2-3 Obligation of Recipient Country

(1) Land Acquisition（for PHIVOLCS package）

1) Real-time Earthquake Monitoring System

The sites for the broadband strong motion seismometers and the strong motion seismometers are the existing earthquake monitoring stations. Since the sites for the strong motion seismometers are the existing manned stations and they are equipped with adequate land and buildings, it is not necessary for the land to be newly acquired. Regarding the sites for the broadband strong motion seismometers, some of the monitoring stations do not have enough land to install solar panels, and thus small piece of lands need to be secured. Equipment for the earthquake information system will be installed within the PHIVOLCS headquarters office or in its compound, land acquisition is not necessary, however, spaces for the new equipment is required to be secured.

On the other hand, concerning the earthquake intensity meters, they are assumed to be located at the mobile phone base stations and/or at the local government offices. PHIVOLCS needs to select the sites and to obtain necessary permissions from the land/facility owners of such sites.

2) Real-time Tsunami Monitoring System

Since the tsunami wave detectors and the tsunami data transmission stations will be newly established, it is necessary to acquire the lands for the equipment installation. Through the site surveys conducted during the field survey, the PHIVOLCS staff accompanied the JICA study team to all the candidate sites for tsunami monitoring and examined the possibility of obtaining permissions regarding use of the lands or the facilities for the equipment installation. Areas of approximately 2.0 meters square (4 m2) are required for the tsunami wave detector either on jetty, pier or revetment. About 6.0 meters square (36 m2) lands either on upland grounds or on reinforced concrete roof slabs of existing buildings need to be secured for the installation of tsunami data transmission stations. If there is appropriate land or existing facilities for the data transmission station is not available, a reinforced concrete elevated platform will be constructed and land around 6.0 meters square needs to be acquired for the platform.

While verbal agreements with the land / facilities owners regarding the use of the lands and/or the existing facilities are confirmed through the site surveys, PHIVOLCS will obtain written permissions for all the sites and submit such documents to the Japan side prior to the tender announcement.

As for the equipment for the tsunami information system, since each item will be installed within the PHIVOLCS headquarters office or in its compound, land acquisition is not necessary, however, spaces for the new equipment is required to be secured.

3) Tsunami Simulation Database Hardware

Land acquisition will not be required because of this hardware will be installed at PHIVOLCS headquarters office. However, installation area will be secured.

(2) Customs Clearance（for both PHIVOLCS and DPWH packages）

Prompt customs clearance of the products imported from Japan and/or third countries at ports of disembarkation in the Recipient country shall be facilitated by the Implementing Agencies for smooth implementation of the Project, and customs duties and other necessary taxes and charges shall be assumed by the Implementing Agencies.

(3) Tax Assumption（for both PHIVOLCS and DPWH packages）

Customs duties, internal taxes and other fiscal levies which may be imposed in the Recipient country with respect to the purchase of the products and the services as well as the employment of the Agent shall be assumed by the Implementing Agencies without using the Grant or its accrued interest.

(4) Expediencies（for both PHIVOLCS and DPWH packages）

Expediencies shall be granted to allow Japanese nationals and/or nationals of third counties, including such nationals employed by the Agent, whose services may be required in connection with the supply of the products and the services for such facilities, for their entry into the Recipient country and stay therein for the performance of their work.

(5) Proper Operation and Maintenance（for both PHIVOLCS and DPWH packages）

The products procured and installed by the Project shall be maintained and used properly and effectively for the implementation of the Project.

(6) Expenditure other than the Grant

All the expenses, other than those covered by the Grant and/or its accrued interest, necessary for the implementation of the Project shall be borne by the Implementing Agencies.

1) Inland Transportation, Installation and Adjustment Works in the Areas with Security Issues （for PHIVOLCS package）

As to the sites located in the areas that the MOFA has classified in their travel advice and warning as level 3, “Recommendation to defer travel”, or above, all the equipment will be handed over in PHIVOLCS headquarters, and then PHIVOLCS will implement inland transportation, installation and adjustment of the equipment.

2) Inland Transportation, Installation and Adjustment Works for Intensity Meters（for PHIVOLCS package）

PHIVOLCS will transport the earthquake intensity meters, which will be handed over at the PHIVOLCS headquarters, to each site and then install and adjust them at the sites. Installation and adjustment shall be done based on the installation manual and demonstration provided by the Supplier.

3) Inland Transportation for Mobile Drainage Pumps after Handing Over（for DPWH package）

The equipment will be handed over at the DPWH-FCSEC compound located in Pasig city, Metro Manila, and after handing over of the equipment, inland transportation from the DPWH-FCSEC to the target regions shall be carried out by DPWH at its own costs. DPWH is also responsible for vehicle registration (acquisition of number plates), procedures to obtain any required permissions including clearance of diesel control regulations.

4) Obtaining Permits（for both PHIVOLCS and DPWH packages）

Application and acquisition of all permits with regard to the Project shall be carried out by the Implementing Agencies without delay, and necessary costs shall be borne by the Implementing Agencies.

5) Travel Expenses for Initial Operation and Maintenance Training Participants（for both PHIVOLCS and DPWH packages）

Initial operation and maintenance trainings shall be held by the Supplier in Metro Manila or the nearest site from Metro Manila. The Implementing Agencies shall be responsible for travel arrangements and costs for the participants dispatched for the trainings from the Implementing Agencies.

(7) Banking Arrangement (B/A)（for both PHIVOLCS and DPWH packages）

The Recipient will open a bank account in its name at a Japanese bank. Based on the B/A, the Recipient should bear payment commissions to the bank.

(8) Environmental and Social Considerations

Environmental and social considerations in the implementation of the Project shall be given, and necessary procedures and costs shall be borne by the Implementing Agencies, if necessary.

2-4 Project Operation Plan

(1) Project Operation Plan for PHIVOLCS

PHIVOLCS is an organization that consists of 200 staff. Among the 200 staff, approx. 60 % of the staff are allocated in the headquarters and the remaining 40 % are working in the manned seismic stations and volcano observatories. The Seismological Observation and Earthquake Prediction Division (SOEPD) is the largest division in PHIVOLCS, and approx. 30 staff in the headquarters and approx. 50 staff in the manned stations belong to the SOEPD.

PHIVOLCS staff are required to have advanced technical knowledge. SOEPD has many staff who received technical education at universities either in the Philippines or in foreign countries including Japan. Moreover, several staff in SOEPD have obtained PhDs. Each staff has not only profound scientific insight into earthquake and tsunami, but also abundant knowledge on monitoring equipment and communication systems. Staff with high technical skills have been allocated in the headquarters, the manned seismic stations, and the volcano observatories, and a sufficient structure for operation and maintenance has been established.

Regarding the operation of real-time earthquake and tsunami monitoring systems, all the data will be monitored at PHIVOLCS headquarters at all times, since the observed data will be transmitted in real-time through the satellite communication systems and the internet. In case of technical problems, such as malfunctions of peripheral equipment and data transmission troubles, the headquarters can detect the problems instantly, send staff to the sites where the problems occur, from the headquarters or from the nearest manned stations, and deal with the troubles.

As to the equipment procured by this Project, spare parts are not considered because the parts of the equipment generally only need to be exchanged once every ten years or so.

Operation and maintenance methods of the major equipment procured by this Project are mentioned below.

1) Broadband Strong Motion Seismometer and Strong Motion Seismometer

As for the broadband strong motion seismometers and the strong motion seismometers, the equipment will be additionally procured or renewed for the existing stations. PHIVOLCS can sufficiently operate and maintain with their current management structure, their operation and maintenance capacity and budget.

2) Earthquake Intensity Meter

Earthquake intensity meters will be installed at the mobile phone base stations nationwide and at the local government offices. PHIVOLCS will provide guidance on the operation and maintenance methods of the equipment to the responsible officer of each

facility when the equipment is installed. Moreover, the equipment will transmit data to PHIVOLCS through the internet, and PHIVOLCS will monitor the operational status of the equipment at all times. In case of troubles, such as malfunctions of the equipment, PHIVOLCS will provide instruction on operation and inspection from the headquarters for the responsible officer of the facility, and/or send the staff from the headquarters or from the nearest manned stations.

As mentioned above, the parameters on the PEIS calculation formula will be updated remotely via the internet from the PHIVOLCS headquarters.

3) Real-time Tsunami Monitoring System

The real-time tsunami monitoring systems will be newly provided by this Project and an operation and maintenance structure for the system needs to be established. On the other hand, methods of operation and maintenance for the unmanned stations have already been constructed for the unmanned seismic stations. Therefore, similar methods of operation and maintenance can be applied for the tsunami monitoring stations without any difficulties. As to the daily operation and maintenance, PHIVOLCS will cooperate with Philippine Ports Authority (PPA) and the owners of the lands and facilities, and appoint caretakers for daily duty on operation and maintenance. Additionally, the equipment will transmit data to PHIVOLCS through the satellite communication systems, and PHIVOLCS will monitor the operational status of the equipment at all times. In case of troubles, such as malfunctions of the equipment, PHIVOLCS will send the staff from the headquarters or from the nearest manned stations.

(2) Project Operation Plan for DPWH

DPWH has 16 Regional Offices (RO), and the equipment provided by the Project will be deployed to such RO. The Flood Control and Sabo Engineering Center (FCSEC) under the Project Management Office (PMO) of DPWH is responsible for coordination relating to the Project. The RO and/or DEO, to whom the equipment was deployed, will be responsible for operation and maintenance of the equipment.

Currently, DPWH does not own any mobile drainage pumps, but the other equipment for infrastructure maintenance are generally well-used and well-maintained by the ROs. Based on such facts, it is recognized that the ROs are capable of good operation and maintenance even for the Mobile Drainage Pumps to be provided by the Project.

Necessary spare parts for the operation for two years or 400 hours are to be covered by the Project, except for items which are locally available. Since the manufacturers of the equipment have a branch office and/or the local agent in Manila, necessary spare parts will be procured through such manufacturer's branch office and/or the local agent even after all the spare parts covered by the Project are run out.

2-5 Project Cost Estimation

2-5-1 Initial Cost Estimation

(1) Costs to be borne by the Philippine Side

2.87 million PHP （Approx. 5.71 million Japanese Yen）

1) PHIVOLCS

① Inland Transportation, Installation and Adjustment Works in the Areas with Security Issues

The costs for the transportation of the equipment and materials to such sites within the areas with security issues have been estimated referring to transportation costs to the neighboring site. As for the installation costs, the costs have been estimated considering types of the equipment and the installation. In addition, the costs for this item are estimated for the sites shown in Appendix 3-1 “Areas with Security Issues”.

2.20 million PHP （Approx. 4.38 million Japanese Yen）

② Inland Transportation, Installation and Adjustment Works for Earthquake Intensity Meters

Since the earthquake intensity meters are simple equipment, any special installation and adjustment costs will not be required. The transportation costs are estimated based on the tariff of the local parcel service, 245 PHP per parcel, since no special means of transportation is required for the equipment..

0.05 million PHP （Approx. 0.1million Japanese Yen）

③ Travel Expenses for Initial Operation and Maintenance Training Participants

（Necessary travel expenses pursuant to PHIVOLCS’s regulations）

④ Costs of Purchasing Air Conditioners

The heat that is generated by the newly procured equipment and the existing one during the peak time is estimated as almost 100% of the operating capacity of the two existing air conditioners. Considering the heat generated by human and the loss through windows and doors, it is desirable to procure one more air conditioner with a half of the capacity of the existing air conditioner.

0.06 million PHP （Approx. 0.11million Japanese Yen）
including installation costs

2) DPWH

① Inland Transportation to Regional Offices (after handing over)
(To be transported by DPWH drivers, only Fuel fee has been estimated)

0.06 million PHP （Approx. 0.12 million Japanese Yen）

② Travel Expenses for Initial Operation and Maintenance Training Participants

（Necessary travel expenses pursuant to DPWH's regulations）

3) NEDA

① Bank Commissions

0.5 million PHP （Approx. 1.0 million Japanese Yen）

(2) Condition of Estimate

①	Date of Estimate	:	DPWH : May 2012
②	Exchange Rate	:	1US$ = JPY 80.17, 1PHP=JPY 1.99
③	Implementation Period	:	as shown in "2-4-9 Implementation Schedule"
④	Others	:	The Project shall be implemented in accordance with the Grant Aid scheme of Japan

2-5-2 Operation and Maintenance Cost

(1) PHIVOLCS

Estimated Operation and Maintenance costs for the equipment procured by this Project are as follows;

- Personnel Costs :

All the target seismic stations are the existing manned and unmanned stations, while all the tsunami monitoring stations will be established as unmanned stations. Moreover, operation and maintenance for the new equipment will be carried out as a part of regular monitoring activities in the PHIVOLCS headquarters. Newly introduced equipment will not require additional staff, and therefore, there will not be any increase in personnel costs.

- Electric Power Charges :

Electric power charges for each monitoring station will not be required, since all the monitoring sites will be powered by independent solar power generation systems.

At the PHIVOLCS headquarters, additional costs for electricity will be required for operation of the earthquake and tsunami information systems and the hardware for tsunami simulation database. Assuming that the earthquake and tsunami information systems are operated for 24 hours a day and that the hardware for tsunami simulation database is operated for 8 hours a day and 20 days per month, the amount of the electricity to be consumed is 5,582.9 KWh per month. Based on the tariff of MERALCO (electric company), the additional costs will be 49,309.9 PHP per month or 591,718.8 PHP (approx.1.2 million Japanese Yen) per year.

- Satellite Communication Costs :

  Additional contracts will be required, and the costs are as follows.

  - Monthly costs for operating IP-Star in 30 seismic stations (including PHIVOLCS headquarters) and 17 tsunami monitoring stations amount to 92,848 PHP.
  - Monthly costs for operating ABS in 3 seismic stations and 2 tsunami monitoring stations amount to 375 USD.
  - The annual costs in total are calculated as 1.11 million PHP plus 4,500 USD (approx. 2.58 million Japanese Yen).

- Costs for Consumables :

  Any additional costs for consumables will be incurred by implementing this Project.

(2) DPWH

Estimated operation and maintenance costs for the mobile drainage pumps procured by this Project are as follows;

- Fuel (required fuel fee for eight mobile drainage pumps calculated based on emergency operation (twice a year (72 hours per an operation)) and regular maintenance running (once a month))

  0.4 million PHP （Approx. 0.8 million Japanese Yen）per year

- Spare parts and consumables for eight mobile drainage pumps (calculated based on methods of mechanical hire expense of construction machinery in Japan)

  0.2 million PHP （Approx. 0.4 million Japanese Yen）per year

CHAPTER 3

PROJECT EVALUATION

Chapter 3 Project Evaluation

3-1 Preconditions

Preconditions for the smooth implementation of the Project are as follows.

- Land Acquisition (for PHIVOLCS package)

  Necessary land or space for the installation of the equipment will be secured without delay by acquiring land or obtaining permissions for the use of land or space.

- Tax Assumption (for both PHIVOLCS and DPWH packages)

  Customs duties, internal taxes and other fiscal levies which may be imposed in the Recipient country for the Japanese entities, including the Agent, engaged in the Project with respect to the purchase of the products and the services shall be assumed by the Implementing Agencies without delay.

- Expediencies (for both PHIVOLCS and DPWH packages)

  Prompt customs clearance of the products imported from Japan and/or third countries at ports of disembarkation in the Recipient country shall be facilitated by the Implementing Agencies for smooth implementation of the Project. And, necessary expediencies shall be granted to allow Japanese nationals and/or nationals of third counties, including such nationals employed by the Agent, whose services may be required in connection with the supply of the products and the services for such facilities, for their entry into the Recipient country and stay therein for the performance of their work.

- Budgetary Allocation for Proper Operation and Maintenance (for both PHIVOLCS and DPWH packages)

  The budget for proper operation and maintenance of the equipment provided by the Project will be secured by the Philippine side.

- Expenditure other than the Grant

  All the expenses, other than those covered by the Grant and/or its accrued interest, necessary for the implementation of the Project shall be borne by the Implementing Agencies, and the following items shall be conducted by the Philippine side without delay.

  - Inland Transportation, Installation and Adjustment Works for the equipment to be installed in the Areas with Security Issues (for PHIVOLCS Package)
  - Inland Transportation, Installation and Adjustment Works for Intensity Meters (for PHIVOLCS Package)

- Inland Transportation for Mobile Drainage Pumps after Handing Over（for DPWH package）
- Obtaining Permits（for both PHIVOLCS and DPWH packages）
- Travel Expenses for Initial Operation and Maintenance Training Participants（for both PHIVOLCS and DPWH packages）

3-2 Necessary Inputs by Recipient Country

The inputs or undertakings of the Philippine side required for maintaining the outputs of the Project are as follows.

- Budgetary Allocation for Data Communication (for PHIVOLCS Package)

  The budget for data communication costs, such as for satellite communication and internet, will be secured by the Philippine side for transmission of the data obtained with the earthquake and tsunami monitoring equipment procured by the Project.

- Enhancement of Operation and Maintenance of Earthquake and Tsunami Monitoring Systems (for PHIVOLCS Package)

  The methods of operation and maintenance for the unmanned seismic stations have already been put into practice, similar methods will be applied for the equipment to be provided by this Project. As for the tsunami monitoring stations that will be newly established by the Project, PHIVOLCS, in cooperation with PPA and the other owners of the lands / facilities, will appoint caretakers for daily duty on operation and maintenance. In addition, PHIVOLCS will monitor the operational status of the equipment at all times, through real-time data satellite communication systems.

- Proper Operation and Maintenance after Handing Over （for both PHIVOLCS and DPWH packages）

  The equipment provided by the Project will be operated and maintained properly and effectively.

3-3 Important Assumptions

The important assumptions for maintaining the outputs of the Project are as follows.

- The policies and strategies on the disaster risk management sector in the Philippines will not be changed.
- Emergency incidents, such as acts of terrorism, will not occur.

3-4 Project Evaluation

3-4-1 Relevance

(1) Contribution to Disaster Prevention and Mitigation

The Philippines is one of the countries in Southeast Asia with high risks of natural disasters, and the country has often experienced natural disasters, such as earthquakes, volcanic eruptions and huge tsunami waves caused by big earthquakes in the Pacific Rim. In addition, since most of the typhoons formed around the Mariana Trench approach to the country, the death toll of flood-related disasters is outstanding.

The assistance for PHIVOLCS under this Project aims at strengthening the capacity of the earthquake and tsunami monitoring in order to enhance the capacity of disaster mitigation and emergency responses through provision of real-time monitoring information to the disaster related authorities.

Regarding the earthquake monitoring network, installation of broadband strong motion seismometers, strong motion seismometers and earthquake intensity meters will contribute to expand the PHIVOLCS's real-time monitoring networks, in collaboration with SATREPS. Furthermore, it will be made possible to realize enhancement of the accuracy of analysis, swift transmission of information on earthquakes and prediction of disaster damages, and consequently, the capacity for initial responses after the occurrence of disasters will be enhanced. As for the tsunami monitoring network, the first real-time tsunami monitoring network in the Philippines will be established. The real-time data obtained with the monitoring equipment provided by the Project will be utilized for issuance and cancellation of warnings for tsunami.

Thus, the assistance for PHIVOLCS will not only bear direct benefits for strengthening the capacity of disaster prevention and mitigation all across the Philippines, but also build a foundation towards establishment of the future real-time forecasting and warning system.

With respect to the assistance for DPWH, it will contribute to smooth recovery and reconstruction of the infrastructure by making it possible to drain water out of spot inundation of roads and low-lying areas, where drainage pump facilities cannot completely drain water, after flooding disasters occur resulting from tsunamis and typhoons.

(2) Contribution to National Policies and Strategies in the Philippines

The Project is in line with the "Philippine Development Plan 2011-2016" having set a major policy to strengthen disaster risk reduction at both national and local levels, and "The National Disaster Risk Reduction and Management Framework (NDRRMF)" and "The National Disaster Risk Reduction and Management Plan (NDRRMP) 2011-2028" which cover one of the

thematic areas, namely "Disaster Prevention & Mitigation", and its goals and objectives of “Enhanced Monitoring, Forecasting and Hazard Warning” and “Disaster Rehabilitation and Recovery”.

(3) Utilization of Japan’s Technologies in Disaster Risk Management Sector and Lessons Learnt from the Great East Japan Earthquake

Japan has been providing assistance in the disaster risk management sector of the Philippines for more than 30 years from the 1980s, and thus acquired technologies, know-how and broad networks in the sector. Since this Project is categorized into the series of such assistance in the disaster risk management sector of the Philippines, these acquired technologies, know-how and broad networks can be utilized sufficiently.

Especially, regarding the technologies in the sector, they have been newly developed and improved based on the lessons learnt from the Great East Japan Earthquake. Even in Japan, introduction of such newly developed and/or improved equipment for disaster monitoring and response have been promoted. One of the most remarkable cases is introduction of Japan-made broadband strong motion seismometers, which can work for giant earthquakes, since it was leant that the broadband seismometers went off scale when the Great East Japan Earthquake. And, another typical example is Japan-made mobile drainage pumps whose effectiveness was noticed in the tsunami affected areas of the Great East Japan Earthquake. Deployment of the mobile drainage pumps to many of local governments in Japan has been encouraged after the Great East Japan earthquake, and moreover, the equipment has greatly accomplished great results for a severe flood disaster in Thailand in 2011.

(4) Information Sharing among Japan and Neighboring Countries

Earthquake and tsunami monitoring data are not only transmitted within the Philippines, but also shared with the following external agencies. Thus, the data obtained with the equipment provided by the Project is also expected to contribute to enhancing the accuracy of earthquake and tsunami monitoring, and forecasting and warning in Japan and other neighboring countries.

- GEOFON: Global earthquake monitoring network of German Research Centre for Geosciences (GFZ), a public research institute of Germany
- Japan’s National Research Institute for Earth Science and Disaster Prevention (NIED): The data obtained from the 10 unmanned seismic stations where the broadband seismometers and the strong motion seismometers have been installed by SATREPS is transmitted to Japan via the internet. Operating the NIED-developed system in both Japan and the Philippines, analyzing earthquake focal mechanisms and forecasting earthquake intensities, liquefaction and tsunami have been conducted.
- Other agencies:
  the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty

Organization (CTBTO), Ocean Hemisphere Research Center under Earthquake Research Institute of the University of Tokyo (OHRC) (Ocean Hemisphere network Project（OHP）), and etc.

PHIVOLCS is a member of the Regional Working Group on Tsunami Warning and Mitigation System for the South China Sea Region (SCS-WG) under Intergovernmental Oceanographic Commission (IOC) of UNESCO, in which Japan Meteorological Agency also participates. For the purpose of sharing data on earthquake and tsunami in the South China Sea region, they are aiming at development and operation of systems for earthquake monitoring, and tsunami forecasting and warning in the region by 2016 through the establishment of a South China Sea regional tsunami warning center and an information sharing platform. In addition, the regional center will be connected with the Global Telecommunication System (GTS) of the World Meteorological Organization (WMO). The information is expected to be transmitted by the center not only in the South China Sea region but also globally.

Based on fact findings above mentioned, it is considered that relevance of the Project will be high.

3-4-2 Effectiveness

The following outputs are to be expected from the Project. It is considered that the Project will be confidently effective.

(1) Quantitative Outputs

- **Expansion and Improvement of Real-time Earthquake Monitoring Network**

The real-time earthquake monitoring network will be expanded and improved through the provision of the following equipment; 1) broadband strong motion seismometers for the 10 existing unmanned seismic stations, and 2) strong motion seismometers with real-time monitoring function for the 36 manned stations. Consequently, monitoring of seismic intensities, identification of epicenters and calculation of magnitudes can be conducted swiftly, and the accuracy of analyzing earthquakes will be enhanced.

Indicator	Baseline (2013)	Target (2017)
Number of broadband strong motion seismometers (Real-time)	0 site	10 sites
Number of strong motion seismometers (Real-time)	10 sites※1	36 sites
Number of strong motion seismometers with instrumental seismic intensity measurement function (Real-time)	0 site	36 sites
Number of earthquake intensity meters (Real-time)	23 site	340 sites※2
Percentage of earthquake with M4.5 and above with enhanced earthquake and tsunami information e.g. moment magnitude and source mechanism issued within 15 minutes	2 %	Not less than 60 % (Targeted by SOEPD)
Time required for calculation of magnitude of very large earthquakes which is useful for timely tsunami and damage potential evaluation	N/A	Less than 15 min. (Targeted by PHIVOLCS)

※1：The real-time strong motion seismometers that currently installed at the unmanned seismic stations will be replaced by the real-time broadband strong motion seismometers procured by the Project.
※2：340 sites = 240 sites covered by this Project + 100 sites by SATREPS.(incl. 23 sets already installed as of March 2013)

- **Establishment of Real-time Tsunami Monitoring Network**

The real-time tsunami monitoring network will be established through the installation of tsunami wave detectors at 19 sites, and tidal level data can be obtained in real time. Currently, tsunami warnings that are determined based on the analysis of epicenters and magnitudes are notified to the disaster related agencies, such as OCD, by FAX and SMS. However, tidal level monitoring in real time by means of the equipment provided by the Project will contribute to higher accuracy and promptness of tsunami warning and its

lifting.

Indicator	Baseline (2013)	Target (2017)
Number of tsunami wave detectors (Real-time)	6 sites※3	35 sites※4
Time required for confirmation of local tsunami after detection or observation of first tsunami	30 min. to several hours	Less than 1 min.

※3：A wet sensor at Lubang, owned by PHIVOLCS and other 5 monitoring stations to be operated by the local governments, of which monitoring data are transmitted to PHIVOLCS H.Q.
※4：35 sites = 6 existing sites + 19sites covered by this Project + 10 sites covered by SATREPS

- **Promotion of Tsunami Simulation Database Development**

The establishment of the tsunami simulation database is indispensable for high accuracy and promptness of tsunami warnings. Currently, in technical cooperation with SATREPS, the tsunami simulation database is being developed. However, the equipment that is currently in use does not have sufficient capacity for calculation. Thus, a PC cluster with adequate capacity will be provided by the Project in order to accelerate development of the tsunami simulation database.

Indicator	Baseline (2013)	Target (2017)
Number of simulation cases that can be processed per 6 hours	1 case	400 cases

- **Provision of Mobile Drainage Pumps**

For the purpose of contributing to smooth recovery and reconstruction of the infrastructure in occurrence of flooding disasters, 8 mobile drainage pumps will be deployed to the flood prone regions, especially for spot inundation of roads and low lying areas.

Indicator	Baseline (2013)	Target (2017)
Number of DPWH's mobile drainage pumps	0 unit	8 units
Time required for pumping out inland flood in urban areas	Approx.3 days	Approx.1 day

(2) Qualitative Outputs

- Strengthening of the real-time earthquake monitoring network and establishment of the instrumental seismic intensity monitoring network will make it possible to improve the accuracy of the analysis of earthquakes, swift transmission of earthquake information. Consequently, the capacity for disaster mitigation and emergency responses will be encouraged by providing real-time monitoring information and results of analysis and warnings to the disaster related agencies, such as OCD.

- Through the establishment of the first real-time tsunami monitoring network in the Philippines, necessary data for declaring and lifting warnings can be obtained in real-time. As is the case of earthquake monitoring, the capacity for disaster mitigation and

emergency responses will be encouraged by providing real-time monitoring information and results of analysis and warnings the disaster related agencies, such as OCD.

- It is expected that the tsunami simulation result can be improved by using of real time tide data of each station collected through Real-time Tsunami Monitoring Network.
- The implementation of this Project will not only bear direct benefits for strengthening the capacity of disaster prevention and mitigation all across the Philippines, but also build a foundation towards establishment of the tsunami early warning system.
- The Project will contribute smooth recovery and reconstruction of not only infrastructure but also sanitation condition of the flood area by making it possible to drain water out of spot inundation of roads and low-lying areas, where drainage pump facilities cannot completely drain water, after flooding disasters occur resulting from tsunamis and typhoons.

APPENDICES

Appendix 1

Member List of the Survey Team

○ First Field Survey

Mr. Minoru MIYASAKA Team Leader	Senior Advisor to the Director General, Global Environment Department, Japan International Cooperation Agency (JICA)
Mr. Shoji HASEGAWA Planning Management / Grant Aid for Disaster Prevention & Reconstruction	Special Advisor, Disaster Management Division 2, Water Resources and Disaster Management Group, Global Environment Department, Japan International Cooperation Agency (JICA)
Mr. Satoshi MATOBA Grant Aid Program / Procurement Agent	Director, Management Planning and Coordination Division, Planning and Coordination Department Japan International Cooperation System (JICS)
Mr. Shozo KAWASAKI Chief Consultant / Operation & Maintenance Planning	Oriental Consultants Co., Ltd.
Ms. Tamiko ARAMATA Deputy Chief Consultant / Procurement Planning / Cost Estimate	Oriental Consultants Co., Ltd.
Mr. Hiroshi SHIMADA Earthquake & Tsunami Warning System / Information Communication System	Pacific Consultants Co., Ltd.
Mr. Kengo KAWASHIRO Earthquake & Tsunami Monitoring Equipment / Installation Planning	Pacific Consultants Co., Ltd.
Ms. Satoko SEINO Flood Disaster Management Equipment	Pacific Consultants Co., Ltd.
Mr. Susumu MURATA Technical Advisor	Pacific Consultants Co., Ltd.

○ Second Field Survey

Mr. Minoru MIYASAKA Team Leader	Senior Advisor to the Director General, Global Environment Department, Japan International Cooperation Agency (JICA)
Mr. Kota KATSUMATA Planning Management / Grant Aid for Disaster Prevention & Reconstruction	Special Advisor, Disaster Management Division 1, Water Resources and Disaster Management Group, Global Environment Department, Japan International Cooperation Agency (JICA)
Mr. Shozo KAWASAKI Chief Consultant / Operation & Maintenance Planning	Oriental Consultants Co., Ltd.
Ms. Tamiko ARAMATA Deputy Chief Consultant / Procurement Planning / Cost Estimate	Oriental Consultants Co., Ltd.
Mr. Kengo KAWASHIRO Earthquake & Tsunami Monitoring Equipment / Installation Planning	Pacific Consultants Co., Ltd.
Mr. Hironori HONMA Procurement Planning 2 / Cost Estimate 2	Pacific Consultants Co., Ltd.

○ Third Field Survey

Mr. Shiro NAKASONE Team Leader	Director, Disaster Management Division 1, Water Resources and Disaster Management Group, Global Environment Department, Japan International Cooperation Agency (JICA)
Mr. Kota KATSUMATA Planning Management / Grant Aid for Disaster Prevention & Reconstruction	Special Advisor, Disaster Management Division 1, Water Resources and Disaster Management Group, Global Environment Department, Japan International Cooperation Agency (JICA)
Mr. Shozo KAWASAKI Chief Consultant / Operation & Maintenance Planning	Oriental Consultants Co., Ltd.
Ms. Tamiko ARAMATA Deputy Chief Consultant / Procurement Planning / Cost Estimate	Oriental Consultants Co., Ltd.
Mr. Kengo KAWASHIRO Earthquake & Tsunami Monitoring Equipment / Installation Planning	Pacific Consultants Co., Ltd.

Appendix 2

Survey Schedule

○ First Field Survey (from April 16 to May 21, 2012)

	Date		Team Leader	Grant Aid Program / Procurement Agent	Planning Management / Grant Aid for Disaster Prevention & Reconstruction	Chief Consultant / Operation & Maintenance Planning	Deputy Chief Consultant / Procuement Planning / Cost Estimate	Earthquake & Tsunami Warning System / Information Communication System	Earthquake & Tsunami Monitoring Equipment / Installation Planning	Flood Disaster Management Equipment	Technical Advisor
			Mr. Minoru MIYASAKA	Mr. Satoshi MATOBA	Mr. Shoji HASEGAWA	Mr. Shozo KAWASAKI	Ms. Tamiko ARAMATA	Mr. Hiroshi SHIMADA	Mr. Kengo KAWASHIRO	Ms. Satoko SEINO	Mr. Susumu MURATA
			JICA	JICS	JICA	OC	OC	PCKK	PCKK	PCKK	PCKK
1	16-Apr	Mon.			Narita - Manila (JAL741 09:35-13:15) Courtesy Call to JICA Philippines Office						
2	17-Apr	Tue.			Courtesy Calls to Embassy of Japan Joint Meeting with PHIVOLCS, DPWH and NEDA						
3	18-Apr	Wed.			Meeting with DPWH Preparation of M/D Draft		Preparation for Site Survey	Same as Chief Consultant	Same as Deputy Chief Consultant	Same as Chief Consultant	
4	19-Apr	Thu.			Meeting with PHIVOLCS						
5	20-Apr	Fri.			Preparation of M/D Draft Meeting with NEDA		Preparation for Site Survey	Mtg w/ PHIVOLCS Mtg w/ NAMRIA	Same as Deputy Chief Consultant		Mtg w/ PHIVOLCS Mtg w/ NAMRIA
6	21-Apr	Sat.			Survey on Similar Projects (NAMRIA Tide Station @ Manila Port), Internal Meeting						Manila - Narita (JAL746 09:00-14:30)
7	22-Apr	Sun.	Narita - Manila (JAL741 09:35-13:15)		Internal Meeting / Document Preparation						
8	23-Apr	Mon.	Discussion on M/D with PHIVOLCS Preparation of M/D			Metting with PHIVOLCS					
9	24-Apr	Tue.	Discussions on M/D with DPWH Discussion on M/D with NEDA			Preparation for Site Survey		Survey on Equipment Plan			
10	25-Apr	Wed.	Site Survey	Discussion on M/D with DPWH Survey on Satellite Comm. Equipment		Survey on Equipment and O&M Plan	Preparation for Site Survey / Survey on Procurement	Survey on Equipment Plan Survey on Stellite Comm. Equipment			
11	26-Apr	Thu.	Site Survey	Meeting with DOF, Central Bank		Survey on Equipment and O&M Plan	ditto	Survey on Equipment Plan			
12	27-Apr	Fri.	Preparation of M/D Signing of M/D with NEDA, PHIVOLCS, DPWH			Mtg w/ PHIVOLCS	ditto	Same as Chief Consultant Same as Chief Consultant			
13	28-Apr	Sat.	Manila - Narita (JAL746 09:00-14:30)			Site Survey (Buco Volcano Observatory and Tagaytay Seismic Station), Internal Meeting					
14	29-Apr	Sun.				Internal Meeting / Document Preparation					
15	30-Apr	Mon.				Survey on Equipment and O&M Plan	Preparation for Site Survey / Survey on Procurement	Survey on Equipment Plan	Survey on Satellite Comm. Equipment Survey on Equipment Plan		
16	1-May	Tue.				Internal Meeting / Document Preparation					
17	2-May	Wed.				Survey on O&M Mtg w/ PHIVOLCS	Preparation for Site Survey / Survey on Procurement	Same as Chief Consultant	Survey on Equipment Plan		
18	3-May	Thu.				Survey on O&M	ditto	Survey on Equipment Plan			
19	4-May	Fri.				Preparation for Site Survey Reports to JICA Philippines Office		ditto			
20	5-May	Sat.				Internal Meeting / Document Preparation					
21	6-May	Sun.				Manila - Narita	Internal Meeting / Document Preparation				
22	7-May	Mon.					Site Survey for Tsunami Monitoring Site (Corregidor Island)				
23	8-May	Tue.					Mtg w/ PHIVOLCS Mtg w/ DPWH	Survey on Equipment Plan	Survey on Equipment Plan	Mtg w/ DPWH	
24	9-May	Wed.					Supervision of Site Survey / Survey on Procurement	Meeting with PHIVOLCS Meeting with DPWH			
25	10-May	Thu.					Supervision of Site Survey / Survey on Procurement	Tsunami Site Survey (Iloilo)	Survey on Equipment Plan		
26	11-May	Fri.					Mtg w/ DPWH Survey on Procurement	ditto	Survey on Equipment Plan	Mtg w/ DPWH	
27	12-May	Sat.					Internal Meeting / Document Preparation				
28	13-May	Sun.					Document Preparation				
29	14-May	Mon.					Preparation of T/N	Mtg w/ PHIVOLCS Survey on Equipment Plan			
30	15-May	Tue.					Mtg w/ DPWH Prepation of T/N	Site Survey for Seismic Station and Tsunami Station (Virac)		Mtg w/ DPWH Equipment Plan	
31	16-May	Wed.					Preparation of T/N	ditto		Survey on O&M (DPWH Davao Office)	
32	17-May	Thu.					Preparation of T/N	Meeting with PHIVOLCS Meeting with DPWH			
33	18-May	Fri.					Discussion and Signing on Technical Notes with DPWH Discussion and Signing on Technical Notes with PHIVOLCS				
34	19-May	Sat.					Prepation of Report				
35	20-May	Sun.					Document Preparation				
36	21-May	Mon.					Report to JICA Philippines Office Manila - Narita (JAL742 14:25-19:55)				

○ Second Field Survey (from December 2 to December 8, 2012)

	Date		Team Leader	Planning Management / Grant Aid for Disaster Prevention & Reconstruction	Chief Consultant / Operation & Maintenance Planning	Deputy Chief Consultant / Procuement Planning / Cost Estimate	Earthquake & Tsunami Monitoring Equipment / Installation Planning	Procuement Planning 2/ Cost Estimate 2
			Mr. Minoru MIYASAKA	Mr. Kota KATSUMATA	Mr. Shozo KAWASAKI	Ms. Tamiko ARAMATA	Mr. Kengo KAWASHIRO	Mr. Hironori HONMA
			JICA	JICA	OC	OC	PCKK	OC
1	2-Dec	Sun	Narita - Manila (JAL741 09:35-13:15)					
			Internal Meeting					
2	3-Dec	Mon	Joint Meeting with NEDA, DOST, PHIVOLCS and DPWH					
			Courtesy Call to JICA Philippine Office Courtesy Call to Embassy of Japan				Meeting with PHIVOLCS	
3	4-Dec	Tue	Meeting with DPWH (Explanation on DFR)			Meeting with PHIVOLCS, SATREPS		Same as Chief Consultant
			Meeting with PHIVOLCS, SATREPS					
4	5-Dec	Wed	Discussion on M/D with PHIVOLCS		Meeting with PHIVOLCS, SATREPS			
5	6-Dec	Thu	Meeting with JICA Philippine Office		Meeting with PHIVOLCS, SATREPS			
			14 : 00 Meeting with Embassy of Japan				Meeting with PHIVOLCS, SATREPS and Cell-phone Company	
			Meeting with NEDA		Preparation of Technical Notes for PHIVOLCS			
6	7-Dec	Fri	Preparation of M/D		Discussion and Signing on M/D with PHIVOLCS			Site Visit (DPWH-FCSEC, NCR Regional Office)
			Discussion and Sigining on M/D (NEDA, DPWH and PHIVOLCS)				Meeting with PHIVOLCS, SATREPS and PAGASA	
7	8-Dec	Sat	Manila - Narita (JAL746 09:20-14:30)					

○ Third Field Survey (from March 3 to March 8, 2013)

	Date		Team Leader	Planning Management / Grant Aid for Disaster Prevention & Reconstruction	Chief Consultant / Operation & Maintenance Planning	Deputy Chief Consultant / Procuement Planning / Cost Estimate	Earthquake & Tsunami Monitoring Equipment / Installation Planning
			Mr. Shiro NAKASONE	Mr. Kota KATSUMATA	Mr. Shozo KAWASAKI	Ms. Tamiko ARAMATA	Mr. Kengo KAWASHIRO
			JICA	JICA	OC	OC	PCKK
1	3-Mar	Sun			Narita - Manila (JAL741 09:35-13:15)		
					Internal Meeting		
2	4-Mar	Mon			Meeting with PHIVOLCS (Explanation on Draft Final Report and Equipment Specification)		
3	5-Mar	Tue	Narita - Manila (JAL741 09:35-13:15)		Meeting with PHIVOLCS (Explanation on Draft Final Report and Equipment Specification)		
			Discussion on M/D with PHIVOLCS				
4	6-Mar	Wed	Discussion on M/D with NEDA			Meeting with PHIVOLCS	
			Meeting with PHIVOLCS				
5	7-Mar	Thu	Signing on M/D (PHIVOLCS), Press Conference				
			Sining on M/D (NEDA)		Meeting with PHIVOLCS		
6	8-Mar	Fri	Manila - Narita (JAL746 09:20-14:30)		Internal Meeting / Dpcument Preparation		
					Manila - Narita (JAL742 14:50-20:00)		

Appendix 3

List of Parties Concerned in the Recipient Country

1. Embassy of Japan in the Philippines

Mr. Masayuki HARIGAI	:	Secretary
Mr. Akio YONEZAWA	:	Secretary

2. JICA Philippine Office

Mr. Takahiro SASAKI	:	Chief Representative
Ms. Sachiko TAKEDA	:	Senior Representative
Ms. Etsuko TANEDA	:	Representative
Mr. Hayato NAKAMURA	:	Project Formulation Advisor
Mr. Kessy A. REYES	:	Program Officer
Ms. Catherine M. PALANCA	:	Program Officer

3. National Economic and Development Authority (NEDA)

Mr. Florante IGTIBEN	:	Assistant Director
Ms. Martha FLORES	:	Chief Staff of EDS
Ms. Kathleen VIRTYSIO	:	Senior Staff of EDS
Ms. Rachelle CERERALEDNES	:	Senior Staff of EDS
Ms. Williom SEZ	:	Senior Staff of EDS

4. Philippine Institute of Volcanology and Seismology (PHIVOLCS)

Dr. Renato SOLIDUM	:	Director
Dr. Bartolome BAUTISTA	:	Deputy Director
Mr. Delfin GARCIA	:	Planning Officer IV
Mr. Ishmael NARAG	:	Supervising Science Research Specialist
Dr. Jane PUNONGBAYAN	:	Supervising Science Research Specialist
Mr. Arnaldo MELOSANTOS	:	Senior Science Research Specialist
Mr. Enrico MANGAO	:	Senior Science Research Specialist
Mr. Melchor LASALA	:	Science Research Specialist
Mr. Melquiades FIGUEROA	:	Information and Technology Officer
Mr. Hiroshi INOUE	:	JICA Expert (SATREPS)

5. Department of Public Works and Highways (DPWH)

Dr. Maria Catalina CABRAL	:	Assistant Secretary
Ms. Dolores HIPOLITO	:	Project Manager II, Flood Control and Sabo Eng. Center
Mr. Jerry FANO	:	Assistant Section Chief of Flood Control Division
Ms. Carol CANUEL	:	Division Chief of Development Planning Division
Ms. Maryann BAUTISTA	:	Engineer III of Development Planning Division
Mr. Rogelio ANG	:	Project Director of PMO MFCDP
Mr. Alejandra SOSA	:	Assistant Project Director of PMO MFCDP
Mr. Leonila MERCADO	:	Engineer III of PMO MFCDP

Mr. Tomas RODRIGUEZ	:	Assistant Regional Director, DPWH Region XI
Ms. Estela YEE	:	Assistant Chief of Maintenance Division, DPWH Region XI
Mr. Alvin CABUENAS	:	Engineer III of Maintenance Division, DPWH Region XI
Mr. Akihisa OKUDA	:	JICA Expert (River Management Advisor)
Mr. Kazumasa ATARASHI	:	JICA Expert (Road Planning & Management Advisor)
Mr. Hideo NAGAO	:	JICA Expert (JICA Technical Cooperation Project for Improvement of Quality Management for Highway and Bridge Construction and Maintenance, Phase II)

Appendix 4-1

Minutes of Discussions

(signed on April 27, 2012)

MINUTES OF DISCUSSIONS ON THE PREPARATORY SURVEY ON THE PROJECT FOR IMPROVEMENT OF EQUIPMENT FOR DISASTER RISK MANAGEMENT

In response to the request from the Government of the Republic of the Philippines (hereinafter referred to as "the Philippines"), the Japan International Cooperation Agency (hereinafter referred to as "JICA"), in consultation with the Government of Japan (hereinafter referred to as "the GOJ") decided to conduct a Preparatory Survey on the Project for Improvement of Equipment for Disaster Risk Management (hereinafter referred to as "the Project").

JICA sent to the Philippines the Preparatory Survey Team (hereinafter referred to as "the Team"), which is headed by Mr. Minoru Miyasaka, Senior Advisor to the Director General, Global Environment Department, JICA, and is scheduled to stay in the country from April 16th to April 28th, 2012.

The Team held discussions with the officials concerned of the Government of the Philippines and conducted a field survey at the survey area.

In the course of discussions and field survey, both sides confirmed the main items described in the attached sheets. The Team will proceed to further works and prepare the Preparatory Survey Report.

Manila, 27th April, 2012

宮坂 実

Minoru Miyasaka
Leader
Preparatory Survey Team
Japan International Cooperation Agency
Japan

Dr. Amelia P. Guevara
Undersecretary for Research and Development
Department of Science and Technology
(DOST)
Republic of the Philippines

Maria Catalina E. Cabral, Ph.D.
Assistant Secretary
Department of Public Works and Highways
(DPWH)
Republic of the Philippines

Renato U. Solidum, Jr., Ph.D.
Director
Philippine Institute of Volcanology and Seismology
(PHIVOLCS)
Department of Science and Technology (DOST)
Republic of the Philippines

Witnessed by

Florante G. Igtiben
Assistant Director
National Economic and Development Authority
(NEDA)
Republic of the Philippines

ATTACHMENT

1. Current Situation

The Great East Japan Earthquake, occurred on 11th of March, 2011, resulted in tremendous damages to Japan, and it reminded the international community of importance of disaster prevention. Meanwhile, the countries, seriously affected by the Sumatra Earthquake and the Asian Tsunami in 2004, are strategically addressing to improve their disaster management systems, including earthquake monitoring and tsunami warning systems. In those countries, however, monitoring networks, data analysis systems and warning systems for earthquake and tsunami are not yet well-developed.

The Philippines is one of the countries most severely damaged by natural disasters in the East-Asia Region, and the county suffers from variety of natural disasters, such as earthquakes, volcanic eruptions, floods, typhoons, storms, drought, natural fires, landslides and tsunamis. The country is an archipelago of islands, which lies along the Pacific Ring of Fire, and it has thousands of faults and its coast lines are over 36,000-km-long. Due to such geographical nature, the country has been frequently affected by earthquakes, volcanic eruptions and tsunamis caused by great earthquakes occurred in the Pacific Rim. And also, it is emphasized that most of typhoons developed around Mariana Islands tend to reach the country and kill many people.

2. Objective of the Project

The objective of the Project is to contribute toward improving disaster risk management in the Philippines through the provision and installation of equipment in the facilities of the Philippine Institute of Volcanology and Seismology (hereinafter referred to as "PHIVOLCS") and the Department of Public Works and Highways (hereinafter referred to as "DPWH").

3. Project site

The candidate sites of the Project proposed by each implementing agency are confirmed as shown in **Annex-1** respectively.

4. Responsible and Implementing Agency

4-1. The Responsible Agency is the National Economic and Development Authority (hereinafter referred to as "NEDA").

4-2. The Implementing Agencies are the Philippine Institute of Volcanology and Seismology (PHIVOLCS), and the Department of Public Works and Highways (DPWH). The organization charts of PHIVOLCS and DPWH are shown in **Annex-2.**

5. Items requested by the Government of the Philippines

After discussions between the Philippine side and the Team (hereinafter referred to as "both sides"), the items described in **Annex-3** were finally requested by the Philippine side.

Both sides confirmed that the appropriateness of the request would be examined in accordance with the further studies and analysis, and the final components, the design including the sites of the Project would be explained by the Japanese side.

Both sides confirmed the equipment directly relating to the disaster risk management on earthquake and tsunami would be given high priority for procurement in case that there would be remaining fund after tendering.

6. Japan's Grant Aid for Disaster Prevention and Reconstruction (GADPR)

6-1. Outline of GADPR

The Grant Aid provides a recipient country (hereafter referred to as "the Recipient") with non-reimbursable funds to procure the facilities, equipment, and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with relevant laws and regulations of Japan. The Grant Aid is not supplied through the donation of materials as such.

The Japan's Grant Aid for Disaster Prevention and Reconstruction (hereinafter referred to as "GADPR") was introduced in 2006, in the context of worldwide greater interest in disaster management after the Sumatra Earthquake and the Asian Tsunami in December 2004. Japan can contribute assistance in disaster prevention and reconstruction sector, based on our experience and knowledge, to the international community.

6-2. This Project will be implemented under GADPR. The Philippine side understands the Japan's Grant Aid scheme explained by the Team, as described in **Annex-4**.

6-3. The Philippine side will take the necessary measures, as described in **Annex-5**, for smooth implementation of the Project, as a condition for the Japanese Grant Aid to be implemented.

7. Special Consideration

When the Grant Aid for this Project is extended in the Philippines, it would be required (1) to procure products which can contribute to reconstruction of industry in "Specified Disaster Affected Area" stipulated in "the Act on Special Fiscal Aid and Subsidy for Recovery from the Great East Japan Earthquake", and (2) to procure equipment for disaster management especially for earthquake and tsunami, which developed out based on lessons learnt and technologies in Japan, including Japan's advanced technologies, as public properties to the international community. Therefore, equipment covered by this Grant shall be made in and procured from Japan principally, while it may not apply for installation works which locally procured, manufactured and/or built.

Since the Project components may include equipment with Japan's advanced technologies, soft components will be appropriately considered to encourage sustainable operation and maintenance of the equipment, together with considerations to the present situation and needs in the Philippines.

8. Schedule of the Survey

8-1. The consultant members of the Team will proceed to further studies in the Philippines until

May 21, 2012.

8-2. JICA will prepare the draft preparatory survey report in English and dispatch a mission in order to explain its contents to the Philippine side around October 2012.

8-3. In case that the contents of the report are accepted in principle by the Philippine side, JICA will finalize the report and send it to the Philippine side around November 2012.

8-4. Both sides confirmed the Project would be carried out in accordance with the tentative schedule as shown in **Annex-6**.

8-5. Both sides confirmed the Agent Agreement would be concluded after the presentation of the Draft Final Report to the Government of the Philippines by the Team around in November 2012, as shown in **Annex-6**.

9. Consultative Committee

NEDA shall be the focal point for the Project and responsible for the coordination with related organizations. The Philippine side agreed to establish a consultative committee in order to coordinate with the Japanese side which consists of the JICA office in Manila as a member, the Embassy of Japan as an observer, and the procurement agent as an advisor. The Terms of Reference and members of the Consultative Committee are referred to **Annex-7.**

10. Other relevant issues

The following issues were discussed and confirmed by both sides.

10-1. Undertakings of the Philippine Side

(a) To secure land for preparation and installation of the equipment to be procured by the Project,
(b) To ensure the required electricity supply for the equipment to be procured and installed under the Project,
(c) To obtain necessary permission from competent authorities for installation works for the equipment which shall be borne by the Philippines,
(d) To clear necessary procedures for social and environmental considerations and obtain an approval of environmental related regulations by relevant authorities before commencement of the procurement of equipment in accordance with the relevant guidelines in the Philippines, including Environmental Impact Assessment (EIA) if required,
(e) To allocate necessary staff and budget for operation and maintenance of the equipment to be procured by the Project, and
(f) To improve disaster risk management with the equipment procured by the Project.

10-2. Arrangement for the Survey

As a response to the request by the Team, the Philippine side agreed to arrange the followings:

(a) To provide the Team with available relevant data, information and materials necessary for the execution for the Project,

(b) To prepare the answers for the Questionnaires presented by the Team,

(c) To assign full-time counterparts to the Team during their stay in the Philippines and play the following roles as the coordinator to the Team:

1. To make the appointments and set up the meetings with authorities, departments and all other factories and firms whenever the Team intends to visit,
2. To attend the site survey and any other visiting places with the Team and to make any convenience on accommodation, working room, adequate transportation, getting the permissions if required, etc. and,
3. To assist and advice the Team for their collection of data and information as much as possible.

(d) To secure the permission to photograph and enter into private properties and restricted areas for the Team for proper execution of the Project, if necessary,

(e) To take any necessary measures deemed necessary to secure safety of the Team Members,

(f) To obtain necessary permission for the Team to bring back to Japan necessary data, maps and materials related to the Survey, subject to approval of the GOP, in order to prepare the report,

10-3. Tax Assumption

PHIVOLCS and DPWH will secure the budget or take any necessary procedures for bearing Value Added Tax (VAT), custom duty, and any other taxes and fiscal levies in the Philippines which is to be arisen from the Project activities at their responsibility.

10-4. Overlapping with Other Projects

The Philippine side explained that the Project would not be overlapped with any other project supported by other donor agencies, NGOs, and Philippine official organization(s).

10-5. Visibility of the Project

The Team explained that the visibility of the Project should be ensured as a token of cooperation from the Japanese people if the Project was realized. The following ideas could be considered to enhance publicity of the Project:

(a) To display commemoration panels and/or stickers on the equipment procured and at the facilities where the equipment installed by the Grant Aid, and

(b) To publicize the Project in the mass media after the Project is approved by both governments

10-6. Confidentiality of the Survey Report

The Team explained that the preparatory survey report to be prepared at the end of the Survey would be disclosed to the public in principle in Japan. However the Team also explained that a confidential part which might affect tendering process such as cost estimation should be kept undisclosed until the tendering has completed.

Annex-1	Project Sites Map and Table
Annex-2	Organization Charts PHIVOLCS, DPWH
Annex-3	Items Requested by the Philippine Side
Annex-4	Japan's Grant Aid Scheme
Annex-5	Major Undertakings to be taken by Each Government
Annex-6	Tentative Implementation Schedule
Annex-7	Terms of Reference and Members of the Consultative Committee

Annex-1: Project Sites Map and Table
Site Map for Seismometers, PHIVOLCS

Site Table for PHIVOLCS

1. Requested Sites for Broadband Strong Motion Seismometer

No.	Code	Name of Station
1	BBPS	Basco
2	BATP	Bataraza
3	BESP	Borongan
4	ENPP	El Nido
5	GUIM	Jordan
6	LUBP	Lubang
7	MATI	Mati
8	PAGZ	Pagadian
9	PVCP	Virac
10	SRPC	San Manuel

2. Requested Sites for Strong Motion Seismometer

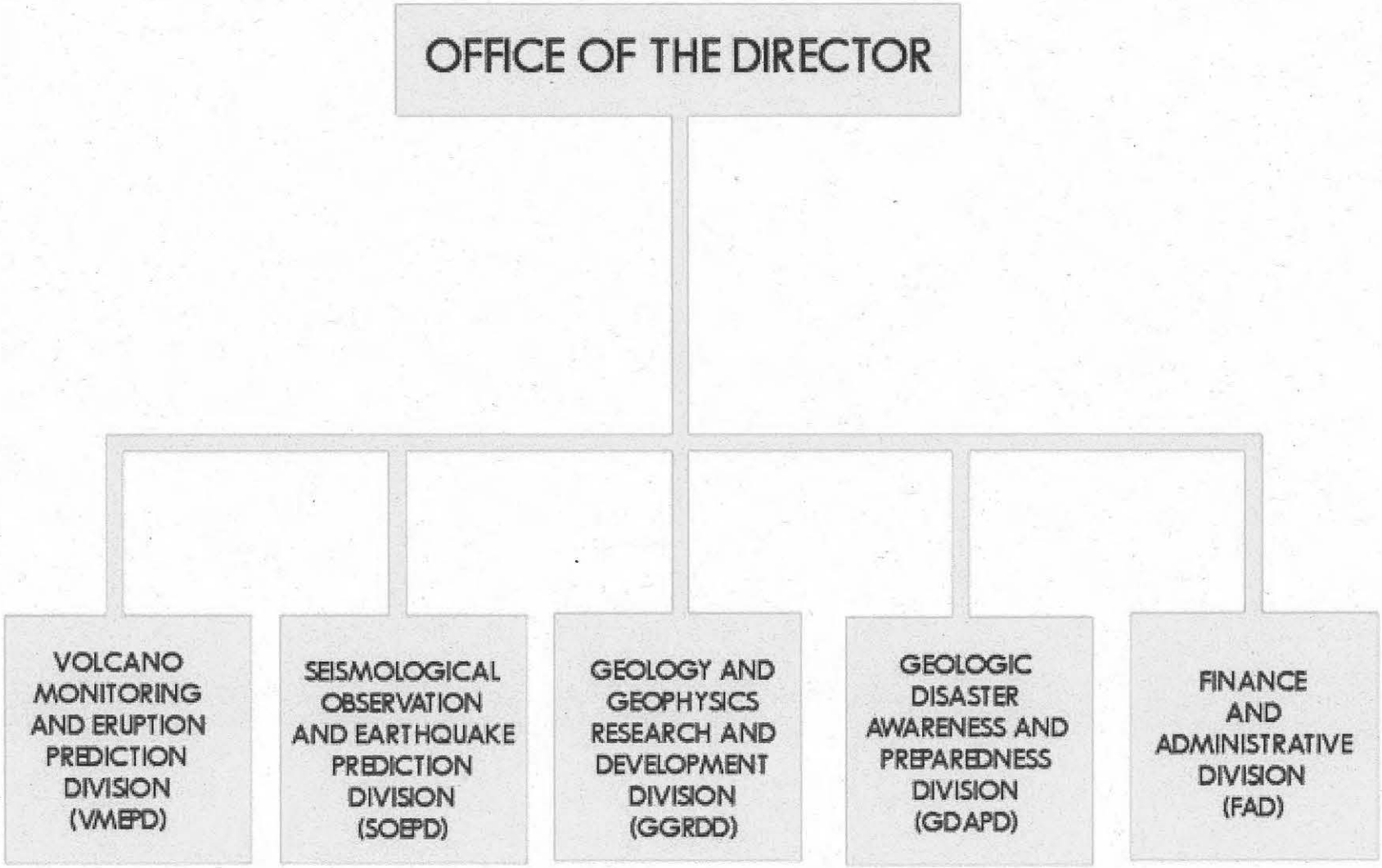
No.	Code	Name of Station	No.	Code	Name of Station
Manned Seismic Station					
1	BBP	Basco	16	MMP	Masbate
2	BCP	Baguio	17	PCP	Palayan
3	BIP	Bislig	18	PGP	Puerto Galera
4	CGP	Cagayan de Oro	19	PIP	Pasuquin
5	CTB	Cotabato	20	PLP	Palo
6	CVP	Callao	21	PPR	Puerto Princesa
7	DCP	Dipolog	22	QVP	PHIVOLCS Main
8	DMP	Davao	23	RCP	Roxas
9	GQP	Guinayangan	24	SCP	Surigao
10	GSP	General Santos	25	SIP	Sinait
11	JAP	Antique	26	SNP	Sibulan
12	KAP	Kalibo	27	TBP	Tagbilaran
13	KCP	Kidapawan	28	TGY	Tagaytay
14	LLP	Lapu-Lapu	29	ZMP	Zamboanga
15	LQP	Lucban	30	MPP	Magalang

No.	Code	Name of Station
Volcano Station		
31		Pinatubo
32		Taal
33		Mayon
34		Sorsogon
35		Canlaon
36		Hibok-Hibok

3. Requested Sites for Sea-Level Monitoring System

No.	Site Name		Quantity		
	Place	Detali	Inside of Bay	Outside of Bay	Total
1	Corregidor	Corregidor		1	1
2	Lubang	Tilik(lubang)		1	1
3	Batangas	Tringloy		1	1
4	Lingayen	San fermand		1	1
5	Albay bay	Rapu-Rapu/virac		1	1
6	Davao	Mati		1	1
7	Zamoanga	Zamoanga	1		1
8	ultan kudara	Kalamansig	1		1
9	eneral sante	Bawing gym		1	1
10	Port Irene	Port ireme	1		1
11	Basco	Basco	1		1
12	Hinobaan	Agutayan		1	1
13	Samar	Guiuan		1	1
14	Baler			1	1
15	iargao island			1	1
16	tandag			1	1
17	tacloban		1		1
18	Iloilo	Iloilo break water or Guimbal rebetment		1	1
19	Dumaguete		1		1
20	LEGAZPY	rapu rapu	1		1
	Total		7	13	20

Annex-2: Organization Charts
(Philippine Institute of Volcanology and Seismology : PHIVOLCS)

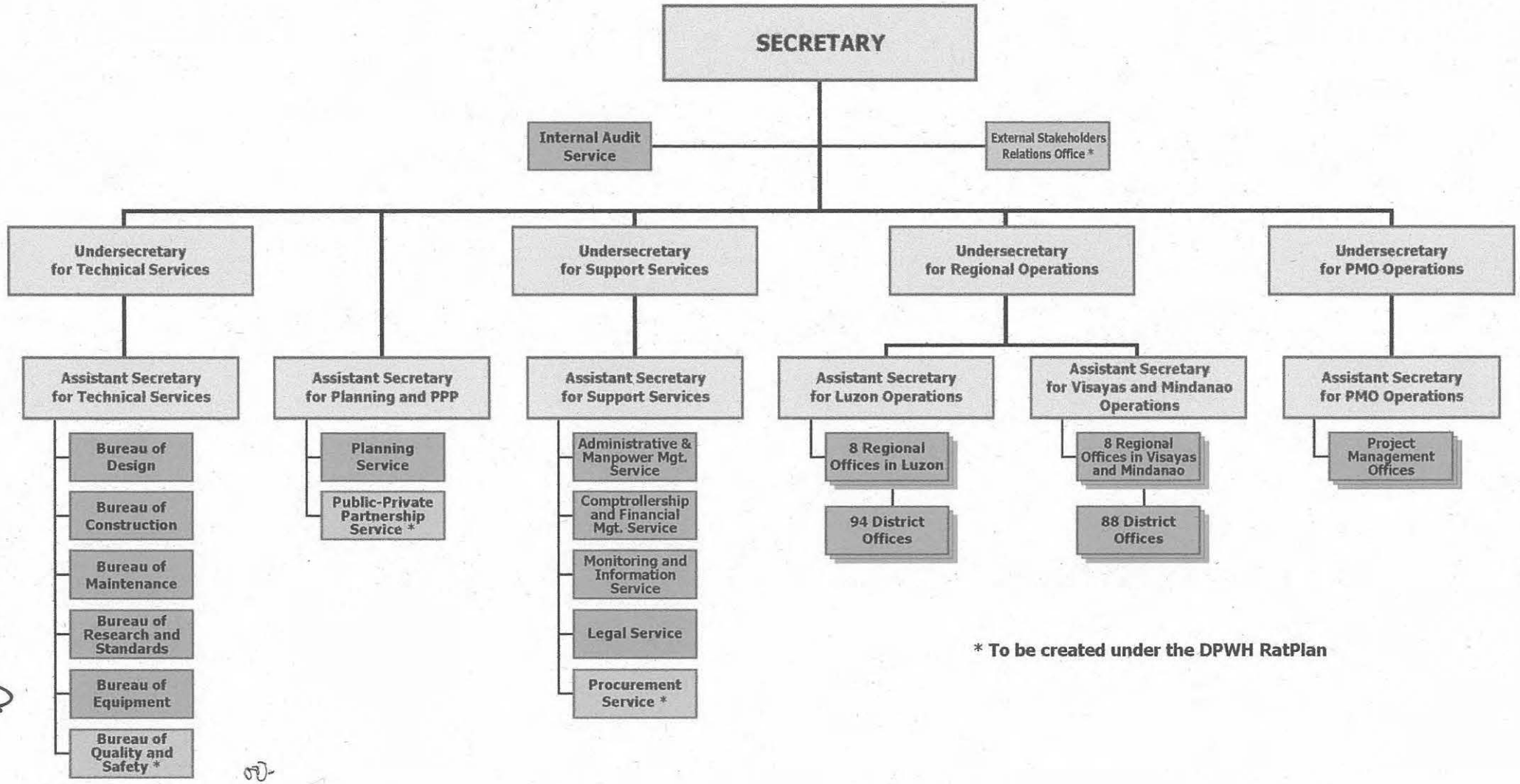


Annex-2: Organization Charts
(Department of Public Works and Highways : DPWH)

DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

Organizational Chart

(per Department Order No. 21, dated April 6, 2011)



* To be created under the DPWH RatPlan

Annex-3: Items Requested by the Philippine Side

Philippine Institute of Volcanology and Seismology (PHIVOLCS)			
	Item	QTY	Priority
1. Enhanced Real-time Earthquake Monitoring			
a.	velocity broadband strong motion seismometers	10	A
b.	strong motion seismometers for replacement	36	A
c.	earthquake intensity meters (including for emergency replacement)	240	A
d.	GPS continuous receivers	10	B
2. Enhanced Tsunami Warning System			
a.	sea-level monitoring system in tsunami-prone areas	20	A
b.	Tsunmi simulation database development hardware	1 cluster	A
3. Integrated Real-time Volcano Monitoring (Bulusan Volcano)			
a.	broadband seismometers (for monitoring of underground magma movements)	5	B
b.	infrasonic sensor (for detection and size estimation of eruptions)	2	B
c.	GPS receivers (for estimation of deformation and pressure source)	3	B

Department of Public Works and Highways (DPWH)			
	Item	QTY	Priority
1. Equipment for Emergency Response and Infrastructure Integrity Assessment			
a-1.	Heli-borne Oblique Photography System	2	B
-2	Disaster Data & Information Sharing System	1 lot	B
-3	Workshop on data process by heli-borne oblique photo system (for approx. 8 persons)	1 lot	B
	Pilot test Heli-borne Oblique Photography System in 6 sites (two each for Luzon, Visayas and Mindanao islanads)	1 lot	B
b.	Bridge Inspection Vehicle	2	A
c.	Non-destructive Test Equipment including operation and maintenace training		
	Concrete Rebound Hammer	3	A
	Reinforced Concrete Detective Radar	3	A
	Infrared Thermal Imager	3	A
d.	Multi-purpose Versatile Dredger	3	B
e.	Mobile Drainage Pump including operation and maintenace training	6	A

Priority

A: High

B: Moderate

Annex-4: JAPAN'S GRANT AID SCHEME FOR DISASTER PREVENTION AND RECONSTRUCTION

The Government of Japan (hereinafter referred to as "the GOJ") is implementing the organizational reforms to improve the quality of ODA operations, and as a part of this realignment, a new JICA law was entered into effect on October 1, 2008. Based on this law and the decision of the GOJ, JICA has become the executing agency of the Grant Aid for General Projects, for Fisheries and for Cultural Cooperation, etc.

The Grant Aid is non-reimbursable fund provided to a recipient country to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for its economic and social development in accordance with the relevant laws and regulations of Japan. Grant Aid for Disaster Prevention and Reconstruction (GADPR) is one of the several types of the scheme designed to assist disaster affected countries in disaster prevention and / or disaster reconstruction. The Grant Aid is not supplied through the donation of materials as such.

1. Grant Aid Procedures

Japanese Grant Aid is supplied through following procedures:

- Preparatory Survey
  - The Survey conducted by JICA
- Appraisal & Approval
  - Appraisal by the GOJ and JICA, and Approval by the Japanese Cabinet
- Authority for Determining Implementation
  - The Notes exchanged between the GOJ and a recipient country
- Grant Agreement (hereinafter referred to as "the G/A")
  - Agreement concluded between JICA and a recipient country
- Implementation
  - Implementation of the Project on the basis of the G/A

2. Preparatory Survey

(1) Contents of the Survey

The aim of the preparatory Survey is to provide a basic document necessary for the appraisal of the Project made by the GOJ and JICA. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of relevant agencies of the recipient country necessary for the implementation of the Project.
- Evaluation of the appropriateness of the Project to be implemented under the Grant Aid scheme from a technical, financial, social and economic point of view.
- Confirmation of items agreed between both parties concerning the basic concept of the Project.
- Preparation of an outline design of the Project.
- Estimation of costs of the Project.

The contents of the original request by the recipient country are not necessarily approved in their initial form as the contents of the Grant Aid project. The Outline Design of the Project is confirmed based on the

guidelines of the Japan's Grant Aid scheme.

JICA requests the Government of the recipient country to take whatever measures necessary to achieve its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization of the recipient country which actually implements the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country based on the Minutes of Discussions.

(2) Selection of Consultants

For smooth implementation of the Survey, JICA employs (a) consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

(3) Result of the Survey

JICA reviews the Report on the results of the Survey and recommends the GOJ to appraise the implementation of the Project after confirming the appropriateness of the Project.

3. Japan's Grant Aid for Disaster Prevention and Reconstruction Scheme

(1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the Exchange of Notes (hereinafter referred to as "the E/N") will be singed between the GOJ and the Government of the recipient country to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Government of the recipient country to define the necessary articles to implement the Project, such as payment conditions, responsibilities of the Government of the recipient country, and procurement conditions.

(2) Selection of Consultants

In order to maintain technical consistency, the consultant firm(s) which conducted the Survey will be recommended by JICA to the recipient country to continue work on the Project's implementation after the E/N and the G/A.

(3) Banking Arrangements (B/A)

The Government of the recipient country or its designated authority should open an account under the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"), and shall notify JICA in the written form prescribed in the G/A attached herewith of the completion of the procedures for the opening the account. JICA will execute the Grant Aid by making payments in Japanese yen to the account during the period referred to in the G/A and on or after the date of receipt of the written notification above.

(4) Contract with Procurement Agent

The recipient country will conclude an Agent Agreement with the Designated Procurement Agent stipulated in the E/N in order to secure smooth implementation of the Project.

(5) Details of Procedures

Details of procedures on procurement and services under GADPR will be agreed between the authorities of the two governments concerned at the time of the signing of the G/A.

Essential points to be agreed are outlined as follows:

a) JICA will supervise the implementation of the Project.
b) Products and services will be procured and provided in accordance with JICA's "Procurement Guidelines of Japan's Grant Aid for Disaster Prevention and Reconstruction (Type I-D) ."
c) The Recipient will conclude a contract with the Agent.
d) The Agent is the representative acting in the name of the Recipient concerning all transfers of funds for the Project.

(6) Focal points of "Procurement Guidelines of Japan's Grant Aid for Disaster Prevention and Reconstruction (Type I-D)

a) The Agent
The Agent is the organization, which provides procurement of products and services on behalf of the Recipient according to the Agent Agreement with the Recipient. The Agent is recommended to the Recipient by the Government of Japan and agreed between the two Governments in the A/M.

b) Agent Agreement
The Recipient will conclude the Agent Agreement, in principle, within two months after the signing of the G/A, in accordance with the A/M. The scope of the Agent's services will be clearly specified in the Agent Agreement.

c) Approval of the Agent Agreement
The Agent Agreement is prepared as two identical documents and the copy of the Agent Agreement will be submitted to JICA by the Recipient through the Agent. JICA confirms whether the Agent Agreement is concluded in conformity with the E/N, A/M, and G/A and the Procurement Guidelines of Japan's Grant Aid for Disaster Prevention and Reconstruction (Type I-D) then approves the Agent Agreement.
The Agent Agreement concluded between the Recipient and the Agent will become effective after the approval by JICA in a written form.

d) Payment Methods
The Agent Agreement will stipulate that "Regarding all transfers of the fund to the Agent, the Recipient will designate the Agent to act on behalf of the Recipient and issue a Blanket Disbursement Authorization ("the BDA") to conduct the transfer of the fund (hereinafter referred to as "the Advances") to the Procurement Account from the Recipient Account.
The Agent Agreement will clearly state that the payment to the Agent will be made in Japanese yen from the Advances and that the final payment to the Agent will be made when the total remaining amount become less than three percent (3%) of the Grant and its accrued interests excluding the Agent's fees.
(I) Blanket Disbursement Authorization (BDA)
By issuing the "Blanket Disbursement Authorization (BDA)" by the Government of the recipient country to the Bank, the Government of the recipient country designates a procurement agent as the representative authorized to act in the name of the recipient country concerning all transfers of the Grant to an account in the name of the procurement agent.

e) Products and Services Eligible for Procurement
Products and services to be procured will be selected from those defined in the G/A.

f) Method of Procurement
When conducting the procurement, sufficient attention will be paid to transparency in selecting the firms and for this purpose, competitive tendering will be employed in principle.

g) Additional procurement

If there is any remaining balance after the competitive and/or selective tendering and/or direct negotiation for a contract, and if the Recipient would like to procure additional items, the Agent is allowed to conduct this additional procurement, following the points mentioned below:

(1) Procurement of same products and services

When the products and services to be additionally procured are identical with the initial tender and a competitive tendering is judged not efficient, additional procurement can be conducted by a negotiated contract with the successful tenderer of the initial tender.

(2) Other procurements

When products and services other than those mentioned above in (1) are to be procured, the procurement should be conducted through competitive tendering. In this case, the products and services for additional procurement will be selected from among those in accordance with the G/A.

h) Conclusion of the Contracts

In order to procure products and services in accordance with the guideline, the Agent will conclude contracts with firms selected by tendering or other methods.

(7) Eligible source country

Under the Japanese Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased. When JICA and the Government of the recipient country or its designated authority deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

(8) Major undertakings to be taken by the Government of the Recipient Country

In the implementation of the Grant Aid Project, the recipient country is required to undertake such necessary measures as Annex-5.

(9) Proper Use

The Government of recipient country is required to maintain and use properly and effectively the facilities constructed and the equipment purchased under the Grant Aid, to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Grant Aid.

(10) Export and Re-export

The products purchased under the Grant Aid should not be exported or re-exported from the recipient country.

(11) Social and Environmental Considerations

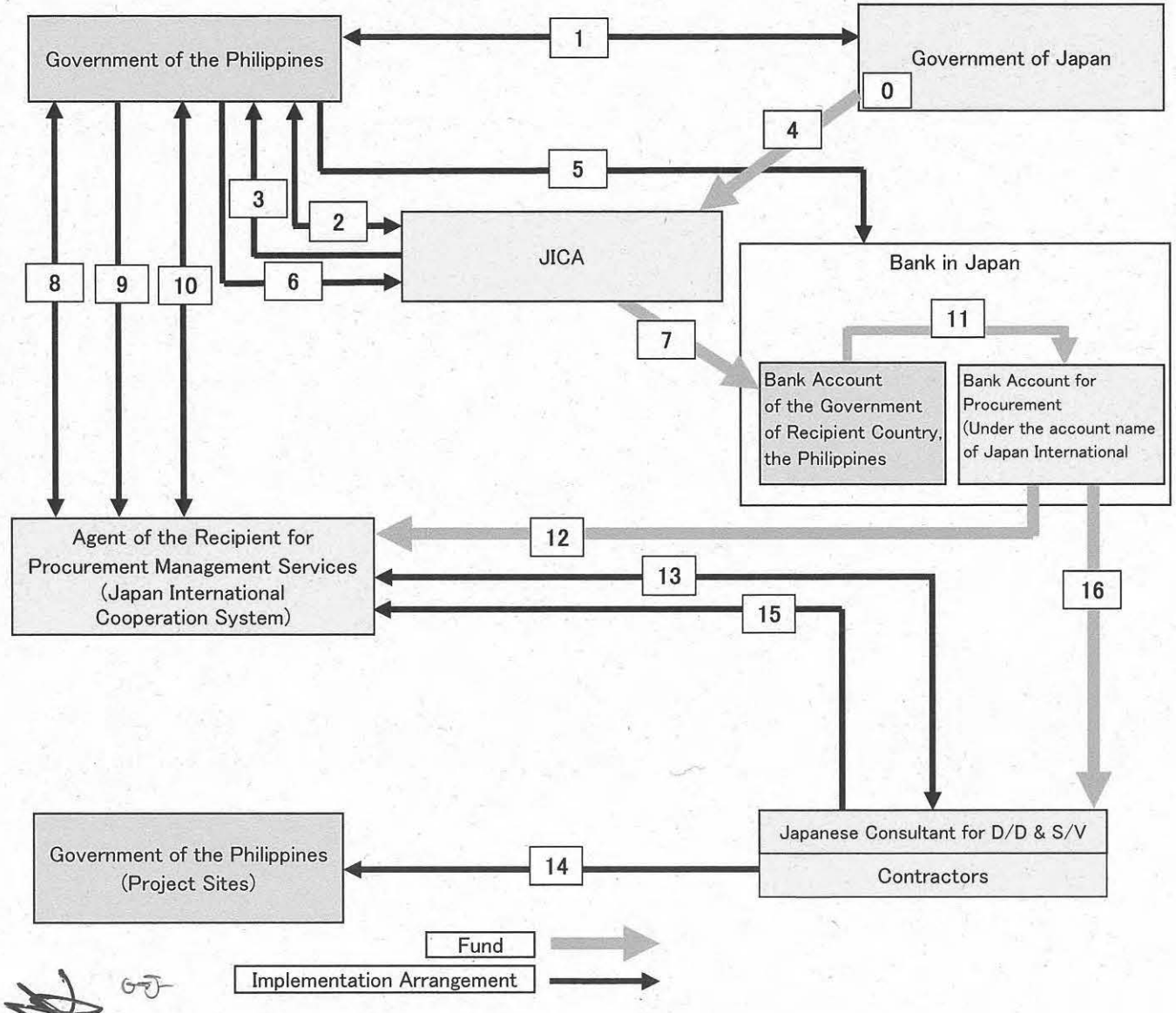
A recipient country must carefully consider the social and environmental impacts by the Project and must comply with the environmental regulations of the recipient country and JICA socio-environmental guidelines.

FLOW CHART OF JAPAN's GRANT AID PROCEDURES

Stage	Work-Flow & Procedures	Recipient Government	Japanese Government	JICA	Agent (JICS)	Consultant	Contractor	Others
Application	Request	○						
	Screening of Project		○	○				
Project Formulation & Preparation – Field Survey 1	Preparatory Survey → Site Survey, Home Office Work, Reporting			○		○		
Project Formulation & Preparation – Field Survey 2	Explanation of Draft Report & Reference Documents for → Final Report, Reference Documents	○		○		○		
Appraisal & Approval	Appraisal of Project		○					
	Inter-Ministerial Consultation		○					
	Presentation of Draft Notes	○	○					
	Approval by the Cabinet		○					
Implementation	E/N and Agreed Minutes (E/N : Exchange of Notes)	○	○					
	G/A (G/A : Grant Agreement)	○		○				
	Banking Arrangement	○						★
	Agent Agreement → Verification by JICA	○		○	○			
	Issuance of BDA (BDA : Blanket Disbursement Authorization)	○			○			★
	Consultant Contract	○		○	○	○		
	Review & Preparation of Tender Documents → Approval by Recipient Government → Preparation for Tender	○		○	○	○		
	Tendering &Evaluation	○		○	○	○	○	
	Procurement Contract	○		○	○	○	○	
	Procurement → Completion Certificate by Recipient Government	○		○	○	○	○	
	Operation → Post Evaluation Study	○		○				
Evaluation & Follow up	Ex-Post Evaluation → Follow up	○	○	○				

★ Bank in Japan

FLOW OF FUNDS AND SERVICES FOR THE IMPLEMENTATION OF JAPAN'S GRANT AID (Exceptional Version for this Project)



0	Approval of Cabinet
1	Signing of Exchange of Notes (E/N)
2	Signing of Grant Agreement (G/A)
3	Preparatory Survey / Reference Document
4	Disbursement of Funds from the Government of Japan
5	Banking Arrangement (B/A)
6	Request for Transfer of Funds
7	Disbursement of Funds from JICA
8	Signing of Agreement for Agent (A/A)
9	Blanket Disbursement Authorization (BDA)
10	Decision on the Project Comonetns
11	Transfer of Funds
12	Payment of Remuneration to the Agent
13	Conclusion of Contract
14	Procurement and Instllation of Equipment
15	Application for Payment
16	Payment

Annex-5: Major Undertakings to be taken by Each Government

No.	Items	To be covered by Grant Aid	To be covered by Recipient Side
1	To secure lots of land necessary for the implementation of the Project and to clear the sites		●
2	To construct the facility if necessary and install the equipment	(●)	(●)
3	To ensure prompt unloading and customs clearance of the products at ports of disembarkation in the recipient country and to assist internal transportation of the products		
	1) Marine (Air) transportation of the Products from Japan to the recipient country	●	
	2) Tax assumption and custom clearance of the Products at the port of disembarkation		●
	3) Internal transportation from the port of disembarkation to the project site	(●)	(●)
4	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the purchase of the products and the services as well as the employment of the Agent be be borne by the Authority without using the Grant and its accrued interest.		●
5	To accord Japanese nationals and / or nationals of third countries, including such nationals employed by the Agent, whose services may be required in connection with the supply of the products and the services such facilities may be necessary for their entry into the recipient country and stay therein for the performance of their work (The term "nationals" whenever used in the G/A means Japanese physical persons or Japanese juridical persons controlled by Japanese physical persons in the case of Japanese nationals, and physical or juridical persons of third countries in the case of nationals of third countries.)		●
6	To ensure that the products be maintained and used properly and effectively for the implementation of the Project		●
7	To bear all the expenses, other than those covered by the Grant and its accrued interest, necessary for the implementation of the Project		●
8	To bear the following commissions paid to the Japanese bank for banking services based upon the B/A		
	1) Payment of bank commission		●
9	To give due environmental and social consideration in the implementation of the Project		●

Annex-6: Tentative Implementation Schedule

Year			2012												2013					
Japanese Fiscal Year			2011			2012												2013		
Item		Month	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6
Preparatory Survey (OD DFR DD)										DF/R			F/R							
Implementation Achedule	Contract	EN / GA / BA			E/N		B/A													
		Agent Agreement (AA)			3/29	G/A														
		Final Selection of the Products and the Services				End of April, or May														
		Consultant Contracts																		
	Procurement	Review & Preparation of Tender Documents																		
		Approval of Tender Documents by Recipient Government																		
		Tender Notice																		
		Tender Closing																		
		Etender Evaluation																		
		Supply Contaract																		

Annex-7. Terms of Reference and Members of the Consultative Committee

Terms of Reference of the Consultative Committee

1. To confirm an implementation schedule of the Project for the speedy and effective utilization of the Grant and its accrued interest;

2. To discuss modifications of the Project, including modifications of designs of the Facilities;

3. To exchange views on allocations of the Grant and its accrued interest as well as on potential end-users;

4. To identify problems which may delay the utilization of the Grant and its accrued interest, and to explore solutions to such problems;

5. To exchange views on publicity related to the utilization of the Grant and its accrued interest; and

6. To discuss any other matters that may arise from or in connection with the G/A.

Members of the Consultative Committee

The Focal Point	NEDA
The Philippines Side	PHIVOLCS
	DPWH
	Department of Finance (DOF, as an Observer)
Japanese Side	JICA
	Embassy of Japan (as an Observer)
Advisor	The Procurement Agent

Appendix 4-2

Minutes of Discussions

(signed on December 7, 2012)

MINUTES OF DISCUSSIONS ON THE PREPARATORY SURVEY ON THE PROJECT FOR IMPROVEMENT OF EQUIPMENT FOR DISASTER RISK MANAGEMENT

(Explanation of Draft Outline Design on DPWH, and Additional Survey on PHIVOLCS)

In April 2012, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched the Preparatory Survey Team on the Project for Improvement of Equipment for Disaster Risk Management (hereinafter referred to as "the Project") to the Republic of the Philippines (hereinafter referred to as "the Philippines"), and through discussions, field survey, and technical examination of the results in Japan, JICA prepared the Draft Final Report for the Department of Public Works and Highways (hereinafter referred to as "DPWH).

In order to explain and to consult with the officials concerned of the Government of the Philippines (hereinafter referred to as "GOP") on the components of the draft report on DPWH, and additional survey for the components requested by Philippine Institute of Volcanology and Seismology (hereinafter referred to as "PHIVOLCS"), JICA sent the Second Preparatory Survey Team (hereinafter referred to as "the Team), which is headed by Mr. Minoru Miyasaka, Senior Advisor to the Director General, Global Environment Department, JICA, to the Philippines, from December 2nd to December 8th, 2012. As a result of discussions, both sides confirmed the main items described in ATTACHMENT-A (for DPWH), ATTACHMENT-B (for PHIVOLCS), and ATTACHMENT-C (for all agencies concerned).

Manila, 7th December, 2012

宮坂 実

Minoru Miyasaka
Leader
Preparatory Survey Team
Japan International Cooperation Agency
Japan

Maria Catalina E. Cabral, Ph.D.
Assistant Secretary
Department of Public Works and Highways (DPWH)
Republic of the Philippines

Witnessed by

Renato U. Solidum, Jr., Ph.D.
Director
Philippine Institute of Volcanology and Seismology (PHIVOLCS)
Department of Science and Technology (DOST)
Republic of the Philippines

Florante G. Igtiben
Assistant Director
National Economic and Development Authority (NEDA)
Republic of the Philippines

ATTACHMENT-A (for DPWH)

1. Components of the Draft Report

The Philippine side agreed and accepted in principle the components of the draft Outline Design on DPWH explained by the Team. The Project sites and the Project Components on DPWH are shown in Annex-1 and Annex-2 respectively.

2. Cost Estimation of the Project

2-1. The Team explained the cost estimation of the Components as described in Annex-3.

2-2. Both sides agreed that cost estimation of the Project on DPWH as attached in Annex-3 should never be duplicated or released to any third parties before the signing of all the contract(s) for the Project.

2-3. The Philippine side understood that cost estimation of the Project on DPWH described in Annex-3 is a provisional one as a result of the study and could be subject to change according to further examination or situation change.

3. Special Consideration of the Project

3-1. Both sides reconfirmed the contents of article 7 "Special Consideration" in the minutes of discussion signed by both sides on 27th April 2012 (hereinafter referred to as "the previous M/D").

3-2. The Philippine side accepted that the equipment described in Annex-2 for DPWH must or should be procured under the Special Consideration specified in the previous M/D in order to contribute to reconstruction of the industry located in "Specified Disaster Affected Area" in Japan.

3-3. The Philippine side understood that the cost of equipment described in Annex-3 for DPWH was estimated under the Special Consideration.

4. Undertakings to be taken by the Philippine side

Both sides confirmed that GOP through DPWH would carry out the following issues shown in accordance with the implementation schedule of the Project in addition to Annex-5 of the Previous M/D.

4-1. Customs Clearance

4-2. Tax Assumption

4-3. Expediencies

4-4. Proper Operation and Maintenance

4-5. Expenditure other than the Grant

All the expenses, other than those covered by the Grant and its accrued interest, necessary for the implementation of the Project shall be borne by the Implementing Agencies.

(1) Inland Transportation for Mobile Drainage Pumps
(2) Obtaining Permits
(3) Travel Expenses for Initial Operation and Maintenance Training Participants

4-6. Environmental and Social Considerations

5. Tentative Schedule of the Project

5-1. The Team will complete the final Outline Design on DPWH in English and send it to the Philippines in January 2013.

5-2. Both sides confirmed the Project will be implemented in accordance with the tentative schedule as shown in Annex-4

5-3. Both sides confirmed that the tender notice would be delayed or the exclusion of the Project components would be considered if conditions mentioned in term 4. are not met by the designated timing.

6. Other Relevant Issues

6-1. Social and Environmental Considerations

The Philippine side through DPWH promised to clear necessary procedures for social and environmental considerations and obtain a necessary approval by relevant authorities before commencement of the procurement in accordance with the relevant guidelines in the Philippines, including Environmental Impact Assessment (EIA), if required.

6-2. Responsibility for the Tender Documents

The Japan side promised to send the Tender Documents for the equipment to be procured in the Project as a result of the study to the Philippine side.

The Philippine side understood that the Philippine side shall review and complete the entire Tender Documents including the Technical Specifications of the equipment in cooperation with the procurement agency. And then the Philippine side through DPWH is responsible for project implementation and the output of the Project executed.

6-3. Tax Assumption

DPWH will secure the budget or take any necessary procedures for bearing Value Added Tax (VAT), custom duty, and any other taxes and fiscal levies in the Philippines which is to be arisen from the Project activities at their responsibility.

6-4. Confidentiality of the Survey Report

The Team explained that the preparatory survey report to be prepared at the end of the Survey would be disclosed to the public in principle in Japan. However the Team also explained that a confidential part which might affect tendering process such as cost estimation should be kept undisclosed until the tendering has completed.

ATTACHMENT-B (for PHIVOLCS)

1. Cost Estimation of the Project

1-1. The Team explained the cost estimation of the Components for PHIVOLCS will be shown in February 2013.

2. Special Consideration of the Project

2-1. Both sides reconfirmed the contents of article 7 "Special Consideration" in the minutes of discussion signed by both sides on 27th April, 2012 (hereinafter referred to as "the previous M/D").

3. Undertakings to be taken by the Philippine side

Both sides confirmed that GOP through PHIVOLCS would carry out the following issues shown in accordance with the implementation schedule of the Project in addition to Annex-5 of the Previous M/D.

3-1. Land Acquisition for Real-time Tsunami Monitoring System

3-2. Customs Clearance

3-3. Tax Assumption

3-4. Expediencies

3-5. Proper Operation and Maintenance

3-6. Expenditure other than the Grant

All the expenses, other than those covered by the Grant and its accrued interest, necessary for the implementation of the Project shall be borne by the Implementing Agencies.

(1) Inland Transportation, Installation and Adjustment Works in the Areas with Security Issues.
(2) Inland Transportation, Installation and Adjustment Works for Intensity Meters.
(3) Obtaining Permits.
(4) Travel Expenses for Initial Operation and Maintenance Training Participants.

3-7. Environmental and Social Considerations

4. Other Relevant Issues

4-1. Social and Environmental Considerations

The Philippine side through PHIVOLCS promised to clear necessary procedures for social and environmental considerations and obtain a necessary approval by relevant authorities before commencement of the procurement in accordance with the relevant guidelines in the Philippines, including Environmental Impact Assessment (EIA), if required.

4-2. Tax Assumption

PHIVOLCS will secure the budget or take any necessary procedures for bearing Value Added Tax (VAT), custom duty, and any other taxes and fiscal levies in the Philippines which is to be arisen from the Project activities at their responsibility.

4-3. Philippine Earthquake Intensity Scale (PEIS)

PHIVOLCS is developing the prototype of PEIS calculation formula through the Japanese technical cooperation project for Enhancement of Earthquake and Volcano Monitoring and Effective Utilization of Disaster Mitigation Information in the Philippines.

Both sides confirmed the prototype of PEIS calculation formula would be incorporated in the equipment provided by the Project, and PHIVOLCS would implement the experimental study in order to finalize the PEIS calculation formula as a national standard in the Philippines.

ATTACHMENT-C (for all agencies concerned)

1. Special Consideration of the Project

1-1. Both sides reconfirmed the contents of article 7 "Special Consideration" in the minutes of discussion signed by both sides on 27th April 2012 (hereinafter referred to as "the previous M/D").

2. Undertakings to be taken by the Philippine side

Both sides confirmed that GOP would carry out the following issues shown in accordance with the implementation schedule of the Project in addition to Annex-5 of the Previous M/D.

2-1. Banking Arrangement (B/A) and Payment of Bank Commission

2-2. Both sides confirmed that the tender notice would be delayed or the exclusion of the Project components would be considered if the condition mentioned in 2-1. are not met by the designated timing.

3. Scheme of Japan's Grant Aid for Disaster Prevention and Reconstruction (GADPR)

Both sides reconfirmed the GADPR scheme and major undertakings to be taken by each side under GADPR, as described in article 6 "Japan's Grant Aid for Disaster Prevention and Reconstruction (GADPR)" in the previous M/D.

4. Implementation Structure

4-1. Both sides reconfirmed that there is no change in responsible agency, National Economic and Development Authority (hereinafter referred to as "NEDA"), and implementing agencies (PHIVOLCS and DPWH) which were confirmed in the previous M/D.

4-2. Both sides reconfirmed that NEDA shall be the focal point for the coordination with implementing and related agencies in the Consultative Committee which was agreed to be established in the previous M/D. The Philippine side explained that the Consultative Committee would be held properly to accomplish the terms of reference of the committee described in Annex-7 in the previous M/D.

5. Other Relevant Issues

5-1. Social and Environmental Considerations

The Philippine side through DPWH and PHIVOLCS promised to clear necessary procedures for social and environmental considerations and obtain a necessary approval by relevant authorities before commencement of the procurement in accordance with the relevant guidelines in the Philippines, including Environmental Impact Assessment (EIA), if required.

5-2. Tax Assumption

The Philippine side through DPWH and PHIVOLCS will secure the budget or take any necessary procedures for bearing Value Added Tax (VAT), custom duties, and any other taxes and fiscal levies in the Philippines which is to be arisen from the Project activities at their responsibility.

5-3. Visibility of the Project

The Team explained that the visibility of the Project should be ensured as a token of cooperation from the Japanese people if the Project was realized. The following ideas could be considered to enhance publicity of the Project:

(a) To display commemoration panels and/or stickers on the equipment procured and at the facilities where the equipment installed by the Grant Aid, and

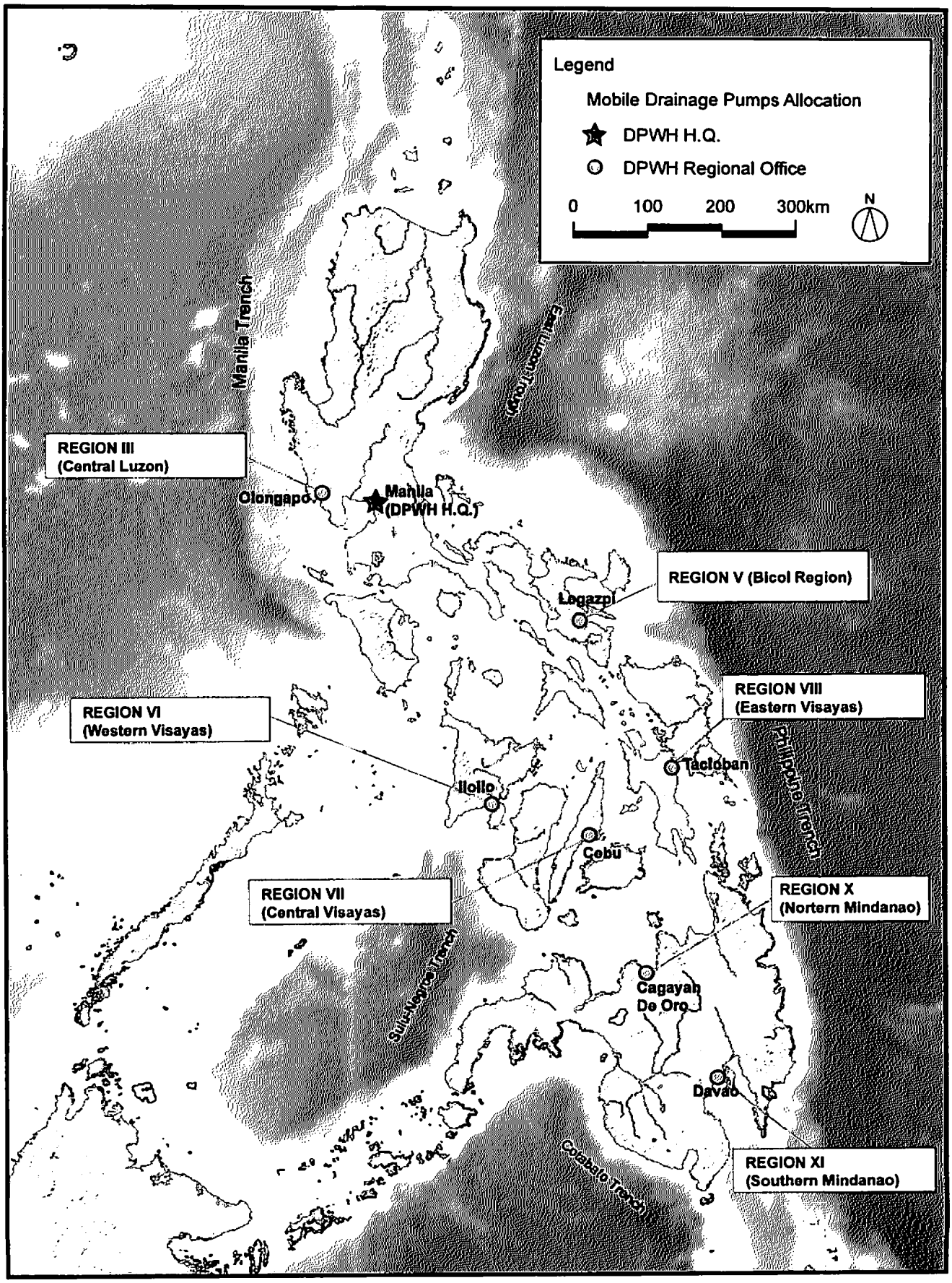
(b) To publicize the Project in the mass media after the Project is approved by both governments.

5-4. Confidentiality of the Survey Report

The Team explained that the preparatory survey report to be prepared at the end of the Survey would be disclosed to the public in principle in Japan. However, the Team also explained that information which might affect the tendering process such as cost estimation should be kept confidential until the tendering has been completed.

Annex-1	Project Sites Map (DPWH Mobile Drainage Pumps)
Annex-2	Project Components (DPWH)
Annex-3	Project Cost Estimate (DPWH)
Annex-4.1	Tentative Implementation Schedule (DPWH)
Annex-4.2	Tentative Implementation Schedule (PHIVOLCS)

Annex-1 : Project Sites Map (DPWH Mobile Drainage Pumps)



LOCATION MAP
(DPWH Mobile Drainage Pump)

Annex-2: Project Components (DPWH)

In order to strengthen DPWH's capacity of disaster rehabilitation and recovery, mobile drainage pumps will be provided by the Project.

Upon the Great East Japan Earthquake, it was still new in our mind that water drainage was great challenges in the tsunami affected areas, and usefulness of mobile drainage pumps was recognized anew. Since tsunami risk is high and floods are frequently occurred in the Philippines, it is expected that provision of mobile drainage pumps will help for efficient flood disaster response and immediate rehabilitation and recovery in the flood affected areas.

Item	Expected Outcomes	Input
Mobile Drainage Pumps	Capacity of flood disaster response will be strengthened and immediate rehabilitation and recovery in the flood affected areas will be enhanced.	Mobile Drainage Pumps : 8 units

<Confidential>

Annex-3: Project Cost Estimate (DPWH)

The Project cost to be financed by the Japan's Grant Aid and the required capital cost for the Project to be borne by DPWH have been estimated and are show in the following table.

However, the Project cost estimates are provisional and would be further examined by GOJ for the approval of the Grant.

Cost borne by GOJ

Item		Amount (JP Yen) (Million)
PHIVOLCS Equipment	-*	This part is closed due to the confidentiality.
DPWH Equipment	Mobile Drainage Pumps 8 units	
Agent Services (for DPWH and PHIVOLCS)		
Detailed Design, Supervision etc	PHIVOLCS	
	DPWH	
Total		

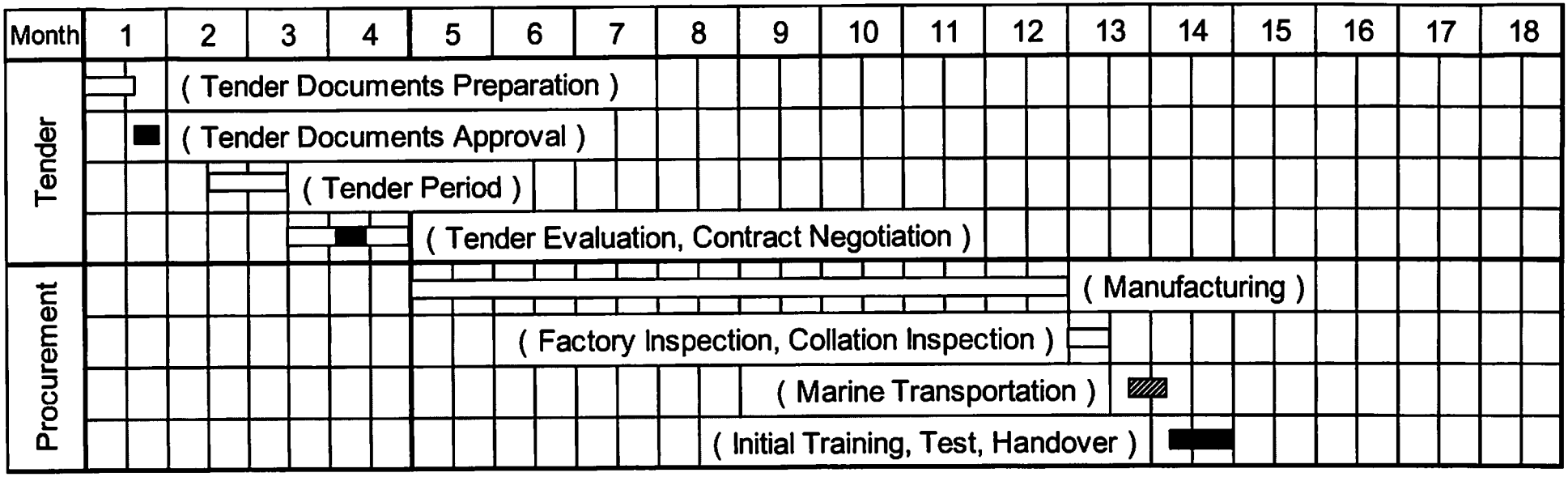
Item		Amount (Peso) (Million)
Inland Transportation for DPWH to Regional Offices (To be transported by DPWH drivers)		0.06
Travel Expenses for Initial Operation and Maintenance Training Participants		(Necessary travel expenses pursuant to DPWH's regulations)
Operation and Maintenance Cost	Fuel	-*
	Spare Parts and Consumables	-*
Total		

Cost borne by GOP

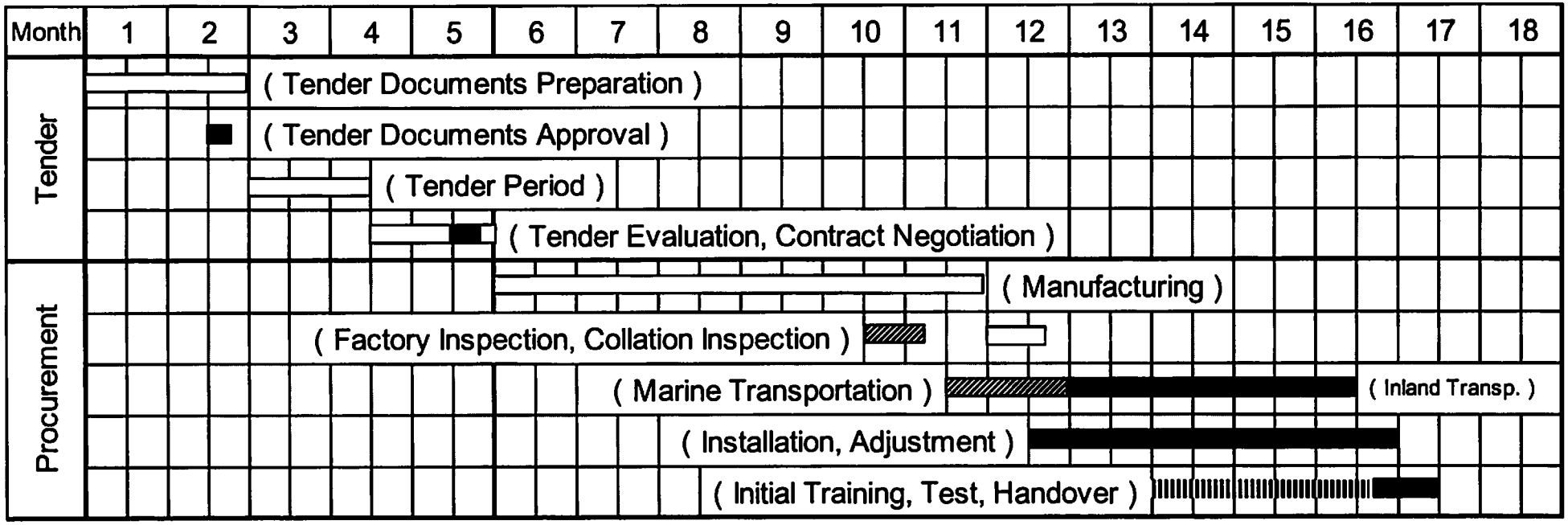
In addition, GOP shall have the responsibility for the payment of banking commission for the Japan's Grant Aid

* : Costs for PHIVOLCS portion, to be prepared after further study.

Annex-4.1: Tentative Implementation Schedule (DPWH)



Annex-4.2: Tentative Implementation Schedule (PHIVOLCS)



Appendix 4-3

Minutes of Discussions

(signed on March 7, 2013)

MINUTES OF DISCUSSIONS
ON
THE PREPARATORY SURVEY
ON
THE PROJECT FOR IMPROVEMENT OF EQUIPMENT FOR DISASTER RISK MANAGEMENT

(Explanation of the Draft Preparatory Survey Report for PHIVOLCS)

In April 2012, Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched the Preparatory Survey Team on the Project for Improvement of Equipment for Disaster Risk Management (hereinafter referred to as "the Project") to the Republic of the Philippines (hereinafter referred to as "the Philippines").

Regarding the components of the Department of Public Works and Highways (hereinafter referred to as "DPWH), in December 2012, JICA sent the Second Preparatory Survey Team to the Philippines to explain and to consult with the officials concerned of the Government of the Philippines (hereinafter referred to as "GOP") on the components of the Draft Preparatory Survey Report for DPWH, and additional survey for the components requested by the Philippine Institute of Volcanology and Seismology (hereinafter referred to as "PHIVOLCS").

Through discussions with PHIVOLCS, additional field survey and technical examination of the results in Japan, JICA prepared the Draft Preparatory Survey Report. In order to explain and to consult with the officials concerned of the GOP on the components of the Draft Preparatory Survey Report for PHIVOLCS, JICA sent the Third Preparatory Survey Team (hereinafter referred to as "the Team"), which is headed by Mr. Shiro Nakasone, Director, Disaster Management Division 1, Water Resources and Disaster Management Group, Global Environment Department, JICA to the Philippines, from March 3th to 8th, 2013. As a result of discussions, both sides confirmed the main items described in the attached sheets.

Manila, 7th March, 2013

Shiro Nakasone
Leader
Preparatory Survey Team
Japan International Cooperation Agency
Japan

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Republic of the Philippines

Witnessed by

Florante G. Igtiben
Assistant Director
National Economic and Development Authority
(NEDA)
Republic of the Philippines

ATTACHMENT

1. Components of the Draft Preparatory Survey Report

The Philippine side agreed and accepted in principle the components of the Draft Preparatory Survey Report on PHIVOLCS as explained by the Team. The project sites and the project components on PHIVOLCS are shown in Annex-1 and Annex-2 respectively.

2. Cost Estimation of the Project

2-1. The Team explained the cost estimation of the Project on PHIVOLCS as described in Annex-3.

2-2. Both sides agreed that cost estimation of the Project on PHIVOLCS as attached in Annex-3 should never be duplicated or released to any third parties before the signing of all the contract(s) for the Project.

2-3. The Philippine side understood that cost estimation of the Project on PHIVOLCS described in Annex-3 is a provisional one as a result of the Survey and could be subject to change according to further examination or situation changed.

3. Special Consideration of the Project

3-1. Both sides reconfirmed the contents of article 7 "Special Consideration" in the Minutes of Discussions signed on 27th April 2012.

3-2. The Philippine side accepted that the equipment described in Annex-2 will be procured under the Special Consideration in order to contribute to reconstruction of industry in "Specified Disaster Affected Area" in Japan.

3-3. The Philippine side understood that the cost of equipment on PHIVOLCS described in Annex-3 was estimated under the Special Consideration.

4. Undertakings to be taken by the Philippine side

Both sides confirmed that the Philippine side through PHIVOLCS shall complete the following undertakings shown in accordance with the implementation schedule of the Project, in addition to Annex-5 of the Minutes of Discussions signed on 27th April 2012 and Attachment-B and C of the Minutes of Discussions signed on 7th December 2012;

- To obtain agreement letters from the owners of the lands / facilities for installation of the following equipment prior to the tender notice that is tentatively scheduled in June 2013.

  (1) Broadband Strong Motion Seismometers, if required.

  PHIVOLCS shall submit actual site plans including dimension for analysis of the best configuration of solar panels by the end of March 2013.

  (2) Tsunami Wave Detectors and Tsunami Data Transmission Stations

- To submit a list of the sites for installation of the Earthquake Intensity Meters prior to the tender notice that is scheduled in June 2013.

5. Scheme of Japan's Grant Aid for Disaster Prevention and Reconstruction

Both sides reconfirmed the Scheme of Japan's Grant Aid for Disaster Prevention and Reconstruction (hereinafter referred to as "GADPR") and major undertakings to be taken by each side under GADPR, as described in article 6 in the Minutes of Discussions signed on 27th April 2012.

6. Implementation Structure

6-1. Both sides reconfirmed that there is no change in the responsible agency and implementation agencies which were confirmed in the Minutes of Discussions signed on 27th April 2012 and the Minutes of Discussions signed on 7th December 2012.

6-2. Both sides reconfirmed that National Economic and Development Authority (hereinafter referred to as "NEDA") shall be the focal point for the coordination with implementation and related agencies in the Consultative Committee which was agreed to be established in the Minutes of Discussions signed on 27th April 2012. The Philippine side explained that the Consultative Committee would be held properly to accomplish the terms of reference of this committee described in Annex-7 in the Minutes of Discussions signed on 27th April 2012 and the Minutes of Discussions signed on 7th December 2012.

7. Tentative Schedule of the Project

7-1. The Team will complete the Preparatory Survey Report in English and send it to the Philippines in May 2013.

7-2. Both sides confirmed the Project will be carried out in accordance with the tentative schedule as shown in Annex-4.

7-3. Both sides confirmed that the tender notice would be delayed or the exclusion of the Project components would be considered if undertakings by the Philippine side mentioned in Article 4 are not met by the designated timing.

8. Other Relevant Issues

8-1. Social and Environmental Considerations

The Philippine side through PHIVOLCS promised to clear necessary procedures for social and environmental considerations and obtain a necessary approval by relevant authorities before commencement of the procurement in accordance with the relevant guidelines in the Philippines, including Environmental Impact Assessment (EIA), if required.

8-2. Responsibility for the Tender Documents

The Team promised to send the Technical Specifications for the equipment to be procured in the Project as a result of the Survey to the Philippine side.

The Philippine side understood that the Philippine side shall review and complete the entire Tender Documents including the Technical Specifications of the equipment in cooperation with the procurement agent. The Philippine side is responsible for project implementation and the output of the Project being executed.

8-3. Tax Assumption

The Philippine side through PHIVOLCS will secure the budget or take any necessary procedure for bearing Value Added Tax (VAT), custom duties, and any other taxes and fiscal levies in the Philippines which may arise from the Project activities at their responsibility.

8-4. Confidentiality of the Draft Preparatory Survey Report and the Preparatory Survey Report

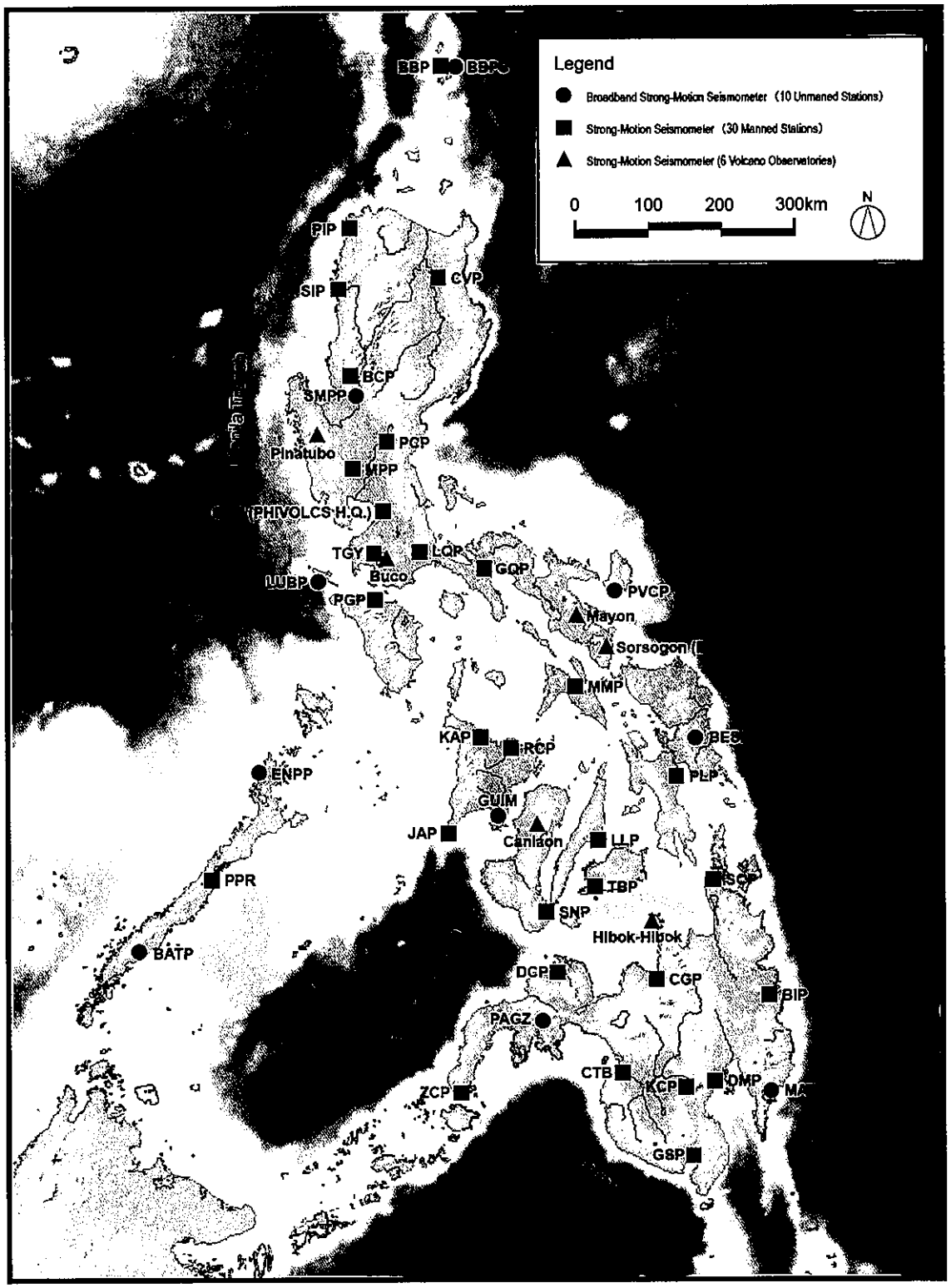
The Team explained that the Draft Preparatory Survey Report and the Preparatory Survey Report to be prepared at the end of the Survey would be disclosed to the public in principle in Japan. However the Team also explained that a confidential part which might affect tendering process such as cost estimation should be kept undisclosed until the tendering has completed.

8-5. Inland Transportation, Installation and Adjustment Works

Both sides reconfirmed that the following expenses, other than those covered by the Grant and its accrued interest, necessary for the implementation of the Project, which were described in Attachment-B of the Minutes of Discussions signed on 7th December 2012, shall be borne by PHIVOLCS;

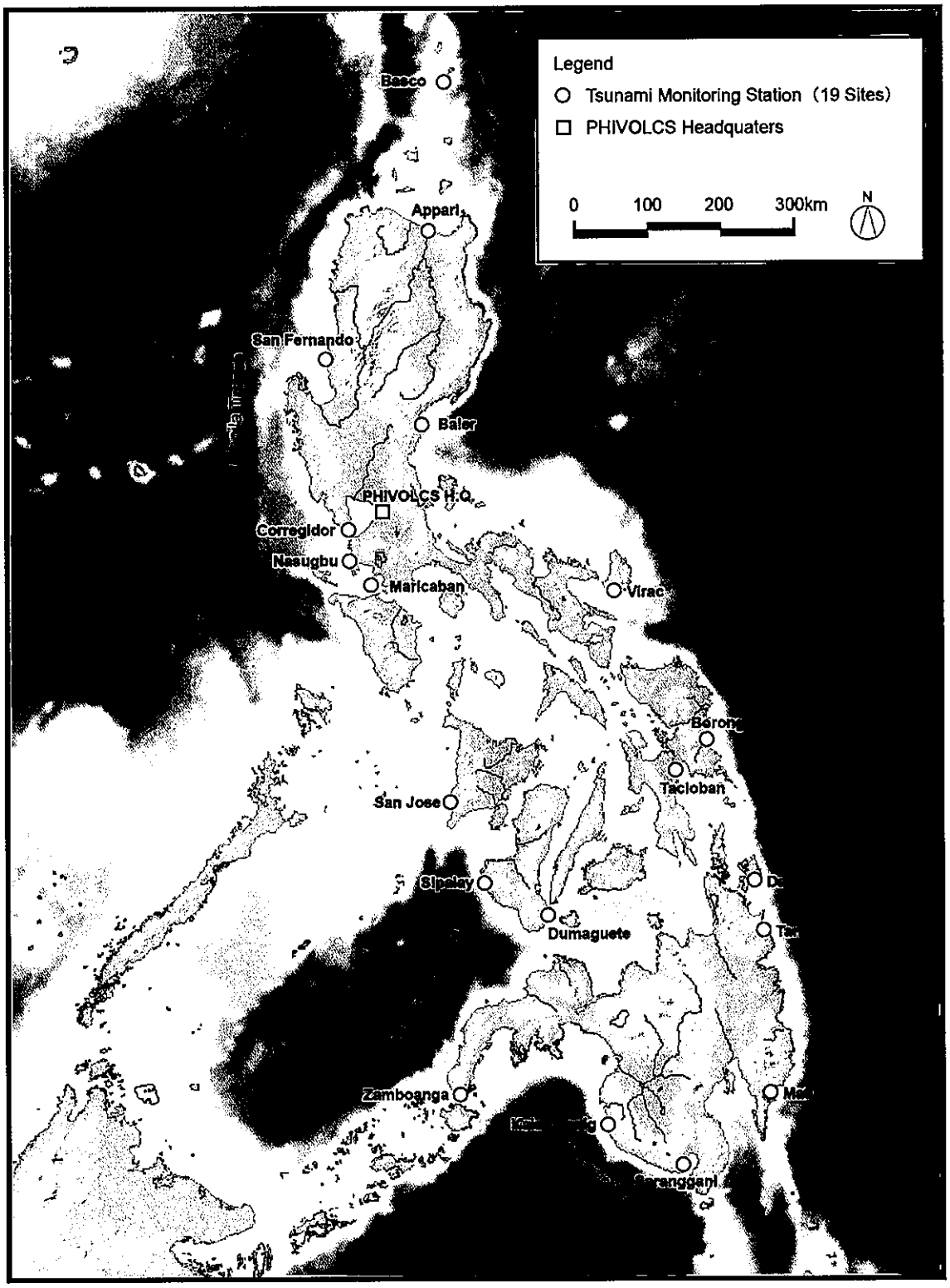
- Inland transportation, installation and adjustment works in the areas with security issues; and
- Inland transportation, installation and adjustment works for intensity meters.

Annex-1 Project Sites Maps (PHIVOLCS)
Annex-2 Project Components (PHIVOLCS)
Annex-3 Project Cost Estimates (PHIVOLCS)
Annex-4 Tentative Schedule (PHIVOLCS)



LOCATION MAP
(PHIVOLCS Realtime Earthquake Monitoring System)

Annex-1 : Project Sites Map (PHIVOLCS)



LOCATION MAP
(PHIVOLCS Realtime Tsunami Monitoring System)

Annex-2 : Project Components (PHIOLCS)

1. Real-time Earthquake Monitoring System

Item	Major Specification	Purpose of Use	Project Site
1-1 Set of Broadband Strong Motion Seismometer (10 sets)		Scales of giant earthquakes will be accurately estimated with broadband strong motion seismometers that can work even for giant earthquakes, and the information acquired by the equipment will be utilized to forecast earthquake damages and tsunami.	10 Unmanned Stations ①BATP ②BBPS ③BESP ④ENPP ⑤GUIM ⑥LUBP ⑦MATI ⑧PAGZ ⑨PVCP ⑩SMPP
Broadband Strong Motion Seismometer	• Symmetric triaxial component Servo-type velocity meter (velocity-type strong motion seismometer) • Frequency: 0.01～70Hz or above • Measurement Range: Not less than ±2m/s (Not less than ±200Kine) • Dynamic Range: Not less than 145dB		
Digitizer	• Nanometrics Trident Digitizer • 3 Channels • 24bit A/D conversion、ΔΣmodulation • NMXP data format (Nanometrics standard) • NMX/UDP (Nanometrics standard transmission system) • Time correction by GPS		
Power Source	• Solar Panel, Charge Controller, Battery, Arrester (Lightning arresters), Cut off Switch, etc.		
1-2 Set of Strong Motion Seismometer (36 sets)		The existing strong motion seismometers that are up for renewal will be renewed, telemetry will be established through satellite communication systems, and a real-time monitoring network for seismic wave form and seismic intensity will be built.	30 Manned Stations 6 Earthquake and Volcano Stations 36 Stations in total ①JAP ②BBP ③BCP ④BIP ⑤CGP ⑥CTB ⑦CVP ⑧DCP ⑨DMP ⑩GQP ⑪GSP ⑫KAP ⑬KCP ⑭LLP ⑮LQP ⑯MMP ⑰MPP ⑱PCP ⑲PGP ⑳PIP ㉑PLP ㉒PPR ㉓QVP ㉔RCP ㉕SCP ㉖SIP ㉗SNP ㉘TBP ㉙TGY ㉚ZCP ㉛Pinatubo ㉜Buco ㉝Mayon ㉞Sorsogon ㉟Canlaon ㊱Hibok-Hibok
Strong Motion Seismometer	• Symmetric triaxial component Servo-type accelerometer • Not less than 24bit A/D conversion、ΔΣmodulation • Sampling Frequency: 100Hz • Measurement Range: Not less than ±3,000gal		
Digitizer (Processor)	• Computed data: PEIS (PHIVOLCS earthquake intensity scale), maximum acceleration, maximum velocity、peak acceleration cycle, seismic intensity (SI) scale, dominant frequency during each 10 seconds including maximum acceleration, Time of earthquake detection • Based on SEED format • Based on SeedLink protocol • Time correction by GPS, error range: less than 10msec • Monitor output: instrumental seismic intensity, maximum acceleration, maximum speed, Time of earthquake detection		
Power Source	• Solar Panel、Charge Controller, Battery, Arrester (Lightning arresters), Cut off Switch, etc.		35 stations except HQ (QVP) which used City Power
Satellite Communication System	• IPSTAR satellite communication equipment (antenna、modem) • ABS satellite communication equipment (antenna、modem)		32 Stations which do not have Satellite Communication System (29 Stations for IP Star, 3 Stations for ABS)
1-3 Earthquake Intensity Meter (240 sets)	• Symmetric triaxial component acceleration sensor • Measurement Range: Not less than ±1,500gal, Noise: less than 0.1gal • Time correction by NTP • Computed data: PEIS (PHIVOLCS earthquake intensity scale)	A network for seismic intensity will be established, and it will be utilized for disaster response.	240 Locations in Nationwide (To be installed at Local Government Office, Potable Base Station, etc.)
1-4 Software for Earthquake Monitoring (2 sets)	• Nanometrics (Canada) Apollo Server • PC Workstation • UPS	The software will be utilized for the connection with the existing systems.	PHIVOLCS HQ
1-5 Earthquake Information System (1 set)	• Server for seismic intensity indication (redundant configuration) • Software for seismic intensity information displays • UPS, large-size monitor, KVM, rack, and etc.	Seismic intensity data will be acquired and stored, and the data will be indicated on maps.	PHIVOLCS HQ
1-6 Equipment for Satellite Communication System in HQ (1 set)	• IPSTAR satellite communication equipment (antenna、modem) • Nanometrics (Canada) Carina Hub	Monitoring data transmitted through satellite systems will be received.	PHIVOLCS HQ

2. Real-time Tsunami Monitoring System

Name	Major Specifications	Purpose	Location
2-1 Set of Tsunami Wave Detector (19 sets)		Tide levels will be measured. The measured data will be transmitted via radios to tsunami data transmission stations constructed in neighboring elevated grounds.	19 Tsunami Monitoring Stations ①Maricaban ②Nasgbu ③Corregidor ④San Fernando ⑤Appari ⑥Basco ⑦Baler ⑧Virac ⑨(Void) ⑩Borongan ⑪Tacloban ⑫Dapa ⑬Tandag ⑭Mati ⑮Saranggani ⑯Kalamansig ⑰Zamboanga ⑱Dumaguate ⑲Sipalay ⑳San Jose
Tsunami Wave Detector	• Radio-wave-type or ultrasonic-type water level gauges (hanging type) • Measurement Interval: Less than 1 second interval、Successive measurement • Measurement Range: not less than 15m, Dead Zone: within 1.0m • Measurement accuracy: within ±0.3%h or ±3cm (Maximum value) • Measurable displacement: not less than 2.0m/s displacement can be followed. • Operating temperature limit: −10℃～50℃ • Installation height: Not less than +3.5m from the existing quay • Stanchion: SUS316 or above		
Radio Transmitter for Data Communication	• Transmission range: not less than 1km (line-of-sight distance) • Frequency range: 481.250～481.475MHz or 486.250～486.475MHz • Output power: 10mW • Operating temperature limit: −10℃～50℃ • Power saving type		
Power Source	• Solar Panels (chloride corrosion protective type for splash area), Charge Controller, Battery, Arrester (Lightning arrester), Cut off Switch, etc.		
2-2 Data Transmission Station (19 sets)		Receiving the tide level data transmitted via radios by the tsunami wave detectors, the stations will relay the data to the PHIVOLCS headquarters with satellite communication systems	
Data Logger	• Memory capacity: The capacity that can store one-year measurement data on tide levels • Time correction by GPS, error range: less than 10msec • Data processing: water level data within every 1 second will be statically processed to make it possible to conduct averaging of the data in any interval approximately from 1 to 600 seconds. • Operating temperature limit: −10℃～50℃		
Radio Receiver for Data Communication	• Transmission range: not less than 1km (line-of-sight distance) • Frequency range: 481.250～481.475MHz or 486.250～486.475MHz • Output power: 10mW • Operating temperature limit: −10℃～50℃ • Power saving type		
Power Source	• Solar Panels (chloride corrosion protective type for splash area), Charge Controller, Battery, Arrester (Lightning arrester), Cut off Switch, etc.		
Satellite Communication System	• IPSTAR Satellite Communication Equipment (antenna, modems) • ABS Satellite Communication Equipment (antenna, modems)		17 IP Star stations (except ⑥⑰) 2 ABS Statins (⑥⑰)
2-3 Tsunami Information System (1set)	• Server for tsunami monitoring data (redundant configuration) • Software for displaying tsunami information • UPS, monitor, KVM, rack, etc.	The measured tide level data will be collected and accumulated. Moreover, observed tide levels and speculated tide levels will be displayed.	PHIVOLCS HQ

3. Tsunami Simulation Database Development Hardware

Name	Major Specifications	Purpose	Location
3 Hardware for Tsunami Simulation Data Base (1 set)		A great many cases of tsunami simulations will be implemented at very high speed. Moreover, the tsunami database will be expanded.	PHIVOLCS HQ
Computational Server (10 units)	• CPU: Not less than Intel Xeon E5-2650(2GHz,turbo boost 2.8GHz/8 core/20MB) x 2 • Memory: Not less than 48GB (DDR3 1333MHz) • Hard disk drive: Not less than 4TB • Removable media drive: DVD-R/RW drive x1 • LAN interface: Gigabit Ethernet (IEEE 802.3z or IEEE 802.3ab), Port x 2 • Chassis: Rack mount • OS: Linux (CentOS)		
Network Attached Storage (NAS) (1 unit)	• Protocol supported: NFS, CIFS • Hard disk drive: Not less than physical storage capacity 36TB • LAN interface: Gigabit Ethernet (IEEE 802.3z or IEEE 802.3a), Port x 2 • Chassis: Rack mount		
Control PC (2 units)	• CPU: Not less than Intel Core i7 3770 • Memory: Not less than 8GB • Hard disk drive: Not less than 2TB • Removable media drive: Blue-ray disk drive • OS: Windows 7 pro / 64bit		
Fortran Compiler	• Intel Fortran Compiler, 2 Licenses (floating license)		
Others	• Network switch, UPS, monitor, KVM, rack, etc.		

Annex-3 Project Cost Estimate (PHIVOLCS)

<Confidential>

1. Project Cost to be borne by Japan's Grant Aid

Item		Amount (million JP Yen)
PHIVOLCS Equipment	Real-time Earthquake Monitoring System • Broadband strong motion seismometers (10 sets) • Strong motion seismometers (36 sets) • Earthquake intensity meters (240 sets) • Software for Earthquake Monitoring (2 sets) • Earthquake Information System (1 set) • Satellite Communication System in HQ (1set) Real-time Tsunami Monitoring System • Tsunami Wave Detectors (19 sets) • Tsunami Data Transmission Stations (19 sets) • Tsunami Information System (1 set) Hardware for Tsunami Simulation Data Base (1 set)	This part is closed due to the confidentiality.
DPWH Equipment	Mobile Drainage Pumps (8 units)	
Agent Services (for PHIVOLCS and DPWH)		
Detailed Design, Supervision etc.	PHIVOLCS	
	DPWH	
Total		

2. Project Cost to be borne by the Philippine side (PHIVOLCS)

Item	Amount (million Philippine Peso)
1. Inland Transportation, Installation and Adjustment Works in the Areas with Security Issues	2.20
2. Inland Transportation, Installation and Adjustment Works for Earthquake Intensity Meters	0.05
3. Travel Expenses for Initial Operation and Maintenance Training Participants	(Necessary travel expenses pursuant to PHIVOLCS regulations)
4. Costs of Purchasing Air Conditioners	0.06
Total	2.31

3. Condition of Estimates

1) Date of Estimate : May 2012
2) Exchange Rate : 1US$ = JPY 80.17, 1PHP=JPY 1.99

Annex-4

Tentative Schedule of the Project (PHIVOLCS)