

**Project:** Maharashtra Sustainable Climate Resilient Coastal Protection Management Project  
**Consultancy package:** Project Management, Design & Supervision support Consultant (PMDSC)

## TERMS OF REFERENCE

### 1. Project Background

India has a coastline of 7,525 kilometers (km) along its nine national coastal states and the union territories. About 20%–25% of its population lives within 50 km of the coast, with 60% of them residing in rural areas. All the coastal states and territories are affected by coastal erosion.

Maharashtra coastline is flanked by Arabian sea in the west and Western Ghat in the east. The coastline has diverse features with rocky headlands creating sandy pocket beaches, rocky cliffs, muddy beaches and mangrove shores. Seven coastal districts Sindhudurg, Ratnagiri, Raigad, Mumbai, suburban Mumbai, Thane and Palghar in the narrow coastal plain support a large population and economic activities like marine transportation, fishing, agriculture, cultural hot spots and recreational tourism. Maharashtra coast is relatively free from tropical cyclones although recent cyclone tracks have indicated increasing exposure of the state to such extreme events. Coastal erosion is a threat. According to an estimate<sup>1</sup>, 24% of the 740 km coast is eroding. Erosion is caused by several factors: geomorphic configuration of the shoreline, human interventions on the coastline disturbing the natural sediment transport balance in the littoral zone, episodic met-ocean conditions. In recent years, climate change effects such as accelerated sea level rise, change in frequency, intensity and track of tropical cyclones and change in wave-climate have exacerbated the erosion.

Until recently, coastal protection in Maharashtra as in other states did not follow a systematic planning. Coastal protection was undertaken in response to demand for protection needs and at many places, was provided by hard revetment type of structures as immediate and emergency need. Such protection measures did not recognize the beaches as valuable natural resources and ensured sustainable protection because of continued or even accelerated erosion of the foreland seaward of the revetments. Coastal infrastructure is currently designed based on historic sea levels and wave regimes, with an estimated design life of 25–50 years. Coastal protection projects will become increasingly vulnerable to damage unless appropriate measures of climate resilience are incorporated. At the same time, design of coastal protection must provide functionality complementing site-specific livelihood, environmental and economic activities.

External assistance for coastal protection and management in India started coming in about a decade back. One primary objective of the external assistance in coastal protection is to increase exposure to new ideas and practices. The projects under implementation or completed recently are (a) Integrated Coastal Zone Management Project (ICZMP) under the Ministry of Environment, Forest and Climate Change (MoEFCC) with support from World Bank and (b) Sustainable Coastal Protection and Management Investment Program (SCPMIP) under the Ministry of Water Resources with support from the Asian Development Bank (ADB) and (c) Climate Resilience Coastal Protection and Management Project (CRCPMP) with grant from Global Environment Facility (GEF).

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<sup>1</sup> Kankara, R.S., Ramana Murthy, M.V. & Rajeevan, M (2018). *National Assessment of Shoreline Changes Along Indian Coast: Status report for 26 years 1990-2016*, Ministry of Earth Sciences.

Asian Development Bank (ADB) approved the project 'SCPMIP' under a Multi-tranche Financing Facility (MFF) for \$ 250 million from the OCR for the two coastal states of Maharashtra and Karnataka. The framework financing agreement (FFA) was signed in 2011 with validity till 2019. This was an investment program supported by an ADB loan designed to address immediate coastal protection needs and coastal instability using environmentally and socially appropriate solutions in the states of Karnataka, and Maharashtra. It also included developing institutional capacities to meet the long-term needs of sustainable coastal protection and management, and support initiatives to increase the participation of the private sector and communities in coastal protection and management.

TA project 'CRCPMP' was implemented through ADB and financed by the Global Environmental Facility (GEF). The TA objectives were to develop a framework for climate-resilient design of protection and management of Indian coast to the adverse impacts of climate change through agreed strategies. The CRCPMP project worked closely with project 'SCPMIP' with the specific objectives of (i) assessing the impacts of climate change on the coast of India; (ii) preparing guidelines for adaptation measures to ensure climate resilience in coastal protection and coastal infrastructure; (iii) implement community-based climate-resilience coastal protection projects in the two focal states of Maharashtra and Karnataka based on the above guidelines; and (iv) provide training to coastal states including training of trainers in the adaptation guidelines.

In Maharashtra, implementation of tranche 1 of SCPMIP started in 2011 after a tripartite agreement among the Government of India, Government of Maharashtra and the ADB. Tranche 1 of the program was completed in 2018, because of which there was no time to undertake the next tranche under the MFF. Key components implemented during the first tranche are (a) shore protection work at Mirya Bay comprising of one offshore geotextile (sand-filled geotextile tubes) reef and beach nourishment (b) GIS-based Coastal Management Information System (CMIS) (c) Shoreline Management Plans (SMP) for seven coastal districts and (d) capacity building.

The state is now seeking financing from the ADB for a follow-on standalone project of coastal protection at several sites as the main component. The present call for Project Management and Design Consulting services is for this standalone loan request which is currently being processed. Maharashtra Maritime Board (MMB) is the Executing and Implementing Agency for the project.

There are two key outputs from the project; (i) sustainable coastal protection projects implemented, and (ii) capacity for sustainable and innovative shoreline protection enhanced.

Four sub-projects are selected for implementation of coastal protection measures. The sites of these sub-projects are (i) Kashid in Raigad district, (ii) Ganapatipule in Ratnagiri district, (iii) Devbag (Creekside) in Sindhudurg district and (iv) to-be-finalized locations for dune enhancement (nature-based solutions). The fourth sub-project of climate resilience component of dune enhancement is planned along approximately 20 Km of shoreline at places exhibiting mild or no erosion.

Institutional strengthening and capacity building is the co-component included to ensure that sustainable coastal protection practice remain continued in the state after the completion of the ADB loan project. Activities related to this aspect were initiated during tranche 1 of the SCPMIP and will be continued during the proposed standalone project.

While coastal protection brings its direct and indirect benefits, livelihood of the coastal communities further depends on additional infrastructure. Two significant sectors of coastal livelihood in the state are fisheries and tourism. The Project has set an objective of supporting sustainable coastal infrastructure in compliance with stable coastline towards enhancing community livelihood. This part of the project is termed 'convergence livelihood'.

### **Output 1: Climate resilient coastal protection measures implemented**

Output 1 includes activities mainly, (a) 3-4 sub-projects of sustainable climate resilient shore protection measures are implemented incorporating climate change effects in the design of the subprojects, and (b) xx km of beaches and dunes protected by using nature-based solutions such as dune construction and plantations, restoration degraded mangroves etc.

Feasibility report, prepared by the earlier State Appointed Consultants, includes examination of the causes of erosion, site-specific met-ocean conditions and astronomical tides as well as local bathymetric and topographic features. The report also includes the basic design schemes at Devbag (creek-side), Ganapatipule and Kashid sub-project sites. Regarding the fourth sub-project, the EA has identified several stretches along the shore for implementation of dune enhancement and nature-based management. The stretches for implementation will be finalized by the PMU with support from the PMDC keeping in mind technical appropriateness, environmental and social safeguards. Implementation of the fourth sub-project will utilize the lessons learnt from a pilot sub-project at Bhatye, Ratnagiri implemented under a TA project 'CRCPMIP' supported by GEF and ADB. Preparation of Detailed Project Reports (DPRs) and tendering of works of these four sub-projects remain to be done.

A summary of the sub-projects is given below.

- (i) Kashid: This site belongs to Raigad district, south of Alibagh. The proposed coastal protection scheme at Kashid is dune nourishment, planting and fencing. Along with this, visitor's facilities and a board walk will also be implemented. There is no fishing along this beach and the economy of the surrounding villages depend mostly on the tourism. The estimated cost of the proposed scheme is \$ 1.29 million.
- (ii) Ganapatipule: This site belongs to Ratnagiri district. It is of significant cultural, religious and recreational importance. Preserving the beach is essential for conserving the heritage Ganapati temple and several other public as well as private properties that dot the shoreline. The beach supports many small business owners catering to the needs of recreational visitors, water sports operators and fisherfolks. Physical evidence of the beach eroding is borne out by many indicators like the receding tree line, beach scarps, scour under the temple steps. The proposed coastal protection measures consist of an offshore reef and beach nourishment. The offshore reef will be constructed of steel caissons at approximately 300m from the temple at depth of 3m Chart Datum (CD). Crest of the reef will be at a height of 3.4 m from CD with a total height of 6.4m from the seabed. Sand volume estimated for the nourishment is 40,000 m<sup>3</sup> and will come from dredging of a designated area of a river intersecting the beach nearby. Cost of the sub-project is estimated at \$7.15 million.
- (iii) Devbag: This site is located on the creek-side of Devbag-Tarkarli in Sindhudurg district. Bank protection is planned on the creek-side where the Tarkarli-Devbag

sand spit has its narrowest width and there is a real risk of Karli River breaching the spit to the sea. River-bank protection will have a length of 1.3 km with the provision of a marina for recreational boats. The protection wall may consist of sheet piles or alternative structure. The riverbed in front of the protection wall will be dredged to 5m depth below CD. Dredged amount may go up to 1,500,000m<sup>3</sup>. Cost of the sub-project is estimated to be \$28.09million.

- (iv) Climate-resilience dune enhancement (nature-based solutions) sub-project will provide cost-effective nature-based protection at sites which presently exhibit low or neutral level of erosion. This sub-project has the scope of dune height elevation supported by estimation of sea level rise and wave overtopping. This sub-project will include construction with sand nourishment/beach scraping and planting of vegetation to help stabilize the dunes as well minor infrastructure for storm water drainage, dune -fencing and walk-ways for beach access. Crest width of the dune may be around 5m or modified to fit local site purpose. It is expected that about 20 Km of shoreline stretch will be taken up for dune enhancement in Sindhurg and Ratnagiri according to Shoreline Management Plan (2017) of the state. Cost of this sub-project is \$8.0 million.

A summary of the proposed interventions for the four subprojects are provided in Table 1below.

Table 1Summary of Proposed Interventions for the Subprojects

Nr	Sub-Project	Protection Length (Km)	Primary feature	Other feature-1	Other feature-2	Other feature-3
1	Kashid	3.0	Dune nourishment (1,35,000m <sup>3</sup> )	Dune planting + fencing	Visitor's facilities	Board walk
2	Ganapatipule	1.0	Offshore reef (200m), Segmented steel caissons	Beach nourishment (40,000m <sup>3</sup> )	-	
3	Devbag	2.2	Riverbank protection (1.3 Km)	Sand spit protection (900m)	River port wall (250m)	River channel dredging (1,500,000m <sup>3</sup> )
4	Climate-Resilience Dune Enhancement	20.0	Beach scraping (550,000m <sup>3</sup> )	Dune enhancement+ Dune planting	Storm water drains,	Boat ramps, beach access

The coastal protection projects create opportunity for promotion of the convergent livelihood activities which are currently being promoted by other departments such tourism and fisheries etc. The project proposes to explore potential of such convergent livelihood development project by conducting consultations with various stakeholders, and then developing project prefeasibility assessments with framework of financing using the convergence state, central and any multilateral funding sources.

Project will support identification of potential PPP and private sector projects associated with the coastal/ waterfront infrastructure and services. A framework will also be developed to assess financial viability of the projects and based on the need of such infrastructure services financing framework using the private and/or public sector resources will also be developed..

## **Output 2: Capacity for sustainable and innovative shoreline protection enhanced**

This output includes the following components (a) coastal Management Information system (CMIS) strengthened with inter-agency coordination for shoreline monitoring; (b) Coastal Infrastructure Management Unit (CIMU)<sup>2</sup>, strengthened and mainstreamed into the core operations of MMB, (c) training CIMU, PMU, and staff of stakeholder departments to enhance capacity for State/district agencies and stakeholders in the planning of the coastal protection measures and its management; (d) updating SMPs for all the coastal districts for planning protection measures and assessing future investments; (e) community participation in sub-project management for the sustainable shoreline strengthened with shoreline management organizations (SMO) at the sub-project locations made functional with improved participation of women in membership and management; and (f) support livelihood activities in the project area.

Several steps were taken on the afore-mentioned aspects of capacity building in the state during tranche 1 of the project 'SCPMIP'. The EA has thus prior experience of the activities and can provide positive and effective feedback on how to build on the past steps.

Information about the existing CMIS and SMP may be found on EA's website Maharashtra Maritime Board . Both CMIS and SMP will be updated with further functionalities, relevant contents and policy information. The present CIMU exists under an office order MMB/CEO/ADB-PMU-M/309 dated 05.09.2014. While the CMIS and SMP are two key tools the CIMU is the organizational unit to ensure continuation and continued improvement of sustainable coastal protection in the state. SMO is essential at the community level for smooth implementation of ne sub-projects, post-construction maintenance, operation and monetization of the assets. Therefore, SMO strengthening at the new sub-project sites will also be a key element of the capacity building under the proposed standalone project.

### **Project Organization**

Consultants will work closely with the Project Management Unit (PMU) and Coastal Infrastructure Management Unit (CIMU) for smooth execution of the complete project, in compliance with the State and ADB requirements.

The project organization is indicated in

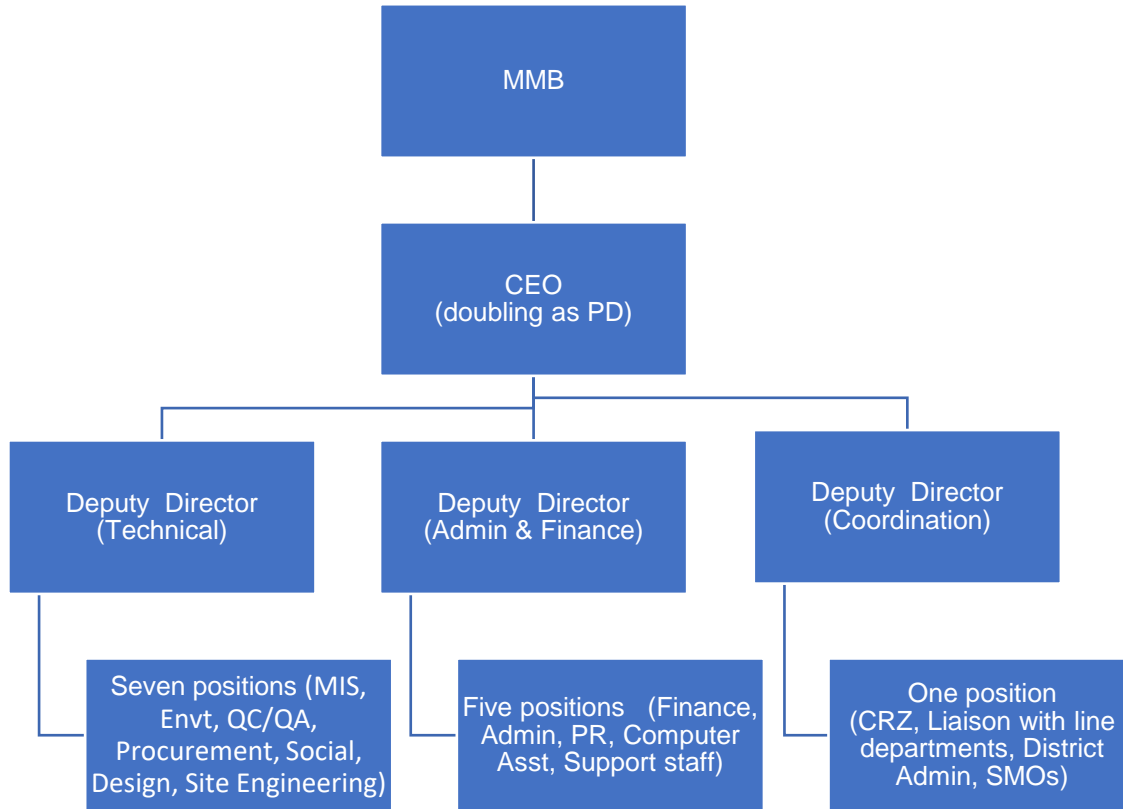
Figure 1. In addition to the PMU structure shown in the figure, there are four state level committees: namely the Project Steering Committee (PSC), Technical Approval Committee (TAC), Procurement Approval Committee (PAC)/Tender Committee and Empowered Committee (EC). These committees act as umbrella bodies for higher level decision-making and project coordination at the state level. Central agencies in role of central level coordination and approval of the project are Ministry of Jal Shakti, Department of Water Resources, River Development & Ganga Rejuvenation, Department of Economic Affairs

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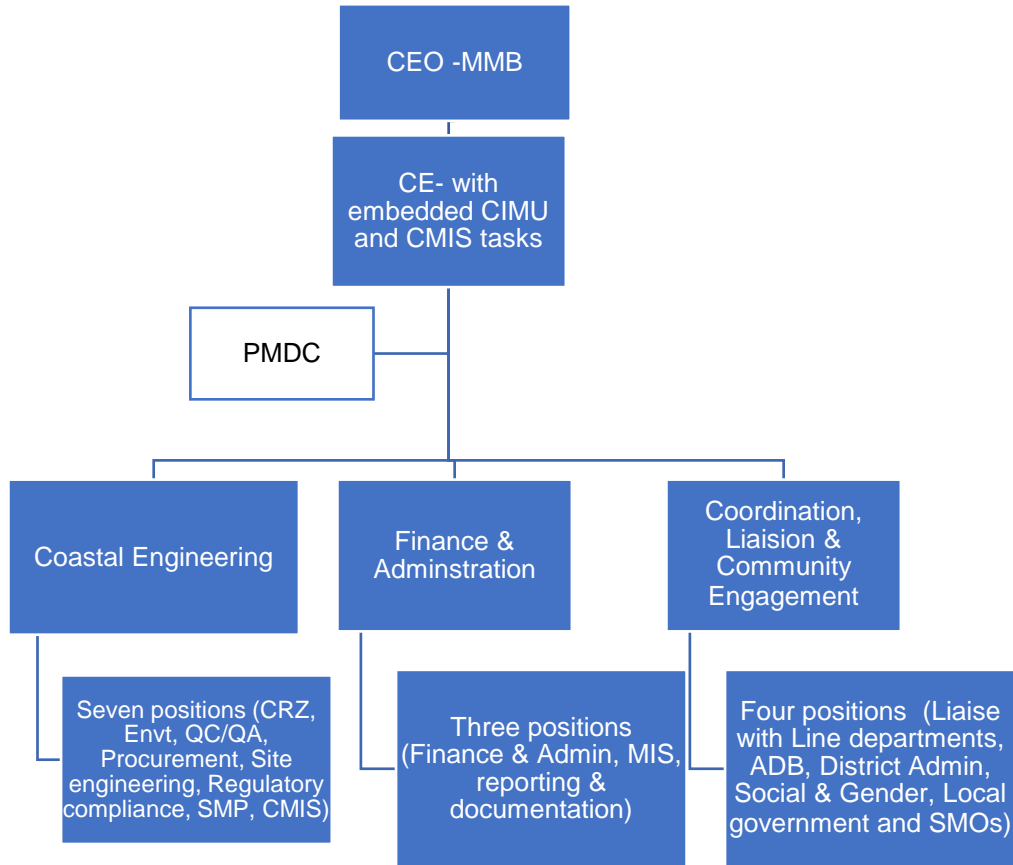
<sup>2</sup> A multi-departmental coastal infrastructure management unit (CIMU) conceptualized during the preceding SCPMIP

(DEA), and Central Water Commission (CWC) and Central Water and Power Research Station (CWPRS).

**Figure 1 Project organization structure**



**Current PMU Structure**



**Proposed PMU Structure**

## **2. Purpose of the Assignment**

The project outputs will result in the i) sustainable climate-resilient coastal protection achieved, and ii) livelihood and income generation improved among the coastal communities. Project impact is state resilience to disasters and climate change enhanced. The purpose of assignment is to support project management, design and implementation of identified targeted interventions in coastal protection management works at identified locations. Consultant scope will include support in **Project Management, Planning and Design** of sub-projects to be implemented; **Construction Management Support** for implementation of the selected subprojects and to-be-identified 'convergence livelihood' sub-project and **Institutional Development and Capacity Building** of CIMU and other state institutions for sustainable coastal protection and management of the coastline etc.

## **3. Duration and Location of the Services**

The consultancy assignment will be for 60 months duration. The Consultant will establish and maintain a fully operational project office throughout the implementation period in Mumbai. Project will be implemented at Kashid in Raigad district (ii) Ganapatipule in Ratnagiri district, (iii) Devbag (Creekside) in Sindhudurg district. Consultant will work from Mumbai office and shall travel to the project locations as required. Required equipment and computers etc shall be arranged by the consultant at its own which will include computers,

printers, telecommunication/ communication facilities (Internet, mobile internet access, video, cameras and other mobile communication equipment), and communications facilities. Transport shall be ensured through owned or rented vehicles. Project personnel, shall be mobilised as per project requirement. The consultants will work closely with the PMU and the CIMU ensuring smooth planning and implementation of the project components and liaison with both state and central level agencies as needed.

#### **4. Scope of Services**

The following are the four main objectives.

- (i) **Project Management** – provide overall planning, coordination, and management of the various components of the project, apprise PMU of the bottlenecks, coordinate and manage consultants' activities, ensure appropriately timed mutual feedback with the PMU.
- (ii) **Planning and Design** –Shoreline management plans and CMIS will be strengthened and updated including climate change effects and new survey results. Detailed project reports, including the necessary surveys, studies, and technical investigations, of the four sub-projects to be implemented will be prepared. Design is also likely to include sub-project elements to be identified under the 'convergence livelihood' support.
- (iii) **Construction Management Support** - provide construction management support for implementation of the selected four subprojects and to-be-identified 'convergence livelihood' sub-project.
- (iv) **Institutional Development and Capacity Building**– (a) Undertake activities towards strengthening of CIMU and other state institutions for sustainable coastal protection and management of the coastline, (b) prepare training assessment and implement training, (c) strengthen SMOs and community level training at the sub-project sites, and (d) support livelihood activities in the project area

The scope of consultancy services is described in the following paragraphs for the four main categories: Project Management, Sustainable Shoreline Planning and Design, Construction management and Institutional Strengthening.

##### **Project Management**

The role of the Consultants will be to prepare a schedule of activities till project completion and identify critical issues and suggest remedial measures for progress of the project. The Consultants will assist with the overall project coordination and management through the relevant agencies at national, state, district, and panchayat levels. The Consultants will work closely with the State Project Management Units (PMU) to ensure the effective and timely delivery of the project outputs till project closure.

The project management tasks of the consultants will include, but not limited to,



- (i) Advise and support the State EA and PMU in overall strategic direction, identify the project management needs, planning, strategies, schedules for execution, contract management, financial management, risk management, cost control and scheduling.
- (ii) Assist and support the PMU for the day-to-day project administration, coordination, supervision, implementation, and monitoring of the project activities and outputs; assist PMU for the timely delivery and completion of project outputs and deliverables; supervise and guide technical consultants and contracted service providers and their outputs and deliverables; assist in the preparation, formulation, and submission of annual work and financial plans and project implementation strategies; and monitor and report on progress of project activities and accomplishment of targets. Providing support to the National Committee, State committees and District Planning Councils to effectively guide the project implementation.
- (iii) Prepare and submit detailed work program in consultation with all stakeholders, including all pertinent activities and critical paths, responsibility and function of each team member, coordination mechanism and communication procedures between the consulting firm, contractor and the PMU; reporting system and the procedure etc. shall ensure orderly and uninterrupted progress of the works; ensure gender and inclusion issues are integrated. The mechanism and procedures set by the consulting firm shall be subject to the approval by the PMU;
- (iv) Develop project performance management and tracking system, using by developing appropriate project management information system software, with necessary dashboards, to schedule and monitor all aspects of activities including but not limited to design and monitoring framework indicators, procurement status and progress, amount of contract awarded, billing and disbursement etc. . This will help the EA and the PMU to monitor and evaluate implementation of the project, identify performance constraints, and formulate practical measures to address the shortcomings. Annual performance evaluations will be conducted based on assessment of the project. Outputs of the PPMS will be supplied to the Project Steering Committees and ADB.
- (v) Establish baseline data to monitor project impacts, including regular monitoring of physical and financial progress.
- (vi) Performing stakeholder mapping and support participative planning, design and implementation of sustainable coastal protection and management practices,
- (vii) Ensuring the implementation schedules reflect the envisaged interlinked activities.
- (viii) Develop tools and operational guidelines, and assist in monitoring project financial disbursement and recommend ways to facilitate and streamline Government administrative procedures for disbursement, set up system for project financial book-keeping and financial accounts in compliance with ADB requirements
- (ix) Assist the PMU in ensuring compliance with all loan covenants during project implementation.
- (x) Provide support to implement mitigation measures to minimize risk elaborated in risk management plan for the project;
- (xi) Preparing plans and assisting the PMU on co-ordination and communication for various relevant departments and stakeholders.
- (xii) Prepare quarterly progress reports; annual progress reports, safeguard monitoring reports and gender equality and social inclusion action plan monitoring reports.
- (xiii) Assist PMU in implementing the gender equality and social inclusion action plan including compliance monitoring; and prepare all social and gender related reports and other technical reports as necessary.
- (xiv) Plan and develop the safeguards monitoring and evaluation systems.
- (xv) Support PMU to update the environmental assessment and environmental management plan (EMP) or prepare a new environmental assessment and EMP

where unanticipated environmental impacts become apparent during project implementation.

- (xvi) Support in establishing grievance redress mechanism acceptable to ADB under the project through following activities: (a) prepare a project specific guideline on complaint handling and conflict resolution; (b) maintain and regularly update a complaint/resolution data base; and (c) monitor complaint, handling, to ensure follow up resolution efforts at levels;
- (xvii) Assist PMU in implementing the gender equality and social inclusion action plan including compliance monitoring; and prepare all social and gender related reports and other technical reports as necessary.
- (xviii) Support other project ancillary activities emerging from time to time.

## **Planning and Design**

**Detailed project design of the sub-projects:** The Feasibility Study commissioned by the EA lays out the design schemes at three sub-project sites Kashid, Ganapatipule and Devbag (creekside). The remaining sub-project utilizes a scheme of nature-based dune enhancement as a component of climate -resilience along 20 Km (indicative) stretches of coastline which at present exhibit mild erosion (less than 2 m/year recession on the horizontal plane) or neutral shoreline change. Feasibility study report presenting the design parameters, design schemes and dimensions at these sites was finalized in 2017 and subsequently updated in 2019. Further work is required to prepare tender-ready Detailed Project Report from the feasibility report. In general, completion of the DPR for a sub-project will require the consultants to (a) commission and interpret the required topographic and bathymetric surveys and geotechnical investigations (if necessary), (b) finalize the dimensions of the work, the detailed design and cost estimate, (c) financial and economic analysis including reporting baseline economic profile, (d) social and environmental safeguards including baseline monitoring, (e) reporting and (f) supporting the EA in approvals from the state and central bodies. Cost of surveys and investigations are covered under the provisional sum allocated in PMC's budget. The TA consultants have carried out preliminary assessment that the project is Cat B for environment and Cat C for social safeguards. However, the consulting team shall prepare/update safeguard documents for the subprojects in compliance with the IEE, EMP, ESMS, gender equality and social inclusion action plan (GESI/AP), and relevant national/state polices. A preliminary economic analysis has assessed the project to meet ADB requirements, but this needs to be reconfirmed under this consultancy.

Technical nature of the works at each sub-project site are described in brief in the following.

- (i) The proposed scheme at Kashid has three main components: dune nourishment, planting and fencing, visitor facilities and board walk. Kashid has a 3 Km long beach of which the northern side is visited by a greater number of visitors and the southern side is quieter. The 3 Km long beach also has different landscape features on the upper part of the beach. Three seasonal rivers intersect the beach before merging with the sea. Detailed project design at this site will require (a) survey of the beach topography, (b) review the landscape usage of the beach upper face and (c) finalization of the actual positions and layout of the proposed components. Design finalization of dune nourishment component at this sub-project may follow the same general structure of dune enhancement sub-project.
- (ii) The proposed scheme at Ganapatipule has two main components: an offshore reef of length 200m constructed from steel caissons at a water depth of 3m with respect

to CD, beach nourishment utilizing 40,000 m<sup>3</sup> of sand. Details of the reef structure are described in the Feasibility Report (2017). Key elements of the DPR preparation for the offshore reef includes (a) bathymetry and sea-bed dive survey covering the reef footprint, (b) geotechnical investigation and subsidence estimate of the reef, (c) review and modification of the reef foundation, (d) construction methodology and construction yard facilities and layout. Sand required for nourishment will be dredged from a river intersecting the same beach. DPR preparation for the nourishment part includes (a) survey of the designated dredge area and testing of sand quality (b) defining the topology of dredging volume, (c) survey of the beach topography covering the nourishment area, (d) beach-fill template design.

- (iii) At Devbag, a creek-side bank protection is proposed to stabilize the spit against breaching by the river around its narrowest width. The bank protection work will support a future construction of marina for recreation boats<sup>3</sup>. The protection wall may consist of sheet piles. The riverbed in front of the protection wall will be dredged to approximately 5m below CD. Thus, the design scheme proposed for the sub-project envisages four key components: (a) riverbank protection of approximately 1300 m, (b) port wall of 250 m, (c) sand spit protection of approximately 900 m on the sea-side and (d) river channel dredging. Once the feasibility report is reviewed and the scope and requirement of the multi-functional sub-project are understood, the Consultants will prepare a sketch of the layout with all elements taking into account the field conditions. The Consultant should discuss possible alternatives or variations in overall configuration and structural elements with the EA. The primary purpose of the marina designer is to work with the team, particularly with the bank protection designer to ensure that the requirements of the future marina layout is factored in the protection works will support operational efficiency and viability as a marina for recreational boats. The feasibility report also lays out an area of the river-bed to be deepened by dredging. The DPR will also include dredging specification and utilization of the dredged sand.
- (iv) The basic cross-section design of the nature-based dune enhancement is laid out in the feasibility report. Likely shoreline stretches for this sub-project are also identified in Ratnagiri and Sindhudurg district. A pilot community-based sub-project of dune enhancement was implemented at Bhatye in Ratnagiri. There are several lessons to learn from this. DPR preparation of this sub-project includes (a) review of the shortcomings of implementation at Bhatye and remedial measures, (b) modification of the cross-section design (c) review of plantings to be used and implementation schedule with respect to the wave and wind climatology of Maharashtra coast, (d) specification of the actual locations of stretches for implementation, (e) layout design clearly showing the storm-water drains, ramps, fencing, beach access and the appropriate cross-sectional design and (f) sand source for nourishment with clear guidelines for beach-scraping if used as a tool for assisted beach recovery.

**Updating SMPs for the state:** Updating the existing SMPs developed during tranche 1 of SCPMIP is another task of the PMDC in this category of sustainable planning and design. Both technical (or physical) and social-economic descriptors are to be considered for this purpose. Climate change projection and shoreline erosion are two key technical parameters. Spatial variation of erosion rate along Maharashtra coastline should be assessed both from new shoreline change maps from NCSCZM and high-resolution ground-based surveys. Relevant ground-based surveys will be specified by the consultants

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<sup>3</sup> Construction of the recreational boat marina is not part of the current project financing. However the design of protection works need to factor in this future requirement.

and interpreted for assessing shoreline change. On the usage side, state departments of tourism, fisheries and environment have become more active in realizing the potentials of the beaches and coastline. The departments have formulated new policies in this regard. The updated SMPs should reflect the changing scenarios. The Consultants should include the PMU and the CIMU in the SMP update as one of key on-the-job trainings. New data from surveys and obtained from analysis are to be uploaded in the CMIS.

**Convergent Livelihood:** The PMDC will support the PMU in identifying and developing the contours to the convergent livelihood projects. This activity includes following main components:

- (i) Supporting consultations with the stakeholder including the state and central government departments for identification of convergent project opportunities
- (ii) Generating conceptual plans of sub-projects based on investment plans of stakeholder departments like Fisheries and Tourism that will be compliant with climate resilient sustainable coastal management,
- (iii) Once approved, provide necessary design and construction management support for the implementation of the sub-projects.

**PPP:** The PMDC will prepare a proposal for potential future public-private-partnership. The PPP may be in the form of capital investment and O&M. This activity includes the following main components:

- (i) Preparing a framework for PPP linked to coastal protection projects,
- (ii) Identify the activities that may be used for PPP in the sub-project areas,
- (iii) Developing the project concept notes, preliminary PPP structure, preliminary financial model models and prefeasibility reports to obtain necessary approvals for the PPP project development.
- (iv) Support department in developing the PPP project, obtaining necessary approvals, conducting the bid process and finalizing the contract award etc
- (v) Support the PMU in organizing roadshows for attracting PPP and facilitate negotiations between potential private partners and the PMU.

### **Construction Management Support of Subproject Implementation**

Construction Management support will be provided for the implementation of the four subprojects mentioned in section II 'The Project'. Specific activities are as follows:

#### **a) Preparation of bid documents and support for contract award for the sub-projects to be implemented:**

- (i) The PMDC will prepare the bid documents of all the sub-projects in ADB's standard bid document format and will incorporate the necessary information from the approved DPRs in the appropriate sections of the bid documents
- (ii) The PMDC will further support the PMU in the contract award process by assisting in the process and helping evaluation of the bid documents.

- b) Pre-construction Activities.** During pre-construction stage of the civil works the PMDC will :
- (i) Review the mobilization plan, work methodology and pre-construction survey plan,
  - (ii) Plan and assist the PMU in obtaining, in a timely manner, the required clearances, permits, approvals, sanctions or any other information from relevant competent authorities so that the project activities are not unduly delayed;
  - (iii) Recommend on the necessary statutory clearances/certifications required of the contractors,
  - (iv) Establish document control and proper filing system for project offices, including official correspondence, drawings, site instructions, variation orders and site records. Establish channel and mode of communications;
  - (v) Carry out adjustments of design dimension, if necessary and provide Good-For-Construction (GFC) drawing after receiving the survey data of the area,
  - (vi) Dissemination of subproject information to the community,
  - (vii) Review the construction scheduling plan of the contractors,
  - (viii) Prepare a Quality Assurance and Quality Control plan for the subproject, including the reporting templates for the contractor and the PMU,
  - (ix) Update EMP based on contractor's methodology and work schedule,
  - (x) Review Health and Safety plan.

### **Construction Inspection and Management Services:**

The consultants will provide management and site supervision support to the PMU for the implementation of the four subprojects. Routine on-site supervision will be conducted by the PMU but the consultants will be required to provide periodic inspection and develop protocol for inspection to be adopted for routine inspection by the PMU. The consultant will support the timely progress of the works, enforce specified materials and workmanship requirements, and control the quality of the construction. This includes assessment of programs, materials, labour, construction methods and monitoring of compliance with specified construction methods, installation, and commissioning. It includes supervision support for the contractors' programs, rates of progress, performance testing, compliance with specifications and drawings, health, safety and compliance with the environmental management plans. Specific tasks will include, but not be limited to:

- (i) Contract administration and management. Develop contract management and tracking system, using commonly available computer software to schedule and monitor all aspects of activities including but not limited to construction activities, payment and disbursements
- (ii) Inspection of construction activities, and preparation of monthly progress reports,
- (iii) Testing of materials on site, offsite testing when needed, as necessary the in-factory testing and inspection of good and materials,
- (iv) Review Quality Assurance Plan (QAP), prepare periodic reports, briefing materials, provide other information time-to-time as necessary
- (v) Review construction drawings and design/drawing changes as prepared and submitted by the contractor during the construction stage and as-built drawings;
- (vi) Ensure compliance with standard international engineering practices by the contractors;
- (vii) Support and assist the PMU in taking engineering decisions

- (viii) Review of contractor's submittals, verification of progress and interim payment requests,
- (ix) Determination of final construction quantities,
- (x) The consultants will conduct training for contractors once during the construction with focus on compliance with EMP during implementation as per the contract and EMP plan of IEE and ADB safeguards requirements. A provisional sum is available for conducting this training.' Supervise the implementation of the environmental management and monitoring plan & prepare six-monthly environmental monitoring report to ADB for each subproject,
- (xi) Undertake due diligence studies to confirm policy compliance to social safeguards.
- (xii) Ensure maintaining a master diary by the contractor showing daily records of labour and equipment employed, work in progress, weather conditions, instruction issued etc.
- (xiii) Monitor periodically labor relation, living conditions, health and safety measures, community relations etc. and where necessary, take steps to minimize any problems.
- (xiv) Health Safety and Environment: Check compliance with HSE plans of the contractors,
- (xv) Maintain records of all survey data, inspection, progress reports and test results and notify the contractors of deficiencies,
- (xvi) Identification of key bottle necks and recommend remedial measures,
- (xvii) Support to implement mitigation measures to minimize risk elaborated in risk management plan for the project
- (xviii) Review and examine the contractor's request for variation orders such as extra items, new rates, requests for time extension and extra payment, filed by the contractor etc. and submit recommendations for approval, if appropriate.
- (xix) Facilitate any design adjustment if necessary, during construction. Major modifications, if required, may require approval by the TAC.
- (xx) Prepare subproject completion report after review of as-built drawing submitted by the contractor and other supporting documents following successful completion.
- (xxi) Assist constructively and submit recommendations in resolving any potential difficulty, conflicts or dispute that may arise between the contractors and the PIU.
- (xxii) Assist the PIU in certification of substantial and completion of the works in accordance with the provisions of the Contracts, including stage certification and final acceptance test.
- (xxiii) Assist on liaison with local authorities, government agencies and ADB. Assist the PMU/PIU in reporting to these agencies.
- (xxiv) Assist the PMU/PIU in conducting regular meetings with contractors, government entities and all other stakeholders etc., to discuss progress and issues related to implementation, and prepare minutes for recording and circulation;
- (xxv) Establish all necessary records and the procedures of maintaining/updating such records for each package and for the entire project;

### **Post-Construction Activities:**

As parts of the works are completed and reach state of 'ready for use', a Taking-over Certificate for the part completed will be recommended by the consultants to the PMU. Prior

to the issue of a Taking-over Certificate by the PMU, the consultants will prepare a list of defects and outstanding minor works. Consultants' recommendation for issuance of Taking-over Certificate can come only after an undertaking from the contractors to rectify the defects and complete the outstanding works during the Defects Liability period.

On completion of each construction contract and on issue of the Defects Liability Certificate, the Consultants will ensure that the Contractor delivers to the Client details of the construction, including formal site diaries, as-built drawings and other documents and manuals as referred to in the contract documents. As far as possible these will be in a standard format for all contracts and the documentation shall be in sufficient detail to enable the Client to operate and maintain the project facilities used in conjunction with the operation and maintenance manuals. The consultant team will prepare a detailed contract completion report in a format agreed with the PMU, for each contract using the information collected from the contractors and data collected by the consultant during contract supervision stage.

During the defect liability period for each package, the PMDC will carry out the following functions: (i) monitoring the functional as well as structural performance of the investments and report to the PMU; (ii) preparation of the inventory of the defects/damages rectification/repair works, if any, to be done by the Contractors as per the provisions of their contracts; (iii) evaluation of the design, drawings and construction methodology for rectification/repair works proposed by the Contractors and make recommendations to the PMU; (iv) supervision and checking of the quality of the defect/damage rectification/repair works; and (v) assisting the PMU with contract management and finance related issues related to the individual works contracts.

The consultants shall spell out the lessons learnt in a report for the PMU and disseminate the lessons on construction management of such works to the EA.

### **Institutional Strengthening and Capacity Building**

The Consultants will undertake activities towards institutional strengthening and capacity building in the state for planning and management of sustainable coastal protection. During tranche 1 of SCPMIP, the EA has established the building blocks for CMIS, SMOs, training and CIMU. The Consultants should review and develop a good understanding of the established processes before embarking on new plans. Specific activities will include:

Restructuring and operationalization of the CIMU: The CIMU has been established as a cell within the MMB through an office order. Although formally established in 2014, there has been limited progress on the activities of the CIMU. It is proposed that the development of the CIMU would be in two stages: (a) the PMDC will support EA in restructuring the CIMU to make it more responsive to the multiple stakeholder departments as beneficiaries of the beaches and shoreline and (b) support operationalizing the CIMU to continue with sustainable coastal protection and management by the state after the term of the project.

CMIS and SMP, two tools that have been developed during tranche 1 will be upgraded and updated under the responsibilities of the PMDC, and will provide data and scientific basis to the CIMU for the state's coastline monitoring and management. Restructuring, training and operationalization of the CIMU should be designed to achieve the following objectives:

- (i) Effective coordination between the various agencies and stakeholders of the state, e.g., departments of environment, tourism, fisheries, agriculture, transport and revenue, sometimes proposing duplicate and conflicting activities,

- (ii) Liaison with the Maharashtra State Coastal Zone Management Authority (MSCZMA) to support long-term sustainability of the coast and shorelines with special attention to ensure that the natural coastal processes and sand movements are maintained with minimal disruption by coastal infrastructure investments.
- (iii) Manage the Coastal Management Information System (CMIS) of the state and its linkage to the national information systems being developed by the MoJS and MoEFCC. The maintenance and updating of the CMIS will be a key responsibility of the CIMU.
- (iv) Support the establishment and training of the Shoreline Management Organizations (SMOs) at each subproject site. The SMOs will consist of local community stakeholders and beneficiaries who will support the coordination and monitoring of the project during the implementation and will undertake local management of the shores, beaches and assets after the completion of the capital works. On a long-term time frame, CIMU will support the successful functioning of SMOs and ensure their sustainability.
- (v) Implement the shoreline management tasks as set out in the Shoreline Management Plans; these will be undertaken by involving district administration, local bodies as stakeholders.
- (vi) Institutional strengthening and awareness of the key stakeholders including the district level organizations, district collectors, district planning committees, Zilla Panchayats, Urban Local Bodies and Gram Panchayats.

**Training plan and implementation:** The PMDC will update the institutional review and training plan, prepared by the TA consultants to prepare an updated and detailed plan of training, with training needs assessments, and its schedule in consultation with the EA. Objectives of the training plan are to address the needs of the CIMU, the PMU and the SMOs. Under this activity, the Consultants will deliver a detailed Training Plan, schedule and budget along with identification of the target audience for each training module. Execution of the training plan is a key task of the PMDC, while the cost of external training providers and other facilitating items is covered under the provisional sum in the budget allocated for the PMDC.

An indicative training plan, prepared by the TA consultants for due diligence, lists the following training modules, shown in Table 2. The indicative training plan also presents an assessment of the target group, number of audience and outline of the contents of each module.

**Table 2 Indicative Training Module**

	<b>Module Name</b>	<b>Duration &amp; Frequency</b>	<b>Training Provider</b>
1	Coastal protection under climate change	Three days, once a year	EXTERNAL, (National)+ PMDC
2	Coastal Management Information System	Three days, repeated annually, refresher till CMIS becomes institutionalized	PMDC working with reputed agency
3	Project Management & Monitoring	One day (generic) + two days (specific)	ADB + External (National)
4	Management of the shoreline under climate change	Two days, twice	External (National) + PMDC



5	Environment Management Plan and Environmental safeguards	Two days, three times	Environmental safeguard specialist + external (if needed)
6	ADB Project Management and Procurement Procedures	Two days	Expected to be a regular ADB training program
7	Overseas Study Visit	Once, seven days (including travel)	Overseas training provider
8	Induction of New PMU staff, interns and orientation to Project	Two days	PMDC + Senior Staff of PMU
9	Contract Management, Construction and Site Supervision	Three days (class room), two days (on-site) followed by on-the-job training	PMDC + External (national)
10	Coastal Data Collection, Data Management and Dissemination	Three days, repeated every year	PMDC
11	Social Safeguards	Two days (class room), one day (field)	Social Safeguard Specialist (PMDC), ADB
12	NGO participation and Community Engagement in sustainable coastal management	Two days	PMDC
13	Exposure to best practice locations in India (Karnataka, Puducherry)	Two days	Respective host agency, coordinated by PMU + PMDC
14	Regional Study Tours, Most Likely sites in South/South East Asia	One week (including travel)	Respective host agency, coordinated by PMU + PMDC
15	Undefined Programs		

**Upgrading the CMIS:** A coastal management information system has been established during tranche 1 of the SCPMIP. This is accessible is through the EA's website Maharashtra Maritime Board. The main objective of the system is to serve as a web-based repository of coastal data for analysis, planning and design and public awareness about state's shoreline protection and management systems. The Consultants will present a road map to the PMU and setup agreed milestones after an assessment of the existing CMIS. Recommendations should cover aspects of data management architecture, content upgradation (especially with respect to the topographic, bathymetric, sediment characteristics and geotechnical investigation data). The Consultants should support the PMU in implementing the roadmap for upgrading the CMIS.

**SMOs at Sub-Project Sites:** The EA has an established precedence of a SMO at Mirya Bay. The EA has additionally set up several community level organizations along the coastline under the 'clean beach movement' (Nirmala Sagara Tata Abhiyan) SMOs in all the coastal districts. The Consultants will review the procedure used, improve them further

and consolidate SMOs at the sub-project sites. The Consultants will also organize training workshops at the sub-project sites on the role of the SMO and how it can carry out its expected functioning for each subproject site. There is a provision for organizing such activities under the budget for capacity building. Design and training of the SMOs should meet the primary objective of creating ownership at the community level for the assets after completion of the capital works and compliant sustainable commercialization of the benefits generated from the works.

**Environmental Safeguards:** The EA has environmental professionals working within the organization who are involved in ensuring the environmental compliance of the projects. The Consultants will review the system in place for incorporating environmental safeguards at all stages of project i.e., planning, design, implementation, and operation and accordingly suggest changes to be in line with the best practices in the sector. Necessary training shall be provided to the EA staff in this regard. Additionally, training shall include methods to measure environmental outcomes a project and prepare the EA for any environmental audits, the project may be subjected to by the Government agencies.

**Social Safeguards:** The staff will undergo an orientation and training in ADB resettlement policy and procedures for social safeguard. Broadly, the training will cover various topics such as (i) Principles and procedures of involuntary resettlement; (ii) Public consultation and participation; (iii) Minimization of impacts; Grievance redress; and (iv) Monitoring of resettlement operations etc. In addition, the community development and social safeguard expert of PMDC can also impart training to the field office staff during the subproject implementation if required.

## 5. Detailed Outputs of the assignment

### 5.1 Team Composition and Qualification Requirements for the Key Experts:

Table 3 lists the key persons and their person-months for the project. The team comprises of 4 international and 13 national consultants. A consultant belonging to an ADB member country and having experience of working as a key member in international projects outside the project country for at least five years is eligible as an international consultant irrespective of the consultant's nationality. Initiation or execution of deployment of any consultant for any of the TOR activities should be carried out in prior consultation with and consent from the PMU.

**Table 3 Key experts for the PMDSC**

No	Position/Expertise	Total person months
<b>A</b>	<b>Key Personnel (international)</b>	
1	Team Leader & Coastal Engineering Specialist	18
2	Institutional Reform Specialist for Sustainable Coastal Protection	3
3	Coastal Management Specialist	6
4	Marina Designer	2
	<b>Total International</b>	<b>29</b>
<b>B</b>	<b>Key Personnel (national)</b>	

1	Construction Management, Quantity Survey& QA/QC Specialist cum-Deputy Team Leader (DTL)	48
2	Coastal Engineer	18
3	River Bank Protection Designer/Geotechnical Engineer	4
4	Institution Development & Capacity Building Expert	12
5	Procurement cum Contract Management Specialist	8
6	Environmental Safeguard Specialist	16
7	Marine Ecologist/Biologist	12
8	Community development and social safeguards expert	12
9	PPP specialist	5
10	Economist	6
11	Financial Management Specialist	9
12	Gender expert	8
13	Monitoring and Evaluation Specialist	8
	<b>Total National</b>	<b>166</b>
	<b>Total (International + National)</b>	<b>195</b>

In addition to the key experts listed in Table 3, the PMDC non-key staff will include several essential members to provide support to their key staff and the PMU. **Table 4** shows the staff members in this category. Efficient and productive working of the PMDSC depends on these staff members and therefore, the PMDSC should carefully select these support staff members. Other than the mandated non-key staff in **Table 4**, the PMDC may include other support staff at their own discretion.

**Table 4 List of non-key staff for the PMDC**

No	Position	Total Person months
1	Coastal Scientist (data collection/analysis and design support)	24
2	Civil Engineer Construction management and QA/QC support (3 x 40)	120
3	Support Engineer/Scientist (2 x 25) : Environmental - 1, Social - 1	50
4	CAD technician	24
5	IT support engineer	30
6	GIS Specialist	8
	<b>Total Non-Key Personnel</b>	<b>256</b>

Table 5 lists the academic and work experience requirements for the key persons of the consulting team. Table 5 outlines the functions and deliverables for individual consultants, while it remains the responsibility of the TL and the team to ensure smooth coordination and collaboration among team members for the deliverables. The Team Leader is designated to provide leadership to the team and the project through planning future steps

as well as identifying bottlenecks well in advance and setting-up of guidelines for the project progress. The DTL will carry out the role of the resident team leader during off-field time of the TL and will spend at least 90% of the allotted time in the field. Monthly mobilization plans of the consultants will be discussed and agreed with the PMU and the Project Director.

**Table 5 Professional requirements and functions of the key experts**

**(a) INTERNATIONAL**

**(i) Team Leader & Coastal Engineer**

<b>Key Personnel</b>	<b>Person month</b>	<b>type</b>
<b>Team Leader &amp; Coastal Engineer</b>	18 months	International
Requirement		
Academic Qualification	<ul style="list-style-type: none"> <li>• Post-graduation degree in Civil Engineering/, with specialization in coastal engineering / Marine Science with specialization in Coastal processes</li> </ul>	
Work Experience	<ul style="list-style-type: none"> <li>• Minimum of 20 years of experience</li> <li>• Minimum of 10 years' experience in climate resilience/coastal management/coastal protection projects</li> <li>• Having work experience in multilaterally funded multi-year projects</li> <li>• Previous experience of team leadership</li> <li>• Coastal protection project implementation experience in tropical monsoon geographical locations</li> </ul>	
Function and deliverables		
<p>As team leader, the main outputs include;</p> <ul style="list-style-type: none"> <li>• Overall management of project consultancy and lead the process of DPR preparation, Overall responsibility for project management and administration, as well as providing advice on ADB's procedures and policies</li> <li>• Monitor and support timely progress of the project implementation including planning, design, and construction, including preparation of detailed work plan for the project implementation in coordination with the EA,</li> <li>• Support and guide EA to establish an effective project performance management system (PPMS) and track project progress through it,</li> <li>• Provide support for procurement of contractors and ensure complete due diligence in procurement and implementation of such contracts. Assist in resolving contractual issues,</li> <li>• Establish a framework for the Deputy Team Leader for effective project management,</li> <li>• Prepare the project preparation inception report and preparation of progress and other reports as required</li> <li>• Manage effective construction supervision and quality control and monitoring,</li> <li>• Facilitate and support PMU/ADB during ADB missions</li> </ul> <p>As Coastal Engineer, the main tasks include;</p> <ul style="list-style-type: none"> <li>• Provide leadership in preparing the shoreline management plan (SMP)</li> <li>• Provide technical leadership to construction expert and coastal engineer</li> <li>• Oversee the project design, review the designs and drawings and other documents, conduct due diligence;</li> </ul>		

- In collaboration with the Deputy Team Leader/ Senior Design Engineer (National), and contractor develop an operation and maintenance manual for the completed works
- Detailed engineering designs and cost estimates and specifications prior to tendering for procurement;
- Provide guidance to the team members on carrying out all those tasks that are required to provide quality works as well as quality documents;
- Guide the engineering survey team on the use of appropriate equipment to acquire the types of survey data required and how the survey data is to be recorded;
- Guide the engineering drafters to produce detailed CAD designs for all infrastructure;
- Review the work of the national design engineer to estimate the type and quantity of materials required to build each structure

**(ii) Institutional Reform specialist for sustainable coastal protection**

Key Personnel	Person month	type
<b>Institutional Reform specialist for sustainable coastal protection</b>	3 months	International
Requirement		
Academic Qualification	<ul style="list-style-type: none"> <li>• Post-graduation degree in Engineering/environment/Economics/Governance</li> </ul>	
Work Experience	<ul style="list-style-type: none"> <li>• Minimum of 15 years of experience</li> <li>• Minimum of 10 years' experience in role of advising on institutional structure, policy-making and progressive administration of climate resilience/coastal management/coastal protection for a state/country</li> </ul>	
Function and deliverables		
<ul style="list-style-type: none"> <li>• Review structure of MMB and other stakeholder departments like environment, tourism, fisheries and agriculture in the state</li> <li>• Review document and functioning of the Coastal Infrastructure Management Unit (CIMU) in the state</li> <li>• Consult stakeholder departments and assess state's needs and shortcoming in adoption and implementation of sustainable coastal protection with inputs from Team Leader and Institutional Development expert (national)</li> <li>• Propose draft report on Institutional Reform including CIMU,</li> <li>• Conduct short workshops on cross-departmental coordination and reforms for achieving administration of sustainable coastal protection,</li> <li>• Finalize institutional reform report and conduct final workshop on the report.</li> </ul>		

**(iii) Dune/ Nature based solutions/Coastal Management Specialist**

Key Personnel	Person month	type
<b>Coastal Management Specialist</b>	6 Months	International
Requirement		

Academic Qualification	Minimum Master's degree in Marine Environmental science/coastal science/ coastal engineering
Work Experience	<ul style="list-style-type: none"> <li>• 10 years in coastal, public infrastructure or environmental protection</li> <li>• 5Years as coastal dune or beach nourishment designer/coastal management specialist</li> </ul>
Function and deliverables	
<ul style="list-style-type: none"> <li>• Review the stretches of shoreline identified for dune enhancement and finalize the 20 Km stretch of shoreline in consultation with the PMU, coastal engineer (national) and marine ecologist,</li> <li>• Review the performance of earlier dune protection work in Maharashtra at Bhatye and propose measures for design and implementation improvement.</li> <li>• Establish designs of varied dune cross-sections for different parts of the shoreline stretches together with (national) coastal engineer, marine ecologist, geotechnical engineer.</li> <li>• Prepare a manual of good practices of sand sources (including Assisted Beach Recovery) for dune management specific to Maharashtra.</li> <li>• Identify the potential areas for nature-based solutions approach</li> <li>• Interpretation of the survey data for dredging areas for Devbag and Ganapatipule sub-project and specification of the dredging plan in the respective DPRs,</li> <li>• Setting-up guidelines and design templates for the beach nourishment at Ganapatipule,</li> <li>• Specifications of utilization of the dredged sand and fill of the lee side of the riverbank protection wall in consultation with the TL, Coastal Engineer and the PMU.</li> <li>• Work on the specifics of the other proposed nature-based solutions including mangrove restoration.</li> <li>• Update the shoreline management plan (SMP)</li> <li>• Prepare and update seasonal beach profile survey report(s)</li> <li>• Works with the IT Engineer to update the CMIS</li> </ul>	

#### (iv) Marina Designer

Key Personnel	Person month	type
Marina Designer	02	International
Requirement		
Academic Qualification	Minimum Master's degree in relevant field	
Work Experience	<ul style="list-style-type: none"> <li>• 10 years in general water front infrastructure</li> <li>• 07 Years as marina designer</li> </ul>	
Function and deliverables		
<ul style="list-style-type: none"> <li>• Specification of details of the layout of the marina to be integrated with the river bank protection wall for the Devbag (Creekside) subproject.</li> <li>• Evaluate the site conditions</li> <li>• Design Berthing systems, pier and pontoon</li> <li>• Provide conceptual design for utilities and safety equipment integration</li> <li>• Provide waterfront development, commercial outlets and infrastructure development concepts</li> <li>• Should work with the 'River Bank Protection Designer' to ensure the right choice of the material or protection wall, entrance to the embedded marina, size and layout of the marina, height of the marina wall and interface with the land side.</li> <li>• Prepare material specifications and quantities required for the marina with the help of the Deputy Team Leader and the Coastal Engineer</li> </ul>		

**(b) NATIONAL**

**(i) Construction Management, Quantity Survey and QA/QC specialist cum Deputy Team Leader**

<b>Key Personnel</b>	<b>Person month</b>	<b>type</b>
<b>Construction Management, and QA/QC specialist</b>	48 months	National
Requirement		
Academic Qualification	<ul style="list-style-type: none"><li>• Degree in Civil Engineering, preferably with specialization in construction engineering/management</li></ul>	
Work Experience	<ul style="list-style-type: none"><li>• Minimum of 15 years of experience</li><li>• Minimum of 10 years' experience in coastal/maritime construction works</li><li>• Experience in quantity estimation, bill certification, quality assurance</li><li>• Experience in FIDIC contract conditions</li><li>• Work experience in multilaterally funded multi-year projects</li></ul>	
Function and deliverables		
<ul style="list-style-type: none"><li>• The specialist will also serve as deputy team leader and take over the role of team leadership in the absence of team leader, support the preparation of DPRs.</li><li>• Assume lead role for Engineering drawings for DPR, Tender and Construction.</li><li>• Take lead role of construction management including preparation of plans of construction management, identify construction bottlenecks and guide streamlining of the construction process, preparation of construction monitoring reports, review of completion reports and as-built-drawings.</li><li>• Estimate Bill of Quantities of each sub-project</li><li>• Prepare plans of construction management, identify construction bottlenecks and guide streamlining of the construction process.</li><li>• Prepare QA plans for each sub-project and ensure QC of the construction</li><li>• Provide recommendations to the PMU on contractor's bill certification</li><li>• Provide required support in technical specifications of tender documents.</li><li>• Work with environmental, social safeguards specialist in ensuring smooth overall execution of the sub-projects.</li><li>• Support with reporting requirements</li></ul>		

**(ii) Coastal Engineer**

<b>Key Personnel</b>	<b>Person month</b>	<b>type</b>
<b>Coastal Engineer</b>	18 months	National
Requirement		
Academic Qualification	<ul style="list-style-type: none"><li>• Degree in coastal engineering or Civil/water resource Engineering, preferably with Masters degree in coastal engineering</li></ul>	
Work Experience	<ul style="list-style-type: none"><li>• Minimum of 15 years of experience</li><li>• Minimum of 10 years' experience in coastal/maritime planning, design and construction works,</li></ul>	

	<ul style="list-style-type: none"> <li>• Familiarity of met-ocean analysis and interpretation of shoreline change from satellite and ground survey data</li> <li>• Three years of work experience in multilaterally funded multi-year projects</li> </ul>
<b>Function and deliverables</b>	
<ul style="list-style-type: none"> <li>• The specialist will provide technical support on coastal engineering aspects of the project, including construction management and site supervision</li> <li>• The specialist will actively provide inputs to the key project outputs together with Team Leader and Deputy Team leader</li> <li>• The Specialist will work other experts to take the preparation of the DPRs to completion</li> <li>• Finalize necessary modification plans during construction and support with construction monitoring, quantity estimation, QA/QC</li> <li>• Support TL and DTL daily site supervision during construction, preparation of reports, contractors' bill certification recommendations</li> <li>• Support with updating Shoreline Management Plans of the state,</li> <li>• Work with Institutional Capacity building expert to formulate fit-for-purpose training plans for the PMU and state technical personnel.</li> </ul>	

**(iii) River Bank Protection Designer**

<b>Key Personnel</b>	<b>Person month</b>	<b>Type</b>
<b>River Bank Protection Designer/ Geotechnical Engineer</b>	4 months	National
<b>Requirement</b>		
Academic Qualification	<ul style="list-style-type: none"> <li>• Master's degree in Hydraulic Engineering /Civil Engineering with specialization in hydraulic engineering</li> </ul>	
Work Experience	<ul style="list-style-type: none"> <li>• Minimum of 10 years of experience in river bank protection design</li> <li>• Minimum of 3 years of experience in the role of a geotechnical expert.</li> <li>• Experience of geotechnical works in coastal/maritime sector is desirable</li> </ul>	
<b>Function and deliverables</b>		
<p>The specialist will</p> <ul style="list-style-type: none"> <li>• Design river bank protection based on hydraulic assessment of energy, river form, soil type, peak river flow, expected maximum river channel scour depth and structural stability, etc.</li> <li>• Assess the physical characteristics of the land and stream, such as topography, soils, banks and channel geometry.</li> <li>• Evaluate channel stability in terms of aggradation and erosion.</li> <li>• Determine discharge, including flow frequency, depths, duration, and floodplain inundation. This would include low flows, mean annual flow peak, flood flows, groundwater recharge and discharge, flood events, and how discharge is affected by vegetation, floodplain connectivity, etc.</li> <li>• Determine the current channel form and sediment transport features.</li> <li>• Estimate future potential channel response to the proposed project</li> </ul>		



- Undertake preliminary assessment of the foundation soil properties at Ganapatipule and Devbag sub-project footprint areas.
- Prepare specification of geotechnical investigations at the reef location for Ganapati-pule subproject,
- Interpret results of geotechnical investigations of the site to assess subsidence of the proposed reef and suitability of reef structure at the proposed location.
- Specify geotextile to be used in dune construction/enhancement sub-project,
- Validate and update the foundation design of the protection structure at Devbag and Ganapatipule,
- Support any other technical issues related to the river bank and geotechnical aspects in the project
- Provide inputs to the project reports

#### **(iv) Institutional Development & Capacity Building Specialist**

<b>Key Personnel</b>	<b>Person month</b>	<b>type</b>
<b>Institutional Development &amp; Capacity Building Specialist</b>	12 months	National
Requirement		
Academic Qualification	<ul style="list-style-type: none"> <li>• Post-graduation degree in Engineering / environment/ Economics/Governance/management/HRD</li> <li>• Post graduate diploma in T&amp;D is desirable</li> </ul>	
Work experience	<ul style="list-style-type: none"> <li>• Minimum of 10 years of experience in institutional assessment and capacity building of government institutions</li> <li>• Minimum of five years' experience in natural hazards management projects</li> <li>• Should be familiar with budgetary regulations, and staff deployment procedures guiding government institutions and externally funded projects</li> <li>• Experience in multilaterally funded multi-year projects would be an advantage</li> </ul>	
Function and deliverables		
<ul style="list-style-type: none"> <li>• Carry out institutional and training needs assessment studies</li> <li>• Map training needs</li> <li>• Map various project related work processes</li> <li>• Define Key Result Area (KRA) based job descriptions</li> <li>• Design and deliver in-house technical and managerial training programs</li> <li>• Liaise with external training providers and facilitate development of course curriculum</li> <li>• Capacity development report with budgetary allocation</li> <li>• Prepare Training curriculum and training completion reports Documentation of delivery-based job-descriptions</li> <li>• Support training/workshop organization with the help of other team members</li> <li>• Individual and institutional learning monitoring reports</li> <li>• Provide inputs to the project reporting requirements</li> </ul>		

**(v) Procurement & Contract Management expert**

Key Personnel	Person month	type
<b>Procurement &amp; Contract Management expert</b>	08 months	National
Requirement		
Academic Qualification	<ul style="list-style-type: none"> <li>Graduate Degree in engineering</li> <li>Diploma in / contract management would be preferred.</li> </ul>	
Work Experience	<ul style="list-style-type: none"> <li>10 years of total experience in handling procurement</li> <li>Five years' of experience as procurement and contract management expert</li> <li>Three years Good experience for working at external assisted projects will be advantageous</li> </ul>	
Function and deliverables		
<p>The specialist will</p> <ul style="list-style-type: none"> <li>Take the lead in preparing bid documents with inputs of technical specifications from TL, DTL, Design Specialists and the PMU</li> <li>ensure adequate procurement process in compliance with ADB and Government rules and regulation;</li> <li>provide support and guidance to the PMU in finalization of bid document, conducting pre bid meetings, issuing clarifications to bidders queries and addendums as required, bid evaluation and reports for getting ADB and Government approvals contract award process etc,</li> <li>Support contract management and resolve contract management issues during implementation, performance monitoring of the contractors;</li> <li>support in resolving issues related to payments, time extension, variations, contractual claims and other procurement and contract management issues,</li> <li>Support in consultant selection process (individual/firms/CBO/NGO) as required</li> <li>Provide inputs to the progress reports and other reports as required</li> </ul>		

**(vi) Environmental Safeguard Specialist**

Key Personnel	Person month	type
<b>Environmental Safeguard specialist</b>	16	National
Requirement		
Academic Qualification	<ul style="list-style-type: none"> <li>Master's Degree in Environmental Engineering / Environmental Sciences .</li> </ul>	
Work Experience	<ul style="list-style-type: none"> <li>15 years' experience in conducting environmental assessments, implementation of environmental management plans and environmental monitoring in multi-lateral funded projects.</li> <li>Experience in coastal projects would be preferred.</li> </ul>	
Function and deliverables		
The Environmental Safeguard Specialist will support the Team Leader and shall carryout the following indicative tasks:		

- Review the Environmental Impact Assessment (EIA) and / Initial Environmental Examination (IEE) Report and update the reports to reflect the final designs for each of the sub-projects;
- Ensure conduct of public awareness campaigns prior to start of construction activities and carry out periodic consultations with the relevant stakeholders to ensure the effectiveness of the EMP and document these consultations in the Safeguard Monitoring Reports (SMR);
- Assist the PMU in CRZ/Environmental clearance applications
- Work with Marine Ecologist / Biologist in updating and implementing the EMP in all relevant project components, marine ecosystems in particular,
- Assist the PMU in the implementation of the Grievance Redressal Mechanism and document the issues in the SMR.
- If there are unanticipated environmental impacts in the project (such as the Covid 19), prepare an environmental assessment and EMP to assess the potential risks and impacts, evaluate the alternatives, and outline mitigation measures and resources to address the impacts,
- Work with PMU to ensure that all construction permits and clearances are complete and valid;
- Provide technical assistance to the PMU on the preparations and revisions of ESMR;
- Review the monthly Contractor's EMP Implementation Report and the construction progress, and verify its effectiveness in achieving the mitigation objectives;
- Conduct necessary training and capacity building of both the Contractor and the PMU staff on EMP implementation;
- Ensure preparation and timely submission of the EMP implementation progress report to PMU on a monthly and quarterly basis and to ADB bi-annually;
- Assist the EA in the conduct and implementation of an Environmental Audit Plan in line with the CAG Environmental Audits;
- Prepare and submit an Environmental Compliance Audit Report to PMU and ADB periodically;
- Provide inputs on procurement and bidding process; and
- Provide assistance to ADB and PMU on any environment related activities.

**(vii) Marine Ecologist/Biologist**

<b>Key Personnel</b>	<b>Person month</b>	<b>type</b>
<b>Marine Ecologist/Biologist</b>	12	National
Requirement		
Academic Qualification	<ul style="list-style-type: none"> <li>• Master's Degree in Environmental Sciences / Marine Biology/coastal ecology</li> </ul>	
Work Experience	<ul style="list-style-type: none"> <li>• 10 years' experience in developing and implementing biodiversity conservation and management plans</li> <li>• Experience in multi-lateral funded projects would be an advantage.</li> </ul>	
Function and deliverables		
The Specialist will support the Team Leader (TL) and work with the Environmental Safeguard Specialist (ESS) will have the following responsibilities:		

- Specify plant types and plant management for the dune enhancement projects in consultation with the dune management specialist and analyzing the lessons from similar projects in Maharashtra and Karnataka.
- Examine and summarize the data and literature on marine ecosystem, their biodiversity values, and endangered status at all the sub-project sites;
- Collect data on marine ecosystem including those on the wetlands, mangroves at each of the sub-project sites;
- Assess the cumulative impact of the sub-project components on marine biodiversity and suggest mitigation measures to be incorporated in the final design;
- Provide technical input and monitor nursery development, dune planting and post construction activities
- Review and suggest solutions for any potential conflicts or synergies with the development activities and management from different agencies in the sub-project sites pertaining to the conserving the marine ecosystem in the sub-project areas;
- Conduct necessary training and capacity building of both the Contractor and the PMU staff on implementing the EMP pertaining to marine ecosystem;
- Provide inputs in the conduct of awareness campaigns and implementing the GRM for addressing issues pertaining to marine ecosystem;
- Provide inputs to the project reports, EMP Implementation progress report to cover the marine ecosystem aspects;
- Provide inputs in conducting and implementing Environmental Audit Plan in line with the CAG Environmental Audits, especially on issues pertaining to the marine ecosystem;
- Provide inputs to Environmental Compliance Audit Report, especially on issues pertaining to the marine ecosystem; and
- Provide assistance to ADB and PMU on any marine ecosystem related activities.

**(viii) Community Organization/Community Development Specialist**

<b>Key Personnel</b>	<b>Person month</b>	<b>type</b>
<b>Community Organization/Community Development Specialist</b>	12 months	National
Requirement		
Academic Qualification	<ul style="list-style-type: none"> <li>• Post-graduation degree in Social Sciences/Social Works</li> <li>• Preferable to have a Diploma in Rural Development/Community Development</li> </ul>	
Work experience	<ul style="list-style-type: none"> <li>• Minimum of 10 years of “hands on” experience in community engagement/ development</li> <li>• Should be familiar with CBO related regulations and promoting livelihood activities</li> <li>• Having work experience in community projects</li> <li>• Must have experience in promoting and nurturing Community Based Organizations/SMOs/SHGs</li> <li>• Must have local language knowledge and communication skills</li> </ul>	
Function and deliverables		

- Assume lead role for baseline socio-economic study and community development needs analysis
- Ensure compliance to ADB social safeguards
- Support formation and registration of Shoreline Management Organizations (SMOs)
- Training & capacity building of SMOs
- Support identification, selection and design of the community pilot projects (e.g. tourism, fishery)
- Support preparation of adaptation guidelines, training modules, and awareness materials with special reference to strategies and mechanisms for community- based coastal protection programs.
- Registration of SMOs (end of 18 months)
- Training of SMOs
- Prepare SMO Work Plan and budget estimates
- Prepare SMO work and Fund disbursement reports

**(ix) PPP specialist**

Key Personnel	Person month	Type
PPP specialist	05	National
Requirement		
Academic Qualification	<ul style="list-style-type: none"> <li>• A Post graduation in economics, finance, business management, or similar areas</li> </ul>	
Work Experience	<ul style="list-style-type: none"> <li>• At least 10 years' national professional experience in PPPs, with expertise covering areas such as PPP structuring and private sector project finance in coastal /waterfront infrastructure, tourism, transport, and fisheries etc.</li> <li>• The expert should (i) understand PPP/infrastructure methodology and framework for resource generation (ii) demonstrate expertise with the formulation, appraisal, and approval procedures for PPP projects; (iii) demonstrate expertise in the following with respect to infrastructure/PPP projects: (a) complex project agreements, (b) tendering arrangements, (c) detailed legal and contractual agreements, (d) risk management and contingent liability issues, and (e) financial modelling of complex project proposals; (iv) demonstrate expertise in infrastructure development financing, (v) comprehend relevant policy and regulatory frameworks to enable the delivery of efficient infrastructure services; (vi) have experience in working with policy makers at all levels of government, with particular reference to determining appropriate methods of structuring PPP; regulations and regulatory requirements in PPPs; government involvement in PPPs;</li> </ul>	
Function and deliverables		

- The PPP Expert will support the team for PPP component development activities including but not limited to marina and waterfront development and water sports etc. at Devbag sub-project site.
- The key tasks include:
  - Assess experience of past PPP projects in coastal sector in Maharashtra, lessons learnt, the strengths, weaknesses, opportunities, and possible issues of private sector participation in coastal infrastructure and services (including tourism, transport, and fisheries etc.)
  - Assist PMU in identifying the potential PPP components and support with necessary research and analysis for preliminary discussions.
  - Sensitize team to appropriate bridge financing mechanisms (such as the Viability Gap Fund scheme) and support PMU in accessing the available resources from central/state/MDB for financing mechanism
  - Develop a framework for screening the PPP projects/subprojects/component in terms of suitability of PPP modality, financial viability, and sustainability.
  - Support PMU in developing the initial PPP component(s) concept note, with preliminary PPP Structure and prefeasibility studies (including demand assessment, market assessments etc.), and preliminary financial models.
  - Support the PMU in obtaining necessary internal and external approvals for the PPP projects
  - Develop, maintain, and continuously update all financial projections for relevant PPP projects/programs.
  - Support PMU in finalizing TOR for any additional technical, legal experts in preparation necessary bid documents and concession agreements; and also support the PMU in recruitment of these experts.
  - Support PMU in finalizing the necessary bid documents, bidding, bid evaluations of the approved PPP projects.
  - Drafting, key relevant PPP policy/ analytical works as determined by PMU.
  - Support in capacity building of officials for PPP
  - Advocacy and facilitating coordination with relevant stakeholders
  - Any other relevant activities as deemed fit by PMU to meet the objectives/scope mentioned above

**(x) Economist**

Key Personnel	Person month	type
<b>Economist</b>	6 months	National
Requirement		
Academic Qualification	<ul style="list-style-type: none"> <li>• Post-graduation degree in economics</li> </ul>	
Work Experience	<ul style="list-style-type: none"> <li>• Minimum 10 years of overall experience</li> <li>• Minimum 5 years' experience specifically in climate resilience/coastal management/coastal disaster management projects</li> <li>• Minimum 5 years of experience as 'economist' in MDB-funded projects</li> </ul>	
Function and deliverables		
<ul style="list-style-type: none"> <li>• Develop the framework for the analysis and the corresponding data requirements, frequency and duration of historic data, acceptable sources (i.e. primary and secondary), and other requirements; agree on a timeframe for the process of economic assessment;</li> </ul>		

- Financial and economic analysis of the selected sub-projects, particular emphasis should be given to extended economic analysis in view of significant indirect benefits that may result from the proposals.
- Participate in the workshops and discussions with relevant government and other stakeholder groups to develop, strengthen, and refine the objectives, scope, and implementation arrangements of the ensuring loan project.
- Prepare detailed financial and economic analysis of selected sub-projects and the overall investment proposals following ADB guidelines.
- Recommend mitigation measures to help safeguard risk exposures;
- Prepare financial and funds flow for community grants, project management and administration budget line items, training and other relevant cost items of the project;
- Prepare a financing plan for the project and describe the flow of funds and disbursement procedures;
- Provide cost and financing inputs for the preparation of the Project Administration Manual (PAM) during the loan documentation preparation
- Review the current staffing and staffing policies and structures of the EA and assess the requirements in terms of number and qualifications of financial management staff and map required staff and positions to determine recruitment needs;
- Undertake an overall governance and risk assessment of the PF and the EA and develop specific actions for management of risks, including capacity development recommendations;
- Review structures, personnel management, budget, and staff for project implementation and identify human and other resource constraints.

**(xi) Financial Management Specialist**

Key Personnel	Person month	type
<b>Financial Management Specialist</b>	9 months	National
Requirement		
Academic Qualification	A recognized professional accountancy qualification (e.g., CPA, CA, CFA or equivalent) or equivalent in related fields;	
Work Experience	<ul style="list-style-type: none"> <li>• An overall 10 years of working experience with 5 years of experience in project/program financial management and training/ capacity building; and</li> <li>• experience in similar capacity and sound knowledge of ADB procedures/policies and working on externally funded projects/programs shall have added advantage</li> </ul>	
Function and deliverables		
<ul style="list-style-type: none"> <li>• Support the PMU in ensuring that separate accounts for the project are duly maintained and that receipts and expenditures are duly segregated by financing source (e.g. ADB and Government funding);</li> <li>• Support the PMU in improving the FM systems including the following: <ul style="list-style-type: none"> <li>○ Support the setting-up of the accounting software in the PMU;</li> <li>○ Prepare/modify the Chart of Accounts (CoA) as necessary and automating the financial reporting to the extent possible.</li> </ul> </li> </ul>		

- Develop FM manual for the project. The manual should summarize the applicable FM arrangements and cover the flow of funds, accounting, financial reporting and audit arrangements under the related activities; as well as,
- Contribute to the strengthening of the internal audit function for the project activities to be implemented under the ensuing loan including.
- Support the PMU in ensuring that all payments are duly prepared, reviewed, authorized, and recorded in the accounting system correctly and in a timely manner, and all expenditure items meet the eligibility criteria as defined in the ADB financing agreement, and are supported by adequate documentation (invoice, contracts, evidence of payments etc..) as outlined in the ADB disbursement handbook;
- Conduct periodic analysis of the execution of the procurement and disbursement projections and provide analysis of the any significant variances between planned vs actual expenditures;
- Conduct an analysis of the financial execution of the approved procurement plan and budget, disbursement projections as well as financial vs physical progress. Analyze and document any significant variations;
- Support the PMU in conducting quarterly reconciliation of the project disbursement records and ADB's disbursement data available in the LFIS to ensure the correctness and completeness of the project records and financial reports/statements. Follow-up on any discrepancies to ensure these are resolved in a prompt manner;
- Assist the PMU in preparing Withdrawal applications and in collection and filing of all supporting documentation in accordance with the relevant procedures outlined in the ADB loan disbursement handbook;
- Assist the PMU in preparing financial information and analysis to be included in the quarterly progress reports in an agreed format to be submitted to ADB;
- Assist the PMU in preparing separate project financial statements annually covering the activities financed under all the funding sources (e.g. ADB and Government funding) in a format agreed with ADB;
- Support the PMU in ensuring that the project financial statements are audited and that the audit report, the audited consolidated financial statements and the management letter(s) are submitted to ADB in a timely manner;
- Support the PMU in the follow-up of internal and external audit recommendations to further improve the internal controls of the project.
- Assist the PMU in other tasks as assigned by the PMU director or equivalent

**(xii) Gender Specialist**

Key Personnel	Person month	type
Gender Specialist	8 months	National
Requirement		
Academic Qualification	Postgraduate degree or equivalent in social sciences, gender equality and social inclusion and development studies, gender and rural development, indigenous peoples or another relevant discipline.	
Work Experience	<ul style="list-style-type: none"> <li>● 7 years' experience on carrying out of implementation of gender and indigenous peoples development aspects in natural resource management projects with 5 years'</li> </ul>	



	<p>demonstrated work experience in the area of gender equality and social inclusion in rural development, gender mainstreaming, experience in gender analysis and implementation of gender actions</p> <ul style="list-style-type: none"> <li>• Preferably with 3 years' experience undertaking gender and vulnerable persons assessments – including application of gender and indigenous peoples sensitive participatory methods for data collection, gender analysis and report writing in projects and programs; experience delivering gender sensitization training and monitoring and evaluation of gender equality and social inclusion targets; experience of effective and timely implementation of GESI actions</li> </ul>
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<b>Function and deliverables</b>	
<ul style="list-style-type: none"> <li>• Support in design of project commitments to gender equality and social inclusion in the project's (a) Project Administration Manual (PAM); (b) Poverty and Social Assessment; (c) Gender Equality and Social Inclusion Action Plan; (d) Stakeholder Communications Strategy; and other, and ensure their effective implementation</li> <li>• Support the PMU to implement gender equality and social inclusion action plan (GESI/AP).</li> <li>• Help the PMU in meeting gender target of the project and gender and scheduled tribe (ST) targets of the GESI/AP.</li> <li>• Promote gender mainstreaming and social inclusion into project activities and project management tools, including tracking of gender equality and social inclusion results.</li> <li>• Assist the PMU in preparing report on implementation of GESI/AP, including to meet the requirement of gender as stipulated in the project Design and Monitoring Framework.</li> <li>• Leverage consultations, focus group discussions and engagement with women's groups, ST groups and other vulnerable stakeholders to provide recommendations on how to best encourage them to participate in the project.</li> <li>• Document and promote best practices from gender equality and social inclusion related activities of the project.</li> <li>• Support establishment of disaggregated data, baselines, realistic targets and effective MIS and consolidate periodic monitoring reports on GESI/AP.</li> <li>• Conduct periodic site visits to SMOs, and requisite project and subproject sites to supervise the GESI/AP implementation.</li> <li>• Contribute inputs to PMDC to quarterly monitoring reports for project management and brief monthly summary reports highlighting potential and actual issues and recommending corrective measures for PMUs actions.</li> <li>• Review the adequacy and impact of project interventions on livelihood enhancement opportunities for women and STs and make suggestions accordingly. Ensure that environmental and climate change issues are an integral part of planning of all project supported schemes.</li> <li>• Be part of grievance redress cell and review types of grievance and the functioning of grievance redress mechanisms by reviewing appeals at all levels and interviewing aggrieved project affected persons.</li> <li>• Carry out other responsibilities as required from time to time as required by the PMU.</li> </ul>	

**(xiii) Monitoring & Evaluation (M&E) Specialist**

<b>Key Personnel</b>	<b>Person month</b>	<b>type</b>
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<b>Monitoring &amp; Evaluation (M&amp;E) Specialist</b>	8 months	National
Requirement		
Academic Qualification	Post graduate degree in Finance, Management, Administration, Economics or related field	
Work Experience	<ul style="list-style-type: none"> <li>• 7 years' experience in project development and implementation including projects related to natural resources management and at least 5 years' experience in monitoring &amp; evaluation including externally aided projects; experience of working within Maharashtra would have added advantage</li> <li>• Experience in similar capacity and sound knowledge of ADB procedures/policies and working on externally funded projects/programs shall have added advantage</li> </ul>	
Function and deliverables		
<p>The Specialist will :</p> <ul style="list-style-type: none"> <li>• Provide technical leadership to develop the program framework, plans, and indicators to capture project performance results and provide effective, accurate and promptly monitoring, evaluation and reporting of all project activities.</li> <li>• Develop the project performance management system (PPMS) including necessary reporting formats.</li> <li>• Train the PMU and other staff in the implementation of the PPMS.</li> <li>• Based on data from the M&amp;E system showing the location of subprojects, create maps showing where subprojects are located and the status of these.</li> <li>• Plan (including preparation of TORs for an external survey firm) and oversee baseline data collection, and impact surveys.</li> <li>• Assist the PMU in the production of progress reports for submission to Government of Maharashtra and ADB, and work with safeguards specialists to ensure that safeguard monitoring reports are produced, including monitoring against the GESI/AP.</li> <li>• Review the M&amp;E needs and plans of the Project, extract relevant indicators, and devise an M&amp;E system or framework to monitor the project outputs and outcomes and ensure its contribution to Project's DMF/Results Framework.</li> <li>• Establish an effective M&amp;E and data collection system, develop reporting forms for capturing quantitative and qualitative information, and prepare and update the PPMS consistent with the project's DMF/Results Framework (RF).</li> <li>• Collect baseline data and monitor the progress towards achieving output- and outcome-level targets and indicators as specified in the DMF.</li> <li>• Monitor project implementation and ensure that all M&amp;E data are disaggregated by sex, and capture social inclusion dimensions (e.g. disability inclusion).</li> <li>• Prepare, design and conduct regular and targeted overall project performance assessment and impact evaluation surveys, in close collaboration and coordination with PMU.</li> <li>• Identify project implementation issues, provide recommendations, and coordinate with concerned parties to find solutions.</li> <li>• Prepare project briefs, presentation materials and semi-annual and annual progress monitoring and accomplishment reports based on the project's DMF/RF.</li> </ul>		

**Support Staff:** The Consulting firm will be required to deploy suitably qualified and experienced additional secretarial/managerial/office staff as deemed fit for timely delivery of deliverables and for smooth operation of office function. As a minimum, the consulting firm shall deploy the following support staff:

- (i) One office secretary (for documentation and record keeping); and
- (ii) One coordinating assistant (for coordination and resource management for smooth functioning of day-to-day PMDC office activities ).

The consulting firm shall keep in mind that no separate payments shall be made for the support staff and the cost shall be deemed covered in out-of-pocket expenses. Payment will be based on the list of outputs/deliverables in Table 6

**B. Survey Requirements (Lumpsum amount)**

Item	Location	Number of surveys
Geotechnical investigation	Devbag and Ganapatipule sub-project sites	Pre-construction
Topographic survey @ 500 m interval	Entire state coastline	6 (2 surveys per year)
Topographic survey @ 25 m interval	Sub-project sites including the 20 km dune nourishment site	Pre-construction, 1 x monsoon and post construction
Drone survey	Sub-project sites including the 20 km dune nourishment site	Pre-construction, 1 x monsoon and post construction
Bathymetric survey	Devbag (including river survey) and Ganapatipule sub-project sites	Pre-construction and post construction
Sediment sampling and chemical/grain size analyses	Sub-project sites including the beach nourishment sand source location and 20 km dune nourishment site	Pre-construction
Baseline Monitoring of the Coastal Ecosystem at each of the sub-project sites	Sub-project sites including the beach nourishment sand source location and 20 km dune nourishment site	Pre-Construction
Baseline socio-economic study	Villages near sub-project sites	Pre-Construction
Monitoring of the Coastal Ecosystem at each of the sub-project sites	Sub-project sites including the beach nourishment sand source location and 20 km dune nourishment site	One-year into the Operation Phase

**5.2 Reporting Requirements and Time Schedule for Deliverables**

During the performance of the services, the Consultant will prepare required reports in English for submission to the Client in electronic form and/or hard copies as per PMU instructions.

Unless otherwise agreed, all deliverables are to be submitted as drafts for review and comment by the PMU and ADB, and thereafter amended and submitted as final versions. Other occasional deliverables may be required from time to time on an informal basis. The Consulting firm shall assist the PMU to maintain an electronic safe backup of all contract related documentation and submit one electronic version of every report listed in Table 6 below.

The reporting/submission format will be consistent with the requirements of ADB and Government of Maharashtra and will be agreed between the Consultant and PMU from time to time. The reporting formats shall further be subject to the amendment/ modifications from time-to-time in consultation with the PMU and ADB. The consultant will submit at least the following reports at periods stated hereunder in Table 6.

**Table 6 - Reporting requirements**

Ref	Report/Deliverable	Timelines after commencement
<b>A</b>	<b>Project Management</b>	
1	<p><b>Inception report</b>            Demonstrating Consulting firm’s understanding of the TOR and ensuring plan of action and timeline for various activities.</p> <p>Inception report should prioritize on the preparation of the DPRs and should contain but not limited to at least the following:</p> <ul style="list-style-type: none"> <li>• Progress report on preparation of DPR for Devbag (Creekside) project and roadmap for completing the DPR within four months of PMDC’s mobilization.</li> <li>• Identification of steps in preparation of DPRs for the remaining sub-projects, progress in the preparation of DPRs and roadmap with intermediate timeline for completion of DPRs and final cost estimate within six months of PMDC’s mobilization.</li> <li>• Review meeting with the PMU on the status and commissioning of the surveys and investigations necessary for the sub-projects.</li> <li>• Assessment of the project with specific attention to the status of the CMIS, CIMU and the future needs and operational plan for the CIMU</li> <li>• Detailed Project plan.</li> </ul>	2 months
2	<p><b>Monthly Reports, Quarterly, and Six-monthly Reports</b></p> <p>Monthly reports should reflect the overall project management during the preceding, work completed,</p>	

	<p>bottlenecks identified and steps required for bottleneck in concise tabular manner.</p> <p>Monthly reports should consist of at least the following:</p> <ul style="list-style-type: none"> <li>• List of consultants deployed and durations of deployment,</li> <li>• List of reports submitted,</li> <li>• List of key activities by the consultant,</li> <li>• List of key activities of the project,</li> <li>• Major bottlenecks of the project progress and problems encountered,</li> <li>• Mitigation plan for the bottlenecks and solutions proposed/adopted.</li> <li>• Activities planned for the coming month</li> <li>• Monthly construction Supervision reports to PMU</li> </ul> <p>Quarterly reports also to help PMU submit QPRs in agreed format to ADB</p> <p>Six-monthly reports are expanded summaries consisting of the same items as in monthly reports for the preceding six-month periods. In addition, it will include a review and an update of the complete project plan, disbursement achieved and review changes that will be necessary.</p>	<p>Within 10 days from the end of each preceding month.</p> <p>Every quarter, at least one week prior to ADB QPR submission deadline</p> <p>Once for every six months within 2 weeks of the end of the preceding six months</p>
3	<p><b>Mid Term Report</b></p> <p>The Mid-term report should give a summary description of the following items:</p> <ul style="list-style-type: none"> <li>• Summary of key activities by the consultant</li> <li>• Summary of key activities of the project</li> <li>• List of consultants deployed and durations</li> <li>• Disbursement achieved</li> <li>• List of reports submitted</li> <li>• Lessons learnt and mid-course corrections to implementation program</li> <li>• problems encountered, solutions proposed/ adopted, risks identified, corrective actions (if required)</li> <li>• Major bottlenecks and mitigation plan for <ul style="list-style-type: none"> <li>a. the short-term horizon (next one or two months)</li> <li>b. medium term (six to eight months)</li> </ul> </li> <li>• Status report on CIMU and SMPs</li> <li>• Updated project plan showing clearly the steps that need to be taken till project completion.</li> </ul>	<p>24 months<sup>4</sup> (Indicative).</p>
4	<p><b>Draft Final Report</b></p>	

<sup>4</sup> This due date is flexible and ideally is a report set before the ADB midterm review mission – therefore state indicative

	<p>The Draft Final Project Report should provide but not limited to the following details:</p> <ul style="list-style-type: none"> <li>• Status of the Outputs by the Consultants</li> <li>• Status on Completion of the Sub-Projects</li> <li>• Training Evaluations</li> <li>• Summary of progress made with CMIS update and operationalization of CIMU</li> <li>• Report on the completion of the project on the whole. Describing the project background, activities performed v/s committed timeline, problems encountered, risks identified, corrective actions taken, and lessons learnt.</li> <li>• Conclusion</li> <li>• Recommendations for the future management of the coastal infrastructure assets built, upgradation of the next Shoreline Management Plan and Coastal Management Information System.</li> </ul>	54 months (indicative)
5	<p><b>Briefing reports</b></p> <p>These will be brief reports prepared to inform the state and central bodies and ADB on project status. These notes will be considered as part of the overall management activities carried out by the TL, DTL and the support staff.</p>	As required
6	<p>Reports of Project Performance Management System (PPMS)</p>	12, 24, 36,48 months
7	<p><b>Final report</b></p> <p>Based on the comments/suggestions provided by the PMU, ADB and other stakeholders, the Consultant shall prepare the final report.</p>	60 months (indicative)
8	<p><b>Safeguard Monitoring Report</b></p> <p>Bi-annual Environmental monitoring reports as per ADBs procedure and format</p>	Within 15 days from the end of the preceding six-month period.
9	<p><b>Management Information System tool/ PPMS:</b></p> <p>Information Technology (IT) based Project Performance Management Evaluation tool capable of monitoring and implementation of the project; identify performance constraints; and formulate and implement practical measures to</p>	Within 60 days from the date of issuance of Notice to Proceed.
10	<p><b>Project Completion Report:</b></p> <p>In ADB format covering</p> <p>(i) a concise description and assessment of the project from identification to completion;</p> <p>(ii) evaluating the adequacy of preparation, design, appraisal, implementation arrangements, and performance of the EA, IA and ADB, including how problems were handled, whether they were foreseen as potential risks, and the adequacy of the solutions adopted during implementation;</p>	Within 3 months from the date of completion of the Project.

	<p>(iii) a preliminary evaluation of initial operation, and achievement and sustainability of benefits;</p> <p>(iv) a preliminary evaluation of the extent of achievement of the outcome of the project and the project's contribution to achieving the expected impact;</p> <p>(v) suggest follow-up actions required during project operation; and</p> <p>(vi) makes recommendation - based on the evaluation and lessons - for future project implementation and operation, as well as improvements in related ADB procedures.</p>	
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<b>B</b>	<b>Planning &amp; Design</b>	
<b>Ref</b>	<b>Milestones/Reports</b>	<b>Timeline after commencement</b>
8	Completion of DPR for Devbag sub-project Completion of DPRs at other three sub-projects	4 months 6 months
9	Specification of topo-graphic and bathymetric surveys along state's shoreline and baseline monitoring of social and economic profile along shoreline for update of SMP. and support contract award process for surveys	14 months
10	Shoreline change & beach behavior analysis from topographic and bathymetric surveys and comparison with previous shoreline data and change analysis from satellite images under National Shoreline Change Program	20 months
11	Updating SMP on the basis of topo-graphic, bathymetric, social and economic surveys	30 months

<b>C</b>	<b>Construction Management</b>	
<b>Ref</b>	<b>Milestones/Reports</b>	<b>Timeline after commencement</b>
12	Devbag sub-project: Bid document preparation, support bidding process and contract award	05 months 05-09 months
13	Other sub-projects: Bid document preparation, support bidding process and contract award	07 months 07-11 months
14	Construction management services for the sub-projects	Onward from contract awards (Quarterly report on construction management)

<b>D</b>	<b>Institutional Strengthening</b>	
<b>Ref</b>	<b>Milestones/Reports</b>	<b>Time schedule</b>
15	Detailed Training Plan	12 months
16	Implementation of the training delivery	Spread over 30 months from month 16-46.
17	Report on framework for upgradation of Coastal Management Information System (CMIS)	12months
18	CMIS upgradation with data from the sub-project sites and SMP surveys	24-48 months
19	Report on institutional reform including CIMU restructuring for adoption of coordinated, sustainable coastal protection by the state	12 months
20	Workshops and training with cross-departmental stakeholders on organized, sustainable coastal protection, Finalization of institutional reform report	12-24 months
21	Strengthening and training of SMOs at the sub-project sites	12-36 months

The consultants will submit the reports both in electronic format (through emails or shared web space) and hard copies (three copies) to the PMU. The final reports shall be delivered both in soft and hard copies (seven) to the PMU.

## **6. Client's Input and Counterpart Personnel**

The client will provide:

- (i) Working space at each subproject implementation site through either the contractor or the Regional Port Offices,
- (ii) All study and design reports prepared during tranche 1 of the SCPMIP 1,
- (iii) Feasibility Report commissioned by the EA for the sub-projects.

**Professional support staff of the Client for the implementation of the project.** The Project Management Unit (PMU) has been set up by MMB which will be responsible for executing the project based on the professionally sound technical advice, data, designs and reports from the PMDSC. The PMU will support the PMDC in facilitating discussions with other relevant government agencies and accessing necessary data from other government sources.

Arrangements for the establishment of consultant office accommodation, operation and regular maintenance of office facilities, communication facilities (telephone, fax, and internet), laptop, computers, stationery and all consumables will have to be made by the consultant



**7. Information to facilitate Proposal preparation:**

Concept report, preliminary design reports, detailed project reports, coastal area maps photographs of earlier executed works as available with MMB may be provided to consultant for preparing proposal.

**8. COVID 19 Mitigation:**

Due to the outbreak of COVID-19, the commencement and completion dates and other implementation arrangements for this assignment are to be considered as indicative only. The final dates and implementation arrangements will be agreed with the first-ranked firm at contract negotiations taking into consideration the prevailing situation with COVID-19 at that time. The firm is to provide COVID-19 health and safety measures on the mobilization of consultants.

**9. Basis of Payment:**

Contract will be a Time-Based Contract. Consultant will provide services on a timed basis according to quality specifications, and the Consultant's remuneration will be determined on the basis of the time actually spent by the Consultant in carrying out the Services and will be based on (i) agreed upon unit rates for the Consultant's experts multiplied by the actual time spent by the experts in executing the assignment, and (ii) other expenses, provisional sums and contingency using agreed unit prices. Consultant will ensure delivery of document and outputs in a time bound manner as specified/agreed by PMU. Payments will be linked with the delivery of outputs.