Project Administration Manual

Project Number:49026-004
Loan and Grant Numbers: LXXXX, Loan XXXX and GXXXX
July 2021

Socialist Republic of Viet Nam: Climate Resilient Inclusive Infrastructure for Ethnic Minorities Project I

ABBREVIATIONS

ADB	–	Asian Development Bank
BDP	–	Binh Dinh Province
CEMP	–	contractor environmental management plan
COVID-19	–	coronavirus disease
DED	–	detailed engineering design
EARF	–	environmental assessment and review framework
EIRR	–	economic internal rate of return
EMC	–	ethnic minority community
EMP	–	environmental management plan
FMA	–	financial management assessment
FMM	–	financial management manual
ha	–	hectare
GAP	–	gender action plan
IEE	–	initial environmental examination
km	–	kilometer
LIC	–	loan implementation consultant
MOF	–	Ministry of Finance
OCR	–	ordinary capital resources
ODA	–	official development assistance
PCU	–	passenger car unit
PPC	–	provincial people's committee
PPMS	–	project performance management system
PPMU	–	professional project management unit
QNP	–	Quang Nam Province
RCP	–	representative concentration pathway
RDWS	–	rural domestic water supply
REMDF	–	resettlement and ethnic minority development framework
REMDP	–	resettlement and ethnic minority development plan
SEDP	–	socioeconomic development plan
SOE	–	statement of expenditure
TRTA	–	transaction technical assistance
VRM	–	Viet Nam Resident Mission

CONTENTS

APPENDICES

Project Administration Manual Purpose and Process

The project administration manual (PAM) describes the essential administrative and management requirements to implement the project on time, within budget, and in accordance with the policies and procedures of the government and Asian Development Bank (ADB). The PAM should include references to all available templates and instructions either through linkages to relevant URLs or directly incorporated in the PAM.

The provincial people's Committees of Binh Dinh and Quang Nam provinces as the executing agencies, and with the Binh Dinh Professional Project Management Unit for Agricultural and Rural Development Projects and Quang Nam Professional Project Management Unit for Transport Construction Works as implementing agencies, are wholly responsible for the implementation of ADB-financed projects, as agreed jointly between the borrower and ADB, and in accordance with the policies and procedures of the government and ADB. ADB staff is responsible for supporting implementation including compliance by the executing and implementing agencies of their obligations and responsibilities for project implementation in accordance with ADB's policies and procedures.

At loan negotiations, the borrower and ADB shall agree to the PAM and ensure consistency with the loan and grant agreements. Such agreements shall be reflected in the minutes of the loan negotiations. In the event of any discrepancy or contradiction between the PAM and the loan and grant agreements, the provisions of the loan and grant agreements shall prevail.

After ADB Board approval of the project's report and recommendations of the President (RRP), changes in implementation arrangements are subject to agreement and approval pursuant to relevant government and ADB administrative procedures (including the Project Administration Instructions) and upon such approval, they will be subsequently incorporated in the PAM.

I. PROJECT DESCRIPTION

1. The Climate Resilient Inclusive Infrastructure for Ethnic Minorities Project I (CRIEM I, the "project") will improve will promote inclusive socioeconomic growth directly to 243,000 people of which 126,300 are ethnic minorities in Binh Dinh and Quang Nam provinces in the south-central coastal region by upgrading transport and water resource infrastructures and providing improved access to reliable weather and climate data. The two target provinces comprise 3.1 million people, of which 6% belong to ethnic minority communities (EMCs). EMCs are mostly concentrated in nine of the 29 districts and constitute an average of 45% of the population.[1]

2. The project is aligned with the following impact: inclusive socioeconomic development of Binh Dinh and Quang Nam provinces accelerated. The project will have the following outcome: social and economic status and inclusiveness of ethnic minorities communities improved.

3. The project outcome will be achieved through the following outputs:

4. **Output 1: Climate-resilient transport infrastructure improved.** The project will upgrade seven roads totaling about 121.8 kilometers (km) in seven project districts, with design standards which include climate resilience.[2] The upgraded transport links will enhance the integration of remote rural production sites with markets and processing facilities, including improving the freight movement of acacia and high value crops, thereby improving connectivity and mobility of EMCs. The enhanced transport network will also reduce travel time for road users and improve access to health, education, and market services, especially for women who suffer from time poverty.

5. **Output 2: Climate-resilient water resource infrastructure improved.** This output will (i) construct RDWS to provide water to about 18,600 people through 115 km of piped networks in An Lao district in BDP; (ii) upgrade an existing reservoir to support 117 hectares of irrigation command area with a more reliable and efficient water supply in Phuoc Son district in QNP; and (iii) construct cultural tourism infrastructure, including one river defense (3.6 km of embankment), visitor car parking, and solid waste collection in Tay Giang district in QNP, with a total population of 17,700 including 94% from EMCs. Activities under this output will benefit about 36,300 people improve the health of communities by reducing the risk of waterborne diseases and will particularly benefit women by reducing the time they spend in water collection.

6. **Output 3: Data systems for climate risk management updated**. This output will provide improved access to reliable weather and climate data in a timely and cost-effective manner. These data will help strengthen early warning systems, improve disaster response, and inform a wide range of decisions, including those related to the design of climate resilient infrastructure.[3] High-level online technology will be introduced to improve the capacity of the provincial governments to manage, collect, archive, and share data through client interfaces.

7. The project preparation follows a sector-project approach where representative subprojects are prepared for the key outputs. These representative subprojects are used to

[1] The project districts in BDP are An Lao, Hoai Nhon, Van Canh, Vinh Thanh; and in QNP are Bac Tra My, Nam Tra My, Nam Giang, Phuc Son, and Tay Giang.

[2] The seven project districts are An Lao, Hoai Nhon, Van Canh, and Vinh Thanh districts in BDP; and Bac Tra My, Nam Giang, and Nam Tra My districts in QNP.

[3] The extent and type of investment will vary between the two project provinces, with consideration of the ongoing investments in QNP financed by the World Bank under the Dam Rehabilitation and Safety Project and by ADB under the Urban Environment and Climate Change Adaptation Project, which is developing and implementing a flood forecasting and warning system for Hoi An and Vu Gia-Thu Bon river basin.

establish the feasibility of proposed investments along with project due diligence undertaken by ADB transaction technical assistance (TRTA).

8. A total of 11 shortlisted subprojects including seven for output 1 and four for output 2 are proposed for implementation (Tables 1 and 2). The ADB TRTA prepared two subproject feasibility studies in BDP, one for each output. All shortlisted subprojects were visited by the TRTA and screened for eligibility except for one riverbank protection subproject in Tay Giang district, QNP. This subproject relates to a government-funded flood protection program in this district, and its proposed site will be highly modified by a stream dam to be built under the government flood protection program. The dam will affect water elevations, water velocities which need to be confirmed prior to detailed design procedures being contracted.

Table 1: Subproject Shortlist – Output 1

Code	District	Subproject name	Road Length kilometer (km)
Binh Dinh Province			**76.90**
BD-01a	Vinh Thanh	Upgrade PR637 from Vinh Quang to Vinh Thanh Town	2.40
BD-01b	Vinh Thanh	Upgrade PR 637 from Dinh Binh reservoir to Vinh Son commune centre	39.00
BD-02	Van Canh	Repair inter-commune road Hiep Hung Hamlet, Canh Hiep Commune to Canh Tien village, Canh Lien commune, Van Canh District	12.00
BD-03	An Lao	Inter-commune road An Hung - Tam Quan	23.50
Quang Nam Province			**51.50**
QN-01	Nam Tra My	Section 1: inter-commune road Ngoc Linh, Tra Nam-Tra Linh (11.6 km); Section 2: Inter-commune road Ngoc Linh: Tra Tap-Tra Cang (11.2 km)	22.80
QN-02	Bac Tra My	Upgrade transport road of Song Truong - Tra Giac communes, Bac Tra My District	20.10
QN-03	Nam Giang	Transport road connecting resettlement and production area (Ca Dy commune road), Nam Giang District	8.60
Total	**7**		**128.40**

Source: Asian Development Bank.

Table 2: Subproject Shortlist – Output 2

Code	District	Subproject	Water Supply			Irrigation		Flood Protection
			Connected (No. of household)	**Network length** (km)	**Capacity** (m^3/day)	**Command Area** (ha)	**Canal Length** (km)	**Length** (km)
Binh Dinh Province								
BD-04a	An Lao	Water supply for An Lao Town and An Trung Commune	5,100	75	2,730			
BD-04b	An Lao	Water Supply for An Hoa, An Tan and An Hung Communes	1,285	20	680			
Subtotal	*2*		*6,385*	*95*	*3,410*	*0*	*0.0*	*0.00*
Quang Nam Province								
QN-04	Tay Giang	Riverbank protection for Cot Ecotourism						3.63
QN-05	Phuoc Son	Install water supply, Upgrade irrigation	4,000	20	900	126	3.6	
Subtotal	*2*		*4,000*	*20*	*900*	*126*	*3.6*	*3.63*
Total	**4**		**10,385**	**115**	**4,310**	**126**	**3.6**	**3.63**

Source: Asian Development Bank.

9. Subproject general eligibility criteria are as follows:

(i) The subproject is included in the provincial medium-term investment plan or approved by the Provincial People's Council;
(ii) The subproject is aligned with the Master Plan;
(iii) The subproject is endorsed by the PPCs for inclusion in the project;
(iv) The subproject is included within the provincial socio-economic development plan (SEDP) and medium-term investment plans;
(v) The executing agency committed to prepare feasibility studies and technical engineering design;
(vi) The executing agency committed to advance actions to prepare detailed designs and tender documents for representative subprojects;
(vii) The subproject is simple, has a logical design consistent with local design capacity and recent examples of similar construction;
(viii) Maximum of two civil works packages per subproject;
(ix) Investment amount for roads subprojects is in the range of $3–$20 million;
(x) Investment amount for other subprojects (no roads) is in the range of $1–$5 million;
(xi) The subproject does not overlap with other investments;
(xii) Subproject's economic internal rate of return is at least 9% for economic development or 6% with prior agreement with ADB regarding the social impact of the proposed investment – the economic internal rate of return will apply the ADB guidelines for economic assessment of road and water supply subprojects and will include explicit provision for climate change and road safety for road subprojects;
(xiii) All ADB safeguard categories of the proposed subproject must be B or C;
(xiv) Formal government commitment to (a) funding operations and maintenance, (b) ensuring water tariffs are able to support the full cost of operation and maintenance of water supply schemes, and (b) provision of counterpart funding according to the requirements of the project and specifically to ensure timely detailed designs and that all land acquisition and compensation costs are fully settled for the entire subproject prior to issuance of any works contractor notice to proceed. This will require supporting financial analysis for recurrent costs within the respective public sector budgets for road subprojects included in both the feasibility study and detailed design documentation that will be reviewed by VRM for concurrence prior to approval by the PPC; and
(xv) Climate change considerations into the subproject detailed engineering designs (DEDs) are consistent with government standards. All subproject designs will need to clearly establish an expected degree of resilience to projected climate change. The Representative Concentration Pathway (RCP) scenario 8.5 will be applied to early-mid and mid-century timeframes depending on the expected economic life of the infrastructure. Further government climate exceedance frequencies for flood, rainfall etc., will be applied but with the provision that they are adjusted for climate change projections. ADB has provided a detailed and relatively easy to apply analysis guidance for this purpose.[4]

10. Additional screening criteria are as follows:

(i) For roads, adequate subproject data provided including: (i) start and end points; (ii) PPC approval of any new alignment sections; (iii) traffic counts and forecasts

[4] ADB. 2020. *Manual on Climate Change Adjustments for Detailed Engineering Design of Roads Using Examples from Viet Nam*. Manila.

to 2035, (iv) passenger car unit (PCU) ratings for 2017 and 2035; and (v) confirmed prioritization within Provincial SEDP with proposed road category consistent with 2035 PCU forecast including:

(a) Adhere to relevant Vietnamese minimum standards and specifications for roads;
(b) Consultations on the subproject proposal have been held in concerned communes and measures for future public consultation and supervision by the Commune Supervision Board are clearly spelled out with each consultation recorded as validation; and
(c) Include road and traffic safety considerations for vulnerable road users into the design.

(ii) For rural domestic water supply infrastructure, adequate subproject data provided including: (i) clear registered legal status of asset owner and operator; (ii) water supply data and demand projections for a minimum of 25 years, including demographic projection and migration factors; and (iii) as appropriate, summary of the profit and loss statements for 5 years, tariff levels and collection details.

(iii) For irrigation infrastructure, availability of water supply to support proposed cropping patterns and financially viable.

(iv) For other water resource infrastructure, based on perceived risk to (i) human life, (ii) public infrastructure and the cost of that infrastructure, (iii) livelihoods, and (iv) future economic returns as well as their priority within the following criteria:

(a) All water supplies must provide evidence (source gauging or water level data) that indicates there is sufficient water as per requirements plus minimum environmental flows based on the P4 drought year within the historical rainfall record; and
(b) The capacity of water supply schemes will be based on projected population levels, non-household water demand and non-revenue water and operating margins.

11. For output 3, the project prioritizes investments to access the use of existing hydromet network data since there has been a very high density of field data stations in both provinces. Investment selection is based on data management systems for online storage and access for both clients and users, which are integrated with existing early warning systems, decision support models, and the provision of flood risk assessments to road network infrastructure. The only technology to be used within the field data network is to develop site-based flood warning systems for infrastructure and associated communities (Appendix 1).

12. The scope of investment is limited to:

(i) Client data server technology and supporting infrastructure;
(ii) User interfaces;
(iii) Risk assessment technologies; and
(iv) Local site-based flood and water level monitoring with linked early warning systems for no more than 8–10 sites.

13. ADB will approve bidding and detailed design documents for each subproject only after all compensation entitlements within the resettlement and ethnic minority development plans (REMDPs) are fully settled. No works undertaken prior to all entitlements being settled will be financed by ADB.

14. Subproject feasibility studies will be carried out in conformity with the above criteria. The feasibility studies will be undertaken for each subproject independently and will include a preliminary design based on 30% of the field site survey data points, an updated bill of quantity, completed initial environmental examinations (IEE) and resettlement and ethnic minorities development plans (REMDP), financial and economic cost assessment, social and poverty assessment for monitoring baselines to ensure the subproject meets all relevant ADB and government due diligence requirements and thresholds. Only subprojects with an approved feasibility study will be eligible to proceed to DED process. A subproject short-list description is provided in Appendix 2.

II. IMPLEMENTATION PLANS

15. Project readiness activities and implementation schedule are presented in sections A and B below. Important points considered in developing the implementation schedule are the historical or recent elapsed times for (i) ADB recruitment of consultants – being a minimum of 10 months, (ii) the time required from government feasibility study approval to contracting of works that legally requires 23 steps and takes on average 300 to 320 days per procurement package (Table 3), and (iii) ADB safeguards concurrence.

Table 3: Processing Steps from Feasibility Study to Contract Award

No.	Steps and/or Activities	Minimum Elapsed time (calendar days)
1	Topographic, geological surveys – legally required	60
2	Construction drawing design - cost estimate	90
3	Internal appraisal of construction drawing design - cost estimate	3
4	Sending to verification unit of construction drawing design - cost estimate	15
5	Submission, appraisal of construction drawing design - cost estimate	30
6	Submission, approval of construction drawing design - cost estimate	5
7	Preparation of the bidding document for civil works and cost estimate	7
8	Submission and internal appraisal of the bidding document and cost estimate	5
9	Seeking no objection from the Asian Development Bank (ADB) for the bidding document	5
10	Internal approval of the bidding document and cost estimate	5
11	Advertising the invitation for bids (the national procurement website and ADB website)	3
12	Preparation of the bids	30
13	Receipt of the bids, Opening and closing of the bids	1
14	Evaluation on the eligibility of the bids, determination of the evaluated price, evaluation on the technical proposal of contractor at the lowest evaluated price	
14.1	Evaluation on the eligibility of the bids	5

No.	Steps and/or Activities	Minimum Elapsed time (calendar days)
14.2	Determination of the evaluated price and confirmation of the accepted contractor and/or explanation of arithmetical error	15
14.3	Post-selection	10
15	Finalization of the evaluation report	7
16	Appraisal of the results of contractor selection	20
17	Seeking ADB no objection on the evaluation report	10
18	Submission by the bid solicitor of the results of contractor selection to the client	1
19	Government approval of the results of contractor selection	10
20	Publication of the contract award decision (advertising the results of contractor selection on the national procurement website, the client's website (within 7 working days) and send the notification (within 5 working days) of the results of contractor selection to the participating bidders.	15
21	Sending the contract agreement to the awarded contractor (within 28 days the contractor must sign the contract agreement and provide guarantee of contract performance accordingly)	28
22	Signing Contract	2

Source: Asian Development Bank

A. Project Readiness Activities

Table 4: Viet Nam Project Readiness Filter

Updated on: 28 May 2021
Project Name: Climate Resilient Inclusive Infrastructure for Ethnic Minorities Project I

Summary of Project Readiness					
- Advance actions agreed and included in the government's investment policies approved by the Prime Minister - Project administration manual (PAM) prepared - Project management unit (PMU) organization structure and staffing proposed and included in the PAM - Government's project proposal has been approved on 1 July 2019 - Government's investment policies for Binh Dinh province (BDP) and Quang Nam province (QNP) have been approved by the Prime Minister on 25 July and 3 August 2020, respectively. - Government's feasibility studies completed and approved by BDP and QNP Provincial People's Committee (PPCs) on 29 December 2020 and 29 January 2021, respectively.					
Actions	**Date of Action Completed**	**By Whom**	**By When**	**Status**	**Projected date for meeting milestone and actions required**
1.1 Concept Paper includes an assessment of required readiness level of the project (high level readiness vs. low level). - Management and team to agree on the required level of readiness, timeline for project processing and possible funding source for Detailed Engineering Design (DED). - For large infrastructure type projects, a separate funding (such as an ongoing loan, a technical assistance (TA) loan or project preparation and start-up support facility) or piggybacking from the ongoing loan is identified (so that the recruitment of DED consultants can be processed before the project's approval). - Safeguard categories are discussed and agreed.	7 November 2018	Asian Development Bank (ADB)	Concept paper stage	Completed	Concept paper approved on 7 November 2018

Actions	Date of Action Completed	By Whom	By When	Status	Projected date for meeting milestone and actions required
2.1 Investment policies submitted to the Prime Minister - Agreed advance actions included - Proposed financial conditions and mechanism applied to the project, repayment method, and financial capacity of executing agency included	15 July 2020	Executing agencies	Before Fact-Finding	Completed	
2.2 Investment policies approved by the Prime Minister - Appraisal Committee provides its recommendation to Prime Minister with inputs from Ministry of Planning and Investments, Ministry of Finance (MOF), State Bank of Viet Nam, and other relevant ministries	3 August 2020	Executing agencies	Before staff review meeting (SRM)	Completed	
2.2.1 Financial mechanism and on-lending modality reviewed by MOF as a part of inputs to the Appraisal Committee's recommendation	4 April 2020	MOF		Completed	
2.3 Project administration manual (PAM) prepared and agreed to with ADB (PAM to include the following 2.3.1 to 2.3.4)		Executing agencies and ADB	Before SRM	PAM prepared	
2.3.1 Procurement plan detailing contract packages, procurement modality, decision making structure and schedule are ready; agreed to with ADB		Executing agencies and ADB	Before SRM	Procurement plan prepared and included in PAM.	

Actions	Date of Action Completed	By Whom	By When	Status	Projected date for meeting milestone and actions required
2.3.2 Financial management system, financial management action plan, cost estimates and financing plan, audit arrangement, fund flow oversight established and agreed with ADB		Executing and implementing agencies, and ADB	Before SRM	Prepared and included in PAM	
2.3.3 Financial Management Manual finalized by implementing agencies		Executing and implementing agencies, and ADB	By loan signing	Draft prepared	
2.3.4 Resettlement and ethnic minority development frameworks and plans (REMDFs and REMDPs) are prepared and agreed to with ADB		Executing agencies, and ADB	Before SRM	two REDMFs for BDP and QNP, and two REMDPs for representative subprojects prepared and agreed by ADB.	
2.3.5 Environment safeguard documents are prepared and agreed to with ADB - Project environment assessment and review framework (EARF) for Category B Projects - Initial environmental examinations (IEEs), including environmental management plans (EMPs) for two representative subprojects (road and water supply) Category B - IEEs for additional subprojects are prepared - Domestic environmental impact assessments (EIAs and/or EMPs for subprojects are prepared and approved by the government		Executing agencies, and ADB Executing agencies Executing agencies	Before SRM Before bidding of respective civil works packages bidding of respective civil works packages	 EARF for BDP and QNP, and 2 IEEs for 2 RSPs prepared and agreed by ADB. Not yet started. Not yet started.	
2.4 Funding source for DED agreed between executing agencies		Executing	Before SRM	DEDs to be funded by	

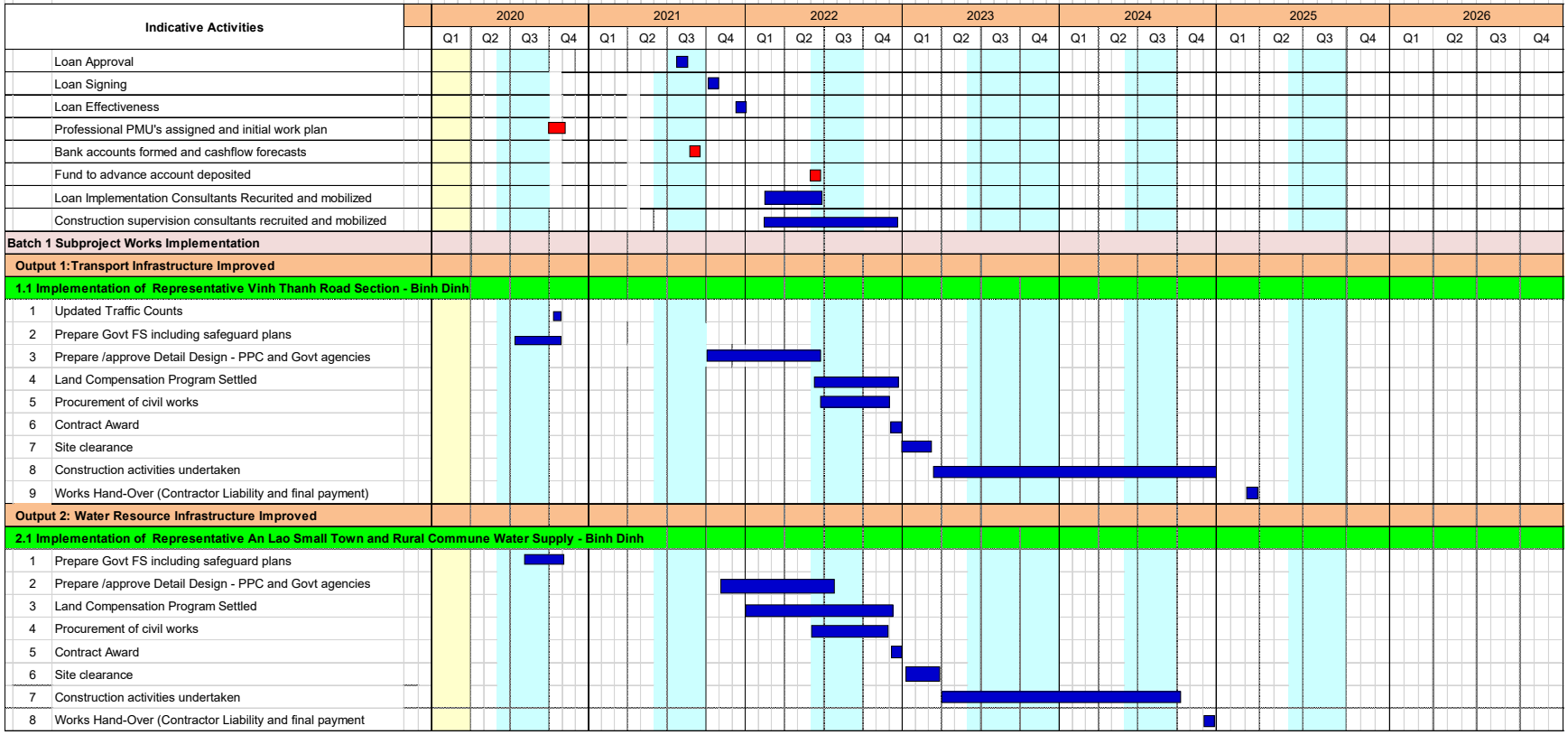
Actions	Date of Action Completed	By Whom	By When	Status	Projected date for meeting milestone and actions required
and ADB, and draft detailed terms of reference (TOR) for DED consultants and project supervision consultants		agencies, and ADB		BDP and QNP. Construction supervisions consultants to be funded by ADB. Their TORs were prepared and included in the PAM.	
2.5 Fund mobilization plan for land acquisition and resettlement plan prepared		Executing agencies, and ADB	Before SRM	Completed	
2.6 Government's feasibility study is completed and approved by the competent authority. - PMUs to complete feasibility studies for all subprojects for BDP and QNP PPCs approval - Agreed procurement plan to be included to avoid a separate approval process EIA/EMP of government to be included to avoid a separate approval process		PMUs and executing agencies	By loan negotiations	Completed	
3.1 PMUs establishment officially announced with core PMU staff in place	June 2020	Executing agencies	By loan negotiations	Completed. PMUs structure and staffing included in PAM and reflected in fact-finding mission memorandum of understanding.	
3.2 Call for expression of interest (EOI) and/or request for proposal (RFP) for DED consultancy work and project supervision consultants advertised or issued		Executing agencies	By loan signing	Not started yet.	To be done in Q4, 2021.

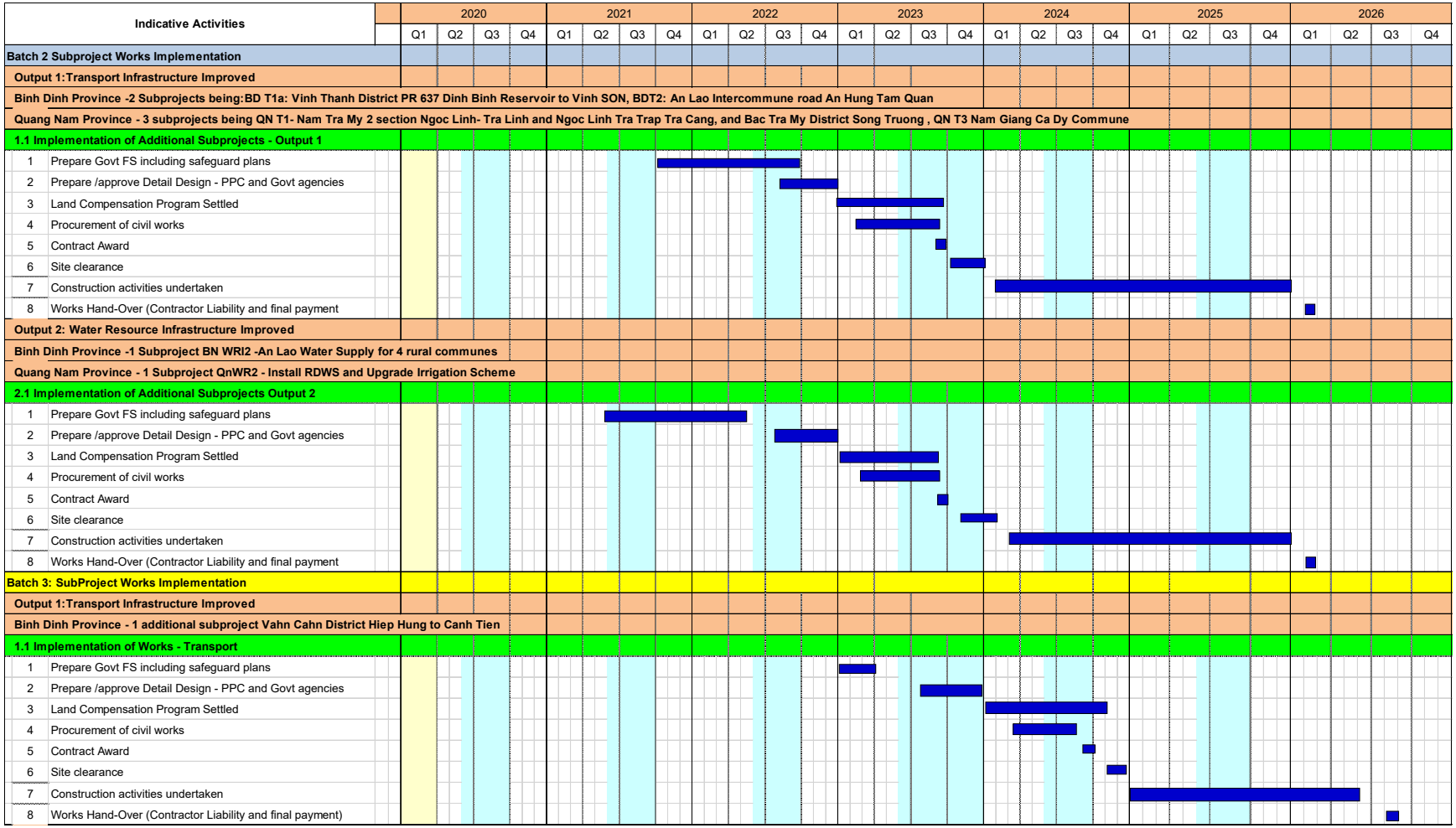
ADB = Asian Development Bank; BDP = Binh Dinh province; DED = detailed engineering design; EARF = environment assessment and review framework; EMP = environmental management plan; EOI = express of interest; IEE = initial environmental examination; MOF = Ministry of Finance; PAM = project administration manual; PMU = project management unit; PPC = Provincial People's Committee; QNP = Quang Nam province; RFP = request for proposal; RSP = representative subproject; SRM = staff review meeting; TA = technical assistance; TOR = term of reference.
Source: Asian Development Bank.

B. Overall Project Implementation Plan

Table 5: Indicative Implementation Plan

Implementation Schedule




Indicative Activities
2020
2021
2022
2023
2024
2025
2026
Q1 Q2 Q3 Q4
Batch 2 Subproject Works Implementation
Output 1:Transport Infrastructure Improved
Binh Dinh Province -2 Subprojects being:BD T1a: Vinh Thanh District PR 637 Dinh Binh Reservoir to Vinh SON, BDT2: An Lao Intercommune road An Hung Tam Quan
Quang Nam Province - 3 subprojects being QN T1- Nam Tra My 2 section Ngoc Linh- Tra Linh and Ngoc Linh Tra Trap Tra Cang, and Bac Tra My District Song Truong , QN T3 Nam Giang Ca Dy Commune
1.1 Implementation of Additional Subprojects - Output 1
1 Prepare Govt FS including safeguard plans
2 Prepare /approve Detail Design - PPC and Govt agencies
3 Land Compensation Program Settled
4 Procurement of civil works
5 Contract Award
6 Site clearance
7 Construction activities undertaken
8 Works Hand-Over (Contractor Liability and final payment
Output 2: Water Resource Infrastructure Improved
Binh Dinh Province -1 Subproject BN WRI2 -An Lao Water Supply for 4 rural communes
Quang Nam Province - 1 Subproject QnWR2 - Install RDWS and Upgrade Irrigation Scheme
2.1 Implementation of Additional Subprojects Output 2
1 Prepare Govt FS including safeguard plans
2 Prepare /approve Detail Design - PPC and Govt agencies
3 Land Compensation Program Settled
4 Procurement of civil works
5 Contract Award
6 Site clearance
7 Construction activities undertaken
8 Works Hand-Over (Contractor Liability and final payment
Batch 3: SubProject Works Implementation
Output 1:Transport Infrastructure Improved
Binh Dinh Province - 1 additional subproject Vahn Cahn District Hiep Hung to Canh Tien
1.1 Implementation of Works - Transport
1 Prepare Govt FS including safeguard plans
2 Prepare /approve Detail Design - PPC and Govt agencies
3 Land Compensation Program Settled
4 Procurement of civil works
5 Contract Award
6 Site clearance
7 Construction activities undertaken
8 Works Hand-Over (Contractor Liability and final payment)

Indicative Activities		2020				2021				2022				2023				2024				2025				2026			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Batch 3: SubProject Works Implementation																													
Output 2: Water Resource Infrastructure Improved																													
Quang Nam Province - 1 Additional SubProject Tay Giang																													
2.1 Implementation of Works the subproject requires final contractor approval of the associated down stream dam to be cleared prior to design of the flood proteciotn																													
1	Prepare Govt FS including safeguard plans																												
2	Prepare /approve Detail Design - PPC and Govt agencies																												
3	Land Compensation Program Settled																												
4	Procurement of civil works																												
5	Contract Award																												
6	Site clearance																												
7	Construction activities undertaken																												
8	Works Hand-Over (Contractor Liability and final payment)																												
Output 3: Data Systems for Climate Risk Management Updated																													
1	Quang Nam Consultant Contracted																												
2	Quang Nam Work Plan Implemented																												
3	Binh Dinh Consultant contracted																												
4	Binh Dinh Work Plan Implemented																												
Project Management																													
1	PPMU Office Equipment																												
2	Incremental staff recruited for PMUs																												
4	PPMUs set up and fully functional																												
5	Project implementation consultants recruited and fielded																												
A	**Safeguards Implementation and Monitoring**																												
1	Implementation of REMDP, GAP																												
2	Safeguard Monitoring																												
3	Quarterly progress reports																												
4	Annual progress reports																												
5	Project completion report (draft and final)																												
B	**Project completion date**																												

FS = feasibility study, GAP = gender action plan, PMU = project management unit, PPC = Provincial People's Committee, PPMU = professional project management unit, REMDP = resettlement and ethnic minority development plan.
Source: Asian Development Bank.

III. PROJECT MANAGEMENT ARRANGEMENTS

A. Project Implementation Organizations: Roles and Responsibilities

1. Ministry of Finance

16. The Ministry of Finance (MOF) is the borrower's representative, accountable for managing all funds received for the implementation of the project. MOF will sign an on-lending agreement with each province.

2. Executing Agency– Project Owner

17. The PPCs of BDP and QNP are the executing agencies. Each PPC shall assign one PPC member with a rank of Chairperson and/or Vice-Chairperson to assume overall responsibility for project implementation and coordination. For key project activities (i.e., REMDP, procurement plan, consultants' terms of reference (TOR), and bid evaluation reports), the Chairperson and/or Vice-Chairperson will be the approving authority.

3. Implementing Agency

18. Binh Dinh professional project management unit (PPMU) for agricultural and rural development projects (Decision No. 3337/QĐ-UBND dated 22 September 2016, in accordance with Law on Construction 2014) and Quang Nam PPMU of transport construction works (Decision 1587/UBND-KTTH dated 26 March 2019) will be the implementing agencies. The implementing agencies have the authority and delegated responsibility to form professional project management units (PPMUs) and are legally required to do so within 30 days after loan signing.

4. Professional Project Management Unit

19. Each PPMU led by a Project Director will be directly accountable to the PPC. The structure and staffs of each PPMU is listed in Section E below. The PPMU will be the equivalent of the ADB - implementing agency and the Project Owner (government terminology).

20. The PPMUs will provide day to day project implementation management. The executing agencies should ensure that PPMUs have proficient capacity to work in English to ensure a smooth oral and written communication with ADB. The importance of counterpart staff with substantial relevant experience in key positions was agreed. No additional project coordination unit is envisaged given that there are only two provinces, and each will report to ADB and their respective PPCs independently.

5. Summary

21. The detailed roles of each agency are presented in Table 6 below.

Table 6: Roles and Responsibilities for Implementation Organizations

Project Implementation Organizations	Management Roles and Responsibilities
MOF	**Representative of the Borrower** ➢ MOF will sign an on-lending agreement with each province. ➢ MOF controls the disbursement and signs on withdrawal applications to allow disbursement.
PPC of Binh Dinh Province **PPC of Quang Nam Province**	**Executing agencies** ➢ Oversight body ➢ Each PPC will be responsible for overseeing project activities within their province. ➢ Each PPC will appoint a Vice-Chairperson to be responsible for the project. ➢ Each PPC will ensure availability of counterpart funding on time. ➢ Each PPC will be the approving authority for procurement plan and subproject detailed designs once appraised by competent authorities.
Binh Dinh PPMU for agriculture and rural development projects (Binh Dinh PPMU) **Quang Nam PPMU of transport construction works (Quang Nam PPMU)**	**Each implementing agency** ➢ will ensure that its staff has sufficient expertise in all sectors covered by the project, especially in transport, water supply, procurement, financial management, and safeguards. ➢ will coordinate and consult with the Departments of Transport and the Department of Construction, the Departments of Agriculture and Rural Development, and other departments under their respective PPCs on technical matters, especially on DED, procurement, recruitment of consultants and implementation of works on road, and rural domestic water supply related to subprojects implementation. ➢ will be responsible for implementing the GAPs and reporting on its implementation status to ADB on regular basis. ➢ Will: • have overall responsibility for the day to day implementation of the project activities; • prepare annual work plans with supporting budget projections; • ensure compliance with loan and grant covenants; • submit disbursement projections to government's authorized authorities and ADB as needed and ensure counterpart fund allocations; • have day to day financial management responsibilities; • ensure that project implementation complies with ADB's safeguard policy and provisions in the EMPs, REMDPs, and GAP; • review designs of subprojects; • propose changes to project design, scope or implementation arrangements, when required; • approve procurement outcomes and sign contracts • approve and submit progress reports and project work plans to ADB. • establish a project advance account at a commercial bank

Project Implementation Organizations	Management Roles and Responsibilities
	nominated by the State Bank of Vietnam and acceptable to ADB for disbursement of eligible expenditures under the loans; • manage, (replenishment, and liquidation) the account; and be fully accountable and responsible for the proper use of the advance accounts; • prepare and sign withdrawal applications for endorsement to MOF; • carry-out advance actions for recruitment of consultants for preparation of detailed designs, bid documents, and contract administration and construction supervision; • recruit the loan implementation consultants; • prepare subproject detailed designs including organizing verification and submission of design, cost estimate and bidding document; • supervise the preparation of additional subproject feasibility reports, their review and approval; • prepare bidding arrangements/documents and evaluating bids for the procurement of subproject civil works contracts; • supervise civil works contractors; • update social and environment safeguard documents and submit to ADB for clearance prior to implementation; monitor implementation of REMDPs; ensure environmental protection and mitigation measures (in the EMPs) are incorporated in detailed designs and contract awards; ensure implementation of the EMPs and submit regular monitoring reports through the implementing agencies to the executing agencies and ADB; • assist in obtaining necessary environmental approvals from responsible/appropriate authorities prior to awarding civil works contracts; • submit regular (quarterly and annual) project reports to PPMU and ADB; • set up and maintaining project financial system and be responsible for project payments through the approved bank accounts; • maintain sound internal controls over accounting and financial reporting for the project; • keep separate accounting records for the project covering all funding sources in the accounting system; • maintain reports and supporting documents for all transactions to provide a complete audit trail in accordance with the government regulations; • ensure the implementation of financial management action plans and annual submission of acceptable audited project financial statements to ADB; • coordinate and liaise with line agencies and other agencies as appropriate on common policy, regulatory context, implementation procedures and financial issues; • ensure day to day coordination and liaison between the two PPMUs and communications to the project steering committee

Project Implementation Organizations	Management Roles and Responsibilities
	and other relevant agencies; • undertake quality control inspections of the project facilities during construction and on completion; • manage project facilities and handover operations and maintenance to related agencies. • organize training programs; and • procure office equipment and goods as needed.
CISB with guidance of the Commune Fatherland Front Committee	➢ The CISB is established to follow government Decree No.84/2015/ND-CP dated 30 September 2015. The CISB with support and guidance of PPMUs, will be responsible for: • monitoring all community development activities (under GAP and resettlement and ethnic minorities development framework) that are inter-communal roads and water supply connections within community; • supervising implementation of REMDPs and EMPs; • organizing public consultations in collaboration with community facilitators and PPMUs; • monitoring subproject design and quality of subproject construction as guided by the supervision engineer; and • facilitating the implementation of grievance redress mechanism.
ADB	**Project Financier** ➢ ADB is the principal financier and will: • provide loan and grant financing for the works, goods, equipment, and construction supervision consultants; • provide project oversight and administration to support project implementation and supervision; • monitor overall project implementation, disbursement, procurement, consultant selection, and reporting; • monitor schedules of activities, including funds flow; • review compliance with agreed procurement procedures; • review compliance with loan and grant covenants; • review safeguard documents, provide comments and concurrence; • monitor effectiveness of safeguards including six monthly site visits to all active sites and confirm in writing that all land and other compensation dues have been settled and finalized prior to issue a notice to proceed to the contractor; • monitor conformity with ADB anti-corruption policies; and • undertake periodic review missions, including a midterm review and a project completion review.

ADB = Asian Development Bank, CISB = Community Investment Supervision Board, DED = detailed engineering design, EMP = environmental management plan, GAP = gender action plan, MOF = Ministry of Finance, PMU = project management unit, PPMU = professional project management unit, PPC = Provincial People's Committee, REMDP = resettlement and ethnic minorities development plan.

Source: Asian Development Bank.

22. All documentation requiring concurrence or prior approval from ADB, will be submitted by the respective PPMU of each PPC to ADB. No interprovincial coordination function is required. All project management, administration, and procurement will be decentralized to each PPMU as per the directives of Decree 56/2020/ND-CP with the final approvals for procurement being at the PPC level.

23. Subproject implementation will include the following steps:

(i) Preparation of subproject feasibility study, including:
   a. IEE, environment management plan (EMP), and REMDP;
   b. Gender action plan (GAP);
   c. Preliminary engineering designs and supporting bill of quantities and detailed cost estimate including road safety audits;
   d. Financial (where required) and economic assessment.

(ii) Additional subproject feasibility studies will follow the example of the feasibility studies of representative subprojects as agreed between the government and ADB, and will be prepared by PPMUs or their contractors.

(iii) PPMUs will circulate draft additional subproject feasibility studies for comments by provincial technical departments concerned and revise these feasibility studies accordingly.

(iv) PPMUs prepare implementation plan with associated cost estimates and financing plans.

(v) ADB will conduct a due diligence review of additional subproject feasibility studies.

(vi) Feasibility studies and supporting implementation plans submitted to PPCs for approval.

(vii) DED consultants will be contracted by the PPMUs. Request for proposals will be prepared by the loan implementation consultants (LIC) and PPMU procurement staff using government procedures, no ADB review will be required.

(viii) DED consultants will review feasibility studies and supporting field survey design data to validate its accuracy and applicability. They will confirm if feasibility studies require updating due to changes in the proposed subprojects. For roads the review will also ascertain the required technical standards through updated traffic counts and PCU rating for the baseline and for the end of economic life of the proposed road section. For output 2, the review will update the population projections and 24-hour demand estimate to establish the system demand and supply capacity requirements.

(ix) Preparation of DEDs including bill of quantities, cost estimates, supporting technical drawings, updating of safeguard documentation and economic assessment and financial assessment of output 2 subprojects. Further, DED consultants will be responsible for poverty and social baseline assessments, environmental and social safeguards plans, financial sustainability assessment, economic feasibility – counterpart financed. They will provide a full set of data required by the government to approve the design and will respond to the comments from the PPMUs and technical design review entities.

(x) Approval of DEDs by PPMUs after technical review along with safeguard notifications according to ADB policy and concurrence of ADB of each DED.

(xi) All land and affected person compensation to be addressed, completed, and certified before works contracts are awarded.

(xii) Tendering for civil works packages to be financed by ADB and executing agencies.

(xiii) Contract award with the PPMU directors acting on behalf of the PPCs.

(xiv) Site clearance activities, contractor design review, work plan and contractor environmental management plan (CEMP), including a coronavirus disease (COVID-19) preventative actions and risk management plan prepared.
(xv) Notice to proceed once PPMUs and ADB confirm all requirements are satisfactory and meet ADB policy and operational guidelines.
(xvi) Construction, including technical and safeguard supervision and monitoring.
(xvii) Commissioning, training, and handover.

24. Feasibility studies for additional subprojects will be prepared by the consultants recruited by the PPMUs. They shall be responsible for the technical aspects of the feasibility studies including the economic and financial analysis, all safeguard issues, land acquisition assessments required for preparing the IEEs and where appropriate REMDPs, GAP, poverty and social assessments, and inclusion of road safety and climate resilient measures in accordance with government standards.

25. This will ensure that appropriate measures to (i) build and strengthen the inclusiveness of subprojects, and (ii) mitigate any negative social impacts including special measures for land acquisition, compensation, ethnic minorities specific actions as required, and to improve the participation of women and other disadvantaged groups as beneficiaries.

26. Upon completion of the subproject feasibility studies each PPMU shall use the consultant services provided through the LIC, to review the feasibility studies to ensure that: (i) appropriate technical standards are incorporated in the design and that the costs applied reflect realistic market estimates; and (ii) ADB's and the government's social and environmental safeguards requirements are duly addressed. The review will be completed and reported prior to DED contracts are procured to ensure the invitation for bid is accurate.

27. Once reviewed, the PPMUs will submit the feasibility studies to the PPCs for approval. ADB will review all feasibility studies and associated documents. ADB's comments will be incorporated for safeguard compliance. Each executing agency will be ultimately responsible for the quality and compliance of their feasibility studies.

28. All additional subproject feasibility studies for output 1 roads will include a traffic forecast derived from traffic counts of baseline traffic demand. The traffic forecasts will be presented in the summary of each feasibility study for the economic life of the proposed road investment. The technical design standard for the road engineering must be consistent with the assessed traffic demand - specified in daily PCU terms according to the Viet Nam Design Specification TCVN 4054 (Table 7).

29. Where the road traffic forecast spans more than one PCU category the standard to be applied will be based on the design category that is consistent with the traffic forecast at year 10 of the projection. Where the indicated design category differs from the provincial master plan or the proposed subproject design standard indicated in the government investment policy, the PPMU and PPC will confirm the design standard to be used as the standard indicated by the traffic forecast under regulation TCVN 4054. Technical standards for bridges will reflect the PCU for a 30-year projection reflecting the expected economic life of such structures. All technical design specifications will incorporate the impacts of climate change using RCP8.5 projections for early mid-century projections as reported by the Ministry of Natural Resources and Environment and ADB.

30. All output 1 subprojects are required to include full drainage options both horizontal and longitudinal for the entire section, exclusion of drainage as a cost saving strategy will result in the project being ineligible for ADB finance.

31. Output 1 subproject designs will include a road safety audit and investment for implementing the proposed actions.

32. The economic assessment of the subproject must reflect the same assumption and same traffic forecast data to ensure capital investment costs are consistent with the expected benefit streams. This requirement will remove bias of inflated economic internal rate of return estimates from the use of a higher traffic forecast, or alternately, applying a capital investment that is insufficient to construct the category of road required by the traffic forecast and the estimated project economic benefits. ADB guidelines for the economic assessment of transport subprojects will be adhered too.

Table 7: Road Design Categorization by Traffic Demand Forecasts
(Daily Passenger Car Unit)

Design Category (TCVN 4054 – 2005)	Design Traffic Volume (daily passenger car unit)
I	>15,000
II	>6,000
III	>3,000
IV	>500
V	>200
VI	<200

Source: Asian Development Bank.

33. Where the indicated design category differs from the provincial master plan or the proposed subproject design standard indicated in the government investment policy, the PPMU and PPC will confirm the design standard to be used in compliance with the standard indicated by the traffic forecast under regulation TCXDVN 2007. If a subproject is designed according to a standard that differs from the traffic count it will be ineligible for ADB financing.

34. ADB will confirm in writing to the PPMU and to file for each subproject feasibility study that the road subproject feasibility assessment has a traffic forecast that is consistent with the proposed construction design category, and the projected traffic benefits used in the economic assessment. Where there is inconsistency, ADB will notify the executing and implementing agencies that the subproject feasibility is not accepted and is ineligible for ADB financing.

B. Key Persons Involved in Implementation

Executing Agency

Provincial People's Committee of Binh Dinh Province	Officer's Name: Mr. Tran Chau Position: Vice-Chairman Telephone: +84 0256 3812 145 Office Address: 1 Tran Phu Street, Qui Nhon City, Binh Dinh Province, Viet Nam

Provincial People's Committee of Quang Nam Province	Officer's Name: Mr. Le Tri Thanh Position: Chairman Telephone: +84 02353 852739 Office Address: 62 Hung Vuong, Tam Ky City, Quang Nam Province, Viet Nam

Asian Development Bank

Viet Nam Resident Mission	Staff Name: Mr. Andrew Jeffries Position: Country Director Telephone No.: +84 24 3933 1374 Email address: ajeffries@adb.org
Environment, Natural Resources and Agriculture Division, Southeast Asia Department	Staff Name: Mr. Jiangfeng Zhang Position: Sector Director Telephone No.: +63 2 86325162 Email address: jzhang@adb.org
Mission Leaders	Staff Name: Ms. Stefania Dina Position: Sr. Natural Resources and Agriculture Specialist Telephone No.: +84 24 32662124 Email address: sdina@adb.org Staff Name: Ms. Nguyen Hong Anh Position: Programs Officer Telephone No.: +84 24 3933 1374 Email address: honganh@adb.org

C. Project Management Units Structure

1. Binh Dinh Professional Project Management Unit

(v) The Binh Dinh PPMU consists of 41 full-time staff, 18 have been assigned to the project.

Figure 1. Binh Dinh PPMU Structure

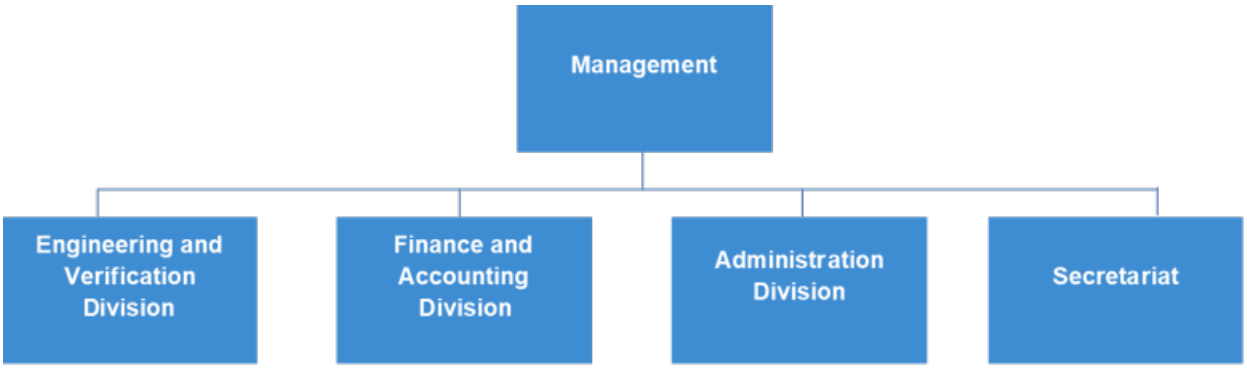


Table 8: Binh Dinh Professional Project Management Unit Staffing

No.	Position	Responsibility / Tasks
1	Director	- Overall project management - Legal representative of the project management unit, signs economic contract, legal documents of the project
2	Vice-director	Transport
3	Vice-director	Irrigation
4	Chief of finance and accounting division	Accounting and financial management
5	Deputy chief of secretariat	Economic analysis
6	Deputy chief of secretariat	Planning and bidding
7	Deputy chief of project administration division 1	Social safeguards policy
8	Deputy chief of project administration division 1	Bidding
9	Deputy chief of engineering and verification division	Irrigation
10	Deputy chief of engineering and verification division	Bidding
11	Staff of engineering and verification division	Irrigation
12	Staff of project administration Division 1	Social safeguards policy
13	Staff of project administration Division 1	Transport
14	Staff of project administration Division 1	Transport
15	Office staff	Archiving
16	Accounting staff - 3	Financial management and disbursement

Source: Asian Development Bank.

2. Quang Nam Professional Project Management Unit

36. The Quang Nam PPMU for transport construction works was assigned has 61 existing full-time staff, 7 of which were assigned to this project.

Figure 2. Quang Nam PPMU Structure

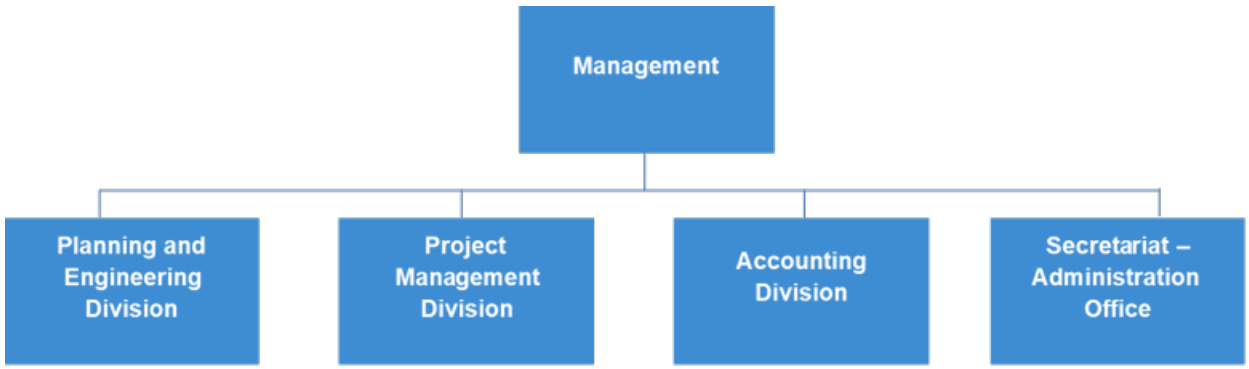


Table 9: Quang Nam Professional Project Management Unit Staffing

No.	Position	Responsibility / Tasks
1	Director	- Overall project management - Legal representative of the project management unit, signs contracts and legal documents of the project
2	Deputy director	Direct implementation of the project activities
3	Chief of secretariat – administration office	Human resources management logistics
4	Officer – administration office	Human resources management and logistics
5	Division of planning and engineering – two staff	Planning and monitoring project implementation, gender action plan planning, implementation, and reporting
6	Project management division – six staff	- Project preparation and implementation - Contract management
7	Accounting division – four staff	Financial management and disbursement

Source: Asian Development Bank.

3. Loan Implementation Consultants

37. The LIC for each PPMU will provide procurement, and safeguard support. The LIC will be funded by counterpart funds and will be procured using government procedures, no ADB review or approval is required. All DEDs will be funded through contracts using counterpart funds and are not the responsibility of the LIC.

Table 10: Indicative Positions and Level of Effort for the National Loan Implementation Consultants

Position	Person Months
A. Binh Dinh Professional Project Management Unit	
1. Infrastructure engineer	40
2. Productive rural infrastructure engineer	30
3. Procurement	24
4. Social safeguard subproject preparation and monitoring	18
5. Gender - gender action plan implementation monitoring	12
6. Environment safeguards and monitoring	18
7. Benefit and impact monitoring	12
8. Land acquisition monitoring	24
Subtotal	**178**
B. Quang Nam Professional Project Management Unit	
1. Infrastructure engineer	30
2. Productive rural infrastructure engineer	15
3. Procurement	20
4. Social safeguard subproject preparation and monitoring	18
5. Gender - gender action plan implementation monitoring	12
6. Environment safeguards and monitoring	20
7. Benefit and impact monitoring	12
8. Land acquisition monitoring	15
Subtotal	**142**

Source: Asian Development Bank.

IV. COSTS AND FINANCING

38. The project financing plan is presented in Table 11.

Table 11: Project Financing Plan

Source	Amount ($ million)	Share of Total (%)
Asian Development Bank		
Ordinary Capital Resources (regular loan)[a]	29.00	35.5
Ordinary Capital Resources (regular loan)[b]	29.00	35.5
High Level Technology Fund (grant)[c]	2.00	2.4
Government	21.73	26.6
Total	**81.73**	**100.0**

[a] To be onlent to Binh Dinh Province.
[b] To be onlent to Quang Nam Province.
[c] Financing partner: Government of Japan. To be fully administered by ADB.
Source: Asian Development Bank.

A. Cost Estimates Preparation and Revisions

39. The costs were based on the estimated bill of quantities for the representative subprojects and applied provincial cost norms. Other costs were derived from field and institutional consultations.

B. Key Assumptions

40. The following key assumptions underpin the cost estimates and financing plan:

(i) Price contingencies over the implementation period are applied as follows:

Table 12: Cost Escalation Assumptions

Item	2020	2021 to 2026	Average
Foreign rate of price inflation	1.5%	1.6% per annum	1.6%
Domestic rate of price inflation	3.8%	4.0% per annum	4.0%

Source: Asian Development Bank.

(ii) The real and nominal exchange rates under purchasing parity assumptions are based on the August 2020 rate of D23,200 per $1 (Table 13).

Table 13: Real and Nominal Exchange Rate Assumptions

Exchange Rates		2020	2021	2022	2023	2024	2025	2026
Real	D/$	23,200	23,200	23,200	23,200	23,200	23,200	23,200
Nominal	D/$	23,200	23,746	24,345	24,967	25,606	26,260	26,931

Note: As of June 2020, the exchange rate was D23,198 = $1 and as such the exchange rates have not been updated since December 2019.

(iii) Expenditure Categories to be Financed.

41. A summary of the project resources by financier is summarized in Table 14 – note all taxes including value added tax and interest costs are financed by counterpart funds.[5]

Table 14: Summary Financing Plan by Financier

Component	Financier	
	Asian Development Bank	Government
Output 1		
Roads bridges associated works		
Detailed engineering design		
Construction supervision consultants		
Land acquisition and resettlement cost		
Output 2		
Infrastructure		
Detailed engineering design		
Construction supervision		
Land acquisition and resettlement cost		
Output 3		
Data systems supply and installation		
Project management		
Project management unit staff and operation		
Vehicles		
Project loan implementation consultants		
Audit of project financial accounts		
Implementation of gender action plan		
Exchange rate loss		
All taxes and duties		
Financial charges during implementation		

Source: Asian Development Bank.

[5] Confirmed with MOF.

C. Detailed Cost Estimate by Expenditure Category

Table 15: Detailed Costs by Expenditure Category

	VND Local Million			USD Million			
	Local	**Foreign**	**Total**	**Local**	**Foreign**	**Total**	**% Total Base Costs**
Investment Costs							
Civil Works	721,989	481,326	1,203,314	31.12	20.75	51.9	76.73
Data Systems Technology	23,836	23,836	47,672	1.03	1.03	2.1	3.04
Construction Supervision	26,037	6,509	32,546	1.12	0.28	1.4	2.08
Loan Implementation Consultants	23,805	2,645	26,450	1.03	0.11	1.1	1.69
Land Acquisition and Compensation	65,876	-	65,876	2.84	-	2.8	4.20
Environmental Management	5,964	663	6,627	0.26	0.03	0.3	0.42
Gender Action Plan	3,631	403	4,035	0.16	0.02	0.2	0.26
Construction Design Services	63,105	7,012	70,117	2.72	0.30	3.0	4.47
Project Management Costs	31,190	3,466	34,655	1.34	0.15	1.5	2.21
Other Costs	67,096	7,455	74,551	2.89	0.32	3.2	4.75
Subtotal Baseline Costs (A)	1,032,527	533,314	1,565,842	44.51	23.09	67.6	100.00
Physical Contingencies	133,645	3,235	136,880	5.76	0.14	5.90	8.73
Price Contingencies (including Devaluation)	147,236	3,546	150,800	6.35	0.15	6.50	9.62
Subtotal (B)	280,881	6,799	287,680	12.11	0.29	12.40	18.35
Total Project Cost before FCDI	1,313,408	540,113	1,853,522	56.61	23.39	80.0	118.34
FCDI (C)						1.73	
Total Project Costs (A+B+C)						81.73	120.90

FCDI = financial charge during implementation.
Note: Numbers may not sum precisely because of rounding.
Source: Asian Development Bank estimates.

D. Allocation and Withdrawal Categories

1. Ordinary Capital Resources Loan

Table 16: Withdrawal and Allocation – Ordinary Capital Resources Loans

No.	Item	Total Amount Allocated for ADB Financing ($)	Basis for Withdrawal from the Loan Account
		Category	
1	Binh Dinh Province**	29,000,000	100% of total expenditure claimed*
	Total	**29,000,000**	

* Exclusive of taxes and duties imposed within the territory of the Borrower.
** Subject to the condition for withdrawal described in paragraph 4(a) of Schedule 3, Loan Agreement.
Source: Asian Development Bank estimates.

No.	Item	Total Amount Allocated for ADB Financing ($)	Basis for Withdrawal from the Loan Account
		Category	
1	Quang Nam Province**	29,000,000	100% of total expenditure claimed*
	Total	**29,000,000**	

* Exclusive of taxes and duties imposed within the territory of the Borrower.
** Subject to the condition for withdrawal described in paragraph 4(a) of Schedule 3, Loan Agreement.
Source: Asian Development Bank estimates.

2. High-Level Technology Fund Grant

Table 17: Withdrawal and Allocation – High-Level Technology Fund Grant

No.	Item	Total Amount Allocated for ADB Financing ($)	Basis for Withdrawal from the Loan Account
		Category	
1	Binh Dinh Province	1,000,000	100% of total expenditure claimed*
2	Quang Nam Province	1,000,000	100% of total expenditure claimed*
	Total	**2,000,000**	

* Exclusive of taxes and duties imposed within the territory of the Recipient.
Source: Asian Development Bank estimates.

E. Detailed Cost Estimates by Financier

Table 18: Detailed Cost Estimates by Financier
($million)

Expenditure Category	ADB OCR Loans				High Level Technology Fund - Climate-				Binh Dinh PPC		Quang Nam PPC		Total Government		Total Project	
	Binh Dinh	Quang Nam	Total Amount	% of Cost category	Binh Dinh	Quang Nam	Total Amount ($ million)	% of Cost category	Amount	% of Cost category	Amount	% of Cost category	Amount	% of Cost category	Amount	Govt Taxes and duties
A. Investment Costs[a]																
Civil Works	23.2	24.0	47.2	91%	0.0	0.0	0.0	0%	2.3	4%	2.4	5%	4.7	9%	51.9	4.7
Data Systems Technology	0.0	0.0	0.0	0%	0.9	0.9	1.9	91%	0.1	5%	0.1	5%	0.2	9%	2.1	0.2
Consulting Services	**0.7**	**0.6**	**1.3**	**22%**	**0.0**	**0.0**	**0.0**	**0%**	**2.5**	**54%**	**2.1**	**46%**	**4.4**	**78%**	**5.8**	**0.2**
Construction Supervision	0.7	0.6	1.3	91%	0.0	0.0	0.0	0%	0.1	5%	0.1	4%	0.2	9%	1.4	0.1
Loan Implementation Consultants	0.0	0.0	0.0	0%	0.0	0.0	0.0	0%	0.7	67%	0.4	33%	1.1	100%	1.1	0.1
Land Acquisition and Compensation	0.0	0.0	0.0	0%	0.0	0.0	0.0	0%	1.4	50%	1.4	50%	2.8	100%	2.8	0.0
Environmental Management	0.0	0.0	0.0	0%	0.0	0.0	0.0	0%	0.	51%	0.1	49%	0.2	100%	0.3	0.0
Gender Action Plan	0.0	0.0	0.0	0%	0.0	0.0	0.0	0%	0.1	65%	0.1	35%	0.2	100%	0.2	0.0
Project Management	**0.0**	**0.0**	**0.0**	**0%**	**0.0**	**0.0**	**0.0**	**0%**	**3.7**	**46%**	**4.1**	**54%**	**7.7**	**100%**	**7.8**	**0.7**
Construction Design Services	0.0	0.0	0.0	0%	0.0	0.0	0.0	0%	1.3	42%	1.7	58%	3.0	100%	3.0	0.3
Project Management Costs	0.0	0.0	0.0	0%	0.0	0.0	0.0	0%	0.7	48%	0.8	52%	1.5	100%	1.5	0.1
Other Costs	0.0	0.0	0.0	0%	0.0	0.0	0.0	0%	1.6	51%	1.5	49%	3.1	100%	3.2	0.3
Audit	0.0	0.0	0.0	0%	0.0	0.0	0.0	0%	0.1	50%	0.1	50%	0.1	100%	0.1	0.0
Subtotal Baseline Costs (A)	**23.9**	**24.6**	**48.4**	**72%**	**0.9**	**0.9**	**1.9**	**3%**	**8.7**	**13%**	**8.7**	**13%**	17.1	26%	**67.6**	**5.8**
B. Contingencies																
Physical	2.3	2.4	4.7	80%	0.0	0.0	0.0	0%	0.6	10%	0.6	10%	1.2	20%	5.9	0.5
Price	2.8	2.0	4.9	74%	0.1	0.1	0.1	2%	**0.9**	14%	**0.7**	11%	1.6	24%	6.5	1.0
Subtotal (B)	5.1	4.4	**9.6**	77%	0.1	0.1	**0.1**	**1%**	**1.5**	**12%**	**1.3**	**10%**	**2.8**	**22%**	12.4	**1.5**
Financial Charges During Implementation (C)													**1.7**	**100%**	**1.7**	
Total Project Costs (A+B+C)	**29.0**	**29.0**	**58.0**	**71%**	**1.0**	**1.0**	**2.0**	**2%**	**10.0**	**12%**	**10.0**	**12%**	**21.7**	**27%**	**81.7**	**7.3**

ADB = Asian Development Bank, HLTF = High-Level Technology Fund, OCR = ordinary capital resources, PPC = Provincial People's Committee.
Notes: Numbers may not sum precisely because of rounding.
[a] Physical contingencies are calculated at 10.0% for civil works and equipment. Price contingencies calculated at an average of 1.5% on foreign exchange costs and 5.0% on local currency costs; includes provision for potential exchange rate fluctuation under the assumption of a purchasing power parity exchange rate.

Source: Asian Development Bank estimates.

F. Detailed Cost Estimates by Output

Table 19: Detailed Cost Estimate by Output

Expenditure Category	Climate-resilient transport infrastructure improved		Climate-resilient water resource infrastructure improved		Data systems for climate risk management updated		Project Management		Total
	Amount ($ million)	% of Cost category	Amount ($ million)	% of Cost category	Amount ($ million)	% of Cost category	Amount ($ million)	% of Cost category	Amount ($ million)
A. Investment Costs									
Civil Works	41.2	83%	10.7	21%	0.00	0%	0.0	0%	49.8
Data Systems Technology	0.0	0%	0.0	0%	2.10	100%	0.0	0%	2.1
Consulting Services									
Construction Supervision	0.0	0%	0.0	0%	0.00	0%	1.4	100%	1.4
Loan Implementation Consultants	0.0	0%	0.0	0%	0.00	0%	0.6	100%	0.6
Land Acquisition and Compensation	2.3	81%	0.5	19%	0.00	0%	0.0	0%	2.8
Environmental Management	0.2	68%	0.1	32%	0.00	0%	0.0	0%	0.3
Gender Action Plan	0.1	68%	0.1	32%	0.00	0%	0.0	0%	0.2
Project Management									
Construction Design Services	1.6	54%	1.4	45%	0.04	1%	0.0	0%	3.0
Project Management Costs	0.6	27%	0.4	18%	0.01	0%	1.1	55%	2.1
Other Costs	2.4	75%	0.7	23%	0.04	1%	0.0	0%	3.2
Audit	0.0	0%	0.0	0%	0.00	0%	0.1	100%	0.1
Subtotal Baseline Costs (A)	48.4	72%	13.9	20%	2.10	3%	3.2	5%	67.6
B. Contingencies									
Physical	4.6	78%	1.3	21%	0.00	0%	0.0	1%	5.9
Price (including Devaluation)	4.7	72%	1.3	21%	0.15	2%	0.3	5%	6.5
Subtotal (B)	9.3	75%	2.6	21%	0.15	1%	0.3	3%	12.4
Subtotal Project Cost before FCDI	57.7		16.5		2.25		3.5		80.0
C. FCDI (C)							1.7		1.7
Total Project Costs (A+B+C)	57.7	71%	16.5	20%	2.30	3%	5.2	4%	81.7

FCDI = financial charge during implementation.
Source: Asian Development Bank estimates.

G. Detailed Cost Estimates by Year

Table 20: Detailed Cost Estimates by Year

Implementation Schedule	2022	2023	2024	2025	2026	Total
Expenditure Category	**Amount** ($ million)	**Amount** ($ million)	**Amount** ($ million)	**Amount** ($ million)	**Amount** ($ million)	**Amount** ($ million)
A. Investment Costs[a]						
Civil Works	15.10	17.96	16.94	9.51	2.78	62.28
Data Systems Technology	1.09	0.78	0.34	0.00	0.00	2.20
Consulting Services						
Construction Supervision	0.55	0.38	0.39	0.20	0.00	1.52
Loan Implementation Consultants	0.34	0.32	0.32	0.13	0.15	1.26
Land Acquisition and Compensation	0.28	1.15	1.45	0.57	0.00	3.45
Environmental Management	0.03	0.11	0.13	0.05	0.00	0.33
Gender Action Plan	0.03	0.07	0.08	0.03	0.00	0.20
Project Management						
Construction Design Services	2.62	0.70	0.04	0.00	0.00	3.36
Project Management Costs	0.99	0.36	0.13	0.12	0.09	1.68
Other Costs	2.55	0.99	0.05	0.00	0.00	3.59
Audit	0.02	0.02	0.02	0.03	0.03	0.12
B. Financial Charges during Implementation	**0.23**	**0.24**	**0.35**	**0.44**	**0.47**	**1.73**
Total Project Costs (A+B)	**23.83**	**23.08**	**20.24**	**11.08**	**3.51**	**81.73**
Share of Total Project Disbursement	30%	28%	25%	13%	4%	100%

[a] Physical contingencies calculated at 10.0% for civil works and equipment. Price contingencies calculated at an average of 1.6% on foreign exchange costs and 4.0% on local currency costs; includes provision for potential exchange rate fluctuation under the assumption of a purchasing power parity exchange rate.

Source: Asian Development Bank estimates.

H. Contract and Disbursement S-Curves

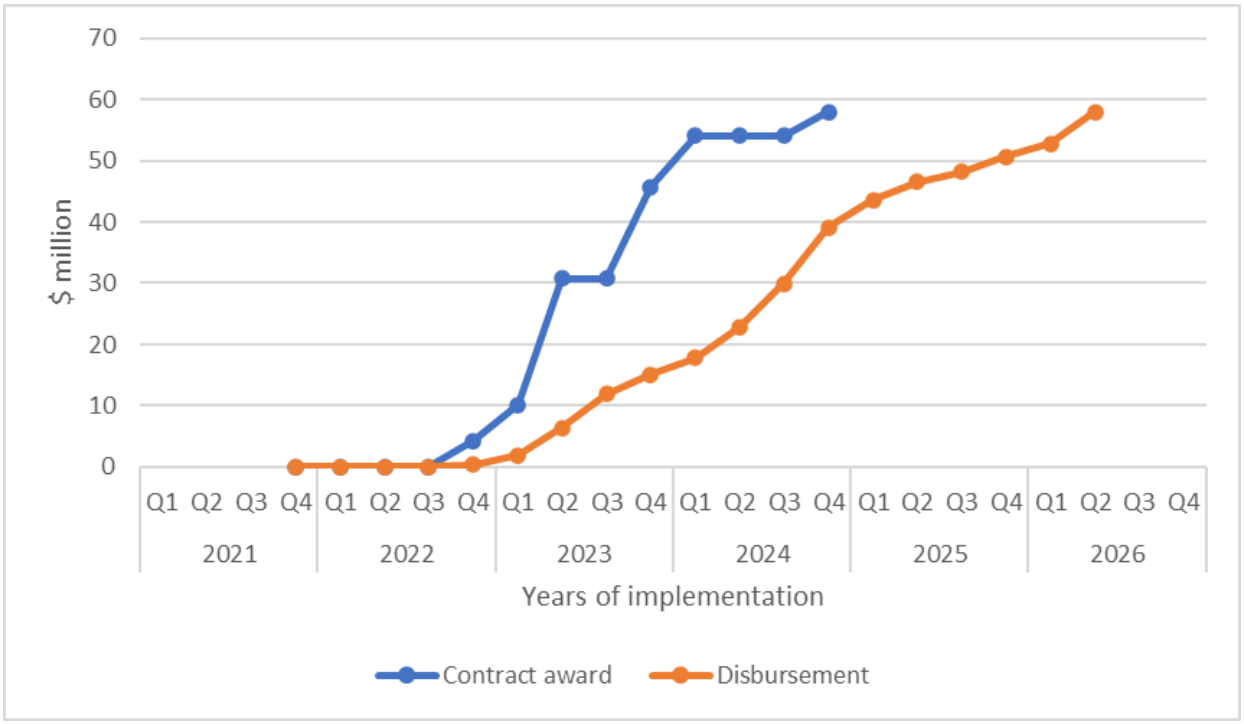
1. Ordinary Capital Resources Loan

Table 21: Ordinary Capital Resources Loan Contract and Disbursement Awards – by Quarter

Year	Contract Awards ($ million)					Disbursements ($ million)				
	Q1	Q2	Q3	Q4	Total	Q1	Q2	Q3	Q4	Total
2022	0.00	0.00	4.32	0.00	4.32	0.00	0.00	0.00	0.43	0.43
2023	5.80	20.64	0.00	14.92	41.36	1.44	4.53	5.53	3.23	14.73
2024	8.38	0.00	0.00	3.94	12.32	2.64	5.05	7.11	9.18	23.98
2025	0.00	0.00	0.00	0.00	0.00	4.48	2.90	1.68	2.51	11.57
2026	0.00	0.00	0.00	0.00	0.00	2.07	5.22	0.00	0.00	7.29
	Total Contract Awards				58.00	Total Disbursements				58.00

Source: Asian Development Bank estimates.

Figure 1: S-Curve Projection for Contract Award and Disbursement – Ordinary Capital Resources Loans



Source: Asian Development Bank.

2. High-Level Technology Fund

Table 22: High-Level Technology Fund Grant Contract and Disbursement Awards – by Quarter

Year	Contract Awards ($ million)					Disbursements ($ million)				
	Q1	Q2	Q3	Q4	Total	Q1	Q2	Q3	Q4	Total
2022	0.00	0.00	0.00	2.00	2.00	0.00	0.00	0.00	0.00	0.00
2023	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.60	0.40	1.20
2024	0.00	0.00	0.00	0.00	0.00	0.40	0.40	0.00	0.00	0.80
2025	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2026	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total Contract Awards				2.00	Total Disbursements				2.00

Source: Asian Development Bank estimates.

Figure 2: S-Curve Projection for High-Level Technology Fund Contract Award and Disbursement

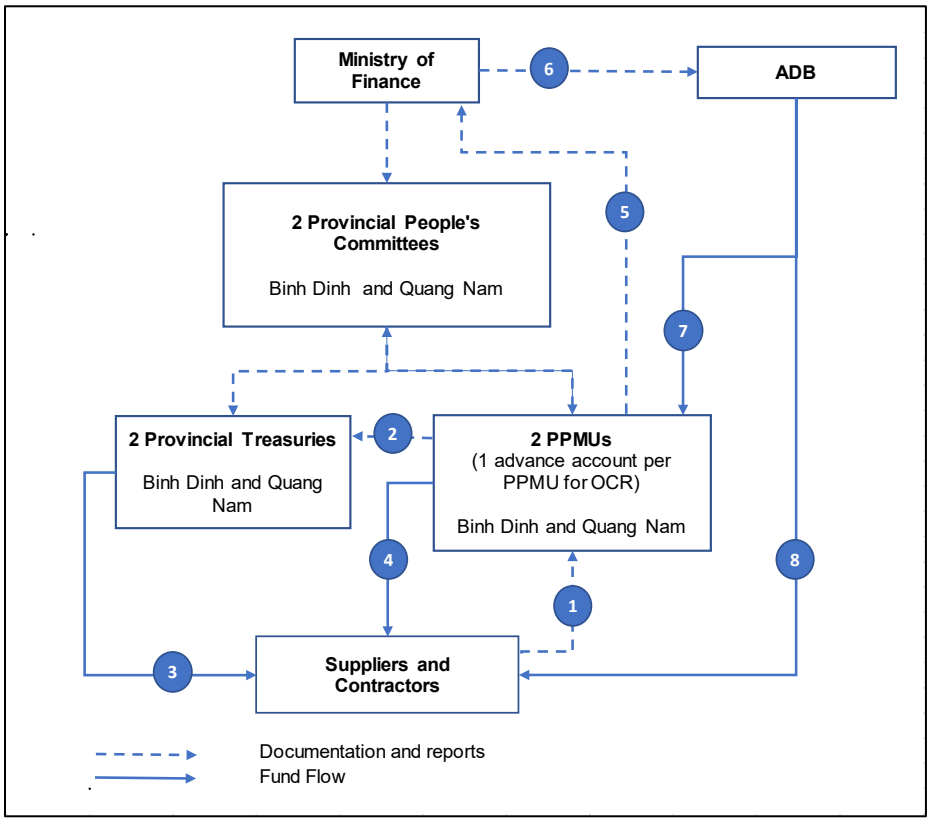
($ million)

Source: Asian Development Bank.

I. Fund Flow Diagram

42. The fund flow for the project is based on the government on-lending the OCR loans according to a sub-loan agreement for each executing agency. Figure 3 outlines the various fund flow pathways and their linkage to reporting information flows. These will cover both advance account and direct payment flows where ADB settles contractor invoices directly to their bank accounts. The significant risks, for example occur if advance account replenishments are not finalized in a timely manner leading to a shortage of funds in the advance accounts managed by each PPMU. Counterpart funding will be the sole responsibility of each executing agency and will be managed by the Provincial Treasury and the respective PPMU. The PPCs will commit to a cashflow projection for counterpart funds based on a project workplan prepared prior to loan effectiveness by each PPMU for both ADB and government financial resources. The timely release of funds from the Ministry of Planning and Investments to each province will be closely monitored by ADB. Delays identified will be reported within the following month to enable ADB and the Ministry of Planning and Investment to discuss remedial actions.

Figure 3: Fund Flow Arrangements



ADB = Asian Development Bank, OCR = ordinary capital resources, PPMU = professional project management unit.
Notes to figure
(1) Submission of claims
(2) Endorsement of claims payable
(3) Payment of claims from counterpart funds
(4) Payment of eligible claims from advance account for disbursement of loan proceeds only
(5) Submission of withdrawal applications for Advance, Liquidation/Replenishment and Direct Payment
(6) Endorsement of withdrawal applications for Advance, Liquidation/Replenishment and Direct Payment
(7) Deposit of Advance and Replenishments to advance accounts
(8) Direct payments of eligible claims for ADB-financed items
Source: Asian Development Bank.

V. FINANCIAL MANAGEMENT

A. Financial Management Assessment

43. The overall risk rating is assessed as moderate within the overall financial management assessment (FMA) – See FMA supplementary document, in the context of financial management arrangements to support a devolved approach, where the project financing (through MOF) will be on-lent to each of the two provinces, and each province is responsible for managing its respective work program. The implementing agencies have adequate capacity to manage the advance account and use the statement of expenditure (SOE) procedures for this project. The FMA uses the ADB country partnership strategy for Viet Nam for 2016–2020, the completed ADB FMA questionnaires, one for each PPMUs tasked with the management of the respective provincial work program for the project, and other consultations.

44. Oversight of the PPMUs is provided by the PPCs, however the day-to-day management responsibilities rest with the PPMUs. The assessed risk takes account of risks associated with the entities themselves, as well as project risks that are identified based on experience from current official development assistance (ODA) projects. The FMA considered personnel and capacity, accounting policies and procedures, internal controls, financial reporting, and audit, taking account of inherent risks and project risks. The overall risk rating is assessed as Moderate. The main financial management risks that need to be managed by the PPMUs are:

(i) Weaknesses in systems and procedures:
  (a) Lack of a comprehensive financial management manual (FMM). The existing FMMs are focused on disbursements, which leaves approximately 50% of the complete financial management systems and procedures without formal guidance.
  (b) Weak, or a complete lack of, complete accounting and financial reporting systems, mainly relating to inadequate accounting software especially for financial reporting.

(ii) Limited capacity to implement the financial management systems and procedures due to a lack of overall experience with ADB or other ODA projects across both PPMUs compounded by the lack of the comprehensive FMM.

(iii) Ensuring effective monitoring and oversight, to provide assurance that financial management systems and procedures are being implemented consistently and correctly, given the proposed devolved implementation approach (where each PPMU will be responsible for managing its own work program) as well as the varying levels of experience with ODA projects across the PPMUs.

45. The PPMUs have a sound organizational structure as well as qualified and experienced financial management staff with a few relatively minor issues to address. This provides a sound foundation from which to address the financial management risks that were identified during the FMA.

46. The ADB's country partnership strategy for Viet Nam 2016–2020 highlighted issues relating to slow and inefficient project performance, and a key aspect of this relates to a lack of readiness at the start of projects. The FMA recommends measures to mitigate key FM risks, with these mitigation measures largely being undertaken prior to project start up, as part of project readiness, to improve project performance from the start of the project. These mitigation measures will be the responsibility of the PPMUs.

47. The identified weaknesses and required mitigation actions, together with the corresponding responsibilities and timelines is presented in Table 23.

Table 23: Financial Management – Time Bound Action Plan

Weakness	Mitigation Action	Responsibility	Timeframe
1. **Financial management policies and procedures**: Lack of a comprehensive project FMM causing potential inconsistency within the project • Activity-based Financial Management Information System and project management reporting to track physical progress • Contracts commitments monitoring • Budget not integrated within the accounting system to timely monitor and update budget versus actual expenditures • Foreign exchange risk management • Land compensation payments • Data back up • Reporting of procurement conflicts of interest and related party transactions.	As part of project readiness: (i) Prepare draft of a comprehensive FMM (ii) Finalize a standardized and comprehensive FMM During implementation: (iii) Revisit the FMM for updates, if necessary, for the latest regulations to fit the project's needs	 (i) TRTA (ii) PPMUs (iii) PPMUs	 (i) During project processing (ii) Before loan and grant signing (iii) Once a year during project implementation
2. **Staffing.** Not enough qualified PPMU financial management staff assigned to the project	Each PPMU to assign at least four qualified financial management staff, including one chief accountant, one disbursement accountant, and two general accounting staff to the project.	PPMUs	Before loan and grant effectiveness date
3. **Staffing:** Limited knowledge and experience with ADB procedures and financial management requirements for ODA projects in general	(i) FM staff to participate in initial trainings on ADB's financial management requirements and disbursement. (ii) PPMUs to disseminate the finalized FMM internally among financial management staff for the project's use. (iii) Financial management staff to attend regular trainings by the government on updated accounting policies, ODA management regulations, etc.	(i) PPMUs and ADB (ii) PPMUs (iii) PPMUs	(i) Within 6 months from loan and grant effectiveness date (ii) Within 6 months from loan and grant effectiveness date (iii) During project implementation (when courses are offered by the government)
4. **Fund flows**. Delays in availability of counterpart funds	The PPMUs to prepare a clear and detailed budget and disbursement targets in close coordination with the PPCs to ensure funding requirements are well	PPMUs and PPCs	(i) Prior to loan and grant effectiveness date and (ii) at least quarterly during project implementation

Weakness	Mitigation Action	Responsibility	Timeframe
	planned, timely allocated, and properly adjusted when necessary.		
5. **External audit**. Project audits reports does not meet ADB's requirements for timeliness, quality, or completeness.	Engagement of external auditor acceptable to ADB, based on the ADB's standard terms of reference	PPMUs	Within 6 months from loan and grant effectiveness date

ADB = Asian Development Bank, FMM = financial management manual, ODA = official development assistance, PPC = Provincial People's Committee, PPMU = professional project management unit
Source: Asian Development Bank.

B. Disbursement Arrangements

1. Disbursement Arrangements of ADB Loans and HLT Fund Grant Proceeds

48. The ADB loans and HLT Fund grant proceeds will be disbursed in accordance with ADB's Loan Disbursement Handbook (2017, as amended from time to time), and detailed arrangements agreed upon between the government and ADB. Online training for project staff on disbursement policies and procedures is available.[6] Project staff are encouraged to avail of this training to help ensure efficient disbursement and fiduciary control.

49. **Advance fund procedure.** One advance account for each loan will be established by each PPMU. The currency of the advance account is the US Dollar. The advance accounts will be established at commercial banks nominated by each PPMU and communicated to ADB by the Borrower. The advance account is to be used exclusively for ADB's share of eligible expenditures. The implementing agency, through PPMU, who administers the advance account is accountable and responsible for proper use of advances to the advance account.

50. The total outstanding advance to the respective advance account should not exceed the estimate of ADB's share of expenditures to be paid through the respective advance account for the forthcoming 6 months. The PPMUs may request for initial and additional advances to the advance accounts based on an estimate of expenditure sheet setting out the estimated expenditures to be financed through the accounts for the forthcoming 6 months. Supporting documents should be submitted to ADB or retained by the implementing agencies in accordance with ADB's Loan Disbursement Handbook (2017, as amended from time to time) when liquidating or replenishing the advance account.

51. **Statement of expenditure procedure**. The SOE procedure may be used for reimbursement of eligible expenditures or liquidation of advances to the advance account. The ceiling of SOE procedure is the equivalent of $100,000 equivalent per individual payment. Supporting documents and records for the expenditures claimed under the SOE should be maintained and made readily available for review by ADB's disbursement and review missions, upon ADB's request for submission of supporting documents on a sampling basis, and for independent audit. Reimbursement and liquidation of individual payments in excess of the SOE ceiling should be supported by full documentation when submitting the withdrawal application to ADB.

52. Before the submission of the first withdrawal application, the borrower should submit to ADB sufficient evidence of the authority of the persons who will sign the withdrawal applications

[6] Disbursement eLearning.

on behalf of the government, together with the authenticated specimen signatures of each authorized person. The minimum value per withdrawal application is stipulated in the Loan Disbursement Handbook (2017, as amended from time to time). Individual payments below this amount should be paid (i) by the implementing agencies (the respective Department of Planning and Investment) and subsequently claimed to ADB through reimbursement, or (ii) through the advance fund procedure, unless otherwise accepted by ADB. The borrower should ensure sufficient category and contract balances before requesting disbursements. Use of ADB's Client Portal for Disbursements[7] system is encouraged for submission of withdrawal applications to ADB.

53. No withdrawals shall be made from any of the loan and grant accounts for any province until the respective Subsidiary Loan Agreement (for on-lending from MOF to each province) and the respective Subsidiary Grant Agreement (for on-grant from MOF to each province), in form and substance satisfactory to ADB, has been duly authorized by, and executed and delivered on behalf of MOF and the concerned province, and is legally binding upon the parties thereto in accordance with its terms.

2. Disbursement Arrangements for Counterpart Funds

54. Counterpart financing estimated at $21.73 million will finance DEDs, support for social and environmental safeguard documentation, approval procedures, land acquisition and compensation costs, loan implementation consultants, independent audit, project management overheads, taxes and duties, and financial charges during implementation. Concerning cash contributions, the PPMUs will be responsible for preparing disbursement projections and the PPCs will be responsible for including the necessary funds in their annual financing plans and allocating the funds following government regulations.

55. **Personnel and Capacity.** The PPMU's financial staff are permanent government staff, within legally defined PPMU structures for each province. All staff are qualified and experienced in accounting.

56. **Budgeting System.** The PPMUs will prepare the respective annual work plans and budgets – the work plans will be prepared by the PPMU technical division, and the budgets in conjunction with the PPMU finance division, for approval by the respective PPC. The work plans and budgets will be prepared in accordance with agreed templates and will integrate the physical and financial targets. The first work plan will be prepared for the whole life of the project and will then be updated based on the project administration manual projections and timelines, costs and defines the likely cashflows by quarter. These will be used as the basis for scheduling counterpart funds to ensure resources are available for recruitment of loan implementation consultants, purchase of PPMU equipment sets, payment of tax on any ADB financed procurement, and most importantly the preparation of DED, safeguards documents for each procurement package, along with the associated finance for land acquisition and linked compensation obligations.

57. Prior to loan effectiveness – the whole of life project work plan will be prepared with a supporting budget by project output, activity, and category. This work plan and supporting budget will be continually applied for ongoing planning, reporting and monitoring by the respective implementing agency. Financial reports will present a comparison between budgeted and actual amounts and highlight budget variances for remedial action by the implementing agency. The

[7] The Client Portal for Disbursements facilitates online submission of withdrawal application to ADB, resulting in faster disbursement. The forms to be completed by the Borrower are available online at https://www.adb.org/documents/client-portal-disbursements-guide.

workplan will also be used to structure the final project chart of accounts, and the structure of financial reporting both for accounting purposes and for project management purposes, and supervision reporting to the PPC and ADB.

58. The initial work plan will adopt a conservative work scheduling approach that has a minimum likelihood of achievement of 95% to manage the risk of possible cancellation of loan resources due to the project being red flagged by ADB for slow implementation.

59. The annual work plans and budgets will highlight, including timing requirements, the required counterpart activities and financing, in order that the counterpart funding may be made available in advance of requirement.

C. Accounting Policies and Financial Reporting

60. The Vietnamese accounting standards and applicable government regulations, including Circular 79/2019/TT-BTC, will be followed for the Project, with two additional requirements: (i) the following of international public sector standards in respect of the capturing and management of conflicts of interest, as well as the associated reporting of related party transactions; and (ii) the clear and standardized basis of accounting and presentation of financial statements, where receipts are recognized when received and expenditures are recognized when incurred – this basis is appropriate for ODA projects with non-revenue earning entities, and will be made clear in the external audit TOR and audit reports.

61. Separate accounting records will be maintained for the project covering all project's funding sources by each executing and implementing agency, with discrete recording of receipts and expenditures for each source of financing, and maintaining of the subsidiary ledgers, all within an accounting system that may be utilized by each implementing agency for ODA projects in general.

62. Standardized financial reporting templates will be established for the project – firstly for the purposes of improved project management (monthly reporting), with these as the basis for reporting to ADB, to the PPCs, and for the audited financial statements for public disclosure. Each implementing agency will report separately, and there will be no consolidated reports for the project as a whole.

63. All reports and supporting documents for all transactions will be maintained within a records management system that provides a complete audit trail and will be stored and retained in accordance with government regulations, to be accessible by authorized users and available for audit inspection.

64. The integration of activity-based accounting and financial reporting systems will enhance physical and financial progress monitoring versus work plans and budgets, for each PPMU to manage their respective work program.

65. The progress of financial management time-bound action plan (Table 24) and compliance with financial reporting and auditing requirements will be monitored by ADB review missions and during normal program supervision.

D. Auditing and Public Disclosure

66. Each executing agency will cause the detailed project financial statements to be audited in accordance with International Standards on Auditing by an independent auditor acceptable to ADB following the standard TOR in Appendix 3. The audited project financial statements together with the auditor's opinion and management letter will be presented in the English language to ADB within 6 months from the end of the fiscal year by the executing agencies.

67. The audit reports for the project financial statements will include a management letter and auditor's opinions, which cover (i) whether the project financial statements present an accurate and fair view or are presented fairly, in all material respects, in accordance with the applicable financial reporting standards; and (ii) whether the proceeds of the loans and grant were used only for the purpose of the project.

68. The government, including the PPCs and the implementing agencies, have been made aware of ADB's approach to delayed submission, and the requirements for satisfactory and acceptable quality of the audited project financial statements. ADB reserves the right to require a change in the auditor (in a manner consistent with the constitution of the borrower), or for additional support to be provided to the auditor, if the audits required are not conducted in a manner satisfactory to ADB, or if the audits are substantially delayed. ADB reserves the right to verify the project's financial accounts to confirm that the share of ADB's financing is used in accordance with ADB's policies and procedures.

69. Public disclosure of the audited project financial statements, including the auditor's opinion on the project financial statements, will be guided by ADB's Access to Information Policy (2018). After their review, ADB will disclose the audited project financial statements and the opinion of the auditors on the project financial statements no later than 14 days of ADB's confirmation of their acceptability by posting them on ADB's website. The public disclosure of the external audit reports, with audited financial statements, will be under one project banner. The management letter, additional auditor's opinion will not be disclosed.

70. **Safeguard of assets.** Inventory records of fixed assets are currently considered to be well managed and kept up-to-date and reconciled with control accounts of the implementing agencies periodically. The implementing agencies will conduct annual physical inventory of all project assets, and all subproject assets will remain on the implementing agencies project registry until formally handed over to the appropriate asset managers on project completion with supporting documentation that will be included in the scope of the external audit and in project progress reports where assets, receiving entity and date of transfer will be recorded. During construction and/or installation insurance shall be the responsibility of contractors and shall cover worker compensation for losses due to accidents apart from compensation for property.

VI. PROCUREMENT AND CONSULTING SERVICES

A. Advance Contracting and Retroactive Financing

71. Neither advance contracting nor retroactive financing is envisaged under the project, however, there are advance actions for the recruitment of consultants for (i) LIC; (ii) detailed engineering designs; and (iii) construction supervision including the preparation of terms of reference, request for proposals, and expression of interest prior to the loan signing.

B. Procurement of Goods, Works, and Consulting Services

1. Procurement Risk Assessment

72. The below table shows a summarized project procurement risk register:

Table 24: Project Procurement Risk Register

	Risk Description	Risk Impact	Likelihood (L) (1-5)	Impact (I) (1-5)	Risk Score (L x I)	Proposed Mitigation	Risk Owner
1	Differences between the national procurement regulations versus the ADB regulations; Weaknesses of national procurement regulations.	Non-compliance with ADB regulations	3	5	15	- Training on ADB Procurement Policy 2017 is provided. - ADB prior review for first and selected packages.	EAs/IAs
2	The mechanism to receive and handle observations, complaints, and protests during procurement process is lack of independence from the procuring entity.	Lack of confidence in the complaint system. Inability to ensure affected parties by the procurement decision to be heard and treated fairly and impartially, as well as to uncover the integrity issues during the procurement process	5	3	15	- Communicate to bidders on ADB procurement complaint procedure during business outreach event for the project. - Application of standstill period, under procurement of goods and works to provide a credible mechanism for addressing bidding-related complaints, reduce risks, improve fairness, transparency.	EAs/IAs
3	Complicated and burdensome administrative approval requirements.	Delaying project progress	4	5	20	- Dialogue with EA about streamlining internal approval processes to expedite implementation process. - Detailed project implementation plan capturing all required government approval processes is established and closely monitored.	EAs/IAs
4	Low procurement readiness	Delay project start-up	5	4	20	- Securing other available funding sources (from counterpart fund) to prepare detailed engineering design for works contracts,	EAs/IAs

	Risk Description	Risk Impact	Likelihood (L) (1-5)	Impact (I) (1-5)	Risk Score (L x I)	Proposed Mitigation	Risk Owner
						and bidding documents for those contracts in advance.	
5	IAs' limited experience in recruitment of consultant following ADB procedures.	Non-compliance with ADB regulation and delayed selection process.	4	4	16	- ADB provides trainings on procurement and recruitment of consultant to relevant IAs' staff. - EA/IA ensures to have staff who have relevant technical expertise and English capacity to be included in the CSC to recruit consultant and manage the contract. - Reduce number of consulting service packages by grouping similar assignment into one package (e.g., construction supervision of civil works contract).	IAs
6	No experience in international OCB to procure goods and civil works as well as management of FIDIC contract type	Non-compliance with ADB regulation and deficient contract management.	3	1	3	- Mitigation is not necessary because national OCB with contract form for small works will be applied to works contracts under this project due to their small sizes which are within the local capacity and not attractive to foreign contractors.	IAs
7	Corruption and collusion	Serious effect on integrity of public procurement, failure to achieve procurement objectives and value for money.	4	5	20	- OCB, 1S1E is used to procure civil works package under the project. - usage of e-procurement system to procure all national OCB goods and works contracts in the project. - Increase oversight for contracts for goods and works from $5 million and above by ADB. - Capacity	EAs and IAs

	Risk Description	Risk Impact	Likelihood (L) (1-5)	Impact (I) (1-5)	Risk Score (L x I)	Proposed Mitigation	Risk Owner
						development measures included in projects focused on strengthening transparency in processes. - Periodic review of procurement review arrangements.	
8	Lack of bidder participation.	Potential high prices and/or reduce quality.	3	5	15	- Business outreach events to (i) notify construction industry about pipeline of contracts to be procured in the project; (ii) providing tips to prospective bidders on preparing compliant bids; (iii) how to find bidding opportunities and submit bids online; and (iv) reassuring the mechanisms in place to ensure procurement is conducted in a fair and transparent manner.	IAs
9	National procurement requires mandatory usage of 1S2E for competitive bidding for goods contract in excess of $500,000 and works contract in excess of $ 1,000,000	(i) Delay procurement process; (ii) Reduction of price competition and (iii) Non-transparent, biased bid evaluation practices	5	5	25	- Discourage use of 1S2E for OCB contracts for goods and works under this project.	?
10	Deficient contract management	Failure to follow contract conditions, quality reduced, project implementation delayed, and/or cost increase.	3	4	12	- Early preparation of contract management plan. - Improve IA's capacity in contract management. - Support by construction supervision consultants.	IAs

Likelihood: 1-rare, 2-Unlikely, 3-Possible, 4-Likely, 5-Almost certain.
Impact: 1-Insignificant, 2-Minor, 3-Moderate, 4-Major, 5-Severe.
ADB = Asian Development Bank, CSC = consultant selection committee, EA = executing agency, IA = implementing agency, OCB = open competitive bidding.
Source: Asian Development Bank.

2. Procurement Packaging and Scheduling

73. **Works contracts.** BDP has three subprojects to upgrade and rehabilitate roads and bridges and one subproject to build rural domestic water supply system. QNP has three subprojects to upgrade and rehabilitate roads and bridges, one subproject to build river revetments, and one subproject to upgrade irrigation and water supply system.

74. To improve efficiency, economy and reduce interface problem, each road in the transport sub-projects will be packaged as one single package.

75. Under output 2 in QNP, subproject no. 5 includes construction of one rural domestic water supply system and rehabilitation of one irrigation system, which are different in nature; therefore, it will be split into one package to build water supply system and one package to rehabilitate the irrigation system.

76. **Consulting services.** The project includes two types of consulting services, (i) consultancy for establishment of client server system in BDP and design of flood risk assessment software in QNP, and (ii) construction supervision. The construction supervision for all civil works (include both works for output 1 and output 2) will be procured as one package for each province to help (i) reduce consulting recruitment transactions, (ii) attract reputable and large consulting firms due to the contract volume; and (iii) increase efficiency and achieve cost effectiveness.

3. Procurement Method and Bidding Procedures

77. For civil works packages, it is recommended to use national open competitive bidding, e-procurement with single stage one envelope bidding procedures and post qualification.

78. For consulting service, fixed budget selection with full-technical proposal is appropriate to recruit consultant for the establishment of client server system in BDP and design of flood risk assessment software in QNP given the need to recruit high quality consultant and the contract will be lump sum type. Construction supervision will be procured through quality- and cost-based selection (90:10) and contract is time-based.

4. Specifications

79. The civil works packages will be procured using conformance specifications due to nature of the works and the type of contract applied.

80. A detailed TOR for the establishment of client server system and decision support in Binh Dinh and design of flood risk assessment software in Quang Nam (output 3) is in Appendix 1. For the construction supervision contracting an input-based TOR is provided in Appendix 4 to ensure a time based contract that retains all technical positions is maintained from proposal to contract award and for the completion of the assignment.

5. Review Requirements

81. Procurement of first contract for goods and works, valued above $5 million by each executing agency shall be subject to ADB's prior review. Succeeding procurement of goods and works contracts will be subject to ADB's post review (sampling) in which ADB reviews documents, decisions, and procurement processes, on a sample basis, after contract signing.

82. Recruitment of all consulting service packages financed by ADB are subject to prior review.

6. Standstill Period

83. Standstill period is proposed to apply in the procurement of goods and works to provide a credible mechanism for addressing bidding-related complaints, reduce risks, improve fairness, transparency, and value for money for the project.

7. Standard Bidding Documents and Contract Form

84. The harmonized World Bank and ADB standard bidding documents for procurement of works and procurement of goods shall be used for works and goods packages following national open competitive bidding procedures. ADB standard consulting services documents will be used for selection of consulting services in the project.

8. Pricing and Costing Method

85. Admeasurement, non-adjustable price contract shall be used for works contract with duration below 18 months. Admeasurement, adjustable price contract shall be used for works contract with duration from 18 months and more. Lump-sum contract shall be used for design of data management and decision support systems to use climate data and time-based input contract with price adjustment is used for construction supervision contracts with the duration from 18 months and more.

9. Evaluation method

Table 25: Contract Packages and Evaluation Method

Contract package	Evaluation method
Civil works and goods	Lowest evaluated substantially responsive bid.
Consultancy for establishment of client server system in Binh Dinh and design of flood risk assessment software in Quang Nam	Fixed budget selection (FTP)
Construction supervision	Quality- and cost-based selection (90:10)

Source: Asian Development Bank.

C. Procurement Plan

1. Basic Data

86. Table 26 below shows basic project data.

Table 26: Project Basic Data

Project Name: Climate Resilient Inclusive Infrastructure for Ethnic Minorities Project I	
Project Number: 49026-004	Approval Number:
Country: Socialist Republic of Viet Nam	Executing Agency: Provincial People's Committee of Binh Dinh Province Provincial People's Committee of Quang Nam Province
Project Procurement Classification: Category B	Implementing Agency: Binh Dinh Provincial – Professional Project Management Unit of Agriculture and Rural Development Works
Project Procurement Risk: Moderate	

	Investment Quang Nam Province Professional Project Management Unit of Transport Construction Works	
Project Financing Amount: $81.7 million ADB Financing: $58 million Cofinancing (ADB Administered): $2 million (High-Level Technology Fund) Non-ADB Financing: $21.7 million (Government financing)	Project Closing Date: 30 November 2026	
Date of First Procurement Plan: 28 May 2021	Date of this Procurement Plan:	
Procurement Plan Duration (in months): 18	Advance Contracting: No	e-Procurement: Yes

Source: Asian Development Bank.

2. Methods, Review, and Procurement Plan

87. Except as ADB may otherwise agree, the following methods shall apply to the procurement of goods, works, non-consulting services, and consulting services.

Table 27: Methods, Review, and Procurement Plan

Method	Comments
Procurement of Goods, Works, and Non-consulting Services	
Open competitive bidding with national advertising for goods and works	Materials, equipment for construction of road water supply system are available locally and the local market is competitive.
Open competitive bidding with international advertising for works	No.
Consulting Services	
Open competitive bidding with international advertising, using fixed budget selection for consulting services	Consultancy for establishing a client server system in Binh Dinh and designing a flood risk assessment software in Quang Nam.
Open competitive bidding with national advertising, using quality and cost-based selection for consulting services	Construction supervision consultant

3. Lists of Active, Indicative, Awarded and Completed, and Non-ADB Financing Procurement Packages (Contracts)

88. The following tables list goods, works, non-consulting, and consulting services contracts for which the procurement activity is either ongoing or expected to commence within the procurement plan's duration.

Table 28: List of Active Goods, Works and Non-Consulting Services Packages

Package Number	General Description	Estimated Value ($mil)	Procurement Method	Review	Bidding Procedure	Advertisement Date (quarter, year)	Comments
Binh Dinh province:							Advertising: National for all works and goods packages. Prequalification of bidders: No. Domestic preference applicable: No. Advance contracting: No Bidding document: Harmonized SBD E-procurement: Yes
BD-CW01	Upgrade road PR 637 from Vinh Quang to Vinh Thanh Town	3.80	OCB	Prior	1S 1E	Q2 2022	
BD-CW05	Building water supply system for ethnic minorities and upgrade water supply system for four rural communes in An Lao District	0.95	OCB	Post	1S 1E	Q2 2022	

1S 1E = single-stage–one-envelope, km = kilometer, OCB = open competitive bidding, Q = quarter, SBD = simplified bidding documents.

Table 29: List of Active Consulting Services Packages

Package Number	General Description	Estimated Value ($mil)	Selection Method	Review	Type of Proposal	Advertisement Date (quarter, year)	Comments
Binh Dinh province:							
BD-CS01	Consultancy for establishment of client-server system hosted by the Quy Nhon Hydromet Station, including software design and hardware supply and installation	1.0	FBS	Prior	FTP	Q1 2022	Type: Firm Assignment: International Shortlisting of consultants: Yes Domestic preference applicable: No Advance contracting: No E-procurement: No
Quang Nam province:							
QN-CS01	Design of flood risk assessment software	1.0	FBS	Prior	FTP	Q1 2022	Type: Firm Assignment: International Shortlisting of consultants: Yes Domestic preference applicable: No Advance contracting: No E-procurement: No

FBS = fixed base selection, FTP = full technical proposal, Q = quarter.

89. The following tables list goods, works, non-consulting, and consulting services contracts for which procurement activity is expected to commence beyond the procurement plan duration and over the life of the project (i.e., those expected beyond the current procurement plan's duration).

Table 30: List of Indicative Goods, Works and Non-Consulting Services Packages

Package Number	General Description	Estimated Value ($mil)	Procurement Method	Review	Bidding Procedure	Advertisement Date (quarter, year)	Comments
Binh Dinh province:							Advertising: National for all works and goods packages. Prequalification of bidders: No. Domestic preference applicable: No. Advance contracting: No Bidding document: Harmonized SBDs E-procurement: Yes
BD-CW02	Upgrade road from Dinh Binh lake to the center of Vinh Son commune	8.0	OCB	Prior	1S 1E	Q1 2023	
BD-CW03	Rehabilitate inter-communal roads from Hiep Hung village, Canh Hiep commune to Canh Tien village, Canh Lien commune, Van Canh district	4.3	OCB	Post	1S 1E	Q1 2024	
BD-CW04	Upgrade An Hung inter-commune road to Tam Quan in Hoai Nhon District	10.4	OCB	Prior	1S 1E	Q1 2023	
Quang Nam province:							
QN-CW01	Upgrade Tra Nam - Tra Linh inter-commune road in Nam Tra My District	3.34	OCB	Prior	1S 1E	Q2 2022	Advertising: National for all works and goods packages. Prequalification of bidders: No. Domestic preference applicable: No. Advance contracting: No Bidding document: Harmonized SBD E-procurement: Yes
QN-CW02	Upgrade Tra Tap - Tra Cang inter-commune road in Nam Tra My District	3.04	OCB	Post	1S 1E	Q3 2022	
QN-CW03	Upgrade Song Truong - Tra Giac road in Bac Tra My District	10.00	OCB	Prior	1S 1E	Q1 2023	
QN-CW04	Upgrade road connecting resettlement and production area (Ca Dy commune road) in Nam Giang District	4.96	OCB	Post	1S1E	Q1 2023	
QN-CW05	Construction of 3.63 km river	7.10	OCB	Prior	1S1E	Q1 2023	

Package Number	General Description	Estimated Value ($mil)	Procurement Method	Review	Bidding Procedure	Advertisement Date (quarter, year)	Comments
	bank revetments for A. Vuong river, car parking area and solid waste collection points in Tay Giang District for Cotu Ecotourism						
QN-CW06	Rehabilitate 3.6 km of canals in Zut reservoir irrigation system in Phuoc Nang commune, Phuoc Son district	1.12	OCB	Post	1S1E	Q1 2023	
QN-CW07	Build new water treatment station with capacity of 900 m^3 per day and 20 km network in Phuoc Nang commune, Phuoc Son District	1.00	OCB	Post	1S 1E	Q1 2024	

1S1E = single-stage–one-envelope, km = kilometer, OCB = open competitive bidding, Q = quarter, SBD = simplified bidding documents.

Table 31: List of Indicative Consulting Services Packages

Package Number	General Description	Estimated Value ($mil)	Selection Method	Review	Type of Proposal	Advertisement Date (Q, year)	Comments
Binh Dinh Province							
BD-CS02	Construction supervision for all works contracts under output 1 and output 2 in Binh Dinh	0.79	QCBS (90:10)	Prior	STP	Q1 2022	Type: Firm Assignment: National Quality-Cost Ratio: 90:10 Shortlisting of consultants: Yes Domestic preference applicable: No Advance contracting: No E-procurement: No
Quang Nam Province							
QN-CS02	Construction supervision for all works contracts under output 1 and output 2 in Quang Nam	0.67	QCBS (90:10)	Prior	STP	Q1 2022	Type: Firm Assignment: National Quality-Cost Ratio: 90:10 Shortlisting of consultants: Yes Domestic preference applicable: No Advance contracting: No E-procurement: No

Q = quarter, QCBS = quality- and cost-based selection, STP = simplified technical proposal.

90. The following tables list the awarded and completed contracts for goods, works, non-consulting, and consulting services.

Table 32: List of Awarded and Completed Packages for Goods, Works and Non-Consulting Services

Goods, Works, and Non-consulting Services					
Package Number	**General Description**	**Contract Value**	**Date of ADB Approval of Contract Award**	**Date of Completion**	**Comments**
None					

ADB = Asian Development Bank.

Table 33: List of Awarded and Completed Packages for Consulting Services

Consulting Services					
Package Number	**General Description**	**Contract Value**	**Date of ADB Approval of Contract Award**	**Date of Completion**	**Comments**
None					

ADB = Asian Development Bank.

91. The following tables list goods, works, non-consulting, and consulting services contracts over the life of the project, financed by non-ADB sources.

Table 34: List of Non-ADB Financing Packages for Goods, Works and Non-Consulting Services

General Description	**Estimated Value (cumulative, $)**	**Estimated Number of Contracts**	**Procurement Method**	**Comments**
None				

ADB = Asian Development Bank.

Table 35: List of Non-ADB Financing Packages for Consulting Services

Consulting Services				
General Description	**Estimated Value (cumulative, $)**	**Estimated Number of Contracts**	**Procurement Method**	**Comments**
None				

ADB = Asian Development Bank.

D. Consultants' Terms of Reference

92. The indicative terms of reference for the consultant contracts of auditing service, construction supervision, and loan implementation consultant are in Appendices 3, 4, and 7, respectively.

93. Table 36 provides the detailed inputs proposed for construction supervision teams. The full allocation of the ADB financing limits the ability to add unallocated and also some of the key positions in these two contracts. It is recommended that the contracts be awarded on the evaluation of key experts in charge of technical review of site-based engineering works for transport, rural domestic water supply, or irrigation. The non-key experts should simply be assessed on meeting the minimum requirements.

Table 36: Construction Supervision Teams

BD CS-01 **Binh Dinh Construction Supervision Consultant Team** **Contract Award Milestone Q4 2022**		
Position	**Unit**	**Quantity**
1. Transport supervision engineer (Senior)	p-m	35
2. Road construction engineer	p-m	15
3. Road construction engineer	p-m	12
4. Bridge engineer	p-m	14
5. Hydraulic engineer (water supply)	p-m	14
6. Electrical engineer	p-m	5
7. Benefit monitoring and evaluation	p-m	6
8. Cost estimator - quantity surveyor	p-m	24
9. Laboratory engineer	p-m	15
10. Occupational health and safety	p-m	20
Total		160
QN CS-01 **Quang Nam Construction Supervision Consultant Team** **Contract Award Milestone Q4 2022**		
Position	**Unit**	**Quantity**
1. Transport supervision engineer (Senior)	p-m	30
2. Road construction engineer	p-m	15
3. Road construction engineer	p-m	8
4. Bridge engineer	p-m	6
5. Hydraulic engineer (water supply)	p-m	6
6. Electrical engineer	p-m	6
7. Irrigation engineer	p-m	6
8. Cost estimator quantity surveyor	p-m	12
9. Laboratory engineer	p-m	12
10. Occupational safety	p-m	12
11. Benefit monitoring and evaluation	p-m	4
Total	p-m	117

VII. SAFEGUARDS

1. Environment

94. The overall project is classified as Category B for environment and all subprojects are required to be category B or below. The project has an environmental assessment and review

framework (EARF). Initial environment examinations (IEEs) including environmental management plans (EMPs) have been prepared for the representative subprojects and will be updated and approved by ADB to reflect any changes in the subproject during DED. These documents will be uploaded onto the ADB website before ADB staff review meeting.

95. The processing of additional subprojects will include an IEE during the feasibility stage to be contracted and completed by the executing and implementing agencies. These will be guided by the EARF and are expected to be completed prior to bidding of respective civil works packages. Further the DED consultant will also be required to provide environmental safeguard input to the design process. The approved EMP will be integrated in the bidding and civil work contracts. A subproject construction linked EMP will be produced by the contractor prior to commencement of any works including site clearance, this CEMP will detail mitigation measures to be implemented in each construction package and will be submitted to PPMU for review.

96. The project environment management system integrated in the overall project management will be set up to support for EMP implementation and ensure for safeguard requirement in loan covenant to be complied. The progress of EMP implementation will be monitored and integrated in the project quarterly report. The semiannual environment safeguard monitoring report during construction will be prepared by implementing agencies and submitted to ADB for review and uploaded on ADB's website.

2. COVID-19 Risk Management

97. At the time of processing, the COVID-19 pandemic is present. While Viet Nam had no active cases the risk of COVID-19 second wave or new transmission into Viet Nam remains. The EARF, he IEE and EMP for the two representative subprojects have detailed the requirements of each IEE and CEMP to address the occupational health and safety risks that may arise from COVID-19 during implementation. The basis of this risk management is a COVID-19 Safety and Health Risk Management Plan that the contractor must prepare, resource and monitor. The plan will detail adequate measures for mitigating COVID-19 health risk in each construction work, e.g., detection, prevention, response, and personal arrangement the COVID-19 Health Risk Management Plan will form a part of the CEMP that is required prior to works commencement.

3. Staffing

98. Each province has committed $300,000 (excluding consultant and or staff costs) as counterpart funding for the implementation of the environmental safeguards identified for the representative subprojects and indicative budgets for the additional subprojects for the entire project.

99. Each PPMU will have an environmental safeguards staff/focal point who will also be assisted by an environmental safeguards consultant from the loan implementation consultant team. Further the DED consultants will also be required to provide environmental safeguard inputs to the design process. The PPMU environment safeguards staff will work closely with environmental safeguards consultants as part of the DED team. The environmental consultant in the loan implementation consultant team and construction supervision consultants support each PPMU to assess, monitor and supervise the CEMP implementation, and ensure environment compliance in each subproject. Semiannual environment monitoring report, during construction phase, will be prepared and submitted by PPMU to ADB for review and uploading on ADB's website.

4. Involuntary Resettlement

100. The overall project is classified as Category B for involuntary resettlement. All subprojects are required to be Category B or C for involuntary resettlement. The developments and improvements under the subprojects will not trigger major resettlement impacts because most of the infrastructure will be improved within existing right of ways.

101. The executing and the implementing agencies and/or PPMUs will ensure that any impacts on involuntary resettlement and indigenous peoples are carried out in accordance with the agreed REMDF and REMDPs, ADB's Safeguard Policy Statement (2009), and the Vietnamese laws and regulations on involuntary resettlement and indigenous peoples. In case of discrepancies between the government's laws, regulations, and procedures, and ADB's Safeguards Policy Statement (2009), ADB' Safeguards Policy Statement will apply.

102. As agreed between the PPCs and ADB, a combined REMDF has been prepared for each province. Two REMDPs have been prepared for two representative subprojects (one road and one water supply) in BDP during the project preparation. These REMDPs will be updated and approved by ADB to reflect any changes in the subproject after completion of DEDs and based on results of the detailed measurement survey, public consultation and replacement cost survey. REMDP for any additional subproject included during project implementation will be prepared by PPMUs following guidance of the REMDFs and will be submitted to ADB for approval and disclosing before compensation plans approval and awarding civil works contracts. The PPMUs, Lan Acquisition and Resettlement (LAR) Board at district level, and/or Center for Land Fund Development, the wards and/or communes, and relevant mass organizations will have primary responsibility for the updating and implementation of the REMDPs with the support of the consultant. As such the capacity of these bodies is of critical importance and the project must ensure appropriate capacity building assistance in the form of information, training, and consultation and mentoring.

103. The executing agencies and the PPMUs shall ensure that a site possession notice to a civil works contract to commence construction activities for a subproject is issued only when the PPMUs and their loan implementation consultants have officially confirmed in writing that compensation payment and/or allowances to affected people have been completed.

104. The executing agencies shall provide timely and sufficiently counterpart funds for land acquisition, resettlement and monitoring activities specified in the agreed REMDPs, and will meet any unforeseen obligations more than the REMDPs budget estimate to satisfy social safeguard objectives.

105. PPMUs are responsible for internal monitoring with assistance from the LIC. PMUs will submit semi-annual internal monitoring reports to ADB. Final monitoring and evaluation need to be conducted after completion of all land acquisition activities every 6 months to assess (i) achievement of land acquisition objectives; (ii) changes in living standards and livelihoods of affected people/ethnic minority people; (iii) restoration of the economic and social base of the affected people; (iv) effectiveness and sustainability of entitlements; and (v) the need for further support as required. All reports need to be submitted to ADB timely for review and disclose on ADB website. External resettlement agency is not required for this project because of insignificant impact on land acquisition unless there is a breach to full and final compensation prior to the commencement of works.

5. Indigenous Peoples

106. ADB's Indigenous People's policy requires that under an ADB loan, the borrower/client will undertake meaningful consultation with affected Indigenous Peoples, herein referred to in the Vietnamese context as "ethnic minorities" to ensure their informed participation in (i) designing, implementing, and monitoring measures to avoid adverse impacts on them or, when avoidance is not possible, to minimize, mitigate, and compensate for such effects; and (ii) tailoring project benefits that accrue to them in a culturally appropriate manner. Consultation will be carried out in a manner commensurate with the impacts on affected communities. The consultation process and its results are documented and reflected in the REMDPs.

107. The overall project is classified as Category B for ethnic minorities and all representative and additional subprojects must be Category B. Since in many cases ethnic minorities form the overwhelming majority of the population of road subproject areas and since the project is designed to provide positive impacts for these groups, measures to mitigate negative impacts have been incorporated in the subproject REMDPs and the procedures within the REMDF that the PPMUs apply in the processing of additional subprojects.

108. Impacts on ethnic minorities in the project areas are overwhelmingly positive since the subprojects will be aimed at the overall economic and social improvement of the total population. The project will not cause physical displacement from traditional or customary lands, nor negatively impact the identity, culture, or customary livelihood system of ethnic minorities. REMDPs will ensure the inclusion of ethnic minorities and their access to project benefits. The REMDP also includes mitigation measures to address impacts on ethnic minorities, an institutional capacity development program, a grievance redress mechanism, and compliance with ADB information disclosure and consultation requirements.

109. Internal monitoring and progress reporting for indigenous peoples will be combined with resettlement land acquisition implementation and will be the responsibility of the PPMUs. At the local level, the CISB will provide support for monitoring on a regular basis.

6. Prohibited Investment Activities

110. Pursuant to ADB's Safeguard Policy Statement (2009), ADB funds may not be applied to the activities described on the ADB Prohibited Investment Activities List set forth at Appendix 5 of the Safeguard Policy Statement (2009).

VIII. GENDER AND SOCIAL DIMENSIONS

111. The project is classified as effective gender mainstreaming (EGM) at entry. The GAP will support activities to reduce inequalities between women and men associated with access to benefits and opportunities and social risks such as exposure to disease and road safety. The design features of the GAP are (i) promotion of equality of project benefits and opportunity-sharing between men and women; (ii) reduction in gender inequalities and social risks such as HIV/AIDs transmission prevention, human trafficking prevention and road safety; (iii) capacity development of women, including those from ethnic minorities in technical topics, including, water and sanitation, eco-tourism, environment protection for safe and sustainable tourism, and irrigation water control technologies; (iv) increased representation of women in decision-making and (v) collection of sex-disaggregated data for benefit monitoring and evaluation.

112. A gender analysis revealed that women have fewer opportunities than men to participate in public decision making, and less access to information, training, and employment, whilst having equal or better than access to education. The road subproject in output 1 directly benefits women along the route in terms of reduced time to move to cropping and plantation land, and increased reliability in year-round connectivity with improved mobility to access services and markets. However, women and their children are vulnerable during construction because of HIV/AIDs and human trafficking risks due to contractors who may bring workers from outside to work on sites. Women and girls are also more vulnerable to road safety given their caregiver traditional roles in case of accident occur to them or family members. In output 2, women and girls are substantial beneficiaries due to reduced time needed for accessing and collecting water, and from personal health benefits of having reliable potable water available 24 hours a day within their households.

113. The GAP sets out expected actions and priorities for the inclusion of women throughout the project activities and within the economic opportunities that are being created. It is required that employment linked to the climate data systems be based on gender equality and where necessary a gender bias (female) will be applied to develop this equality in professional roles.

114. **The gender action plan implementation arrangement.** The GAP budget is estimated to be $160,000 for operational costs ($80,000 for each province's GAP) plus the input from the social and gender LIC consultants. It will be financed from the counterpart fund.

115. The two PPMUs will be responsible for the GAP implementation, monitoring and reporting to ADB. The two PPMUs will collaborate with the local Women's Union at various levels to implement GAP's activities and targets. Each PPMU will appoint a gender focal point and recruit social and gender consultants to provide technical support. The PPMUs will include GAP reporting in quarterly progress reports to government and ADB.

Table 37: Gender Action Plan

Gender Objective	Indicators/Targets	Responsibilities	Timeframe
Output 1: Climate-resilient transport infrastructure improved.			
1.1 Improved transport infrastructure increases mobility for women and girls.	1.1.1 121.8 km of district and commune roads upgraded with enhanced climate resilient design improving especially for ethnic minority women, access to social services during rainy season.[a] (DMF 1a).	PPMUs	2026
1.2 Social risks and vulnerabilities related to improved infrastructures are reduced for women and girls.	1.2.1. Project prepared road safety, HIV/AIDS, human trafficking awareness raising materials are gender sensitive and inclusive (for example, women and men are portrayed equitably in said materials; the materials take into account the needs of illiterate individuals and people with disabilities).	PPMUs	2026
	1.2.2 At least one inclusive road safety campaign addressing the different user needs and travel patterns of men, women and other marginalized groups implemented (targeting at least 1,000 people, of whom 50% are women and girls) (DMF 1b).	PPMUs	2026
	1.2.3 Prior to start of civil works, the project conducts refresher IEC sessions on HIV/AIDS prevention and human trafficking to communities, especially targeting women[b] (targeting at least 500 people, 50% who are women and girls).	PPMUs	2026
	1.2.4 Contractors delivered HIV/AIDS and human trafficking prevention sessions to their workers.	PPMUs	2026
1.3 Women's voice and leadership on road issues at the community level are enhanced.	1.3.1 Women account for 40% of participants during consultation on project impacts and/or resettlement issues, design, and implementation.	PPMUs	2026
	1.3.2 At least 11 women-only consultation meetings conducted in all road subprojects communes.	PPMUs	2026
	1.3.3 Gender-responsive approach is applied to convening consultation meetings (for example, holding meetings at times and in locations convenient and safe for female participants, etc.).	PPMUs	2026
	1.3.4 Community construction supervision committees in communal and inter-communal road subproject include at least 40% female members (2019 baseline: 33%).	PPMUs	2026
	1.3.5 Construction supervision committee members are guided on construction supervision by PPMU prior to civil work starts, in which 40% of the guided committee members are women.	PPMUs	2026
	1.3.6 At least 35% of community facilitators of all 13 subprojects' communes (in BD and QN provinces) are women (on average three facilitators per commune) (2020 baseline: 33%).	PPMUs	2026
1.4. Equitable and inclusive practices and fair labor standards are utilized by the project contractors.	1.4.1 Contractors do not use child labor.	PPMUs	2026
	1.4.2 Contractors ensure equal pay for equal work for men and women in project civil works.	PPMUs	2026
	1.4.3 Contractors prioritize using local unskilled female workers through local Women's Union's channels, with the target of at least 25%.	PPMUs	2026
Output 2: Climate-resilient water resource infrastructure improved.			
2.1 Water resource infrastructures improved, expanding	2.1.1 Rural domestic water supply schemes consisting of 115 km of pipelines constructed with 18,600 people connected (50% women and girls) (2018 baseline: 0) (DMF 2a).	BD PPMU	2026
	2.1.2 Feedback from community consultations[b] (involving at least 35% participation of women) inform the design features of the 3.6 km of river embankment constructed to protect Tay Giang Town (2018 baseline: 0) (DMF 2c).	QN PPMU	2026

Gender Objective	Indicators/Targets	Responsibilities	Timeframe
benefits to women and girls.	2.1.3 One irrigation scheme with 117 ha of command area upgraded, which responds to the different needs and experiences expressed by female and male farmers in consultation meetings upgraded (2018 baseline: 0) (DMF 2d).	QN PPMU	2026
2.2 Social risks and vulnerabilities related to improved infrastructures are reduced for women and girls.	2.2.1 Project prepared HIV/AIDS, human trafficking awareness raising materials are gender sensitive and inclusive (for example, women and men are portrayed equitably in said materials; the materials take into account the needs of illiterate individuals and people with disabilities).	PPMUs	2026
	2.2.2 Prior to start of civil works, the project conducts refresher IEC sessions on HIV/AIDS prevention and human trafficking to communities, especially targeting women[a] (targeting at least 500 people, 50% who are women and girls).	PPMUs	2026
	2.2.3 Contractors delivered HIV/AIDS and human trafficking prevention sessions to their workers.	PPMUs	2026
2.3 Women's voice and leadership on water issues at the community level are enhanced.	2.3.1 Women account for 40% of participants during consultation on project impacts and/or resettlement issues, design, and implementation.	PPMUs	2026
	2.3.2 At least 13 women-only consultation meetings conducted in all subprojects communes (one in each commune).	PPMUs	2026
	2.3.3 Gender-responsive approach is applied to convening consultation meetings (for example, holding meetings at times and in locations convenient and safe for female participants, etc.).	PPMUs	2026
	2.3.4 At least 35% of community facilitators of 13 communes in water related subprojects (in BD and QN provinces) are women (on average three facilitators per commune) (2020 baseline: 33%).	PPMUs	2026
2.4 Access to water resource infrastructure information and benefits for women and girls is expanded.	2.4.1 At least 65% of the 1,000 people trained in efficient water and sanitation usage demonstrate improved understanding of good hygiene practices[c] (of whom at least 50% are women and girls) (2018 baseline: 0) (DMF 2b).	BD PPMU	2026
	2.4.2 In A Tieng river embankment subproject, training on sustainable tourism (eco-tourism, community-based tourism, safe tourism, and environment protection) is conducted for at least 50 tourism stakeholders (40% are women from Ko Tu ethnic group).	QN PPMU	2026
	2.4.3 Women and girls access to water reduce their time for water fetching.	PPMUs	2026
2.5 Equitable and inclusive practices and fair labor standards are utilized by the project contractors.	2.5.1 Contractors do not use child labor.	PPMUs	2026
	2.5.2 Contractors ensure equal pay for equal work for men and women in project civil works.	PPMUs	2026
	2.5.3 Contractors prioritize using local unskilled female workers through local Women's Union's channels, with the target of at least 25%.	PPMUs	2026
Output 3: Data systems for climate risk management updated.			
3.1 Equitable opportunities for human resources development for men and women are practiced.	3.1.1 PPMUs ensure that equal opportunities are provided to women and men in staff appointment and recruitment for data hub through advertisement that strongly encourages women to apply and also by advertising through the Women's Union channels.	PPMUs	2026
	3.1.2 All male and female technicians are trained to work with the updated climate risk data management system.	PPMUs	2026
	3.1.3 Two social and gender flood risk impact assessments for road infrastructure completed[d] (2018 baseline: 1) (DMF 3b).	PPMUs	2026
Project Management and Gender-Specific Activities:			

Gender Objective	Indicators/Targets	Responsibilities	Timeframe
Recruitment of two social development experts (Gender) with 9 person-month inputs each. PPMU female staff accounts for at least 30% of total PPMUs staff (2020 baseline: 10 out of 36 in BDP and 12 out of 62 in QNP). At least 35% of staff receiving training on project management are women (2020 baseline: 0). Training on GAP implementation and monitoring will be delivered to PPMU, PIC, and other key implementing partners. Sex-disaggregated data will be collected by the PPMU in fulfillment of DMF and GAP reporting requirements.			

BD = Binh Dinh province, DMF = design and monitoring framework, GAP = gender action plan, ha = hectare, IEC = information, education, and communication, km = kilometer, PIC = project implementation consultant, PPMU = professional project management unit, PPMS = project performance management system, QN = Quang Nam province

[a] Number of targeted women and girls from ethnic minorities in the targeted female participants is proportional to the ethnic minorities' population of the overall population.

[b] Documented in consultation meetings minutes.

[c] Including menstrual hygiene practices.

[d] An inclusive impact assessment would consider where possible the different impacts of floods upon women and men.

Source: Asian Development Bank.

IX. PERFORMANCE MONITORING, EVALUATION, REPORTING, COMMUNICATION

A. Project Design and Monitoring Framework

Impact the Project is aligned with Inclusive socioeconomic development of Binh Dinh and Quang Nam Provinces accelerated (Socio-Economic Development Master Plan of Binh Dinh and Quang Nam Provinces through 2020)[a]

Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting Mechanisms	Risks
Outcome Social and economic status and inclusiveness of ethnic minorities communities improved.	By 2028 a. Travel time on upgraded roads reduced by 50% to an average of 3 minutes per km. (2018 baseline: 6 minutes per km) b. At least 18,600 people (of whom at least 50% are women and girls) in the two project provinces connected to year-round potable water (2018 baseline: 2,320 people) c. Key province-wide climatic data available in the two project provinces to inform infrastructure design, agricultural decision making, and hazard early warning (2018 baseline: none)	a. PPMS; and government and public transport operator statistics b. PPMS and annual provincial public health reports c. PPMS and PPC annual reports	Major disasters caused by natural hazards and COVID-19 reduce sustainability of project results
Outputs 1. Climate-resilient transport infrastructure improved	By 2026 1a. 121.8 km of district and commune roads upgraded with enhanced climate-resilient design that improves access to social services during rainy season, especially for ethnic minority women (2018 baseline: 0) 1b. At least one inclusive road safety campaign implemented for at least 1,000 people (of whom at least 50% are women and girls), addressing the different user needs and travel patterns of men, women, and marginalized groups (2018 baseline: 0)	1a–b. PPMS and QPRs	Major disasters damage project infrastructure COVID-19 delays infrastructure works
2. Climate-resilient water resource infrastructure improved	2a. 115 km of pipelines for rural domestic water supply schemes constructed. (2018 baseline: 0) 2b. At least 65% of the 1,000 people trained (of whom at least 50% are women and girls) in efficient water and sanitation usage report improved	2a–d. PPMS, QPRs, and surveys	

Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting Mechanisms	Risks
	understanding of good hygiene practices[c]. (2018 baseline: 0) 2c. Feedback from community consultations[d] (involving at least 35% participation by women) informed the design features of the 3.6 km of river embankment constructed to protect Tay Giang Town. (2018 baseline: NA) 2d. One irrigation scheme with 117 ha of command area in Quang Nam province upgraded, which responds to the different needs and experiences expressed by female and male farmers in consultation meetings. (2018 baseline: 0)		
3. Data systems for climate risk management updated	3a. Two provincial data systems (one for each project province) for climate risk management, integrated with automated real time data collection, made accessible to users (2018 baseline: 1) 3b. Two social- and gender-inclusive flood risk impact assessments (one for each project province) for road infrastructure completed[e] (2018 baseline: 1)	3a–b. PPMS and QPRs	Institutional changes negatively affect the availability of skilled staff under the project

Key Activities with Milestones

1. Climate resilient transport infrastructure improved

1.1 Prepare DED for batch 1 subprojects by June 2022.
1.2 Award contracts for batch 1 subprojects by December 2022.
1.3 Prepare DED for additional subprojects (batch 2) by December 2022.
1.4 Award contracts for batch 2 subprojects by July 2023.
1.5 Prepare DEDs for additional subprojects using remaining funds (batch 3) by December 2023.
1.6 Award contracts for final batch subprojects by July 2024.
1.7 Complete all construction by May 2026.

2. Climate resilient water resource infrastructure improved

2.1 Prepare DED for batch 1 subprojects by July 2022.
2.2 Award contracts for batch 1 subprojects by December 2022.
2.3 Prepare DEDs for additional subprojects (batch 2) by December 2022.
2.4 Award contracts for batch 2 subprojects by August 2023.
2.5 Prepare DEDs for additional subprojects using remaining funds (batch 3) by December 2023.
2.6 Award contracts for final additional subprojects by August 2024.
2.7 Complete all construction by May 2026.

3. Data systems for climate risk management updated

3.1 Obtain PPC approval for the final design and procurement by December 2022.
3.2 Procure and install high level technology equipment and systems by December 2023.
3.3 Populate the system and build capacity for operation of equipment and user interfaces by December 2024.

Project Management Activities

Mobilize loan implementation consultants by June 2022.

Mobilize construction supervision consultants by December 2022. Establish a functioning PPMS including sex- and ethnic- disaggregated data, within 5 months from mobilization of loan implementation consultants. Fully implement gender action plan with counterpart funds by 2026. Complete two social and gender flood risk impact assessments for road infrastructure completed by May 2026.
Inputs ADB: $58 million (2 loans $29 million each) Government: $21.73 million High-Level Technology Fund: $2 million (grant)
Assumptions for Partner Financing Not applicable

ha = hectare, km = kilometer.

ADB = Asian Development Bank, COVID-19 = coronavirus disease, DED = detailed engineering design; ha = hectare, km = kilometer, PPC = provincial people's committee, PPMS = project performance management system, QPR = quarterly progress report.

[a] Government of Viet Nam. 2011. *Decision No. 1600/QD-TTg Issuing the List of the National Target Programs—Phase 2016–2020*. Hanoi; Government of Viet Nam. 2013. *Decision No.2622/2013//QD-TTG dated 31 December 2013 approving the socio-economic development master plan of Quang Nam province through 2020, with vision to 2030.* Hanoi*;* Government of Viet Nam. 2009. *Decision No. 54/2009/QD-TTG dated 14 April 2009 approving the socio-economic development master plan of Binh Dinh province through 2020.* Hanoi.

[b] Includes menstrual hygiene practices.

[c] Documented in minutes of consultation meetings.

[d] Women will be introduced to the credit funds and assisted to apply for a loan.

[e] A social-and gender-inclusive impact assessment will consider, where possible, the different impacts of floods upon women and men.

Contribution to the ADB Results Framework:

Roads built or upgraded - Provincial, district, and rural roads (kilometers) [rural]. Expected: 121.8 km. People with new or improved water supply (number) [rural]. Expected: 18,600 people (50% women and girls). People with new or improved sanitation (number) [rural]. Estimated: 650 people (50% women and girls). Land improved through irrigation, drainage, and/or flood management (hectares). Estimated: 117 ha.

Source: Asian Development Bank.

B. Monitoring

1. Project Performance Monitoring

116. Project progress and performance will be based on the indicators and targets shown in the design and monitoring framework. Five kinds of monitoring will be carried out including: (i) implementation progress monitoring; (ii) safeguard monitoring; (iii) benefit monitoring and evaluation; (iv) GAP monitoring; and (v) loan agreement covenant monitoring.

117. Implementation progress monitoring will be one of the main tasks of each PPMU that will be supported by each PPMU (and LIC benefit and monitoring evaluation consultant) monitoring and evaluation specialist and will be based on the detailed work planning schedules (Appendix 5) for the proposed subproject and project management work planning template and the overall project implementation schedule. Collectively these will be consolidated into a provincial executing agency wide project performance management system (PPMS).

118. The provincial PPMS will be managed by the PPMU who will maintain it and report updated progress on a quarterly basis with each province reporting directly to the PPC, MOF and ADB.

119. The PPMS will monitor the progress of activities in the province. The subproject feasibility studies will provide a baseline dataset for each subproject that will define (i) activities, (ii) the implementation timelines and milestones, (iii) outputs delivery progress, (iv) final output, and (v) contribution of each subproject output to the outcome indicators. The PPMS will not directly assess the contribution to the project impact. PPMS monitoring activities will entail periodic

monitoring of the benefits and impacts of a representative number of selected subprojects as reported in quarterly reports. This will be undertaken by each PPMU monitoring and evaluation staff member.

120. Each subproject will have a completion report prepared by the construction supervision consultant that will include details of (i) output completed, (ii) output still in progress, (iii) road user data and forecasts based on traffic counts after road completion and within 6 months of project completion and the conversion of this data into PCU with a comparative assessment of measured PCU's and the those projected at subproject design and feasibility approval. For Water supply the number of connections, sale of water data will also be compared to design forecasts. The PMU staff will collate this into provincial level reports for the project performance data base and reporting system that can be used for post evaluation purposes.

2. Compliance Monitoring

121. The government and executing agencies have agreed with ADB on certain covenants for the project, which are set forth in the loan agreement including the following:

(i) The government will ensure that adequate funds are allocated for the periodic maintenance of infrastructure developed under the project through provincial budgets to maintain the infrastructure in functional order; and
(ii) The government will ensure that a grievance redress mechanism established in REMDPs for affected people in the participating districts will be implemented effectively and satisfactorily.

122. ADB will monitor compliance with all covenants throughout implementation via regular review missions, quarterly progress reports submitted by the PPMUs to ADB, and review of project accounts and procurement procedures.

123. **Safeguards monitoring** with associated grievance redress mechanisms will be developed to ensure that the required policies, procedures and plans for: (i) resettlement including land acquisition and compensation; (ii) ethnic minority people specific actions are implemented and achieve their expected outcomes during subproject preparation, implementation and operation; and (iii) CEMP plan implementation.

3. Gender and Social Dimensions Monitoring

124. PPMUs will report to ADB quarterly, which will include GAP reporting. Data will be disaggregated by sex and where sensible[8] ethnic minorities. Routine monitoring by the Project will focus on assessing progress against GAP targets, identifying constraints and developing remedial actions to effectively address these. Monitoring results will be included in at least every second quarterly progress reports, and assessment/evaluations of the GAP will be an essential element of all reviews.

C. Evaluation

125. ADB will conduct regular (at least twice per year) reviews throughout implementation of the project to assess implementation performance and achievement of outcomes and objectives,

[8] Where ethnic minorities account for more than 85% of the population the need to disaggregated is significantly reduced.

examine financial progress, and identify issues and constraints affecting the project and work out time-bound action plans for their resolution.

126. A midterm review will also be undertaken within 22 months from loan signing. This review will include a comprehensive evaluation of project implementation arrangements, detailed evaluation of the scope and implementation process and progress of subprojects, feedback from the PPMS, performance of consultants, and possible reallocation of loan proceeds. During this more significant review, the effectiveness of project management arrangements will be a priority with remedial action will be instituted as required.

127. Within 12 months of physical completion of the project, ADB will conduct a project completion mission to carry out a preliminary assessment of the success of the Project to achieve its physical, and socio-economic developmental objectives, as well as to review compliance with ADB requirements and loan covenants.

D. Reporting

1. Provincial Work Planning and Reporting

128. Reporting will be directly linked to the physical implementation progress of project annual work plans, budgets and forecasts of contract awards and disbursements. Work plan for the following year will be developed by each PPMU no later than 45 days prior to the end of the fiscal year with a mid-year update - no later than 30 days after mid-year. The work plans will be developed for each individual subproject with the first annual work plan within 45 days of loan signing.

129. Draft work plans will be developed prior to loan signing to enable preparation of advance funds to be planned and approved. A draft structure for subproject physical planning is included in Appendix 5 and will be linked into the ADB (VRM project detailed implementation plan-Excel spreadsheet) after loan negotiations. The individual subproject work plans will be consolidated and linked to the budgets for ADB and government funds in separate projections. Both the work plan and projections will be based on a life of project approach with progress reported against these and modifications and adaptation to plans made as needed but no less than every six months.

130. The Project Director is solely responsible for ensuring work plans and forecast are developed and maintained on this timeline. In addition to the subproject work plan each PPMU will also derived a project procurement and contract award schedule. The information for this schedule will be derived from the subproject workplan schedule and will develop a procurement and contract award reporting worksheet that clearly identifies progress against plans and highlights on a quarterly basis any deviation from planned schedule timelines where the deviation exceeds one month and formal PPMU statement on the cause and management response to address the delay is required.

131. The PPMU Project Director will also ensure that the overall progress of the project implementation and management are clearly scheduled including activities such as Safeguard monitoring reports, compliance reporting, land acquisition and compensation achievement and the achievement of outputs and how these are contributing to the project design and monitoring framework indicators. As such this will require each PPMU to establish a PPMS that disaggregates technical, social and financial data within each subproject and captures (i) baselines data from the feasibility study surveys, (ii) data on technical, safeguards and social from

the detailed design stage, (iii) subproject outputs and the effects on the number of beneficiaries, the nature of impacts etc. The different outputs require significantly different data sets that will need to be stored and accessible to the PPMU for project completion reporting as well as implementation reporting. An indicative table of contents for the progress report is provided in Appendix 6.

2. Project Level Work Planning and Reporting

132. Each PPMU and executing agency will be responsible for the work planning and reporting in their province. The reporting required will include (i) quarterly and annual reports including (a) progress achieved by output as measured through the indicator's performance targets, (b) key implementation issues and solutions, (c) updated procurement plan, and (d) updated implementation plan for the next 12 months; and (iii) a project completion report within 6 months of physical completion of the project. To ensure that projects will continue to be both viable and sustainable, project accounts and the executing agency audited financial statement together with the associated auditor's report, should be adequately reviewed.

133. Each PPMU will ensure that the project milestones are monitored and reported to the PPC and ADB as required.

(i) PPMU annual implementation and work plans are presented by subproject and output, including (a) annual budgets in the form of financial forecasts that define budget and cashflow requirements by source of funding, (b) annual projection of contract awards, and (c) projected disbursements.

(ii) PPMU conducts project annual reviews to: (a) review the project progress and achievements in the past year, (b) update status of subproject preparatory work for submission to ADB and PPC for approvals, (c) update procurement and contracting status, (d) update implementation program for the following year including carry over uncompleted activities, revise budget and financial projections by subproject, financial cashflows, and (f) revise contract award and disbursement projections.

134. Each PPMU's annual work plan and financial projection is provided to ADB 8 weeks prior to the end of each project year. It also conducts an annual planning update meeting within one month of the mid-year point to:

(i) Review the quarterly report,
(ii) Identify outstanding implementation issues and challenges,
(iii) Identify issues or bottlenecks that need to be addressed within or across the provinces, and
(iv) Prepare a report for ADB.

E. Stakeholder Communication Strategy

1. Consultation

135. The project is designed to improve the welfare of rural inhabitants in two project provinces through a series of investments aimed to improve transport, socioeconomic wellbeing linked to rural domestic water supplies, irrigation rehabilitation and upgrading, and flood protection works.

136. Project preparation has been conducted with stakeholder agencies in the government at provincial and district levels including the participating provinces with Department of Planning and

Investments, Department of Transport, Department of Agriculture and Rural Development, Department of Industry and Trade, and Department of Finance officials, focusing on management arrangements and issues. Requirements for ensuring appropriate levels of consultation for subproject preparation and implementation have been reviewed and confirmed. Representative subproject preparation included consultation requirements involving documented evidence of inclusive consultation with all communities in the subproject area and participant information including numbers of women and men disaggregated by ethnic minority. Subproject socio-economic/gender surveys that identify vulnerable groups to provide a basis for specific consultation and participation mechanisms will be followed during implementation.

137. During implementation, the process of consultation will continue throughout the process for preparing and approving feasibility study for additional subprojects and the follow on DEDs for each subproject. The consultation seeks to provide community groups the opportunity to voice their views on how the subproject is to be designed, implemented, and operated. In addition, associated initiatives will be built into the design of each subproject to enhance the inclusiveness of the project activities from the perspective of social and economic integration of less well-off communities.

2. Participation

138. It is anticipated that the community will be mobilized in several different ways during subproject design, implementation and operation. During subproject design and preparation stages, community participation will consist primarily of their contribution through the consultation process, field survey ad focus group discussions and direct consultation. During construction, there will be significant opportunities for active participation, particularly for the poor households who will benefit from the subproject through opportunities to participate in paid employment for unskilled workers and through connectivity and increased mobility to markets and wider services and to access reliable safe water for domestic consumption and irrigation purposes.

139. These participation options will be encouraged through the bidding documents which will require contractors to investigate the option of local employment whenever possible.

3. Awareness

140. Information about the project and the subprojects, including the objectives, potential environmental impact, implementation arrangements, resettlement and compensation matters, gender issues, issues of concerns for ethnic minorities will be provided to beneficiaries. Information will be provided through village meetings, pamphlets, and other announcements in both Vietnamese language and the language(s) of the communities whenever appropriate. The community will be fully informed of issues such as their right to participate in the subprojects and to be compensated for any loss of property including productive land and/or assets as well as gender equity and other relevant policies. Separate meetings and discussions will be arranged with the people who are directly affected by land acquisition and/or resettlement issues. The community and particularly the affected households will be provided with detailed guidance and procedures regarding resettlement and compensation.

141. An example of a subproject communication plan is incorporated in Table 38.

Table 38: Draft Communication Strategy and Plan

Objective	Key Risks Challenges	Stakeholder Group	Messages	Means of Communication	Timeline	Responsibility	Resources
Disseminate information on project design, key impacts anticipated as well as any mitigation measures, to project affected persons and beneficiaries	Language, culture, and literacy Managing expectations, including that of establishment of farmer groups. Reach of information to both men and women. Reach of information, especially in isolated, remote areas. Lack of confidence in local authorities.	Subproject affected persons Community members (men and women in communes and/or villages) Women headed households Poor households Ethnic minority households	Subproject design, key benefits, implementation arrangements, and schedule of infrastructure investment for value chains development. Main impacts of subproject (positive and negative) through disclosure. Planned mitigation measures, especially for female affected persons (including compensation rates, entitlements, and grievance redress mechanism).	Public information meetings Resettlement committee meetings in affected areas Printed information in language with simple sentences and/or pictures for ethnic minorities to easily understand and posted in accessible public areas. Gender-sensitive IEC campaign, including community-level training and public media campaign. Meetings, consultations and other interactions between PMUs, communities, and farmer groups in the subproject area's service zones.	Ongoing prior to implementation of activities. Early in each phase of subproject preparation Subproject detailed design Ongoing during civil works Post evaluation after project completion	Primary: PMUs, contractors and/or subcontractors for civil works, local authorities at commune-, ward-, city- and district-level (CPCs, and DPCs), and VWU Secondary: PPCs, DPI, and DARD	Costs will be covered in part by the resettlement plans, GAPs as well as basic project implementation budgets under PMU Incremental cost and construction supervision contract Resettlement Specialist WSSU and/or PMU Social Development and Safeguards Specialists CRCs CSBs
Deliver information on labor	Language, culture, and literacy	Community members as well as outsiders	Opportunities for appropriate skills training and/or	Printed information in local language(s)	Early in each phase of subproject	Primary: PMUs, WSSUs, local	Costs will be covered in part by the

Objective	Key Risks Challenges	Stakeholder Group	Messages	Means of Communication	Timeline	Responsibility	Resources
opportunities and good labor practices.	Low levels of awareness	hired as semi-skilled and skilled construction workers, community mobilizers and IEC campaign facilitators in subproject areas. Contractors and/or subcontractors for civil works	upgrading during period of hire, with quotas reserved for women (GAP) Core labor standards, including no forced labor and child labor Gender parity in work related compensation, i.e., equal pay for equal work, for women and men, and the right to separate living and toilet facilities at work sites Schedule of civil works Labor safety regulations Risks and prevention of HIV/AIDS transmission and human trafficking	and language(s) of migrant workers (on pamphlets and billboards), posted in accessible public areas, especially at or near construction sites. IEC campaign for HIV/AIDs and human trafficking, including community-level training and public media campaign.	preparation Ongoing during civil works and conduct of IEC campaigns.	authorities at commune-, ward-, city- and district-level, VWU, CHCs, DPI Secondary: PPCs DOLISA	GAPs as well as basic project implementation budgets under PMU Incremental cost and construction supervision contract, PMU, Social Development and Safeguards Specialists, CSBs, community health workers, and health NGOs
Inform provincial stakeholders about project design and entry points for their	Lack of sectoral capacity Relative lack of resources and	VWU	Basic project design and anticipated impacts, as they matter to women	Public information meetings IEC campaign (including	From outsets of the project	VWU, local authorities at commune-, ward-, city- and district-level,	Costs will be covered by the GAP budget

Objective	Key Risks Challenges	Stakeholder Group	Messages	Means of Communication	Timeline	Responsibility	Resources
participation – community mobilization, and ensuring women's access to all project benefits	decision making authority compared to other departments and agencies.		Disseminate information on improved household water management, sanitation and hygiene to communities in collaboration with community health centers.	materials) to raise awareness on links between gender and WASH issues Training materials integrating gender considerations		CHCs	PMU Director PMU Social Development and Safeguards Specialists, CSBs, and community health workers
Inform network of community health centers in project areas about project design and the role they are expected to play in disseminating information on improved WASH as well as HIV/AIDS causes and prevention	Relative lack of resources and decision-making authority compared to other departments and agencies, including WSSUs	Community health centers (and community health workers), and Department of Health	Disseminate information on health benefits of improved WASH to communities in collaboration with VWC. Design and propagate training module about HIV/AIDS.	Public information meetings, IEC sanitation and hygiene awareness materials, including community-based training and public media campaign HIV/AIDS training module	Early in each phase of subproject preparation Ongoing during civil works and conduct of IEC campaigns	VWU, PMUs, WSSUs, local authorities at commune-, ward-, city- and district-level, and CHCs	Costs will be covered by the project implementation budget and Safeguards Specialists, CSBs, and community health workers
Promote community involvement in resettlement and project monitoring	Identifying valid community representatives, keeping in mind gender balance. Newly formed, slow to build up capacity required functions vaguely defined.	CSBs and CRCs	Information on resettlement areas, affected households, resettlement plan, and compensation policies. Core labor standards integrating gender concerns and labor safety regulations.	Meetings between WSSUs and/or PMUs, CSBs, and CRCs. Public information meetings presided over by CSBs or CRCs. Direct interactions between affected households and CSBs or	Early in each phase of subproject preparation Ongoing during civil works and conduct of IEC campaigns	VWU, PMUs, WSSUs, local authorities at commune-, ward-, city- and district-level	Costs will be covered by the GAPs and basic project implementation (Social Development component) budgets. PMU Social Development and Safeguards

Objective	Key Risks Challenges	Stakeholder Group	Messages	Means of Communication	Timeline	Responsibility	Resources
			Special consideration of community members from poor and/or women-headed households in all aspects of the project risks and prevention of HIV/AIDS transmission and human trafficking.	CRCs. Printed information in local language(s) posted in accessible public areas. Gender-sensitive IEC campaign, including community-level training and public media campaign.			Specialists CSBs, and community health workers
Ensure understanding of HIV/AIDS transmission and human trafficking risks, and prevention measures for both.	Language, culture, and literacy and low levels of awareness	Communities in or near project area construction sites Workers on construction site	Key risks and mitigation measures of HIV/AIDS transmission and human trafficking	Public information meetings Printed information in local language(s) and language(s) of migrant workers (on pamphlets and billboards), posted in accessible public areas, especially at or near construction sites. IEC campaign for HIV/AIDs and human trafficking, including community-level training and public media campaign	Prior to commencement of civil works and throughout civil works	PMUs, VWU, CHCs, civil works contractors and/or subcontractors	Costs will be covered in part by the GAPs as well as basic project implementation budgets PMU Social Development and Safeguards Specialists, CSBs, community health workers, local NGOs with a health focus

CHC = community health center; CPC = commune people's committee; CRC = compensation and resettlement committees; CSB = community supervision board; DARD = Department of Agriculture and Rural Development; DOLISA = Department of Labor, Invalids, and Social Affairs; DPC = District People's Committee; DPI = Department of Planning and Investment; GAP = gender action plan; IEC = information, education, and communication; NGO = nongovernment organization; PMU = project management unit; PPC = Provincial People's Committee; VWC = Viet Nam Women Center; VWU = Viet Nam Women's Union; WASH = water, sanitation, and hygiene; WSSU = water supply and sanitation unit.
Source: Asian Development Bank.

Table 39: Stakeholder Participation Plan

Topics or Subjects	Stakeholder Group	Why They are Included	Type of Participation		Participation Methods	
				Methods	Responsibility	Timeline Cost
REMDP	Women, poor, and vulnerable households, ethnic minority groups near project sites	Representing interests of women and ethnic groups	Information sharing (M) Collaboration (M)	Separate meetings with ethnic groups in local language and meetings with women organized through VWU. Printed information about infrastructure and training programs available in local and accessible language (or visual depictions) posted in accessible public areas. Designation and provision of materials and/or toolkit to women's groups and disseminating information about work and training opportunities from the project.		Included in REMDP cost
GENDER EQUALITY	Beneficiary communities and villages, poor and vulnerable households, and ethnic groups, with 50% representation of women	Direct beneficiaries of project; participants in value chains and water supply schemes to ensure awareness of negative impacts (land acquisitions, resettlement, compensation policy), implementation plan (to reduce inconveniences) and social risk reduction.	Information sharing (M), Consultation (M) Collaboration) (M)	Information: Community meetings and dissemination of information brochures on project scope, design elements, participation mechanisms, and entitlements for person affected by involuntary resettlement impacts. Consultation through village meetings and focus group discussions on		During detail design of infrastructure subprojects and throughout project implementation. Included in GAP budget

Topics or Subjects	Stakeholder Group	Why They are Included	Type of Participation		Participation Methods	
				Methods	Responsibility	Timeline Cost
				measures to enhance benefits and mitigate risks. Decisions: Community members determine participation and guidelines for women's groups with support from village leaders and mass organizations to ensure they are inclusive, with representatives of ethnic groups, women and other subgroups.		
SOCIAL RISKS	Mass organizations (e.g., VWU, etc.)	Representing interests of women and ethnic groups.	Information sharing (H)	Project management and implementation: Direct consultations and participation in project implementation through collaboration with PMU and representation on provincial steering committee. Strategic decision-making: Contribute to decisions on destination management and GAP and consultation plan implementation.	Monitoring: Representation on provincial steering committees and district and/or commune level committees	During detailed design of subprojects and throughout project implementation. Included in GAP budget
PROJECT DESIGN, IMPLEMENTATION, MONITORING	Provincial and district government	Representatives of government are responsible for project implementation and representing provincial and district interests.	Partnership (H) Information sharing (H)	Approvals: Review and approve annual work plan and budgets, safeguard documents, civil works design, and site management contracts	PMU	During detailed design of subprojects and throughout project PMU cost

Topics or Subjects	Stakeholder Group	Why They are Included	Type of Participation		Participation Methods	
				Methods	Responsibility	Timeline Cost
				or concessions.		
	Government departments on national and provincial steering committee	Setting policy and guidelines, and coordination and approvals	Information sharing (H) Collaboration (M)	Policy guidance and approvals: Semi-annual meetings of the national project steering committee to provide direction on project implementation matters. Review periodic progress reports and safeguards reports.	PMU	At least two meetings of each committee per year. PMU management cost

H = high, M = medium, L =low.
GAP = gender action plan, PMU = project management unit, REMDP = resettlement and ethnic minority development plan, VWU = Viet Nam Women's Union.
Source: Asian Development Bank.

X. ANTICORRUPTION POLICY

142. ADB reserves the right to investigate, directly or through its agents, any violations of the Anticorruption Policy relating to the project.[9] All contracts financed by ADB shall include provisions specifying the right of ADB to audit and examine the records and accounts of the executing agency and all project contractors, suppliers, consultants, and other service providers. Individuals and/or entities on ADB's anticorruption debarment list are ineligible to participate in ADB-financed activity and may not be awarded any contracts under the project.

143. To support these efforts, relevant provisions are included in the loan and grant agreements and the bidding documents for the project. All contracts financed by ADB shall include provisions specifying the right of ADB to audit and examine the records and accounts of the executing, and implementing agencies, as well as all contractors, suppliers, consultants, and other service providers as they relate to the project. Individuals and/or entities on ADB's anticorruption debarment list are ineligible to participate in ADB- financed activity and may not be awarded any contracts under the project.

144. The project design and implementation arrangements provide for mitigation of corruption risks. Risks associated with project management, including procurement and disbursement, will be mitigated by the engagement of LIC to advise and assist in the procurement of goods and services, and the engagement of other consultants. The overall project will establish and operate a website in which it will disclose implementation progress; bid notifications and their results; and provide grievance redress mechanism against any corrupt practice. References on ADB's Anticorruption Policy can be accessed through the following link: http://www.adb.org/Integrity/.

XI. ACCOUNTABILITY MECHANISM

145. People who are, or may in the future be, adversely affected by the project may submit complaints to ADB's Accountability Mechanism. The Accountability Mechanism provides an independent forum and process whereby people adversely affected by ADB-assisted projects can voice, and seek a resolution of their problems, as well as report alleged violations of ADB's operational policies and procedures. Before submitting a complaint to the Accountability Mechanism, affected people should make an effort in good faith to solve their problems by working with the concerned ADB operations department. Only after doing that, and if they are still dissatisfied, should they approach the Accountability Mechanism.28.[10]

XII. RECORD OF CHANGES TO THE PROJECT ADMINISTRATION MANUAL

146. All revisions and/or updates during implementation should be retained in this section to provide a chronological history of changes to implemented arrangements recorded in the project administration manual, including revision to contract awards and disbursement s-curves.

[9] Anticorruption Policy: http://www.adb.org/Documents/Policies/Anticorruption-Integrity/Policies-Strategies.pdf
[10] Accountability Mechanism. http://www.adb.org/Accountability-Mechanism/default.asp

TERMS OF REFERENCE FOR OUTPUT 3 CONSULTING SERVICES

I. OVERVIEW

1. Output 3 seeks to reduce the risks and the associated costs that are incurred by Binh Dinh and Quang Nam provinces due to their high levels of exposure, hazard and vulnerability to extreme weather events and the impact of climate change. The climate of the project provinces is characterized by heterogeneity within the hydrological cycle of the coastal provinces with wide extremes ranging from drought to floods over extended periods of the year that result in the Central Coastal Provinces recording the highest annual mortality rates due to disasters caused by natural hazards. The project will invest in technology that provides increased access and a broader set of application tools that use climate data. This will include technology to aggregate and archive climate data including integration of multiple sources and with downstream applications such as early warning and decision support systems. The rationale for output 3 focuses on the use of existing information and knowledge to support decision making rather than simply increasing the density of the hydromet network.

2. Viet Nam continues to transition towards integrated water resources management (IWRM) systems from policy through to operation of infrastructure, allocation of water, and the management of water during periods of excess and scarcity.[1] IWRM relies on moving from data capture to one of understanding data, building capacity for predictive outcomes, assessment of trade-offs through time and space. The success of IWRM requires informed decision making that is reliable, yet this is a major obstacle in Viet Nam where IWRM has struggled to gain traction due to (i) a perceived lack of need – there is no scarcity or excess of water, (ii) data for decision making is often incomplete or inaccessible denying decision makers the ability to respond to increasing impact of climate risk resulting in the cost of extreme events being higher than necessary, and (iii) the lack of capacity, skills within an appropriate institutional arrangement. Effective IWRM is data intensive that requires access to both quality and timely data.

3. The changing availability of water requires a wider context within which water-based decision making is undertaken. Urbanization, industrialization, food safety and processing, are creating new demands on water resources both in terms of required volumes and required qualities that often compete with each other. The changes and growth in water demand along with the underlying heterogeneity of the hydrological cycles increasingly necessitate more active management.

4. Decision making relating to water resource management is a function of the underlying hydrological heterogeneity especially within the land-based phase of the water cycle.[2] One limiting factor to successful IWRM is the ability to understand the dynamics of the hydrological system in both the short and medium/long run and the ability to monitor and model these changes, something that climate change adds additional complexity to. Without this monitoring, the understanding of the underlying causes of variability within a changing hydrological system is increasingly inadequate and the risks of decisions across a range of management requirements has become increasingly costly.

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[1] Akkerman, M., Nguy Thi, K., Witter M. and Rutten, M. 2018. Emergence of Integrated Water Resources Management: measuring implementation in Vietnam. Water Knowledge #6. Vientiane, Lao PDR, CGIAR Research Program on Water, Land and Ecosystems.

[2] Guide to Hydrological Practices Volume I: Hydrology – From Measurement to Hydrological Information. WMO -No. 168, Sixth edition, 2008.

5. If IWRM is to be effective, there will need to be greater commonality in the understanding of choices regarding the allocation of resources and the management of water resources through time and space. This consensus is a prerequisite for society members to buy into an acceptable balance of costs and benefits amongst the competing uses. The shared understanding requires information and more importantly the knowledge of water availability and the hydrologic variability through a range of time and space constraints.

6. The growing range of climate data users include urban and rural planners, infrastructure planners, water resource managers, operators of key hydrologically linked infrastructure including hydro-power reservoir and run of river systems, irrigation and drinking water reservoirs, flood water management infrastructure and transport infrastructure, the finance and insurance sector. The need for increased resilience reflects the changing scarcity and excess balances in the hydrological systems as well as the high investment cost of upgrading or maintaining physical assets to ensure their resilience within the economy.

7. The management and or underwriting of hydrological risk is critical for personal asset and enterprise investment along with the emergence of the need for the financial sector to reflect these risks in their on-lending to households and businesses and for the emergence of insurance products that seek to share this risk between investors and through time.

8. The purpose of the provincial hydrological monitoring systems should reflect the need for knowledge and information by all potential uses and beneficiaries as opposed to simply adopting a “more data capture” focus that continues to drive the sector. Both provinces have a hydromet network for data capture however the use of this data remains limited and as such the information available for decision makers is inadequate, or inaccessible, for the implementation and management of a IWRM approach. Current hydromet networks are no longer a single institutional network but an increasingly multilayered – multiple institutions operate an often-linked and in some cases overlapping set of networks with data rarely shared between network operators. Some networks provide little more than a data archive. The quality of the data archive within and across networks is highly variable reflecting past and ongoing operational capacity and priorities assigned to the network by investors, owners or custodians.

9. Additional investment into increasing network density should respond to knowledge and information needs and how these will be provided rather than simply adding increased density of stations. Consequently, as a result of the changing complexity in institutional arrangement and in the demand for knowledge the use of network data is prioritized and will increasingly requires integration within and across available networks.

10. The high priority for the use of data and information has arisen from disaster risk management following significant climate-related events such as floods and storms that resulted in the highest annual death rates, high incidence of injuries, and extensive loss of personal and public assets. Equally insidious is the growing risk arising from water shortages on rural water supplies, drought induced crop losses and deterioration of water quality during the dry season.

11. The data within the existing hydromet networks can be used to inform the likelihood the scale and impact of flood risks, the probability of flood events, that in combination with weather forecasts provides a critical element in early warning systems that enable people to protect themselves and their assets. Far less obvious is the role of this data in the planning and engineering – in selecting the location and design of structures and infrastructure where historical exceedance frequencies are used to increase resilience to hydrological variation. More recently the additional variance arising from more extreme events within climate change projections has

been integrated into the historic exceedance frequencies to ensure resilience of infrastructure for the economic life of the investment (ADB, 2018). Further integration of climate change projections is an increasing priority for both project provinces.

12. Currently the networks have been used to develop models from some of the gauged and measured data points with the models of floods, and storm impacts tested. Most of these models are then used to predict impacts over a larger geographic scale. Where models have a proven reliability in predicting or representing extreme events these models can be applied across a wider landscape where the meterological records is linked to a lower density data network. Reliable models enable engineering and planning decisions to incorporate increased resilience of climate events which in turn reduces the future operation and maintenance costs of the assets.

13. The quality of model representation to the non-gauged areas is determined by the quality of both the model and the data being derived from the hydromet network. Most model applications are limited to being able to access small parts of the multi-layered and owned networks that include differing Provincial Agencies, private sector or quasi state owned enterprises that manage irrigation or hydro-reservoirs, the national agencies that hold data for primary national network and its integration with national and regional weather and storm forecasting services. The impact of constrained access is to reduce the value of the network, reduce the value of the modelling and increase the uncertainty of model outcomes resulting is less reliable output to inform decision makers.

14. Any investment in network expansion has to balance the needs for increased density of data capture vis a vis the needs for better access to available data so that the quality of information and knowledge can be increased and supplied. Once the quality is increased the ability to enter into cost recovery management systems is far more viable which in turn simply strengthens the quality of both data and models using the data.

15. Investment to increase the density of network data stations needs to consider user needs as a determinant of how additional investment is applied and where it is needed. Given the lag in developing a usable and reliable data set from a new site that requires sufficient duration of record (usually 20 years) - a more important short-term investment is to ensure that existing data across the total network is available and applied within the many models that currently exist or that may be developed as more data access to secured.

16. Data point quality is dependent on accuracy, reliability, timeliness, and the duration of the data point operation. The duration of record is a contributor to most of Viet Nam's failure within the existing networks, where donors, academics and government have invested in additional stations that after one or two years are abandoned, or only operated in a sporadic manner. The institutional arrangement is a critical factor in the duration of the recorded data and is a part of the determinant of data quality and the related ability to recover the cost of data collection and management.

17. Currently both Project Provinces are supporting a range of Government, ODA (WB8, ADB Green Cities, and bilateral programs) providing additional resources for network expansion along with minor advancement in modelling and use of limited data subsets. The ADB *Development and Implementation of Flood Forecasting and Warning System for Hoi An and* Vu Gia-Thu Bon River Basin is the improvement of the forecasting and warning services as well as the response capacity of the government and society to reduce the impact of meteorologically induced natural hazards in the Vu Gia-Thu Bon river basin area of Quang Nam Province investment has adopted a wider response by adopting an information needs based approach.

This grant funded initiative concluded that the existing basic networks were more than sufficient to support a very detailed modelling framework of floods, drought, and land slide projection models.

18. The WMO provides guidelines for the minimum densities of stations with a network. For the project provinces these densities would require rainfall gauging station densities of 1 per 250 or 2500sqkm in the mountainous districts and 1 per 5,750sq km in the hills and plains. For stream flow recoding the minimum densities recommended are 1 per 1,000sq km in the mountains and 1 per 1,875 square km in the hill and plain districts. Coastal areas require even lower densities.

Table A1.1: Minimum Network Densities – WMO 2008

Table I.2.6. Recommended minimum densities of stations (area in km^2 per station)

Physiographic unit	*Precipitation*		*Evaporation*	*Streamflow*	*Sediments*	*Water quality*
	Non-recording	*Recording*				
Coastal	900	9000	50000	2750	18300	55000
Mountains	250	2500	50000	1000	6700	20000
Interior plains	575	5750	5000	1875	12500	37500
Hilly/undulating	575	5750	50000	1875	12500	47500
Small islands	25	250	50000	300	2000	6000
Urban areas	–	10–20	–	–	–	–
Polar/arid	10000	100000	100000	20000	200000	200000

19. More recently – Table A1.2, 2019 modelling recommended standards that were elaborated for more difficult conditions however the basic density recommendations are similar to WMO, 2008.

Table A1.2: Network Density recommendations [3]

Region type	Range of norms for minimum network (km^2/gauge)	Range of provisional norms in difficult situations (km^2/gauge)
I	600–900	900–3000
II_a	100–250	250–1000
II_b	25	
III	1500–10,000	

I: Flat regions in temperate, Mediterranean, and tropical zones;

II_a: Mountainous regions in temperate, Mediterranean, and tropical zones;

II_b: Small mountain/islands with irregular precipitation patterns, requiring dense hydrographic networks;

III: Arid and polar zones.

20. Within the two CRIEM 1 provinces the current network density for rain gauge stations is 1 per 156 km^2 in Binh Dinh and 1 per 101 km^2 in Quang Nam whilst flow gauging densities in Binh Dinh are 1 per 685 km^2 and for Quang Nam 1 per 402 km^2 – see table 3. The basic networks are more than adequate for meeting the minimum needs of users provided access to the full range of networks in each province is accessible and the quality of data is confirmed and maintained going forward. Within each network there maybe strategic gaps that warrant new sites however these should be determined by the envisaged needs of those that the data is being collected for. Here the model developers and model operators along with the monitoring of hydrological systems need to inform and prioritize such gaps.

Table A1.3: Current Provincial Network Densities – (existing and financed plans)

Item	WMO (Minimum guideline)	WMO (Difficult Condition guideline)	Binh Dinh	Quang Nam
	(km^2/stn)	(km^2/stn)		
Number Rain gauges			133	103
Rain Gauge Density	250	2500	34	101
Ratio of WMO Minimum			13.5%	40%
Number of water level gauges			34	26
Water level density	1000	1875	202	402
Ratio of WMO Minimum			20%	40%

[3]K.B. Katsaros, 2019,Sensors for Mean Meteorology, *Encyclopedia of Ocean Sciences* (3rd Edn), Vol 5,2019., pp179-186. https://www.sciencedirect.com/science/article/pii/B9780124095489112102

21. The CRIEM 1 investment rationale is to invest in modern technology that supports data access and processing that supports the needs of users rather than the continued increased in network density that has resulted in redundancy and declining quality of data sets.[4]

II. BINH DINH PROVINCE

1. Background

22. Binh Dinh is one of the South Central Coastal provinces with the highest vulnerability and associated disaster costs arising from disasters caused by natural hazards, that are primarily flood events along the 3 major river basins being (i) Lai Giang, (ii) La Tinh, (iii) Kon-Ha Thanh.

2. Existing Systems

23. The data on Binh Dinh overall networks remains unclear. The number and types of stations reported vary. VRM recruited ADB staff consultant reported that the existing network comprised of the following:

(i) Basic Network all owned by Viet Nam Meterology and hydrological Administration (VHMA)
   a. 3 Metrological weather stations – manual
   b. 7 Hydrological stations – manual
   c. 1 Oceanic station
   d. 52 rainfall gauge stations
      i. 6 old stations
      ii. 2 new stations
      iii. 45 Con River basin stations – all manual

(ii) Specialized network – owned by the PPC
   a. 11 auto water level stations
   b. 44 automated rain gauges

24. The TRTA has been provided a list of stations that are being installed during 2020. This includes:

(i) Automated rain gauge stations
   a. 5 from the Community Disaster Prevention Fund of Government
   b. 25 from the World Bank 8 – Dam Safety project
   c. 7 from the Binh Dinh Hydromet Station

(ii) Automated Water and flood level gauges
   a. 16 from World Bank 8 Dam Safety project.

25. Assuming that the two lists are independent with no overlap the scale of the current public sector hydromet station network is presented in Table 4 which clearly indicates the adequacy of the province hydromet networks. As such the CRIEM -1 investment is targeting investment into data management, and information technology that reduces the cost of the network but moves to support access and use of data systems.

[4] This finding is consistent with the ADB 2019 TA 8171 for Hoi Anh flood forecasting where the inventory of networks, data points and use of such data also coincided with the Quang Nam PPC request that any increase in network density be supported for operation and maintenance costs which the public sector struggled to deliver.

Table A1.4: Binh Dinh Hydromet Network Stations - 2020

Network	Metrological station	Rain Gauge Stations	Water Level Stations	Oceanic
VHMA	3	52	7	1
PPC_BD		44	11	
Subtotal 2019	3	96	18	1
2020 financed additions				
Community Disaster Prevention Fund		5		
World Bank 8 Dam Safety		32	16	
Total Installed or financed	3	133	34	1
Station Density (km^2/stn)		51.5	202	
WMO Minimum Standard		250	1000	

26. In addition, to the data collection stations in table 1 the wider hydromet inventory for the province includes:

(i) Hydromet flood models (all use MIKE 11 platform) for all river basins (except the La Tinh) including:
   a. Kon – Ha Thanh River Basin (2017)
   b. Kon River Basin (2019)
   c. Lai Giang River Basin (2016)
   d. Lai Giang River Basin Upgrade for An Du Beach project (2019-2020 –ongoing)

(ii) Early Warning systems – there are currently two early warning systems that have been developed one is automated through SMS – both are based on water level status reporting with no automated flood model early warning system. These include GIZ supported systems for 4 automated water level recording stations, and CBLS (with support of Rockerfeller Foundation) for 3 automated water and rain guage stations

(iii) Risk and impact assessment tools linked to the hydraulic models for flooding have been developed for the Kon-Ha Thanh River basin

(iv) Sea level rise model based on MIKE11 was developed post the 2015 Storm and Typhoon season.

3. Investment Priorities

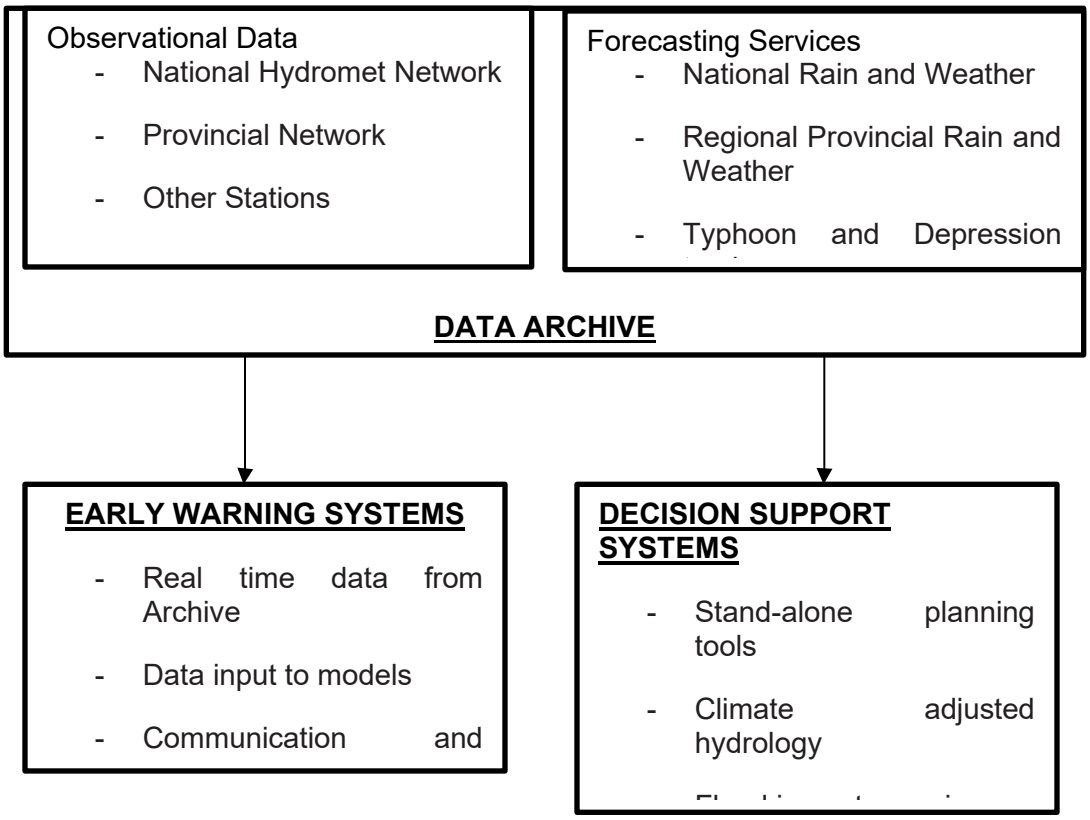
1. Client Data Access Systems

27. The proposed use of HLTF grant funding is to establish a modern customized technology based data access and information system that supports the growing diversity users for climate based data and forecasts. The proposed system seeks to enhance data archive to enable increased development of both information and knowledge related to climate risk through enabling users from a range of sectors to access reliable and consistent data sets.

28. The proposed investment will support the establishment of a client – server system to be hosted by the Quy Nhon Hydromet Station on behalf of the Provincial Peoples Committee by the Provincial Committee for Natural Disaster Prevention and Control, Search and Rescue.

29. The client server system will provide an online (and possibly cloud-based) system that archives data online that is exchanged or accessed digitally with clients. Typically, the server receives, captures, stores and processes data whilst the client accesses the data to transform it into visual or similar layers for decision support purposes using simulations, modelling, and spatial GIS layers.

Figure A1.1: Schema of Client Server Structure Adapted from Quang Nam TA 8171 Inception



30. Clients to be connected will be identified by the Provincial Committee with a minimum of four clients in other agencies, in addition, the Provincial DoT and its PPMU will be established and supported as a client while the Provincial Joint Stock Company for rural water supply will be offered the option of becoming a client user. All clients will have on-line connectivity with the data archive and the option of accessing client information systems such as flood forecasting, flood impact mapping and storm events. For the DoT and its PPMU this will include the development of flood risk impacts for the road networks and based on these impact assessments additional site-based warning systems will be provided for up to 8 sites. In return the flow and water level stations within these systems will be required to connect into the data archive and provide integration with the disaster relief procedures of the province.

2. Indicative Hardware and Software Specifications

31. All hardware and software will be finalized within a detailed design and supply agreement that will require the design to maximize compatibility for its integration with the hydromet networks and the range of early warning and decision support tools currently developed – see above. Within Binh Dinh (and most provinces within the coastal region) the predominant software platforms are linked to the DELFT related software platforms for hydraulic modelling, flood mapping etc. with the current models operating on MIKE11. The key design complexity is to ensure that the wide range of sources and data types can be managed within the Client Server interfaces. As such hardware specifications need to include the range of communication protocols for input data and protocols for external communication or transmission of data. Looking forward a core element in the client server arrangement is the requirement of internet speeds in excess of 50Mbps and ideally 100Mbps or above.

Table A1.5: Technical Specifications

Item / Goods Description	Technical Spec. (Minimum requirements)
PC/Laptop for Operator Client	• 1CPU minimum 4 cores 2.6GHz or equivalent • 8GB RAM, • 500GB HDD • Keyboard, • Mouse, • Monitor (minimum 23inch) • UPS of at least 1KVA-600W • Windows 10 Pro 64bit • 1Gbps network interface
Server for Forecasting shell	• Rack mountable • At least 1 CPU minimum 4 cores / 8 threads 3.0GHz or equivalent • 64 GB RAM DDR4 ECC • (2x) 600GB 12Gb SAS 15Krpm HDD or enterprise SSD • Hardware Raid with 1GB cache and battery • Redundant PSU • Windows Server 2016 or better • 2 Gigabit ethernet ports • Management port (IPMI2 or equivalent)
Server for Forecasting shell – future capacity	• Rack mountable • (2x) CPU with at least 10 cores/20 threads 2.5 GHz or equivalent • 128 GB RAM DDR4 ECC • (2x) 600GB 12Gb SAS 15Krpm HDD or enterprise SSD • Hardware Raid with 1GB cache and battery • Redundant PSU • Windows Server 2016 or better • 2 Gigabit ethernet ports • Management port (IPMI2 or equivalent)

Item / Goods Description	Technical Spec. (Minimum requirements)
Server – Master Controller	• Rack mountable • At least 1 CPU minimum 8 cores/16 threads 3.0 GHz or equivalent • 64 GB RAM DDR4 ECC • (2x) 600GB 12Gb SAS 15Krpm HDD or enterprise SSD • Hardware Raid with 1GB cache and battery • SAS/FC card and cables to connect to the storage system • Redundant PSU • 2 Gigabit ethernet ports • Management port (IPMI2 or equivalent)
Server - Central Database	• Rack mountable • At least 1 CPU minimum 8 cores/16 threads 3.0 GHz or equivalent • 64 GB RAM DDR4 ECC • (2x) 600GB 12Gb SAS 15Krpm HDD or enterprise SSD • Hardware Raid with 1GB cache and battery • SAS/FC card and cables to connect to the storage system • Redundant PSU • 2 Gigabit ethernet ports • Management port (IPMI2 or equivalent
Server – Admin interface	• Rack mountable • At least 1 CPU minimum 8 cores/16 threads 3.0 GHz or equivalent • 64 GB RAM DDR4 ECC • (2x) 600GB 12Gb SAS 15Krpm HDD or enterprise SSD • Hardware Raid with 1GB cache and battery • SAS/FC card and cables to connect to the storage system • Redundant PSU • 2 Gigabit ethernet ports • Management port (IPMI2 or equivalent
Server – Open Archive	• Rack mountable • At least 1 CPU minimum 8 cores/16 threads 3.0 GHz or equivalent • 64 GB RAM DDR4 ECC • (2x) 600GB 12Gb SAS 15Krpm HDD or enterprise SSD • Hardware Raid with 1GB cache and battery • SAS/FC card and cables to connect to the storage system • Redundant PSU • 2 Gigabit ethernet ports • Management port (IPMI2 or equivalent
Server PI Web	• Rack mountable • At least 1 CPU minimum 8 cores/16 threads 3.0 GHz or equivalent • 64 GB RAM DDR4 ECC • (2x) 600GB 12Gb SAS 15Krpm HDD or enterprise SSD • Hardware Raid with 1GB cache and battery • SAS/FC card and cables to connect to the storage system • Redundant PSU • 2 Gigabit ethernet ports • Management port (IPMI2 or equivalent

Item / Goods Description	Technical Spec. (Minimum requirements)
Storage system	• Rack mountable • Dual controller with at least 8GB cache/controller, connected to DB and Open archive servers using SAS or FC cables • At least (24x) SAS 12Gb 10Krpm 1.2TB HDD, configured into Raid60+Hotspare array. Usable capacity of at least 18TB • LAN connection and management software • Redundant PSU
42 Rack	• Rack 42 U, D 1000mm, W 600mm • PDU with at least 24 sockets, MCB 2P 50A
Air conditioner	• At least 42K BTU
KVM switch/console	• Rack mountable with monitor of at least 17", keyboard, touchpad • Cables to connect to all servers
Gigabit switch	• Rack mountable • Managed switch • At least 48 port 10/100/1000Mbps, 2SFP, 2 GigE combo • Switching capacity: at least 96Gbps unblocking
Router/Firewall	• At least 2x WAN, 2x LAN port • Support SSL-VPN, IPsec VPN • Load balancing on WAN • VPN SSL connections: at least 100 concurrent • VPN SSL throughput: at least 250Mbps • VPN IPsec throughput: at least 900Mbps
UPS	• Smart online UPS • 3 phases Input and Output • True sine wave • Capacity of at least 20KVA/18KW • LAN interface • Temperature and humidity sensors • Management software running on Windows and Linux • Runtime: at least 30 minutes on battery with full load
Auxiliary equipment for the server room	• All auxiliary equipment needed for installation, including but not be limited to: - power cables, - aptomat, - air conditioner - pair controller, ...
Internet subscription	• Bandwidth 80Mbps, 1 static IP (3-5 years contract)
Domain name subscription	• Domain name sub. (3-5 years contract)
SSL certificate subscription	• SSL cert, support browsers on desktops and mobile devices (3-year contract)
PC/Laptop for DSS plus auxiliary hardware	• 1 CPU with at least 8 cores / 16 threads 2.6GHz or equivalent • At least 64GB RAM, 2x 1TB 7200rpm Enterprise HDD • Hardware Raid 1GB cache and battery • Keyboard, mouse, monitor (at least 23") • UPS with capacity at least 2KVA - 1200W • Windows 10 Pro 64bit • Redundant PSU • 1Gbps ethernet port

Item / Goods Description	Technical Spec. (Minimum requirements)
PC/Laptop for Other Clients	• 1 CPU at least 6 core 2.6GHz, 8GB RAM, 500GB HDD • Keyboard, mouse, monitor (at least 23") • UPS at least 1KVA - 600W • Windows 10 Pro 64bit • 1Gbps ethernet port
Laptop	• 1 CPU at least 4 core 1.6GHz • RAM 8GB • HDD: 500GB SSD • Screen: 15.6" Full HD • OS: Window 10 Home • Office 2019 permanent license • LAN, wifi, bluetooth
Teamviewer subscription	• Teamviewer Business 1 user 3 -5 year
Server room infrastructure	• Raised floor 15m2 • Steel raised surface covered with HPL • Slab of lightweight cement steel core, specification 600x600x35mm. • Synchronous load: 1.45 tons / MM • Centralized load of 445 kg Base: • Height of the stand to the surface: 300mm. • The entire base is made of steel and copper. • The type of pipe diameter is 25mm. 1.5mm thick steel. • Bottom sole square size: 100 x 100 x 2.0mm. • Position the floor with specialized glue Backing: • Galvanized steel bracing bars. • The base surface is adjacent to the floor plate with noise-proof padding • Completed accessories • Glass wall 15m2 and door: 8mm thick tempered glass wall, with synchronous collapse frame, translucent stickers of glass base (1m below) • Doors open with 1 wing, made of 8mm thick toughened glass, with locks and accessories. Size 1x2.2m
Fire alarm system	• 1x 4-Channel Fire Alarm Control Panel (With Accu 7Ah) • 1x Smoke detector • 1x Heat detector • 1x Fire alarm button with reset function • 1x Fire alarm • 2x Fire alarm light

3. Indicative Costings

32. A total investment cost of $1 million is estimated based on the expected costs detailed in the Table below of which the central data hub based on the client and user server interfaces is estimated at $800,000 including customization of existing decision support and forecasting models with the client server system and historical data population of the data archive – see Table 6 for equipment bill of quantity and cost estimate and table 7 for proposed installation and customization for operators.

33. The additional $200,000 will support modernization of the flood warning and flow level network based on the road network and local community high risk sites identified by DOT through the use of flood mapping model outputs it will access through the client interface – see table 8. IT is envisaged that these sites will procure locally manufactured flood warning systems that include water flow, water level recording stations, downstream early Warning systems, and data and message transmission systems. The final scope of these will be determined during the detailed design, and will need reflect the priorities from flood risk mapping, vulnerable communities and the likely installations under the World Bank 8 – Dam safety initiative.

34. The current priority sites that will be reviewed during detailed design include

(i) Định Bình reservoir, Vĩnh Kim commune, Vĩnh Thạnh district (Flow metering in front of the reservoir).
(ii) Núi Một reservoir, Nhơn Tân commune, An Nhơn town (Flow metering in front of the reservoir).
(iii) Flow metering on the Kôn river, Phú Phong bridge, Phú Phong town, Tây Sơn district
(iv) Flow metering on Lại Giang River, at Bồng Sơn Bridge, Hoài Nhơn District
(v) Flow and water level metering on the Kim Sơn, river, Mục Kiến bridge, at Ân Tường Đông commune, Hoài Ân district.
(vi) Water level and flow metering on the La Tinh River, downstream of the Cây Gai dam.
(vii) Water level and flow metering on the Hà Thanh River, at Canh Vinh bridge.
(viii) Water level metering on the Trường Úc river, at Hà Thanh 7 bridge

Table A1.6: Indicative cost estimate (excl Tax)

Equipment for operator and client interfaces	Total Cost ($)	Quantity	Unit cost ($)
Operator/Client PC/Laptop and screens	6,000	4	1,500
Forecasting shell -server lean	22,000	4	5,500
Forecasting shell server heavy	96,000	8	12,000
Master server	15,000	2	7,500
Central Data base server	15,000	2	7,500
Admin Interface server	11,000	2	5,500
Open Archive server	8,000	1	8,000
PI Web server	5,500	1	5,500
Storage systems	25,000	1	25,000
Racks	2,000	1	2,000
Air Con - CDH and User n=8	10,000	4	2,500
KVM switches	3,000	1	3,000
Gigabyte Switch	3,000	2	1,500
Router firewall	3,500	1	3,500
UPS (CDH -21000: User 15000)	36,000	2	18,000
Server room equip	2,000	1	2,000
Server room upgrade infrastrure	10,000	1	10,000
Subscriptions - 5yr CDH and 2 users			
Internet	9,600	2	4,800

Equipment for operator and client interfaces	Total Cost ($)	Quantity	Unit cost ($)
Domain	500	1	500
Ssl	500	1	500
Laptop - DSS / Aux	5,000	4	1,250
Laptop - user clients	6,500	4	1,625
Laptop CDH	6,500	4	1,625
Team View er Subscriptions n=2	1,800	2	900
Server room and associated connectivity, furniture etc.	5,000	1	5,000
Fire Alarms	1,000	1	1,000
O&M support and service contract $3k/yr 5 yr)	15,000	1	15,000
User modelling platforms	30,000	1	30,000
Subtotal	354,400		
Technical Support			
Detailed Design	42,528		
Installation and operational training			
Int Pmnths 10, Nat Pmnth 18(1)	321,300		
Subtotal	718,228	ADB	
VAT	71,822	Government	
Total	790,051		
Contingency	79,005		
(11% on ADB costs net tax)			
Subtotal CDH	797,233		
Resources for upgrading hydro-met network			
Flood level and flow stations (2)	189,603	8	23,700
Contingency for hydro-met network	13,164		
Subtotal hydro-met network	202,767		
Total Investment	1,000,000		

(1) See below for break out by position
(2) See below for breakout

Table A1.7: Installation and Customization Support Input

	Person months	
Positions	**International**	**National**
System architecture design and Specification	2	2
Forecast and decision support model integration	3	6
Database -open source connectivity	3	4
System integration and reporting	2	6
Subtotal PM	**10**	**12**
Cost per person month ($/person month)	$24,000	$5,500
Total Fees (inclusive of disbursement costs)	$240,000	$66,000
Total	**$306,000**	
Contingency 5%	$32,130	
Grand Total	**$338,130**	

Table A1.8: Proposed Flow and Flood Level Hydro-met Investment

Category	Quantities (set)	Unit price (VND)	Amount (VND)
Control station combined with an electronic water level meter that connects to LoRa and the Lora connection management platform and management platform: + 03 electronic water level meter connected to LoRa + 01 Data transmission and broadcasting module (LoRa, GPRS / GSM / 4G) + 01 controller for solar battery charge + 01 12V / 20 Ah battery + 01 speaker 50W + 01 Stand, 20W Solar Panel + 01 station support column + Management platform	01	120,000,000	120,000,000
Outdoor warning station connecting Lora and management platform: + 01 audio amplifier + 01 Data transmission and broadcasting module (LoRa, GPRS / GSM / 4G) + 01 controller for solar battery charge + 01 12V / 38 Ah battery + 02 speaker 150W + 01 Stand, 40W Solar Panel + 01 station support column + Management platform	03 (per site)	95,000,000	285,000
LoRa wave transmission Station LoRa (Relay): + 01 Control system. + 01 Data transmission module + Overall integration of solar power sources, backup batteries. + 01 Support column	01	65,000,000	65,000,000
Total per site			**470,000,000**

4. Procurement

35. Development of decision support models and their applications will build on existing knowledge obtained through the Quang Nam provincial program financed under ADB TA 8171 and especially will need consideration of the linkages and integration of the Provincial system with the regional hydromet center in Tam Ky. The Client Server and its integration with decision support systems and early warning systems will use a software supplier technical assistance contractor whose terms of reference will include the development of sufficient capacity and experience to be able to maintain and extend the geographic coverage of these tools as well as the capacity to apply the decision support tools by the targeted user groups.

36. The nature of the software systems needs to reflect the existing systems, hardware and capacity as well as the wider sector throughout the central region and national levels. These requirements and directions are mostly influenced by the predominant software platforms for managing data, early warning using real time interface and supporting decisions support requirements relating to flood risks.

37. Procurement will involve a firm contractor as per the eligibility and terms of reference appended to this document. Procurement will apply Fixed Budget Selection with eligible firms providing technical proposals for specified deliverables within a fixed budget of $1.0 million – excluding tax.

38. The proposed procurement reflects the ADB Procurement Guidelines for post July 2017 under “Appendix 4: Special Considerations for Procurement of Information Technology” that indicate the importance of moving from the run based procurement systems applied to goods and services and more generic consulting services or where off the shelf operational systems can be procured to the “Procurement for Innovation” in guidance (Para A4.11 to A4.22) where a mode direct and partnered approach to procurement is recommended to achieve the Value for Money (VFM) principles required by ADB Procurement Policy.

39. The hydromet sector in Viet Nam clearly demonstrates the loss of value of money through competitive procurement where lower priced solutions have been contracted using multiple systems that are not integrated, expand the range of operational capabilities and skills required beyond the available set of skills, and fail to be maintained leading to substantial redundancy of investment and low outcome value.

40. A key element in achieving VFM from High Technology in the IT sector is to focus on outcome-based procedures and not compliance rule-based procurement procedures Para A4,12 point (iv) and to ensure specified technology are consistent with the current systems whilst also being the most up to date option suitable for the proposed outcomes that do not deviate from the requirements.

41. To empower the PPC and the CRIEM PPMU, the contract will be negotiated on the basis of the terms of reference that prioritize issues such as:

(i) fit with existing infrastructure being supported by ADB TA 8171- and specifically the choice of proposed and agreed software upgrades, access systems which are to be fully compatible with the current use of MIKE based systems
(ii) fit with the existing processes and protocols relating to the Provincial Data Archive and client Server – User Server interfaces and the linked early warning and decisions support systems
(iii) reflect global best practice and integration options for wider application in Viet Nam
(iv) the proposers’ share of global market for hydromet and applied hydromet software
(v) the support for the software and the models being an integral partner in their development and the capacity of their technical partner in Viet Nam with the ongoing relationships ensuring access to technical support and guidance from those with direct local knowledge of the systems.

42. It is proposed that the consortia be requested to develop a technical proposal with supporting workplan that is agreed in advance with the Client and ADB. The proposal will include the usual consultant budget items of fees and out of project expenses with all software, hardware, data and equipment purchases being identified as “provisional sums that once final specification, quantities and costs are known will be approved by the IA. All provision amounts identified will need to clearly state each system including the scope of modelling in terms of geographic boundaries, grid sizes, and the range of parameters to be modelled in either 1D or 2D systems, the scale and scope of risk simulation and visualization software and supporting hardware.

5. Implementation Arrangement

43. The Binh Dinh PPMU (CRIEM) will be responsible for implementing output three procurement and will coordinate with Binh Dinh Provincial Hydro-Meteorological Centre (BD PHC). The proposed ToR will be reviewed and agreed in principle by the (i) BD PHC, (ii) Provincial Committee for Natural Disaster Prevention and Control, Search and Rescue, and (iii) Water Resource and Flood Control Department of DARD and the PPC (EA) for final ratification.

44. Immediately on loan signing the TOR will be submitted by the IA for EA approval. An EOI will be called for through the ADB CMS with the responsive parties being screened against the eligibility criteria (see TORs) with eligible firms being short listed. There is a distinct probability that the number of eligible firms may be less than 3. Short listed firms will then need to provide the technical methodology that responds to the terms of reference and against which all eligible proposals will be evaluated. The technical proposal and workplan will be submitted to the IA, who will in turn summit this to the EA and other stakeholders including the Provincial Procurement Committee for approval. Once the technical proposal is finalized and approved the consortia will be requested to submit direct to the IA (copied to ADB) their financial proposal for contract negotiation. Contract award will be undertaken by the IA/ BD PPMU.

III. TERMS OF REFERENCE - OUTPUT 3 BINH DINH

A. Background

45. The required contracted deliverables are described below and the contractors will be required to provide a detailed methodology for determination of the technical specifications, bill of quantities and installation with supporting capacity development for each deliverable. The proposals will be evaluated on the basis of the methodology and corporate capability and are required to fall within the $1 million budget available for Binh Dinh Province net of taxes that are currently estimated to be $100,000 and which will be financed by the BD Provincial Peoples Committee. The contractor can seek to be paid directly from ADB for their share of the financing based on the EAs approval of documentation and deliverables.

B. Corporate profile

46. The contract is linked to specialisation in the fields of (i) climate and hydraulic modelling in coastal, delta and river basins and catchments, and (ii) software development and support. As such the successful bidder will be required to clearly demonstrate expertise and capability in both aspects of specialisation. Further, bidders will need to clearly demonstrate commitment to products and services within the region over extended periods of time including updating, extension of decision support models and application of decision support models and digital integration and automation.

47. Eligible bidders will be required to meet **all** of the following criteria:

(i) An international firm/enterprise with proven capacity in the development and configuration of climate data archives, forecasting and communication systems with proven reputation and delivery in the following requirements:

- A minimum average annual turnover of $15 million for the period from 2015 to 2019 inclusive (to exclude the impact of COVID -19) derived from the (a) commercial sale of climate, hydrological modelling, climate and climate risk

decision support systems, and the communication of climate data, climate risk and the impact assessments of these risks, (b) the conduct of related research to support into software development that includes climate data integration, data transformation and standardisation, data archives, hydrological modelling and risk assessment applications that include communication of data in forecasting and early warning systems, and (c) development and implementation of applications linked to (a) and (b).

- Commercial revenues can include both direct sales revenues and revenues from licensing of product use linked to data management, integrated modelling with temporal and spatial relationships, that have been developed in-house.
- At least 150 in-house technical experts that cover all of the following aspects (a) systems research and development, (b) or development of software systems, (c) development of applications through spatial, 1D and 2D representation of water and climate-based risk modelling and simulation products, and (d) provision of technical support and capacity building.
- Both GMS regional and local Vietnamese staff with knowledge of the systems within the wider GMS region on existing data and forecasting systems, existing models – including accessing data or output parameters, the predominant digital architecture for the data and modelling and demonstrable understanding of the major actors in the regional systems and the ability to access and link with these as required.
- An owner (or licensed access to sell and configure) of software for climate data archives/databases, software systems for integration of hydromet data sets, and hydrological models that support inundation forecasting based on precipitation and modelling of whole of catchment systems that has been technically supported for a minimum of five years within the GMS region.
- Demonstrable commitment for sustaining and improving digital tools with at least a minimum of two major updates or innovation to the software and models commercially offered since 2015.
- Offering software and software-based solutions with associated licensing and technical support services that is proven over a minimum of ten years.
- At least 7 years of both regional and Vietnamese experience including (i) provision of software with technical support (minimum of 5 years or three cycles of support), model development and customisation in climate data and climate-based modelling (minimum of 3 contracts in excess of $200,000 within the region).
- GMS regional presence in all the following application areas: client server and data archive architecture at both national and subnational level, client – user interfaces for the archive and use of climate data/models at a subnational level, hydromet network assessment and design, 1D and 2D hydraulic modelling of river and coastal systems, flood forecasting, coastal zone risk assessment and management including discharge management modelling for river based flows, salinity modelling and representation, sea level rise and storm surge modelling, early warning systems for flood risks.
- In house “state of art” impact modelling capability with a focus on flood risk impact assessment, salinity risk and sea level/storm surge risk impact assessment in a 1D and 2D modelling with risk visualisation and communication capability.
- Proven track in assessing client needs, develop system architecture options and design concept used to obtain client consensus on software and decision

support models, and deliver such models within agree timelines and budgets with 10 supporting examples of this capacity.

- Technical staff that are easily accessible to in-country software and model users.
- Proven capacity in the delivery of operational capacity through local public sector staff with awareness, technical training and mentoring, application development, and wider systems operation including the communication of data and results with a minimum of 10 client referenced contracts.

C. Contractual Deliverables

48. The contractor will submit a report to the PPC on priority provincial needs for the archive, integration and storage and provision of digital access to potential users of climate data and models. The proposal will require provincial agreement on priorities (deliverable 1) and approval of a detailed design and implementation contract for establishing the data hub (deliverable 2) that will be informed by provincial assessment of current climate data collection and management systems, data use and decision support, and climate risk assessment and communication systems. Once the data hub is operational (deliverable 3), within the fixed budget of $1 million (net of all taxes) the residual investment will be used to pilot flood risk impact assessment decision support with associated site based early warning technology recently developed in Viet Nam (deliverable 4). A minimum of 15 percent of total investment will be applied to deliverable 4.

1. Deliverable 1: Provincial assessment of Current Situation and Priorities for establishing a Provincial Climate Data Hub

(i) Assessment of current data collection

a. Conduct an inventory and review of the current system of hydromet or metrological data collection, data communication, data archive, and data access that includes all actors including national, regional and provincial – both public and private sector
   i. Site identification of data through georeferenced data
   ii. A list of collected parameters from each site
   iii. Extent of each site data time series that identify data gaps and data quality issues including data logging and communication systems
   iv. A detailed set of specifications for each set or type of digital technology and operating guidelines
b. Assessment of data archive platforms and databases, their quality reliability and accessibility
c. Identification and specification of data provided for weather forecasting and early warning including from international, national, regional and provincial sites

(ii) Assessment of climate change data and needs

a. Climate baselines to support mid and late century impacts of climate change projections with respect to extreme events and changing baseline conditions that include sea level rise, storm surge, temperature change, extreme temperatures including heat wave, changing rainfall including extreme rainfall events covering 1, 3 and 7 day rainfall maxima for a range of exceedance frequencies, drought events including severity, duration and timing such events
b. Integration with national, regional, and international modelling of climate change across the full range of RCP scenarios applied by the IPCC

c. Datasets that link or simulate climate change impacts within a catchment or site-based planning context

(iii) Assessment of data applications and current or potential use and linkages to the climate data collection system including:
   a. Hydrological modelling including projections and forecasting capability in a spatial and temporal dimensions including strengths and weaknesses
   b. Spatial and urban planning decision support and data base tools
   c. Networked infrastructure planning and design that includes roading at the commune, district, provincial or national level, other transport infrastructure including ports, riverways, flood protection and management infrastructure, priority water supply and telecommunication infrastructure
   d. Hydrological modelling for extreme events
   e. Risk assessment and visualisation/representation

(iv) Early warning and disaster management systems
   a. Identification and characterization of disaster risk within the Province
   b. Institutional systems for disaster risk management
   c. Disaster Management decisions support systems including early warning systems

(v) Systems for infrastructure climate-based risk impact assessment for planning and design of the transport infrastructure

(vi) Institutional capabilities and capacity for the management and operation of climate-based data systems and their application covering points (i) through (v) above and including human and budget resource assessment for:
   a. Data collection, data verification, data storage and management, data transformation and communication
   b. Data linked modelling and interpretation
   c. Communication and knowledge dissemination

2. Deliverable 2: Specifications and detailed costing for the development, operationalisation and capacity development of a Provincial Climate Data Hub

49. The proposed investment will support the establishment of a client – server system to be hosted by the Quy Nhon Hydromet Station on behalf of the Provincial Peoples Committee by the Provincial Committee for Natural Disaster Prevention and Control, Search and Rescue. The client – server system will support online (possibly cloud- based) system that captures and archives data with the capacity for client and user groups to digitally exchange or access.

50. The data archive will include both observational data from the national and provincial hydromet stations, private enterprise managed and operated stations – mostly linked to hydro energy reservoir management, dam safety and reservoir management systems under MARD and observation records imported from overseas for events such as typhoons, ENSO and climate change. The archive will also capture and archive forecasting data systems National Rain and Weather stations including rain radar, Regional Provincial Rain and Weather, and Typhoon and Depression tracks.

51. The data hub will link directly with early warning systems through real time data systems that automatically update models and trigger communication and warning systems as well as provide interactive links with decision support systems for stand-alone planning tools, climate adjusted hydraulic modellings, reservoir management, flood risk impact modelling etc.

52. The data hub will be the server that receives, captures, stores and processes data whilst the client accesses the data to transform it into visual or similar layers for decision support purposes using simulations, modelling, and spatial GIS layers.

53. The clients to be connected will be identified during deliverable 1 and will be confirmed by the Provincial Peoples Committee but the minimum requirement will be 4 users in other agencies that include (i) the Provincial DoT, (ii) the DoT Professional Project Management Unit, and (iii) the Provincial Joint Stock Company for rural water supply will be offered the option of becoming a client user. All client-users will have on-line connectivity with the data archive and the option of accessing client information systems such as flood forecasting, flood impact mapping and storm events.

54. The data hub proposal will include detailed technical specifications for hardware, software, and decision support systems. The proposal must demonstrate digital and associated modelling systems with seamless integration for access to use data. Digital compatibility must be demonstrated between field data collection, imported data systems, data transmission, data archive and storage and the linked use such as decision support models. For client and users, the contractor will identify customized needs and ensure that these are fully reflected in the IT design and architecture and supporting software systems.

55. The data hub proposal will include the (i) hardware requirements, (ii) supporting infrastructure for hardware, (iii) software and internet/communication technologies with detailed specifications for managing the data archive, (iv) client user interface technologies and digital platforms/systems, (v) existing decision support system interfaces, and (vi) proposed interfaces for flood risk impact assessments. The proposal will provide a detailed bill of quantities with supporting technical specifications for all items to be procured and supplied by the contractor through the use of provisional amounts within their contract as such the contractor will be required to specify in detail the items and expected costs of supply installation and operational support.

56. The compatibility of proposed hardware and software with the main decision support models with a minimum of data transformation or manipulation will be essential. In this regard existing river and coastal flooding projection and mapping hydraulic models are critical tools for the priority climate risks faced by the Province. As such the type of software for such models will inform the choice of software and systems. The successful contractor will need to be a licensed reseller or owner of such software platforms.

57. The design complexity will need to address the wide range of sources and data types can be managed within the Client Server and user interfaces. As such hardware specifications need to include the range of communication protocols for input data and protocols for external communication or transmission of data. Looking forward a core element in the client server arrangement is the requirement of internet speeds in excess of 50Mbps and ideally 100Mbps or above.

58. The breakout of hardware and software items and their specification for the Client server will be responsibility of the contractor. These will include licensing and subscription costs for the data hub and an operation and maintenance support service not exceeding three years.

59. The proposal will include professional time to complete deliverables 1 and 2 broken out by position/skill set and with each position linked to a staff member with supporting biodata, level of input and detail of home and field time inputs.

60. The contractor will be required to provide a detailed proposal for the client server to the CRIEM-1 PPMU for Binh Dinh within 6 weeks of mobilization. The PPMU will seek comments on the proposal from technical departments within the Province and any other significant stakeholder and present these to the contractor with 60 days. The contract will then submit a final proposal with a detailed implementation and staffing schedule and revised cost estimate for the Data hub and client and user interfaces. Over the fixed budget deliverables 1 and 2 have an indicative budget of $780,000 to $820,000.

3. Deliverable 3: Establishment of an Operational Provincial Climate Data Hub

61. Based on the approved data hub proposal, the contractor will procure all hardware, supply software and ensure its customisation and operational capacity. The systems will be established with the data archive populated and linked with the range of data sources agreed. The contractor will ensure operational capability through the provision of training and operational mentoring of designated staff and ensure all software licensing and subscriptions are secured and in place. Once established the data hub and its operation will be handed over under the technical service agreed with the PPC.

4. Deliverable 4: Application Development for Road Flood Risk Impact Assessment for High Vulnerability Road Sections

62. For the DoT and its PPMU the proposal will include a pilot flood risk impacts for high risk sections of District road networks with the impact assessments identifying the need for site based warning systems – the contract will support installation and training in operation for up to 6 sites based on available resources. All flow and water level stations within the hydrologically linked systems will be required to connect into the data archive and be available for informing the risk assessment that will be integrated with Provincial systems for disaster relief.

63. The contractor will develop and test a decision support for assessing flood impact risks within the road transport network and then provide site-based flood early warning systems for these sections. The deliverable seeks to demonstrate to the DoT and its engineering contractors how to assess flood risk impacts on road sections, options for road network planning and engineering design to mitigate or manage the risks and to support small scale local early warning systems to reduce the cost of such floods on local communities. The scale of input will reflect the residual budget available after the data hub as agreed and as such the final deliverable 4 proposal will be included with the revised deliverable proposal as described in paragraph 12 above.

64. Deliverable 3 will support knowledge development for flood warning and flood risk decision support in the road and linked local community for high risk sites that will be identified in conjunction with DOT. The identification will use flood mapping tools that are linked to the client interface. Once the flood risk impact assessment for a t least two sites is complete – future options for road network planning, road network upgrades can be undertaken by the DoT and their engineering teams. Whilst the risk to the transport network and associated communities will not be mitigated it is proposed that localized site based early warning systems be provided (these are available on the local market) and that these will be linked to the client server forecasting models. The contractor will procure locally manufactured flood warning systems that include water flow, water level recording stations, downstream early warning systems, and data and message transmission systems. The final scope of these will be determined during the detailed design, and will need to reflect the priorities from flood risk mapping, vulnerable communities and the likely installations under the World Bank 8 – Dam Rehabilitation and Safety Improvement Project for Vietnam.

IV. QUANG NAM PROVINCE

65. Quang Nam is one of the South Central Coastal Region Provinces and within the region the province reports the highest level vulnerability and associated disaster costs arising from disasters that are primarily flood events.

A. Existing Systems

1. Regional Hydromet services

66. A Regional Meteorological and Hydrological Center is stationed in Da Nang as part of the Vietnam Meteorological and Hydrological Administration (VMHA) network involved in forecasting. The organization consists of 90 staff members, of which 16 staff members under the Forecasting Department. The regional station provides a second tier presence of the National Administration and is linked nationally. Currently the most extensive hydro-met surface monitoring network in Quang Nam is owned by the Da Nang Regional Hydro-Meteorological Service Centre (RHMS) as a regional unit of VMHA. This network consists of rain gauges, weather stations, river water level/flow stations and one coastal water level station. Some of the roles of the center include the following.

a. Forecasting system

67. The RCHMF runs (similar to the NCHMF) its own river flood forecasting models, also based on NAM, MIKE 11 and reservoir routing using Excel macros. The RCHMF forecasts are on a higher level of detail, compared to the NCHMF models. But similar as the NCHMF, model simulations take rather long (order of hours), despite that the installed servers are quite moderate.

68. Model output parameters from the RCHMF forecasts are (similar as the NCHMF):

(i) Water levels at key locations.
(ii) Flood maps based on a catalogue approach (no real-time flooding maps available).

2. Provincial Systems

69. The data on Quang Nam is far clearer although the number reported by the. VRM Recruited ADB staff consultant seems to differ widely from the numbers reported by the ADB TA – 8171 team.

70. The TRTA has been identified a list of stations from the ongoing ADB-PPTA 8171-VIE “Urban Environment and Climate Change Adaptation” plus an additional list from the PPMU that are not fully consistent. The overall indicative scale and scope of the provincial hydromet network is presented in table 4 that clearly indicates that at an aggregate level the network density is far and above both the government and the WMO guidelines. This is consistent with the findings reported for the Inception stage of ADB-TA 8171-Vie that thee hydromet data **was more than sufficient for the purposes of modelling hydraulic flows and events**. Note however this needs to include the catchments and reservoirs systems operated by hydro-electric operating enterprises.

71. As a consequence ADB CRIEM will not continue to add to the density of the Provincial Hydromet Network, rather it will seek to extend access to the data and decision support tools

whilst also supporting the use of updated technology for modelling 2-d aspects of floods, establishing flood visualisation and impact assessment technologies that will provide the next generation of modelling and decision support tools for climate risk management.

Table A1.9: Quang Nam Hydromet network stations as at 2020(operating and funded proposals)

Network	Metrological station	Rain Guage Stations	Water Level Stations	Oceanic
VHMA	4	25		1
PPC_BD		24	14	
Subtotal 2020	4	49	14	1
2020 financed additions	2	50	26	
Total Installed or financed	6	99	40	1
Station Density (km^2/stn)		105	261	
WMO Minimum Standard		250	1000	
Govt Guideline		314 to 706 km2/stn (equivalent to 10 to 15km apart)		

72. The ADB TA-8171 inception report identifies a different number of rain gauge stations in the Province. This report identifies 20 rain gauge stations as part of the VHMA operated through the regional HMA office in Da Nang, with a further 44 stations operated by the Quang Nam Province, 15 by the QN Joint Stock Irrigation Company, 22 by Hydroelectric enterprises and 7 by Da Nang City. This list does not include the additional 20 stations to be installed under the WB 8 – Dam Safety Project or the additional 30 that are funded but yet to be installed.

73. In addition, to the stations in table 4 - the wider inventory for the province hydromet assets includes a number of modelling and simulation assets for floods and flows – see table 10 below, and wider hydromet analytics linked to a range of more specific issues.

3. Coastal Storm Surge

74. Currently the following models are run on an operational basis by the NCHMF:

(i) Wave forecast using Simulating Waves Nearshore (SWAN) model;
(ii) Storm surge forecasts using China Typhoon Surge (CTS) model;
(iii) Japan Meteorological Agency (JMA) storm surge model;
(iv) Tidal predictions using 24 harmonic constants for several coastal ports;
(v) Sea current forecast using Regional Ocean Modeling System (ROMS), and storm surge forecast using Surge Wave and Tide (SuWAT) model.

75. Additionally, a number of other coastal models have been developed, as part of studies such as:

(i) Vu Thi Thu Thuy & Nghiem Tien Lam, 2005. A simulation model for storm surges along Vietnam coast. Journal of Water Resources & Environmental Engineering, ISSN 1859-3941. Issue 9/2005. Pp 68-74.
(ii) Vietnam Academy for Water Resources, 2016. Research on storm surge by strong typhoon and super typhoon for flood mapping in Quang Nam – Da Nang Provinces. Technical report.
(iii) Nguyen Kim Dan and others 2017. Studies of erosion process and protection measures for Hoi An beach. Project funded by the French AFD and the People's Committee of Quang Nam Province. Institutions involved: CARE, HCMUT, WRU, VIASM, LEGOS
(iv) Hoang Duc Cuong, Nguyen Ba Thuy, Nguyen Van Huong, Du Duc Tien, 2018. Risk of typhoon and storm surges in coastal areas of Vietnam. Slide presentation 26-27 February 2018. Proceedings of the Technical Conference of 50th Annual Section of Typhoon Committee (TECO TC50) 2018, Hanoi, Vietnam. Institute: Vietnam National Center for Hydro-meteorological Forecasting (NCHMF).

4. Drought and salinity intrusion

76. The LUCCI project and the Vietnam Academy for Water Resources (in both Hanoi headquarter and Da Nang office) have been carrying out analyses on salinity intrusion in the VGTB catchment or a number of years with the issue studied and well understood. The investigations used coupled Hydro Dynamic (HD) and Advection Dispersion (AD) MIKE 11 models. Interesting outputs can be found in T.Q. Viet's dissertation for the academic degree of Doktor-Ingenieur (Dr. -Ing.) at RUHR University Bochum "Estimating the impact of climate change induced saltwater intrusion on agriculture in estuaries – The case of Vu Gia Thu Bon, Vietnam" (2014), for example:

(i) Minimum required flows to push back against the saltwater intrusion at specific points in the [VGTB] system
(ii) Results of simulated saltwater intrusion in different scenarios at selected sites.
(iii) Salinity intrusion hazard maps for different scenarios

Table A1.10: Hydraulic Models for Quang Nam River and Flood flows – Taken from ADB TA 8171 Inception report (Dec 2019)

No	Project/Author	Institution	Date of issue	Objectives	Hydrological model	Reservoir operation model	River model	Complementary elements
1	National Centre for Hydro-Meteorological Forecast (NCHMF)	NCHMF, Hanoi (Vietnam)	Currently used	Provide forecast in VGTB catchment at national level	NAM	In-house routines	MIKE 11	Flood maps available based on catalog approach
2	Flood forecast by Regional Hydro-Meteorological Service	Regional Hydro-Meteorological Service, Da Nang (Vietnam)	Currently used	Provide forecast in VGTB catchment at regional level	NAM in lower catchment + outflows from reservoirs	Not included	MIKE 11	Flood maps available based on catalog approach
3	Flood forecast by Provincial Hydro-Meteorological Service	Provincial Hydro-Meteorological Service, Tam Ky (Vietnam)	Currently used	Provide forecast in VGTB catchment at provincial level	NAM/TANK in lower catchment + outflows from reservoirs	Not included	MIKE11	
4	*Inter-reservoir operation rules for A Vuong, Dak Mi 4 and Song Tranh 2 dams during flood season*	NCHMF, Hanoi (Vietnam)	2010	Inter-reservoir operation impacts for several floods and definition of operation rules during flood season for 3 dams in VGTB catchment	NAM in lower catchment + outflows from reservoirs	Not included	MIKE 11	
5	Nguyễn Mai Đăng et al, *Inter-reservoir operating procedure in Vu Gia Thu Bon catchment*	Hanoi Water Resources University and others (Vietnam), for MONRE	2015	Inter-reservoir operation impacts for several floods and definition of operation rules during the whole year for 6 dams in VGTB catchment	NAM in lower catchment + outflows from reservoirs	Not included	MIKE 11	
6	Land Use and Climate Change Interactions project in Central Vietnam (LUCCi)	Cologne University of Applied Sciences (Germany), in collaboration with Vietnam Academy for Water Resources Hanoi (Vietnam)	2015	VGTB catchment understanding of different phenomenon, including climate, land use and ecosystems, water cycle, agricultural, hydropower, floods and droughts, and their interactions	J2000	ResSim Hydro	MIKE11 (different version used for different thematics, e.g. MIKE 11 AD model developed for salinity intrusion)	MIKE Basin used to analyse water demand

7	Vietnam Academy of Water Resources (VAWR)	Vietnam Academy of Water Resources, Hanoi (Vietnam)	Under development	Provide flood maps to Vietnam Disaster Management Agency, development of forecasting tools for reservoir operation at national scale	NAM	In-house routines	MIKE11 (reused from LUCCI project)	MIKE Flood model under construction to provide flood hazard map
8	Institute for Water Resources and Planning: *Analysis of flood control using reservoir operations in VGTB catchment*	Institute for Water Resources and Planning, Hanoi (Vietnam)	2011	Provide flood maps of different flood mitigation strategies using multi-reservoir operations, for 3 different floods	NAM	2 different models: MIKE 11 routing model from upstream of reservoirs to flow gauging stations, MIKE Flood model in floodplain area		Flood maps of the floodplain area provided for each flood / reservoir operation scenario
9	Ngoc Duong VO (PhD thesis) : Deterministic hydrological modelling for flood risk assessment and climate change in large catchment. Application to Vu Gia Thu Bon catchment, Vietnam	University of Nice-Sophia Antipolis (France)	2015	Simulation of the long-term variation of runoff factors for a river system in VGTB catchment	MIKESHE	Unknown	MIKE 11 in upstream area, MIKE Flood in floodplain	Tests carried out to compare impacts on water levels / flood extents of different modelling options: 1D, quasi-2D, 2D and 1D/2D
10	Hoang Ngoc Tuan et al *: Assess surface water in Da Nang considering the conditions of climate change, socio- economic development and proposed water use orientation to 2050*	Vietnam Academy for Water Resources, Da Nang (Vietnam), under Rockefeller Foundation funds	2015	Simulation of Vu Gia Thu Bon , Tuy Loan and Cu De River in order to help evaluate the current state of water resources and forecast the flow, water using needs, and water balance until 2020, 2030 and 2050 in Da Nang City	WEAP	WEAP	WEAP + MIKE 11 for specific analysis on salinity intrusion	
11	Nguyen Kim Loi et al, *Flood early warning system in Vu Gia Thu Bon catchment*	Nong Lam University Ho Chi Minh City (Department of agro- forestry) (Vietnam)	2013	Support farmers who live in downstream Vu Gia watershed for preventing flooding, with following specific objectives (1) to determine peak flooding and vulnerability flood area in Vu Gia watershed; (2) to build the online website support information about hydro-meteorology at real time; (3) to support farmer in vulnerability flood area by SMS message	SW AT	Unknown	HEC-RAS in the flood plain area	

B. Proposed Investment

1. Rationale

77. With ADB TA-8171 already resourced for the development of data archive, client-server and user interfaces, and updated flood early warning systems as well as the strengthening of the hydromet data network through to a completion date of March 2021. During this period the WB 8 - Dam Safety Project will support strengthening of the hydro met network linked to dam and reservoir management.

78. CRIEM will target the follow-on from the above ADB TA - 8171 investment in terms of building systems to manage climate risk. The High-Level Technology Fund will be used to procure software platforms for the development of risk assessments linked to flood inundation.

79. The project will procure and develop additional software modules for the spatial visualization of risk assessment and the characterization of these risks based on the output from the hydraulic and flood modelling developed by ADB TA – 8171. The flood models are being developed as part of the Provincial Early Warning Systems and the associated Decision Support Systems (see Figure 1) that will be linked in real time to the data archive. CRIEM will add the risk assessment capability to broaden the use of data and to increase the value of the models to a wider range of applications that will increasingly reflect the risk to civil society and the risk profiles associated with the expanding private sector investment. The output of the investment is to establish the technology and application of technology and applications for two risk impact assessments. These include: (i) a risk assessment of DoT managed infrastructure that will target vulnerable infrastructure which will also include the application and integration of climate change risks to transport infrastructure as reported in ADB TRTA[1] and use of the TRTA findings in the Knowledge Product produced by ADB[2]. The key purpose of this risk assessment is to provide input to transport network upgrading investment planning, detailed design considerations and decisions, operational management and traffic safety considerations for high flood risk road sections, and maintenance planning trade-off decision making. The outcome from this part of the investment is to target significant increases in road network climate resilience, and (ii) a climate risk assessment for high flood vulnerability and exposure area being linked to future urban growth, tourism and commercial development and or industrial developments.

80. The Project will support the procurement of risk simulation and visualization software that is integrated with the decision support tools for flood modelling and early warning systems. The risk simulation and visualization software will derive information from the decision support tools

[1] Asian Development Bank (ADB). 2018. *Project Preparatory Technical Assistance Report: Adjusting Hydrological Inputs to Road Design for Climate Change Risk Based on Extreme Value Analysis*. Manila (PPTA 8957-VIE).

[2] Asian Development Bank (ADB) 2020. *Manual for Climate Change Adjustment for Detailed Engineering Design of Roads – Using Examples from Viet Nam*.

developed under ADB TA 8171. The contractor will work closely with the respective sector and environmental agencies to develop hazard data layers and the supporting spatial data sets for the inventory of assets and infrastructure.

81. The ADB TA: 8171 flood modelling will be updated to reflect the increased complexity of decision support. CRIEM will seek to enhance the flood modelling through updating digital terrain models onto a finer grid specification especially for highly complex terrains, topography and surface infrastructure – such as urban and tourist commercial real estate. An key requirement for flood warning and risk assessments is the need to develop increase certainty and knowledge about flood water flows – in terms of direction, extent, depth and velocity of water. The coupling of the 1D flood models with an enhanced 2D modelling capacity is a natural progression for climate risk management and vastly improves the utility and value (economic and commercial) of the hydromet data set. Specifically, CRIEM will provide a modern technology solution for an updated Digital Elevation model for two priorities that include built infrastructure and then support capacity development and mentoring for the production of improved flood mapping. Once complete the flood maps would be an addition data and input source to the risk assessment visualization and simulation models also supported by CRIEM.

82. The third expected output from the enhanced risk assessment of DoT and built infrastructure will be the demonstration for up to 10 sites flood risk monitoring, flood advanced and early warning systems for owners of at-risk assets including public infrastructure, and the transmission and integration of such data into the provincial data archive, the early warning communication systems linked to mass media and telecommunication/mobile phone systems.

83. An essential element of the CRIEM investment will be the integration within the Provincial hydromet network and supporting Client Server systems. As such the CRIEM will include as a condition that the high level technology fund ensures the DoT and its PPMU have an operational user interface to the Data Archive, early warning system, and decision support tools being installed under ADB TA 8171.

84. The proposed risk assessment and visualization tools will procure the related software platforms that are fully compatible and wherever possible automatically connected or integrated with the wider hydromet data and modelling tools. Software compatibility will be a prerequisite for all software procured including support ARC GIS capability, risk simulation and the interactive risk visualization platforms. It is envisaged that the current predominance of MIKE 11 software will be retained and that an expanded and updated MIKE software and supporting risk software will form the basis of the CRIEM support. This will include the capabilities of:

(i) MIKE – Flood – primarily a 1 D model for in channel flows under a range of meterological events, and a 2 D model for overland flow based on either single or flexible grid model assumptions.
(ii) MIKE - Hydro – Rivers – linked to real time flood forecasts with data from MIKE hydrodynamic model and the additional capacity to understand and model overland flows (2-D) soil and land type water infiltration, Evapotranspiration and ground water linkages.
(iii) MIKE –URBAN with linked ARC GIS and MIKE 21 – a 2D model
(iv) The combination of MIKE Hydro and MIKE URBAN +ARCGIS will provide the inputs for the identification of climate risk assessment along with other GIS data layers including built infrastructure, population projections, and sea level rise/climate change

85. Some hardware may be required to support the simulation and visualization of risks to the user interfaces.

86. The concurrent development of enhanced flood modelling using MIKE Hydro and MIKE Urban will also require a significant investment in an updated Digital Elevation Model. THE DEM update will be financed for CRIEM demonstration and pilot areas only and will also seek to demonstrate the use of modern technology for establishing the DEM grid.

2. Cost Estimate

87. The total indicative costing is $1 million USD exclusive of taxes of $100,000 that will be financed by the PPC.

3. Procurement

88. Development of decision support models and their applications will build on existing knowledge obtained through the Quang Nam Provincial Program financed under ADB TA 8171 and especially will need consideration of the linkages and integration of the Provincial system with the regional hydromet center in Tam Ky. Specifically linkages and integration with the client server and associated decision support and early warning systems. The terms of reference include developing sufficient local capacity and experience to be able to maintain and extend the geographic coverage of these tools as well as the capacity to apply the decision support tools by the targeted user groups.

89. The nature of the software systems needs to reflect the existing systems, hardware and capacity as well as the wider sector throughout the central region and national levels. These requirements and directions are mostly influenced by the predominant software platforms for managing data, early warning using real time interface and supporting decisions support requirements relating to flood risks.

90. Procurement will involve a firm contractor as per the eligibility and terms of references appended to this document. Procurement will apply Fixed Budget Selection with eligible firms providing technical proposals for specified deliverables within a fixed budget of $1.0 million – excluding tax.

91. The proposed procurement reflects the ADB Procurement Guidelines for post July 2017 under “Appendix 4: Special Considerations for Procurement of Information Technology” that indicate the importance of moving from the run based procurement systems applied to goods and services and more generic consulting services or where off the shelf operational systems can be procured to the “Procurement for Innovation” in guidance (Para A4.11 to A4.22) where a mode direct and partnered approach to procurement is recommended to achieve the Value for Money (VFM) principles required by ADB Procurement Policy.

92. The hydromet sector in Viet Nam clearly demonstrates the loss of value of money through competitive procurement where lower priced solutions have been contracted using multiple systems that are not integrated, expand the range of operational capabilities and skills required beyond the available set of skills, and fail to be maintained leading to substantial redundancy of investment and low outcome value.

93. A key element in achieving VFM from High Technology in the IT sector is to focus on outcome based procedures and not compliance rule-based procurement procedures Para A4,12

point (iv) and to ensure specified technology are consistent with the current systems whilst also being the most up to date option suitable for the proposed outcomes that do not deviate from the requirements.

94. In the proposed HLTF grant procurement the existing presence in the sector and the wider relationship with the national and regional will minimize the exploitation of information asymmetry that will exist by the need to customize the tools and software into models that represent local flood catchments.

95. To empower the PPC and the CRIEM PPMU, the contract will be negotiated on the basis of the terms of reference that prioritize issues such as:

(i) fit with existing infrastructure being supported by ADB TA 8171- and specifically the choice of proposed and agreed software upgrades, access systems which are to be fully compatible with the current use of MIKE based systems,
(ii) fit with the existing processes and protocols relating to the Provincial Data Archive and client Server – User Server interfaces and the linked early warning and decisions support systems
(iii) reflect global best practice and integration options for wider application in Viet Nam
(iv) the proposers share of global market for hydromet and applied hydromet software
(v) the support for the software and the models being an integral partner in their development and the capacity of their technical partner in Viet Nam with the ongoing relationships ensuring access to technical support and guidance from those with direct local knowledge of the systems.

96. A service provider will be procured according to the procedures and terms of reference outlined below. The procurement methods will be fixed-based selection with eligible bidders requested to develop a technical proposal with supporting workplan that is agreed with the Client and ADB. The proposal will include the usual consultant budget items of fees and out of project expenses with all software, hardware, data and equipment purchases being identified as “provisional sums that once final specification, quantities and costs are known will be approved by the IA. All provision amounts identified will need to clearly state each system including the scope of modelling in terms of geographic boundaries, grid sizes, and the range of parameters to be modelled in either 1D or 2D systems, the scale and scope of risk simulation and visualization software and supporting hardware.

4. Implementation Arrangement

97. The Quang Nam PPMU (CRIEM) will be responsible for implementing output three procurement and will coordinate with Quang Nam Provincial Hydro-Meteorological Service Centre (QN PHSC) to confirm the arrangements and to ensure timely contracting of the existing Consortia. The proposed ToR will be reviewed and agreed in principle by the (i) QN PHSC, (ii) Provincial Committee for Natural Disaster Prevention and Control, Search and Rescue, Tam Ky who have the lead role in the Decision Support Services under ADB TA 8171, (iii) and the EA prior to loan signing.

98. Immediately on loan signing the TOR will be submitted by the IA for EA approval. An EOI will be called for through the ADB CMS with the responsive parties being screened against the eligibility criteria (see TORs) with eligible firms being short listed. There is a distinct probability that the number of eligible firms may be less than 3. Short listed firms will provide the technical methodology that responds to the terms of reference and against which all eligible proposals will

be evaluated. The technical proposal and workplan will be submitted to the IA, who will in turn summit this to the EA and other stakeholders including the Provincial Procurement Committee for approval. Once the technical proposal is finalized and approved the consortia will be requested to submit direct to the IA (copied to ADB) their financial proposal for contract negotiation. Contract award will be undertaken by the IA/ BD PPMU. The key milestone or performance target for the contract award will be in the fourth quarter 2021 to ensure continuity of work – extended delays beyond the second quarter of 2022 will trigger the cancelation of the HLTF grant to Quang Nam.

V. TERMS OF REFERENCE – OUTPUT 3 QUANG NAM

A. Background

99. Quang Nam Province is currently implementing through ADB TA-8171 the development of data archive, client-server and user interfaces, and updated flood early warning systems as well as the strengthening of the hydromet data network through to a completion date of March 2021. During this period the WB 8 - Dam Safety Project will support strengthening of the hydromet network linked to dam and reservoir management.

100. CRIEM 1 will support “the next stage” of climate data use building on ADB TA - 8171 investment by building systems to manage climate risk. The High-Level Technology Fund will be used to procure software platforms for the development of risk assessments linked to flood innundation.

101. The project will establish operational capacity in climate risk impact assessment through provision of software modules for the spatial visualization of risk assessment and the characterization of these risks based on the output from the hydraulic and flood modelling developed by ADB TA – 8171 and establishing operational capacity including data populated customization and human resource development and mentoring.

102. Flood models are being developed as part of the Provincial Early Warning Systems and the associated Decision Support Systems that are linked in real time to the Provincial data hub and data archive. CRIEM-1 will add the risk assessment capability to broaden the use of data and to increase the value of the models to a wider range of applications that will increasingly reflect the risk to civil society and the risk profiles associated with the expanding private sector investment.

103. The purpose of the investment is to establish the technology and application of the technology and as such CRIEM output will target two application of risk impact assessment. These include: (i) a risk assessment of DoT managed infrastructure that will target vulnerable infrastructure which will also include the application and integration of climate change risks to transport infrastructure as reported in ADB TRTA[3] and use of the TRTA findings in the Knowledge Product produced by ADB[4].

[3] Asian Development Bank (ADB). 2018. *Project Preparatory Technical Assistance Report: Adjusting Hydrological Inputs to Road Design for Climate Change Risk Based on Extreme Value Analysis*. Manila (PPTA 8957-VIE).

[4] Asian Development Bank (ADB) 2020. *Manual for Climate Change Adjustment for Detailed Engineering Design of Roads – Using Examples from Viet Nam*.

104. The key output of risk assessment is to provide input to transport network upgrading investment planning, detailed design considerations and decisions, operational management and traffic safety considerations for high flood risk road sections, and maintenance planning trade-off decision making. The outcome from this part of the investment is to target significant increases in road network climate resilience. The second focus will be on developing and completing a climate risk assessment for a high flood vulnerability and exposure area linked to future urban growth, tourism and commercial development and or industrial developments.

105. The required contracted deliverables are described below and the contractors will be required to provide a detailed methodology for determination of the technical specifications, bill of quantities and installation with supporting capacity development for each deliverable. The proposals will be evaluated on the basis of the methodology and corporate capability and are required to fall within the $1 million budget available for Quang Nam Province net of taxes that are currently estimated to be $100,000 that are financed by the Quang Nam Provincial Peoples Committee. The contractor can seek to be paid directly from ADB for their share of the financing based on the EAs approval of documentation and deliverables.

B. Corporate Profile

106. The contract is linked to specialisation in the fields of (i) climate and hydraulic modelling in coastal, delta and river basins and catchments, and (ii) software development and support. As such the successful bidder will be required to clearly demonstrate expertise and capability in both aspects of specialisation. Further, bidders will need to clearly demonstrate commitment to products and services within the region over extended periods of time including updating, extension of decision support models and application of decision support models and digital integration and automation.

107. Eligible bidders will be required to meet **all** of the following criteria:

(i) An international firm/enterprise with proven capacity in the development and configuration of climate data archives, forecasting and communication systems with proven reputation and delivery in the following requirements:

- A minimum average annual turnover of $15 million for the period from 2015 to 2019 inclusive (to exclude the impact of COVID -19) derived from the (a) commercial sale of climate, hydrological modelling, climate and climate risk decision support systems, and the communication of climate data, climate risk and the impact assessments of these risks, (b) the conduct of related research

to support into software development that includes climate data integration, data transformation and standardisation, data archives, hydrological modelling and risk assessment applications that include communication of data in forecasting and early warning systems, and (c) development and implementation of applications linked to (a) and (b).

- Commercial revenues can include both direct sales revenues and revenues from licensing of product use linked to data management, integrated modelling with temporal and spatial relationships, that have been developed in-house.
- At least 150 in-house technical experts that cover all of the following aspects (a) systems research and development, (b) or development of software systems, (c) development of applications through spatial, 1D and 2D representation of water and climate-based risk modelling and simulation products, and (d) provision of technical support and capacity building.
- Both GMS regional and local Vietnamese staff with knowledge of the systems within the wider GMS region on existing data and forecasting systems, existing models – including accessing data or output parameters, the predominant digital architecture for the data and modelling and demonstrable understanding of the major actors in the regional systems and the ability to access and link with these as required.
- A owner (or licensed access to sell and configure) of software for climate data archives/databases, software systems for integration of hydromet data sets, and hydrological models that support inundation forecasting based on precipitation and modelling of whole of catchment systems that has been technically supported for a minimum of five years within the GMS region.
- Demonstrable commitment for sustaining and improving digital tools with at least a minimum of two major updates or innovation to the software and models commercially offered since 2015.
- Offering software and software based solutions with associated licensing and technical support services that is proven over a minimum of ten years.
- At least 7 years of both regional and Vietnamese experience including (i) provision of software with technical support (minimum of 5 years or three cycles of support), model development and customisation in climate data and climate-based modelling (minimum of 3 contracts in excess of $200,000 within the region).
- GMS regional presence in all the following application areas: client server and data archive architecture at both national and subnational level, client – user interfaces for the archive and use of climate data/models at a subnational level, hydromet network assessment and design, 1D and 2D hydraulic modelling of river and coastal systems, flood forecasting, coastal zone risk assessment and management including discharge management modelling for river based flows, salinity modelling and representation, sea level rise and storm surge modelling, early warning systems for flood risks.
- In house “state of art” impact modelling capability with a focus on flood risk impact assessment, salinity risk and sea level / storm surge risk impact assessment in a 1D and 2D modelling with risk visualisation and communication capability.
- Proven track in assessing client needs, develop system architecture options and design concept used to obtain client consensus on software and decision support models, and deliver such models within agree timelines and budgets with 10 supporting examples of this capacity.

- Technical staff that are easily accessible to in-country software and model users.
- Proven capacity in the delivery of operational capacity through local public sector staff with awareness, technical training and mentoring, application development, and wider systems operation including the communication of data and results with a minimum of 10 client referenced contracts.

C. Contractual Deliverables

108. The contractor will submit a report to the PPC on priority provincial needs for the archive, integration and storage and provision of digital access to potential users of climate data and models. The proposal will require provincial agreement on priorities (deliverable 1) and approval of a detailed design and implementation contract for establishing the data hub (deliverable 2) that will be informed by provincial assessment of current climate data collection and management systems, data use and decision support, and climate risk assessment and communication systems. Once the data hub is operational (deliverable 3), within the fixed budget of $1 million (net of all taxes) the residual investment will be used to pilot flood risk impact assessment decision support with associated site based early warning technology recently developed in Viet Nam (deliverable 4). A minimum of 15 percent of total investment will be applied to deliverable 4.

109. The Project will support the procurement of risk simulation and visualization software that is integrated with the decision support tools for flood modelling and early warning systems. The risk simulation and visualization software will derive information from the decision support tools developed under ADB TA 8171. Deliverable one will conduct a review of existing flood damage and flood information systems and consult with Provincial officials to identify priority and medium term needs for flood risk management that will then be confirmed and officially ratified by the Provincial Peoples Committee (PPC). Deliverable two will use the ratified priority needs to prepare a design concept for the proposed risk impact assessments that will define the hardware and software requirement, data linkages and access, risk assessment tools including inundation mapping, risk visualization and characterization of site and system wide data. The proposal will be presented to the Quang Nam PPC for technical review, revision by the contractor and approval by the QN PPC. Deliverable three will procure, install, customize and establish operational capacity of the approved concept design while Deliverable four will provide two case study applications of flood risk impact assessment as capacity building programs for (i) the road transport sector led by the Provincial DoT, and (ii) urban and tourism destination sector development.

1. Deliverable 1: Provincial assessment of Current Flood Risk Data and Knowledge Products

(i) Assessment of current flood risk data based on an update to the ADB 8171 review and progress reports and the World Bank Dam Rehabilitation and Improved Safety Project (World Bank 8) documentation and outputs.

a. Conduct an inventory and review of the above data systems including hardware and software inventories, data parameters and quality, data archive and access that includes all direct actors including if necessary from national, regional and provincial – both public and private sector
b. The data review should clearly identify
    i. Site identification through georeferenced site labels
    ii. A list of collected parameters from each site
    iii. Scale and known risk characteristics for each site

iv. Detailed specifications for each site and associated information management systems

c. Assessment of data archive platforms and databases, their quality reliability and accessibility
d. Identification and specification of data provided for weather forecasting and early warning including from international, national, regional and provincial sites
e. Assessment of the existing DEM grid and identification of proposed improvements

(ii) Assessment of climate change projection data and its application in knowledge products

a. Climate baselines to support mid and late century impacts of climate change projections with respect to extreme events and changing baseline conditions that include sea level rise, storm surge, temperature change, extreme temperatures including heat wave, changing rainfall including extreme rainfall events covering 1, 3 and 7 day rainfall maxima for a range of exceedance frequencies, drought events including severity, duration and timing such events
b. Integration with national, regional and international modelling of climate change across the full range of RCP scenarios applied by the IPCC
c. Datasets and methods that link or simulate climate change impacts within a catchment or site based planning context

(iii) Assessment of risk assessment data applications and current or potential use and linkages to the climate data collection system including:

a. Hydrological modelling including projections and forecasting capability in a spatial and temporal dimensions including strengths and weaknesses
b. Spatial and urban planning decision support and data base tools
c. Networked infrastructure planning and design that includes commune, district, provincial or national roads, other transport infrastructure including ports, riverways, flood protection and management infrastructure, priority water supply and telecommunication infrastructure
d. Hydrological modelling for extreme events
e. Risk assessment and visualisation/representation

(iv) Early warning and disaster management systems

a. Identification and characterization of disaster risk within the Province
b. Institutional systems for disaster risk management
c. Disaster Management decisions support systems including early warning systems

(v) Systems for infrastructure climate based risk impact assessment for planning and design of the transport infrastructure

(vi) Institutional use of future risk assessment outputs including the major infrastructure sectors especially road transport, urban development, water resources, and tourism

(vii) Institutional capabilities and capacity for the management and operation of climate based risk assessment systems and their application covering points (i) through (v) above and including human and budget resource assessment for:

a. Data management, data transformation and communication
b. Data and interpretations that are linked to spatial models and visualisation
c. Risk assessment methodologies, and their use in infrastructure planning and design, and extreme event management
d. Communication and knowledge dissemination

2. Deliverable 2: Specifications and Detailed Budget Proposal the Development, Operationalisation and Capacity Development for Climate

Risk Impact Assessment Technology linked to the Provincial Climate Data Hub

110. The proposed investment will support the establishment of a client – server system to be hosted by the Quang Nam Provincial Data Hub with access to each of the priority institutional actors on behalf of the Provincial Peoples Committee by the Provincial Committee for Natural Disaster Prevention and Control, Search and Rescue.

111. The ADB TA: 8171 flood modelling will be further strengthened to reflect the increased complexity of decision support. CRIEM-1 will seek to enhance the flood modelling through updating digital terrain models onto a finer grid specification especially for highly complex terrains, topography and surface infrastructure – such as urban and tourist commercial real estate. A key requirement for flood warning and risk assessments is the need to develop increase certainty and knowledge about flood water flows – in terms of direction, extent, depth and velocity of water. The coupling of the 1D flood models with an enhanced 2D modelling capacity is a natural progression for climate risk management and vastly improves the utility and value (economic and commercial) of the hydromet data set. Specifically the contractor will review the needs and recommend a modern technology solution for an updated Digital Elevation model for the two proposed case study priorities that will include built infrastructure and then support capacity development and mentoring for the production of improved flood mapping. Once complete the flood maps would be an addition data layer to the risk assessment visualization and simulation models also supported by CRIEM.

112. An essential element will be the integration within the Provincial hydromet network and supporting Client Server systems. As such the contractor will be required as part of the CRIEM loan assurance that the DoT and its PPMU have an operational user interface to the Data Archive, early warning system, and decision support tools being installed under ADB TA 8171.

113. The proposed risk assessment and visualization tools will use software platforms that will be compatible and wherever possible automatically connected or integrated with the wider hydromet data and modelling tools within the Provincial Data hub. Software compatibility will be a prerequisite for all software procured including support GIS capability, risk simulation and the interactive risk visualization platforms. It is envisaged that the current predominance of MIKE 11 software will be retained and that an expanded to support integrated risk software. This may will require consideration of the different options being offered through:

(i) MIKE – Flood – primarily a 1 D model for in channel flows under a range of meterological events, and a 2 D model for overland flow based on either single or flexible grid model assumptions.
(ii) MIKE - Hydro – Rivers – linked to real time flood forecasts with data from MIKE hydrodynamic model and the additional capacity to understand and model overland flows (2-D) soil and land type water infiltration, Evapotranspiration and ground water linkages.
(iii) MIKE – URBAN with linked ARC GIS or MIKE 21 – a 2D model
(iv) The combination of MIKE Hydro and MIKE URBAN +ARCGIS will provide the inputs for the identification of climate risk assessment along with other GIS data layers including built infrastructure, population projections, and sea level rise/climate change

114. Some hardware may be required to support the simulation and visualization of risks to the user interfaces and the contractor will identify these needs and ensure it is included in the proposal

along with technical specifications that will support the software proposed for the foreseeable future.

115. The concurrent development of enhanced flood modelling using MIKE Hydro and MIKE Urban will likely require a significant investment in an updated Digital Elevation Model. As such updated DEM will be financed demonstration and pilot areas only and will seek to demonstrate the use of modern technology for improving the DEM grid and establish competence for this work to continue as required. As such these activities will need to be included in the proposal

116. The current development of the Provincial data hub will link directly with early warning systems through real time data systems that automatically update models and trigger communication and warning systems as well as provide interactive links with decision support systems for stand-alone planning tools, climate adjusted hydraulic modellings, reservoir management, flood risk impact modelling etc. The contractor will need to ensure that the risk assessment tools can link to these systems in both directions and if and where beneficial become fully integrated.

117. The proposal will include the (i) hardware requirements, (ii) supporting infrastructure for hardware, (iii) software and internet/communication technologies with detailed specifications for managing any additional data, (iv) integration through the client user interface systems, (v) decision support system interfaces, and (vi) interfaces for producing on request site based flood risk impact assessments.

118. The proposal will provide a detailed bill of quantities with supporting technical specifications for all items to be procured and supplied by the contractor through the use of provisional amounts within their contract as such the contractor will be required to specify in detail the items and expected costs of supply installation and operational support.

119. The design complexity will need to address the wide range of sources and data types can be managed within the client server and user interfaces. As such hardware specifications need to include the range of communication protocols for input data and protocols for external communication or transmission of data.

120. The breakout of hardware and software items and their specification for the Client server will be responsibility of the contractor. These will include licensing and subscription costs for the data hub and an operation and maintenance support service not exceeding three years.

121. The proposal will include professional time to complete all deliverables broken out by position/skill set and with each position linked to a staff member with supporting biodata, level of input and detail of home and field time inputs.

122. The contractor will be required to provide a detailed proposal to the CRIEM-1 PPMU for Quang Nam within 6 weeks of mobilization. The PPMU will seek comments on the proposal from technical departments within the Province and any other significant stakeholder and present these to the contractor with 60 days. The contract will then submit a final proposal with a detailed implementation and staffing schedule and revised cost estimate for the Data hub and client and user interfaces.

3. Deliverable 3: Establishment of an Operational Provincial Climate Data Hub

123. Based on the approved data hub proposal, the contractor will procure all hardware, supply software and ensure its customisation and operational capacity. The systems will be established with the historic data populated and linked with the range of data sources agreed. The contractor will establish the updated DEM grids for the two proposed demonstrations. The contractor will also ensure operational capability through the provision of training and operational mentoring of designated staff and ensure all software licensing and subscriptions are secured and in place. Once the risk assessment software and data systems and its operation is established the systems will be handed over under the technical service agreed with the PPC.

4. Deliverable 4: Demonstration of Flood Risk Impact Application - Two Pilots for (i) High Vulnerability District Road Sections and (ii) an Urban and/or Tourism Destination

(i) Application (1) – Road Flood Risk Assessment and Early Warning Systems

124. For the DoT and its PPMU the proposal will include conducting a flood risk impact assessment for preselected section of the district road network within the CRIEM 1 Districts that face high vulnerability from flood events or upstream flood waters. The scopes of these network sections will be defined in consultation with the DoT, district officials and the PPMU and should incorporate source of flood water, transmission channels including downstream impacted communities and the extent of flood inundation. The risk impact assessment will require an updated DEM with the required grid specification, detailed road inventories including structures, drainage systems and road cross section with elevations. For each of the high priority and agreed sites a proposed flood risk assessment program will be detailed under Deliverable 2 to ensure budget adequacy and political support through the PPC.

125. The expected output will be a completed risk assessment with impacts on the transport and associated infrastructure identified, assessed and communicated using visualization, mapping and wider community dialogue. A significant aspect of the impact assessment will be the integration of climate change projections and the inclusion of the climate change impact on road networks through the inclusion of the climate change adjustment from extreme event analysis into the flood inundation models as recommended by ADB[5],[6]. These models will then be used as input for updated and project inundation and flood events using the Flood mapping and risk management software.

126. The outcome from the impact assessment will be DoT staff and local design engineers with the knowledge and data systems to more fully represent and respond to flood risks within the District road network through alignment plans and adjustment, drainage and structure design, road elevations and through the provision of road safety through the installation of localized early flood warning systems that alert road users, whilst also enabling local communities to protect their personal and community assets. The contract will support the installation and training in operation for up to 10 sites based on resource availability and needs outlined in Deliverable 2.

[5] Asian Development Bank (ADB). 2018. *Project Preparatory Technical Assistance Report: Adjusting Hydrological Inputs to Road Design for Climate Change Risk Based on Extreme Value Analysis*. Manila (PPTA 8957-VIE),

[6] Asian Development Bank (ADB) 2020. *Manual for Climate Change Adjustment for Detailed Engineering Design of Roads – Using Examples from Viet Nam*.

127. The contractor will supply, customise, and test a decision support for assessing flood impact risks within the road transport network and then provide site-based flood early warning systems for these sections. The deliverable seeks to demonstrate to the DoT and its engineering contractors how to assess flood risk impacts on road sections, options for road network planning and engineering design to mitigate or manage the risks and to support small scale local early warning systems to reduce the cost of such floods on local communities. The scale of input will reflect the residual budget available after the data hub as agreed and as such the final deliverable 4 proposal will be included with the revised deliverable proposal under deliverable 2.

128. Deliverable 3 will support knowledge development for flood warning and flood risk decision support in the road and linked local community for high risk sites that will be identified in conjunction with DOT. The flood risk and impact tools will be linked to the client and user interfaces to make them more widely available to planners and design engineers. Once the flood risk impact assessment is complete – future options for road network planning, road network upgrades can be undertaken by the DoT and their engineering teams. Whilst the risk to the transport network and associated communities will not be mitigated it is proposed that localized site based early warning systems be provided (these are available on the local market) and that these will be linked to the client server forecasting models. The contractor will procure locally manufactured flood warning systems that include water flow, water level recording stations, downstream early warning systems, and data and message transmission systems. The final scope of these will be determined during the detailed design and will need to reflect the priorities from flood risk mapping, vulnerable communities and the likely installations under the World Bank 8 – Dam Rehabilitation and Safety Improvement Project for Vietnam.

(ii) Application Two: Flood risk Impact assessment for a defined Urban/Tourism Destination Area

129. One site will be identified to demonstrate the application of flood risk assessment to local officials, planners and infrastructure design and maintenance teams. The site will be identified within Deliverable 2 if there is sufficient budget to do so. The costly aspect of this case study is to establish a detailed DEM grid that can support a 2D flood model at sufficient precision for urban environments. The complexity of this part will require the PMU/PPC to engage with multiple sectors and different administrations. Guidance for the priority should be informed by Provincial Socio-Economic Development priorities but should also reflect the required complexity to ensure an achievable output. Deliverable 2 will establish this and the ratified proposal will be the basis for the implementation of this part of Deliverable 4.

130. The outputs will include the updated DEM grid, supporting software and digital systems for risk characterization, assessment and mitigation including mapping visualization and interactive spatial modelling. A flood risk impact report and supporting knowledge products will be provided along with a set of mitigation strategies that will be presented to the PPC in a forum to be structured by the contractor and agreed by the PPC/PPMU of CRIEM 1.

131. The contractor will be required to specify all equipment, software, data sets, the DEM and supporting field costs to undertake the flood risk assessment as part of the Output 2 Deliverable – Proposal budget.

SUBPROJECT SCREENING REPORT

I. PROJECT OVERVIEW

1. The Climate Resilient Inclusive Infrastructure for Ethnic Minorities Project 1 (CRIEM1) is aligned with the following impact: inclusive socioeconomic development of Binh Dinh and Quang Nam Provinces accelerated.[1] CRIEM1 will have the following outcome: social and economic status and inclusiveness of ethnic minorities communities improved.

2. Output 1: Climate resilient transport infrastructure improved. The project will upgrade seven district and commune roads totaling about 121.8 kilometers (km), which will improve connectivity and mobility of EMCs within the seven districts with a total population of 206,700 of which an average of 48% belong to EMCs. The climate-resilient transport links will integrate remote rural production into market chains and processing facilities. Freight movement of acacia and high value crops will be improved. The effort of EMCs to dependably reach essential services including health, education, and markets will be reduced. The overall transport network will be much more efficient, reducing travel time for road users and especially improving access to health, education, and market services especially for women who already suffer from time poverty.

3. Output 2: Climate resilient water resource infrastructure improved. This output will construct, upgrade, rehabilitate, or stabilize: (i) RDWSs to provide water to approximately 18,600 people through 115 km of piped networks; (ii) an existing reservoir to support 117 hectares of irrigation command area with more reliable and efficient water supply; and (iii) cultural tourism infrastructure including one river defense - 3.6 km of embankment, visitor car parking and solid waste collection in district's communities with a total population of 17,700 of which 94% are from EMCs. Activities under this output will benefit about 36,300 people and improve communities' health by reducing the risk of water borne diseases and will particularly benefit women by reducing their time for water collection.

4. Output 3: Data systems for climate risk management updated. This output will provide improved access to reliable weather and climate data, in a timely and cost-effective manner. These data will inform a wide range of decisions including design of climate resilient infrastructure, strengthened early warning systems, and improved disaster response.[2] High level online technology will be introduced to improve the capacity of the provincial government, to manage, collect, archive, and share existing data through client interfaces.

5. CRIEM1 investment targets 8 of 29 districts within Binh Dinh and Quang Nam provinces with the highest proportion of ethnic minority communities. These mostly remote western districts have very low population density meaning that most local inhabitants face extended travel times to access services and markets compared with high density areas where schools and health clinics are able to be provided closer.

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[1] Government of Viet Nam. 2011. *Decision No. 1600/QD-TTg Issuing the List of the National Target Programs—Phase 2016–2020*. Hanoi; Government of Viet Nam. 2013. *Decision No.2622/2013//QD-TTG dated 31 December 2013 approving the socio-economic development master plan of Quang Nam province through 2020, with vision to 2030.* Hanoi*;* Government of Viet Nam. 2009. *Decision No. 54/2009/QD-TTG dated 14 April 2009 approving the socio-economic development master plan of Binh Dinh province through 2020.* Hanoi.

[2] The extent and type of investment vary significantly between the two provinces, reflecting the ongoing investments into Quang Nam Province financed by the World Bank through the Dam Rehabilitation and Safety Project and ADB through the Developing and Implementation of Flood Forecasting and Warning System for Hoi An and Vu Gia-Thu Bon River Basin contract, Urban Environment and Climate Change Adaptation Project.

6. CRIEM1 preparation follows a sector-project approach where representative subprojects (RSPs) are prepared for the key outputs. These RSPs are used to establish the feasibility of proposed investments along with project due diligence undertaken by ADB transaction technical assistance (TRTA).

II. SUBPROJECT SCREENING CRITERIA

7. The following are general eligibility criteria for **output 1 and output 2 subprojects.**

(i) The subproject is included in the provincial medium-term investment plan or approved by Provincial People's Council;
(ii) The subproject is aligned with the Master Plan on Socio-Economic Development of the South-Central Coastal Region through 2020;
(iii) The subproject is endorsed by the provincial people's committees (PPCs) for inclusion in the project;
(iv) The subproject is included within the provincial SEDP and medium-term investment plans;
(v) The executing agency (EA) committed to prepare feasibility studies and technical engineering design;
(vi) The EA committed to advance actions to prepare detailed designs and tender documents for representative subprojects;
(vii) The subproject is simple, has a logical design consistent with local design capacity and recent examples of similar construction;
(viii) Maximum of 2 civil works packages per subproject;
(ix) Investment amount for roads subprojects is in the range of $3-20 million;
(x) Investment amount for other subprojects (no roads) is in the range of $1 to $5 million;
(xi) The subproject doesn't overlap with other investments;
(xii) Subproject's economic internal rate of return is at least 9% for economic development or 6% if there is a prior agreement with ADB regarding the social impact of the proposed investment;
(xiii) All ADB safeguard categories of the proposed subproject must be B or C;
(xiv) Formal government commitment to (a) funding O&M, (b) ensuring water tariffs are able to support the full cost of operation and maintenance of water supply schemes, (c) provision of counterpart funding according to the requirements of the project and specifically to ensure timely detailed designs and that all land acquisition and compensation costs are fully settled for the entire subproject prior to issuance of any works contractor notice to proceed; and
(xv) Climate change considerations into the subproject DEDs are consistent with government standards. All subproject designs will need to clearly establish an expected degree of resilience to projected climate change. The Representative Carbon Dioxide Pathway (RCP) scenario 8.5 will be applied to early-mid and mid-century timeframes depending on the expected economic life of the infrastructure. Further Government climate exceedance frequencies for flood, rainfall etc. will be applied but with the provision that they are adjusted for climate change projections. ADB (2018) has provided a detailed and relatively easy to apply analysis guidance for this purpose. (https://www.adb.org/sites/default/files/publication/613611/manual-climate-change-design-roads-viet-nam.pdf)

8. Additional screening criteria for output 1 and output 2 subprojects are as follows:

(i) For roads: adequate subproject data provided including (a) start and end points; (b) PPC approval of any new alignment sections; (c) traffic counts and forecasts to 2035, PCU ratings for 2017 and 2035; and (d) confirmed prioritization within Provincial Socio-economic Development Plans (SEDP) with proposed road category consistent with 2035 PCU forecast, i.e adhering to relevant Vietnamese minimum standards and specifications for roads; consultations on the subproject proposal have been held in concerned communes and measures for future public consultation and supervision by the CSB are clearly spelled out with each consultation recorded as validation; and including road and traffic safety considerations for vulnerable road users into the design.

(ii) For domestic water supply infrastructure: adequate subproject data provided including: (i) clear registered legal status of asset owner and operator; (ii) water supply data and demand projections for a minimum of 25 years, including demographic projection and migration factors; (iii) as appropriate, summary of the profit and loss statements for 5 years, tariff levels and collection details;

(iii) For irrigation infrastructure: availability of water supply to support proposed cropping patterns and financially viable.

(iv) For other water resource infrastructure: based on perceived risk to (a) human life, (b) public infrastructure and the cost of that infrastructure, (c) livelihoods and (d) future economic returns as well as their priority within the following criteria:

ii. All water supplies must provide evidence (source gauging or water level data) that indicates there is sufficient water as per requirements plus minimum environmental flows based on the P4 drought year within the historical rainfall record; and

iii. The capacity of water supply schemes will be based on projected population levels, non-household water demand and non-revenue water and operating margins.

9. For output 3 - Climate Risk Management Data Systems, CRIEM1 prioritizes investments to upgrade the access and use of existing hydro-met network data since there has been a very high density of field data stations in both provinces. Investment selection is based on data management systems for online storage and access for both clients and users, which are integrated with existing early warning systems, decision support models, and the provision of flood risk assessments to road network infrastructure. The only technology to be used within the field data network is to develop site-based flood warning systems for infrastructure and associated communities. The scope of investment is limited to: (i) client data server technology and supporting infrastructure; (ii) user interfaces; and (iii) risk assessment technologies. Local site-based flood and water level monitoring with linked early warning systems for no more than 8 – 10 sites.

III. SHORTLISTED OUTPUT 1 AND OUPUT 2 SUBPROJECTS

10. Following screening criteria presented in the previous section, a total of 11 subprojects have been shortlisted in Binh Dinh Province (BDP) and Quang Nam Province (QNP). BDP has 6 subprojects,[3] including 4 road subprojects and 2 water supply subprojects, in 5 districts. QNP has five subprojects, including 3 road subprojects and 2 water supply projects. Details are in the Tables 1 and 2 in the following pages.

[3] Binh Dinh Province combines subprojects 1 and 2 into subproject 1, subprojects and 5 and 6 into subproject 4.

Table A2.1: Output 1 - Shortlisted Subprojects

District	Subproject name	Road Category Proposed	Length (km)	Number of Communes	Number of Hamlets	Remarks
Binh Dinh Province						
Vinh Thanh	SP1: DT 693 Dinh Binh Reservoir to Vinh Son commune centre	V	39	2	2	Road upgrading to connect Vinh Son to new organic vegetable area plus acacia. Existing road condition is not highly degraded. Section needs to be justified by traffic count difficult terrain and slope.
Vinh Thanh	SP2: DT 637 Vinh Quang – Vinh Thanh Town	IV	2.4	2	1	Short section prone to severe flooding – increase elevation 1.5 m replace 60m bridge and increase span and deck elevation.
Van Canh District	SP3: Canh Hiep Canh Lien Communes	V	12	2	2	Connects a commune back into the transport network and will support significant acacia area, but route alignment is steep and need more technical review. A stand-by subproject.
An Lao – Hoai Nhon District	SP4: Intercommune An Hung to Tam Quan	VI	23.5	2	3	Acacia and cassava transport route, difficult terrain significant time savings to deliver acacia as opposed to route via Bang Son.
Subtotal	**4**		**76.9**	**8**	**8**	
Quang Nam Province						
Nam Tra My	SP5 Section 1: Ngoc Linh: Tra Nam-Tra Linh	VI (mtn)	22.8	2	3	New Acacia area, resettled communities, bridge added at Km=0
	SP5 Section 2: Ngoc Linh: Tra Tạp – Tra Cang	VI (mtn)		2	3	Completes loop involving section 1, shifted starting point until after largest bridge due to road condition
Bac Tra My	SP6: Song Truong -Tra Giac	VI	20.1	3	4	About 50% is new alignment, major acacia route and diverted traffic time saving, resettlement village. Cost overrun likely.
Nam Giang	SP7: Ca Dy Commune Road	VI	8.6	1	3	Connects HCMH to NH 14 via new bridge under construction, 70m bridge required at HCM end. Justified to support 1200ha of acacia.
Subtotal	**3**		**51.50**	**8**	**13**	
Total	**7**		**128.4**	**16**	**21**	

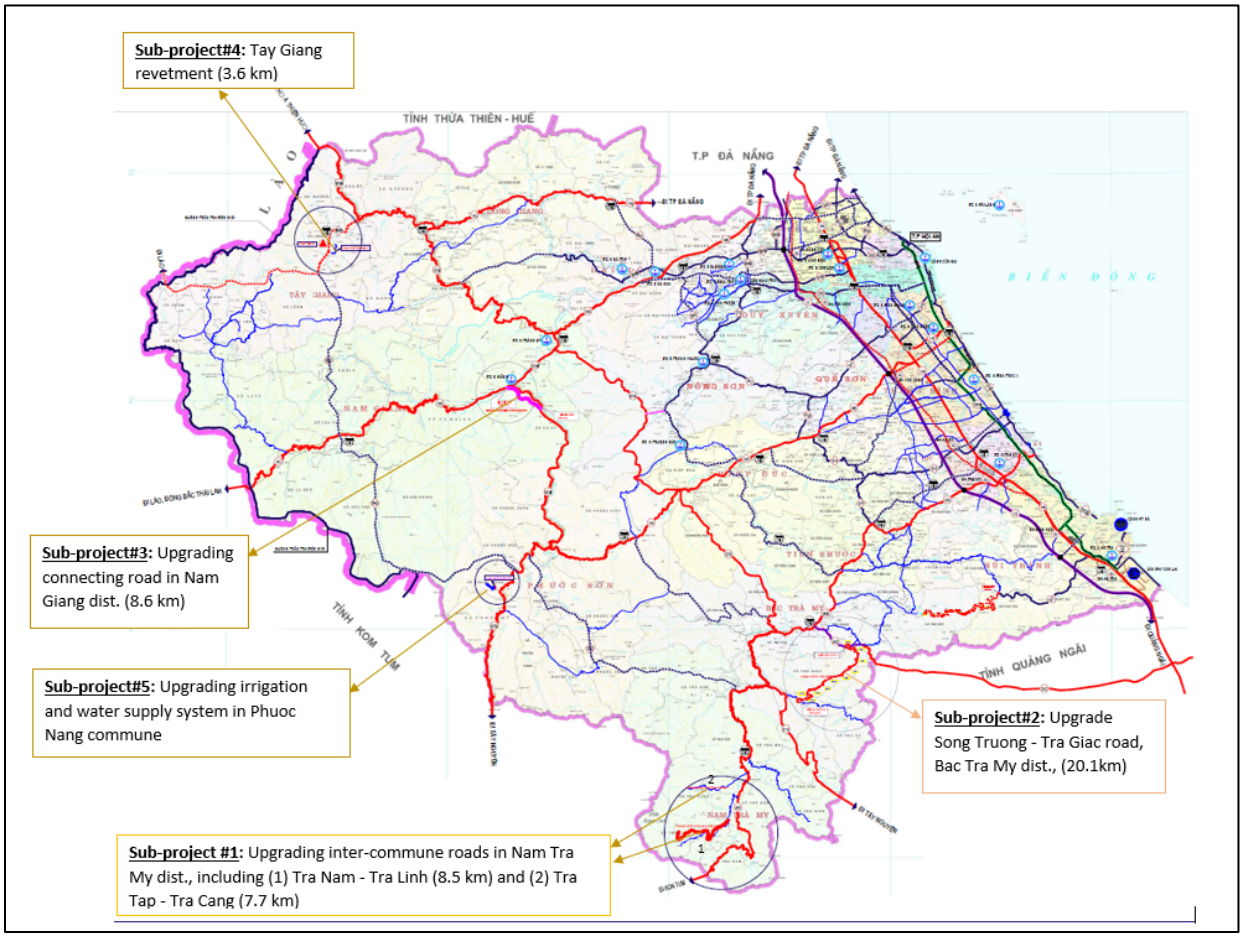
Table A2.2: Output 2 – Shortlisted Subprojects

Dist.	Subproject title	Water Supply			Irrigation		Flood Protct n	Remarks
		Conn . (hh)	Netwrk length (km)	Cap. m3/day	Cmmn d Area (ha)	Canal Length (km)	Length (km)	
Binh Dinh Province								
An Lao	SP1: Water supply for An Lao Town and An Trung Commune	5100	75	2730				Total all 4 commune plus small town 9,300 beneficiaries. Small Town An Lao extension: 1500 beneficiaries (1,000 EM) An Trung: 1300 beneficiaries and 1100 EM.
An Lao	SP2: Water Supply for An Hoa, An Tan, An Hung Communes	1285	20	680				
Subtotal	2	6,385	95	3,410				
Quang Nam Province								
Tay Giang	SP3: Riverbank protection for Cotu Ecotourism						3.63	Subproject needs to be confirmed in terms of starting and ending point. The objective is to protect the investment for the private sector and the Cotu Cultural Centre.
Phuoc Son	SP4: Install water supply, Upgrade irrigation	4,000	20	900	126	3.6		For irrigation: spillway, canals. For water supply for resettled community: pumping and treatment station, piped network. RED FLAG – probably non-feasible, needs additional work. Raise level of the spillway to increase storage capacity and then extend the irrigation network. Install a pumping and treat station and a distribution networks for water supply. Issues: High cost of irrigation, $12000/ha or more. Unknown water balance from catchment to established what additional storage would be achieved. Additional

Dist.	Subproject title	Water Supply			Irrigation		Flood Protctn	Remarks
		Conn. (hh)	Netwrk length (km)	Cap. m3/day	Cmmnd Area (ha)	Canal Length (km)	Length (km)	
								Storage volume unknown. Crop demand needs based on low efficiency paddy rice from canals.
Subtotal	2	4,000	20	900	126	3.6	3.63	
Total	**4**	**10,385**	**115**	**4,310**	**126**	**3.6**	**3.63**	

Figure A2.1: Location Map of Output 1 and 2 Subprojects in Binh Dinh Province

Figure A2.2: Location Map of Output 1 and 2 Subprojects in Quang Nam Province



AUDITOR'S TERMS OF REFERENCE

STATEMENT OF AUDIT NEEDS (AUDITOR'S TERMS OF REFERENCE)
AUDITED PROJECT FINANCIAL STATEMENTS (APFS)
[Entity Name:_____]
[Project number:_____]
[Loan Agreement number:_____]

I. PROJECT BACKGROUND INFORMATION

1. A description of the project must be provided with a focus on: (i) the purpose for which the funds are intended, which is consistent with broad project objectives and budget; (ii) a description of the executing and implementing agencies; (iii) loan amount and project cost (by ADB, co-financier(s), and government counterpart; (iv) accounting and financial management practices, financial reporting periods to be audited (whether it is the first or last audit); and (v) other relevant information that should be brought to the attention of the auditors.

II. AUDIT OBJECTIVES

2. The purposes of the audit of the project financial statements are to enable the auditors to express independent opinions on:

(i) ***Fair presentation of the financial statements***: whether the project financial statements present fairly, in all material respects, or give a true and fair view of the project's financial position, its financial performance and cash flows in accordance with the relevant accounting and reporting framework applicable for the project;

(ii) ***Use of loan and grant proceeds***: whether loan proceeds were used only for the purposes of the project, e.g. "In our opinion, the funds have been used in all material respects in accordance with the conditions of the loan and grant agreements between the Government of Vietnam and ADB."

III. RESPONSIBILITIES OF MANAGEMENT

3. Management is responsible for selecting and applying appropriate accounting policies, for preparing and fairly presenting the project financial statements, and for maintaining sufficient internal controls to ensure that the financial statements are free from material misstatement, whether due to fraud or error. In addition, management is responsible for ensuring that funds were used only for the purpose(s) of the project, for compliance with financial covenants (if applicable) as set forth in the loan agreement, and for ensuring that effective internal controls, including those over the procurement process, are maintained.

4. The project accounting is maintained in accordance with Vietnamese Accounting Standards ("VAS"), specifically Circular No. 79/2019/TT-BTC.

5. In order to prepare for the audit, project management will prepare and sign the following documents, which will be included in the audited financial statements of the project:

(i) **Report of the Project Management Unit** will incorporate responsibilities of project management with respect to the financial statements, internal control design, operational and compliance requirements with respect to the Project under audit.

(ii) **Financial Statements** prepared in accordance with the reporting frameworks applicable for the Project. The accounting and reporting frameworks must be consistently applied from year to year and clearly stated among the Reports of the PMU, notes to the financial statements, audit opinion, and any other related reports submitted to the ADB. The content of the financial statements to be audited shall include, but not limited, to all statements listed below.

(iii) **Statement of Compliance**: Management will prepare and sign a statement to confirm the compliance with the loan agreement and other applicable requirements during the period under audit.

IV. SCOPE OF AUDIT ENGAGEMENT

6. The audit is required to be conducted in accordance with the Standards promulgated by the International Auditing and Assurance Standards Board ("IAASB"), including: (i) International Standards on Auditing ("ISA") for the audit of the financial statements, specifically ISA 800: "*Special Considerations – Audits of Financial Statements Prepared in Accordance with Special Purpose Frameworks*"; and (ii) International Standards on Assurance Engagements ("ISAE") 3000: "*Assurance Engagements Other than Audits or Reviews of Historical Financial Information*" for the audit on compliance and will include such tests and auditing procedures as the auditors consider necessary under the circumstances.

7. An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the project financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the project financial statements whether due to fraud or error.

8. The audit report will clearly state the generally accepted accounting standards applied and indicate the effect of any deviations from those standards. The auditors should also evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates made by management, as well as evaluating the overall presentation of the project financial statements. The auditors also need to note the impact on APFS arising from any material deviations from the agreed accounting standards and comment on any accounting policy changes during a financial year or from one year to another.

9. In addition, the auditors should pay particular attention to the following aspects of the financial statements and project operations during the audit:

(i) **Record keeping**: General condition and completeness of proper books, records, and documentation;

(ii) **Internal control system**: The adequacy of the internal control system with regards to financial reporting, disbursement mechanism, and compliance with the project documents;

(iii) **SOE Procedures**: Audit procedures should be planned and performed to ensure that (i) the SOEs have been prepared in accordance with ADB Loan Disbursement Handbook; (ii) the individual payments for expenditures stated in the SOE are supported by evidence; (iii) the expenditures stated in the SOEs comply with the approved project purposes and cost categories stipulated in loan agreement; and (iv) the amount of expenditures stated in the SOEs comply with disbursement percentages stipulated in the loan agreement. Any ineligible expenditures identified should be separately noted by the auditor;

(iv) **Statement of Advance Account**: The auditors should pay attention to the reasonableness of the balance(s) of the advance account(s) at year end and examine the advance account activities during the year in accordance with the latest ADB Loan Disbursement Handbook and the loan documents;

(v) **Statement of Withdrawals**: The auditors should pay attention to the accuracy of this schedule and obtain reasonable assurance as to whether the supporting documents for the withdrawals of funds are fully maintained and sufficient in accordance with the requirements per loan documents;

(vi) **Counterpart funds**: Counterpart funds have been provided and used in accordance with the relevant loan agreements, with due attention to economy and efficiency, and only for the purposes for which they were provided;

(vii) (if applicable - only include if this TOR will cover the final APFS to be submitted to ADB) **Specific presentation requirements on Final APFS**: The final APFS will include all eligible expenditures incurred up to the loan closing date:

- For financial statements prepared under the accrual basis of accounting, the final audited project financial statements will accrue the value of expenditures incurred up to the loan closing date that are expected to be disbursed in the succeeding period.
- For financial statements prepared under the cash basis of accounting, where disbursements are made after the loan closing date, the final audited project financial statements will include information such as the receivables, payables, borrowings, other liabilities, and accruing expenses that are not normally recognized under cash accounting in the notes to the financial statements.

10. **Audit fieldwork location(s)**: The auditors will conduct the audit at the [*PMU office*] in [*PMU HQ location*] and [*other locations, if relevant: central level, provincial or lower levels and auditors may have to travel to lower levels to do the audit – TOR should specify the levels/provinces where auditors must visit for audit purposes*].

11. **Phasing of the audit**: The Project must be audited on an annual basis for the period from the loan effective date to the loan closing date. The deadlines for draft and final audit reports shall be as follows:

Period	FY start	FY End	Submission Deadline	Remarks
1				
2				
3				

Note:

(i) Although the audit firm will be contracted for the aforementioned audit phase of 03 years (maximum three years per contract), the financial proposal from the audit firm must indicate the amount in USD for each year independently.

(ii) If performance is not satisfactory in one year then the project management will not be bound with the same auditor for subsequent years.

(iii) If the performance is satisfactory, the audit firm may participate in bidding process for the subsequent phases, but the total assignment of an audit firm can only be up to 06 years for one project.

(iv) In case the PMU wants to renew the contract with the audit firm after the first three years bypassing the re-bidding process, the matter must be discussed with ADB team leader.

12. **Information Access**

(i) The auditors shall have access to all legal documents, correspondences, and any other information associated with the project and deemed necessary by the auditors for the purposes of conducting the audit under this TOR. Available information should include, but not limited to, copies of the relevant project appraisal document, loan agreement, procurement plan, assessment reports, supervision mission reports, and implementation status reports, etc.

(ii) The auditors will be provided with full cooperation by all employees of the entity, along with consultants, contractors, and other persons or firms hired by the project implementing agency, whose activities involve, or might be reflected in, the annual project financial statements.

(iii) It is highly desirable that the auditors become familiar with the Project's Loan Agreement and other project documents, especially the documents related to the ADB's financial reporting and loan covenant requirements. The auditors should also be familiar with ADB Procurement Guidelines and Disbursement Handbook. These documents are available on the ADB's website and could be obtained from the project management.

(iv) ADB can request access to the auditors' working papers at any time.

13. **Reporting Relationships**: The audit services will be contracted by the [*EA or IA or project management units*]. The auditors shall report to the [Project Director] and [Chief Accountant] of the [EA, IA, or PMU] whose contact information is as follows:

(i) [Project Director]:
   a. Name:
   b. Phone number:
   c. Email:

(ii) [Chief Accountant]:
   a. Name:
   b. Phone number:
   c. Email:

V. AUDIT DELIVERABLES

14. The audited project financial statements should be prepared in [08] copies (04 in English and 04 in Vietnamese). All reports submitted to ADB must be presented in the English language within [06] months following the end of the year or period under audit. The reports include the following:

15. **Audited Project Financial Statements:** Auditors' opinion on providing reasonable assurance in accordance with ISA 800 that the project financial statements have been prepared in accordance with the accounting and reporting standards applied (see **Annex 1**).

(i) The audit report will clearly state the generally accepted accounting standards applied and indicate the effect of any deviations from those standards.

(ii) The audit opinion will cover, in all material respects, the financial statements, notes of the financial statements, and all supporting schedules.

16. **Auditors' Opinions on Compliance:** In addition to the opinion on the financial statements, the auditors will carry out a reasonable assurance engagement in accordance with ISAE 3000 and express opinions on the compliance with the use of proceeds per loan and grant agreements.

17. If an opinion different than an unqualified opinion is given, the basis for such opinion shall be clearly stated on the auditors' independent report and, where applicable, the auditors will prepare a separate schedule of findings and questioned costs by funding sources in the management letter.

18. **Management letter**: must be prepared and signed by the same auditors signing off on the financial statement reports for the same period under audit. Management letter shall include the following elements at the minimum, as applicable:

(i) Status of significant matters raised in previous management letters and give comments on previous auditors' recommendations that have not been satisfactorily implemented.
(ii) Identify specific control deficiencies or areas of material weakness in systems and controls, including any irregularity in the use of the advance account and SOE procedures or the procurement process, bidding, evaluation, and contract management (where applicable) and make recommendations for their improvement;
(iii) Any other matters that the auditors consider pertinent, including details about ineligible expenditures under the terms of the loan documents, findings relating to fraud and/or corruptions, and expenditures incurred in violation of applicable government regulations.
(iv) The letter should also include responses from the project management to the issues highlighted by the auditors along with the timeframe for implementation.
(v) If no material weaknesses or control deficiencies are found, then the management letter should clearly indicate that there are no such issues noted by the auditors during the audit of the project financial statements.

VI. AUDITORS' QUALIFICATIONS

19. **Qualifications of audit firms:**

(i) Possess business license to practice or official decision to set up business in the fields relevant to the requirements of this TOR under Vietnamese laws;
(ii) Be authorized to provide audit services by the Vietnamese Ministry of Finance and possesses full legal status to practice under the Vietnam Enterprise Law;
(iii) Be impartial and independent from all aspects of management or financial interests in the Executing Agency ("EA") and Implementing Agency ("IA") of the Project under audit;
(iv) Have experience in providing audit services for ODA funded projects or Government programs;
(v) Have adequate staff with appropriate professional qualifications and suitable experience to perform the audit under this TOR; and
(vi) Have established procedures and reliable methodology in conformity with the International Standards on Auditing.

20. **Qualifications of the audit engagement team members:** (*The TOR must indicate clearly how many international and national experts the assignment will include)*

(i) Be authorized to practice in Vietnam and capable of applying the procedures and methodology in conformity with the International Standards on Auditing.

(ii) Have appropriate professional qualifications and in-depth audit experience, including experience in auditing the accounts of projects or entities comparable in nature, size and complexity to the project or entity under audit. Each proposed engagement team member is required to provide curriculum vitae outlining their qualifications and audit experience relevant to this TOR;

(iii) Be impartial and independent from all aspects of management or financial interest in the entity or project under audit. In particular, the auditors should be independent of the control of the entity. The auditors should not, during the period covered by the audit, be employed by, or serve as director for, or have any financial or close business relationship with the EA or IA of the Project under audit. The auditors should not have any close personal relationships with any senior participant in the management of the EA or IA. The auditors must disclose any issues or relationships that might compromise their independence throughout the audit.

Specific minimum required qualifications and experience for each position are as follows:

21. **Audit Director or Engagement Partner (XX national expert):**

- A university graduate (preferably with a post–graduate degree) in accounting, auditing, finance, or related fields;
- Holder of the Audit practitioner certificate granted by the Vietnamese MoF and, preferably, an internationally recognized professional certificate to practice audit or accounting, such as ACCA, US CPA, CPA Australia, etc.;
- Professional experience for 15 years or above working in financial, advisory or audit services, with 08 years or more providing audit services since being granted with Vietnamese or international auditor certificate, of which at least 04 years in directing auditing teams;
- Experience as Audit Director for at least 03 audit contracts for projects funded by ADB, the World Bank, or large international donors;
- Experience working for a Big4 or large regional accounting firm is a plus; and
- Fluent English is compulsory.

22. **Audit Manager (XX national experts):**

- A university graduate (preferably with a post–graduate degree) in accounting, auditing, finance, or related fields;
- Holder of the Audit practitioner certificate granted by the Vietnamese MoF and/or an internationally recognized professional certificate to practice audit or accounting, such as ACCA, US CPA, CPA Australia, etc.;
- At least 10 years of experience providing audit services, of which 05 years or more in managing the audit team;
- Audit experience for projects funded by ADB, the World Bank, or large international donors in Vietnam would be an advantage;
- Experience working for a Big4 or large regional accounting firm is a plus; and
- Fluent English is compulsory.

23. **Senior Auditors (XX national experts)**:

- A university graduate in accounting, auditing, finance, or related fields;
- Preferably holder of the Audit practitioner certificate granted by the Vietnamese MoF and/or an internationally recognized professional certificate to practice audit or accounting, such as ACCA, US CPA, CPA Australia, etc.;
- At least 05 years of experience in providing audit services;
- Audit experience for projects funded by ADB, the World Bank, or large international donors in Vietnam would be an advantage; and
- English proficiency is preferable.

24. **Auditors (XX national experts):**

- A university graduate in accounting, auditing, finance, or related fields;
- Preferably holder of the Audit practitioner certificate granted by the Vietnamese MoF and/or an internationally recognized professional certificate to practice audit or accounting, such as ACCA, US CPA, CPA Australia, etc.;
- At least 02 years of experience working in providing audit services;
- Audit experience for projects funded by ADB, the World Bank, or large international donors in Vietnam would be an advantage; and
- English proficiency is preferable.

25. The selected audit firm must notify and obtain written approval from the EA if an audit engagement team member is substituted after the selection has been made.

26. Sub-contracting of audit services is not permitted.

FORMAT OF ANNUAL PROJECT FINANCIAL STATEMENTS

1. The project financial statements are prepared in accordance with the Vietnamese Accounting Standards ("VAS"), specifically Circular No. 79/2019/TT-BTC, etc.

2. The content of the financial statements to be audited should include the following contents, as minimum:

a. Balance Sheet;

b. Statement of Funds Receipts and Disbursements;

c. Statement of Funds and Expenditures: includes a summary of fund by sources, and total expenditures presented in categories corresponding to the project's components per loan agreement for the fiscal year under audit and cumulative to date;

d. Statement of Advance Account comprises of (i) advance deposits; (ii) withdrawals related to project expenditures, (iii) interest that may have been earned on the accounts; and (iv) reconciliation with the bank statement balance at period-end;

e. Statement of Loan and Grant Withdrawals: shall detail all individual withdrawal applications during the period under audit by specific reference number, date, and amounts claimed;

f. Statement of Budget versus Actual Expenditures;

g. Notes to the Financial Statements include (i) accounting policies adopted for the project; (ii) explanatory notes; and (iii) reconciliations of the amounts recorded as expenditures from ADB funding for the project with actual amounts disbursed by ADB for the year and cumulative for the project (if the basis of accounting is accrual or modified cash); and

h. Any additional schedules agreed, if necessary.

3. Specific considerations:

a. Annual project financial statements should normally be presented in the local currency, with the basis for conversion of any foreign exchange transactions or commitments explicitly stated.

b. The project expenditures should be presented following the expenditure categories contained in the legal agreement, other project documents, and revisions thereto.

c. The annual project financial statements should include comparative figures for the preceding reporting year and cumulative figures from the loan effectiveness date to the end of the current reporting year. For projects that receive funding from other sources, the annual project financial statements should include all sources of funds for the Project (ADB, counterpart fund, co-financiers, etc.).

d. The accompanying Notes to Financial Statements should provide sufficient explanation and information on the financials in narrative form or appropriate supporting schedules, including description of key financial reporting policies, and the adopted accounting standards.

CONSTRUCTION SUPERVISION TERMS OF REFERENCE

I. TERMS OF REFERENCE CONSTRUCTION SUPERVISION CONSULTANT PACKAGES BD CS0-01 AND QNCS-01

A. Objective

1. The primary objectives of the consulting services are to:

(i) Function as the Engineer in administering the civil works contract (the Contract) in accordance with the International Federation of Consulting Engineers (FIDIC) conditions of contract;
(ii) Design Consultants Contractors;
(iii) Review and advise PPMUs (the Employer) on approval of the construction methods and construction implemented by the Construction Contractors;
(iv) Ensure that the permanent and temporary works have been designed and are constructed in accordance with the provisions of the Contracts and in accordance with the Vietnamese Design and Construction Standards; and
(v) Advise the Employer on all matters concerning implementation of the Contracts including quality control, work progress, implementation issues, and arbitration or litigation etc.

B. Scope of Work

C. Civil Works Contract Administration

2. Design review. DEDs have been prepared through a firm of consultants. The design review includes, but is not limited to, the following:

3. Establish the schedule, methods and procedures for the review of detailed engineering design and construction drawings of the civil works provided by the Employer.

4. Review the detailed design and construction drawings in accordance with the design standards, criteria and conceptual design provided in the Contract.

5. Ensure that the Technical Specifications in the Bid Documents and the provisions of Vietnamese Design and Construction Standards have been duly accounted for in the DED and construction drawings.

D. Contract Administration

6. The construction works will be executed under the International Federation of Consulting Engineers (FIDIC) Conditions of Contract for Works of Civil Engineering Construction. The PPMUs will be the Employer and the consultant will function as the Engineer but will report to the PPMU engineers through the Team Leader. Accountability for construction supervision and the integrity of construction supervision resides with the Project Director PPMU..

7. The consultant will administer the civil works contracts and ensure that the road and water supply, irrigation and flood protection subprojects are constructed in accordance with the provision of the civil works contracts including the agreed Contractors Environmental Management Plan. The consultant will be required to nominate an engineer’s representative who

will be a based full-time in the subproject area. The responsibility of the Engineer includes, but is not limited to, the following tasks:

8. Give the order to commence the works based on (i) confirmation that all land acquisition and associated compensation payments for the entire subproject are finalized with no outstanding amounts and or grievances, (ii) a notice to proceed is signed by the Project Director based on the PPMU approval the contractors work plan, that there is an agreement over the detailed engineering designs and associated quantities based on the contractor review of the design, and (iii) all site clearance is completed

(i) Review and approve contracts proposed personnel for positions nominated in the Contract;
(ii) Inspect and approve all material sources identified by the Contractor;
(iii) Review and approve the Contractor's implementation schedule, and supervise the progress of construction works.
(iv) The Consultant will keep the Employer informed of any delay or potential delays in the work schedule of the Contract, and will take all necessary actions to prevent potential delays;
(v) Review, approve and monitor the construction plan to minimize disruption to vehicular traffic and water supply and agricultural activities during construction, and to ensure that construction activities do not endanger safety of the public;
(vi) Regularly monitor and inspect the contractor's quality control and assurance program to ensure that quality of the finished works meet the contract standards and specifications. This includes regular checking of the materials testing program;
(vii) Advise and assist the Employer with respect to arbitration or litigation relating to the works, whenever required;
(viii) Monitor progress of the construction works through computer-aided project management techniques;
(ix) Convene regular site meetings with the Contractor to discuss issues and problems affecting the progress, and brief the Employer;
(x) Coordinate with the relevant local government authorities/agencies so as to minimize disruption to the works program, as required by the Contractor;
(xi) Review the contractor's insurance cover to ensure that the contractor has provided all the insurance required by the contract and such insurance are maintained throughout the contract period;
(xii) Prepare any required variation orders requested by the Employer and review any variation order proposed by the contractor and provide their advice to the Employer in accordance with the contract;
(xiii) Review all claims submitted by the Contractor and provide advice to the Employer of the validity of the claim, the effect of such claim on the construction schedule and the cost of the project;
(xiv) Review and comment on the monthly progress reports submitted by the contractor detailing the work undertaken during the previous month, the progress of the work against the approved schedule, the problems and difficulties encountered by the contractor and other issues requested by the Employer;
(xv) Issue completion certificate after satisfactory completion of the works in accordance with the contract provisions;
(xvi) Supervise updating of the Resettlement Plan, if necessary, and develop poverty monitoring impact monitoring systems;
(xvii) Review and advise the Employer whether the construction methods as proposed by the contractor for carrying out the works are satisfactory, with particular

references to the technical requirements of sound environmental standards on the basis of ADB's Safeguards Policy Statement (2009), inspection of contractor's construction equipment, safety of the works, property, personnel, and general public;

(xviii) Assess and check the laboratory and field tests carried out by the contractor, and independent tests.

(xix) Issue orders to the Contractor to remove or improve any works that are not in accordance with the drawings and/or specifications;

(xx) Maintain records of all testing work, including cross-referencing of items of work to which each test refers and location from which any samples were obtained for testing.

(xxi) At the completion of the contract, verify the contractor's "as-built drawings" as a true record of the works as constructed;

(xxii) Measure the completed works and keep detailed records, including the measurement books;

(xxiii) Prepare quarterly cash flow projections for the Employer in an acceptable format, in which cash flow should identify budget estimates for all outstanding works;

(xxiv) Supervise the maintenance of records for all plant, labor and materials used in the construction of the works;

(xxv) Supervise the process of interim and final payments to the Contractor (interim monthly payment shall be based on interim payment certificate processed by the Consultant following claims filed by the Contractor);

(xxvi) The Consultant will be responsible for checking and monitoring the performance requirements in the Contract and ensuring the criteria and limits are met;

(xxvii) Maintain a day-to-day diary, which shall record all events pertaining to the administration of the contract, request forms, and order given to the contractor, and any other information which may at a later date be of assistance in resolving queries which may arise connecting execution of the works;

(xxviii) Supervise the implementation of training programs of PPMUs staff at the site on project management including quality assurance and contract administration.

(xxix) In addition, or as an expansion of the activities and responsibilities required of the engineer under the civil works contracts, the consultant will:

(a) Ensure that the construction methods proposed by the contractor for carrying out the works are satisfactory, with particular references to the technical requirements of sound environmental standards on the basis of the ADB's Safeguards Policy Statement (2009) and the agreed provisions of the Initial Environmental Examination (IEE) and the associated EMP as well as the Contractors Updated EMP and any additions or alterations deemed necessary during the process of undertaking the works program;

(b) Conduct an initial and regular inspection of contractor's construction equipment; safety of the works, property, personnel, and general public; and the recommendations of the Contractors Environmental Management Plan (CEMP);

(c) Supervise the implementation of the environmental monitoring plan and annual report of implementing this plan as part of project implementation report.

(d) Supervise the provision of environmental management seminars for contractors and PPMU staff;

(e) Ensure the required provisions for a COVID-19 Preventative Actions and Site Risk Management Plan are detailed, agreed and, if necessary,

implemented and maintained for the entire period of construction, including the training of site staff, management of entry and tracing systems, social distancing, use and disposal of Personal Protective Equipment, and the reporting of all such activities

(f) Supervise of resettlement plans as per ADB's Safeguards Policy Statement (2009);

(g) Monitor the Construction Contractors to ensure that no child labor is used for the execution of the civil works contracts as required by the civil works contracts;

(h) Monitor the implementation of the health and safety program at camp site including the information and education campaign on sexually-transmitted diseases and HIV/AIDS (human immunodeficiency virus/acquired immunodeficiency syndrome) as required by the civil works contracts; and

(i) Supervise the implementation of training programs for PPMUs staff at site on project management including quality assurance, contract administration, and water treatment system maintenance.

E. Actions Requiring Specific Approval of the Employer

9. The consultant will be required to obtain prior approval of the employer in the following matters as specified in the civil works contracts:

(i) Recommending the subletting of any part of the works;
(ii) Certifying additional cost;
(iii) Determining an extension of time;
(iv) Issuing a variation having financial implications; and
(v) Fixing rates or prices.

II. INDICATIVE INPUTS FOR CONSTRUCTION SUPERVISION

10. The proposed composition of the construction supervision team is presented in Table 1 and 2.

A. Binh Dinh Province

Table A4.1: Construction Supervision Team BDCS-01

Position	Person Months	Key Positions[1]	Qualification and Experience
Transport Supervision Engineer (snr)	35	Key	• Registered Practicing Engineer with road transport infrastructure design • 10 years experience in the design of roads, or associated structures • 10 years of construction supervision
Road Construction Engineer	15		• Registered Practicing Engineer with road transport infrastructure design • 5 years experience in the design of roads, or associated structures • 5 years of construction supervision
Road Construction Engineer	12		• Registered engineer with experience in road transport infrastructure design and works implementation

Position	Person Months	Key Positions[1]	Qualification and Experience
			• 5 years experience in design of roads, or associated structures • 3 years of construction supervision
Bridge Engineer	14		• Registered engineer with experience in road transport / bridge structural design and works implementation including hydrological risk modelling • 5 years experience in design of roads, or associated structures • 5 years in contract implementation roles
Hydraulic Engineer (Water Supply)	14	Key	• Registered engineer with experience in rural domestic water supply, flood protection including hydrological, hydraulic modelling, and water treatment • 10 years experience in design of RDWS, Flood protection, or associated structures • 10 years in contract implementation roles
Electrical Engineer	5		• Registered electrical engineer certified for electrical engineering design and installation • 10 years experience in design and installation
BME	6		• Engineer or Social impact specialist with 5 years experience in benefit monitoring
Cost Estimator - Quantity Surveyor	24		• Registered quantity surveyer with a minimum experience of 5 years in the road or water resources sector
Laboratory Engineer	15		• Certified Laboratory Analyst with supporting post graduate degree
Occupational Health and Safety	20		• OSH expert that is familiar with site based OSH systems development and management
Total	160		

Source: [1] Key Positions need to be identified individuals that meet the minimum technical specifications to be eligible

B. Quang Nam Province

Table A4.2: Construction Supervision Team QN CS-01

Position	Person Months	Key Positions	Qualification and Experience
Transport Supervision Engineer (snr)	30	Key	• Registered Practicing Engineer with road transport infrastructure design

Position	Person Months	Key Positions	Qualification and Experience
			• 10 years experience in the design of roads, or associated structures • 10 years of construction supervision
Road Construction Engineer	15		• Registered Practicing Engineer with road transport infrastructure design • 5 years experience in the design of roads, or associated structures • 5 years of construction supervision
Road Construction Engineer	8		• Registered engineer with experience in road transport infrastructure design and works implementation • 5 years experience in design of roads, or associated structures • 3 years of construction supervision
Bridge engineer	6		• Registered engineer with experience in road transport / bridge structural design and works implementation including hydrological risk modelling • 5 years experience in design of roads, or associated structures • 5 years in contract implementation roles
Hydraulic Engineer (Water Supply)	6	Key	• Registered engineer with experience in rural domestic water supply, flood protection including hydrological, hydraulic modelling, and water treatment • 10 years experience in design of RDWS, Flood protection, or associated structures • 10 years in contract implementation roles
Electrical engineer	6		• Registered electrical engineer certified for electrical engineering design and installation • 10 years experience in design and installation
Irrigation Engineer	6	Key	• Qualified agricultural and water resource engineer trained in the irrigation and flood protection sectors • Minimum of 10 years design experience in ODA projects • Knowledge of pressurized irrigation networks
Cost Estimator quantity surveyor	12		• Registered quantity surveyor with a minimum experience of 5 years

Position	Person Months	Key Positions	Qualification and Experience
			in the road or water resources sector
Laboratory Engineer	12		• Certified Laboratory Analyst with supporting post graduate degree
Occupational Safety _1	12		• OSH expert that is familiar with site based OSH systems development and management
BME	4		
Total	117		

Source: [1] Key Positions need to be identified individuals that meet the minimum technical specifications to be eligible

III. CONSTRUCTION MANAGEMENT AND MONITORING GUIDELINE

A. General

11. Works quality and contractor performance are key contributors to the success of the works programs under both output 1 and 2 as the quality assurance of works construction and works practices will define the effectiveness of project outputs as well as the long run efficacy in terms of affordable operations and maintenance cost. In short, civil works built to technical standards that are fit for purpose are significantly easier to sustain.

12. The following guideline will be applied during the implementation of construction contracts by the contractor and supervising personnel and will form part of the increased focus on contract management. Management of the construction contracts aim to ensure the works are completed in compliance with the technical specifications, environmental management plans and social safeguard requirements of the CRIEM-1 investment.

13. Construction Supervision is to be undertaken by a contractor recruited using ADB CMS systems using QCBS with a 90:10 technical financial weighting and financed by ADB. However, the contractor represents the PPMU and as such accountability for construction supervision sits clearly with the PPMU/IA.

14. The structuring of the construction supervision contract will seek to incentivise (i) presence at all sites, (ii) supervision outputs in terms of subproject reporting to the PPMU on progress, (iii) clear understanding of the CEMP requirement and how these are addressed, (iv) ensuring the provisions and requirements of the approved REMDP are fully applied in a timely and effective manner – including the requirement to ensure no works commence prior to full and final payment of all compensation within a subproject.

15. Contract payment milestones and invoices will only be processed if all reporting, supporting evidence and documentation is available. Where this is not the case the contractor will incur substantial delays and the additional costs will be borne by the respective contactor.

16. The guideline is not a technical manual as it is assumed that all parties to the contract and personnel assigned to undertake the various tasks and duties during implementation are appropriately qualified and experienced for executing their responsibilities and are trained in the procedures and requirements of the project to be awarded the contract.

17. Instances where an assigned or contracted personnel does not have the requisite qualification or performance, experience or motivation it is the duty of their superiors to provide the necessary support so as they are able to undertake their tasks in compliance with the required standards at their own costs or request approval for their replacement.

18. Within the loan implementation consultants and the PPMU technical engineering staff that are experienced in the full range of sector works (primarily roads and water resources) will provide oversight and technical review of the construction works supervision and their outputs. The CS contractor will be required to provide full and open access to these staff or LIC personnel at any time that a site is open and operational.

19. A national construction supervision consultant will provide mentoring and on-time supervision of the Provincial construction supervisors work and performance. Any shortfalls in inputs, quality of supervision or reporting will be raised with the Director of the PPMU. All such matters will be assigned to the project record and reported in both monthly and quarterly reports to the ADB.

B. Meetings and Site Records

20. All formal meetings between the project and the contractor must be documented with minutes prepared. Copies are to be maintained by the PPMU and by the contractor.

21. All site visits and inspections must be recorded in the site register (record book) which is to be maintained at every site. Photographs, by mobile phone, must also be taken at all stages of construction especially during mandatory technical inspections and where any defective works, environmental or social issues are observed.

22. To facilitate implementation the contactor's representative assigned to attend meetings and site inspections must be authorized to make decisions on behalf of contractor on issues that are brought up during the meetings and inspections. Similarly, the assigned site supervisor(s) must be authorised to make timely decisions (in consultation with appropriate persons as necessary) on the day to day implementation issues.

C. Pre-construction meeting

23. A pre-construction meeting is to be held between the contractor and PPMU to review all aspects of the contract. Includes:

(i) Scope of works
(ii) Implementation schedules
(iii) Assigned personnel (contractor and PPMU supervisors), roles, responsibilities and coordination
(iv) Labour and equipment – including camp locations, access and maintenance
(v) Health and safety provisions and plans
(vi) Works technical specifications and standards
(vii) Environmental Management and Monitoring Plan (EMMP)
(viii) COVID-19 Preventative Actions and Site Risk Management Plan
(ix) Social safeguards compliance requirements (REGDF)
(x) Social standards, behaviour and gender actions
(xi) Quality control and quality assurance requirements (incl. mandatory inspections, materials traceability, testing, etc)

(xii) Progress monitoring and reporting
(xiii) Contract variations
(xiv) Completion, commissioning and handover
(xv) Defect liability
(xvi) Payment schedules
(xvii) Disputes management procedures

D. On–site pre-construction meeting

24. Prior to the commencement of construction, meetings with the communities are to be held to discuss the implementation activities and programme. At this time the roles of the contractor, project personnel and communities are explained. The role of the community in assisting with monitoring the technical, environmental and social safeguards aspects is elaborated, emphasising the importance of ensuring quality standards are met as the assets are within the community and for which they are responsible for O&M after completion.

25. Attendees at the meeting must include (at least):

(i) Project manager and site foreman of the contractor
(ii) Assigned construction site supervisor(s)
(iii) Other representatives from PPMU
(iv) Local community leaders (male and female)
(v) Villagers – representatives from both beneficiaries and affected persons (male and female)
(vi) LIC personnel where specific technical, environmental or social safeguards aspects need to be addressed

26. The following items are to be discussed:

(i) Introduction of implementation staff, responsibilities and coordination
- Contractor and his staff. (i.e Contractor Representative(s), Project Manager, Site Supervisor(s), labors)
- PPMU and assigned site supervisor(s)
- Village liaison person(s) – appointed by villagers
- LIC personnel supporting scheme development

(ii) Work description and time schedule
- The works to be undertaken with special attention paid to site access, workers camp, machine / materials site, proposed sources for materials and other aspects likely to impact on the village eg road use, site safety, etc
- The construction time schedule and works sequencing

(iii) Technical, Environmental and Social Safeguards aspects
- The technical standards / quality control / quality assurance procedures
- The CEMP
- The social safeguards aspects with compliance with land settlement confirmed from subproject LARP or DDR
- The grievance procedures with confirmation from villagers that they are understood

- Monitoring and recording of works progress and compliance with technical, environmental and social standards. The on-site works register to be maintained and completed on a daily basis by on-site staff and during all visits / inspections
- Recording and reporting of grievances or other concerns of individuals or community, including procedures for recording complaints (verbal or written) and confidential meeting requests

E. Works supervision

27. Under CRIEM - 1, the role of the construction site supervisor is paramount as they must not only work in close liaison with the contractor on technical aspects but also will assume overall responsibility for day to day monitoring of the environmental and social safeguards applicable to the scheme. This will involve familiarising himself / herself with the scope of works, conditions of contract, technical specifications, environmental management plan (EMP), social safeguards requirements (LARP / DDR), and Gender Action Plan (GAP) for the scheme prior to commencement of the works and then liaising closely with the contractor and communities to check and report compliance during implementation. Check lists for regular recording of site observations are attached (Annexes 2 – 4). The construction supervisor will also need to work closely with the PPMU Social Safeguards focal point on a no-decline request basis.

28. In addition to the assigned site supervisor who is responsible for the day to day supervision and quality control, the works will be inspected at least twice per month during the construction period by a senior engineer / supervisor from the PPMU who will provide quality assurance assessments. These checks are to ensure the day to day monitoring, reporting and follow-up of issues are being undertaken, technical standards are being met (test reports inspected), environmental and social safeguards are being complied with and appropriate actions and mitigation are being undertaken in a timely manner. In addition spot inspections, measurements and audits of recorded quantities will be undertaken as will materials supply and delivery documents. All materials used on site must be legal and hence require traceability and proof of source.

29. These visits are to be a mix of unannounced and prearranged inspections with the inspector being accompanied by the site supervisor, contractor's representative, village liaison person (for at least the prearranged visits) and other villager representatives as necessary during the walkover surveys. The site record book which is to be kept at the project site at all times during the construction period is inspected and countersigned by the senior engineer / supervisor. A quality assurance inspection visit should be scheduled immediately before the monthly PPMU meeting.

F. Monthly meeting

30. The PPMU will be fully briefed on works progress with decisions on actions to address any outstanding issues taken at the monthly project meeting. Where matters are in dispute, both the project site supervisor and the contractor (or contractor's representative) are to be given the opportunity to present their views. This meeting is also the forum at which changes and variation orders are presented and ratified.

31. The items to be discussed with respect to the works contract are:

(i) Time schedule
- Progress and revision of the time schedule if necessary

(ii) Quality and quantity control.
- Checks of quality and quantity test results and documents
- Findings from spot audits
- General observations of site management and environment

(iii) Problems encountered
- Reported issues and actions taken / yet to be taken
- Other observed issues or issues raised by villagers during visit
- Actions to be taken to resolve reported or observed issues

(iv) Variation orders and changes during the month
- Ratification of changes and variation orders that have been issued
- Discussion and decisions on new or pending issues

(v) Payments
- Approval of payment request documents (The payment requests to be prepared by the contractor as per supporting documents confirmed by site supervisor and certified by senior inspector)

(vi) Planned work activities in next month

32. Use of photos to illustrate points discussed during the meeting is important to ensure clear understanding by all participants.

G. Contract Variations

33. Variation orders are required where additions or deductions to the works quantities, changes in specified materials or adjustments in technical methods increase or decrease the contract sum. During the course of the construction, the site supervisor (in consultation with the design engineer, senior supervisor or LIC technical advisor as appropriate) may instruct the contractor to make any necessary variation of the quantity, quality or form of the works described in the specifications and/or shown on the drawings without invalidating the contract. This instruction will be done in writing as a Variation Order.

34. Note: As per Govt regulations, Variation Orders are not permitted to exceed 15 % of the total original contract value. A standard physical contingency of 10% of original contract sum should be included within the contract under the CRIEMP which can be utilised for Variation Orders to facilitate changes to this level without the need to seeking approval for a revised budget which often leads to delays.

35. Variations are most commonly applied to increase or decrease of quantities already included in the Bill of Quantity. The PPMU may approve a twenty percent (20%) increase or decrease in an item of work without entitling the contractor to claim an adjustment in item rates. The site supervisor must provide justification for additional work with the request certified by the senior engineer / supervisor. Comments and recommendations, if any, with respect these variations must be retained in the contract file.

36. For variations exceeding 20% of listed quantities or when introducing items not included in the Bill of Quantities, the contractor has the right to request an increase or decrease in the current contract unit price and to negotiate the unit price for new items, As for all variations, the site supervisor must provide justification for the additional works with the request certified by the senior engineer / supervisor and comments and recommendations, if any, with respect these variations must be retained in the contract file.

37. A copy of all approved variations should be provided to the contract file in the PPMU. Where there are increases in the contract sum, the revised contact sum must be updated on the Provincial Contract Register and advised to ADB to adjust the PCSS.

H. Filing system

38. A copy of the contract drawings, specifications and bills of quantities is to be kept on site along with the site register (record book) at all times for reference by the contractor and site supervisor. In addition, copies of the technical, environmental and social safeguard check lists are to be on site for completion during inspections. On completion of inspections, digital copies are to be made of the completed site forms and sent to the PPMU for review by the senior engineer / supervisor before filing in the main contract file held in the project office.

39. The following filing structure is recommended:

(i) Contract documents
(ii) Letter of Acceptance, Contract Agreement, Bank Guarantees, Contractor's Workplan etc.
(iii) Payment documents
- Payment requests and payment certificates
- Handing-over inspection forms, defects liability inspection forms
- Letters to and from the contractor
- Minutes of meetings

(iv) Materials testing results
(v) Site records (copies of register and checklists)
(vi) Photographs

I. Works completion inspection

40. The contractor is to advise the PPMU in writing when the construction works are completed and the subproject is ready for commissioning. Within seven calendar days of receiving notice the PPMU will arrange a "contract works completion inspection" involving the contractor, site supervisor and appropriate technical specialists (i.e. civil, bridge, road engineers, etc) as necessary. Village representatives will also be invited to accompany the inspection team.

41. This inspection shall involve:

(i) Walk-over visual inspection of the works, and
(ii) Check of supporting documents (site register, test reports, materials verification statements, etc) submitted to confirm that the works fulfil the contract requirements

42. Any works found to be outstanding, areas where additional works are considered necessary and / or any defects identified are to be noted.

43. If the PPMU arranged inspection team and the contractor agree that the works are completed (save for the minor pending or additional works noted), and there is no reason to prevent the infrastructure being used for the intended purpose, then the PPIT inspection team will recommend that Contract Works Completion Certificate be issued. The defects liability period (normally 12 months) will commence from the date of issue of this Certificate. A list of the outstanding works which must be completed during the defects liability period is agreed with the

contractor. During the defects liability period, the Contractor also remains responsible for maintaining the works and therefore a maintenance schedule should also be agreed.

44. At this stage typically up to 80 to 90% payment of Contract Sum is made to the contractor, depending on the payment schedule agreed in the Contract.

J. Commissioning

45. During the defects liability period and before final acceptance (and final payment), the infrastructure must be commissioned. Commissioning tests must therefore take place for water resources subprojects that test delivery rates pressures and related issues. Testing during the wet season based on simulating wet season operation is NOT acceptable.

46. The commissioning must be organised by the contractor assisted by the PPMU staff and the in the case of output 2 water users. The PPMU must prepare an appropriate schedule to be followed and advise the users in advance to participate in witnessing the event. Testing should be of sufficient duration to identify any infrastructure and/or management issue. Any issues identified must be clearly recorded, remedial actions determined and appropriately addressed by the contractor (if deemed his responsibility) or by the PPMU (if deemed project responsibility). In either case, the Final Completion Certificate (and final payment) can only be issued once all defects are rectified and scheme commissioned.

47. It is important to note that under CRIEMP-1, final acceptance and final contract payment is only made once the infrastructure is proven to be fully functioning with all water users can receive water as per the approved design.

K. Final inspection

48. This final inspection is carried out at the end of the defects liability period once all defects have been reported as rectified by the Contractor and commissioning is completed. As for the contract works completion inspection, within seven calendar days of receiving notice the PPMU will arrange a final inspection involving the contractor, site supervisor and appropriate technical specialists (i.e. civil, bridge, road engineers, etc) as necessary. Village representatives will also be invited to accompany the inspection team.

49. This inspection will undertake a walk-over visual inspection of the rectified works, and again check supporting documents submitted to confirm that the works fulfil the contract requirements.

50. If the PPMU inspection team and the contractor agree that the works are completed and in the case of the irrigation scheme it is fully operational, then the PPMU inspection team will recommend that Final Completion Certificate be issued. At this stage the balance contract amount and any retention monies will be paid and infrastructure handed over to the agency or organisation responsible for its ongoing O&M.

L. Subproject handover

51. After the Final Completion Certificate is issued, responsibility for the O&M of the irrigation and associated infrastructure constructed under the sub-project is formally “handed over” to the respective agencies or entity. At this stage a ceremony will be conducted to formalise the event.

52. However, the “hand-over” process actually starts 12 months earlier once the construction is completed and the scheme can be operated. It continues during the commissioning phase when water users participate in the testing and by the end of the first year they will have observed and be familiar with its operation. During this year the respective receiving entity will be confirmed.

Annex 1: Construction Site Register (Record book):

A **construction site register** is an A4 hard bound notebook with numbered pages that remains on site along with the construction drawings, contract specifications, BoQs and other site documents. It is to be used as follows:

- A daily record of work progress, i.e. work completed, staff working on site (male /female) and materials used. To be signed by foreman each day, and
- A record of each inspection by the assigned District / Province Site Supervisor(s) and other persons associated with the construction inspection / supervision

For each inspection, the original page(s) is to be retained in the site book with a copy (either carbon or digital) to be taken by the person visiting/ writing the report. The book is to be handed over by Contractor to the Engineer to the Contract (PPMU) at Contract Works Completion

Note: The copy of the inspection report is to be retained by the reporter with a further copy provided to the responsible site supervisor (if not the reporter) plus another given to the PPIT. Where variations or use of contingency funds are required, the report is to be immediately submitted to the Engineer to the Contract (PPMU) for NOC

.

Topics / Headings for Inspection Report:

1. Date and time of inspection

2. Persons participating in inspection

- Names and positions and telephone numbers.

3. Purpose of visit / inspection

Specific for inspection of construction/ infrastructure – specific item / stage of construction (Note whether it is a mandatory inspection i.e. condition for payment or not), or general visit to village for patrolling, or other activity, etc.

4. Infrastructure Site observations

- Activities reported as completed / in progress since last inspection (check earlier records)
- Activities / items inspected / checked
- Quality of activities executed / deficiencies observed
- Quality of items / materials used, compliance with specifications, documentation,
- General observations of site including contractor's staff (nos. male/female), safety, etc
- Compliance with Environmental Management and Monitoring Plans (use checklist provided)
- Compliance with COVID-19 – Preventative Action and Site Risk Management Plan
- Compliance with Social Safeguards requirements (use checklist provided)

5. Discussions and agreements

- Technical points discussed / recommendations / instructions made verbally on site
- Agreements reached / variations or use of contingencies required
- Activities / structures accepted (especially mandatory items)
- Environmental aspects discussed / recommendations / instructions given
- Social safeguards aspects discussed / recommendations / instructions given
- Photos taken – of what and by whom

6. Follow-up items

- List of items / actions to be followed up, by whom and by when

  (Note: Details to be very specific for any contract variations / use of contingencies)

7. Signatures

- District / province site supervisor or other visitor (person preparing report), and
- Contractor's site representative

Annex 2: Technical Monitoring – Indicative examples

To be used during construction phase of the sub-project

Subproject Name:

Village:

Construction Phase Technical Monitoring – Observations *(give details)*									
		Location and dates							
No.	**Activity to check**	**L:**							
		D:							
I	**Headworks**								
1	Progress since last inspection *(overall % completed)*								
2	Foundations - - Depths - Soils *(mandatory inspection / approval before placing steel / concrete work)*								
3	Reinforcing Steel - Sizing - Quantity - Placing *(mandatory inspection / approval before concrete work)*								
4	Concrete - Formwork - Cement - Aggregates - Sand - Quality (test?) *(mandatory inspection / approval at early stage of infrastructure)*								
5	Pipes - Sizes - Quality - Installation								
6	Other site observation: - Embankments - Compaction - Rock/.riprap *(Note items for special attention)*								
II	**Canals**								
1	Progress since last inspection *(overall % completed)*								

Construction Phase Technical Monitoring – Observations *(give details)*									
		Location and dates							
No.	**Activity to check**	**L:**							
		D:							
2	Excavation/ Foundations - - Depths - Soils - Slopes (RLs) *(mandatory inspection / approval before placing steel / concrete work)*								
3	Embankments: - Compaction - Slopes - Rock/.riprap *(Note items for special attention)*								
4	Reinforcing Steel - Sizing - Quantity - Placing *(mandatory inspection / approval before concrete work)*								
5	Concrete - Formwork - Cement - Aggregates - Sand - Quality (test?) *(mandatory inspection / approval at early stage of construction)*								
6	Structures / Pipes - Locations - Sizes - Quality - Installation (RLs)								
7	General site observation: *(Note items for special attention)*								
III	**Roads**								
1	Progress since last inspection *(overall % completed)*								
2	Excavation/ Foundations - - Depths - Soils - Slopes (RLs) *(mandatory inspection / approval before filling / placing running surface)*								

Construction Phase Technical Monitoring – Observations *(give details)*									
		Location and dates							
No.	**Activity to check**	**L:**							
		D:							
3	Base / running surface: - Compaction - Depths - Slopes *(Note items for special attention)*								
4	Culverts - Locations - Sizes - Quality - Installation (RLs) (*mandatory foundations inspection / approval before pipe laying / concrete work)*								
5	Road side drains - Depths - Soils - Slopes (RLs) - Protection *(mandatory inspection of excavation / approval before placing protection)*								
6	General site observation: *(Note items for special attention)*								
IV	**Structures eg bridges, buildings**								
1	Progress since last inspection *(overall % completed)*								
2	Foundations - - Depths - Soils *(mandatory inspection / approval before placing steel / concrete work)*								
3	Reinforcing Steel - Sizing - Quantity - Placing *(mandatory inspection / approval before concrete work)*								
4	Concrete - Formwork - Cement - Aggregates - Sand - Quality (test?) *(mandatory inspection / approval at early stage of infrastructure)*								

Construction Phase Technical Monitoring – Observations *(give details)*									
		Location and dates							
No.	**Activity to check**	**L:**							
		D:							
5	Structural steelwork - Sizes - Installation - Corrosion protection - Other								
6	Cladding - Quality - Installation								
7	Other site observation: - Earthworks - Rock/.riprap - Pipework - Site management *(Note items for special attention)*								

Annex 3: Environmental Monitoring- Indicative examples

To be used during construction phase of the sub-project

Subproject Name:

Village:

Construction Phase Environmental Management and Monitoring – Observations *(give details)*									
No.	**Potential Impact**	**Date**							
1	Release of silt into water courses from excavations and earthworks								
2	Environmental damage of any form results from the poor understanding of sub-project requirements by the contractor								
3	Clearance of vegetation leads to the unnecessary removal of trees and other plants.								
4	Temporary closure of irrigation systems during construction.								
5	Disposal of soil from excavations such as irrigation canals.								
6	Release of dust into the atmosphere from excavations and other construction activities.								
7	Release of noxious gases into the atmosphere.								

Construction Phase Environmental Management and Monitoring – Observations *(give details)*									
No.	**Potential Impact**	**Date**							
8	Noise nuisance from construction activities.								
9	Temporary use of land for construction affects livelihoods or leaves it damaged.								
10	Influx of temporary labour disrupts local communities.								
11	Operation of construction machines affects both workers and local society.								
12	Pollution by hydrocarbons from construction plant.								
13	Pollution from construction site wastewater, from camps and other work sites.								
14	Pollution from solid waste materials.								
15	Injuries to workers and others.								
16	Disruption of cultural sites.								
17	Subsequent users may not fully understand how to manage the subproject works.								

Annex 4: Social Monitoring Checklist Indicative Example

To be used during construction phase of the subproject
Subproject Name:
Village:

	Item	Results of Inspection / Monitoring							
	Date								
I	**Consultation and Information Disclosure**								
1	Grievance procedures explained / confirmed with villagers in required local languages *(No. persons M/F/ ethnicity)*								
2	Meeting / public consultation on impacts on community assets eg land, access, trees, crops etc in required local languages *(No. persons M/F/ethnicity and discussion details)*								
3	Labors are aware of the grievance procedures, and have contact details of relevant grievance officers and contact persons with them to hand out to affected people								
4	Grievance process contact details are listed on subproject notice boards								
5	No. of grievance cases, either verbal or written, recorded and reported to PRC and PPIT *(disaggregated by sex and ethnicity)*								
II	**Labor Employment**								
1	Contractor is following Lao Labour Law (2013) *(Art 101).* No child labor is allowed								
2	Village labor employed with AP, IP/EG and poor families given								

	Item	Results of Inspection / Monitoring							
	priority. Equal opportunity for M/F.								
3	Employment contract in place between Contractor / community or labors								
4	M/F receive equal pay for equal work								
5	All labors have received work safety training & safety equipment *(eg. clothes, gloves, glasses, boots, helmet)*								
6	Workplace is gender sensitive (*eg. separate toilet facilities for M/F labors*)								
7	All labors received training on HIV/AIDS and human trafficking								
III	**Land Acquisition and Resettlement**								
1	All activity undertaken on private land, prior arrangement agreed (voluntary temporary land release) / compensated (permanent land acquisition) with land owner *(eg camps, borrow pits, site access, etc)*								
2	Notification of works to be given 2 months in advance of construction to affected community and HHs								
3	Work schedule and any impacts on normal HH and community activities will be consulted and agreed with HHs and community								
4	Any loss of access to HH, natural resources or community facilities will be minimized in consultation and agreement with the								

	Item	Results of Inspection / Monitoring							
	HHs, with alternative access facilitated when possible								
IV	**Social culture and security issues**								
1	Community rules are respected by Contractor (*eg. traditional beliefs, sacred places, etc)*								
2	In case of relocation of tombs local reburial ceremonies are organised								
3	Any problem / conflicts between Contractor employees and community? *(eg. theft, violence, alcohol, drugs. prostitution, etc)*								

PROJECT PLANNING TEMPLATE

Prov:	Cost Estimates (VND mil.)			Implementation Status	Detailed Implementation Plan			Progress Report Status Update - Q**_ 20**		
Subproject:								Implementation Vs Planning		
	Total	ADB Loan	C. Fund		Task	Deadline	Project Management Service Standard	Achieved	Delayed	Action
Output 1:								Yes/No	Revised date	
Rehabilitation and upgrade of the road connecting from the center of Pac Nam district, Bac Kan province with Son Lo, Bao Lac district, Cao Bang province										
Feasaibility Reports for Additional Subproject FS					Preliminary design prepared by Provincial Consultant	before loan signing				
					Land Acquisition surveys completed					
					Subproject REMDP prepared					
					Environmental Examination and IEE /EIA prepared					
					Social and Poverty Assesments and Gender Action Plan prepared with baseline data					
					Subproject Financial and Economic assesment					
					FS report prepared by Provincial Consultant					
					FS reviewed by PMU/DPI					
Feasibility Reports for Representative / and Additional Subprojects				Prepared during PPTA	FS updated by provincial consultant		14 days			
					FS endorsed by PMU/PPC submitted to ADB		14 days			
					Implementation plan submitted to PMU by consultant		7 days			
					Implemetnation plan reviewed by PMU		5 days			
					Implementaiton plan revised and resubmitted to PMU		7 days			
					Implementation plan Approved by PMU submitted PPC		30 days			
Detailed Engineering Design					ToR for Detailed Design Prepared		PPSFF			
					DED TOR Approved		30 days			
					Bidding documents prepared submitted to DPI		14 days			
					Bidding document apporved by DPI		5 days			
					Advertisement in newspapers		3 days			
					Proposal submitted to PMU by firms		3 weeks			
					Techncial propsoal evaluated by PMU		10 days			
					Technical evaluation approved by DPI		3 days			
					Financial Proposals public opening by PMU		2 days			
					Financial Proposals evaluated by PMU		5 days			
					Financial Evaluation results approved by DPI		3 days			
					Contract signing PMU - consultants		7 days			
					Advance Payment (20% completed by PMU)		7 days			
					Technical Design completed by consultant		90 days			
					Technical design appraised by independent consultant		30 days			
					Techncial edsign revied and commented by LIC		14 days			
					Design revisions by consultant		14 days			
					Revised design endorsed by PMU/LIC		14 days			
					Technical design appraised by DPI		3 month			
					Technical design approved by PPC		14 days			
					Payment up to 90-% of contract value		7 days			
					Last paymentof 10% to consultant by PMU					
Land Acquisition and Resettlement					Contract signed between PMU and CLD					
					Inventory completed by CLD		30 days			
					Compensation plan prepared by CLD		30 days			
					Compensation plan publiced by CLD		30 days			
					Compensation plan approved by CPC		30 days			
					REMDP updated by LIC		14 days			
					Updated REMDP submitted by CPMU to ADB		7 days			
					Comment of ADB for updated REMDP provided to PMU		7 days			
					REMDP finalized LIC & resubmitted by PMU to ADB		7 days			
					Updated REMDP approved by ADB		7 days			
					Compensation delivered by CLD and PMU		3 weeks			
					LIC checked and submitted report to ADB		30 days			
					Last payment (10%) done by PMU to inventory consultant		30 days			

Prov:	Cost Estimates (VND mil.)			Implementation Status	Detailed Implementation Plan			Progress Report Status Update - Q**_ 20**		
Subproject:								Implementation Vs Planning		
	Total	ADB Loan	C. Fund		Task	Deadline	Project Management Service Standard	Achieved	Delayed	Action
Output 1:								Yes/No	Revised date	
Rehabilitation and upgrade of the road connecting from the center of Pac Nam district, Bac Kan province with Son Lo, Bao Lac district, Cao Bang province										
Construction supervision consultant (across all subprojects) Procurement stats within 1 month of Loan SIgning					Procurement based on draft BD's prepared by PPTA					
					BDs revised updated sbmit by PMU to DPI		7 days			
					BDs approved by DPI		10 days			
					BD/ToR forwarded to ADB for CMS uploading (STP)		7 days			
					CMS uploading by ADB		3 days			
					Proposals submitted by consulting firms forwared to PMU		21 days			
					Technical proposals evaluated by PMU		3 weeks			
					Technical evaluation results approved by PMU/DPI		10 days			
					Financial proposals opened publicily by PMU		5 days			
					Financial proposals evaluated by PMU		7 days			
					Financial evaluation results approved by DPI		7 days			
					Contract signed between PMU and consutants		10 days			
					Advance payment (20% of contract) done by PMU		30days			
					Second payment (20% of contract) done by PMU		1 year			
					Third payment (20% of contract) done by PMU		1 year			
					Fourth payment (20% of contract) done by PMU		1 year			
					Contract expired		60 days			
					Last payment (20% of contract) done by PMU		300 days			
Civil works					Bidding documents prepared by DED consultant					
					Bidding documents submitted by PMU to DPI		7 days			
					Bidding documents submitted by DPI to ADB		2 weeks			
					Bidding documents commented by ADB		2 weeks			
					Revised bidding documents submitted by DPI to ADB		7 days			
					Final bidding documents approved by ADB		7 days			
					Bidding documents approved by DPI/PPC		5 days			
					Advertisement placed on ADB website/newspapers		10 days			
					Bid opening ceremony organized by PMU		30 days			
					Bid evaluation completed by PMU		45 days			
					BER submitted by PMU to DPI		7 days			
					BER submitted by CPMU to ADB		30 days			
					BER reviewed and commented by ADB		2 weeks			
					BER revised by PMU and resubmitted by DPI to ADB		30 days			
					Revised BER approved by ADB		7 days			
					BER approved by DPI		10 days			
					Contract signed by PMU and contractor		10 days			
					Advance payment (20% of contract) done by PMU		30 days			
					Second payment (20% of contract) done by PPMU		90 days			
					Third payment (20% of contract) done by PPMU		120 days			
					Fourth payment (10% of contract) done by PPMU		120 days			
					Civil works completed by the contractor					
					Quality of civil works checked by consultant		30 days			
					Civil works handed over to the end user		31 days			
					Fifth payment (15% of contract) done by PPMU		31 days			
					Warranty payment (5% of contract) done by PPMU		365 days			

Prov:	Cost Estimates (VND mil.)			Implementation Status	Detailed Implementation Plan			Progress Report Status Update - Q**_ 20**		
Subproject:								Implementation Vs Planning		
	Total	ADB Loan	C. Fund		Task	Deadline	Project Management Service Standard	Achieved	Delayed	Action
Output 1:								Yes/No	Revised date	
Rehabilitation and upgrade of the road connecting from the center of Pac Nam district, Bac Kan province with Son Lo, Bao Lac district, Cao Bang province										
Subproject planning and implemetnation activities					FS appraisal fees					
					Last payment done for TOR & cost estimates for FS					
					Last payment done for FS monitoring survey					
					Appraisal fee for feasibility of investment					
					Last payment done for preparation of EIA					
					TOR & cost estimates for technical design					
					RFP preparation					
					Detailed design monitoring survey					
					Appraisal consultant of detailed design & cost estimates					
					Appraisal fees for detailed design & cost estimates					
					BD preparation & assessment & appraisal fees					
					Last payment done for English translation fee					
					Evaluation results appraisal fees					
					Monitoring and assessment fee for investment					
					Quality of civil works checked by consultant					
					Document file fee					
					Others					
Subproject audit			0	Not yet due.	Subproject audit completed					
Subproject liquidation			0	Not yet due.	Subproject liquidation completed					
Subtotal	0	0	0		Subproject Completion Date					

PROGRESS REPORT TABLE OF CONTENT

LOAN IMPLEMENTATION CONSULTANT TERMS OF REFERENCE

A. Proposed LIC Team Positions

1. Each PPMU will contract a firm for loan implementation support using their own counterpart funds. The LIC will be required to support the PPMU in the completion of detailed engineering designs and the approval of these designs. Indicative positions are provided for each Province in the Table below and a description of the proposed TOR provided in the sections following.

Table A7.1: Proposed LIC Positions and Inputs

Position	Person Months
A: Binh Dinh PPMU	
1. Infrastructure Engineer	40
2. PRI Engineer	30
3. Procurement	24
4. Social Safeguard subproject prep and monitoring	18
5. Gender - GAP implementation monitoring	9
6. Environment Safeguards and monitoring	18
7. Benefit and Impact Monitoring	12
8. Land Acquisition Monitoring	24
Subtotal	178
B: Quang Nam PPMU	
1. Infrastructure Engineer	30
2. PRI Engineer	15
3. Procurement	20
4. Social Safeguard subproject prep and monitoring	18
5. Gender - GAP implementation monitoring	9
6. Environment Safeguards and monitoring	20
7. Benefit and Impact Monitoring	12
8. Land Acquisition Monitoring	15
Subtotal	142

B. LIC - Position Terms of Reference

1. Infrastructure Engineer (XX person months per province) – team leader

2. The Infrastructure Engineer (roads) (40 PM) will be the team leader. The infrastructure engineer will provide implementation support and coordinate the other specialists' inputs under the project. The position requires infrastructure engineer qualifications, registration and experience to provide technical input to the PPMU decision making regarding the approvals for detailed designs, managing oversight of the design teams advising on technical issues during procurement and contracting, and reviewing the works supervision reports and contractor performance.

3. The specialist will report to the Project Director and the Deputy Directors and will be based in the Professional Project Management Unit (PPMU) to provide leadership of the LIC team and ensure the day to day management of the LIC responds to work plans agreed by the PPMU.

4. The Infrastructure Engineer will hold a tertiary qualification, preferably with a post graduate degree in transport with experience in ODA And ideally ADB donor projects.

5. They will have a minimum of 10 years' experience in rural transport infrastructure. Ideally the candidate will have experience in the project provinces and in Team Leadership.

6. Duties of the specialist include to act as the LIC Team Leader in its management and technical duties including:

(i) Support project quality assurance regime for the road and water supply subprojects;
(ii) Provide a technical review of proposed road and water supply designs in subproject investment reports and investment studies prepared by consultants in participating provinces;
(iii) Support the provincial roads and water supply specialists in briefing consulting engineers engaged to prepare subproject investment reports and investment studies on the proposed changes and explain the reasons for these changes;
(iv) Prepare construction supervision quality control guidelines to be followed by the provincial consultants appointed to carry out this task. This shall specifically address the quality control of materials and the construction processes;
(v) Provide technical review for all road and water supply subproject investment reports and investment studies and provide recommendations;
(vi) Assist the PMU in the scheduling and planning of project implementation;
(vii) Provide technical support and input to procurement, contracting, disbursement and liquidation of expenditures following ADB procedures;
(viii) Assist in the design, planning and supervision of the monitoring of implementation safeguards and benefits;
(ix) Ensure that baseline surveys and quarterly reports are carried out to obtain the necessary information to measure and report implementation performance.
(x) Ensure that appropriate levels of community participation are undertaken in the detailed design activities;
(xi) Supervise the training consultants and ensure that the training program is properly prepared and implemented;
(xii) Ensure that the safeguard studies are undertaken for each of the subprojects and assist in preparing RPs/REMDPs for new sub-projects and updating REMDPs to submit to ADB for review and approval before implementation;
(xiii) Assist the PMU by reviewing and overseeing the input of the construction supervision consultants as and when required;
(xiv) Bring safeguard issues identified by other consultants or the monitoring teams to the attention of the PPMU, accompanied by recommendations for action;
(xv) Assist the PPMU to develop the information for their preparation of the project completion report.

2. Rural Infrastructure Engineer (Water Supply ** Person Months)

7. The Rural Infrastructure Engineers (water supply) (30 PM) will be the deputy team leader responsible for output 2 works programs. The infrastructure engineer will provide implementation support and coordinate the other specialists' inputs under the project. The position requires infrastructure engineer qualifications, registration and experience to provide technical input to the PPMU decision making regarding the approvals for detailed designs, managing oversight of the design teams advising on technical issues during procurement and contracting, and reviewing the works supervision reports and contractor performance.

8. The specialist will report to the Project Director and the Deputy Directors through the team leader and will be based in the Professional Project Management Unit (PPMU) to provide leadership of the LIC team and ensure the day to day management of the LIC responds to work plans agreed by the PPMU.

9. The Infrastructure Engineer will hold a tertiary qualification, preferably with a post graduate degree in water resources, hydrology, water resource engineering with experience in ODA and ideally ADB donor projects. The expert must have proven design and technical engineering capacity to oversee and ensure system level thinking is applied from water resource availability, water balances, through to extraction and distribution.

10. They will have a minimum of 10 years' experience in rural water supply infrastructure. Ideally the candidate will have experience in the project provinces and have experience with rural water supply operators. .

11. Duties of the specialist include to act as the LIC Leader for Output 2 in its management and technical duties including:

(i) Support project quality assurance regime for the road and water supply subprojects;
(ii) Provide a technical review of proposed water supply designs in subproject investment reports and investment studies prepared by consultants;
(iii) Support the PPMU water supply design team in briefing consulting engineers engaged to prepare subproject investment reports and investment studies on the proposed changes and explain the reasons for these changes;
(iv) Prepare construction supervision quality control guidelines to be followed by the provincial consultants appointed to carry out this task. This shall specifically address the quality control of materials and the construction processes;
(v) Provide technical review for all water supply subproject investment reports and investment studies and provide recommendations;
(vi) Assist the PMU in the scheduling and planning of project implementation;
(vii) Provide technical support and input to procurement, contracting, disbursement and liquidation of expenditures following ADB procedures;
(viii) Assist in the design, planning and supervision of the monitoring of implementation safeguards and benefits;
(ix) Ensure that the detailed designs adopt national best practice and reflect international experience with respect to affordability and scheme viability, through the structured assessment of tariffs and affordability as presented by the TRTA
(x) Ensure that resource and social baseline surveys (especially the connection surveys are comprehensive and complete.

(xi) Further ensure quarterly reports are carried out to obtain the necessary information to measure and report implementation performance.
(xii) Ensure that appropriate levels of community participation are undertaken in the detailed design activities;
(xiii) Supervise the training of consultants and ensure that the training program is properly prepared and implemented;
(xiv) Ensure that the safeguard studies are undertaken for each of the subprojects and assist in preparing RPs/REMDPs for new sub-projects and updating REMDPs to submit to ADB for review and approval before implementation;
(xv) Assist the PPMU by reviewing and overseeing the input of the construction supervision consultants as and when required;
(xvi) Bring safeguard issues identified by other consultants or the monitoring teams to the attention of the PPMU, accompanied by recommendations for action;
(xvii) Assist the PPMU to develop the information for their preparation of the project completion report.

3. Procurement Specialist 24 Person Months)

12. The Procurement Specialist (24 PM – 4 months per contract package) will report to the Team leader and will be responsible for ensuring the PPMU implements the Procurement plan in a timely manner whilst achieving the performance benchmarks that drive the Value for Money Principle of ADB. The specialist will provide implementation support and capacity building to the procurement staff of the PPMU across the entire procurement and contract award cycle for both works and consulting service contracts.

13. The position requires procurement qualifications ideally including engineering qualifications, and procurement and e-procurement certification along with experience in supporting and providing oversight to procurement plan implementation.

14. The specialist will be based in the Professional Project Management Unit (PPMU) to be close to the PPMU procurement staff to address questions and work planning inputs.

15. The specialist will have experience in road sand water supply ODA projects and have at least a minimum of 5 years ODA experience in procurement or procurement related roles. The expert must have proven proficiency in the development of procurement documentation, RFP and Bid evaluations, and contract award documentation.

16. They will have a minimum of 10 years' experience in procurement activities with the candidate ideally having knowledge and experience in the project provinces. The expert is required to have a complete knowledge of e-procurement which may become mandatory within the Project implementation period.

17. Duties of the specialist include to provide leadership in procurement and contract management and technical duties including:

(i) Updating the procurement plan on a regular basis once it us output of date or revised data on procurement packages becomes available, ensuring that the PPMU has an early identification and warning of substantial changes during the design and procurement process;
(ii) Prepare a detailed procurement implementation work plan and monitoring system;

(iii) Review the detailed design documentation to ensure the bill of quantities, cost estimates and the supporting data are sufficient for procurement preparation;
(iv) Assist in the preparation of procurement package supporting information and documentation packages that enable the procurement process to be initiated in a timely and smooth manner
(v) Provide training and technical support to the PPMU staff in the use and management of documents through the ADB CMS systems
(vi) Reappraise the option of using E-Procurement as PPMU staff become familiar with the ADB procurement systems
(vii) Provide a procurement plan implementation monitoring and reporting systems that is included in monthly and quarterly reports
(viii) Provide staff mentoring through the production of packages requiring prior ADB review
(ix) Ensure the PPMU has digital and hard copy records for the post review of procurement procedures and outcomes
(x) Provide input to all ADB reports and maintain contact with the Procurement staff at ADB to identify training courses and options for the PPMU and efficiency gains opportunities.

4. Social Safeguard Specialist (18 pm)

18. The safeguard requirements of ADB seek to ensure the poor and other disadvantaged groups within the target area access project benefits. This will require specialist expertise in identifying affected groups characteristics and needs and accommodating these needs wherever feasible. Given the large proportion of ethnic minorities among the target population, measures will need to be taken to ensure these groups benefit from project interventions. The specialists will support project initiatives in community development including gender and indigenous peoples' activities.

19. The specialist will assist the PMUs in developing and implementing initiatives to assure that benefits are shared by all disadvantaged groups including the ethnic minorities. In addition, there is scope to develop other associated initiatives that will target women, the poor and ethnic groups that require further definition during preparation of subprojects for funding under the proposed Project. The specialist will have tertiary qualifications from a recognized institution with preferably 10 years of experience in related fields on internationally funded projects.

20. The specialist needs to work closely with the PPMU social safeguard staff and focal points as well as retaining oversight with stakeholders to ensure implementation of the project social safeguards comply with the Project Resettlement and Ethnic Minority Development Framework (REMDF) and ADB safeguard policy statement 2009 and relevant regulations of the government.

21. The candidate will report to the team leader and will be stationed within the PPMU. The candidate will need to demonstrate recent capacity and quality of work in the area of resettlement and ethnic minorities, the preference for qualifications is someone with (i) demonstrable field survey capability to ensure quality of field data collection, (ii) knowledge and experience with inventory of loss surveys and supporting documentation, and (iii) preparation of REMDP documentation. The candidate will be required to write in English.

22. Duties of the specialists will include the following:

(i) For each Subproject review the Poverty and Social Assessment, REMDP's, REMDF and the PAM to ascertain the nature and extent of interventions considered appropriate under the project;
(ii) Review/ascertain changes or updates to ADB and Government policies on ethnic minorities and resettlement as set out in the PAM;
(iii) Prepare and deliver workshops on social safeguards to ensure sound understanding of the principles and operational requirements for PPMU staff and other relevant stakeholders;
(iv) Assist the PPMU and related agencies in preparation, update, implementation and monitoring of subproject REMDPs to ensure that all provisions and requirements from all approved subproject REMDPs are undertaken and ensure they are appropriately monitored by the project performance monitoring systems (PPMS);
(v) In coordination with the Commune Supervision Boards (CSB) monitor (government funded and includes at least one woman) all subprojects to determine if serious negative impacts on ethnic minorities, women or other disadvantaged groups are occurring and make recommendations to the PMU to ameliorate/mitigate these;
(vi) In coordination with the CSB monitor community involvement in subproject implementation and bring issues or problems to the attention of the PMUs;
(vii) In coordination with the CSB document the community participation process and make recommendations for changes in processes and procedures for the balance of the project to strengthen the understanding and skills of government staff in this critical area;
(viii) Assist the PMUs in development of performance frameworks and quarterly activity schedules for the Community Development Officers;
(ix) Provide updates on each Subproject progress with respect to the required land acquisition and compensation schemes, and
(x) Other relevant duties and responsibilities as required.

5. Gender Specialist (National, 9 person-months per province; 18 person-months for project)

23. The specialist will have at least a BA degree in social sciences or related fields. The specialist will need to have at least 5 year-experience in gender mainstreaming in development projects in rural communities in Viet Nam that include ethnic minorities. Prior knowledge and experience with Effective Gender Mainstreaming strategies and implementation in ODA projects is highly desirable. Prior experience in similar assignments in ADB financed projects will be an advantage. The specialist should have good English skills (speaking and writing).

24. The specialist's tasks and deliveries are as follows:

(i) Support the PMU to implement GAP (including provide technical inputs for gender related training, briefing to stakeholders, workshop, materials development, gender provision in bidding documents, assessments and studies, etc)
(ii) Develop and deliver gender related training, and mentoring of each PMU's gender focal point in GAP implementation
(iii) Review PMUs workplans and schedules and suggest options for strengthening the gender mainstreaming activities as defined in the GAP
(iv) Support PPMUs in implementing the GAP and ADB missions' recommendations.
(v) Develop and support PMUs to monitor and report on GAP implementation and DMF gender targets to ADB in collaboration with M&E specialist and other staff.

(vi) Prepare GAP Project Completion report (PCR) for the government PCR report, based on ADB templates.

6. Environment Safeguard Specialist (18 person months per province)

25. While the pre-screened subprojects are expected to have minimal long term environmental impacts, there are possibly short-term concerns for which mitigation strategies need to be designed and implemented. Expertise is needed to ensure that the subprojects have well developed and executable contractor environmental management plans (CEMP) with appropriate mitigation measures based on the environmental assessment and review framework prepared. They will develop mechanisms to ensure that mitigating measures are observed and will establish reporting formats to monitor the performance of contractors during the construction phase when environmental impacts are most likely.

26. The expert shall have qualifications in an environmental subject (e.g. soil science, botany, zoology, physical geography, ecology, forestry, agronomy or environmental science but with a preference aligned to water resources and pollution. Preferably the ideal candidate will hold an advanced degree in a similar subject. The expert shall have at least five years of experience environmental safeguards monitoring and supervision in construction based projects and at least 3 years safeguard requirements of ADB / WB rural infrastructure development projects (i.e. in project implementation).

27. The consultant shall have sole responsibility for the following deliverables.

(i) EMP monitoring and reporting for each CRIEM subproject approved by the PPC
(ii) Project Quarterly Environmental Monitoring Reports (from Q1 of year 2 onwards).
(iii) Project Annual Environmental Monitoring Reports (end of each year) as a component of annual reports.

28. The following tasks are expected to be undertaken:

(i) Manage and support the PPMU to ensure compliance with the EMP provision for each subproject.
(ii) Review the environmental recommendations of the TRTA Final Report and the formats for environmental examinations contained therein;
(iii) Brief the staff of the PPMUs in participating provinces on environmental procedures and requirements for subproject preparation;
(iv) Visit each subproject during the subproject detailed design to ensure environmental safeguards are being properly conducted providing advice and support for IEE updating;
(v) Assist the PPCs with the internal review of the initial environmental examinations and associated environmental management plans prepared for each subproject and assist with updating the draft IEEs in response to comments received;
(vi) Assist the PPMUs to ensure that EMP is adequately integrated in bidding document and civil contract;
(vii) Assist PPMU in establishment and operation of environment management system described in EMP;
(viii) Undertake regular supervision of all contractor's environmental performance and carry out environment sampling program for surface/ground water quality, dust and

noise as required in the EMP and, prepare semiannual monitoring report for submission to ADB and government environment authority and;

(ix) Assist in the preparation and implementation of training activities with regard to the environmental aspects of the Project.

(x) For output 1 Monitor the subproject impacts during planning and construction to determine whether there are any unexpected negative environmental impacts caused by the road investments. If necessary, propose suitable mitigation measures.

(xi) For output 2 Monitor water resource subproject areas that are the potentially impacted and ensure EMP is fully integrated with construction contracts and implemented to determine whether there are any unexpected negative environmental impacts caused by the changed management of upland watersheds. If necessary, propose suitable mitigation measures

29. Prepare a monitoring report as required that

(i) Review all loan covenants and recent national environmental legislation.

(ii) For all of the subprojects, update the EMP or Code of Conduct and provide a training seminar to each of the implementing stakeholders. Prepare stakeholder-specific checklists of mitigation actions that must be implemented based on the EMPs.

(iii) Confirm the EMP or Code of Conduct for each subproject, and seek agreement on its use by subproject stakeholders including contractors, construction supervision consultants.

(iv) Liaise with the project stakeholders to collect and interpret additional environmental data that may be necessary as part of EMP baselines.

(v) Manage environmental sampling and analysis as necessary to ensure that safeguards are in place or to quantify environmental trends as identified in the EMPs.

(vi) Monitor the subproject areas that are the target of activities to determine whether there are any unexpected negative environmental impacts caused by the upgraded rural infrastructure. If necessary, propose suitable mitigation measures.

(vii) Provide capacity development support in the form of advice and seminars to DONRE Environmental Officers, covering all aspects of subproject environmental management and monitoring.

(viii) Prepare inputs for the Project Environmental Monitoring Reports.

7. Benefit and Impact Monitoring (12 person month)

30. The specialist will have a qualification in either social assessment related themes or institutional issues and benefit monitoring. The candidate will have a minimum of 10 year-experience in ODA project implementation, monitoring, and impact assessments. The candidate will report to the LIC team leader and will be an integral part of assembling a data capture, and reporting framework.

31. The consultant will help the PPMU establish a system for project performance monitoring in accordance with the project framework. The consultant will:

(i) Identify, on the basis of the project framework developed during project processing, performance indicators to be monitored during the implementation of the Project;

(ii) Advise on the establishment of systems for collecting data and statistics for such monitoring;

(iii) Advise on the carrying out a baseline survey on performance indicators including on poverty, socioeconomic survey, gender development, employment– generation amongst others to Project Affected Persons, and other social and economic development activities;
(iv) Advise on collection of required data and undertake other relevant surveys before construction and immediately after completion of the Project; and
(v) Develop data requirements to be collected and assembled during the FS that cover social, EM, Gender, Poverty, and economic impact data to establish a quantifiable baseline.
(vi) Establish a data archive on line and preferably cloud based to enable wider access to project documentation
(vii) Prepare a reporting framework for the six monthly reports and assist the PPMU to prepare these reports for the first six months and the first annual report.
(viii) Incorporate findings and supporting data in the project completion report, in accordance with a schedule and terms of reference to be mutually agreed PPMU and ADB.

8. Safeguard Monitoring and Public Reporting (24 months)

32. The consultant will be responsible to review and report the implementation of the REMDPs for all subprojects. The expert shall have detailed knowledge of resettlement, land acquisition, and compensation systems of both ODA and Govt. A minimum of 5 year-experience in resettlement or compensation is required. The expert shall be responsible for the following tasks:

(i) Reviews and recommendations on all subproject REMDP and the associated LARPS through providing comments to PPMU on the draft review documents, to ensure the REMDF is fully responded to and that the REMDPs are structured into a work plan that the contractors can fully understand.
(ii) Review of implementation status of each SP LARP prior to detailed design approvals to ensure that procedures, consultations and actions are being implemented as defined, and that the compensation arrangements are fully understood and have been fully implemented prior to the award of any works contract
(iii) A status report on the completion of each Subproject land acquisition and compensation plan
(iv) Meet and interview all construction supervision staff regarding social safeguard issues and processes that are included in the REMDP and then verify the accuracy and quality of what has been reported
(v) Conduct field site visit and face to face interviews with AP to ascertain outstanding grievances,
(vi) Provide the Director of the PPMU a quarterly report on outstanding issues and current status of social safeguard and compensation implementation arrangements
(vii) Report direct to ADB if works are proposed prior to the full and final payment of all subproject compensation