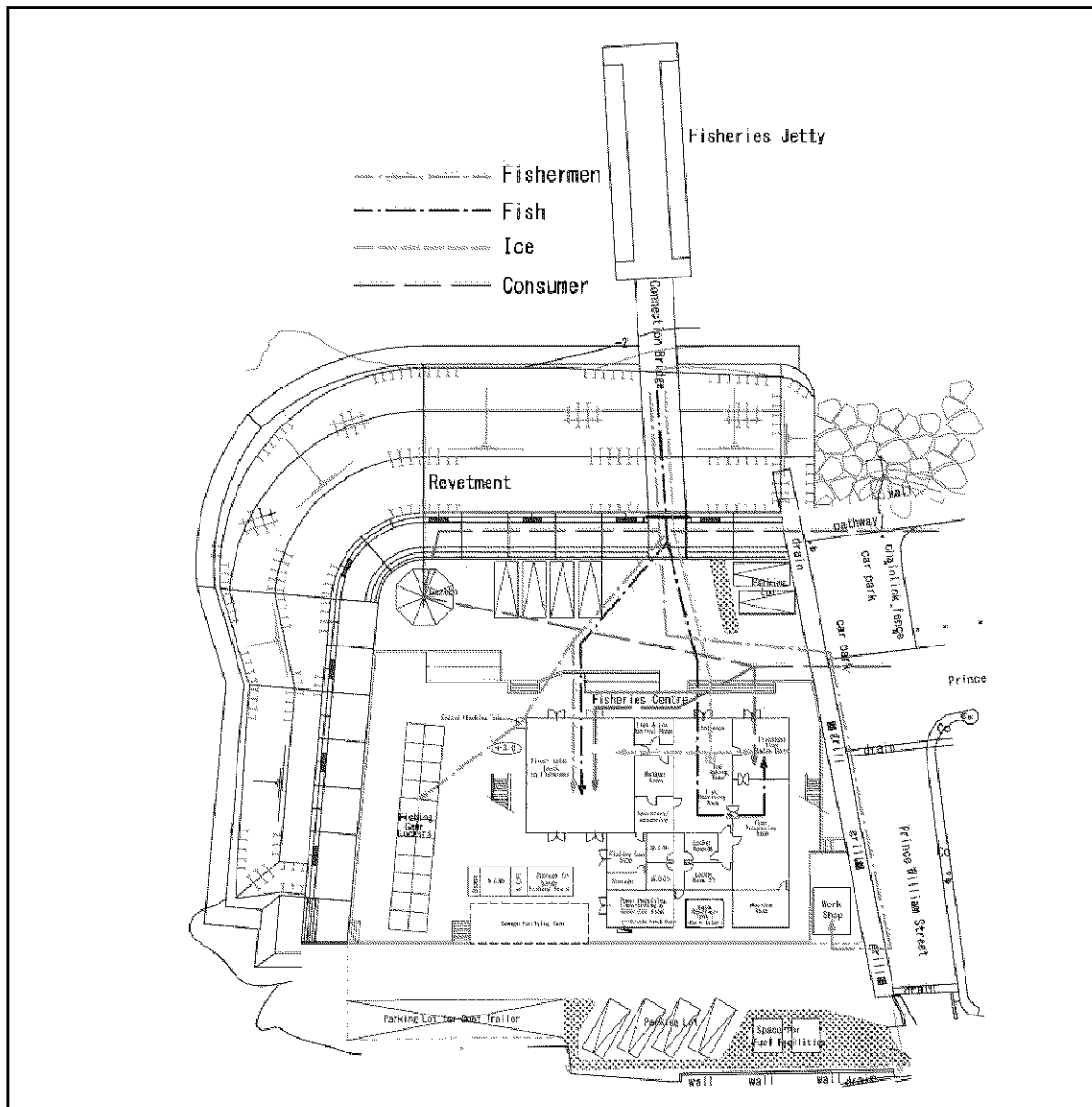


Figure-2.2.2(13) Flow line of fishes, ices, fishermen, and consumers

3) Thought on Room Layout in Facility

(a) Utilization method of rooms in the New Fisheries Center and necessary equipment

Flow Chart of fresh fishes, ice and fishermen in the New Fisheries Center shall be shown in Figure -2.2.2(14). Comparison of functional layout in the New Fisheries Center is shown in Table -2.2.2(12).

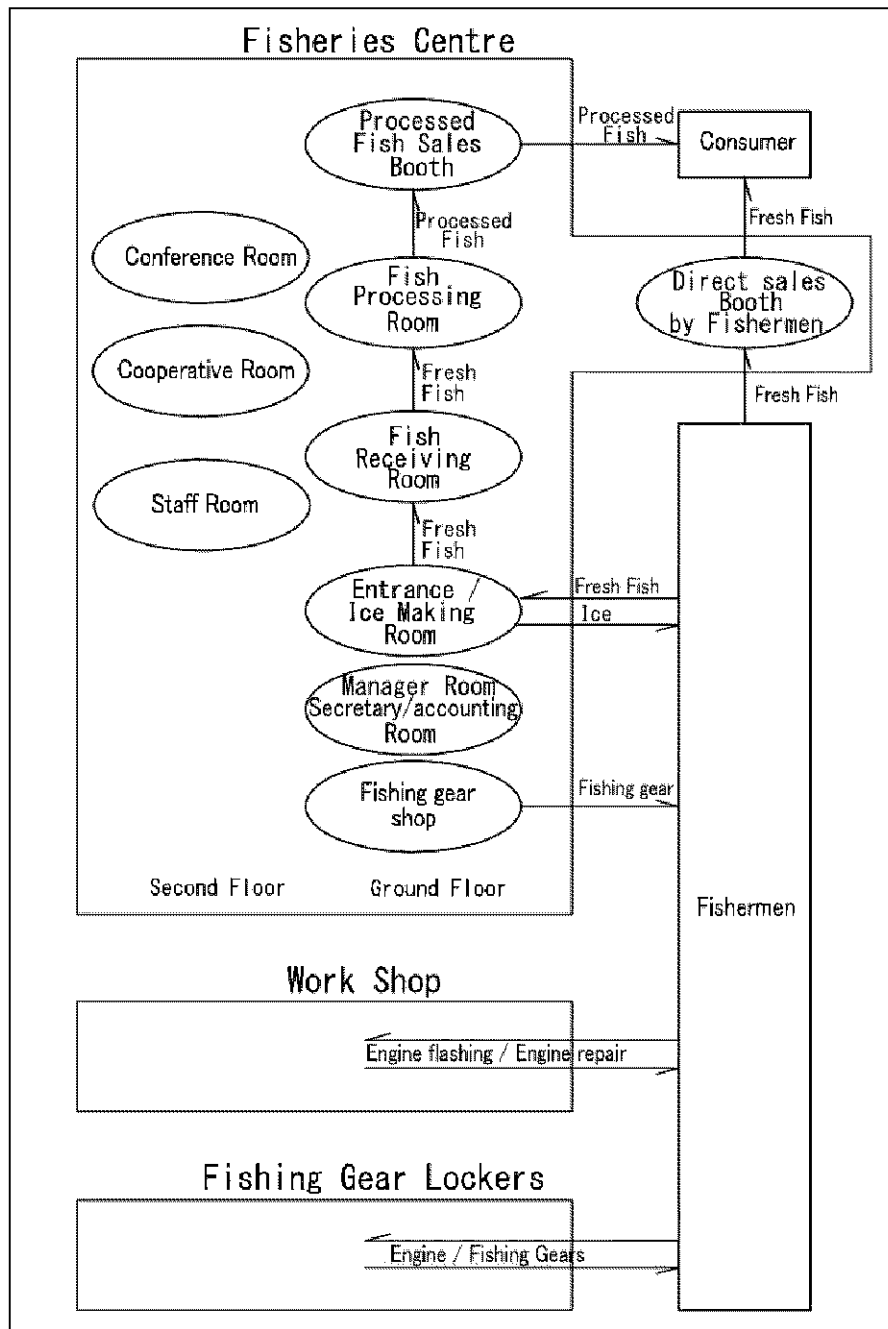
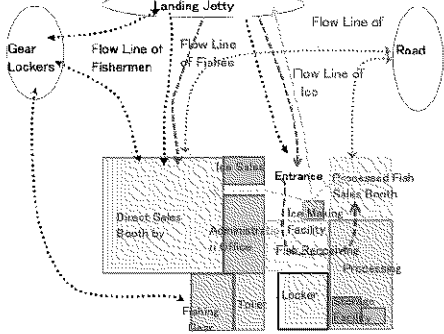
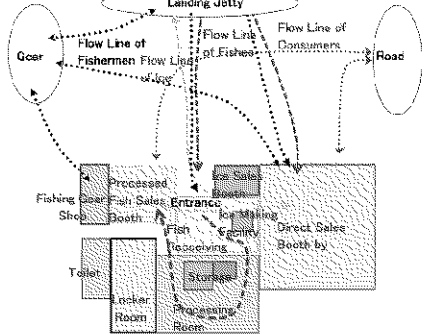
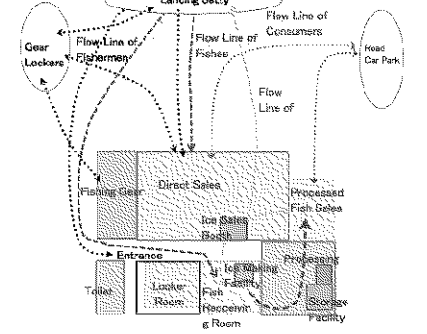


Figure-2.2.2(14) Flow Chart of fish and ice in New Fisheries Center

Table-2.2.2(12) Comparison of Functional Layout in New Fisheries Center

	<p style="text-align: center;">Type A</p> 	<p style="text-align: center;">Type B</p> 	<p style="text-align: center;">Type C</p> 
<p>Zoning and Flow Lines</p>			
<p>Points to consider</p>	<ol style="list-style-type: none"> 1. Direct Sales Booth by Fishermen and Fishing Gear Shop shall be allocated to the side of Fishing Gear Lockers. 2. Processed Fish Sales Booth where the works take long shall be allocated the side of road and parking area of the entrance. 3. Ice making machine shall be allocated near the entrance. 4. Administration function shall be allocated at the center of ground floor. 	<ol style="list-style-type: none"> 1. Processed Fish Sales Booth and Fishing Gear Shop shall be allocated at the side of Fishing Gear Lockers. 2. Direct Fish Sales Booth by Fishermen where has many sales volume shall be allocated at the side of road and parking of the entrance. 3. Ice making machine shall be allocated near the entrance. 4. Administration function shall be allocated at the second floor. 	<ol style="list-style-type: none"> 1. Processed Fish Sales Booth, Direct Fish Sales Booth by Fishermen and Fishing Gear Shop shall be allocated at the entrance and make an appeal to consumers. 2. Fish receiving to Processing room shall be allocated at the side of Fishing Gear Lockers. 3. Ice making machine shall be allocated at the center of facility. 4. Administration function shall be allocated at the second floor.
<p>Consumers</p>	<p>As the Processed Fish Sales Booth is allocated at the entrance, it is understood that the Fisheries Center is always opened.</p>	<p>Direct Fish Sales Booth by Fishermen where is closer to the entrance shall be busy in the morning.</p>	<p>As Processed Fish Sales Booth and Direct Fish Sales Booth are allocated at the entrance, there shall be always busy and so feel easy to enter.</p>
<p>Fishermen</p>	<p>Direct Fish Sales Booth by Fishermen and Fishing Gear Shop are closer to Fishing Gear Lockers and Jetty and the flow line to fish receiving room shall be easily accessible and the ice for the operation is also easy to be used.</p>	<p>Although the Direct Fish Sales Booth by Fishermen has a distance from the Fishing Gear Lockers, as fish can be directly transported from the jetty, it shall not be the problem and the ice for the operation is also easy to be used.</p>	<p>Direct Fish Sales Booth by Fishermen and Fishing Gear Shop are closer to Fishing Gear Lockers. However, the flow lines to fish receiving room are hard to be used in comparison with Type A and Type B. And, as the ice making machine is installed at the back of facilities, it is hard to be used.</p>
<p>Management</p>	<p>As administration office is allocated at the center of ground floor, the situation of fishes, fishermen and consumers can be easily understood.</p>	<p>As the administration office is located at the second floor, in order to understand the situation of fishes, fishermen and consumers, the officers are necessary to go down to the ground floor.</p>	<p>As the administration office is located at the second floor, in order to understand the situation of fishes, fishermen and consumers, the officers are necessary to go down to the ground floor.</p>
<p>Evaluation</p>	<p style="text-align: center;">Adopted</p>		

<Ground Floor>

a) Direct sales booth by fishermen

Fish landing time in Charlestown is usually concentrated at hours from 8 to 10 in the morning and fishermen were held at 8 spots as maximum during survey period. 7 sales booths shall be planned and cope with scooping over the sales spaces if more fishermen are gathered. And, a movable sales table which equips a table for ice box and fishes display table together shall be installed in each booth. As 4 cleaners (remove fish scales and guts) have worked at the same time during survey period, two cleaner booths (2 persons per booth) shall be planned.

At present, fishermen themselves sell their fishes catch outside under the scorching sun. Controlled salable space blocking the sun's ray as well as tallying landing volume shall be installed in the New Fisheries Center. Fishermen shall sell fishes face to face with consumers using fish display table. One booth shall be 3,000 mm x 2,500 mm with the space for putting ice box for fishes being lateral to fishermen considering the space for 4 to 5 consumers. Consumers may ask cleaner to clean fishes after purchasing fishes. The facility is designed as flat floor (drain shall be installed for discharging cleaning water in the center part) and the lot shall be shown on the floor for each sale. 7 booths shall be installed considering the concurrent usage. The width of 1,500 mm shall be secured for the transportation of fishes catch as passage for fishermen and as the space for consumers to move.

Booths for cleaners shall be the same size. Working sink for cleaner shall be made of concrete. Solid matter removed by cleaners like guts shall be disposed to basket however smaller solid matters shall be collected by baskets equipped in grease trap at the end of drainage and periodically disposed.

Large size aperture with fixed security grating instead of window shall be installed outside for better ventilation since air conditioner shall not be equipped. These gratings shall equip insect net and hurricane shutter for strong wind like hurricane. Meanwhile, considering the request to change ventilation direction depending on wind direction, ventilations shall be installed.

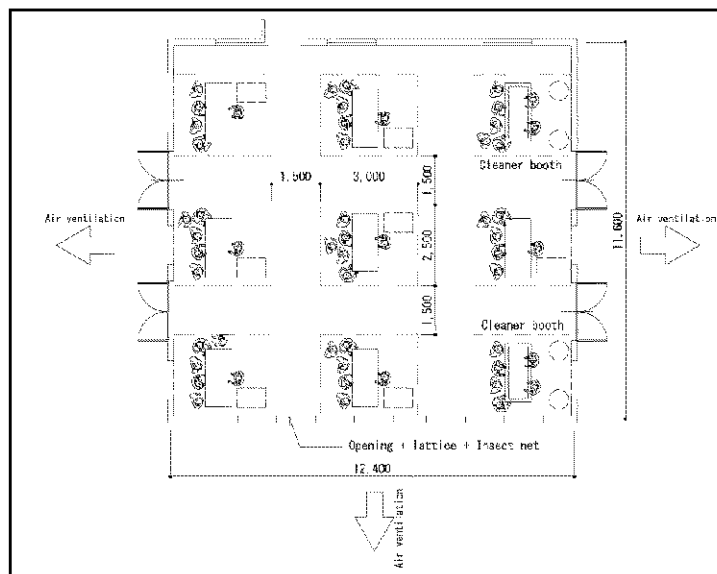


Figure-2.2.2(15) Layout for Direct Sales Booth by Fishermen

b) Fish control and operator room for ice

A room for the management of fishermen to use the above a) and for ice sales shall be planned. Windows to watch fishermen's movement shall be installed at sea side and the inside of the room. The space for office desk to make up records and book shelf shall be secured. The area shall be $4.2 \times 2.9 = 12.20 \text{ m}^2$.

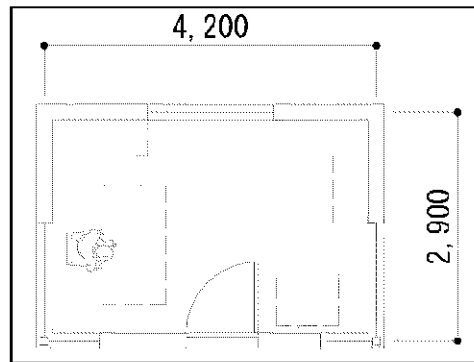


Figure-2.2.2(16) Layout for Fish Control and Operator Room for Ice

c) Entrance and room for ice making machine

This is a space for carrying fishes to processing room equipped with ice making machine and ice is also sold here. The ice can be carried to direct sales booth by fishermen through passage and also a door shall be equipped so as to be able to directly carry ice to be laid on fish sales table to sales booths for processed fishes.

d) Fish receiving room

This room shall allocate a sink for cleaning fishes, a box for temporary storage of receiving fishes and measuring apparatus for received fishes. This room shall be equipped a wash basin at the entrance. There shall have no walls in the above c) and d) but plan as one room.

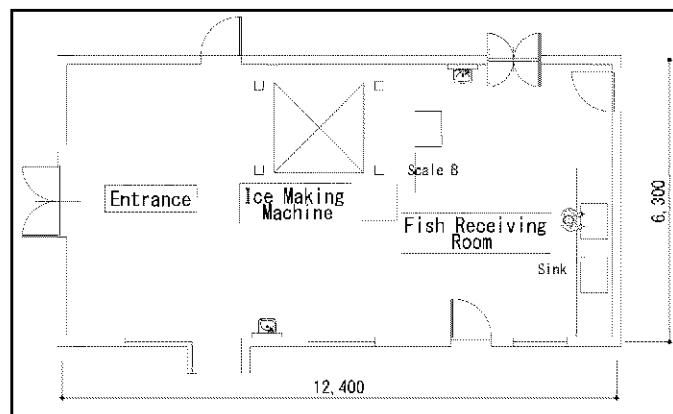


Figure-2.2.2(17) Layout for Ice Making Machine & Receiving Room

e) Fish processing room

This room shall equip tables (made in stainless steel) and sinks for fish processing, insulated room for storage of processed fishes and freezer for the long time storage. Band saw for fish processing and a vacuum packaging machine for the sales of processed fishes shall be equipped. Water drain shall be equipped for the water of cleaning of floor and wall and it collects waters.

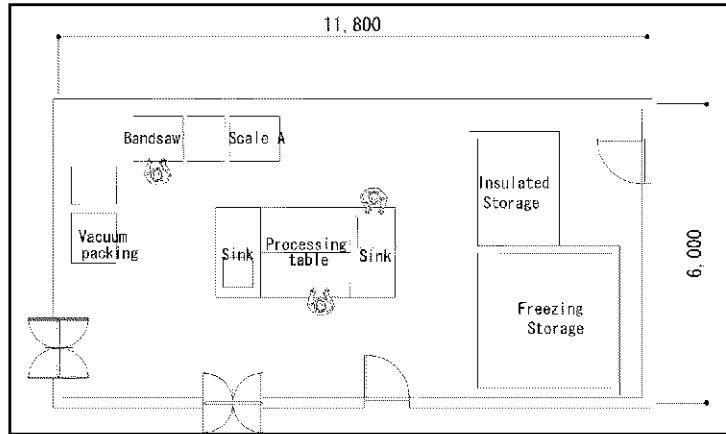


Figure-2.2.2(18) Layout for Fish Processing Room

f) Sales booth for processed fish

This place shall equip showcases aiming to sell processed fishes to general consumers so as to put processed fishes on laying ice. The existing chest freezer to increase salable fish volume shall be installed and the existing freezer for the sales of soft drinks is also installed. Water pit shall be equipped under the floor as floor and walls are cleaned.

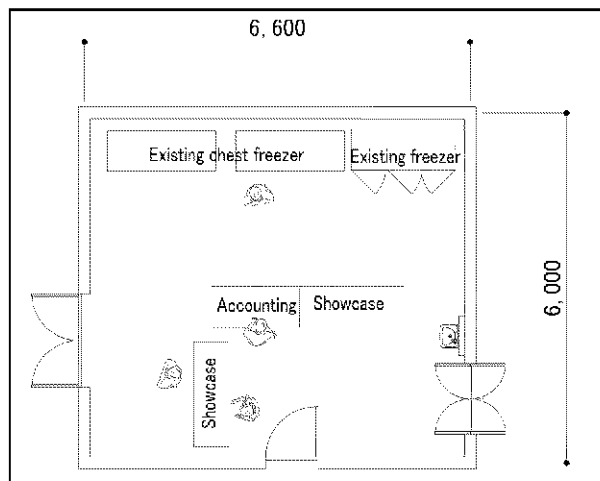


Figure-2.2.2(19) Layout for Processed Fish Sales Booth

g) Locker rooms and toilet

This room shall be planned to be sure to pass after using toilet including aims of washing and changing as the approach part to the fish processing room. Shower room to be used at the time of finished work for women shall be equipped.

For Man: 6 users

Manager: 1 person

Person in charge of Ice Making and Fresh Fish Management: 1 person

Cleaner: 4 persons

For Woman: 4 users

Secretary/Accountant: 1 person

Sales (processed fish): 1 person

Fish processing: 2 persons

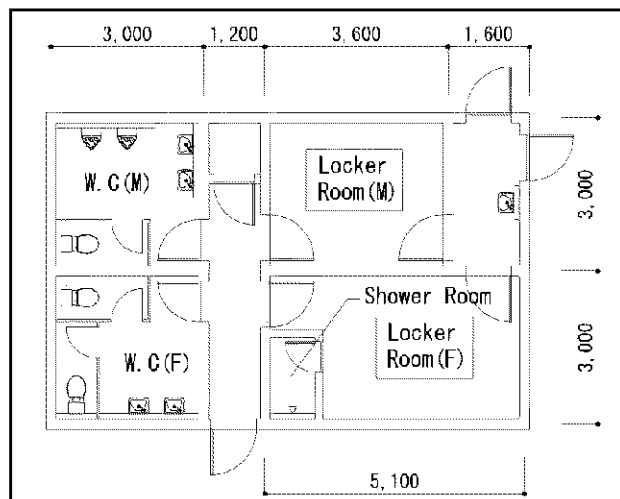


Figure-2.2.2(20) Layout for Locker Rooms

h) Fishing gear shop

This shop shall be allocated at the ground floor of the New Fisheries Center as one the supporting facility for fishermen. Shelf to display gears and the storage shall be equipped together. The size shall be as follows,

New Fisheries Center: $6\text{m} \times 4.2\text{m} = 25.2\text{m}^2$

Existing Fisheries Center: Gear Sales Booth $2.65\text{m} \times 5\text{m} = 13.25\text{m}^2$

Storage for gears 10m^2 Total: 23.25m^2

This space shall be planned to have the equivalent area with the fishing gear shop and storage of the existing Fisheries Center.

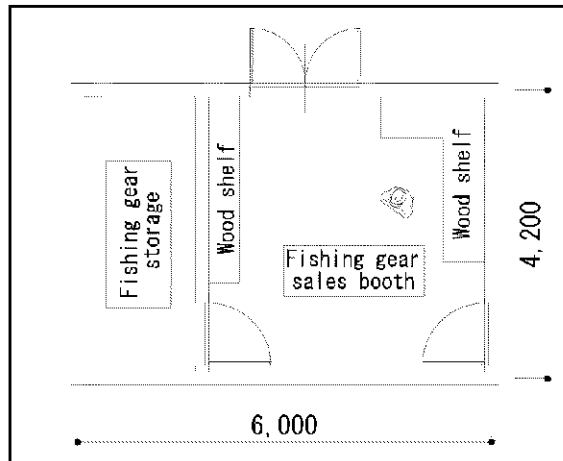


Figure-2.2.2(21) Layout for Fishing Gear Shop

i) Electric receiving and transforming room and machine room

3 phases 4 wires 400v power shall be lead through under ground from electric pole installed in the road in front of the project site and 3 phases and single phase 230v shall be lead into the electric receiving & transforming room by outdoor panel board. As single phase needs two kinds for the operation of these facilities, the power to be transformed to single phase 100v from the single phase 230v and the power of single 230v shall be distributed to each facility. For the emergency, a generator and a reserve tank shall also be equipped. And, a water reservoir tank for city water and a necessary pump to supply water shall be installed in the machine room. Water shall be supplied to necessary places from the reservoir tank for city water and rain water. Alternating operation of two pumps for each tank shall be conducted for the troubles and damages. The area shall be 7.2m x 4.0m=28.8m² (Electricity room) and 6.0m x 4.0m= 24.0m² (machine room).

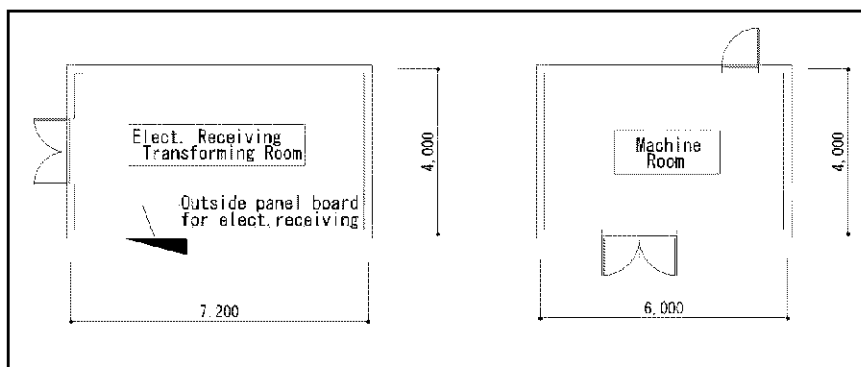


Figure-2.2.2(22) Layout for Electricity and Machine Rooms

j) Manager room

As the responsive person of New Fisheries Center, this room shall be allocated at the ground floor and in order to be able to confirm the situations of ice sales, fish receiving and fish sales windows for both ends of this room shall be installed. The space for putting desk, book shelf and reception set to be for about 6 persons shall be secured. The area for manager and secretary/accounting room shall be referred to the area to be used in the Ministry of Land, Infrastructure, Transport and Tourism of

Japan as shown in Table-2.3(12). The area for the manager room shall be 18.48 m² (4.20 x 4.40 = 18.48 m²)

(k) Secretary/ Accounting room

In order to work as the secretary for the manager this room is planned to have a door between two rooms and copy machine and other office machines shall be installed. And, a door to fishing gear shop shall also be installed and manage the gear sales. The area shall be 16.38 m² (4.20 x 3.90 = 16.38m²).

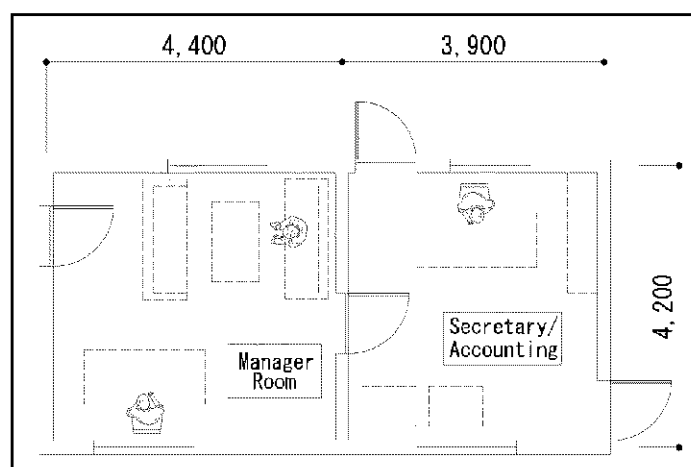


Figure-2. 2.2(23) Layout for Manager Room and Secretary/Accounting Room

Table-2.2.2(13) Standard for Necessary Area of Newly Established Government Facility

Room Name	Class	Conversion Factor	Factor x Area	Calculation Area (m ² /person)
General Office and Reception Room	General	1.0	1.0 x 4.4	4.4
	Sub-Manager	1.8	1.8 x 4.4	8.0
	Manager to be	2.5	2.5 x 4.4	11.0
	Manager	5.0	5.0 x 4.4	22.0
	General Manager	9.0	9.0 x 4.4	39.6
	Chief	18.0	18.0 x 4.4	79.2

Source: Standard for necessary area of newly established government facility issued by the Ministry of Land, Infrastructure, Transport and Tourism of Japan

<Second Floor>

Rooms in second floor are for the staff and each space shall be the room to be able to observe sea and jetty. And, pedestrian deck shall be installed in three directions of second floor and doors to be installed as an evacuation passage. The land side deck shall secure the width which is able to apply the door width to outside in accordance with the architectural standard of Nevis. Second floor administration rooms shall be for 5.0 to 10.0 m² referring to Architectural Design Data Corpus.

l) Administration room

This room is used by 5 persons consisting of 2 processors, 1 person of Sales (Processed fish), 1 person of Security and 1 person of cleaner as their common room. 4 persons who shall be employed in the future (1 person of Supervisor for fish processing, 1 person of quality control engineer, 1 person of sales promotion of marine product and 1 person of vehicle driver) use the room with own partition. It is assumed that this room is used by total 9 persons as one big room and planned the area of $12.3\text{m} \times 4.0\text{m} = 49.2\text{m}^2$ ($5.5 \text{ m}^2/\text{person}$).

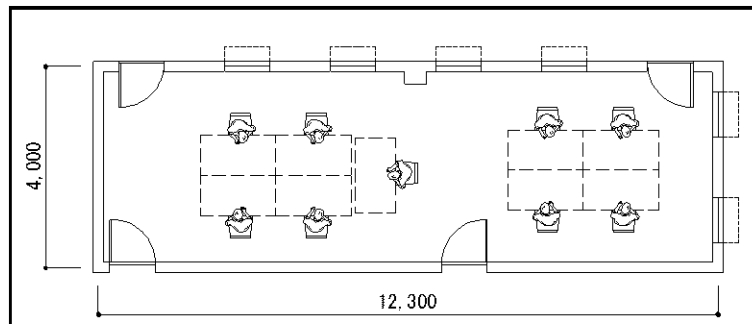


Figure-2.2.2(24) Layout for Administration Room

m) Cooperatives room

One person of President, 4 persons of board members totaling 5 persons shall use as their office and individual consultation and discussion shall be held. The area shall be planned as $8.6\text{m} \times 5.4\text{m} = 46.4\text{m}^2$ ($9.28 \text{ m}^2/\text{person}$)

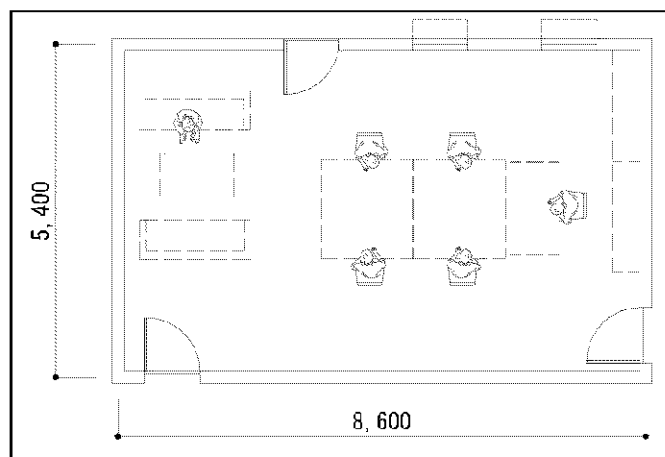


Figure-2.2.2(25) Layout for Cooperatives Room

n) Storage

This is used for placing desks and chairs of conference room, spares of fish boxes and pallets to be used in fish receiving room and processing room in the ground floor and tray and vinyl for packaging. The area shall be planned as $4.3\text{m} \times 6.40\text{m} = 27.52\text{m}^2$.

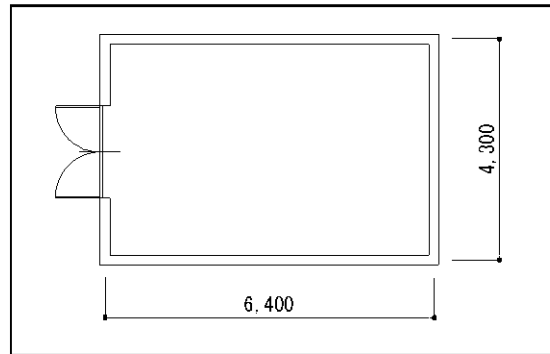


Figure-2.2.2(26) Layout for Storage

o) Ice making machine room

This is used to install a Control Panel of ice making machine, Operator Control Panel of Freezer and Compressor and as the machine room the area shall be planned as 5.0m x 6.4m = 32.0 m².

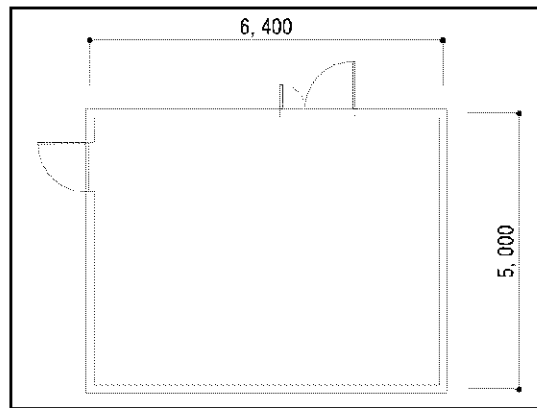


Figure-2.2.2(27) Layout for Ice Making Machine Room

p) Kitchen and toilet

This shall be planned as the toilet for conference room, Cooperatives room and administration room and a kitchen for staff.

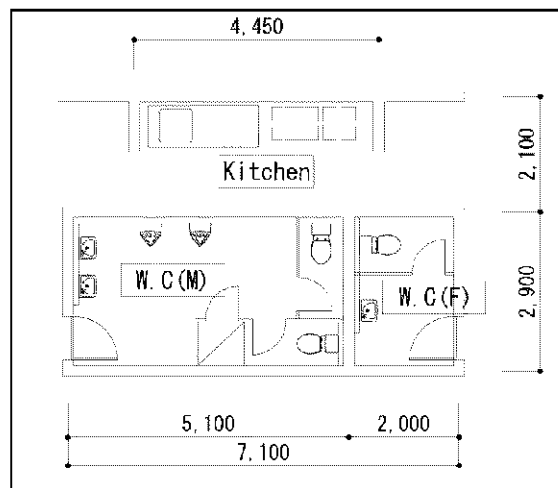


Figure-2.2.2(28) Layout for Kitchen and Toilet

q) Conference room

Proper number of attendant shall be considered for the usage of conference and fishermen’s assembly. This is the space for regular monthly meeting of FAC, regular board meeting of Cooperatives, general assembly of Cooperatives, various seminars and training to be held by the sponsorship of this Fisheries Center. Number of yearly conferences and trainings are shown in Table-2.2.2(14). It is planned as per Figure-2.2.2(29) assuming about 50 persons (using chairs only) at seminar and training, 20 to 24 persons (tables and chairs) in general conference. Chairs, tables, white board and other fixtures shall be stored in second floor storage. 6 fisheries workshops (15 to 20 fishermen have attended) were held by JICA expert in last three years however, the existing Fisheries Center has no conference room and the Red Cross Office in Charlestown has been used. The area shall be planned with 1.5 m²/person as standard in accordance with Architectural Design Data Corpus and 7.2m x 10.4m = 74.88 m² (50 persons x 1.5 m² = 75.0 m²).

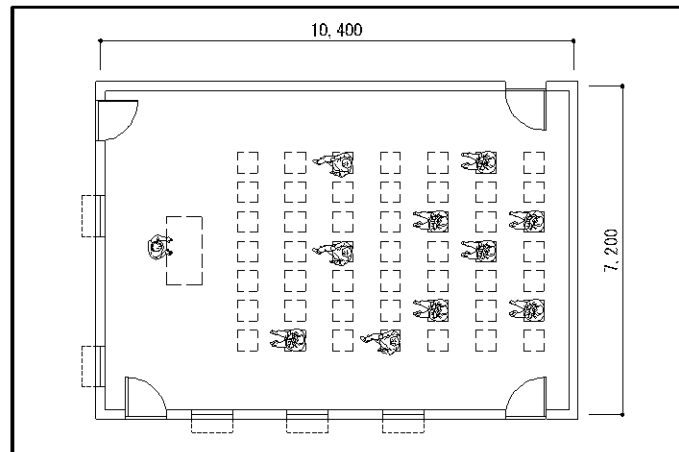


Figure-2.2.2(29) Layout for Conference Room

Table-2.2.2(14) Schedule for Conferences and Trainings in a year

Category of Conference	Using frequency	Number of attendee
Spread enlightenment activities by NIA	4	Maximum 50 persons
Training workshop by JICA expert	3	20 persons
General Assembly by members of Cooperatives	1	100 persons (hold in two times)
Board Meeting of Cooperatives	12	15 persons
Regular Meeting by FAC	12	20 persons

Summing up the above, each room area and the number of persons are shown in Table-2.2.2(15).

r) Summary of rooms

Table-2.2.2(15) Each Room Area and Number of Staff

	Room Name	Area (m ²)	Number of persons
Ground Floor	Direct sales booth by fishermen	143.8	0
	Fish control and operator room for ice	12.2	2
	Fish receiving room	78.1	0
	Locker room	26.1	0
	Fish processing room	70.8	2
	Sales booth for processed fishes	39.6	1
	Fishing gear shop	25.2	(1)
	Manager room	18.5	1
	Secretary/Accounting room	16.4	1
Toilet	18.0		
Second Floor	Administration room	49.2	5
	Cooperatives room	46.4	(5)
	Conference room	74.9	(50)
	Kitchen	8.9	0
	Toilet	14.4	

(b) Fishing gear lockers

Number of fishing boats which fish landed in Charlestown during landing volume survey (6 August to 21 August, 2010) was 15 and the fishing boats which were confirmed by the survey were 37 including the ship under repair. The NIA has requested 27 lockers and proposed that the NIA shall construct the shortfall by obtaining private land where is located at north side of project site in the future. Therefore, the number of lockers shall be 22 in view of system to be effectively used by the back to back construction of two lockers.

Fishing gear lockers shall mainly aim to place outboard engine and also consider to place fuels, gears and etc. Module of each locker shall consider the size of existing lockers in New Castle which is 2,000 mm x 2,000 mm. Each door shall be wooden one and fix key by each user. Mild slope in the floor from backside to door shall be considered so as to discharge water. The roof of each wall between lockers shall not be extended to the roof and it becomes possible ventilated structure against air blow behind the lockers with the grid for anticrime measure.

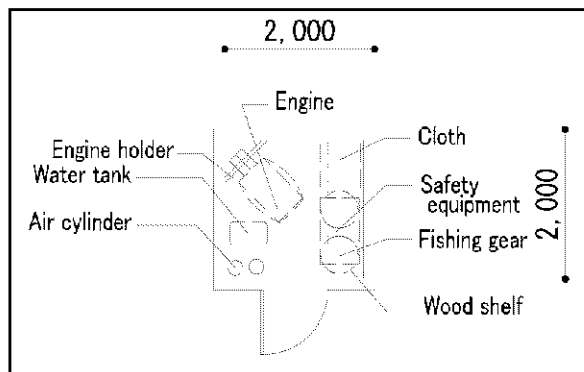


Figure 2.2.2(30) Layout for Fishing Gear Locker

(c) Storage for large fishing gears and toilet

The storage for large fishing gears such as wire mesh and ropes shall be planned together with outside toilet and a compressor to fill air into scuba tank shall be equipped inside of it. Showers for fishermen are planned with the toilet.

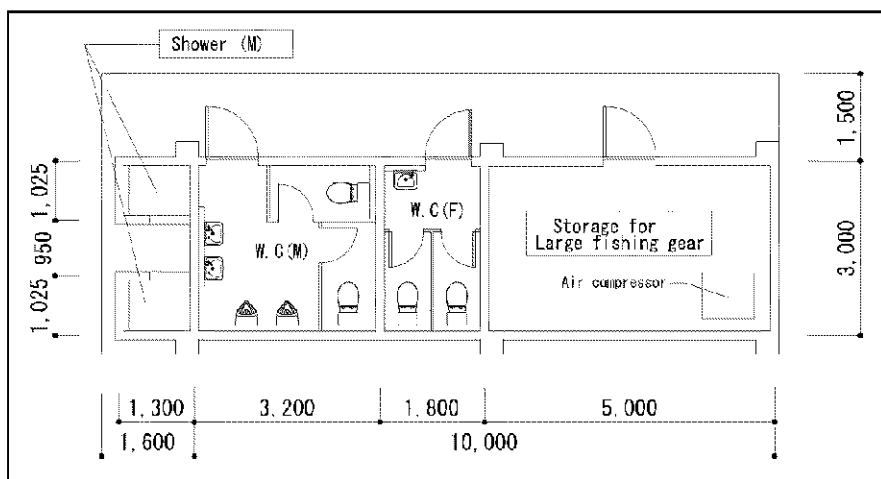


Figure 2.2.2(31) Layout for Storage of Large Fishing Gears and Toilet

(d) Work shop

Work shop shall conducts checking 50 to 200 Hp outboard engines, parts replacement, repairs and etc. The work shop shall be considered that space for repair equipment, storage place for out board engine under repair, working table, working space, storage for test tank for engine (movable one), tools, parts shelf and etc. are installed and the area shall be planned as $5m \times 4m = 20m^2$. Shutter at the entrance shall be installed so that the outboard engines can be carried in by pick-up truck. And, H beams shall be installed on roof slab as crane rails for the chain block with lifting capacity of 500 kg and its transfer. It is necessary to distribute 3 phases power in order to cope with repair equipment.

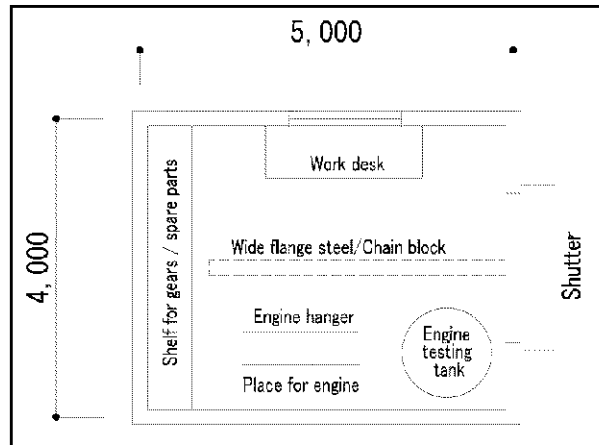


Figure 2.2.2(32) Layout for Work Shop

(e) Gazebo

There are two gazebos in the Ferry Dock from the tourist jetty to the south. In the same manner, a gazebo shall be planned at the retarding basin for preventing from direct sunlight as the stop for relaxation of consumers and fishermen.

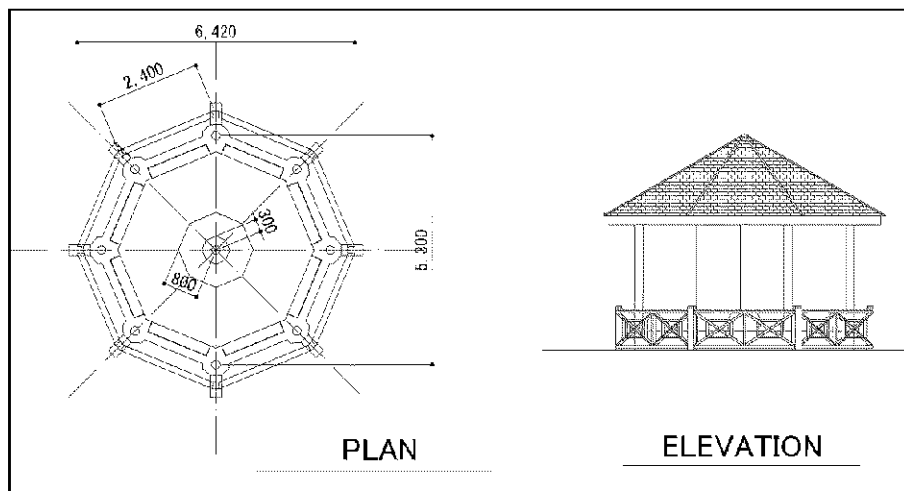


Figure 2.2.2(33) Layout for Gazebo

(f) Exterior facilities

Outside of about 2 m from exterior wall of New Fisheries Center shall be under ground pit aiming protection of water related piping. The head part shall be closer to the under ground part of storage of large fishing gears and septic tank and minimize the influence of land subsidence to facilities to the utmost extent.

Apron shall be installed with the width of about 1.0 m around fishing gear lockers. And, it is planned that slopes which are dangerous if unequal subsidence is generated shall be concrete finish with pile foundation.

And, nine (9) lighting poles shall be installed considering the safety of the site. Discharging water

from the septic tank shall be effluent to sea. The density of BOD after treatment is 20 mg/l which is very low and it is considered that the influence to sea shore is small due to the dilution with sea water.

Drainage of rainwater shall be planned to flow to the existing drainage which is located at north side of the site and setback levee which is located at west side of the site by making slopes on the ground.

<Study on Surface Finish of Exterior Area>

Mechanically stabilized crushed stone to be the surface finish of exterior area was proposed as the countermeasure of long term secondary consolidation settlement however, NIA requested it to be covered by lawn. The study results are shown below.

Main exterior area around buildings are below (i) to (iii) and basically concrete pavement is normal which makes vehicles passage possible. The exterior area is shown in Figure-2.2.2(34).

- (i) Retarding basin behind revetment: Retarding basin aims to prevent direct incursion of overtopping waves into buildings over the revetment at the time of hurricane. It is utilized as parking lot of pickup trucks at the normal time for handling fishing gears and ice boxes onto fishing boats. And it is also utilized multi-purposely as car parking area for general users, drying fishing nets, repairing fish traps and so forth.
- (ii) Around fishing gear lockers: Pick-up truck carries outboard engine and fishing gears into lockers using slope from retarding basin.
- (iii) Access road behind facilities: It is utilized as access road to seashore, car parking space, boat trailer storage and space for fuel supply facilities. And, it is also utilized as emergency evacuation road for fishing boats carried by boat trailer at the time of hurricane.

It has been proposed that the surface finish of exterior area as the countermeasure of for long term secondary subsidence should be mechanically stabilized crushed stone finish at the time of additional site survey however, NIA has requested to study to lay down lawn. The study result is as follows.

Occurring cracks on concrete or the subsidence can not be avoided by long term subsidence of secondary consolidation of peat layer existed under ground when the surface finish of exterior area is made by concrete pavement. Therefore, it is necessary to do surface finish considering long term subsidence not by concrete pavement at the time of project execution.

As the result of comparison of surface finish shown in Table-2.2.2(16), rolled mechanically stabilized crushed stone was considered to be most suitable. And, the concrete pavement shall be executed by NIA at the time of convergence of long term subsidence. The exterior area was to execute by mechanically stabilized crushed stone however NIA again requested strongly to lawn finish on the retarding basin due to the consideration of appearance and easiness of post handling at the time of extra ordinal over flowing. It shall be necessary to consider not to rut by vehicles in case of lawn finish. The Consultant has explained that the ground consolidation settlement in the future by the influence peat layer at the total project site with the lawn finish of retarding basin shall be

generated and the ruts are easily appeared at the time of passing vehicles. But, the Implementation Agency for this project has expressed that NIA shall be responsible for the repair of unevenness and the maintenance work. Therefore, lawn work and the related maintenance shall be the obligation of NIA and the soil grounding work for the lawn shall be the scope of Japan side (200 mm in thickness for lawn soil).

And, as the countermeasure of ruts for the vehicles, concrete board shall be laid at the passage part of vehicles. As the generation of unevenness after construction of concrete board shall not be avoided, it shall not be subject to the defect of design and construction work. The size of concrete board shall be L40 cm x B40 cm x H10 cm and wire mesh (6 mm x 100 mm x 100 mm) shall be installed in it for the protection of cracks. And crushed stone with the thickness of 20 cm shall be laid beneath the board as the countermeasure of the unevenness of concrete board. The location of concrete boards shall be installed as per Figure-2.2.2(34) at the slope for vehicles along with New Fisheries Center from the entrance of north side of the facility and at the parking space of north west side of the site.

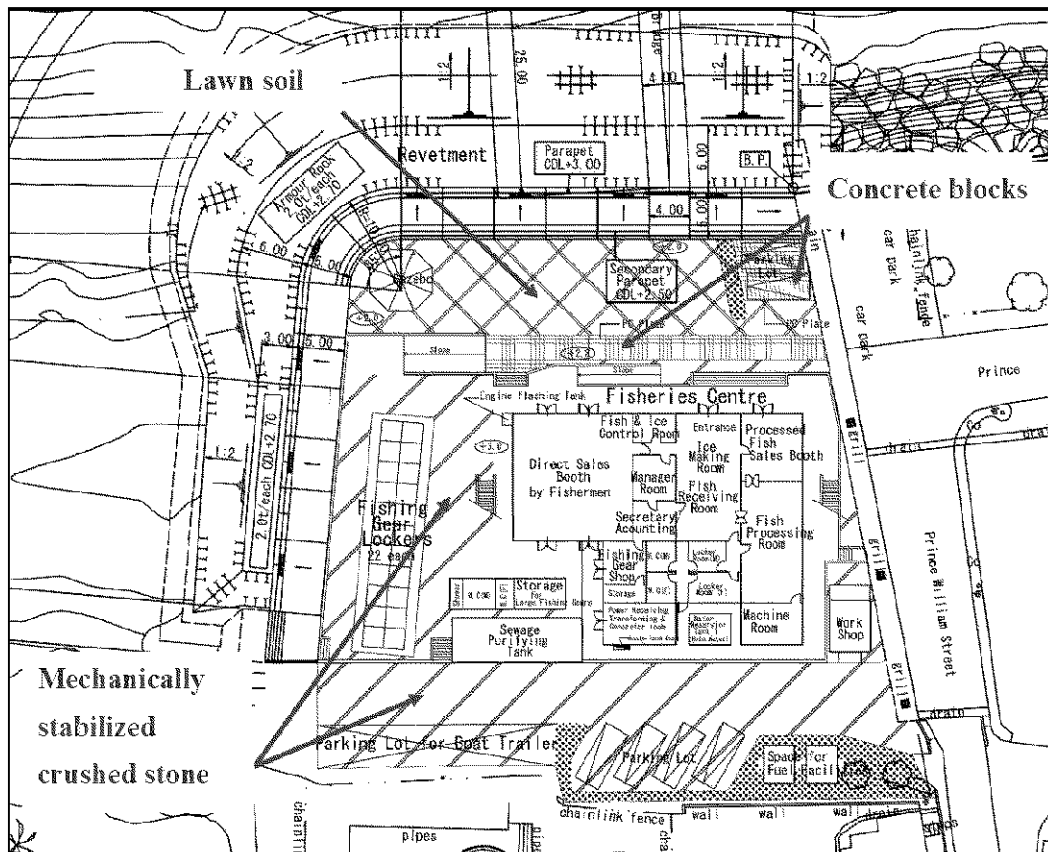
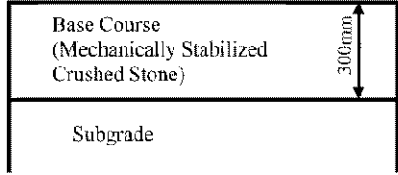
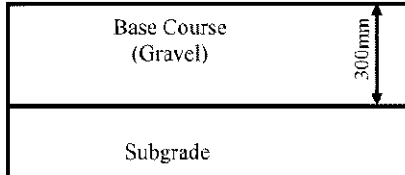
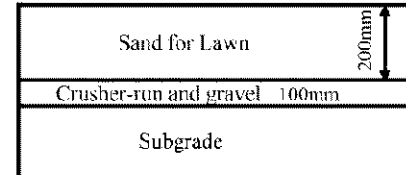


Figure-2.2.2(34) Surface Finish of Exterior Area

Table-2.2.2(16) Comparison of Surface Finish of Exterior Area

Surface Finish Method		Mechanically Stabilized Crushed stone	Gravel	Lawn
Structural of Surface Finish				
Vehicle and Walking		<ul style="list-style-type: none"> • No problem on vehicle passage • No problem on people's walking 	<ul style="list-style-type: none"> * Rutted surface is easy to be generated due to gravel. * It is hard to walk. 	<ul style="list-style-type: none"> * In case of planting lawn, the lawn dies down without water when the soil becomes hard under the situation that enough water is not supplied due to the soil compaction by rut and vehicle wheels. * Vehicle shall be troubled by unevenness made by rut.
Construction Method		<ul style="list-style-type: none"> * Compaction on surface of mechanically stabilized crushed stone as base course. * The construction up to base course of general concrete pavement 	<ul style="list-style-type: none"> * Leveling ground with gravel as base course. 	<ul style="list-style-type: none"> * After laying crushed stones with 10 cm thick, lawn shall be turf upon putting sandy soil with 20 cm thick mixing with fertilizer and others.
Maintenance	About one month after completion of construction	<ul style="list-style-type: none"> * Maintenance work like lawn is not necessary. 	<ul style="list-style-type: none"> * Maintenance work like lawn is not necessary. 	<ul style="list-style-type: none"> * It takes time by the time when lawn strikes roots ether from the removed turf or seed. * There is high possibility to be died down if the lawn is not strong enough for salt damage. * Watering in the morning and evening shall be important.
	Thereafter	<ul style="list-style-type: none"> * Maintenance work to even out surface against unequal subsidence is necessary. 	<ul style="list-style-type: none"> * Maintenance work to even out surface against unequal subsidence is necessary. 	<ul style="list-style-type: none"> * Maintenance works like additional fertilization, lawn mowing, watering, weeding and etc. shall be necessary.
Applicability for long term unequal subsidence		<ul style="list-style-type: none"> * It is possible to cope with unequal subsidence by leveling the ground or adding mechanically stabilized crushed stone depending on subsidence situation. 	<ul style="list-style-type: none"> * It is possible to cope with unequal subsidence by adding gravel to place generated deeper subsidence. 	<ul style="list-style-type: none"> * In case that lawn grows up and strikes roots, the surface shall be uneven along the unequal settlement and its recovery shall be difficult. * Total re-turf shall be necessary.
Concrete pavement after settlement of long term subsidence		<ul style="list-style-type: none"> * Mechanically stabilized crushed stone shall be added to spot of unequal subsidence and concrete after the compaction. 	<ul style="list-style-type: none"> * Base course by mechanically stabilized crushed stone shall be constructed after removal of aggregate in surface part and concrete on the above. 	<ul style="list-style-type: none"> * After removing surface lawn and underneath soil and crushed stones, base course is made by mechanically stabilized crushed stone and concreting shall be made on top of that.
Total Evaluation		Adopted		

4) Thought on Facility Structure

According to the results of soil investigation, as soft peat layer with the thickness of about 3 m from -1 m of the existing ground surface was found, each facility shall be constructed with bearing piles made by reinforced concrete.

(a) Structure of New Fisheries Center

The New Fisheries Center shall be 2 stories high and the foundation, columns and beams shall be made of reinforced concrete (RC) and the building structures shall be prevented from the subsidence by RC bearing piles. Walls at the ground floor shall be RC structure considering reinforcement by bearing wall and stone pitching and the one at the second floor shall be concrete block. Roof truss support to big roof and the roof of one story portion shall be made by steel and the finish shall be V-shaped steel sheet. And, underground pit below the floor slab of ground floor shall be installed considering protection of facility system against ground subsidence to be predicted in the future and pipes for water supply and drainage shall be installed its inside. The finish of pit floor shall be by crushed stone. RC wall with the depth of 40cm shall be installed around the pit for the adjustment of level difference with the ground at the east, west and north sides surrounding of the New Fisheries Center. Stairs, slopes and etc. shall have countermeasure for the subsidence by extending some of their structures.

(b) Structure of Work Shop

The work shop shall be constructed at the ground about 2.0 m lower than other facilities. The foundation, columns and beams shall be RC structures and the wall shall be concrete block. 4 columns each shall be supported by bearing piles. The roof finish shall be coated waterproof on RC slab.

(c) Structures of Storage for Large Fishing Gears and Toilet

This storage shall be single story and prevented from the subsidence by using RC bearing piles. Underground pit shall be installed due to the water supply and drainage facility. Pit floor finish shall be crushed stones. The foundation, underground portion, columns, beams shall be RC structure and the wall shall be concrete blocks.

(d) Structures of Septic Tank

The septic tank shall be a drainage treatment from New Fisheries Center, storage for large fishing gears and work shop. In order to cope with peat layer at the site, the septic tank shall be placed in the RC box. One face of RC box shall be used in lieu of retaining wall with the ground sunk 2.0m.

(e) Structure of Gazebo

It shall be referred the existing Gazebo in Ferry Dock located at north side of the site so as not to provide cense of discomfort with the existing facilities around the project site. As the existing

Gazebo was not damaged by hurricanes, the structure itself is considered to be strong enough. It shall be planned as RC for the foundation and wooden structures for the columns and roof support.

(f) Structure of Fishing Gear Lockers

The structure of fishing gear lockers is consisted of repetition of plain faces and the RC foundation, floor, columns and beams shall be used. The measure for the subsidence shall be bearing piles. The roof shall be consisted of steel structures and V-shape steel sheet and the walls shall be concrete blocks. It shall be planned to have a slope on floor slab to be able to discharge when water enters inside of it.

(g) Structure of Retaining Walls

The ground for project facilities shall have retaining walls depending on the level difference (1.0 m to 2.0 m) with the surrounding grounds. A part of the retaining wall shall be the one face of RC box to place pit of New Fisheries Center and septic tank but other parts shall be common gravity retaining walls. The earth retaining shall be conducted utilizing retaining walls, slope, stairs and etc. at the level difference with the retarding basin at the west side.

(h) Standards to be used in Structural Design

a) Seismic Force

Calculation of horizontal force against seismic force shall be calculated with CUBiC under the “Section 12 LOADS” of St. Kitts and Nevis Building Code as follows,

$$V = Z \times C \times I \times K \times S \times W$$

Z: Zonal Coefficient (0.75 in Saint Christopher and Nevis)

C: Coefficient of fundamental elastic period of structure (0.12)

I: Occupancy Importance Coefficient (1.5)

K: Structural Behavior Factor (0.8)

S: Soil Factor (1.5)

W: Total Gravity Load of Building (Dead Load + Live Load)

With the above, the horizontal force considering the seismic force is,

$$V = 0.75 \times 0.12 \times 1.5 \times 0.8 \times 1.5 \times W = 0.162 W.$$

Whereas, seismic layer shearing force coefficient C_i in the Building Standards Act of Japan is calculated as follows,

$$C_i = Z \times R_t \times A_i \times C_o$$

And the meaning of each symbol is,

Z: Coefficient which is set up by Ministry of Land, Infrastructure and Transportation and it is a degree of seismic damage based on the past local record of earth quake (0.7 to 1.0)

R_t : Numerical value calculated with the method setting up by Ministry of Land, Infrastructure and Transportation depending on own natural period of

building and soil features and it indicates vibration property of building.
(1.0)

Ai: Numerical value calculated with the method setting up by Ministry of Land, Infrastructure and Transportation to indicate distribution direction of building height of seismic layer shearing force coefficient (1.0)

Co: Standard Shearing Coefficient (more than 0.2)

With the above, $C_i = 0.8 \times 1.0 \times 1.0 \times 0.2 = 0.160$ is obtained. In case of Japan, the seismic force is obtained with seismic layer shearing force x gravity load (Dead Load + Live Load) therefore, the seismic force shall be

$$C_i \times W = 0.160 W$$

As the concept of gravity load and the numerical value W in CUBiC is the same in Building Standards Act of Japan, numerical value $C_i W$ and V obtained by the methods of both countries have almost the same meaning and therefore it is regarded as almost same numerical value.

b) Wind Pressure

Calculation method of horizontal force against wind pressure in Nevis is regulated referring to CUBiC by St. Kitts and Nevis Building Code as follows,

$$W = (q \text{ ref}) \times (C \text{ exp}) \times (C \text{ shp}) \times (C \text{ dyn}) \times W$$

$q \text{ ref}$: Reference velocity pressure ($q \text{ ref} = 0.60 \text{ kPa}$ in Nevis)

$C \text{ exp}$: Exposure factor ($C \text{ exp} = 1.00$ at the maximum height 5m to 10m)

$C \text{ shp}$: Aerodynamic shape factor ($C \text{ shp} = 0.7$)

$C \text{ dyn}$: Dynamic response factor ($C \text{ dyn} = 2.0$ for main structures)

With the above,

$$W = 600 \times 1.0 \times 0.7 \times 2.0 = 840.0 \text{ Pa (N/m}^2\text{)}$$

Calculating wind pressure from Japanese Standards, in case of buildings with gable roof, the wind pressure to beams face using the maximum height 9.1 m of the existing buildings although it depends on the maximum height, the velocity pressure q shall be,

$$q = 60\sqrt{9.1} = 181.00 \text{ (kgf/m}^2\text{)}$$

Wind factor using 0.9 which is described in the Table of Building Standards Act shall be,

$$W = 0.9 \times q = 162.90 \text{ (kgf/m}^2\text{)} = 1,597.48 \text{ Pa (N/m}^2\text{)}$$

In comparison with both calculation results, Japanese value is about double of its Nevis. Basically, value obtained with CUBiC should be adopted since it is the standard of the country however as these buildings are located at coastal area where receives wind pressure directly, structural calculation shall be based on the Japanese standards considering past hurricane damages.

Structural Plan of each facility is shown in Table-2.2.2(17).

Table-2.2.2(17) Structural Plan of Facilities

Facility	Pile	Foundation	Floor Slab	Column	Beam	Wall	Roof Structure
1.Fisheries Center	RC	RC	RC	RC	RC	RC(1F), CB(2F)	S
2.Work Shop	RC	RC	RC	RC	RC	CB	—
3.Storage for Large Fishing Gears	RC	RC	RC	RC	RC	CB	—
4.Septic Tank	RC	RC	RC	—	—	RC	—
5.Gazebo	—	RC	—	W	W	—	W
6.Fishing Gear Lockers	RC	RC	RC	RC	RC	CB	S

Remark: RC: Reinforced Concrete, CB: Concrete Block, S: Steel, W: Wood

5) Finish Plan for Buildings

Finish Plan for buildings are shown in Table-2.2.2(18).

Table-2.2.2(18-1) Finishes of New Fisheries Center

<Building Frame>

Foundation	Bearing pile
Superstructure	Reinforced Concrete • Pit for plumbing under 1F slab
Wall	Outside: RC(1F),Concrete block t= 200(2F), Inside : Concrete block t=150
Roof structure	Steel structure

<Exterior Finishes>

Parts	Finishes
Roof	Galvalume sheet roof
Soffit	C.S.B + AEP
Eaves	Wood + OP
Outside wall	C.B、Cement mortar, sprayed paint (2F) RC、Stone pitching finish (1F)
Openings	Alum. double hung window, alum. Door, Steel door, Hurricane shutter
Pedestrian deck	Polyurethane W.P. (floor / wall ~1.0m) • Stainless balustrade
Place for machine	Rubber sheet waterproof + cement mortar steel trowel finish

<Interior Finishes>

Name of room	Finishes		
	Ceiling	Wall	Floor
Office	D.Gyp.Board	Cement mortar +EP	Non-slip porcelain tile
Direct fish sales booth by fishermen	C.S.B +AEP	Cement mortar +EP	Polyurethane W.P.
Fish Receiving	C.S.B +AEP	Cement mortar +EP	Polyurethane W.P.
Fish processing room	C.S.B +AEP	Cement mortar +EP	Polyurethane W.P.
Processed fish shop	C.S.B +AEP	Cement mortar +EP	Polyurethane W.P.
Locker room	D.Gyp.Board	Cement mortar +EP	Polyvinyl sheet
Toilet	C.S.B +AEP	Porcelain tile/ Cement mortar + EP	Non-slip porcelain tile

Fishing gear shop	D.Gyp.Board	Cement mortar +EP	Polyvinyl sheet
Corridor	D.Gyp.Board	Cement mortar +EP	Non-slip porcelain tile
Kitchen	C.S.B +AEP	Cement mortar +EP	Non-slip porcelain tile
Electric room/ Machine room	C.S.B +AEP	Cement mortar S.T.F trowel finish	Floor hardener
Ice making machine	C.S.B +AEP	Cement mortar S.T.F	Polyurethane W.P.
Machine room(2F)	C.S.B +AEP	Cement mortar S.T.F	Polyurethane W.P.
Storage	C.S.B +AEP	Cement mortar S.T.F	Floor hardener

Abbreviations: (D.Gyp. Board) : Decorated gypsum board (C.S.B) : Calcium Silicate Board
(S.T.F) : Steel trowel finish (W.P.) : Water proof
(EP) : Emulsion Paint (AEP) : Acrylic Emulsion Paint
(Alum.) : Aluminum (O.P.) : Oil Paint

Table-2.2.2(18-2) Finishes of Work Shop

<Building Frame>

Foundation	Bearing pile
Superstructure	Reinforced Concrete • Pit for plumbing under 1F slab
Wall	Concrete Block t = 150, Cement mortar, EP
Roof structure	Steel structure

<Exterior Finishes>

Parts	Finishes
Roof	Concrete slab + Polyurethane W.P.
Soffit	Concrete slab + EP
Outside wall	Concrete Block, Cement mortar + EP
Openings	Alum. double hung window, Steel door, Hurricane shutter

<Interior Finishes>

Name of room	Finishes		
	Ceiling	Wall	Floor
Workshop	None	Cement mortar +EP	Floor hardener
Remarks	Chain block for lifting engine / I-beam for chain block		

Table-2.2.2(18-3) Finishes of Fishing Gear Lockers

<Building Frame>

Foundation	Bearing pile
Superstructure	Reinforced Concrete
Wall	Outside : Concrete block t= 150. Inside : Concrete block t=150
Roof structure	Steel structure

<Exterior Finishes>

Parts	Finishes
Roof	Galvalume sheet roof
Soffit	C.S.B + AEP
Outside wall	Concrete Block, Cement mortar + EP
Openings	Wood door

<Interior Finishes>

Name of room	Finishes		
	Ceiling	Wall	Floor
Storage	None	Cement mortar +EP	Floor hardener

Table-2.2.2(18-4) Finishes of Storage for Large Fishing Gears/ Toilet

<Building Frame>

Foundation	Bearing pile
Superstructure	Reinforced Concrete • Pit for plumbing under 1F slab
Wall	Outside : Concrete block t= 150, Inside : Concrete block t=150

<Exterior Finishes>

Parts	Finishes
Roof	Concrete slab + Polyurethane W.P.
Soffit	Concrete slab + EP
Outside wall	Concrete Block, Cement mortar + EP
Openings	Alum. door, Hurricane shutter

<Interior Finishes>

Name of room	Finishes		
	Ceiling	Wall	Floor
Toilet	C.S.B +AEP	Porcelain tile/ Cement mortar + EP	Non-slip porcelain tile
Storage for large gears	None	Cement mortar + EP	Floor hardener
Shower(M)	None	Cement mortar + EP	Floor hardener
Remarks	Air compressor for scuba tank in Storage of large fishing gear		

Table-2.2.2(18-5) Finishes of Gazebo

<Building Frame>

Foundation	Mat foundation
Main structure	Wood structure
Roof structure	Wood structure
Roof	Sheathing board + asphalt felt + shingle finish

6) Thought on Facility Equipment

(a)Electric Facility

a) Strong Electric Facility

3 phases power is installed to panel board for electric receiving & transforming by ground burial from the road at north side front of the site and distributes to each facility after transformation. Concerning lighting apparatus, common triangle fluorescent light and water proof fluorescent light for cleaning floor, walls and ceiling of the room to handle fishes by water shall be installed.

Concerning outlet, that for single phase 230V which is rated voltage in Nevis Island and that for 100V for the usage of American products shall be installed together. 3 phases shall be distributed to

work shop, ice making machine room (New Fisheries Center), machine room to install pump for water supply and storage for large fishing gears. Concerning emergency generator to be installed in the electric receiving & transforming room, it accepts only for the equipment like ice making machine, freezer and septic tank which long haul outage shall have an influence on the total fishing activities. The above power distribution to three facilities adding 11 KVA for starting power of the motor of ice making machine shall be 45 KVA from the calculation of $9.0 + 7.5 + 5.0 + 4.5 + 11.0 = 37.0$ KVA. Fuel tank capacity for the generator shall be 40 liters and about 3 hours continuous use is possible (about 13 liters/hour) however a reserve tank with 280 liters shall be installed together considering the case to be used 24 hours for emergency.

Table-2.2.2(19) Necessary Electric Energy for Each Facility

Power distribution to	Necessary Power Energy
Ice making machine	9.0 KVA *
Freezer	7.5 KVA *
General Lights and Outlets (New Fisheries Center)	20.0 KVA
Air Conditioners and Ventilations	35.0 KVA
General Lights and Outlets (Fishing Gear Lockers)	2.0 KVA
Work Shop	5.0 KVA
Septic Tank	5.0 KVA *
Water Supply & Drainage Pump	4.5 KVA *
Total	88.0 KVA

Remark: It shall be 26.0 KVA ($9.0 + 7.5 + 5.0 + 4.5$) if power distribution is made by emergency generator at the time of outage.

b) Light Electric Facility

At present, cell-phone becomes widely used but fixed-line phone is also necessary to liaise with outside. And, from the necessity to exchange data among staff and secure communications through internet with outside, hard wiring for LAN cable shall be considered to be installed in administration room. The installation of telephone terminal, hard wiring and LAN is the obligation by the NIA however the piping work for these hard wirings shall be included in the project.(even if Wi-Fi is installed in one room it is affected by RC wall and RC slab therefore, pipes for wired LAN shall be installed at necessary rooms) .

(b) Water Supply Facility

The clean water from city water and rain water shall be used at the same time. Rain water shall be used only for ice making machine. Rain water is collected, stored in water reservoir tank and the water is used through filter like strainer when used. Especially, two weeks impounded water as countermeasure at the time of dry season is considered and the water reservoir tank shall be planned with the capacity of 30m^3 from the calculation of $1.5 \times 1.2 \times 14 / 0.8 = 31.5\text{m}^3$. If it still in short, city water shall be used. City water shall be entered from 100φ main pipe laying under ground and tapped and stored at water receiving tank and supplied to each facility by alternate

operation of two pumps.

Toilet at the ground floor of New Fisheries Center shall be planned to be used by 6 men and 4 women and the toilet at the second floor shall be used as mixed one for 15 persons. Other than that, the second floor toilet is considered to be used one time by 30% of 50 persons attended at the assembly. And, a toilet for fishing gear lockers shall be planned to be used by 30% of 48 fishermen (8 boats x 3 men x two times) and 40 consumers visiting here for purchasing fishes (8 boats x 5 persons). And shower room shall be used one time by women working staff and the shower room in fishing gear lockers shall be considered to be used by men working staff together with fishermen and next table was made up with the above.

Capacity of water reservoir tank is calculated to be 10m³ as shown in Table-2.2.2(20).

Table-2.2.2(20) City Water Distribution and Quantity

Distribution to	Necessary Quantity
Fishing Boats	0.4 t /day
Fish Cleaning	0.4 t /day
Floor Cleaning	0.8 t /day
Toilet at New Fisheries Center	1.0 t /day
Shower at New Fisheries Center	0.2 t /day
Outdoor Toilet	0.6 t /day
Shower at Outdoor Toilet	1.2 t /day
Work Shop	0.5 t /day
Ice Making Machine	1.8 t /day
Total	6.9 t /day

Remark: Water reservoir tank with 10m³ capacity from the calculation of

$$6.9\text{m}^3 / 0.8 = 8.8\text{m}^3$$

(c) Air Conditioning and Ventilation Facility

a) Air Conditioner

Air conditioner shall be installed to Manager room, Secretary/Accounting room and Fresh fish control and ice making machine operation room at ground floor and Conference room, Cooperatives room and Administration room at second floor of New Fisheries Center. And, Fish receiving room, Processing room and Processing fish sales shop shall equip air conditioners considering the control of temperature and humidity as fresh fish handling rooms. Concerning air conditioning equipment, wall mounting type shall be installed considering local procurement and easy maintenance after handing over.

b) Ventilation facility

Ventilation fan shall be installed to each room except Electric room, Machine room and Direct fish sales booth by fishermen at New Fisheries Center. The number of ventilation shall be about 2 to 4 times per hour.

Electric room and Machine room shall install wall mounting pressure ventilation fans with 400 φ. And as Direct fish sales booth by fishermen aims to sell fishes at the place where fishes are not

exposed to direct daylight improving the present sales system which sell fishes under the scorching sun, air conditioner shall not be installed but wall mounting pressure ventilation shall be installed for preventing hot air detention. Assuming the number of ventilation as 10 times since fishermen and consumers use many times temporary and calculate as follows,

Direct Fish Sales Booth

$$\text{Area: } 11.6 \times 12.4 + 0.8 \times 1.2 = 144.8 \text{ m}^2$$

Ceiling height: 3 m

$$\text{Room cubic measure: } 144.8 \times 3.0 = 434.40 \text{ m}^3$$

Number of ventilation: 10 times

$$\text{Necessary ventilation volume: } 434.40 \times 10 = 4,344 \text{ m}^3$$

From the data of Japanese made pressure ventilation fan with 400 ϕ , 2,280 m³/h can be obtained as the capacity of one ventilation and it goes to $4,344.0 \div 2,280 = 1.90$ and the installation of two ventilation fans shall be required.

Meanwhile, considering the request to change ventilation direction depending on wind direction, total 4 ventilations with 2 each on both east and west sides shall be installed. As storage for large fishing gears shall equip air compressor to fill air to scuba tank other than large fishing gears, one pressure ventilation fan with 400 ϕ shall be installed in order to let produced heat out.

(d) Drainage Facility

There are 3 different discharging waters. Firstly, rain water on roof shall be stored in dedicated water reservoir tank and that can not be collected goes to sea. Secondly, sewage water shall be discharged to septic tank from toilet and it is effluent to sea after treatment. Thirdly, miscellaneous discharging waters from washing room, kitchen sink shall be effluent to septic tank together with sewage water. Miscellaneous discharging waters that solid matters are possibly included like fish cleaning shall be collected by installing drain at each room floor and removed solid matters by grease trap with basket to lead miscellaneous water without solid matters to septic tank.

Effluent water to septic tank

- Discharging water after fish processing $0.4 \text{ m}^3/\text{day} \times 800 \text{ mg/L} = 0.32 \text{ kg}$
- Floor cleaning water $0.8 \text{ m}^3/\text{day} \times 100 \text{ mg/L} = 0.08 \text{ kg}$
- Discharging water from Work Shop $0.5 \text{ m}^3/\text{day} \times 800 \text{ mg/L} = 0.40 \text{ kg}$
- Discharging water from New Fisheries Center

Discharging water from ground floor toilet 10 person \times 50L \times 260 mg/L = 0.13 kg

Discharging water from second floor toilet

With the assumption: 5 working staff, half of attendee to conference or assembly use one time, $(5 \text{ person} \times 50\text{L} + 25 \text{ person} \times 10\text{L}) \times 260 \text{ mg/L} = 0.13 \text{ kg}$

Discharging water from shower $4 \text{ person} \times 50\text{L} \times 50 \text{ mg/L} = 0.01 \text{ kg}$

- Discharging water from Outdoor Toilet

From Toilet $60 \text{ person} \times 10\text{L} \times 260 \text{ mg/L} = 0.16 \text{ kg}$

From Shower $24 \text{ person} \times 50\text{L} \times 50 \text{ mg/L} = 0.06 \text{ kg}$

The above total shall be calculated as below and septic tank shall be designed based on these values. There is no standard for discharging water with apparent figures therefore, the aeration septic tank which is popular in Japan shall be adopted and 20mg/L was adopted as the standard for discharging water that is ruled by Ministry of Environment of Japan.

Table-2.2.2(21) Necessary Treatment Capacity of Septic Tank

Sewage water volume into Septic tank	4.70 m ³
BOD inflow density	1.29 kg/4.70 m ³ x 1,000= 274 mg/L
BOD outflow density	20 mg/L

Necessary equipment for each room is shown in Table-2.2.2(22) as below.

Table-2.2.2(22) Equipment List for Each Room

F1	Room Name	Outlet	3p Power Source	Phone	LAN	Water	Air Con- ditioner	Illumin- ance (Lux)
New Fisheries Center								
Ground floor	Direct Fresh fish sales booth	o				o		200
	Fresh fish control and ice making machine operation room	o		o	o		o	400
	Fish receiving room	o				o	o	300
	Locker room for man & woman	o				o		400
	Processing room	o	o	o	o	o	o	400
	Processing fish sales shop	o		o	o		o	300
	Fishing gear shop	o		o	o		o	400
	Manager room	o		o	o		o	500
	Secretary/Accounting room	o		o	o		o	500
	Machine room							200
	Electric room							200
Second floor	Administration room	o		o	o		o	500
	Cooperatives room	o		o	o		o	500
	Conference room	o		o	o		o	400
	Kitchen	o				o		300
	Ice making machine room		o					200
	Machine room		o					200
	Storage	o						200
Fishing Gear Lockers								
	Fishing Gear Lockers	o						200
Work Shop								
	Operation room	o	o	o		o		400
Outdoor toilet & Storage for large fishing gear								
	Storage for large fishing gear	o	o			o		300
	Toilet					o		200
	Outdoor shower					o		

*Note 1: Outlet for 230V and 110V shall be installed together.

*Note 2: Only piping work shall be required for telephone and LAN.

7) Thought on Countermeasure to Natural Conditions

<Countermeasure to Salt damage and Termite>

Coastal facilities should not be constructed using materials to be easily rusted since they are continuously exposed by gas including salt content and sometime receive direct waves. However, roof finish is made generally by steel sheet. In case that structural steel is needed considering self-weight of building, the roof-purlin shall be concealed with soffit or in case that the part has no other choice but exposed, salt resistant coating shall be used for the protection of structural steel surface as an anti-corrosive measure.

And, wood to be used in Nevis Island which has tropical weather shall be necessary to conduct anti-aunt treatment.

8) Thought on Construction Plan

- a) Land making by reclamation becomes necessary in this project. Construction plan considering the primary consolidation settlement and the time due to the existence of soft peat layer shall be drawn up.
- b) Settlement volume of primary consolidation shall be monitored during construction period.
- c) Construction of facilities shall be commenced from casting bearing piles. It is necessary to confirm the depth of bearing stratum in advance. Bearing pile shall be produced at site after confirming actual pile length. Confirming the coating thickness, asphalt shall be applied to pile surface as the countermeasure against negative friction (NF).
- d) After piling foundation work shall be commenced however as under ground pit is planned for the buildings of New Fisheries Center, Work Shop and Storage for large fishing gears, the removal of formworks have to be well considered such as having temporary holes on floor slab.
- e) As 2 m level difference between the public access road at east side of the project site and the project site ground is there, it is necessary to pay enough attention to construct retaining wall and pit wall of New Fisheries Center which is organized a part of retaining wall.
- f) As fishermen are working even during construction period, it is necessary to pay attention to the passage of fishermen and consumers especially, sufficient attention to in and out of heavy vehicles shall be required.

(3) Design for Ice Making Machine and Storage Facility

1) Thought on Scale of Ice Making Machine (Ice Making Capacity: 1.5 ton per day)

a) for operation of fishing boats, b) for fresh fish sales (at direct sales booth and sales booth of processed fishes), c) for insulated room of fresh fish storage, d) for transportation to outside of area such as hotel and restaurant from New Fisheries Center are enumerated as the intended use of ice. In other words, it is important to keep freshness consistently from fish catch to the retail sales. Once deteriorated marine products can not be renovated in its freshness by ice treating or freezing again. Therefore, it is required to get cool as soon as they were caught. With the above, the ice making machine shall be the most important facility to secure the marine products quality of commercially distributed goods. Ice shapes are various according to the usage though, flake ice

which has a large surface area shall be adopted in order to increase rapid cooling function.

And, in deciding the scale, the ice making capacity shall be 1.5 tons per day with the following policies as preconditions.

(a) Precondition for deciding ice making capacity

- a) As ice for fishing operation is not almost used in whole Nevis Island, the ice for operation to other areas shall be considered to supply.
- b) The ice for operation with the above a) shall consider the maximum value at the off season from the record of site survey.
- c) The ice for fresh fish sales with the above b) shall be based on average fresh fish sales and the usage of ice shall be 40% (1:0.4) of original fish catch.
- d) The ice for insulated room of fresh fish with the above c) shall secure the maximum figure from the stock simulation. And as there will possibly be cold storage in 2 days, the usage of ice shall be 40% (1:0.4) of original fish catch.
- e) The ice for transportation to other area with the above d) is considered to be about 600 kg (1,324 lbs) per one week in hotels (except Four Seasons Hotel) and restaurants from the hearing surveys of large consumers. And, about 900 kg (1,986 lbs) shall be estimated if Four Seasons Hotel is included. The ice for supermarkets shall be about 50 kg (110 lbs) per week and about 50 kg (110 lbs) shall be for Basseterre in St. Kitts Island. Therefore, it is considered to be 1,000 kg (2,207 lbs) per one time of total transportations to other area though, estimated as 600 kg (1,423 lbs) is for frozen fishes and 400 kg (883 lbs) is for fresh fishes deal out of it.

Table-2.2.2(23) Scale Setup of Ice Making Machine

Intended Use	Daily Volume of Fresh Fish Deal		Daily Ice Making Capacity	Ratio with Fish and Ice
a) Operation	1. Maximum Landing Volume in other area	310 kg (688 lbs)	0.31 tons (688 lbs)	1:1
	2. Maximum Landing Volume in the project site	470 kg (1,023 lbs)	0.47 tons (1,023 lbs)	1:1
b) Fresh Fish Sales	3. Daily Average Sales Volume in Direct Sales Booth by Fishermen	200 kg (450 lbs)	0.08 tons (180 lbs)	1:0.4
	4. Daily Average Handling Volume in Fish Processing Room	40 kg (90 lbs)	0.02 tons (36 lbs)	1:0.4
c) Fresh Fish Stock	5. Maximum Volume of Fresh Fish Stock before moving to Chest Freezer	420 kg (930 lbs)	0.42 tons (930 lbs)	1:1
d) Distribution to other areas	6. Transportation Volume to Hotels, Restaurants and others.	400 kg (900 lbs)	0.16 tons (360 lbs)	1:0.4
Total of 1 to 6			1.46 tons (3,217 lbs)	

Remarks: Fresh Fish Handling

- 1. 310 kg (688 lbs) as daily maximum volume of other areas is the total of NC, LH, and IC on August 14, 2010. < refer to Table-2.2.1(5)>

2. Daily maximum landing volume in the project site is 470 kg (1,023 lbs). < refer to Table-2.2.1(12)>
3. Daily average sales volume at the direct sales booth by fishermen is 200 kg (450 lbs). < refer to Figure-2.2.1(2)>
4. As 40 kg (90 lbs) as daily average sales volume at the fish processing room is consisted of “fresh fish “ : “processed fish +frozen fish” = 1,210 lbs: 230 lbs, the volume of processed fish sales shall be 40 kg (90 lbs) against 200 kg (450 lbs) for the above 3.
5. 420 kg (930 lbs) which is the maximum volume of fresh fish before moving into freezer shall adopt from the maximum figure of stock simulation. < refer to Figure-2.2.2(35) and 2.2.2(36)>
6. 400 kg (900 lbs) which is transportation volume to hotels, restaurants and others is to be referred the preconditions.

2) Thought on Scale of Storage Facility

Daily landing volume in this project set out as 340 kg (750 lbs) with the average of top 5 of the result of site survey at the off season. However the actual handling volume bringing into New Fisheries Center shall be affected by daily weather, number of operating fishing boat and so forth and it will be vertically fluctuated centering 340 kg (750 lbs) which is daily average handling volume. And at the same time, the sales volume to consumers at direct sales booth by fishermen and fish processing room is also expected to be vertically fluctuated and it shall be surplus if planned sales volume is less than the daily landing volume.

While, as described previously, sales to other area like hotels, restaurants and super market and certain large volume of frozen and fresh fishes can be expected to deal. The potential demand shall be 1 ton (2,207 lbs)/week in total Nevis Island from the result of hearing survey and it is the situation to purchase directly from fishermen and etc.

Basically, what to prevent the dropping-off in quality by proper storage facility and keep away from the fish disposal loss if many surpluses are generated. For this, the adoption of freezer is necessary and desirable to freeze fish catches at short time which heat quantity is small in view of maintenance and management cost of cold storage and insulated room is also necessary to temporary stock in cooler boxes with ices.

Because of this, the stock simulation in the New Fisheries Center was done in this project as shown in the reference data (refer to Figure-2.2.2(35) and 2.2.2(36)) when the scale of storage facility was studied. The storage scale judging from the result is as follows,

(a) Insulated Storage Facility (Storage Capacity: 0.5 ton)

Fish catch volume which should be put in insulated storage shall be conditional on moving to freezer after a few days in order to prevent from quality loss. It is estimated that the residual quantity is 230 kg (507 lbs) to 420 kg (927 lbs)/day (maximum storage quantity in insulated storage function) from the stock simulation. Therefore, the storage quantity to be handled in insulated storage room is planned as maximum 500 kg (1,103 lbs)/day.

However, it is estimated that the daily average handling quantity is about 150 kg (331 lbs) to 170 kg (375 lbs)/day as daily cold storage function. And, as the handling quantity in cold storage room is estimated the fluctuation from 150 kg (331 lbs) to 500 kg (1,103 lbs), temporary storage room utilizing cooler box with ices by effective use of ice making machine is more economical than the

adoption of cold storage facility in order not to increase maintenance cost like electricity expenses.

(b) Freezing Facility (Storage Capacity : 3 ton)

In this project, daily landing volume is set out as 340 kg (750 lbs) (average of top 5 at the time of off season) however the landing volume is not constant every time and generates the fluctuation. Therefore, from the result of simulation Case-A which continues daily maximum landing volume in 3 ensuring days and Case-B which continues in 2 ensuring days and 2 weeks, the storage capacity being necessary as chest freezer shall be 2 tons (4,415 lbs) in either case.

Fishing operation is obliged to be stopped for about one to two weeks for fishermen in the aftermath of waves at the time of hurricane and fish purchase becomes also difficult for general consumers and major users. In fact, the handling quantity in direct sales booth by fishermen shall be zero if the fishing operation is stopped for one week. While, consumers are apt to purchase fishes from a day after next since the hurricane is passed. Therefore, 1 ton (2,207 lbs) (=200 kg (441 lbs) x 5 days) is necessary to stock frozen fishes to consumers at the time of hurricane and the storage capacity of freezer shall be set out as 3 ton (6,622 lbs) including necessary frozen fishes stock at the time of hurricane.

<Stock Simulation>

The stock simulation for setting out the scale of cold facility and freezer in the New Fisheries Center was made with the following two cases.

Case A: Continuous 3 days landing volume of 470 kg (1,037 lbs)/day was confirmed one time in one week.

Case B: Continuous 2 days landing volume of 470 kg (1,037 lbs)/day was confirmed two times in two weeks.

【Prior Condition】

(1) Landing Volume at Project site

Average: 200kg (450 lbs)/day
 Top 5: 340kg (750 lbs)/day
 Max. Volume: 470kg (1,023 lbs)/day

(2) Receiving Volume at the New Fisheries Center

1) Mon~Wed~Thu : 300kg (675 lbs)/day
 2) Tue~Fri~Sat: 400kg (900 lbs)/day
 3) Sunday: 200kg (450 lbs)/day

(3) Daily sales Volume at Direct Sales Booth

1) Tue~Sat: 300kg (675 lbs)/day
 2) Other than 1): 200kg (450 lbs)/day
 3) Sunday: 0 to 50kg (110 lbs)/day

(4) Sales Volume in Processing Room

1) Mon to Sat: 40kg (90 lbs)/day
 2) Sunday: 0kg (0 lbs)/day (1 holiday)

(5) Sales Volume from Processing Room to Outside

1) Outside area means hotels & restaurants and distribution to St. Kitts Island
 2) 600 kg (1,324 lbs) for 2 weeks is distributed (1,250kg (2,759 lbs) /2weeks according to the survey)

(6) Cold Function (Stock in insulated storage and freezer)

1) Excess out of receipt shall be stocked
 2) Moving to freezer a few days later
 3) If insulated storage capacity is exceeded the receiving volume, they move to freezer

Case-A Continuous 3 days landing volume of 470 kg (1,037 lbs)/day was confirmed one time in one week (unit: kg)

Date	Received Volume	Sales Volume		Balance of fresh fish	Storage Volume		Sales to outside	Stock
		Direct Sales	Processed		Cold function	Freezer		
Sat 1	400	300	40	60	60	0		60
Sun 2	200	50		150	210	0		210
Mon 3	470	200	40	230	230	210		440
Tue 4	470	300	40	130	360	210		570
Wed 5	470	200	40	230	230	570		800
Thu 6	300	200	40	60	290	570		860
Fri 7	400	200	40	160	160	860		1,020
Sat 8	400	300	40	60	60	860		920
Sun 9	200	50		150	210	860		1,070
Mon 10	300	200	40	60	60	1,070		1,130
Tue 11	400	300	40	60	120	1,070		1,190
Wed 12	300	200	40	60	60	1,190		1,250
Thu 13	300	200	40	60	120	1,190		1,310
Fri 14	400	200	40	160	160	710	600	870
Sat 15	400	300	40	60	60	870		930
Sun 16	200	0		200	260	870		1,130
Mon 17	300	200	40	60	60	1,130		1,190
Tue 18	400	300	40	60	120	1,130		1,250
Wed 19	300	200	40	60	60	1,250		1,310
Thu 20	300	200	40	60	120	1,250		1,370
Fri 21	400	200	40	160	160	1,370		1,530
Sat 22	400	300	40	60	60	1,530		1,590
Sun 23	200	0		200	260	1,530		1,790
Mon 24	300	200	40	60	60	1,790		1,850
Tue 25	400	300	40	60	120	1,790		1,910
Wed 26	300	200	40	60	60	1,910		1,970
Thu 27	300	200	40	60	120	1,910		2,030
Fri 28	400	200	40	160	160	1,430	600	1,590
Sat 29	400	300	40	60	220	1,430		1,650
Sun 30	200	0		200	420	1,430		1,850
Ave	340	200	40	107	155	1,066	600	1,221
MAX	470	300	40	230	420	1,910	600	2,030

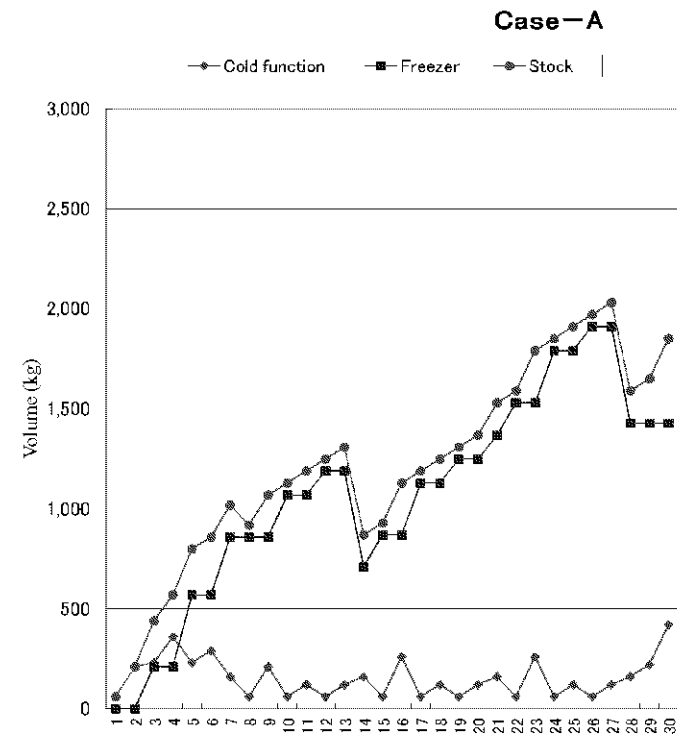


Figure-2.2.2(35) Stock Simulation (Case A: Continuous 3 days landing volume of 470 kg (1,037 lbs)/day was confirmed one time in one week)

[Prior Condition]

(1) Landing Volume at Project site

Average: 200kg (450 lbs)/day
 Top 5: 340kg (750 lbs)/day
 Max. Volume: 470kg (1,023 lbs)/day

(2) Receiving Volume at the New Fisheries Center

1) Mon-Wed-Thu: 300kg (675 lbs)/day
 2) Tue-Fri-Sat: 400kg (900 lbs)/day
 3) Sunday: 200kg (450 lbs)/day

(3) Daily sales Volume at Direct Sales Booth

1) Tue-Sat: 300kg (675 lbs)/day
 2) Other than 1): 200kg (450 lbs)/day
 3) Sunday: 0 to 50kg (110 lbs)/day

(4) Sales Volume in Processing Room

1) Mon to Sat: 40kg (90 lbs)/day
 2) Sunday: 0kg (0 lbs)/day (Holiday)

(5) Sales Volume from Processing Room to Outside

1) Outside area means hotels & restaurants and distribution to St. Kitts Isaland
 2) 600 kg (1,324 lbs) for 2 weeks is distributed (1,250kg (2,759 lbs) /2weeks according to the survey)

(6) Cold Function(Stock in insulated storage and freezer)

1) Excess out of receipt shall be stocked
 2) Moving to freezer a few days later
 3) If insulated storage capacity is exceeded the receiving volume, they move to freezer

Case-B Continuous 2 days landing volume of 470 kg (1,037 lbs)/day was confirmed two times in two weeks (unit: kg)

Date	Received Volume	Sales Volume		Balance of fresh fish	Storage Volume		Sales to outside	Stock
		Direct Sales	Processed		Cold function	Freezer		
Sat 1	400	300	40	60	60	0		60
Sun 2	200	50		150	210	0		210
Mon 3	470	200	40	230	230	210		440
Tue 4	470	300	40	130	360	210		570
Wed 5	300	200	40	60	60	570		630
Thu 6	300	200	40	60	120	570		690
Fri 7	300	200	40	60	60	690		750
Sat 8	400	300	40	60	120	690		810
Sun 9	200	50		150	270	690		960
Mon 10	470	200	40	230	290	900		1,190
Tue 11	470	300	40	130	360	900		1,320
Wed 12	300	200	40	60	60	1,320		1,380
Thu 13	300	200	40	60	120	1,320		1,440
Fri 14	400	200	40	160	160	840	600	1,000
Sat 15	400	300	40	60	220	840		1,060
Sun 16	200	0		200	420	840		1,260
Mon 17	300	200	40	60	60	1,260		1,320
Tue 18	400	300	40	60	120	1,260		1,380
Wed 19	300	200	40	60	60	1,380		1,440
Thu 20	300	200	40	60	120	1,380		1,500
Fri 21	400	200	40	160	160	1,500		1,660
Sat 22	400	300	40	60	220	1,500		1,720
Sun 23	200	0		200	420	1,500		1,920
Mon 24	300	200	40	60	60	1,920		1,980
Tue 25	400	300	40	60	120	1,920		2,040
Wed 26	300	200	40	60	60	2,040		2,100
Thu 27	300	200	40	60	120	2,040		2,160
Fri 28	400	200	40	160	160	1,560	600	1,720
Sat 29	400	300	40	60	220	1,560		1,780
Sun 30	200	0		200	420	1,560		1,980
Ave	339	200	40	100	179	1,103	666	1,282
Max	470	300	40	230	420	2,040	600	2,160

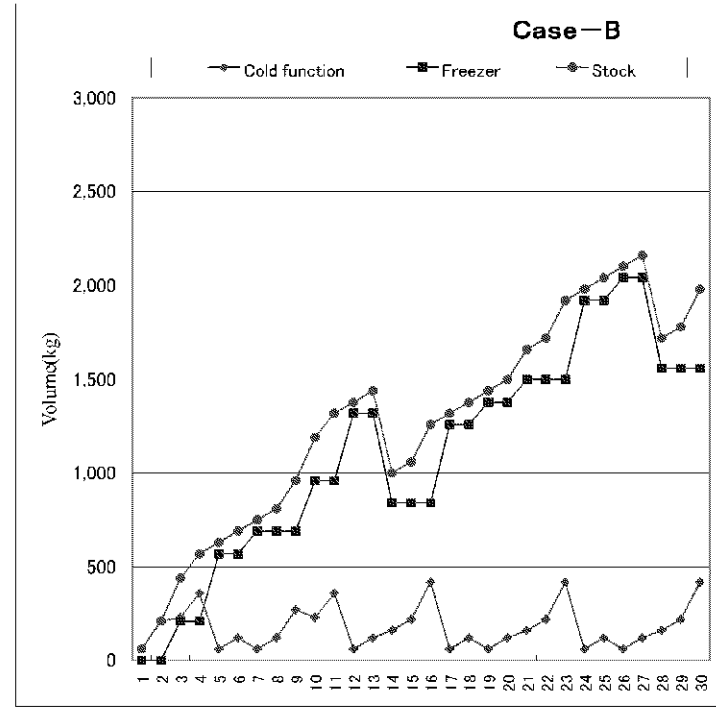


Figure-2.2.2(36) Stock Simulation (Case B: Continuous 2 days landing volume of 470 kg (1,037 lbs)/day was confirmed two times in two weeks)

3) Specifications for Ice making and Cold Storage

(a) General Conditions

Ambient temperature and humidity:	+ 35 degree C, 80%
Refrigerant :	R404A
Kind of raw water:	City water
Raw water temperature:	+25 degree C.
Power source:	AC400V / 50Hz / 3 phase, AC230V / 50Hz / 1 phase
Type of ice:	Flake Ice
Ice Production capacity:	1.5 ton / 24hrs
Ice storage:	3 ton Storing Capacity (No room cooler)
Cold storage:	Room Temp -20 degree C, Storage Capacity 3ton
Insulated storage:	0.5 ton Storing Capacity (No room cooler)

(b) Specifications for Major equipment

Table-2.2.2(24) Specifications for major equipment for ice making and cold storage

Equipment	Specifications
Ice making Machine	Chrome multiple plating ice plate Flake ice automatic operation type
Refrigeration compressor unit	R404A Semi-hermetic type, and Reciprocating type, Oil separators, High and Low pressure switches, Oil level control switch, and Motor protection Starting method: Part winding starter
Prefabricated insulation storage	Prefabricated Sandwich Insulation Panel Insulation coefficient 0.018WmK Surface panel : Color coated steel thickness 0.4mm Insulation: thickness 100mm Inside wall protection : SUS 1.0mm thickness x 1.0mH Sheet (Only Ice storage and Insulated Storage) Insulation door: Manual Single swing type, with emergency anti lock system
Condenser	Heavy- salt proof air cooled condenser Condensing coil: Copper fin and Copper tube, Casing: Stainless Steel Effective condensing surface: 200m ² for Ice making, 130m ² for Cold storage
Liquid receiver	High Pressure vessel installed under air cooled condenser Anti corrosive paint finish
Unit Cooler	Ceiling Hanging type with electrical defrost heater Coil: Aluminum fin and Copper tube, Casing: Galvanized steel Effective cooling surface: 50m ²
Control panel	Indoor Self Standing type, Timer relay control system, Alarm controls Panel display: Each operation mode, and Alarm mode
Piping materials	Hard coating copper pipe Pipe Insulation : High pressure piping 10mmth and Low pressure piping 50mm thickness Nitrile Rubber Insulation Support fittings: Stainless for outdoor, Galvanized steel for indoor

2-2-2-3 Basic Plan for Equipment

(1) Basic Policy for Equipment

- a) Inevitable equipment for maintaining and expanding the function of New Fisheries Center shall be set up.
- b) Contributable equipment for the improvement of convenience and the asset protection of fishermen shall be set up.
- c) Possible equipment to obtain their spare parts and to maintain locally shall be set up.

(2) Equipment Design

Table-2.2.2(25) Equipment List Planned

Item	Use	Skelton of Specification	Q'ty
1. Ice Box	Carrying ice	Approx. 100 liters	30
2. Scale for weighing	Measurement of receiving and sales fishes	330 lbs (150 kg) 60 lbs (30 kg)	2 2
3. Engine flushing tank	Cleaning outboard engine	Approx. 300 liters	1
4. Fish processing table	Processing of fresh fish and ancillary table	Sink (Stainless made) Table (Stainless made)	2 2
5. Showcase	For processed fish sale	Fish display case (Stainless made)	2
6. Fish selling table	Fresh fish sales by fishermen	Table for ice box (Stainless made) Fish display table (Stainless made)	7 7
7. Vacuum Package Machine	Vacuum packing for processed fishes	Indoor desktop type, Seal effective length: Approx. 300 mm	1
8. Air compressor for scuba tank	Filling air for scuba tank	Portable one for filling air to scuba tank	1
9. Boat Trailer	For beaching of fishing boats	For 20 to 30 ft boats	1

1) Ice Box

Ratio of fishing boats that do not use ice at all in Nevis Island is 40% and as the number of operated fishing boats of total Nevis Island is 85, about 34 fishing boats (85 boats x 40%) do not use ice during the operation. It shall be effective measure for the ice diffuse by letting ice box out as well as ice to these fishing boats. The number of ice box is set out as 30 boxes since the number of fishing boats that do not use ices is about 34 boats. As fish catch volume of one time of pot fishing and net fishing which are major fishing methods is about 45 to 55 lbs (20.4 to 25.0 kg), the capacity of ice box is set up as about 100 liters. Therefore, 30 ice boxes with each capacity of about 100 liters shall be planned.

2) Scales for weighing

Two different types of scales which one is the large type for fish receiving and the other one is the small type for fish sales are necessary with 2 numbers of them as backup for the fault shall be planned. Considering the existing activities situation the plan is as follows,

For fish receiving maximum weight:	330 lbs (150 kg)	2 scales
For fish sales maximum weight:	60 lbs (30 kg)	2 scales

3) Engine flushing tank

As the outboard engine with 40 Hp is mainly used and the maximum is 225 Hp one, one plastic tank with the capacity of approx. 300 liters that is fit for their cleaning shall be planned.

4) Equipment for fish processing

Processing table for fish primary processing (scale, gut, head cut and etc.) and making filet with sink and working table for ancillary works (large fish cut, package and temporary storage and etc.) shall be set out. Primary processing capacity of one processing worker 12 lbs/hour (5.5 kg/hour) from the actual record of the existing Fisheries Center and total 7 hours is necessary to process planned processing volume about 90 lbs (40 kg). In case that this could process in about 5 hours as 2 workers (7 hours / 5hours=1.4) is necessary, processing table shall planned to have sizes being workable by 2 workers at the same time.

Sink:	SUS	approx.	L1,800mm x D750mm x H800mm	2 units
Work table:	SUS	approx.	L1,800mm x D750mm x H800mm	2 units

5) Showcase

2 showcases to install at processed fish sales room in the New Fisheries Center shall be planned.

Ice cooling display case :	SUS	approx.	L1,800mm x D750mm x H1,200mm	2 units
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6) Fish selling table

7 sales booths at direct sales place by fishermen shall be installed. Tables to put ice boxes and fish display tables to place fishes setting out shall be planned at each booth.

Fresh fish display table:	SUS	approx.	L1,200mm x D600mm x H900mm	7 units
Table:	SUS	approx.	L 900mm x D750mm x H500mm	7 units

7) Vacuum Packaging Machine

Assuming that one third of receiving volume about 300 lbs/day (140 kg) shall be filet processed and vacuum packed, the proper equipment shall be studied.

50 lbs (22.7 kg) filets from the 100 lbs (45.3 kg) of original fishes can be made if the yield loss of filet process is 50%. In case that package average as half lbs (0.23 kg) per 1 pack, about 100 packages shall be made. In case that this work is required to complete in about 2 hours, the capability to finish it 120 min. ÷100 packs= 1.2 min./pack is required. Considering to provide a pack with 4 to 5 lbs (1.8 to 2.3 kg) for big users like hotels, the desktop type with short seal length shall be selected.

Indoor Desktop Type
Seal effective length: approx. 300mm
Vacuum pump: approx. 15m³/h

8) Air compressor for scuba tank

There are water cooling type and air cooling type as the cooling system of air compressor. As water cooling type needs many accessories and its maintenance is not easy, air cooling type shall be adopted.

Portable one for filling air to scuba tank
Cooling method: Air cooling type
Discharge rate: approx. 150 L/min
Maximum pressure: approx. 20 Mpa

9) Boat trailer

Most of the fishing boats based on Charlestown are less than 30 ft. And, the smaller boats less than 20 ft is possible to land using skids on the beach. Therefore, one boat trailer made of aluminum (anti salt damage specification) for the landing of fishing boats with the max. length of 30 ft shall be planned. As this boat trailer aims boat landing only, road going shall not be assumed.

2-2-3 Outline Design Drawing

2-2-3-1 Planned Facilities and Equipment by the Project

Table-2.2.3(1) Planned Facilities and Equipment by the Project

(1) Civil Facilities

Name of Facilities	Scale, Contents of Planning
Land Reclamation	Reclamation Area: approx. 2,000m ² Filling soil volume : approx. 6,000m ³
Revetment	Crown height : M.S.L+3.0m Stone Gravity Type
Fishery Jetty	Steel pipe pile type jetty Berth Part: L=25m, B=8.0m Access Bridge Part: L=25m, B=4.0m Lighting: 2 poles, Water Tap: 2 nos.

(2) Architectural Facilities

Name of facilities	Scale, Contents of planning
New Fisheries Centre	Total Floor Area: 973.82 m ² Structure: Reinforced concrete 2 stories with pile foundation Roof: Galvalume sheet roof Exterior Wall: Stone on concrete wall (Ground Floor) Sprayed texture paint concrete. block (Second Floor) Equipment: Water reservoir tank for rain water 30m ³ Water reservoir tank for city water 10m ³ Emergency generator: 45 KVA Ice making plant: Ice making machine 1.5ton/day, Ice storage 3.0ton Freezer 3.0ton, Insulated storage 0.5ton
Work Shop	Total Floor Area: 20.00 m ² Structure: Reinforced concrete with pile foundation Roof: Reinforced concrete slab with polyurethane water-proof Exterior wall: Concrete block, Cement mortar with emulsion paint Equipment: Manual chain hoist lifting capacity of 500kg
Fishing Gear Lockers	Total Floor Area: 88.00 m ² Number of locker: 22 Structure: Reinforced concrete with pile foundation Roof: Galvalume sheet roof Exterior wall: Concrete block, Cement mortar with emulsion paint
Storage for large Fishing gears and Toilet	Total Floor Area: 33.90 m ² Structure: Reinforced concrete with pile foundation Roof: Reinforced concrete slab with polyurethane water-proof Exterior wall: Concrete block, Cement mortar with emulsion paint Equipment: Shower, Air compressor for scuba tank
Gazebo	Total Floor Area: 29.82 m ² Structure: Wood structure with reinforced concrete foundation (mat foundation) Roof: Shingle roofing

Septic Tank	Total Floor Area : 52.50 m ² Material : FRP (installed in reinforced concrete box) Treatment Capacity: Approx. 5.0t/day BOD density in disposal water: 20mg/l
Exterior Works	Mechanically stabilized crushed stone finish: approx. 1,090m ² Lawn finish: approx. 435m ² Concrete blocks finish for vehicles: approx. 110m ² Fencing for anti-falling Equipment: Exterior lighting fixtures: 9 poles

(3) Equipment

Name of Equipment	Q't	Specification	Usage
Ice Box	30	Approx. 100 liters Plastic made (urethane foam inside)	Transportation of ice and fish
Scale for weighing 330 lbs (for 150 kg) 60 lbs (for 30 kg)	2 2	Platform Scale Platform Scale	Weighing of *Receiving fish *Sales fish
Engine flushing tank	1	Approx. 300 liters Plastic made	Cleaning outboard engine
Fish processing table Sink	2	Approx. L1,800 x D750 x H800 mm, Stainless made	*Fresh fish processing
Table	2	Approx. L1,800 x D750 x H800 mm, Stainless made	*Auxiliary table
Showcase for display	2	Approx. L1,800 x D750 x H1200 mm, Stainless made	Processed fish sales by center
Fish selling table Fish display table	7	Approx. L1,200 x D600 x H900 mm, Stainless made	*Ice cooling fresh fish display in direct sales booth by fishermen
Table	7	Approx. L900 x D750 x H500 mm, Stainless made	*For placing ice box
Vacuum Packaging Machine	1	Interior desktop type Length of seal: approx. 300mm Vacuum pump: approx. 15 m ³ /h	Vacuum packaging for processed fish
Air Compressor for scuba tank	1	Movable type for scuba tank, Cooling method: Air cooling type Discharge rate: approx. 150L/min. Maximum air pressure: approx. 20 Mpa	Air filling to scuba tank
Boat Trailer	1	Maximum 30ft for fishing boat Aluminum made (Salt resistance specification)	Beach landing for fishing boat

2-2-3-2 Outline Design Drawing

Figure-2.2.3(1) General Layout Plan

Figure-2.2.3(2) Fishery Jetty (Plan and View)

Figure-2.2.3(3) Fishery Jetty Berth Part (Plan, View and Cross Section)

Figure-2.2.3(4) Fishery Jetty Access Part (Plan, View and Cross Section)

Figure-2.2.3(5) Revetment (Cross Section)

Figure-2.2.3(6) New Fisheries Center (Ground Floor plan)

Figure-2.2.3(7) New Fisheries Center (Second Floor Plan)

Figure-2.2.3(8) New Fisheries Center (Elevation)

Figure-2.2.3(9) New Fisheries Center (Cross Section)

Figure-2.2.3(10) Fishing Gear Lockers (Plan, View and Cross Section)

Figure-2.2.3(11) Workshop (Plan, View and Cross Section)

Figure-2.2.3(12) Storage for Large Fishing Gears and Toilet (Plan, View and Cross Section)

Figure-2.2.3(13) Gazebo (Plan, View and Cross Section)

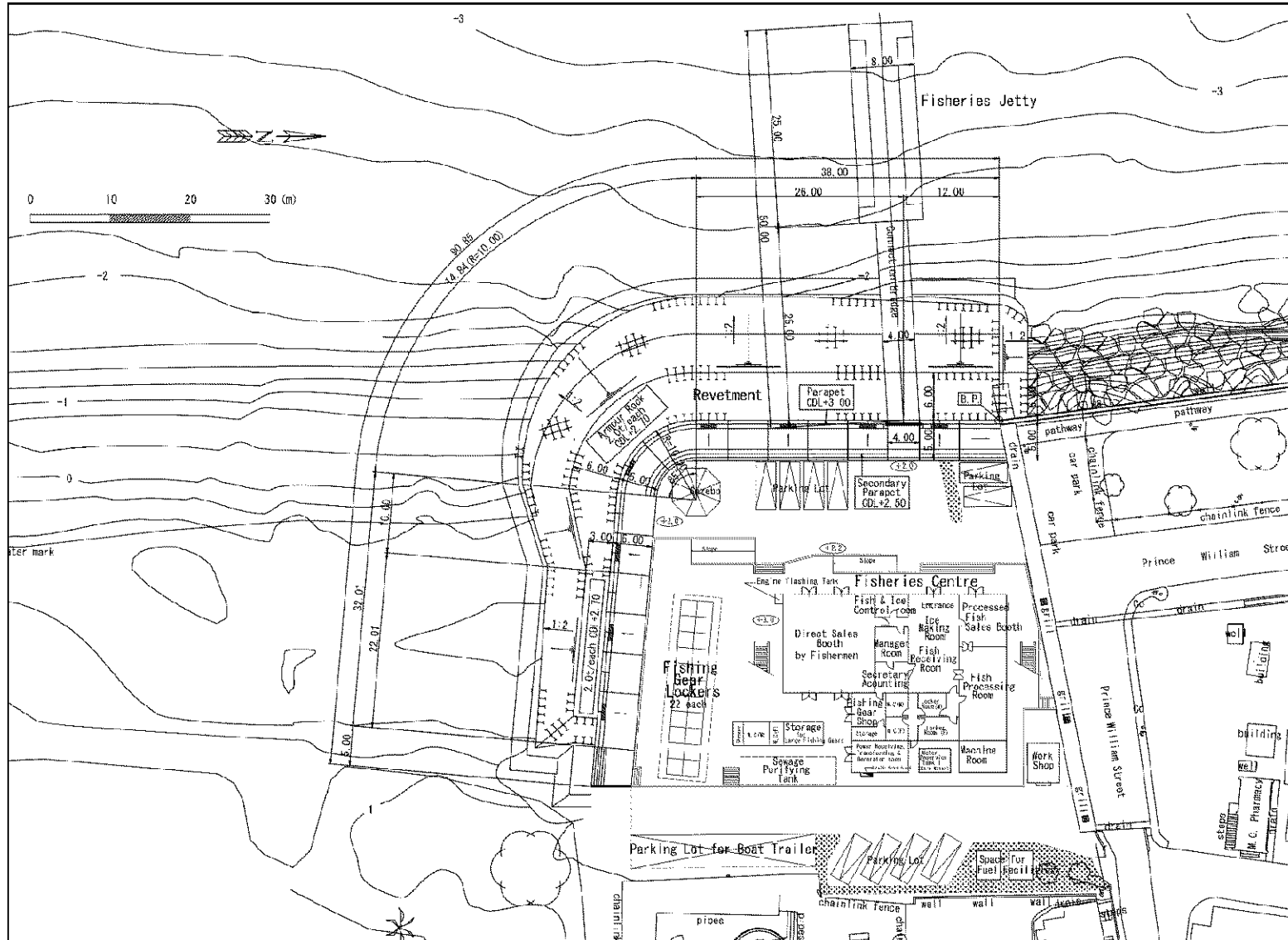


Figure-2.2.3(1) General Layout Plan

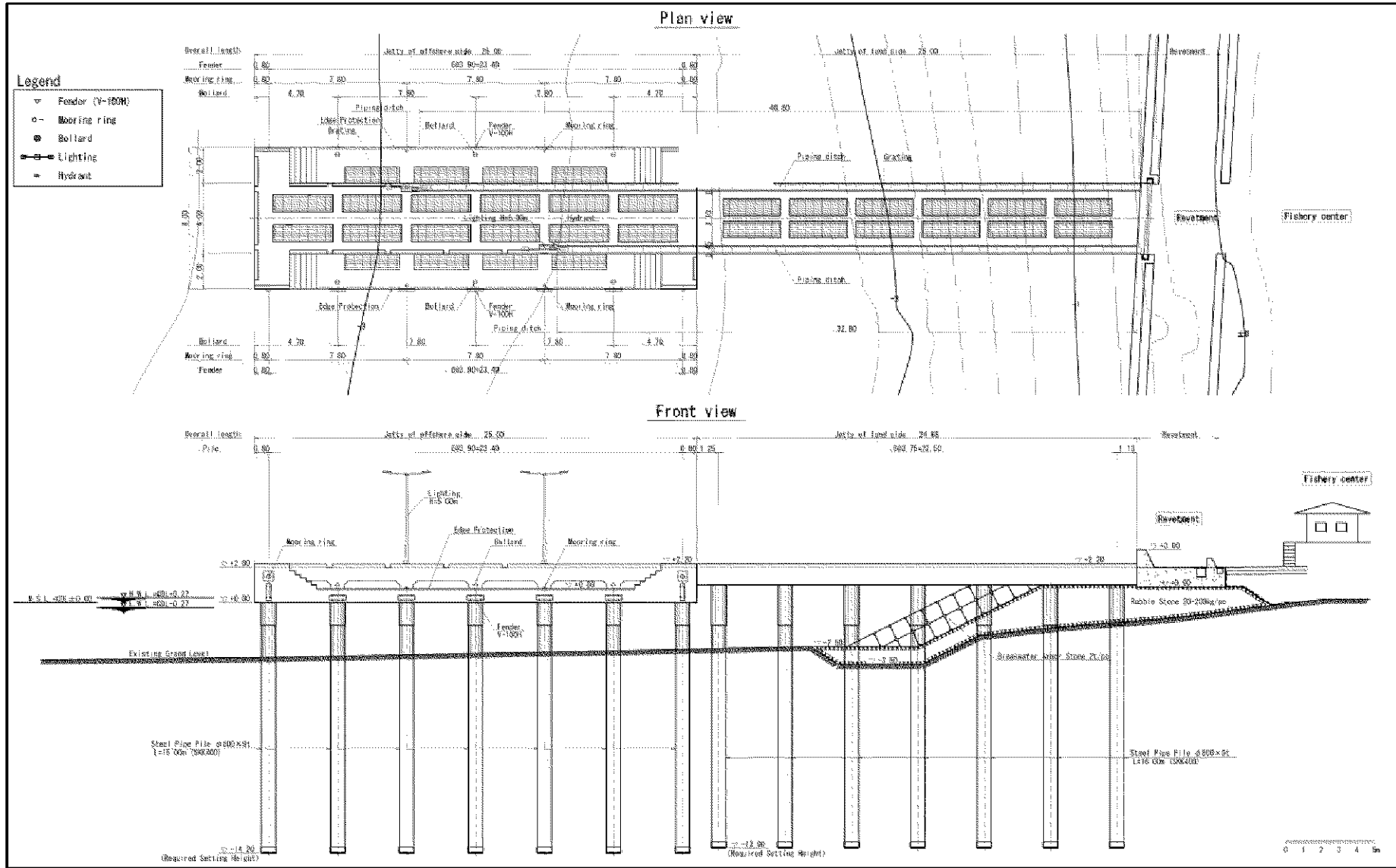


Figure-2.2.3(2) Fishery Jetty (Plan and View)

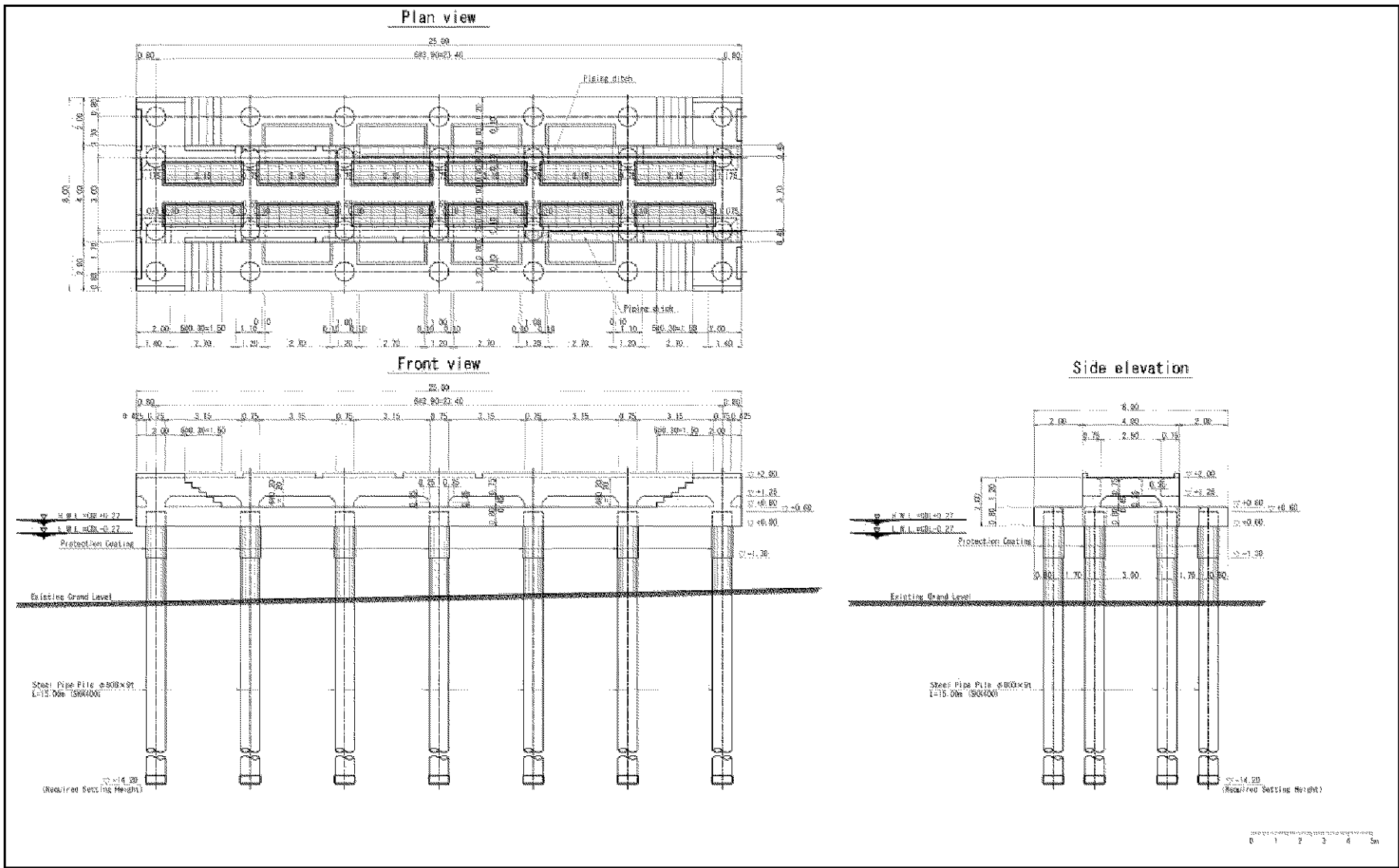


Figure-2.2.3(3) Fishery Jetty Berth Part (Plan, View and Cross Section)

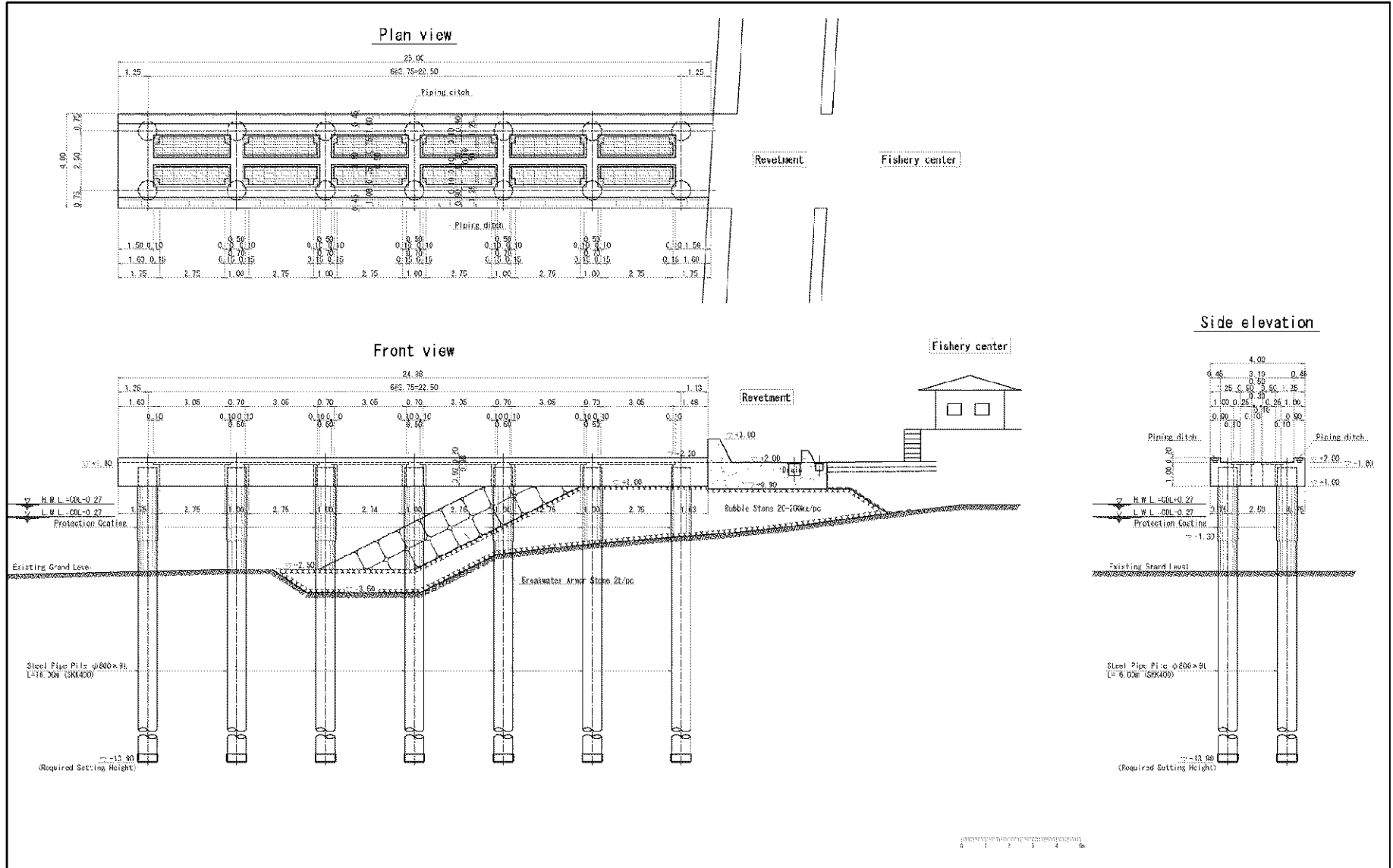


Figure-2.2.3(4) Fishery Jetty Access Part (Plan, View and Cross Section)

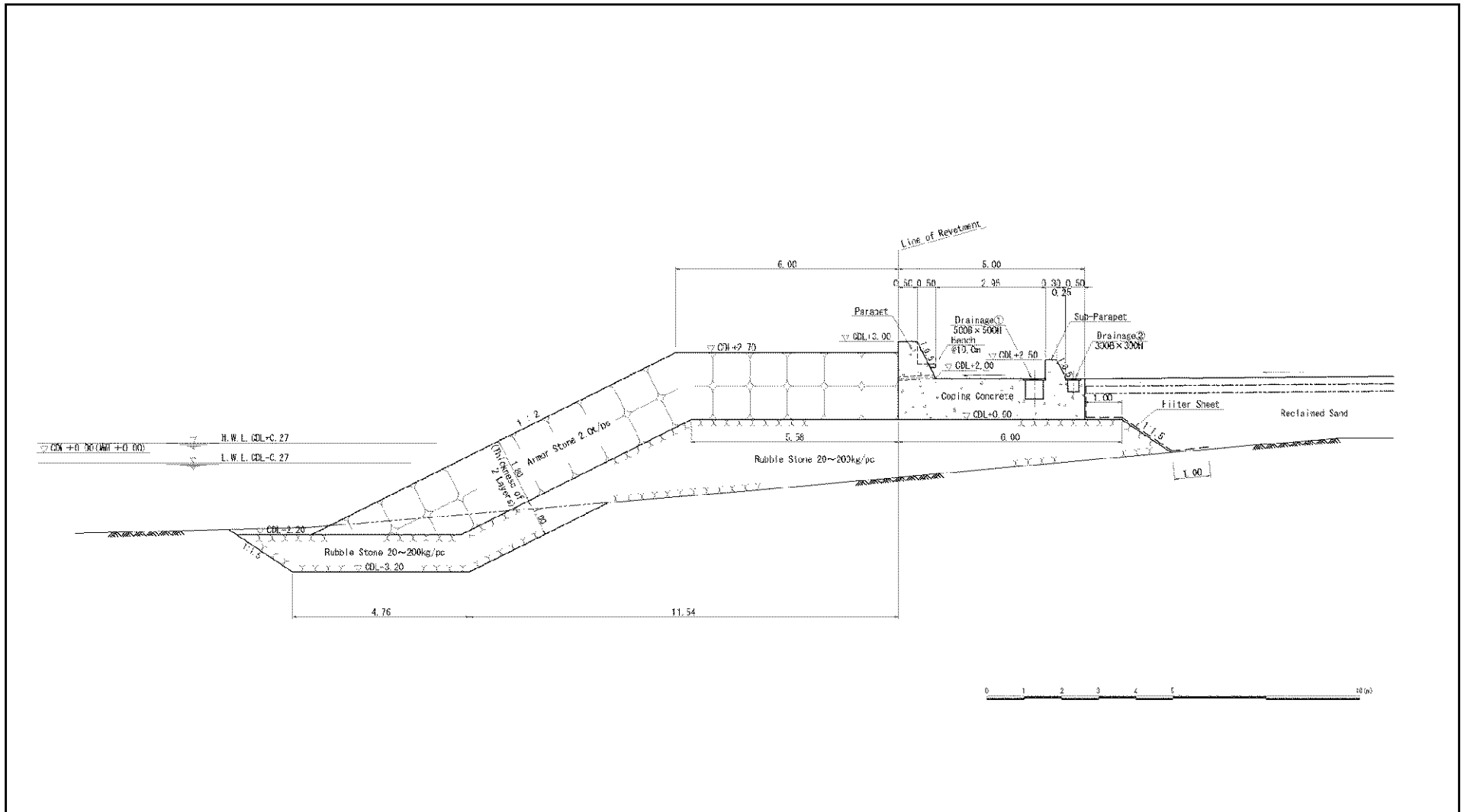


Figure-2.2.3(5) Revetment (Cross Section)

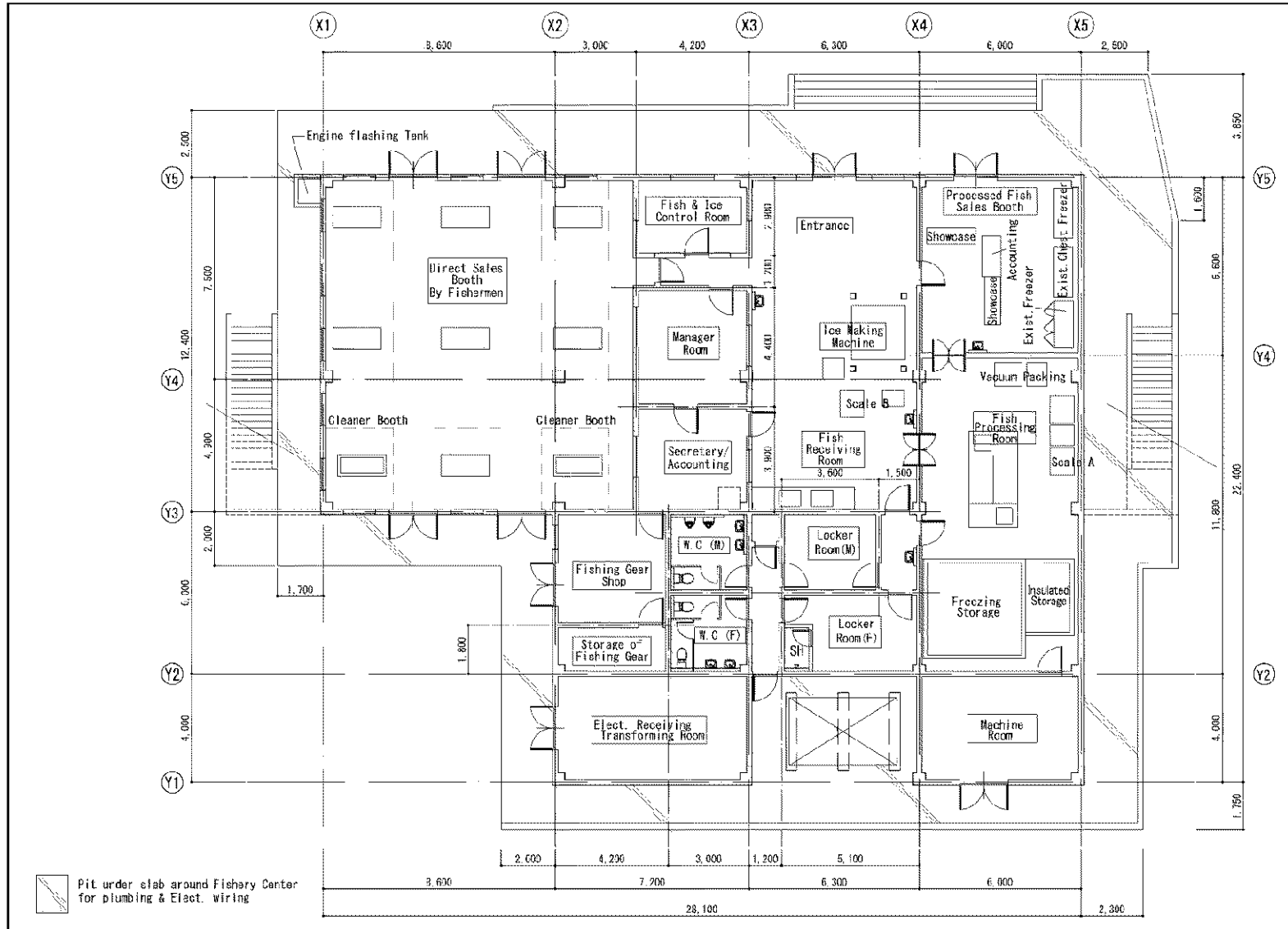


Figure-2.2.3(6) New Fisheries Center (Ground Floor Plan)

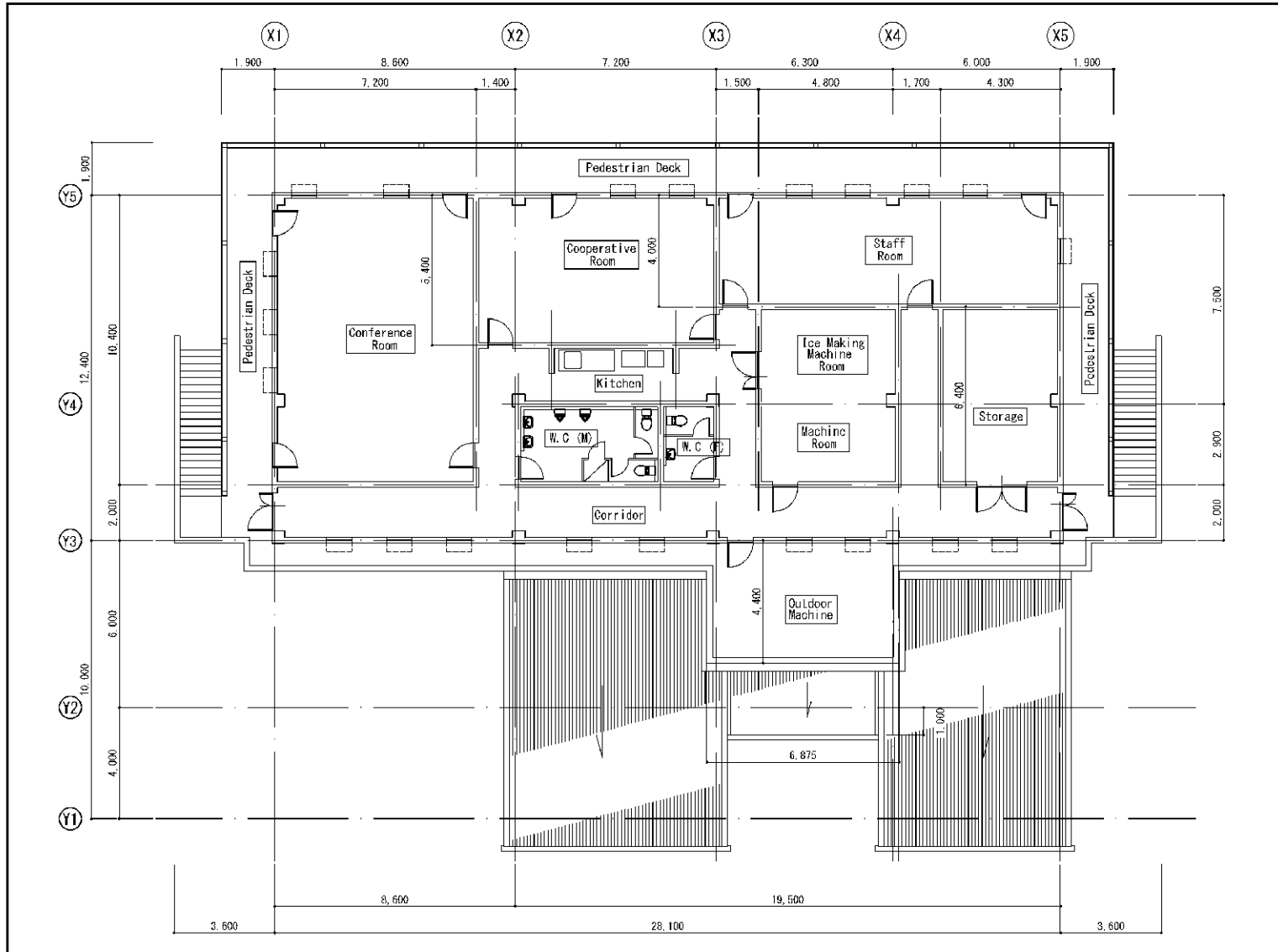


Figure-2.2.3(7) New Fisheries Center (Second Floor Plan)

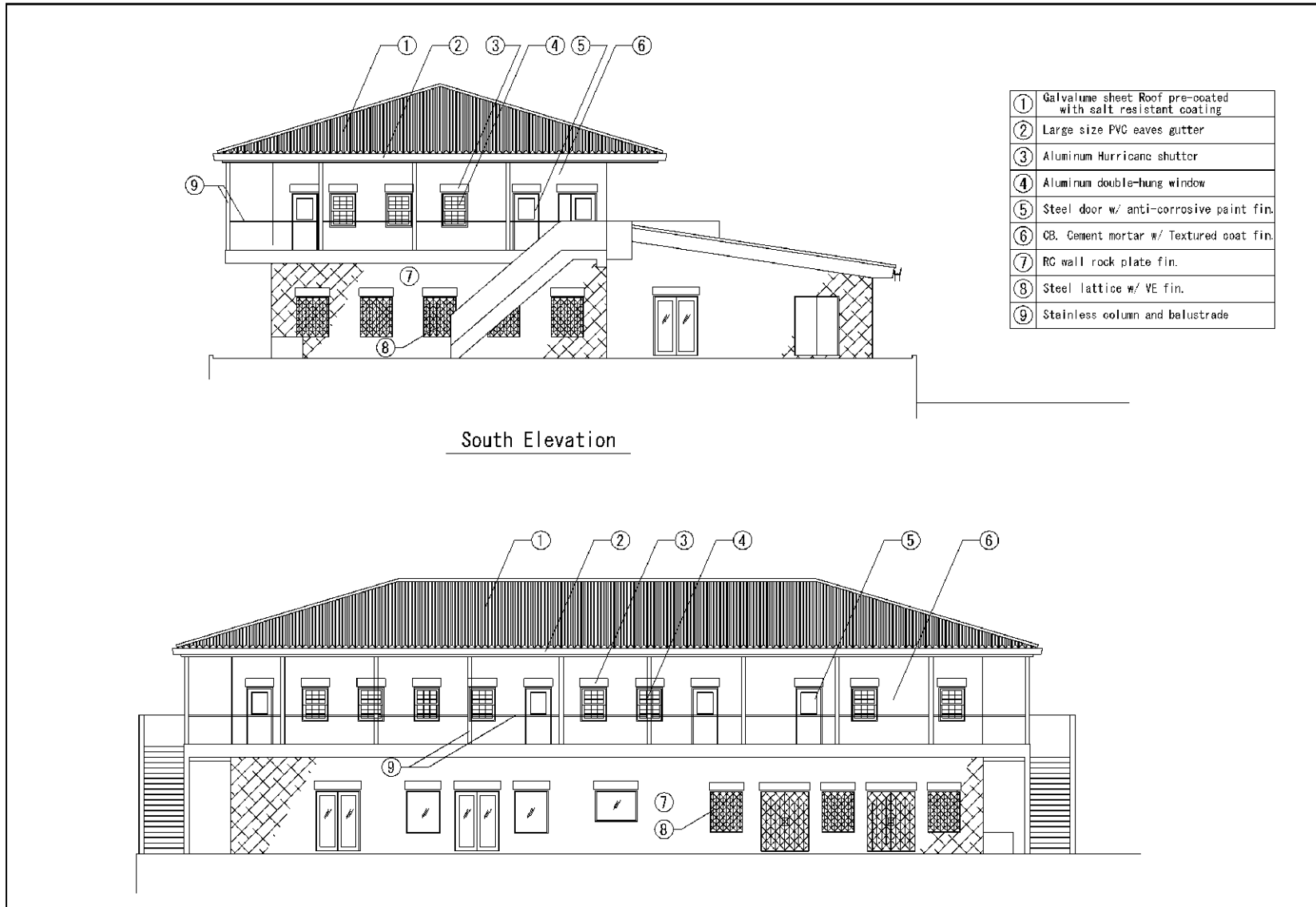


Figure-2.2.3(8) New Fisheries Center (Elevation)

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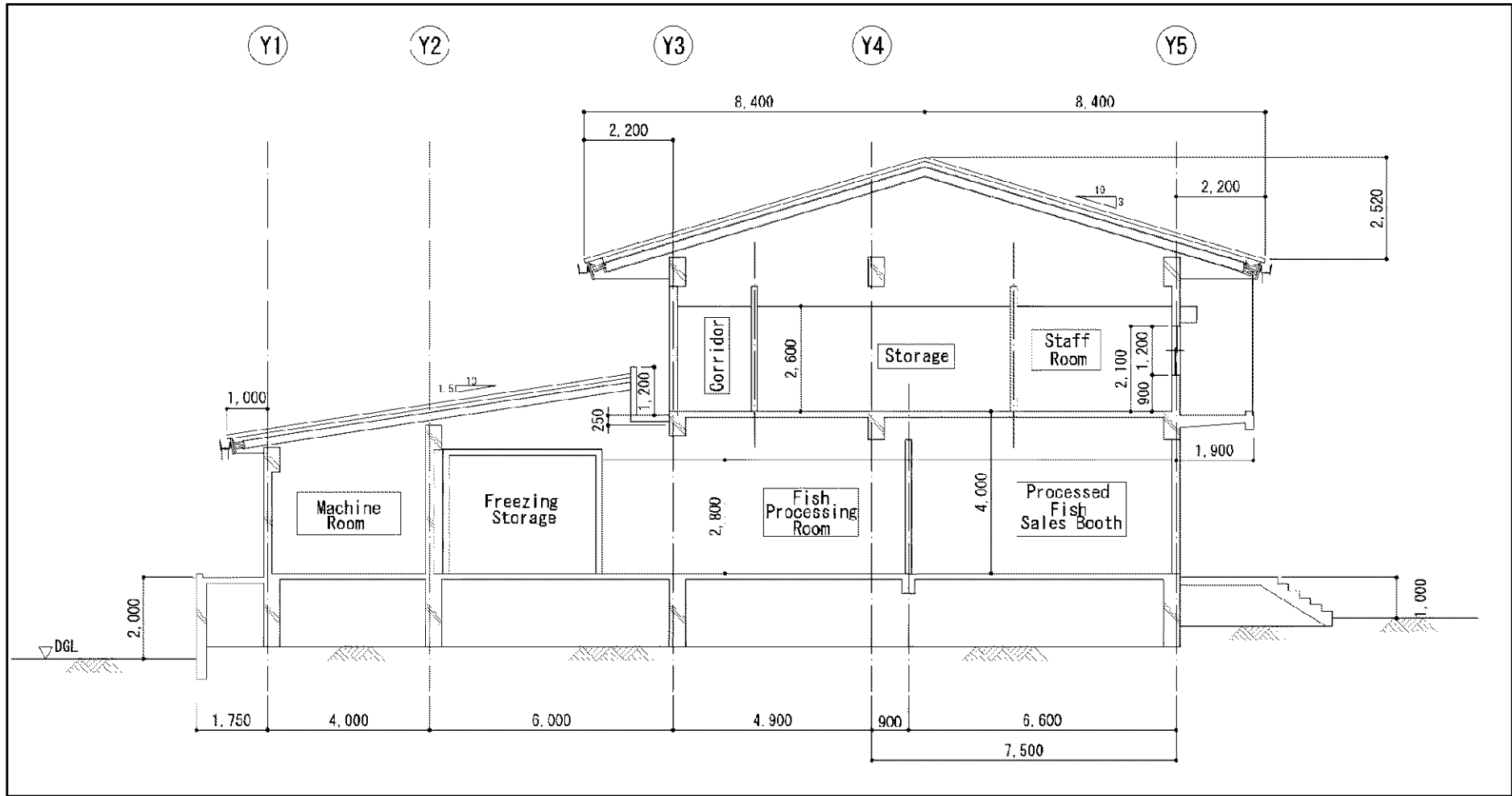
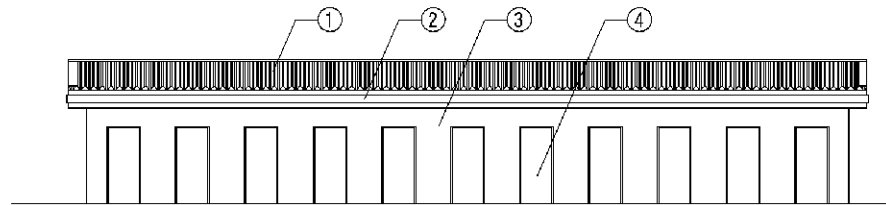
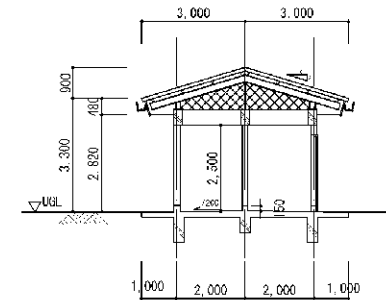


Figure-2.2.3(9) New Fisheries Center (Cross Section)

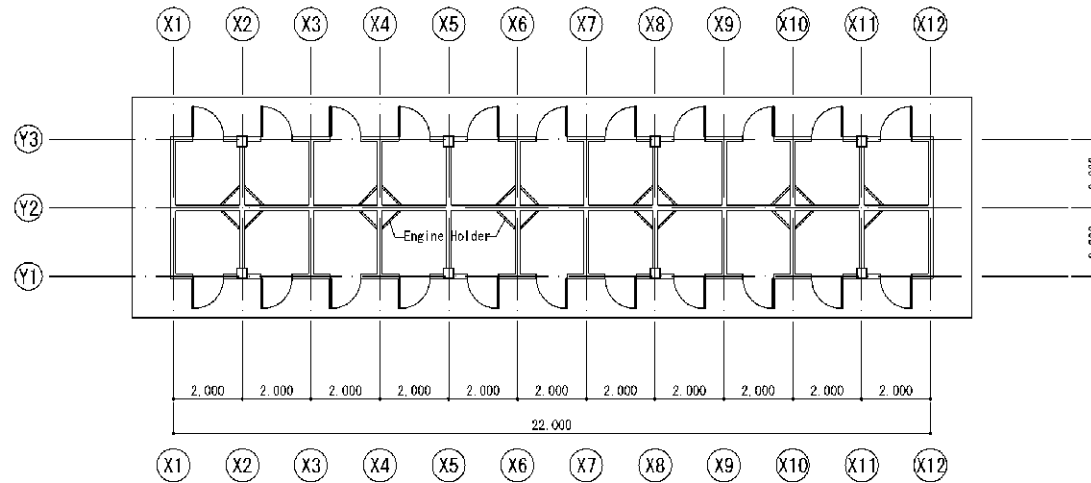
①	Galvalume sheet Roof pre-coated with salt resistant coating
②	PVC Eaves Gutter
③	CB, Cement mortar w/ EP Fin.
④	Wood Door OP Fin.



ELEVATION



SECTION



PLAN

Figure-2.2.3(10) Fishing Gear Lockers (Plan, View and Cross Section)

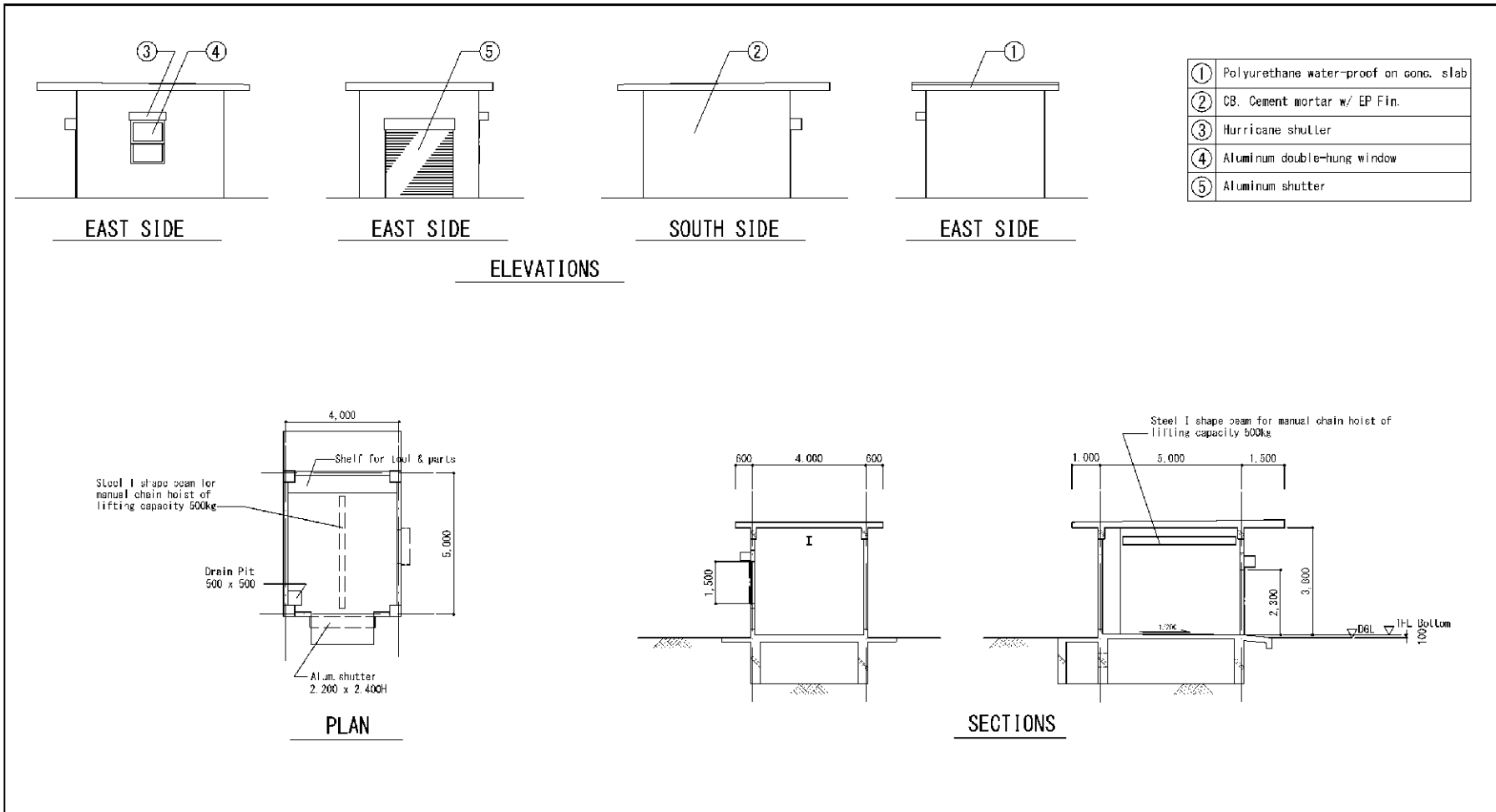


Figure-2.2.3(11) Work Shop (Plan, View and Cross Section)

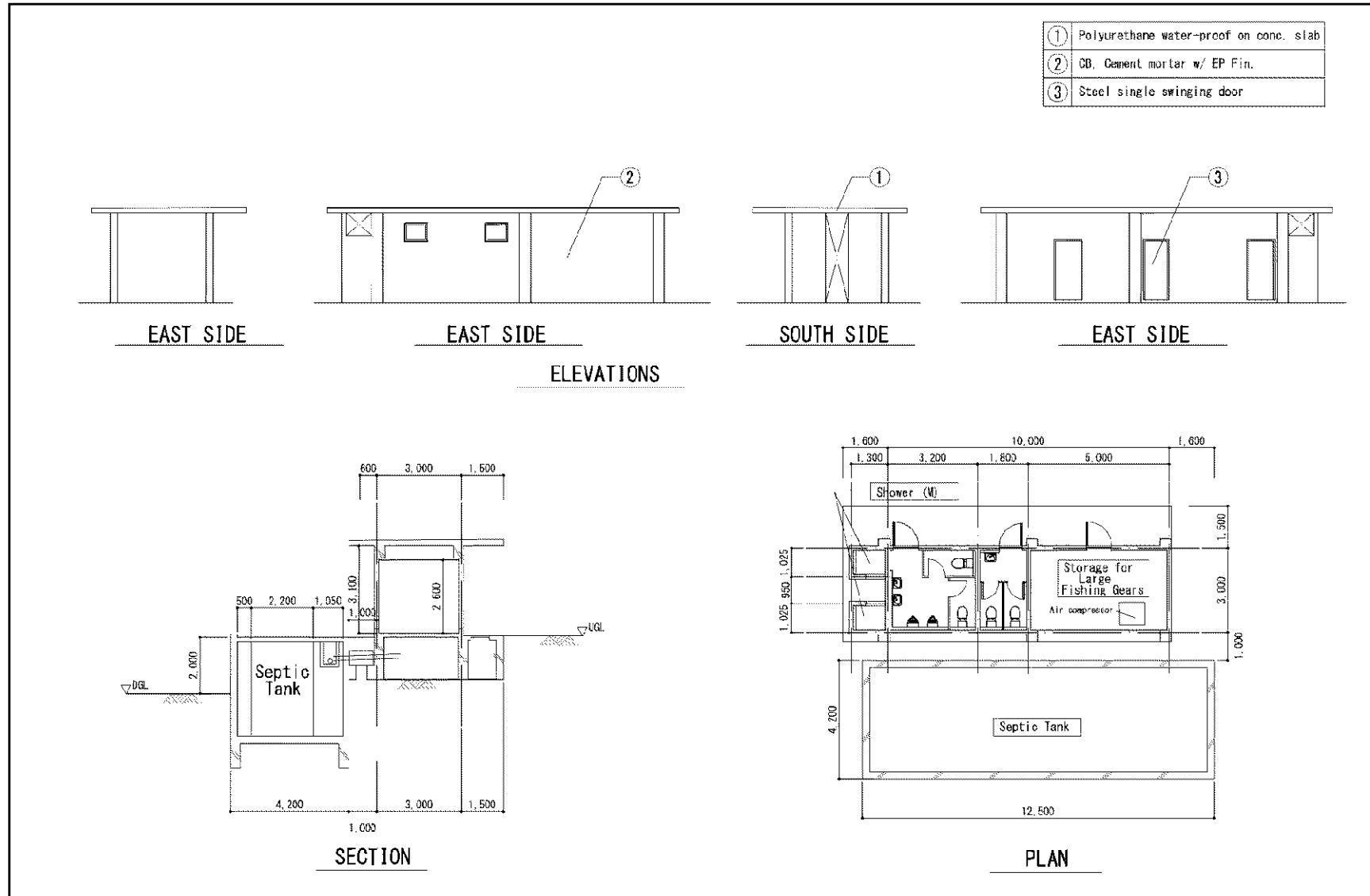


Figure-2.2.3(12) Storage for Large Fishing Gears and Toilet (Plan, View and Cross Section)

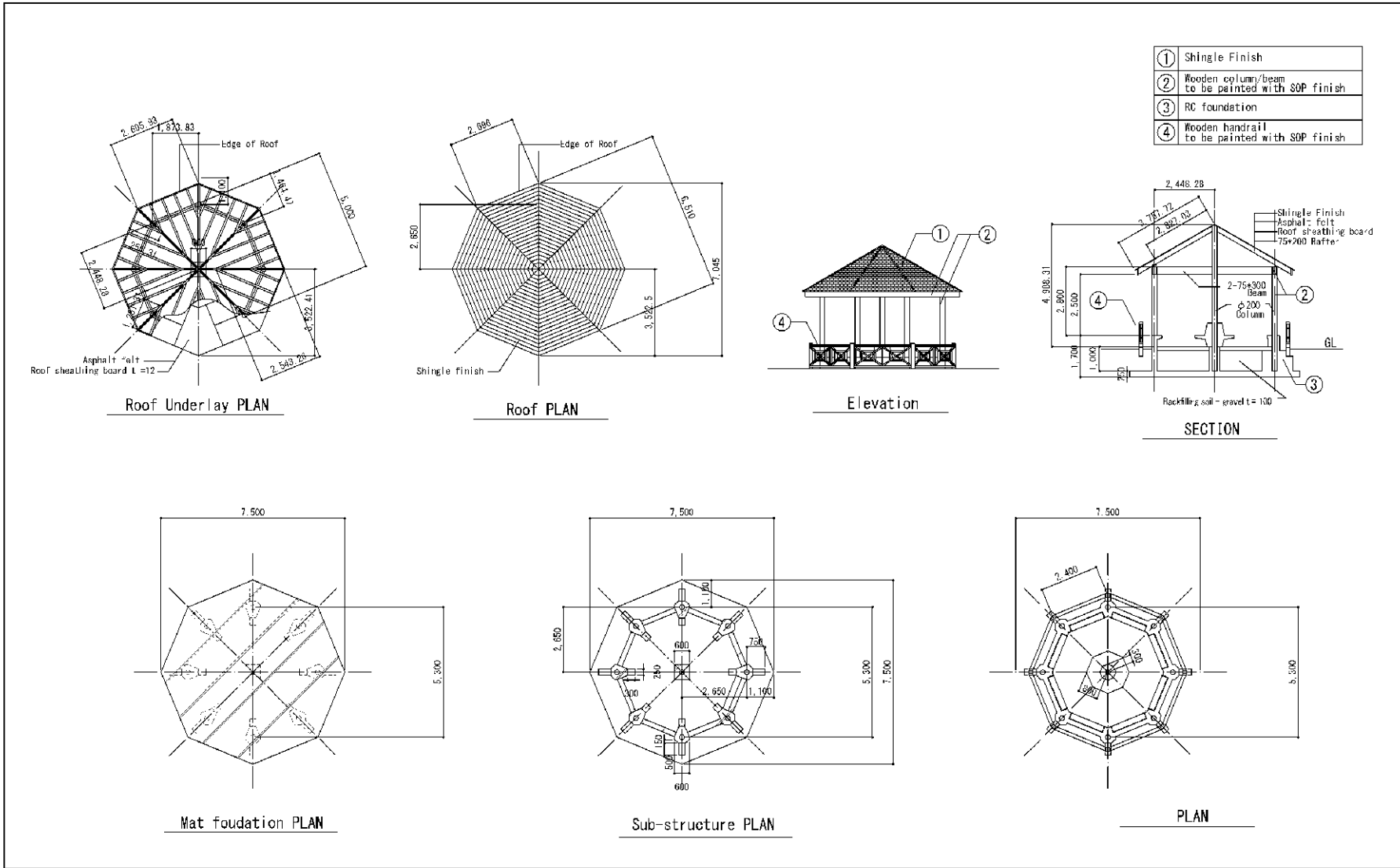


Figure-2.2.3(13) Gazebo (Plan, View and Cross Section)

2-2-4 Implementation Plan

2-2-4-1 Implementation Policy

(1) Basic Concern for Project Execution

- a) After concluding the Exchange of Notes (E/N) between the Government of Saint Christopher and Nevis and the Government of Japan Grant Agreement (G/A) is going to be concluded between the Government of Saint Christopher and Nevis and JICA concerning the execution of construction of fisheries facilities and the procurement of equipment. Thereafter, the Consultant Agreement shall be concluded between the Government of Saint Christopher and Nevis and the Consultant which holds Japanese nationality.
- b) The Consultant shall draw up necessary drawings, specifications, tender documents and the contract for the construction and select a construction company which holds Japanese nationality by tender upon approval of the Government of Saint Christopher and Nevis through the evaluation of tender qualification and tender documents.
- c) The construction work shall be executed in accordance with the Construction Contract which will be concluded between the Government of Saint Christopher and Nevis and a Construction Company.
- d) 25.0 months (5.5 months for the detailed design and 19.5 months for the construction works) judging from the facility scale, its component and the conditions of location of the project site is considered to be necessary as the total construction period.

(2) Construction Policy/Procurement Policy

- a) Facilities which are going to be constructed in this project are fishery jetty and revetment as the civil facilities and Fisheries Center building, fishing gear lockers and etc. as building facilities. As the water depth at the location of jetty construction is deep, marine works utilizing temporary steel bridge is planned for shortening the construction period. As soft soil layer (Peat) is existed in the project site, construction method shall be studied considering the consolidation settlement after construction of facilities.
- b) Two major construction companies in Nevis have a few construction machines and make a monopoly of the public works and their high rate of lease fees were confirmed. As the lease rate in the third countries (Trinidad Tobacco, Barbados and others) is also expensive, the procurement plan shall be set up considering the procurement from Japan.
- c) Freezing and ice making facilities shall be purchased from the third countries or Japan considering maintenance and cost aspects and the assembly and start-up works shall be executed under the instruction of a dispatched Japanese or third country's engineer.
- d) Materials and equipment which are procurable locally shall be prioritized as much as possible studying on its quality and the supply capacity and minimize the procurement from Japan in view of cost.

(3) Safety Management

The project site is in reclamation land located at Charlestown in the center of Nevis Island and there are no conventional houses. All the materials and equipment transported have to pass through narrow urban area and need to work together with local police since there are many passage of people and street

car parking. In this project plan, safety observers (Traffic Controller) are allocated at key points and the project site is enclosed by fence not so as to prevent outsiders from their incursion and set up sign board to show that this area is dangerous. And it is necessary to beware marine perils during marine work by showing working water area using buoys.

2-2-4-2 Implementation Conditions

- a) Concerning construction work of fishery jetty, as the water depth of design location is deep, the work is done by temporary steel bridge and the total construction period shall be shortened and conspire the cost reduction with planning execution of civil and building works in parallel.
- b) Proper temporary construction plan, construction method plan and construction schedule plan shall be set up well considering local natural conditions (especially hurricane).
- c) Measurement of the primary consolidation settlement of peat layer shall be done after completion of reclamation work. And, the measurement of the secondary consolidation of peat layer shall be done after completion of facility construction work.
- d) Staff and expert engineers from Japan are planned to dispatch proper number, time and period in accordance with the construction progress.
- e) Local materials shall be purchased as much as possible and minimize the one from foreign countries.
- f) Temporary yard being necessary for construction works shall be provided by NIA.

As NIA has not owned proper land near the project site, it has been agreed to be provided a part of container storage area for value in Long Point Port (about 50 m x 50 m) as material storage and fabrication factory of reinforced steel bars and forms with the discussion of NASPA. Temporary construction yard as storage yard for construction machine and others uses sandy beach near the project site.

2-2-4-3 Scope of Works

The scope of works to be undertaken by the Government of Japan and the Government of Saint Christopher and Nevis is as follows.

(1) Scope of works to be undertaken by the Government of Japan

1) Construction works

- a) Construction of new fishery jetty
- b) Construction of revetment
- c) Land reclamation for new fisheries center
- d) Construction of new fisheries center
- e) Construction of fishing gear lockers
- f) Construction of work shop
- g) Construction of storage for large fishing gears and toilet

2) Procurement of Equipment

- a) Ice box
- b) Scale for weighing
- c) Engine flushing tank

- d) Fish processing table
- e) Showcase
- f) Fish selling table
- g) Vacuum packaging machine
- h) Air compressor for scuba tank
- i) Boat trailer

3) Soft Component

- a) Soft Component for maintenance and operation of New Fisheries Center

(2) Scope of Works to be Undertaken by the Government of Saint Christopher and Nevis

a) Electric power supply to site	EC\$	1,200 (Approx. 0.04 million J¥)
b) Removal of a power pole near project site	EC\$	6,000 (Approx. 0.20 million J¥)
c) Water supply to site	EC\$	4,000 (Approx. 0.14 million J¥)
d) Telephone line to site	EC\$	4,000 (Approx. 0.14 million J¥)
e) Removal of existing two fishing gear lockers	EC\$	8,000 (Approx. 0.27 million J¥)
f) Installation of fence and gate around project site	EC\$	25,000 (Approx. 0.85 million J¥)
g) Procurement of laboratory equipment	EC\$	6,000 (Approx. 0.20 million J¥)
h) Procurement of equipment and tools for work shop	EC\$	103,000 (Approx. 3.51 million J¥)
i) Installation of fire hydrant	EC\$	3,000 (Approx. 0.10 million J¥)
j) Payment of bank commission	EC\$	29,000 (Approx. 0.99 million J¥)
k) Land acquisition:	EC\$	563,000 (Approx. 19.16 million J¥)
l) TOR preparation for EIA	EC\$	3,900 (Approx. 0.13 million J¥)
m) Execution of EIA	EC\$	52,000 (Approx. 1.77 million J¥)

2-2-4-4 Consultant Supervision

Consistent and smooth execution design work and construction supervision work of the project shall be executed by the consultant who well understands the gist of Preparatory Study in accordance with the policy of Grant Aid Cooperation of the Government of Japan. The consultant shall dispatch a resident supervisor who has enough experiences in construction site and also dispatch expert engineer at the necessary time upon work progress and inspection and supervision instruction are executed in addition to the work for construction supervision and liaison.

(1) Policy of Construction Supervision

- a) Supervisor aims to have close contacts to both national organizations and the persons in charge and complete facilities without delay in accordance with the execution schedule.
- b) Supervisor gives timely and proper direction and advice to related persons with construction for the facilities construction conforming to the design drawings.
- c) Supervisor gives priority to adopt local construction method with local materials to the utmost extent.
- d) Supervisor copes with technical transfer related with construction method and technique and makes effects as Grant Aid Cooperation.

e) Supervisor persuades proper direction and advise on smooth operation concerning the maintenance of facilities after completion.

(2) Construction Supervision Work

1) Service for Construction Contract

Selection of Contractor, decision of construction contract method, making up draft of construction contract, checking construction breakdown, witnessing construction works and others are to be executed.

2) Service for Inspection and Confirmation of Shop Drawings and others

Inspection shall be done for shop drawings, materials, finish samples and others which will be proposed by contractor.

3) Service for Construction Supervision

Study for construction plan and construction schedule, direction for Construction Company and report for construction progress to the client.

(3) Cooperation for Payment Approval Procedure

Cooperation for checking invoices of construction fee which will be paid during construction and after completion of construction shall be made.

(4) Witness on Inspection

Inspection at each work progress during construction period upon need shall be done and instruct construction company. The consultant shall finish the work upon confirming all the construction contract is performed and construction work is completed and witnesses on handing over the facilities which are described in the contract with receipt confirmation of the client. In addition, the consultant shall report necessary matters for work progress during construction period, payment procedures and handing over after completion to the Government of Japan.

2-2-4-5 Quality Control Plan

Materials to be used in this construction works shall be controlled in conformity with Common Specification for Construction of Fishing Ports (edited by National Association of Fisheries Infrastructure), Common Specification for Construction of Port and Harbor (edited by Ministry of Land, Infrastructure, Transport and Tourism), Architectural Standard Common Specification and the Commentaries JASS 5 (edited by Architectural Institute of Japan), Architectural Standard Common Specification (edited by Ministry of Land, Infrastructure, Transport and Tourism), Architectural Supervisory Guideline (edited by Ministry of Land, Infrastructure, Transport and Tourism), Japan Industrial Standards (JIS) and American Society for Testing and Materials (ASTM) and have to get prior approval before the actual use.

And concrete to be used in this construction work shall be confirmed its strength, mixing time and etc. through trial mixture before using and consider how to cast. In addition, Maintenance and control of the quality shall be executed by making up test result in each composition, concrete strength control table and control chart (X-R control chart and etc.).

2-2-4-6 Procurement Plan

(1) Circumstance on Construction Field

1) Construction Company

Construction Companies in Saint Christopher and Nevis own a few large construction machines like cranes and have the experiences of marine civil and building works like jetty and there are two possible companies to be consigned for this project. It is considered no problem for the construction works both of civil and building since one of them has experienced to work as a sub-contractor under the Grant Aid Cooperation scheme. However as these two companies in Nevis have occupied most of public works except small scale road construction works, their lease fee etc. is expensive therefore the procurement plan shall be made up considering procurement from third countries or Japan.

As Public Works Department of NIA directly manages small scale road construction, it owns small size paving machine and quarry. The quarry is managed together with private company at present though it supplies only filling earth and sand (soil included gravel) for road construction since rock cracking work is not possible due to the ageing of machine.

2) Construction Machinery

Local construction companies own general construction machineries however the models and the number are quite limited. And, workboats (Crane Barge, Flat Barge, Tag Boat and etc.) are not owned at present and there are almost no possible workboats to be rented there. These construction companies have own net-works with neighboring Caribbean countries like St. Martin, Barbados and Trinidad Tobago and procure necessary machineries for construction works choosing the cheapest construction machineries with rental.

With the above, construction machineries which are impossible to procure locally shall procure them from neighboring countries to the utmost extent and minimize the one from Japan.

3) Labor

It is considered to be possible to cope with general construction works by migrant workers from neighboring countries who are living locally or in Nevis now.

And, on-job training to local engineers by the expert engineer from manufacturer who has technical knowledge for special facility like ice making machine shall be necessary.

(2) Circumstance on Procurement

Construction materials to be produced in Nevis are ready-mixed concrete and block for buildings. There are seven quarries in Nevis Island and aggregate for concrete, rubble foundation, armor stone are procured locally. Ready-mixed concrete plant is premised to use local plant which is blind to transportation time since any company is taking method to mix water weighed in construction site transported by agitator (10 ton and 20 ton) directly injecting cement and aggregate being automatically weighed. Cement, steels including reinforcing bars and general building materials are imported mainly from Trinidad Tobago and USA (Miami), Barbados, Brazil, Bermuda and others.

1) Steel

Reinforcing steel bar is used supplied from local supplier (imported from Miami or Caribbean countries). And, steel pipe is procured from Japan since it is not produced locally. Other steel materials shall be procured from Japan.

2) Building Materials

Building materials are possible to procure locally since many of them are available in Nevis however they are expensive due to the import. Therefore, the procurement from the third countries shall be considered. Materials which are difficult to secure its quality and quantity locally and the neighboring countries shall be considered to procure from Japan.

3) Procurement Policy

Materials and equipment to be able to supply locally shall be well studied its quality (test result) and supply capacity (delivery and quantity) and give priority to local procurement as much as possible. Procurement from Japan shall be minimized in view of cost and delivery.

(a) Procurement from Japan

Careful procurement and transportation plan has to be done for the materials from Japan which need the one on order or another process require reasonable period from order to delivery. Construction machineries shall basically be procured locally or from the neighboring countries and minimized the procurement from Japan.

(b) Local Procurement

Procurement for local materials of main stone materials and aggregates shall be decided well considering its producer, quality, delivery capacity and etc.

(c) Cost

Materials and equipment locally procured and from Japan shall be adopted whichever cheaper comparing their costs. In case of procurement from Japan, it is necessary to pay attention to the additions of packing, transportation, insurance and port charges and the tax exemption.

(d) Procured Items

a) Construction Materials

Procurement sources are shown at Table-2.2.4(1).

Table-2.2.4(1) Procurement Source of Main Construction Materials

Construction Material		Procurement Source			Remarks
		Local	Japan	3 rd country	
Civil	Ready-mixed concrete	o			
	Reinforcing steel bars	o			
	Steel pipe pile and Steel material		o		Quality, Heavy duty coating
	Stone material	o			
	Material for reclamation	o			
	Material for forming	o			
	Accessories for Jetty		o		Easy procurement
Building	Ready-mixed concrete	o			
	Reinforcing steel bars	o			
	Material for form and woods	o			
	Concrete blocks	o			
	Fabricated Steel		o		Quality
	Fittings	o			
	Roofing Materials		o		Quality
	Paints	o			
	Tiles	o			
	Electricity	Cable	o		
Conduits		o			
Lighting apparatus		o			
Plumbing	Piping Materials	o			
	Septic Tank		o		Quality
	Sanitary Fittings	o			
	Air Conditioner	o			
Ice	Ice making machine		o		Quality

b) Construction Machinery

Table-2.2.4(2) shows procurement sources of construction machineries.

Table-2.2.4(2) Procurement Sources of Main Construction Machineries

Construction Machineries	Procurement Source			Remark
	Local	Japan	3 rd country	
Bulldozer(15t class)	o			
Backhoe (0.2 - 1.0m ³)	o			
Clamshell(0.8m ³)	o			
Dump Truck (10t)	o			
Crawler Crane(35-40t lifting)	o			Neighboring Countries
Crawler Crane (50t lifting)	o			Neighboring Countries
Rough Terrain Crane (16t lifting)	o			
Rough Terrain Crane (25t lifting)	o			
Hydraulic Hammer (10t)	o			Neighboring Countries
Vibratory Hammer (60 kw)	o			Neighboring Countries
Large Scale Breaker (1,300 kg)	o			
Road Roller	o			
Tamper (Vibration Rammer)	o			
Agitator Truck (20t)	o			
Generator (150 KVA)	o			Neighboring Countries
Welding Machine	o			
Boat for Divers (70ps)	o			Neighboring Countries

(3) Tax Exemption

Tax exemption has been confirmed by the letter from Ministry of Finance, Statistic and Economic Planning, NIA concerning imported materials and equipment and overseas and domestic sub contractors with this project. However all the companies (including Japanese Construction Company) which wish tax exemption are required company registration (registration fee is EC\$ 500) to Revenue Authority.

2-2-4-7 Operational Guidance Plan

Since Operational Guidance Plan is not included in the procurement of the equipment, Operational Guidance Plan is not included in the Project.

2-2-4-8 Soft Component (Technical Assistance) Plan

After this project will be implemented it will be possible that fishermen can sell fishes caught directly to consumers or sell fresh fishes to New Fisheries Center. However, in the existing Fisheries Center is,

- 1) There is a little volume of fresh fishes sales and the fishermen do not utilize sales table for fresh fishes at all.
- 2) Consumers are reluctant to get in the sales booth since the entrance is located far away from the road and it is humid due to the bad ventilation and has closed and dark atmosphere.

- 3) The convenience for fishermen and consumers is not good since Saturday that has much landing volume is closed.
- 4) As freezing and cold storage capacity are ran short and there is no financial leeway therefore, enough fishes for processing are not secured.
- 5) With the reasons that it is difficult to sell fresh fishes being preferred by consumers since there is no cold storage facility, it is not functioned.

Therefore, it is inevitable to get the management and operation of the New Fisheries Center started smoothly after completion of facilities.

For the Ministry of Agriculture of NIA that is the implementation organization, this is the first Fisheries Center Japan's Grant Aid Cooperation. Soft Component for the technical transfer of adaptable management and operation plan is executed considering the existing handling system of marine products since NIA has not enough knowledge to manage and operate of Fisheries Center.

The activities shall be the operation and maintenance of the New Fisheries Center as the content and make use of one assistant from the third country (a staff of Fisheries Division in Commonwealth of Dominica which the level of structure and activities of the operation and management organization are relatively well-above out of the Fisheries Centers constructed by Japan's grant aid cooperation in Caribbean countries) and one local assistant (manager of Basseterre Fisheries Center) under the management of the Consultant. Soft Component summary is as shown below.

Table-2.2.4(3) Contents of Soft Component

	Execution period	Contents
First Step	Before completion of facilities	<ul style="list-style-type: none"> *Making out execution plan *Recommendations for necessary administrative support on the facilities operation *Making out 1) list for responsibility and competence of Fisheries Center, 2) revised rules and regulations on use of Fisheries Center(draft).
Second Step	3 months after commencement of operation	<ul style="list-style-type: none"> *Confirming the status of operation and maintenance of the Center and correct the problems *Confirming the contents and operation status of 1) list for responsibility and competence, 2) revised rules and regulations and correct the problems *Education and training on hygienic handling freshness keeping method of marine products to fishermen *Education and training on hygienic processing and sales method and filling in and utilizing method of record for landing volume, fresh fish sales, processing and the sales to the Center staff.
Third Step	6 months after commencement of operation	<ul style="list-style-type: none"> *Confirming the status of corrected problems at th Second Step *Confirming the contents and operation status of 1) list for responsibility and competence, 2) rules and regulations and making out further correction plan and its execution.

The result of activities is confirmed by 1) Recommendations concerning administration support that is necessary for the operation of the New Fisheries Center, 2) Rules and Regulations to use the New Fisheries Center, 3) List for responsibility and competence of the New Fisheries Center, 4) Manual for primary processing, storage and sales, 5) Record for landing volume, fresh fish sales and processing and sales, 6) List of fresh fish purchasing, processing and storing.

Soft Component Plan is shown in Appendix-5

2-2-4-9 Implementation Schedule

Grant Agreement is going to be concluded between JICA and the Government of Saint Christopher and Nevis after concluded the Exchange of Notes (E/N) by both countries when this project is executed by Grant Aid Cooperation of the Government of Japan. Since then, the Government of Saint Christopher and Nevis shall select the Consultant which has Japanese nationality and the design and supervision contract between the Government and the Consultant shall be concluded. Thereafter, through the execution design, making up tender documents, tender, construction contract and construction works, the project shall be completed.

(1) Execution Design Works

After concluded Consultant Service Agreement between the implementing agency of this project in Saint Christopher and Nevis and the Consultant, through the attestation of the contract by JICA, the Consultant shall commence execution design. At that stage, execution design documents, specification, one set of tender documents including drawings and tender procedures shall be made up. During this period, the discussion on the contents of facilities and equipment with the Government of Saint Christopher and Nevis shall be held and the approval on one set of tender documents shall be given at a last stage.

Execution design needs about 3 months period to be completed.

(2) Tender Procedure

A Construction Company (Japanese nationality holder) for this project is going to be decided by tender. The tender takes 2.5 months and performs tender notice, receipt of participation interest, prequalification, delivery of tender documents, execution of tender, evaluation of tender result, award of construction company and construction contract in order.

(3) Construction Work

After conclusion of construction contract, the construction shall be commenced through verification of the contract by JICA. The construction period is estimated considering facilities scale, contents and local construction circumstances and with the premise that any accidental force like hurricane will be occurred as about 19.5 months. After the Exchange of Notes (E/N) is concluded, execution schedule to the completion is as shown at next table.

Table-2.2.4(4) Implementation Schedule

month	1	2	3	4	5	6	7													Remarks	
Execution Design	■		Consultant Agreement and finalization of project contents																		
	▬			Making up tender documents (home work)																	
	■			Approval on tender documents																	
	▨		The Federal Government and the NIA side shall complete EIA for the Project and obtain the Project approval before prequalification for the tender.																		
	▬			Tender (home work)																	Total 5.5 months
month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
Construction Work and Procurement of Equipment	(Production in Japan)		(Transportation)																		Civil Works
	▬		▬																		Production of steel pipe piles and transportation
	▬		Preparation and removal of existing structures																		
	▬			▬															▬		Revetment and land reclamation
	▬							▬													Fishery Jetty
																			▬		Cleaning
																			Building Works		
	▬							▬													Preparation and temporary works
	▬								▬												New Fisheries Center Building
	▬												▬								Work Shop
	▬													▬							Fishing gear lockers
	▬														▬						Storage for large fishing gears and toilet
																			▬		Gazebo
	▬																▬				Septic tank and sewage tank
	▬																	▬			Exterior facilities
																			▬		Cleaning
																			Procurement of Equipment		
	▬												▬								Procurement of Equipment
	▬																▬				Transportation
																		▬		Acceptance inspection and handing over	
																Total 19.5 months					

2- 3 Obligations of Recipient Country

The following is a summary of the obligations of Saint Christopher and Nevis as confirmed in the Minutes of Discussions and other documents during the Preparatory Survey.

- (a) Land acquisition for project site
- (b) Execution of EIA, acquisition of environmental permission and approval of facilities construction
- (c) Security of temporary yard near project site
- (d) Security of dumping area for waste soil generated during construction period
- (e) Utilization of Tourist jetty for fish landing during construction period
- (f) Removal of a power pole near project site
- (g) Removal of existing two fishing gear lockers located back side of project site
- (h) Provision of electricity, water and telephone line to project site
- (i) Installation of fuel supply facility and fire hydrant
- (j) Installation of fence and gate around project site
- (k) Procurement of repair equipment and tools at work shop for repairing outboard engine (work shop building is included in Japan side)
- (l) Planting lawn and its maintenance in exterior area
- (m) Monitoring and countermeasures against secondary consolidation settlement after the completion
- (n) Installation of general furniture and fixtures such as desks and chairs
- (o) Collection and treatment for sewage, rubbish and etc. after completion of facilities
- (p) Security of personnel and budget for maintenance and operation of facilities
- (q) Taking care of sedimentation and erosion generated around civil facilities after the completion
- (r) Exempting taxes and other levies on importation from overseas and procurement in domestic market for the materials and equipment to be used and for the local subcontractors.
- (s) Exempting taxes and other physical levied by Saint Christopher and Nevis on Japanese personnel coming into Saint Christopher and Nevis in order to carry out the verified contracts by the Government of Japan and work relating to the contracts
- (t) Providing the necessary arrangements in terms of entering and residing in the country to Japanese personnel coming into Saint Christopher and Nevis in order to carry out the verified contracts and work relating to the contracts
- (u) Paying the fees for banking arrangements and payment authorizations
- (v) Appropriate and effective use of the facilities constructed through grant aid by the Government of Japan
- (w) Paying all expenses that are necessary to the project and not covered by the grant aid by the Government of Japan

2-4 Project Operation Plan

2-4-1 Operation and Maintenance System

The draft of OPERATION AND MAINTENANCE PLAN was submitted to the study team on 7 September, 2010 from NIA.

Fisheries Advisory Committee: FAC is established composed of representatives from Department of Fisheries, Department of Cooperatives, Air & Sea Ports Authority, Ministry of Agriculture, Lands, Housing, Cooperatives and Fisheries, Cooperatives (Ministry of Agriculture) as the organization to decide activity policy of operation organization and to manage of operation organization periodically in view of strengthening operation and maintenance system of the New Fisheries Center.

The name of Fisheries Development Board (FDB) was written at the time of Minutes of Discussions for the filed survey stage. However, as the name of Fisheries Advisory Committee was written in Fisheries Act (1995), it has been changed.

Member of FAC is consisted as follows,

- 1 Representative from Department of Fisheries : Director
- 1 Representative from Department of Co-operatives : Director
- 2 Representatives from Nevis Fishermen Co-operative Society (Cooperatives):
President & manager
- 1 Representative from Nevis Air & Sea Ports Authority
- 1 Business Development Officer from Ministry of Agriculture
- 1 Representative from Tourism Association
- 1 Representative from Small Enterprise Development Unit
- 1 Representative from Accounting profession

FAC is the ruling body of center operation and maintenance organization and manage the center operation by Cooperatives and a staff from Ministry of Agriculture that is implementation agent joins.

The role of the FAC is as follows,

- *Assist with strategies for smooth operation
- *Advise on dispute settlement strategies between general public and fishermen
- *Policy Advise/Recommendation

2-4-2 Operation and Maintenance Organization

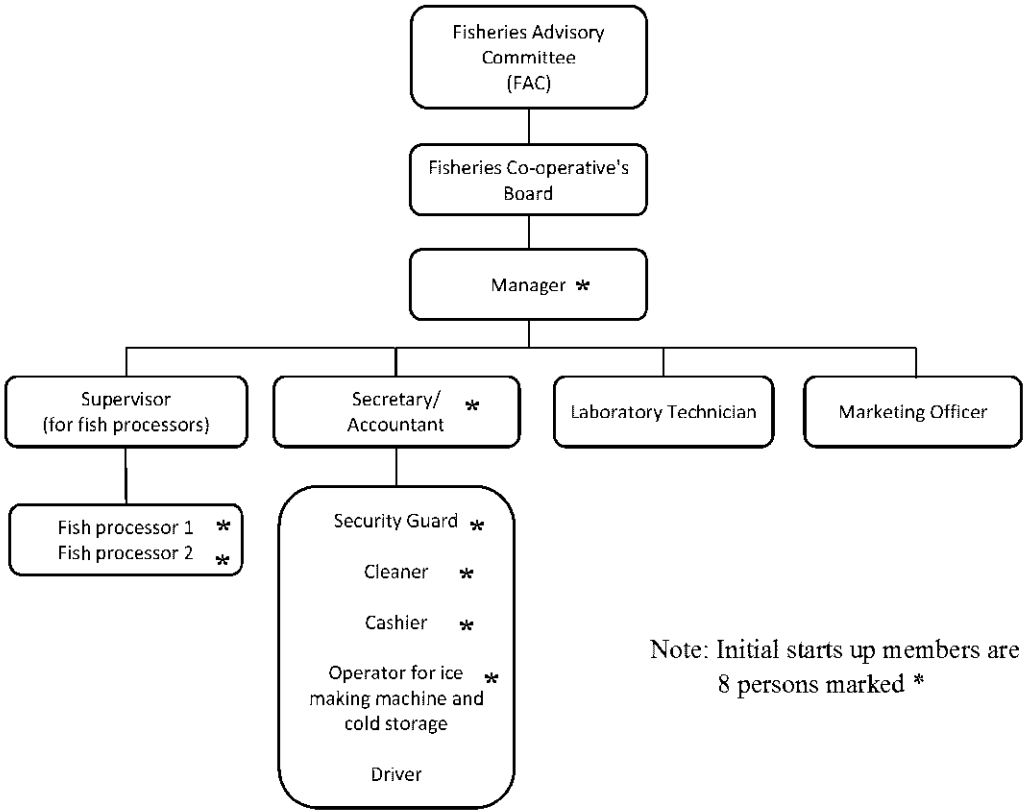
(1) Staff structure and organization chart of Fisheries Center

Operation and Maintenance organization of these project facilities are shown in Figure -2.4.2(1). The management for operation and maintenance of the New Fisheries Center is done by Cooperatives same as the existing Fisheries Center however, it is planned that the cost for electricity and water and staff personnel cost are born by the Government of NIA for the period of the first 2 to 3 years after commencement of the operation. The draft of operation and maintenance management organization chart proposed by Ministry of Agriculture was confirmed as attached in Appendix-4. 12 persons

system as the final operation and maintenance organization shown in Table-2.4.2(1) however, 8 persons (marked *) are planned as starting number of staff.

Table-2.4.2(1) Number of Staff in New Fisheries Center and its job content

Job title	Numbers	Job Content
Manager	1*	General responsive person in the Center
Secretary/Accountant	1*	Manager’s secretary –cum- accounting responsive person
Cashier	1*	Sales for processing fishes and fishing gears
Supervisor (fish processors & fish purchasing)	1	Expert opinion on fresh fishes purchased by the Center and responsive person for fish processor
Fish processors	2*	Person in charge of fish processors
Laboratory technician	1	Quality inspection of fresh fishes and processing fishes
Security Guard	1*	Person in charge of total facility security
Operator for ice making machine and cold storage	1*	Responsive operator for ice making machine and freezer
Cleaner	1*	Cleaning for direct sales booth by fishermen and other facilities including processing room
Driver	1	Driver for the vehicles that the Center own
Marketing Officer	1	Sales person of processed fishes in the Center and the marketing research
Total	12	(8 persons marked * are the starting up member)



Note: Initial starts up members are 8 persons marked *

Figure-2.4.2(1) Organization Chart of New Fisheries Center

2-4-3 Government (NIA) Support

NIA shall be executed the following supports for the operation and maintenance of the New Fisheries Center.

- a) Financial support for the center's staff remunerations
- b) Concessions for the water supply, electricity, and sewage treatment for the Center
- c) Provision of subsidized fuel for fishermen
- d) Provision of reduced price of ice for fishermen
- e) Provision of contracted maintenance for ice making and refrigeration system of the Center
- f) Provision of Technical support

2-4-4 Support by the Government of Japan

Soft component concerning the operation and maintenance of the New Fisheries Center shall be executed by the project. Detailed plan of the Soft Component is described in Appendix-5.

(Soft Component : JICA's scheme for technical assistance)

2-5 Project Cost Estimation

2-5-1 Initial Cost Estimation

The cost borne by the Government of Saint Christopher and Nevis is estimated tentatively. Total cost will be EC\$ 808,100. Details are as follows.

a) Electric power supply to site	EC\$ 1,200	(Approx. 0.04 million J¥)
b) Removal of a power pole near project site	EC\$ 6,000	(Approx. 0.20 million J¥)
c) Water supply to site	EC\$ 4,000	(Approx. 0.14 million J¥)
d) Telephone line to site	EC\$ 4,000	(Approx. 0.14 million J¥)
e) Removal of existing two fishing gear lockers	EC\$ 8,000	(Approx. 0.27 million J¥)
f) Installation of fence and gate around project site	EC\$ 25,000	(Approx. 0.85 million J¥)
g) Procurement of laboratory equipment	EC\$ 6,000	(Approx. 0.20 million J¥)
h) Procurement of equipment for work shop	EC\$ 103,000	(Approx. 3.51 million J¥)
i) Installation of fire hydrant	EC\$ 3,000	(Approx. 0.10 million J¥)
j) Payment for bank commission	EC\$ 29,000	(Approx. 0.99 million J¥)
k) Land acquisition	EC\$ 563,000	(Approx. 19.16 million J¥)
l) Preparation of TOR for EIA	EC\$ 3,900	(Approx. 0.13 million J¥)
m) Execution of EIA	EC\$ 52,000	(Approx. 1.77 million J¥)
Total	EC\$ 808,100	(Approx. 27.50 million J¥)

2-5-2 Operation and Maintenance Cost

(1) Income

1) User fee for facilities and equipment

Basic rate of facilities and equipment shall refer to the fees which are assumed in the Operation, Maintenance and Management Plan (Draft) by the NIA. User fees for facilities and equipment is shown in Table-2.5.2(1).

Table-2.5.2(1) Setting Up of User Fee for Facilities and Equipment

Facility • Equipment	Fee	Calculation Base of Annual Amount
Work Shop	500 EC\$/month	500 EC\$/month×12 months =6,000 EC\$
Lockers	30 EC\$/month	30 EC\$/month×22 lockers×12 months = 7,920 EC\$
Selling Tables	10 EC\$/week	10 EC\$/week×7 tables×48 weeks = 3,360 EC\$ Assumed that there are 4 weeks in a year which fishing works can not be made during hurricane season and the annual working period of direct sales booth by fishermen is 48 weeks.
Cleaners Tables	5 EC\$/week	5 EC\$/week×4 tables×48 weeks = 980 EC\$
Ice Box	5 EC\$/week	5 EC\$/week×30 boxes×48 weeks= 7,200 EC\$
Boat Trailer	20 EC\$/time	20 EC\$/time×20 times/month×4 months = 1,680 EC\$ Assumed that boat trailer is used 20 times in total per month in 4 months of hurricane season (August to November).

2) Sales of Fish

Purchasing volume of fresh fishes per a day in the New Fisheries Center is 300 lbs assuming as 40% of 750 lbs which is Planned Landing Volume. As the weight after taking guts (10%) makes 270 lbs (300-30=270), the sales price of processed fish shall add 35% of processing fee over 9EC\$/lb of the fresh fish purchasing price in the same manner with the existing Fisheries Center. Assuming annual opening days as 300 days, annual fish sales income is as follows,

$$(300-30) \text{ lbs/day} \times 9 \text{ EC\$/lb} \times 135\% \times 300 \text{ days} = 984,150 \text{ EC\$/year}$$

(Remark: 30 lbs guts of fish shall be subtracted.)

3) Fishing gear selling

Assuming as 10,000EC\$/month from the result of the existing Fisheries Center and add 10% on it as the commission. The income of fishing gear selling is as follows,

$$10,000 \text{ EC\$/month} \times 110\% \times 12 \text{ months} = 132,000 \text{ EC\$/year}$$

4) Ice selling

Assuming that the ice selling price conforms with the one of present flake ice in Basseterre Fisheries Center in St. Kitts Island which is 0.3 EC\$ and daily ice selling volume is 70% of 1,500 kg and annual opening days is 300 days. The annual ice selling income shall be as follows,

$$1,500 \text{ kg/day} \times 1/0.453 \times 0.3 \text{ EC\$/lb} \times 300 \text{ days} \times 70\% = 208,609 \text{ EC\$/year}$$

5) Air compressor for scuba tank

Assuming the 5 usages in a week by 50% of 30 fishermen who are specializing in scuba fishing from the result of hearing survey to Fisheries Department, the air compressor fee shall set 12 EC\$/time which is cheaper than 16 EC\$/time of the private company (G.C. Enterprise) and operating days shall be 48 weeks considering days which can not go fishing during hurricane season. The annual air compressor income shall be as follows,

$$30 \text{ fishermen} \times 50\% \times 5 \text{ times/week} \times 12 \text{ EC\$/time} \times 48 \text{ weeks} = 43,200 \text{ EC\$/year}$$

(2) Expenditures

1) Staff Personnel Cost

Staff personnel cost shall refer to the salary described in Operation, Maintenance and Management Plan (Draft) by NIA.

Table-2.5.2(2) Setting up Staff Salary and Wages

Staff	Salary (EC\$/month)	Numbers	Annual Wage (EC\$)
Manager	4,000	1*	1 no. x 4,000 EC\$/month x 12 months = 48,000
Secretary/Accountant	3,500	1*	1 no. x 3,500 EC\$/month x 12 months = 42,000
Casher	2,500	1*	1 no. x 2,500 EC\$/month x 12 months = 30,000
Supervisor (for fish processors)	2,100	1	Future employment and not booking
Fish Processors	1,500	2*	2 no. x 1,500 EC\$/month x 12 months = 36,000
Laboratory technician	2,500	1	Future employment and not booking
Security guard	1,500	1*	1 no. x 1,500 EC\$/month x 12 months = 18,000
Operator for ice making machine, etc.	2,000	1*	1 no. x 2,000 EC\$/month x 12 months = 24,000
Cleaner	1,500	1*	1 no. x 1,500 EC\$/month x 12 months = 18,000
Driver	1,500	1	Future employment and not booking
Marketing Officer	2,500	1	Future employment and not booking
Total		12	Annual staff wages in total: 216,000 EC\$ (8 staffs marked *)

2) Fish Purchase

Purchasing volume of fresh fishes per a day in the New Fisheries Center is 300 lbs assuming as 40% of 750 lbs which is Planned Landing Volume. The purchasing price of fresh fishes shall be 9 EC\$/lbs in the same manner with the existing Fisheries Center. Assuming annual opening days as 300 days, annual fish purchasing cost is as follows,

$$300 \text{ lbs/day} \times 9 \text{ EC\$/lb} \times 300 \text{ days} = 810,000 \text{ EC\$/year}$$

3) Fishing Gear Purchase

Assuming that the fishing gear purchasing cost from the actual record of the existing Fisheries Center is 10,000 EC\$ per month and the annual purchasing cost is as follows,

$$10,000 \text{ EC\$/month} \times 12 \text{ months} = 120,000 \text{ EC\$/year}$$

4) Insurance for facilities

Annual insurance premium for the facilities is assumed as 0.1 % of the construction cost of buildings from the result of hearing survey of NIA.

$$\text{Cost of building facilities} \times 0.1\% = 10,000 \text{ EC\$/year}$$

5) Maintenance Cost

Annual maintenance cost for the facilities and equipment of the New Fisheries Center shall be assumed as 0.1 % of construction cost and equipment procurement cost.

$$\begin{aligned} & (\text{Construction costs for all facilities} + \text{Equipment procurement cost}) \times 0.1\% \\ & = 18,000 \text{ EC\$/year} \end{aligned}$$

And, as facility maintenance cost of ice making machine and freezer

$$1,000 \text{ EC\$} \times 12 \text{ months} = 12,000 \text{ EC\$/year}$$

$$\text{Total } 30,000 \text{ EC\$/year}$$

There are two companies to produce ice cube for shops in Charlestown and three companies are there to be able to maintain ice making machine including air conditioner. These companies are doing maintenance services of facilities in Government related organizations, schools, hospitals and private company offices on a contractual basis.

6) Communication Fee

Annual communication cost (Telephone and Internet) is assumed as 300 EC\$/month from the actual record of the existing Fisheries Center.

$$300 \text{ EC\$/month} \times 12 \text{ months} = 3,600 \text{ EC\$/year}$$

7) Utilities Cost

a) Electricity

Monthly usage of the New Fisheries Center shall be 17,307 KWh totaling all the planned electrical facilities. Annual electric cost using present price structure with 0.50 EC\$/KWh which is good for commercial facilities is as follows,

$$17,307 \text{ KWh/month} \times 0.50 \text{ EC\$/KWh} \times 12 \text{ months} = 103,848 \text{ EC\$/year}$$

b) Water

Monthly water consumption of the New Fisheries Center shall be 184.0 m³ totaling planned water supply facilities. Annual water cost using present price structure with 0.025 EC\$/Gallon is as follows,

$$184.0 \text{ m}^3 \times 220 \text{ gallons/m}^3 \times 0.025 \text{ EC\$/gallon} \times 12 \text{ months} = 12,144 \text{ EC\$/year}$$

c) Garbage collection

Annual garbage collection cost from the present collection fee by the NIA is as follows,

$$15 \text{ EC\$/month} \times 12 \text{ months} = 180 \text{ EC\$/year}$$

d) Sewage treatment

Cleaning cost of sludge in septic tank from the sewage treatment fee of present NIA shall be as follows,

$$1,500 \text{ EC\$/time} \times 3 \text{ times/year} = 4,500 \text{ EC\$/year}$$

8) Other costs

a) Packing materials

This is the material costs such as seals for vacuum pack of processed fishes or trays and assumed as follows,

$$\text{EC\$}250/\text{month} \times 12 \text{ months} = 3,000 \text{ EC\$/year}$$

b) Advertising

This is the advertising costs such as poster of the New Fisheries Center or advertising literatures and assumed as follows,

$$\text{EC\$}250/\text{month} \times 12 \text{ months} = 3,000 \text{ EC\$/year}$$

c) Transportation

This is the travel costs to attend to training by manager or other staff and monthly conference with the manager of Basseterre Fisheries Center in St. Kitts Island, etc. and assumed as follows,

$$\text{EC\$}500/\text{month} \times 12 \text{ months} = 12,000 \text{ EC\$/year}$$

d) Fuel and Maintenance of Vehicle (not book in the annual plan)

This is the fuel and maintenance fee for refer truck to collect fishes from each landing site in Nevis Island in the future. At the beginning, as the refer truck will not be provided, the cost shall not be booked in the annual balance plan.

$$\text{EC\$}500 \times 3 \text{ times/year} = 1,500 \text{ EC\$/year}$$

e) Other expense

The other costs are referred to the actual expenditures of the existing Fisheries Center.

$$4,000 \text{ EC\$/month} \times 12 \text{ months} = 48,000 \text{ EC\$/year}$$

(3) Ice price cost and Sales price

Ice price cost is consisted of the electricity cost and water cost for ice making machine. The cost of electricity and water to produce 1.5 ton per day is as follows,

a) Electricity

Electricity usage of ice making machine: 139.2 KWh/day

Power rate : 0.50 EC\$/KWh (for commercial facility)

Therefore, daily power cost shall be,

$$139.2 \text{ KWh/day} \times 0.50 \text{ EC\$/KWh} = 69.6 \text{ EC\$/day}$$

b) Water

Water usage of ice making machine : $1.8\text{m}^3/\text{day} \times 1,000 \text{ liter}/4.545 \text{ gallon} = 396 \text{ gallons}$

Water rate : 0.025 EC\$/gallon

Therefore, daily water cost shall be,

$$396 \text{ gallons/day} \times 0.025 \text{ EC\$/gallon} = 9.9 \text{ EC\$/day}$$

c) Ice price cost

From the above a) + b),

$$69.6 + 9.9 = 79.5 \text{ EC\$/day}$$

$$\text{Price cost for 1 kg of ice is } 79.5 \text{ EC\$} \div 1,500\text{kg} = 0.05 \text{ EC\$/kg}$$

d) Ice sales price

As the present ice sales price is 0.3EC\$/lb, the sales price for 1 kg of ice shall be,

$$0.3 \text{ EC\$/lb} \div 0.453\text{kg/lb} = 0.66 \text{ EC\$/kg}$$

(4) Annual Balance

Annual Income and Expenditure Statement Plan of the New Fisheries Center based on the actual result of the existing Fisheries Center is shown in Table-2.5.2(3). Annual Income will be EC\$ 1,395,079 (approx. 47,488 thousand yen), the expenditure will be EC\$ 1,370,272 (approx. 46,644 thousand yen) and EC\$ 24,807 (approx. 844 thousand yen) profit can be expected.

(Exchange rate: 1EC\$ = 34.04 yen)

The income is occupied by fish sales with about 71% and ice sales with about 15% and the expenditure is occupied by fish purchase with about 59% and personnel cost with about 16%. However, it is planned that water and electricity cost and personnel cost (EC\$ 331,992 which is approx. 11,301 thousand Japanese Yen) will be paid by the Government of NIA for the first 2 to 3 years after commencement of the operation same as the existing Fisheries Center. The sum to be paid by the Government of NIA is only a 1.1% of net operating cost EC\$ 28,986,000 (approx. 986,683 thousand Japanese Yen) except the fixed cost of total NIA Government budget of 2011 and it is possible sum to be born. It has been confirmed with Ministry of Agriculture of NIA to indemnify the fund if it is suffered loss by the operation although the operation of the project facilities is to be done on a stand-alone basis.

Table-2.5.2(3) Annual Income and Expenditure Statement

Items	Amount (EC\$)	Breakdown
1. Income (Revenue)		
1.1 User fee for the facilities		
1) Workshop	6,000	500EC\$/month x 12 months = 6,000
2) Lockers	7,920	30EC\$/month x 22 nos x 12 months = 7,920
3) Selling table	3,360	10EC\$/week x 7 tables x 48 weeks = 3,360
4) Cleaning table	960	5EC\$/week x 4 tables x 48 weeks = 960
5) Ice boxes	7,200	5EC\$/week x 30 boxes x 48 weeks = 7,200
6) Boat trailer	1,680	20EC\$/time x 20 times/month x 4 months = 1,680
Sub total	27,120	
1.2 Sale of Fish	984,150	(300-30) lbs/day x 9 EC\$/lb x 135% x 300 days = 984,150 (30 lbs is guts of fish)
1.3 Fishing gear selling	132,000	10,000 EC\$/month x 110% x 12 months = 132,000
1.4 Ice selling	208,609	1,500 kg/day x 1/0.453 x 0.3 EC\$/lb x 300 days x 70% = 208,609
1.5 Air compressor for scuba tank	43,200	30 fishermen x 50% x 5 times/week x 12 EC\$/time x 48 weeks = 43,200
Total Income	1,395,079	
2. Expenditure		
2.1 Personnel cost (Salary and Wages)		
1) Manager	48,000	1person x 4,000 EC\$/month x 12 months = 48,000
2) Secretary/Accountant	42,000	1person x 3,500 EC\$/month x 12 months = 42,000
3) Cashier	30,000	1person x 2,500 EC\$/month x 12 months = 30,000
4) Supervisor (for fish processors)	0	1person x 2,100 EC\$/month x 12 months = 25,200
5) Fish processors	36,000	2persons x 1,500 EC\$/month x 12 months = 36,000
6) Laboratory technician	0	1person x 2,500 EC\$/month x 12 months = 30,000
7) Security guard	18,000	1person x 1,500 EC\$/month x 12 months = 18,000
8) Operator for ice making machine etc	24,000	1person x 2,000 EC\$/month x 12 months = 24,000
9) Cleaner	18,000	1person x 1,500 EC\$/month x 12 months = 18,000
10) Driver	0	1person x 1,500 EC\$/month x 12 months = 18,000
11) Marketing Officer	0	1person x 2,500 EC\$/month x 12 months = 24,000
Sub total	216,000	
2.2 Fish Purchase	810,000	300 lbs/day x 9 EC\$/lb x 300 days = 810,000
2.3 Fishig Gear Purchase	120,000	10,000 EC\$/month x 12 months = 120,000
2.4 Insurance for facilities	10,000	Construction cost of building x 0.1% = 10,000 (For N/A Consideration)
2.5 Maintenance cost	18,000	Construction and equipment cost x 0.1% = 18,000
2.6 Telephone and internet	3,600	300EC\$/month x 12 months = 3,600
2.7 Utilities cost		
1) Electricity	103,848	8,654 EC\$/month x 12 months = 103,848
2) Water	12,144	1,012 EC\$/月 x 12月 = 12,144
3) Garbage collection	180	15 EC\$/month x 12 months = 180
4) Sewage treatment	4,500	1,500 EC\$/time x 3 times/year = 4,500
Sub total	120,672	
2.3 Other costs		
1) Packing Material	3,000	EC\$250/month x 12 months = 3,000
2) Advertising	3,000	EC\$250/month x 12 months = 3,000
3) Transportation	6,000	EC\$500/month x 12 months = 12,000
4) Vehicle(petrol, servicing etc)	0	EC\$500 x 3 times/year
5) General expense/Administration	60,000	5,000 EC\$/month x 12 months = 60,000
Sub total	72,000	
Total Expenditure	1,370,272	
Profit	24,807	

Chapter 3
Project Evaluation

Chapter 3 Project Evaluation

3-1 Preconditions

In order to implement this project under the scheme of Grant Aid Cooperation, it is a mandatory requirement to execute the obligations responsively described in “2-3 Obligations of Recipient Country” upon well understanding the frame-works and regulations of Grant Aid Cooperation by the Government of Japan. Especially, the acquisition of land for the project and the environmental approval shall be significant precondition. Concerning these, implementing agency of the recipient country is now proceeding as follows.

(1) Acquisition of land for the project

Privately-owned area at the project site has been basically agreed to exchange equivalently with the government owned land in the island and it is on the way to change the ownership of registration documents at Legal Office.

(2) Environmental Social Consideration and Development Permission (Building)

It is considered to take about 3 months for the completion of EIA although EIA is going to be proceeded based on the Draft Final Report of Preparatory Survey which will be submitted in this study. The Development Permission shall be applied upon the results of EIA. Study Team has reconfirmed that the approval of EIA and Development Permission shall be completed for sure as the responsibility of the recipient country before the commencement of the Project. The implementing agency is proceeding EIA entering into the contract with a local private consultant.

3-2 Necessary Inputs by Recipient Country

The obligations to be executed by the recipient country to lead and sustain the effect of this project shall be as follows,

(1) Employment of a manager for the New Fisheries Center

Targeting smooth operation and management at the initial stage after starting facility operation of the New Fisheries Center, it is necessary to employ a manager at the latest 2 months before the completion of construction since Soft Component (Technical Assistance) is scheduled at around 1 month before the completion of construction.

(2) Obligations concerning maintenance works for secondary consolidation settlement

Exterior area of building at the project site where is not supported by piles is predicted to have about 15 cm secondary consolidation settlement in 5 years. For maintenance works against this, it is necessary to appoint engineers from Public Works Department of NIA to conduct the monitoring of consolidation settlement.

- 1) Periodical monitoring for the transition of secondary consolidation settlement
- 2) Exchanging movable joint upon necessity after confirming the influence to piping by consolidation settlement.

- 3) Confirming the convergence of secondary consolidation settlement comparing between calculated long term settlement volume and actual one.
- 4) Treatment such as concrete pavement for exterior area when necessary after the convergence of secondary consolidation settlement.

Concerning technical aspects on the observation for the volume of consolidation settlement, a Japanese contractor is going to transfer techniques to engineers of Public Works Department of NIA during construction period.

(3) Stakeholders Meeting

There were keen discussion on the operation policy of the facilities in the stakeholders meeting held at the time of Draft Final Report Explanation and it was attracted a lot of attention on the matter by fishermen. Concerning the operation of facilities, as the Soft Component is scheduled during construction period, the importance to set out the facility operation policy shall be fully understood by an expert (a fisheries officer is to be dispatched from Fisheries Division of Commonwealth of Dominica). It is necessary to have enough chances for the consensus formation with fishermen.

(4) Inducement of subsidy system to fishermen for fuel

The reason why fishermen do not use the existing Fisheries Center is less merit for fishermen even if sell fish-catch to the center. Therefore, the inducement of subsidy system to fishermen for fuel by the Government of NIA should be studied aiming the promotion of utilization of the New Fisheries Center and the promotion of organizational and cooperative activities of fishermen by selling fishing boat fuel to the members of Cooperatives with cheaper price being supplied by the New Fisheries Center.

3-3 Important Assumption

The external conditions to lead and sustain the project effects are as follows.

- 1) Unforeseen natural calamity shall not be occurred.
- 2) Loss of marine resources by large scale climate change shall be minor.

3-4 Project Evaluation

3-4-1 Relevance

This project is considered to be relevant as the project under the scheme of Grant Aid Cooperation with the following reasons.

(1) Coherence with National Development Plan

This project is within the scope of National Development Plan of the Saint Christopher and Nevis and conducive to the fisheries industry and greatly contribute to the artisanal fisheries by the implementation of this project in Nevis Island where modern landing site does not exist.

(2) Beneficiaries

Direct beneficiaries by this project in Nevis Island are about 300 fishermen. As the freshness of fishes can be improved and the harvest loss can be reduced by using ice for operation and distribution, it leads to the increase of income and employment opportunity for fishermen. And, the indirect beneficiaries are 12 thousand people in Nevis Island and 38 thousand people in St. Kitts Island who are the consumers and fresh marine products are stably supplied.

(3) Improvement of Fish Landing, Sales and Distribution

Safe landing facilities and hygienic fisheries center shall be constructed and the work environment of fishermen shall be improved in addition to the promotion of sales and distribution status in Nevis Island by this project. With the result, highly fresh marine products are stably provided for the people and tourism industry in Nevis Island.

(4) Operation and Maintenance

The implementing agency is Ministry of Agriculture, Lands, Housing, Co-operatives and Fisheries, NIA. This is the first project to construct the New Fisheries Center under the scheme of Japanese Grant Aid Cooperation for the organization and promote operation and maintenance capabilities by the Soft Component for the proper operation and maintenance of the New Fisheries Center.

(5) Environmental Social Consideration

There is almost no adverse influence on environmental social aspects by the implementation of this project.

3-4-2 Effectiveness

Expected effects by the implementation of this project are considered to be as follows.

(1) Quantitative Effects

Table-3.4(1) Index of Quantitative Effects

Index	Reference Value (2010)	Target Value (2016) [3 years after completion]
Annual fresh fish handling volume at New Fisheries Center	5.5 ton	102 ton
Annual ice sales volume at New Fisheries Center	3 ton	315 ton

[Basis of Index Figures]

1) Annual handling volume of fresh fishes in the New Fisheries Center

Standard Value: 5.5 ton which is from actual value of fish handling volume of the existing Fisheries Center in 2010.

Target Value: With 340 kg (750 lbs) which is the design landing volume per day is put into Direct Sales Booth by Fishermen and Fish Processing Room,
 $340 \text{ kg} \times 300 \text{ days/year} = 102,000 \text{ kg} (102 \text{ ton})$
65 days out of 365 days are regarded as closing days for fishing like impossible days for fishing by hurricanes or Christmas holiday.

2) Annual ice supply volume in the New Fisheries Center

Standard Value: With EC\$4,436.30 which is from actual ice sales value and the sales price EC\$6.00 per 9 lbs of the existing Fisheries Center in 2010
 $EC\$4,436.30 \div 6EC\$ \times 9 \text{ lbs} \times 0.453 \text{ kg/lb} = 3,014 \text{ kg} (3 \text{ ton})$

Target Value: With 1.5 ton ice making capacity per day,
 $1.5 \text{ ton} \times 300 \text{ days/year} \times 70\% = 315 \text{ ton}$
65 days out of 365 days are regarded as closing days for fishing like impossible days for fishing by hurricanes or Christmas holiday.
The operation rate makes as 70 %.

(2) Qualitative Effects

- (a) Stable supply of fresh fish shall be possible by the construction of New Fisheries Center.
- (b) Safe landing of fish catch shall be possible and the efficiency of fishing preparation shall be improved by the construction of Fishery Jetty.
- (c) Freshness of fish catch at the time of distribution shall be improved by the installation of ice making machine and storage facility.
- (d) Fishes caught can be sold by fishermen under the hygienic circumstances by the provision of Direct Sales Booth by Fishermen.
- (e) With the mutually complementary relationship between the New Fisheries Center and Basseterre Fisheries Center, more stable and hygienic supply of fishes shall be possible than now and it leads to the decrease of import volume of marine products in total Saint Christopher and Nevis.
- (f) Stable and safe supply of fresh fishes shall be possible for the annual 121 thousand tourists (as of 2008) to visit Saint Christopher and Nevis which main industry is tourism and hotels and restaurants.

(3) Beneficiaries by this project

Beneficiaries by this project are considered to be as follows.

1) Direct Beneficiary

About 300 fishermen in Nevis Island

2) Indirect Beneficiary

About 12 thousand residents in Nevis Island and 38 thousand residents in St. Kitts Island

With the above, the relevance of implementation of this project is very high and the effectiveness is considered to be expected.

(Appendices)

Appendix-1 Member List of the Study Team

(1) Field Survey

[Official Member]

Name	Assignment	Organization
Mr. Shunji SUGIYAMA	Team Leader	Senior Advisor(Fisheries sector), Japan International Cooperation Agency (JICA)
Mr. Masanosuke SAKAKI	Project Coordinator	Program Officer Field Crop Based Farming Area Division I Field Crop Based Farming Area Group Rural Development Department Japan International Cooperation Agency (JICA)

[Consultant Member]

Name	Assignment	Organization
Mr. Hitoshi TAKEMOTO	Chief Consultant, Operation & Management / Environmental and social considerations I	ECOH CORPORATION
Mr. Michio TORII	Fisheries Marketing Engineering	ECOH CORPORATION
Mr. Kenji KUROKI	Civil Engineering for Port and Harbor / Natural Condition Survey / Environmental and social considerations II	ECOH CORPORATION
Mr. Takeyoshi HANADA	Construction Plan	ECOH CORPORATION
Mr. Shuji SAKAI	Construction & Procurement planning / Cost estimation	ECOH CORPORATION

(2) Additional Field Survey

[Official Member]

Name	Assignment	Organization
Mr. Shunji SUGIYAMA	Team Leader	Senior Advisor(Fisheries sector), Japan International Cooperation Agency (JICA)

[Consultant Member]

Name	Assignment	Organization
Mr. Hitoshi TAKEMOTO	Chief Consultant, Operation & Management / Environmental and social considerations	ECOH CORPORATION

(3) Explanation of Draft Final Report**[Official Member]**

Name	Assignment	Organization
Mr. Shunji SUGIYAMA	Team Leader	Senior Advisor(Fisheries sector), Japan International Cooperation Agency (JICA)
Mr. Nariaki MIKUNI	Project Coordinator	Senior Fisheries Expert, Latin America and the Caribbean Department Japan International Cooperation Agency (JICA)

[Consultant Member]

Name	Assignment	Organization
Mr. Hitoshi TAKEMOTO	Chief Consultant/Operation & Management	ECOH CORPORATION
Mr. Takeyoshi HANADA	Construction Plan	ECOH CORPORATION

Appendix-2 Survey Schedule

(1) Field Survey

Survey Schedule

Date	Time	Official Members			Consultant Members			Mr. Saka	
		JICA (a) Mr. Sugiyama Team Leader	JICA (b) Mr. Sakaki Project Coordinator	Mr. Takemoto Chief Consultant	Mr. Torii Fisheries Marketing/Engineering	Mr. Kuraki Civil Engineering/ Natural Corridor Survey	Mr. Hamada Agricultural Planning		Construction Planning/ Cost estimation
9 AUG Sun		Team Meeting							
10 AUG Mon	●	CO008 NRT(16:35) → NVK(16:30) CO1878 NYK(23:45) → → POS(04:50) Japan's Embassy T&T L338 POS(18:45) → VOB(00:00) L770 VOB(21:10) → ADB(22:20)	CADENDO at 9:30 Courtesy Call to Dr. Daly at 10:00 L1541 NEV(12:30) → ADR(1:30)	CADENDO at 9:30 Courtesy Call to Dr. Daly at 10:00 Meeting with Fisheries Department Field Survey	AA2289 MA(10:45) → SKB(13:50) St Kitts → Nevis Team Meeting	CADENDO at 9:30 Courtesy Call to Dr. Daly at 10:00 Meeting with Fisheries Department Field Survey			
11 AUG Tue		Inspection of fisheries facilities in Antigua L1563 ADB(16:25) → DOM(17:05)		Field Survey	Field Survey	Field Survey			
12 AUG Wed		Inspection of fisheries facilities in Dominica L394 DOM(16:20) → ADB(16:00) L394 ADB(16:40) → NEV(17:10)		Field Survey	Field Survey	Field Survey			
13 AUG Thu		Courtesy Call to Dr. Daly at 9:00 Meeting with Fisheries Department Inspection of project site		Field Survey	Field Survey	Field Survey			
14 AUG Fri		Nevis → St Kitts Courtesy Call to Dr. Anthony in Federal Gov. at 9:30 Meeting with Fisheries Department in St Kitts St Kitts → Nevis		Field Survey	Field Survey	Field Survey			
15 AUG Sat		Team Meeting							
16 AUG Sun		Team Meeting	Setting of Weas Measurement Machine Team Meeting	Team Meeting	Setting of Weas Measurement Machine Team Meeting	Team Meeting			
17 AUG Mon		Consultation Meeting with fishermen at Fisheries Department Conference room at 19:00							
18 AUG Tue		Discussion of draft of Minutes of Discussion		Field Survey	Field Survey	Field Survey			
19 AUG Wed		Discussion of draft of Minutes of Discussion		Field Survey	Field Survey	Field Survey			
20 AUG Thu		Signing Minutes of Discussion		Field Survey	Field Survey	Field Survey			
21 AUG Fri		WM315 NEV(09:50) → MAARTIN(10:25) CO874 MAARTIN(18:10) → NYK(17:45)		Steering Committee at Administration Conference room at 9:00 (All related Authorities)					
22 AUG Sat		CO008 NYK(11:00) →		Field Survey	Field Survey	Field Survey	JL082 NRT(17:10) → LAX(11:20), AA252 LAX(14:45) → MIA(22:45)		
23 AUG Sun		NRT(13:55)		Team Meeting			AA2289 MA(10:45) → SKB(13:50) St Kitts → Nevis		
24 AUG Mon				Field Survey	Field Survey	Field Survey	Field Survey		
25 AUG Tue	○			Field Survey	Field Survey	Field Survey	Field Survey		
26 AUG Wed				Field Survey	Field Survey	Field Survey	Field Survey		
27 AUG Thu		Stakeholder Meeting at Red Cross at 19:00 (all stakeholders)							
28 AUG Fri				Field Survey	Field Survey	Field Survey	Field Survey		
29 AUG Sat				Field Survey	Field Survey	Field Survey	Field Survey		
30 AUG Sun				Hurricane EARL		Hurricane EARL			
31 AUG Mon				Hurricane EARL		Hurricane EARL			

Survey Schedule

Date	Time	Official Members		Consultant Members						
		JRO(A)3 Mr. Shoyama Team Leader	JRO(A)1 Mr. Sakaki Project Coordinator	Mr. Takemoto Chief Consultant	Mr. Toni Fisheries Marketing Engineering	Mr. Kuroki Chief Engineer/ Natural Condition Survey	Mr. Hanada Architectural Planning	Mr. Sakai Construction Planning/ Sanitation		
32	31 AUG Tue									
33	1 SEP Wed									
34	2 SEP Thu									
35	3 SEP Fri									
36	4 SEP Sat									
37	5 SEP Sun									
38	6 SEP Mon									
39	7 SEP Tue									
40	8 SEP Wed									
41	9 SEP Thu									
42	10 SEP Fri									
43	11 SEP Sat									
44	12 SEP Sun									
45	13 SEP Mon									
46	14 SEP Tue									
47	15 SEP Wed									
48	16 SEP Thu									
49	17 SEP Fri									
50	18 SEP Sat									

(2) Additional Field Survey

[Consultant Member (Mr. Hitoshi TAKEMOTO): Chief Consultant]

No.	Date	Activity
1	2011 28 Jan (Fri)	17:15 Tokyo (JL62) → 10:00 Los angels 12:05 Los angels (AA1520)→ 20:05 Miami
2	29 Jan (Sat)	10:55 Miami (AA2299) → 14:50 St. Kitts St. Kitts → Nevis
3	30 Jan (Sun)	Preparation for survey
4	31 Jan (Mon)	Courtesy Call to MAFF of NIA Explanation of Progress Report
5	1 Feb (Tue)	Field Survey
6	2 Feb (Wed)	CPT test
7	3 Feb (Thu)	Field Survey
8	4 Feb (Fri)	Field Survey
9	5 Feb (Sat)	Field Survey
10	6 Feb (Sun)	Field Survey
11	7 Feb (Mon)	Field Survey
12	8 Feb (Tue)	Field Survey
13	9 Feb (Wed)	Field Survey
14	10 Feb (Thu)	Field Survey
15	11 Feb (Fri)	Field Survey
16	12 Feb (Sat)	Field Survey
17	13 Feb (Sun)	Field Survey
18	14 Feb (Mon)	Field Survey
19	15 Feb (Tue)	Field Survey
20	16 Feb (Wed)	Field Survey
21	17 Feb (Thu)	Pre-loading Survey
22	18 Feb (Fri)	Preparation of Boring Investigation
23	19 Feb (Sat)	Boring Investigation BH-4
24	20 Feb (Sun)	Boring Investigation BH-4 and BH-5
25	21 Feb (Mon)	Boring Investigation BH-5
26	22 Feb (Tue)	Stand-by due to swell
27	23 Feb (Wed)	Stand-by due to swell
28	24 Feb (Thu)	Boring Investigation BH-6
29	25 Feb (Fri)	Preparation for marine boring works
30	26 Feb (Sat)	Preparation for marine boring works
31	27 Feb (Sun)	Preparation for marine boring works
32	28 Feb (Mon)	Stand-by due to swell
33	1 Mar (Tue)	Stand-by due to swell
34	2 Mar (Wed)	Boring Investigation BH-3
35	3 Mar (Thu)	Boring Investigation BH-3
36	4 Mar (Fri)	Report to MAFF of NIA
37	5 Mar (Sat)	Nevis → St. Kitts 15:50 St. Kitts(AA2262) → 18:15 Miami(AA1125) → 00:55 Los angels
38	6 Mar (Sun)	11:50 Los angels(JL062) →
39	7 Mar (Mon)	16:55 Tokyo

[Official Member (Mr. Shunji SUGIYAMA): Team Reader]

No.	Date	Activity
1	28 Mar (Mon)	00:35 Tokyo (AF283) → 06:20 Paris 10:50 Paris (AF3510) → 13:35 St. Martin 17:55 St. Maarten (WN357) → 18:30 Nevis
2	29 Mar (Tue)	Discussion with MAFF of NIA for Minutes of Discussion
3	30 Mar (Wed)	Signature for Minutes of Discussions
4	31 Mar (Thu)	07:30 Nevis (AF3510) → 08:10 St. Maarten 16:00 St. Maarten →
5	1 Apr (Fri)	06:10 Paris 11:00 Paris →
6	2 Apr (Sat)	05:45 Tokyo

(3) Explanation of Draft Final Report

No.	Date	Activity	
		Official Member	Consultant Member
		Mr. Shunji SUGIYAMA (Team Reader) Mr. Nariaki MIKUNI (Project Coordinator)	Mr. Hitoshi TAKEMOTO (Chief Consultant) Mr. Takeyoshi HANADA (Construction Plan)
1	16 Jul (Sat)		17:25 Tokyo (JL062) → 22:20 Miami
2	17 Jul (Sun)		11:15 Miami (AA2299) → 14:15 St. Kitts St. Kitts → Nevis
3	18 Jul (Mon)	16:35 Tokyo (CO08) → 16:30 NewArk	Courtesy call on MAFF of NIA Field Survey
4	19 Jul (Tue)	7:51 NewArk (CO874) → 12:05 St. Maarten (WN357) → 19:05 Nevis	Field Survey
5	20 Jul (Wed)	Courtesy call on MoPW of NIA Discussion with Secondary Consolidation Settlement Courtesy call on MAFF of NIA Explanation overview of basic design to Fisheries Department of 「Nevis」 island	
6	21 Jul (Thu)	Discussion on Minute Nevis → St. Kitts Courtesy call on MAFF of Federal Government Discussion on Minute, St. Kitts Island site visit St. Kitts → Nevis Meeting with stakeholders	
7	22 Jul (Fri)	Signing Minute of Discussions Field Survey	
8	23 Jul (Sat)	Nevis → St. Maarten St. Maarten →	Nevis → St. Kitts St. Kitts → Miami → Los angels
9	24 Jul (Sun)	NewArk →	Los angels →
10	25 Jul (Mon)	Tokyo	Tokyo

Appendix-3 List of Parties Concerned in the Recipient Country

[Federal Government of Saint Christopher and Nevis]

Hon. Dr. Timothy Harris	Minister Ministry of International Trade, Commerce, Agriculture, Marine Resources and Consumer Affairs (MICAMC)
Dr. Hermia Morton Anthony	Permanent Secretary Ministry of Housing, Agriculture, Fisheries, Cooperative and Consumer Affairs (MHAFCC)
Mr. Ralph Wilkins	Fisheries Officer Fisheries Department, MHAFCC

[Nevis Island Administration]

Hon. E. Robelto Hector	Minster Ministry of Agriculture, Lands, Housing, Cooperatives and Fisheries (MALHCF)
Mr. Ashley Farrell	Chairman, the Charlestown Waterfront Development Project Committee
Dr. Kelvin Daly	Permanent Secretary Ministry of Agriculture, Lands, Housing, Cooperatives and Fisheries (MALHCF)
Mr. Laurie Lionel Lawrence	Permanent Secretary Ministry of Finance, Statistics and Economic Planning
Mr. Ernie Stapleton	Permanent Secretary Ministry of Communications, Works, Public Utilities, Posts, Physical Planning, Natural Resources and Environment
Mr. E Lemuel Pemberton	Director of Fisheries, Department of Fisheries Ministry of Agriculture, Lands, Housing, Cooperatives and Fisheries (MALHCF)
Mr. Raoul Pemberton	Director, Public Works Department Ministry of Communications, Works, Public Utilities, Posts, Physical Planning, Natural Resources and Environment
Ms. Angela Walters Delpeche	Director, Department of Physical Planning Ministry of Communications, Works, Public Utilities, Post, Physical Planning, Natural Resources and Environment
Ms. Donna Browne	Director, Department of Cooperative Ministry of Agriculture, Lands, Housing, Cooperatives and Fisheries (MALHCF)
Ms. Eren Hanley	Director, Department of Statistics and Economic Planning Ministry of Finance, Statistics and Economic Planning

Ms. Claudia Walwyn	Environmental Planning Officer Ministry of Communications, Works, Public Utilities, Post, Physical Planning, Natural Resources and Environment
Ms. A. Laurel Arthurton	Project Consultant, Economist, Business development Officer Ministry of Agriculture, Lands, Housing, Cooperatives and Fisheries
Ms. Gail Lawrence	Project Officer, Department of Statistics and Economic Planning Ministry of Finance, Statistics and Economic Planning
Ms. Heidi-Lynn Sutton	Legal Department, Senior Legal Counsel,
Mr. Audra Barrett	Chief Operation Officer, NASPA (Nevis Air and Sea Port Authority)

[Ministry Of Agriculture, Lands, Housing & the Environment, Antigua and Barbuda]

Mr. Philmore James	Senior Fisheries Officer, Fisheries Division
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**[Ministry of Environment, Natural Resources Physical Planning and Fisheries
Commonwealth of Dominica]**

Mr. Andrew Y. Magloire	Chief Fisheries Officer, Fisheries Division
Mr. Norman J. Norris	Fisheries Officer, Fisheries Division

[Private Company]

Mr. Garfield Claxton	Manager, G.C. ENTERPRISES
Ms. Melissa Allen	Acting Manager, Nevis Fishermen Marketing and Supply Cooperative Society Limited (NFMSCL)
Mr. Winston Hobson	President, NFMSCL
Mr. Alfred Tyson	Treasurer, NFMSCL
Mr. Arthur Anslyn	Former Director of Fisheries
Mr. Glenville Jeffers	General Manager, St. Kitts Nevis Anguilla Trading and Development Co., Ltd. (TDC)
Mr. Ellis Chaderton	Owner/Director, Scuba Safaris Ltd.
Ms. Janice Hodge	Principal. Caribbean Development and Environmental Consultants, Inc. (CADENCO)
Mr. Gaston Barry	Technician HVAS/R GASSPREE 24 HR SERVICE LTD.

[JICA]

Mr. Kohei Hori	Project Formulation Advisor, JICA Republic of Dominica
Mr. Mitsuhiro Ishida	JICA Expert

Appendix-4 Minutes of Discussions

(1) Field Survey

MINUTE OF DISCUSSIONS
ON
THE PREPARATORY SURVEY (2nd)
ON
THE PROJECT FOR DEVELOPMENT OF A COMMUNITY
FISHERIES CENTRE IN CHARLESTOWN, NEVIS

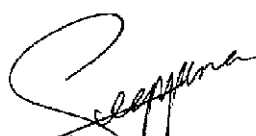
Based on the results of the first preparatory survey, the Government of Japan decided to conduct the second preparatory survey on the Project for development of a community fisheries centre in Charlestown, Nevis (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent to Saint Christopher and Nevis the preparatory survey team (hereinafter referred to as "the Team"), which was headed by Mr. Shunji SUGIYAMA, Senior Advisor, JICA and was scheduled to stay in the country from 1st August to 9th September, 2010.

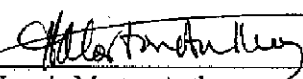
The Team held discussions with the officials concerned of the Government Saint Christopher and Nevis (hereinafter referred to as "Federal Government") and the Nevis Island Administration (hereinafter referred to as "NIA") and conducted field surveys at the Project site.

In the course of the discussions and the field survey, both parties confirmed the main items described in the attached sheets.

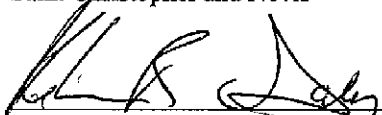
Charlestown, 19th August, 2010



Mr. Shunji SUGIYAMA
Leader
Preliminary Study Team
Japan International Cooperation
Agency (JICA)



Dr. Hermia Morton Anthony
Permanent Secretary
Ministry of International Trade, Industry,
Commerce, Agriculture, Marine
Resources, Consumer Affairs and
Constituency Empowerment
Saint Christopher and Nevis



Dr. Kelvin Daly
Permanent Secretary
Ministry of Agriculture, Lands, Housing,
Co-operatives and Fisheries
Nevis Island Administration

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ATTACHMENT

1. Objective of the Project

The objective of the Project is to improve the efficiency of fishing operations of local fishers, and of marketing/distribution of fishery products through the development of a community fisheries centre in Charlestown.

2. Project Site

The site of the Project is in Charlestown, as shown in Annex-1.

3. Responsible and Implementing Agency

The Responsible agency is the Ministry of International Trade, Industry, Commerce, Agriculture, Marine Resources, Consumer Affairs and Constituency Empowerment of the Federal Government.

The Implementing agency is the Ministry of Agriculture, Lands, Housing, Co-operatives and Fisheries, Nevis Island Administration. The organization chart of the Agency is shown in Annex-2.

4. Items requested by the Federal Government/NIA

After discussions with the Team, the items described in Annex-3 were requested by the Federal Government and the NIA side. JICA will assess the appropriateness of the request and will recommend to the Government of Japan for approval.

5. Japan's Grant Aid Scheme

The Federal Government and the NIA side understood the Japan's Grant Aid Scheme and the necessary measures to be taken by the Federal Government and the NIA side as described in Annex-5 and Annex-6 of the Minutes of Discussions of the first preparatory survey signed on 4th March, 2010.

6. Schedule of the Survey

6-1. The consultant members of the Team will continue their surveys in the country until 9th September, 2010.

6-2. Based on the survey results, JICA will prepare the draft (outline design) report of the Project and dispatch a mission in order to explain its contents in January, 2011.

6-3. Once both side agreed in principle on the contents of the report, JICA will finalize the report and send it to the Federal Government and the NIA before May, 2011.

7. Other Relevant Issues

7.1 Land issues

It was informed that the Cabinet approval on the transfer of the lands at Gallows Bay (Project site) was made on 30th of March, 2010 and the legal procedure to execute the transfer has been initiated. The Federal Government and the NIA side ensure that this process will be completed before the beginning of March 2011. Upon completion of the process, the NIA will report to the JICA Dominican Republic Office.

7.2 Necessary arrangements during the construction period

1) It is envisaged that the existing fisheries jetty will need to be closed in order to facilitate shore protection work. The NIA shall take necessary measures to ensure that local fishers are allowed to use the adjacent passenger jetty as an alternative landing facility.

2) It will be also necessary to prepare a temporary yard and dumping site for the construction work of the Project. The Federal Government and the NIA side shall designate appropriate areas for this purpose in time for the commencement of the Project.

7.3 Environmental and Social Considerations

The Federal Government and the NIA side shall complete the Environmental Impact Assessment (EIA) for the Project and subsequently obtain the project approval from the Department of Physical Planning by the end of February 2011, the progress of which will be report to the JICA Dominican Republic Office.

7.4 Development (Construction) permission

Upon completion of the EIA procedure, the Federal Government and the NIA side shall obtain a construction permit from the Development Authority Committee in time for the commencement of the Project.

7.5 Consensus building among key stakeholders

The Federal Government and the NIA side agreed to exert continued efforts for consensus building among key stakeholders on the Project. It is a common



understanding that the proper consultation with key stakeholders from the designing stage of the Project is a key to successful implementation of the Project.

7.6 Possible impacts of marine facilities

Marine facilities of the Project are aimed at protecting the shoreline from the current rate of erosion. The Team explained, however, that any marine facilities including those of the Project inevitably alter the movement of coastal current, which might result in undesirable sedimentation/erosion. The Federal Government and the NIA side understood the explanation and guarantee to take necessary countermeasures under their responsibility if this should occur.

7.7 Operation and Management (O/M)

1) The Federal Government and the NIA side informed that the operation and management of the new fisheries center will be entrusted to a newly established entity, the Fisheries Development Board under close supervision by the Ministry of Agriculture, Lands, Housing, Co-operatives and Fisheries, NIA. The Board member will include a representative of the Fisheries Department, a representative from the Nevis Fishermen's Marketing and Supply Cooperative Society Limited, and representatives of fishing society (fishing communities). The details of its (tentative) functions and responsibilities will be reported to the Team by 1st of September, 2010.

2) In order to promote smooth operation/management of the center, the Ministry shall consider assistance measures as listed below.

- Financial support for the center's staff remunerations
- Concessions for the water supply, electricity, and sewage treatment for the center
- Provision of subsidized fuel for fishers
- Provision of reduced price of ice for fishers
- Provision of contracted maintenance for refrigeration systems of the center

3) Taking the above mentioned arrangements into consideration, the Federal Government and the NIA side shall submit the O/M plan that includes the income and expenditure projections to the Team by 1st September, 2010.

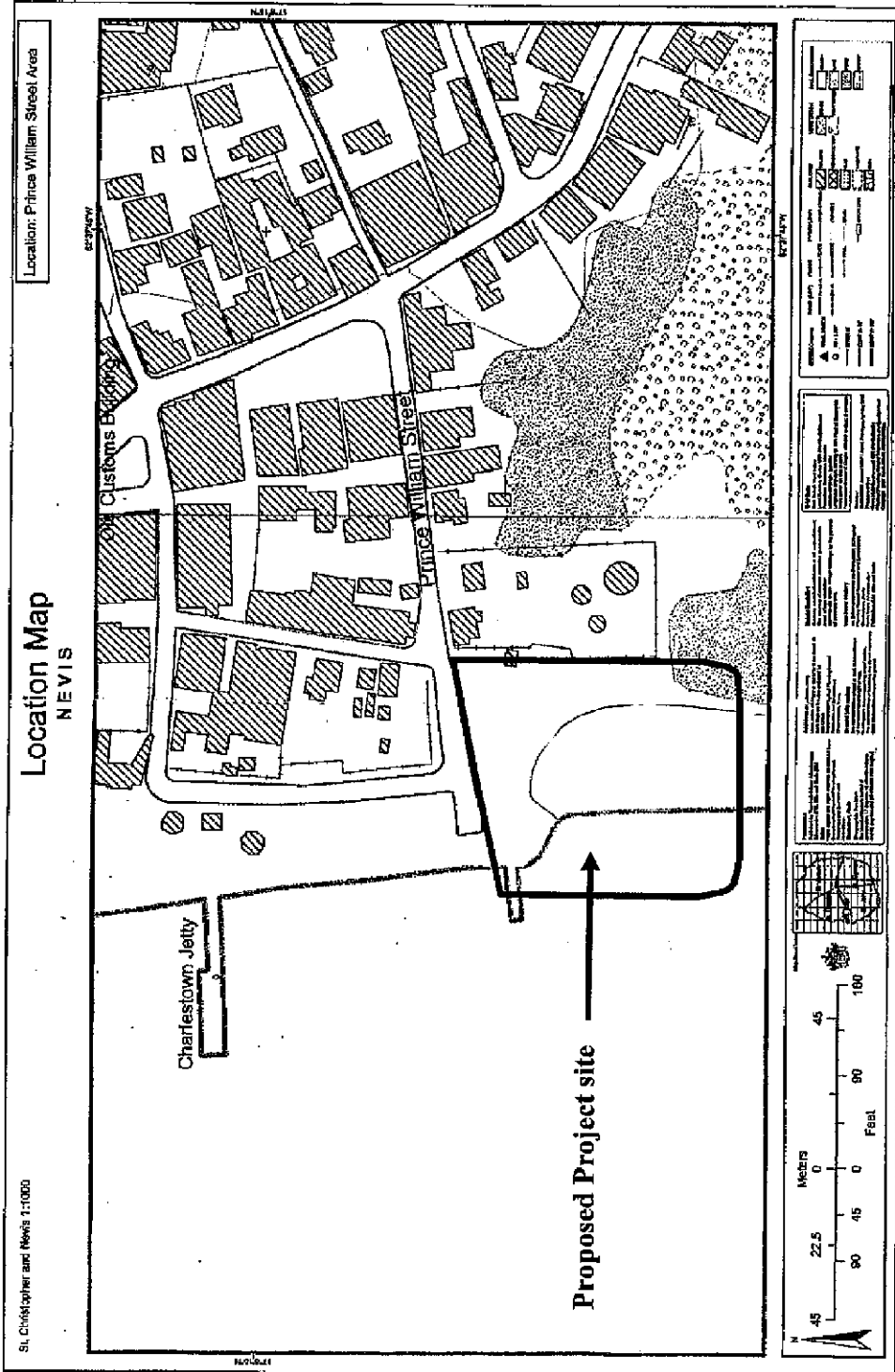
4) In this connection, technical assistance for the operation and management of the new fisheries center has been requested as a soft component of the Project.

ANNEX-1 Project Site

ANNEX-2 Implementing Agency

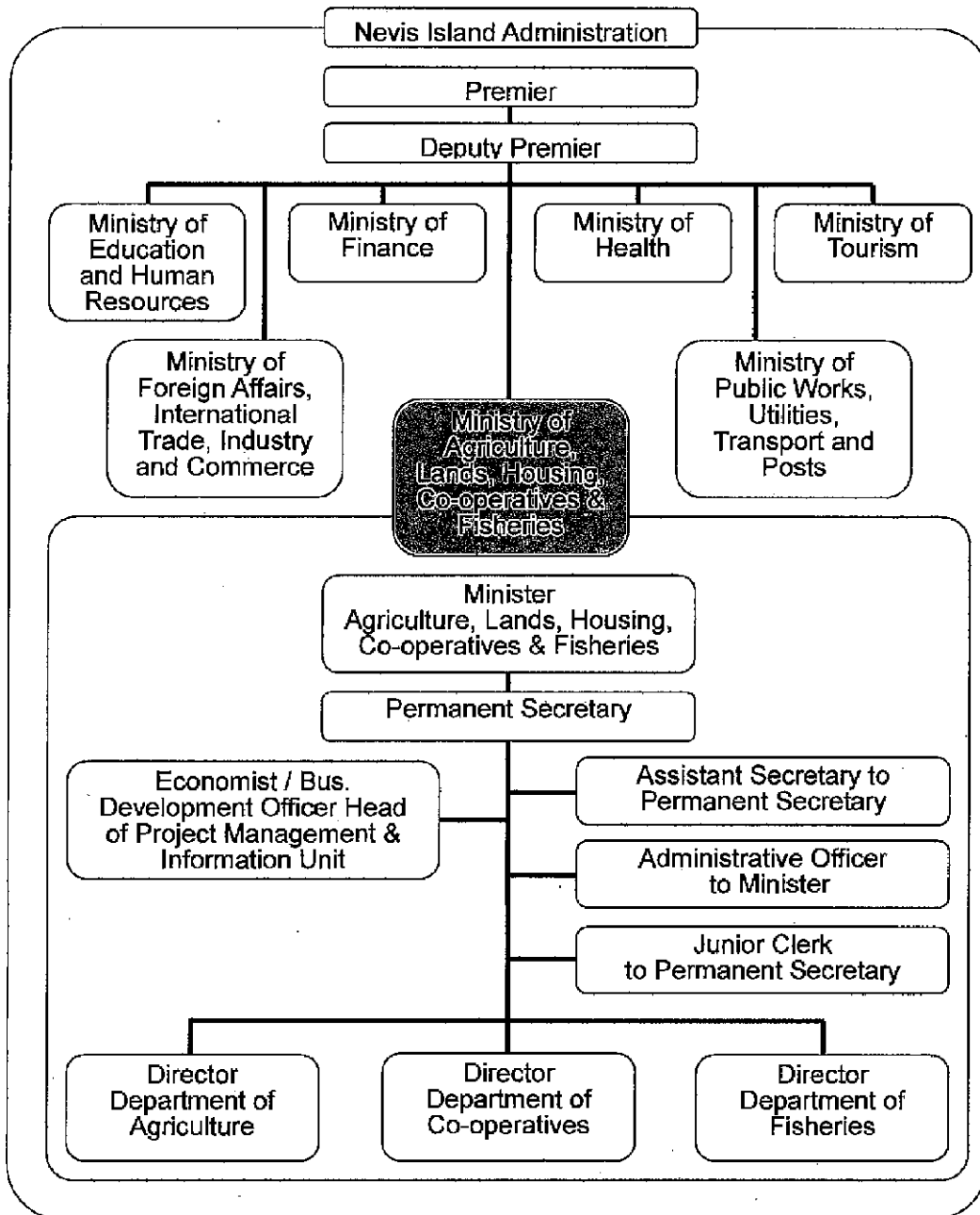
ANNEX-3 Items requested by the Federal Government/NIA

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Organization Chart
Ministry of Agriculture, Lands, Housing, Co-operatives and Fisheries,
Nevis Island Administration



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Items Requested by the Federal Government/NIA

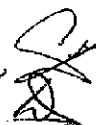
No.	Item	Priority
1	Main fisheries building as New Fisheries Center	
1-1	High hygiene standard fish processing, handling and selling facilities	A
1-2	Cold storage	A
1-3	Administration quarter	A
1-4	Laboratory quarter (wet and dry usage)	B
1-5	Store rooms	A
1-6	Other utility quarters (Air conditioning, etc.)	B
1-7	Ice making unit	A
1-8	Workshop for engine repair and Maintenance	B
1-9	Space for fuel station	A
1-10	Fishing gear shop	A
2	Water tank and related supply system	
2-1	10 ton capacity (cistern type) tank with powered supply pipe, etc.	A
3	Waste treatment installation as sanitary device	
3-1	Holding tank	A
3-2	Drains/Drainage System	A
4	Gear Lockers	
4-1	(8'x8') 27 units	A
5	Equipment	
5-1	Ice boxes (insulated box) @100 litre capacity 30pcs	B
5-2	Lab material assorted as appropriate 1lot	B
5-3	Scales for weighing Large type 2pcs, small type 2pcs	A
5-4	Engine flushing tank 1unit	B
5-5	Emergency generator	A
5-6	Equipment for fish processing	A

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5-7	Air compressor for scuba tank	A
7	Construction of New Fisheries Jetty	
7-1	Fish landing jetty	A
7-2	Mooring fender system and bollards, lighting units and water pipe lines	A
7-3	Navigation light	A
8	Shore protective work as sea defense structure	
8-1	Shore line revetment (approx. 65m long)	A
9	Land reclamation	A
10	Exterior works	
10-1	Car parking lot	A
10-2	Pavement interior the site premises	A
10-4	lighting(security)	A
11	Technical assistance (Soft component)	
11-1	Operation and management of the fisheries center	A

A: Considered essential (First priority)

B: Considered necessary (Second priority)

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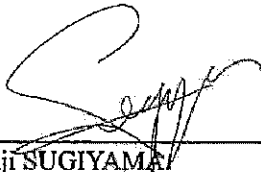
(2) Additional Field Survey

**MINUTE OF DISCUSSIONS
ON
THE ADDITIONAL PREPARATORY SURVEY (2nd)
ON
THE PROJECT FOR DEVELOPMENT OF A COMMUNITY
FISHERIES CENTRE IN CHARLESTOWN, NEVIS**

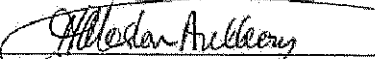
Based on the results of the first preparatory survey on the Project for development of a community fisheries centre in Charlestown, Nevis (hereinafter referred to as "the Project"), the Japan International Cooperation Agency (hereinafter referred to as "JICA") sent an additional survey team (hereinafter referred to as "the Team") to Saint Christopher and Nevis from 28th to 30th March, 2011, which was headed by Mr. Shunji SUGIYAMA, Senior Advisor, JICA..

The survey was aimed mainly at discussing implications of the geological survey results and the Team held a series of discussions with the officials concerned of the Government of Saint Christopher and Nevis (hereinafter referred to as "Federal Government") and the Nevis Island Administration (hereinafter referred to as "NIA"), and both parties confirmed the main items described in the attached sheets.

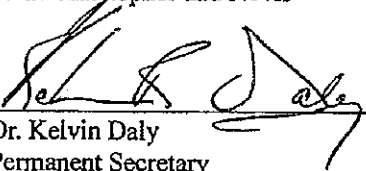
Charlestown, 30th March, 2011



Mr. Shunji SUGIYAMA
Leader
Preliminary Study Team
Japan International Cooperation
Agency (JICA)



Dr. Hermia Morton Anthony
Permanent Secretary
Ministry of International Trade, Industry,
Commerce, Agriculture, Marine
Resources, Consumer Affairs and
Constituency Empowerment
Saint Christopher and Nevis



Dr. Kelvin Daly
Permanent Secretary
Ministry of Agriculture, Lands, Housing,
Co-operatives and Fisheries
Nevis Island Administration

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ATTACHMENT

1. Summary results of geological investigations at the Project site

The Team explained summary results of geological investigations conducted during and after the first preparatory survey, which clearly indicated the presence of peat layers at the Project site. The Federal Government and the NIA side recognized that construction of project buildings and facilities at the site under such geological conditions may cause subsidence in the area.

2. Project Site

Having informed of the fact above, the Federal Government and the NIA side re-examined the selection of the project site and concluded that there was no alternative site that offers better operational environment for the Project. The Federal Government and the NIA side re-affirmed the location of the project site as shown in the Annex-1.

3. Countermeasures for subsidence

The Team briefly explained necessary countermeasures to deal with possible subsidence of the area. The Federal Government and the NIA side basically agreed to bear responsibilities for countermeasures. The details of countermeasures will be elaborated by JICA and to be informed to the Federal Government and the NIA side during the visit of the next mission.



4. Items requested by the Federal Government/NIA

After discussions with the Team, the list of requested items was revised as described in the Annex-2. JICA will assess the appropriateness of the request and will recommend to the Government of Japan for approval.

5. Further schedule of the Survey

5-1. Based on the survey results, JICA will prepare the draft (outline design) report of the Project and dispatch a mission in order to explain its contents in May, 2011. However, there remain some possibilities that the timing of the mission would be changed depending on circumstances of the Japanese side.

5-2. Once both sides agreed in principle on the contents of the report, JICA will finalize the report and send it to the Federal Government and the NIA in due course.

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6. Other Relevant Issues

6.1 Land issues

The Federal Government and the NIA side ensured that the process of land acquisition will be completed before the end of April 2011. Upon completion of the process, the NIA will report it to the JICA Dominican Republic Office.

6.2 Environmental and Social Considerations



The Federal Government and the NIA side shall complete the Environmental Impact Assessment (EIA) for the Project and subsequently obtain the Project approval from the Department of Physical Planning by the mid-May 2011, the progress of which will be reported to the JICA Dominican Republic Office.

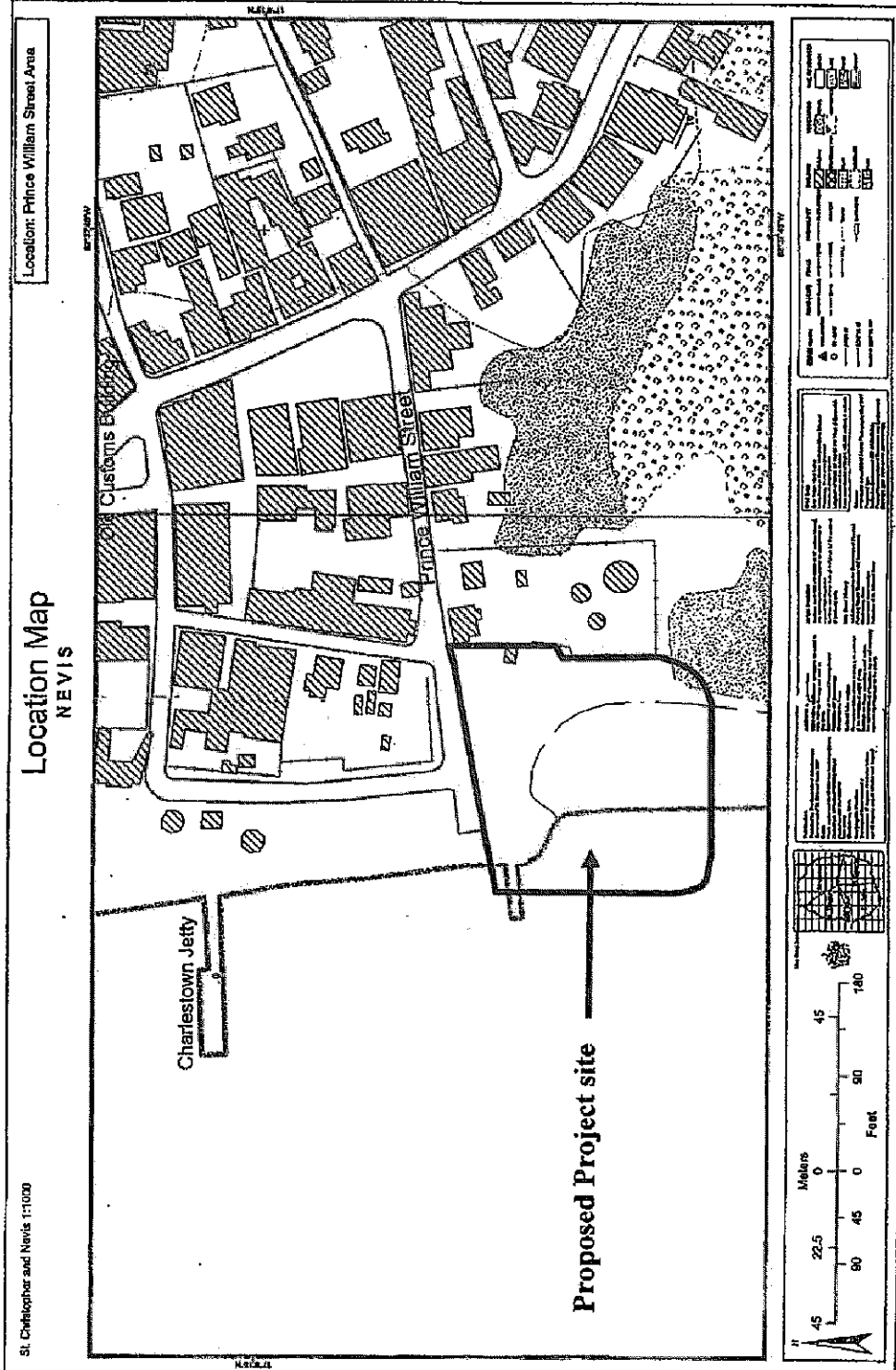
6.3 Consultation with key stakeholders

The Federal Government and the NIA side agreed to inform key stakeholders of the (draft) outline design of the Project once it is drawn and made available to the NIA side. It is desirable that such stakeholder consultation will be held during the visit of the next JICA mission.

ANNEX-1: Project Site

ANNEX-2: List of requested items

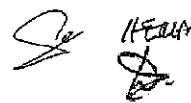
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Items Requested by the Federal Government/NIA


No.	Item	Priority
1	Main fisheries building as New Fisheries Complex	
1-1	High hygiene standard fish processing, handling and selling facilities	A
1-2	Cold storage	A
1-3	Administration quarter	A
1-4	Store rooms	A
1-5	Other utility quarters (Air conditioning, etc.)	B
1-6	Ice making unit	A
1-7	Workshop for engine repair and Maintenance	B
1-8	Space for fuel station	A
1-9	Fishing gear shop	A
2	Water tank and related supply system	
2-1	10 ton capacity (cistern type) tank with powered supply pipe, etc.	A
3	Waste Treatment Installation as sanitary device	
3-1	Holding tank	A
3-2	Drains/Drainage System	A
4	Gear Lockers	
4-1	(2mx2m) 22 units	A
5	Equipment	
5-1	Ice boxes (insulated box) @100 litre capacity 30pcs	B
5-2	Lab material assorted as appropriate 1lot	B
5-3	Scales for weighing Large type 2pcs, small type 2pcs	A
5-4	Engine flushing tank 1unit	B
5-5	Boat Trailer (beaching of boats) 1unit	B
5-6	Emergency generator	A
5-7	Equipment for fish processing (Processing table and packing machines)	A
5-8	Scuba tank recharging compressor	A

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6	Construction of New Fisheries Jetty	
6-1	Fish landing jetty	A
6-2	Complete with mooring fender system and bollards, lighting units and water pipe lines	A
7	Shore Protective Work as Sea Defense Structure 1 lot	
7-1	Shore line revetment (approx. 65m long)	A
8	Land Reclamation	A
9	Exterior Works	
9-1	Car parking lot	A
9-2	Pavement interior the site premises for new complex	A
9-3	lighting(security)	A
10	Training	
10-1	Fisheries complex management	A

A: Considered essential (First priority)

B: Considered necessary (Second priority)

Se HEMA


DIRECTORS:

D. M. MORTON, CHAIRMAN
E. A. KELLY B.A., M.B.A.
N. N. J. JON. B.Sc., M.B.A.
E. A. F. CE. B.A.
J. A. CRAMER
M. R. WALWYN, B.Sc., M.A., D.I.P., LAW
A. P. MERCHANT, B.A.
C. P. STAPLETON, B.Sc., C.P.A.

COMPANY SECRETARY:
W. Z. MOVING, B.Sc.

BANKERS:
FIRST CARIBBEAN INTERNATIONAL BANK
(BARBADOS) LIMITED



TDC NEVIS LTD


REGISTERED OFFICE:
MAIN STREET, CHARLESTOWN, NEVIS, WEST INDIES

P. O. BOX 548
MAIN STREET, CHARLESTOWN
NEVIS, WEST INDIES

TEL: (869) 469-5430
FAX: (869) 465-1329
E-mail: tdcnevis@sisterisles.kn

REF NO. GEN/016/11

11th March 2011

Dr. Kelvin Daly 
Permanent Secretary
Ministry of Agriculture, Lands, Housing and Co-operatives & Fisheries
Prospect Estate
P O Box 644
Nevis

Dear Dr. Daly,

Thank you for your correspondence dated March 3rd 2011


Please be advised that your offer of two (2) acres of land at Belmont Estate in exchange for our two parcels of land (Deed #5704 & #6705) situated at Lower Prince William Street has been accepted.

We wish therefore, to very shortly engage in discussions and if necessary undertake a visit to the Estate so that the exact location of the said two (2) acres being offered can be determined.

Please advise of a time most convenient to you.

Thank you for your usual co-operation.

Very Kind Regards
TDC NEVIS LTD


Ernie A. France
General Manager

/bbf 11-03

(3) Explanation on Draft Final Report

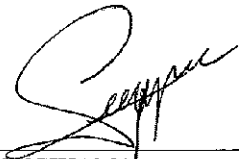
**MINUTE OF DISCUSSIONS
ON
THE PREPARATORY SURVEY
ON
THE PROJECT FOR DEVELOPMENT OF A COMMUNITY FISHERIES
CENTRE IN CHARLESTOWN, NEVIS
(EXPLANATION ON DRAFT FINAL REPORT)**

In August 2010, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched a Preparatory Study Team on the Project for development of a community fisheries centre in Charlestown, Nevis (hereinafter referred to as "the Project") to Saint Christopher and Nevis, and through discussion, field surveys and technical examination of its results in Japan, JICA prepared a draft report of the study.

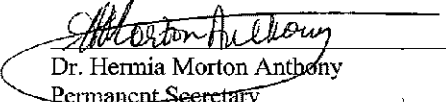
In order to explain and to discuss the components of the draft final report, JICA sent the Draft Final Report Explanation Team (hereinafter referred to as "the Team"), which is headed by Mr. Shunji SUGIYAMA, Senior Advisor of JICA, from 19th July to 23rd July, 2011.

The Team held a series of discussions with the officials concerned of the Government of Saint Christopher and Nevis (hereinafter referred to as "Federal Government") and the Nevis Island Administration (hereinafter referred to as "NIA"), and both parties confirmed the main items described on the attached sheets.

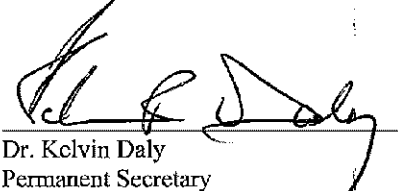
Charlestown, 22nd July, 2011



Mr. Shunji SUGIYAMA
Leader
Preparatory Study Team
Japan International Cooperation
Agency (JICA)



Dr. Hermia Morton Anthony
Permanent Secretary
Ministry of International Trade, Industry,
Commerce, Agriculture, Marine Resources,
Consumer Affairs and Constituency
Empowerment
Saint Christopher and Nevis



Dr. Kelvin Daly
Permanent Secretary
Ministry of Agriculture, Lands, Housing, Co-
operatives and Fisheries
Nevis Island Administration



ATTACHMENT

1. Components of the Draft Report

The Federal Government and the NIA side agreed and accepted in principle the components of the draft final report explained by the Team including obligations of the recipient country, which are mentioned in the Chapter 3 of the draft final report.

2. Japan's Grant Aid Scheme

The Federal Government and the NIA side understood the Japan's Grant Aid Scheme and the necessary measures to be taken by their side as explained by the Team.

3. Schedule of the Study

JICA will complete the final report in accordance with the confirmed items and send it to the Federal Government and the NIA side by the end of October, 2011.

4. Confidentiality of the Project Information

4.1. Specifications of the Facilities and Equipment

Both sides confirmed that all information related to the Project including detailed drawings and specifications of the facilities and equipment and other technical information shall not be released to any outside parties before the signing of all the contracts for the Project.

4.2. Cost Estimation

The Team provided the information on the estimation of the Project cost as described in the ANNEX-1. Both sides agreed that the project cost estimation should never be duplicated or released to any outside parties before signing of all the contracts for the Project. The Federal Government and the NIA side understood that the project cost estimation was not final and was subject to change.

5. Other Relevant Issues

5.1. Acquisition of the land for the project

The NIA side explained that the process of the land acquisition is in the final stage and shall be completed by the end of September 2011. Upon completion of the process, the NIA will report it to the JICA Dominican Republic Office.

5.2. Temporary yard and dumping site

The Team explained that considering the project site's proximity to the main areas of the Charlestown, provision of temporary yard and dumping site for the construction work is



fundamental for smooth implementation of the project. The NIA side confirmed that temporary yard and dumping site for the project will be identified and secured in time for the commencement of the Project.

5.3. Construction permission and environmental/social considerations

The NIA side shall complete the Environmental Impact Assessment (EIA) for the Project and subsequently obtain the Project approval from the Department of Physical Planning before the commencement of the project, the progress of which will be reported to the JICA Dominican Republic Office.

5.4 Stakeholder meeting

The NIA side informed the Team that a meeting was held with representatives of fishers to explain to them the concept and draft outline design of the Project. Fishers expressed their general satisfaction with the project design and willingness to cooperate with the implementation of the Project.

5.5 Countermeasures for the secondary consolidation settlement

The NIA side agreed to bear responsibilities for the following countermeasures against possible secondary consolidation settlement for proper maintenance of the Project facilities.

- 1) Periodical monitoring of the transition of the secondary consolidation settlement - when necessary, the NIA side replaces flexible joints of plumbing pipes.
- 2) Assessment of the completion of the secondary consolidation settlement – this can be done by comparing the calculated volume of long-term consolidation settlement and actual volume of settlement observed.
- 3) Proper treatment of exterior areas (e.g. concrete pavement) upon completion of the secondary consolidation settlement.

It was agreed that the NIA will assign an engineer from the Ministry of Public Works to be in charge of the countermeasures mentioned above.

5.6 Recruitment of personnel for the fisheries centre

The implementation of the Project will require additional staff members of the fisheries centre to be recruited (e.g. manager and ice making machine operator). The NIA side confirmed that recruitment process of these staff members will be completed, at latest, two months before the completion of the construction work. This will enable these new staff members to receive necessary technical guidance and training from the Project.

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Project Cost Estimation

This Page is closed due to the confidentiality.

(2) Project Cost borne by the Federal Government and NIA Side

Project cost borne by the Federal Government and the NIA side is estimated to be EC\$ 808,100. The table below shows the breakdown of the project cost.

Project Cost Borne by the Saint Christopher and Nevis Side

Item	Amount (EC\$)
1) Electric power/water supply and telephone line	9,200
2) Removal of a power pole/existing gear lockers	14,000
3) Installation of fence and gate around the project site	25,000
4) Procurement of laboratory equipment	6,000
5) Procurement of workshop equipment and tools	103,000
6) Installation of fire hydrant	3,000
7) Payment for bank commissions	29,000
8) Land acquisition	563,000
9) Preparation of TOR for EIA	3,900
10) Conduct of EIA	52,000
Total	808,100

(3) Conditions of Estimation

- 1) Date of estimation base September, 2010
- 2) Exchange rate 1.00 US\$ = 90.90 yen (Average of the past 6 months)
 1.00 EC\$ = 34.04 yen (Average of the past 6 months)
- 3) Others Cost estimation is in accordance with the framework of the Japanese Grant Aid Scheme.

Appendix-5 Soft Component (Technical Assistance) Plan

(1) Background for planning Soft Component

Saint Christopher and Nevis is an island country located at the east Caribbean Sea with the population of about 50 thousand, the area of about 262 k m² consisting of two major islands, St. Kitts Island and Nevis Island.

GDP industrial structures in Saint Christopher and Nevis are consisted of 2% of Primary Industry, 21% of Secondary Industry, 77% of Tertiary Industry and the main industry is Travel Industry. Contribution rate of the fishery industry to GDP is only 1.0% however this industry occupies employers (about 14%) next to the travel industry. In addition, the Government aims for the promotion of fishery sector in view of the increase of animal protein supply, the promotion of food self sufficiency ratio and the diversification of economy for the people.

However, since most of fishermen is in the artisanal operation, there are only 7 small size landing sites in Nevis Island without modern facilities like ice making machine and therefore, the deterioration of freshness and the loss after catch are generated. What is worse that as there is no proper jetty, fishermen are enforced unsafe work for fish landing. About 600 ton of marine products are imported from other countries against 540 ton of yearly landing volume and it does not stably satisfy the demand of marine products.

This project aims for stably supplying fresh marine products to Nevis Island people and tourist by improving sales and distribution status of marine products and improving work environment of fishermen. With the above, 1) construction of New Fisheries Center, 2) construction of jetty and revetment, 3) procurement of related equipment are executed.

It will be possible that direct sales of marine products to consumers and fresh fishes to the New Fisheries Center by fishermen with the construction of new jetty and fishermen direct sales booth in the New Fisheries Center. However, as the existing Fisheries Center does not well function due to the problems such as design defects, ageing of facilities and management and operation, it is inevitable to get the management and operation of the New Fisheries Center started smoothly after completion of facilities.

Implementation organization of Nevis Island Administration (NIA) is the Ministry of Agriculture, Lands, Housing, Cooperatives and Fisheries. New Fisheries Center project by Japan's Grant Aid Cooperation is the first experience for the organization and the technical transfer of management and operation plan which is possible to adopt is necessary considering the existing handling system of marine products.

(2) Target of Soft Component

It is the target that NIA can be possible to smoothly manage and operate the New Fisheries Center in Charlestown since the early days of facilities operation by the implementation of Soft Component.

(3) Achievement of Soft Component

Achievement which should achieve at the time of completion of Soft Component is as follows,

(Achievement 1) Information concerning countermeasures and innovations for proper facility operation and promotion of utilization by fishermen in the similar facilities with Charlestown Fisheries Center can be shared and the recommendations can be made concerning government support which is considered to be necessary on facility operation of the New Fisheries Center.

(Achievement 2) Utilization rules and regulations of the New Fisheries Center which sums up operation and maintenance management of the centre shall be made up.

(Achievement 3) List for Responsibility and Competence and the Management Rules and Regulations of the New Fisheries Center which put the responsibility, competence and work in charge to be given for each operator of the New Fisheries Center in the statutory form shall be made up.

(Achievement 4) Manuals for primary processing, storage and sales of marine products shall be made up.

(Achievement 5) Information management system and the record to perceive proper landing volume, fresh fish sales and purchase volume (amount), facility usage fee and etc. which will be necessary to operate the New Fisheries Center and the monitor of utilization status shall be made up.

(Achievement 6) Collaboration with the New Fisheries Center in Nevis Island and the Basseterre Fisheries Center in St. Kitts Island will be made.

(4) Confirmation method of achievement

The method to confirm each achievement above is as follows,

(Achievement 1) To confirm that recommendations is made up concerning the government support which is considered to be necessary for its facility operation in the New Fisheries Center.

(Achievement 2) To confirm that “Operation Management and Activity Plan” and “Utilization Rules and Regulations” of the New Fisheries Center are made up and the operation, maintenance and management of the Centre is executed in accordance with the contents.

(Achievement 3) To confirm that the management and operation in the New Fisheries Center are executed in accordance with the list for Responsibility and Competence and the Management Rules and Regulations.

(Achievement 4) To confirm that the works of primary processing, storage and sales at processing room in the New Fisheries Center are executed in a sanitary manner as per manuals for Primary Processing, Storage and Sales.

(Achievement 5) To confirm that the existing street vendors move to hygienic indoor sales booth by checking the number of fresh fish seller at fishermen direct sales booth and its sales volume in the New Fisheries Center.

And, to confirm that the status of distribution of marine products is improved by checking users of fresh fish, purchasing volume, purchasing amount, users of processed fish, its sales volume and its sales amount at fish processing factory in the New Fisheries Center as per rules.

And, to confirm that the financial status of the New Fisheries Center is analyzed reading monthly settlement of balance and the necessary correspondence is made.

(Achievement 6) To confirm the delivery status of marine products between the New Fisheries Center in Nevis Island and Basseterre Fisheries Center in St. Kitts Island is checked using by the list of fresh fish purchase and processed fish storing.

(5) Soft Component Activity (Input Plan)

Table-A5(1) Soft Component Activity

Achievement 1	Information concerning countermeasures and innovations for proper facility operation and promotion of utilization by fishermen in the similar facilities with Charlestown Fisheries Center can be shared and the recommendations can be made concerning government support which is considered to be necessary on facility operation of the New Fisheries Center.
Activity	<p>*Shearing information concerning the countermeasures and innovations for the operation of similar facilities (Basseterre Fisheries Center, Granted Facilities in the Commonwealth of Dominica) and the utilization promotion for fishermen.</p> <p>*Recommendations for the government support which is considered to be necessary for the facilities operation of the New Fisheries Center shall be sorted out and summed up.</p> <p>*This recommendations shall be consisted of following 6 items. "Rules and Regulations for Fisheries Center Operation", "Work Responsibility for Operation Staff of Fisheries Center", "Primary Processing, Storage and Sales of Marine Products", "Data Collection of Landing Volume, Fresh Fish Sales Volume, Processing and its Sales Volume", "Consideration on Fisheries Center Operation" and "Other Effective Information"</p>
Organization	Direct support by One Japanese Consultant, One third country assistant (Staff of Fisheries Division in Commonwealth of Dominica) and One local assistant (Manager in Basseterre Fisheries Center)
Period	<p>During and after construction of facilities</p> <p>*Staff for organization design (Japanese Consultant, Manager Class) 0.5 man/month x 1 time, 1.0 man/month x 1 time.</p> <p>*Assistant (Third Country, Manager Class) 0.3 man/month x 1 time, 1.0 man/month x 1 time, 0.5 man/month x 1 time</p> <p>*Assistant (Local, Manager Class) 0.1 man/month x 3 times</p>
Result	Recommendations for government support considered to be necessary for the operation of the New Fisheries Center

Achievement 2	“Utilization Rules and Regulations for the New Fisheries Center” which is summed up Operation and Maintenance of the New Fisheries Center shall be made up.
Activity	<p>*”Operation Management/Activity Plan” of the first year studying detailed work contents of the New Fisheries Center thinking of “Recommendations concerning the government support which is considered to be necessary for its facility operation in the New Fisheries Center”.</p> <p>*In accordance with the first year “Operation Management/Activity Plan” the New Fisheries Center shall be operated for 6 months “Utilization Rules and Regulations of the New Fisheries Center” shall be made up on revising necessary articles.</p> <p>*The first year “Operation Management and Activity Plan” shall be reviewed in 3 months and 6 months and revised when necessary.</p>
Organization	Direct support by One Japanese Consultant, One third country assistant (Staff of Fisheries Division in Commonwealth of Dominica) and One local assistant (Manager in Basseterre Fisheries Center)
Period	<p>During and after construction of facilities</p> <p>*Staff for organization design (Japanese Consultant, Manager Class) 0.5 man/month x 1 time, 1.0 man/month x 1 time.</p> <p>*Assistant (Third Country, Manager Class) 0.3 man/month x 1 time, 1.0 man/month x 1 time, 0.5 man/month x 1 time</p> <p>*Assistant (Local, Manager Class) 0.1 man/month x 3 times</p>
Result	Utilization Rules and Regulations of the New Fisheries Center

Achievement 3	List for Responsibility and Competence and the Management Rules and Regulations of the New Fisheries Center which put the responsibility, competence and work in charge to be given for each staff of the New Fisheries Center in the statutory form shall be made up.
Activity	<p>*Responsibility, competence and the work in charge to be given for each staff of the New Fisheries Center shall be sorted out.</p> <p>*TOR which put responsibility, competence and work in charge in the statutory form shall be made up as “The List for Responsibility and Competence”</p>
Organization	Direct support by One Japanese Consultant, One third country assistant (Staff of Fisheries Division in Commonwealth of Dominica) and One local assistant (Manager in Basseterre Fisheries Center)
Period	<p>During and after construction of facilities</p> <p>*Staff for organization design (Japanese Consultant, Manager Class) 0.5 man/month x 1 time, 1.0 man/month x 1 time.</p> <p>*Assistant (Third Country, Manager Class) 0.3 man/month x 1 time, 1.0 man/month x 1 time</p> <p>*Assistant (Local, Manager Class) 0.1 man/month x 3 times</p>
Result	List for Responsibility and Competence of the New Fisheries Center

Achievement 4	Manual for prime processing, storage and the sales of marine products shall be made up.
Activity	Referring to the recommendations concerning the government support which is considered to be necessary for its facility operation in the New Fisheries Center, the manual for .Prime Processing, Storage and Sales of fresh fishes shall be made up. The idea for prime processing, storage and sales of unused fishes which are able to effectively use in Nevis Island shall be written.
Organization	Direct support by One Japanese Consultant, One third country assistant (Staff of Fisheries Division in Commonwealth of Dominica) and One local assistant (Manager in Basseterre Fisheries Center)
Period	During and after construction of facilities *Staff for organization design (Japanese Consultant, Manager Class) 0.5 man/month 1 time, 1.0 man/month x 1 time. *Assistant (Third Country, Manager Class) 0.3 man/month x 1 time, 1.0 man/month x 1 time *Assistant (Local, Manager Class) 0.1 man/month x 3 times
Result	Manual for Prime Processing, Storage and Sales

Achievement 5	Information Management System and the record to perceive proper landing volume, fresh fish sales and purchase volume (amount), facility usage fee and etc. which will be necessary to operate the New Fisheries Center and the monitor of utilization status shall be made up.
Activity	Referring to the recommendations concerning the government support which is considered to be necessary for its facility operation in the New Fisheries Center, the record for landing volume, fresh fish sales volume, processing and the sales volume etc. shall be made up.
Organization	Direct support by One Japanese Consultant, One third country assistant (Staff of Fisheries Division in Commonwealth of Dominica) and One local assistant (Manager in Basseterre Fisheries Center)
Period	During and after construction of facilities *Staff for organization design (Japanese Consultant, Manager Class) 0.5 man/month x 1 time, 1.0 man/month x 1 time. *Assistant (Third Country, Manager Class) 0.3 man/month x 1 time, 1.0 man/month x 1 time, 0.5 man/month x 1 time *Assistant (Local, Manager Class) 0.1 man/month x 3 times
Result	Record for Landing Volume, Fresh Fish Sales Volume, Processing and the Sales Volume etc.

Achievement 6	Collaboration between Basseterre Fisheries Center in St. Kitts Island and the New Fisheries Center shall be made.
Activity	Referring the list of fresh fish purchase and processing and storage of Basseterre Fisheries Center, the list for fresh fish purchase and process & storage shall be made up. The system to use the same list to be able to mutually exchange the data shall be established.
Organization	Direct support by One Japanese Consultant, One third country assistant (Staff of Fisheries Division in Commonwealth of Dominica) and One local assistant (Manager in Basseterre Fisheries Center)
Period	During and after construction of facilities *Staff for organization design (Japanese Consultant, Manager Class) 0.5 man/month x 1 time, 1.0 man/month x 1 time. *Assistant (Third Country, Manager Class) 0.3 man/month x 1 time, 1.0 man/month x 1 time, 0.5 ma/month x 1 time *Assistant (Local, Manager Class) 0.1 man/month x 3 times
Result	List for fresh fish purchase and process and storage

(6) Execution Resource of Soft Component

The Soft Component is executed by 3 persons consisted of one Japanese Consultant, one third country assistant (staff of Fisheries Division in Commonwealth of Dominica where shows high evaluation on its organization for operation and management and its activity out of New Fisheries Center donated by the Government of Japan to Caribbean countries) and one local assistant (Manager of Basseterre Fisheries Center). It is necessary to hire main person in charge from the Consultant who executed preparatory survey in view of achievement effect, efficiency, and the consistency with the basic design thought. It is planned as direct support by the Consultant. A Japanese Consultant is the person to have knowledge on the operation and maintenance of Fisheries Center.

TOR for Japanese Consultant, Third country assistant and Local assistant are as follows,

1) Japanese Consultant (Organization Design)

- a) To make up Execution Plan of Soft Component (Japanese and English)
- b) To make up and sort out Progress Report for Execution Status (Japanese and English)
- c) To make up and sort out Completion Report of Soft Component (Japanese and English)
- d) To sort out the recommendations concerning government support to be considered necessary for the facility operation of the New Fisheries Center and the discussion with NIA and Operation and Management Organization of Fisheries Center.
- e) To make up and sort out the draft of List for Responsibility and Competence and Usage Rules and Regulations.
- f) To make up and sort out the draft of Manual for Primary Processing, Storage and Sales.
- g) To make up and sort out the draft of Record for Landing Volume, Fresh fish sales and Processing and its Sales.
- h) General Management on education and training of fishermen for hygienic handling of marine products and freshness keeping method.
- i) General Management on education and training of staff in the New Fisheries Center for hygienic handling, processing and sales method of fresh fish.
- j) General Management on training of staff in the New Fisheries Center for filling in and using method of record for landing volume, fresh fish sales, processing and its sales.
- k) General Management on training for filling in and using method of list for fresh fish purchase and processing and its sales.
- l) General Management on checking for operation status after 6 months from the start-up of the New Fisheries Center and on the study of countermeasure for going on problem.

2) Third country assistant (Staff in Fisheries Division of Commonwealth of Dominica)

- a) To share the data concerning countermeasures and innovations for facility operation of the similar facilities in Commonwealth of Dominica and utilization promotion for fishermen.
- b) To make up Progress Report for Execution Status (English)
- c) To make up Completion Report of Soft Component (English)
- d) To discuss with NIA and Operation and Management Organization of New Fisheries Center.

- e) To make up the draft of List for Responsibility and Competence and Usage Rules and Regulations.
- f) To make up the draft of Manual for Primary Processing, Storage and Sales.
- g) To make up the draft of Record for Landing Volume, Fresh fish sales and Processing and its Sales.
- h) To educate and train fishermen for hygienic handling of marine products and freshness keeping method.
- i) To educate and train staff in the New Fisheries Center for hygienic handling, processing and sales method of fresh fish.
- j) To train staff in the New Fisheries Center for filling in and using method of record for landing volume, fresh fish sales, processing and its sales.
- k) To train filling in and using method of storing list of fresh fish purchase and processing and its sales.
- l) To check and correct operation status after 3 months from the start-up of the New Fisheries Center and study countermeasure for going on problem.
- m) To check and correct operation status after 6 months from the start-up of the New Fisheries Center and study of countermeasure for going on problem.

3) Local assistant (Manager of Basseterre Fisheries Center)

- a) To share the data concerning countermeasures and innovations for facility operation of the similar facilities and utilization promotion for fishermen.
- b) To make up Progress Report for Execution Status (English)
- c) To make up Completion Report of Soft Component (English)
- d) To discuss with NIA and Operation and Management Organization of New Fisheries Center.
- e) To check the draft of List for Responsibility and Competence and Usage Rules and Regulations.
- f) To check the draft of Manual for Primary Processing, Storage and Sales.
- g) To check the draft of Record for Landing Volume, Fresh fish sales and Processing and its Sales.
- h) To check the draft of storing list of fresh fish purchase and processing and its sales.
- i) To execute collaboration works between the New Fisheries Center and Basseterre Fisheries Center.
- j) To train filling in and using method of storing list of fresh fish purchase and processing.
- k) To check and correct operation status after 3 months from the start-up of the New Fisheries Center and on the study of countermeasure for going on problem.
- l) To check and correct operation status after 6 months from the start-up of the New Fisheries Center and on the study of countermeasure for going on problem.

(7) Execution Schedule of Soft Component

This Soft Component is related with the operation management of the New Fisheries Center and therefore, 0.5 months which is just before the completion, 1.0 month which is three months after handing over the facilities and 1.0 month which is six months after the operation started totaling

three times are executed.

1) Execution Plan

Execution plan is shown below and an execution report shall be submitted.

(a) First Stage

- a) The execution plan is drawn up by the discussion among Fisheries Advisory Committee, Board Meeting of Cooperatives, Staff of New Fisheries Center, Staff of Fisheries Division in Commonwealth of Dominica and Manager of Basseterre Fisheries Center. And the benefit (fuel and ice can be obtained at cheaper price than market by the support of NIA as the example) to utilize the Fisheries Center for fishermen shall be summed up.
- b) (i) List for Responsibility and Competence of Fisheries Center, (ii) Revised rules and regulations on use of Fisheries Center (draft), (iii) Manual for primary processing , storage and sales(draft), (iv) Record for landing volume, fresh fish sales, marine products processing, and its sales (draft) (v) Produce a list for fresh fish purchase and process & storage (draft)
- c) Person in charge : for organization design (Japanese) 0.5 man month
Assistant (third country) 0.3 man month
Assistant (Local) 0.1 man month

(b) Second Stage

- a) Confirming the status of operation and maintenance of the New Fisheries Center and correct the problems by the discussion among Fisheries Advisory Committee, Board Meeting of Cooperatives, Staff of New Fisheries Center, Staff of Fisheries Division in Commonwealth of Dominica and Manager of Basseterre Fisheries Center.
- b) (i) Usage Rules and Regulations of Fisheries Center, (ii) List for responsibility and competence of Fisheries Center, (iii) Manual for primary processing, storage and sales (draft), (iv) Records for landing volume, fresh fish sales, marine products processing, and its sales (draft), (v) Making up a list for fresh fish purchase and process & storage (draft) and these operation status are confirmed and correct the problems.
- c) To educate and train hygienic handling and freshness keeping method of marine products to fishermen.
- d) To educate and train hygienic handling, processing and sales method of purchased fishes to the staff of the New Fisheries Center.
- e) To train methods how to fill in and how to use the record for landing volume, fresh fish sales and processing and the sales to the staff of the New Fisheries Center.
- f) To train how to fill in and how to use the list for fresh fish purchase and process and the storage.
- g) The education and training to fishermen and the staff of the New Fisheries Center shall be done by the third country assistant.
- h) Person in charge : Assistant (third country) 1.0 man month
Assistant (Local) 0.1 man month

(c) Third Stage (Final)

- a) To confirm the corrected problems and in case that the problems are not corrected further correction plan shall be produced and executed by the discussion among Fisheries Advisory Committee, Board Meeting of Cooperatives, Staff of New Fisheries Center, Staff of Fisheries Division in Commonwealth of Dominica and a Manager of Basseterre Fisheries Center.
- b) (i) Usage Rules and Regulations of New Fisheries Center, (ii) List for Responsibility and Competence of New Fisheries Center, (iii) Manual for primary processing , storage and sales (draft), (iv) Record for landing volume, fresh fish sales, marine products processing, and its sales (draft) (v) List for fresh fish purchase and process & storage . And to confirm that the contents and these corrected operation status shall be done,. If not, further revised plan shall be made up and executed.
- c) Summing up activities results
- d) Person in charge : for organization design (Japanese) 1.0 man month
 Assistant (third country) 0.5 man month
 Assistant (local) 0.1 man month

2) Execution Schedule

Table-A5 (2) Execution Schedule

Item	month	Month						
		1	2	3	4	5	6	7
1. Completion of Facilities			▲					
2. Making up execution plan	■							
3. Recommendations for government support on facility operation of the New Fisheries Center	■							
4. Making up usage Rules and Regulations of the New Fisheries Center including detailed rules	■				■			■
5. Making up the List of Responsibility and Competence of the New Fisheries Center	■				■			■
6. Making up the manual for primary processing, storage and sales.	■				■			■
7. Making up record for landing volume, fresh fish sales, processing and its sales etc.	■				■			■
8. Making up list for fresh fish purchasing, processing and storage								■
9. Summing up activities results								■
(Staff)								
Consultant	■							■
Assistant from Third Country	■				■			■
Local Assistant	■				■			■

(8) Achievement results of Soft Component

- a) Recommendations concerning the government support which is considered to be necessary for its facility operation in the New Fisheries Center
- b) Usage Rules & Regulations of the New Fisheries Center
- c) List for Responsibility and Competence of Fisheries Center,
- d) Manual for primary processing, storage and sales
- e) Record for landing volume, fresh fish sales, marine products processing, and its sales
- f) List for fresh fish purchase and process & storage

(9) Obligation of Recipient Country

It is necessary for NIA to make starting up status by the year establishing organization for management and operation of the New Fisheries Center before the implementation of the Soft Component. And during Soft Component execution period, it is required to cooperate for the Japanese Consultant to do a bunch of works related with work shop (holding preparation, supply of holding place, calling for attendant, moderator etc.)

Appendix-6 Other Relevant Data

6-1 Letters from the Recipient Country

(1) Tax Exemption



Nevis Island Administration

Ministry of Finance, Statistics and Economic Planning

Administration Building
Charlestown
Nevis

Tel: (869) 469-5521

Fax: (869) 469-5863

E-mail:

financenevis@niagov.com

August 27, 2010

Mr. Hitoshi Takemoto
Senior General Manager/
Senior Civil Engineer
Ecoh Corporation
International Department
Ueno - Takeuchi Building
2-6-4, Kita-Ueno, Taito-Ku,
Tokyo 110-0014, Japan

Dear Mr. Takemoto,

Please be informed that all of the materials imported for the fisheries project in Nevis, funded by Japanese Aid, will be exempted from all duties and taxes. In addition the foreign contractors and sub-contractors working on the project will be exempted from all business taxes. However, they will be required to register with the Inland Revenue Department and pay the appropriate business license fee.

Best wishes in your endeavors.

Yours Sincerely,


.....


Permanent Secretary
Ministry of Finance

x.c. Deputy Comptroller, Customs Department
Deputy Comptroller, Inland Revenue Department

(2) Approval of Use of Existing Tourist Jetty during Construction Period



NEVIS AIR AND SEA PORTS AUTHORITY

P.O. Box 741, Long Point
Charlestown, Nevis W.I.

August 25, 2010

Mr. E. Lemuel Pemberton
Director of Fisheries
Nevis Island Administration
P. O. Box 644
Prospect Estate
Nevis

Dear Mr. Pemberton

Re: Proposed Fisheries Complex at Gallows Bay, Charlestown

This is to confirm Nevis Air and Sea Ports Authority's (NASPA) authorization for Nevis' fishermen to be accommodated at Charlestown Cruise Pier during the construction of the proposed Fisheries Complex at Gallows Bay. This authorization may be rescinded at any time, and is subject to the terms and conditions of the **International Ship and Port Facility Security Code (ISPS Code)**.

Grateful if you would notify NASPA of the start date at least 30 days in advance. Should you have any questions, please do not hesitate to contact this office.

Sincerely,

Spencer W. Hanley
General Manager

Cc: ECHO Corporation, Tokyo, Japan
Mr. Audra Barrett, Operations Officer - Charlestown
Mr. Everette Mason, Marine Manager
Mr. Arthur Anslyn, Marine Consultant

Main Office:
Phone: 869-469-2001
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Airport
Phone: 869-469-9040
Fax: 869-469-9046

Charlestown Port
Phone: 869-469-0393

Directors: Laurie Lawrence (Chairman)
John Cornelius, Ermine Evebyn,
Calvin Fafie, Wendell Kuggiris
Miguel Mills, Sean Springette
Spencer Hanley - Secretary

(3) Minutes of the Steering Committee

Minutes of the Steering Committee for the proposed new fisheries complex in Charlestown. Held on Friday August 20th 2010, Conference Room Administration Building, Charlestown.

The meeting commenced at about 9:30 am with eight persons present along with Japan International Cooperation Agency (Jica) officials and a representative from Ecoh Corporation, the consultants for the project. The members of the steering committee are Cardlous Walters and Cartwright Farrell of the Nevis Electricity Company (Nevlec), George Morris of the Nevis Water Department, Kelvin Daly of the Ministry of Agriculture, Lands, Housing, Cooperatives and Fisheries, Ernie Stapleton of the Ministry of Communications et al, Raoul Pemberton of the Public Works Department (PWD), Rene Walters of the Department of Physical Planning, Natural Resources and Environment (DPPNRE) and Lemuel Pemberton of the Department of Fisheries. All above named members of the Committee were present.

Mr. Daly welcomed all persons to the meeting. Takemoto san introduced the Japanese delegation while Mr. Daly introduced the members of the steering committee. Dr. Daly gave an outline of the project components indicating that the present fishermen's' jetty will be removed and a longer one built. He indicated that the drainage in the area will be revamped and stated that a fuel depot was a part of the project. Takemoto san wanted to know the details of the water connection as well as the electricity connection. Messrs Morris and Farrel stated that once the projected consumption of water and electricity were known then both utility entities would accommodate them. A number of questions were asked regarding access to the beach. Attendees were assured that public access to the beach would remain uninhibited.

Jica officials showed slides of different fisheries facilities built by the Japanese in the Caribbean and Africa. Persons at the meeting appeared to favour the Gouyave, Grenada facility. It was agreed that the Nevis facility would be of a similar design. Mr. Stapleton wanted to know what the next step would be. He was told that Ecoh Corporation would go back to Japan and that the project will go before the Japanese Cabinet in April of 2011 for approval. Following this, an agreement or exchange of notes would be signed. At present the project is at the study stage. Later in 2011 (between September and November) the Japanese government and the contractors will sign an agreement after tenders have been received for the project. Construction is scheduled to start in January of 2012 and the project should be concluded in March 2013. Takemoto san opined that after January 2011 minor changes could be made. Ishida san mentioned that the main components of the project have already been decided and that only minor changes could be made after January 2011. Ecoh Corporation will hold further discussions with the steering committee before returning to Japan.

Takemoto san asked whether duty free concession would be given on materials brought in for the project by the construction company. He was assured that duty free concession on such material would be given.

George Morris asked whether the provision of a fishing vessel was part of the project. He was told that such a vessel was not one of the project components. Dr. Daly requested that in the next meeting plans for the water tanks, sewage disposal system and the proposed new jetty be included in the Power Point

Presentation by the Japanese delegation.. The meeting ended at about 11:00 am with Dr. Daly thanking all for attending the meeting.

DRAFT

OPERATION AND MAINTENANCE PLAN

FOR

NEW FISHERIES CENTRE, CHARLESTOWN, NEVIS

ST. KITTS & NEVIS

PRESENTED BY

MINISTRY OF AGRICULTURE, NEVIS ISLAND ADMINISTRATION

AND

**THE NEVIS FISHERMEN MARKETING & SUPPLIES COOPERATIVE
SOCIETY'S BOARD OF DIRECTORS**

SEPTEMBER 07, 2010

1



Operation and Maintenance Plan for the New Fisheries Centre, Charlestown, Nevis

1. BACKGROUND

The Government's overall administrative goal, in accordance with this development platform, is to stimulate artisanal fisheries development in a sustainable manner in order to attain broader economic and nutritional benefits for the population and improve balance of payments through reduced fish imports. In addition, it seeks to enhance the management of the fisheries sector in order to develop and increase the potential of marine living resources to meet human nutritional needs, as well as social, economic, and development goals.

1. Increasing incomes and returns to fishermen and other members of the fishing communities;
2. Increasing output, and therefore fish protein supplies to the population;
3. Improving the processing and marketing capacity;
4. Developing fisheries in sustainable manner through the application of a sound management scheme for the marine resources;
5. Reduction in post-harvest losses;
6. Increasing incomes of the people involved in the fishing industry;
7. Increasing productivity of the artisanal fishermen;
8. Increasing the supply of fish to the domestic market;
9. Assisting with the achievement of surplus for export which result in foreign exchange earnings;
10. Increasing employment in the sector; and
11. Providing better quality fish on the local market;

The project proposed seeks to make provision for the necessary infrastructure which will help to solve some of the operational difficulties that currently hamper fisheries sector, such as:

- Ice making and storage plant;
- Berthing facilities or sheltered waters;
- Improved storage and retailing facilities;
- Fishing center to counteract the inefficiencies in dispersed activity;
- Quality products assurance system;
- Advanced hygiene fish processing and marketing infrastructure in the primary fishing base and supply to rural areas;
- Reduce food poisoning from bad storage and fish poisoning (ciguatera) from the harvesting of fish beyond the island shelf;
- Cold storage transportation of fish from landing sites island-wide to Fisheries Complex in Charlestown; and
- A central location for fiberglass boat repairs and engine repairs and maintenance

2. OUTLINE OF THE PROJECT

(1) Objective of the Project

The objective of the Project is to improve the efficiency of fishing operations of local fishers, and of marketing/distribution of fishery products through the development of a community fisheries centre in Charlestown.

(2) Items requested by the Federal Government/NIA

After discussions with the Team, the items described in Table-1 were requested by the Federal Government and the NIA side. JICA will assess the appropriateness of the request and will recommend to the Government of Japan for approval.

Table-1 Items Requested by the Federal Government/NIA

No.	Item	Priority
1	Main fisheries building as New Fisheries Center	
1-1	High hygiene standard fish processing, handling and selling facilities	A
1-2	Cold storage	A
1-3	Administration quarter	A
1-4	Laboratory quarter (wet and dry usage)	B
1-5	Store rooms	A
1-6	Other utility quarters (Air conditioning, etc.)	B
1-7	Ice making unit	A
1-8	Workshop for engine repair and Maintenance	B
1-9	Space for fuel station	A
1-10	Fishing gear shop	A
2	Water tank and related supply system	
2-1	10 ton capacity (cistern type) tank with powered supply pipe, etc.	A
3	Waste treatment installation as sanitary device	
3-1	Holding tank	A
3-2	Drains/Drainage System	A
4	Gear Lockers	
4-1	(8'x8') 27 units	A
5	Equipment	
5-1	Ice boxes (insulated box) @100-litre capacity 30pcs	B
5-2	Lab material assorted as appropriate 1lot	B
5-3	Scales for weighing Large type 2pcs, small type 2pcs	A
5-4	Engine flushing tank 1unit	B
5-5	Emergency generator	A
5-6	Equipment for fish processing*	A
5-7	Air compressor for scuba tank	A
7	Construction of New Fisheries Jetty	
7-1	Fish landing jetty	A
7-2	Mooring fender system and bollards, lighting units and water pipe lines	A
7-3	Navigation light	A
8	Shore protective work as sea defense structure	
8-1	Shore line revetment (approx. 65m long)	A
9	Land reclamation	A
10	Exterior works	
10-1	Car parking lot	A
10-2	Pavement interior the site premises	A
10-4	Lighting(security)	A
11	Technical assistance (Soft component)	
11-1	Operation and Management of the Fisheries Center	A

A: Considered essential (First priority)

B: Considered necessary (Second priority)

*Equipment requested by the NIA for fish processing include: processing tables, band saw, vacuum and tray packing machines, grinder/mixer for fish patties, patties former, and de-bone machine.

**Additional Request from NIA: Boat Trailer (beaching of boats) 1unit Priority B

3. ESTABLISHMENT OF AUTHORITY OF MANAGEMENT

(3.1) The Fisheries Advisory Committee (FAC)

The Fisheries Advisory Committee, FAC, will assist with all decisions with regards to the daily operations of the new facility (technical and administrative). The Nevis Island Administration will give technical through its representatives on the FAC. The FAC will be comprised of public and private persons to ensure productivity, efficiency, and accountability. A Chairman will be elected from within the FAC.

(3.2) Proposed member list and role of the Fisheries Advisory Committee (FAC)

The Membership of the FAC is proposed accordingly:

- 1 Representative from the Department of Fisheries – Director
- 1 Representative from the Department of Co-operatives – Director
- 2 Representatives from the Nevis Fishermen Co-operative Society (President & Manager)
- 1 Representative from the Nevis Air & Sea Ports Authority
- 1 Business Development Officer from Ministry of Agriculture
- 1 Representative from the Tourism Association
- 1 Representative from the Small Enterprise Development Unit, SEDU
- 1 Representative from the Accounting profession

The Role of the Fisheries Advisory Committee will be, among other things, to:

- Assist with strategies for smooth operation
- Advise on dispute settlement strategies between general public and fishers
- Policy Advice/Recommendation

(3.3) Staff for the Centre

	Number
* Manager	1
* Secretary/Accountant	1
* Cashier	1
* Supervisor (for fish processors & fish purchasing)	1
* Fish processors	2
* Laboratory technician	1
* Security Guard	1
* Operator for ice making machine and cold storage	1
* Cleaner	1
* Driver	1
* Marketing Officer	1
Total	12

(3.4) Proposed Authorization Chart

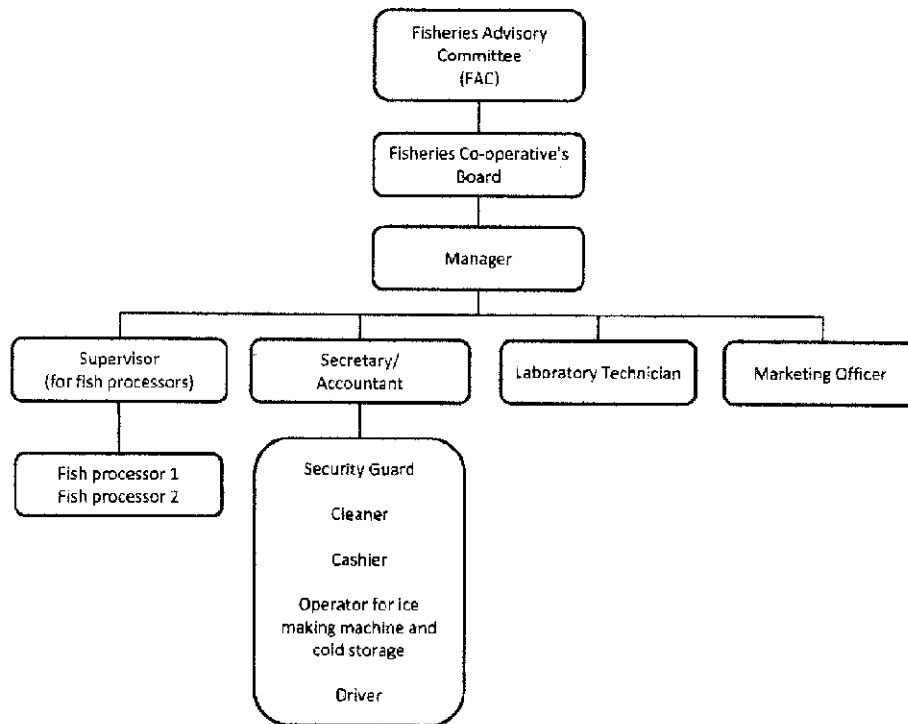


Figure-1 Authorization Chart of New Fisheries Centre

4. MANAGEMENT, COMMUNICATION, & MAINTENANCE PLAN

(A) Management Plan

The Manager will oversee the daily operations at the Centre (to include the management of human resource, equipment and building). He/She will ensure that all internal controls (to include Job Descriptions) are in place to ensure transparency, accountability, and efficiency.

(B) Communication Plan

The Organizational Chart above determines the communication tiers for the smooth operation of the Centre. The Vertical style of communication requires that the Manager supervise the Senior and Ancillary Staff.

1. The Manager will report to the Nevis Fishermen Cooperative Society Board (either in person or through written communication).
2. The Lab Technician, Maintenance Operator, and Secretary/Accountant will report directly to the Manager.
3. The Fisheries Supervisor will supervise all Fish Processors
4. The Security Guard, Driver, and Cleaner will report to the Secretary.

(C) Maintenance Plan

Maintenance of the building and equipment will be done on an as-needed basis (daily, monthly, and quarterly). A trained/qualified Maintenance Operator will be assigned to address maintenance issues. An additional Contract will be in place for a private entity (GASSPREE 24 Hour Service) to provided maintenance services for ice making machine and the air-condition units and/or other equipment, when necessary.

Insurance on the equipment and Building will be applied in the event of loss of equipment and building be it for natural or manmade reasons.

5. GOVERNMENT (NIA) SUPPORT TO ENSURE SMOOTH OPERATION/MANAGEMENT OF THE CENTER

The NIA will ensure the smooth operation/management of the new center through:

- 1) Financial support for the center's staff remunerations
- 2) Concessions for the water supply, electricity, and sewage treatment for the center
- 3) Provision of subsidized fuel for fishers
- 4) Provision of reduced price of ice for fishers
- 5) Provision of contracted maintenance for refrigeration systems of the center
- 6) Provision of Technical support

6. BUDGET FOR THE CENTRE

(A) Cost (Expenditure)

(2) Personnel cost (Salary and Wages)

Staffs	Number	EC\$/month
* Manager	1	\$ 4,000.00
* Secretary/Accountant	1	\$ 3,500.00
* Cashier	1	\$ 2,500.00
* Fish processors	2	\$ 3,000.00
*Supervisor (for fish processors)	1	\$ 2,100.00
* Laboratory technician	1	\$ 2,500.00
* Security Guard	1	\$ 1,500.00
* Operator for ice making machine and cold storage	1	\$ 2,000.00
* Cleaner	1	\$ 1,500.00
* Driver	1	\$ 1,500.00
* Marketing Officer	1	\$ 2,500.00
Total	12	\$ 26,600.00

(3) Utilities cost

***Electricity**

1,500 – 2,000 EC\$/month x 12 months \$24,000

***Water**

5 ton x 300 days x 1,000 x 1/4.55 gallons x 1/1,000 x EC\$25.00 \$8,242

***Garbage Collection**

15 EC\$/month x 12 months \$180

*** Sewage Treatment**

1500 EC\$/month x 3/year \$4,500

***Telephone and Internet**

According to actual payment of the existing fisheries complex,
300 EC\$/month x 12 months \$3,600

*** Insurance (For NIA Consideration)**

Building: 10,900,000 EC\$ x 0.1 %/year (to be decided) \$10,900

Equipment: 200,000 EC\$ x 0.1 %/year (to be decided) \$200

Sub total **\$11,100**

(4) Maintenance cost (Project document stated maintenance cost for building, equipment and vehicle). However, the vehicle will be acquired under a different grant funds. Maintenance cost will be calculated using an annual depreciation figure of 10% for equipment and 1% for building based on annual depreciation.

***Maintenance cost**

Building: EC\$10,900,000 x 0.1 %/year \$10,900

Civil facilities: EC\$6,200,000 x 0.1%/year \$6,200

Equipment: EC\$200,000 x 0.1 %/year \$200

Sub total **\$17,300**

***Fish Purchase**

Purchase: 250 lbs/day x 10.3 EC\$/lb x 300 days \$772,500

Where, average fish purchase rate in July 2009 to June 2010 is 10.3 EC\$/lb

***Fishing Gear Purchase**

According to actual amount of the existing fisheries complex in July 2009 to June 2010,
Purchase: 10,000 EC\$/month x 12 month \$120,000

***Other Costs**

*Packaging Material	\$250 x 12 months	\$ 3,000
*Advertising	\$250 x 12 months	\$ 3,000
*Transportation	\$1,000 x 12 months	\$12,000
*Vehicle Maintenance (petrol, servicing, etc)	\$500 x 3/yr	\$ 1,500
*General Expense / Administration		\$60,000
TOTAL		\$79,500

***Depreciation cost (this is only used to calculate the annual value of building and equipment for insurance purposes)**

Building:	EC\$10,900,000 x 1 %/year	\$109,000
Equipment:	EC\$200,000 x 10 %/year	\$20,000
Sub total		\$129,000

Where, direct construction and purchase cost is

Building:	EC\$10,900,000
Civil facilities:	EC\$6,200,000
Equipment:	EC\$200,000

(B) Income (Revenue)

(1) User fee for the facilities

User fee for the facilities will be calculated based on usage of the following:

• Space rent for workshop	500 EC\$/month	\$6,000
• Lockers	30 EC\$/week, 27 nos.	\$9,720
• Selling Table	10 EC\$/week, 10 tables	\$5,200
• Cleaning table	5 EC\$/week, 4 tables	\$1,040
• Ice Boxes	5 EC\$/week, 30 boxes	\$7,800
• Air Compressor for Scuba Tank	20 EC\$/time, 10 times/week	\$10,400
• Boat Trailer	20 EC\$/time, 20 times/month, 4 months	\$1,680
TOTAL		\$41,840

(2) Sale of Fish

Sale:	250 lbs/day x 10.3 EC\$/lb x 110% x 300 days	\$849,750
-------	--	-----------

(3) Sale of Fishing Gear

Sale: 10,000 EC\$/month x 110% x 12 months \$132,000

(4) Vending area for fishermen

Sale of fish volume: 250 lbs/day x 300 days = 75,000 lbs/year

(5) Ice selling

Capacity of ice making machine is expected to be 1 ton/day,

Selling price of ice is to be 0.3 EC\$/lb the same as Basseterre Fisheries Complex

(30 EC\$/bag, 1bag = 100 lbs)

(2.7 EC\$/bag, 1bag = 9 lbs)

Selling volume: 1000kg x 1/0.453 x 300 days x 70% = 464,000 lbs/year

Income for ice sale: 464,000 lbs/year x 0.3 EC\$/lb \$139,073

(C) ANNUAL INCOME AND EXPENDITURE STATEMENT

(The statement included in this Draft Plan will be adjusted upwards to reflect current rates plus an additional 5% adjustment for inflation over the next three (3) years). Please refer to Table 2(1) and Table 2(2) below for further information.

Table-2 ANNUAL INCOME AND EXPENDITURE STATEMENT (1)

Items	Amount (EC\$)	Breakdown
1. INCOME (REVENUE)		
1.1 User fee for the facilities		
1) Workshop	6,000	500 EC\$/month x 12 months = 6,000
2) Lockers	9,720	30 EC\$/month x 27 mos x 12 months = 9,360
3) Selling table	5,200	10 EC\$/week x 10 tables x 52 weeks = 5,200
4) Clearing table	1,040	5 EC\$/week x 4 tables x 52 weeks = 1,040
5) Ice boxes	7,800	5 EC\$/week x 30 boxes x 52 weeks = 7,800
6) Air compressor for scuba tank	10,400	20 EC\$/time x 10 times/week x 52 weeks = 10,400
7) Boat trailer	1,680	20 EC\$/time x 20 times/month x 4 months = 1,600
Sub total	41,840	
1.2 Sale of Fish	849,750	250 lbs/day x 10.3 EC\$/lb x 110% x 300 days = 849,750
1.3 Fishing gear selling	132,000	10,000 EC\$/month x 110% x 12 months = 132,000
1.4 Ice selling	139,073	1,000 kg/day x 1/0.453 x 0.3 EC\$/lb x 300 days x 70%
Total Income	1,162,663	
2. EXPENDITURE		
2.1 Telephone and internet	3,600	300 EC\$/month x 12 months
2.2 Insurance for facilities	17,100	(10,900 + 200) x 1,000 EC\$ x 0.1% = 11,100 (For NIA Consideration)
2.3 Maintenance cost	17,300	(10,900 + 200 + 6,200) x 1,000 EC\$ x 0.1% = 86,500
2.4 Fish Purchase	772,500	250 lbs/day x 10.3 EC\$/lb x 300 days = 772,500
2.5 Fishing Gear Purchase	120,000	10,000 EC\$/month x 12 months = 132,000
2.6 Other Costs		
1) Packing Material	3,000	EC\$250/month x 12 months = 3,000
2) Advertising	3,000	EC\$250/month x 12 months = 3,000
3) Transportation	12,000	EC\$1,000/month x 12 months = 12,000
4) Vehicle (petrol, servicing, etc.)	1,500	EC\$500 x 3/year
5) General expense/Administration	60,000	5,000 EC\$/month x 12 months = 60,000
Sub total	79,500	
Total Expenditure	1,004,000	
PROFIT	158,663	

* Based on the above profit calculation, the assumptions are

1) Year 1 and 2 Government could pay a portion of all salaries and wages

2) Year 3 Government will no longer pay salaries and wages because operation will be self sustained (can meet its operational costs).

Table-2 ANNUAL INCOME AND EXPENDITURE STATEMENT (2)

3. Operation Cost for Government Subsidy		Amount (EC\$)	Breakdown
3.1 Personnel cost (Salary and Wages)			
1) Manager	48,000		1 person x 4,000 EC\$/month x 12 months = 48,000
2) Secretary/Accountant	42,000		1 person x 3,500 EC\$/month x 12 months = 42,000
3) Cashier	30,000		1 person x 2,500 EC\$/month x 12 months = 30,000
4) Supervisor (for fish processors)	25,200		1 person x 2,100 EC\$/month x 12 months = 25,200
5) Fish processors	36,000		2 person x 1,500 EC\$/month x 12 months = 36,000
6) Laboratory technician	30,000		1 person x 2,500 EC\$/month x 12 months = 30,000
7) Security guard	18,000		1 person x 1,500 EC\$/month x 12 months = 18,000
8) Operator for ice making machine etc	24,000		1 person x 2,000 EC\$/month x 12 months = 24,000
9) Cleaner	18,000		1 person x 1,500 EC\$/month x 12 months = 18,000
10) Driver	18,000		1 person x 1,500 EC\$/month x 12 months = 18,000
11) Marketing Officer	30,000		1 person x 2,500 EC\$/month x 12 months = 24,000
Sub total	319,200		
3.2 Utilities cost			
1) Electricity	24,000		1,500 - 2,000 EC\$/month x 12 months
2) Water	8,242		5,000 kg/day x 1/4.55 gallons x 25 EC\$/1,000 gallons x 300 days = 8,242
3) Garbage collection	180		15 EC\$/month x 12 months = 180
4) Sewage treatment	4,500		1,500 EC\$/time x 3 times/year = 4,500
Sub total	36,922		
Total	356,122		

7. ACTION PLAN

Prior to the opening of the New Fisheries Centre, in consultation with the Fishermen Cooperative Society, will decide on the beneficiaries for the gear lockers and arrange to hand over the keys to the respective fishermen.

Table-3 Time Schedule

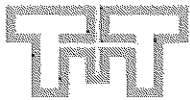
	Milestones	MONTHS											
		Nov	Dec	Jan	Feb	Mar	COMPLETION (March 2013)	Apr	May	OPENING (May 2013)	Jun	Jul	Aug
1	Staff Recruitment					■							
2	Negotiate Budget 2013 (October 2012)	■											
3	Install Utilities, Services & Fuel Tanks					■							
4	Fencing, Gates & Security					■							
5	Establishment of FAC	■	■										
6	FAC Meeting			■	■	■		■	■			■	■
7	Provision of Ancillary Services							■	■				
8	Distribution of Gear Lockers								■	■			
9	Setting Up security System												
10	Opening Promotion											■	■

FAC is Fisheries Advisory Committee

It was also agreed that the input from other key stakeholders, such as the Departments of Cooperatives and Fisheries, the Permanent Secretary, the Board of the Fisheries Cooperative Society, will be necessary to complete the O/M Plan. A meeting is scheduled for Tuesday, August 31 at 5pm, Fisheries Complex, Charlestown. It is expected that after this meeting, the O/M will be prepared.

The Meeting was held on Tuesday, August 31 with the Board of Directors of the Nevis Fishermen Marketing & Supplies Cooperative Society. After much discussion on the proposed Fisheries Development Board, it was agreed that the Fishermen Cooperative's Board needed additional time to peruse the proposed Draft after which they will provide feedback.

This DRAFT Operations & Maintenance Plan reflects the input of the Nevis Fishermen Marketing & Supplies Cooperative Society's Board as of September 06, 2010 in which they proposed the establishment of a Fisheries Advisory Committee. Their proposition is found to be in compliance with the Federation of St. Kitts & Nevis Fisheries Regulations Act 1995, No.11; Article 2.



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BOREHOLE LOG

BOREHOLE No: BH1
Hole Location: WP18
SHEET 2 OF 2

PROJECT: Geotechnical Investigation			LOCATION: Charlestown Fisheries Centre, Nevis			JOB No: 750781											
CO-ORDINATES 539383.76 1694780.25			DRILL TYPE: HPP150			HOLE STARTED: 4/6/10											
R.L. 0.40 m			DRILL METHOD: Rotary Wash			HOLE FINISHED: 7/9/10											
DATUM			DRILL FLUID: Water			LOGGED BY: ADP											
CHECKED: ADP																	
GEOLOGICAL				ENGINEERING DESCRIPTION													
GEOLOGICAL UNIT, GENERIC NAME, ORIGIN, MINERAL COMPOSITION				SOIL DESCRIPTION Soil type, minor components, gradation or particle size, colour.													
				ROCK DESCRIPTION Substance: Rock type, particle size, colour, minor components. Defects: Type, location, thickness, roughness, filling.													
FLUID LOSS	WATER	CORE RECOVERY (%)	METHOD	CASING	TESTS	SAMPLES	R.L. (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MOISTURE CONDITION	WEATHERING	STRENGTH CLASSIFICATION	SHEAR STRENGTH (kPa)	COMPRESSION STRENGTH (kPa)	DEFLECT. SPACING (mm)	
		100	SPT		10		-10						MD				Grey and brown, fine to coarse, sub angular to sub rounded, volcanic GRAVEL, some cobbles.
		30	CORING		11		-11										
		100	SPT		22	6	-12						D				
		25	CORING		23		-12										
		25	CORING		23		-12										
		100	SPT		27	7	-14						VD				
		40	CORING		21		-14										Grey fine to medium sand with much sub angular to fine coarse, volcanic gravel and occasional cobbles.
		75	SPT		4 for 15mm		-15										
		25	CORING		N=50+ bouncing		-15										
		75	SPT		33	8	-16						VD				
		25	CORING		17		-16										Grey and pink coarse SAND and fine to coarse, sub angular to sub rounded, volcanic GRAVEL.
		25	CORING		8 for 25mm		-16										
		50	SPT		N=50+ bouncing		-16										
		50	SPT		34	9	-18						VD				
					16 for 40mm		-18										END OF BOREHOLE AT 18.2m
					N=50+ bouncing		-18										
							-19										
							-20										

T:\T DATA\TEMPLATE.GDT mm

BORELOG 750781.GPJ 25/3/11

Figure-A6(2) BH-1(2)



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BOREHOLE LOG

BOREHOLE No: BH3
Hole Location: Refer site plan.

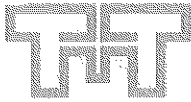
SHEET 1 OF 2

PROJECT: Fisheries Project, Charlestown		LOCATION: St Kitts and Nevis		JOB No: 750781.100		
GO-ORDINATES 17° 8' 14" N 62° 37' 50.45 W R.L. -2.00 m		DRILL TYPE: Hell-Rig		HOLE STARTED: 3/3/11		
DATUM		DRILL METHOD: Coring and SPT		HOLE FINISHED: 3/3/11		
GEOLOGICAL		DRILL FLUID: Seawater		LOGGED BY: CWP CHECKED: ADP		
		ENGINEERING DESCRIPTION				
GEOLOGICAL UNIT, GENERAL NAME, ORIGIN, MINERAL COMPOSITION.		TESTS		SOIL DESCRIPTION		
FLUID LOSS		SAMPLER		ROCK DESCRIPTION		
WATER		DEPTH (m)		Substance: Rock type, particle size, colour, minor components.		
CORE RECOVERY (%)		GRAVEL LOG		Defects: Type, inclusion, thickness, roughness, fissg.		
METHOD		CLASSIFICATION SYMBOL		MOISTURE		
CASING		MOISTURE WEATHERING CONDITION		CLASSIFICATION		
		STRENGTH CLASSIFICATION		SHEAR STRENGTH (kPa)		
				COMPRESSIVE STRENGTH (kPa)		
				NOTED SPACING (mm)		
				1. 0-1000		
				2. 1000-2000		
				3. 2000-3000		
				4. 3000-4000		
				5. 4000-5000		
				6. 5000-6000		
				7. 6000-7000		
				8. 7000-8000		
				9. 8000-9000		
				10. 9000-10000		
BEACH DEPOSIT	HQ	1/0/0 L0 N=1	SW	W+	Fine to medium SAND, with some fine to boulder sized, rounded gravel, grey/brown, boulders over lower 0.5m	
SWAMP DEPOSIT PEAT: Amorphous. Peat, some fibrous layers	SPT	0/0/1 0/0 N=1	OH	W+	VS	Organic rich, silty CLAY, with some sand, dark brown, plastic, variable sand content, typically amorphous. Interbedded with ~50mm thick layers of silty CLAY, with some organics
ALLUVIAL DEPOSIT	HQ	4/5/11 7/4 N=27	MH	W+	Inferred clayey SILT layer, brown, plastic, organic rich	
NEVIS PEAK VOLCANICLASTICS: EW to MW Andesite Boulders and Gravel	SPT	6/4/4 5/7 N=20	GW/GS	W+	MD	Sandy, fine to very coarse/boulder sized sub-angular, GRAVEL, with minor silt, dark grey and reddish grey. Interbedded layers of gravelly SAND
	HQ					Layer of gravelly SAND

T-T DATATEMPLATE.GGT 08/08/11

BORELOG 750781.100.GPJ 14/3/11

Figure-A6(5) BH-3(1)



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BOREHOLE LOG

BOREHOLE No: BH3
 Hole Location: Refer site plan.
 SHEET 2 OF 2

PROJECT: Fisheries Project, Charlestown		LOCATION: St Kitts and Nevis		JOB No: 759781.100													
CO-ORDINATES 17° 8' 14"		DRILL TYPE: Heli-Rig		HOLE STARTED: 3/3/11													
R.L. 62° 37' 50.45 W		DRILL METHOD: Coring and SPT		HOLE FINISHED: 3/3/11													
DATUM -2.00 m		DRILL FLUID: Seawater		DRILLED BY: Webster Drilling Ltd													
				LOGGED BY: CWP CHECKED: ADP													
GEOLOGICAL			ENGINEERING DESCRIPTION														
GEOLOGICAL UNIT, GENERIC NAME, ORIGIN, MINERAL COMPOSITION.	FLUID LOSS	WATER	CORE RECOVERY (%)	METHOD	CASING	TESTS	DEPTH (m)	CLASSIFICATION SYMBOL	MOISTURE CONDITION	WEATHERING	STRENGTH DENSITY CLASSIFICATION	SHEAR STRENGTH (kPa)	COMPRESSIVE STRENGTH (kPa)	DEFLECT SPACING (mm)	SOIL DESCRIPTION Soil type, minor components, plasticity or particle size, colour.	ROCK DESCRIPTION Substance: Rock type, particle size, colour, minor components. Defects: Type, definition, thickness, roughness, fibry.	
NEVIS PEAK VOLCANICLASTICS: EW to MW Andesite Boulders and Gravels				SPT		25/18/25 10 for 45mm Refusal	11								Sandy GRAVEL, with minor silt, as above 100mm layer of SAND, with minor gravel		
				HIQ			12										
				SPT		50 for 100mm Refusal	14									BOULDERS, up to 250mm dia. MW, Moderately to strong.	
				HIQ			15										
				SPT		10 for 30mm Refusal	17									END OF BOREHOLE AT 15.03m.	
				HIQ			18									NORTH: 17° 8' 14"	
							19									WEST: 62° 37' 50.45"	
							20										
							21										
							22										
							23										
							24										
							25										

T-T DATATEMPLETE.GDT .mm

BORELOG 750781.100.GPJ 14/3/11

Figure-A6(6) BH-3(2)



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BOREHOLE LOG

BOREHOLE No: BH4
 Hole Location: Refer site plan.

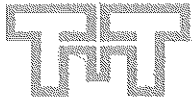
SHEET 1 OF 2

PROJECT: Fisheries Project, Charlestown		LOCATION: St Kitts and Nevis		JOB No: 750781.100		
CO-ORDINATES 17° 08' 14.5" N 62° 37' 46" W		DRILL TYPE: Hell-Rig		HOLE STARTED: 19/2/11		
R.L. 0.50 m		DRILL METHOD: Coring and SPT		HOLE FINISHED: 20/2/11		
DATUM		DRILL FLUID: Seawater		DRILLED BY: Webster Drilling		
GEOLOGICAL				ENGINEERING DESCRIPTION		
GEOLOGICAL UNIT, GENERIC NAME, ORIGIN, MINERAL COMPOSITION		TESTS		SOIL DESCRIPTION		
FLUID LOSS		DEPTH (m)		ROCK DESCRIPTION		
WATER		GRAPHIC LOG		Substrate: Rock type, particle size, colour, minor components.		
CORE RECOVERY (%)		CLASSIFICATION SYMBOL		Defects: Type, location, thickness, roughness, flag.		
METHOD		INDUSTRIAL WEATHERING CONDITION				
CASING		STRENGTH-DENSITY CLASSIFICATION				
		SHEAR STRENGTH (kPa)				
		COMPRESSIVE STRENGTH (MPa)				
		DEFECT SPACING (mm)				
BEACH DEPOSIT	20/2	SPT	5/1/5 29/21 for 30mm N=56	SW	M	Fine to medium SAND, with some fine to coarse gravel, grey brown, some rounded boulders at base of layer, shell fragments
SWAMP DEPOSIT: PEAT, typically amorphous, some fibrous layers	SPT	1/10/1/01 N=2	OH	W	SVS	Organic rich SILT clayey (PEAT), with some sand, dark brown, plastic, variable sand content, typically amorphous texture, some fibrous layers
ALLUVIAL DEPOSIT	SPT	0/110/0/0 N=1	MH	M	VSt	100mm layer of sandy PEAT
NEVIS PEAK VOLCANICLASTICS: FW to MW Andesite Boulders and Gravels	SPT	0/0/0/1/11 N=2	GS/GW	M	D	Clayey SILT, with some sand and fine to medium sub-rounded gravels, grey, plastic
	SPT	1/4/6 5/4 N=19	VD			Sandy, fine to boulder sized Sub angular GRAVEL, with some silt, red and grey, very weak to strong Gravels. Interbedded layers of gravelly SAND.
	SPT	12/7/9 9/8 N=33				300mm dia. MW BOULDER
	SPT	50 for 80mm N>50				
	SPT	9/8/15 15/14				

T-1 DATA/TEMPLATE.GPJ amm

BORELOG 750781.100.GPJ 14/3/11

Figure-A6(7) BH-4(1)



TONKIN & TAYLOR LTD
BOREHOLE LOG

BOREHOLE No: BH4
Hole Location: Refer site plan.
SHEET 2 OF 2

PROJECT: Fisheries Project, Charlestown LOCATION: St Kills and Nevis JOB No: 750781.100
 CO-ORDINATES 17° 08' 14.5" N DRILL TYPE: Hell-Rig HOLE STARTED: 19/2/11
 62° 37' 46" W DRILL METHOD: Coring and SPT HOLE FINISHED: 20/2/11
 R.L. 0.50 m DRILL FLUID: Seawater DRILLED BY: Webster Drilling
 DATUM LOGGED BY: CWP CHECKED: ADP

GEOLOGICAL				ENGINEERING DESCRIPTION													
GEOLOGICAL UNIT	FLUID LOSS	WATER	CORE RECOVERY (%)	TESTS	SAMPLES	DEPTH (m)	DEPTH (ft)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MOISTURE CONDITION	WEATHERING	STRENGTH CLASSIFICATION	SE-BAR STRENGTH (MPa)	COMPRESSION STRENGTH (MPa)	DEFECT SPACING (mm)	SOL DESCRIPTION	
ORIGIN			METHOD													Soil type, minor components, plasticity or particle size, colour.	
MINERAL COMPOSITION																ROCK DESCRIPTION	
																Substance: Rock type, particle size, colour, minor components	
																Details: Type, inclination, thickness, roughness, etc.	
				NSSU												END OF BOREHOLE AT 9.95m. Target depth achieved. NORTH: 17° 08' 14.5" WEST: 62° 37' 46.0"	
						-10											
						-11											
						-12											
						-13											
						-14											
						-15											
						-16											
						-17											
						-18											
						-19											
						-20											

T-T DATATEMPLATE.GPJ 14mm

BORELOG 750781.100.GPJ 14/3/11

Figure-A6(8) BH-4(2)



TONKIN & TAYLOR LTD

BOREHOLE LOG

BOREHOLE No: BH5
 Hole Location: Refer site plan.
SHEET 1 OF 2

PROJECT: Fisheries Project, Charlestown		LOCATION: St Kitts and Nevis		JOB No: 760781.109													
CO-ORDINATES 17° 08' 13.8" N		DRILL TYPE: Heli-Rig		HOLE STARTED: 20/2/11													
R.L. 62° 37' 46.9 W		DRILL METHOD: Coring and SPT		HOLE FINISHED: 21/2/11													
DATUM 0.50m		DRILL FLUID: Seawater		LOGGED BY: CWP													
				CHECKED: ADP													
GEOLOGICAL			ENGINEERING DESCRIPTION														
GEOLOGICAL UNIT, GENERIC NAME, ORIGIN, MINERAL COMPOSITION	FLUID LOSS WATER CORE RECOVERY (%)	METHOD	TESTS	SAMPLES RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MOISTURE CONDITION	WEATHERING	STRENGTH CLASSIFICATION	SHEAR STRENGTH (kPa)	COMPRESSION STRENGTH (kPa)	DEFECT SPACING (mm)	SOIL DESCRIPTION Soil type, minor components, plasticity, particle size, colour.	ROCK DESCRIPTION Substance: Rock type, particle size, colour, minor components. Defects: Type, thickness, frequency, roughness, filling.		
BEACH DEPOSIT	21/2	HQ			0		SW	M						Fine to coarse SAND, with some fine to coarse rounded gravel, grey, boulders in lower 0.5m.			
		SPT	6/3/5 5/6 N=19		1					MD				ANDESITE BOULDERS	1		
SWAMP DEPOSIT: PEAT, typically amorphous, some fibrous layers		PT			2									Organic rich, Silty CLAY (PEAT), dark brown, with some sand, plastic, minor fine sub-rounded gravels at top of layer variable sand content. Peat is typically amorphous, spongy containing bark, twigs and leaves			
		SPT	0/0/0/0/1 400mm N=1		3											3	
		PT			4												4
		SPT	0/0/0/0/0 N=0		4												Spongy amorphous peat
ALLUVIAL DEPOSIT		PT			5									No sand, some fibres: twigs and bark Clayey SILT, with some sand and fine sub-rounded gravel, dark grey, plastic.			
		SPT	0/0/1 1/0 N=2		5												5
NEVIS PEAK VOLCANICLASTICS: EW to MW Andesite Boulders and Gravels		HQ			6									Sandy, fine to coarse sub-angular GRAVEL, with minor silt, dark grey, gravels are typically weak, interbedded layers of gravelly sand.			
		SPT	26/19/9 9/8 N=35		6												6
		HQ			7												7
		SPT	22/15/7 9/8 N=29		8												
		HQ			9									Increased sand content, sandy GRAVEL, weak to moderately strong boulders			
		SPT	32/19/9 9/13 N=40		9												9
					10									Up to 400mm dia. MW boulders			

T-T DATA TEMPLATE CDT - mm

BORELOG 750781.100.GPJ 25/3/11

Figure-A6(9) BH-5(1)



TONKIN & TAYLOR LTD

BOREHOLE LOG

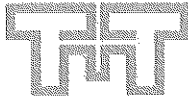
BOREHOLE No: BH5
 Hole Location: Refer site plan.
SHEET 2 OF 2

PROJECT: Fisheries Project, Charlestown				LOCATION: St Kitts and Nevis				JOB No: 750781.100									
CO-ORDINATES				DRILL TYPE: Heli-Rig				HOLE STARTED: 20/2/11									
R.L. 0.50 m				DRILL METHOD: Coring and SPT				HOLE FINISHED: 21/2/11									
DATUM				DRILL FLUID: Seawater				DRILLED BY: Webster Drilling									
								LOGGED BY: CWP									
								CHECKED: ADP									
GEOLOGICAL				ENGINEERING DESCRIPTION													
GEOLOGICAL UNIT, GENERIC NAME, ORIGIN, MINERAL COMPOSITION:	FLUID LOSS: WATER	CORE RECOVERY (%)	METHOD	CASING	TESTS	SAMPLES	R.L. (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MOISTURE CONDITION	WEATHERING	STRENGTH CLASSIFICATION	SHEAR STRENGTH (kPa)	COMPRESSION STRENGTH (kPa)	DEFECT SPACING (mm)	SOIL DESCRIPTION: Soil type, minor components, plasticity or particle size, colour. ROCK DESCRIPTION: Substance: Rock type, particle size, colour, minor components. Defects: Type, location, thickness, roughness, filling.
NEVIS PEAK VOLCANICLASTICS: EW to MW Andesite Boulders and Gravels			HQ		23/27 Refusal		-10		[Graphic Log: Sand and gravel]	GS	M	VD					Sandy GRAVEL, with minor silt as above
			HQ		11 for 10mm Refusal		-11		[Graphic Log: Sand and gravel]								END OF BOREHOLE AT 12.01m. NORTH: 017° 08' 13.8" WEST: 062° 37' 46.9"
							-12										
							-13										
							-14										
							-15										
							-16										
							-17										
							-18										
							-19										
							-20										

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BORELOG 750781.100.GPJ 25/3/11

Figure-A6(10) BH-5(2)



TONKIN & TAYLOR LTD
BOREHOLE LOG

BOREHOLE No: BH6
Hole Location: Refer site plan.
SHEET 1 OF 2

PROJECT: Fisheries Project, Charlestown		LOCATION: St Kitts and Nevis		JOB No: 760781.100											
CO-ORDINATES 17° 08' 13.9" N 62° 37' 47.1" W		DRILL TYPE: Hell-Rig		HOLE STARTED: 24/2/11											
R.L. -1.00 m		DRILL METHOD: Coring and SPT		HOLE FINISHED: 24/2/11											
DATUM		DRILL FLUID: Seawater		DRILLED BY: Webster Drilling Ltd											
				LOGGED BY: GWP CHECKED: ADP											
GEOLOGICAL			ENGINEERING DESCRIPTION												
GEOLOGICAL UNIT, GENERIC NAME, ORIGIN, MINERAL COMPOSITION.	FLUID LOGS	CORE RECOVERY (%)	METHOD	CASING	TESTS	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MOISTURE CONDITION	WEATHERING	STRENGTH/STABILITY CLASSIFICATION	SHEAR STRENGTH (kPa)	COMPRESSIVE STRENGTH (kPa)	DEFECT SPACING (mm)	SOIL DESCRIPTION Soil type, minor components, plasticity or particle size, colour. ROCK DESCRIPTION Substance: Rock type, particle size, colour, minor components. Defects: Type, inclination, thickness, roughness, filling.
BEACH DEPOSIT			HQ			0		SW	W+						Fine to medium SAND, with some fine to coarse rounded gravel, grey brown, boulders lower 0.5m.
SWAMP DEPOSIT PEAT: Amorphous Peat, some fibrous layers			SPT		1/0/0 0/0 N=0	1		OH	W+	VS					Organic rich, Silty CLAY, with some sand and minor gravels, dark brown, plastic, variable sand content, typically amorphous, spongy, containing bark, twigs and leaves, sulfurous smell
			SPT		0/1/0 1/0 N=0	2									
			SPT		0/1/0 0/0 N=1	3									Minor fibres, amorphous, silty clay fines
			SPT		0/0/0 0/0 N=0	4		MH	M	VS					Clayey SILT, with some sand and fine to median sub-rounded to sub-angular gravel, brown, plastic, rich in organics
ALLUVIAL DEPOSIT			SPT		0/0/0 0/0 N=0	5		3WGS	M	MID				Sandy, fine to coarse GRAVEL, with minor silt, some boulders, reddish grey, sub-angular to angular, some interbedded sand layers, Gravels are typically weak.	
NEVIS PEAK VOLCANICLASTICS. EW to MW andesite boulders and gravel			SPT		11/6/7 6/5 N=24	6									
			SPT		8/2/3 4/6 N=15	7									200mm layer gravelly SAND
			SPT		17/23/10 8/9 N=50	8									Weak to strong boulders, colour change to greenish brown.
			SPT			9									
			SPT			10									

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BORELOG1 750781.100.GPJ 31/3/11

Figure-A6(11) BH-6(1)



TONKIN & TAYLOR LTD

BOREHOLE LOG

BOREHOLE No: BH6
 Hole Location: Refer site plan.
 SHEET 2 OF 2

PROJECT: Fisheries Project, Charlestown				LOCATION: St Kitts and Nevis				JOB No: 760781.100								
CO-ORDINATES (17° 08' 13.9" N 62° 37' 47.1" W -1.00 m)				DRILL TYPE: Heli-Rig				HOLE STARTED: 24/2/11								
R.L.				DRILL METHOD: Coring and SPT				HOLE FINISHED: 24/2/11								
DATUM				DRILL FLUID: Seawater				DRILLED BY: Webster Drilling Ltd								
				LOGGED BY: GWP				CHECKED: ADP								
GEOLOGICAL						ENGINEERING DESCRIPTION										
GEOLOGICAL UNIT, GENERIC NAME, ORIGIN, MINERAL COMPOSITION.						SOIL DESCRIPTION Soil type, minor components, plasticity or particle size, colour.										
ROCK DESCRIPTION Substance: Rock type, particle size, colour, minor components. Defects: Type, inclination, thickness, roughness, filling.																
FLUID LOSS	WATER	BORE RECOVERY (%)	METHOD	CASING	TESTS	SAMPLES	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MOISTURE CONDITION	WEATHERING	STRENGTH/DENSITY CLASSIFICATION	SHEAR STRENGTH (kPa)	COMPRESSION STRENGTH (kPa)	DEFECT SPACING (mm)	
			SPT		9/8/6 4/4 N=22	11	11	11	M			MD				300mm layer gravelly SAND
			HQ			12	11	11	D							Boulders up to 150mm diameter.
			SPT		12/11/9 10/12 N=42	13	12	12								300mm layer gravelly SAND
						14	13	13								END OF BOREHOLE AT 11.95m.
						15	14	14								NORTH: 17° 08' 13.9"
						16	15	15								WEST: 62° 37' 47.1"
						17	16	16								
						18	17	17								
						19	18	18								
						20	19	19								

T-T DATEX/PLATE.GDT.dmm

BORELOG 760781.100.GPJ 31/3/11

Figure-A6(11) BH-6(2)