Chapter 12 Implementation Plan

12.1 Overview of the Implementation Plan

The implementation plan study was conducted following the procedure shown in Figure 12.1.1 below.

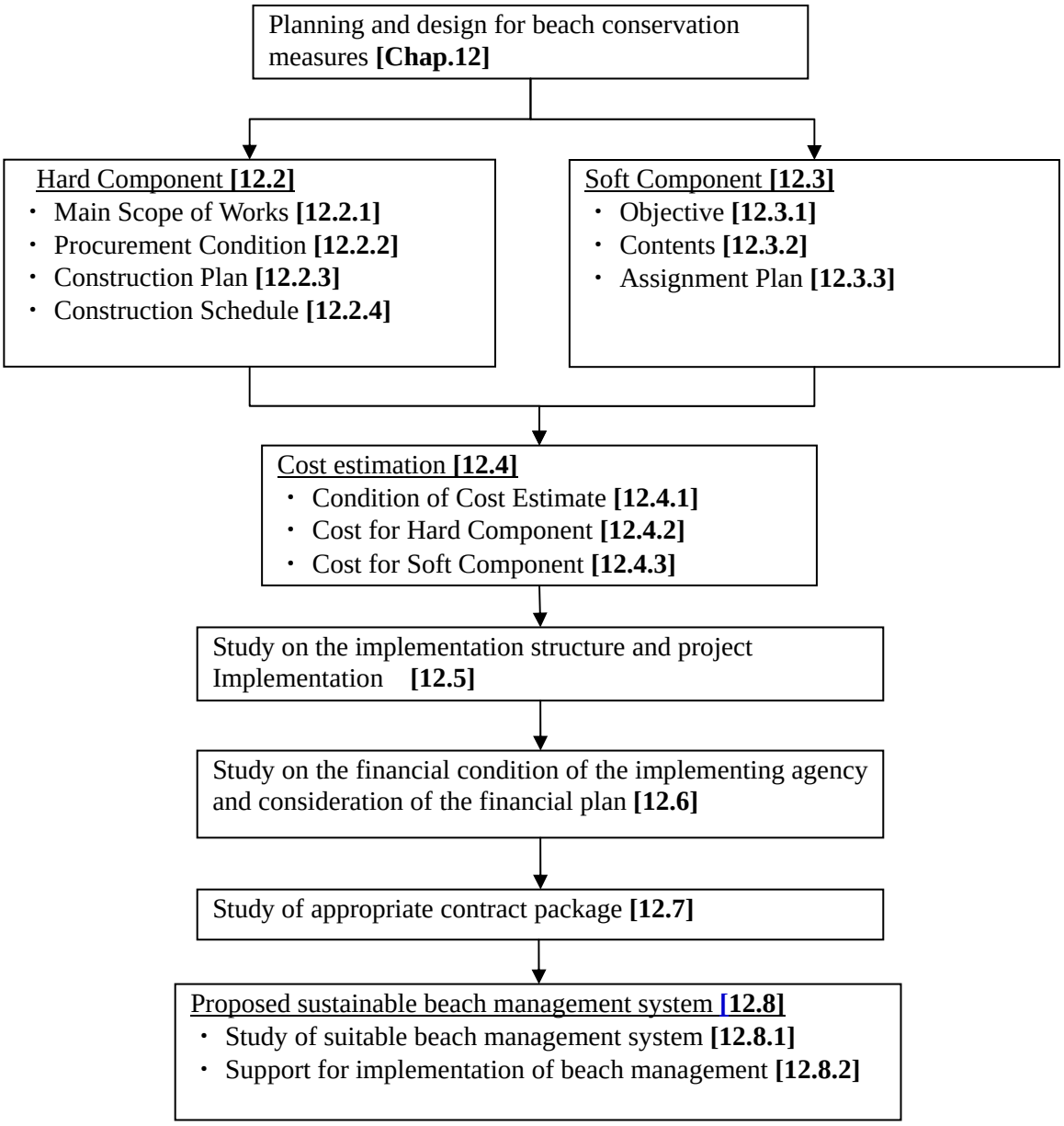


Figure 12.1.1 Procedure of the Implementation Plan

(Source: JICA Study Team)

12.2 Implementation Plan for Hard Component

(1) Main Scope of Works

The main scope of works for the hard component of this project according to the plan set-up is shown in Table 12.2.1.

In Package 1 (Candidasa), the case study with two different study areas was examined, which are Cases 1 and 2. Case-1 has a 3 km alongshore stretch from the Peninsula (Tanjung Nti) to the temple (Pura Dalem Samudra) while Case-2 has a 5 km alongshore stretch from the Peninsula to Alilla Manggis Resort Hotel. Furthermore, taking into account the request from the directorate of river and coastal in the Directorate General of Water Resources (DGWR), two different scopes of works (with and without beach nourishment) in Package-1 were also compared in the study. The main scope of works and its quantity for each package are also presented in Table 12.2.1.

Table 12.2.1 Scope of Works for Hard Component

Package and Objective Area		Scope of Works	Quantity
Package-1: Candidasa	Case-1 : 3 km From the Peninsula (Tanjung Nti) to the temple (Pura Dalem Samudra)	Beach nourishment	188,140 m^3
		Construction of revetment	3,100 lin. m
		New groin	3 groins
		Groin modification	6 groins
	Case-2 : 5 km From the Peninsula to Alilla Manggis Resort Hotel	Beach nourishment	341,960 m^3
		Construction of revetment	5,261 lin. m
		New groin	6 groins
		Groin modification	7 groins
Package-2: North Kuta-Legian-Seminyak		Beach nourishment	280,300 m^3
Package-3: Improvement at Kuta		Modification of existing BWN-1&2	2 BWN
		New L-shape Headland	1 Headland
		Sand refilling	15,700 m^3

(Source: JICA Study Team)

(2) Procurement Condition

a) General

Almost all of the major materials commonly used for civil works (sand, andesite, limestone, cement, etc.) can be procured in Indonesia. As there are many construction projects in progress in and around Bali, most of the required machineries such as barges, excavators, transport vehicles and cranes can also be procured in Bali. However, it is expected that the dredger will be procured through an international competitive bidding because dredging work requires considerable experience and expertise in the field.

In Indonesia, there are a lot of construction companies and abundant human resources for construction works in and around Bali.

Table 12.2.2 Sources of Major Materials Expected to be Procured

Item/Facilities	Items Procured from Overseas	Items Domestically Procured
Civil Material		- Sand - Andesite - Limestone - Cement
Construction Machinery	- Dredger - (TSHD: Trailer Suction Hopper Dredger) - Super Grab Bucket	- Barge - Cranes - Bulldozer - Excavators (backhoe, etc.) - Transport vehicles (dump truck, etc.) - Pipe line

(Source: JICA Study Team)

b) Quantities of Major Materials

A list of major materials to be procured for the beach conservation project is provided in Table 12.2.3.

Table 12.2.3 Volume of Main Materials

Area		Item	Material	Unit	Volume
Package-1: Candidasa	Case-1 (3 km)	Beach nourishment	Sand	m^3	188,140
		Revetment	Andesite	m^3	65,645
			Limestone	m^3	27,700
		Groin	Andesite	m^3	17,430
			Limestone	m^3	10,690
	Case-2 (5 km)	Beach nourishment	Sand	m^3	341,960
		Revetment	Andesite	m^3	103,070
			Limestone	m^3	47,100
		Groin	Andesite	m^3	25,640
			Limestone	m^3	15,410
Package-2: North Kuta-Legian-Seminyak		Beach nourishment	Sand	m^3	280,300
Package-3: Improvement at Kuta		Sand refilling	Sand	m^3	15,700
		Modification of BWN1, N2	Andesite	m^3	18,946
			Limestone	m^3	4,744
		L-shape groin	Andesite	m^3	10,325
			Limestone	m^3	5,025

(Source: JICA Study Team)

c) Sand for Nourishment

Sand is the most important material for the beach nourishment project. Furthermore, it has also the greatest impact in terms of the construction cost. Thus, it is required to recommend a suitable borrow site for sand digging, taking into account the quality of sand, potential volume as well as the cost.

Considering the characteristics of sand and the required volume for the beach nourishment, it was recommended to take sand from the offshore area. This is the same method as that in the Phase-1 Project. In the Phase-1 Project, the sand for nourishment at each beach was taken from only one borrow site, which is the offshore area at South Nusa Dua. This caused the increase of construction cost due to the increase of cycle time (from taking sand at the borrow site until filling the sand into the beach) and the unexpected social problem which was exposed by the community at the nearby sand borrow area. Based on experience from the

previous Phase-1 Project and to minimize the construction cost, it was recommended to take sand from places nearby each project site. As described in Section 9.4, Chapter 9, the diving survey was carried out to find the potential areas of sand borrow at Candidasa and west coast (North Kuta-Legian-Seminyak) individually. Proposed sand borrow areas are shown in Figures 12.2.6 and 12.2.14. However, further detailed survey is required to make sure that there is potential to obtain suitable sand with required quantity in the detailed design stage.

d) Andesite for Core and Under Layer Material

Andesite is used as a core and an under layer material for the coastal structures such as groin, headland and breakwater which are mainly used in the Package-1 Project. The quarry site for andesite is planned at Kubu, Karangasem Regency, which is the same quarry site as that in the Phase-1 Project as shown in Figure 12.2.1 below.

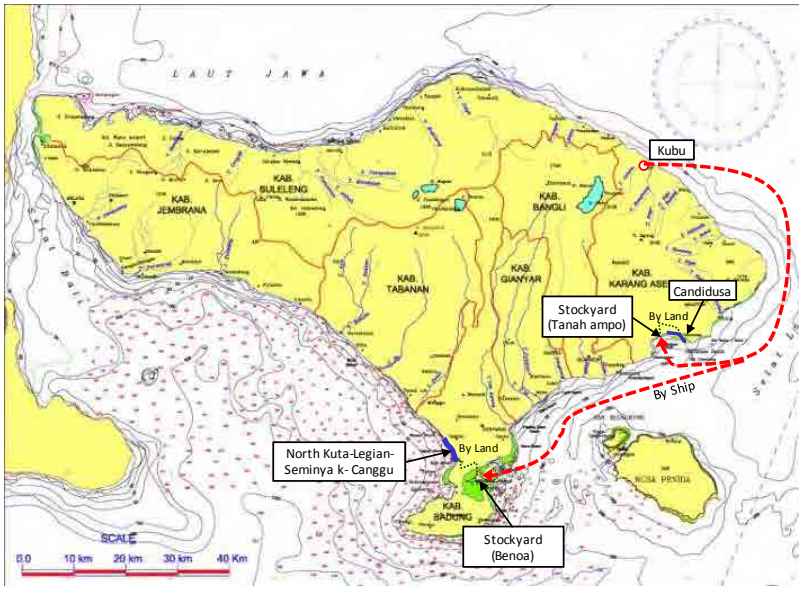


Figure 12.2.1 Quarry Site for Andesite

(Source: JICA Study Team)

Andesite Quarry Plant

Andesite Quarry

Andesite Quarry

Jetty

Photo 11.2.1 Condition of Quarry Site for Andesite

(Source: JICA Study Team)

e) Limestone for Armor Layer Material

It was recommended to employ the limestone as the armor layer of the groin, headland and breakwater. The reason is that the light color of the limestone can be well harmonized with the white colored coral beaches. Taking into account the quality and quantity of limestone, it was recommended that limestone material be procured in Taliwang, Sumbawa Island which was the same quarry site as that in the Package-1 Project, as shown in Figure 12.2.2 below.

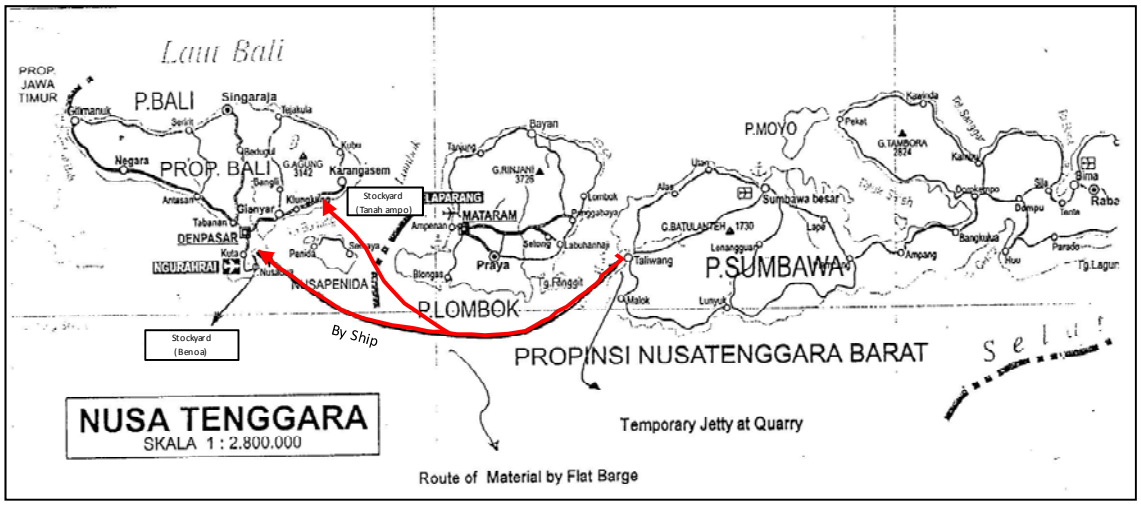


Figure 12.2.2 Potential Site of Limestone

(Source: JICA Study Team)

(3) Construction Plan

a) Candidasa

i) General

The basic layout image for beach conservation measures at Candidasa is as shown in Figures 12.2.3 and 12.2.4

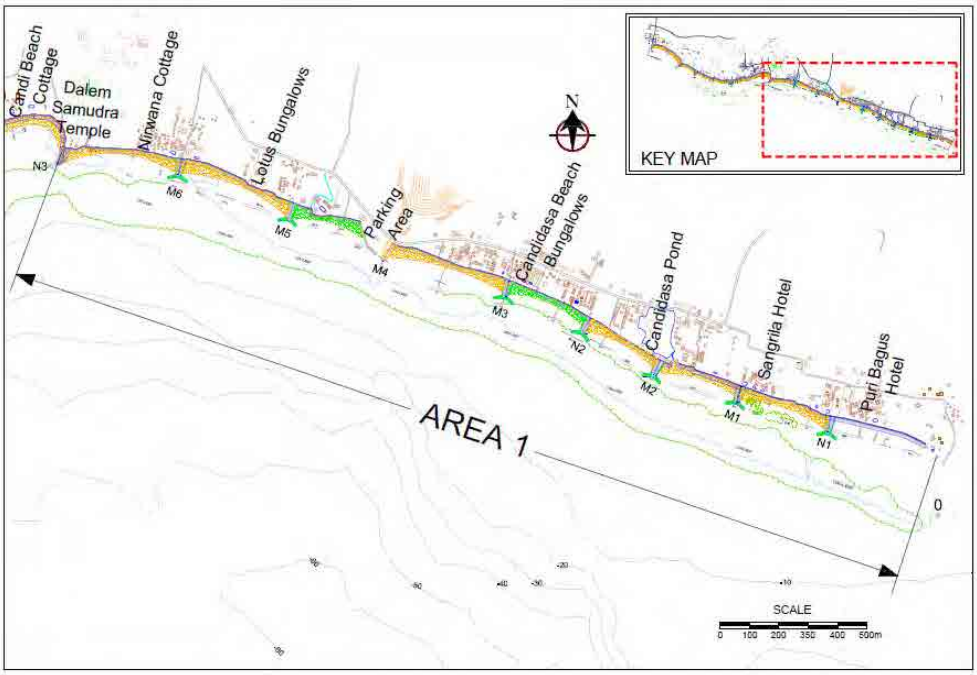


Figure 12.2.3 Layout Plan at Candidasa (Area 1, re-posted from Chapter 11)

(Source: JICA Study Team)

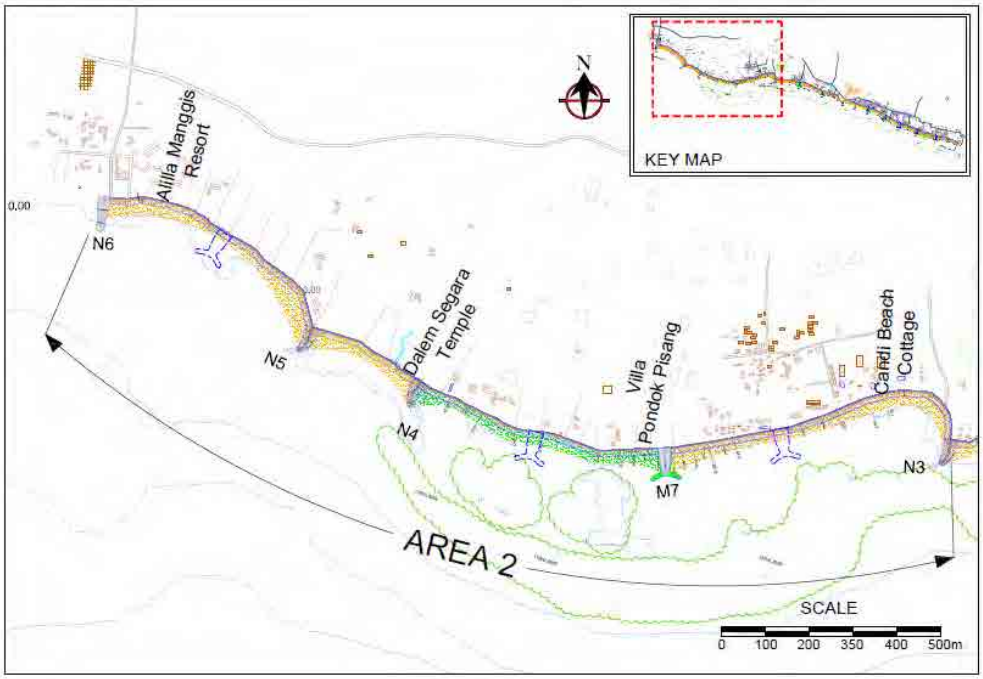


Figure 12.2.4 Layout Plan at Candidasa (Area 2, re-posted from Chapter 11)

(Source: JICA Study Team)

Main construction works of the Candidasa Beach Conservation Project consist of demolition works, revetment modification, groin modification and beach fill. Figure 12.2.5 shows the sequence of works of this conservation project at Candidasa.

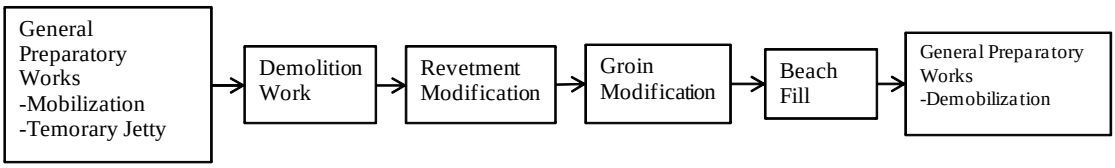


Figure 12.2.5 Sequence of Beach Conservation Project at Candidasa

(Source: JICA Study Team)

ii) Temporary Jetty, Temporary Stock Yard, and Transportation of Main Material

Temporary jetty and stock yard will be constructed to transport main materials such as sand, andesite, and limestone to the project site. Figure 12.2.6 shows the location of the temporary jetty and stock yard, and the transportation method of main materials.

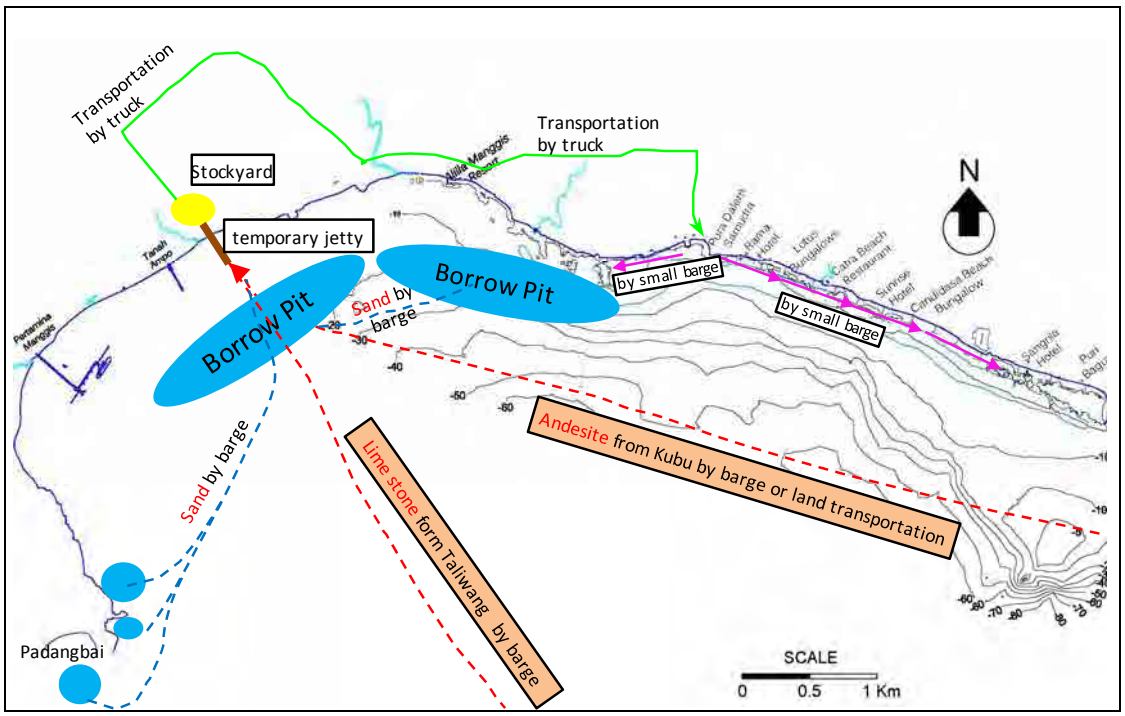


Figure 12.2.6 Temporary Jetty, Temporary Stock Yard, and Transportation Method of Main Materials

(Source: JICA Study Team)

iii) Demolition Works

The sequence of demolition works is shown in Figure 12.2.7.

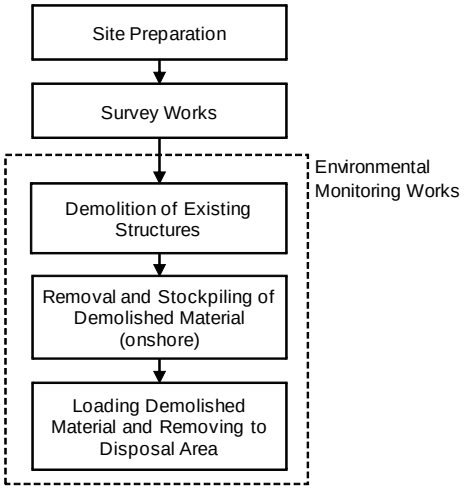


Figure 12.2.7 Sequence of Demolition Works

(Source: JICA Study Team)

iv) Revetment

Revetment is constructed at Candidasa Beach and the revetment areas are as follows:

- Area 1. (Puri Bagus-Navy Parking Area) : 1959 lin. m (Case-1 and Case-2 areas)
- Area 2. (Navy Parking Area-Temple) : 1141 lin. m(Case-1 and Case-2 areas)
- Area 3. (Temple-Alila) : 2161 lin. m (Case-2 area)

Revetment is a rubble mound type structure. It consists of three layers, namely; core layer, under layer, and armor layer. Below the core layer, geotextile is laid for filtration function.

The sequence of revetment works is shown in Figure 12.2.8 below.

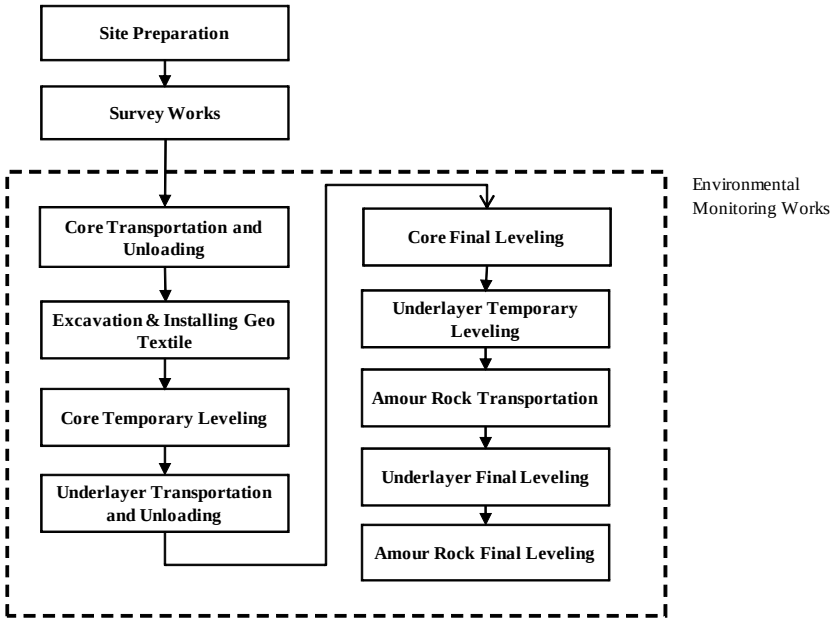


Figure 12.2.8 Sequence of Revetment Works

（Source: JICA Study Team）

v) Groin

The groin and headland are made from rubble stone structure. It consists of three layers, namely; core layer, under layer, and armor layer. Seabed excavation is required at the toe part of the structure. The construction is carried out as land work.

The sequence of groin works is shown in Figure 12.2.9 below.

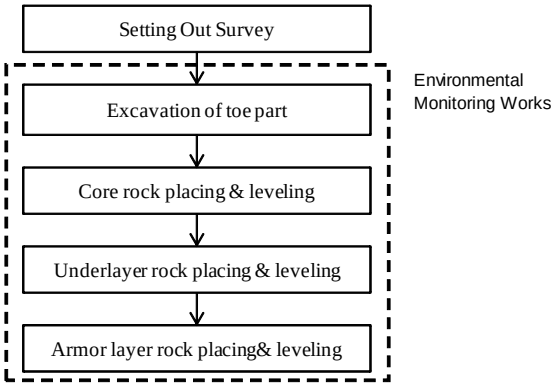


Figure 12.2.9 Work Flow of Groin Works

(Source: JICA Study Team)

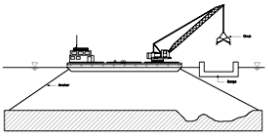
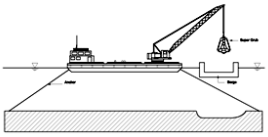
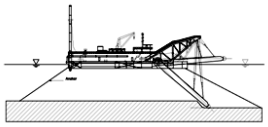
vi) Sand Mining Method

After all hard structures such as revetment and groin are constructed at the beach, the sand for nourishment will be dug from the borrow pit, transported, and filled into the beach. In order to minimize the environmental impact on water turbidity and to the existing corals, different types of dredger were compared as shown in Table 12.2.4. For the possible and realistic method to be used for the sand mining at Candidasa, two types of dredger can be considered, which are the “grab dredger” and “trailer suction hopper dredger”.

It has been commonly known that the grab dredger has less-impact to the turbidity of the sea water, although using it will make the construction period become longer as compared to when using the trailer suction hopper dredger.

The special type of grab (which is called “super grab bucket”) was proposed and used in Japan when the influence to the turbidity was to be minimized as much as possible. This special grab can be procured only from Japan. Considering the undesirable impact to the water quality and corals, it was proposed to utilize this special type of grab in this Study. However, whether this special bucket is required or not depends on further impact analysis on turbidity. The impact analysis will be carried out in the detailed design stage. Suitable dredging method will be studied taking into account the requirement of turbidity, following the Indonesian environmental regulation.

Table 12.2.4 Comparison of Dredger Types for Sand Mining

Description \ Dredger Type		Case-A	Case-B	Case-C
		Grub Bucket +Barge	Super Grub Bucket+Barge	Trailer Suction Hopper Dredger
Construction Method				
Condition				
Water Depth	～25 m	Good	Good	Good
Dredger Capacity		SD 5m3	SD 5m3	SD 6000PS
Layer Thickness	0.8 ～1.0 m	○	Good	Good
Soil Property	Sand	○	Good	Good
Obstruction	Coral	○	Good	Bad
Surplus water	Light→Good○	Fair	Good	Bad
Turbidity	Light→Good○	Bad	Good	Fair
Capacity	m3/Hour	120	82.8	2,000
Cost*	m3/IDR	95,800	101,400	685,715
Work Periods (340,000m3, 1Party)		10 months	14 months	1 months
Judgment		Not recommended	Recommended	Not recommended

*) The cost Include dredging works and transportation to stock yard

(Source: JICA Study Team)

The sequence of beach fill works is shown in Figure 12.2.10 below.

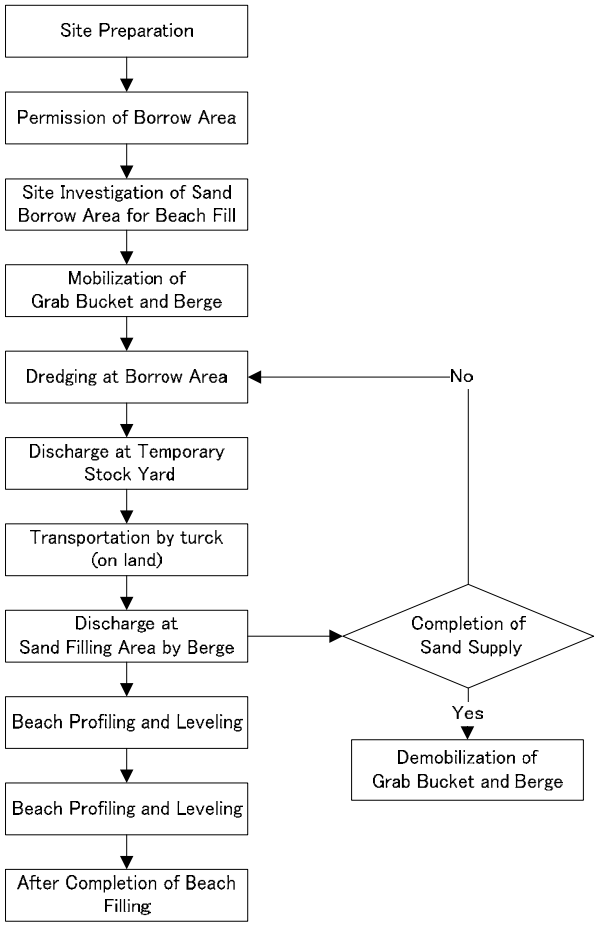


Figure 12.2.10 Sequence of Beach Nourishment Works

(Source: JICA Study Team)

b) North Kuta-Legian-Seminyak

The basic layout image for beach conservation measures at North Kuta-Legian-Seminyak is shown in Figure 12.2.11 below.

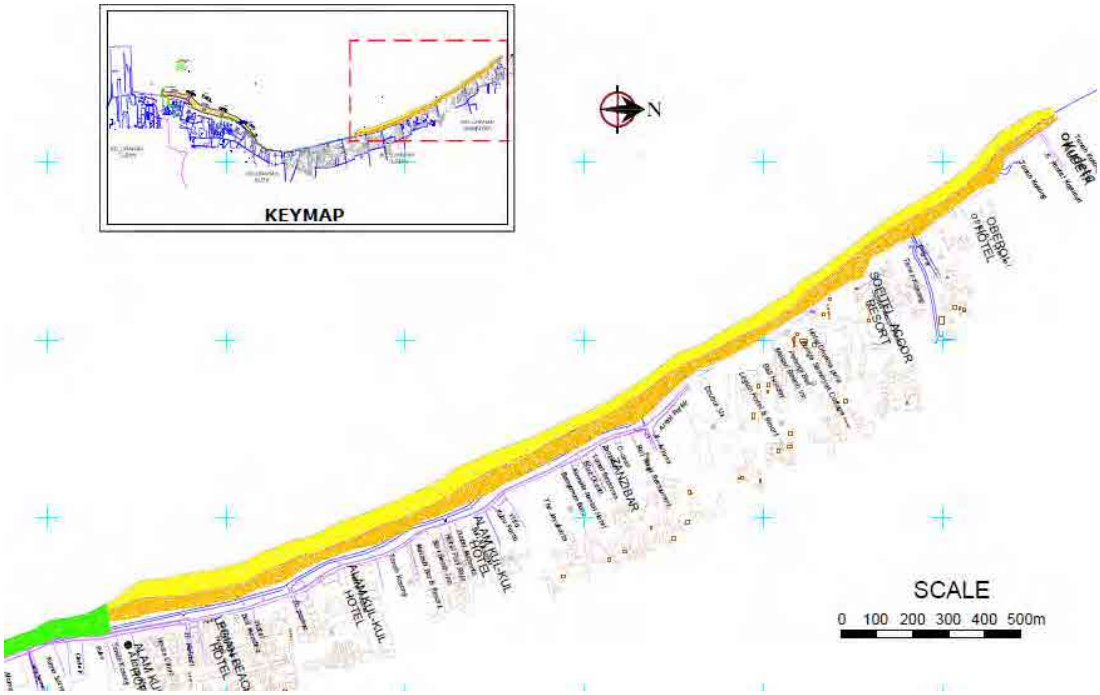


Figure 12.2.11 Layout Plan for Beach Nourishment at North Kuta-Legian-Seminyak (Re-posted from Chapter 11)

(Source: JICA Study Team)

Main construction works of the North Kuta-Legian-Seminyak beach conservation project consist of beach fill works. Figures 12.2.12 to 12.2.14 show the sequence of the construction method, the method used for sand mining, and transportation from the borrow site.

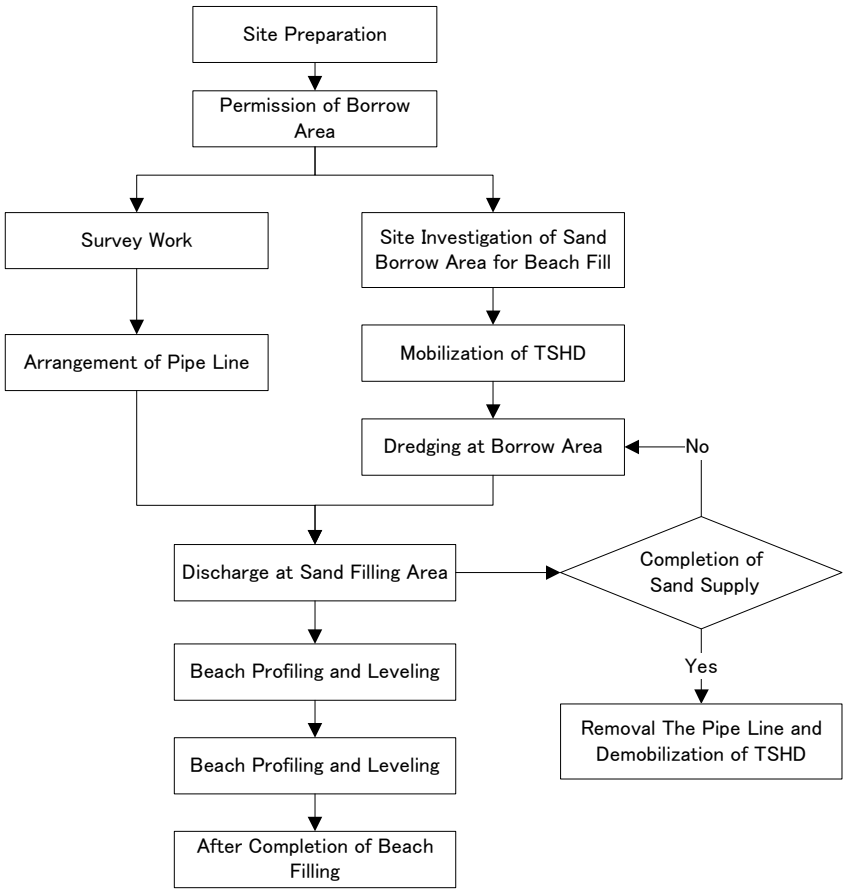


Figure 12.2.12 Flow Chart of Construction Method at North Kuta-Legian-Seminyak

(Source: JICA Study Team)

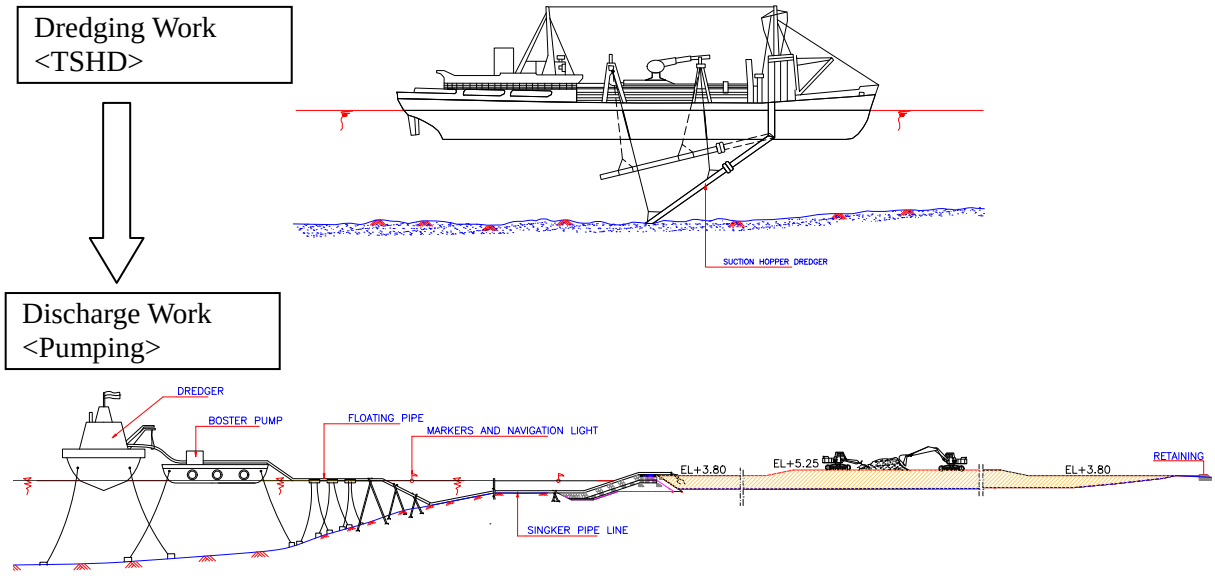


Figure 12.2.13 Construction Image of Sand Mining Work

(Source: JICA Study Team)

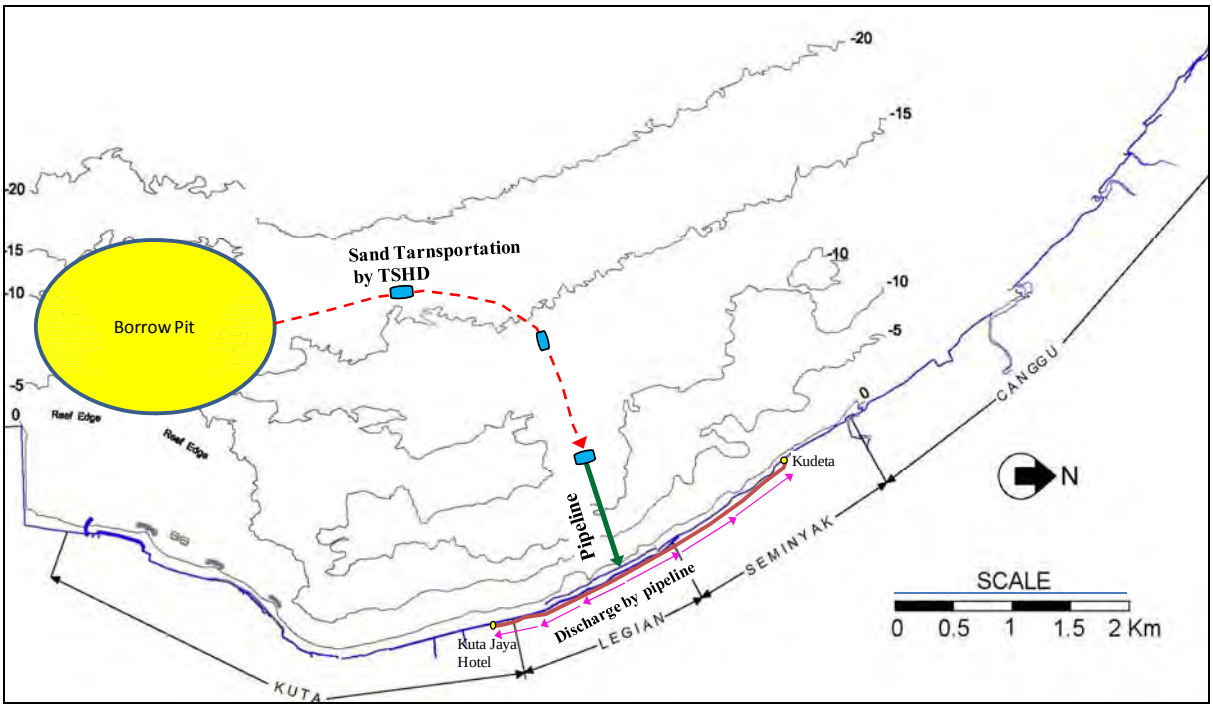


Figure 12.2.14 Construction Image for Sand Transportation from Borrow Site

(Source: JICA Study Team)

c) Improvement at Kuta

The basic layout image for the recommended improvement at Kuta is shown in Figure 12.2.15 below.

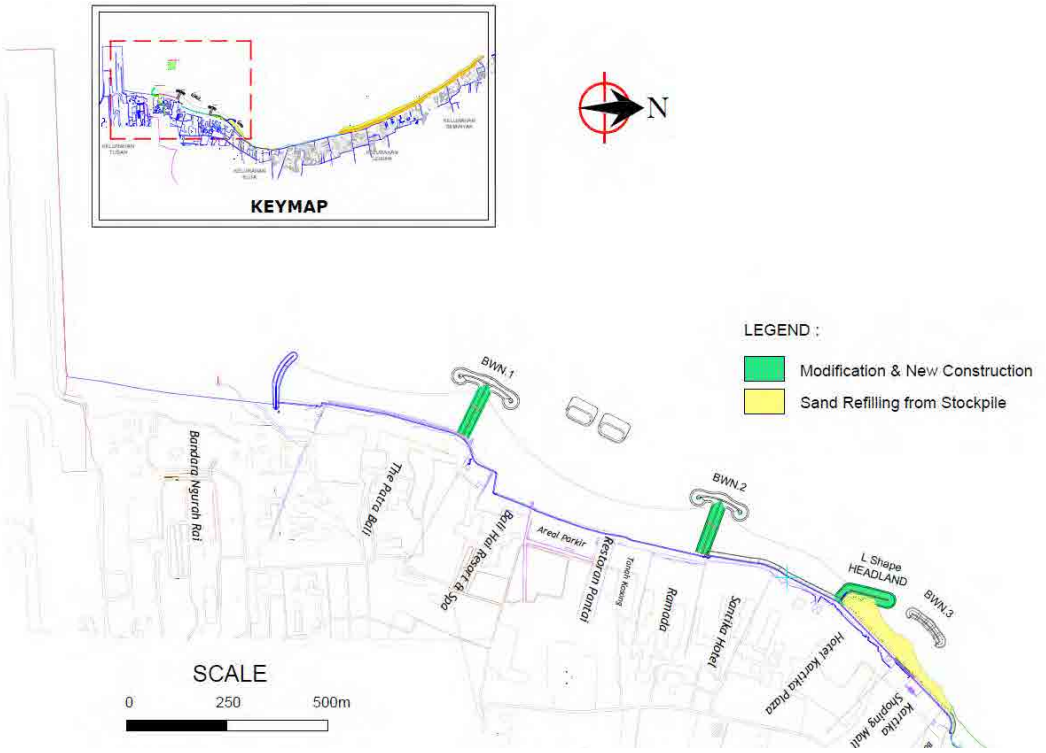


Figure 12.2.15 Layout Plan for the Improvement at Kuta (Reposted from Chapter 11)

(Source: JICA Study Team)

Main construction works of improvement at Kuta consist of sand refilling, modification of existing breakwaters, and construction of the L-shaped groin.

Sand for refilling will be transported from the stockpile to the project area by trucks. The andesite and limestone will be transported by barge from Kubu and Taliwan, respectively, which are the same sites of Package-1, Candidasa. These materials are going to be stocked at Benoa Port first. Then, the materials will be transported to the project area by barge.

d) Consideration during the Implementation

The consideration points during the implementation of the project, which expects an environmental point of view, are listed as follows. The environmental considerations and recommended mitigation measures are described in Chapter 14.

- Three project sites belong to the tourism area, and the daily construction work will be undertaken in parallel with tourism activities on the beach. Basically, it is difficult to keep the tourists from getting near the construction area on the beach. Thus, the safety management during the construction is very important to secure the safety of the tourists.

- The project area has spread to a certain distance. As a result, several groups of stakeholders (communities and hotels) exist inside the project area. Based on the experience on the Phase-1 Project, even if consensus building is performed and common consensus from related stakeholders is obtained, there is a possibility that social problems due to different opinions will arise after the commencement of the implementation. It is surely necessary to obtain the commitment with the evidence for all result of socialization, and it is important to maintain the good relation between the stakeholders and project.

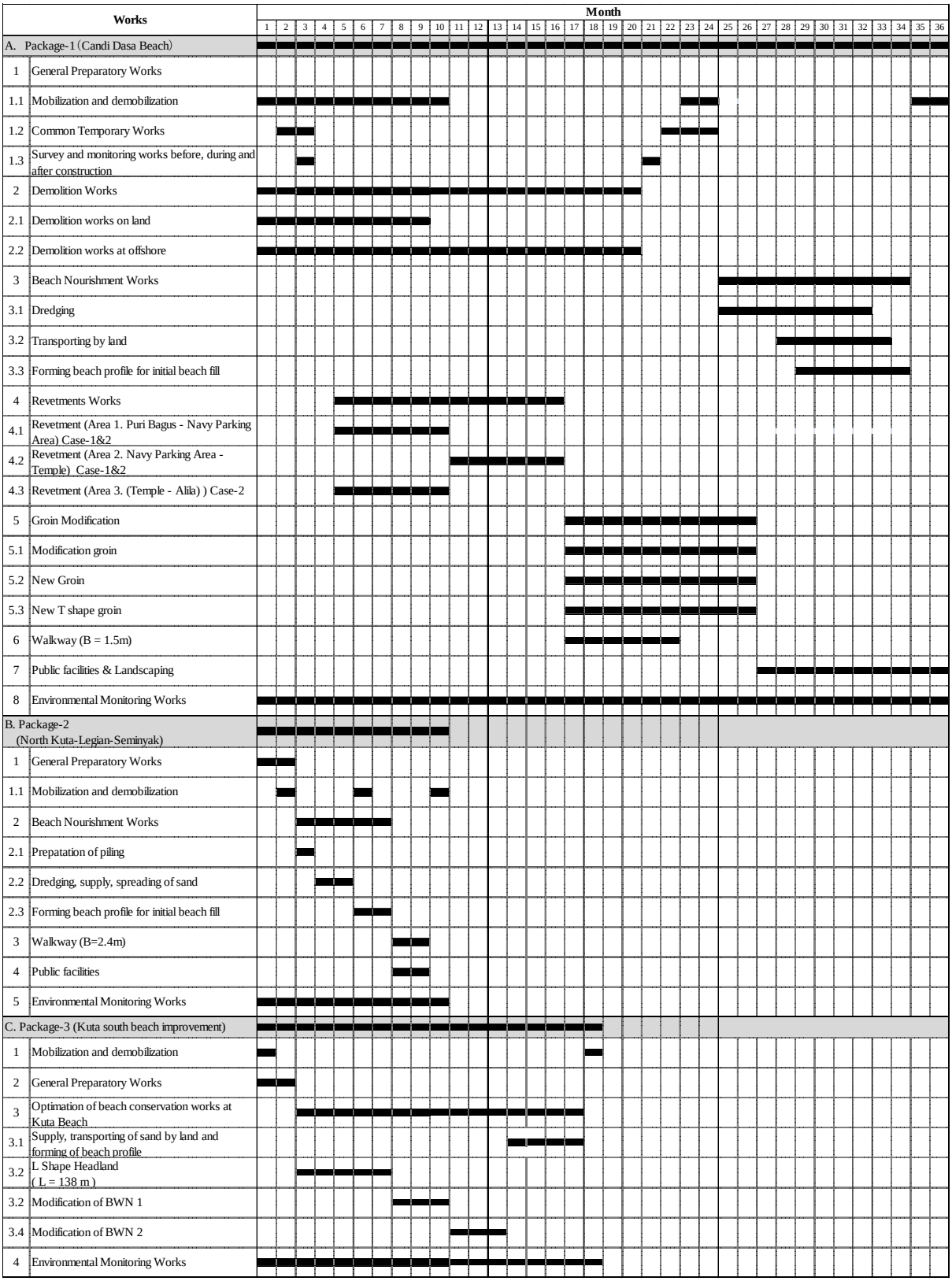
(4) Construction Schedule

The expected construction schedule for the three packages is shown in Table 12.2.5. The construction schedule which applies to Case-1 (3 km alongshore, with beach nourishment) for Package-1 (Candidasa) is shown as a recommended package. The total construction period for this case is expected to be 36 months.

Even if Case-2 (5 km alongshore, with beach nourishment) is assumed to be applied for Package-1, the total construction period is expected to be of the same period as that of Case-1 (36 months) considering the employment of the two parties of construction, and proceeding with the construction work in parallel at two different areas.

In case there is no beach nourishment for Package-1, the construction period will be shortened from 36 months to 28 months.

Table 12.2.5 Construction Schedule (Package-1 with Beach Nourishment)



(Source: JICA Study Team)

12.3 Implementation Plan for Soft Component

(1) Objective

The objective of the soft component in the Phase-2 Project is to establish a suitable and sustainable beach management system for both Phase-1 and Phase-2 beaches, considering the review of the present situation and implementation conditions after the establishment of TKMPP during the middle and final stages. The objective is also based on the road map that was described in Section 5.4, Chapter 5. In accordance with the actual achievement in the Phase-1 Project, the soft component will be spread out horizontally to establish beach management system for the Phase-2 Project, and to some places with serious problems against beach erosion in order to integrate the principle and methods of beach management in Bali.

It is important to consider that various activities that may result to the establishment of beach management in the Phase-2 Project will contribute to the establishment of a beach management system not only in Bali, but also in the whole of Indonesia as a model for integrating coastal management.

(2) Contents

Contents of soft component are as follows:

- Establishment of beach management system for Phase-1 beaches;
- Establishment of beach management system for Phase-2 beaches; and
- Beach conservation plan for seriously eroded areas in Bali.

The training in Japan is planned to be conducted twice during the Phase-2 Project period as capacity building program for government institutions in charge of the beach management. Five trainees or so each for Phase-1 and Phase-2 will be invited to Japan and trained for ten days. The training program includes cases of beach nourishment, beach management under the cooperation between the public and the private, the status of use of coastal and public facilities, “Adopt Program”, and so on which will contribute to the establishment of sustainable beach management in Bali. The contents of each component are summarized as follows.

Table 12.3.1 Contents of Soft Component (1/2)

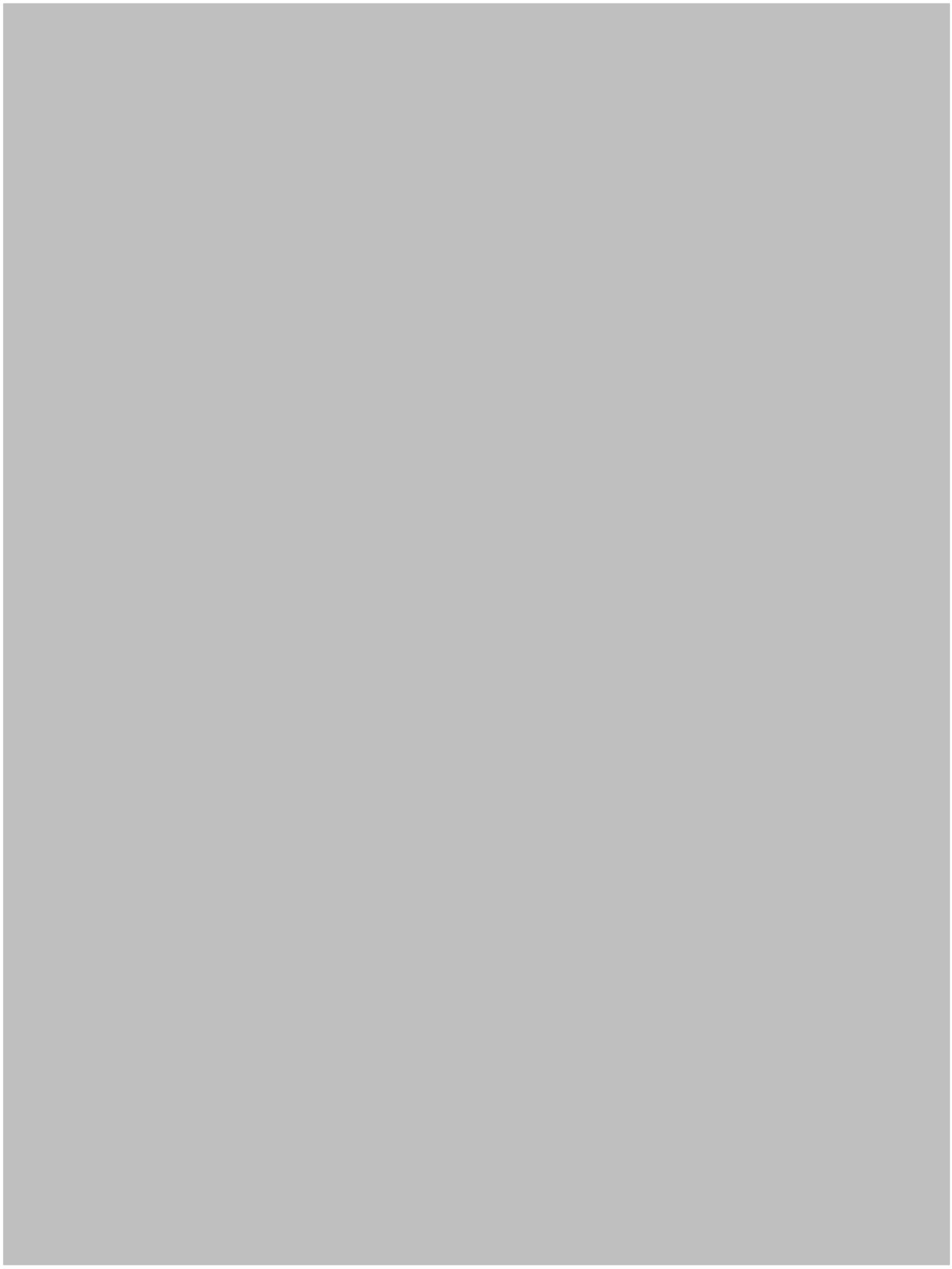
Component-1 : Beach Management System for Phase-1		
1	Review of activities for middle-term action	➢ To study the improvement plan considering the status of implementation based on Middle Action as Step-2 that is described in the road map, and issues caused by the implementation, etc.
2	Review of organization and demarcation for beach management system based on the result of the middle-term action	➢ To review the organization and demarcation in accordance with the above.
3	Technical support to TKMPP on planning and designing for the maintenance of beaches and facilities for the whole areas of Sanur, Nusa Dua, and Kuta	➢ To make plans for the most suitable operations and maintenance (O&M) plan considering beach erosion, damage of coastal protection facilities, and public facilities based on the result of monitoring data. This review work will be carried out together with government officials who relate to beach management as an opportunity of capacity building.
4	Establishment and follow up management for "Adopt Program" by the private sector	➢ To make plans for specific measures to push ahead sustainable beach management aiming to be led by the private sector based on the review activities of “Adopt Program” during Step-2. ➢ To cooperate in the institutionalization and implementation of “Adopt Program” by the private sector.
5	Enlightenment of clean-up program to education and administration institutions (picture books, stories told with pictures, etc.)	➢ To push ahead enlightenment program widely to the educational and government institutes by using visual content such as picture story books, and picture-story shows in order to enhance awareness of beautification. ➢ This program requires continued effort, planning, and preparation in cooperation with NGO and stakeholders.
6	Review of O&M manual for Phase-1	➢ To review the existing O&M manual based on the monitoring method and the abovementioned countermeasures.

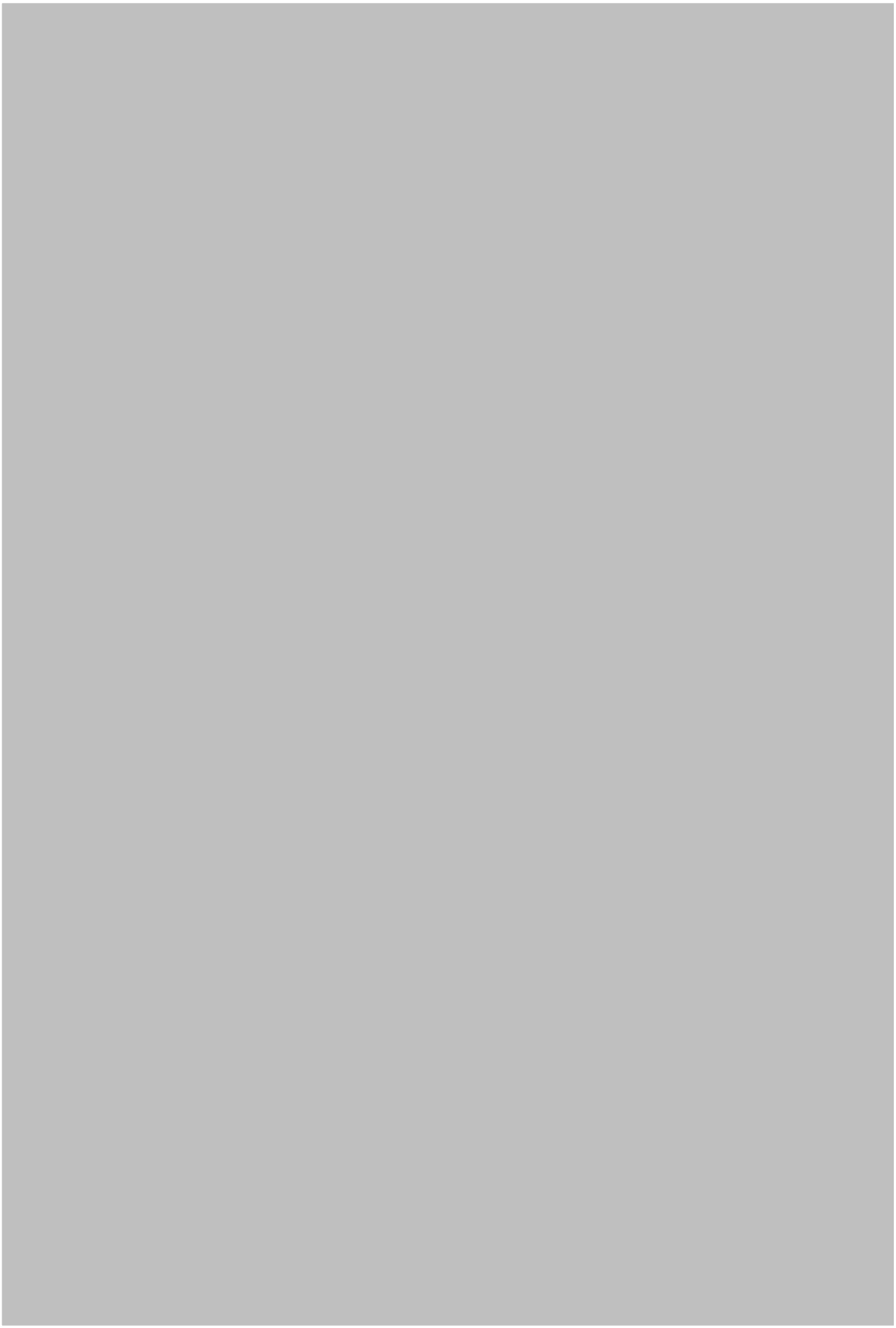
(Source: JICA Study Team)

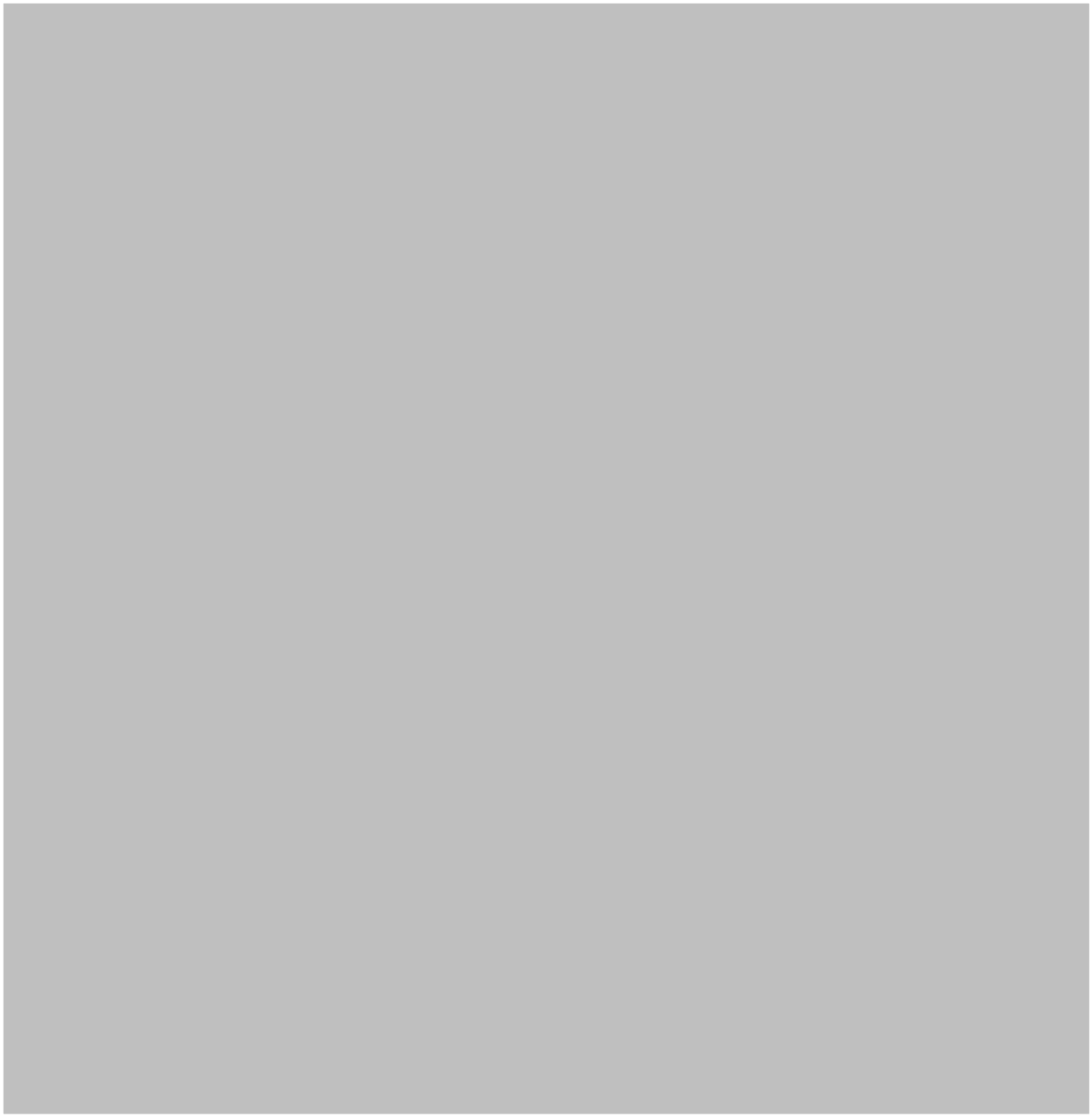
Table 12.3.1 Contents of Soft Component (2/2)

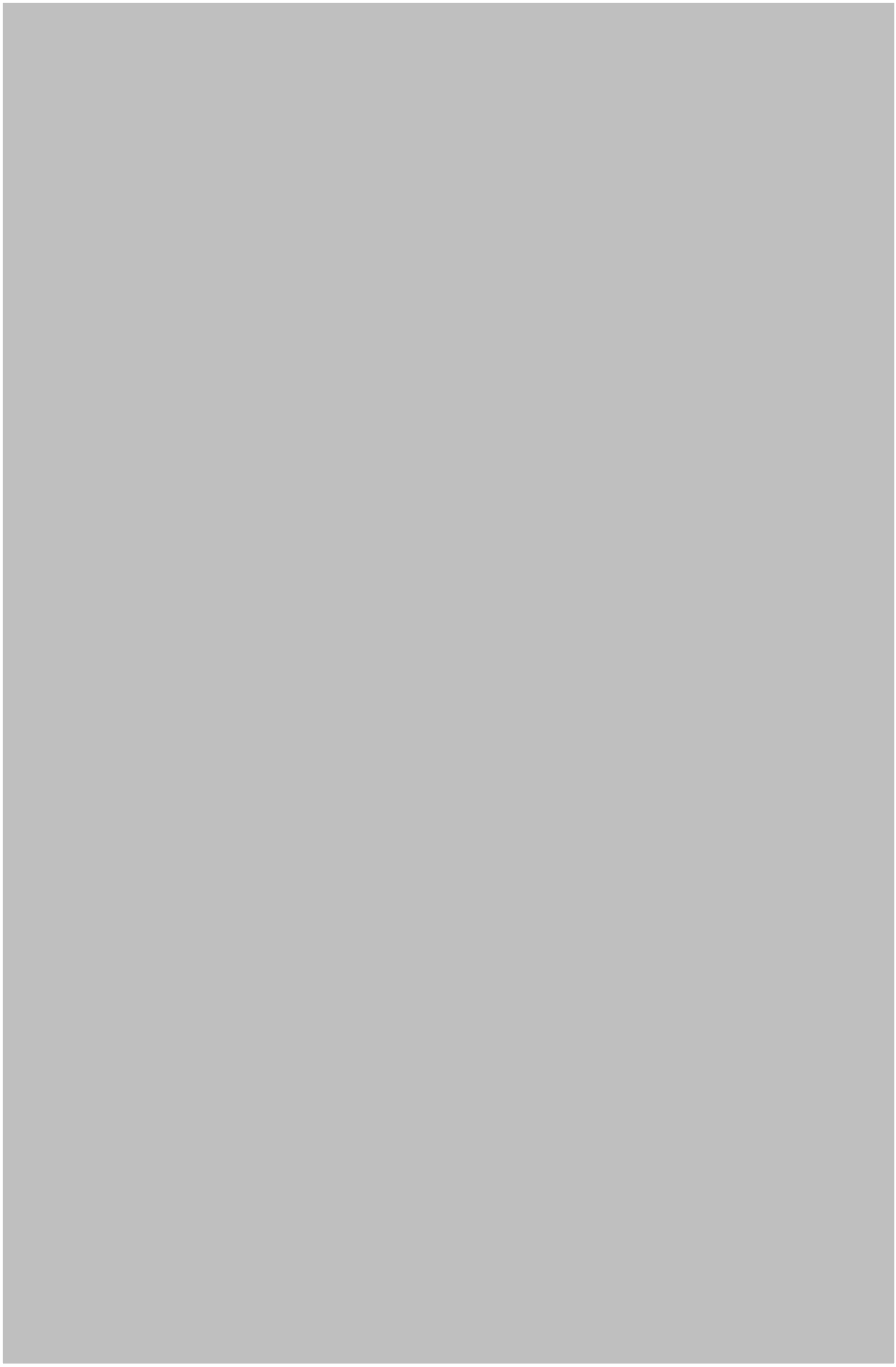
Component-2 : Beach Management System for Phase-2		
1	Establishment of coordination team for Phase-2 (TKMPP-2)	➢ To assist the establishment of TKMPP-2 by taking into consideration the results of the activities of TKMPP-1 and its issues.
2	Arrangement and capacity building for TKMPP-2	➢ To assist capacity building for beach management through OJT and seminar for the local government and stakeholders who relate to beach management at Candidasa.
3	Establishment and follow up management for "Adopt Program " by private sector	➢ To assist the establishment of "Adopt Program" for Phase-2 project by taking into consideration the results of Phase-1.
4	Enlightenment of clean-up program to education and administration institutions (picture book, story told with pictures, etc.)	➢ To assist the enlightenment of clean-up program by taking into consideration the results of activities for Phase-1 and its issues.
5	Preparation of O&M Manual for Phase-2	➢ To assist the preparation of O&M manual for Phase-2 in keeping with the results of review work and finalization for Phase-1.
Component-3 : Beach Conservation Plan in Bali		
1	Site reconnaissance survey and data collection	➢ To carry out site reconnaissance survey and data collection at beaches eroded remarkably and sites required by the local government in Bali
2	Site survey and taking aerial photography	➢ To carry out urgently required field survey and aerial photography at high priority sites.
3	Review of previous countermeasures and studies	➢ To review previous studies and construction works at these sites. ➢ To evaluate the cause of erosion and adequacy of its countermeasures
4	Planning of beach conservation measures	➢ To prepare suitable coastal conservation plan based on the field survey and review works as mentioned above.
5	Preparation of O&M Manual for the whole of Bali	➢ To prepare the O&M manual in order to establish sustainable beach management based on the cases of erosion and countermeasures

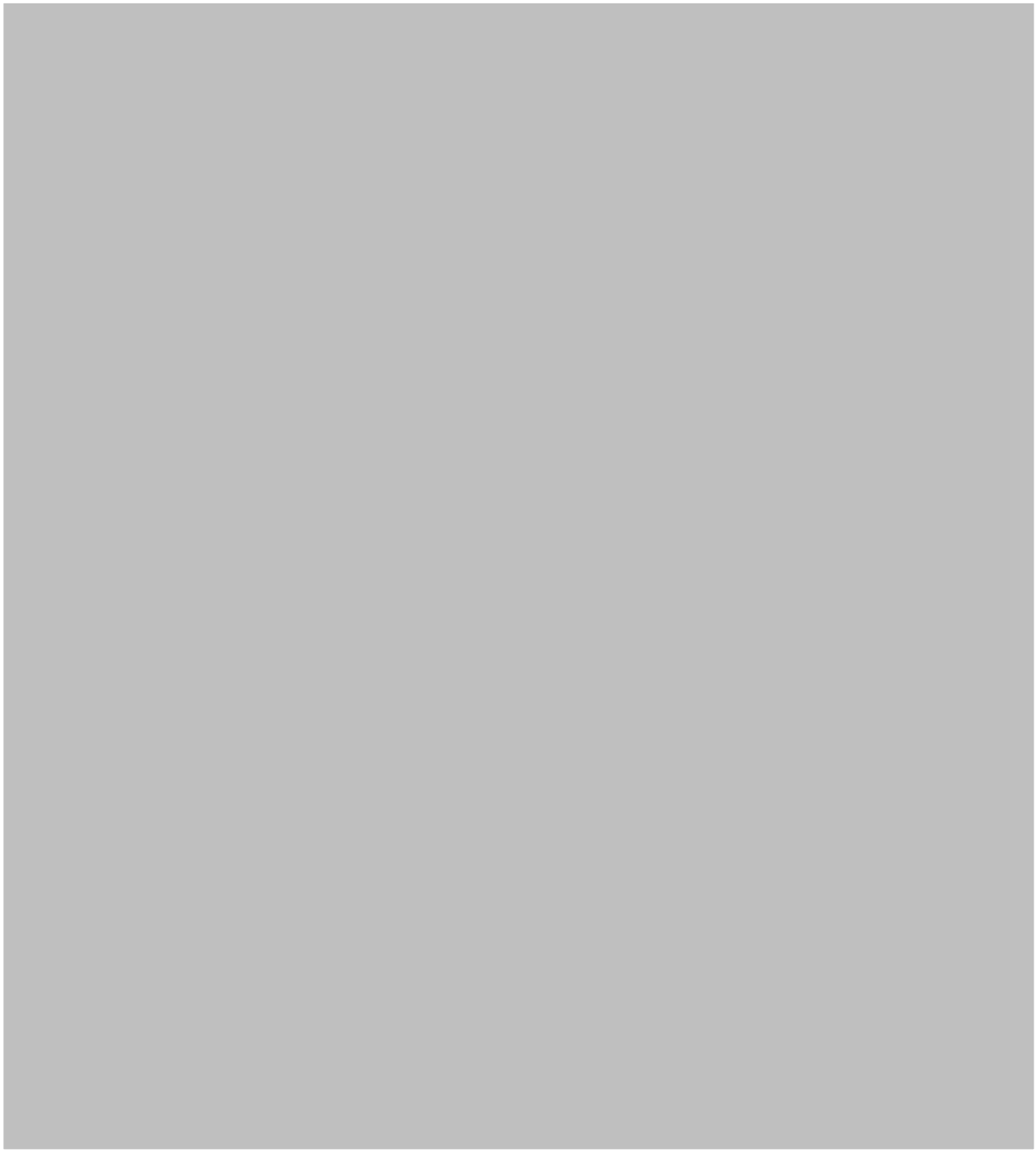
(Source: JICA Study Team)

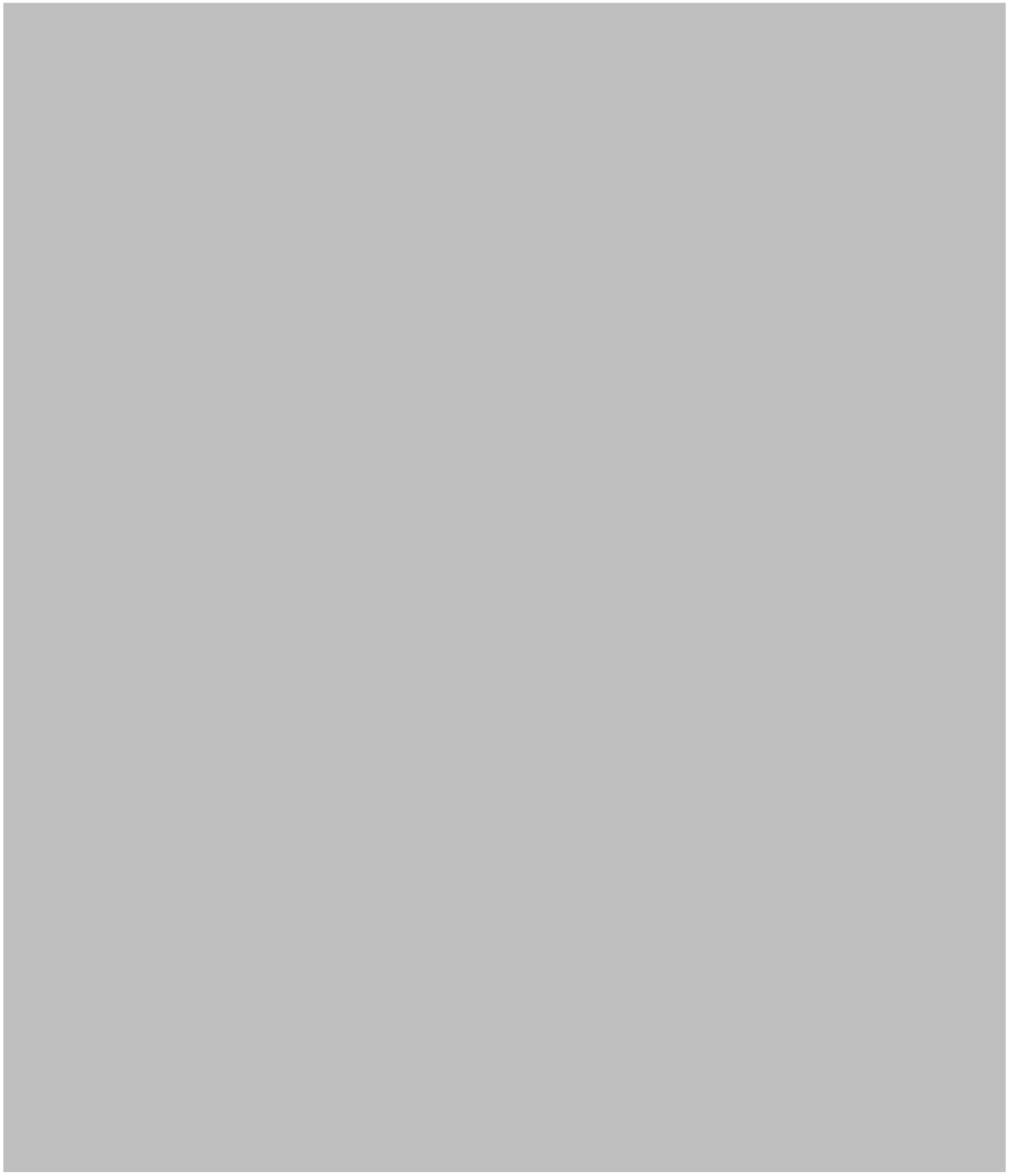


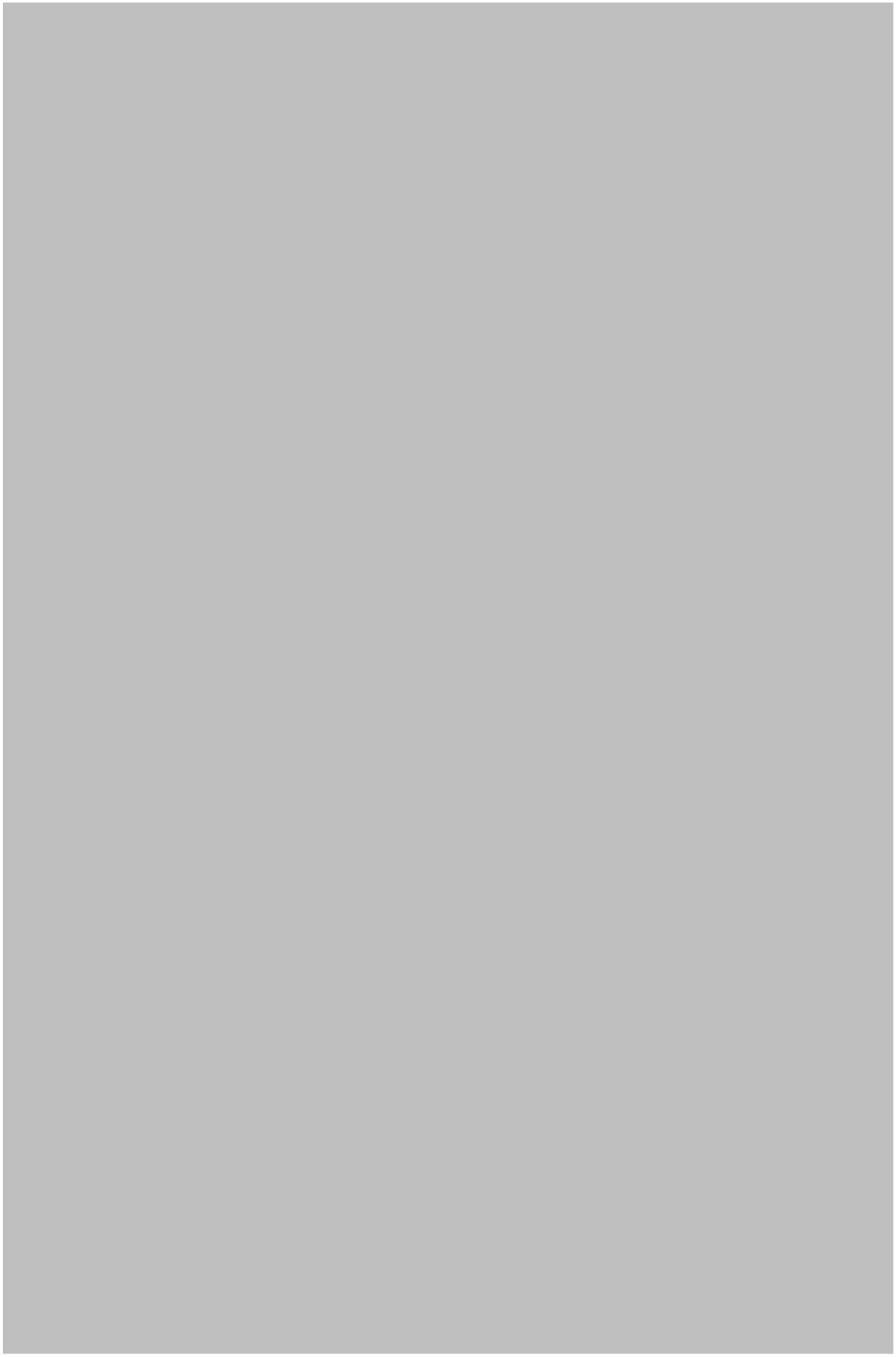


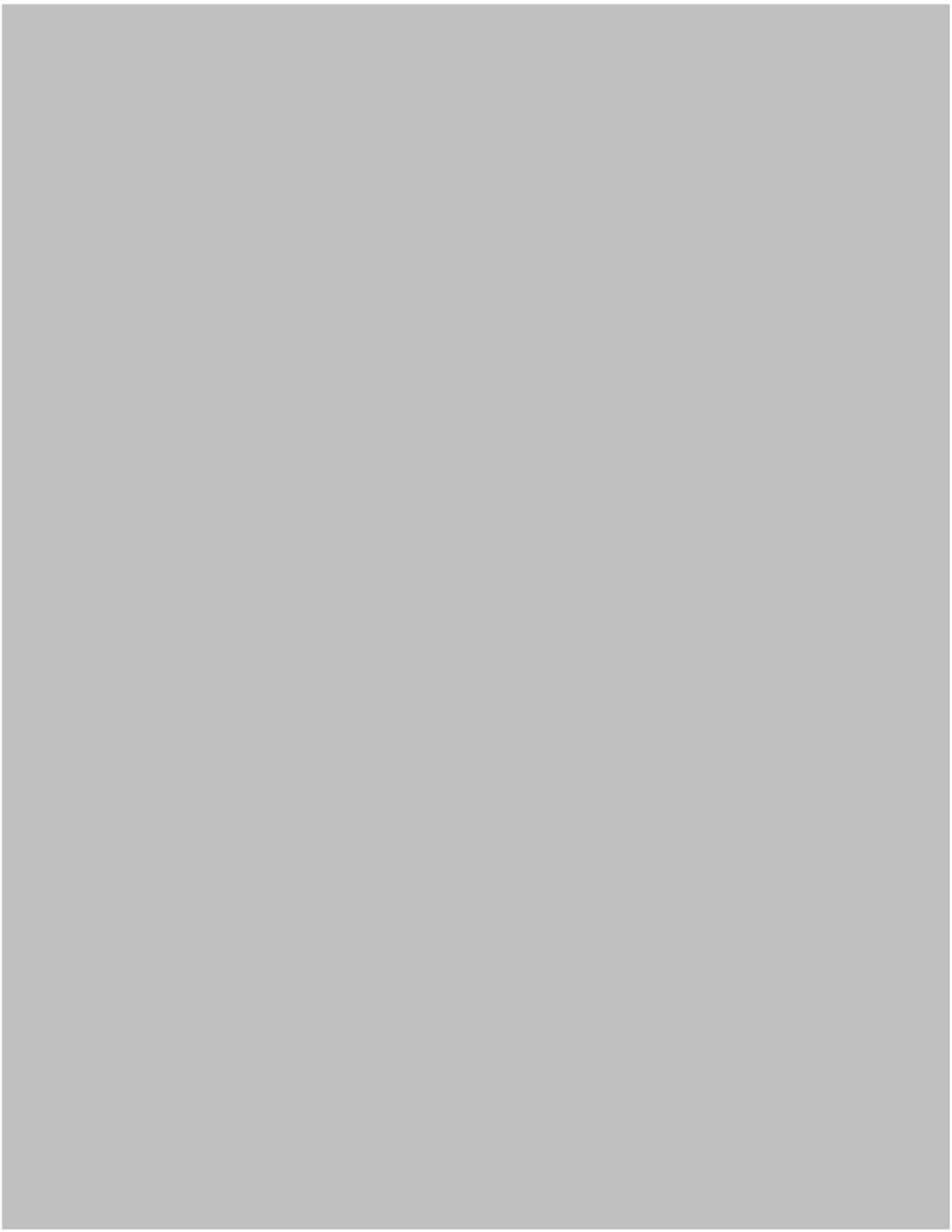












12.6 Executive Structure and Financial Condition

(1) Review of the Ability of the Execution Agency

a) Confirmation of Execution Structure

The executing agency of the proposed project will be DGWR under MPW, with its office located at Jakarta, Indonesia. During the implementation stage, the project will be administered by the representative of DGWR in Bali Province, since the project location there. The representative of DGWR is called BWS-BP (Balai Wilayah Sungai Bali-Penida). BWS-BP shall administer the implementation of the project with the assistance of a Consultant for engineering services. The organizational chart of executing agency, DGWR, is shown in Figure12.6.1.

Under DGWR, there are several directorates for each technical/section specialty. Being 'The Head Assistant-1' of BWS-BP, its function is inclined in the structural section. The Head of Bali Province Public Works, which is also a part of the structural division, also functions as 'The Head Assistant-2' for BWS-BP.

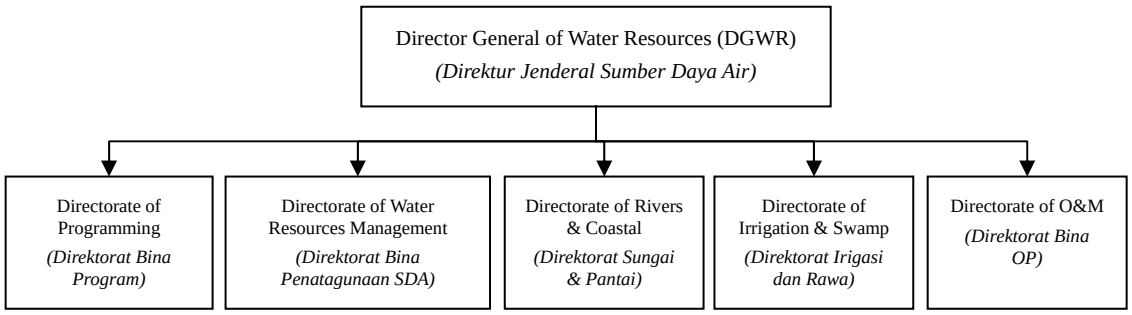


Figure 12.6.1 Organizational Chart of DGWR

(Source: BWS-BP, 2012)

The relationship between DGWR and its internal structure, BWS-BP, and the local government is presented in Figure 12.6.2.

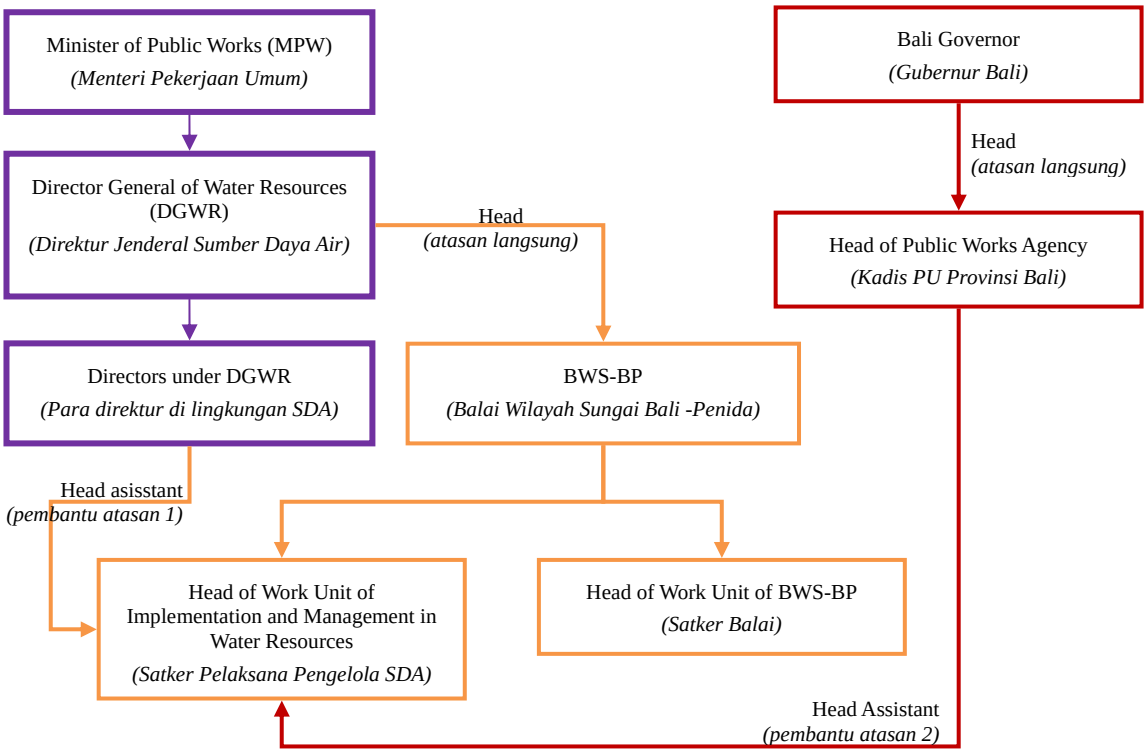


Figure 12.6.2 Work Relationship between BWS-BP, DGWR, and the Local Government

(Source: BWS-BP, 2012)

The task of the Head of Public Works of Bali Province in the above figure is to ensure good coordination of the implementation of the central government program at its region.

b) Responsibility and Staff Condition of Executing Agency

The boundary of authority and responsibility of the executing agency will be as follows: *(1).* DGWR is the policy maker of development/action taker for the water resources development and conservation, and *(2).* BWS-BP will be the administrator for the project implementation (PMU).

DGWR has defined the vision and mission for 2025. The vision is *"Achievement of sustainable water resources utilization for people prosperity"*.

The mission of DGWR in 2025 are as follows:

- Continuous water resources conservation;
- Fair use of water resources utilization and fulfillment of quality and quantity criteria on people's needs;
- To prevent the total destruction of water;
- Improvement of community and government involvement in water resources management; and
- Improvement of the openness, availability of water resources management data and management.

General conditions of achievement in 2025 are as follows:

- Improve the safety and protection of the people against water pollution;
- Achievement of water resources management on comprehensive river basin management and its sustainability considering the environmental aspect;
- Achievement of water sufficiency for most people with the priority of fulfilling the human basic need, and for agriculture;
- Achievement of active involvement from stakeholder in the water resources management through 'Dewan SDA' (water resources forum). Dewan SDA shall be used for dialog forums and coordination among all related stakeholders (government, community, local people, etc.); and
- Achievement of a financing principle for water resource management services which can provide incentives and disincentives with synergy and integrated utilization of various resources.

The numbers of staff of both DGWR and BWS-BP at present are shown in Table 12.6.1 below. These include the number of DGWR staff includes staff which stay at the central (Jakarta) office, and those who are deployed at each of the BWS-BP offices at each province.

Table 12.6.1 Number of Staff at DGWR and BWS-BP in 2012
(Employment status : Central Government)

No.	Place of Duty	Engineer Staff	Non Engineer
1.	DGWR (Central and all BWS-BP)	4044	4672
2.	BWS-BP (part from above, with employment status "A")	59	120

Remarks : *(Status of Employment : A=Central Government Employee; B= Bali Provincial Government Employee)*

(Source : DGWR and BWS-BP, processed)

Table 12.6.2 Number of BWS-BP staff (2009-2012) based on employment status is shown below.

Table 12.6.2 Number of BWS-BP Staff (2009-2012)

No	Year	Employment Status								**Total**
		Government Employee				Outsourcing Employee		Daily Worker		
		Status 'A'		Status 'B'						
		Engineer	Non-Engineer	Engineer	Non-Engineer	Engineer	Non-Engineer	Engineer	Non-Engineer	
1	2009	24	91	40	67	10	26	7	36	**301**
2	2010	33	119	49	30	9	12	3	16	**271**
3	2011	43	129	43	26	39	36	1	5	**322**
4	2012	59	120	28	20	50	142	1	5	**425**
Total		**159**	**459**	**160**	**143**	**108**	**216**	**12**	**62**	

Remarks : *(Status of Employment : A=Central Government Employee; B= Bali Provincial Government Employee)*

(Source : BWS-BP, processed)

c) Financial and Budget Conditions

The financial condition of DGWR and BWS-BP varies every year and has increased every year for the past four years. From DGWR and BWS-BP's annual total expense, it has used an

average of ± 80% for the investment. The financial data of DGWR and BWS-BP for the past four years are shown below.

Table 12.6.3 Financial Data of DGWR and BWS-BP for the Past Four Years

(in US$ x 1,000. Assuming US$1= Rp.9,300)

DGWR Annual Expenses		2009	2010	2011	2012
Expense for personnel		12,945	34,106	46,847	50,164
	Portion	*1.6%*	*3.7%*	*8.1%*	*4.5%*
Expense for goods		58,143	148,964	124,176	156,974
	Portion	*7.3%*	*15.9%*	*21.6%*	*14.0%*
Expense for investment		724,515	751,140	404,116	916,718
	Portion	*91.1%*	*80.4%*	*70.3%*	*81.6%*
Total Expenses		**795,603**	**934,211**	**575,139**	**1,123,855**
	Portion	***100.0%***	***100.0%***	***100.0%***	***100.0%***

(Source : DGWR, 2012 processed)

Based on the DGWR annual expenses above, the amount/portion spent by BWS-BP is as follows:

Table 12.6.4 Financial Data of BWS-BP for the Past Four Years

(in US$ x 1,000. Assuming US$1 = Rp.9,300)

BWS-BP Annual Expenses		2009	2010	2011	2012
Expense for personnel		453	453	199	213
	Portion	*1.5%*	*2.0%*	*0.7%*	*0.8%*
Expense for good		1,088	1,198	1,570	3,031
	Portion	*3.7%*	*5.3%*	*5.8%*	*11.2%*
Expense for investment		27,989	20,976	25,239	23,898
	Portion	*94.8%*	*92.7%*	*93.5%*	*88.0%*
Total Expenses		**29,531**	**22,627**	**27,008**	**27,142**
	Portion	***100.0%***	***100.0%***	***100.0%***	***100.0%***

(Source : DGWR, 2012 processed)

In February 2011, BAPPENAS has issued the 'List of Medium-Term Planned External Loans and Grants (DRPHLN-JM) 2011-2014' for Indonesia. The proposed project for the DGWR sector can be summarized as follows:

Table 12.6.5 Proposed Project for DGWR Sector

(unit: US$ x 1,000)

No.	Executing Agency	Kind of project		Loan	Grant	Local	Remarks
		PA	TA				
1.	Ministry of Public Works	57	35	5,215,034	417,635	765,864	*Total for MPW*
	- Directorate General of Water Resources	17	14	1,546,062	81,435	282,424	*DGWR section*

(Source: List of Medium-Term Planned External Loans and Grants (DRPHLN-JM) 2011-2014, BAPPENAS, Feb 2011)

From the abovementioned conditions, it can be concluded that DGWR as the Executing Agency, has the potential to financially support the preparation of the sharing portion for the works.

d) OM Cost Allocated for the Phase-1 Project in the Post Project Stage

Maintenance works carried out by BWS-BP at Phase-1 Project beaches area consist mostly of constructing the structure, in which it was rejected or modified due to local people request or objection. At the post project stage, impact of rejected/modified structure is realized by local people and thus, the government was requested for repair. Total cost spent by BWS-BP since 2006 is as follows:

Table 12.6.6 OM Cost Spent by BWS-BP from 2006

(unit: US$. Assuming US$1 = Rp.9,300)

No.	Work Item	Area	Amount (IDR)	Year
1	Additional modification groin and sand re-nourishment (Semawang area)	Sanur	679,931	2006
2	Maintenance work at Tanah Lot Temple	Tanah Lot	15,539	2006
3	Maintenance work for revetment (Pantai Karang area)	Sanur	70,968	2010
4	Additional groin and sand re-nourishment (Tanjung Benoa area; GA3-GA2)	Nusa Dua	408,602	2010
5	Additional groin and sand re-nourishment (Tanjung Benoa area; GA8-GA3)	Nusa Dua	322,581	2011
		Total	**1,497,621**	(US$)

(Source : BWS-BP, 2011 processed)

e) Technical Level for Execution

As the executing agency, BWS-BP, has experience on beach conservation projects through the Phase-1 Project. The scope of works during Phase-1 Project consists of the construction of coastal structure (groin, offshore breakwater) and sand nourishment. It also includes the construction of submerged breakwater and coral transplantation. These scopes of works are similar with the proposed counter measures at the candidate project of Phase-2 Project.

During the Phase-1 Project, BWS-BP was also involved in the monitoring works of beach condition. Moreover, after the completion of the project, BWS-BP have continuously carried out the periodic monitoring works on three beaches (Sanur, Nusa Dua and Kuta) with local budget up to now, following the O&M Manual prepared by the Consultant (during Phase-2 Project) in order to maintain the condition of the project beaches. Some adaptive management to maintain the sandy beach has been carried out by BWS-BP since 2009-2012:

1. Year 2006 - construction modification/extension length of groin (G.32) at Sanur, due to rejection by the local people during implementation.
2. Year 2006 – construction of additional groin (G.37) at Sanur, due to rejection by the local people during implementation.
3. Year 2009 – construction of additional groin (GN.5 and GN.6) and sand re-nourishment as adaptive management at Nusa Dua.
4. Year 2011 - construction of additional groin (GA.4) and sand re-nourishment as adaptive management at Nusa Dua.

Based on the abovementioned conditions, it can be said that the executing agency has adequate experience and knowledge on beach conservation project and beach maintenance in viewpoint of adaptive management system. Furthermore, the transfer of technology for the *beach conservation project* and especially for *beach management in post project stage* will improve the capability of the executing agency, local government, Indonesian engineers, and stakeholder along the beach. Hopefully, after the implementation of the Phase-2 Project, 'sustainable beach management' can be implemented well with the involvement of the central government, local government, and stakeholders.

f) Experience for Similar Project

As discussed above, the executing agency has adequate experience in beach conservation project. Similar project construction, technical requirement, solutions to social problem, and environmental consideration during project implementation are experienced during the Phase-1 Project.

(2) Proposal for Executive Structure (PMU)

The proposal for executive structure (PMU) during project implementation is proposed to ensure the effectiveness and efficiency of the execution of the project. The organizational structure is proposed considering the coordination of project among the DGWR, other concerned agencies, JICA, and the Consultant.

At the existing structure of BWS-BP, there are two project managers (PM) handling the river and coastal project, namely; a) PM- River and Coastal I and b) PM- River and Coastal II. The PM of River and Coastal I is mostly concerned with the river from upstream to downstream (boundary of river mouth), while the PM of River and Coastal II handles the estuary (river mouth) area and coastal area.

In the proposed PMU for project implementation, there are two alternatives:

Alternative 1. The Consultant for the Phase-2 Project will work hand in hand with the existing project manager (PM River and Coastal II). In this case, the PMU does not only manage the Phase-2 Project, but also other on-going projects funded by the national budget. The PM of River and Coastal II has several engineering and administration staff, and they will divide the task of each staff for every on-going projects available (including Phase-2 Project).

Alternative 2. BWS-BP will establish the new project manager for Phase-2 Project if the existing project manager is not capable of performing the scope of work.

This case will apply if the load (project operations to be managed) of PM River and Coastal II is too many and the staff available is not adequate to handle the management of the Phase-2 Project. Moreover, it is justified that the project to be managed has its complexity. In this case, BWS-BP will establish a new PM for the Phase-2 Project.

Based on the previous experience (during Phase-1 Project) and other loan projects at BWS-BP before 2010, Alternative 1 is applied. But in the last two years, BWS-BP created the new PMU for the implementation of 'Titab Dam/Reservoir' project, instead of the existing available project manager (PPK) of Water Resources Conservation Infrastructure. This means that both schemes of PMU (Alternatives 1 and 2) have the potential to be applied based on the BWS-BP condition at the time of the implementation of the Phase-2 Project.

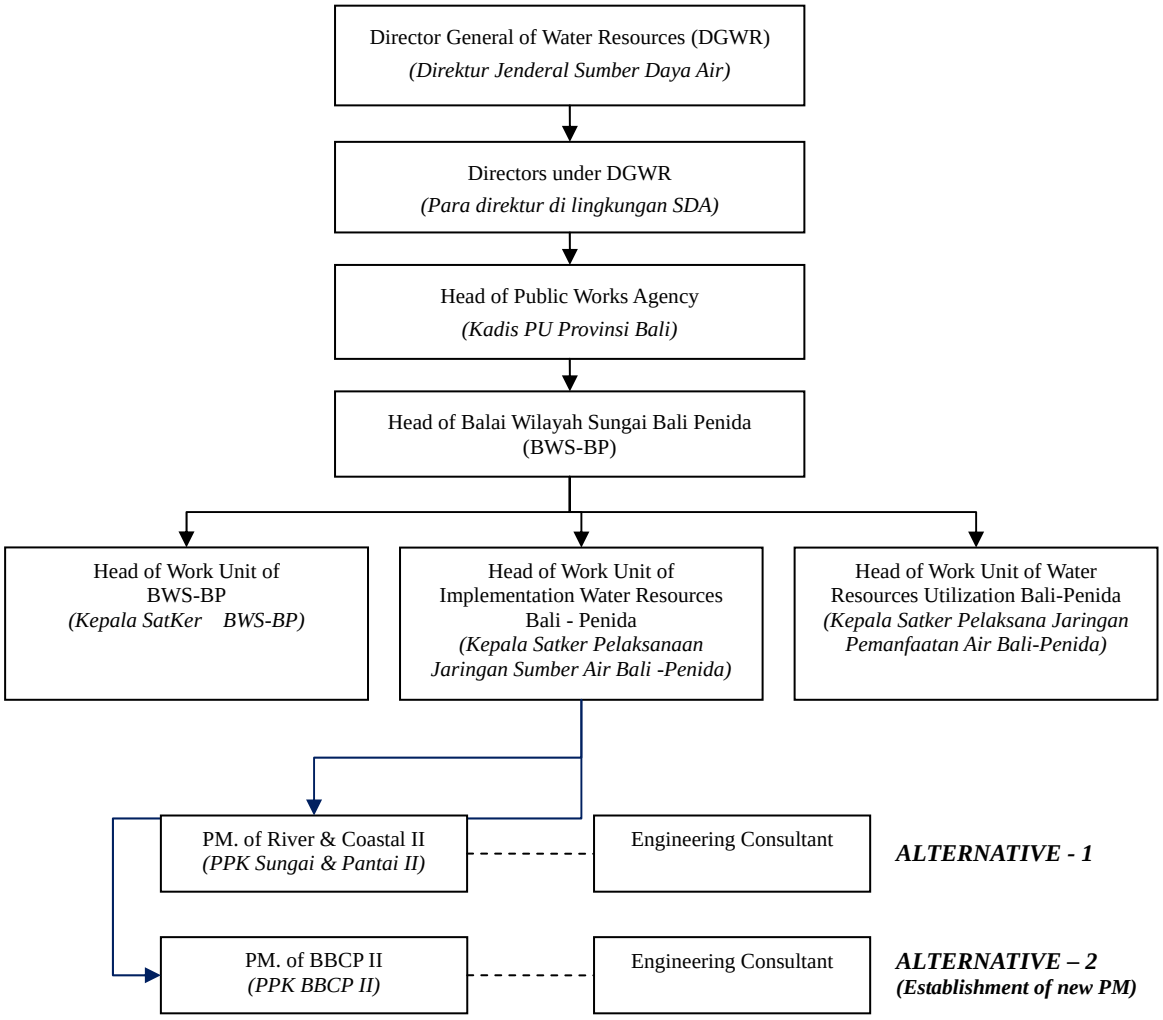


Figure 12.6.3 Proposed Structure of PMU

(Source: JICA Study Team)

Procurement procedures in Indonesia in the recent years already apply the *e-procurement* procedure under Presidential Decree No. 54/2010 regulation regarding 'Procurement of goods and services for the government sector' and Presidential Decree No. 70/2012 regulation regarding the 'Second Revision of Presidential Decree No. 54/2010' in order to ensure transparency and good governance. It was detailed by MoPW Regulation No. 07/PRT/M/2011, regarding 'Standard and Guideline Procurement of Construction Works and Consultant Services'. The steps and procedure of e-procurement are basically the same as the 'old style tender'. The only difference is that bids are no longer submitted in printed paper (hard copy) as applied as 'old style tender', but rather submitted as a soft copy (PDF file) and uploaded to the PW server. The steps of tender are as follows:

No.	Step	Old Style Procurement	E-Procurement
1.	Tender announcement	Through newsletter and at announcement board of executing agency	Through website and newsletter
2.	Registration of participants	Come to the committee at executing agency/ registration office	Online registration through MoPW website
3.	Distribution of qualification documents	Taking hard copy from the committee	Download the document online
4.	Submission of prequalification (PQ) documents	Submit the hardcopy of PQ documents to the committee.	Submit soft copy of documents (scanned document) by uploading to the website
5.	Opening of PQ documents	At bid committee office, attended by minimum of two participants	At bid committee office, attended by minimum of two participants
6.	Evaluation of PQ documents	Committee evaluates the hard copy submitted	Clarification to the participant for proof/ to check the authenticity of the documents
7.	PQ result announcement	Through official letter, send and adhere the letter at announcement board at executing agency office	Announce electronically through website
8.	Objection to the PQ results	Participant will submit official letter to the committee	Participant will submit through website
9.	Bid call	Through official letter, send and adhere at announcement board at executing agency office	Announce electronically through website
10.	Bid submission	Same as step '4'	Same as step '4'
11.	Bid opening (1st envelope)	Same as step '5'	Same as step '5'
12.	Evaluation of 1st envelope	Committee evaluates the hard copy submitted	Committee evaluates the soft copy submitted
13.	Announcement of 1st envelope evaluation result	Same as step '7'	Same as step '7'
14.	Objection to the evaluation result	Same as step '8'	Same as step '8'
15.	Opening of 2nd envelope	Same as step '5'	Same as step '5'
16.	Evaluation of 2nd envelope	Same as step '12'	Same as step '12'
17.	Announcement of bid evaluation result	Same as step '7'	Same as step '7'
18.	Objection to the evaluation result	Same as step '8'	Same as step '8'
19.	Announcement of bid winner	Same as step '7'	Same as step '7'

The website for e-procurement of the MoPW sector for all of Indonesia can be found at http://www.pu.go.id/punetnew2010/subindex.asp?pid=0906. The procurement at this webpage is both for construction and consultancy services funded by the national budget under MoPW. For the loan project, based on information from DGWR, it will depend on the agreement between the donor agency and DGWR. If the donor agency agreed to perform the tender through MoPW procurement website, it will use the existing system. Further discussion regarding tender procedure can be held between DGWR and the donor agency.

For the evaluation of the tender, consultancy service, and contractor's service, DGWR will establish the working unit called 'Pokja ULP' (working unit of procurement service/tender committee). The 'Pokja ULP' consists of several officers of executing agency who are inaugurated/ inducted by the head of the executing agency. The 'Pokja ULP' has the task and authority to procure, announce, evaluate, and decide on who will be the tender winner. This result will be reported to the project manager for the implementation and contract process.

Proposing the budget allocation for the consultancy and contractor's services is the responsibility of each PM. The PM will prepare and submit the required budget and program to the head of BWS-BP for further processing at DGWR.

(3) Review of the Ability of Government Officials Related to Coastal Management

In order to understand the capability of beach O&M of the beach management body for Phase-2, the JICA Study Team investigated the past records of O&M activities and budget for O&M at the Phase-2 area as shown in Table 12.6.7. The aim of this investigation is to evaluate the present capability for the O&M of Phase-2 based on present activities and budget allocation. In viewpoint of budget for monitoring, all bodies concerned except Balai Wilayah Sungai Bali-Penida have not allocated budget for monitoring activities. However, the budget for beach monitoring was allocated at some beaches in Gianyar, Klungkung, and Buleleng Regency. Monitoring activities have been conducted at the Phase-1 area intensively, because the fiscal budget, except for Phase-1, has been held down（Rp.91,000,000 to Rp. 250,000,000).

All bodies concerned except for BWS-BP, Dinas PU of Bali Province and Karangasem Regency have not been allocated budget for maintenance activities since 2007. The fiscal budget scale for BWS-BP was between Rp.8,000,000 and Rp.6,470,000,000 since 2007. BWS-BP has been continuously allocated with budget for maintenance works, but it was unstable (for example, Rp.8,000,000 in 2009 and Rp.6,470,000,000 in 2007. Dinas PU of Bali Province and Karangasem Regency have not been allocated budget continuously, that is, beach maintenance was conducted by Bali Province in 2007 only, and by Karangasem Regency in 2007 and 2009. The past record of fiscal budget for them was Rp.1,089,000,000 for Bali Province, and Rp.10,000,000,000 to Rp.16,500,000,000 for Karangasem Regency. As a result, Karangasem Regency has got a relatively larger budget for beach maintenance as compared with the other regencies.

In addition, the JICA Study Team investigated beach O&M activities and budget for beach O&M, and relative division and department in Karangasem Regency except Candidasa area so as to understand the potential capability suitable for O&M structure shown in Table 12.6.7 According to past records of budget for O&M, Karangasem Regency has not received budget for O&M, and the fiscal budget scale was Rp.3,000,000,000 in 2007 and Rp.4,500,000,000 in 2009.

According to budget for relative division and department for beach O&M in the last five years, the fiscal budget scale for the bodies concerned is shown as follows:

(Head of public works)

- Dinas PU of Karangasem Regency: Rp.19,637,403,084 (2010) to Rp.55,113,300,000 (2009)

(Relative division and department for beach O&M)

- Highway and Water Resources Unit (Karangasem) : Rp.8,413,626,000 to Rp.19,875,000,000

Furthermore, the JICA Study Team investigated the a) contents of beach monitoring which are categorized into the following: 1) specific item and frequency, 2) item and number of equipment, 3) method, 4) engineer; and b) staff and contents of beach maintenance such as: 1) maintenance records, 2) possession situation of equipment, heavy machine, etc. Each of the concerned bodies is shown in Table 12.6.8.

BWS-BP and Bali provinces have and hold equipment such as total station, water pass, GPS, eco-sounder, current meter, etc., which are used for beach monitoring activities. On the other hand, Badung and Karangasem regencies only have cameras, measuring tapes, and GPS. As a result, they cannot conduct beach monitoring except for visual inspection.

According to the engineer and staff in charge of beach monitoring, they have designated staff for O&M including related organizational set-up. However, there is no coastal engineer and expert in all bodies concerned who can evaluate monitoring data and plan countermeasures. It is necessary to involve engineers and/or experts who have knowledge in coastal engineering in order to implement continuous beach management based on concepts of adaptive beach management.

Regarding the beach maintenance, BWS-BP and Karangasem Regency has implemented maintenance work at the Phase 2 area. The principal maintenance work by Karangasem Regency was the construction of several structures and black sand nourishment between groins at Candidasa Beach. BWS-BP, and Badung and Karangasem regencies have dump trucks and/or trucks for maintenance.

Table 12.6.7 Past Records of Beach Management

Category	Item		Beach Management Body				
			Balai Wilayah Sungai Bali-Penida (BWS-BP)	Dinas PU of Bali Province	Environmental agency, Bali Province	Dinas PU of Badung Regency	Dinas PU of Karangasem Regency
	Object beaches		Candidasa, Padang Galak - Unda, Legian - Canggu	Candidasa, Padang Galak - Unda, Legian - Canggu	Candidasa, Padang Galak - Unda, Legian - Canggu	Legian - Canggu	Candidasa
Activities for O&M	Activities for monitoring of beaches		**PPK Operational and Maintenance** a. Monitoring and evaluation of beach line and Beach Protection Structure Performance in Gianyar & Klungkung regency in 2011 b. Monitoring and evaluation of Beach Protection Structure Performance in Buleleng regency in 2011	No beach monitoring activity by Bali Province's Public Works.	Environment Agency is never conduct the monitoring of Beach Shoreline, only several monitoring as follow; - Monitoring of water quality and beach utilization - Monitoring of coral and seagrass - Monitoring of Coral reef and Seagrass condition (Water quality conduct as regularly works which taken every month at Several area at Bali, all data analysis by SNI and resume some conclution and report for further	No Activity for Beach Monitoring. If any information from the community about erosion at Legian - Canggu Area, Dinas PU will coordinate and inform to Balai Wilayah Sungai Bali Penida for further action.	Dinas PU of Karangasem never conduct the monitoring of beach. Unit for Swamp, Coastal and River just establish on 2010.
	Activities for maintenance of beaches		**PPK Operational and Maintenance** a. Maintenance of Beach Protection Structure of Canggu beach at Badung Regency (Renovation of Stone Masonry Seawall at Canggu) -2007 b. Maintenance of Beach Protection Structure at Buleleng Regency (renovation of stone masonry seawall at Buleleng)- 2008 c. Self-management of Maintenance of Beach Protection Structure (Purchasing Material only) - 2010 d. facilities /	• Revetment Construction of Cupel Beach Jembrana regency (2007)		No Activity for Beach Maintenance. If any information from the community about erosion at Legian - Canggu Area, Dinas PU will coordinate and inform to Balai Wilayah Sungai Bali Penida for further action.	If any retreat of construction damage, Dinas PU will analysis by their consultant for countermeasure. For construction budged, Karangasem Regent bring the document and drawing to the jakarta for funding. Ministry of Community Welfare was funded for several coastal project at Candidasa (2007-2009)
Budget for O&M	Budget for monitoring of beaches	2011	Rp 180.000.000,-				
		2010	Rp 250.000.000,-				
		2009	Rp 206.000.000,-				
		2008	Rp 91.000.000,-				
		2007	Rp ----				
	Budget for maintenance of beaches	2011	Rp 3.330.000.000,-				
		2010	Rp 4.460.000.000,-				
		2009	Rp 8.000.000,-				Rp. 16.500.000.000,-
		2008	Rp 96.000.000,-				
		2007	Rp 6.470.000.000,-	Rp 1.089.000.000,-			Rp. 10.000.000.000,-

(Source: JICA Study Team)

Table 12.6.8 Implementation Status of Government Institutions which are related to Beach Management

Category	Item	Beach Management Body				
		Balai Wilayah Sungai Bali-Penida (BWS-BP)	Dinas PU of Bali Province	Environmental agency of Bali Province	Dinas PU of Badung Regency	Dinas PU of Karangasem Regency
	Object beaches	Candidasa, Padang Galak - Unda, Legian - Canggu	Candidasa, Padang Galak - Unda, Legian - Canggu	Candidasa, Padang Galak - Unda, Legian - Canggu	Legian - Canggu	Candidasa
Contents of beach monitoring	Specific item and frequency of beach monitoring	Beach monitoring has conducted since the completion of the project twice a year (June and November). - Sanur : 2004 - 2008, 2009 and 20011 - Nusa dua : 2004 - 2008, 2009 and 2011 - Tanjung Benoa : 2004 - 2011 - Kuta : 2009 - 2011	- There is no funding allocation from the Local Budged (APBD) for coastal monitoring activities - Surveillance of the beach utilization performed by City Planning Agency with coordination by Public work of Bali Province	Environment Agency is never conduct the monitoring of Beach Shoreline, only several monitoring as follow; - Monitoring of water quality and beach utilization - Monitoring of coral and seagrass - Monitoring of Coral reef and Seagrass condition (Water quality conduct as regularly works which taken every month at Several area at Bali, all data analysis by SNI and resume some conclution and report for further action)	No Activity for Beach Monitoring. If any information from the community about erosion at Legian - Canggu Area, Dinas PU will coordinate and inform to Balai Wilayah Sungai Bali Penida for further action.	Dinas PU of Karangasem never conduct the monitoring of beach. Unit for Swamp, Coastal and River just establish on 2010.
	Item and number of equipment for beach monitoring	The equipment of beach monitoring is listed as follows: - Total station : 2 sets (Sokkia and Topcon) - Water pass : 2 sets (Sokkia and Topcon) - Echo sounder : 1 set (Rayteon)	The equipment of beach monitoring is listed as follows: - Total station : 1 sets (Topcon) - Water pass : 1 sets (Topcon) - Measuring Tape : 1 (one) unit - Camera : 2 (two) unit - Current Meter : 1 (one) set	The Equipment own by Environmental Agency is follows; - Total Station 2(two) unit - GPS 1(one) unit - Auto Level 1 (one) unit - Camera 5(five) unit - Video Camera 1 (one) unit	GPS 2 (two) unit, Measuring Tape 2(two) unit, Camera 12(twelve) unit	The Equipment own by Environmental Agency is follows; - Camera 2(two) unit
	Method of beach monitoring	The method of monitoring is based on the Indonesian Standard for Topographic Monitoring Survey. - Level survey for structures : survey on level of top, slope and toe part of each facilities - Topographic survey : Cross section survey in order to compare shoreline change, sand lost and sedimentation/erosion process. - Terestrial Photo : Taken photo at fix position and same angle of photo for determine beach condition.	Not knowing about the method of measurement the shoreline change.	For Coral Reef Survey identification, consultant used manta method and Sampling for Water Quality used Indonesian Standard (SNI)	Not knowing about the method of measurement the shoreline change.	Not knowing about the method of measurement the shoreline change.
	Engineer and staff for beach monitoring	The beach monitoring is carried out by PPK Operational and Maintenance (water resources) under Sub unit of Planning and operating maintenance in BALAI. (PPK Operation and Maintenance) - Engineer : 2 (two) persons - Staff : 2 (two) persons	The beach monitoring and maintenance will be carried out by Sub section of Technical Planning and Supervise Water Resources Engineering and Sub section of Operation and Maintenance Water Resources Infrastructure under Section of Water Resources Engineering . This existing organization consists of the following engineer and staff. - Coastal Engineer : - persons - Civil Engineer : 5 persons (Ir. I Nyoman Sueta, ME, Ir. Si luh Nyoman Sukarmini, Ir. I G B Putra Budiartha, MM, I Wayan Suardana, ST,MT dan Komang Edy Indrawan Kusuma, ST) - Geologist : 1 persons (Ir. I Ketut Suharta M.Si) - Staff : 10 (ten) persons	The beach environmental monitoring is carried out by Unit of Conservation under Sub unit of Biological conservation - Engineer : 3 (three) persons - Staff : 5 (five) persons	The beach monitoring will be carried out by Operation and Maintenance Bureau, Water Resources Engineering under Highway and Water Resources Department. This existing organization consists of following engineer and staff. - Civil Engineer : 2 (two) persons (Ir. A Agung Dalem, I Wayan Ledi Utama, ST) - Staff : 12 (twelve) persons	The beach monitoring and maintenance will be carried out by Sub Section of River, Swamp and Coastal under Section of Water Resources Engineering. This existing organization consists of the following engineer and staff. - Civil Engineer : Ir. Nyoman Sutirtayasa, MT , Ni Made Aryadi, ST, I Made Wiguna, ST, MT - Staff : 10 (ten) persons
Contents of beach maintenance	Maintenance records	**Operational and Maintenance of PPK** a. Maintenance of Protection Structure of Canggu beach at Badung Regency (Renovation of Stone Masonry Seawall at Canggu) -2007 b. Maintenance of Protection Structure at Buleleng Regency (renovation of stone masonry seawall at Buleleng)- 2008	Never conduct any construction for this area	Out of task and responsibility of this Agency, we only monitor the condition of sea water, coral reef and see grass at Candidasa Area.	Never conduct any construction for this area	Construction several structure at Candidasa Area and Black Sand Nourishment.
	Possession situation of equipment, heavy machine, etc for O&M works	The following equipment is possessed by BALAI for the maintenance of the beach. - Dump truck : 1 - Truck : 1	Dinas PU of Bali Province doesn't have any heavy equipment	Environmental Agency of Bali Province doesn't have any heavy equipment	Dump Truck 1 (one) unit and Pick Up 2 (two) unit	Dump Truck 1 (one) unit and Pick Up 2 (two) unit

(Source: JICA Study Team)

(4) Proposal for the Operations and Maintenance of the Project

The beach management plan required after the completion of the Phase-2 Project is summarized in Table 12.6.9. The structure for beach management consists of BWS-BP and Loka Pantai as the central government, and province of Bali, Badung and Karangasem regencies as the local government and stakeholders. The establishment of a coordination team (TKMPP-2) for beach management is required in order to implement sustainable beach management in the same way as Phase-1, as shown in Table 12.6.9. The detailed beach management plan will be prepared after the completion of the detailed design, in consideration of the final scope of works of Phase-2, with some issues and improvement plan to be undertaken after the establishment of TKMPP-1. It will be reviewed in detail during the final stage of the construction period.

Table 12.6.9 Summary of Beach Management Plan

Category of beach management	Required actions		Task	Responsibility	Frequency
Management 1 (Monitoring and maintenance of beach fill area)	Monitoring (Visual & technical/survey)	Adaptive beach management	Visual checking and reporting to Coordination Team for Beach Management (TKMPP-2), if any problem	Stakeholders	Every 2 months
			Beach profile survey & fixed point photo	BWS-BP & Loka Pantai	Unstable area : every 6 months Stable area : every 1 year
	Evaluation / technical study		Data processing & analysis of shoreline change and sand lost	BWS-BP & Loka Pantai	Unstable area : every 6 months Stable area : every 1 year
	Planning & Design for required adaptations		Planning of shoreline alignment and cross section Calculation of sand volume and Construction plan and cost estimation	BWS-BP & Loka Pantai	As required
	Implementation		*Large Scale* - Supplementary beach fill to permanent stock pipe - Transportation of sand with large scale from stockpile to the beach	BWS-BP	As required
			Small Scale - Sand rotation (sand bypass) and - Additional beach fill with small scale that is used by sand in stock pipe under technical support by BWS-BP	Stakeholders	As required
Management 2 (Maintenance of coastal protection structure : Revetment, Groin, Breakwater)	Monitoring of coastal protection structure		Visual checking and reporting to Coordination Team for Beach Management (TKMPP), if any problem	Stakeholders	Every 6 months
			Level survey & fixed point photo	BWS-BP & Loka Pantai	
	Evaluation of need of maintenance and implementation		- Analysis of level change and cause of damage - Planning of repairing method - Calculation of repairing volume - Construction plan and cost estimation	BWS-BP & Loka Pantai	As required
Management 3 (Maintenance of landscape and public facilities : Walkway, gazebo, parking area, public building)	Monitoring of landscape and public facilities		Visual checking and reporting to Coordination Team for Beach Management (TKMPP-2), if any problem	Stakeholders	Every 6 months
	Evaluation on required maintenance and implementation		*Indirect benefit area (empty, temple, shop, etc)* - Planning of repairing method - Calculation of repairing method - Construction plan and cost estimate	Badung & Karangasem regency	As required
			Direct benefit area (Hotel area) and Direct utilization (Public building) - Planning of repairing method - Construction plan and cost estimate	Stakeholders	As required
Management 4 (Beach cleaning)	Daily beach cleaning	Indirect benefit area	*Indirect benefit area (empty, temple, shop, etc)* - Financing of beach cleaning activities for stakeholders	Badung & Karangasem regency	Daily
			Indirect benefit area (empty, temple, shop, etc) - Daily beach cleaning - Collecting garbage to collecting point	Stakeholders	
		Direct benefit area	*Direct benefit area (Hotel area)* - Financing of beach cleaning activities - Daily beach cleaning - Collecting garbage to collecting point	Stakeholders	Daily
	Transport to disposal area		Transporting garbage from collecting point to disposal area	Badung & Karangasem regency	Daily
Management 5 (Beach utilization)	Daily monitoring of the beach utilization		Visual checking and reporting to Coordination Team for Beach Management (TKMPP-2), if any illegal activities and facilities are found	Stakeholders	Daily
				Badung & Karangasem regency	Monthly
	Sanction for violations of the beach utilization		Arrangement of socialization meeting for widely known, if necessary	Stakeholders	As required
			Enforcement of beach utilization rules	Province & Regency	As required

(Source: JICA Study Team)

12.7 Study of Appropriate Contract Package

In the construction plan mentioned earlier in this chapter, it is proposed that the project area be divided into three packages.

Table 12.7.1 Contract Packages

Package-1:		Package-2:	Package-3:
Candidasa Case-1 : 3 km	Candidasa Case-2 : 5 km	North Kuta ~ Legian ~ Seminyak	Improvement at Kuta
Project Scope - General and preparatory works (including temporary jetty) - Demolition works - Construction of revetment - Construction of groin - Beach fill (188,140 m^3) - Revetments works - Groin modification (6 groins) - New groin (3 groins) - Walkway and walk road above groin - Landscape - Environmental monitoring works - Coral transplantation	Project Scope - General and preparatory works (including temporary jetty) - Demolition works - Construction of revetment - Construction of groin - Beach fill (341,960 m^3) - Revetments works - Groin modification (7 groins) - New groin (6 groins) - Walkway and walk road above groin - Landscape - Environmental monitoring works - Coral transplantation	Project Scope - General and preparatory works - Beach fill (280,300m^3) - Construction of walk way - Environmental monitoring works - Temple protection works	Project Scope - General and preparatory works - Modification of existing BWN-1&2 - New L-shaped headland - Sand re-nourishment (15,700 m^3) - Environmental monitoring works
Construction Period 36 months *(with beach nourishment)* 28 months *(without beach nourishment)*	Construction Period 36 months *(with beach nourishment)* 28 months *(without beach nourishment)*	Construction Period 10 months	Construction Period 16 months

(Source: JICA Study Team)

12.8 Proposed Sustainable Beach Management System

(1) Study of Suitable Beach Management System

The beach management system for Phase-2 is covered at Candidasa on the east coast and North Kuta-Legian-Seminyak on the south west coast. It is assumed that beach management between North Kuta and Seminyak will be carried on into the beach management system that was established in Phase-1, because the beach is located in Badung Regency. On the other hand, Candidasa is located in Karangsem Regency, which is outside of the Phase-1 area, and they are inexperience in full-scale beach management under the cooperation between public and private organizations. Therefore, it is necessary to establish suitable beach management system considering not only their capability and actual achievement, but also the result of consensus building and enlightenment programs that will be carried out in the design and construction period in reference to the experience and process of Phase-1. The schedule and contents for the establishment of beach management system for Phase-2 are described in Section 12.3, "Study of Implementation Plan for Soft Components".

A coordination team for Phase-2 is proposed to combine with TKMPP, as mentioned in Chapter 5, that will be established for beach management system on Phase-1. Figure 12.8.1 shows beach management structures for TKMPP which includes Candidasa and North Kuta-Legian-Seminyak. This structure will be established from the latter half of the construction period to the monitoring period, taking into consideration the results of consultation among government officials and stakeholders who are related to beach management. Capacity building for members is required through regular meetings from design stage and on the job trainees (OJTs) on site during the construction and monitoring period. Overseas training in Japan will also be planned to be conducted for core members of TKMPP as a program of capacity building.

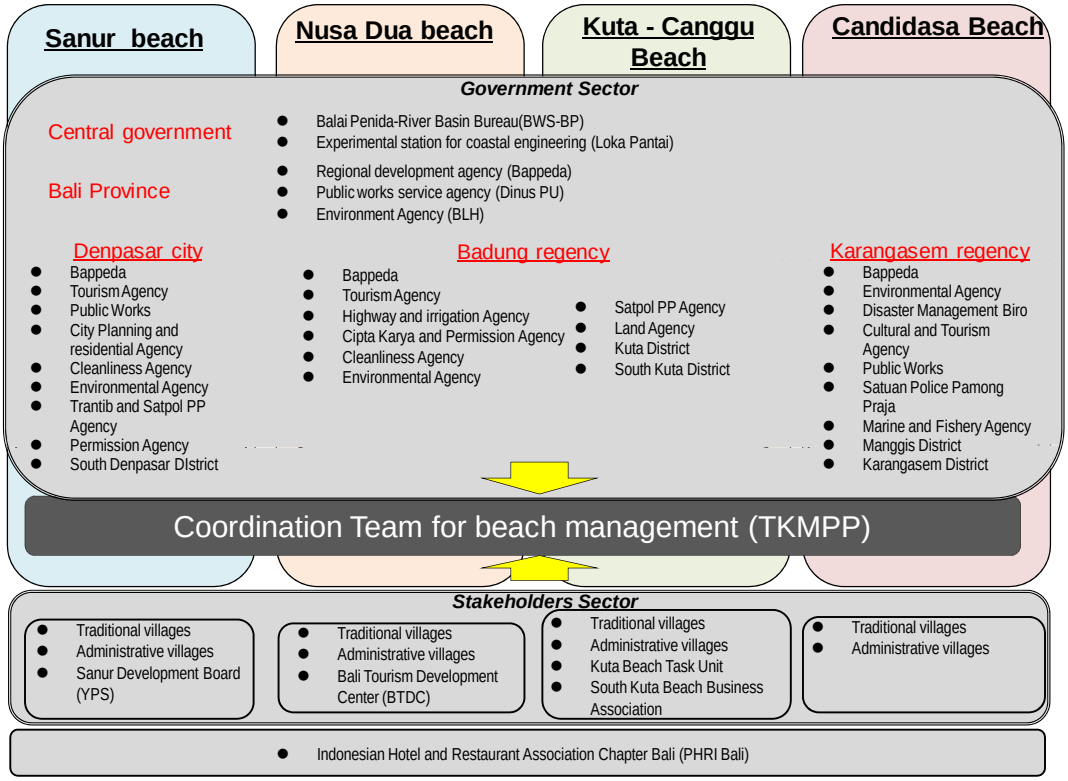


Figure 12.8.1 Proposed Beach Management Structure for Phase-2

(Source: JICA Study Team)

(2) Support for the Implementation of Beach Management

To undertake the task of beach management on a systematic basis is a first case for the Karangsem Regency. It is necessary to establish beach management system considering the reality of the situation of Candidasa and Karangesem Regency, and by using examples obtainable from TKMPP, such as implementation structure and demarcation of responsibilities.

In this study, staffs from Bappeda and Dinus PU of Karangsem Regency were invited by the JICA Study Team. They will fulfill an important role as observers in the third WG for Phase-1 in order to give an opportunity to enhance their understanding, especially from the following points of view:

- Objective of beach management;
- Organization and structure for sustainable beach management;
- Beach utilization issues; and
- Necessity of institutionalization, etc.

In order to check the level of understanding and the questions of staffs against beach management, questionnaire surveys to staffs of Karangsem Regency were carried out (staffs of Karangsem Regency were asked with eight questions). Results of the survey are shown as follows. It was an opportunity to deepen the understanding on the importance of sustainable management and to confirm the necessity of various types of beach management that was required after the completion of the project through the 3rd WG. On the other hand, it is important to establish a suitable management system, considering the situation of Karangsem, the requirements, and opinions from both local governments and stakeholders during the construction period of Phase-2. Apparently, the scale of TKMPP and a few responsibility issues were pointed out.

Question	Answer	Degree of Understanding		
		Well	Normal	Insufficient
1. Do you understand beach management issues after completion of project?			√	
2. Do you understand importance of continual and sustainable beach management?		√		
3. Do you understand category and required actions for beach management (Management 1 to 5)?			√	
4. What do you think about the members of the coordination team for beach management (TKMPP)?	• The number of members of the team is too big so that mobility will be slow			
5. What do you think about the tasks and responsibilities of TKMPP?	• Tasks and responsibilities of the team still overlap resulting to the disorganized implementation			
6. If you have any opinions and questions for demarcation and responsibility from Management 1 to 5, please fill in the right column.	• Beach management should be implemented in respective management (central, province and regency/ city should have obvious tasks and responsibilities)			
7. Do you understand the importance of legalization of walkway as boundary between public and private?			√	
8. Do you understand illegal activities and facilities on the beach?			√	

Chapter 13 Economic Impact Analysis and Operation and Effect Outcome Measure

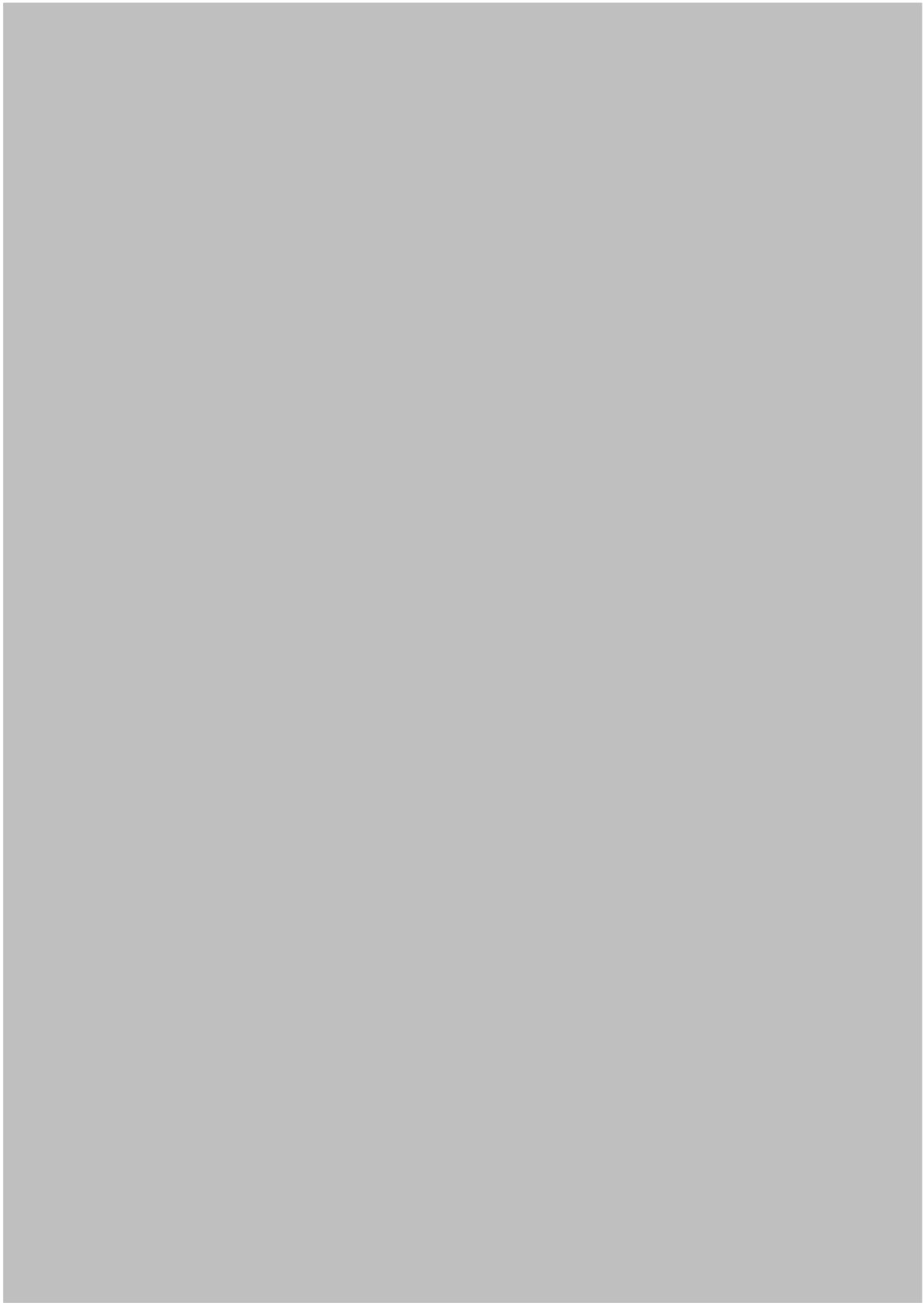
13.1 Overview of the Economic Impact Analysis

(1) Objective of Economic Analysis

In general, there are two representative methods to evaluate the project effect; economic analysis and financial analysis. The purpose of the economic analysis is to evaluate the proposed project from the viewpoint of the national economy. On the other hand, financial analysis is aimed to appraise the financial viability of the proposed project from the viewpoint of capital investment whether it could yield sufficient returns. The former is evaluated with EIRR (Economic Internal Rate of Return) and the latter is evaluated with FIRR (Financial Internal Rate of Return).

A beach conservation project is generally implemented as public works since it contributes to the national economy by protecting national land, saving people's lives, enhancing the tourism industry and so on. In this study therefore, the economic analysis evaluated with EIRR is applied to evaluate the project effects.

The project effect on Candidasa, Legian~Seminyak, and Kuta Beach in Phase II are evaluated through economic analysis as a pre-project evaluation. Economic analysis is conducted for both the entire project (i.e., initial project and maintenance project) and only the maintenance project. The latter analysis is aimed to examine the maintenance project itself is economically feasible taking the possibility of PPP (Public-Private Partnership) as a mode of project implementation. The PPP in this study assumes that initial project is conducted by the government and the following maintenance project is conducted by private sectors. In this point of view, the analysis for the maintenance project is conducted with following assumptions: 1) Cost is covered by private sector and 2) Benefit is focused on direct effect to private sector (i.e., increase of tourist expenditure).



(3) Benefits Evaluated in this Study

Table 13.1.1 shows the general benefit items for a beach conservation project and the evaluated items in this study.

Table 13.1.1 List of Benefits Evaluated in this Study

Type of Benefit	Category	Description	Evaluation			Note
			Candi-dasa	Legian -Seminyak	Kuta	
Protection	Storm damage reduction	Storm damage reduction	-	-	-	Not evaluated. There is little inundation damage
	Erosion prevention	Land loss prevention	◎	◎	◎	Evaluated by shoreline change from survey
Environment	Protection of Nature landscape	Protection of Nature landscape	○	○	-	For Candidasa and Legian~Seminyak, evaluated with other benefits uniformly by CVM*[1] method
	Continuation of ecosystem	Continuation of ecosystem	○	○	-	Evaluated by CVM uniformly
Availability	Recreational effect	Recreational effect	○	○	-	Evaluated by CVM uniformly
	Activation of a local industry	Increased tourism income of commercial facilities	◎	◎	◎	Evaluated by case-based reasoning of Sanur and Nusa Dua area
		Increased Entrance fee / parking fee	-	-	-	Not evaluated. The value is assumed to be more or less resident in willingness to pay (CVM)
		Increased tax revenue	-	-	-	Not evaluated with same reason above
	Fishery industry use	Protection of area to keep fish boats, fisheries conservation	-	-	-	Not evaluated. There is little use of fish boats on the beach

◎ : Evaluated in this study
○ : Evaluated with other benefits uniformly by CVM

Note:
*[1]CVM(Contingent Valuation Method)
CVM is used to estimate economic values for all kinds of ecosystem and environmental services. It can be widely used to estimate non-use values. CVM involves directly asking people, in a survey, how much they would be willing to pay for specific environmental services. Sufficient publicity to related organizations is needed before conducting a survey.

(Source: JICA Study Team)

13.2 Benefits Calculation

(1) Case-based Reasoning from Phase I

As described in Chapter 13.1. (3), three types of benefit shown below were calculated by the beach conservation project as effects at the candidate sites.

- Erosion prevention
- Environmental and recreational effect
- Increase of tourist expenditure (tourist income)

Among those, the benefit of increase of tourist expenditure needs case-based reasoning because a calculation requires the assumption for the increase rate of visitors due to the project effect. To assume the increase rate, case-based reasoning for Sanur and Nusa Dua (i.e., Phase I area) beaches were conducted as shown below. The available data for case-based reasoning was very limited and within short periods. Therefore, it is noted that the resulting increase rate contains more or less uncertainty.

a) Sanur Beach: Increase of tourists due to the project effect

Table 13.2.1 and Figure 13.2.1 show the number of tourist who stayed in Denpasar by tourist area from 2000 to 2010. From the table, it is shown that the number of tourist in Sanur Beach area has increased more than the city area after the completion of the project in 2004.

Table 13.2.1 Number of Tourist Who Stayed in Denpasar by Tourist Area

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
City	33,479	42,192	28,250	35,747	40,868	144,924	32,839	29,229	57,785	44,358	49,473
Sanur	174,249	189,854	169,947	129,493	164,107	169,043	192,365	186,141	238,127	331,823	368,584
Total	207,728	232,046	198,197	165,240	204,975	313,967	225,204	215,370	295,912	376,181	418,057

(Source: Denpasar Tourisum Data 2010)

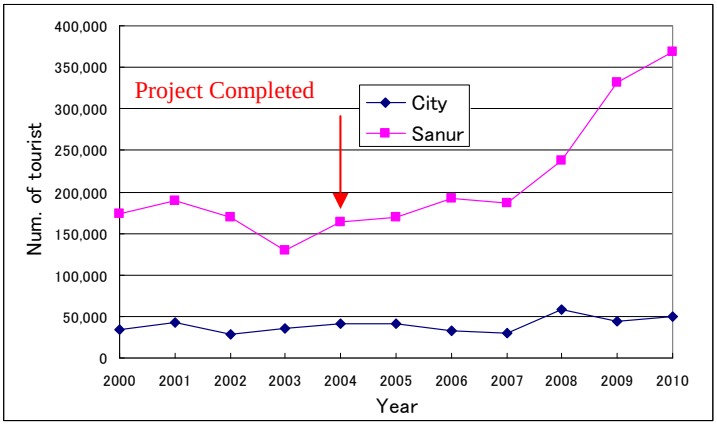


Figure 13.2.1 Change in the Number of Tourist Who Stayed in Denpasar by Tourist Area

(Source: Denpasar Tourism Data 2010)

Table 13.2.2 shows the tourist increase rate from 2004 (which is the year of project completion) to 2010 based on 2004. According to the linear approximation in Figure 13.2.2, the tourist increase rate at Sanur area is about 21% and about 5% for city area. There is a quite difference in tourist increase rate between Sanur and city area after the project completion. In

this study, it was assumed that this difference is created by the condition of with and without the project. Therefore, the following assumptions about the project effect on tourism industry were considered.

Without project: The increase rate of tourist approaches that of city area (i.e., increase rate=5%)

With project: The increase rate of tourist approaches that of project site (i.e., increase rate=21%)

Table 13.2.2 Tourist Increase Rate 2004-2010 (based on 2004)

	Year	2004	2005	2006	2007	2008	2009	2010
Num. of Tourist	City	40,868	40,868	32,839	29,229	57,785	44,358	49,473
	Sanur	164,107	169,043	192,365	186,141	238,127	331,823	368,584
Percentage based on 2004	City	100%	100%	80%	72%	141%	109%	121%
	Sanur	100%	103%	117%	113%	145%	202%	225%

(Source: Denpasar Tourism Data 2010)

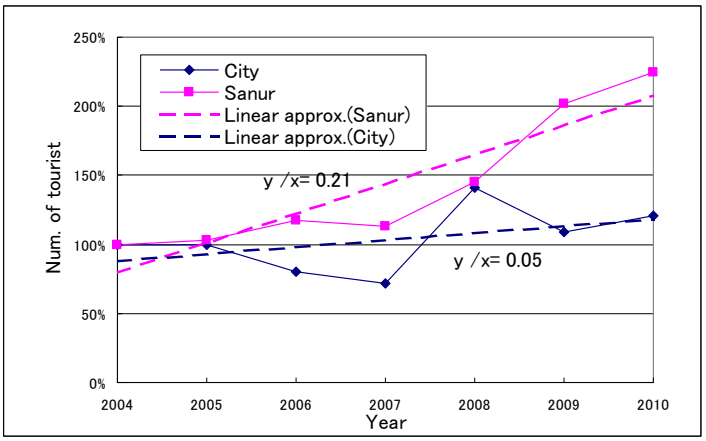


Figure 13.2.2 Tourist Increase Rate from 2004 to 2010 Based on 2004, and Linear Approximation of Increase Tendency

(Source: Denpasar Tourism Data 2010)

The total increase rate with the project was assumed at 21% with annual basis. Then, the proportion of the project effect in total increase was calculated at 0.76 using the following equation shown below. The increase rate due to the project was also considered at about 15%, which was obtained for the product of 21% and 0.76.

$$R_{\mathrm{Pr}oject} = \frac{R(w) - R(w/o)}{R(w)}$$

Where,

R(w) : Assumed increase rate with project (i.e., 21%)

R(w/o) : Assumed increase rate without project (i.e.,5%)

$R_{Project}$: Assumed increase rate due to project effect (i.e.,76%)

b) Nusa Dua Beach: Increase of tourists due to the project effect

The Beach Conservation Project Phase I for Nusa Dua Beach was completed in 2004. The objective in this section is to assume the increase of tourists due to the project effect. Since there is no data available on the number of tourist in the beach resort area, the number was assumed by the hotel guests near the beach in 2004. There were about 22 starred hotels with 5170 rooms and 11 non-starred hotels with 250 rooms near the project area. Among these, hotels in Table 13.2.3 were selected to assume the number of guests. The selection was conducted in the point of view that the project effect is relatively larger than other hotels referring to the report of Bali Beach Conservation Project Phase I.

The total number of guests in 2004 was assumed by following the equation below.

$$T_{year} = N_R \times R_o \times G_{ave} \times 365 days$$

Where,

T_{year} : Total guests per year
N_R : Number of rooms (Source: Direktori Hotel Bintang 2010)
R_o : Average occupancy rate in 2004 (Source: Hearing with hotels)
G_{ave} : Average guests per room

(Source: Report of Bali Beach Conservation Project Phase I)

Table 13.2.3 Assumed Total Number of Visitors in Nusa Dua Beach Area Based on Number of Hotel Guests

Name	Class	Num. of Rooms	Guests per room	2004(year project completed)		
				Occupancy rate(%)	Num. of Guest per day	Num. of Guest per year
Bali Tropic Resort	4	150	2.1	56.67%	179	65,335
Melia Benoa	5	128	1.7	56.67%	123	44,895
Club Mediteranie	4	400	2.1	56.67%	476	173,740
Nusa Dua Beach	5	381	1.7	56.67%	367	133,955
The Westin Resort Nusa Dua	5	334	1.7	56.67%	322	117,530
Sheraton Laguna	5	276	1.7	56.67%	266	97,090
Melia Bali Villas	5	500	1.7	56.67%	482	175,930
Inna Putri Bali	5	384	1.7	56.67%	370	135,050
Total	-	2553	-	-	2,585	943,525

(Source: JICA Study Team)

Table 13.2.4 show the change of occupancy rate of hotels near the beach area from 2004 to 2011. According to the linear approximation in Figure 13.2.3, the increase rate was assumed to be about 10% based on 2004. It was assumed that the beach conservation project, which was completed in 2004, made a contribution to the increase to some extent.

Table 13.2.4 Change of Hotel Occupancy Rate from 2004 to 2011
(Source: Interview with hotels)

Year	Hotel A	Hotel B	Average	Increase rate Based on 2004
2004	55.84%	57.50%	56.67%	100.00%
2005	59.90%	56.10%	58.00%	102.35%
2006	60.80%	50.90%	55.85%	98.55%
2007	79.76%	71.80%	75.78%	133.72%
2008	91.62%	84.80%	88.21%	155.66%
2009	95.13%	80.80%	87.97%	155.22%
2010	95.81%	82.10%	88.96%	156.97%
2011	92.50%	85.40%	88.95%	156.96%

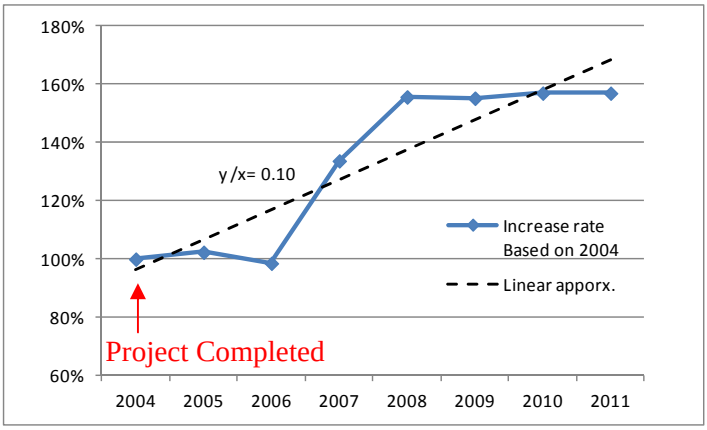


Figure 13.2.3 Linear Approximation on the Increase Rate of Hotel Occupancy Based on 2004

(Source: JICA Study Team)

The total increase rate was assumed at 10% with annual basis. Then, the proportion of the project effect in total increase was assumed the same as Sanur case, which was 0.76. Therefore, the increase rate due to the project was considered at about 7.6%, which was obtained for the product of 10% and 0.76.

(2) Candidasa; Benefits Calculation

a) Calculation of benefits

The following types and amounts of benefits were considered for the beach conservation project at Candidasa Beach. The procedures of the calculations are shown following next pages.

- Erosion prevention : 1,014 (US$1000/year) [Refer to Table.13.2.5]
- Environmental and recreational effect : 1,165 (US$1000/year) [Refer to Table.13.2.8]
- Increase of tourist expenditure : 7,942 (US$1000/year) [Refer to Table.13.2.11]

*Each annual benefit is shown as the value of the project area with 3 km

i) Erosion prevention

In recent years, coral mining has been widely carried out for getting construction materials, resulting in the deterioration of the Candidasa coast. After the coral mining, wave action to the beach increased and coral sand was washed away. Shoreline had been eroded 20 m to 60 m over the last 20 years. In this study, the effect of erosion protection was evaluated as a benefit of the beach conservation project. The procedure of the calculation is shown in Table 13.2.5.

Table 13.2.5 Calculation of the Benefit by Erosion Prevention

Items	Value			Description
(1)Duration	20		(years)	From 1981~2011
(2)Averaged Erosion Distance	40		(m)	The range of erosion distanse is from 20m to 60m
(3)Averaged Erosion rate	2.0		(m/year)	(1)/(2)
(4)Shorline Distance in Project Area	3.0	5.0	(km)	Project Area 1 :3km Project Area 2 :5km
(5)Erosion area	6,000	10,000	(m^2/year)	(3)x(4)x1000
(6)Averaged Land Value				
(7)Erosion land value				

(Source: JICA Study Team)

ii) Environmental and recreational effect

Environmental and recreational effect was calculated using the Contingent Valuation Method (CVM). CVM is used to estimate the economic values for all kinds of ecosystem and environmental services. It can be widely used to estimate non-use values. CVM involves directly asking people, in a survey, how much they would be willing to pay for specific environmental services. In this study, the questionnaire survey was conducted at Candidasa Beach to ask beach users their willingness to pay for the beach conservation project. Details of the questionnaire are shown in Appendix 13.2.1. Overview of the survey results is listed below.

< Overview of the survey >

- Eligible person: Tourists who spend leisure time at Candidasa area
- Methodology of the survey: Interactive survey by the JICA Study Team


Photo 13.2.1 Interactive Survey at Candidasa (Source: JICA Study Team)

- Number of beach user: Assumed from number of guests who stayed at hotels nearby* Candidasa beach (Table 13.2.6). (*Approximately within 500 m distance from the beach)
- Sample size: more than 96 are needed to ensure the statistical reliability. The sample size was generally calculated by the formula below. The population was assumed from the number of guests of hotels near Candidasa Beach.

$$n \geq \frac{N}{\left(\frac{e}{k}\right)^2 \frac{N-1}{P(1-P)} + 1}$$

N	(Population)	: 132,976(person/stay period, year)
e	(Desired accuracy)	: 0.10 (standard value 0.05~0.10)
A	(Confidence interval)	: 0.95 (standard value)
P	(Population rate)	: 0.5 (standard value)
k	(Coefficient related with desired accuracy)	: 1.96 (standard value)
n	(Sample size)	: 96 (calculated value)

(Source: JICA Study Team)

Table 13.2.6 Number of Guest per Stay Period, Year

Project Area	Name of Hotel	Class	Num. of Rooms	Guests per room	Year of 2010				
					Occupancy rate(%)	Num. of Guest per day	Num. of Guest per year	Length of stay (day/person)	Num. Of Guest per stay period, year
5km	Candi Beach Cottages	4	64	2.3	69.7%	103	37,595	4.4	8,544
3km	Rama Candi Das	2	52	2.3	69.7%	83	30,295	4.4	6,885
5km	Alila	3	58	2.3	69.7%	93	33,945	4.4	7,715
3km	Taman Air	2	14	2.3	69.7%	22	8,030	4.4	1,825
3km	Lotus Bungalow	1	20	2.3	69.7%	32	11,680	4.4	2,655
3km	Othe Hotels (39 Hotels with less than 2stars)	-	676	2.3	69.7%	1,084	395,660	4.4	89,923
5km	(43 Hotels with less than 2stars)	-	792	2.3	69.7%	1,270	463,550	4.4	105,352
3km	Total (3km area)	-	884	-	-	1,221	445,665	-	101,288
5km	Total (5km area)	-	1,612	-	-	1,603	585,095	-	132,976

(Source: Hearing with hotels, JICA Study Team)

- Questionnaire result: The willingness to pay (WTP) was asked twice. The first question asked about the WTP for US$10 as payment for beach conservation. The second question will depend on the first answer, if the answer is yes for the first question, another question is posed on WTP for US$20 or if no to the first question, what about a decrease to US$5.

Table 13.2.7 Result of Willingness to Pay for Beach Conservation Project

WTP setting (US$)			Result (number)				
T	TU	TL	YY	YN	NY	NN	Total
10	20	5	32	30	5	32	99

T : Charge asked at first phase(i.e. Q4)
TU: Charge asked at second phase for those who agree with T(i.e. Q5-1).
TL: Charge asked at second phase for those who disagree with T(i.e. Q5-2).
YY: Number of who agrees both T and TU
YN: Number of who agrees with T and disagrees with TU
NY: Number of who disagrees with T and agrees with TL
NN: Number of who disagrees with both T and TL

(Source: JICA Study Team)

- Statistical analysis of the WTP (willingness to pay): Average value of US$11.5 was given by the Weibull distribution which was commonly applied for WTP calculation. The average value was given by the value of integral of the highlighted area in Figure 13.2.4

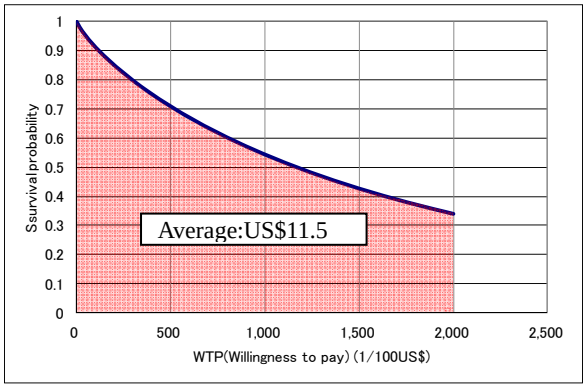


Figure 13.2.4 Analysis Result for WTP

(Source: JICA Study Team)

- Total WTP: Total WTP was calculated using the following procedure shown in Table 13.2.8.

Table 13.2.8 Total WTP

Items	Value		Description
	Project Area 3km	Project Area 5km	
(1)Number of visitors to Candidasa beach	101,288	132,976 (person/period, year)	From Table 13.2.6, Num. of guest per stay period, year.
(2)Willingness to pay(WTP)	11.5 (US$/stay period)		From Figure 13.2.4
(3)Total WTP	1,165	1,529 (1,000US$/year)	(1)x(2)/1,000

(Source: JICA Study Team)

iii) Increase of tourist expenditure

Beach conservation project contributes in promoting the environmental and recreational aspects of the beach. Therefore, the number of tourists who visited Candidasa was assumed to increase after the project, as is the case with Phase I area such as Sanur and Nusa Dua. In this section, increase of tourist expenditure due to the project effect was calculated.

Table 13.2.9 shows tourist expenditure and proportion of foreign and domestic tourists. With these values and number of guests in Table 13.2.6, number of visitor for without and with the project to Candidasa Beach was calculated as shown in Table 13.2.10. From the case-based reasoning, the increase rate of tourist was assumed to be the same level as Sanur because the present occupancy rate in Candidasa area is relatively low (i.e., occupancy rate has much room for further increase). Finally, the increase of tourist expenditure was calculated as presented in Table 13.2.11.

Table 13.2.9 Tourist Expenditure and Proportion of Foreign and Domestic Tourists

	Expenditure per person per day(US$/day)	
	Foreign	Domestic
2008	148.4	40.63
2009	137.9	59.23
2010	147.46	57.74
Average	144.59	52.53

	Foreign		Domestic		Sub Total
	Number	Percentage	Number	Percentage	
2005	1,312,294	71%	540,825	29%	1,853,119
2006	1,391,449	67%	675,266	33%	2,066,715
2007	1,902,542	70%	820,840	30%	2,723,382
2008	1,942,046	74%	696,305	26%	2,638,351
2009	1,966,833	76%	629,538	24%	2,596,371
Total	8,515,164	72%	3,362,774	28%	11,877,938

(Source: Bali Tourism Statistic 2010, Bali in Figure 2010)

Table 13.2.10 Assumed Number of Visitor to Candidasa Beach per Year

	Assumed Num. Of Visitor to Candidasa Beach per year		Note
	Project Area with 3km	Project Area with 5km	
(1)Without the Project	445,665	585,095	From Table. 13.2.6, Num. of guest per year.
(2)With the Project	512,515	672,859	With the increase rate of 15% (Assumed same as Sanur Area) (1)x1.15
Increase due to the project effect	66,850	87,764	(2)-(1)

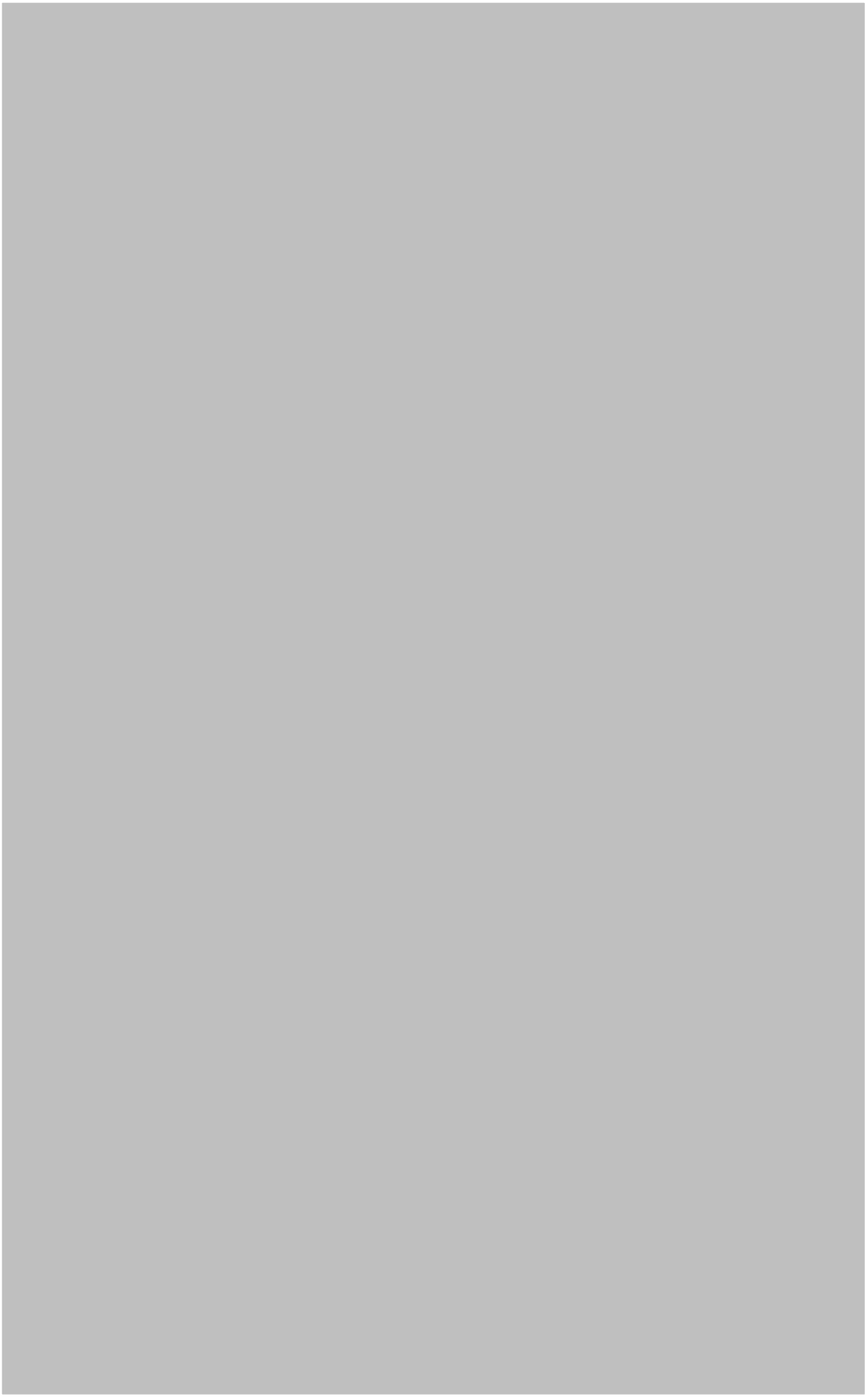
*One day stay is counted as one visitor

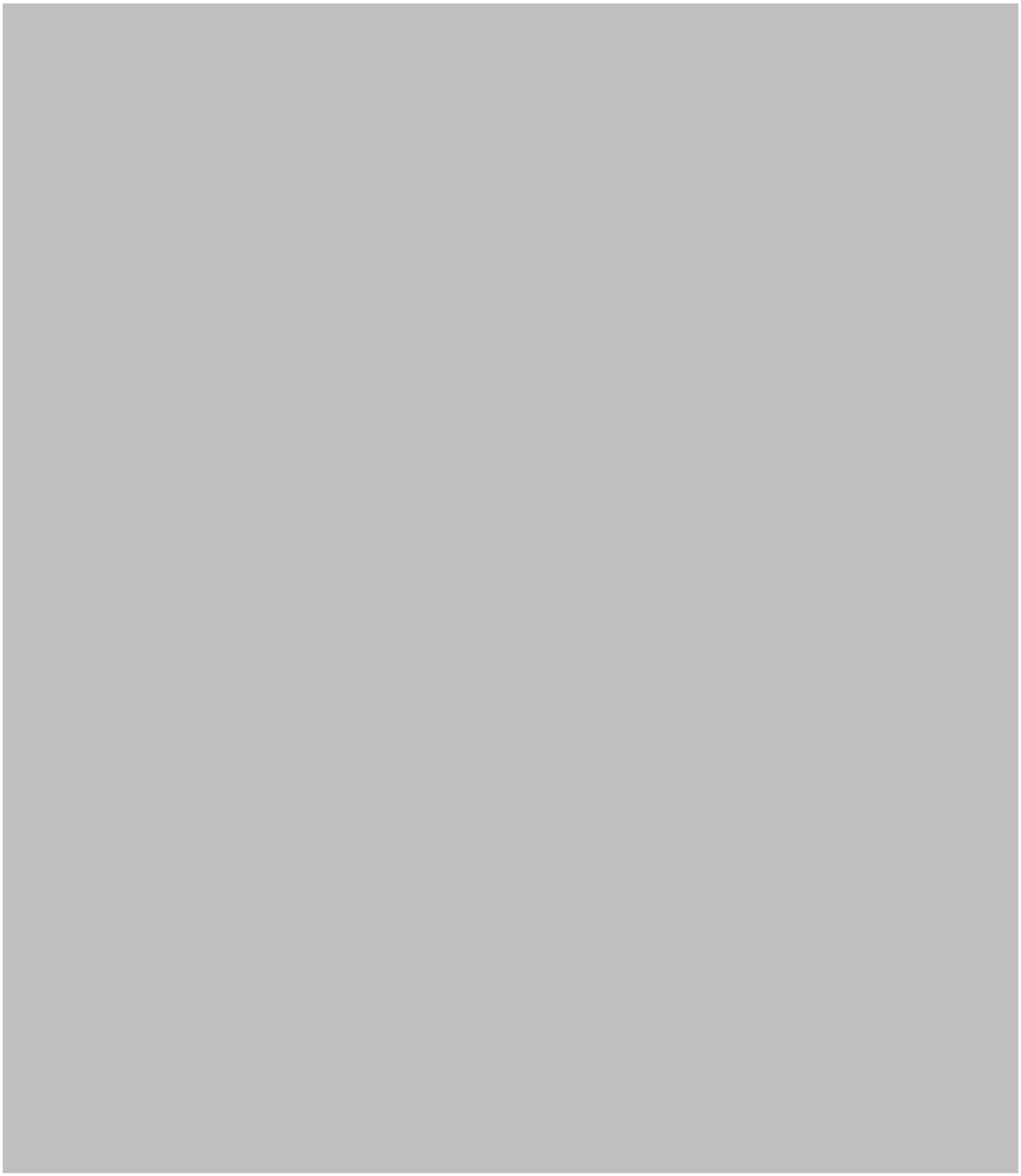
(Source: JICA Study Team)

Table 13.2.11 Increase of Tourist Expenditure

Project Area	Assumed Number of Increased Tourist with the Project (Based on 2010 data)			Expenditure per person per day(US$/day)		Increase of Expenditure (1,000US$/year)		
	Total	Foreign	Domestic	Foreign	Domestic	Foreign	Domestic	Total
3km	66,850	48,132	18,718	144.59	52.53	6,959	983	7,942
5km	87,764	63,190	24,574	144.59	52.53	9,136	1,291	10,427

(Source: JICA Study Team)





(3) Legian~Seminyak; Benefits Calculation

a) Calculation of benefits

The following types and amount of benefits were considered for the beach conservation project at Legian~Seminyak Beach. As for the environmental and recreational effect, two types of benefits were considered, namely, offshore breakwater and beach nourishment, to show the importance of maintaining a natural beach condition.

- Erosion prevention : 2,298 (US$1000/year) [Refer to Table.13.2.15]
- Environmental and recreational effect : 1,255 (US$1000/year) [Refer to Table.13.2.18]
- Increase of tourist expenditure : 7,432 (US$1000/year) [Refer to Table.13.2.21]

*Environmental and recreational benefit is shown as the value for beach nourishment

i) Erosion prevention

The coastal area from Legian to Seminyak, which is located in the north side of Kuta, is one of the highest tourist areas in Bali Island. Tourists visit this area for marine activities such as surfing, swimming, sunbathing, walking, and sightseeing. The area is also one of the famous spots for sunset viewing. The beach is not so wide originally but eroded from 5 m to 15 m over the last 28 years. In this study, the effect of erosion protection was evaluated as a benefit of beach conservation project. The procedure of the calculation is shown in Table 13.2.15.

Table 13.2.15 Calculation of the Benefit by Erosion Prevention

Items	Value	Description
(1)Duration	28 (years)	From 1982~2010
(2)Averaged Erosion Distance	10 (m)	The range of erosion distanse is from 5m to 15m
(3)Averaged Erosion rate	0.4 (m/year)	(1)/(2)
(4)Shorline Distance in Project Area	3.85 (km)	-
(5)Erosion area	1,540 (m^2/year)	(3)x(4)x1000
(6)Averaged Land Value		
(7)Erosion land value		

(Source: JICA Study Team)

ii) Environmental and recreational effect

Environmental and recreational effect was calculated using the Contingent Valuation Method (CVM). CVM is used to estimate the economic values for all kinds of ecosystem and environmental services. It can be widely used to estimate non-use values. CVM involves directly asking people, in a survey, how much they would be willing to pay for specific environmental services. In this study, the questionnaire survey was conducted at Lgian~Seminyak Beach to ask beach users their willingness to pay for the beach conservation project. Details of the questionnaire are shown in Appendix 13.2.1. Overview of the survey results is listed below.

< Overview of the survey >

- Eligible person: Tourists who spend leisure time at Legian~Seminyak Beach
- Methodology of the survey: Interactive survey by JICA Study Team


Photo 13.2.2 Interactive Survey at Legian~Seminyak

(Source: JICA Study Team)

- Number of beach user: Assumed from the number of guests who stayed at hotels near* Legian~Seminyak Beach (Table 13.2.16). (*Approximately within 2 km distance from the beach)
- Sample size: more than 96 are needed to ensure the statistical reliability. The sample size was generally calculated by the formula given below. The population was assumed from the number of guests of hotels near Legian~Seminyak Beach.

$$n \geq \frac{N}{\left(\frac{e}{k}\right)^2 \frac{N-1}{P(1-P)} + 1}$$

N	(Population)	: 114,315(person/stay period, year)
e	(Desired accuracy)	: 0.10 (standard value 0.05~0.10)
A	(Confidence interval)	: 0.95 (standard value)
P	(Population rate)	: 0.5 (standard value)
k	(Coefficient related with desired accuracy)	: 1.96 (standard value)
n	(Sample size)	: 96 (calculated value)

(Source: JICA Study Team)

Table 13.2.16 Number of Guest per Stay Period, Year

Name of Hotel	Class	Num. of Rooms	Guests per room	Year of 2010				
				Occupancy rate(%)	Num. of Guest per day	Num. of Guest per year	Length of stay (day/person)	Num. of Guest per stay period,year
ALAM KUL-KUL HOTEL	4	80	2.1	81%	136	49,640	7.2	6,894
LEGIAN BEACH HOTEL	4	218	2.1	81%	371	135,415	7.2	18,808
HOTEL BALI MANDIRA	3	100	2.1	81%	170	62,050	7.2	8,618
HOTEL PADMA	5	406	2.1	81%	691	252,215	7.2	35,030
HOTEL JAYAKARTA	4	278	2.1	81%	473	172,645	7.2	23,978
HOTEL OBEROI	5B	75	2.1	81%	128	46,720	7.2	6,489
RESOR SEMINYAK	4	90	2.1	81%	153	55,845	7.2	7,756
THE LEGIAN	5	78	2.1	81%	133	48,545	7.2	6,742
Total	-	1,325	-	-	2,255	823,075	-	114,315

(Source: JICA Study Team)

- Questionnaire result: The WTP (willingness to pay) was asked twice. At first, US$10 as the WTP for the beach conservation project was asked. Second question depends on the answer on the above question, if the tourist has WTP for the first question, a follow up question for US$20 or if not, US$5 will be asked.

Table 13.2.17 Result of Willingness to Pay for Beach Conservation Project

WTP setting (US$)			Result (number)				
T	TU	TL	YY	YN	NY	NN	Total
10	20	5	36	43	7	33	119

T : Charge asked at first phase(i.e. Q4)
TU: Charge asked at second phase for those who agree with T(i.e. Q5-1).
TL: Charge asked at second phase for those who disagree with T(i.e. Q5-2).
YY: Number of who agrees both T and TU
YN: Number of who agrees with T and disagrees with TU
NY: Number of who disagrees with T and agrees with TL
NN: Number of who disagrees with both T and TL

(Source: JICA Study Team)

- Statistical analysis of the WTP (willingness to pay): Average value of US$12.0 was given by the Weibull distribution which was commonly applied for WTP calculation. The average value was given by the value of integral on the highlighted area as shown in Figure 13.2.5

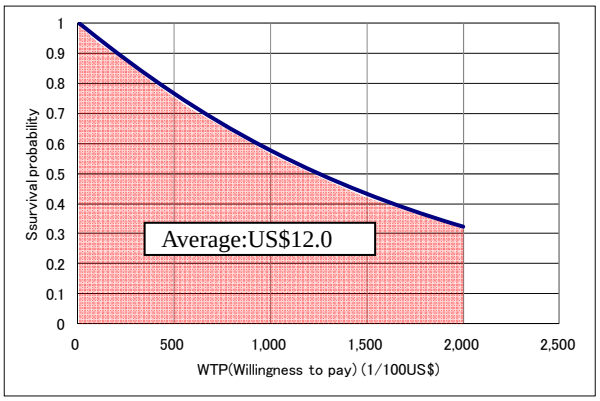


Figure 13.2.5 Analysis Result for WTP

(Source: JICA Study Team)

- Total WTP: Total WTP was calculated using the following procedure presented in Table 13.2.18

Table 13.2.18 Total WTP

Items	Value		Description
	Offshore Breakwater	Beach Nourishment	
(1)Number of visitors to Legian~Seminyak beach	114,315 (person/stay period,year)	114,315 (person/stay period,year)	From Table 13.2.16, Num. of guest per stay period, year
(2)Percentage of who preffer O.B. or B.N. as beach conservation	8.5 (%)	91.5 (%)	From interview survey, O.B. : 8.5% B.N. : 91.5%
(3)Willingness to pay (WTP)	12.0 (US$/stay period)	12.0 (US$/stay period)	From Figure. 13.2.5
(4)Total WTP	117 (1,000US$/year)	1,255 (1,000US$/year)	(1)x(2)/100x(3)/1,000

*O.B. : Offshore Breakwater
*B.N. : Beach Nourishment

(Source: JICA Study Team)

iii) Increase of tourist expenditure

Beach conservation project contributes in promoting the environmental and recreational aspects of the beach. Therefore, the number of tourists who visited Legian~Seminyak was assumed to increase after the project, similar with the case of Phase I area such as Sanur and Nusa Dua. In this section, increase of tourist expenditure due to the project effect was calculated.

Table 13.2.19 shows tourist expenditure and proportion of foreign and domestic tourists. With these values and number of guests in Table 13.2.16, number of visitor for pre- (with) and post- (without) project to Legian~Seminyak Beach was calculated as presented in Table 13.2.20. From the case-based reasoning, the increase rate of tourist was assumed to be the same level as Nusa Dua because present occupancy rate in Legian~Seminyak area is relatively high (i.e., occupancy rate has less room for further increase). Finally, the increase of tourist expenditure was calculated as shown in Table 13.2.21.

Table 13.2.19 Tourist Expenditure and Proportion of Foreign and Domestic Tourists

	Expenditure per person per day(US$/day)	
	Foreign	Domestic
2008	148.4	40.63
2009	137.9	59.23
2010	147.46	57.74
Average	144.59	52.53

	Foreign		Domestic		Sub Total
	Number	Percentage	Number	Percentage	
2005	1,312,294	71%	540,825	29%	1,853,119
2006	1,391,449	67%	675,266	33%	2,066,715
2007	1,902,542	70%	820,840	30%	2,723,382
2008	1,942,046	74%	696,305	26%	2,638,351
2009	1,966,833	76%	629,538	24%	2,596,371
Total	8,515,164	72%	3,362,774	28%	11,877,938

(Source: Bali Tourism Statistic 2010, Bali in Figure 2010)

Table 13.2.20 Assumed Number of Visitor to Legian~Seminyak Beach per Year

	Assumed Num. Of Visitor to Legian~Seminyak Beach per year	Note
(1)Without the Project	823,075	From Table 13.2.16, Num. of guest per year.
(2)With the Project	885,629	With the increase rate of 7.6% (Assumed same as Nusa Dua Case in Phase I) (1)x1.076
Increase due to the project effect	62,554	(2)-(1)

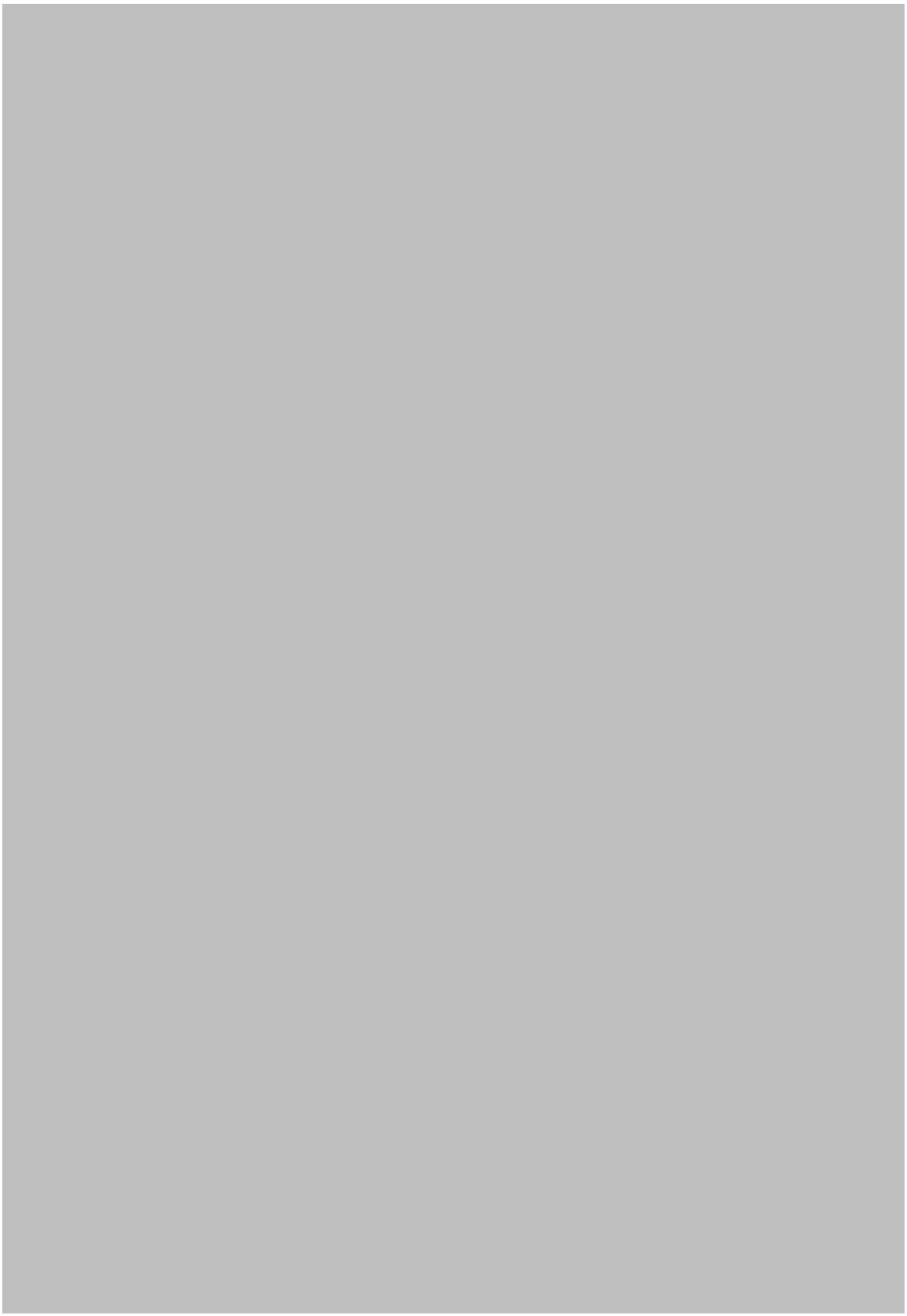
*One day stay is counted as one visitor

(Source: JICA Study Team)

Table 13.2.21 Increase of Tourist Expenditure

Assumed Number of Increased Tourist with the Project (Based on 2010 data)			Expenditure per person per day(US$/day)		Increase of Expenditure (1,000US$/year)		
Total	Foreign	Domestic	Foreign	Domestic	Foreign	Domestic	Total
62,554	45,039	17,515	144.59	52.53	6,512	920	7,432

(Source: JICA Study Team)



(4) Kuta; Benefits Calculation

a) Calculation of benefits

The following types and amount of benefits were considered for the beach conservation project at Kuta Beach. The project is going to be conducted as improvement of the projected area in Phase I. Therefore, benefits are focused only where the beach has been eroded to avoid double-estimation of benefits. In this study, the benefit of environmental and recreational effect was not evaluated since it is difficult to determine the exact area where the benefit is to be counted.

- Erosion prevention : 4,964 (US$1000/year) [Refer to Table 13.2.25]
- Avoidance on the decrease of tourist expenditure : 368 (US$1000/year) [Refer to Table 13.2.29]

i) Erosion prevention

Beach nourishment at Kuta in Phase I was completed in 2008. Figure 13.2.6 shows the shoreline change after the beach nourishment. While beach erosion has been going into remission at some areas, there are still some areas where beach erosion is occurring. In this study, the benefit of erosion prevention was calculated from the eroded area after the nourishment. The procedure of the calculation is shown in Table 13.2.25.

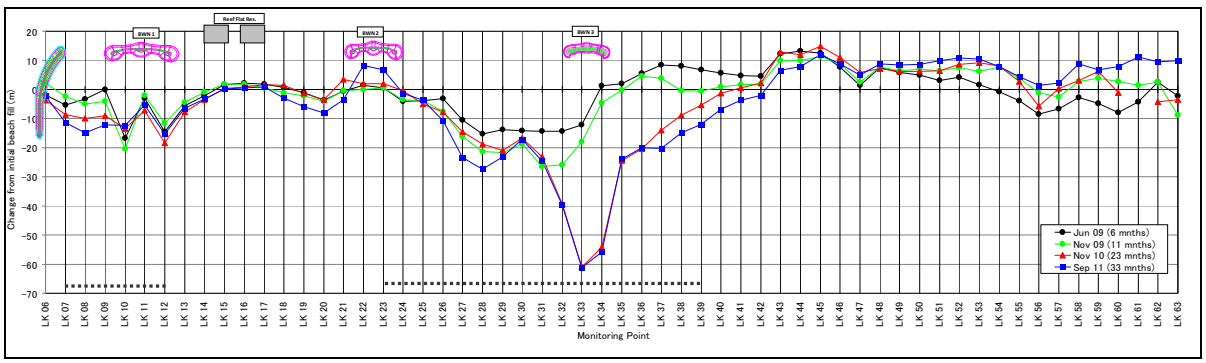


Figure 13.2.6 Shoreline Change from Dec. 2008 to Sep. 2011

(Source: JICA Study Team)

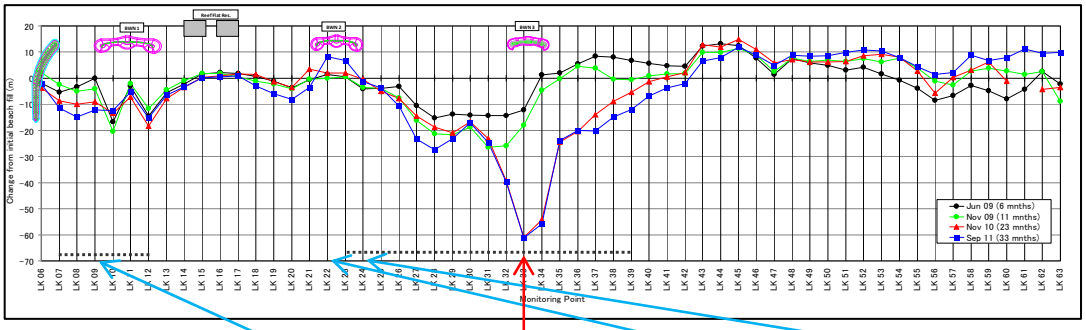
Table 13.2.25 Calculation of the Benefit by Erosion Prevention

Items	Value	Description
(1)Duration	2.75 (years)	From Dec.2008~ Sep.2011 (i.e.33months)
(2)Total area of shoreline change (Erosion)	15,600 (m^2)	Area from the sand stopper to Alam Kul-Kul(K1~K5) Sedimentation Area: 9,200m^2 Erosion Area: 24,800m^2
(3)Averaged Erosion rate	5,673 (m^2/year)	(2)/(1)
(4)Averaged Land Value		
(5)Erosion land value		

(Source: JICA Study Team)

ii) Avoidance on the decrease of tourist expenditure

Figure 13.2.7 shows the locations and occupancy rates of representative hotels at Kuta. From the table, while occupancy rates of the three hotels have been increasing, the rate of a hotel located in front of rapid erosion area has been decreasing after the beach nourishment was completed in 2008. In this study, it was assumed that the occupancy rate will continually decrease at present rate if the beach conservation project is not conducted. On the other hand, the occupancy rate was assumed to remain at the present level if the project is conducted. With this assumption, avoidance on the decrease of tourist expenditure was calculated.



HOTELS AT KUTA				
Name of Hotel	**The Patra Bali**	**Bali Garden Beach Resort**	**Santika Premiere Beach Resort**	**Ramada Bintang Bali Resort**
Address	Tuban	Jl. Kartika Plaza, Tuban – Bali	Jl. Kartika Plaza, Tuban – Bali	Jl. Kartika Plaza, Tuban – Bali
OCCUPANCY DATA (Yearly)				
2005	63.57%	N/A	81.37%	66.30%
2006	66.92%	N/A	69.44%	60.90%
2007	80.94%	54.95%	81.16%	77.97%
2008	83.24%	69.01%	90.01%	83.82%
2009	78.84%	70.47%	85.21%	78.81%
2010	83.57%	61.55%	91.28%	86.15%
2011	84.19%	64.15%	92.93%	85.35%

Figure 13.2.7 Location and Occupancy Change of Hotels at Kuta

(Source: JICA Study Team)

Table 13.2.26 shows the tourist expenditure and proportion of foreign and domestic tourists. With these values and number of guests in Table 13.2.27, the number of visitor for without and with the project to Kuta Beach was calculated in Table 13.2.28. Finally, the avoidance on the decrease of tourist expenditure was calculated in Table 13.2.29.

Table 13.2.26 Tourist Expenditure and Proportion of Foreign and Domestic Tourists

	Expenditure per person per day(US$/day)	
	Foreign	Domestic
2008	148.4	40.63
2009	137.9	59.23
2010	147.46	57.74
Average	144.59	52.53

	Foreign		Domestic		Sub Total
	Number	Percentage	Number	Percentage	
2005	1,312,294	71%	540,825	29%	1,853,119
2006	1,391,449	67%	675,266	33%	2,066,715
2007	1,902,542	70%	820,840	30%	2,723,382
2008	1,942,046	74%	696,305	26%	2,638,351
2009	1,966,833	76%	629,538	24%	2,596,371
Total	8,515,164	72%	3,362,774	28%	11,877,938

(Source: Bali Tourism Statistic 2010, Bali in Figure 2010)

Table 13.2.27 Assumed Number of Visitor to Eroded Area in Kuta

Name of Hotel	Class	Num. of Rooms	Guests per room	Year of 2010				
				Occupancy rate(%)	Num. of Guest per day	Num. of Guest per year	Length of stay (day/person)	Num. Of Guest per stay period, year
BALI GARDEN	4	143	2.0	64%	183	66,795	3.8	17,578
Total	-	143	-	-	183	66,795	-	17,578

(Source: JICA Study Team)

Table 13.2.28 Assumed Number of Visitor for With and Without the Project

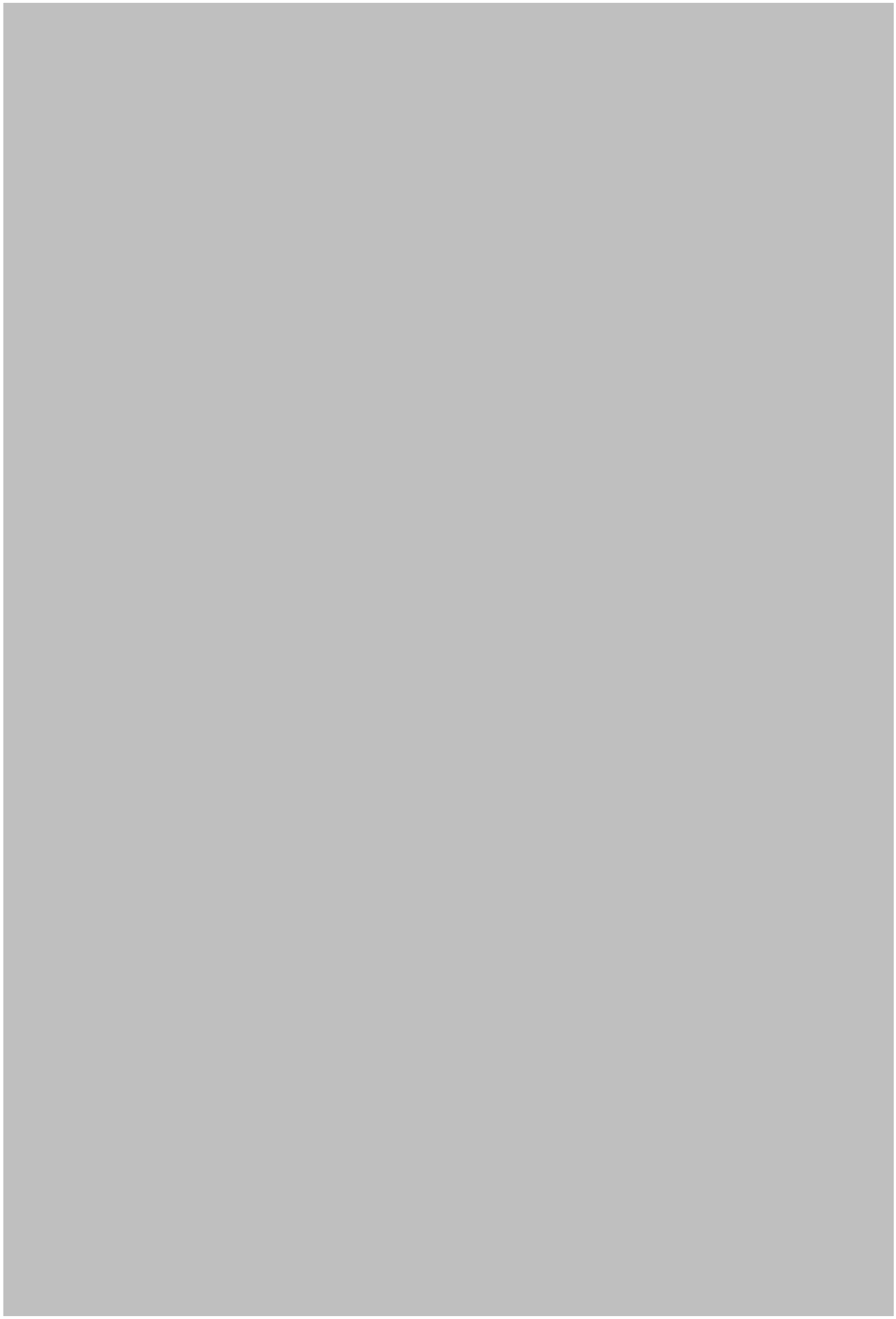
	Assumed Num. Of Visitor to eroded area in Kuta per year	Note
(1)Without the Project	63,789	With the decrease rate of 4.5% (decrease tendency from 2009 to 2011 of Bali Garden hotel) (2)x(1-0.045)
(2)With the Project	66,795	From table 13.2.27, Num. of Guest per year
Avoidance of dencrease due to the project effect	3,006	(2)-(1)

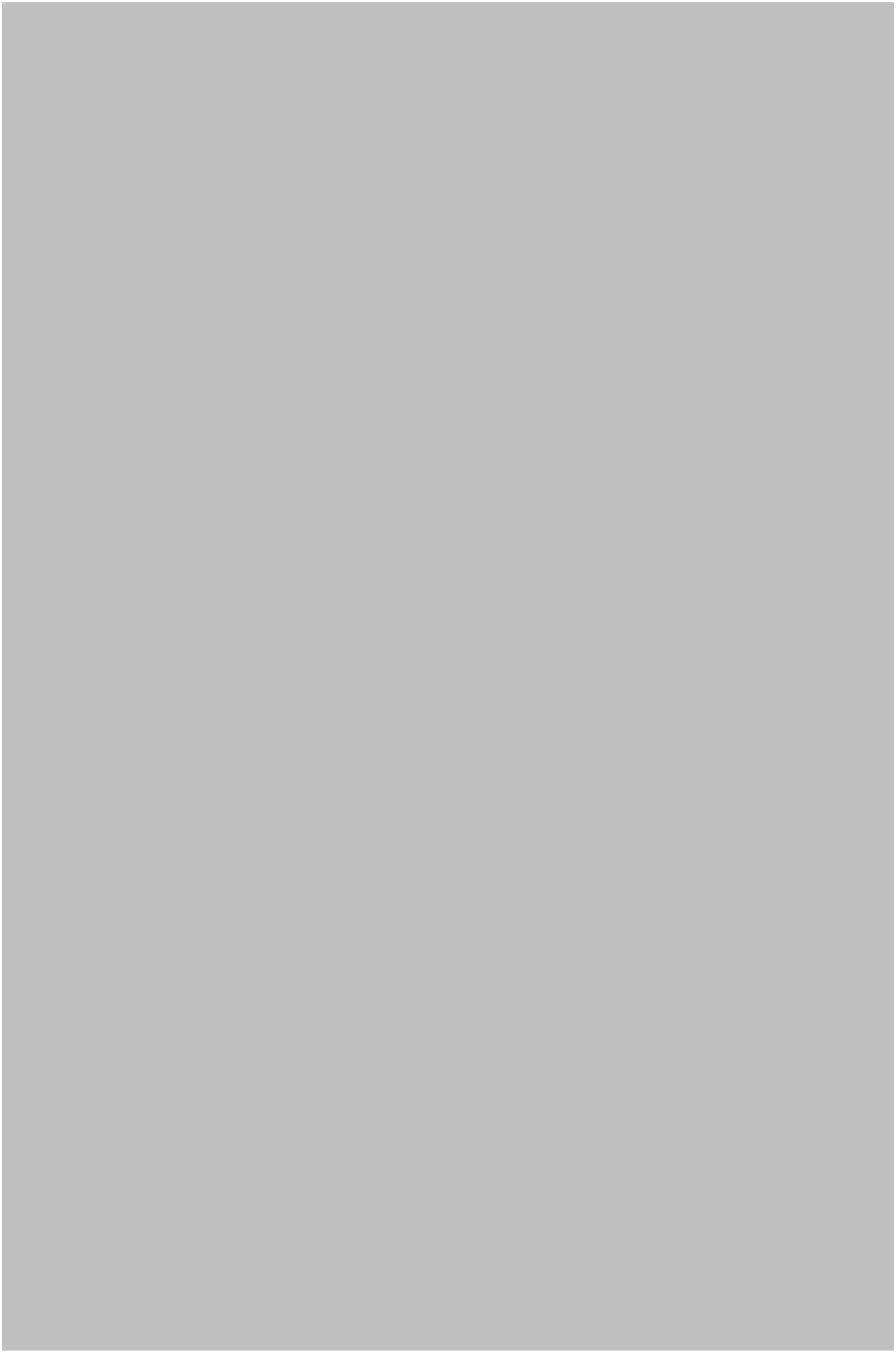
(Source: JICA Study Team)

Table 13.2.29 Avoidance on the Decrease of Tourist Expenditure

Avoidance of decrease of Tourist with the Project (Based on 2010 data)			Expenditure per person per day(US$/day)		Avoidance of Decrease of Tourist Expenditure (1,000US$/year)		
Total	Foreign	Domestic	Foreign	Domestic	Foreign	Domestic	Total
3,006	2,164	842	147.46	57.74	319	49	368

(Source: JICA Study Team)





13.3 Operation and Effect Outcome Measure

In general, the operation outcome measure is used to evaluate the management situation of the project and the effect outcome measure is used to evaluate the effect situation of the project. In other words, they are used to evaluate the effectiveness of the implementation of the project. Since the project effect is estimated as benefits in cost-benefit analysis, the basic conditions used to calculate the benefits are selected as operation and effect outcome measures. In addition, some effect to the public beach area, which is not directly included in project area, is also assumed as the measures. In this study, operation and effect measures were proposed as shown in Table 13.3.1 for each project area.

Table 13.3.1 Operation and Effect Outcome Measure

Types of Outcome Measure		Project Area	Present (2012)	After 3 Years from the Project Completion (2021)	Confirmation method of outcome measure
Operation 1	Rate of sand flow	Candidasa	-	5～10%*	Comparison of shoreline change (e.g. aerial photos)
		Legian~Seminyak	-	10～15%*	
		Kuta	-	5～10%*	
Operation 2	Erosion prevention of the land by the revetment	Candidasa	Erosion intruded into the land at some area	Erosion would be completely prevented by the revetment	Periodic site investigation
Operation 3	Reduction on the frequency of wave overtopping by the revetment	Candidasa	4-5 times per month	Decrease to almost nothing	Periodic interview to hotel owners behind the project area
Effect 1 (Private area)	Increase on the occupancy rate of hotels near the project area	Candidasa	Less than 70%	More than 80%	Periodic interview to hotel owners behind the project area
		Legian~Seminyak	Less than 80%	More than 85%	
	Avoidance on the decrease of occupancy rate of hotels at eroded area	Kuta	Less than 65%	More than 70%	
Effect 2 (Public area)	Increase of parking fee for public beach	Candidasa	-	10%* increase based on the present	Periodic interview to corresponding regency
		Legian~Seminyak	-	10%* increase based on the present	
	Avoidance on the decrease of parking fee for public beach	Kuta	-	No decrease from the present	

* Applied with actual effect from Phase I Project

(JICA Study Team)

Chapter 14 Environmental and Social Considerations

14.1 Overview of the Environmental and Social Considerations

(1) Objectives

Impacts on the project site by the proposed project were assessed, and the avoidance and/or mitigation of impacts were proposed. The projects are: 1) Sand nourishment for the southwest coasts; 2) Sand nourishment, walkway, and setback of protection line where it is feasible in Candidasa; and 3) Sand dredging works at offshore areas of the above mentioned sites.

(2) Study Procedure

In order to achieve the purpose, the following procedures are planned as follows:

- Summarize the legal and organizational framework to be applied;
- Project and sites are defined;
- Impacts are expected for each site;
- Mitigation measures are recommended and proposals of monitoring plans are formulated;
- Local stakeholder meetings are held for the project sites. In the meetings, information of the projects are given and opinions are exchanged.

(3) Study Results of the Environmental and Social Considerations

Summary of the study results of the environmental and social considerations are:

- A full environment impact assessment (EIA) is required to be filed for the proposed coastal conservation plans for both Candidasa and the southwest coast;
- Involuntary resettlement and land acquisition are not necessary in either sites;
- Biologically protected land does not exist in and around the project sites;
- The projects are fully supported by the local stakeholders;
- Major impacts on the natural and social environment could increase the turbidity at the dredging sites and along the coast. Since there are some cluster of corals attached on the artificial structures, these corals need to be transplanted; and
- Private tourism businesses (hotels and villas) may need to remove their facilities directly located behind the protection wall in exchange for sandy beach with full agreement of the land owners. No compensation of land will be necessary as was the practice that was conducted in Phase-I coasts: Nusa Dua, Kuta, and Sanur.

14.2 Legal and Organizational Framework of EIA

(1) EIA Procedure

The Indonesian EIA flow chart, defined by Environmental Permit No.27/2012 is shown in Figure 14.2.1.

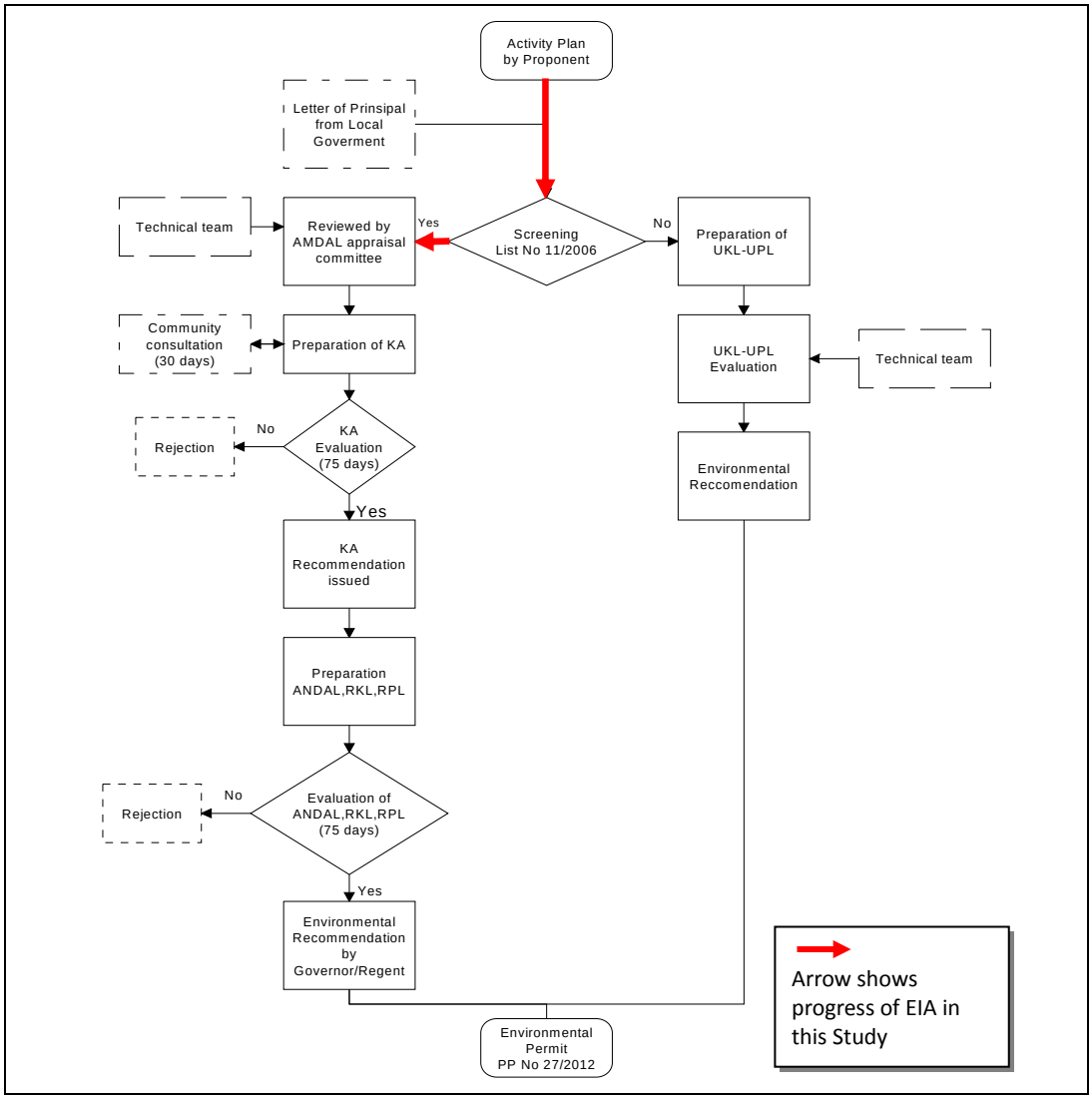


Figure 14.2.1 EIA Flowchart of Indonesia

(Source: Environment Permit No. 27/2012)

According to No.11 2006 (Table 14.2.1) and by the decision of the Environmental Agency of Bali Province (BLH), two proposed beach conservation plans, i.e., Candidasa and the Southwest Coast, will require EIA (AMDAL) procedure to be completed before construction.

There are two Government Regulations related to EIA procedure and Loan Agreement; however, both of them do not clearly determine if "an EIA approval is necessary BEFORE discussion of loan agreement." The regulations are: Regulation of Ministry of National Planning No.4/2011 regarding Procedure of planning, submission of proposal, appraisal, monitoring and evaluation of activity funded by foreign loan and grant; and Government Regulation No.27/2012 regarding Environmental Permit. Common understanding of the BAPPENAS, hearing by JICA study team, is that AMDAL should have been conducted at the time of L/A discussion.

Table 14.2.1 Regulation of Environment Minister Number 11, Year 2006 (Attachment I)

Kinds of work plans and/or activities obliged to be completed with environmental impact

NO.	KIND OF ACTIVITIES	SCALE/ QUANTITY	SPECIAL SCIENTIFIC REASONS
4	a. Capital dredging - Volume	≥ 500,000 m^3	Having potential of causing important impacts toward hydrology system and wider ecology of activity itself, change of bathymetry, ecosystem, disturbing natural process in the water area (river and sea) including decrease in area productivity can cause social impact. This activity also causes trouble in waterways traffic.
	b. River and/or sea waterways dredging with *capital dredging* that cut of the coral reef and/or stone material	All quantities	
5	Harbor development c. Wave defender and/or break water - Length	≥ 200 m	Having potential of causing impacts such as emission, traffic errors, transportation accessibility, noise, vibration, view irritation, ecology, social impact, and security surrounding the activity and the need of wide area.
6.	Reclamation: - Width - Volume	≥ 25 ha ≥ 500,000 m^3	- Having potential of causing impacts toward geo-hydrology system, hydro-oceanography, social impact, ecology, bay line change, land stability, traffic, and also disturbing the natural process in bay area.
7.	Dumping activity on the shore: - Volume - Dumping wide area	≥ 500,000 m^3 ≥ 5 ha	Causing change in the ecology and local hydrology landscape.

(Source: Regulation of Environment Minister Number 11, Year 2006)

Attachment II

LIST OF PROTECTED AREA

Protected area meant by the Explanation of Section 7 sub (1) Laws Number 24 year 1992 about Space Management, Government Regulation Number 47 year 1997 about Space Plan of National Area, and Section 37 Decree of President of Republic of Indonesia Number 32 year 1990 about Protected Area Management, as follows:

1. Protected forest area
2. Area of mangrove
3. Water absorbing area
4. Surrounding beach
5. Surrounding river
6. Surrounding lake/reservoir area
7. Surrounding oasis area
8. Natural protected area (wild life, animal protection, tourism forest, protection area of biodiversity, and animal evacuation area)
9. Marine sanctuary area and others (sea navigation, land navigation, coastal area, river mouth, coral reef, and atoll that have ecosystem uniqueness)
10. Mangrove area
11. National park
12. Grand forestry park
13. Natural tourism park

(Source: Regulation of Environment Minister Number 11, Year 2006)

It was found that an EIA process is required for the proposed plan. The responsible organizations and the outline of the EIA process will be as followings.

Project Proponent: Ministry of Public Works/ Bali-Penida River Regional Bureau (Balai)

EIA Reviewer: Environmental Agency of Bali Province (BLH); however, the Karangasem Regency (for Candidasa coast) and Badung Regency (for southwest coast) both have an environmental division and have the capability for an AMDAL review. The regencies have the authority to give environmental permits if the project is concluded within the regency.

Community Consultation: Stakeholders' meeting needs to be held once during the preparation phase of the Terms of Reference for EIA (TOR for EIA/ KA-ANDAL), which requires 30 days of information disclosure.

Overall Duration: AMDAL process usually need six months from the application to the approval of an environmental permit. It will likely be shorter if the environmental division of the regency will review the EIA documents.

EIA Compiler: AMDAL documents must be compiled by an AMDAL engineer/firm who is certified by the Ministry of Environment. However, the number of AMDAL engineer is limited.

There are some differences between JICA and Indonesian EIA procedures that the project proponent must be aware of. JICA guidelines should be considered by the Ministry of Public Works if the project will be implemented based on the Japanese loan-aid basis (Table 14.2.2).

Table 14.2.2 Differences between JICA and Indonesian EIAs

Items	Laws and Guidelines of the Republic of Indonesia	JICA Guidelines
Duration of validity of EIA approval	3 years	Not defined (the guidelines require valid EIA approval from the respective country)
Requirement of EIA/ categorization	Types of projects are specified in Appendix-I and Appendix –II, Regulation of Ministry of Environment No.11/2006. *Proposed plans are required to conduct full EIA for both Candidasa and the southwest coast*	Division of classification is not clearly defined. Environmental category for each project is determined by overall consideration of all aspects. Category A projects are required to implement detailed EIA study.
Requirement before and after implementation of project	Environment permit is required (Government Regulation No. 27/2012). For maintaining environment permit, project proponent should follow their RKL and RPL (Government Regulation No. 27/2012).	Project proponents etc. must submit EIA reports for Category A projects. For projects that will result in large-scale involuntary resettlement, a Resettlement Action Plan (RAP) also must be submitted. For projects that will require measures for indigenous people, an Indigenous People Plan (IPP) must be submitted as well. Monitoring report to be submitted to JICA.
Public hearings	Compulsory based on Government Regulation No. 27/2012, public disclosure period of TOR for EIA.	Public hearings are compulsory to a project proponent of 'Category A' project. Public participation is encouraged from earliest possible time during the process. Consultations with relevant stakeholders, such as local residents, should take place if necessary throughout the preparation and implementation stages of the project, especially during preparation of: ➢ TOR for EIA ➢ Draft final report
Resettlement	Regulation of Head of National Land Agency No. 3/2007 on Implementation of Presidential Decree No. 36 of 2005 established procedures for land acquisition, however, there are no provisions on resettlement. Detailed procedures have not been set up for the settlers.	JICA guideline refers to WB OP4.12 for involuntary resettlement as follows. ➢ All PAP shall be given the choice of receiving a cash payment for compensation or resettlement according to government made plan; ➢ In addition to restitution of land, buildings, and real estate, PAP shall receive resettlement assistance consultation as well as new permanent income sources, job training, etc.
Land acquisition	Having **legitimate** rights to the land, project affected people (PAP) shall receive compensation for all land and buildings as their replacement value.	Eligibility for compensation also include: those who do not have formal legal rights to land but have a claim to such land or assets, provided that such claims are recognized under the laws of the country or become recognized through a process identified in the resettlement plan.

(Source: JICA Study Team)

(2) Spatial Plan

Spatial plan in Indonesia is the land use master plan with legal background, such as Explanation of Section 7 sub (1) Laws Number 24 year 1992 about Space Management, Government Regulation Number 47, Year 1997 about Space Plan of National Area.

a) Designation of Bali Provincial Spatial Plan (2009-2029)

Beaches which are selected for Phase-II sites are Candidasa and southwest coast. These two areas are designated as 1) Conservation of coastal and small island area, 2) Tourist area, and 3) Strategic tourist area. Phase-I beaches are also designated in almost the same way (Table 14.2.3, Figure 14.2.2).

Table 14.2.3 Bali Province Spatial Plan (2009-2029)

Phase	Project Area	Area Designated by Spatial Plan		
		Conservation of Coastal and Small Island Area	Tourism Area	Strategic Tourism Area
BBCP-II (Phase II)	Candidasa	✓	✓	✓
	Kuta-Legian-Seminyak	✓	✓	✓
BBCP-I (Phase I)	Kuta	✓	✓	✓
	Sanur	✓	✓	✓
	Nusa Dua	-	✓	✓

(Source: Bali Province Spatial Plan)

Conservation of coastal and small island area is not biologically ‘preserved’ area; but it is a ‘conservation’ area, which means an area with sustainable utilization of resources which is recommended. All the areas are also defined as tourist area; which means an area should be conserved as tourist resources.

Ir Komang Ardana, Head of Environmental Board of Bali Province Environmental Agency (Badan Lingkungan Hidup: BLH) also confirmed to the JICA Study Team that conservation work of the coastal area can be implemented in the ‘Conservation of Coastal and Small Island Area’ if the project arises due to public concern.

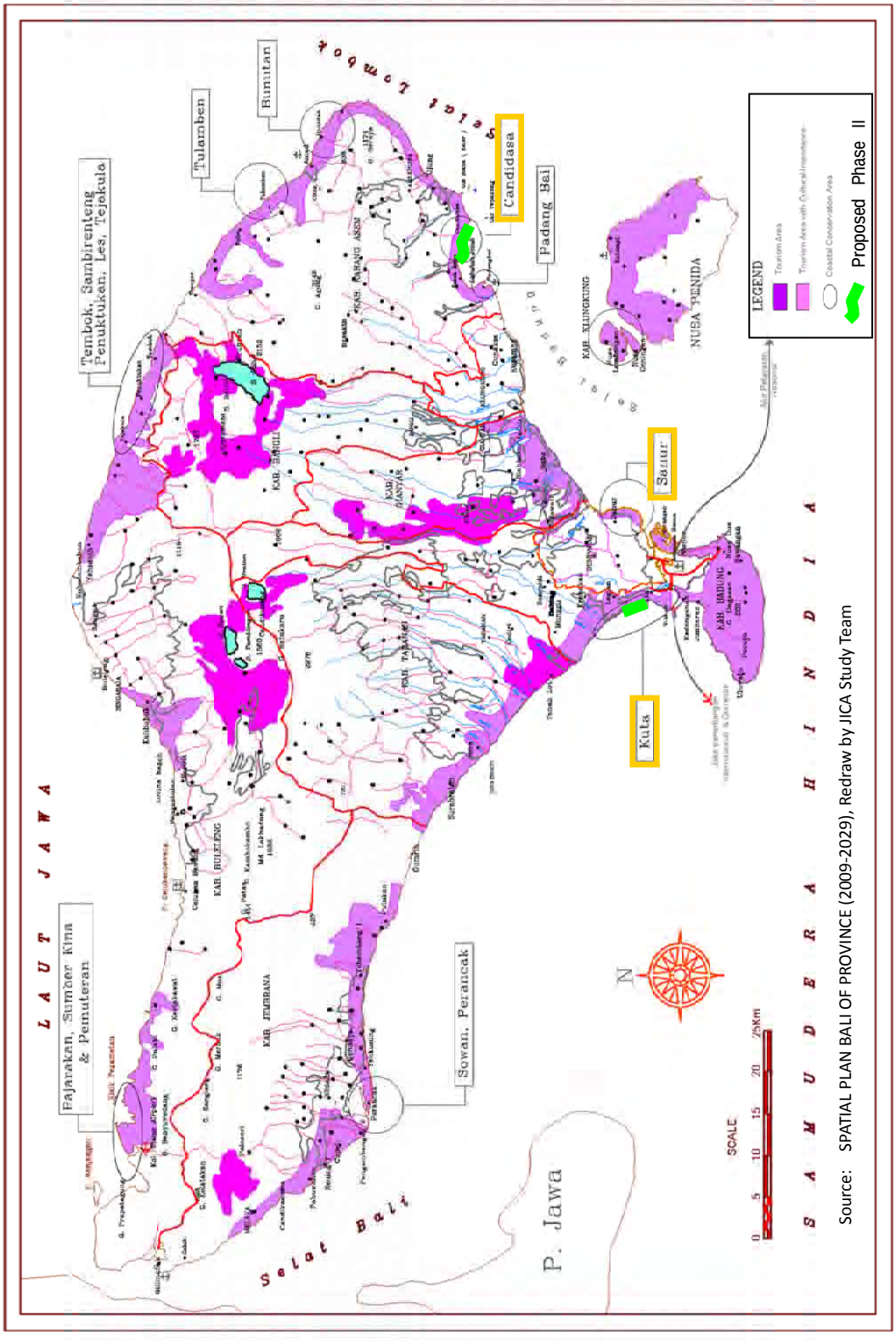


Figure 14.2.2 Spatial Plan of Bali Province (Tourism and Coastal Conservation Area)

(Source: Spatial Plan Bali Province (2009-2029), Redrawn by the JICA Study Team)

b) Karangasem Regency Spatial Plan

[Designation]

Taking the Spatial Plan of Bali Province into account, the Spatial Plan of Karangasem Regency was formulated. Candidasa area was extracted from the spatial plan and shown in Figure 14.2.3 (the eastern area) and Figure 14.2.4 (the western area).

As tourist area, coastal area is designated as:

- Tourist facilities/hotels,
- Wharf,
- Creation of beach and pedestrian walkway along the beach, and
- Public spaces.

[Land Use]

Current beach rehabilitation works are affirmed in the provincial spatial plan which has legal background. Mr Budiyasa, Regional Development Planning Agency, Karangasem Regency, confirmed to the JICA Study Team that the Planning Division of Bali Province is acknowledged in the Karangasem Regency's Spatial Plan, especially on the development of the Candidasa waterfront, since they had series of discussions.

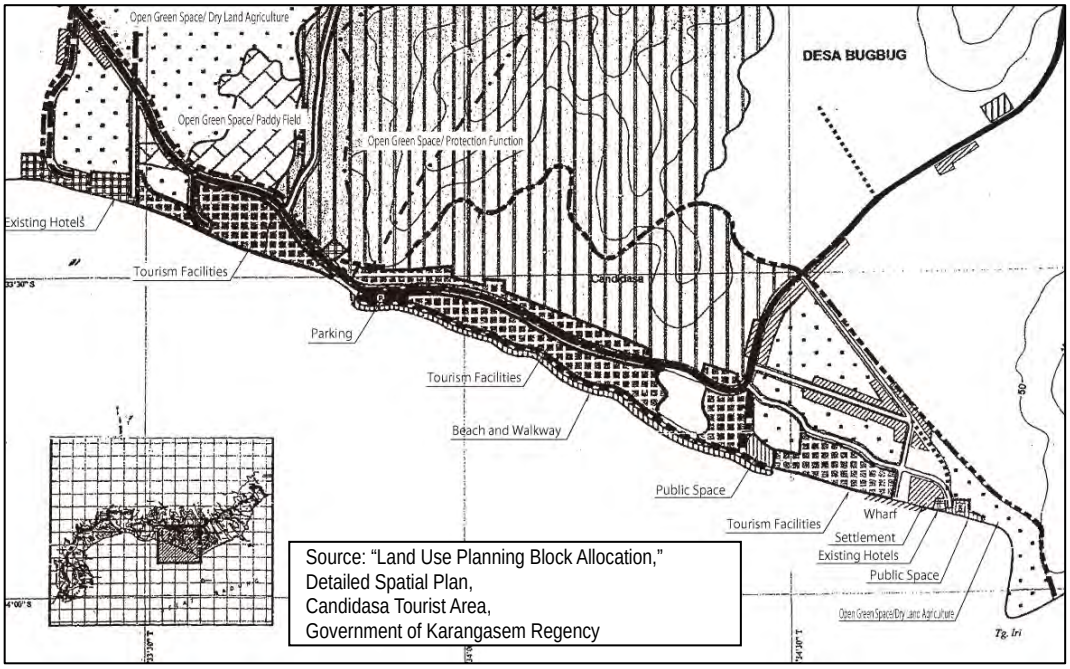


Figure 14.2.3 Spatial Plan of Candidasa Area (East), Karangasem Regency

(Source: "Land Use Planning Block Allocation," Detailed Spatial Plan, Candidasa Tourist Area, Government of Karangasem Regency)

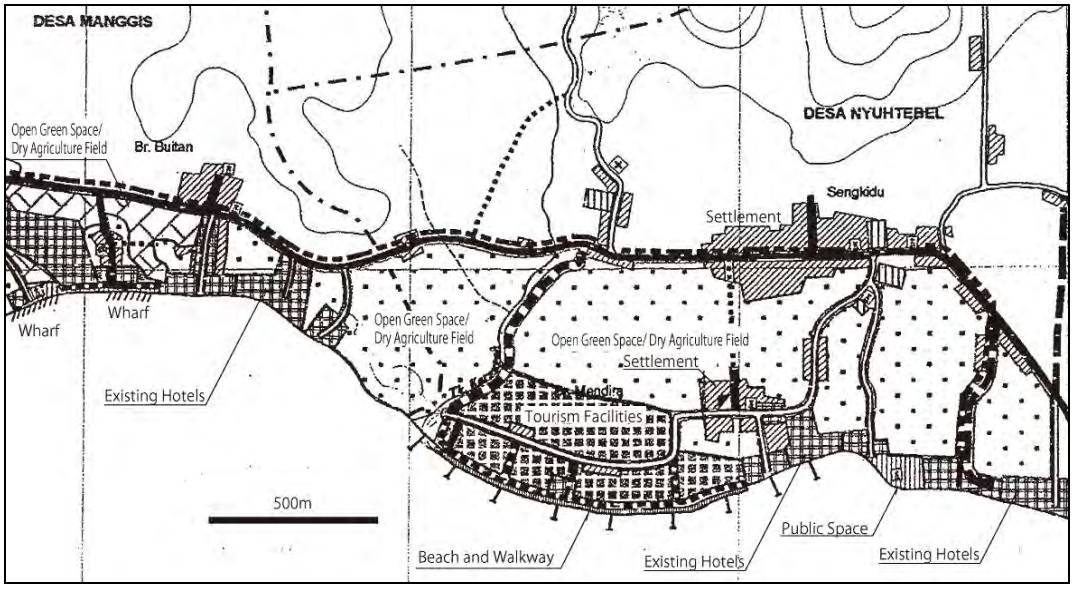


Figure 14.2.4 Spatial Plan of Candidasa Area (West), Karangasem Regency

(Source: "Land Use Planning Block Allocation," Detailed Spatial Plan, Candidasa Tourist Area, Government of Karangasem Regency)

[Conclusion]

According to the spatial plan, the Candidasa coastal area is expected be developed and utilized as an attractive tourist natural resource. Therefore, the implementation of proposed projects are in accordance with the spatial plans.

(3) Laws on Dredging and the Procedure

The following procedures for obtaining concession right of offshore sand dredging are listed below. In this section, information were obtained at the Assessment and Licensing Department, Bali Provincial Office on December 14, 2011.

a) Procedure for obtaining concession rights of offshore sand dredging

1) Send letters which explains an outline of sand dredging activities to be implemented in Bali Province (if dredging will be 4-12 miles from the shoreline).

2) Explain in the joint-meeting which consisted of:

*Dinas PU (Department of Public Works, Bali Province)

*Mining and Energy Agency (Ministry of Energy and Mineral Resources), and

*Balai (Water Resources DG, Ministry of Public Works)

b) Responsible office

Responsible offices of concession rights are listed in Table 14.2.4 below.

Table 14.2.4 Responsible Offices for Sand Dredging Permission

Distance from Shoreline (miles)	Responsible Office for Concession Right		Office Location
< 4	For Candidasa	Karangasem Regency	Karangasem
	For beaches southwest coast of Badung Regency	Badung Regency	Mamgupura
4 - 12	Bali Province (Assessment and Licensing Department)		Denpasar
12 <	Ministry of Energy and Mineral Resources (ESDM)		Jakarta

(Source: Assessment and Licensing Department, Bali Provincial Office on December 14, 2011)

c) Days required for obtaining the concession right

Three months (If no obstacles are found)

d) Concession Fee

The price will be discussed in a joint-meeting.

e) Number of concessions required

1) One approval is enough for all projects (if Bali Province is the responsible area)
2) One from each local government if sand is taken within four miles from the coastal line

f) Applicant

Applicant of sand concession rights will be the dredging contractor. The applicant needs to clarify the activities. An example is shown in the box below.

cf: Outline of dredging activities (Example):

[Location]

1) Candidasa (Sea depth 20 m - 40 m)
2) Kuta (Sea depth 20 m - 40 m, 5 km - 10 km offshore area)

[Amount]

1) 100,000 m^3 (Candidasa)
2) 100,000 m^3 (Canggu, Sminyak-Kurobokan, Legian)

[Dimension]

1) d = 1.5 m, w = 50 m, l = 2000 m (approximately)

g) Approval in the beach conservation area

Sand dredging activities will be permitted at offshore of coastal conservation area, according to Ir Komang Ardana, Head of Environmental Board of Bali Province Environmental Agency (Badan Lingkungan Hidup: BLH).

h) Resettlement

Resettlement of residents will not occur in any of the coastal conservation plans proposed in this study.

14.3 Candidasa Coast

(1) Area of Coverage

There are two areas proposed by the JICA Study Team based on the local communities' strong request for project implementation. On the other hand, project cost is expected to be higher compared to the coastal conservation projects in other locations. The optimal coverage area will be determined. The areas are shown in Figure 14.3.1.

Alternative 1: Point Niti – Mendira Beach

Alternative 2: Point Niti – Alila Mangis Hotel

Figure 14.3.1 Proposed Project Coverage Areas

(Source: JICA Study Team)

(2) Typical Cross Section

It is preferable to setback present embankments away at some distance, allowing space for sand to stay during high tide. However, it is difficult to remove existing facilities such as pool, restaurant, since land will be decreased (Figure 14.3.2). Thorough social discussions should take place to determine the exact position of the top slope (where the walkways are to be constructed); the same as what the Study Team went through during the implementation of Phase I beaches.

There are no inhabitants along the coastal line, and therefore, resettlement will not occur. Land acquisition will not be necessary in the entire stretch of Candidasa. Likewise, in the coastal area for Phase-I, beach will be created for those who agreed to exchange their land for sandy beach. Compensation for land will not be made to any land owners in order to keep equality among all land title holders. Detailed survey is necessary for determining the precise protection line because erosion and positions of facilities are different per site. Concluding protection line is useless. Facilities which need to be removed should be discussed with every single title holder in the next phase.

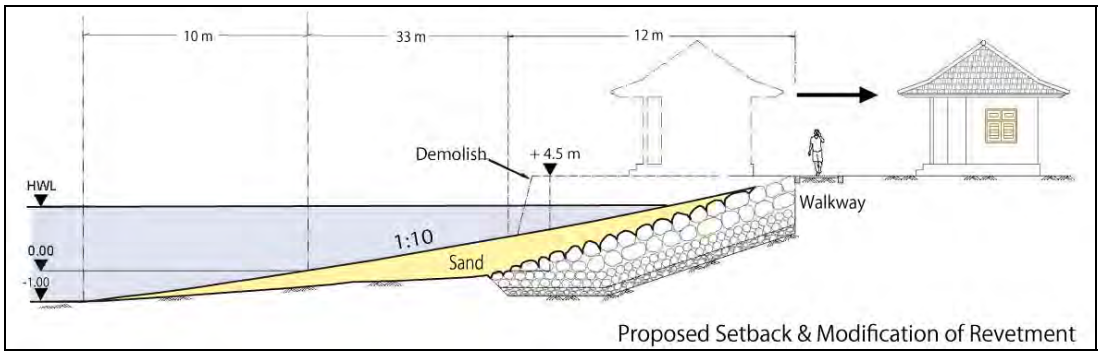


Figure 14.3.2 Cross Section of Alternative-3

(Source: JICA Study Team)

The slope of sand is designed at 1:10. In this case, the area of sand will cover more than 40 m from the present embankment line. Cross section has more than two alternatives as shown in Table 14.3.1.

Table 14.3.1 Cross Section of Alternatives

	Setback (0 m)	Setback (6 m)	Setback (12 m)	Sloped Revetment by Cobbles	Sand Nourishment
Alternative 1	✓			✓	-
Alternative 2		✓		✓	✓
Alternative 3			✓	✓	✓

(Source: JICA Study Team)

Locations of buildings at the hinterland were spotted and described in Figure 14.3.3 and Figure 14.3.4, with the recession line of Alternative-3 setback at 12 m. Although none of the main buildings are required to be removed, tourism facilities such as pools, benches, private walkways, plants, etc., will be the subject for exchange with sandy beach. The choice totally depends on the land owners.

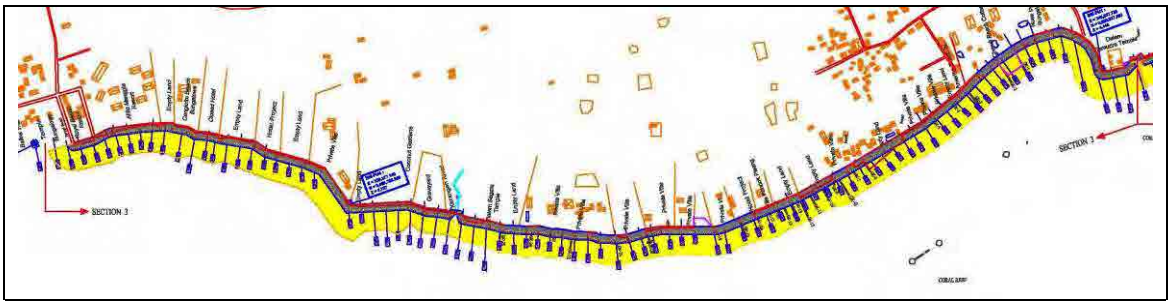


Figure 14.3.3 Western Area of Candidasa

(Source: JICA Study Team)

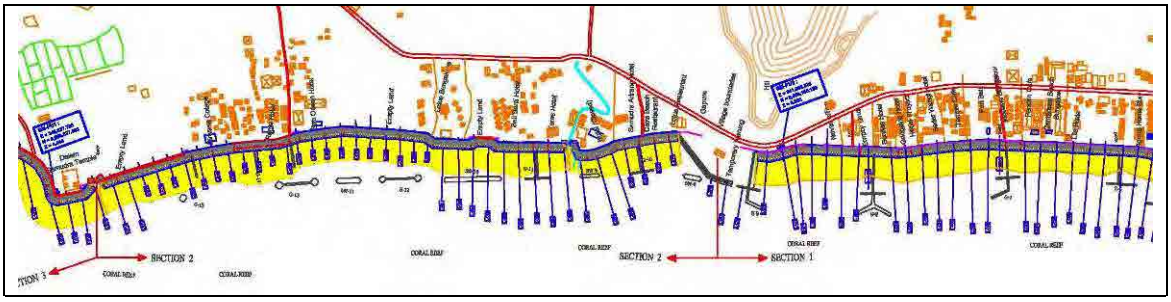


Figure 14.3.4 Central Area of Candidasa

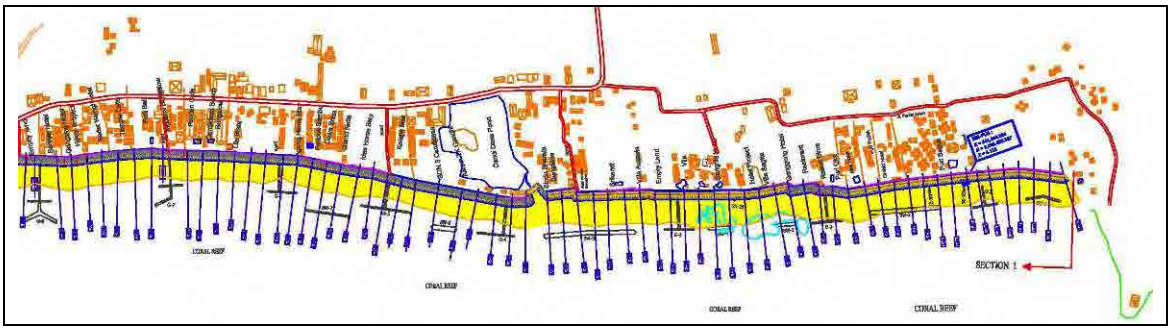


Figure 14.3.5 Eastern Area of Candidasa

(Source: JICA Study Team)

(3) Comparison of Impacts of Alternatives

Alternatives are compared by natural and social impacts, together with the benefits. A "No project" alternative (Alternative 4) was also compared (refer to Table 14.3.2). A setback plan incurred the most severe impacts to the natural environment, however, the benefit is also large if nourished sand is stable.

Table 14.3.2 Natural and Social Comparison of Alternatives in Candidasa

		Alternative 1	Alternative 2	Alternative 3	Alternative 4
Description of Facilities		* Setback: 0 m * Sloped-revetment by cobbles (No sandy beach)	* Setback: 0 m * Sloped-revetment by cobbles * Breakwaters made of artificial rocks	* Setback: 6-12 m * Sloped-revetment by cobbles * Sand nourishment * Groins for sand retention purpose	* No project (status quo)
➢ Negative Impacts	Biological Impacts	* Rising turbidity during construction may affect corals and sea grass in reef flat.	* Rising turbidity during construction may affect corals and sea grass in reef flat.	* Corals attached on artificial structures and sea grass will be affected by sand coverage and turbidity. Demolition of the groins and breakwaters will undermine living grounds of corals. * Off-shore dredging activities may disturb benthic organisms and fishes around it.	* No adverse impacts expected on corals attached on existing breakwaters.
	Social Impacts	* Tourism business will continuously experience economic loss by not having sandy beach (degradation of the tourism resources). * Tourists can not use the shoreline for sunbathing. * Fisherman can not pull up their boat from the water. * Cultural ceremony need to use parking lot. * Noise and vibration of construction will affect the tourism resources during construction. * Walkway during high waves could be washed up by waves; entrance should be restricted.	* The residents need to understand that beach will not be created immediately after the construction. * Breakwaters will be an obstacles for fisherman's boat trespassing through. * Noise and vibration of construction will affect the tourism resources during construction. * Walkway during high waves could be washed up by waves; entrance should be restricted.	* Fishermen need to remove their boats during construction. * Tourism business firms (hotels and villas) will exchange their land for beach. * If setback plan is implemented, the owners of the business may have to move their facility (with agreement). * The Ministry of Public Works may lose credibility if nourished sand will disappear by high waves. * The Ministry of Public Works may need to supply sand periodically. * Noise and vibration of construction will affect the tourism resources during construction. * Walkway during high waves could be washed up by waves; entrance should be restricted.	* Tourism business will continuously experience economic loss by not having sandy beach (degradation of the tourism resources). * Tourists can not use the shoreline for sunbathing. * Fisherman can not pull up their boat from the water. * Cultural ceremony need to use parking lot.
	Pollution	* Turbidity of reef flat during construction will be higher.	* Turbidity of reef flat during construction will be higher.	* Turbidity of reef flat during and after construction will be higher.	* No adverse impacts expected.
	Physical Impacts	* Noise and vibration of construction will be higher during construction. * Waves overtops more easily over a sloped embankment than a vertical wall.	* Noise and vibration of construction will be higher during construction. Waves overtops more easily over a sloped embankment than a vertical wall.	* Noise and vibration of construction will be higher during construction. Waves overtops more easily over a sloped embankment than a vertical wall.	* No adverse impacts expected.

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
➢ Benefits	* Tourists can transport along the beach through walkway.	*Visitors can travel along the beach along the walkway. * Wave energy will be dissipated by breakwaters. * Corals may be attached on breakwaters again. (If sand is accumulated) * Fisherman can use the beach for keeping their boats. * Cultural ceremony can come back to the beach again. * Aesthetic scenery as tourism resource will be improved. * Tourists can use the beach as transportation pass way along the beach.	* Fisherman can use beach for keeping their boats. * Cultural ceremony can come back to the beach again. * Aesthetic scenery as tourism resource will be improved. * Tourists can use the beach as a passage way of transportation * Wave energy will be dissipated by nourished sand.	-

(Source: JICA Study Team)

(4) Sand Dredging

Sand dredging will be done in the offshore area of Candidasa. Tentative route for sand transportation is shown in Figure 14.3.3.

- Dredging volume (Alternative -1→ 3 km): 190,000 m^3

  (Alternative -2→ 5 km): 350,000 m^3
- Duration of dredging works (three months)
- Specific sand dredging site is not determined yet. Appropriate sand quality and rough estimate on the availability was confirmed in this phase. Detailed survey on the available volume of sand in good quality will be conducted and the location will be determined. Concession right will be obtained in the detailed design phase.

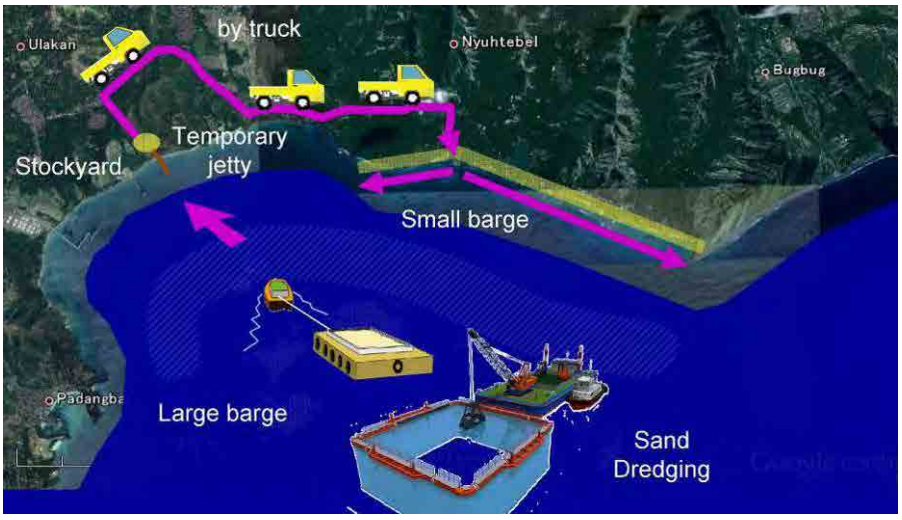


Figure 14.3.6 Sand Dredging, Transportation, and Sand Filling

(Source: JICA Study Team)

(5) Project Site

a) Land Use

The main use of Candidasa hinterland is for tourism accommodation facilities. From Point Niti at the eastern end, more than 5 km land stretch of the Candidasa coastal area is owned by numerous investors due to its high tourism resource value. Refer to Figure 14.2.2 and Figure 14.2.3 for reference regarding land use.

b) Erosion

Candidasa has lost its beach. One of the causes is said to be its coral mining during the 1970s. According to hearings conducted by the JICA Study Team, corals in front of Candidasa were excavated 1.0 m-1.5 m deep during low tide and used as construction material. Incoming waves became stronger and the returning waves from hotel walls flushed out the sand during low tide. Fishing in Candidasa is being done more than 5 km offshore by using fish nets. Benthic fishes are not fishing objects in this area (Table 14.3.3).

Table 14.3.3 Fishing Activities in the Dredging Area

Fishing Range	Name of Fisherman's Group	Target Fish	Number of Fisher-men	Distance from the Coast	Depth of Fishing Ground	Catching Season	Catching Equipment
Candidasa East	*Samuh	Mackerel, Sniper fish, Grouper, Albacore tuna	130	5-25 km	Varied	All year round	Fishing net
Candidasa West	*Sengkidu	Mackerel, Sniper fish, Grouper, Albacore tuna	26	over 5 km	Varied	All year round	Fishing net

(Source: JICA Study Team)

14.4 Southwest Coast

(1) Area of Coverage

The main area of conservation in the southwest coast is in the Legian Administrative Village and Seminyak Administrative Village, just north of Kuta Village. Conservation plan covers 2.9 km long, with its tourism accommodation area located next to the Phase I area in the north (refer to Figure 14.4.1).

In addition to the stretch of the beach, there are areas which also require protection from adjacent buildings. Land acquisition in the area is not necessary for the project.

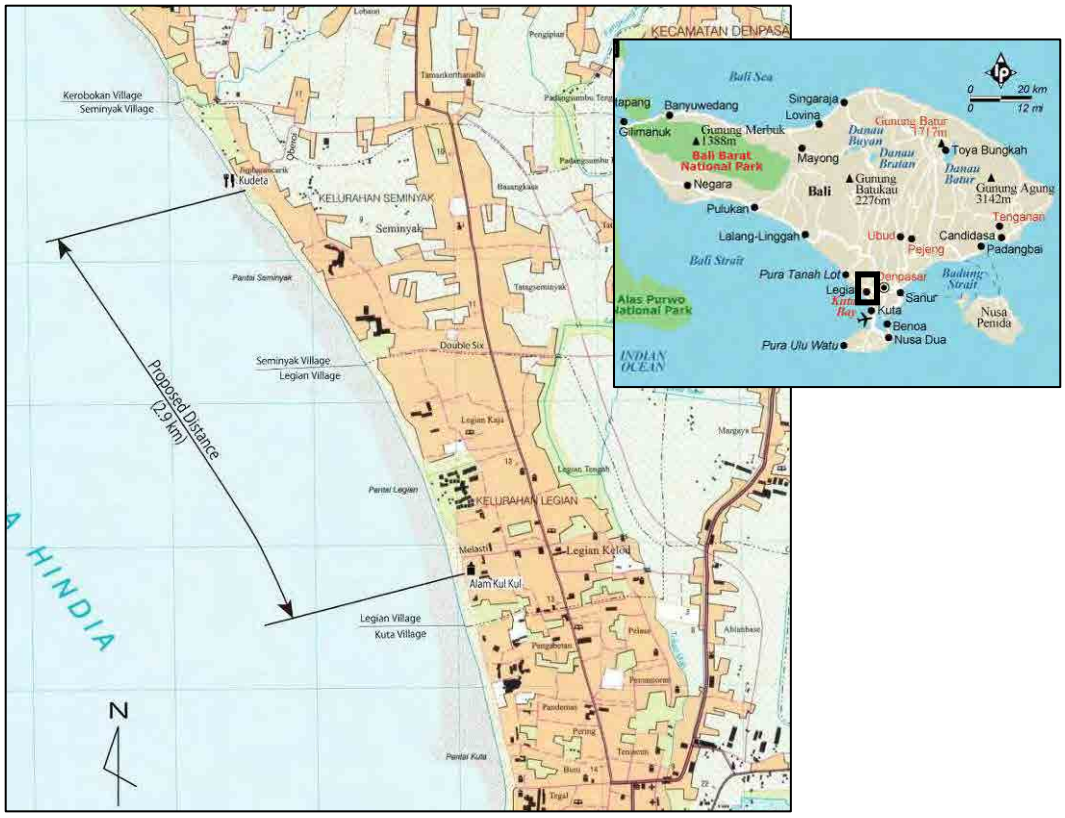


Figure 14.4.1 Proposed Coverage of the Southwest Coast

(Source: JICA Study Team)

(2) Proposed Sand Nourishment Works

The proposed profile of sand nourishment is presented below and shown in Figure14.4.2.

- Back shore elevation: approx +5.5 m
- Planned slope: 1/10 (Figure 14.4.2)
- Minimum beach at high water level: 20 m

As a result of study, the appropriate beach conservation method was determined to be sand nourishment. Long wave period of incoming waves due to missing corals in the offshore area and heavy beach usage for tourism resources make the artificial coastal protection structures inappropriate in the area (Table 14.4.1).

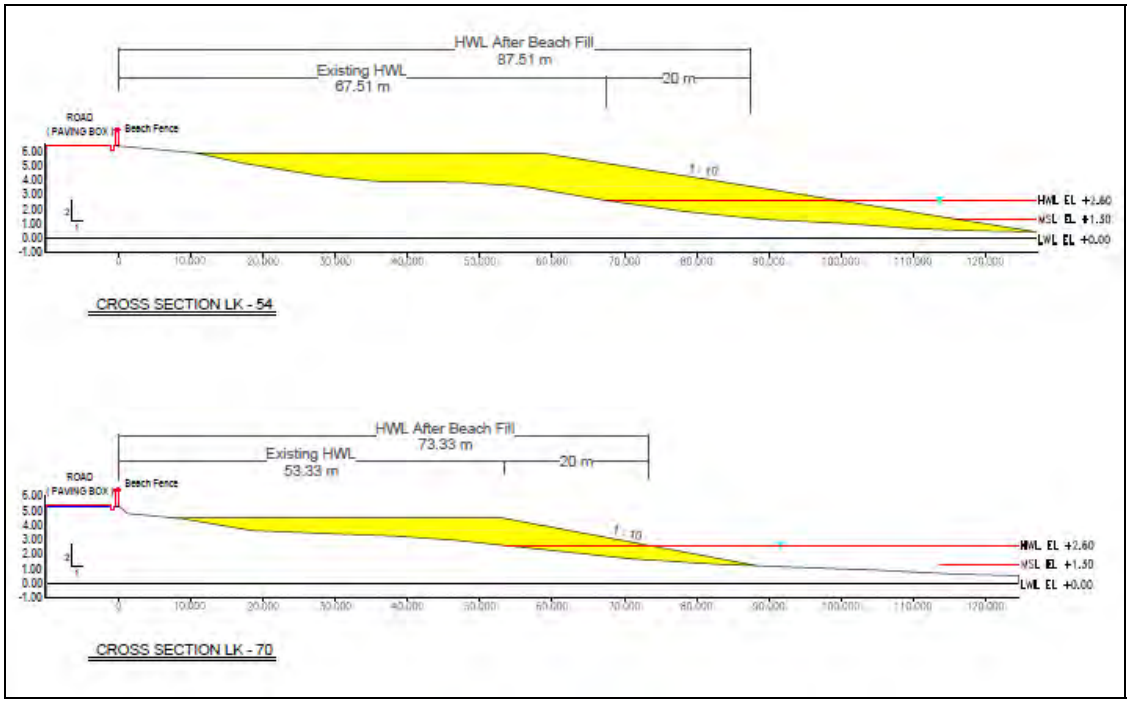


Figure 14.4.2 Proposed Profile of Beach for South West Coast

(Source: JICA Study Team)

- Conservation method: Sand nourishment without structures
- Volume of beach nourishment: 280,000 m^3
- Dredging duration: Less than one month
- Dredging depth from the bottom surface: 1.0 m
- Procedure of civil works: Dredging by suction machine → transportation by bulges → unloading sand at transfer facility in the offshore area of Kuta → direct sand fill to the beach by pressured transfer pipe

Table 14.4.1 Comparison of Facilities with Other Alternatives

Alternatives	Pros	Cons
Plan-1 Structure * Embankment * Breakwater * Natural rocks	➢ Good protection function	➢ Artificial look ➢ Ocean view obstructed ➢ Trespassing obstructed ➢ Damage expected by incoming waves
Plan-2 Sand Fill	➢ Natural look ➢ Preferable for beach uses	➢ Sand dredging necessary ➢ Appropriate maintenance necessary

(Source: JICA Study Team)

➢ Specific site for sand dredging is not determined yet. An appropriate sand quality and a rough idea on its availability was confirmed in this phase. Detailed survey on the available volume of sand in good quality will be conducted and the location will be determined. Concession rights will be obtained in the detailed design phase (refer to Figure 14.4.3).

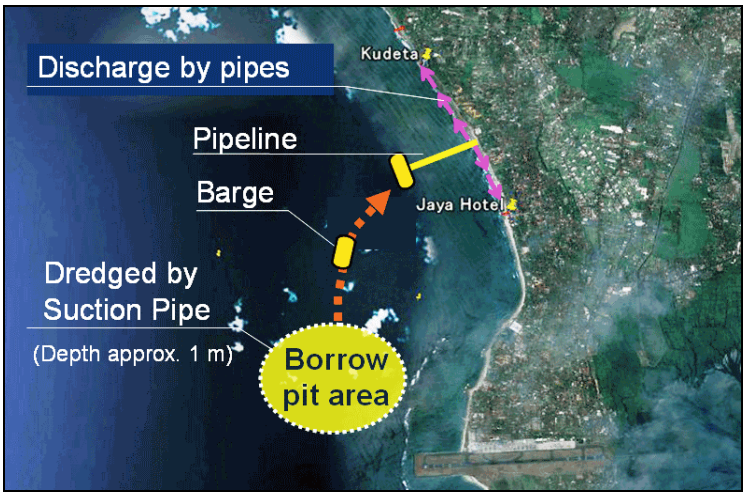


Figure 14.4.3 Proposed Sand Nourishment Implementation Works

(Source: JICA Study Team)

(3) Comparison of Alternatives

The natural and social environmental impacts of the four alternatives were compared. A case of “No Project” was also compared as one of the alternatives. Alternative-2 and alternative-3 are those with structures and which the impacts of these structures are profound and not suitable for the characteristics of the coastal area (Table 14.4.2). Sand nourishment is best suited for the area. The “no project” alternative is also a candidate choice if the local government will not evaluate the importance of widening the eroded beach.

Table 14.4.2 Natural and Social Comparison of Alternatives in the Southwest Coast

		Alternative 1	Alternative 2	Alternative 3	Alternative 4
Description of Facilities		* Sand nourishment	* Construction of detached breakwaters	* Construction of seawall	* No project (status quo)
➢ Negative Impacts	Biological Impacts	* Benthic biology will be disturbed by dredging activities. * Turbidity will be higher along the project site during construction and disturb the aquatic environment.		* Turbidity will be slightly higher along the project site during construction.	* No adverse impacts expected.
	Social Impacts	* Noise and vibration of construction equipment will affect the tourism resources during construction. * Use of coastal area will be limited at the construction site. * Turbidity will be higher along the project site during construction and disturb the tourist business. * The Ministry of Public Works may need to supply sand periodically.	* Noise and vibration of construction equipment will affect the tourism resources during construction. * Tourism business will continuously experience economic loss by not having sandy beach (degradation of the tourism resources). * Aesthetic beauty of the beach will severely be damaged. * Detached-breakwater will be an obstacles for fisherman especially at night time. * Detached-breakwaters will limit the surfing in the area.	* Noise and vibration of construction equipment will affect the tourism resources during construction. * Tourism business will continuously experience economic loss by not having sandy beach (degradation of the tourism resources). * Aesthetic beauty of the beach will severely be damaged.	* Tourism business will experience economic loss by not having sandy beach (degradation of the tourism resources).
	Pollution	* Use of coastal area will be limited at the construction site due to high turbidity. * Noise and vibration will be slightly higher during construction.	* Turbidity will be slightly higher along the project site during construction. * Noise and vibration will be higher during construction.	* Turbidity will be slightly higher along the project site during construction.	(Existing problem) Extremely low quality of sea water at the river mouth
	Physical Impacts	* No adverse impacts expected.	* Ocean side of the breakwater will be deeper than other area, and shoreline between breakwaters will be eroded.	* Noise and vibration will be higher during construction. * Shoreline behind the edge of the seawall may well be eroded.	* No adverse impacts expected.
➢ Benefits		* Aesthetic scenery as tourism resource will be improved. * The beach will be widened.	* Beach will be created in some portions behind the detached-breakwaters.	* Hinterland will be protected from high wave.	-

(Source: JICA Study Team)

(4) Site Description

a) Land Use and Social Environment

The land use of the hinterland of the proposed conservation area will concentrate on the tourism industry. Numerous hotels, villas, and restaurants are operating their business along the stretch (Figure 14.4.4, Photo 14.4.1 – 14.4.4).

The beachfront is being used for sunbathing, swimming, and surfing. Although swimming is prohibited in most of the area, limited areas with lifesaver attendance are allowed.

b) Water Quality Problems

One of the biggest existing issues in Legian-Seminyak Beach area is poor water quality. Algae bloom is occurring in shallow water, which degrades the environmental quality to the worst possible level (refer to Photos 14.4.5 to 14.4.8). Nutrients supplied to the beach by the incoming river water are assumed to be the cause of low water quality. The offensive smell, color, and solid debris will presumably affect the beach environment, even after its sand nourishment.

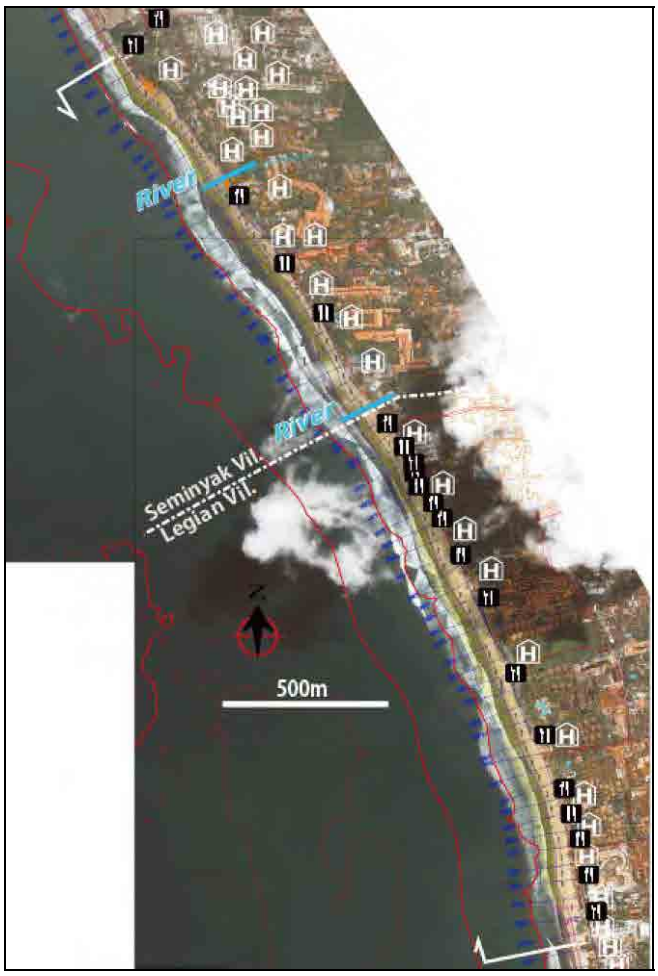


Figure 14.4.4 Location of Hotels and Restaurants at the Proposed Area

(Source: JICA Study Team)

Photo 14.4.1 Hinterland at the Northern End of the Proposed Site

Photo 14.4.2 North Part of Seminyak Village at during Low Tide

Photo 14.4.3 Hinterland of Legian Beach

Photo 14.4.4 A Wall that Divides Legian Beach and the Road

Photo 14.4.5 Severe Algae Bloom in Shallow Waters of Legian-Semunyak Border Area

Photo 14.4.6 Nutrients Suspected to be Discharged by Heavily Polluted River Outlet

Photo 14.4.7 Washed up Algae

Photo 14.4.8 Remaining Algae on the Beach

(Source: JICA Study Team)

c) Fishery

There are two fisherman groups at the southwest coast (Table 14.4.3). Study for the selection of appropriate sand for the dredging area in the offshore of Kuta will conclude the project. Fishermen in the Kuta area are shifting their income source from fishing to tourism industry since the demand for marine sports and pleasure boat is high in Kuta area, while fishermen in Canggu are concentrating on lobster fishing because tourists are much fewer in the area than that of Kuta.

Table 14.4.3 Fishing Activities in the Dredging Area

Fishing Range	Name of Fisherman's Group	Target Fish	Number of Fisher-men	Distance from the Coast	Depth of Fishing Ground	Catching Season	Catching Equipment
West Coast Seminyak-Tana Lot *(Not selected as dredging site)*	*Canggu *Brawa	Lobster, prawn/ shrimp, all kinds of fish	86	1 km-10 km (Seminyak to the north)	0 m-40 m	All year round, Peak season: March-May	Lobster basket, net
Kura-Tana Lot	*Samudera Jaya I *Samudera Jaya II *Samudera Jaya III *Samudera Jaya IV	All kinds of fish, prawn/ shrimp,	100	1 km-50 km	0 m-70 m	May-December Peak season: November-December	Net, hook

(Source: JICA Study Team)

Outline of lobster fishing in Canggu area is as follows;

- 20 baskets set by a fisherman
- Average catch 0.5 kg/basket (2-3 lobsters), Maximum catch 2000 g
- Sold at Rp.35,000/100 g
- Low season: January to June

Photo 14.4.9 Kuta Fisherman's Moor

Photo 14.4.10 Fish Market near Kuta

Photo 14.4.11 Basket for Lobster Catch (Lobster fishing in Kuta area is not as important as in Canggu area)

Photo 14.4.12 190 g Lobster Sold for Rp.66,500 by Canggu Fisherman Association

(Source: JICA Study Team)

14.5 Environmental Impact and Mitigation Measures

(1) Scoping

EIA (AMDAL) process is necessary for both plans of the southwest cost and Candidasa, according to the Indonesian regulation (Regulation of Environment Minister No 11/2006). In this section, subjects with probable impacts are screened out as presented in Table 14.5.1.

Table 14.5.1 Scoping for Candidasa and Southwest Coast (1/4)

Field	No.	Subject	Estimation		Justification
			Pre/During Construction	During Operation	
Pollution	1.	Air	d	d	**During Construction**: Although emission from dredging ship and sand transportation machines in the offshore area are expected during sand transportation, impacts on residents are negligibly small. **During Operation:** There is no machine to be operated after construction.
	2.	Water	b-	b-	**During Construction**: Turbidity of shallow water area becomes higher at the dredging point and sand nourishment area. **During Operation:** Fine particles attached to the dredged sand will be washed out by tidal action and waves gradually to the shallow area for long period of time.
	3.	Solid waste	d	d	**During Construction**: Sand dredging, sand nourishment, and construction of embankment will not produce solid waste. **During Operation**: Nothing really operates at the coastal area after construction.
	4.	Soil	d	d	**During Construction**: Soil contamination is not likely during sand nourishment works. Leakage from trucks and ships may occur but only at a negligible level **During Operation:** There would be no source of pollution after the civil works.
	5.	Noise/ vibration	b-	d	**During Construction**: Dump trucks give noise impacts along the access road; bulldozers are planned to be operated to push the sand into the water. The noise and vibration along the access road, nearby sand nourishment area are expected. **During Operation:** There would be no source of noise and vibration after the civil works.
	6.	Ground subsidence	d	d	**During Construction and Operation**: There would be no construction works or operation practices which will cause ground subsidence.
	7.	Offensive odor	d	d	**During Construction and Operation**: There would be no construction works or operation activities which will cause offensive odor.
	8.	Sedimenta-tion	d	c	**During Operation**: No significant impact by sedimentation is foreseen at the southwest coast, but nourished sand may affect corals in reef flat of Candidasa. Specific positions of corals were examined in this study.

(Source: JICA Study Team)

Table 14.5.1 Scoping for Candidasa and Southwest Coast (2/4)

Field	No.	Subject	Estimation		Justification
			Pre/During Construction	During Operation	
Natural Environment	9.	Preservation area	d	b+	**During Construction and Operation**: Both the southwest coast and Candidasa area are designated as "coastal conservation area" and "strategic tourism area" by Bali RTRW 2009-2029. This does not mean the usage is prohibited but wise conservation for the resource utilization is obligated.
	10.	Biodiversity	b-	b-	**During Construction**: Coral clusters in the reef-flat area exist in Candidasa.. Dredging activity and beach creation will change the sea bottom environment. **During Operation:** The same with No.8 above.
	11.	Water flow	d	d	**During Construction and Operation**: Littoral current will not be changed but power of incursion waves will be decreased by nourished sand. However, if new groins are constructed, water circulation between the groins will be altered.
	12.	Topography/ Geology	d	d	**During Construction and Operation**: Although dredging activity and beach creation will change the sea bottom environment, but the changes are not significant because the sand has been drifted and accumulated in the present place from other area.
Social Environment	13.	Involuntary resettlement and/ or Land aquisition	b-	d	**During Construction**: There would be no involuntary resettlement that will occur in Candidasa area and in the Southwest coast area by the proposed coastal conservation work plans. In case of implementation of setback in Candidasa, facilities/buildings will be removed in exchange for creating beach area. The choice is selected by the owners/investors of the hinterland area. **During Operation**: There would be no operation practices which will cause involuntary resettlement.
	14.	Low income group	d	d	**During Construction and Operation**: Since the project proposed areas have been utilized as important tourist areas, and the land is subject to land speculation, low income people are not living in and the surrounding area.
	15.	Minority/ indigenous people	d	d	**During Construction and Operation**: The same with No.14.
	16.	Employment/ income source/ regional economy	c	b+	**During Construction**: Dredging activity may require alternation of fishing practices at nearby area. Fishing activities are studied. **During Operation**: Creation of beaches will give remarkable and positive impacts on the hinterland tourism business.
	17.	Land use/ natural resources	c	b+	**During Construction**: The same with No.16 above. **During Operation:** Creation of beaches will give remarkable and positive impacts on the hinterland tourism business.

(Source: JICA Study Team)

Table 14.5.1 Scoping for Candidasa and South West Coast (3/4)

Field	No.	Subject	Estimation		Justification
			Pre/During Construction	During Operation	
	18.	Water use/ rights	d	d	**During Construction and Operation**: There would be no construction works or operation activities which will limit water use, or cause impact on water use.
	19.	Infrastructure, social service	d	d	**During Construction and Operation**: There would be no construction works or operation activities which will cause impact on infrastructures.
	20.	Social infrastructure, local organization	d	d	**During Construction and Operation**: There would be no construction works or operation activities which will cause impact on social infrastructure and local organizations.
	21.	Unfair distribution of cost and benefit	c	d	**During Construction**: Beneficiaries of the proposed projects are the communities as a whole by increasing the number of tourists. However, for the southwest coast, sand accumulated in the offshore area of Kuta is planned to be dredged and conveyed to Legian and Seminyak area. This may develop to inter-community argument, such as the Nusa Dua community showed annoyance for sand dredging in Phase-I. Fishermen in Kuta may also feel discontent.
	22.	Social conflicts	c	d	**During Construction and Operation**: The same with No.21 above.
	23.	Archaeolo-gical/ historical heritage	d	d	**During Construction and Operation**: Although there is a famous temple in the hinterland area of Candidasa, no archaeological or historical heritage site in the project proposed site.
	24.	Landscape	d	b+	**During Construction**: Construction machineries will be utilized to push out sand to form a beach in Candidasa; however, the duration is limited to few days, and the impact on landscape is negligible. Machines are not necessary for the southwest coast because direct sand nourishment using pressured pipes are planned. **During Operation** The landscape of the southwest and Candidasa area will be improved by the creation of a sandy beach.
	25.	Gender	d	d	**During Construction and Operation**: There would be no construction works or operation activities which stimulates inequality of gender or exploitation.
	26.	Children's rights	d	d	**During Construction and Operation**: There would be no construction works or operation activities which undermine children's rights.
	27.	Transmitting disease, i.e., HIV/AIDS	d	d	**During Construction and Operation**: There is a large number of population influx to the proposed areas compared to the construction workers because they are popular tourist areas. The impact on increasing incidents of transmitting disease is small.

(Source: JICA Study Team)

Table 14.5.1 Scoping for Candidasa and South West Coast (4/4)

Field	No.	Subject	Estimation		Justification
			Pre/During Construction	During Operation	
	28.	Working environment/ safety	d	d	**During Construction and Operation**: There would be no construction works or operation activities which degrade working environment/ safety.
	29.	Accidents	c	c	**During Construction**: Since construction vehicles will share hinterland roads with tourists, possibility of accidents chould be higher. The access routes will be confirmed. **During Operation** New walkway along the coast in Candidasa attracts tourists but they may see high waves hit the walkway.
Others	30.	Climate change, inter- national impacts	d	d	**During Construction and Operation**: There would be no construction works or operation activities which will cause climate change or cross-border impacts.

A+/-: Significant positive/negative impact is expected.
B+/-: Positive/negative impact is expected to some extent.
C: Extent of positive/negative impact is unknown. (A further examination is needed, and the impact could be clarified as the study progresses)
D: No impact is expected.

(Source: JICA Study Team)

(2) Implementation Plan of Preliminary Impact Assessment

Subjects which require further study are shown in Table 14.5.2. Its corresponding method of impact estimation is described on the right column of the table.

Table 14.5.2 Survey Summary of Present Condition in Candidasa and Southwest Coast

No.	Subject	Scoping	Present Condition
2.	Water pollution	**During Construction**: Turbidity of shallow water area becomes higher at the dredging point and sand nourishment area. **(b-)** Living coral distribution and the living status are summarized and described in a map of Candidasa. Dredging plan at this point is to be summarized. **During Operation:** Fine particles attached to the dredged sand will be washed out by tidal action and waves gradually to the shallow area for long period of time. **(b-)** Location summarized above will be utilized for assessment.	Distribution of outer reef corals are summarized in Figure 14.5.2 Location of Reef Limestone, Figure 14.5.3 Hard Coral Coverage Ratio, Figure 14.5.4 Soft Coral Coverage Ratio, Photo 14.5.1 Fore Reef (Outer Reef/Reef Slope), Photo 14.5.2 Reef Flat, Photo 14.5.3 Reef Crest. Refer results for corals in reef flat in Table 14.5.3 Results of Coral Recognition Survey and Figure 14.5.6 Aerial View in the Eastern End of Candidasa.
5.	Noise/ vibration	**During Construction**: Dump trucks give noise impacts along the access road; and bulldozers are planned to be operated to push the sand into the water. The noise and vibration along the access road, nearby sand nourishment area are expected to occur. **(b-)** Land use of the hinterland is to be summarized in both the southwest coast and Candidasa coast.	In order to clarify impact vulnerability, land use of the hinterland in Candidasa and the Southwest coast is summarized as in Figure 14.3.3 Western Area of Candidasa, Figure 14.3.4 Central Area of Candidasa, and Figure 14.3.5 Eastern Area of Candidasa. Sand transportation routes are shown in Figure 14.3.3 for Candidasa, and Figure 14.4.3 Proposed Sand Nourishment Implementation Works for the Southwest coast. Distance between the construction site and hotel can be estimated from Figure 14.3.2 Cross Section of Alternative-3.
8.	Sedimentation	**During Operation**: Nourished sand may lose stability and be diffused to offshore area. No significant impact by sedimentation is foreseen at the southwest coast, but on the corals living in reef flat of Candidasa. Specific position of corals to be examined in this study. **(c)**	Results obtained for No.2. will be used for impact assessment.
10.	Biodiversity	**During Construction**: Coral clusters in the reef-flat area exist in Candidasa. Rare species may exist. **(b-)** **During Operation:** The same with No.8 above,biological survey should be conducted for searching rare species of coral. **(b-)**	Same with No.2. Results obtained for No.2 are used for impact assessment on corals.
13	Land Acquisition	**During Construction**: There would be no involuntary resettlement that will occur in Candidasa area and in the Southwest coast area by the proposed coastal conservation work plans. In case of implementation of setback in Candidasa, facilities/buildings will be removed in exchange for creating beach area. The choice is selected by the owners/investors of the hinterland area. **(b-)**	The same survey results as No.5 will be utilized to impact assessment.
16.	Employment/ income source/ regional economy	**During Construction**: Dredging activity will change the sea bottom environment in the offshore area, especially on shellfish. This activity may require alternation of fishing practices at nearby area. Fishing activities are studied. **(c)**	Fishing activities in offshore areas are summarized in Table 14.3.3 Fishing Activities in the Dredging Area for Candidasa and Table 14.4.3 Fishing Activities in the Dredging Area is for the Southwest Coast.

No.	Subject	Scoping	Present Condition
17.	Land Use/ natural resources	**During Construction**: Marine fishery resources may receive impacts by sand dredging activities. The scopes are same with No. 16 above. **(c)**	Ditto
21.	Unfair distribution of cost and benefit	**During Construction**: In the southwest coast, sand of the offshore area of Kuta is planned to be dredged and conveyed to Legian and Seminyak area. This may lead to inter-community argument, such as the Nusa Dua community denounced sand dredging in Phase-I. Fishermen in Kuta may also feel discontent. **(c)** Likewise No.12 above, stakeholders' meeting with Kuta traditional village and fisherman's association to be held for the southwest coast.	Fishing grounds are surveyed as in No.16 above. Likewise, the stakeholders' meetings were held in Candidasa and the Southwest coast. In stakeholders' meeting, the outline of the conservation plan, the environmental impacts, and the mitigation measures were explained and discussed. Refer Appendices 14.1.1-14.1.3 for the detail.
22.	Social conflicts	**During Construction and Operation**: The same with No.21 above. **(c)**	Ditto
29.	Accidents	**During Construction**: Since construction vehicles will share hinterland roads with tourists, possibility of accidents will be higher. **(c)** Outline of access road in implementation plan is summarized.	Refer access road alignment for sand transportation in Figure 14.3.6 for Candidasa, and Figure 14.4.3 Proposed Sand Nourishment Implementation Works for the Southwest coast.

(Source: JICA Study Team)

(3) Results of Impact Assessment Study

a) Impacts on Corals (in relation to No.2 Water pollution, No.8 Sedimentation, and 10. Biodiversity, in Table 14.5.2)

Living coral is concentrated at the outer reef (fore reef) area (Figure 14.5.1). Coral reefs at this area, in Candidasa, are supported by clear water, waves and currents. (Source: Environmental Status in 2010 Bali Province). On the other hand, reef crests and inner reefs (reef flat) support less favorable living condition for corals.

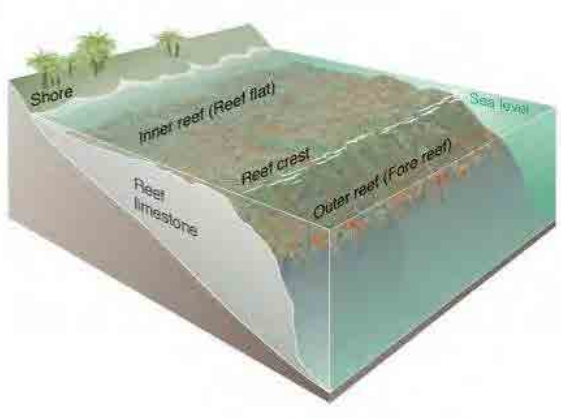


Figure 14.5.1 Cross Section of Typical Coral Reef

(Source: BALAI)

i) Reef Edge (Reef Lime Stone)

The position of reef lime stones is shown in Figure 14.5.2 with red mesh hatching, which is not a living coral, but made of limestone. Coverage ratio of living coral is shown in Figure 14.5.3 and Figure 14.5.4.

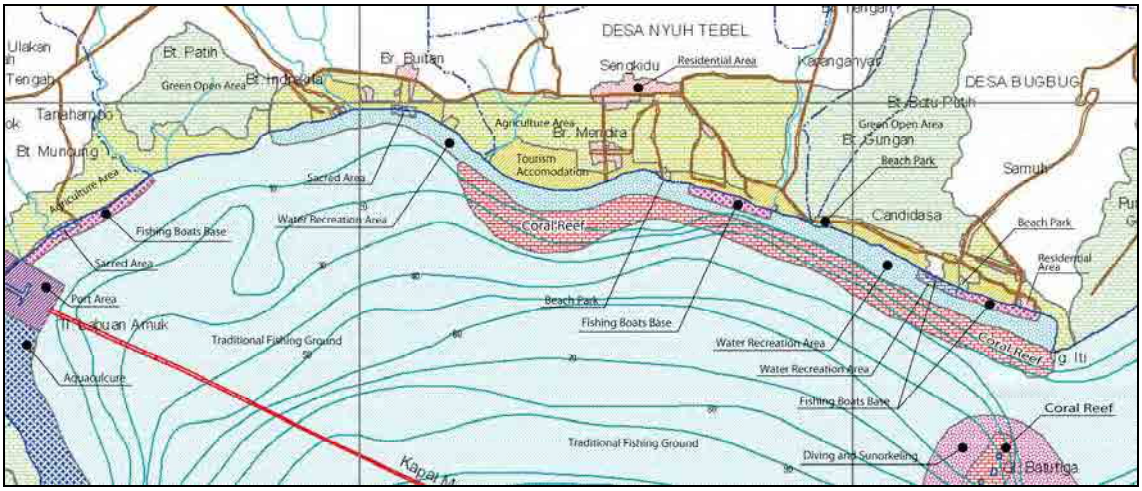


Figure 14.5.2 Location of Reef Limestone

(Source: National Demonstration Project, Integrated Coastal Zone Management, Bali Southeast, Utilization Zoning Map Area, Marine and Coastal District. Karangasem, Padanbai-Candidasa, Bali Province)

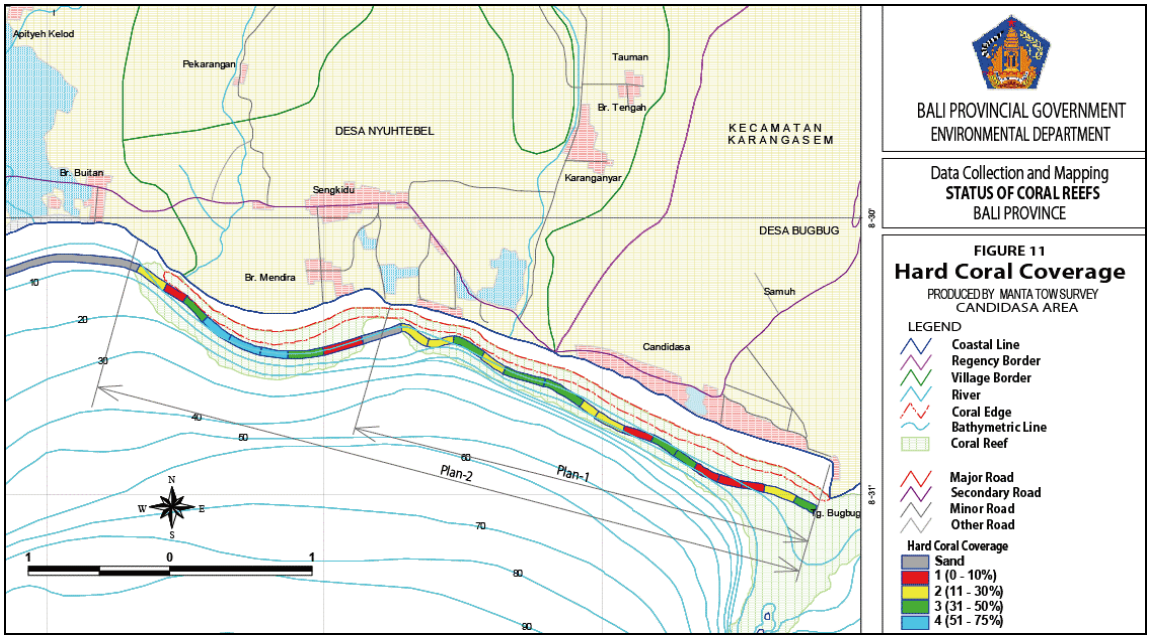


Figure 14.5.3 Hard Coral Coverage Ratio

(Source: Bali Provincial Government Environmental Department)

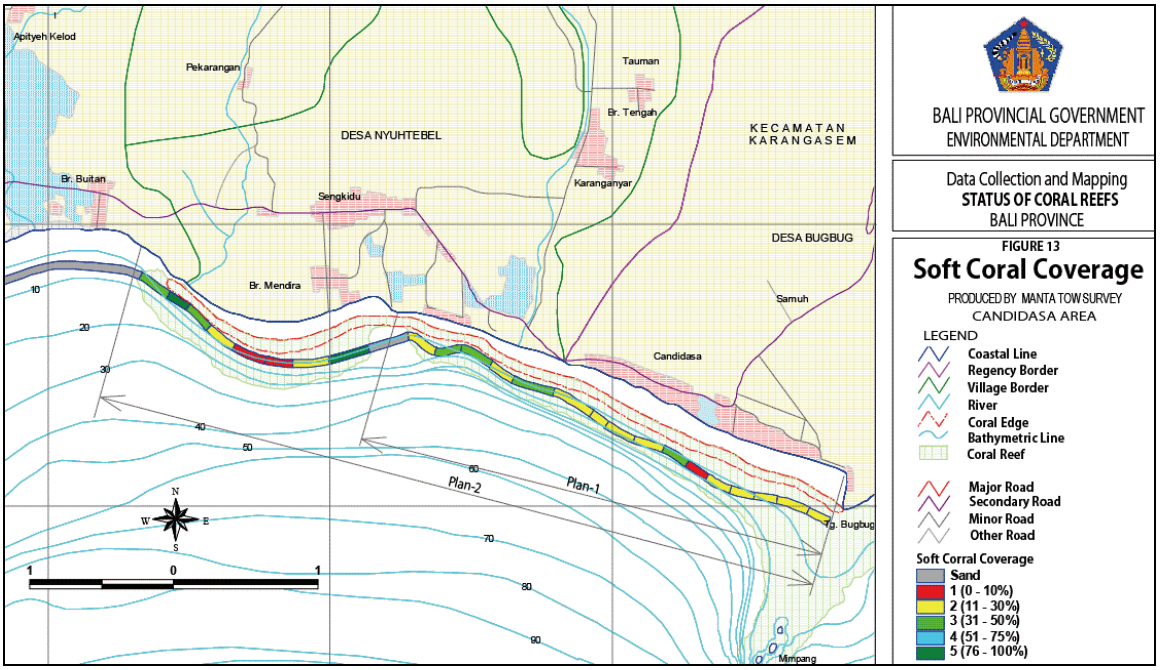


Figure 14.5.4 Soft Coral Coverage Ratio

(Source: Bali Provincial Government Environmental Department)

Photo 14.5.1 Fore Reef (Outer Reef/Reef Slope)

Photo 14.5.2 Reef Flat

Photo 14.5.3 Reef Crest

(Source: JICA Study Team)

[Summary of Fore Reef Corals Distribution]

- Corals live in high density water areas, mostly at the ocean side of fore reef.
- Reef crest and reef flat are not favorable living environment for corals.

ii) Distribution of Reef Flat Corals

Although living corals are mainly attached to fore reef in Candidasa, dense coral habitats are also observed in reef flat areas. There are clusters of corals attached to some breakwaters in good condition. The following are the results of the survey on corals in reef flat.

[Objectives]

- To identify the existence of corals attached on the breakwater.
- As baseline data for the marine engineer considering the re-design of breakwater on the next project.

[Conducted survey]

- Survey area: 28 structures in Candidasa reef flat (Figure 14.5.5).
- Survey date: from end of February to middle of March 2012
- Survey method
  - ⇒ Visual survey for all structures in the survey area during low tide
  - ⇒ Visual survey conducted by snorkeling, taking picture by using underwater camera and recorded in underwater papers
  - ⇒ Coverage is recorded by cover ratio (%) of corals on structures
  - ⇒ Types of corals were classified into four as shown in Photo. 14.5.4.

Figure 14.5.5 Locations of Survey Points

(Source: JICA Study Team)

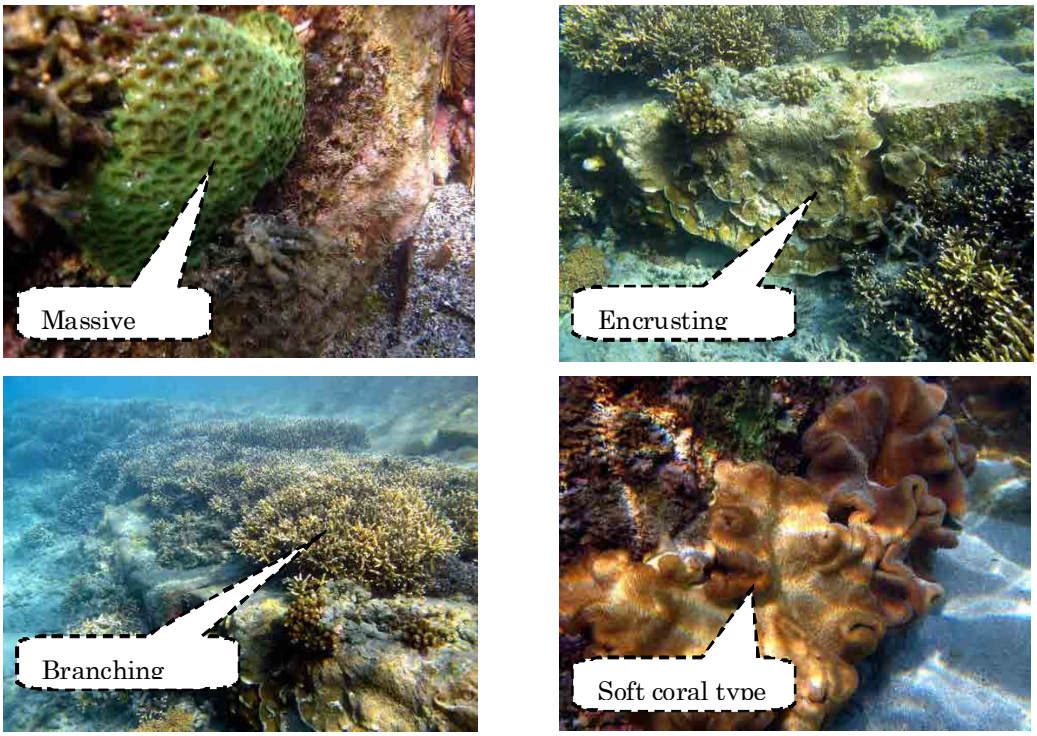


Photo. 14.5.4 Types of Corals Observed in Candidasa

(Source: JICA Study Team)

[Survey results: Distribution of reef flat corals]

- The existing corals attached on the breakwater/groin are found only in the eastern area of Candidasa, especially in front of Puri Bagus Hotel to the front of Candidasa pond, maximum percentage of coral coverage is approximately 85% at breakwater No.5 (Table 14.5.3, Figure 14.5.6).
- There is no attachment coral on breakwater No.13 to No.28 in the western area of Candidasa (Figure 14.5.7).

Table 14.5.3 Results of Coral Recognition Survey

No.Groin	Types of Breakwater or Groin	Type of coral				Coverage (%)
		Massive	Encrusting	Branching	Soft coral	
1	Crooked Breakwater	√	√	√	√	< 10 %
2	T-Groin with concrete tube shape	√	√	√	√	< 10 %
3	Straight breakwater	√	√	√	√	< 5 %
4	T-Groin with concrete tube shape	√	√	√	√	< 17 %
5	Straight breakwater	√	√	√	√	< 85 %
6	Straight breakwater	√	√	√	√	< 35 %
7	T-Groin with concrete tube shape	√	√	√	√	< 44 %
8	Straight breakwater	√	√	√	√	< 46 %
9	T-Groin with concrete tube shape	-	-	-	-	0%
10	Straight Breakwater	√	-	-	-	< 1 %
11	T-Groin with concrete tube shape	√	-	-	-	< 4 %
12	Straight Breakwater	√	-	-	-	< 4 %
13	T-Groin with concrete tube shape	√	-	-	-	0%
14	F-Groin with andesit construction	-	-	-	-	0%
15	Y-Groin with andesit boulder construction	-	-	-	-	0%
16	Extension F-Breakwater with andesit construction	-	-	-	-	0%
17	T-Groin with concrete tube shape	-	-	-	-	0%
18	Straight Breakwater	-	-	-	-	0%
19	T-Groin with concrete tube shape	-	-	-	-	0%
20	Straight Breakwater	-	-	-	-	0%
21	Sphere and straight Breakwater	-	-	-	-	0%
22	Straight Breakwater	-	-	-	-	0%
23	Sphere and straight Breakwater	-	-	-	-	0%
24	Sphere and straight Breakwater	-	-	-	-	0%
25	Sphere and straight Breakwater	-	-	-	-	0%
26	Sphere and straight Breakwater	-	-	-	-	0%
27	Sphere and straight Breakwater	-	-	-	-	0%
28	Sphere and straight Breakwater	-	-	-	-	0%

(Source: JICA Study Team)

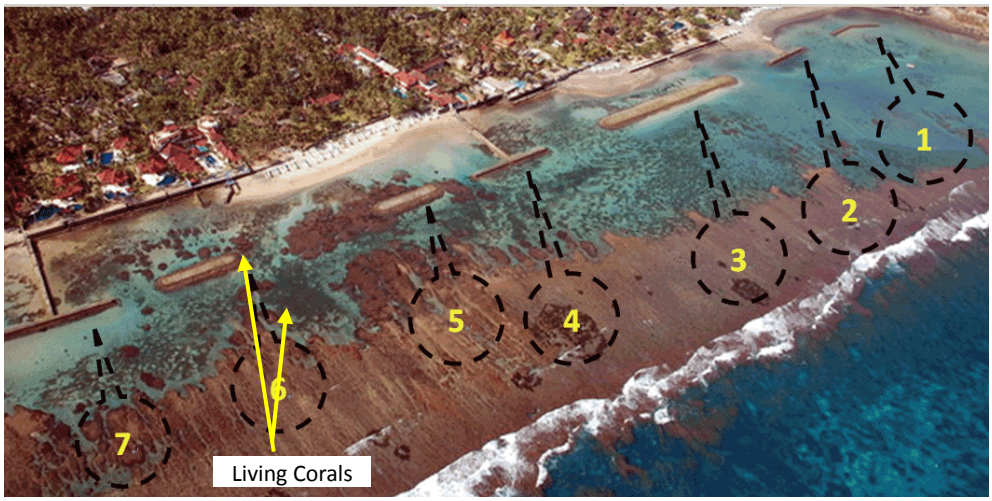


Figure 14.5.6 Aerial View in the Eastern End of Candidasa

Living corals are observable in limited areas between breakwater No.5 and No.6

(Source: JICA Study Team)

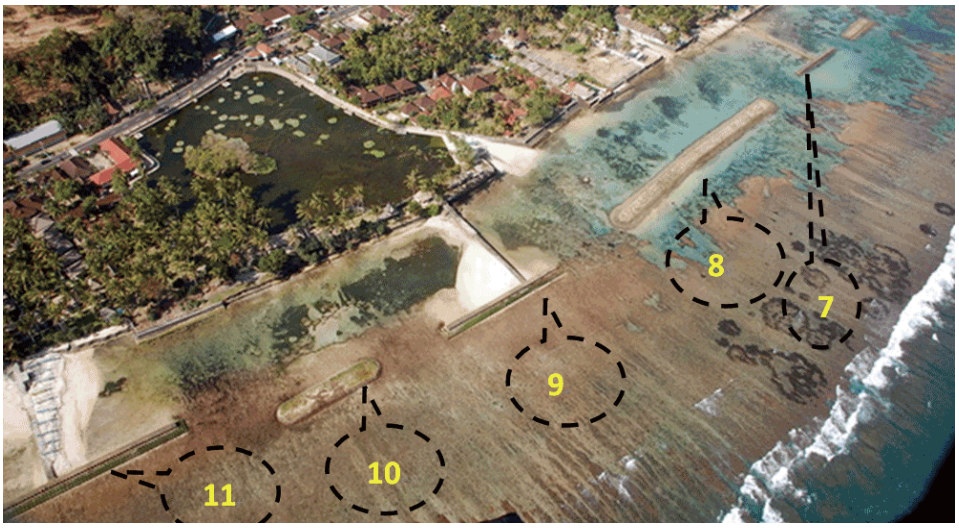


Figure 14.5.7 Aerial View of the Area in between Breakwater No.7 to No.11

Coral is not observable around groin (No.9) and in the west

(Source: JICA Study Team)

iii) Expected Impacts of Sand Dredging on Living Coral

Expected impacts on corals at fore reef and reef flat are summarized in Table 14.5.4.

Table 14.5.4 Expected Impacts on Corals

Location of Coral	Expected Impacts
Fore reef	➢ Sand nourishment works will not give profound impacts on corals because abundant sea water from offshore areas is always supplied. Waves and currents at the coast of Candidasa are coming from the southern to eastern direction, and provide seawater to the corals at ocean side of the reef edge. Current speed declines rapidly at the reef crest, so as the incoming current to reef flat. Abundant water is supplied to fore reef corals, but less to the corals inside of the reef edge. Sand dredging activities may give impacts on coral reef at other areas such as near Padan Bai area, by continuous turbidity arises from dredging ship for three months. The transparency is more than 40m-50m all time.
Reef flat (lagoon)	➢ Sand nourishment will create 40 m- 50m wide sand bottom in the lagoon. Corals which live on breakwaters are buried or polyps get damaged due to friction caused by sand during high tide. ➢ Turbidity in reef flat water will be high after sand nourishment. Decreasing of incoming light will affect zooxanthella and eventually damage the host coral.

(Source: JICA Study Team)

b) Expected Impact on Fishing Activities (in relation to No.16 Employment/ income source/ regional economy, No. 17 Land Use/ natural resources, No.21 Unfair distribution of cost and benefit, and No.22 Social conflicts, in Table 14.5.2)

The offshore areas of the proposed sites, Candidasa, and the southwest coast are being utilized as fishing ground for local fishermen. Although the number of fishermen numbers 150 in Candidasa and 180 in the southwest coast area approximately, these fishermen are shifting

their income source from fishing to tourist services such as rocker renting, provision of various marine sports equipment, pleasure boat navigation for visitors of Candidasa and Kuta beaches.

Lobster fishing at the offshore area of Kuta is not practiced extensively as it is in the Canggu area, therefore, the impacts on benthic fishes are negligibly small.

Table 14.5.5 Expected Impacts on Fishery and the Remedies

Location of Fishery Ground	Expected Impacts and Mitigation Measures
Pelagic fish	High turbidity at dredging area will occur at the offshore of Kuta (2 km-5 km from the shore), as shown in Figure 14.5.9, but the duration is less than a month and pelagic fish will move away from the dredging area. The impact is insignificant, however, the perception of the fisherman with this project is crucial. If it is less than 4 miles (6.44 km) from the shoreline, understanding on the dredging plan by Badung Regency (for the southwest coast area) or Karangasem Regency (for Candidasa) is also necessary together with fisherman, since the concession rights will be given by the regency.
Shellfish (southwest coast only)	The proposed dredging area is not the main fishing ground of lobsters. Significant impacts on its habitat are not expected since lobster juveniles are grown in coral reef habitats and move out to the offshore area. Fisherman can set basket in other areas.

(Source: JICA Study Team)

c) Resettlement and Land Acquisition (in relation to No.13 Land Acquisition)

➢ Resettlement

Involuntary resettlement will not occur in both Candidasa and the southwest coast. It is illegal to live in a land in between the shoreline of high sea water level and 100 m from the shoreline by Indonesian Law, which is declared as a public land (No.27/2007 on Management of Coastal Zone and Small Island). In fact, there are many encroachments to the coastal line, especially along the tourist area, including Candidasa.

The proposed conservation measure in Candidasa requires land behind the protection line by 12 m in some parts of Candidasa. However, officially and unofficially, there are no residents living behind the protection line in the entire stretch (Figure 14.5.8).

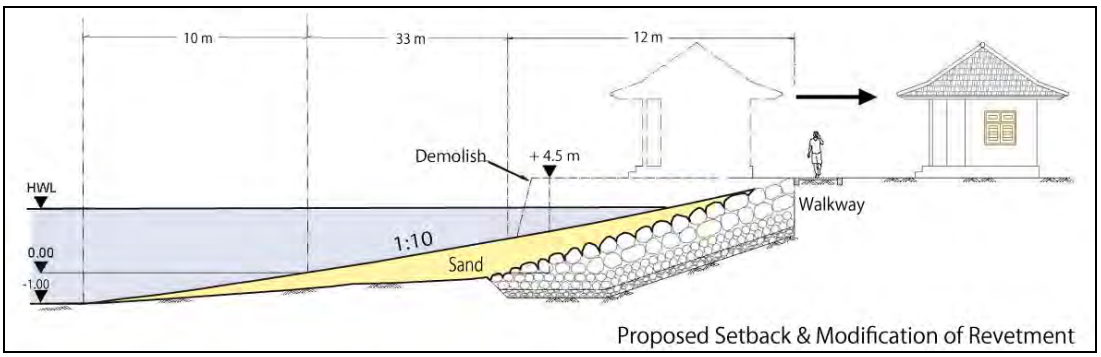


Figure 14.5.8 Modification (Setback) of the Protection Line

(Source: JICA Study Team)

- Land Acquisition

Land acquisition will not occur either in Candidasa and the southwest coast. Since the proposed setback plan may not be acceptable for all tourism business owners who built their facilities directly behind the protection wall, the protection line will be determined through consultations with individual land owners. The maximum extent of land acquisition for Alternative 1 (3.1 km) is 3.72 ha. and 6.12 ha. for Alternative 2 (5.1 km). Setback will be implemented only with an agreement that land will be used for the project without any compensation.

d) Noise and Vibration (in relation to No.5 Noise and Vibration)

Sand nourishment works in the Southwest coast is further than 50-70m to the hotels in the hinterland (Figure 14.4.2). Since the sand is planned to supply from the ocean side, noise and vibration is negligible; whereas sand nourishment works and construction of walkway in Candidasa are likely to disturb the atmosphere of tourists resort area (Figure 14.5.8). Many tourists' facilities are built in high density just behind the shore in Candidasa (Figure 14.3.3-5). In addition, sand is planned to unload at temporary port facility, and then transported by dump trucks along the community road (Figure 14.3.6). Although it is necessary to push sand out from the land side for suppressing turbidity purpose, tourists' facilities along sides of access road will receive impacts by noise and vibration from the trucks.

e) Accidents (in relation to No.29 Accidents)

For the Southwest coast, sand is directly supplied from the ocean side; thereby construction yard can be separated from the residents and tourists. However, in Candidasa, community roads will be utilized for sand transportation. Although disembark point and transportation routes are not designed in detail at this point, it increases traffic of the area. However, since the road is a trunk line along the eastern coast of Bali Island, and thus it does not have significant impacts on the present usage and the chance of accidents in the community (Figure 14.3.6).

(4) Examination of Mitigation Measures

a) For turbidity problem on fore reef corals in Candidasa (in relation to No.2 Water pollution, No.8 Sedimentation, and 10. Biodiversity, in Table 14.5.2)

- Careful selection of sand dredging location

Selection of sand dredging area should be carefully chosen; the location of coral reef and oceanic current should be taken into consideration when choosing the points.

- Selection of sand dredging method

Dredging method that disturbs less will be selected, such as bucket type dredger that is equipped with screen according to the necessity (Figure 14.5.9). The capacity is usually smaller and takes time than suction types, but it can dredge dredging points precisely.

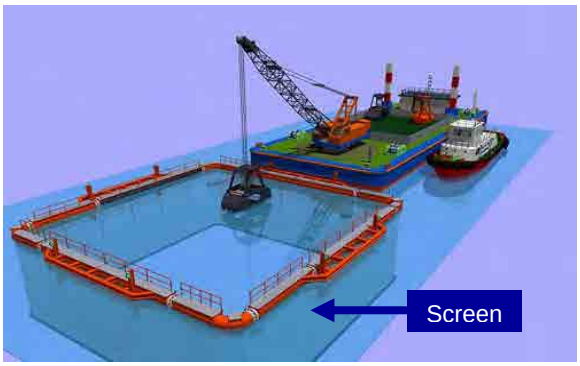


Figure 14.5.9 Bucket Type Dredger Equipped With Screen

(Source: BALAI)

b) Sand coverage problem for corals in Candidasa lagoon (in relation to No.2 Water pollution, No.8 Sedimentation, and 10. Biodiversity, in Table 14.5.2)Transplant Corals

Removal of corals attached on breakwater No.5 and No.6 should be carefully studied after completing the specific dimension of protection facilities at the section. Since there is already a good sandy section behind the breakwater No.5 and No.6; it may be due to the living corals and the existing breakwaters are ideally functioning as the wave dissipating structures. If removal of the corals is required by the plan, coral transplantation, as the mitigation measure, should also be considered together with Balinese experts, such as Reef Check Foundation. If all corals are required to transplant, the extent is about 1.1 ha. Following laws should also be considered in this case. First, Bali government banned coral mining by Law PP No. 10/1983 since 1985; and second, Law No.5/1990 regarding Conservation of Living Resources and their Ecosystems restricts coral exploitation. In addition, Regulation of Environmental Minister, No.11/2006, Attachment-A addresses that a project including "cut of the coral reef in all quantities requires EIA." Therefore either to remove or to leave corals as they are should be carefully considered together with legal advice with Bali Province Environmental Agency.

Direct discharge from pressured pipe or ship should be avoided. Pushing sand out from the land is more preferable than direct discharge in order to decrease turbidity.

Photo 14.5.5 Direct Discharge of Sand by Pipe

Photo 14.5.6 Direct Discharge of Sand by Ship

(Source:BALAI)

- Installation of separation screen

Installation of separation screens in order to confine turbid water should be considered.

Photo 14.5.7 Separation Screen for Preventing Turbidity Diffusion

(Source:BALAI)

- Layout Plan

Overall layout plan of breakwater and sand nourishment area should be considered for living coral on adjacent breakwater No.5 to breakwater No.6. Since there is a sandy beach behind breakwaters No.5 and No.6 already. Specific design according to the characteristics of the location should be considered.

c) Disturbance on fishery by dredging activities (in relation to No.16 Employment/ income source/ regional economy, No. 17 Land Use/ natural resources, No.21 Unfair distribution of cost and benefit, and No.22 Social conflicts, in Table 14.5.2)

- Selection of appropriate dredging area
- Balai should consult first the fisherman's association and responsible offices of Karangasem and Badung districts before making a dredging plan for choosing the month, specific location, and provide dredging implementation information to fisherman association.
- Selection of appropriate dredging method
- The same with mitigation measures for impacts on corals.
- Formulation of appropriate dredging plan
- Balai should limit the amount of sand to be dredged at appropriate level, and shorten the duration of dredging and sand nourishment as possible.

d) Disturbance on hotels by noise, vibration of through trucks, and leveling machineries (in relation to No.5 Noise and Vibrations and No29 Accidents, in Table 14.5.2)

- Transporting routes should be carefully examined and planned with stakeholders in order to decrease impact of noise and vibration
- Good understanding of stakeholders on the working period, method, and impacts (the best possible work plan, expected noise and vibration, and possibility of accidents) should be obtained.
- Safety education should be compulsory curricula for all workers including drivers and security personnel, and it should be mandatory item in the contracts with construction companies.

e) Land Acquisition (in relation to No. 13 Involuntary Resettlement and Land Acquisition, in Table 14.5.2)

- The same practices as Phase I beached are planned to be conducted. During detailed design phase, thorough discussions with each land owners will be held and agreements will be made. If agreement is not obtained, the section will not be the subject area for sand nourishment. However, since certain length is required for practical sand nourishment measure, cooperation among the adjacent hotels will be required for determining the suitable type of coastal protection measure.
- Land should not be compensated in order to be fair with all stakeholders, including Phase I beaches; however, the facilities being subjects for removal could be the subjects of negotiation for the compensation.

(5) Environmental Monitoring Plan

Monitoring is essential to assess the impact and effectiveness of the mitigation measures. The most important issues are: 1) turbidity at dredging site, 2) turbidity at sand nourishment site, 3) living conditions of corals, and 4) development of 'adopt system' for the beach maintenance, 5) process of consensus building, and 6) stability of nourished sand

In order to monitor the changes of the impacts, the methods shown in Table 14.5.6 are proposed. The responsible organization is the Ministry of Public Works which will serve as the project proponent.

Table 14.5.6 Draft Monitoring Plan

Responsible Organization:	Ministry of Public Works (BWS Bali-Penida: Balai)
Reported to:	*Environmental Agency, Bali Province, *Karangasem/ Badung Regency, and *JICA

1. Permits and Public Relations

Items	Items to be Monitored	Actions to Comply the Conditions	Results
Environmental permit	Conditions of providing environmental permit	To be filled in by project proponent (PP)	(PP)
Public participation	*System of redressing grievance *grievances	(PP)	(PP)

2. Water Quality of Sea Water

Parameter	Survey Results (Mean)	Survey Results (Max)	RI Standard (MOE No.51/2004)		International Standard		Location	Frequency of Reporting	Method of Survey
			Touri-sm	Bio-logy	Touri-sm	Bio-logy			
pH	(PP)	(PP)	7 - 8.5	7 - 8.5	7.8 – 8.5*	7.8 - 8.5*	Dredging site, nourished site Attached location map	During construc-tion (Everyday) After comple-tion (Every month)	To be deter-Mined by PP
Turbidity (NTU)	(PP)	(PP)	<5	<5	-	-			ditto
Trans-parency	(PP)	(PP)	-	-	0.5 m<**	-			
Suspended solid (mg/l)	(PP)	(PP)	20	20 (Coral)	-	-			ditto

* For recreation, Class-1 aquaculture, natural environment
**Water quality C, MOE Japan

3. Natural Environment

Parameter	Mitigation Measures	Description of Status (Type, Coverage%)		Location (Fore reef, Reef flat)	Frequency of Reporting	Method of Survey
		Baseline	After construction			
Impacts on corals	(PP)	(PP)	(PP)	(PP)	(PP)	Overall observation on 5*5 m quadrant
Impacts on sea grass	(PP)	(PP)	(PP)	(PP)	(PP)	ditto

4. Social Environment

Parameter		Status		Location	Frequency of Reporting	Method of Survey
		Baseline	After construction			
Impacts on income source	Business	Individual income	←	(PP)	(PP)	(PP)
	Fisherman	Individual income	←	(PP)	(PP)	(PP)
Noise & Vibration	Business along shore	(dB) during construction/ before construction	←	(PP)	(PP)	(PP)
	Business road side	(ditto)	←	(PP)	(PP)	(PP)
Land acquisition		Land owner/ record of discussion/ agreements	←	(PP)	(PP)	(PP)
Social conflicts (Sand dredging in Kuta, Fisherman in Kuta and Candidasa)		Opinions in stakeholders Meeting	←	(PP)	(PP)	(PP)
Record of grievance redressing		(PP)	(PP)	(PP)	(PP)	(PP)

(Source: JICA Study Team)

(6) JICA Checklist

Category	Particular	Question	Y/N	Justification and Mitigation Measure
1. Approval and Gaining Understand-ing of Stakeholders	(1) Approval of EIA and other environmental permissions	(a) Was ANDAL and RKL, RPL reports are compiled?	N	Study in this phase had just completed the selection of coastal area, type of protection measures, and the approximate scale. EIA, based on the Republic of Indonesia was not conducted in this stage.
		(b) Was the environmental certificate issued by a responsible agency?	-	EIA not yet done
		(c) Are there any conditions for approval of the EIA report? If there are, will these conditions be satisfied?	-	EIA not yet done
		(d) Are there other approvals necessary in the field of environmental concern?	-	Approval is necessary for offshore sand dredging. The responsible organizations are: districts (less than 4 miles from the shore) and provinces (between 4-12 miles)
	(2) Explanation to local stakeholders	(a) Were the outline of the project and the assessment of environmental consequences disclosed to the local stakeholders? Was their understanding obtained?	Y	Local stakeholders' meetings are held for Candidasa and for southwest coast area.
		(b) Comments from local stakeholders reflected to the project design?	Y	Representatives of tourism industry, fishermen, and the residents have affirmative opinions for the project proposal. Since specific structures are not discussed yet in Candidasa, where "setback" of protection line is proposed, careful discussions with individual landowners are indispensable for the process of final design determination.
	(3) Study on project alternatives	(a) Were other alternative plans compared by environmental and social impacts?	Y	Multiple alternatives including no project are studied for both Candidasa and the southwest coast.
2. Pollution	(1) Water quality	(a) Does discharged water from the facilities meet environmental and effluent standards of the Republic of Indonesia?	-	Facilities which discharge effluent are not planned in this project.
		(b) Does discharged water from the vessels and attached facilities meet the environmental and effluent standard of the Republic of Indonesia?	-	Ships, except fisherman's boat, will not be used in the area. Other port facilities are not planned.
		(c) Are measures for preventing proliferation of oil and toxic substances into surrounding water body taken?	-	Facilities which discharge oil and/or toxic substance will not be introduced.
		(d) Will changes in water temperature or water quality occur by the disruption or changes of shoreline current?	Y	Present condition of stagnant sea water will be improved due to wider openings between the groins after project implementation. Existing detached breakwaters and T-shaped groins are planned to be removed in Candidasa.

Category	Particular	Question	Y/N	Justification and Mitigation Measure
		(e) Will mitigation measures for degrading water quality by sand nourishment be designed and implemented?	Y	Silt particles stuck on the sand grains will be washed and will flow out to the sea water and turbidity of shore line water will be higher for long period of time. This can be reduced by separation filter and/or separation of silt before nourishment.
	(2) Solid waste	(a) Will preventing measures for water degradation by disposing of excavated sand be implemented according to the standard of the Republic of Indonesia?	-	Dredged sand will not be disposed anywhere, but higher turbidity during sand nourishment works and after completion are expected.
		(b) Will measures for preventing toxic substances proliferation be implemented?	-	Toxic substances will not be produced or discharged from the project facilities.
3. Natural Environment	(1) Preservation district	(a) Is the project site located in protected area which is determined by law or international treaty? Or these protected site will receive any influence from the project?	N	Both project sites, Candidasa and the southwest coast are designated as strategic tourist area. These coasts are coastal conservation area for tourism but not preservation area for biological diversity. There is no biological preservation area in the adjacent area.
	(2) Bio-diversity	(a) Does the project site include biologically important environment such as primitive forest, tropical forest, coral reef, mangroves, or tidal flat?	Y	Lively corals are attached on the ocean side of the reef front. There are almost no corals at the reef top and reef flat, except corals attached on groins. Impacts on corals of ocean side are not expected; however, the corals at the groins will be transplanted.
		(b) Is there a habitat of protected living species which is determined by law or international treaty?	N	There is no protected species in the project site.
		(c) If significant impact is expected by the project, will measures for preventing or decreasing impacts on the living environment of the protected species be implemented?	-	Significant impacts on corals are not expected due to the reason stated in 3.(2)(a) above.
		(d) Is there any possibility that the project will affect the biological habitat in shallow water?	Y	Corals of Candidasa are stated in 3. (2) (a). Sea grass will be buried by the sand which will be nourished by the project. Further study on the importance of the sea grass is required. The southwest coast is a part of long beach, facing the open ocean. There is no sea grass at the sea bottom. Since the oceanic environment is uniform, fishes can choose other places if turbidity is temporary high. No significant impact is expected.
		(e) Is there any possibility that the project will affect the flora and fauna along the shoreline? If there is, any mitigation measures will be taken?	Y	-do-

Category	Particular	Question	Y/N	Justification and Mitigation Measure
	(3) Water flow	(a) Will the project affect littoral current, waves, or oceanic current?	N	No impact is expected due to the sand nourishment. Wave energy will be decreased but this is the main purpose of the structure in Candidasa, and it is not an adverse impact but positive one. Oceanic current will not receive any impact because the structures are at the coastal line area.
	(4) Topography and geology	(a) Will sand nourishment project modify topography or geology in large scale? Will decreasing of natural coastal line occur?	N	There is no significant impact since sand nourishment is a project to recover the natural sandy beach which used to exist before. Sand dredging is planned to take surface sand to the depth of 1 m in sand accumulated area. Since it is sand accumulated area, the sand will be accumulated again naturally.
4. Social Environment	(1) Involuntary resettlement	(a) Will involuntary resettlement occur by the implementation of the project? If it will, are there any mitigation measures for the resettlement be implemented?	N	Nobody is living in the specific project site, and resettlement is not required.
		(b) Will appropriate compensation and plan for rebuilding of livelihood be explained prior to the resettlement?	-	There is no need for resettlement
		(c) Will social survey and resettlement plan be implemented, which include appropriate compensation and restoring of income source, be formulated?	-	〃
		(d) Will compensation fee be paid prior to resettlement?	-	〃
		(e) Will the compensation policy be agreed upon documents?	-	〃
		(f) Is the resettlement plan paying full attention to women, children, elderly, low income group, and indigenous people?	-	〃
		(g) Will project proponent and the resettlers agree on the resettlement plan prior to the resettlement?	-	〃
		(h) Will arrangement of organizations regarding implementation of appropriate resettlement be formulated? Will the organizations have appropriate capabilities and budget?	-	〃
		(i) Will the monitoring plan on impacts of resettlement be formulated?	-	〃
		(j) Is grievance redress system formulated?	N	There is a possibility of removing business facilities with an agreement of landowner. Grievance redress system will be formulated after the specific design is determined. The setback option will be implemented if the landowner provides land for beach.

Category	Particular	Question	Y/N	Justification and Mitigation Measure
4. Social Environment (Cont'd)	(2) Living environment and income source	(a) Does the project affect the residents' living environment? Will mitigation measures be implemented, if necessary?	N	No significant impacts are expected since residential area is not at the proximity. The location of the project site is at the shoreline, and the biggest beneficiaries are the owners of the business facilities at the hinterland.
		(b) Will the project affect the utilization of the water surface, and their economic activities as a consequence?	N	Fisherman's boat used moor on the sandy beach but they will not be able to use it now. Cultural ceremony also can come back on the beach. Sand nourishment has strong positive impacts on fisherman, traditional culture, and above all, tourism.
		(c) Will the project affect land and sea transportations of the surrounding area?	N	Sand nourishment will not interfere the transportation of fisherman's boat. There are no other transportations in the area.
		(d) Is there a possibility of wide spreading of transmitting diseases (including HIV-AIDS) due to the incoming population along the civil works implementation? Will appropriate measures on public sanitation be taken?	N	Both project sites are the most popular tourist areas in Bali Island. The society is accustomed to receive large number of population inflows. The increasing number of population by the entry of construction workers are negligibly small.
	(3) Historical/ archaeological site	(a) Is there any possibility that the project will disrupt archaeological, historical, cultural, or religious site? Any measures designated by laws of the Republic of Indonesia will be taken?	N	There is no archaeologically, historically, culturally, and religiously important sites in the project site.
	(4) Aesthetics	(a) Will the project affect the surrounding aesthetic scenery? Will appropriate measures be taken if there would be an impact?	N	The aesthetic beauty of Candidasa has been lost together with sandy beach and beach encroachment by the hotel businesses. This project aims to recover the original scenery by sand nourishment. The southwest coast is the same except there is no encroachment by the hotels.
	(5) Minorities/ indigenous people	(a) Will there be any measures to mitigate impacts on minorities, the culture, and livelihood of indigenous people?	N	There are no minorities or indigenous people.
		(b) Will the rights of minority and/or indigenous people, such as land and resources, be respected?	-	〃
	(6) Laborers' environment	(a) Will laws of the Republic of Indonesia on working environment applicable to the project, be respected?	Y	Law No.13/2003 regarding working environment of construction is applicable to both private and government cooperatives. Government employees should follow Law No.8/1974 regarding government employee.
		(b) Will physical measures, such as equipment, preventing construction accidents, and facilities for supporting management of toxic substance be provided?	N	Physical accident preventing measures will be written in the project implementation plan.

Category	Particular	Question	Y/N	Justification and Mitigation Measure
		(c) Will non-material measures for prevention of accidents, such as education and/or program of traffic safety and sanitation be provided?	N	Accident preventing measures in education and methodology will be written in the project implementation plan.
		(d) Will appropriate measures be taken for prevention of the security guards for the project, who may undermine security of the community?	N	Education for the construction related security agents will also be written in the project implementation plan.
5. Others	(1) Impacts during construction	(a) Will appropriate pollution control measures be implemented against noise, vibration, turbidity, suspended particles, and solid waste?	Y	Turbidity of the sea water near the shoreline will be higher by sand nourishment and washing out of silt particle by waves after the construction. Principal mitigation measure during implementation is to nourish the sand from land side. Separation filter should be installed if necessary. In addition, construction period should be as short as possible; and notification to the fisherman for the location of dredging is also important.
		(b) Will the construction activities affect the biological environment? Will mitigation measures be taken for the impact?	Y	There is significant impact on the corals which attached to groins and breakwaters in Candidasa. The corals should be transplanted if necessary
		(c) Will the construction activities affect the social environment? Will mitigation measures be taken for the impact?	Y	Since emission of noise is inevitable at the construction site during the period, duration and time to the hotel business in proximity should be notified and consulted. There is no impact on the beach because the beach is not usable at present. Mooring locations of the boats need to be relocated during construction.
	(2) Monitoring	(a) Will the project proponent will plan and conduct monitoring on the subjects which are estimated to have impacts by project implementation?	Y	Project proponent will conduct monitoring on dredging area during construction, wholesomeness, types, coverage ratio of corals, and sea grass at sand nourishment area. However, the specific locations, numbers of monitoring points, the depth will be determined after location of dredging area, facility design, and the types of facilities, if there are any.
		(b) What are the specifications of the monitoring such as monitored subjects, methodologies, and frequencies?	-	〃
		(c) Will sustainable monitoring activities (organization, personnel, equipment, and budget) by the project proponent be assured during the proposed period?	Y	Although the project proponent is the Ministry of Public Works, it is agreed by stakeholders meeting that integral management among provincial, local government, villages, and private business will be applied. Actual monitoring organization will be determined after monitoring plan is formulated.

Category	Particular	Question	Y/N	Justification and Mitigation Measure
		(d) Is reporting plan which includes responsible person/organization and frequencies of the monitoring results determined?	N	Ministry of Public Works will report to Bali Province Environmental Agency and Karangasem District (for Candidasa) / Badung District (southwest coast). Reporting frequencies will be determined in monitoring plan which will be formulated in facility plan and implementation plan. The Ministry of Public Works needs to obtain agreement of Bali Province Environmental Agency.

Note 1: If there is a large gap between the law of the Republic of Indonesia and international standard, remedies shall be planned as needed. If there is a subject without control standards,

Other appropriate standards (including the Japanese standards) will be compared and applied with reasonable justification.

Note 2: This list is a modification of JICA checklists, specifically formulated for the project

Recommendation

(1) Review of the Beach Monitoring and Maintenance System on Phase-1

a) Continuous support for beach management activities in the viewpoint of long-term basis through the scheme of "soft component " during the Phase-2 Project

As one of the results of this study, it was proposed and agreed to establish the "Coordination Team for Beach Management (TKMPP)" to make a decision and control the beach management of the Phase-1 Project beaches in cooperation with public and private sectors. However, Indonesia has no experience in beach management system until now, and this is the first trial for a beach management system to be conducted. Considering the current actual conditions for beach management in Indonesia, technical know-how is absolutely insufficient. Continuous support is surely required. Two kinds of support are mainly required on beach management, i.e., 1) capacity development to obtain technical skills in "adaptive management system" to manage the sandy beach and 2) capacity development for beach management and control. Beach management is to be run by the Indonesian themselves. Continuous support in the point of long-term basis is still required. To achieve this, it is strongly recommended to carry out a continuous and long-term basis capacity development through the scheme of "soft component" during the Phase-2 Project.

b) Technical assistance until the time the "Coordination Team for Beach Management (TKMPP)" can independently operate well.

According to the agreement which was obtained in the working group meeting (WG3) in this study, the local governments of Bali will take a necessary action for the establishment of the TKMPP. Furthermore, after the establishment of TKMPP, the Indonesian government promised to continue the discussion for required issues on beach management, such as sharing of the responsibility for each management item, budgeting which is required to conduct the beach maintenance, legalization for necessary beach rule, etc. However, it is uncertain whether the Indonesian government can operate by themselves without any support from JICA. Taking into consideration the actual condition, it is recommended to consider some assistance to be provided to the local governments and BWS-BP who are the main players of beach management and maintenance.

c) Cooperation with Coastal Research Center with BWS-BP to support the technical part

It is planned that the Institute of Coastal Research Center of the Ministry of Public Works will move from Bandung to the new laboratory situated at north of Bali, and start the research work by next year. This institution shall become the top organization who will manage and handle all technical matters on coastal engineering in the Ministry of Public Works. Loka Pantai is the primary organization already doing coastal research works at north of Bali. However, it seems that their main works now are mainly focusing on research work based on laboratory and small-scale field test, not emphasizing on the actual practical problems of the coastal fields including the issue of beach management. As mentioned several times in this report, "Adaptive Management System", which is a cyclic system based on monitoring, evaluation, planning, and execution, is strongly required for the nourished beach management. There will be no success on beach management without fully understanding the system. The "lessons learned" based on the actual problems on the site is required to obtain adaptive management skills. According to the agreement for the establishment of TKMPP, BWS-BP shall take care all the technical part on beach management. However, it is anticipated to carry it out surely with appropriate judgment based on sufficient experience and skill for coastal engineering. Considering the abovementioned current conditions, it is recommended to cooperate with the Coastal Research Center to share the technical part together with BWS-BP. To have a sufficient experience and skill to manage the actual coastal problems, capacity development of the Coastal Research Center especially on the adaptive management system for the beach is strongly required through actual coastal practice.

d) Legalization for the definition of walkway and ownership of sand stock pile

One of the problems on beach management for the Phase-1 Project is the unauthorized boundary between public and private properties. Basically, the position of walkway is defined as the boundary between public and private properties. However, this definition has not been understood by both related parties due to the non-legalization of the walkway function. This has caused several illegal use and construction at the beach area which is under the control of the government. Based on this condition, it is recommended to legalize the function of the walkway to avoid further illegal beach use.

The sand stockpile was constructed at the south of Sanur in the Phase-1 Project. About 140,000 m^3 of sand has been stocked as the required sand filling for maintenance work of the Phase-1 Project beaches. During the four years after the completion of the Phase-1 Project, the stocked sand has been utilized for additional countermeasures at the north of Nusa Dua area with the order of 10,000 m^3, while most of the stocked sand still remain. Even though the ownership for the area of sand stockpile and usage of stock sand were already discussed and

agreed between the central government and related communities in Sanur, both the ownership and the usage of sand are unclear. The different understanding of the ownership and the usage for sand stock pile has appeared not only on the stakeholders side but also from the government side. This has caused unclearness and dissatisfactory individual planning for the use of the sand stock area and its stocked sand. An immediate discussion and authorization (if necessary) for the ownership and the usage of sand stockpile are recommended

e) Institutionalization of the buffer zone in the coastal area and clarification on the authorization and permission for construction at the beach area

Unsatisfied construction of permanent facilities such as buildings, seawalls, etc., for hotels, villas, restaurants, and communities were observed especially at the newly developing area for tourism (e.g., Candidasa, north Seminyak, Canggu). These constructions have sometimes affected the long shore sediment transport and induced new beach erosion problems. These problems were caused mainly by unclearness of the coastal buffer zone (beach riparian area) and unsystematic control system on the permission for construction at the coastal area. It is strongly requested that the institutionalization of the coastal buffer zone and clarification on the authorization and permission of construction at beach area be put in place. This issue is one the important discussion items in the TKMPP.

(2) Feasibility Study of the Phase-2 Project

a) Combined the implementation of beach nourishment and construction of coastal facilities as one package for Candidasa

There is an opinion from the Indonesian side that the implementation of beach nourishment in Candidasa will be separated from other implementation works such as the construction of revetments and groins. In this case, the implementation of beach nourishment will be separated from the loan project and conducted by the local contractor and will be supervised by the local consultant. As mentioned before, high attention to the coastal and marine environment is strongly required for the implementation of the project in Candidasa in order to secure the present coastal and marine conditions. The suitable construction method based on experience with high technology and appropriate supervision during the implementation work is strongly required. Furthermore, several heavy equipment such as barge, tag boat, etc., and countermeasures to mitigate the turbidity such as silt protector, etc., can be shared for the implementation of both beach nourishment work and construction of coastal facilities, if the implementation will be carried out as one package. This will achieve the effective use of equipment and reduce the cost of implementation. Taking into account these factors, it is recommended to do the implementation of beach nourishment and construction of coastal facilities at the same time as one package.

c) Consideration for additional sand stock during implementation stage in Phase-2 Project

It is difficult to find a sand source with suitable color and grain size specifications from the inland side. Thus, the seabed sand at the offshore area will be utilized as the material for beach nourishment as the same concept used in the Phase-1 Project. For the digging of sand from the seabed with a depth of more than 20 m, a specified dredger (trailer suction hopper dredger) with a sufficient pump capacity is commonly used. There is no such type of dredger with sufficient pump capacity in Indonesia. The opportunity for digging sand from the offshore area is very limited, and only during a big-scale beach conservation project like Phase-1 can it be utilized. On the other hand, the present stock sand will be utilized for beach maintenance for several years, and further stock sand will be required for future maintenance of the beach. Thus, taking advantage of the opportunity for the implementation period of the Phase-2 Project, it is recommended to consider the preparation of additional stock of sand.

d) Effective technical transfer during the Phase-2 Project (Necessity for the involvement of C/P into the consultant team as OJT)

Through the Phase-1 Project, it is a lesson learned that the effect of occasional opportunity on technical transfer such as workshop, seminar, short training in other countries, etc., which are common technical transfer methods, was limited mainly on capacity development. The most effective method for capacity development of the technical part is the involvement of selected C/P into the consultant team, where they will examine, do analysis, prepare technical document as one of the engineers in the consultant team. It is also recommended to put into practice such system during the detailed design and the implementation stage.