



Lao People's Democratic Republic
Peace Independence Democracy Unity Prosperity

**SOUTH EAST ASIA DISASTER RISK MANAGEMENT (SEA DRM) PROJECT FOR
LAO PDR (Project ID No: P160930)**
COMPONENT 1: INTEGRATED URBAN FLOOD RISK MANAGEMENT

3rd Environmental and Social Monitoring Report (ESMR)

(01 January to 30 September 2023)

Volume 2 – Annexes

Prepared by:

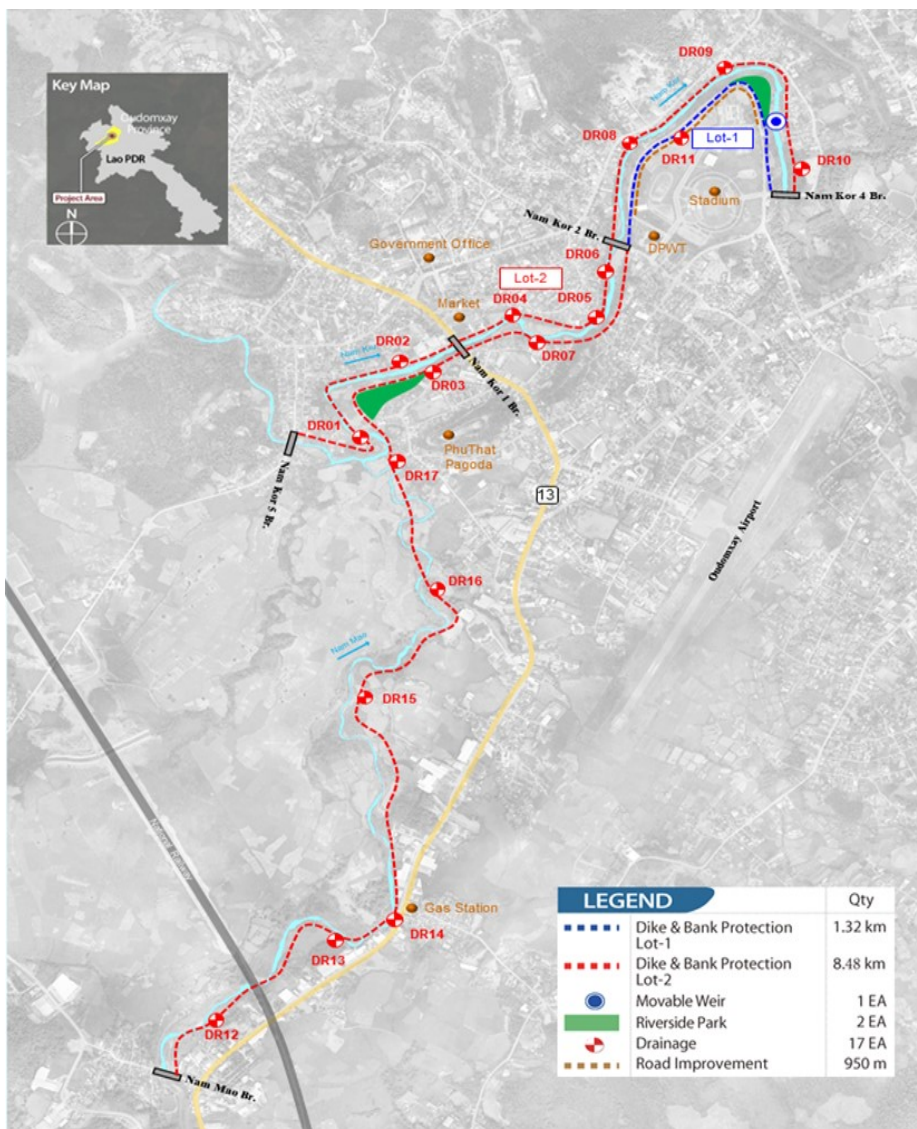
The Ministry of Public Works and Transport (MPWT) through the Project Management Unit (PMU) of the Department of Waterways (DOW) and the Environment and Disaster Prevention Division (EDPD) of the Public Works and Transport Institute (PTI)

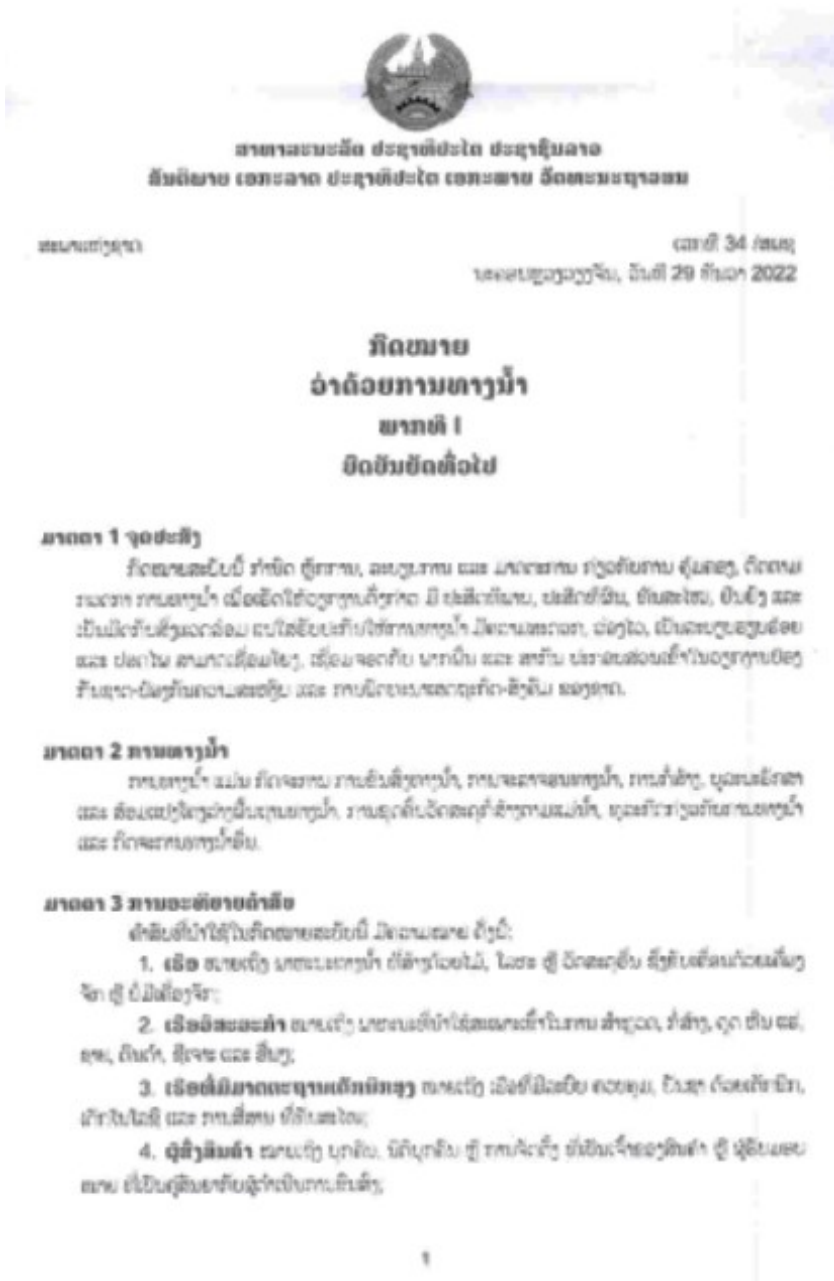
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Annex 1A. ODX -Lot-2 Construction sites and facilities





ພາກທີ V ເຂດສະຫງວນທາງນໍ້າ

ມາດຕາ 65 ເຂດສະຫງວນທາງນໍ້າ

ເຂດສະຫງວນທາງນໍ້າ ແມ່ນ ຝື່ນທີ່ ໜ້າດິນ, ໃຕ້ດິນ, ໜ້ານໍ້າ, ເທິງໜ້ານໍ້າ ແລະ ດິນຝື່ນນໍ້າ ທີ່ສະຫງວນໄວ້ ສໍາລັບການ ຂົນສົ່ງທາງນໍ້າ, ກໍ່ສ້າງໂຄງລ່າງຝື່ນຖານທາງນໍ້າ ແລະ ຊຸດຄື້ນວັດສະດຸກໍ່ສ້າງ ຊຶ່ງບໍ່ອະນຸຍາດໃຫ້ມີການ ກໍ່ສ້າງ, ປຸກສ້າງ ຫຼື ດໍາເນີນກິດຈະການໃດໜຶ່ງ ເວັ້ນເສຍແຕ່ໄດ້ຮັບອະນຸຍາດຈາກກະຊວງໂຍທາທິການ ແລະ ຂົນສົ່ງ ໂດຍສົມທົບກັບ ກະຊວງ, ອົງການ ແລະ ອົງການປົກຄອງທ້ອງຖິ່ນທີ່ກ່ຽວຂ້ອງ.

ມາດຕາ 66 ເຂດສະຫງວນທາງນໍ້າຢູ່ໜ້າດິນ

ເຂດສະຫງວນທາງນໍ້າຢູ່ໜ້າດິນ ແມ່ນ ຝື່ນທີ່ສະຫງວນໄວ້ ນັບຈາກແຄມຕາຝັ່ງເຂົ້າໄປໃນເຂດທີ່ດິນເປື້ອງໃນ ຢ່າງໜ້ອຍ ສາມສິບຫ້າແມັດ ສໍາລັບແມ່ນໍ້າຂອງ ແລະ ຊາວຫ້າແມັດ ສໍາລັບແມ່ນໍ້າອື່ນ ເພື່ອກໍ່ສ້າງໂຄງລ່າງຝື່ນຖານທາງນໍ້າ ແລະ ການຂົນສົ່ງທາງນໍ້າ.

ການກໍານົດຝື່ນທີ່ດັ່ງກ່າວ ໃຫ້ອີງຕາມຄວາມຈໍາເປັນ ຂອງມາດຕະຖານເຕັກນິກ ເພື່ອບ້ອງກັນຄວາມປອດໄພ ແລະ ປົກປັກຮັກສາສິ່ງແວດລ້ອມ, ທໍາມະຊາດ ແລະ ສັງຄົມ.

ໃນກໍລະນີ ມີຝື່ນທີ່ຈໍາກັດໃນເຂດຊຸມຊົນໜ້າແໜ້ນ, ແຫຼ່ງວັດຖຸບູຮານ, ສະຖານທີ່ສໍາຄັນທາງດ້ານປະຫວັດສາດ ແລະ ເຂດອະນຸລັກນັ້ນ ຝື່ນທີ່ເຂດສະຫງວນທາງນໍ້າຢູ່ໜ້າດິນ ໃຫ້ປະຕິບັດຕາມກົດໝາຍ ແລະ ລະບຽບການທີ່ກ່ຽວຂ້ອງ.

ມາດຕາ 67 ເຂດສະຫງວນໃຕ້ດິນ

ເຂດສະຫງວນໃຕ້ດິນ ແມ່ນ ຝື່ນທີ່ສະຫງວນຈາກໜ້າດິນເລິກລົງໄປຕາມເຂດສະຫງວນໜ້າດິນ ເພື່ອບ້ອງກັນຕາຝັ່ງເຊາະ, ເຈື່ອນ, ຍຸບ ຫຼື ກໍ່ສ້າງໂຄງລ່າງຝື່ນຖານທາງນໍ້າ.

ຖ້າມີຄວາມຈໍາເປັນກໍ່ສ້າງກິດຈະການໃດໜຶ່ງ ເປັນຕົ້ນ ການວາງທໍ່ນໍ້າປະປາ, ທໍ່ລະບາຍນໍ້າ, ທໍ່ສາຍໄຟຝ້າ, ທໍ່ສົ່ງອາຍແກັສ ແລະ ອື່ນໆ ຢູ່ໃຕ້ດິນ ຕ້ອງອໍອະນຸຍາດນໍາອະແຫງງການໂຍທາທິການ ແລະ ຂົນສົ່ງ.

ພາກທີ XIV

ນະໂຍບາຍຕໍ່ຜູ້ມີຜົນງານ ແລະ ມາດຕະການຕໍ່ຜູ້ລະເມີດ

ມາດຕາ 140 ນະໂຍບາຍຕໍ່ຜູ້ມີຜົນງານ

ບຸກຄົນ, ນິຕິບຸກຄົນ ແລະ ການຈັດຕັ້ງ ທີ່ມີຜົນງານດີເດັ່ນ ໃນການປະຕິບັດກົດໝາຍສະບັບນີ້ ຈະໄດ້ຮັບ ການຍ້ອງຍໍ ຫຼື ນະໂຍບາຍອື່ນ ຕາມລະບຽບການ.

ມາດຕາ 141 ມາດຕະການຕໍ່ຜູ້ລະເມີດ

ບຸກຄົນ, ນິຕິບຸກຄົນ ແລະ ການຈັດຕັ້ງ ທີ່ໄດ້ລະເມີດກົດໝາຍສະບັບນີ້ ເປັນຕົ້ນ ຂໍ້ 1 ຈະຖືກປະຕິບັດມາດຕະການ ສຶກສາອົບຮົມ, ກ່າວເຕືອນ, ລົງວິໄນ, ປັບໃໝ, ໃຊ້ແທນຄ່າເສຍຫາຍທາງແມ່ງ ຫຼື ຖືກລົງໂທດທາງອາຍາ ຕາມກົດໝາຍ.

ພາກທີ XV

ບົດບັນຍັດສຸດທ້າຍ

ມາດຕາ 142 ການຈັດຕັ້ງປະຕິບັດ

ລັດຖະບານ ແຫ່ງ ສາທາລະນະລັດ ປະຊາທິປະໄຕ ປະຊາຊົນລາວ ເປັນຜູ້ຈັດຕັ້ງປະຕິບັດກົດໝາຍສະບັບນີ້.

ມາດຕາ 143 ຜົນສັກສິດ

ກົດໝາຍສະບັບນີ້ ມີຜົນສັກສິດ ນັບແຕ່ວັນທີ 30 ມີນາ 2023 ມາຍຫຼັງ ປະທານປະເທດ ແຫ່ງ ສາທາລະນະລັດ ປະຊາທິປະໄຕ ປະຊາຊົນລາວ ອອກລັດຖະດໍາລັດປະກາດໃຊ້ ແລະ ໄດ້ລົງຈົດໝາຍເຫດທາງລັດຖະການ ເປັນຕົ້ນໄປ.

ປະທານສະພາແຫ່ງຊາດ



ບອ ໄຊສົມພອນ ພິມວິຫານ

Annex 2A. ODX -Map/photos on construction area & GRM boxes



Annex 2B: Map/photos on site barricades & warning signs



Installation of Project sign boards at Namkor bridge 5 Thin Village



Installation of Project sign boards at Leuxay Market



Installation of warning signs at 0+500 R in Nalao Village



Installation of warning signs at 1+050 L in Vanghai village



Installation of warning signs at 3+350 R in Nawhannoy Village



Installation of warning signs at 1+625 R in Nalao Village



Installation of warning signs at 0+650 L in Vang hai Village



Installation of warning signs at 0+350 L in Thin village



Installation of warning signs at the construction site in Vang hai village



Installation of site barricades (white vinyl tape) in Nawan Noy village



Site barricades with gate at km 3+350 R
Nawhannoy Village

Site barricades with gate at km 3+000 L
Nawhannoy Village



Site barricades with gate at km 0+350 L Thin
village

Site barricade at km 0+350 L Thin village



Site barricade at km 0+350 L Thin village



Site barricade



Installation of safety and speed control signs at 2+850 R in Nawhannoy village



Installation of safety and speed control signs at 4+940 R

Photos of corrective actions: installation of site barricades (red-and-white vinyl tape) and warning signs

Photos Before	Photos After
Construction Worker Camp for the Lot 2 at Nalao village on 10-15 January 2023	
	
<p>Site barricades (red-and-white vinyl tape) and warning signs at Section L2 (Km1+000 to 3+517) along the Nam kor river at Longkordeua village on May 2023</p>	









Site barricades (red-and-white vinyl tape) and warning signs at Section R4 station 4+130 R in Nawan Noy village on March 2023



Site barricades (red-and-white vinyl tape) at Section R3 station 3+350 in Nalao village



NRA letter

ສາທາລະນະລັດ ປະຊາທິປະໄຕ ປະຊາຊົນລາວ

ສັນຕິພາບ ເອກະລາດ ປະຊາທິປະໄຕ ເອກະລາຍ ວັດທະນະຖາວອນ

LCT USD Clearance Company, Ltd.
SARASOY VILLAGE, SATTIMARTI CHOK, THONGKHAO CAPITAL, LAO PDR.
Tel: (+85621) 2561776, 8998778 | Email: info@lctusa.com, info@lctusa.com

ເລກທີ 236/2023

ທີ, ເລກອະນຸລາຍງານຈົນ ວັນທີ 25/ 07/ 2023

ເອກະສານຢັ້ງຢືນ

ໂຄງການ: ກໍ່ສ້າງກິນເຈືອນລຽນຕາມແຜນນໍ້າມາດ ແລະ ນໍ້າກໍ່ ເຂດເອກສະບານເມືອງໄຊ ແຂວງ ອຸດົມໄຊ.

ສິ່ງກາມສໍ້ຄົງລັດຖະມົນຕີກະຊວງມະຫາວິທະຍາໄລ ແລະ ສະຫວັດດີການສຶກາ ວ່າດ້ວຍການຈັດຕັ້ງ ແລະ ການເກືອບໄຫວສອງກະບະກຳມະການຖິ້ມລູກແຫ່ງຊາດ ເພື່ອແກ້ໄຂບັນຫາລະເບີດບໍ່ສົນເລກ ທີ່ຕົກຄ້າງູ່ ສປປ ລາວ ສະບັບເລກທີ 4999/ສສ, ລົງວັນທີ 09 ຕັນວາ 2022.

ສິ່ງກາມບົດທີ 19 ການລົງມາຄອງບັນຫາ ສໍ້ທີ 8.2.1, ການຄວບຄຸມຄຸນນະພາບສາບອກ ສໍ້ພົມ ລຽນກຸ່ມກວດຈັດລະເບີດ, ສໍ້ ກ.ສ ແລະ ລົງລັບ (1) ແລະ (2).

ສິ່ງໃສ່ເຫນື້ອທີ່ມູນກາຍຖິ້ມລູກລະເບີດໃນ ສປປ ລາວ ໃນສະໄໝສິ່ງກາມໂລກຄັ້ງທີ 2 ໃນຊຸມປີ 1965 – 1973.

ບໍລິສັດ ແອວຊີວາຍ ເກີບຈີ້ ແລະ ອຳລາຍລະເບີດ ຈຳກັດຜູ້ດຽວ ໄດ້ສອກເອກະສານຢັ້ງຢືນສໍາລັບຜູ້ໃນ ເຂດສື່ນທີ່ບໍ່ສອບຖິ້ມລົງຄ່າງໂຄງການກິນເຈືອນລຽນຕາມແຜນນໍ້າມາດ ແລະ ນໍ້າກໍ່, ລວມເນື້ອທີ່ສັງຄົດ 85,200 ຕາແມັດ ເຊິ່ງເນື້ອງຈາກວ່າສິມງຸນລັດຖາກສອງບໍລິສັດ ແອວຊີວາຍ ເກີບຈີ້ ແລະ ອຳລາຍລະເບີດ ຈຳກັດ ກໍ່ໄດ້ຜິງ ປະເມີນຄວາມສ່ຽງອາກສະຫນາດຕົວຈິງ ແລະ ສຶກຄ່າງຜິງຜູ້ໃນສື່ນທີ່ດັ່ງກ່າວນີ້ແມ່ນບໍ່ໄດ້ມີການສຸດຕາຍລົງໃນສື່ນ ຕົນ. ທາງບໍລິສັດສໍ້ຄົງຢັ້ງຢືນວ່າ ສື່ນທີ່ດັ່ງກ່າວນີ້ແມ່ນມີຄວາມຄວາມປອດໄພຕໍ່ ຖືກຕ້ອງຕາມລະບຽບການປະຕິບັດ ກຸນສອງບໍລິສັດ ແລະ ສອດກ່ອງກິນເຈືອນລະຖານແຫ່ງຊາດທີ່ໄດ້ກຳນົດໄວ້.

ສະນັ້ນ, ຈິ່ງໄດ້ສອກໃນຢັ້ງຢືນສື່ນທີ່ດັ່ງກ່າວນີ້ໃຫ້ແກ່ໂຄງການລົງມາຄອງຄວາມສ່ຽງໄຂສິດນໍ້າຖ້ວມເຂດ ຕົວເມືອງໄຊ ແຂວງອຸດົມໄຊ ບໍາໄຊສື່ນທີ່ດັ່ງກ່າວຕາມຈຸດປະສົງ.

ຫົວໜ້າກຸ່ມຄອງບັນຫາ ຕຸກກວ

ບໍລິສັດ ແອວຊີວາຍ ເກີບຈີ້ລະເບີດ ຈຳກັດຜູ້ດຽວ



Annex 2D: ODX -Existing conditions of the construction sites





Section R4 in Nalao village on March 2023



Section R4 in Nalao village on March 2023



Section L1 in Nalao village on March 2023



Section L1 in Nalao village on March 2023



Existing condition at Section L2 in Nalao village on March 2023



Existing condition at Section L2 in Nalao village on March 2023



Ongoing work at the Riverside Park1 in Nawan Noy village on May 2023



Ongoing work at the Riverside Park1 in Nawan Noy village on May 2023



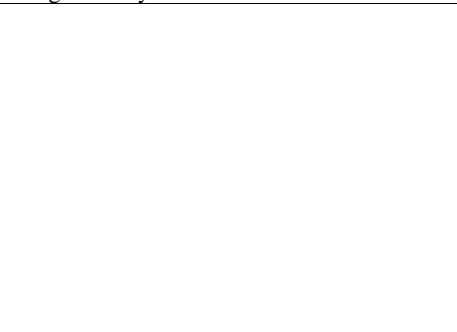
Existing condition at disposal area in Nawan Noy village on May 2023



Ongoing work at disposal area in Nawan Noy village on May 2023



Existing conditions of Drainage/Gate



Annex 3A. CSC-TOR for LPB and BKX Subprojects

(i) Task 1: Mobilization and Initial Actions

- Establish project office/s and facilities for the consulting services including providing or identifying a suitable test laboratory for independent testing of soils, concrete and other construction materials etc. (cost of offices and laboratory to be paid through works contracts)
- Review and coordinate detailed work programs featuring all pertinent activities and critical paths;
- Prepare the project organizational charts and overall implementation and consultant staffing schedules and maintain and update such charts and schedules as necessary;
- Establish document control and filing systems for the project office/s, including official correspondence, drawings, site instructions, variation orders, diaries and all site records;
- Develop program management and tracking system, using proprietary computer software such as Microsoft Project or similar forms of Gantt Charts to schedule, and monitor progress in all aspects of construction activities; and
- Prepare an Inception Report within the first six weeks of the consulting services to present the result of the above tasks.

(ii) Task 2: Design Review and Updating Contract Documents as Necessary

- While it is envisaged that construction work will proceed soon after the completion of Detailed Engineering Design unforeseen delays may occur in procuring works contracts. The consultant may therefore be required to update designs, contract drawings and contract documents to accommodate any pertinent changes that occur. Before commencement of the work, the consultant shall carry out selected "route walking" to identify any necessary changes to the planned works and the access to them. Any changes shall be subjected to endorsement by the design consultant, approval of the client and, depending on the implication on costs, the no objection of the World Bank.
- The recommended design criteria, specifications, technical standards, and codes of practice should give due consideration to Lao PDR Standard and Specifications, taking due account of advice provided by DOW, and where Lao PDR codes of practice/specifications and standards are not available, relevant international codes of practice, specifications, and standards (with the approval of DOW.)
- The particular specifications for material and workmanship of all major work items should be presented in the bidding documents, and contain a general overview of the elements on which the work will be performed, inter alia, including technical parameters, main materials, characteristics, performance criteria for the main components, test and passing requirements, and acceptance criteria.

(iii) Task 3: General activities

- Regular assessment of the adequacy of the contractor/s input materials, labor, equipment, and construction methods;
- Establish field survey control, as required, in accordance with the construction contracts. Check the construction contractors' setting out to ensure that work complies with the tolerances established by the contract documents and to ensure proper control of construction;

- Check and ensure the contractors carry out work in accordance with their submitted Method Statements and ensure the contractors adopt international safety standards in carrying out the works;
- Ensure that the construction contractors have valid permission to access construction sites before work commences, and that their site occupation program complies with conditions applicable to that permission;
- Make and keep records of condition surveys at each site prior to commencement of construction;
- Conduct random (but at least fortnightly) reviews of the contractors' daily records, material-testing results, batch records, set-out survey records etc. and report to the Client;
- Scrutinize construction methods proposed by the contractor including environmental, safety, personnel and public issues. This to include the review and approval of any temporary works proposed, including any necessary design checks;
- Extend timely assistance and directions to the contractors in all matters related to interpretation of the contract documents, plans, quality control testing, and other matters relating to contract compliance and progress;
- Check and revise construction drawings if any alteration is needed according to site requirements. Any significant revisions to design drawings should be certified by the design consultants;
- Conduct regular formal site meetings with the contractor and keep minutes of matters of concern;
- Carry out regular daily site visits and maintain an overview of progress, with particular attention to ensuring contractors' adherence to the design and construction drawings and specifications. Maintain daily records of the activities on the site, site conditions, and contractor's resources;
- Attend to third party inspections as necessary;
- Assist DOW as necessary in meeting its obligations under the World Bank Credit, particularly in relation to reporting requirements and providing support during World Bank implementation review, and mid-term review missions.

(iv) Task 4: Inspect and test construction materials for quality assurance

- Monitor, audit, and perform independent testing of materials and systems put in place by the works contractor to verify their compliance with the required standards in accordance with the specifications;
- Supervise, approve, and keep records of all site tests of the works according to the specifications;
- Check and verify that the materials testing laboratories established by the contractor, or outsourced to a private laboratory by the contractor, are well equipped and staffed by qualified personnel. On a random basis, have parallel samples tested at an independent and separate materials testing laboratory to verify the accuracy of the contractor's results.

(v) Task 5: Report progress and certify Interim Payments

- Prepare monthly progress report with supporting photos for submission to the Client; the reports will also include progress related to Environmental and Social Safeguard implementation;

- Record and measure the quantity of work in accordance with the Conditions of Contract and the Bills of Quantities and provide certification; and
- Process the contractors' claims for interim payments and issue interim payment certificates for the Client's review and approval;

(vi) Task 6: Monitor and update as necessary implementation schedules and cost projections

- Review, comment, and recommend for approval the Construction Contractors' proposed implementation schedules and programs, including periodic updates as the works proceed;
- Monitor the implementation schedule and if actual progress lags significantly behind the approved planned project schedules, require the contractors to submit alternative schedules and work plans to achieve completion on time;
- Prepare and update contract cash flow and financial projections on a monthly basis;

(vii) Task 7: Environmental and social safeguards monitoring

- Review and monitor the government (PO and SPO) and contractor's adherence to (i) the approved Environmental and Social Management Plan (ESMP), Contractor- Environmental and Social Management Plan (C-ESMP), Ethnic Group Engagement Plan (EGEP), and Resettlement Action Plan or Abbreviated Resettlement Action Plan (ARAP); (ii) any monitoring plans as recommended in the Environmental and Social Impact Assessment (ESIA) report; and (iii) relevant national legislation including EIA Decree 2019 and Compensation and Resettlement Decree 84, 2016; and review documentation, resolution and reporting on non-compliance issues and complaints;
- Undertake regular monitoring and include in all reports adherence and implementation status of ESMP, C-ESMP, RAP/ARAP and EGEP and follow up as needed on the actions required in the safeguards documents and previous progress reports or any specific incidence reports prepared;
- Support EDPD/PTRI, DPWT and Project Resettlement Committee (PRC) and local authorities to operate the Project Grievance Redress Mechanism (GRM), and monitor, report on the status of grievances received and responded or addressed;
- Promptly attend to, and report on, any public complaints and incidences concerning execution of the works;
- Ensure that the contractors are aware of the approved GRM and grievance procedures established for the local communities and concerned stakeholders, and for contractor's workers, appoint two separate focal points with one for handling with grievances received from the local communities and others for dealing with grievances from contractor's workers and ensure that they follow the protocols as detailed in ESMP, C-ESMP, RAP/ARAP and EGEP (including proper documentation), and address any work-related complaints in a timely manner;
- Liaise with, and give necessary support to any independent environmental and social safeguards consultants in carrying out their monitoring and evaluation tasks, and fully cooperate with and participate in periodic monitoring visits, implementation support missions and spot-checks or investigation missions undertaken by DOW, World Bank staff or their consultants
- Undertake the inspection of and approval of contractors' camps and disposal sites to ensure that the ESMP/ESCOPs criteria for such sites are met;

- Assist with the encouragement of employment of communities, specifically women and ethnic people during infrastructure work and ensure that core labor standards are followed and monitored during implementation. This includes integrating necessary provisions in contracts to ensure that Project goals can be reached and indicators measured.
- Undertake regular monitoring to ensure that the measures to mitigate risks and negative impacts from the works and labor influx, as described in the environmental/safeguards documents applied, including implementation of ESMP, Environmental, Social, Health and Safety (ESHS) Guidelines including occupational and community health and safety plan, Code of Conduct (COC) to prevent and address Gender-based Violence, Violence Against Children (VAC) and Sexual Exploitation and Abuse (SEA), as part of their contractual obligations;
- Reviewing contractors' Monthly Construction Progress Report/s (MCPR) and prepare a summary for all contracts;
- Supervise contractors' compliance with safeguard documents and Construction Environmental Management Plans (C-EMPS), and issue instructions and notifications to the Contractor to address any safeguards non-compliance concerns;
- Review and advise on compliance with the Resettlement Action Plans and Ethnic Group Engagement Plans by the SPO (DPWT) and PO (EDPD/PTRI). Social Specialists of the Supervision Consultant will assess and certify completion of RAP and compensation provided to PAHs/PAPs to enable SPO and PO to handover the subproject sites or parts of the subproject sites (where RAP and compensation is completed) to contractors to start their works;
- Supervision of contractors in all matters concerning compliance with occupational health, safety (OHS) and labour management procedures or plan (LMP) and the community health and safety standard, including education on HIV/AIDS and COC to prevent and address potential GBV, VAC and SEA issues. If required, instruct the Contractors to take actions in accordance with the requirements of the Contract to ensure compliance with the requirements of the project for addressing HIV/AIDS and GBV, VAC and SEA;
- Conduct safety audits to validate the OHS supervision of the resident engineer and independently confirm compliance with the Contractor's OHS plan. Provide regular audit reports of the findings.
- Ensure that any workers camps are established and managed in accordance with the recommendations of the Environmental Management Plan (EMP), OHS and LMP and the guidance contained in the IFC Guidance Note on Worker's Accommodation (Version 2009) see: <http://tinyurl.com/workers-camps>;
- Provide materials for consultation and otherwise support the SPO and local authorities to consult with the communities and stakeholders in accordance with ESMP, RAP and EGEP and ensure that outcomes of consultations are documented and included in safeguard monitoring reports, annual and semi-annual progress reports. A Provisional Sum has been incorporated in the contract to cover the costs associated with consultation including the costs of organizing consultation workshops with stakeholders, including the costs of interpretation and participants' per diem, transportation, accommodation, and catering as deemed necessary (refer also to paragraph 30 of this TOR).

(viii) Task 8: Variations and Claims

- Prepare for DOW's review and approval and subsequent issue to the contractor/s, submissions for variations to the contract/s that may be necessary to address unforeseen circumstances or other matters. Such variations should be in accordance with Section 13 Variations and Adjustments of the Conditions of Contract. The submissions should inter alia indicate to DOW any effect the changes may have on the contract amount and any additional time required to complete the contract;
- Assess any contractor/s' claims for extension of time, additional payment etc., and recommend means of resolving them for approval by the Client¹. Adopt the procedures described in Section 20 Claims, Disputes and Arbitration for resolution of such claims;
- In case of unresolved claims prepare a report stating the issues, documentary evidences and way forward for the Client;

(ix) Task 9: Test, commission and certify civil works and any mechanical and electrical equipment

- Review and approve the contractor/s' procedures for commissioning and acceptance tests (to be submitted by the contractor);
- Supervise all tests and commissioning of all civil works in conformity with the specifications of the bidding document and approve all test certificates.
- Supervise the installation, testing and commissioning of any electro mechanical and control equipment supplied and installed by the contractor/s and ensure that quality and performance as stipulated in the contract document. Verify and approve all test certificates;
- Review and approve all operating manuals submitted by the contractor before turn over to the Client;

(x) Task 10: Ensure the documentation of final works

- Verify and ensure that the contractors carry out all revisions to construction drawings and any detailed drawings as necessary during the contract implementation;
- Check and approve (i) as-built drawings and other documentation, and (ii) operation and maintenance manuals submitted by the contractors;

(xi) Task 11: Certify completion and prepare the final payment certificate

- Certify partial, substantial, and final completion of the work in accordance with provisions of the contracts, including certification of stage and final acceptance tests. This should include: inspecting the work and informing the contractor in writing regarding the items outstanding or needing remedial work for full completion. Upon full completion, the Consultants shall assist the DOW in undertaking the inspection of the works in connection with the issuance of the Completion Certificate stating the date or dates from which the Period/Defects Liability period shall start. The Consultants will issue taking-over certificates after prior approval by DOW and completion of remedial/outstanding works.

(xii) Task 12: Defects Liability Period

- During the 12-month defects liability period, intermittent checks are required to ensure that the works constructed including any electro mechanical equipment and control systems are operating in accordance with technical specifications of the bidding document and operating

manuals. The Consultants shall carry out at least two evaluation missions during the defects liability period. The Consultant will agree the mission dates in consultation with, and approval by the DOW. One of the evaluation missions must take place during the rainy season. Each evaluation mission shall cover, inter alia:

- Review of the performance of any electro mechanical equipment and control systems, including all monitoring data and testing in accordance with the manufacturers' specifications;
- Identification of any performance issues with the works;
- Assessment of the day-to-day operation and maintenance of the works;
- A status report to DOW including recommendations for any remedial actions necessary
- Each evaluation mission report shall be submitted to DOW not later than one week after completion of the mission.
- On satisfactory completion of the defects liability periods for the works the consultant shall certify final completion.

1.4. Coordination with Other Agencies

- i. In addition to the other two primary participants to the contracts, the DOW and the contractor, the consultant shall coordinate and interact as necessary for the smooth implementation of the work with all other parties involved. It is envisaged that this will include but not necessarily be limited to: other departments of MPWT; utility providers; the Local Government; National Government ministries; the Police; representatives of commercial and civil society groups and other consultants and contractors engaged in urban infrastructure works. Such coordination with parties outside of DOW shall be done in close consultation and collaboration with DOW.
- ii. Assist DOW to coordinate with other agencies to solve any problems in relation to traffic management, public nuisance etc. that may arise from construction activities. This will include examining, approving and supervising all temporary and permanent traffic management proposals of the contractor and ensuring that interruption to movement of all road users is kept to a minimum. In the case of Luang Prabang, which is a World Heritage Site, the consultants shall liaise closely with the World Heritage Office and shall ensure that the contractor/s similarly do so and follow any requirements stipulated by them relating to heritage matters;
- iii. Coordinate and supervise all service/utility diversions and relocations required to facilitate the timely completion of the contracts, paying close attention to the associated costs. Costs will be accommodated in the BoQ as a provisional sum. The works should be closely supervised and costs carefully managed.

1.5 Outputs and Reporting

- iv. Submit the reports listed below in English and Lao PDR, both in word editable and in pdf formats, including maps at clearly readable scales, in both electronic and hard copy format. Translations must be high quality with editing for language and technical accuracy by a translator familiar with technical terminology. All major reports need to contain an executive summary in both languages. The reports are to be prepared first in draft and finalized upon review by the GoL. All reports will include a section

on environment and social safeguards describing the implementation progress, issues, actions and/or recommendations that can be used to judge compliance with the Environment, Social, Health, and Safety (ESHS) requirements as incorporated in the bidding/contract documents as well as the effectiveness of the C-ESMP and/or performance of contractor. The Consultant will be responsible for providing at least the following major reports:

No.	Report	Number of copies		Submission of Reports (from the date of contract signing)
		Lao	English	
1	Inception Report	6	6	2weeks
2	Monthly Progress Report covering safeguard (ESMP/C-ESMP, RAP/ARAP, EGEP, IEE) implementation status, issues, GRM, lessons learned, and actions taken and to be taken	6	6	Monthly (5 working days after the end of each month)
3	RAP/ARAP Completion Reports (ICR)consisting two parts. One will be prepared and submitted to the World Bank via SPO/PO after completion of compensation to all PAHs/PAPs and the other will be prepared and submitted after completion of the subproject (works)	6	6	First report to be submitted to the Bank 2 weeks after RAP/ARAP completion
4	EGEP Completion Report	6	6	To be submitted two weeks after subproject completion,
5	Any reports on relevant issues or incidence that may happen during the construction/works	6	6	Depending on the nature and level of severity of the incidence, the report needs to be submitted to PO/SPO as soon as possible.
6	Final Completion Report	6	6	On substantial completion of contract/s
7	Final Project Completion Report	6	6	Upon completion of works

Annex 3B. LPB - UXO Certificate and Environmental Compliance Certificate (ECC)

ສາທາລະນະລັດ ປະຊາທິປະໄຕ ປະຊາຊົນລາວ
ສັນຕິພາບ ເອກະລາດ ປະຊາທິປະໄຕ ເອກະພາບ ວັດທະນະຖາວອນ

ກະຊວງແຮງງານ ແລະ ສະຫວັດດີການສິ່ງໃນ
 ຫ້ອງການຄະນະກຳມະການຄຸ້ມຄອງແຫ່ງຊາດ ເພື່ອແກ້ໄຂ ເລກທີ: 285 /ຫກ.ຕຊກລ.ຕຍ
 ບັນຫາລະເບີດບໍ່ສົນແຕກ ທີ່ຕິກຕ້າງຢູ່ ສປປ ລາວ. ນະຄອນຫລວງວຽງຈັນ, ວັນທີ: 14/01/2023

ໃບຢັ້ງຢືນດູນນະພາບ.

ເຖິງ: ທ່ານ ປະທານໄດ້ລິດ ແອວຊີວາຍ ເກີບຄູ້ ແລະ ທ່ານລະເບີດ ຈຳກັດ.

ເລື່ອງ: ການຢັ້ງຢືນດູນນະພາບ ຂອງການກວດກຳລະເບີດ ຂຶ້ນທີ່ໂຄງການກິນເຈືອນຕາວິງບ້າຂອງ ແລະ ບ້າຄານ ບ້ານ ວັດແສນ ນະຄອນຫຼວງພະບາງ, ແຂວງ ຫຼວງພະບາງ.

- ສິ່ງຕາມຂໍ້ຕົກລົງລັດຖະມົນຕີກະຊວງແຮງງານ ແລະ ສະຫວັດດີການສິ່ງໃນ ວ່າດ້ວຍການຈັດຕັ້ງ ແລະ ການເກືອບໄຫລຂອງຄະນະກຳມະການຄຸ້ມຄອງແຫ່ງຊາດ ເພື່ອການແກ້ໄຂບັນຫາລະເບີດບໍ່ສົນແຕກທີ່ຕິກຕ້າງຢູ່ ສປປ ລາວ ສະບັບເລກທີ 4999/ຜສສ, ລົງວັນທີ 09 ສິບວາ 2022.
- ສິ່ງຕາມບົດທີ 19 ການຄຸ້ມຄອງດູນນະພາບ ຂໍ້ທີ 8.2.1, ການຄວບຄຸມດູນນະພາບພາຍນອກ ສຳລັບວຽກງານກວດກຳລະເບີດ, ຂໍ້ 3.2 ແລະ ລົງລັບ (1) (2).
- ສິ່ງໃສ່ໃບສະເໜີຂອງໄດ້ລິດ ແອວຊີວາຍ ເລກທີ 265/ອຊວ, ລົງວັນທີ 06/03/2023 ໃຫ້ຕາງໜ້ວຍ ງານກວດ ກາດູນນະພາບຫ້ອງການ ຕຊກລ ລົງ (QC) ໃນລະຫວ່າງວັນທີ 11 ຫາ 16 ມີນາ 2023.
- ສິ່ງໃສ່ບົດລາຍງານຜົນສຳເລັດການກວດກາຄວບຄຸມດູນນະພາບພາຍນອກ (QC) ຫ້ອງການ ຕຊກລ ເລກທີ 285/ຫກ.ຕຊກລ.ຕຍ, ລົງວັນທີ 14/01/2023.

ຫ້ອງການຄະນະກຳມະການຄຸ້ມຄອງແຫ່ງຊາດເພື່ອແກ້ໄຂບັນຫາລະເບີດບໍ່ສົນແຕກ ທີ່ຕິກຕ້າງຢູ່ ສປປ ລາວ (ຕຊກລ) ການດຳເນີນການກວດກາວຽກງານໂຄງການກິນເຈືອນຕາວິງບ້າຂອງ ແລະ ບ້າຄານ ບ້ານ ວັດແສນ ນະຄອນຫຼວງພະບາງ, ແຂວງ ຫຼວງພະບາງ, ໂດຍສິ່ງຕາມ ມາດຕະຖານແຫ່ງຊາດຫ້ອງການ ຕຊກລ ຕ້ອງໄດ້ກວດກາຄວບຄຸມດູນນະພາບບໍ່ໃຫ້ຫຼຸດ 2% ຂອງເນື້ອທີ່ກວດກຳລະເບີດ ຕາມການກວດກາຄວບຄຸມດູນນະພາບຂຶ້ນທີ່ຕິດຈິງ ຈຳນວນ 01 ສະໜາມ, ລະຫັດສະໜາມ Task ID : LCY_AC_2023_601004_001 Area_90,815 m² ສະບັບຫ້ອງການ ຕຊກລ ຂໍ້ຢັ້ງຢືນວ່າ ຂຶ້ນທີ່ດັ່ງກ່າວແມ່ນມີຄວາມປອດໄພ ຖືກຕ້ອງຕາມລະບຽບການປະຕິບັດງານຂອງໄດ້ລິດ ແລະ ສອດ ດ້ອງກັບມາດຕະຖານແຫ່ງຊາດທີ່ໄດ້ກຳນົດໄວ້.

ສະນັ້ນ, ຈຶ່ງໄດ້ອອກຢັ້ງຢືນຂຶ້ນທີ່ໄດ້ລິດ ແອວຊີວາຍ ເກີບຄູ້ ແລະ ທ່ານລະເບີດ ຈຳກັດ ບຳໃຊ້ຂຶ້ນທີ່ດັ່ງກ່າວຕາມຈຸດປະສົງ.

ຫົວໜ້າຫ້ອງການ ຕຊກລ.

ໂພແນງ ແຮງກອງສະຫວັດ

LPB-Environmental Compliance Certificate (ECC)



ສາທາລະນະລັດ ປະຊາທິປະໄຕ ປະຊາຊົນລາວ
ສັນຕິພາບ ເອກະລາດ ປະຊາທິປະໄຕ ເອກະອາຍ ວັດທະນະຖາວອນ

ກະຊວງຊີບສະບາຍກອນສຳນະຊາດ ແລະ ສິ່ງແວດລ້ອມ
 ກົມສິ່ງແວດລ້ອມ

ເລກທີ **0616** /ກຊສ.ກສຂ
 ນະຄອນຫຼວງວຽງຈັນ, ວັນທີ **24 FEB 2023**

ໃບຢັ້ງຢືນ ກ່ຽວກັບສິ່ງແວດລ້ອມ

- ສິ່ງຕາມ ກົດໝາຍດຳລັດການປົກປັກຮັກສາສິ່ງແວດລ້ອມ ສະບັບເລກທີ 029/ສມຊ, ລົງວັນທີ 18 ທັນວາ 2012;
- ສິ່ງຕາມ ດຳລັດດຳລັດບັນຍັດບັນຍັດກະກຽມສິ່ງແວດລ້ອມ ສະບັບເລກທີ 389/ລບ, ລົງວັນທີ 20 ຕຸລາ 2022;
- ສິ່ງຕາມ ຂໍ້ຕົກລົງມອບສິດສອງຜ່ານ ລັດຖະມົນຕີ ກະຊວງຊີບສະບາຍກອນສຳນະຊາດ ແລະ ສິ່ງແວດລ້ອມ ສະບັບເລກທີ 0288/ກຊສ, ລົງວັນທີ 21 ກຸມພາ 2023.

ກົມສິ່ງແວດລ້ອມ:

1. ສັບສອງຍົກ ບົດລາຍງານການປະເມີນຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມແບບລະອຽດ ທີ່ອມດ້ວຍ ແບບຖົມກອງ ແລະ ຕິດຕາມກວດກາສິ່ງແວດລ້ອມ ສະບັບເລກທີ ທັນວາ 2022 ສຳລັບ ໂຄງການລົງທຶນກອງທຶນສ້າງໄຟຟ້າຕົ້ນຕໍຖືກຖືວ່າເໝາະສົມ ທາງດ້ານສະບາຍກອນສະຫຼວງສະບາຍ, ແຂວງຫຼວງສະບາຍ ທີ່ສະຖາບັນໄຍທາຍິການ ແລະ ສົນສິ່ງ ແລະ ກົມທາງນ້ຳ, ກະຊວງໄຍທາຍິການ ແລະ ສົນສິ່ງ ເພີ່ມເຈົ້າຂອງໂຄງການ;
2. ເຈົ້າຂອງໂຄງການ ດ້ອງປະຈຳປີປັບປຸງເສັ້ນງ່າດ ເນື້ອໃນບົດບັນຍັດດຳລັດ ບັນດາຖ້ອນໄຟທີ່ກຳນົດໄດ້ເປັນເອກະສານຊ່ອຍຮັບສອງໃບຢັ້ງຢືນກ່ຽວກັບສິ່ງແວດລ້ອມສະບັບນີ້ ແລະ ຖ້າຫາກວ່າປະຕິບັດໄດ້ໃບຢັ້ງຢືນໄຟໃດສິ່ງ, ກະຊວງຊີບສະບາຍກອນສຳນະຊາດ ແລະ ສິ່ງແວດລ້ອມ ມີສິດສຳນະນາໄຈະ ຫຼື ບົກລົງ ໃບຢັ້ງຢືນກ່ຽວກັບສິ່ງແວດລ້ອມ ສະບັບນີ້;
3. ໃບຢັ້ງຢືນກ່ຽວກັບສິ່ງແວດລ້ອມ ສະບັບນີ້ ມີຜົນຢັ້ງຢືນໃຊ້ໄດ້ຕະຫຼອດໄລຍະເວລາອາຍຸໂຄງການ, ໃນກໍລະນີ ຫາກວ່າດຳລັດການ ຫຼື ຕ່າງການປະເມີນຜົນກະທົບໂຄງການ ຂອງກະຊວງຊີບສະບາຍກອນສຳນະຊາດ ແລະ ສິ່ງແວດລ້ອມ ທີ່ເຫັນວ່າໂຄງການບໍ່ມີຄວາມເປັນອັນໃນການຈັດຕັ້ງປະຕິບັດໂຄງການ ຮາຍໃນເວລາ 2 ປີ ຫຼື ມີບັນດາບັນດາໂຄງການໃບຢັ້ງຢືນດ້ອງໄດ້ປັບປຸງແບບຖົມກອງ ແລະ ຕິດຕາມກວດກາສິ່ງແວດລ້ອມ ເພື່ອບໍ່ສະເໜີ ກະຊວງຊີບສະບາຍກອນສຳນະຊາດ ແລະ ສິ່ງແວດລ້ອມ ມີຈຳລະນາສັບສອງໃນໃໝ່;
4. ໃບຢັ້ງຢືນກ່ຽວກັບສິ່ງແວດລ້ອມ ສະບັບນີ້ ມີຜົນສຳນະນາຕໍ່ສິ່ງແວດລ້ອມດ້ວຍລົງທຶນເປັນຕົ້ນໄປ.

ຜູ້ອອກໃບຢັ້ງຢືນ



ສຸມເລີອນ ໄຊຍະຈັກ

Annex 3C. LPB -Agreement on selection of borrow pits and disposal area



ສາທາລະນະລັດ ປະຊາທິປະໄຕ ປະຊາຊົນລາວ
ສັນຕິພາບ ເອກະລາດ ປະຊາທິປະໄຕ ເອກະສານ ວັດທະນະຖາວອນ

ບົດບັນຍັດ

ກອງປະຊຸມ ປົກສາທາລະນະການກຳນົດ ຈຸດຖິ້ມສົ່ງສະເລ່ຍ, ຈຸດຖິ້ມດິນ ແລະ ບໍ່ວັດສະດຸ ບຳໃຊ້ເຂົ້າໃນການກຳສ້າງ ທີ່ ເປັນສອງລັດຖະມາດ ເພື່ອຄອບສະໜອງໃຫ້ ໂຄງການລົມຄອງຄວາມສ່ຽງໄພພິບັດນ້ຳຖ້ວມ (ບຸນປະມານເພີມເດີມ) ປຸ່ມຫດສະບານ ນະຄອນ-ຫຼວງສະບາງ, ແຂວງຫຼວງສະບາງ.

- ອີງຕາມ ບົດບັນຍັດຄວາມເຂົ້າໃຈ ແບ່ງຄວາມຮັບຜິດຊອບໃນການຈັດຕັ້ງປະຕິບັດໂຄງການລົມຄອງຄວາມສ່ຽງໄພພິບັດນ້ຳປະຊາດ ເຂດອາຊີຕາເວັນອອກສ່ຽງໃຕ້ ປຸ່ມ ສປປ ລາວ, ອົງປະກອບ 1 (ບຸນປະມານເພີມເດີມ) ລະຫວ່າງ ກະຊວງ ໂຍທາທິການ ແລະ ສືນສົ່ງ ແລະ ອົງການປົກຄອງແຂວງຫຼວງສະບາງ;
- ອີງຕາມ ຂໍ້ຕົກລົງຂອງອຳນວຍເອກະຊົນຂອງກະຊວງ ວ່າດ້ວຍການແຕ່ງຕັ້ງຄະນະກຳມະການໄກ່ເກ່ຍ, ບົດບັນຍັດສືບ, ຊິດເຊີຍ ແລະ ແກ້ໄຂດ້ານສິ່ງອຸຊາ ສຳລັບໂຄງການ ລົມຄອງຄວາມສ່ຽງໄພພິບັດນ້ຳຖ້ວມດິວເມືອງປຸ່ມ ສປປ ລາວ, ເຫດສະບານ ນະຄອນ-ຫຼວງສະບາງ, ສະບັບເລກທີ 44/ຈສ.ຫຼຸບ, ມິຖຸນາທີ 29 ມັງກອນ 2021;

ໃນຕອນບ່າຍ ຂອງວັນອັງການ, ວັນທີ 21 ທັນວາ 2021,ເວລາ 14:00 ໂມງ, ສ້ອງການຈັດຕັ້ງປະຕິບັດໂຄງການ, ພະແນກ ບສຂ ແລະ ຄະນະກຳມະການໄກ່ເກ່ຍ ສື່ນນະຄອນ ໄດ້ຈັດກອງປະຊຸມປົກສາທາລະນະ ກ່ຽວກັບການກຳນົດ ຈຸດຖິ້ມສົ່ງສະເລ່ຍ, ຈຸດຖິ້ມດິນ ແລະ ກຳນົດບໍ່ວັດສະດຸ ບຳໃຊ້ເຂົ້າໃນການກຳສ້າງ ທີ່ເປັນສອງລັດຖະມາດ ຕອງ ເພື່ອຄອບສະໜອງໃຫ້ ໂຄງການລົມຄອງຄວາມສ່ຽງໄພພິບັດນ້ຳຖ້ວມ (ບຸນປະມານເພີມເດີມ) ປຸ່ມຫດສະບານ ນະຄອນ-ຫຼວງສະບາງ, ແຂວງຫຼວງສະບາງ ສື່ນ, ໂຕເກນເປັນປະຊາກອນອຳນວຍ ບຸນຄົງ ສຸກສະຫວິດ ຮອງຫົວໜ້າ ພະແນກ ໂຍທາທິການ ແລະ ສືນສົ່ງ (ຜູ້ຊີ້ນຳວຽກ), ມີອຳນວຍເອກະຊົນນະຄອນ-ຫຼວງສະບາງ ຕັ້ງເປັນສົວສັກຄະນະກຳມະການໄກ່ເກ່ຍສື່ນນະຄອນ, ມີຄະນະກຳມະການໄກ່ເກ່ຍສື່ນນະຄອນ ແລະ ສະແໜງການທີ່ກ່ຽວຂ້ອງ ອາຍໃນພະແນກ ບສຂ, ເຊິ່ງມີຜູ້ເຂົ້າຮ່ວມທັງໝົດ 17 ອ່ານ, ຍິງ 3 ອ່ານ (ມີລາຍຊື່ຜູ້ເຂົ້າຮ່ວມສື່ນດັບມາພ້ອມນີ້):

ອາຍຊື່ງ່ານປະຊາກອນໄດ້ບຳສະເໜີຈຸດປະສົງຂອງກອງປະຊຸມ, ມີດຳເນີນຊື່ນຳ ແລະ ໄດ້ມອບໃຫ້ ສ້ອງການ PIU ສື່ນລະບຽບຈຸດປະສົງ, ເບົາອາຍ ໃນການກຳນົດຈຸດຖິ້ມສົ່ງສະເລ່ຍ, ຈຸດຖິ້ມດິນ ແລະ ກຳນົດບໍ່ວັດສະດຸ ບຳໃຊ້ເຂົ້າໃນການກຳສ້າງ ທີ່ເປັນສອງລັດຖະມາດ ໃນການຄອບສະໜອງໃຫ້ໂຄງການດັ່ງກ່າວ, ເພື່ອດຳເນີນໄປຕາມ ທາລະບົດບາດ ແລະ ຕາມບົນໃນບົດບັນຍັດຄວາມເຂົ້າໃຈ ລະຫວ່າງ ອົງການປົກຄອງແຂວງ ແລະ ກະຊວງ ໂຍທາທິການ ແລະ ສືນສົ່ງ ສະບັບເລກທີ 13 ສິງຫາ 2020, ເພື່ອເປັນບ່ອນສົ່ງໃນການຈັດຕັ້ງປະຕິບັດ ກອງປະຊຸມເກົ່າເດີ ເປັນເອກະສານກັນດັ່ງນີ້:

1. ສຳລັບຈຸດຖິ້ມສົ່ງສະເລ່ຍ, ຈຸດຖິ້ມດິນ ຈາກການກຳສ້າງໂຄງການ ແມ່ນເກີດຈາກກຳນົດເອົາສະໜາມສີ່ແຫຼ່ຍ ປຸ່ມ ບ້ານຫຼັກ 8 ເປັນບ່ອນສອງຮັບ, ແຕ່ຕ້ອງໄດ້ມີການສຳຫຼວດລະອຽດເພື່ອກຳນົດບົນເຂດສອງປະເທດສີ່ແຫຼ່ຍແດ່ ລະປະເທດ ເຊັ່ນ: ດິນ, ເສດໄມ້ ແລະ ສົ່ງສະເລ່ຍດ່າງງ, ດ້ອງຮັບປະກັນບໍ່ໃຫ້ມີຜົນກະທົບຕໍ່ປະຊາຊົນ ແລະ ສິ່ງແວດລ້ອມເສດສິ້ນທີ່ດັ່ງກ່າວ;

2. ສໍາລັບບໍລິເວນສະດວກ(ເດີນ) ທີ່ຈະມານໍາໃຊ້ເຂົ້າໃນການກໍ່ສ້າງ ແມ່ນເຫັນດີກໍານົດເອົາບໍ່ສອງຈຸດ ຄື:
 - ບໍ່ສະໜາມຂີ້ເຫຍື້ອ ບ້ານຫຼັກ 8;
 - ບໍ່ຈຸດທີ່ຈະກໍ່ສ້າງໂຮງຮັບແລດອບ-ຫຼວງສະບາງ ຫຼັງໃໝ່ (ບໍ່ເຂດ ບ້ານຜາມິມ ແລະ ບ້ານນາສ້າງຫວີຍ);
3. ຍ້ອມດຽວກັນນັ້ນສະເໜີໃຫ້ຫ້ອງການຈັດຕັ້ງປະຕິບັດໂຄງການ (PIU) ຈຶ່ງພົວພັນ ຫ້ອງການ PMU ດື່ມ ກ່ຽວກັບ ບໍລິມາດຂອງຂີ້ເຫຍື້ອ, ຂີ້ງຮຸດເຫຼືອ ແລະ ຈໍານວນບໍລິມາດຂອງດິນເປີດ ໃຫ້ລະອຽດວ່າດ້ອງການຈໍານວນເທົ່າໃດແມັດກ້ອນ, ຍ້ອມທັງພິມອົບກັບຄະນະກຳມະການໄກ່ເກ່ຍຂັ້ນແລດອບ ແລະ ອາກສ່ວນທີ່ກ່ຽວຂ້ອງ ລືງສໍາຫຼວດເບິ່ງລາຍລະອຽດສິ່ງທີ່ໃນແຕ່ລະໂຊນຂອງສະໜາມຂີ້ເຫຍື້ອນັ້ນ ສາມາດສອງຂຶ້ນ ໄດ້ຫຼາຍກວ່າອຸ່ນຊໍາໃດ? ເພາະວ່າສະໜາມຂີ້ເຫຍື້ອດັ່ງກ່າວ ປະຈຸບັນແມ່ນໄດ້ນໍາໃຊ້ໄປແລ້ວ 70% ຈາກເນື້ອທີ່ທັງໝົດ 20 ເຮັກຕາ;
4. ສໍາລັບການຈັດຕັ້ງປະຕິບັດດັ່ງກ່າວ ສະເໜີໃຫ້ຫ້ອງການ PIU ກໍານົດແບບແຜນ ວິທີການ/ຈັດຕັ້ງປະຕິບັດໃຫ້ລະອຽດເພື່ອຈຶ່ງປະກັນບໍ່ໃຫ້ມີບັນຫາຄວາມຕ້ານສົ່ງແວດລ້ອມ-ສັງຄົມ ແລະ ຊີວະພັນຂອງປະຊາຊົນ;
5. ສ່ວນການລົງທຶນແຍກສິ່ງທີ່ ຂອງເຂດ ເພື່ອກໍານົດຈຸດກຸ້ມດິນ, ຖິ່ນສົ່ງຮຸດເຫຼືອ ແລະ ບໍ່ດິນ ນັ້ນ, ຖ້າໄດ້ຂໍ້ມູນລະອຽດຈາກສົມມາດບໍລິສັດທີ່ປຶກສາຫຼວດ-ອອກແບບ ແລະ ຈາກຫ້ອງການປະສານງານໂຄງການ (PUM), ກົມຫາງນໍ້າ, ກະຊວງ ບທຂ ແລ້ວ, ຫ້ອງການ PIU, ບະແນກ ບທຂ ຈະໄດ້ພິມອົບກັບຄະນະກຳມະການ ແລະ ອາກສ່ວນທີ່ກ່ຽວຂ້ອງ ລືງໄປວິດແອກ ແລະ ກໍານົດຈຸດໃຫ້ລະອຽດ.

ດັ່ງນັ້ນ, ຈຶ່ງໄດ້ສ້າງບົດບັນຍັດສະບັບນີ້ໄວ້ ເພື່ອເປັນບ່ອນອີງໃນການຈັດຕັ້ງປະຕິບັດ ແລະ ລາຍງານໃຫ້ຂັ້ນເທິງໄດ້ພິມສຸບໃນຂັ້ນຕໍ່ໄປ.

ຫຼວງສະບາງ, 21 ວັນທີ ທັນວາ 2021

ປະທານກອງປະຊຸມ



ບຸນທິງ ສຸກສະຫວີດ

ບຸນທິງ

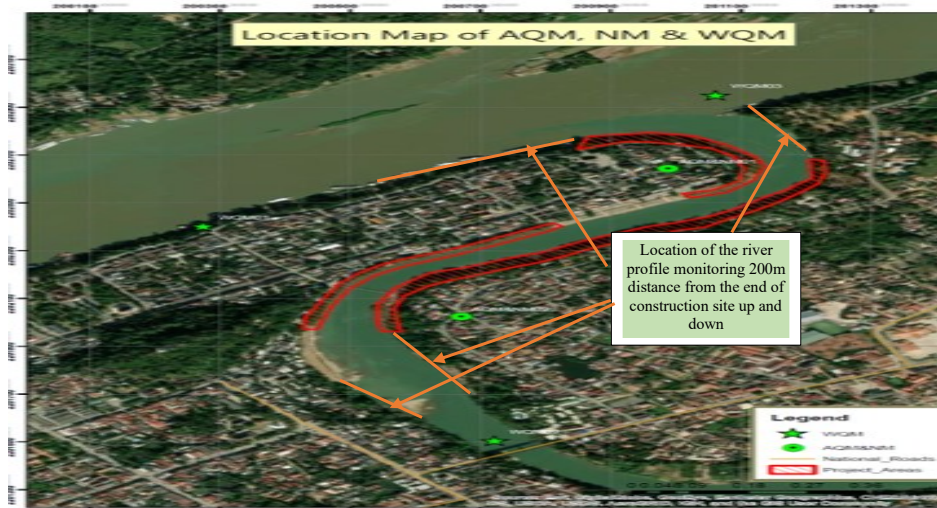


ນາກອຸສຸມພິນພິກດີ

Annex 3D. LPB -Map of disposal area



Annex 3E. LPB -Location of the river profile monitoring (baseline)



Annex 4A. BKK -UXO certificate and ECC Certificate

ສາທາລະນະລັດ ປະຊາທິປະໄຕ ປະຊາຊົນລາວ
ສັນຕິພາບ ເອກະລາດ ປະຊາທິປະໄຕ ເອກະສານ ວັດທະນະຖາວອນ

ກະຊວງແຮງງານ ແລະ ສະຫວັດດີການສິ່ງຄົມ
 ຫ້ອງການຄະນະກຳມະການດຸ້ມຄອງແຫ່ງຊາດ ເພື່ອແກ້ໄຂ ແລະ ທີ່ 55 / ຫກ.ຄຊກ.ຄຍ
 ບັນຫາລະເບີດບໍ່ສົນເຫດ ທີ່ຕິດກ້າງຢູ່ ສປປ ລາວ. ມາດຕະການລວມວຽກງານ, ວັນທີ: 16 ມັງກອນ 2023

ໃບຢັ້ງຢືນຄຸນນະພາບ.

ເຖິງ: ບ້ານ ປະທານບໍລິສັດ ແອວຊີວາຍ ຜົນງື່ ແລະ ຫໍາລາບລະເບີດຈຳກັດ.


ເລື່ອງ: ການຢັ້ງຢືນຄຸນນະພາບຂອງການກວດກາລະເບີດບໍ່ສົນເຫດທີ່ໂຄງການກໍ່ສ້າງ ກິນເຈືອນຕາມິ່ງ ແຄມນ້ຳຂອງ ບ້ານ ປາກສິນໃຕ້ ແລະ ບ້ານ ຫ້ວຍສຽດ ເມືອງ ປາກສິນ, ແຂວງ ບໍລິຄໍາໄຊ.

- ສິ່ງການສຳຄັນທີ່ກວດກາລະເບີດບໍ່ສົນເຫດຂອງ ກະຊວງແຮງງານ ແລະ ສະຫວັດດີການສິ່ງຄົມ ວ່າດ້ວຍການຈັດຕັ້ງ ແລະ ການເກືອບໄຫວຂອງຄະນະກຳມະການດຸ້ມຄອງແຫ່ງຊາດ ເພື່ອການແກ້ໄຂບັນຫາລະເບີດບໍ່ສົນເຫດທີ່ຕິດກ້າງຢູ່ ສປປ ລາວ ສະບັບເລກທີ 4999/ອສສ, ລົງວັນທີ 09 ສິນວາ 2022.
- ສິ່ງການບົດທີ 09 ການດຸ້ມຄອງຄຸນນະພາບ ສຳຄັນ ສ.2.1, ການຄວບຄຸມຄຸນນະພາບສາຍເອກ ສຳລັບວຽກງານກວດກາລະເບີດ, ສຳ ກ.ສ ແລະ ລົງລິບ (ຳ) (2).
- ສິ່ງໃຊ້ໃນສະເໜີຂອງບໍລິສັດ ແອວຊີວາຍ ເລກທີ 09/ອຊວ, ລົງວັນທີ 09/09/2023 ໃຫ້ທຸກໆໜ່ວຍງານກວດກາຄຸນນະພາບຂອງການ ຄຊກ.ຄ ລົງ (OG) ໃນລະຫວ່າງວັນທີ 09 ຫາ 10 ມັງກອນ 2023.
- ສິ່ງໃຊ້ບົດລາຍງານຜົນສຳເລັດການກວດກາຄວບຄຸມຄຸນນະພາບສາຍເອກ (OG) ຫ້ອງການ ຄຊກ.ຄ ເລກທີ 4.2.1/ຄຊກ.ຄ.ຄຍ, ລົງວັນທີ 16 ມັງກອນ 2023 .

ຫ້ອງການຄະນະກຳມະການດຸ້ມຄອງແຫ່ງຊາດເພື່ອແກ້ໄຂບັນຫາລະເບີດບໍ່ສົນເຫດ ທີ່ຕິດກ້າງຢູ່ ສປປ ລາວ (ຄຊກ.ຄ) ການດຳເນີນການກວດກາວຽກງານໂຄງການກໍ່ສ້າງ ກິນເຈືອນຕາມິ່ງ ແຄມນ້ຳຂອງ ບ້ານ ປາກສິນໃຕ້ ແລະ ບ້ານ ຫ້ວຍສຽດ ເມືອງ ປາກສິນ, ແຂວງ ບໍລິຄໍາໄຊແມ່ນ ກວດກາຄວບຄຸມຄຸນນະພາບບໍ່ໃຫ້ອຸດ 2% ຂອງເນື້ອທີ່ກວດກາລະເບີດຕົວຈິງ ຜ່ານການກວດກາຄວບຄຸມຄຸນນະພາບຂຶ້ນທີ່ຕົວຈິງ ຈຳນວນ 02 ສະໜາມ, ສະບັບ, ຫ້ອງການ ຄຊກ.ຄ ຈຶ່ງຢັ້ງຢືນວ່າ ຂຶ້ນທີ່ຕິດກ້າງແມ່ນມີຄວາມປອດໄພ ຖືກຕ້ອງຕາມລະບຽບການປະຕິບັດງານຂອງບໍລິສັດ ແລະ ສອດຄ່ອງກັບມາດຕະຖານແຫ່ງຊາດທີ່ໄດ້ກຳນົດໄວ້. ລາຍລະອຽດດັ່ງລຸ່ມນີ້:

1. Task ID : LCY_AC_2022_101001_001 Area_20,222 m² ,
2. Task ID : LCY_AC_2022_101011_001 Area_15,510 m²

ສະນັ້ນ, ຈຶ່ງໄດ້ອອກຢັ້ງຢືນ ຄຸນນະພາບໃຫ້ບໍລິສັດ ແອວຊີວາຍ ຜົນງື່ ແລະ ຫໍາລາບລະເບີດ ຈຳກັດ ບໍາໃຊ້ ຂຶ້ນທີ່ຕິດກ້າງຕາມຈຸດປະສົງ.

ສີເວນາຊີອາການ ຄຊກ.ຄ.

ໂຈມເຊງ ແຂງທອງສະຫວັດ

BKX- ECC Certificate



ສາທາລະນະລັດ ປະຊາທິປະໄຕ ປະຊາຊົນລາວ
ສັນຕິພາບ ຕະຫລາດ ປະຊາທິປະໄຕ ແຮງແມ່ນ ວັດທະນາຖາວອນ

ແຂວງ ບໍລິຄໍາໄຊ
 ພະນະກຳມະການອຸປະກອນສຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມ

ເວລາທີ 2065 ກອສ
 ບໍລິຄໍາໄຊ, ວັນທີ 31 ສິງ ຄ.ສ. 2022

ໃບສົ່ງຊົມກ່ຽວກັບສິ່ງແວດລ້ອມ

- ສິ່ງຕາມ ກົດໝາຍ ບໍາລັດສະກັບປັບປຸງກົດໝາຍສິ່ງແວດລ້ອມ(ສະບັບປັບປຸງ)ເວລາທີ 29/ສອ.ສ. ລົງວັນທີ 18/ສິບຕາ 2012;
- ສິ່ງຕາມ ບໍາລັດ ບໍາລັດສະກັບປັບປຸງກົດໝາຍສິ່ງແວດລ້ອມ ສະບັບເວລາທີ 21/ສອ, ລົງວັນທີ 31 ມັງກອນ 2019;
- ສິ່ງຕາມ ສົ່ງເສີມຊ່ວຍເຫຼືອລັດຊະໄນຕົກຂອງ ຊີເບນສະກອນສຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມ ສະບັບເວລາທີ 4983/ກອສ, ລົງວັນທີ 03 ພະຈິກ 2020 ບໍາລັດສະກັບປັບປຸງ ແລະ ການເຄື່ອນໄຫວຂອງ ພະນະກຳມະການອຸປະກອນສຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມ ແຂວງ;
- ສິ່ງຕາມ ບົດລາຍງານການສຶກສາເບື້ອງຕົ້ນກ່ຽວກັບຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມ ແລະ ແຜນຊົມຄອງ ແລະ ກົດຕາມກົດກາ ສິ່ງແວດລ້ອມ ໂຄງການຊົມຄອງອາວະກາສຊຽງໃນເມັດບໍາລັດບໍາລັດສະກັບປັບປຸງ ເມືອງ ປາກອິນ ແຂວງ ບໍລິຄໍາໄຊ ຊ່ວງ 1-652 ຂ.ປ.ຕ ຜູ້ບັນ ຫັດສະຈຸ ສະບັບ ເດືອນ ສິງ ຄ. ປີ 2022;
- ສິ່ງຕາມ ສົ່ງເສີມສະໜີ ຂອງໂຍທາທິການຂອງໂຍທາທິການ ແລະ ສົບສິ່ງ) ສະບັບເວລາທີ 11415/ສອ. ກອນ ລົງວັນທີ 20 ມິນາສະກ 2022.

ຕົວຕົກ ພະນະກຳມະການອຸປະກອນສຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມ ແຂວງບໍລິຄໍາໄຊ:

1. ເສັ້ນຕົວສະໜີ ບົດລາຍງານການສຶກສາເບື້ອງຕົ້ນກ່ຽວກັບຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມ ແລະ ແຜນຊົມຄອງ ແລະ ກົດຕາມກົດກາສິ່ງແວດລ້ອມ ໂຄງການຊົມຄອງອາວະກາສຊຽງໃນເມັດບໍາລັດບໍາລັດສະກັບປັບປຸງ ເມືອງ ປາກອິນ ແຂວງ ບໍລິຄໍາໄຊ ຊ່ວງ 1 - 652 ຂ.ປ.ຕ ຜູ້ບັນ ຫັດສະຈຸ ສະບັບ ເດືອນ ສິງ ຄ. ປີ 2022 ໂທລະທັດຂອງໂຍທາທິການແມ່ນ ກະຊວງໂຍທາທິການ ແລະ ສົບສິ່ງ ເບີໂທລະທັດ(856-21) 452423;
2. ຜູ້ໂຮງແຮມໂຄງການຕ້ອງເຮັດໃ້ໃຊ້ໃນການຊົມຄອງກົດຕາມ ບໍາລັດສິ່ງແວດລ້ອມສິ່ງຕົວ ແລະ ບໍາລັດສະກັບປັບປຸງ ແລະ ຕ້ອງເຮັດໃຫ້ຕາມເງື່ອນໄຂ ແລະ ຜົນກະທົບຂອງບໍລິຄໍາສະໜີ ຂອງໃບສົ່ງຊົມສະບັບນີ້ຢ່າງເຂັ້ມງວດ;
3. ມອບໃຫ້ ສະໜອງສິ່ງແວດລ້ອມ ແລະ ການປ່ຽນແປງໃນຜົນກະທົບ ແລະ ຕ້ອງການສຶກສາອຸປະກອນສຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມ ເມືອງ ປາກອິນ ສົມທົບກັບສະໜອງການຕີກຽດຂອງ ເລິກທ່າທີ່ກົດຕາມກົດກາ ການຈັດຕັ້ງ ແຜນປັບປຸງການຕ້ອງກັບ ແລະ ຫຼຸດລົດຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມ ຂອງໂຄງການ:

ໃບສົ່ງຊົມສະບັບນີ້ ມີອາຍຸການບໍາໃຊ້ໄດ້ຈຸດສຸດໄວແກ່ເປັນໂຄງການ ແລະ ມີຜົນກະທົບໃຫ້ ສົມກະທົບ ສິ່ງຕາມເສັ້ນຕົວນີ້ໄປຢູ່

ສິດສົມພອນ



ສົມສຽງ ຊຸນໂພລາ
SOMSOUNG SOUNHOLA

Annex 4B. BKK -Location of disposal area and agreement of land owner


Commented [mu1]: See comment above



Location of Disposal Spoil Materials for Section 01



Location of Disposal Spoil Materials for Section 02


ສາທາລະນະລັດ ປະຊາທິປະໄຕ ປະຊາຊົນລາວ
ສັນຕິພາບ ເອກະລາດ ປະຊາທິປະໄຕ ເອກະພາບ ວັດທະນະຖາວອນ

ສະແນກ ໄຊທາງການ ແລະ ສົນສົ່ງ
ຫ້ອງການ ຈັດຕັ້ງປະຕິບັດໂຄງການ

ບົດບັນທຶກການຖົມຖີ່

ທີ່ຈັກອອກຈາກໂຄງການດຸ້ມຕອງດວນສ້າງໄພພິບັດນໍ້າຖ້ວມເທດສະບານເມືອງ ປາກສັນ

- ສິ່ງຕາມ ສັນຍາຖົມຖີ່ ແລະ ການຊ່ວຍເຫຼືອອຸດົມສະຫວ່າງລັດຖະບານແຫ່ງ ສປປ ລາວ ແລະ ສະບານຄານໂລກ, ເລກທີ IDA Credit No. 6518-LA, ລົງວັນທີ 28 ມັງກອນ 2020
- ສິ່ງຕາມ ແຜນດຳເນີນງານຂອງໂຄງການດຸ້ມຕອງດວນສ້າງໄພພິບັດນໍ້າຖ້ວມເທດສະບານເມືອງ ປາກສັນ

ບົດບັນທຶກສະບັບນີ້ໄດ້ສ້າງຂຶ້ນໃນເວລາ 10:30 ນາທີ, ຂອງວັນທີ 17/1/2022 ລະຫວ່າງ ທ່ານ ນະລິດ ດໍາມຸນ ປະຈຸບັນບົນ ສິມຸງຄຸນ, ເມືອງ ປາກສັນ, ແຂວງ ບໍລິຄໍາໄຊ (ຜູ້ທີ່ຕິດຕໍ່ກ່ຽວແມ່ນຊື່ຖືບ້ານ ມີໄຊ, ເມືອງ ປາກສັນ, ແຂວງ ບໍລິຄໍາໄຊ ເບີໂທຄິດເຕີ 02055512975 ໂດຍມີລະບະສົມການໂຄງການດຸ້ມຕອງດວນສ້າງໄພພິບັດນໍ້າຖ້ວມເທດສະບານເມືອງ ປາກສັນ ດ່າງທົດໂດຍ ທ່ານ ດໍາປະເສີດ ບັນຍາບຸວິງ, ຕະນະກຳມະການໄກ ຫ່ວຍຂອງໂຄງການ ແລະ ເຈົ້າຂອງຖິ່ນໄດ້ຕົກລົງເຫັນດີເປັນເອກະພາບສໍາເລັດສ້າງບົດບັນທຶກສະບັບນີ້ຂຶ້ນມາເພື່ອຢັ້ງຢືນ ໃນການຖົມຖີ່ ເຊິ່ງມີເນື້ອໃນດັ່ງນີ້:

1. ເຫັນດີໃຫ້ບໍລິສັດທີ່ຈັດຕັ້ງປະຕິບັດ ໂຄງການດຸ້ມຕອງດວນສ້າງໄພພິບັດນໍ້າຖ້ວມເທດສະບານເມືອງ ປາກສັນ ເຮັດໃນທີ່ຈັກອອກຈາກແລກກໍ່ສ້າງໂຄງການສ່ວນທີ 1 ເຂດ ບ້ານ ຫ້ວຍສຽດ ແລະ ບ້ານ ອານສອນໄຊ ໃຫ້ມາຖົມຖີ່ ແລະ ບົດບັນທຶກໃຫ້ແກ່ກະສັມ ແລະ ສາມສຽງຕາມສອບທົດກໍາໜົດໄດ້ໃນແຜນທີ່ແຜນຂອງຖິ່ນປູກສ້າງເອງຜູ້ກ່ຽວ (ທີ່ຕິດຕິດມາຍ້ອນນີ້) ສໍາມຸກຸມຕິນກວມເອົາຂະໜາດ ແລະ ຫ້ວຍເດີດສາດ.
2. ສ່ວນສິ່ງກໍາໜົດຂອງສິນທາງຂຶ້ນ-ສິ່ງທາງຕໍາກຸມຕິນແມ່ນມອບໃຫ້ບໍລິສັດທີ່ຈັດຕັ້ງປະຕິບັດໂຄງການປັບປຸງທາງ ຂຶ້ນ-ສິ່ງກໍາໜົດກ່ຽວໃຫ້ມີງ່ອນໄຂສະດວກ ແລະ ຖ້າຕິດມີມົນລະພິດທາງອາກາດ ຫຼື ຂີ້ຝຸ່ນແມ່ນມອບໃຫ້ທາງບໍລິສັດທີ່ຕິດມາໃນເຂດດັ່ງກ່າວ.
3. ສ່ວນທາງບັນຫາອື່ນທີ່ຕິດຂຶ້ນໃນເວລາຈັດຕັ້ງປະຕິບັດແມ່ນຕະນະກຳມະການໄກຫ່ວຍຈະ ໄດ້ປະສານງານກັບ ຖິ່ນ ແລະ ສ່ວນກົນແກ້ໄຂສ່ວນກົນເຈົ້າຂອງຖິ່ນຖ້າເຫັນວ່າມີບໍ່ສອດຄ່ອງກັບການຈັດຕັ້ງປະຕິບັດຕິດຈິງ. ດັ່ງນັ້ນ, ຈຶ່ງສ້າງບົດບັນທຶກສະບັບນີ້ຂຶ້ນເພື່ອເປັນຫຼັກຖານຢັ້ງຢືນໃນການຈັດຕັ້ງປະຕິບັດໃນຂັ້ນຕໍ່ໄປ.


ບໍລິຄໍາໄຊ, ວັນທີ 17 ມັງກອນ 2022

ຫ້ອງການຈັດຕັ້ງປະຕິບັດໂຄງການ ເຈົ້າຂອງຖິ່ນ

K. Somsri *ນະລິດ ດໍາມຸນ*

ດໍາປະເສີດ ບັນຍາບຸວິງ

01. ຕະນະກຳມະການໄກຫ່ວຍ ຍິງບັນຈານຍບ້ານ

ສອງລິດ ຟອງສິນວນ 

ໄມພາ ທຳມະວົງ
Maipha THAMMAVONG

Annex 4C. BKX -Map showing safety signs on land and in Mekong River

Commented [mu2]: See comment above.
 No warning and safety signs in the Mekong River.
 Pl show it in the next ESMR



Annex 4D. BKK: Location of the river profile monitoring (baseline)

Commented [mu3]: See comment above



Annex 5A. Final TOR for the wetland study

LAO PEOPLE'S DEMOCRATIC REPUBLIC SOUTHEAST ASIA DISASTER RISK MANAGEMENT PROJECT
(LAO SEADRM) WITH ADDITIONAL FINANCE (IDA CREDIT NO. 6518-LA)

Technical Assistance Program on Integrated Urban Flood Risk Management for Luang Prabang

Terms of Reference (TOR) for Consultancy Services:

Feasibility Study and Detailed Design for

Wetlands Management and Restoration Pilot in Luang Prabang

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C. Background

- 2 **Context.** Lao People's Democratic Republic (PDR) is increasingly at risk to a range of natural hazards – including floods, storms, and droughts – which often result in significant social, physical, and financial impacts at the local and national level.¹ In addition to the loss of lives and injuries, such disaster events frequently impose large financial costs on the government, businesses and households, particularly as a result of damage to infrastructure, diminished economic production, loss of livelihoods, population displacement, and increased risk of disease outbreaks.
- 3 Extreme flooding events—often as a result of severe storms—are the most common and destructive natural hazards in Lao PDR, affecting people, livelihoods, infrastructure, and the economy. Annual expected losses for flood events alone range from 2.8% to 3.6% of GDP. Expected economic losses from a high-impact flood (one occurring on average once every 100 years) are 11.7% of GDP. The estimated average annual fiscal cost of floods is 2.7% of government expenditures.²
- 4 The deep uncertainty associated with climate change and socioeconomic pressures has led to increased focus on resilient and robust nature-based solutions (NBS) that perform reasonably well over a range of future conditions.³ Global experience suggests that green infrastructure and NBS such as wetlands can complement traditional engineered infrastructure in improving stormwater drainage services while providing environmental and socioeconomic co-benefits.
- 5 Wetlands have a natural capacity to help sustain water supplies year-round by storing water during wet seasons, slowly releasing it during dry seasons, and promoting groundwater infiltration. Urban wetlands are those that have survived historical development around which urbanization gradually took place or that are newly constructed in an urban setting. They help to improve water and air quality and moderate extreme city temperatures, among other functions.⁴
- 6 The Luang Prabang urban wetlands are a network of ponds that meander through the city, and are protected as part of the city's classification as a UNESCO World Heritage site. They provide important ecosystem services, such as flood control and aquaculture. As the population and demand for land increases, there has been a tendency to encroach on wetlands or cause direct or indirect impacts to their function. For instance, as there is no sewerage network in the city and on-site sanitation systems vary in quality, domestic wastewater is often discharged directly into the ponds, canals, and streams, contributing to water quality degradation and potential impact on public health. From 183 ponds in 1999, they have been reduced to about 80 ponds today⁵ due to infilling, land use conversion, construction of illegal structures, pollution

Commented [mu4]: See comment above.

To also add the TOR

and blockage from sewage and solid waste, drying up and alteration of hydraulic functions, and weak enforcement of regulations.⁶

7 **Lao PDR SEA DRM Project and Additional Financing.** The Government of Lao People's Democratic Republic (GoL), with financing from the International Development Association (IDA) of the World Bank (WB), is implementing the Lao People's Democratic Republic (PDR) Southeast Asia Disaster Risk Management (SEA DRM) Project with Additional Financing. The Project adopts a comprehensive approach to DRM through activities in target areas related to urban flood risk management, hydromet modernization and early warning systems, and financial preparedness.⁷ An Environmental and Social Management Framework (ESMF), a Resettlement Policy Framework (RPF), and an Ethnic Group Engagement Framework (EGEF) have been prepared for the project and approved by the WB.

8 **Component 1 of the Lao PDR SEA DRM Project** aims to strengthen flood protection and resilient planning in urban areas. It is implemented at the central level by the Department of Waterways (DOW) of the Ministry of Public Works and Transport (MPWT) (hereinafter, the Client), in close cooperation with Public Works and Transport Research Institute (PTRI), the provincial Department of Public Works and Transport (DPWT), the Department of World Heritage in Luang Prabang / *La Department du Patrimoine* Luang Prabang (DPL), and the Provincial Authority of Luang Prabang. The Memorandum of Understanding (MOU) describing the Lao SEADRM project roles and responsibilities of agencies involved can be found in Annex 1

9 **Subcomponent 1.1 on Structural Investments** supports climate-resilient construction and rehabilitation of flood protection infrastructure. In Luang Prabang, the investments will finance the construction of riverbank protection along the downstream reaches of the Nam Khan and the installation of pumped water gate systems along the Mekong River and the Nam Khan. Under Subcomponent 1.1, the investments will also finance preparatory studies and a proposed wetlands management and restoration pilot, with a focus on flood risk management functions. **Subcomponent 1.2 on Non-Structural Investments** supports other Technical Assistance, studies, and surveys related to flood risk management that identify activities that demonstrate an integrated approach to urban flood risk management. Luang Prabang is considered a priority area, where the Client and local authorities have requested for project support to restore and improve current wetland functions, as well as to promote sustainable tourism development.

D. Objective of the Consulting Assignment

10 The World Bank promotes an integrated approach to urban flood risk management, which balances the use of structural and non-structural solutions and utilizes innovative technical and financial solutions to support the development and sustainable maintenance of DRM investments. In line with this approach, the Lao PDR SEA DRM Project includes a Technical Assistance (TA) program on integrated urban flood risk management (IUFMRM). This supports

priorities for action to reduce flood risk in Luang Prabang, which was identified in a 2015 study as the highest priority city requiring for flood mitigation along the Mekong in Lao PDR.⁸

11 The GoL's priorities emphasize the restoration and use of Luang Prabang's wetlands by integrating Sustainable Urban Drainage Systems (SUDS) as part of their approach to urban drainage and water quality management. This has been embraced elsewhere via "Sponge City" interventions that use or mimic natural water cycles and mitigate urbanization impacts.⁹ A holistic wetlands management approach is also envisaged, emphasizing sustainable sanitation practices, wetlands-friendly livelihood practices, and greater community engagement in biodiversity conservation and management activities.

12 **The objectives of this Consulting Assignment are to:** (i) collect baseline information and conduct a rapid appraisal of wetlands-related infrastructure and services in Luang Prabang including the application and/or study of the Decentralized Wastewater Treatment Solution (DEWATS) in Lao PDR¹⁰; (ii) define the scope for potential wetlands management activities (including constructed wetlands, integration into SUDS, and other environmental restoration projects in Luang Prabang) with a focus on flood risk management and water quality improvement in the Target Areas; (iii) conduct an environmental, social, and cultural impact assessments (e.g. Cultural Heritage Impact Assessment [CHIA] and Initial Environmental Examination [IEE] or Environmental Impact Assessment [EIA]) where necessary; (iv) develop a Wetlands Management Strategy and a roadmap for implementation (for both structural and non-structural measures); and (v) support implementation of the selected pilot(s) structural and/or non-structural measures through the preparation of detailed designs, technical specifications, and Bills of Quantity (BoQ). The pilot(s) may involve, for example, a combination of the construction of a DEWATS, drainage improvement and flood alleviation measures, and other associated urban improvements such as construction of walkways and maintenance access, boundary demarcation and urban greening.

13 The expected key outcomes are: (i) increased awareness, technical understanding, and active cooperation among key stakeholders about the ecosystem services provided by the wetlands and the need for local communities to be responsible for operation and maintenance (O&M) of the eventual pilot and other facilities as agreed with local authorities and local communities (LA/LC); (ii) sustainable use and management of the wetlands for flood risk management, livelihood enhancement, and tourism, as part of a city-wide SUDS and roles of LA/LC on O&M of the systems; (iii) formulation of investment plans (structural and non-structural measures) for SUDS, flood risk management, and wetlands restoration in Luang Prabang; and (iv) preparation of key technical documents to allow future implementation of the pilot infrastructure in the Target Areas.

E. Scope of Services

14 **Participatory Planning and Design** will establish the analytical baseline for investing in wetlands restoration, identify potential pilot investments (whether structural or non-structural in nature), and develop preliminary and detailed designs, technical specifications, and Bills of Quantity (BoQ). The need for land acquisition and/or relocation of private assets should be avoided as much as possible, and consultation with the World Bank's safeguards specialists is highly recommended when this issue may be involved. The main tasks are outlined below:

- (a) **Task 1:** Preliminary review and inception
- (b) **Task 2:** Rapid appraisal of key infrastructure and services
- (c) **Task 3:** Scoping of Pilot Measures, Strategy and Action Plans, Feasibility Study, and Preliminary Design
- (d) **Task 4:** Environmental and Social Impact Assessments (ESIA) / Cultural Heritage Impact Assessment (CHIA) for Pilot
- (e) **Task 5:** Detailed Design (drawing and Report) and Technical Specifications and Bills of Quantity (BOQ)

Task 1: Preliminary Review and Inception

15 This Task involves all basic preparatory reviews needed to develop an inception report that meets the TOR requirements and responds to the needs of local stakeholders. Task 1 shall consist of the following sub-tasks:

- (a) **Draft Inception Report** – prepare an Inception Report with a clear work plan within seven (7) calendar days after signing the contract, describing the understanding of the TOR. The Inception Report shall include:
 - o A work plan with the methodology, detailed schedule, planned touchpoints with local stakeholders, and expected contributions of key experts
 - o A project administration plan showing reporting lines and external / internal communication methods
 - o A quality assurance plan to set up well-organized documentation, produce high quality reports, and ensure that all Client's requirements have been met
 - o A risk management plan, particularly for project risks such as COVID-19 or travel disruptions if applicable. Virtual implementation of project tasks shall be clearly articulated as a contingency.
- (b) **Literature review** – conduct a desktop review of relevant literature and completed/on-going studies by GoI, academia, private sector, civil society, and other development partners related to the Luang Prabang wetlands. At a minimum, the literature review should include the information below. Based on these, an analysis of the information gaps and topics for further investigation shall be prepared.
 - o Ongoing and planned interventions for the wetlands (and their structural design levels) and related urban infrastructure. Details to be collected include the nature of the work, scale, development timeline, agency responsible, funding source and amount, and likely impacts.

- o Geomorphological wetland characteristics including area, depth, batter slope, gradient variability etc., underlying soils and geology, substrate, habitat types, typical and rare flora and fauna species, management regimes, and other aspects that contribute to an adequate characterization of the Luang Prabang urban wetlands

- o Socio-economic and demographic information, including population growth and urbanization, land conversion, and tourism

- o An overview of SUDS and constructed wetland approaches and their adoption in Southeast Asia and other countries with conditions similar to that of Lao PDR

- o Other important social aspects, particularly those that affect health and welfare of residents.

- o Initial reviews of documents and initial discussions suggest four previous studies conducted in the target areas be prioritized, and their recommendations quickly evaluated. The Consultant shall review these, with select reports under the Client's purview to be provided by Client upon contract signing:

- Report on the preparation of detailed design for Mano Village Area Water Environmental Improvement Project – DEWATS (dated May 2016), produced by BORDA¹³ for the Department of Housing and Urban Planning (DHUP)
- Socio-economic Survey in Ban Mano and Ban Pongkham by GRET¹⁴ Laos under the Wetlands Improvement and Sanitation (WIS) Project – contingent upon author's permission
- Technical Guidance Report (Revised) on Contribution of CDIA's Pre-feasibility Study on Wastewater Management in Luang Prabang (dated September 2021), prepared by the Cities Development Initiative for Asia (CDIA)¹⁵ to Support Flood Risk Management Strategies for World Bank's Lao PDR SEADRM Project
- Feasibility Study/Preliminary Engineering Design Report (version 3, dated November 2021) prepared by ISAN Corporation for the Lao PDR SEADRM Subcomponent 1.1 riverbank protection works in Luang Prabang. This includes hydrological and hydraulic analyses relevant to the larger area.
- Other reports from the Global Water and Sanitation Program (GWSP) supported by the World Bank or Global Water Security and Sanitation Partnership (supported by a multi-donor trust fund), with a focus on community-led initiatives (e.g. business establishment at community level for producing components for septic tanks, etc.)

(c) **Review of governance and legislation** – consider implications for the proposed project options, particularly restoration of selected wetlands and also their adoption into SUDS and/or formal constructed wetlands, in relation to major international (mainly pertaining to UNESCO and DPL), national or local laws or guidelines. At a minimum, the review shall encompass the requirements below, spanning all stages of a typical investment project including conceptual studies, pre-construction investigations (e.g. beneficiary surveys, geotechnical investigations, etc.), stakeholder engagement / interviews, design, and construction:

- Areas and boundaries of protected sections, scheme of current settlements and land use plans
- Special detailed and control plans, including the Safeguarding and Enhancement Plan of Luang Prabang World Heritage Site (*Plan de Sauvegarde et de Mise en Valeur – PSMV*), buffer zones, conservation plans, land use or building height/density restrictions, and other applicable laws, policies, regulations, guidelines, permits, approvals (statutory and non-statutory), and building codes at the national or provincial level
- Institutional arrangements and regulatory authorities
- For settlements deemed ‘illegal’ or uses deemed non-conforming, highlight any existing or proposed scheme for enforcement such as relocation of households (if any)

(d) **Stakeholder mapping** – map stakeholders and institutions involved in and responsible for wetlands management and urban drainage at the national and local level. At a minimum, the mapping should cover the aspects listed below. Based on these, an analysis of the stakeholder relationships and potential ways to efficiently structure stakeholder touchpoints shall be prepared.

- Roles, responsibilities, resources, interests, decision-making processes, and institutional arrangements of GoL institutions involved in, whether directly or indirectly, to: disaster (flood) risk management, drainage, embankments, public works, engineering codes, urban planning and design, architecture, cultural heritage, land use management and zoning, water quality management, tenure, resettlement, environmental and social standards, and data management
- Relationships with other agents including non-government organizations (NGOs) / civil society organizations (CSOs), beneficiaries, community groups (particularly village committees and leaders), private sector, development partners, and other relevant stakeholder groups

(e) **Project initiation workshop** – organize a physical visit to the city (of at least three days)¹⁴ to:

- Introduce the overall TA program to the local stakeholders and solicit feedback on the Inception Report work plan for this Assignment
- Discuss stakeholder priorities and geographic / topical areas of interest, and establish a consensus on the needs, expectations, scope, and outputs of the Assignment
- Present a clear and succinct analysis of information gaps and topics to be discussed at the workshop, based on the preceding desktop-based reviews. Confirm understanding

of institutional arrangements and regulatory/decision-making processes with the relevant authorities

- Prepare an inventory of information required for succeeding tasks, and confirm and validate the availability of this with stakeholders who will be the main source of information
- Define and agree on the format, content, and frequency of periodic touchpoints with local stakeholders

(f) **Final Inception Report** – refine and submit the final Inception Report based on results of the above tasks.

Task 2: Rapid Appraisal of Key Infrastructure and Services

10 This Task will assess the existing status of the wetlands based on a review of primary and secondary sources of information, historic published information, recently conducted empirical studies or research, key informant interviews, and stakeholder consultation. Surveys shall be conducted where needed to fill critical baseline data gaps. The Consultant shall conduct the appropriate level of investigation needed to achieve the objectives. Preliminarily, the priority topics¹⁵ to be appraised under this task are:

(a) Wetland physical features

- Surface area and topography – note that Digital Elevation Model (DEM) of Luang Prabang, which covers the Target Areas, will be provided by the Client to the successful bidder to facilitate more detailed analyses of urban hydrology and hydraulics.
- Soil type
- Groundwater levels
- Water quality
- Wetland bathymetry including depth, batter slope, and gradient
- Hydrological and hydraulic characteristics (e.g. periodicity of flooding, extent of flooding and depth, freeboard, water balance, outlet connections, etc.) for each wetland area. The Consultant is expected to estimate the potential role of wetlands in pluvial flood management based upon a few sample calculations, considering available retention storage and selected design storms. A comparison of the baseline versus storage scenarios should be included in the appraisal to establish their value in flood risk management.
- Major surface water drainage pathways through the city
- Wetland connection or isolation from local drainage pathways
- Localized low-lying areas and flooding locations

(b) Wetland ecological features

- Existing site ecological data and biodiversity species surveys for each wetland area. This includes birds, mammals, plants (terrestrial, aquatic and alien invasive species), amphibians, reptiles, fish, macroinvertebrates (terrestrial and aquatic). The presence of pests and non-native invasive species should be noted. Direct observations may be used to the extent feasible within the project scope, timeline and budget.

(c) **Wetland socio-economic uses**

- Baseline inventory of settlements, illegal structures, and encroachments not in line with the permitted use under the PSMV
- Interviews, focus group discussions, or site surveys with local community to determine socio-economic use in and around the wetlands
- Businesses and services established and planned, whether conforming or non-conforming uses
- Calculation of the value of livelihoods directly or indirectly supported by each wetland area
- Wetland management approaches particularly in relation to operations (water storage and release) and maintenance

(d) **Wetland areas description and mapping¹⁸**

- Area and updated location of wetland areas in Luang Prabang, with focus on the Target Areas and its catchment. Information available from relevant local departments shall be validated based on interpretation from satellite imagery, surveys and the DEM to map current extent of wetlands.
- Location and type of wetland according to The Ramsar Convention on Wetlands' classification of wetlands and site-specific hydrogeomorphological classification
- Land and water surface water use, activities, land/building ownership and institutional jurisdiction
- Special site designations (e.g. historical site, heritage status, protected area, etc.)
- Type and number of inhabitants, where the adjoining development has a residential component
- A composite map with layers of critical information regarding the above priority topics, namely, wetland physical features (particularly surface water drainage pathways), ecological features, socio-economic uses, and municipal infrastructure and services, organized in a geographic information system (GIS)

(e) **Wetland ecosystem service valuation**– determine and evaluate key ecosystem services provided by or derived from the wetlands, collectively and individually, as defined in the Millennium Ecosystem Assessment (2005), and use the Common International Classification of Ecosystem Services (CICES).¹⁷ The Consultant is strongly encouraged to refer to the list of wetland ecosystem services, approach, and indicators studied in McInnes & Everard (2017)'s Rapid Assessment of Wetland Ecosystem Services (RAWES)¹⁹, and use a Driver-Pressure-State-Impact-Response (DPSIR) framework²⁰ to present a systematic analysis. An alternative framework may be used as the Consultant deems appropriate for the task if it demonstrates a recognition of the resource limitations for this study. At a minimum, the Consultant shall:

- Produce maps, descriptions and quantification of the Provisioning, Regulating, Cultural, and Supporting ecosystem services within the study area
- Identify areas with the highest level of flood regulation ecosystem service
- Develop clear and concise presentation slides to share the ecosystem valuation methodology and results to key stakeholders in future participatory workshops and policy dialogues.

(f) **Municipal infrastructure and services**

- Land use, tenure, and ownership
- Wetland management activities and proposals²⁰
- Drainage and flood risk management
- Urban planning and design
- Water supply
- Water quality management including sewerage and sanitation
- Solid waste management, including current practices, recycling and disposal facilities, and solid waste bottleneck areas in the drainage system
- Tourism
- Cultural Heritage
- Smart solutions, including existing or proposed interventions using sustainable or energy-efficient devices and information technology solutions

Task 3: Scoping of Pilot Measures, Development of Strategy and Action Plans, Feasibility Study, and Preliminary Design

¹⁷ This Task will assess the trends, constraints, and Strengths-Weaknesses-Opportunities-Threats (SWOT) relevant to the wetlands, which determine the potential for wetlands management and restoration projects and the level of future assessment required. This task shall consist of the following sub-tasks:

(a) **Trends** – study national and local trends that may have an impact on the design and sustainability of potential wetlands management and restoration projects, which may be structural or non-structural in nature. Specifically address the apparent dichotomy between the urgent need for land for urban development and protecting residents from the increasing threats of flooding arising from climate change and loss of the flood storage capacity that wetlands provide. These may include but are not limited to:

- Population and resource demand, and corresponding waste (solid waste and wastewater) generation
- Wetland loss and degradation, including changes in wetland type and function due to anthropogenic or other pressures (such as climate change)
- Tourism and development / redevelopment
- Emerging capacity constraints and training needs (for example, in wetlands conservation and management, ecosystem services valuation, and flood risk management)
- Architecture, Engineering and Construction (AEC) sector review, including market players, construction trends, industry readiness in terms of availability of skilled personnel for infrastructure projects

(b) **Constraints** – articulate conditions that limit the kind of restoration activities possible or preclude certain management activities as part of a potential wetlands management and restoration project. These may include but are not limited to:

- Urban infrastructure constraints, such as land ownership, existing or planned utilities, administrative issues, or requirements to avoid disturbance of heritage sites/buildings
- Flood management constraints, such as impact of revegetation on flow or transfer of flood risk
- Health impacts such as disease vectors
- Irreversible or ongoing environmental impacts, such as altered microclimate, nutrient or sediment loads, or hydrologic and hydraulic conditions (e.g. drying, flow rerouting)
- Governance issues, financial limitations or municipal budget constraints

(c) **Weaknesses and Threats** – identify threats and articulate the level of impact significance of such threats to a potential wetlands management and restoration project, both before and after application of mitigating measures. These may include but are not limited to:

- Solid waste disposal
- Dredge spoil dumping
- Invasive species
- Unregulated wastewater discharge
- Unregulated infilling
- Unregulated buildings
- Unregulated water abstraction
- Agriculture / aquaculture pollution
- Surface runoff from roads or developments

(d) **Strength, Opportunities, Scoping of Pilot Measures, and Feasibility Study** – based on the above analyses, explore possible entry points for critical wetlands management and restoration projects in the Target Area, with a focus on flood risk management aspects. It must be noted that while the TA program focuses on flood risk management, the study should be broadened as appropriate to encompass the multiple values of wetlands and co-benefits from 'green infrastructure' or 'nature-based solutions' (NBS). At a minimum, the Consultant shall:

- Review the city's proposed or planned investment projects at concept level and identify synergies, complementarities, and areas for improvement in terms of flood risk management. This should include the possibility of integrating some of the wetlands into flood mitigations plans through the adoption of SUDS and constructed wetlands
- Identify problem locations in terms of localized flooding and identify existing wetlands, SUDS or constructed wetland interventions to mitigate these
- Identify specific wetlands that are in critical need of management, based on objective prioritization criteria
- Tabulate the main problems and issues versus potential project proposals
- Align the project proposals to national and local plans/strategies
- Generate options for: improvements or construction of wetland areas that provide a high level of ecosystem service in terms of flood hazard regulation; improvements in the landscaping, public amenities, operations and maintenance (O&M); treatment stormwater preferably using nature-based solutions; and increasing the public health standards and welfare of populations in and around flood-prone areas. Where feasible, preference should be given to relatively simple and cost-effective measures that promote community involvement and are associated with SUDS
- Prioritize the interventions using a multi-criteria analysis encompassing environmental, social, and technical aspects. The technical criteria shall minimally include a demonstration of the value of the wetlands in flood risk mitigation using quantitative methods, such hydrological models and simplified hydraulic models.
- From the prioritized options, identify a priority / demonstration pilot project(s) that incorporates both structural and non-structural aspects, with a specific description of the value-add to flood risk management in Luang Prabang, preliminary cost estimate for structural and/or non-structural measures, financing mechanisms, implementation arrangements, likelihood of carrying out more detailed Environmental Impact Assessments (EIA), recommendations for Monitoring and Evaluation (M&E) activities to ensure sustainability of project activities, and potential project risks and mitigating measures – including but not limited to the following aspects: (i) Governance; (ii) Technical design; (iii) Fiduciary; (iv) Institutional Capacity; (v) Stakeholder Management; (vi) Environmental and Social standards; and (v) Climate Change. The pilot should be achievable within an estimated US\$1.5million envelope. The Consultant shall summarize the above tasks in a Feasibility Study Report.

(e) **Wetlands Management Strategy and Action Plan** – working with the Client, relevant MPWT departments, provincial DPWT, DPL, and local government, produce a (i) time-bound Wetlands Management Strategy and (ii) time-bound Action Plan, of which the proposed pilot (structural or non-structural in nature) will be the first action to be implemented. It is critical that this strategy and action plan is given due importance as a non-structural measure.

(f) **Knowledge transfer and capacity building** – Knowledge Transfer and Capacity Building shall cover activities related to the assignment including technical support for DOW, DPWTs:

i. Prepare a workshop with corresponding budget for to improve the technical capacity of local government officers, academia, private developers, and conservation agencies in relation to wetlands conservation and management, ecosystem services valuation, and flood risk management in Luang Prabang.

ii. Arrange a knowledge transfer and capacity building of ODL counterparts, primarily DOW and DPWTs staff, on wetlands management and restoration, to exchange knowledge with excellent sample from other country, through a Study Trip involving field visits to select wetland areas.

The program shall cover design aspects and shall include: Wetlands Management Strategy and the Restoration for both structural and non-structural measures; disaster risk management practice; infrastructure design, addressing environmental and social safeguard aspects, and design and maintenance of green infrastructure, eco- and tourism-friendly solutions; the technical understanding about the ecosystem services provided by the wetlands, sustainable use and management of the wetlands for flood risk management, livelihood enhancement, and tourism. The aim of the program is to bring about changes in terms of knowledge, skills and attitude of the staff to be able to cope with the particular requirements of their job.

(g) **Participatory design workshops** – organize a workshop with key stakeholders (as identified in mapping exercise under *Task 1d, Stakeholder Mapping*) to conduct the activities listed below. Findings from this workshop will help to formulate a shortlist of potential wetlands management and restoration projects (including SUDS initiatives), which may be structural or non-structural in nature, to be reviewed in subsequent stages of the TA program:

- o Co-create a vision for potential wetlands management and restoration, including innovative co-management models with the community and the local government
- o Identify stakeholder preferences and values. Ensure that the workshops document the diversity of values, and types of value (monetary, aesthetic, etc.) assigned by different stakeholders to wetlands, which need to be captured and integrated into decision-making processes
- o Develop a multi-criteria decision-making framework, using a combination of quantitative, qualitative or relative weights arising from stakeholder preferences and values
- o Discuss project wetland areas, with a description of the scope, development timeline, financing mechanisms, implementation arrangements, outcomes and outputs
- o As a workshop output, synthesize participants' input and develop a communications plan for the Luang Prabang stakeholders identified in *Task 1*, with a focus on (i) flood hazard regulation and potential to use the wetlands as part of an integrated flood risk

management approach including SUDS initiatives, and (ii) community engagement practices and potential community-based methods to prevent wetland loss or restore degraded wetlands.

(h) **Preliminary design** – preliminary designs will be carried out for the pilot as described in the Feasibility Study Report. The Preliminary Design should include but is not limited to:

- o Surveys and Soil Investigations – undertake all necessary additional detailed topographic surveys, and geotechnical investigations to enable preliminary and detailed engineering to be carried out
- o Site Analysis Plan
- o General design documentation of all proposed elements of the pilot (structural or non-structural in nature), where applicable. This includes socio-economic surveys, three-dimensional perspectives, general arrangement/site plans, elevations, sections, and schematic diagram of the proposal, communicating the concept and illustrating the main features/green infrastructure/nature-based flood risk management solutions proposed.
- o Where structural drawings are required, the preliminary design drawings shall be produced at 1:2000 horizontal scale and 1:200 vertical scale (or any other scale deemed appropriate if more detail is needed – to be agreed with DOW) showing all existing plan features, construction limits, existing ground levels, proposed finished profiles, typical cross sections, etc.
- o Economic analysis of the pilot, including a sensitivity analysis that takes account of potential variations in project costs, benefits, and implementation period.
- o Present the results in a concise Preliminary Design Report with drawings and a preliminary Cost Estimate and breakdown.

Task 4: Environmental and Social Impact Assessments (ESIA) / Cultural Heritage Impact Assessment (CHIA) for Pilot

18 This Task will synthesize all the above information to guide the preparation, additional studies, and approvals needed for more advanced environmental, social, and cultural heritage impact assessments for the proposed wetlands management and restoration pilot(s), whether structural or non-structural in nature. This task shall consist of the following sub-tasks:

- (a) **Review and preparation of E&S safeguards documents and PSMV** – ensure that the requirements of the Environmental and Social Management Framework (ESMF), Environmental and Social Management Plan (ESMP), and Abbreviated Resettlement Action Plan (ARAP) are addressed. Where needed, an Environmental and Social Impact Assessment (ESIA) must be submitted to the Ministry of Natural Resources and Environment (MONRE). The Consultant shall also check with DPL regarding the requirements for development of a CHIA.

Task 5: Detailed Design and Technical Specifications and Bills of Quantity (BOQ)

19 This Task will involve the preparation of Detailed Designs, for components of the pilot that are structural in nature. The Consultant shall obtain formal agreement from DOW on the structural (civil works) elements of the pilot to proceed, and on the procurement strategy. The Detailed Design should include but is not limited to:

- (a) **Detailed designs and drawings** – developed detailed construction documentation based on the approved preliminary design. This shall include all engineered drawings needed for the bidding package such as: general arrangement plans; structural, civil and hydrological engineering plans, sections and details; drainage plans and connection details; site utilities layouts and connection details; landscaping plans, plant schedules, and details; erosion and sediment control plans; sections and cross-sectional details; elevations; building/structure design plans (e.g. play features or recreational amenities), as well as all needed schedules, technical details, and construction specifications. Design drawings shall be prepared at scales suitable for construction and agreed with DOW.
- (b) **ESIA and CHIA** – finalize the CHIA and submit to DPL and UNESCO for any clearance (if needed). Finalize the ESIA (including ESMP, ARAP, and EOP) and submit the documents to DNEP of MONRE for approval. Clearance from the Bank will also be required. Cost for implementation and monitoring of the CHA, ESMP, ARAP, and EOP (if needed) shall be part of the project cost estimate.
- (c) **Bills of Quantities (BOQ) and Final Cost Estimate** – prepare BOQs for the above works and use these to finalize the cost estimate.
- (d) **Economic Analysis (updated)** – based on the final cost estimate, update the economic analysis of the project and include a sensitivity analysis considering prevailing economic conditions (e.g. inflation, price increase of materials, etc.)
- (e) **Detailed Design Report and Technical Specifications** – present the results of the above in a concise report with detailed drawings and technical specifications, which can be used for future bidding.
- (f) **Completion Report** – produce final report and presentation summarizing the results of all tasks, key lessons learned, and next steps to advance project preparation of the priority / demonstration wetlands management and restoration pilot, whether structural or non-structural in nature. Include compelling communication materials for the public (including but not limited to fly-through videos with 3D visualization).

F. Outputs, Duration of Project, and Schedule of Payments

20 It is anticipated that the overall duration of the project is approximately 12 months from the commencement of services.

21 The Consultant shall be paid according to the expected implementation schedule as follows:

Participatory Planning and Design (Lump Sum – payment against milestones)

Item No.	Output Description / Milestone	Activity Duration	Expected Deadline (in no. of months from the date of contract signing)
5	Task 1: - Task 1: literature review (including review of governance/legislation), stakeholder map, project initiation workshop/site visit, final inception report	1.5	1.5

6	Tasks 1, 2 and 3 outputs: -Task 2: report on rapid appraisal of key infrastructure and services - Task 3: feasibility study report, wetlands management strategy and action plan, training, preliminary design report. Including completion of Knowledge Transfer and Capacity Building Activities	4	5.5
7	Task 4 outputs: Environmental and Social Impact Assessments (ESIA) / Cultural Heritage Impact Assessment (CHIA) for Pilot, other safeguards documents required.	3	8.5
8	Task 5: Detailed Design (drawings and report), Technical Specifications and Bills of Quantity (BOQ)	3.5	12
TOTAL			12

G. Required Expertise of Consulting Firm and Key Experts

22 The following requirements are a broad description of the likely expertise needed for this consultancy assignment. The Consultant may propose additional experts in the Technical Proposal as may be needed to fulfil this TOR. The Consultant may mobilize supporting experts and administrative staff as necessary to execute the scope of services. The Consultant is encouraged to engage a diverse and gender-balanced team.

23 The Consultant is expected to:

- be a firm with appropriate and sufficient capabilities, resources, and experience to execute the full extent of the services to a high quality;
- have a strong presence in Lao PDR during the technical assignment, with either Team Leader or Deputy Team Leader ideally based in Luang Prabang;
- have a proven record in completing at least three similar assignments successfully in the following sectors: disaster risk management, cultural heritage, risk-informed urban planning and design, and water resources management;
- demonstrate experience in implementation and management of programs related to wetlands management and restoration, SUDS, stakeholder engagement, and consideration of environmental and social management aspects in Lao PDR or a country with similar context;
- ability to form a dedicated team comprised of international experts (with relevant experience in large developing countries; experience in Lao PDR would be highly advantageous) and national experts (with extensive experience in Lao PDR and deep knowledge of the Lao and Luang Prabang context) with the relevant technical expertise, qualifications, and work experience;

24 **Indicative staffing.** The following team composition is recommended. Key Experts, indicated with an asterisk (*), must be included in the Consultant's proposal. For the other team members, the Consultant must evaluate for themselves the staff required—whether international or national—to achieve the objectives of the assignment and may propose additional, alternative,

or multi-role staff. The Consultant is expected to submit a full CV for all staff covering Key Expertise positions, along with a brief description of staff covering other positions.

Participatory Planning and Design

No.	Indicatives Team Composition and Description
1	<p>*Team Leader / Wetlands Specialist</p> <p>Take overall responsibility for the whole Assignment, lead the implementation of all tasks, guide technical appraisal and evaluation of ecosystem services, strategize on project preparation for future wetlands management and restoration projects and ensure quality of all deliverables to the Client. Specific qualifications include:</p> <ul style="list-style-type: none"> ○ At least a Master's degree or similar advanced postgraduate training in ecology, biology, natural resources / environmental management or related field; ○ Minimum 20 years of working experience related to planning and/or implementation of management assignments on biodiversity conservation, protection and/or restoration and/or operational planning and management in protected areas; wetland construction and/or restoration, or projects of similar characteristics and complexity to this Assignment preferably in Lao PDR, Mekong countries, or other international contexts; ○ Good communication skills (English is required; Lao is strongly preferred), organization skills and presentation skills. ○ Experience in environmental and social safeguards ○ Experience working with development banks is an asset
2	<p>*Deputy Team Leader / Civil Engineer</p> <p>As Deputy Team Leader assist and work under the direction of the Team Leader to ensure that the objectives of this scope of services are met. Coordinate inputs of all team members, proactively manage sequencing and delivery of tasks, lead participatory workshops and major touchpoints with OoL and local stakeholders. Specific qualifications include:</p> <ul style="list-style-type: none"> ○ At least a Master's degree or similar advanced postgraduate training in engineering (civil, environmental hydraulic) or a closely related discipline; ○ Minimum 15 years working experience related to the feasibility study and design of wetlands, flood protection schemes, nature-based solutions, or similar works, including at least 5 years of experience working on OoL projects; ○ Good communication skills (English and Lao is required), organization skills and presentation skills. ○ Experience in environmental and social safeguards ○ Experience working with development banks is an asset
3	<p>*Municipal Drainage and Sewerage Engineer</p>

	<p>Conduct appraisal of wetland wastewater conditions and water-related municipal infrastructure, review water supply and sanitation issues (including access, coverage, sewage collection/disposal, and investment needs), assess water-related issues related to control of vectors and waterborne diseases, and resilience to water-related disasters, and conduct technical studies as needed. Specific qualifications include:</p> <ul style="list-style-type: none"> ○ Degree (BSc minimum) in civil / structural / environmental or hydraulic engineering (specializing in drainage and sewerage), hydrology, water resources management, or related fields; ○ Minimum 10 years' working experience related to the appraisal and design of municipal drainage and sewerage systems including at least 5 years' experience in the design of SUDS, processing of hydro-meteorological data, analyses of rainfall, water level and discharge data and rainfall-runoff modelling; ○ Good communication skills (English is required); organization skills and presentation skills. ○ Experience in environmental and social safeguards ○ Experience working with development banks is an asset
4	<p>*Hydrology and Hydraulics Specialist</p> <p>Conduct appraisal of wetland hydrologic and hydraulic conditions and water-related municipal infrastructure (including drains and flow control infrastructure), analyze potential for flood risk management projects using the wetlands as part of a holistic nature-based solution or green infrastructure proposal, and conduct technical studies as needed. Specific qualifications include:</p> <ul style="list-style-type: none"> ○ At least a Master's degree in civil / structural / environmental or hydraulic engineering, hydrology, water resources management, risk modelling or related fields; ○ Minimum 10 years' working experience in the monitoring and processing of hydro-meteorological data, including field installation of equipment, data consistency checking, water balance studies, statistical analyses of rainfall, water level and discharge data and rainfall-runoff modelling; ○ Good communication skills (English is required; Lao is strongly preferred), organization skills and presentation skills. ○ Experience working with development banks is an asset
5	<p>*Urban Planner and Designer</p> <p>Lead development of urban assessments, facilitate stakeholder consultation meetings and workshops, assess land use, management, and tenure issues related to future wetlands management and restoration projects; and align proposals with national and local priorities and development plans. Specific qualifications include:</p> <ul style="list-style-type: none"> ○ At least a Master's degree in urban planning, spatial planning, urban development/design, urban management, or related areas; ○ Minimum 15 years' working experience related to urban planning and development, including developing urban strategies, policies and institutional frameworks;

	<ul style="list-style-type: none"> o Good communication skills (English is required; Lao is strongly preferred), organization skills and presentation skills. o Experience working with development banks is an asset
6	Institutions and Policy Specialist
7	Economist
8	GIS and Database Specialist
9	Environmental and Social Safeguards Specialist
1*) Key Expert	

H. Reporting, Feedback, and Invoicing

25 The Consultant will report to the Client, i.e. the Project Management Unit (PMU) for Component 1 of the Lao PDR SEA DRM Project within MPWT-DOW. The PMU will supervise and monitor the implementation progress in close consultation with World Bank team. The Consultant shall be guided by the Roles and Responsibilities of the Client and provincial agencies as stipulated in the Memorandum of Understanding on the Implementation of the Lao SEA/DRM Project with Additional Financing (see Error! Reference source not found.) and the Lao SEA/DRM Project Operation Manual (POM). The provincial DNWT and DPL, in consultation with the Provincial Department of Natural Resources and Environment (PONRE) will work closely with the Consultants for both Tasks.

26 All final deliverables shall be prepared in both English and Lao language to facilitate the review by local government agencies. Submissions should be made in both in PDF and native editable formats (including word-editable documents, CAD drawings, graphics, presentation slides, spreadsheets, and models) as required at clearly readable scales. Translations must be of a high quality, with editing for language and technical accuracy by a translator familiar with technical terminology. The report needs to contain an executive summary in both languages.

27 All deliverables are to be prepared as a draft version and finalized upon review by the Client. The Consultant shall allow at least five (5) business days for the Client to review all outputs. The Consultant will need to integrate these feedback periods into the project planning and milestones.

28 The Consultant shall submit to the Client a succinct fortnightly progress report by email to outline key updates on progress of the consultancy assignment, issues to be addressed, and upcoming activities and deadlines. Invoices shall be submitted promptly to the Client for approval after completion of outputs per Section D.

I. Items to be Provided by the Client

29 The Client shall make available to the Consultant the following facilities, services, documents and information for carrying out the proposed Assignment:

- Data and information such as reports, documents, drawings, maps, statistics, legislation and regulations, etc., in connection with the Assignment, which may not be publicly or widely available. The Client will provide support in obtaining data, maps and supporting materials from other DoL agencies.
- Administrative support to obtain permits and authorizations from Government agencies necessary for customs clearance, entry and exit visas, travel documents and status of experts, etc., as required for carrying out the services under the Assignment.

30 The Consultant will be responsible for other services that may be needed, including:

- Professional editing and design of developed communications materials;
- Interpretation costs to understand consultations/workshops.
- National and international telecommunication;
- Costs related to consultation workshops with stakeholders in target areas, presentations, and other communication to the Client or beneficiaries (e.g. facilitation, refreshments); and
- Other means required for performing the Services.

J. Data Confidentiality

31 All data, information, and relevant documents shall be confidential and for the sole use for this Assignment only. A brief Data Management and Protection Plan describing how data will be collected, used, managed, stored, disseminated, and deleted shall be included as part of the Inception Report.

32 Upon completion of the Assignment, the Consultant shall submit all data used and produced under the Assignment in usable formats agreed with the Client. This includes all input data used for the study, as well as data collected from various sources. A data management and file sharing system shall be prepared and handed over at completion of the Assignment.

Annex 1

Memorandum of Understanding (MOU) between MPWT and the Provincial Authority of Luang Prabang on the Implementation of Lao PDR SEA/DRM with Additional Financing – Component 1

(13 August 2020)

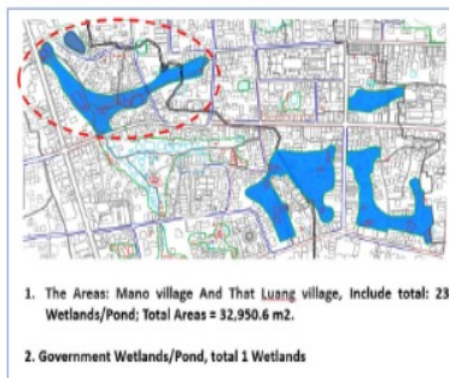


Annex 2

Map of Study Area (1999)



Target Area for Pilot (subject to further discussion with Client)



Annex 5B. Final TOR for the flood management study

LAO PEOPLE'S DEMOCRATIC REPUBLIC SOUTHEAST ASIA DISASTER RISK MANAGEMENT
PROJECT (LAO SEADRM) WITH ADDITIONAL FINANCE (IDA CREDIT NO. 6518-LA)

Terms of Reference (TOR) for Consultancy Services:
Flood Risk Management for Vientiane Capital City and Pakxan City
(Ref: AF-C04)

A. Background

- 1. Context.** Lao People's Democratic Republic (PDR) is increasingly at risk to a range of natural hazards – including floods, storms, and droughts – which often result in significant social, physical, and financial impacts at the local and national level.¹ Extreme flooding events—often as a result of severe storms—are the most common and destructive natural hazards in Lao PDR, affecting people, livelihoods, infrastructure, and the economy. Annual expected losses for flood events alone range from 2.8% to 3.0% of GDP. Expected economic losses from a high-impact flood (one occurring on average once every 100 years) are 11.7% of GDP. The estimated average annual fiscal cost of floods is 2.7% of government expenditures.² The risks of flooding are likely to increase in the future, as Lao PDR is considered vulnerable to climate change. In the Lower Mekong Basin climate change is expected to lead to higher temperatures and more intense rainfall events, more extreme flooding, and prolonged drought.
- 2. Lao PDR SEA DRM Project and Additional Financing.** The Government of Lao People's Democratic Republic (GoL), with financing from the International Development Association (IDA) of the World Bank (WB), is implementing the Lao People's Democratic Republic (PDR) Southeast Asia Disaster Risk Management (SEA DRM) Project with Additional Financing. The Project adopts a comprehensive approach to DRM through activities in target areas related to urban flood risk management, hydromet modernization and early warning systems, and financial preparedness.³
- 3. Component 1 of the Lao PDR SEA DRM Project** aims to strengthen flood protection and resilient planning in urban areas. It is implemented at the central level by the Department of Waterways (DOW) of the Ministry of Public Works and Transport (MPWT) (hereinafter, the Client), in close cooperation with Public Works and Transport Research Institute (PTRI) and the provincial Departments of Public Works and Transport (DPWT). Subcomponent 1.2 includes a Technical Assistance (TA) program on integrated urban flood risk management that supports priorities for action to reduce flood risk in Vientiane capital city ('VTE', in Vientiane prefecture) and Pakxan city ('PKX', in Borikhamxay province), two of the most flood-prone areas in Lao PDR, with population growth rates at 1.0% and 2%, respectively.⁴ While the GoL has made significant investments since the 1990s in flood protection infrastructure in both Vientiane and Pakxan, most investments focused on Vientiane and mainly on fluvial flooding from the Mekong River, and less on flood protection along the tributary rivers. Urban drainage systems in Vientiane have been upgraded since the 1990s, but these systems still have insufficient capacity to manage peak floods. They also largely continue to function as combined systems for both stormwater and wastewater in most of the city.⁵
- 4.** The World Bank promotes an integrated approach to urban flood risk management, which balances the use of structural and non-structural measures⁶ and adopts innovative technical as well as financial solutions to support the development and sustainable maintenance of disaster risk management (DRM) investments. Structural interventions can include both 'gray' or hard-engineered infrastructure (such as embankments, polders, erosion works, drainage canals, etc.) and 'green' or nature-based solutions (such as temporary flood retention areas, wetlands, etc.), while non-structural measures can include land use management, building regulations, emergency planning and response, flood early warning and dissemination, etc.
- 5.** In line with this, the TA program will establish the evidence base to identify priority areas for investment, with an emphasis on resilient and inclusive urban design and a balance of structural (i.e. hard-engineered (or gray) and nature-based (or green) solutions, including Sustainable Urban Drainage System or SUDS) and non-structural solutions. Broadly, the TA program comprises of the following key components.
 - (a) Component A (already completed):** Baseline Study for Vientiane and Pakxan cities that serves as the analytical foundation for flood risk management planning of priority investment, and assesses data availability necessary for flood modeling studies going forward. The Baseline study has been completed and will be made available to the Consultants short-listed to submit proposals ;
 - (b) Component B (already completed for VTE; may become available for PKX in mid 2023):** Preparation of a Digital Terrain Model (DTM) of areas of interest within Vientiane and Pakxan cities. The DTM and associated datasets for Vientiane will be made available to the Consultant, while the DTM for Pakxan may be made available in 2023 by the Department of Climate Change (DCC), Ministry of Natural Resources and

Environment (MONRE) under a separate project.⁷ If it becomes clear that the Pakxan DTM will not become available by October 2023, the Consultant shall submit a costed proposal to DOW for an alternative methodology for deriving ground levels for the FXN catchment area.

(c) **Component C (this Assignment):** Integrated urban flood risk management study; comprising flood hazard mapping and modelling. For VTE a priority investment package of works for flood risk management will be prepared. For PXN the main driver(s) of flood hazard and level of flood risk will be identified and recommendations made for the future preparation flood risk management (FRM) works.

6. **Focus on cities: Vientiane capital and Pakxan.** In 2022, with support from the World Bank under Component A of the TA program, a baseline study on flood risk was carried out for Vientiane capital city (VTE) and Pakxan city in Borikhamxay Province (PXN). The study focussed primarily on potential flood risk arising from the Mekong and its tributaries. There was insufficient data or time available to assess urban drainage networks. The study indicated that tributary rivers of the Mekong (the Nam Ngum and Mak Hiao in Vientiane and Nam Nejeap and Nam San in Pakxan) may contribute to urban flooding with discharges being blocked by high water levels in the Mekong during the rainy season causing periodic overtopping of the tributary river banks, resulting in flooding of the lowest parts of the cities. While the Mekong itself has received riverbank protection works over recent decades, the tributaries remain largely unprotected. This appears to be further exacerbated by stagnation of flood water due to lack of drainage infrastructure of sufficient capacity and/or functionality. Both cities, but especially Vientiane, have grown rapidly in recent years and have over time developed very close to the banks of the Mekong and its tributaries. Finally, the study found gaps in the availability of data needed for more detailed flood modelling and analysis, which is needed to support planning and decision-making for future flood risk management investments.

7. For this assignment, the "Project Areas" are defined as follows:

- 7.1. **VTE:** watershed that encompasses the 6 districts of VTE namely, Chanthabouly, Sikhottabong, Sisattanak, Xaysettha, Xaythany, and Hatsayfong, which are frequently flooded and are therefore a high priority of DPWT-VTE for flood alleviation measures; and
- 7.2. **PXN:** watershed that encompasses Pakxan district and Borikhane district in Borikhamxay province.

B. Outcomes

8. **The expected key outcomes are:** (i) DOW/provincial DPWTs of VTE and PXN (the implementing agencies) together with a broad range of stakeholders, including representatives of city residents have a clearer and more precise understanding of the causes of, and their exposure to, flood risk and they have a shared vision for flood risk management measures, which forms the basis for investment planning; and (ii) the

implementing agencies have a clear pipeline of priority works that form part of the agreed flood risk management measures, with at least 1 package ready for near-term implementation. In the case of VTE a Feasibility Study and Preliminary Design will be prepared for the Highest Priority Drainage Investment identified. For PXN recommendations will be made for the future design of the highest priority flood risk management works identified.

C. Scope of Works

9. The Scope of Works for this Consulting Assignment comprises the key tasks listed below:

- (a) **Task A: Development of an Integrated Urban Flood Resilience Strategy**
- (b) **Task B: Flood Hazard, Risk Mapping and Analysis through Modelling**
- (c) **Task C: Feasibility Study and Preliminary Designs for the Priority Drainage Investment in VTE.**

Tasks A and B will be carried out for both VTE and PXN with separate reports for each, while Task C will be carried out for VTE only.

Task A: Development of Integrated Urban Flood Risk Management Strategies for VTE and PXN

10. The purpose of Task A is to formulate broad flood risk management (FRM) strategies for VTE and PXN with options for flood risk mitigation, comprising a combination of structural and non-structural measures with buy-in from key stakeholders. Task A shall consist of the following sub-tasks:

11. **Task A1: Objectives, Strategy, and Preliminary Options (for VTE and PXN)** – organize at least one (1) workshop⁸ with the Client and relevant stakeholders to determine the following starting points for studying flood risk management investment options:

- 11.1. **Stakeholder mapping and institutional arrangement** – Identify the current stakeholders and institutions related to FRM and drainage in VTE and PXN, and examine the strengths and weaknesses of the current institutional arrangements for operation and maintenance of the drainage system. Identify options that could be considered to improve performance. Identify the extent to which the views of residents/communities on drainage are sought by the authorities responsible for the Mekong, its tributaries and drains and assess if there are opportunities whereby greater engagement could benefit the performance of the network. In the case of urban drains (including large open channels/canals) this should take account of measures to reduce the indiscriminate dumping of waste and to promote, where feasible, the adoption of SUDS measures such as encouraging infiltration and retention/detention of runoff at the tertiary level.
- 11.2. **Setting of FRM objectives** – for the management of flood risk within VTE and PXN, set appropriate objectives (expressed qualitatively – in terms of community resilience objectives and quantitatively – in terms of flood return period design levels) that focus on reducing the adverse consequences of flooding for key flood receptors such as human health, the environment, cultural heritage and economic

⁷ DCF funded "Building resilience of urban populations with ecosystem-based solutions in Lao PDR" program, supported by the United Nations Environment program (UNEP). Dataset may be available in year 2023, subject to confirmation by UNEP.

⁸ The workshop should be planned for at least 30 pax (10 from VTE, 10 from BKK, and 10 from the central Project Management Unit (PMU)), held at a centrally-located venue in Vientiane capital city.

- activity. The objectives should account for the cultural and historical context of the Project Area where possible and address economic and social inclusion issues related to women and vulnerable, poor, or disadvantaged groups. These should be discussed with key stakeholders in the Project Area.
- 11.3. Development of FRM strategy – formulate a strategy that best captures the flood risk management and broader urban resilience objectives discussed above. To facilitate the selection of a strategy, the Consultant shall quantify or assign appropriate weighting factors to represent the relative importance of the abovementioned objectives, for discussion and evaluation by the Client. The intention would be to adopt such factors into a Multi Criteria Analysis to prioritise different proposals (see more on this in Task B3 below)
- 11.4. Needs Assessment and Development of Capacity Building Plan for Flood Risk Management – enhance the technical capacity of DOW, DPWT and other stakeholders by providing an overview of FRM planning techniques and global good practice to mitigate flood and river erosion risks at a level of detail suitable to their training needs. The Consultant shall determine (via the workshop) the understanding of FRM issues and risks and ascertain the technical capacity building needs of the stakeholders regarding FRM and their corresponding environmental and social (E&S) impacts. Following the workshop, the Consultant shall summarize as part of the Task A reports their findings and recommendations on the existing capacities of the key stakeholders, their needs for development and enhancement, and specific capacity building initiatives needed to fill the identified needs over the short term (5 years) and long term (10 years).
- 11.5. Presentation of preliminary FRM options – prepare a list of preliminary FRM options, based on good practice globally and in contexts similar to Lao PDR, to alleviate flooding, whether structural (e.g. upstream watershed interventions, detention/retention facilities, embankments, increased drainage network capacity, pumping stations, raised platform levels etc.) or non-structural (e.g. watershed protection, increased maintenance budget, capacity building program, enhanced urban planning and building regulations and the enforcement of such, improved solid waste management and enforcement of illegal dumping, etc.). The options should be prepared at the conceptual design level. In preparing the options, potential barriers to their adoption should be highlighted, such as technical capacity constraints, shortfall of operation & maintenance funding, lack of enabling policies and regulations, and other constraints. Recommendations to lift these barriers shall also be developed as part of the list of potential non-structural measures. Where needed, the options should also make general recommendations for other municipal infrastructure impacted by flooding such as sewerage, wastewater collection and treatment facilities, solid waste management, roads, bridges, etc. Emphasis should be placed on meeting the needs and protecting the interest of all members of society including poor and disadvantaged groups. Potential adverse environmental and social (E&S) impacts including dealing with wastewater and solid waste management should be flagged for deliberation.
- 11.6. Financing mechanisms – The Consultant shall also explore possible financing mechanisms (such as land value capture), enabling policies, and/or institutional arrangements that could facilitate implementation of the proposed interventions,

considering the mandate and financial capacity of implementing agencies in Lao PDR.

- 11.7. Task A Reports on Stakeholder Mapping/Institutional Arrangements; Agreed FRM Objectives and Strategy; Capacity Needs Assessment and Capacity Building Proposals and Preliminary FRM Options – prepare reports (separately for VTE and PXN) covering the above that present the outcomes and conclusions of Task A. The reports shall incorporate brief Executive Summaries (in English and Lao) that cover the main findings and conclusions.

Task B: Flood Hazard, Risk Mapping and Analysis through Modelling for VTE and PXN

12. The purpose of Task B is to provide an understanding through river and rainfall and in the case of VTE of urban drainage system modelling of: (a) the impact of the Mekong and its tributaries, the Nam Ngoun and Mak Hiao in VTE and the Nam Xan and Nam Ngiep in PXN, on potential predominantly overland flooding of the cities; and (b) for VTE, an assessment of the capacity and performance of the parts of the existing urban drainage system¹ in the 6 priority Districts most affected by flooding. Environmental & social impacts arising from the current level of flooding that occurs and the effectiveness of proposed FRM options guided by results from the modelling and impact analysis should also be assessed. Task B shall consist of the following sub-tasks:

13. Task B1: Data collection (for VTE and PXN) – collect data available for VTE on the Mekong and its tributaries the Nam Ngoun and Mak Hiao and also for Vientiane's urban drainage system (at the primary and secondary drainage network levels). For PXN collect data on Mekong and its tributaries the Nam Xan and Nam Ngiep. Collected data should where necessary be supplemented through field surveys (additional cross-sections, long sections, levels condition assessments etc) to fill in gaps. Review conclusions presented in the 2022 Baseline Study by Deltares. Account should be taken of the report's qualification that "the models in this preliminary assessment have not been calibrated or extensively validated" and measures should be adopted to address this shortfall.

- 13.1. Existing available data and desktop studies The Consultant shall collect and review the following:
- Existing studies/models/plans on drainage and flood risk management for the Mekong and its tributaries for both cities and in addition relevant sector strategies and plans such as water resources management, hydropower, irrigation and forestry, water supply, urban development, and land use management. For VTE this should include the recent/ongoing work of consultants employed by agencies of the Hungarian and Korean Governments who are developing related proposals for wastewater and drainage projects, which are likely to be relevant to this study.

- Data available on Vientiane's urban drainage system (at the primary and secondary parts of the drainage network) and supplement this (see 13.2 below) where necessary through field surveys to fill in gaps.
 - PXN's urban drainage network is understood to be much less developed than that of VTE. It should however be reviewed, and an assessment made of its functionality. If necessary surveys should also be carried out of any primary drains to supplement record drawings as required.
 - Data for flood modelling and risk assessment which should include but not be limited to: past flood event records including satellite image of flood extent and anecdotal accounts from local officials and residents; meteorological records from the nearest recording stations for VTE and PXN; hydrological records from the nearest hydromet stations recording water levels and flows on the Mekong and if available on tributaries of the Mekong within the drainage catchments of VTE and PXN; land use/land cover, soil maps; irrigation system infrastructure; DTM²⁰ and other topographic information to enable delineation of catchment/sub-catchment areas; hydraulic structures on the rivers/tributaries affecting flows and their operating arrangements that could impact on flooding such as reservoir operation etc; critical infrastructure that could be impacted by flooding; land use regulation; and socio-economic data, etc.
 - Identify and delineate ponds and wetlands, within the catchments under assessment, that provide a retention function for the drainage system using the DTMs and any other relevant sources of information.
 - Data on environmental and social risks and impacts related to flood risk management arising from unexpected storms and releases of water from operations of hydropower operations upstream of the cities should be assessed.
 - Identify the relevant requirements of Government regulations related to environmental and social impact assessments such as an initial environmental examination (IEE), an environment impact assessment (EIA, 2022), a strategic environmental assessment (SEA, 2017) and other related requirements that FRM proposals will need to comply with.
- 13.2. **Field Surveys.** The Consultant shall supplement the collected data above by performing field surveys as described below, as it is likely that existing records are limited. A costed proposal for the additional survey work deemed necessary should be submitted to the Client for approval within 4 weeks of commencement. Payment shall be made from provisional sums (US\$200,000 for VTE and US\$40,000 for PXN) in the contract.
- Conduct questionnaire surveys on flood information, flood related damage and socio-economic data in flood affected areas. Review the full 2022 Baseline Report for VTE and PXN to ensure that past collected data is fully utilized.
 - Level data for all field surveys must be referenced to the same central benchmarks used for the DTM surveys in VTE and PXN respectively.
 - The following data shall be collected to meet the requirements of hydrological modelling: time series (e.g., rainfall data, river water levels and discharges, etc.) spatial information (e.g., river and tributary cross-sections, inventory of existing primary / base maps (GIS layers) (e.g., land use, soil type and thickness, vegetation cover, terrain levels, etc.) and cost-benefit / robustness / risk analyses assessments (e.g., population density, built-up value, land ownership, etc.);
 - Conduct hydrological observation surveys to obtain water level and discharge data including floods where the inputs and calibration of modelling are necessary. Water levels need to be observed at a high frequency and referenced to the central benchmarks used for the DTM surveys.
 - For VTE specifically:
 - o Inspect primary and secondary drains including channels, canals and other open drains, underground drains and culverts, and natural water courses and marshes/wetlands that provide retention storage) to check the accuracy of, and where necessary, update the record drawings provided and assess the condition and functionality of the network. Where no existing record drawings are available drawings shall be prepared. All updated drawings and any new drawings shall be submitted to the respective DPWTs as digital and hard copies and shall be incorporated in the Data Retention and Storage Facility (DRSF) described under Task B5 below.
 - o Identify and record any on-site problems causing disruption of drain discharge such as siltation, obstruction from solid waste/garbage, utility infrastructure crossings etc. Identify the location of hydraulic structures such as water gates, penstocks, pumping stations etc. and record their condition and functionality.
 - o Identify to the extent possible the measures adopted for wastewater collection and treatment in the project areas and from this estimate the volume of wastewater likely to be entering the drainage/combined sewerage network. From the network inspections identify locations/areas where pollution is either visible or can be detected by smell
 - o Identify any measures being taken to intercept wastewater before it enters the drains.
 - o The indiscriminate dumping of solid waste is understood to be a serious cause of blockages in the drainage system – if there are no measures currently in place, identify possible practical measures that could be taken to address this.
 - To enable flood damage assessments conduct surveys of building and critical infrastructure to create damage functions for each building class based on specific heights of buildings, doorsteps plinths, electrical sockets, ceilings,

number of floors/stories. critical infrastructure must be classified, including roads, railroads, electricity, gas, communication, powerlines and their characteristics.

- Where land use plans are not available, prepare a simple land-cover map to determine realistic hydrological factors using the orthophotos from the DTM surveys.
- Identify key environment and social risks and impacts that could be avoided during the planning and decision-making process of FRM proposals
- Carry out consultation with relevant stakeholders including some selected local communities affected by flood and stagnant water to obtain their feedback, concern and inputs for the draft Integrated Urban Flood Resilience Strategy, Flood Hazard & Risk Mapping and Analysis and Feasibility Study.

14. Task B2: Modelling of the Rivers/Tributaries for VTE and PXN and Urban Drainage Systems for VTE to further develop Flood Risk Management Options – develop sufficiently accurate and reliable flood hazard and risk analyses to enable further development of FRM options.

14.1. Modelling/flood risk assessment – provide simulation capability for understanding risk, developing / testing a range of flood risk management measures for a range of possible scenarios, and evaluating these measures against their effects on hazard or risk levels. The Consultant shall:

- Finalise details of a proposed software package for modelling the river/tributaries in VTE and PXN and urban drainage system in VTE and reach agreement on its adoption with the client within 4 weeks of commencement before commencing analysis of the existing systems (initial software package proposal to be provided in the Consultant's proposal)
- Schematize the river/tributary and urban drainage system for the study areas to create an integrated hydrological and hydrodynamic model. The hydrological model shall: in principle, be distributed, and provide the most realistic descriptions of storage, infiltration and runoff for various land use types. The hydrological model used must enable linking of model parameters to information provided by GIS-organized information compiled in the 2022 Baseline Study or additional information collected as part of this Assignment.
- Set up the model schematization to facilitate the evaluation of a range of urban flood resilience measures including additional retention volumes, pump capacity, canal widening/deepening, control measures to reduce runoff, improvement of canal maintenance, green infrastructure or other nature-based interventions. For demonstration purposes to the Client, mark out sub-catchment areas and the characteristics of each sub-catchment of the river basins and construct runoff models to calculate flood flows from sub-catchment / catchment areas.
- Ensure that the hydrological and hydraulic model are calibrated/validated based on latest available data. In particular, ensure that runoff volumes and peak discharges produced by the model represent physically correct magnitudes. As accurate records of flooding may be limited, anecdotal evidence collected under Task B1 may need to be taken into account.

Refinements and recalibrations of the model should be carried out until there is a reasonable coherence between actual and modelled flooding.

- Construct flood risk assessment models to represent flood flow and inundation. Risks should focus on aspects such as direct risk to human life; damage to properties including their contents and infrastructure; disruption of traffic; health risk; disruption of business activities; environmental impact and other matters such as political considerations.
- Identify the environmental and social impacts arising from the current level of flooding that occurs. In the case of VTE this should include addressing the fact that the drains serve as combined sewers and the fact that Vientiane currently has no provision for large scale wastewater treatment.
- Prepare flood hazard maps and animations for a selection of representative return periods of storm return periods say T-2, 5, 10, 25, 50, 100 to T-200 and check against records and anecdotal evidence of at least two recent actual flood occurrences. These maps should consider the impact of future uncertain scenarios due to socio-economic development (including but not limited to population growth, land use change, and urbanization) and climate change (e.g. drought, changes to rainfall patterns - based on climate change considerations and the relevant climate change scenario for 2030 [near-term] and 2050 [long-term]). Particular attention should be given to the impact of planned and unplanned urban development in VTE and PXN (e.g. increase in paved areas, increase in informal settlements near waterways, increase in populations vulnerable to flooding), and how these will affect the flood risk. Describe how uncertainties will be dealt with throughout the entire chain of hazard and risk modelling (modelling uncertainties, future climate and socio-economic scenarios). Provide quality assurance and quality control to reduce risk of errors in data processing

14.2. Supplementary FRM Options – Based on the above modelling of river and drainage systems, the Consultant shall propose additional FRM options to supplement those already identified under Task A. For VTE take account of proposals for wastewater and drainage improvements that are being developed by consultants acting for agencies of other Development Partners, particularly the Hungarian and Korean governments. The Client will provide information on these proposals which appear to be largely focussed on the interception and treatment of wastewater. Duplication of effort should be avoided.

15. Task B3: Modelling of Flood Risk Management options and ranking them using Multi-Criteria Analysis (MCA) – model the impact of FRM options identified in Tasks A and B2 above and to rank the options using Multi-Criteria Analysis (MCA). The Consultant shall:

- Using the approved software, model the effectiveness and impacts of the FRM options identified in Tasks A and B2 above over the range of return periods identified in Task B2 above,
- Apply MCA to assess the relative performance of the FRM options considering a range of factors including: flood risk reduction, impact to receptors, cost minimization, co-benefits enhancement, land use planning, and social and

environmental aspects. In particular, the performance assessment for reducing flood risk shall make use of the approved models and a comparison shall be carried out of flood risk levels before and after adoption of the selected measures. The suitability of the proposed measures shall be compared qualitatively and quantitatively against the objectives as defined under Task A1. The criteria and their relative weightings shall be discussed and agreed with DOW and the World Bank.

- Cost-benefit and Robustness analyses – support the multi-criteria assessment of measures with an estimate of costs and benefits, considering capital costs, operations & maintenance costs over their functional lifespan, and other long-term budget needs. Detail any other implementation needs and constraints.
- Evaluate the robustness of solutions for a range of (uncertain) future scenarios due to climate and socio-economic changes, etc. Minimally, consider risk indicators such as economic losses, number of people affected, damage to assets, impacts to key sectors (e.g. agriculture, transport, commerce, supply chains, etc.), economic losses and social impacts, and environmental and cultural damage. Risk mitigation measures shall be partly prioritized based on their robustness, i.e., their ability to deliver reduced flood losses under a range of future conditions, and their cost benefit ratio.
- Co-benefits / indirect benefits – apart from direct economic benefits, assess indirect benefits associated with improved flood resilience, for instance in improving the overall quality of life (health, attractive landscape, safety, etc.) and explore opportunities for attracting private capital to complement the investment envelope of the local and national government agencies involved.

10. **Task B4: Presentation and identification of priority FRM investments (separately for VTE and FXN)** – conduct, separately for VTE and FXN, presentations for the Client and other key decision makers and stakeholders to explain the overall flood hazard and risk modelling methodology, identify the dominant flood drivers, interpret the model results, and explain the ranking exercise. Where assumptions have been made in the flood modelling phase because insufficient data was available or couldn't reasonably be collected, the assumptions should be clearly identified and the reasons for adopting them explained, together with the actions that will be required to enable a responsive design to be prepared. For VTE in particular, a decision will be taken on a Priority FRM Investment for which a Feasibility Study and Preliminary Design shall be prepared (Task C below refers). It is proposed that the budget amount for this investment shall be \$50 million. This should be a discrete package of works that is hydraulically viable i.e., would enable discharge of projected maximum flow for a defined return period, to be agreed with the Client.

17. **Task B5: Data Retention and Storage (for VTE and FXN)** – set up a filesharing, data management, and data archiving system for use during the Assignment period and that will be handed over to the Client at completion. In particular, ensure that all spatial data used in this project (both existing records and field data) and stored in the data management system are referenced correctly to the National Datum. The Consultant shall hand over the data collected and all project-related outputs (including models, reports, presentation slides, meeting minutes, etc.) in the database. While the use of free and

open-source software is strongly encouraged for the flood model, if proprietary software is used for the model, the Consultant shall provide the Client with 5 licenses for a minimum 3-year period after completion of the Assignment with full access to the model. This shall be included in the consultant's financial proposal. The consultant shall also provide costed estimates for continued access beyond the 3 year period. The consultant shall also provide "on-the-job" training to at least one staff member each from DOW and the DPWTs of VTE and FXN in the use of the model and the data retention system. The staff members shall be required to have the academic and language capacity to enable effective training.

18. **Task B6: Reports on Conclusion of Flood Hazard Risk Mapping and Analysis** – Prepare separate reports for VTE and FXN that present the conclusions of Task B. The reports shall incorporate brief Executive Summaries (in English and Lao) that cover the main findings and conclusions.

Task C. Design Development for the Highest Priority Drainage Investment for VTE only

19. The purpose of Task C is to prepare a feasibility study and preliminary engineering designs to support project readiness for the Highest Priority Drainage Investment selected by the Client based on the MCA carried out under Task B3. This shall include an initial E&S assessment. Task C shall consist of the following sub-tasks:

20. **Task C1: Preparation of Feasibility Study and Preliminary Design (FSPD) for VTE** – prepare a Feasibility Study and Preliminary Design (FSPD) for the Highest Priority FRM investment that could be funded within a budget of \$50m for potential investment within the next five years. It is envisaged that the FSPD shall require the activities listed below to be undertaken. This is not intended to be an exhaustive list and the consultant should undertake whatever activities are necessary to ensure an effective FSPD. The FSPD may be presented as a single report. The Consultant shall:

- Further develop structural and non-structural interventions from Task B2 to the level of FSPD and employ appropriate modelling techniques to assess the technical performance of proposed FSPD interventions. The models prepared under Task B should be employed, to the extent possible, for optimization of the engineering design, hence an iterative approach is expected
- The feasibility of adopting non-structural measures should be discussed and agreed with the client at an early stage. Such measures should include identifying opportunities to improve drainage through regulatory measures to planning controls and building regulations with the objectives of minimising stormwater runoff and the preservation of wetlands etc that retain and detain flood flows safely.
- Similarly the feasibility of adopting green/SUDS structural measures should be discussed in depth with the client at an early stage. Where appropriate and feasible the design should adopt the principles of Sustainable Urban Drainage Systems (SUDS)¹² i.e., to manage stormwater locally (as close to its source as possible), to mimic natural drainage and encourage its infiltration and

attenuation via retention measures and passive treatment. This should include incorporating existing retention basins such as wetlands (the preferred approach) or the provision of new basins, to attenuate storm flows

- Additional surveys and data collection are likely to be required to enable more accurate modelling of existing drains that will form part of the design,
- Assess the extent to which refurbishment of existing drains to improve their functionality and working life would be feasible
- Design new drains to supplement the capacity of existing drains that can be retained, or to replace existing drains that cannot be economically rehabilitated
- Carefully review the boundary conditions for the design, the main one of which will be the levels against which the drains will have to discharge. Data for this will become available from Task B2.
- If pumping is considered, its advantages and disadvantages should be carefully presented in terms of the capital and operational cost, economic benefit, and the expected source of funding for operation and maintenance
- Incorporate hydraulic structures such as storm gates/penstocks where necessary to control and direct storm flows
- Estimate the cost of annual operation and maintenance activities for the drainage network and the source of funding for DPWT to be able to reliably meet such costs. This should include the seasonal desilting of drains to maintain their operational capacity.

21. Task C2: Cost estimate – The cost estimate of the proposed works should be based on an initial bill of quantities. Rates for the work items should be based on the most relevant recent works of a similar nature that have been undertaken in Vientiane or elsewhere in the Laos PDR. The cost estimate should be submitted as a separate report marked confidential.

Task C3: Environment and Social assessment – conduct a screening and initial assessment of the positive and negative environmental and social impacts and associated uncertainties and risks of the highest ranked options for VTE to identify/define: (a) safeguards policies triggered; (b) Environmental Assessment or EA category; (c) safeguards instruments to be prepared to fully assess and manage the social and environmental impact during preparation of the detailed engineering designs; and (d) consultation and disclosure requirements, in line with World Bank E&S requirements and Lao PDR regulatory requirement. The consultant shall prepare a scope of the data collection and surveys needed to assess and manage the social and environmental impacts during the detailed design. Results of the assessment will be reviewed and commented on by the World Bank.

22. Task C4: Reporting – Present the Feasibility Study (with a chapter on E&S assessment) and Preliminary Design in a single report and the Cost Estimate in a separate report marked “Confidential”.

23. The contract period for the assignment is expected to be 14 months from the date of commencement of the services. The Consultant shall be procured on a Lump Sum basis (payment against milestones) that shall include all services needed to carry out the tasks as outlined above. This shall include all technical consulting fees and expenses, workshop facilitation and logistics expenses (including venue rental for 30pax as indicated in Task 1), software license fees, and any other administrative fees related to the consultancy assignment.

24. The Consultant shall be paid at relevant report submission milestones according to the expected implementation schedule as follows:

Item No.	Output Description / Milestone	Number of copies		Expected Deadline (as no. of months from the date of contract signing)
		Lao*	English	
Mobilization				
1	Contract signing	-	-	-
2	Inception reports (separate for VTE and FXN) - detailed work plan presented as Gantt chart, with accompanying text describing the following: >Overall understanding of TOR tasks >Task A: plan for workshops (number to be proposed by consultant) - objective-setting, development of strategy and capacity building plan, rough list of options based on consultant's experience, financing mechanisms to be explored based on consultants' experience >Task B: field survey plan with financial proposal, flood mapping and modelling methodology including a detailed proposal for integrated software package for hydrological and hydraulic modelling, approach for flood hazard mapping, risk assessment and economic analysis. Identify appropriately skilled candidates (one each from DOW, VTE and FXN) to be assigned to the consultants to learn how to operate the flood modelling software and to operate the Data Retention and Storage System.	-	1	1

	>Task C: detailed plan for preparation of Feasibility Study and Preliminary Design of priority drainage investment for VTE.			
Task A: Development of Integrated Urban Flood Resilience Strategies for VTE and PXN				
3	Workshop(s) (combined for VTE and PXN) - Organize 1 workshop	-	-	2
4	FRM Strategy Report (separate for VTE and PXN) - Stakeholder map and institutional arrangement overview, objectives, strategy and capacity building plan, preliminary FRM options, financing mechanisms	-	1	2
Task B: Flood Hazard, Risk Mapping and Analysis through modelling for VTE and PXN				
5	Data collection (separate for VTE and PXN) -- existing and field data including updated and/or new record drawings for Mekong Tributaries and the urban drainage network in VTE based on field surveys -- database	-	1	4
6	Detailed flood hazard and risk modelling and initial designs for FRM options (separate for VTE and PXN) - hydrological and hydrodynamic modelling of the study areas, flood risk analysis with vulnerability curves, mapping and visualization - Initial designs for FRM options based on modelling - Multi-criteria assessment and ranking of proposed FRM options - Presentation workshops and identification of priority FRM investments	1	1	11
Task C: Design Development for the Highest Priority Drainage Investment in VTE only				
7	FSPD Report and Cost Estimate report (VTE only) - separate reports for FSPD (with E&S impact assessment chapter) and Cost Estimate.	2	2	14

E. Required Expertise of Consulting Firm and Key Experts

25. The following requirements are a broad description of the likely expertise needed for this consultancy assignment covering both Vientiane and Pakxan. The consultants' proposals shall be partially evaluated as noted in the Request for Proposals on the qualifications and experience of the six "Key Experts" (KE) identified below. The Consultant may propose additional experts in the Technical Proposal as may be deemed necessary to fulfill this TOR. The Consultant may also mobilize supporting experts, administrative staff and survey teams etc. as necessary to execute the scope of services. The Consultant is encouraged to engage a diverse and gender-balanced team.

26. Minimum qualifications and experience requirements of the consulting firm:

- be a firm or an association of consultants with appropriate and sufficient capabilities, resources, with demonstrated experience over the last 10 years on flood risk management, urban drainage, hydrological and hydraulic modelling, cost-benefit analysis, and detailed engineering design to execute the full extent of the scope of services to a very high quality;
- have demonstrated experience in stakeholder engagement and consideration of the environmental and social safeguard requirements of Lao PDR, or a country with similar context, and the World Bank or other similar multilateral development agency;
- have extensive experience in interdisciplinary work on urban flood resilience projects in developing country contexts.

Internationally-Experienced Staff

All internationally experienced staff must be fluent in spoken and written English. The ability to speak and/write Lao would be advantageous. A strong presence in Lao PDR during the assignment, with the Team Leader and Deputy Team Leader being based in LaoPDR for most of the assignment duration.

KEY EXPERTS:

- a) **Team Leader / Urban Flood Specialist (KE1)** The Team Leader will: be responsible for the overall performance, timeliness and quality of all outputs; lead the project team throughout the scope of services; facilitate stakeholder consultation activities; and be the key point of communication with the Client. The Team Leader shall have:
- o an advanced university degree (master's degree or equivalent) in a relevant discipline such as engineering, flood risk management, or related area;
 - o proven team leadership and project management skills, including ability to lead the team by coaching and mentoring team members to achieve individual inputs, and be responsible for the overall quality of deliverables;
 - o have at least 15 years of experience in integrated urban flood risk management, hydraulic engineering, flood modelling, operation and

maintenance of urban flood control and drainage systems resources management, civil engineering and disaster risk management.

- o excellent project management capability, including managing teams of national and international experts;
- o excellent communication skills (English is essential; Lao would be advantageous), presentation skills, and an ability to prepare and manage the development of high-quality reports, project documentation, and communications materials;
- o demonstrated experience working in Lao PDR or similar international contexts, and of working with development partners;
- o good knowledge and understanding of international development and experience of working on projects fund by multilateral development banks (experience on World Bank projects would be advantageous)

b) **Hydrological/Hydraulic Modeller (KE2)** will provide technical inputs during all tasks under the scope of services; contribute to stakeholder consultation meetings and workshops. The Modeller shall have:

- o an advanced university degree (master's degree or equivalent) in a relevant discipline such as hydraulic engineering, civil engineering, environmental engineering, water resources management, risk modelling or related areas; and
- o have at least 10 years experience in urban flood protection engineering and urban hydrology
- o demonstrated experience of hydrological and hydraulic modelling including the monitoring and processing of hydro-meteorological data, the field installation of related equipment, data consistency checking, water balance studies, statistical analyses of rainfall, water level and discharge.
- o demonstrated experience of producing flood hazard maps based upon the statistical processing of underlying data; determination of flood risks based on flood hazard maps and exposure and vulnerability values underlying the assessment of the benefits of proposed flood management measures.

c) **Urban Drainage Engineer (KE3)** will provide technical inputs for all tasks under the scope of services. The Engineer shall have:

- o a bachelor's degree or higher in a relevant discipline such civil or municipal engineering;
- o have at least 10 years of experience on projects related to municipal (drainage and sewerage) engineering, urban resilience, and disaster (flood) risk management
- o experience in preparing feasibility and design documents for urban drainage and related cost estimates;
- o experience in working with technical departments and local government stakeholders in developing countries; and
- o excellent in-depth knowledge of disaster (flood) risk management in developing countries.

d) **Green Infrastructure/SUDS Specialist (KE4)** shall have at least 10 year's experience in green infrastructure, nature-based/SUDS solutions for drainage and shall also have:

- o a Bachelor's degree or higher in a relevant discipline such civil or municipal engineering; urban design, landscape architecture, architecture, or related area;
- o excellent knowledge of urban flood risk management, water-sensitive urban design, SUDS/nature-based solutions, and green infrastructure development for flood risk mitigation and climate change.
- o demonstrated experience designing and facilitating stakeholder engagement activities including design workshops;
- o demonstrated international experience developing green infrastructure/SUDS drainage designs (experience in Lao PDR or a similar developing country would be advantageous).

NON-KEY EXPERTS:

e) **Urban Planner** will provide planning inputs to all tasks under the scope of services, and contribute to stakeholder consultation meetings and workshops. The Urban Planner shall provide expertise on urban planning and development best practices, including institutional and regulatory frameworks, urban planning legislation and regulations. Specific experience working in urban development and water-sensitive urban design, and experience in developing programs that mainstream disaster risk reduction in urban policies, programs, or development practices are advantageous.

f) **Economist** will prepare cost-benefit and robustness analyses for urban infrastructure projects, including working on the economic analysis of flood risk reduction investments. The Economist shall provide support for cost-benefit analysis. Specific experience working on large-scale civil infrastructure and non-market evaluation methods, and in cost estimation for post-disaster needs assessment are advantageous.

g) **Procurement Specialist** will prepare procurement documents for international Competitive Bidding. The Procurement Specialist shall provide guidance on procurement procedures. Specific experience on World Bank or other multilateral development agency procurement processes are advantageous.

h) **Environmental Specialist** will advise on aspects related to environmental safeguards at various stages of design (up to FSPD stage). The Environmental Specialist shall ensure that relevant environment issues are taken into account and the initial environmental and social impact assessment to be conducted as part of the FSPD is carried in a manner that reflects the principles of the World Bank safeguards. The environmental specialist will ensure that environmental requirements are included in the designs and cost estimates. Specific experience on preparing environmental assessments and related documents for civil engineering projects financed by the World Bank or other Development Partners is advantageous.

- i) **Social Specialist** will advise on aspects related to social safeguards at various stages of design (up to FSPD stage). The Social Specialist shall lead tasks to ensure that social aspects are addressed as an integral part of the assignment, ensure that social protection requirements are included in the designs and cost estimates, and quantify the number and type of project beneficiaries. Specific experience on community driven development, land acquisition, and socially sensitive issues in LaoPDR or countries with similar contexts are advantageous.

Nationally-Experienced Staff

All national staff must be fluent in spoken and written Lao and in spoken English. Fluency in written English would be advantageous.

KEY EXPERTS:

- j) **Deputy Team Leader/Drainage Engine (KES)** The Deputy Team Leader will support the Team Leader as the primary local focal point for coordination with the national and local government counterparts and shall have:
 - o an advanced university degree (master's degree or equivalent) in a relevant discipline such as civil engineering, flood risk management, or related area;
 - o have at least 10 years of experience in urban flood risk management, including experience in fields such as hydraulic engineering, operation and maintenance of urban flood control and drainage systems, hydrology, water resources management, civil engineering and disaster risk management.
 - o at least 5 years experience proven experience of working as a local coordinator in similar joint ventures with international consultants in the Lao PDR;
 - o detailed knowledge of Lao Ministry of Public Works and Transport and Provincial Department of Works and Transport project development and management procedures,
 - o At least 5 years of experience working on projects funded by International Development Agencies – experience on projects funded by the World Bank would be advantageous.
- k) **Hydrological/Hydraulic Modeller (KEB)** will work closely with the International Hydrological/Hydraulic modeller including facilitating effective technical communication with government counterparts; provide technical inputs during all tasks under the scope of services; contribute to stakeholder consultation meetings and workshops; and shall have:
 - o an advanced university degree (master's degree or equivalent) in a relevant discipline such as hydraulic engineering, civil engineering, environmental engineering, water resources management, risk modelling or related areas; and
 - o have at least 7 years of experience in urban flood protection engineering and urban hydrology
 - o demonstrated experience in the monitoring and processing of hydro-meteorological data, including field installation of equipment, data consistency

checking, water balance studies, statistical analyses of rainfall, water level and discharge data and being experienced in rainfall-runoff modelling.

- o demonstrated experience of producing flood hazard maps based upon the statistical processing of underlying data; determination of flood risks based on flood hazard maps and exposure and vulnerability values underlying the assessment of the benefits of proposed flood management measures.

NON-KEY EXPERTS:

- l) **Information Management/GIS Expert** will manage the project database (particularly the one used for the flood model) and support in the production of maps and visualizations. Specific experience in use of hydraulic and hydrological modelling software, climate change models, and proficiency in working with temporal data bases and time series information is advantageous.
- m) **Urban Planner** will support the Internationally-experienced Urban Planner in interactions with national and local government counterparts and contribute to stakeholder consultation meetings and workshops. The Urban Planner shall provide expertise on the Lao PDR urban planning and development sector, including institutional and regulatory frameworks, urban planning legislation and regulations. Specific experience working in urban development and water-sensitive urban design, and experience in developing programs that mainstream disaster risk reduction in urban policies, programs, or development practices are advantageous.
- n) **Urban Drainage/Municipal Engineer** will support the Internationally-experienced Urban Drainage Engineer in interactions with national and local government counterparts and contribute to assessments of the functionality and capacity of the Project Areas' drainage systems and management of the survey teams mobilised to collect additional data. Specific experience in urban and municipal engineering practices, procedures and regulations at the national and local level in Lao PDR, and experience working in water-sensitive urban design are advantageous.
- o) **Procurement Specialist** will prepare procurement documents for International Competitive Bidding. The Procurement Specialist shall provide guidance on LaoPDR's national procurement procedures. Specific experience with LaoPDR government procurement processes are advantageous.
- p) **Environmental Specialist** will support the internationally-experienced Environmental Specialist in conducting all necessary works including workshops or public consultations related to environmental impacts. Specific experience in environmentally sensitive areas and issues in LaoPDR is advantageous.
- q) **Social Specialist** will support the internationally-experienced Social Specialist in conducting all necessary public consultations related to social impacts. Specific experience in designing, facilitating, and reporting on community engagement activities in LaoPDR is advantageous.

r) **Survey Team/s** will be required to supplement the limited data available (cross and longitudinal sections) on the tributaries of the Mekong that impact on Vientiane and Pakxan and full details of the urban drainage network in the six districts under consideration in Vientiane, including dimensions of the drains, their structural condition, and the extent of siltation and other capacity restrictions affecting their capacity.

s) **Local focal point/administrative support staff** will support the team across all tasks under the scope of services. The local focal point will coordinate with the national and local government counterparts and manage document control between the Consultant team and Client. Excellent communication skills in Lao is required.

F. Reporting, Feedback, and Invoicing

27. The Consultant will report to the Client, i.e. the Project Management Unit (PMU) for Component 1 of the Lao PDR SEA DRM Project within DOW, who will be the main point of contact for all technical and administrative issues. For key deliberations, decision points, and approvals, the Client will work closely with the DPWTs of VTE and PKN.

28. All deliverables shall be prepared in English, and Lao language where indicated in Section D, to facilitate the review by local government agencies. Submissions should be made both in PDF and editable formats (including word-editable documents, CAD drawings, graphics, presentation slides, spreadsheets, and models) as required at clearly readable scales. Translations must be of a high quality, with editing for language and technical accuracy by a translator familiar with technical terminology. Reports shall include an executive summary in both languages.

All deliverables are to be prepared as a draft version and finalized upon review by the Client. The Consultant shall allow at least ten (10) business days for the Client to review outputs (preliminary or final). Pending review of the draft documents by the Client, the Consultant shall, following discussions and agreement of the Client, proceed to the next Task. Where activities require specific decisions of the Client before they can proceed, a meeting shall be arranged with the Client to obtain guidance. The Consultant will need to integrate these feedback periods into the project planning and milestones.

29. The Consultant shall submit to the Client a succinct monthly progress report by email to outline key updates on progress of the consultancy assignment, issues to be addressed, and upcoming activities and deadlines.

G. Items to be Provided by the Client

30. The Client shall make available to the Consultant the following facilities, services, documents and information for carrying out the proposed Assignment:

- Data and information such as reports, documents, drawings, maps, statistics, legislation and regulations, etc., in connection with the Assignment, which may not be publicly or widely available. The Client will provide support in obtaining data, maps and supporting materials from other Govt agencies.

- Administrative support to obtain permits and authorizations from Government agencies necessary for customs clearance, entry and exit visas, resident permit, semi-permanent visas, travel documents and status of experts, etc., as required for carrying out the services under the Assignment.

- As noted under Task B3 one staff member each from DOW and the DPWTs of VTE and PKN shall be assigned to the consultant's hydrological/hydraulic modelling team to learn how to operate the hydrological/hydraulic models and the data retention/storage facility. The staff assigned must have appropriate academic and English language capacities.

31. The Consultant will be responsible for other services that may be needed, including:

- Professional editing and design of developed communications materials;
- Interpretation or translation costs to understand consultations/workshops and written materials in local language;
- National and international telecommunication; and
- Costs related to 1 consultation workshop with stakeholders in Project Areas, presentations, and other communication to the Client or beneficiaries (including facilitation, refreshments).

H. Data Confidentiality

32. All data, information, and relevant documents shall be confidential and for the sole use for this Consulting Assignment only.

33. Upon completion of the study, the Consultant shall submit all data used and produced under the Assignment in in usable formats agreed with the Client. This includes all input data used for the study including record drawings of rivers and the VTE urban drainage network resulting from surveys, as well as data collected from various sources. The Consultant is responsible for appropriate management of versions of hydraulic models or any other model used for this Assignment and shall hand over any new model schematization prepared, and all model output generated (in digital format) under this Assignment in accordance with the requirements set out in Task B3.

34. The Consultant shall cover all license costs or other costs for software etc. incurred for running the models, to the extent necessary for the satisfactory completion of the Assignment. Free access (including license and login details) to any proprietary software used in the modelling shall be granted for a period of 3 years after the date of completion of the assignment. The Client shall retain the right to utilize the models and data for any follow-up studies.

