

A 9.1 Data of Initial Environmental Examination

9.1.1 Methodology of Initial Environmental Examination

1. An Initial Environmental Examination (IEE) was carried out based on the long term development execution plan for the ferry routes for the target year 2019. IEE report was prepared by a Screening and a Scoping methodology using the existing data and result of site survey conducted by the JICA team.

2. The purpose of the Initial Environmental Examination is to identify preliminary negative impact through the Screening and Scoping (For conditions of Screening and Scoping, see Table A9.1.1). If an Environmental Impact Assessment (EIA) is required at the next stage, the environmental considerations for the project are provided based on this IEE report.

9.1.2 Ferry Routes and Name of Terminal Sites

3. IEE report was prepared for the following ferry routes and terminal sites.

- 1) Surabaya - Banjarmasin
- 2) Jakarta - Pontianak
- 3) Surabaya - Ujung Pandang
- 4) Kendari - Ambon
- 5) Ambon - Sorong
- 6) Selayar - Labuhan Bajo
- 7) Manokwari - Biak
- 8) Wahai - Babang
- 9) Patani - Sorong

9.1.3 Evaluation and Prediction of Environmental Impact

4. Refer to the attached data and appendix (See Table A9.1.2 to A9.1.16)

Table A9.1.1 Conditions of Screening and Scoping

	Items	Description	
Social Environment	1	Resettlement of inhabitants	Resettlement by occupancy
	2	Economic activities	Loss of productive opportunity such as land
	3	Traffic and life facilities	Influence of existing traffic such as congestion
	4	Division of regional area	Split of communities by obstruction of traffic
	5	Historical and cultural heritage	Loss of cultural property and falling of values
	6	Water right and common right	Obstruction of fishing right, water right and common right of forest
	7	Hygiene and health	Deterioration of a hygienic environment by production of refuse and noxious insect
	8	Waste and garbage	Occurrence of waste dumps and solid waste
	9	Risks and hazards	Increase of possibility of danger of landslide and accident
Natural Environment	10	Topography and geology	Change of valuable topography and geology by excavation of filling work
	11	Soil erosion	Surface soil erosion by rain water after land development(vegetation removal)
	12	Underground water	Change of distribution of ground water by large scale excavation
	13	Hydrological regime for river and lake	Change of river discharge and riverbed condition due to landfill and drainage inflow
	14	Coastal zone	Coastal erosion and sedimentation due to landfill or change in marine
	15	Ecology, fauna, flora	Obstruction of breeding and extinction of species due to change of habitat condition
	16	Meteorology	Change of temperature, precipitation, wind, etc. due to large scale development
Pollutant	17	Landscape	Change of topography and vegetation by land development and harmonious obstruction by structural objects
	18	Air Pollution	Pollution caused by exhaust gas or toxic gas from vehicles and factories
	19	Water pollution	Pollution by inflow of silt, and effluent into rivers and ground water
	20	Soil contamination	Contamination of soil by dust and chemical
	21	Noise and vibration	Noise and vibration generated by vehicles
	22	Land subsidence	Deformation of land and land subsidence due to the lowering of ground water level
	23	Offensive odor	Generation of exhaust gas and offensive odor by facility construction and operation

Table A9.1.2(1) Matrix of Element for Environmental Impact (Banjarmasin)

Location : Banjarmasin

Items Port and related facilities		Total Evaluation	PC Change of Topogra- phy	PC Operation of Construc- tion	PC Exclusive use of Space	OP Driving of Car	OP Navigat- ion of Vessels	OP Operation of Facilities
Social Environment	1	Resettlement of inhabitants	B	X	X			X
	2	Economic activities	C	X		X	X	X
	3	Traffics and life facilities	B	X		X	X	X
	4	Division of regional area	C	X		X		
	5	Historical and cultural heritage	D					X
	6	Water right and common right	D			X	X	
	7	Hygiene and health	D		X			X
	8	Waste and garbage	D		X		X	X
	9	Risks and hazards	C	X	X		X	
Natural Environment	10	Topography and geology	C	X	X			
	11	Soil erosion	D	X				
	12	Underground water	D					X
	13	Hydrological regime for river and lake	C	X		X	X	
	14	Coastal zone	D	X				
	15	Ecology, fauna, flora	C		X	X		X
	16	Meteorology	D	X	X			
17	Landscape	D	X	X				
Pollutant	18	Air Pollution	D			X		X
	19	Water pollution	C		X		X	X
	20	Soil contamination	D					X
	21	Noise and vibration	C		X			
	22	Land subsidence	D		X			
	23	Offensive odor	D					X

A : High magnitude of impact is expected

B : Low magnitude of impact is expected

C : Unknown (Need study; provide consideration that it will become clear after the site investigation and survey)

D : No effect is expected, and does not require consideration for the items of EIA.

PC : Pre-construction Stage OP : Operation Stage

Table A9.1.2(2) Project Environment (Banjarmasin)

Location : Banjarmasin

Items		Description
Name of Site		Banjarmasin Ferry Terminal
Social environment	Local Inhabitants (Resident/Inhabitants/Consciousness for Planning , etc.)	There are 100 families living in the vicinity of the proposed project site at the river side area. Most inhabitants living in this area are engaged in services such as retails of daily living necessities, street stalls, port-related services, factories and the like. There is no fisherman living in this area.
	Utilization of land (Fishing Village -Fish Market/Coastal Industry area, etc)	No fishing village and fisherman were observed in the proposed project site. The following industrial and domestic facilities were observed in the vicinity of the project site: Rubber factory, Storage yards for coal, Fish market, Miscellaneous stores, Mosque, etc.
	Economy/Recreation (Agriculture/Commerce/Resort Facilities, etc.)	There is no agricultural nor resort facility in the vicinity of the project site.
Natural Environment	Topography and Geology (Steep Slope-Poor Subsoil-Damp Area/Dislocation, etc.)	The existing port has been maintained at a water depth of 6m by maintenance dredging of about 2,000,000m ³ /year. All of dredged materials are disposed to the sea at current stage.
	Coastal Zone (Erosion-Deposition/Tidal Current-Tide-Depth, etc.)	Due to muddy conditions of river, the water has low transparency, and there is very low visibility in the river water at the expected project area.
	Precious Fauna and Flora, Habitat (Mangrove-Coral-Hydrobious, etc.)	There are no Corals and Mangroves in the vicinity of project area. Three big islands located in Barito river, approximately 4km far from project site, are designated as a national park. There was not observed precious fauna and flora in the project areas and nearby.
Pollutant	Occurring Conditions of Concern (High Occurrence of Environmental Pollution, etc.)	According to information received from Bapedal, the following pollution occur in the city at current stage : - Air pollution from coal storage yards - Offensive odor from rubber factory - Air pollution from mountain fire during cultivation / farming.
	Countermeasure	None
Other Items		There are paved access roads of 3 meters width running from the port to the center of City though necessary repairs and modifications of these roads are needed.

Table A9.1.3(1) Matrix of Element for Environmental Impact (Surabaya)

Location : Surabaya (Lamong Bay)

Items Port and related facilities		Total Evaluation	PC Change of Topogra- phy	PC Operation of Construc- tion	PC Exclusive use of Space	OP Driving of Car	OP Naviga- tion of Vessels	OP Operation of Facilities
Social Environment	1	Resettlement of inhabitants	C	X	X			X
	2	Economic activities	D	X		X	X	X
	3	Traffics and life facilities	C	X		X	X	X
	4	Division of regional area	D	X		X		
	5	Historical and cultural heritage	D					X
	6	Water right and common right	C		X	X		X
	7	Hygiene and health	D		X			X
	8	Waste and garbage	C		X		X	X
	9	Risks and hazards	D		X		X	X
Natural Environment	10	Topography and geology	C	X	X			
	11	Soil erosion	D	X				
	12	Underground water	D		X			X
	13	Hydrological regime for river and lake	B	X	X		X	X
	14	Coastal zone	D	X	X			
	15	Ecology, fauna, flora	B		X	X		X
	16	Metecorology	D		X			
	17	Landscape	C	X	X			
Pollutant	18	Air Pollution	D			X		X
	19	Water pollution	C		X		X	X
	20	Soil contamination	D					X
	21	Noise and vibration	D		X			
	22	Land subsidence	C		X			
	23	Offensive odor	D					X

A : High magnitude of impact is expected

B : Low magnitude of impact is expected

C : Unknown (Need study; provide consideration that it will become clear after the site investigation and survey)

D : No effect is expected, and does not require consideration for the items of EIA.

PC : Pre-construction Stage OP : Operation Stage

Table A9.1.3(2) Project Environment (Surabaya)

Location : Surabaya (Lamong Bay)

Items		Description
Name of Site		Surabaya Ferry Terminal
Social Environment	Local Inhabitants (Resident/Inhabitants/Consciousness for Planning , etc.)	Approximately 80 families of fishermen live at the mouth of Anak river and they carry out their fishing operation by small boats at the lagoon in the bay area.
	Utilization of land (Fishing Village -Fish Market/Coastal Industry area, etc.)	There are salt fields where they carry out production of salt during the dry season. The following industrial and domestic facilities were observed at the existing coastal area of the bay : Plywood factories, power plants, chemical factory, container yards, long distance bus terminal, railroad station etc.
	Economy/Recreation (Agriculture/Commerce/Resort Facilities, etc.)	Recreation and resort facilities are not available in this bay area. Fishermen conduct fishing operations in the bay area but basically there are no fishing operations using large scale boats. Only small scale fishing is conducted throughout the year in this bay area. The existing seaport is located at the mouth of the bay area.
Natural Environment	Topography and Geology (Steep Slope-Poor Subsoil-Damp Area/Dislocation, etc.)	The proposed project area is located at the lagoon in the bay area which has an average depth of 0.5m to 1.2m. There are five rivers in the bay area and large volumes of water flow to the bay area throughout the year.
	Coastal Zone (Erosion-Deposition/Tidal Current-Tide-Depth, etc.)	The seawater has low transparency, and there is very low visibility at the expected project area. The seabed is almost covered by muddy soil at the lagoon area.
	Precious Fauna and Flora, Habitat (Mangrove-Coral-Hydrobious, etc.)	Corals : not observed There are mangroves at the coastal area of the bay and at the vicinity of the proposed project area. Several kinds of wild birds are observed in the lagoon along the Anak river.
Pollutant	Occurring Conditions of Concern (High Occurrence of Environmental Pollution, etc.)	As no public sewage treatment facilities and pipelines are installed in fishing village, most domestic sewage is disposed to the river and sea area, Water pollution is already observed in the mouth of Anak river.
	Countermeasure	None
Other Items		At present, the government has a development plan for an industrial area. The area has already been approved as such but the timetable and details for the plan is not yet known.

Table A9.1.4(1) Matrix of Element for Environmental Impact (Ujung Pandang)

Location : Ujung Pandang (Existing Seaport)

Items Port and related facilities		Total Evaluation	PC Change of Topogra- phy	PC Operation of Construc- tion	PC Exclusive use of Space	OP Driving of Car	OP Navigat- ion of Vessels	OP Operation of Facilities
Social environment	1	Resettlement of inhabitants	D		X			X
	2	Economic activities	C	X		X	X	X
	3	Traffics and life facilities	B	X		X	X	X
	4	Division of regional area	D	X		X		
	5	Historical and cultural heritage	D					X
	6	Water right and common right	D	X	X			
	7	Hygiene and health	D	X				X
	8	Waste and garbage	D	X			X	X
	9	Risks and hazards	C	X	X		X	X
Natural Environment	10	Topography and geology	C	X	X			
	11	Soil erosion	D	X	X			
	12	Underground water	D		X			X
	13	Hydrological regime for river and lake	D					
	14	Coastal zone	C	X	X			
	15	Ecology, fauna, flora	C		X	X		X
	16	Meteorology	D		X			
	17	Landscape	D	X	X			
Pollutant	18	Air Pollution	B			X		X
	19	Water pollution	B		X		X	X
	20	Soil contamination	D					X
	21	Noise and vibration	C		X			
	22	Land subsidence	C		X			
	23	Offensive odor	D					X

A : High magnitude of impact is expected

B : Low magnitude of impact is expected

C : Unknown (Need study; provide consideration that it will become clear after the site investigation and survey)

D : No effect is expected, and does not require consideration for the items of EIA.

PC : Pre-construction Stage OP : Operation Stage

Table A9.1.4(2) Project Environment (Ujung Pandang)

Location : Ujung Pandang (Existing Seaport)

Items		Description
Name of Site		Ujung Pandang Ferry Terminal
Social Environment	Local Inhabitants (Resident/Inhabitants/Consciousness for Planning , etc.)	The proposed ferry terminal is located at the seaport area and it is planned for construction in the future. No permanent resident/inhabitant is living in this area.
	Utilization of land (Fishing Village -Fish Market/Coastal Industry area, etc.)	All of the areas are utilized for port facilities including port office buildings, cement/grain storage, passenger terminals etc. The existing seaport is located at the center of the city. Most of the coastal area is utilized for housing and port facilities with only a limited space remaining for the project
	Economy/Recreation (Agriculture/Commerce/Resort Facilities, etc.)	Recreation and resort facilities are not available at the existing port area except for some hotels. Only a few fishing boats and fishermen are observed at day time, but many fishermen conduct fishing with small boats at night time in the coastal area. There is an increasing number of tourists coming from other provinces and foreign countries.
Natural Environment	Topography and Geology (Steep Slope-Poor Subsoil-Damp Area/Dislocation, etc.)	Reclamation for site preparation would be required for this project. In case dredged materials would be utilized for reclamation, there is a possibility that seawater will be contaminated with dredged materials. Appropriate and proper methods of construction should be considered.
	Coastal Zone (Erosion-Deposition/Tidal Current-Tide-Depth, etc.)	There are many beautiful coasts at the coastal area of the city, and these are presently utilized by citizens as seaside park and view point. The coastal area of the existing seaport has a limited space.
	Precious Fauna and Flora, Habitat (Mangrove-Coral-Hydrobious, etc.)	Mangroves : not observed. There are corals at the coastal areas and at the vicinity of the proposed project area.
Pollutant	Occurring Conditions of Concern (High Occurrence of Environmental Pollution, etc.)	If the ferry terminal will be constructed inside the seaport, the street for access will be congested by traffic from the loading and unloading of ferry boats. Even now, the main streets of the town are already congested with cars
	Countermeasure	To obtain smooth traffic control, the local government recommends that the new project be planned outside the city area.
Other items		None

Table A9.1.5(1) Matrix of Element for Environmental Impact (Selayar)

Location : Selayar

Items Port and related facilities		Total Evalu- ation	PC Change of Topogra- phy	PC Operation of Construc- tion	PC Exclusive use of Space	OP Driving of Car	OP Navigat- ion of Vessels	OP Operation of Facilities
Social Environment	1 Resettlement of inhabitants	B		X	X			X
	2 Economic activities	C		X		X	X	X
	3 Traffics and life facilities	C		X		X	X	X
	4 Division of regional area	D		X		X		
	5 Historical and cultural heritage	D						X
	6 Water right and common right	C		X	X			X
	7 Hygiene and health	D		X				X
	8 Waste and garbage	D		X			X	X
	9 Risks and hazards	D		X		X		X
Natural Environment	10 Topography and geology	C	X		X			
	11 Soil erosion	D	X					
	12 Underground water	D		X				X
	13 Hydrological regime for river and lake	D						
	14 Coastal zone	D	X	X				X
	15 Ecology, fauna, flora	B		X	X			X
	16 Meteorology	D		X				
17 Landscape	D		X					
Pollutant	18 Air Pollution	D				X		X
	19 Water pollution	C		X			X	X
	20 Soil contamination	D						X
	21 Noise and vibration	D		X				
	22 Land subsidence	C		X				
	23 Offensive odor	D						X

A : High magnitude of impact is expected

B : Low magnitude of impact is expected

C : Unknown (Need study; provide consideration that it will become clear after the site investigation and survey)

D : No effect is expected, and does not require consideration for the items of EIA.

PC : Pre-construction Stage OP : Operation Stage

Table A9.1.5(2) Project Environment (Selayar)

Location : Selayar

Items		Description
Name of Site		Patumbukang Ferry Terminal
Social Environment	Local Inhabitants (Resident/Inhabitants/Consciousness for Planning , etc.)	Approximately 25 families of fishermen and farmers live adjacent to the project area. The fishermen carry out their fishing operation by small boats without engine in the bay area.
	Utilization of land (Fishing Village –Fish Market/Coastal Industry area, etc.)	The proposed port area is located at a hillside having a gentle slope. There are several reforestation areas planted with coconut trees,
	Economy/Recreation (Agriculture/Commerce/Resort Facilities, etc.)	Recreation and resort facilities are not available in this bay area. There are no fishing operations by large scale boats. Only small scale fishing is conducted throughout the year in this bay area. Apatana, south of Selayar island, is designated as a recreational area by the local government. There is a construction plan for hotels in this area.
Natural Environment	Topography and Geology (Steep Slope-Poor Subsoil-Damp Area/Dislocation, etc.)	Part of main access roads to the port area are unpaved and are having steep slope. It is observed that most require repair and maintenance including bridges.
	Coastal Zone (Erosion-Deposition/Tidal Current-Tide-Depth, etc.)	The coastal zone of Selayar island is comprised of a little sand rock beach and a sandy beach with no observed erosion problems.
	Precious Fauna and Flora, Habitat (Mangrove-Coral-Hydrobious, etc.)	Corals were observed at the mouth of the bay and at the access area . A part of the coastal area of the bay is covered with tropical, jungly and unmanned trees. There is mangrove forest in the coastal area and in the vicinity of the proposed project area though part of it is damaged. The fisherman carry out the preparation of fish ponds in this area. The sea area south of Selayar island is designated as Taman National Park (Tanabonerate Sea Park).
Pollutant	Occurring Conditions of Concern (High Occurrence of Environmental Pollution, etc.)	None
	Countermeasure	None
Other items		Due to the tight conditions of water supply in the City and with only a limited number of pipelines for city water installed, a lot of families are using artesian wells in this island.

Table A9.1.6(1) Matrix of Element for Environmental Impact (Kendari)

Location : Kendari (Existing Seaport)

Items Port and related facilities		Total Evalu- ation	PC Change of Topogra- phy	PC Operation of Construc- tion	PC Exclusive use of Space	OP Driving of Car	OP Navigat- ion of Vessels	OP Operation of Facilities
Social Environment	1	Resettlement of inhabitants	D		X	X		X
	2	Economic activities	D		X		X	X
	3	Traffics and life facilities	B		X		X	X
	4	Division of regional area	C		X		X	
	5	Historical and cultural heritage	D					X
	6	Water right and common right	D		X	X		
	7	Hygiene and health	D		X			X
	8	Waste and garbage	D		X			X
	9	Risks and hazards	C		X		X	X
Natural Environment	10	Topography and geology	D	X		X		
	11	Soil erosion	D		X			
	12	Underground water	D					
	13	Hydrological regime for river and lake	D					
	14	Coastal zone	C	X	X			
	15	Ecology, fauna, flora	C		X	X		X
	16	Meteorology	D		X			
17	Landscape	D	X	X				
Pollutant	18	Air Pollution	C			X	X	X
	19	Water pollution	B		X			X
	20	Soil contamination	D					X
	21	Noise and vibration	C		X			
	22	Land subsidence	C		X			
	23	Offensive odor	D					X

A : High magnitude of impact is expected

B : Low magnitude of impact is expected

C : Unknown (Need study; provide consideration that it will become clear after the site investigation and survey)

D : No effect is expected, and does not require consideration for the items of EIA.

PC : Pre-construction Stage OP : Operation Stage

Table A9.1.6(2) Project Environment (Kendari)

Location : Kendari

Items		Description
Name of Site		Kendari Ferry Terminal
Social Environment	Local Inhabitants (Resident/Inhabitants/Consciousness for Planning , etc.)	The proposed ferry terminal is located adjacent to the existing ferry terminal area which is under construction at present stage. No residents / inhabitants live in this area.
	Utilization of land (Fishing Village -Fish Market/Coastal Industry area, etc.)	Almost all areas are utilized for port facilities including terminal building, port office buildings, etc. The existing ferry terminal adjoins the old market for the local inhabitants.
	Economy/Recreation (Agriculture/Commerce/Resort Facilities, etc.)	Recreation and resort facilities are not available except for some hotels. Only a few fishing boats and fishermen were observed in this bay area. Almost all fishermen live at the opposite side of the bay.
Natural Environment	Topography and Geology (Steep Slope-Poor Subsoil-Damp Area/Dislocation, etc.)	There is no maintenance dredging work conducted in the existing port. In case dredged materials would be utilized for reclamation, there is a possibility that seawater will be contaminated with dredged materials. Appropriate methods and proper method of construction should be considered.
	Coastal Zone (Erosion-Deposition/Tidal Current-Tide-Depth, etc.)	The existing ferry terminal area was prepared by reclamation. There are many lagoons having mangrove forests at the coastal zone in the bay area.
	Precious Fauna and Flora, Habitat (Mangrove-Coral-Hydrobious, etc.)	Corals : not observed There are mangroves in the coastal area of the bay and in the vicinity of the proposed project area. There was not observed precious fauna and flora in the project area.
Pollutant	Occurring Conditions of Concern (High Occurrence of Environmental Pollution, etc.)	There is an old market along the existing narrow access road to the ferry terminal. If a new ferry terminal will be constructed inside the existing port, access road will be congested by traffic from the loading and unloading of ferry boats and by cars passing through this road.
	Countermeasure (Countermeasure of Organization/Compensation, etc.)	To minimize the disturbance on regular traffic, proper planning, re-routing and scheduling of transports to off- peak hours should be considered.
Other Items		None

Table A9.1.7(1) Matrix of Element for Environmental Impact (Ambon)

Location : Ambon (Funinua)

Items Port and related facilities		Total Evalu- ation	PC Change of Topogra- phy	PC Operation of Construc- tion	PC Exclusive use of Space	OP Driving of Car	OP Navigat- ion of Vessels	OP Operation of Facilities
Social Environment	1	Resettlement of inhabitants	D		X			
	2	Economic activities	C		X	X	X	X
	3	Traffics and life facilities	C		X	X	X	X
	4	Division of regional area	D		X	X		
	5	Historical and cultural heritage	D					X
	6	Water right and common right	D		X	X		
	7	Hygiene and health	D		X			X
	8	Waste and garbage	D		X		X	X
	9	Risks and hazards	C		X			X
Natural Environment	10	Topography and geology	D	X	X			
	11	Soil erosion	D	X	X			
	12	Underground water	D		X			X
	13	Hydrological regime for river and lake	D					
	14	Coastal zone	C	X	X			
	15	Ecology, fauna, flora	C		X	X		X
	16	Metcorology	D		X			
	17	Landscape	D	X	X			
Pollutant	18	Air Pollution	D			X		X
	19	Water pollution	B		X		X	X
	20	Soil contamination	D					X
	21	Noise and vibration	D		X			
	22	Land subsidence	C		X			
	23	Offensive odor	D					X

A : High magnitude of impact is expected

B : Low magnitude of impact is expected

C : Unknown (Need study; provide consideration that it will become clear after the site investigation and survey)

D : No effect is expected, and does not require consideration for the items of EIA.

PC : Pre-construction Stage OP : Operation Stage

Table A9.1.7(2) Project Environment (Ambon)

Location : Ambon (Funimua)

Items		Description
Name of Site		Hunimua Ferry Terminal
Social Environment	Local Inhabitants (Resident/Inhabitants/Consciousness for Planning , etc.)	The proposed ferry terminal is located adjacent to the existing ferry terminal area for the route of Seram. Approximately 10 fishermen conduct their fishing operation in this coastal area with small boats without engine.
	Utilization of land (Fishing Village –Fish Market/Coastal Industry area, etc.)	The coastal zone adjacent to the existing ferry terminal area is designated as a recreational area by the local government and it has recreational facilities such as restaurant, sheds, cottages, gate, mosque, etc. The P. Pombo island located east of Hunimua is designated as a national park and there are tropical, jungly and unmanned areas with plants. The land adjacent to the existing port is utilized as an army base.
	Economy/Recreation (Agriculture/Commerce/Resort Facilities, etc.)	Approximately 30 families of farmers live in the area along the access road, about 3km far from the port.
Natural Environment	Topography and Geology (Steep Slope-Poor Subsoil-Damp Area/Dislocation, etc.)	Reclamation for site preparation would be required for this project. In case dredged materials would be utilized for reclamation, there is a possibility that seawater will be contaminated with dredged materials. Appropriate and proper methods of construction should be considered.
	Coastal Zone (Erosion-Deposition/Tidal Current-Tide-Depth, etc.)	Seawater has high transparency, and there is very high visibility in the expected project area.
	Precious Fauna and Flora, Habitat (Mangrove-Coral-Hydrobious, etc.)	Mangroves : not observed in the project area. There are corals in the coastal area and in the vicinity of the proposed project area.
Pollutant	Occurring Conditions of Concern (High Occurrence of Environmental Pollution, etc.)	None
	Countermeasure	None
Other Items		Paved road of 6 meters width runs from the port through the Tuluhu seaport to the center of Ambon.

Table A9.1.8(1) Matrix of Element for Environmental Impact (Wahai)

Location : Seram (Wahai)

Items Port and related facilities		Total Evalu- ion	PC Change of Topogra- phy	PC Operation of Construc- tion	PC Exclusive use of Space	OP Driving of Car	OP Navigat- ion of Vessels	OP Operation of Facilities
Social Environment	1	Resettlement of inhabitants	C	X	X			X
	2	Economic activities	C	X		X	X	X
	3	Traffics and life facilities	C	X		X	X	X
	4	Division of regional area	D	X		X		
	5	Historical and cultural heritage	D					X
	6	Water right and common right	D	X			X	
	7	Hygiene and health	D	X				X
	8	Waste and garbage	D	X			X	X
	9	Risks and hazards	D	X	X			X
Natural Environment	10	Topography and geology	C	X				
	11	Soil erosion	C	X	X		X	
	12	Underground water	D		X			X
	13	Hydrological regime for river and lake	D	X			X	X
	14	Coastal zone	C	X	X			
	15	Ecology, fauna, flora	C		X			X
	16	Meteorology	D		X			
17	Landscape	D	X	X				
Pollutant	18	Air Pollution	D			X		X
	19	Water pollution	B		X		X	X
	20	Soil contamination	D					X
	21	Noise and vibration	D		X			
	22	Land subsidence	C		X			
	23	Offensive odor	D					X

- A : High magnitude of impact is expected
 B : Low magnitude of impact is expected
 C : Unknown (Need study; provide consideration that it will become clear after the site investigation and survey)
 D : No effect is expected, and does not require consideration for the items of EIA.
 PC : Pre-construction Stage OP : Operation Stage

Table A9.1.8(2) Project Environment (Wahai)

Location : Seram (Wahai)

Items		Description
Name of Site		Wahai Ferry Terminal
Social Environment	Local Inhabitants (Resident/Inhabitants/Consciousness for Planning , etc.)	The proposed ferry terminal is located adjacent to the existing seaport. Approximately 20 families live nearby and 2km from the port area. Residents of this area earn their living by fishery and farming.
	Utilization of land (Fishing Village -Fish Market/Coastal Industry area, etc.)	Fishermen conduct their fishing operation in this coastal area with small boats without engine. Almost all fishermen moor their fishing boats in the fishing village. There are port office buildings and small shops selling daily necessities adjacent to the existing seaport.
	Economy/Recreation (Agriculture/Commerce/Resort Facilities, etc.)	Recreation and resort facilities are not available in this area not even hotels. There are no commercial facilities along the access road and the main road to the port.
Natural Environment	Topography and Geology (Steep Slope-Poor Subsoil-Damp Area/Dislocation, etc.)	Small scale site preparation would be required for this project. In case dredged materials would be utilized for reclamation, there is a possibility that seawater will be contaminated with dredged materials. Appropriate and proper methods of construction should be considered.
	Coastal Zone (Erosion-Deposition/Tidal Current-Tide-Depth, etc.)	Seawater has high transparency, and there is very high visibility in the expected project area. As there are no revetment walls, there were observed erosion problems nearby the existing port. There is a river adjacent to the project area which flows to the bay area.
	Precious Fauna and Flora, Habitat (Mangrove-Coral-Hydrobious, etc.)	There are mangrove trees in the coastal area and in the vicinity of the proposed project area. Corals were observed in the shallow part beside the existing jetty. Area : Approximately 5m x 40m
Pollutant	Occurring Conditions of Concern (High Occurrence of Environmental Pollution, etc.)	None
	Countermeasure	None
Other Items		Paved road of 2-3 meters width runs from the existing port to the center of the city, though it was observed that the road would require repair and maintenance including extension of width. There is no water supply system in the project area.

Table A9.1.9(1) Matrix of Element for Environmental Impact (Patani)

Location : Patani (Sif)

Items Port and related facilities		Total Evalu- ation	PC Change of Topogra- phy	PC Operation of Construc- tion	PC Exclusive use of Space	OP Driving of Car	OP Navigat- ion of Vessels	OP Operation of Facilities
Social Environment	1	Resettlement of inhabitants	B		X	X		X
	2	Economic activities	C		X		X	X
	3	Traffics and life facilities	C		X		X	X
	4	Division of regional area	D		X		X	
	5	Historical and cultural heritage	D					X
	6	Water right and common right	C		X			
	7	Hygiene and health	D		X			X
	8	Waste and garbage	D		X		X	X
	9	Risks and hazards	D		X			X
Natural Environment	10	Topography and geology	D	X				
	11	Soil erosion	D	X	X			
	12	Underground water	D		X			X
	13	Hydrological regime for river and lake	D	X			X	X
	14	Coastal zone	D	X	X			
	15	Ecology, fauna, flora	B		X			X
	16	Meteorology	D		X			
	17	Landscape	D	X	X			
Pollutant	18	Air Pollution	D			X		X
	19	Water pollution	C		X		X	X
	20	Soil contamination	D					X
	21	Noise and vibration	D		X			
	22	Land subsidence	D		X			
	23	Offensive odor	D					X

A : High magnitude of impact is expected

B : Low magnitude of impact is expected

C : Unknown (Need study; provide consideration that it will become clear after the site investigation and survey)

D : No effect is expected, and does not require consideration for the items of EIA.

PC : Pre-construction Stage OP : Operation Stage

Table A9.1.9(2) Project Environment (Patani)

Location : Patani (Sif)

Items		Description
Name of Site		Sif Ferry Terminal
Social Environment	Local Inhabitants (Resident/Inhabitants/Consciousness for Planning , etc.)	The population of residents living in the center of Patani village is approximately 2000, and 70% of them are engaged in fishery and farming. The port is located 13km east of the village. There are 20 families living inside the proposed project area, and they are engaged in fishery and farming.
	Utilization of land (Fishing Village -Fish Market/Coastal Industry area, etc.)	Fishermen conduct fishing operation in this coastal area with small boats (without engine : 50, with engine : 20). Due to the small scale of the market, they have limitation on their fishery business. Most of the fishes are consumed only within the village. Approximately 30 families live along the access road to the port.
	Economy/Recreation (Agriculture/Commerce/Resort Facilities, etc.)	The main farm product is coconut. There are only a few shops selling daily necessities in Patani village. Cargo and passenger vessels come from Ternate at an average of two times per month.
Natural Environment	Topography and Geology (Steep Slope-Poor Subsoil-Damp Area/Dislocation, etc.)	Small scale site preparation would be required for this project. In case dredged materials would be utilized for reclamation, there is a possibility that seawater will be contaminated with dredged materials. Appropriate and proper methods of construction should be considered.
	Coastal Zone (Erosion-Deposition/Tidal Current-Tide-Depth, etc.)	Seawater has high transparency, and there is very high visibility in the expected project area. There is a river adjacent to the project area.
	Precious Fauna and Flora, Habitat (Mangrove-Coral-Hydrobious, etc.)	Corals : observed. There are many mangroves observed adjacent to the expected project area and at the coastal area of Patani village. Inland and coastal area of Sif area are covered with tropical, jungly and unmanned trees.
Pollutant	Occurring Conditions of Concern (High Occurrence of Environmental Pollution, etc.)	None
	Countermeasure	None
Other Items		Paved and unpaved access roads of 2-3 meters width run from the port to the center of the village though necessary repair and modifications of these roads including bridges are needed. There are no power supply, water supply and telephone systems in the project area.

Table A9.1.10(1) Matrix of Element for Environmental Impact (Babang)

Location : Babang

Items Port and related facilities		Total Evalu- ation	PC Change of Topogra- phy	PC Operation of Construc- tion	PC Exclusive use of Space	OP Driving of Car	OP Navigat- ion of Vessels	OP Operation of Facilities
Social Environment	1	Resettlement of inhabitants	C	X	X			X
	2	Economic activities	C	X		X	X	X
	3	Traffics and life facilities	D	X		X	X	X
	4	Division of regional area	D	X		X		
	5	Historical and cultural heritage	D					X
	6	Water right and common right	C	X	X		X	
	7	Hygiene and health	D	X				X
	8	Waste and garbage	C	X			X	X
	9	Risks and hazards	D	X	X			X
Natural Environment	10	Topography and geology	D	X	X			
	11	Soil erosion	D	X				
	12	Underground water	D	X				X
	13	Hydrological regime for river and lake	D				X	X
	14	Coastal zone	C	X	X			
	15	Ecology, fauna, flora	C	X	X			X
	16	Meteorology	D	X				
	17	Landscape	D	X	X			
Pollutant	18	Air Pollution	D			X		X
	19	Water pollution	B	X			X	X
	20	Soil contamination	D					X
	21	Noise and vibration	D	X				
	22	Land subsidence	D	X				
	23	Offensive odor	D					X

- A : High magnitude of impact is expected
 B : Low magnitude of impact is expected
 C : Unknown (Need study; provide consideration that it will become clear after the site investigation and survey)
 D : No effect is expected, and does not require consideration for the items of EIA.
 PC : Pre-construction Stage OP : Operation Stage

Table A9.1.10(2) Project Environment (Babang)

Location : Babang

Items		Description
Name of Site		Kanimanis Ferry Terminal
Social Environment	Local Inhabitants (Resident/Inhabitants/Consciousness for Planning , etc.)	The proposed ferry terminal is located at the bay area. As land is utilized for Timber Company, no inhabitants live in this area. There are family houses in the area along the road to the proposed port. Approximately 2000 people and 400 families live at the center of Babang. It is estimated that 70-80% of those living in this area are engaged in fishery and farming.
	Utilization of land (Fishing Village -Fish Market/Coastal Industry area, etc.)	Most fishermen live in Pananbon area nearby Labuha. Fishermen conduct their fishing operation in this coastal area with 30 small boats with and without engine. Due to the small scale of the local market, they have limitation on their fishery business. Most of the fishes are consumed only within the village. There is a nursery plant adjacent to the proposed port.
	Economy/Recreation (Agriculture/Commerce/Resort Facilities, etc.)	Recreation, resort and industrial facilities are not available in this area. The main farm products are coconut and cacao. There is an old local market beside the existing seaport. There are small street traders selling daily necessities and foods in this area.
Natural Environment	Topography and Geology (Steep Slope-Poor Subsoil-Damp Area/Dislocation, etc.)	Small scale site preparation would be required for this project. In case dredged materials would be utilized for reclamation, there is a possibility that seawater will be contaminated with dredged materials. Appropriate and proper methods of construction should be considered.
	Coastal Zone (Erosion-Deposition/Tidal Current-Tide-Depth, etc.)	Seawater has high transparency, and there is very high visibility in the expected project area. Coastal area at the bay is comprised of lagoon with mangroves Erosion problems were not observed.
	Precious Fauna and Flora, Habitat (Mangrove-Coral-Hydrobious, etc.)	Coral : not observed. Many mangrove forest were observed in the coastal area of the bay 1km from the project area.
Pollutant	Occurring Conditions of Concern (High Occurrence of Environmental Pollution, etc.)	None
	Countermeasure	None
OTHER ITEMS		There are no permanent power supply ,water supply and telephone systems in this area .

Table A9.1.11(1) Matrix of Element for Environmental Impact (Biak)

Location : Biak (Mokmer)

Items Port and related facilities		Total Evalu- ation	PC Change of Topogra- phy	PC Operation of Construc- tion	PC Exclusive use of Space	OP Driving of Car	OP Navigat- ion of Vessels	OP Operation of Facilities
Social Environment	1	Resettlement of inhabitants	D	X	X			X
	2	Economic activities	C	X		X	X	X
	3	Traffics and life facilities	D	X		X	X	X
	4	Division of regional area	D	X		X		
	5	Historical and cultural heritage	D	X	X			
	6	Water right and common right	D		X	X		X
	7	Hygiene and health	D		X			X
	8	Waste and garbage	C		X			X
	9	Risks and hazards	D		X			X
Natural Environment	10	Topography and geology	D	X		X		
	11	Soil erosion	D		X			
	12	Underground water	D		X			X
	13	Hydrological regime for river and lake	D					
	14	Coastal zone	C	X	X			
	15	Ecology, fauna, flora	C		X			X
	16	Meteorology	D		X			
17	Landscape	D	X	X				
Pollutant	18	Air Pollution	D			X		X
	19	Water pollution	B		X		X	X
	20	Soil contamination	D					X
	21	Noise and vibration	D		X			
	22	Land subsidence	C		X			
	23	Offensive odor	D					X

A : High magnitude of impact is expected

B : Low magnitude of impact is expected

C : Unknown (Need study; provide consideration that it will become clear after the site investigation and survey)

D : No effect is expected, and does not require consideration for the items of EIA.

PC : Pre-construction Stage OP : Operation Stage

Table A9.1.11(2) Project Environment (Biak)

Location : Biak (Mokmer)

Items		Description
Name of Site		Biak Ferry Terminal
Social Environment	Local Inhabitants (Resident/Inhabitants/Consciousness for Planning , etc.)	No local inhabitants live in the project area but approximately 200 families live at the coastal area along the access road and adjacent to the project area. Most residents living in this area are engaged in fishery and farming.
	Utilization of land (Fishing Village -Fish Market/Coastal Industry area, etc.)	The proposed port is located beside the seaport planned by the local government which has already completed its site preparation. The hinterland area has gentle hills and small mountains. There are tombs for the local inhabitants and a monument for World War- II constructed by the Japanese Government near the project area. There are fish ponds located on both sides of the ferry terminal now under construction.
	Economy/Recreation (Agriculture/Commerce/Resort Facilities, etc.)	There are recreational and resort facilities constructed and operated by the government 27km from the project area. There are several plywood factories and a fishing company in this city. Fishermen conduct their fishing operation in this coastal area with small boats without engine.
Natural Environment	Topography and Geology (Steep Slope-Poor Subsoil-Damp Area/Dislocation, etc.)	Reclamation for site preparation would be required for this project. In case dredged materials would be utilized for reclamation, there is a possibility that seawater will be contaminated with dredged materials. Appropriate and proper methods of construction should be considered.
	Coastal Zone (Erosion-Deposition/Tidal Current-Tide-Depth, etc.)	Seawater has high transparency, and there is very high visibility in the expected project area. Coastal area is comprised of a little coral stone and a sandy beach with no observed erosion problems.
	Precious Fauna and Flora, Habitat (Mangrove-Coral-Hydrobious, etc.)	Corals : not observed, Mangrove : not observed. There was not observed precious fauna and flora in the project area. Almost all of the project area are covered with coconut trees and tropical trees.
Pollutant	Occurring Conditions of Concern (High Occurrence of Environmental Pollution, etc.)	None
	Countermeasure	None
Other Items		Reclamation for site preparation of the existing area used corals taken from the inland area.

Table A9.1.12(1) Matrix of Element for Environmental Impact (Manokwari)

Location : Manokwari (Sowi)

Items Port and related facilities		Total Evaluation	PC Change of Topogra- phy	PC Operation of Construc- tion	PC Exclusive use of Space	OP Driving of Car	OP Navigat- ion of Vessels	OP Operation of Facilities
Social Environment	1 Resettlement of inhabitants	B		X	X			X
	2 Economic activities	C		X		X	X	X
	3 Traffics and life facilities	D		X		X	X	X
	4 Division of regional area	D		X		X		
	5 Historical and cultural heritage	C	X	X				
	6 Water right and common right	D		X	X		X	
	7 Hygiene and health	D		X				X
	8 Waste and garbage	C		X			X	X
	9 Risks and hazards	D		X				X
Natural Environment	10 Topography and geology	C	X		X			
	11 Soil erosion	C		X				
	12 Underground water	D		X				X
	13 Hydrological regime for river and lake	C	X				X	
	14 Coastal zone	C	X	X				
	15 Ecology, fauna, flora	C		X				X
	16 Meteorology	D		X				
17 Landscape	D	X	X					
Pollutant	18 Air Pollution	D				X		X
	19 Water pollution	B		X			X	X
	20 Soil contamination	D						X
	21 Noise and vibration	D		X				
	22 Land subsidence	C		X				
	23 Offensive odor	D						X

A : High magnitude of impact is expected

B : Low magnitude of impact is expected

C : Unknown (Need study; provide consideration that it will become clear after the site investigation and survey)

D : No effect is expected, and does not require consideration for the items of EIA.

PC : Pre-construction Stage OP : Operation Stage

Table A9.1.12(2) Project Environment (Manokwari)

Location : Manokwari (Sowi)

Items		Description
Name of Site		Sowi Ferry Terminal
Social Environment	Local Inhabitants (Resident/Inhabitants/Consciousness for Planning , etc.)	30 families of fishermen and farmers live adjacent to the proposed project area and along the coastal area. Fishermen conduct their fishing operation by small boats in the bay area. Most residents living in this area are engaged in fishery and farming.
	Utilization of land (Fishing Village –Fish Market/Coastal Industry area, etc.)	The hinterland area has gentle hills and small mountains. There are cacao factory, several lumber mills and a university along the access road near the project area. The biggest industry in the city is a concrete block factory for building materials.
	Economy/Recreation (Agriculture/Commerce/Resort Facilities, etc.)	There is a recreational beach 10km from the project area. There are logging factories. 72845 people live in city area, and it is estimated that approximately 35% of them are engaged in fishery and farming. Fishermen conduct their fishing operation in this coastal area with small boats without engine (total number of fishing boats : 150).
Natural Environment	Topography and Geology (Steep Slope-Poor Subsoil-Damp Area/Dislocation, etc.)	Reclamation for site preparation would be required for this project. In case dredged materials would be utilized for reclamation, there is a possibility that seawater will be contaminated with dredged materials. Appropriate and proper methods of construction should be considered
	Coastal Zone (Erosion-Deposition/Tidal Current-Tide-Depth, etc.)	The coastal area is comprised of coral rock and small coral pebble stones. There were observed erosion problems in the coastal area. Part of the existing coastal line receive damages from waves and several roots of trees are exposed. There is a river (Sowi river) nearby the project area which flows to the bay.
	Precious Fauna and Flora, Habitat (Mangrove-Coral-Hydrobious, etc.)	Mangrove : not observed. Corals were observed in the shallow sea area nearby the coastal area (50m from shore line) and in the access area. Precious fauna and flora was not observed in the project area.
Pollutant	Occurring Conditions of Concern (High Occurrence of Environmental Pollution, etc.)	None
	Countermeasure	None
Other Items		None

Table A9.1.13(1) Matrix of Element for Environmental Impact (Sorong)

Location : Sorong (Klademak)

Items Port and related facilities		Total Evaluation	PC Change of Topogra- phy	PC Operation of Construc- tion	PC Exclusive use of Space	OP Driving of Car	OP Navigat- ion of Vessels	OP Operation of Facilities
Social Environment	1	Resettlement of inhabitants	B		X	X		X
	2	Economic activities	C		X		X	X
	3	Traffics and life facilities	C		X		X	X
	4	Division of regional area	D		X		X	
	5	Historical and cultural heritage	D		X			
	6	Water right and common right	D		X	X		X
	7	Hygiene and health	D		X			X
	8	Waste and garbage	C		X			X
	9	Risks and hazards	D		X			X
Natural Environment	10	Topography and geology	D	X		X		
	11	Soil erosion	D	X	X			
	12	Underground water	D		X			X
	13	Hydrological regime for river and lake	D	X			X	X
	14	Coastal zone	C	X	X			
	15	Ecology, fauna, flora	D		X	X		X
	16	Metecorology	D		X			
17	Landscape	D	X	X				
Pollutant	18	Air Pollution	D			X		X
	19	Water pollution	C		X		X	X
	20	Soil contamination	D					X
	21	Noise and vibration	D		X			
	22	Land subsidence	D		X			
	23	Offensive odor	D					X

A : High magnitude of impact is expected

B : Low magnitude of impact is expected

C : Unknown (Need study; provide consideration that it will become clear after the site investigation and survey)

D : No effect is expected, and does not require consideration for the items of EIA.

PC : Pre-construction Stage OP : Operation Stage

Table A9.1.13(2) Project Environment (Sorong)

Location : Sorong (klademak)

Items		Description
Name of Site		Sorong Ferry Terminal
Social Environment	Local Inhabitants (Resident/Inhabitants/Consciousness for Planning , etc.)	Approximately 70 families of fishermen live adjacent to the proposed project area, and there are many family houses along the access roads and nearby. Fishermen living in this area conduct their fishing operation by small boats in the bay area.
	Utilization of land (Fishing Village -Fish Market/Coastal Industry area, etc.)	The proposed ferry terminal is located beside the existing ferry terminal and adjacent to the existing seaport (Navigasi port). The existing wooden made jetty is utilized by ferry boats bound for the air port and plywood factory. The hinterland area has gentle hills with some family houses constructed on it.
	Economy/Recreation (Agriculture/Commerce/Resort Facilities, etc.)	There are fishery companies, plywood factories, and oil company (Pertamina), etc. in this city. The biggest company in the city is Pertamina and approximately 1,000 workers are employed in this company. There are also several fishery companies of shrimp in the city. Approximately 100,000 people live in the city area, and it is estimated that approximately 10% of them are engaged in fishery. It was observed that fishermen conduct their fishing operation with large type boats (15tons) in the sea of Irian Jaya. (Number of boats : approximately 30).
Natural Environment	Topography and Geology (Steep Slope-Poor Subsoil-Damp Area/Dislocation, etc.)	Minimal land preparation is required.
	Coastal Zone (Erosion-Deposition/Tidal Current-Tide-Depth, etc.)	Concrete walls for revetment are already constructed in the project area. Erosion problems were not observed in the coastal area. There is a river approximately 5km from the proposed port and it is flowing to the bay area.
	Precious Fauna and Flora, Habitat (Mangrove-Coral-Hydrobious, etc.)	Mangrove : not observed. Corals : not observed. There was not observed precious fauna and flora in the project area.
Pollutant	Occurring Conditions of Concern (High Occurrence of Environmental Pollution, etc.)	As no public sewage treatment facilities and pipelines are installed in the fishing village, most domestic sewage is disposed to the sea. Water pollution was already observed in the fishing village.
	Countermeasure	None
Other Items		None

Table A9.1.14(1) Matrix of Element for Environmental Impact (Labuhan Bajo)

Location : Labuhan Bajo

Items Port and related facilities		Total Evaluation	PC Change of Topogra- -phy	PC Operation of Construc- -tion	PC Exclusive use of Space	OP Driving of Car	OP Navigat- ion of Vessels	OP Operation of Facilities
Social Environment	1	Resettlement of inhabitants	D	X	X			X
	2	Economic activities	C	X		X	X	X
	3	Traffics and life facilities	D	X		X	X	X
	4	Division of regional area	D	X		X		
	5	Historical and cultural heritage	D	X				
	6	Water right and common right	D	X	X		X	
	7	Hygiene and health	D	X				X
	8	Waste and garbage	C	X			X	X
	9	Risks and hazards	D	X				X
Natural Environment	10	Topography and geology	D	X	X			
	11	Soil erosion	D	X	X			
	12	Underground water	D		X			X
	13	Hydrological regime for river and lake	D					
	14	Coastal zone	D	X	X			
	15	Ecology, fauna, flora	B		X	X		X
	16	Meteorology	D		X			
17	Landscape	D	X	X				
Pollutant	18	Air Pollution	D		X	X		X
	19	Water pollution	B		X		X	X
	20	Soil contamination	D					X
	21	Noise and vibration	D		X			
	22	Land subsidence	D		X			
	23	Offensive odor	D					X

A : High magnitude of impact is expected

B : Low magnitude of impact is expected

C : Unknown (Need study; provide consideration that it will become clear after the site investigation and survey)

D : No effect is expected, and does not require consideration for the items of EIA.

PC : Pre-construction Stage OP : Operation Stage

Table A9.1.14(2) Project Environment (Labuhan Bajo)

Location : Labuhan Bajo

Items		Description
Name of Site		Labuhan Bajo Ferry Terminal
Social Environment	Local Inhabitants (Resident/Inhabitants/Consciousness for Planning, etc.)	Approximately 100 families of fishermen live adjacent to the proposed project area. There are many family houses along the access roads and nearby. Fishermen living in this area conduct their fishing operation by small boats in the bay area.
	Utilization of land (Fishing Village -Fish Market/Coastal Industry area, etc.)	The proposed ferry terminal is located beside the existing ferry terminal for Sape and Komodo. The hinterland area has steep hills and small mountains and there is only a limited flat area which can be utilized for the project. The harbor for fishing village is littered with outrigger fishing boat and is sheltered by the island. Komodo island is designated as a national park by the government, and the existing port is utilized as base station for Komodo tours.
	Economy/Recreation (Agriculture/Commerce/Resort Facilities, etc.)	Fishermen conduct their fishing operation with small boat with and without engine in the coastal area. There are many beautiful coral reefs in the coastal area and beautiful beaches in the outskirts of the city which attract not only the citizens but also the many tourists coming from foreign countries.
Natural Environment	Topography and Geology (Steep Slope-Poor Subsoil-Damp Area/Dislocation, etc.)	Site preparation would be required for this project. In case dredged materials would be utilized for reclamation, there is a possibility that seawater will be contaminated with dredged materials. Appropriate and proper methods of construction should be considered.
	Coastal Zone (Erosion-Deposition/Tidal Current-Tide-Depth, etc.)	Seawater has high transparency, and there is very high visibility in the expected project area. Coastal area is comprised of a little coral rock and a sandy beach with no observed erosion problems.
	Precious Fauna and Flora, Habitat (Mangrove-Coral-Hydrobious, etc.)	Mangrove : not observed. Many corals were observed in the coastal area of the island. Inland and coastal areas are covered with tropical, jungly and unmanned trees.
Pollutant	Occurring Conditions of Concern (High Occurrence of Environmental Pollution, etc.)	None
	Countermeasure	None
Other Items		The existing movable bridge was constructed in 1996 and the terminal building was constructed in 1993.

Table A9.1.15(1) Matrix of Element for Environmental Impact (Jakarta)

Location : Jakarta (Tanjung Priok Port)

Items Port and related facilities		Total Evaluation	PC Change of Topogra- phy	PC Operation of Construc- tion	PC Exclusive use of Space	OP Driving of Car	OP Navigat- ion of Vessels	OP Operation of Facilities
Social Environment	1	Resettlement of inhabitants	C	X	X			X
	2	Economic activities	C	X		X	X	X
	3	Traffics and life facilities	B	X		X	X	X
	4	Division of regional area	D	X		X		
	5	Historical and cultural heritage	D					X
	6	Water right and common right	C			X	X	
	7	Hygiene and health	D	X				X
	8	Waste and garbage	D	X			X	X
	9	Risks and hazards	C	X	X		X	
Natural Environment	10	Topography and geology	C	X	X			
	11	Soil erosion	D	X			X	
	12	Underground water	D					X
	13	Hydrological regime for river and lake	D	X		X	X	
	14	Coastal zone	C	X				
	15	Ecology, fauna, flora	C		X	X		X
	16	Meteorology	D	X	X			
Pollutant	17	Landscape	D	X	X			
	18	Air Pollution	D			X		X
	19	Water pollution	C		X		X	X
	20	Soil contamination	D					X
	21	Noise and vibration	C		X			
	22	Land subsidence	D		X			
	23	Offensive odor	D					X

A : High magnitude of impact is expected

B : Low magnitude of impact is expected

C : Unknown (Need study; provide consideration that it will become clear after the site investigation and survey)

D : No effect is expected, and does not require consideration for the items of EIA.

PC : Pre-construction Stage OP : Operation Stage

Table A9.1.16(1) Matrix of Element for Environmental Impact (Pontianak)

Location : Pontianak (Kapuas Kacial River)

Items Port and related facilities		Total Evaluat- ion	PC Change of Topogra- phy	PC Operation of Construc- tion	PC Exclusive use of Space	OP Driving of Car	OP Navigat- ion of Vessels	OP Operation of Facilities
Social Environment	1	Resettlement of inhabitants	C	X	X			X
	2	Economic activities	C	X		X	X	X
	3	Traffics and life facilities	B	X		X	X	X
	4	Division of regional area	C	X		X		
	5	Historical and cultural heritage	D					X
	6	Water right and common right	C			X	X	
	7	Hygiene and health	D		X			X
	8	Waste and garbage	D		X		X	X
	9	Risks and hazards	C	X	X		X	
Natural Environment	10	Topography and geology	C	X		X		
	11	Soil erosion	C	X			X	
	12	Underground water	D					X
	13	Hydrological regime for river and lake	C	X		X	X	
	14	Coastal zone	D	X				
	15	Ecology, fauna, flora	C		X	X		X
	16	Meteorology	D	X	X			
17	Landscape	D	X	X				
Pollutant	18	Air Pollution	D			X		X
	19	Water pollution	C		X		X	X
	20	Soil contamination	D					X
	21	Noise and vibration	C		X			
	22	Land subsidence	D		X			
	23	Offensive odor	D					X

- A : High magnitude of impact is expected
 B : Low magnitude of impact is expected
 C : Unknown (Need study; provide consideration that it will become clear after the site investigation and survey)
 D : No effect is expected, and does not require consideration for the items of EIA.
 PC : Pre-construction Stage OP : Operation Stage

9.1.4 Anticipated Environmental Impact and Mitigation Measures

5. The results of the Screening and Scoping assessment, as well as recommendations could be found in the following comments regarding the anticipated environmental impact and mitigation measures for the ferry terminal development project.

(1) Pollution by the ferry terminal construction work

6. In the proposed long-term development plan, it is planned to construct facilities such as breakwater, revetment, jetty, etc. and the works will include reclamation, dredging, piling, concreting, and rubble mound for new ferry terminal facilities. Due to the resulting disturbance of the seabed soil during construction, it is anticipated that part of the dredged soils will become suspended solids in the sea. It will therefore be necessary to provide in advance adequate countermeasures to reduce pollution and to prepare necessary construction procedures.

7. The diffusion area of pollution is influenced largely by the conditions of topography, depth of water, conditions of seabed, relations of geography between structures installed in the adjacent area, and the meteorological and oceanographic conditions such as tidal current, ocean waves and tide. It is therefore vital to get accurate information on these factors.

8. There is currently no available sufficient data. However, it is foreseen that fishes and shell fishes will receive minimal damage due to the scale of required construction works. In the shallow sea at the coast, there are observed table corals. It is therefore recommended to adopt proper construction method on dredging work.

9. This project will also include the reclamation for the ferry terminal facilities. The reclamation will require soils for filling and part of the dredged soil will be utilized for this purpose. If additional soil is required for reclamation, it will be taken from the mountain side in the suburbs. The water discharged from spillway in the reclamation area will require adequate environmental preservation measures to prevent diffusion of pollutants.

10. In this project, only small scale facilities are included and it is expected that

construction work which will have the most environment impact is short in duration. In the event of water pollution, it is foreseen that the environmental impact to the coastal zone is relatively small. However it is recommended to adopt construction methods which will minimize the environmental impact to the coastal zone and the coastal sea area.

(2) Pollution by ship's bilge

11. The types of waste oil occurring during ordinary operations of a ship are mainly bilge. Bilge is the waste oil accumulated at the bottom of a ship. It is composed of fuel and lubricant oil leaking from the engine mixed with water used to wash out these fuel and oil. Based on the number of ships utilizing each ferry terminal, ship's bilge which is necessary for treatment is expected to increase in the future.

12. There is however no bilge treatment facilities in the existing terminal. It is anticipated that it will be very difficult to construct such facilities due to economic reasons and maintenance problems. However improved procedures for collection and handling of such waste product will mitigate this impact. One proposed measure is to install an oil collection container at the port. Furthermore, regulations for the handling of liquid waste, together with a monitoring program, will be recommended. Therefore, this impact is considered to be insignificant. Aside from bilge, there are also other causes of pollution generated from ship such as ballast water, tank cleaning water, collect oil, slop oil, sludge, etc.

(3) Water pollution

13. In several project sites, it is observed that most domestic sewage from the habitants of the fishing village is discharged to water area without any treatment. As there are no public sewage treatment facilities such as pipelines and sewage treatment plants, raw sewage from buildings are treated through individual septic tanks. As there are no sewage treatment facilities in the several proposed project sites, the sewage water drains out without treatment to the sea.

14. The volume of the sewage water from the terminal building is estimated to be comparatively small because water will be used mainly by passengers as living water and for a short period. To avoid water pollution and to reduce environmental impact to

coastal and sea area, appropriate water treatment system is recommended. In addition to the above, it is required that consideration shall be provided to temporary facilities of sewage treatment system for the workers at the construction stage.

(4) Traffic

15. A huge amount of materials will be required in the construction of the terminal project. It is estimated that only a few materials will be imported from overseas. As to locally procured materials, sand and aggregate for concrete, rocks for the foundation of jetty, and the like are expected to be transported by large size trucks. Considering the traffic operations for the construction, the several ferry terminals planned inside the city and the disturbance on regular traffic, proper planning as well as scheduling of transport to off peak hours, and if appropriate night hours, should be carried out.

16. Basically, almost all materials that will be procured in the local market will be transported through the existing road network. For the construction inside the existing seaport, it will be necessary to conduct sufficient discussion and consultation with concerned port authority before hand.

17. On completion of new ferry terminals, it is foreseen that the volume of traffic will increase in the city area such as Jakarta, Surabaya, Ujung Pandang and Banjarmasin. To minimize the disturbance to regular traffic, proper planning, re-routing and scheduling of transports to off-peak hours are recommended. Number of vehicles using ferry terminal is relatively small compared with general traffic in the city. However, it is necessary to provide counter measures which will minimize the environmental impact on the disturbance to regular traffic.

(5) Utilities

18. Fresh water is supplied by the water authority in each site though there is a limitation of distribution pipeline and production capacity. Most of the sites therefore cannot obtain fresh water through pipe line at present stage. Electricity is generated by PLN in each site, though there is also a limitation of power supply line and capacity with most sites needing new power supply system in this project. Both the conditions of these infrastructures and the influence to the citizens' lives should be considered in the planning of ferry terminal construction.

19. A movable bridge for the ferry terminal facilities will require high electricity consumption. For the safe operation of the terminal, a study of the power supply including installation of emergency generator is necessary. Required capacity will change depending on the future plan of power plant and domestic demand for electricity. If there is sufficient water and power supply sources, required water and electricity would be obtained from the existing facilities. However in case they are not available or there is shortage of the existing water and power supply source, required water and electricity shall be provided by own system in this project.

(6) Disturbance to fauna and flora

20. Several ferry terminal sites are planned in sites having natural environment and areas covered with tropical, jungly and unmanned trees. To minimize the environmental impact to the vulnerable ecosystem and the fauna and flora, it is required therefore to carry out a detailed survey and to conduct a confirmation of endangered and/or rare species listed in the Red Data Books of the International Union for Conservation of Nature and Natural Resources (IUCN) regarding the fauna and flora in the expected project area and nearby.

21. Several terminal development projects will take place in areas of mangrove forests. Mangroves are widely dispersed throughout the Indonesian archipelago, from the vast muddy coasts of Sumatra, Kalimantan and Irian Jaya to the shores of small oceanic high islands. Mangroves are productive intertidal ecosystem found mainly in sheltered coastal, estuarine and deltaic environment, where they often form distinct vegetational units at the junction of the land and the sea. Due to their intertidal habitat, mangroves are influenced by the tides and are subject to wide environmental fluctuations. It is required therefore to minimize damages to the existing mangrove forests in this development plan.

(7) Solid waste

22. Solid wastes in many cities are hauled by bull carts or government trucks. Due to lack of equipment, only the urban area including the port is served by garbage collectors. A large segment of the rural sector has to dispose their garbage on their own. The method of disposal consists of dumping and burning which is undertaken in the mountain areas and which sometimes leads to contamination of water and occurrence of

offensive odor.

23. It is observed that residents living in the port area and seashore dispose their garbage and wastes to the sea. It is therefore recommended to provide an incineration system for the solid waste. One of the most effective advantages of this system is the reduction in volume and weight of solid wastes by furnaces designed for burning. Incineration can reduce the total volume of ordinary refuse by more than 80 % (including unburnable materials). This is very effective in densely populated areas where large sites suitable for land filling are not available within reasonable hauling distance.

9.1.5 Recommendations

24. The preparation of IEE report was carried out from the view point of the environmental consideration based on the Screening and Scoping assessment. In the preparation of the IEE report which is based on the long term development plan, many data were obtained from the previous site survey. It is recommended however that additional survey and study be conducted at the Feasibility Study Phase which is planned in the next phase of the project :

(Survey of Resettlement)

25. It is observed that resettlement of local inhabitants living near the ferry terminal is required at several project sites. The number of families is very small but it is important to compensate them by providing appropriate relocation space and job opportunities such as farming and fishing. Collection of information on these inhabitants and carrying out of additional survey for resettlement are therefore necessary.

(Survey of Fauna and Flora)

26. There are mangrove forest and corals in the coastal area and in the vicinity of the proposed project area, and a part of the coastal area of the project area is covered with tropical, jungly and unmanned trees. Moreover, due to lack of data on fauna and flora, evaluations can not be conducted as to the effect on ecology of the project area. Additional survey of fauna and flora living in this area and study of the environmental impact on them are necessary. The work should include hydrobios survey.

(Seabed Quality Survey)

27. Minor dredging work for ports and access channels are required in this project. Assessment of environmental impact of pollution for dredging requires study of seabed quality survey. To assess the existing natural conditions of seabed in the project area, it is necessary to conduct seabed quality survey for the evaluation of the existing conditions of seabed soils.

(Seawater Quality Survey)

28. Minor dredging work for ports and access channels are required in this project. To assess the existing natural conditions of the seawater in the project area, it is necessary to conduct seawater quality survey for the evaluation of the existing conditions of water pollution, and to determine the environmental impact on biology (Flora and Fauna).

(Survey of Local Inhabitants and Community)

29. In the several proposed project sites, there are fishermen's families living adjacent to the project area. The fishermen carry out their fishing operations by boats with and without engines. It is supposed that most families in the project site earn their living mainly by fishery and farming. It is necessary therefore to conduct studies of the environmental impact on the ferry terminal operations and the local communities.

30. For the "Scope of Additional Survey and Study", refer to Table A9.1.17.

Table A9.1.17 Scope of Additional Survey and Study

NO.	Scope of Additional Survey and Study	
1	Seawater quality survey	<ul style="list-style-type: none"> -Temperature -Salinity -Transparency -Sea water Depth -Laboratory Test (Particle Distribution, pH, Ignition Loss, Oil & Grease, COD, T-S, T-P, T-N, T-Hg, Cd, CN, Or-P, Pb, As, Cr, PCB, Cu, Zn)
2	Seabed Quality Survey	<ul style="list-style-type: none"> -Appearance -Odor -Color -Laboratory Test (Particle Distribution, pH, Ignition Loss, Oil & Grease, COD, T-S, T-P, T-N, T-Hg, Cd, CN, Or-P, Pb, As, Cr, PCB, Cu, Zn)
3	Survey of Benthic Ecosystem	<ul style="list-style-type: none"> -Corals and Seaweed -Fishes -Plankton -Benthic Animals -Juvenile and Oolite
4	Survey of Fishery	<ul style="list-style-type: none"> -Records of Fish Catch -Fishing Ground -Market
5	Survey of Fauna and Flora	
6	Survey of Inhabitants	<ul style="list-style-type: none"> -Economic Activity -Size of Resettlement -Public Facilities
7	Survey of Soil Conditions	

31. Environmental Impact Assessment is carried out in accordance with the Indonesian environmental assessment system and related international standards.

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