

**TECHNICAL COOPERATION
DIAGNOSTIC, TECHNICAL AND SOCIO ENVIRONMENTAL STUDIES
FOR SECONDARY AND TERTIARY ROADS IN HAITI**

**TERMS OF REFERENCE
FOR CONSULTANCY SERVICES**

I. BACKGROUND

- 1.1 Over the last decade, Haiti has improved significantly the quality of its road infrastructure with financing from the Bank and others donors. Immediately after the earthquake in January 2010 it was estimated that only 9% of the total road network was in good condition. Moreover, only 10% of the roads received continuous maintenance. In the past four years, more than 100 km of primary network (953 km in total) and 250 km of secondary (1,315 km in total) and tertiary (1,304 km in total) roads have been rehabilitated and estimates by the Government of Haiti (GoH) indicate that currently about 15% of the total road networks and 64% of the primary network are in good condition. Since 2010, through the Program of the Transportation Sector Development 2010-2015 (PTSD II), IADB approved a total of US\$ 350 million for the sector in the form of investment grants, supporting an extensive program of road rehabilitation and focused institutional strengthening.
- 1.2 Following these efforts of improving the road infrastructure network on the main island, the Bank is interested in developing a similar rehabilitation project for roads on Gonâve Island (Île de la Gonâve), the largest satellite island of the Republic and located in the gulf of the same name. With an estimated population of 78,000 and an area of 743 km² (287 sq. mi) the island's infrastructure conditions fall well below those witnessed on the main island mainly due to its geographic isolation and overall resource scarcity.

II. OBJECTIVES

- 2.1 This consultancy aims to develop technical and environmental studies required to carry out the rehabilitation of strategic roads of secondary and tertiary level in rural Haiti. Through this technical assistance, the Bank seeks to mitigate one of main causes of cost overruns attributable to the lack of detailed or updated engineering designs prior to the procurement of civil works.
- 2.2 The funds of this operation will finance the preparation of diagnostic and prioritization study for secondary and tertiary roads and the technical studies and engineering designs (for a strategic selection of projects on the studies secondary and tertiary networks) including hydraulic works to mitigate the effects of hurricanes and heavy rains, and the implementation of alignment adjustments to offset right-of-ways from river beds that cross the region. The activities will also provide inputs for a Resettlement Plan (RP) which will identify components requiring land acquisition and resettlement. The consultancy will focus its efforts on minimizing the need for population displacement due to the project's execution.

III. SCOPE AND ACTIVITIES

1. DIAGNOSTIC AND PRIORITIZATION STUDY

- 3.1 To optimize the investment of resources, the consultant should develop a prioritization methodology for secondary and tertiary networks in Haiti. This methodology will serve as the principal tool to define a master list of investments in infrastructure rehabilitation. To achieve this the consultant should carry out the following activities:

a. EXISTING CONDITIONS ANALYSIS

- 3.2 Revision of existing road inventories and road inventory methodologies developed either by the Bank¹ or by other international cooperation organizations in previous studies².
- 3.3 Identification of additional roads with the potential to be included based on strategic importance (e.g. Île de la Gonâve). This process must thrive in recognizing every road with potential to be rehabilitated but that under the current circumstances do not stand out as crucial for development.
- 3.4 Elaboration of secondary and tertiary roads inventory effective for the project. Based on the findings of 3.2 and 3.3 the consultant should prepare a detailed road network inventory specifying: Road Name, Cross section, Drivable width, Surface, Villages, Flooding frequency, Condition, among others. Georeference and photographic memory is highly recommended as part of this inventory.

b. DEFINITION OF A PRIORITIZATION METHODOLOGY

- 3.5 Proposal of a methodology that effectively prioritizes the roads on both secondary and tertiary road networks. This prioritization will be the result of a multicriteria evaluation of 1) Consultation with local communities on the base of participatory road planning mechanisms and 2) Valuation of key elements contained within the road inventory.
- 3.6 Community outreach and consultation stand as a dominant part of this prioritization endeavor and as such should be prepared and organized following IADB's best practices in the matter.³
- 3.7 Following the completion the prioritization process, the highest ranked projects will continue to the detailed design phases. The number of projects for which detailed design will be carried out will be determined by an initial economic assessment for each ranked project weighed by the available funds destined for detail design. This is necessary to ensure that all necessary elements (engineering, socio-environmental, etc.) will be covered and completed in full by the design consultancy.

¹ BID – “Priorización de Vías. Itapúa, Paraguay” Dirección de Caminos Vecinales – Programa de Caminos Rurales Fase II.

² USAID – “How to Plan, Design and Maintain Cost Effective Farm to Market Low-Volume Roads to Support the USAID Feed the Future Initiative”, Jacob Greenstein, 2014.

³ For guidelines on public consultations: Discussion Paper.

2. DETAILED ENGINEERING STUDIES FOR PRIORITIZED SELECTED ROADS

a. DESIGN SPECIFICATIONS AND BUDGET OF THE PROJECT

- 3.8 The Consultant, based on the documentation and information provided by the Bank and the Ministry of Transport and Public Works (MTPTC) and other relevant entities, will carry out technical, engineering and design studies as well as cost estimates for the project(s) selected by task **1. Diagnostic and prioritization study**.
- 3.9 To achieve this the consultant should perform the following tasks:
- a. Detailed revision of the technical standards used by the counterpart for road design and ancillary works;
 - b. Elaboration of detailed engineering designs (See details in following section)
 - c. Evaluation of the feasibility of the planned interventions in terms of layout and geometric design, considering the procedures to follow according to standards and specifications commonly accepted (within the national context or regional/international in case local standards are missing) to ensure an adequate level of service to users.
 - d. Revision of cost estimates for investment of the proposed interventions according to the guidelines of the Bank and/or the MTPTC/Central Unit of Execution (UCE).
 - e. Proposal of recommendations deemed relevant and appropriate, advice to the MTPTC about deploying complementary road design standards, including cost estimate fluctuations for the project.

b. DETAILED ENGINEERING STUDY

- 3.10 To meet the above objectives the Consultant shall perform activities related to:
- i. Socioeconomic studies
 - ii. System analysis between transportation modes
 - iii. Traffic studies
 - iv. Promotion of the participation of civil society (including conformity to the Bank's gender policy OP-270)
 - v. Alternatives for road tracing and road technology
 - vi. Project engineering
 - vii. Definition and calculation of investment costs
 - viii. Determination of benefits and beneficiaries
 - ix. Environmental studies
 - x. Economic evaluation
 - xi. Integrated analysis and selection of alternatives

i. SOCIOECONOMIC STUDIES

- 3.11 The socioeconomic survey will include the following activities, which are essential for achieving the objectives of the studies:
- a. Characterization of the area of direct and indirect influence.

- b. Definition of the traffic areas that will be adopted in the studies.
 - c. Analysis of existing production, including climate, soils, population, economic activities, local production, productivity and markets.
 - d. Analysis of the economic potential of the regions for the different route alternatives and the functional characteristics of the section(s) under study.
 - e. Determination of growth rates of each traffic area to be used in traffic projections.
 - f. Definition of hypothesis to adopt in quantifying the benefits.
- 3.12 Only after determining the items above listed will the consultant is able to, from an economic and social perspective, define and characterize the areas of direct and indirect influence of the project. Subsequently, the traffic zones will be identified and characterized based on socioeconomic data and origin-destination matrices.
- 3.13 The analysis of the prospects for economic, social and fleet expansion, along with a vision that includes the various modes of transport in the area of influence of the project, will be critical in the traffic forecasting process.

ii. ANALYSIS OF THE INTERMODAL SYSTEM

- 3.14 The potential traffic derivations generated as a consequence of the planned interventions in the infrastructure should be studied based on existing traffic and preliminary objectives. To do this the consultant must analyze the characteristics of the main export/import corridors within Haiti.
- 3.15 The main results of the analysis of different modes of transport must allow the identification of alternative routes for the export of the production coming from the area of influence of the project as well to determine its capabilities and operational costs from the origin to the final destination.

iii. TRAFFIC STUDIES

- 3.16 In addition, the consultant should use the information obtained from the studies described in the preceding paragraphs and propose a detailed Origin-destination survey plan that considers volumetric classified traffic counts on major sites considered important for the study.
- 3.17 The set of survey points to be defined should allow the interception of all flows within the area of influence of the road(s) being studied, and the identification of the zone of origin of each vehicle traveling along it to estimate the existing traffic with the appropriate factors. To achieve this, the consultant must identify and justify the optimal locations to carry out the origin/destination survey. This data collection exercise should be performed for a minimum of three consecutive days in daylight hours.
- 3.18 Traffic counts should be carried out at the same Origin-Destination locations every day of the week (7 days), having 24 hour survey periods at certain of these locations. These all-day counts must be carried out on a weekday at least at one location and will support the calibration and adjustment of the hourly variation.
- 3.19 Additional traffic count locations will be needed along the roads under consideration, always for a period of seven days.
- 3.20 To consider seasonal variations, data on the harvest of agricultural products will be important.

- 3.21 The consultant is advised to use a set of survey tables and formats used in previous survey exercises to facilitate the presentation of results. The consultant team can expand the information to be collected if he deems appropriate.
- Origin destination tables
 - Classified counts of the vehicle fleet
 - Table of load factor for each vehicle type
 - Table of travel motives
 - Flows of goods by origin and destination
- 3.22 Additionally, the information required for estimating travel time savings must be taken into account in these surveys.
- 3.23 An inventory should be prepared for roads within the study, which will be useful to verify possible traffic derivations.
- 3.24 By using this inventory it should be possible to not only get an overview of the current status of the section, but also to determine the operational costs of vehicles using the road network of interest for the study.

1) Existing Traffic Estimation

- 3.25 Existing traffic data and the resulting complementary surveys shall be analyzed and tabulated appropriately, considering the expansion of volumetric classified counts and the generation of origin/destination matrices. To do this, issues related to the location of survey points, survey period, flow characteristics and traffic conditions must be considered.
- 3.26 Current daily traffic volumes shall be determined by uniform traffic segments, considering the different vehicle categories. Such volumes must be corrected with adjustment factors (hourly, weekly, seasonal, closing, etc.) for determining the mean annual Mean Annual Daily Traffic.

2) Future Traffic Estimation

- 3.27 Considering growth rates obtained through historical data or projections of certain socio-economic variables for traffic zones, the origin/destination matrix for the study and variations in future road network, with and without the project, projections for future traffic will be made, considering the two mentioned situations (with and without project).
- 3.28 The projected traffic flows will comprise three basic types of users: the “existing”, “derived” users and “induced”:
- The “existing” users are captive individuals who currently use the route and will continue using it regardless of any potential improvements of its current conditions.
 - The “derived” users are those who currently use other routes and will be attracted to the improved route. Depending on the studies, international derived traffic should be considered international as well.
 - “Induced” traffic does not exist and would not exist in the future should the rehabilitation project does not come to fruition.

- 3.29 The calculation model for traffic forecasting and assignment shall be developed by the Consultant who should provide detailed explanations regarding the data, assumptions made and methodology used for this purpose.

iv. PROMOTION OF THE PARTICIPATION OF CIVIL SOCIETY

- 3.30 Community outreach exercises strengthen the process of environmental and social analysis of the project and help the stakeholders be aware of their surrounding environment, clarify their vision of the future and about what is important or not from the potential transformations coming their way and about the scale of values that the community gives to these changes. Likewise, community participation helps define what would be the most appropriate management measures in accordance with the needs, aspirations and cultural values of those affected. This will ultimately result in more effective management measures to be taken and in favorable conditions for the social acceptance of the projects.
- 3.31 To promote community participation the consultant must conduct public consultations in which the flow of information should occur in both directions between the project sponsor and other stakeholders. The objective should be to gather the point of view of beneficiaries, affected and interested stakeholders on the proposed actions and to involve them in the dialogue. *These opinions should be incorporated into project designs, scope, management plans and participatory processes.*
- 3.32 Consequently public consultation (PC) should be carried out during the development of the diagnosis, with the participation of the following communities:
- 3.33 At least 3 public consultations; an informative (at the beginning), another advisory (late diagnosis, analyzed alternatives), and a concluding (with the defined alternative).
- 3.34 The consultant will be free to use different techniques and tools to carry out the public consultations.
- 3.35 The public consultations results, as well as changes in the procedure, if any, shall be filed as an annex to the feasibility studies. Additionally, attendance lists, event description, and other information deemed relevant should be included in this Annex. In the event that such results may present proposals or concerns regarding the final design of the route, they should be included in the annex and should be considered for EIA preparation.

v. ALTERNATIVES FOR ROAD ALIGNMENT AND ROAD TECHNOLOGY

- 3.36 The consultant must carry out the required studies to analyze the alternatives in location and those that are necessary to determine the alignment of the selected options and construction technologies to implement.
- 3.37 For the analysis of the alignment variants to the current road (if any road is present), the consultant must perform additional surveys along at least two alternatives. These variants should be selected according to the characteristics of the terrain and topography, the same to be assessed by the Consultant to select the optimal alternative cost and level of service during your lifetime.
- 3.38 In all cases for which it is justifiable abandoning the existing road alignment for a span of, or over five kilometers measured along the existing road, the consultant will perform an economic evaluation to determine the optimal alternative. The decision on

which alternative should be adopted will be made, in all cases, by the Consultant prior approval of MTPTC, in light of the background and comparisons that the consultant prepared and studied, the rationale for this decision should be included in an update to the project's economic feasibility. Costs associated with mitigating the environmental and social impacts of the various options should be taken into account in the evaluation and comparison of alternatives to select the best option.

- 3.39 Studies evaluating the technical, economic and environmental aspects of the different alignment alternatives should be provided, considering the following observations:
- 3.40 Elaboration of a comparison of studied alternatives, including the “no project” hypothesis.
- 3.41 This analysis could suggest designs deemed more appropriate than the alternative selected originally from the environmental, socio-cultural or economic point of views.
- 3.42 All the evaluated alternatives should be presented in maps at an appropriate scale.
- 3.43 With regard to activities related to the preliminary design of pavements to use at this stage, mainly aimed at establishing the necessary information to carry out feasibility studies, expeditious estimates made from the available information and additional tasks at preliminary will be prepared in detail. This will allow the definition of construction and maintenance costs with a consistent approach of these kinds of studies.
- 3.44 The Consultant shall perform all measurements and on-site checks it deems necessary to carry out the estimates for the preliminary stage - for all alternatives to be studied.
- 3.45 This study will include pavement alternatives for each case.
- 3.46 The pavements should be tested for a 20 years life span for at least 3 alternatives:
 1. Gravel (all weather) roads.
In this case it should be considered regular maintenance and/or replacement of gravel, as required, to achieve an analysis period of 20 years.
 2. Flexible pavement with bituminous surface.
In this case it should be considered regular maintenance and/or construction of asphalt concrete layer, as required, to reach a period of 20 years.
 3. Flexible pavement with surface layer of hot asphalt concrete hot.
In this case at least two cases should be evaluated:
 - i. Design for an initial period of 20 years
 - ii. Design for a phased construction, with initial period of 10 years and the corresponding reinforcement for year 10 to reach 20 years.
- 3.47 To estimate the required parameters for the preliminary design of pavements, whenever this is possible and is adequately justified, the Consultant will use the basic information included in the studies and designs available, previously elaborated, on their own responsibility and shall supplement and/or make everything deemed necessary to achieve an adequate precision for this feasibility level.

- 3.48 Recommendations on alternative structural package should be developed, giving the advantages and disadvantages of each alternative from both a technical and economic standpoint.
- 3.49 The availability of materials, characteristics and corresponding transport distances, demand special consideration in order to ensure that the proposed alternatives are technically feasible and acceptable from the point of view of construction.
- 3.50 A set of alternatives to study will be presented along with a preliminary design, all of which will be discussed with MTPTC engineers.
- 3.51 The analysis of possible designs should include a brief description or tentative specifications of the methods chosen for the provision and use of materials, the mixing process and the general structural characteristics of each component of the pavement. The most suitable design will be determined based on these analyses and on the behavior of similar structures within the area.
- 3.52 Similarly, over the next item, design activities needed for preliminary engineering are described, given the need:

vi. PROJECT ENGINEERING

1) Inventory of Routes to Study

- 3.53 Following the prioritization exercise completed on the “Diagnostic and Prioritization Study” (Numeral 1 of the scope and activities section) the consultant will perform, for the selected group of roads/projects, a revision of the inventory initiated and completed for that task and update it (if necessary) taking into consideration the following elements:
 - a) Inventory for determining vehicle operating costs
 - Road characteristics must be inventoried (width, lateral obstruction, type and condition) transverse obstructions, curves and slopes.
 - The purpose of these identifications is to allow the adjustment of operational costs of vehicles along flat and sloped roads.
- 3.54 The final inventory should identify the following for each km of route (update and validate figures if already measured in the Diagnostic and Prioritization Study):
 - Type and condition.
 - Width.
 - Lateral obstruction distance at different ranges such as % of each km total.
 - Transversal obstructions per km.
 - Horizontal Curves: length and mean radius of each per km.
 - Slope ranges in% of the length of each path.
- b) Inventory to obtain information for engineering studies.
 - The main purpose will be to establish the type and condition of existing road works to profit from should the existing path is kept.
- 3.55 On a km basis the consultant should obtain:
 - Type and condition of existing pavements.

- Geometric characteristics of existing routes.
- Characteristics and condition of the drainage.
- Dimensions, features and condition of bridges and structures.

2) Design Standards And Parameters

- 3.56 Will be defined based on “A Policy on Geometric Design of Rural Highways” by the Association of State Highway and Transportation Officials-ASSHTO and on local requirements of the MTPTC.
- 3.57 The geometric project will be performed to a preliminary level based on evidence obtained from topographic, hydrologic and hydraulic studies, and the application of the established rules. This will consist of:
1. Determination of the cross sections of the project. The definition of the typical cross section will be done based on the parameters given for Class 1.
 2. Special elements for the project should be preliminarily designed such as:
 - U-turns and at-level accesses
 - Intersections
 - Slip roads

3) Study of Layout and Longitudinal Profile

- 3.58 It will be necessary to carry out the study of layout for those alternatives that do not have previous design studies, or where it is considered appropriate to study alternatives to the route already studied.
- 3.59 The geometric design will be executed based on the plans prepared by the MTPTC and data obtained from topographic, hydrological studies always following current regulations and standards.
- 3.60 The design speed to consider in the project will be 100 km/h in rural areas.
- 3.61 The study of the path should be based on a speedometer with a density of survey points allowing security in the definition of the trace.
- 3.62 The studies will be consigned on maps or drawings of general type in which the recommended lengths for different sections will be established and defined.
- 3.63 In order to assess the cost of the basic work it will be necessary to define a proper horizontal and vertical alignment adequate for this purpose, therefore it will be necessary to carry out a plan and profile study.
- 3.64 The density of points to survey and desired accuracy will be adjusted as a function of the impact that the cost of the basic work has on the total price per road segment. Therefore it is estimated that it will not be required to generate cross sections on terrain deemed flat or gently/moderately undulated, with the exception of a few critical points.
- 3.65 By contrast, in cases where the terrain is highly undulated and sinuous, it will be necessary to have cross sections at locations where the excavation volumes cannot be accurately determined with the required accuracy from the current available information (existing photogrammetric restitutions or plaques).

- 3.66 The intervals for each case will be determined on the field at the discretion of the professional expert, whom in all cases shall be able to measure construction costs.
- 3.67 The longitudinal study could lead to changes in the trace preliminarily chosen. The adopted definitive trace should be properly marked on the ground.
- 3.68 Once this step is completed, a preliminary draft will be prepared for those sections or variants for which studies have been identified as necessary. For such specific cases, a set of preliminary draft plans should be prepared with a horizontal scale of 1:5.000, and with a vertical scale of 1:2.000 for plan and profile submission. The elaboration of these maps and plans with alternate tentative alignments will provide the basic elements necessary to formulate the cost estimates for road construction.

4) Soil and Materials Studies

- 3.69 The scope of the soils and materials studies to be carried out should be precise enough to allow an accurate estimation of costs.
- 3.70 The following describes the set of tasks the Consultant shall perform.
- a) Study of soils along the trace
- 3.71 The study of the subgrade will consist of performing manual drill holes, approximately 1,000 meters apart, performing a trial pit every 5,000 meters. From the drill holes surveyors should collect the necessary samples to carry out the tests for a classification by the HRB method. Samples obtained at trial pits will be destined to carry out both compaction (Proctor) and value relative support (CBR) tests.
- 3.72 At sections where the existing basic infrastructure is deemed usable, the characteristics of support value will be studied and the results used as valid subgrade bearing parameters.
- b) Deposit site studies
- 3.73 In order to determine the all the possibilities of the materials to be used, a thorough scouting exercise must be carried out to identify potential material deposits to be used in the structural design of the pavement. After identifying and locating potential places with suitable materials, surveys should be conducted to determine:
- Approximate volume of the deposit.
 - The suitability of the materials for soil stabilization. For this, material sampling is necessary to perform tests of identification and CBR and to perform material mixtures which, in turn, should be tested as well.
- 3.74 A survey will be conducted every 20,000 to 30,000 cubic meters (estimated) of material.

5) Hydrological Studies

- a) Basin studies
- 3.75 To establish the area of basins and sub basins the team could seek support from the plans and topographic maps referred to in subparagraph # 3.
- b) Runoff
- 3.76 To establish the runoff factor the following elements should be considered: topography, vegetation, soil permeability and degree of saturation, urbanized areas

based on land use and zoning, rainfall intensity and in some cases water control and/or storage.

c) Rainfall

- 3.77 It will be necessary to analyze the rainfall historical registries to obtain intensity-duration curves

d) Discharge calculation

- 3.78 The discharge calculation will be based on the Rational Method for smaller areas. For other areas the Utility Triangular diagram should be used or any method suitable to the characteristics of the area. The design of structures will be done for a return period of 5-10 years. Analysis to verify the environmental and economic impacts of rainfall should be done with return period of 50 years. Bridge design shall be for done with a return period of 50 years.

6) Hydraulic studies

- 3.79 For this aspect the diameter and slope of the structures and the input/output characteristics should be considered. Attention should be given to the design speeds that could cause abrasion and erosion of the structures along the channels; consequently erosion control items should be designed: energy dissipators, paved channels, protection with grass, etc. Also the hydraulic capacity and structural condition of existing bridges and culverts on the stretch should be verified.

7) Structural studies

- 3.80 Structural studies include surface drainage, major and minor works of art and major bridges.

a) Surface drainage

- 3.81 Elements of surface drainage for urban roads to consider are: storm drains (sinks); cords, gutters, headers, manholes and sewer lines from storm drain system, etc.

b) Minor works of art

- 3.82 It will considered as minor works of art will be all pipes with a diameter equal to or less than 1.50 m. (concrete or corrugated metal), or equivalent reinforced concrete box section or made of stone masonry and concrete slab, etc.

- 3.83 To make a decision on the type of structure to adopt a comparative cost study as well as an assessment of advantages and disadvantages such as lifespan and maintenance feasibility and disadvantages should be performed.

c) Major works of art

- 3.84 It will be considered as major works of art all those pipes with a diameter greater than 1.50 m. or equivalent structure, excluding bridges.

- 3.85 The following structures could be considered:

- Reinforced concrete pipelines.
- Corrugated metal pipelines.
- Reinforced concrete box culverts; single or multiple.
- Vaulted box culverts with sill and side walls on stone masonry and superior arch on simple or reinforced concrete (or concrete slab).

- Arch reinforced concrete, using the base of the sill as a connection.

3.86 In the case of excessive speeds, it should be considered coating the floor and part of the side walls using blocks.

3.87 The decision on the type of structure to be used should be based on a comparative cost analysis, as well as the advantages (life span and maintenance feasibility) and disadvantages.

d) Bridges

3.88 The consultant should perform the following studies:

I. Geological studies

3.89 At potential bridges locations a geological survey should be carried out identifying details on foundations and pillars of the bridge itself. Information should be surveyed regarding type of rocks and soils; stratigraphy; erosion that may affect foundations and pillars, etc.

II. Geotechnical Studies

3.90 Drilling and test pits should be done on sufficient numbers in accordance with the magnitude of the structures and site's geological features. A borehole or trial pit at each of the footing of the foundation and pillar(s) stack (s) will be performed. The works shall include at least:

- Visual recognition of rocks or soils traversed.
- Identification of the subsoil profile.
- Elaboration of standard penetration tests (SPT) over subsoil profile.
- Acquisition of undisturbed samples in the case of thin soils found.
- Acquisition of undisturbed samples to run the SPT test with a recovery according to the soil type.
- Identification of the water table level.

III. Bridge design

3.91 Bridge design will be based on the current standards of the AASHTO, "Standard Specifications for Highway Bridges" and of the roadways and road works division at the MPTPC.

3.92 In addition, the consultant will take into account the type of loads to be considered and the nature and volume of traffic to be circulated.

3.93 For each bridge alternative designs will be considered in regard to:

- Number and length of sections.
- Materials used in the various components. For example: concrete abutments, or stone masonry or mechanically stabilized earth, etc. For the superstructure concrete, pre-compressed concrete, post-tensioned concrete, etc. could be considered.

3.94 The selection of the optimal alternative will be based on a comparative analysis of costs and benefits, such as life and ease of maintenance, and disadvantages.

- 3.95 **Open Channels.** In the design of open channels the Consultant shall establish the design speeds and provide the type of coating to use in order to prevent erosion of the different types of soils found along the watercourse. Elements to be considered are concrete coating, stone, grass, etc., or a combination of them.
- 3.96 **Pavement design.** As mentioned above, emphasis will be given to the technical-economic analysis used for selecting the surface pavement alternative that offers the best cost/effectiveness ratio for the assigned traffic volume. The surface alternatives mentioned in the subsection v: "Alternatives for road tracing and road technology" should be considered.
- 3.97 To identify the dimensions of the flexible pavement structural package the consultant will use the AASHTO method, and this process should be verified by another method approved by the Department of Transportation of MTPTC.
- 3.98 The consultant, according to the ability of soils and materials, will explore the possibility of using economically stabilized sub-bases and bases (soil-lime, soil-cement, chemical stabilizers, or other stabilizers).
- 3.99 **Signaling.** The preliminary design of the signaling pathway will be made in full compliance with the standards of the Department of Roads at the MTPTC. The preliminary design of the signaling is primarily intended to determine an approximate cost to feed the economic evaluation.
- 3.100 **Metric calculation and budget.** The estimated cost (budget) of the works will be presented in aggregate and broken down forms, by stage and work item, expressed in US dollars. These figures should differentiate those related to the Environmental Technical General Specifications (ETGS).
- 3.101 Quantities of work shall be calculated according to the details shown on the plans. The unit of each of the items included in the project price will be analyzed and calculated based on the applicable specifications at the Department of Roads at the MTPTC.

vii. CALCULATION OF INVESTMENT COSTS

- 3.102 Construction costs shall be included in cost analysis for each alternative to be studied, including costs of temporary works required for of traffic management during construction phases, regular rehabilitation costs, annual maintenance costs and the related direct measures of environmental protection ETGS's and indirect (Environmental Management Plan), plus those on expropriation and resettlement.
- 3.103 Investment costs of the economic analysis will be determined in order to obtain:
- Costs for the necessary economic feasibility analysis;
 - Financial costs required for financial disbursement schedule.
- 3.104 Consequently, the flow of annual expenses will be established for the entire period of analysis (20 years) and for each alternative studied.
- 3.105 The Consultant must discriminate by items, the necessary tasks for the performance of routine and periodic maintenance works, to establish the annual maintenance costs per kilometer.

viii. DETERMINATION OF BENEFITS AND BENEFICIARIES

- 3.106 Depending on the circumstances and the methodology adopted for the projections of traffic, the benefits may be calculated as:
- a. User benefits derived from reductions in transportation costs, operating costs of vehicles, and travel time. These benefits apply to normal traffic, derived transit and generated traffic.
 - b. Express benefits in terms of socio-economic development of the region served by the road due to increased local production.
- 3.107 The definition of the benefits will depend on available data and the relative importance of the functions to be exercised by the road, that is, to serve the existing traffic compared to the expected results in the opening of new areas. At the same time, it must be evaluated the possibility of double counting of benefits at definition and calculation stages. For example, the benefits for generated traffic should not be added to the value of increased local production, given these are equivalent benefits.
- 3.108 In relation to the benefits due to the reduction of accidents, these should be identified and would be quantified to be included in a sensitivity analysis.
- 3.109 The main groups of beneficiaries in the program should be identified, especially those with low incomes, for which the Bank must follow the procedures adopted.

1) User benefits

- 3.110 Direct or user benefits will be calculated from the comparison of the operating costs of the vehicles and the costs related to travel time for each alternative in the situation with and without the project. In calculating these benefits, the following aspects should be considered:
- Presentation of benefits in separate for users of each vehicle category and traffic type (normal, derived and generated);
 - Calculation of the operational costs of vehicles based on the methodology presented in the model "Highway Maintenance Design" (HDM -VOC) commonly used in such studies;
 - Calculation of travel times reductions for users and generation of hypotheses about the monetary value that can be achieved with time savings;
 - Calculation of annual road maintenance costs, depending on road conditions for scenarios with and without project.
- 3.111 All costs must be estimated based on economic costs and non-financial costs.

2) Benefits of socioeconomic development

- 3.112 These indirect benefits correspond to the estimated advantages derived from the implementation/improvement of the road, affecting positively the development of the region by bringing better living standards to the population.
- 3.113 To calculate the benefits of economic development, the following tasks should be carried out: (i) analyze climatic and soil conditions of the region; (ii) identify the production, productivity and prices; (iii) estimate future demand for local production; (iv) verify the existence of other plans for the region (energy infrastructure, irrigation, storage) whereas the road probably did not constitute a sufficient condition for a great

local development (v) analyze the performance of other similar regions with adequate transportation infrastructure, before projecting the possible increase in the local region.

- 3.114 It would be hard to attribute over 30% (thirty percent) of the projected increase in the value added of agricultural production to the implementation of the road expressed as economic benefit. For production estimates in the areas of influence of the project satellite images and local surveys may be used in addition to any available official information.

ix. ENVIRONMENTAL STUDIES

- 3.115 The overall objective of the environmental component will be to select the most suitable alternative project from a socio-environmental perspective and identify measures and programs to be implemented so that its feasibility, design, construction, operation and maintenance, are environmentally sustainable.
- 3.116 Technical alternatives analyzed in terms of their potential environmental impacts should be compared; indicating which are irreversible or unavoidable and which can be attenuated, with special attention to determining watersheds.
- 3.117 The activities related to the environmental component shall be carried out in coordination with the other components of the feasibility study (technical and socio-economic) in compliance with IDB's OP-703 and OP-704.
- 3.118 In addition, to meet the objectives of this component the Consultant shall perform the following tasks:

1) Determination of the Area of Direct Impact (ADI) and Indirect (AII)

- 3.119 The Consultant shall specify the boundaries of the area of direct and indirect influence of the section being technical and economically evaluated. These areas will be the object of the Environmental Feasibility analysis for further evaluation and decision-making process, being these not necessarily coincident with the areas determined for economic feasibility study.
- 3.120 To be considered for the AID: i) The area of the right-of-way; ii) Probable areas of material deposits; iii) Probable support facilities (construction office site and industrial plants – asphalt, soil and/or concrete, quarries, etc.); iv) Areas of variants subject to expropriation; and v) Other not specifically listed, but that will be affected by the road works directly.
- 3.121 To be considered for the AII: sub-watershed(s) in which the project is located, considering the entire area to be benefited by the accessibility improved by the road project, with emphasis on the conservation units; sociocultural areas (indigenous communities, rural, etc.); agricultural areas, etc.
- 3.122 These AID and AII should be mapped at appropriate graphic scales.
- 3.123 After being defined these areas should be grouped into homogeneous areas from the environmental point of view (ecosystems), according to their physical characteristics; biological and socio-cultural, using the best available methods, such as overlay charts, maps and/or satellite imagery.

2) Description of the analyzed project alternatives

- 3.124 Describe the technical alternatives studied in order to justify the selection from a technical, economic, environmental and strategic point of view.

3.125 Update and/or provide information on the following points:

- Location and characteristics of all development sites that relate to the project feasibility stage; this information will come from the Socioeconomic Studies.
- Main features of the project;
- The most likely works for adverse effects; activities and their characteristics for each stage of the road cycle (feasibility, design, construction, operation and maintenance), with emphasis on the implementation stage.
- Support facilities and activities taking place in them, such as labor camps; industrial works; quarries, etc.);
- The alternatives for changing the route alignment, if any (variants);
- Activities related to the closing stage of construction operations that could complement the considerations embedded in ETGSs
- The Environmental Aspects considered as part of road project (e.g. erosion control measures, protection of watercourses, etc.); and
- Other relevant information associated with the project.

3.126 A description and/or update must be accompanied by general and detail plans in appropriate scales, such as general planimetry; typical cross section; detail of: works of art; detail of support facilities; details of other drainage works (surface and underground); works for direct impacts mitigation provided in the draft; and others not specifically mentioned but necessary to facilitate the understanding of the project.

3.127 Provide appropriate scale maps to illustrate the general distribution of sites that relate to the project, as well as surrounding areas likely to be affected, with respect to the natural and man-made environment.

3.128 These maps should include relief contours and the location of all areas of population centers, water reserves, roads, land use and district boundaries, as well as borrow areas and solid waste landfills. They should also describe the installation construction office sites, materials used, disposal of solid waste and liquid effluents, etc. during the construction phase. *Obs.: All maps must be submitted in printed format A3 sheet at the appropriate scale.*

3) Description of the environment within the defined areas of influence

3.129 In order to develop an environmental assessment of the AID and AII that were previously defined and delimited, a description should be made of the environment inherent to the new alternatives being analyzed depicting regional general characteristics, specific features of physical, biotic and socio-cultural environments according to the inserts guidelines to follow:

a) Physical environment:

3.130 Topography (e.g., drainage patterns in the area of construction, events and susceptibility to erosion.), current land use, identifying wetlands and potential use (e.g. coating or covering waste sites.), surface and groundwater hydrology, fountains, (e.g. adequacy of water resources, average discharge, etc.), water quality of streams

and rivers to be crossed by the route, discharges of pollutants into the water, bank protection, regime of precipitation and other climate variables.

b) Biotic environment:

- 3.131 Describe the current conditions of different wildlife species in particular Key Biodiversity Areas (KBA) if any.

c) Sociocultural environment:

- 3.132 Population (permanent and temporary), community structure, distribution of income, goods and services, recreation, etc.
- 3.133 The environmental assessment, which corresponds to the baseline of the AID and AII before project implementation, should consider the location of these areas in relation to ecoregions and shall be accompanied by maps of the main features biophysical (e.g. geology, soil, climate, vegetation cover, watersheds, etc.), with emphasis on the identification of protected areas, if any, and the habitats of flora and fauna that are endemic, in danger of extinction or threatened (e.g. any identified KBA). It should also identify critical areas concerning the characteristics of soils and wet areas. From the various thematic maps prepared, the methodology may be applied so as to overlap zones or areas identify environmentally fragile.
- 3.134 In addition, an inventory of environmental liabilities should be developed identifying existing environmental problems which could affect the project, to incorporate as recommendations in the engineering design.

4) Legal and Institutional Aspects.

- 3.135 Mention and discuss the pertinent regulations (governmental and IDB) and standards governing environmental quality, health and safety at local, national and regional levels. Include an analysis of the effective Environmental Technical General Specifications (ETGS), which was approved by the MTPTC in due course.
- 3.136 The consultant should pay particular attention to comply with the Bank's environmental criteria in the selection and/or eligibility of alternatives, which are described below:

- **With respect to the indirect impact of the work on environmentally fragile areas:** The condition is that the works are developed at a location more than 10 km away from areas deemed priority for national conservation, or included in the national system of protected areas or native forest conservation.
- **Regarding the direct impact of the work on environmentally fragile areas:** That the work does not cross areas with presence of fragile soils or wetlands.

5) Determination of the potential impacts of project alternatives

- 3.137 Identify and evaluate, through interaction matrices (cause-effect), all significant changes that the different project alternatives may cause on different environments. The analysis of impacts must include the four fundamental stages – identification, characterization, magnitude prediction and attribution of importance.
- 3.138 Research is required for positive and negative impacts, direct and indirect, temporary and permanent, cumulative and synergistic, reversible and irreversible in the short, medium and long term, in the physical, biotic and socio cultural environments of the

alternatives analyzed and at different stages of the road cycle (feasibility, design, construction, operation and maintenance) as well as those for the closing stage of construction activities, at least considering the impacts caused at:

a) At feasibility or design stages:

- 3.139 Impacts caused by interference with the project plan or other development plans, plans for land use, plans for agricultural development, environmental protection, etc.
- 3.140 Social conflicts arising from the lack of compatibility of the proposed works to the expectations of the communities to be benefited, as appropriate, according to the results of surveys and public consultations.

b) At construction stages:

- 3.141 Impacts on the physical and biological environments in the study's AID (impacts on flora and fauna, on water resources, soil and the atmosphere in the strip of domain and surrounding areas, in the vicinity of camps and industrial plants);
 - Risk of accidents in urban and peri-urban areas;
 - Risk of accidents caused by the transport of explosives and other machinery and equipment;
 - Impacts on people and property subject to expropriation for release of right of way.
 - Impacts on population due to risk of disease by the presence of foreign workforce;
 - Others not specifically mentioned but necessary to ensure the socio-environmental quality of the work.

c) Operational stage

- 3.142 Impacts associated with transport and handling of dangerous loads; etc.
- 3.143 Other not specifically mentioned but necessary to ensure the socio-environmental quality of the work.

d) Closure of activities Stage

- 3.144 Impacts of abandonment without protection and environmental restoration of the work camps, industrial plants, areas of lending and quarrying.

e) Maintenance stage

- 3.145 Potential impacts of road maintenance activities on natural resources and on neighboring communities, specifically in regard to the sources of materials and disposal of sterile remnants from the work site.

6) Development of Mitigation Plan

- 3.146 Prepare a mitigation plan of the significant adverse impacts identified over the development of the task of literal "5) Determination of the potential impacts of project alternatives", recommending feasible measures with actual costs, including proposed work plans.
- 3.147 Discriminate mitigation measures in actions related to direct and indirect impacts.

- 3.148 For the development of the plan with respect to direct impacts, consider the recommendations in the ETGS's, with emphasis on those related to activities most likely to cause adverse impacts.

7) Development of a Monitoring Plan

- 3.149 Prepare a detailed plan to monitor the implementation of mitigation measures and project impacts during construction and operation plan.

8) Environmental Management Plan (EMP)

- 3.150 EMP corresponds to a results summary of the tasks corresponding to the items **3) Description of the environment within the defined areas of influence** and **5) Determination of the potential impacts of project alternatives**, which shall include all programs and sub-programs for which all actions to be implemented should be identified, costs, institutional responsibilities of the implementation of the EMP, and implementation schedule, discriminated by environmental management plan of the direct and indirect impacts.

x. ECONOMIC EVALUATION

- 3.151 The results of the economic evaluation will be presented, considering a time horizon of twenty years. Evaluations of the alternatives studied must be presented along with results that prove the choices made. Once the final designs of the selected alternative are completed, the economic profitability indicators will be revised based on the final costs obtained from the final designs and environmental studies.

1) Determination of the profitability indicators

- 3.152 The indicators of economic performance are the following:
- IRR – Internal Rate of Return;
 - NPV – net present value, discounted to the real rate of interest of 12% per year;
 - C/B – cost/benefit ratio, at a real rate of interest of 12% per year.

2) Sensitivity analysis

- 3.153 In order to evaluate possible changes in the variables of the project related to the project's feasibility, the consultant should perform a sensitivity analysis, considering at least a variation of + 20% in construction costs; -20% in the expected benefits and a joint consideration of + 10% in construction costs with -10% in profits.

xi. INTEGRATED ANALYSIS AND SELECTION OF ALTERNATIVE

- 3.154 The consultant shall conduct an integrated results analysis of all study components (technical, environmental and economic) in order to select the best alternative, which will be subject to further study of final design engineering.
- 3.155 The methodology for this analysis and subsequent selection shall be proposed by the consultant, taking into consideration that the profitability indicators obtained from the economic evaluation will define the best alternative, once the most convenient alternative has been chosen under the trace and technical characteristics, operational and environmental approaches, based on the comparison of the estimated costs.

IV. CHARACTERISTICS OF CONSULTANCY SERVICES

- 4.1 This is an open and competitive process, based on quality and cost criteria. The consulting services shall meet the following requirements:
- a. **Type:** Company, individual (s) or organization of one of the member countries of the IDB.
 - b. **Duration of works:** The activities in this command must be completed within 10 months, with a tentative start date of March 2015.
 - c. **Location:** Based in Haiti (if not local).
- 4.2 **Qualifications:** Must be a firm or individual consultant with not less than 15 years in road planning and management experience. Experience in the development of road design documents and desired experience with projects involving strong and frequent community outreach initiatives and participative planning mechanisms. Preferably knowledgeable with the rules and procedures governing the implementation of internationally funded road projects especially the Bank (inclusive).

V. REPORTS AND DISBURSEMENTS

- 5.1 The Consultant shall submit the following reports to MTPTC:
- a. Report 1 – Initial report: 30 days after the contract signature, where the Consultant validates the methodology to be used in the diagnostic and prioritization study as well as that to follow for the detailed design stage. A timeline should also be presented validating or adjusting the one included in the Technical Proposal.
 - b. Report 2 – Diagnostic and prioritization progress report: Within 90 days of the order of commencement of work. This report contains preliminary results of the fieldwork, data procurement and community outreach, etc., incurred in the development of the diagnostic report. The consultant should be able to identify, in a preliminary stage, the most strategic projects which will be later ranked following the defined prioritization methodology. This shortlist should not be considered as final but only indicative of the ongoing evaluation of projects done by the consultant.
 - c. Report 3 – Diagnostic and prioritization final report: Within 180 days of the order of commencement of work. A prioritized list of projects will be the ultimate product of this report. In addition, this report should provide extensive technical background documenting the prioritization process and methodologies followed. The first findings of the traffic studies, analysis of multimodal transport, economic and environmental characterization of the areas of influence of the most relevant projects should be part of this report given the complementarity of tasks between diagnosis and detailed design.
 - d. Report 4 – Draft Final Report: Within 240 days of the order of commencement of work. This report will be made to complete the first draft of the study, detailing the tasks and results in accordance with the Terms of Reference and Proposal. This report must include the study of alternatives.

- e. Report 5 – Final Report: after 300 days of commencement of work, and will consist of a volume of text, one or more volumes of appendices and an Atlas, and shall include the following chapters:

- I. Executive Summary
- II. Diagnostic and Prioritization Study
- III. Socioeconomic Studies for the Area of Influence
- IV. System Analysis Between Transportation Modes
- V. Traffic Study
- VI. Promotion of the Participation of Civil Society
- VII. Alternatives for Road Tracing and Road Technology
- VIII. Project Engineering
- IX. Definition and Calculation of Investment Costs
- X. Determination of Benefits and Beneficiaries
- XI. Environmental Studies
- XII. Economic Evaluation
- XIII. Integrated Analysis and Selection of Alternatives

Annex A: Statistical Information on the Economy of the Area of Influence.

Annex B: Road Network.

Annex C: Vehicle Operating Costs.

Annex D: Road Maintenance

Annex E: HDM III Model Results (if applicable)

Annex F: Road Construction Unitary Cost Analysis

Other Annex

- f. Special Reports: The Consultant shall produce special reports in the occurrence of an event that deserves special attention or deemed relevant for the project and/or by MTPTC's request. Likewise, the Consultant will provide assistance to the Department of Roads and the Environmental Unit in the preparation of all documents and information that must be furnished to the Bank as required by the Loan Agreements.

5.2 Reports shall be presented physically on A4 sheets and in magnetic CD format. The Atlas of maps and plans on A3.

5.3 The reports shall be submitted in five (5) copies. Electronic files must be submitted along with the printed report. The consultant should also summarize all available information indicating potential problems in meeting the terms of reference conditions, strategies to resolve and confirm the Activity Schedule. The reports will also be presented in digital format containing all documents, appendices, graphs, maps and other compiled and hyperlinked elements in a single document, prepared in PDF format (Adobe Acrobat Reader).

5.4 In addition, regular meetings shall be held at the request of MTPTC or IDB in order to check the progress of the studies.

5.5 Payments for the consulting services will be specified within the contract and following these installments:

First payment:	20% upon contract signature;
Second Payment:	10% upon Work Plan's approval – Report 1
Third Payment:	30% upon approval of the Report 3
Final Payment:	40% upon approval of the final report (Report 5)

VI. SUPERVISION

- 6.1 Supervision of the consultancy works will be done by the IDB, however, all activities will be carried out in coordination with the MTPTC which will hold the technical leadership of the contracts. In addition, the MTPTC will confirm with the consultant, before starting each set of activities, dedication of time, duration of work and delivery dates of expected products based on the contents of these Terms of Reference.

**TECHNICAL COOPERATION
SOCIAL STUDIES FOR
SECONDARY AND TERTIARY ROADS IN HAITI**

TERMS OF REFERENCE

I. BACKGROUND

- 1.1 Over the last decade, Haiti has improved significantly the quality of its road infrastructure with financing from the Bank and others donors. Immediately after the earthquake in January 2010 it was estimated that only 9% of the total road network was in good condition. Moreover, only 10% of the roads received continuous maintenance. In the past four years, more than 100 km of primary network (953 km in total) and 250 km of secondary (1,315 km in total) and tertiary (1,304 km in total) roads have been rehabilitated and estimates by the Government of Haiti (GoH) indicate that currently about 15% of the total road networks and 64% of the primary network are in good condition. Since 2010, through the Program of the Transportation Sector Development 2010-2015 (PTSD II), IADB approved a total of US\$ 350 million for the sector in the form of investment grants, supporting an extensive program of road rehabilitation and focused institutional strengthening.
- 1.2 Following these efforts of improving the road infrastructure network on the main island, the Bank is interested in developing a similar rehabilitation project for roads on Gonâve Island (Île de la Gonâve), the largest satellite island of the Republic and located in the gulf of the same name. With an estimated population of 78.000 and an area of 743 km² (287 sq. mi) the island's infrastructure conditions fall well below those witnessed on the main island mainly due to its geographic isolation and overall resource scarcity.

II. OBJECTIVES

- 2.1 This consultancy aims to develop social studies and elaborate a Resettlement Plan necessary to carry out the rehabilitation of strategic roads of secondary and tertiary level in Haiti. This selection of strategic roads is the main product of the study **DIAGNOSTIC AND PRIORITIZATION STUDY** to be developed by consultancy services according to Terms of Reference: **Diagnostic, Technical and Socio Environmental Studies for secondary and tertiary roads in Haiti** and should serve as reference in the identification of the roads/projects for which the activities listed in the present document will be developed.
- 2.2 The activities performed will provide inputs for a Resettlement Plan (RP) and identify key components requiring land acquisition and resettlement. The consulting efforts will focus on minimizing the need of population displacement as a consequence of the development of the project.

III. SCOPE AND ACTIVITIES

- 3.1 The following describes some of the main activities to be undertaken by the consultant for the group of projects selected in the Diagnostic and Prioritization Study.

- 3.2 **Activity 1.** Institutional and legal framework. The consultant shall provide the legal requirements associated to involuntary expropriation/resettlement applicable to the project. The differences between Haitian law and IDB policies will be identified.
- 3.3 **Activity 2.** Socioeconomic conditions (census and socioeconomic surveys). A detailed description, including quantitative data and information from existing social conditions in the proposed project will be presented. Consultation will be held with stakeholders. A survey, including an inventory of losses (IOL), and socioeconomic studies are to be conducted in order to collect all data needed to assess the impact of the project on resettlement. The following is a list of socioeconomic conditions that will exist:
- a. Population and settlement patterns
 - b. Land use and tenure
 - c. Livelihoods, economic base, health, education, services and local infrastructure levels and indicators
 - d. Social organizations and associations, vulnerable or minority groups (e.g., elderly, low income, disabled, and youth)
 - e. General socioeconomic characteristics of the population affected by the project
 - f. Results of consultations with stakeholders
- 3.4 **Activity 3.** Impacts on those affected. The consultant will prepare and present description of the social impacts of the project, particularly addressing effects that should be mitigated and compensated. All impact categories and the people affected will be identified. This will include:
- a. Impacts on agricultural activities
 - b. Impact on businesses
 - c. Impact on employment
 - d. Impact on assets, houses and other structures
 - e. Impact on community assets
 - f. Any other impact that requires the application of (RP)
- 3.5 **Activity 4.** Compensation and resettlement strategy. The consultant will present the strategy to ensure income restoration of the affected people. The following items are included:
- a. Preparation of an identification matrix (identification of eligible persons / household / community, depending on the type of impact)
 - b. Description of the valuation method used for affected structures, land, trees and other assets
 - c. Evaluation of losses and replacement costs
 - d. Description of processes to provide compensation
 - e. Description of the complaints resolution mechanism
 - f. Description of specific assistance to potential vulnerable people

IV. CHARACTERISTICS OF CONSULTANCY SERVICES

- 4.1 This is an open and competitive process, based on quality and cost criteria. The consulting services shall meet the following requirements:
- a. **Type:** Company, individual (s) or organization of one of the member countries of the IDB.
 - b. **Duration of works:** The activities in this command must be completed within 10 months, with a tentative start date of March 2015.

c. **Location:** Based in Haiti (if not local).

- 4.2 **Qualifications:** Must be firm or individual consultant with not less than 10 years of experience in social management and planning of road infrastructure projects. Experience in elaboration of resettlement plans. Preferably knowledgeable with the rules and procedures governing the execution of road infrastructure projects with financed with international funds particularly those involving the Bank (not limited).

V. REPORTS AND DISBURSEMENTS

- 5.1 The consultant shall prepare and submit two reports: an interim report and a final report, in addition to the detailed work plan for the first 10 business days of the contract.
- 5.2 Reports shall be presented physically on A4 sheets and in magnetic CD format. The Atlas of maps and plans on A3.
- 5.3 Payments for the consulting services will be specified within the contract and following these installments:
- | | |
|-----------------|---------------------------------------|
| First payment: | 20% upon contract signature; |
| Second Payment: | 10% upon Work Plan's approval |
| Third Payment: | 30% upon approval of the Report 1 |
| Final Payment: | 40% upon approval of the final report |

VI. SUPERVISION

- 6.1 Supervision of the consultancy works will be done by the IDB, however, all activities will be carried out in coordination with the MTPTC which will hold the technical leadership of the contracts. In addition, the MTPTC will confirm with the consultant, before starting each set of activities, dedication of time, duration of work and delivery dates of expected products based on the contents of these Terms of Reference.

**TECHNICAL COOPERATION
URBAN TRANSPORTATION
IMPROVEMENT STUDIES FOR HAITI**

TERMS OF REFERENCE

I. BACKGROUND

- 1.1 Over the last decade, Haiti has improved significantly the quality of its road infrastructure with financing from the Bank and others donors. Immediately after the earthquake in January 2010 it was estimated that only 9% of the total road network was in good condition. Moreover, only 10% of the roads received continuous maintenance. In the past four years, more than 100 km of primary network and 250 km of secondary and tertiary roads have been rehabilitated and estimates by the Government of Haiti (GoH) indicate that currently about 15% of the total road networks and 64% of the primary network are in good condition. Since 2010, through the Program of the Transportation Sector Development 2010-2015 (PTSD II), IADB approved a total of US\$ 350 million for the sector in the form of investment grants, supporting an extensive program of road rehabilitation and focused institutional strengthening.
- 1.2 In terms of urban mobility in Port-Au-Prince (PAP), the country's capital and largest city, the systemic absence of any kind of planning strategy nor entity responsible of such tasks has allowed chaos to take over the city's transport network worsening the traffic and transit conditions (speeds along some the few main arteries available average 11 km/h for direct origin-to-destination trips). The existing road infrastructure has been developed mostly off-code, without following proper designs with little to none road provision for non-motorized transportation flows; along busy corridors pedestrians are forced to share the right-of-way with motorized vehicles after lateral shoulders and occasional sidewalks are occupied by informal street vendors. Approximately 80% of motorized transport is privately owned and operated with a low-cost collective taxis fleet. Operations are moderately regulated by the government, however fare structure definitions are not the result of a formal technical study and route itineraries are loosely defined. Ironically, this chaotic and ineffective transit system is still unaffordable to certain parts of the population given the state of extreme poverty they live in. (Kopp and Preud'homme, 2011).

II. OBJECTIVES

- 2.1 This consultancy aims to develop an assessment of the conditions of the existing road network in PAP and define an action plan to pursue the improvement of urban transportation conditions in the capital Port-au-Prince.
- 2.2 This assessment and action plan would serve as the foundation of a much larger and detailed urban and transportation master plan to be developed for Haitian cities.

III. SCOPE AND ACTIVITIES

- 3.1 The following describes some of the main activities to be undertaken by the consultant.

- 3.2 The activities of this component follow the short and medium term recommendations included in the urban transport diagnosis funded by the Bank in November 2011⁴. The main activities are:

1. DIAGNOSIS AND EVALUATION

- 3.3 **Activity 1.** Construction of a GIS-based road network for the PAP metropolitan area. Using a compatible and known format, the consultant should work along local planning authorities or agencies (if any and to be determined with the help of MTPTC and Bank's country office staff) to develop from scratch (or revise and update using existing versions) a comprehensive GIS network for the city of PAP.
- 3.4 This network will update this network with the findings of the inventory exercise of Activity 2.
- 3.5 **Activity 2.** Road Inventory: Identification of existing urban main arteries and physical condition. Elements to determine in the inventory include⁵:
- a. Available and effective right-of-way. (Drivable Width)
 - b. Physical condition.
 - c. Traffic conditions.
 - d. Non-motorized transportation (NMT) right-of-way provision.
 - e. Informal commerce presence (classification based on road invasion and pedestrian displacement, etc.).
 - f. Location of signalized intersections and functionality.
- 3.6 To identify and determine the elements of this inventory the consultant should prepare and conduct field visits and surveys whenever deemed necessary, documenting every finding and data collection activity in a memoire to be annexed to the final road inventory.
- 3.7 It is strongly advised to include photographic evidence when evaluating subjective indexes such as those of items **B**, **D** and **E** from the previous list. A standardization methodology should be developed by the consultant to avoid biased evaluations.
- 3.8 The inventory should provide information for AM and/or PM peak periods when traditionally traffic and transit conditions are worse. Surveys and field visits must be carried out at these periods on workdays and the schedule should be shared in advance with the supervisor of the contract.
- 3.9 If the critical conditions happen to exist outside these traditional peak periods the consultant should adjust the survey schedule to capture the conditions at the worst situation accordingly.
- 3.10 **Activity 3.** Definition of a ranking based on a combined index of road importance, level of congestion and overall physical condition. This ranking will identify the critical links or intersections where immediate action is required and prioritize the efforts.
- 3.11 The consultant should practice discretion when evaluating the urban transportation conditions of the city and validate the indexes suggested in these terms of reference (road importance, level of congestion and physical condition). The consultant is thus

⁴ Urban Transport in Port-au-Prince. Authors: Pierre Kopp and Rémy Prud'homme. Nov 2011

⁵ Final inventory list to be defined conjointly with consultant and local counterpart teams.

invited to add, adjust and/or modify this group of indexes always trying to best illustrate the existing situation.

2. DEFINITION OF AN ACTION PLAN BY GROUP DETERMINING SCOPE AND SCALE.

- 3.12 **Activity 4.** Definition of an action plan by group. The action plan should be grouped by category. Four action groups are being suggested:
1. NMT – Policy for right-of-way provision and enforcement.
 2. Road Maintenance – Policy for maintenance and urgent interventions.
 3. Road signalization – Policy for maintenance of existing signals (horizontal and vertical) and installation of new or additional elements considered necessary
 4. Public Transportation – Strategy to optimize operations and improve level of service. Although being a complex topic it is crucial to structure a plan effective in the short term leading to improve conditions for operators and users under the existing situation. E.g. route licensing, itinerary coding and mapping, vehicle maintenance program, fleet renewal and upgrade, user information, among many others. This will be the initial phase of a series of initiatives to be implemented towards a comprehensive urban planning and transportation reform for PAP.
- 3.13 The consultant should practice discretion when evaluating the measures to be proposed and implemented based on the categories suggested in these terms of reference (NMT, Road Maintenance, Road Signalization and Public Transportation). The consultant is thus invited to add, adjust and/or modify these groups always trying to best structure an effective action plan.

IV. CHARACTERISTICS OF CONSULTANCY SERVICES

- 4.1 This is an open and competitive process, based on quality and cost criteria. The consulting services shall meet the following requirements:
- a. **Type:** Company, individual (s) or organization of one of the member countries of the IDB.
 - b. **Duration of works:** The activities in this command must be completed within 9 months, with a tentative start date of March 2015.
 - c. **Location:** Based in Haiti (if not local).
- 4.2 **Qualifications:** Must be firm or individual consultant with not less than 10 years of experience in urban and transportation planning projects. Experience in elaboration of regional and urban mobility plans and traffic studies. Preferably knowledgeable with the rules and procedures governing the execution of road infrastructure projects with financed with international funds particularly those involving the Bank (not limited).

V. REPORTS AND DISBURSEMENTS

- 5.1 The consultant shall prepare and submit two reports: an interim report and a final report, in addition to the detailed work plan for the first 10 business days of the contract.
- 5.2 Reports shall be presented physically on A4 sheets and in magnetic CD format. The Atlas of maps and plans on A3.
- 5.3 Payments for the consulting services will be specified within the contract and following these installments:

First payment:	20% upon contract signature;
Second Payment:	10% upon Work Plan's approval
Third Payment:	30% upon approval of the Report 1
Final Payment:	40% upon approval of the final report

VI. SUPERVISION

- 6.1 Supervision of the consultancy works will be done by the IDB, however, all activities will be carried out in coordination with the MTPTC which will hold the technical leadership of the contracts. In addition, the MTPTC will confirm with the consultant, before starting each set of activities, dedication of time, duration of work and delivery dates of expected products based on the contents of these Terms of Reference.