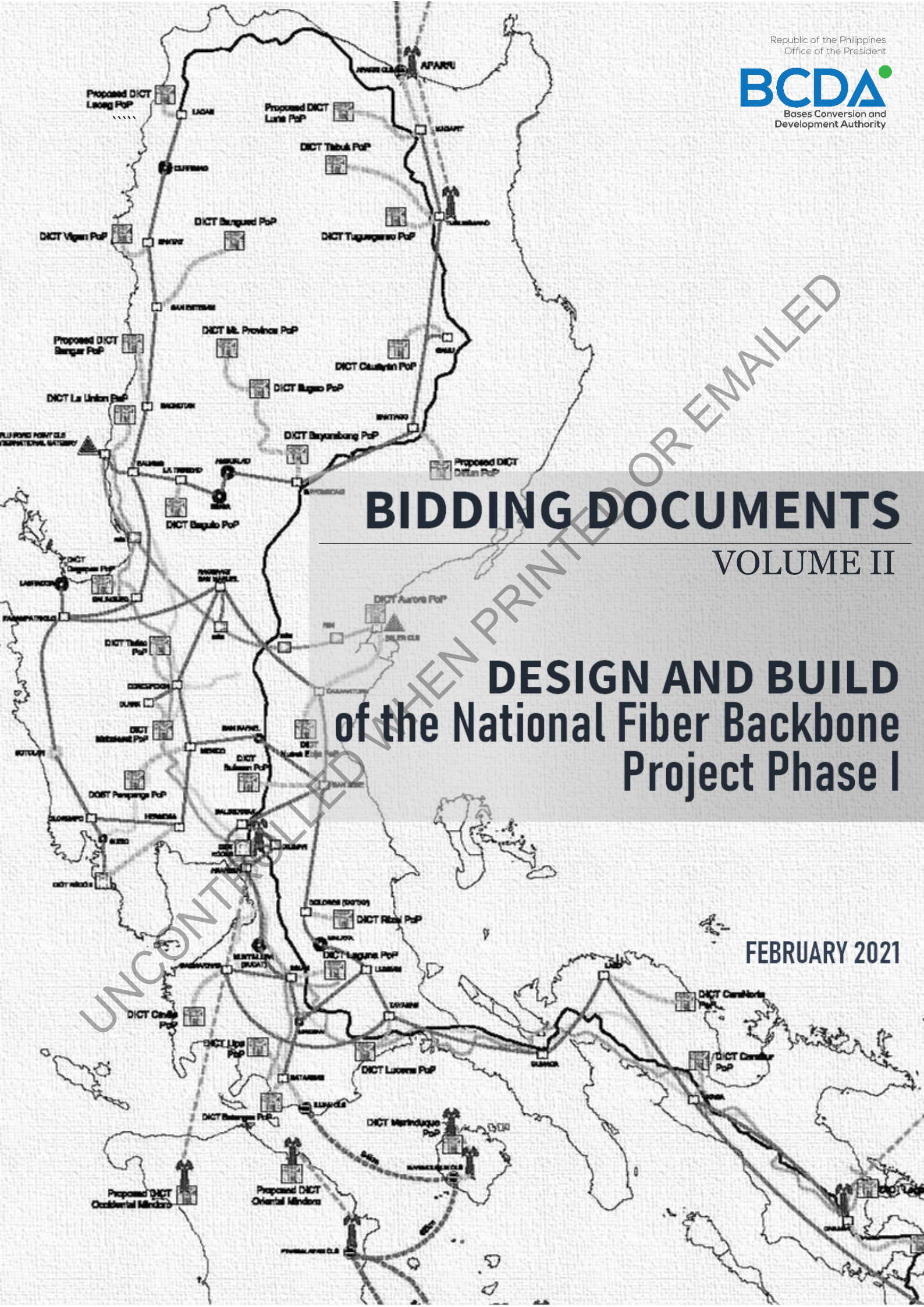
Republic of the Philippines
Office of the President

BCDA
Bases Conversion and Development Authority



BIDDING DOCUMENTS

VOLUME II

DESIGN AND BUILD of the National Fiber Backbone Project Phase I

FEBRUARY 2021

TABLE OF CONTENTS

SECTION I
TERMS OF REFERENCE

1. BACKGROUND

The National Broadband Program (NBP) is one of the flagship projects of DICT envisioned to address the growing clamor for a nationwide roll-out of broadband connectivity through deployment of broadband connectivity across the nation. The NBP is in fulfillment of DICT's responsibility in meeting the (i) increasing demand for data transmission and access to information, (ii) the lack of pervasive internet connectivity, (iii) the need for the private sector's investment in open and expansive broadband infrastructure, as well as (iv) in boosting the persistently low broadband penetration rate outside of Metro Manila which has hampered the socio-economic development of the country-side and curbed opportunities for growth and expansion.

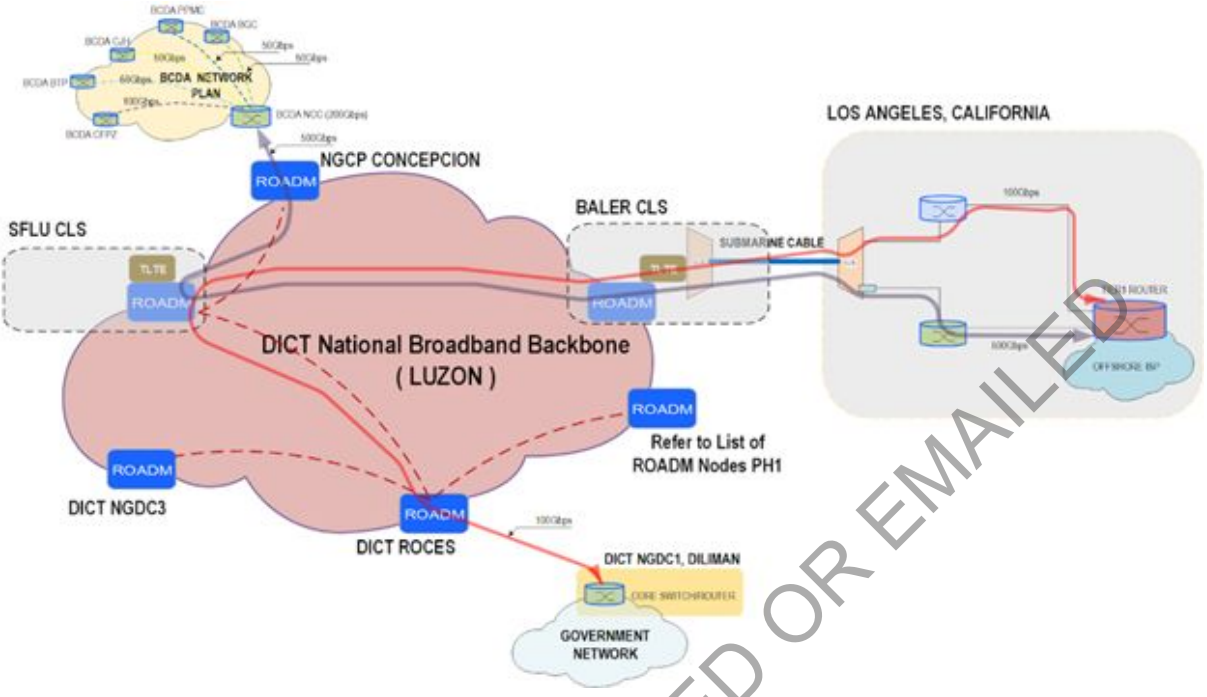
The NBP is in line with RA 10929 or the "Free Internet Access Program in Public Places Act" which underpins the agency's role and the task of undertaking the "creation, establishment, installation, maintenance, and operation of infrastructure, equipment, systems, platforms, applications, and such other Program requirements necessary to effectively provide free internet access in public places throughout the country" and reiterates DICT's mission to establish a resilient, redundant, and cost-effective backbone. Furthermore, its objectives are aligned with the Philippine Development Plan 2017-2022 and the AmBisyon Natin 2040 which promulgated the importance of an ICT infrastructure to help decongest Metropolitan Manila. Moving forward to the New Normal, it is now, more than ever, essential to accelerate the broadband initiatives to foster growth in digitization for economic and social resilience which were hampered due to the COVID-19 pandemic.

The Bases Conversion and Development Authority (BCDA), being a major Stakeholder of the NBP, was entrusted by DICT to conduct the actual procurement of its National Fiber Backbone Project Phase I (Project).

2. PROJECT BRIEF

The Project intends to select the most competent and eligible provider of a resilient and cost-effective fiber optic cable backbone and its ancillaries covering the central part of Luzon Island. It aims to provide internet connectivity to the two National Government Data Centers and other identified priority areas, and cascade optical spectrum to four Bases Conversion and Development Authority (BCDA) ecozones.

To realize the aforementioned objective, the Project seeks to activate the nodes using the National Grid Corporation of the Philippine's (NGCP) dark fiber and commission the laying-out of fiber optic cables (FOC).



By the 3rd quarter of 2021, this project should **make internet readily available** in the twenty-eight designated nodes where government entities or DICT's other last-mile projects may tap into the convergence points or the PoP. Below are the specific objectives that the Winning Bidder must accomplish promptly to provide the major output of an active and operational network capable of distributing internet:

- To establish a resilient broadband network connecting twenty-eight (28) nodes in the central and northern parts of Luzon Island through Fiber Optic Cable.
- To utilize the fiber optic cable of the National Grid Corporation of the Philippines (NGCP) to cascade internet capacity to Regions I, III, CAR, and NCR.
- To home the 100Gbps internet capacity to the DICT core network in Diliman which will distribute the internet capacity to the 28 nodes in Luzon.
- To create a network that is scalable and future-proof.

To properly distribute this capacity from the backbone to beneficiaries of the GovNet Project and Free WiFi for All end-users, the Winning Bidder must first provide well-thought-out and standards-compliant detailed designs and plans of the FOC network. This design will be the basis for the installation of ICT equipment needed to terminate, distribute, and optimize this capacity.

3. CONTRACTUAL FRAMEWORK

The contractual arrangement to be used for the Project shall be procured and implemented following the Design and Build Scheme pursuant to the provisions of Republic Act (RA) 9184 and its Revised Implementing Rules and Regulations

(RIRR), specifically Annex E - Contract Implementation Guidelines for the Procurement of Infrastructure Projects and Annex G - Guidelines for the Procurement and Implementation of Contracts for Design and Build Infrastructure Projects.

Under this scheme, the procuring entity will award a single contract for the engineering design and construction to a single firm, partnership, corporation, joint venture or consortium.

4. GENERAL REQUIREMENTS

The Project subject to this Terms of Reference is composed of the design and build of the following components:

NO.	PARTICULARS
1	Design, Supply, Build, Delivery, Installation, Testing, Commissioning, Acceptance of 7-way HDPE microducts, manholes, handholes, telecommunication poles, air-blown mini fiber optic cable, optical joint enclosures, optical distribution frames, and their corresponding accessories (“**Fiber Optic Cable Build**”)
2	Design, Supply, Build, Delivery, Installation, Commissioning, Integration, Testing, Acceptance of Transponder / Muxponder Equipment System, Power System, Network Management System (NMS), and Data Communications Network (DCN) (“**Transponder**”)
3	Design, Supply, Delivery and Installation, Testing, Commissioning and Integration of twenty five (25) Dense Wavelength Division Multiplexing (DWDM) / Reconfigurable Optical Add-Drop Multiplexer (ROADM) and In-Line Amplifier equipment with three (3) fiber-bypass site connections, Network Management System (NMS), support facilities, materials and services needed at identified NGCP and DICT sites (“**Optical Transport Network**”)
4	Supply, Delivery, Testing, Integration and Acceptance of 100 Gbps IP Transit from Los Angeles, California, USA Internet Service Providers and Service Level Agreement for one (1) year (“**100Gbps IP Transit**”)

5. SCOPE OF SERVICES

The Winning Bidder shall undertake the design and build of the Project based on the Conceptual Design and Minimum Performance Specifications and Parameters, and shall conform, at the minimum, to the provisions of the:

- National Building Code of the Philippines
- National Structural Code of the Philippines

- Philippine Electrical Code 2017
- American Institute of Steel Construction latest edition (AISC)
- American Society of Testing and Materials latest edition (ASTM)
- American Concrete Institute (ACI318-11M)
- American Society of Civil Engineer (ASCE)
- American Welding Society latest edition (AWS)
- British, European and International Standards (BS EN ISO)
- Other laws and regulations covering environmental concerns and local ordinances and regulations

5.1 **Preliminary Works**

Surveys and investigations of the site includes, but not limited to, the boundary/route, topographic, cross section, structural/facility and utilities (e.g., power, water, communications lines, etc.), geotechnical investigation and other field surveys/investigations necessary to carry out the Project.

The Winning Bidder shall coordinate with utility providers for identification of existing utility corridors that might be affected by the Project. The Winning Bidder shall also be responsible in coordinating with the utility providers for the tapping points of the necessary utilities for the Project.

The acquisition of permits and right-of-way shall be the responsibility of the bidder with assistance from DICT. Refer to Annex "F" for the complete matrix.

5.2 **Detailed Design Phase**

The Winning Bidder shall prepare a detailed network design, work plan, work methodology, and technical specifications of the Phase 1 network based on the existing conceptual design attached in the annexes. The detailed designs and schematics will validate and recommend the best and most strategic placement/installation of the ICT equipment, as well as direct or guide the Winning Bidder where the most cost-effective routes are for the laying of underground FOC in the creation of partial protection loops.

5.3 **Construction Phase**

The second stage involves the delivery, installation, testing, and integration of all equipment and associated deliverables for *Fiber Optic Cable Build, Transponder, Optical Transport Network, 100GBps IP Transit components*. The Transponder component is where the spectrum capacity and the 100GBps IP Transit component will flow. This will be then transmitted through the DWDM system under the Optical Transport Network component for homing to the convergence points where the project's clients may tap in building their own last-mile network. Those that will tap to these convergence points will be responsible for the last mile. This build-out will rely on the designs produced in the first stage of the project, provided that it is thoroughly reviewed and duly approved by the DICT management.

In detail, the Fiber Optic Cable Build component covers the provision of the FOC which is the "highway" through which the internet connectivity will course through and is distributed as the middle mile of the overall network. The first component aims to install FOC in segments (listed below with corresponding approximate lengths) to bridge select NGCP nodes with identified DICT nodes and BCDA's four (4) Ecozones:

	SITE A	SITE B	ESTIMATED TOTAL FIBER ROUTE (KM)
1	NGCP La Trinidad	DICT Baguio	4.8
2	DICT Baguio	BCDA Camp John Hay Management Center	5.23
3	NGCP Bauang	DICT CLS San Fernando, La Union	6.13
4	DICT CLS San Fernando La Union	BCDA Poro Point Management Corporation	2.8
5	NGCP Subic	DICT NGDC 3	6.58
6	DICT Roces	NGCP Araneta	3
7	NGCP Concepcion	BCDA National Government Administrative Center (NGAC)	15.1
8	NGCP Clark	BCDA Clark Freeport Zone	9.8
T O T A L			**53.44**

It also covers the layout of FOC from the International Cable Landing Station in Baler, Aurora, to the International Cable Landing Station in Poro Point, La Union, with the four (4) Repeater Stations per 50-kilometer interval along the route.

The protection loops for the middle mile (i.e., NGCP access nodes to DICT sites and BCDA ecozones) are not included in this Phase 1 Project.

The Transponders component of the Project covers the provision of transponders/muxponders that shall be placed in the two International Cable Landing Stations in Baler, Aurora, and Poro Point, La Union. It works by terminating the 600 Gbps optical spectrum which is then transmitted to

the DWDM equipment. From here on, the 500 Gbps spectrum will be distributed initially to the four (4) BCDA ecozones, listed below:

	BCDA ECOZONE	LOCATION
1	John Hay Art and Forest Park	Baguio City
2	Clark Freeport Zone	Pampanga
3	New Clark City (NCC)	Tarlac
4	Poro Point Marine Headlands	La Union

The remaining 100 Gbps spectrum shall be homed to DICT's core router located in the National Government Data Center 1 in the NCR.

The DWDM equipment is part of the Optical Transport Network component of the project. The identified requirement for the DWDM is the CDC-F ROADM. This hardware will be installed in telecom rooms in NGCP's substations, listed below:

NGCP SUBSTATIONS			
1	Araneta, Metro Manila	11	Mexico, Pampanga
2	Diliman, Metro Manila	12	San Jose, Bulacan
3	Balintawak, Metro Manila	13	Hermosa, Bataan
4	Bauang, La Union	14	Botolan, Zambales (Amplifier)
5	Balingueo, Pangasinan	15	Olongapo, Zambales
6	Bolo, Pangasinan	16	Cabanatuan, Nueva Ecija
7	Nagsaag, Pangasinan	17	Bacnotan, La Union
8	La Trinidad, Benguet	18	San Esteban, Ilocos Sur
9	Concepcion, Tarlac	19	Bantay, Ilocos Sur
10	Clark, Pampanga	20	Laoag City, Ilocos Norte

The Winning Bidder needs to note that three (3) of the NGCP substations identified in the design will *only have fiber bypass connection*. Five (5) DWDM equipment are to be installed in DICT's Points of Presence (PoPs) as listed below:

DICT NODES		LOCATION
1	Cable Landing Station	Baler, Aurora
2	Cable Landing Station	San Fernando, La Union
3	National Government Data Center 3	Zambales
4	DICT Data Center	Roces, Metro Manila
5	Repeater Station	Sta. Maria, Pangasinan

Out of the four (4) fully-constructed Repeater Stations along the 250 km route of the Luzon Bypass Infrastructure, only the Repeater Station in Sta. Maria, Pangasinan (Relay Station) will be installed with the DWDM equipment.

The CDC-F ROADM equipment (DWDM) is required to enable dynamic provisioning of wavelengths through the existing fiber of NGCP to carry large capacity over the network and manage remotely without the need for major network changes. This will effectively bring the 100Gbps IP transport, as well as the incoming 1.4 Tbps optical spectrum and remaining IP transport, across the nation in key, strategic locations.

Finally, the *100Gbs IP transport component* covers the provision of 100 Gbps of internet bandwidth from Tier-1 ISP providers to serve and connect last-mile services or platforms, such as the DICT's GovNet Project or the Free Wi-Fi for All Program and their end-users, to the global internet. This is done through a dedicated router in the ISP Providers' backbone network and the provisioning of IPV4 and IPV6 protocols.

5.4 **Post-Construction Works**

The comprehensive training is essential to enable effective operations and maintenance of the Project. The Winning Bidder must conduct the knowledge transfer refers to DICT on the installations done, configurations, circuit provisioning, support levels, and troubleshooting, at a minimum.

6. ELIGIBILITY REQUIREMENTS

6.1 The bidder should be able to show a Design Contract for a project, within the last ten years, of at least 50% of the ABC (PhP 625,000,000) or at least 2 Design Contracts for projects, within the last ten years, with an aggregate total of at least 50% of the ABC (PhP 625,000,000) involving any or a combination of the following:

1. Design of Laying down of an aggregate of 25km of Fiber Optic Cable with Equipment;

2. Design of Optical Transport Network;

3. Design of ICT Network and Telecommunications Facilities.

AND

6.2 The bidder should be able to present a Civil Works Contract for a project within the last ten years, of at least 50% of the ABC (PhP 625,000,000) or at least 2 Civil Works Contract within the last ten years, with an aggregate total of at least 50% of the ABC (PhP 625,000,000) involving any or a combination of the following:

1. Laying down of an aggregate of 25km of Fiber Optic Cables;
2. Civil Works of roads with provision for underground electrical power or telecom utilities or installation of underground electrical power or telecom underground utilities.

Or, in lieu of I and II above:

6.3 Design and Build Contract for a project, within the last ten years of at least 50% of the ABC (PhP 625,000,000) or at least 2 Design and Build Contracts with an aggregate of 50% of the ABC, involving any or a combination of the following:

1. Laying down of an aggregate of 25km of Fiber Optic Cable with Equipment;
2. Optical Transport Network;
3. ICT Network and Telecommunications Facilities
4. Civil Works of roads with provision for underground electrical power or telecom utilities or installation of underground electrical power or telecom underground utilities.

6.4 Bidder must provide Manufacturer's Authorization that the Bidder is an accredited reseller of the following proposed equipment to be supplied:

1. Optical Transport Network System
2. Transponders
3. Fiber Optic Cable
4. HDPE Ducts
5. Generator Sets

6.5 A PCAB License of AAA Large B is required for the Project. In case of Consortium, at least one (1) company or partner of the Consortium should have a PCAB license of AAA Large B, and it is the constructor which shall possess the said PCAB License. In case of Joint Venture (JV), a Special PCAB License is required for JV, and all JV partners must secure a PCAB License. For individual companies/bidders, i.e. neither JV nor Consortium, their PCAB Licenses may be submitted during Post-Qualification.

6.6 The PCAB License must be in General Engineering, General Building, Electrical Works, or Communication Facilities.

6.7 The Bidder must submit an accomplished Summary of Technical Specifications to be attached as part of its Proposal. Tab R in Section IX. Forms in Volume 1 of the Bidding Documents.

6.8 For the detailed evaluation of the design and build proposals a two-step procedure shall be adopted by the BAC consistent with Annex G - Guidelines for the Procurement and Implementation of Contracts for Design and Build Infrastructure Projects of Revised IRR of RA 9184, which will be undertaken with the assistance of DICT:

6.8.1 **First-Step Procedure**

The first step of the evaluation shall involve the review of the preliminary conceptual designs and track record submitted by the contractor for **Components 1, 2, 3 and 4** as indicated in the bid documents using a nondiscretionary "pass/fail" criteria that involve compliance with the following requirements:

a) Adherence of preliminary design plans to the required performance specifications and parameters and degree of details as indicated in Section 2 Minimum Performance Specifications and Parameters and Annexes;

b) Concept of approach and methodology for detailed engineering, design and construction with emphasis on the clarity, feasibility, innovativeness and comprehensiveness of the plan approach, and the quality of interpretation of project problems, risks, and suggested solutions;

c) Quality of personnel to be assigned to the project which covers suitability of key staff to perform the duties of the particular assignments and general qualifications and competence including education and training of the key staff as indicated in the Minimum Qualifications of Manpower Personnel under Installations and Maintenance Work Requirements of Section 2 Minimum Performance Specifications and Parameters and Annexes;

The basis of bid evaluation will be based solely on the Technical Proposal submitted by the Bidder and officially received by BCDA, as the Procuring Entity. Each Bidder shall be given a maximum of forty five (45) minutes to make an

oral presentation of its Technical Proposal. After the oral presentation, BCDA/DICT shall be given fifteen (15) minutes to ask questions or clarifications.

6.8.2 Second-Step Procedure

Only those bids that passed the evaluation of the Technical Proposal shall be subjected to the second step of evaluation. The BAC shall open the financial proposal of each "passed" bidder and shall obtain the correct calculated prices. The financial bids as so calculated shall be ranked, in ascending order, from lowest to highest. The bid with the lowest price shall be identified as the Lowest Calculated Bid (LCB).

7. APPROVED BUDGET FOR THE CONTRACT

The total Approved Budget for the Contract (ABC), sourced from the DICT GAA, is :

ONE BILLION TWO HUNDRED FIFTY MILLION PESOS	**PHP 1,250,000,000.00**

Inclusive of supply, delivery, installation of materials and services, warranty, utilities, incidental expenses, VAT, and other government taxes, for the Procurement of Design and Build of the National Fiber Backbone Phase 1.

Bids received in excess of the ABC shall be automatically rejected.

7.1 Division of Project Phases

The set of deliverables for the Project is divided into two (2) key phases, defined below:

7.1.1 Design, Supply and Delivery Phase

The deliverable components for this phase include:

- Design of the National Fiber Backbone Phase 1 Network (Mutually Agreed Work Plan)
- Supply and Delivery of Equipment, Materials and Accessories

7.1.2 Build Phase

The deliverable components for this phase include:

- Installation, Testing and Commissioning, and Integration of Fiber Optic Cable Build Component and Optical Transport Network Component
- Installation, Testing and Commissioning, and Integration of Transponder Component
- Installation, Testing and Commissioning, and Integration of 100Gbps IP transit Component
- Final Acceptance of Integration Testing of All Components
- Knowledge Transfer and Submission of the Final Project Documents

7.2 **Submission of Financial Proposal**

The Bidder shall prepare and submit a Financial Proposal containing a detailed cost estimate of the key project phases, and a detailed breakdown of the respective components identified above (item no. 7.1). In preparing the cost estimates, the Bidder shall be cognizant of the limit of the Project ABC, and the proposal shall be further subject to the following terms:

7.2.1 **Payment Method for the *Design, Supply, Delivery, and Build Phase***

Deliverable/s	**Percentage Due** (from Total Contract Price)
Advance Payment	15%
First Billing: ● Delivery of Final Design ● Delivery of Muxponder	20% (less recoupment and retention)
Subsequent Billing/s	Monthly Progress Billing (less recoupment and retention)

The Procuring Entity shall pay the Contractor (Winning Bidder) progress payments based on billings for actual works accomplished, as certified by the BCDA and DICT. As prescribed by RA 9184, the first progress payment under the *Build Phase* of this project may be paid by the Procuring Entity to the Contractor provided **at least 20% of the work had been accomplished** as certified by the Procuring Entity's representative. Note that any agreements reached by the Procuring Entity and the Contractor, in terms of a proposed payment schedule for actual works accomplished must indicate and include all identified deliverables under item no. 7.1.2 above as progress milestones. These identified

progress milestones and approved payment schedule shall form part of the Contract Documents and shall be used in progress monitoring.

However, notwithstanding, the 200- day timeline allocated for project completion, in no case shall progress billing be made more than once every thirty (30) calendar days.

7.2.3 **Retention**

In accordance with RA 9184 and its IRR, progress payments shall be subject to retention of ten percent (10%) based on the amount due to the Contractor prior to any deduction. The total retention money shall be released only upon Final Acceptance of the Project. The Contractor may however request for its release prior to Final Acceptance subject to the guidelines set forth in RA 9184 and its IRR.

8. DATA / SERVICES TO BE PROVIDED BY BCDA / DICT

8.1 **Project Data**. DICT shall make available for reference all existing documents pertaining to the Project. Whenever practicable, DICT shall provide assistance to the Winning Bidder in securing data from concerned government agencies/offices.

8.2 **Access to Land Property**. DICT shall arrange with the agencies concerned with the Project for the free and unimpeded access by the Winning Bidder's Personnel to all lands and properties in respect of which access is required for the performance of the services.

8.3 **Availability of Funds**. Funds required for the engagement of the services of the Winning Bidder in the amount of **ONE BILLION TWO HUNDRED FIFTY MILLION and 00/100 PESOS (PHP 1,250,000,000.00)**, inclusive of supply, delivery, installation of materials and services, warranty, utilities, incidental expenses, VAT, and other government taxes, is made for the Procurement of Design and Build of the National Fiber Backbone Phase I through the issuance of Certificate of Funds Availability (CFA) for that purpose.

8.4 **Evaluation of Contractor's Outputs**. DICT shall review and evaluate the documents submitted by the Winning Bidder as required herein.

9. DATA TO BE PROVIDED BY THE CONTRACTOR DURING CONTRACT IMPLEMENTATION

All Project documents must be submitted in hard and soft copies (1 copy each for BCDA and DICT stored in external drives) and shall be reviewed and accepted by

DICT. Any changes on the Design documents during the project duration shall be at no charge to DICT.

9.1 Engineering Plans

Detailed Technical Design and Construction Plans provided by the Winning Bidder must be approved and signed respectively by a Professional Electronics Engineer (PECE), Civil/Structural Engineer, and/or Electrical Engineer to include the following preliminary requirements:

9.1.1 Preliminary Plans

a. Site Validation, Site Staking, and Technical Site Survey Report
b. Site Readiness Status
c. Equipment Space Allocation Plan
d. Power Allocation and Electrical Wirings Plan
e. Grounding System Plan per Project Site
f. Cable Entrance Facility Plan
g. Manhole Location Plan
h. Structured Cabling Plan, if needed
i. Underground FOC Build Installation Plan (Single Line Diagram, Splice Plan, Pilot Hole Plan, etc.)

9.1.2 Detailed Design and Construction Plans

The detailed design and construction plans must be drawn to scale on durable paper and must be of sufficient clarity to indicate the location, nature, and extent of the proposed work.

9.1.3 Detailed End-to-End Connectivity Plan

The Winning Bidder must draft the appropriate schematic diagram, network diagram, network design, cross-connection plan, etc. of the following network segments to complete the detailed end-to-end connectivity plan.

a. Offshore Segment: Transponder / Muxponder System Technical & Installation Plan, and Cross-Connect, Structured Cabling and Equipment Room at Equinix LA4.
b. Domestic Optical Transport Segment: DWDM/ROADM, In-Line Amplifier, Fiber-Bypass, Cross-Connect Technical & Installation Plan.
c. Internet Subscription: 100 Gbps IP Transit Subscription Plan and IP Transit Policy and Framework Plan
d. Network Segment: IP Addressing, Configuration Plan, etc.

e. NMS: Cross-Connect Plan, Circuit Provisioning, Activation Plan

9.1.4 **Detailed Network Design**

The detailed network design must be composed of Project Description, Conceptual National Network Design, and Work Methodology

9.2 **Detailed Work Plan**

The Winning Bidder must provide a detailed implementation schedule for the design, delivery, installation, testing, commissioning, acceptance, and other related activities, including the following:

9.2.1 Project Implementation Plan showing the two hundred (200) calendar day period from Notice to Proceed to Ready for Service (RFS) in MS Project Gantt Chart. The Winning Vendor must identify the Critical Path of the Gantt Chart.

9.2.2 Detailed Installation Schedule for Optical Transport Equipment, Transponder/Muxponder, FOC segments, lay of manholes, handholes, telecommunication poles, cable entrance facilities, Gensets, battery banks, and rectifier, etc.

9.2.3 Detailed Supply and Delivery Schedule showing (i) offshore manufacturing of equipment, FOC materials, and their corresponding hardware, kits, and accessories, (ii) local fabrication of manholes, handholes, telecommunication poles, cable trays, cable ladders, etc. (iii) air freight and customs duties, and (iv) delivery to site.

9.2.4 Detailed Test Plan, Inspection and Acceptance Plan

9.3 **Technical Documents**

9.5.1 Technical Specifications of Transponder/ Muxponder, Power System, DWDM/ROADM, Line Amplifier, and Network Management System (NMS).

9.5.2 Mechanical and Electronics Specifications

9.5.3 User and Maintenance Manuals

9.5.4 Material Specifications of FOC, 7-Way Micro ducts, ODF, Patch Panels, Optical Patch Cords, etc.

9.5.5 Installation Standard Practices including Safety Considerations, Construction Safety and Health Program (CSHP), Occupational Safety and Health Program, etc.

9.4 **As-Built Plans and Test Result**

9.4.1 Optical Transport Network and NMS

Network Plan, Equipment Layout Plan, Equipment Rack & Shelf Plan, Cable Layout Plan, Electrical Plan, Cross-Connection Plan, Support Facility Plan, etc.

9.4.2 Fiber Optic Cable Build

Cable Layout/Route Plan, Splice Plan, ODF Port Assignment and Layout Plan, Cable/Fiber Stub Plan, 7-Way HDPE Microduct Plan, Utility (MH, HH, Poles, Splice Points) Coordinates, Cable Entrance Facilities Plan, etc.

9.4.3 Transponder / Muxponder and NMS

Network Plan, Equipment Layout Plan, Equipment Rack & Shelf Plan, Cable Layout Plan, Electrical Plan, Cross-Connection Plan, Support Facility Plan, etc.

9.4.4 IP Transit (End-to-End Connectivity Plan, etc.)

9.5 **Reports and Documentation for Maintenance Work**

The Winning Bidder must submit the following reports / plans:

9.5.1 Preventive and Maintenance Plan
9.5.2 Monthly submission of maintenance report
9.5.3 Incident report, in case of problems
9.5.4 Inventory of Installations and Maintenance Materials
9.5.5 Actual Accomplishment Report
9.5.6 OSH Zero Accident Program Daily Report
9.5.7 Other reports required by DICT

9.6 **Delivery of Technical Documents**

9.6.1 The Winning Bidder must provide a hard and soft copy of the technical documents, detailed network design, technical specifications, and other Project documentation to the DICT NBP Project Management Office in the approved format.

9.6.2 The Winning Bidder must submit to the DICT NBP Project Management Office the Installation and Construction Plans

at least fifteen (15) calendar days before the conduct of installation and/or construction works.

9.6.3 The Winning Bidder must submit to the DICT NBP project management office the Detailed Work Plan within fifteen (15) calendar days upon receipt of NTP.

9.6.4 The Winning Bidder must submit to the DICT NBP project management office the Engineering Plans within thirty (30) calendar days upon receipt of NTP.

9.6.5 The Winning Bidder must submit to the DICT NBP project management office the Technical Plans within thirty (30) calendar days upon receipt of NTP.

9.6.6 The Winning Bidder must submit to the DICT NBP project management office the As-Built Plans and Test Results within thirty (30) calendar days of work completion. The Winning Bidder must sign and seal the as-builts of Engineering and Construction Plans.

9.6.7 The Winning Bidder must submit to the DICT NBP project management office the Test Plan, Inspection, and Pre-Acceptance Test (PAT) plan within thirty (30) calendar days upon receipt of NTP.

9.6.8 The Winning Bidder must submit to the DICT NBP project management office the Training Plan within forty-five (45) calendar days upon receipt of NTP.

9.6.9 The Winning Bidder must submit to the DICT NBP project management office the Maintenance Work Documentation and other Reports as early as needed.

1. PURPOSE

The purpose of the Minimum Performance Specifications and Parameters ("MPSP"), among others, is to:

a) Establish the minimum standards and parameters that the Winning Bidder must comply under the Contract Agreement with BCDA for the Design and Build of the Project, following Annex "G" Guidelines for the Procurement and implementation of Contracts for Design and Build Infrastructure Projects of the Revised Implementing Rules and Regulations of RA 9184;
b) Ensure compliance of the Winning Bidder in adopting Engineering and other Technical Guidelines;
c) Provide a quantifiable and verifiable basis for physical progress as the basis for claims for payments of the Winning Bidder, in accordance with the standards accounting and auditing rules and regulations of BCDA and DICT.

The Scope of Work of the Project essentially covers the Design and Build of the National Fiber Backbone Phase 1 provided on the Terms of Reference.

2. MINIMUM PERFORMANCE SPECIFICATIONS AND PARAMETERS

2.1 Component 1: Fiber Optic Cable Build

2.1.1 The objectives of the Fiber Optic Cable Build component are:

- To **enable access of broadband internet connections** at selected locations for LGUs in the central and northern parts of Luzon by the 3rd Quarter of 2021;
- To extend and distribute 100Gbps of internet speed to designated DICT POPs;
- To ensure that the quality and performance of the FOC are compliant with international standards through a series of testing; and
- To ensure that the micro ducts housing the FOC are durable and free from any leaks.

2.1.2 To achieve the objective above, approximately 310 kilometers of underground FOC shall be established to cascade internet capacity. The 310 kilometers of FOC comprises the 250-kilometer between the Cable Landing Stations, the aggregated 53.44 kilometers of middle mile connection between NGCP nodes and BCDA nodes, and NGCP nodes to DICT nodes.

2.1.3 The sub-activities of the Fiber Optic Build includes the installation of (a) air-blown 144 core mini FOC, (b) 7-way HDPE ducts and (c) air-blown 48 core mini FOC.

2.1.4 **Air-Blown 144 Core mini-FOC**

2.1.4.1 **General Description**. The 144-core mini-FOC must be air-blown into one of the existing and available 16/12mm 7-Way HDPE Microduct of the 250 km Luzon Bypass Infrastructure (LBI). Please refer to Annex C2 - C4 for further details.

2.1.4.2 **Minimum Technical Requirements**

Optical Fiber	❑ must consist of 144 cores of single-mode, low loss cut-off shifted fiber (CSF), glass core, glass cladded fibers complying fully with ITU-T Recommendation G.654.A ❑ listed in "Table 1 ITU-T G.654.A Attributes," released 03/2020 are the recommended value tables ❑ must be supplied and installed with complete accessories and kits
Color Coding	❑ color coding of the loose tubes and the individual fibers must be compliant with TIA 598C
Cable Design	❑ must be designed, manufactured, and packaged so that exposure to the environmental conditions of the Philippines during storage, transport, installation, and operation shall not degrade the physical, transmission, operation, and maintenance characteristics of the cable for **thirty (30) years** ❑ must be compact and lightweight and contain high fiber density to maximize the fiber count available in small cable diameter
Core Filling Compound	❑ all interstices of the cable core must be filled with a suitable filling compound (jelly-filled) and must be capable of halting the ingress of water to the cable core and the transport of water along with the cable core
Loose Tubes	❑ containment must consist of plastic loose tubes and serve as protection to the optical fibers from axial or radial stresses by allowing free movement of the fibers within the tube

Cable Length	❏ supply of duct and aerial cables in nominal lengths of 2.13 kms, 4.190 kms, or 6.25 kms unless stated otherwise ❏ shall state the maximum continuous length of cable that can be delivered; other lengths may be ordered at tender
Cable Marking	❏ cable should bear the following markings: *Property of DICT Philippines* *Manufacturer's Name and Fiber Count* *Date of Manufacture* *Length Marker* *Fiber Type: SM ITU-T G.654A* ❏ completed cable must have sequentially numbered length markers at regular intervals of one (1) meter
Fiber Patch Panels	❏ standard 19" 1U size ❏ connector type: LC/UPC ❏ number of Ports: 144 ❏ with at least six (6) splice cassette/tray accepting up to twenty four (24) fibers per cassette
Patch Cords	❏ LC to LC connector, polish type UPC to UPC ❏ fiber type: Single-mode, 9/125um, ITU-T G.652D ❏ fiber count: Duplex ❏ insertion loss: ≤ 0.5dB ❏ length: 10.0 Meters
FOC Pigtail	❏ single mode, 9/125 um ❏ Tight buffered, 900 um pigtails, 2m length, 12pcs/bag ❏ standard color: TIA-598C color-code specification ❏ connector: LC/UPC
Optical Joint Enclosure	❏ watertight optical joint enclosures must be supplied and installed on FOC joints and/or fiber splices ❏ shall be suitable for installation either in manholes, handholes, concrete or steel poles or in cable rooms ❏ must be suitable for holding and protecting 144 fiber core splices in straight joint and branching applications, must accept a minimum of four (4) mini-FOC cables, and must be designed for air-blown fibers in micro ducts **Note**: Enclosure details are provided in Annex C5
Optical	❏ must design, supply, and install 19" rack-mounted

Distribution Frame	optical distribution frames (ODF) at Baler CLS, Sta. Maria RS, and SFLU CLS with a minimum capacity of 144 cores ❏ shall be modular, high density, ready for future expansion, with a standard and comprehensive range of accessories, hardware and kits, full front and rear access platform, lightweight frame, and with cable and fiber management ❏ shall be equipped with six (6) 24-port fiber patch panels, LC/UPC, complete with pigtail wires, kits, and accessories
Splice Loss Measurement	❏ must not be above 0.1 dB for fusion splices and connectors must have insertion losses of 0.5 dB or less
Maintenance Loop	❏ must be thirty (30) meters of fiber optic cable at existing manholes located along the route with 1 km interval
Other notes	❏ cable configuration, member strength, core wrapping, moisture barrier, internal identification, optical fiber primary coating, and other cable composition and layering are detailed in Annex C5.

2.1.4.3 **Detailed Work**

This section outlines the detailed work to be provided by the Winning Bidder:

2.1.4.3.1 must design, supply, and deliver 144 core mini-FOC, complete with hardware and accessories, to the project site to link the two cable landing stations of DICT. The CLSs are located at Baler, Aurora, and San Fernando, La Union Cable. The total distance of the 16mm/12mm diameter micro ducts is 250km. The length per roll/drum of delivery shall be 4.19km. The FOC Build route is defined in Annex C2-C4;

2.1.4.3.2 must conduct site validation, site staking, etc. along the 250 km Luzon Bypass Infrastructure as required for the detailed Fiber Optic Cable Build Component: design, work familiarization, hazard assessment, and traffic management plan;

2.1.4.3.3 must perform on-reel cable testing to confirm the manufacturer's tests before the installation operation begins;

2.1.4.3.4 must install the cable into one of the existing micro ducts by air-blow using a Blowing Machine;

2.1.4.3.5 must install maintenance loops at existing manholes along the route;

2.1.4.3.6 must join/splice the mini-FOCs on a watertight optical joint enclosure and/or patch panels using Splice Machine;

2.1.4.3.7 must splice, terminate, and label the fibers at the Optical Distribution Frames (ODF) and install the ODF at the following equipment node sites:

- DICT SFLU CLS: San Fernando City, La Union
- DICT Baler CLS: Baler, Aurora
- DICT RS: Sta. Maria, Pangasinan

2.1.4.3.8 must splice fibers following industry standards. During the splicing works, the fiber strand loop with poly-para-phenylene terephthalamide cloth to maintain cleanliness and avoid impurities on the joint. Before splicing activities, the Winning Bidder must submit the Schematic diagram for fiber optics cores splicing assignment reviewed and approved by the DICT;

2.1.4.3.9 must properly terminate and label all spliced and unspliced fiber ends in ODF splice trays or optical joint enclosures;

2.1.4.3.10 must test each fiber link for Optical Power Attenuation/Loss Test, Chromatic Dispersion Test, Polar Mode Dispersion Test, and Spectral Attenuation Test with appropriate test equipment and test instruments;

2.1.4.3.11 must provide valid Calibration Certificates for each test equipment/instrument used;

2.1.4.3.12 must invite the DICT NBP personnel during the Provisional and Final Acceptance Testing of newly installed mini-FOCs;

2.1.4.3.13 must maintain documents of all specifications and activities for record purposes for the duration of the project.

2.1.5 **Air-Blown 48 Core mini-FOC**

2.1.5.1 **General Description**. The 48 core mini-FOC must be blown into one of the 25/21mm of the eight (8) segment 7-Way HDPE micro ducts project. The Winning Bidder must install thirty (30) meters of maintenance loops at manholes installed 1km apart. The total length of FOC per drum of delivery must be 4.19km. The Winning Bidder must splice the dark fibers on watertight optical joint enclosures and must terminate them at the ODF. Refer to *Annex C* for details.

2.1.5.2 **Minimum Technical Requirements**

Optical Fiber	❏ must consist of 48 cores of single-mode, low loss cut-off shifted fiber (CSF), glass core, glass cladded fibers complying fully with ITU-T Recommendation G.654.A. Listed in "Table 1 ITU-T G.654.A Attributes," released 03/2020 are the recommended value tables ❏ must be supplied and installed with complete accessories and kits
Color Coding	❏ color coding of the loose tubes and the individual fibers must be compliant with TIA 598C
Cable Design	❏ must be designed, manufactured, and packaged so that exposure to the environmental conditions of the Philippines during storage, transport, installation, and operation shall not degrade the physical, transmission, operation, and maintenance characteristics of the cable for thirty (30) years ❏ must be compact and lightweight and contain high fiber density to maximize the fiber count available in small cable diameter
Core Filling Compound	❏ all interstices of the cable core must be filled with a suitable filling compound (jelly-filled) and must be capable of halting the ingress of water to the cable core and the transport of water along with the cable core
Loose Tubes	❏ containment must consist of plastic loose tubes and serve as protection to the optical fibers from axial or radial stresses by allowing free movement of the fibers within the tube

Cable Length	❏ must install thirty (30) meters of maintenance loops at existing manholes located along the route with 1 km interval ❏ shall supply duct and aerial cables in nominal lengths of 2.13km, 4.190km, or 6.25km unless stated otherwise ❏ shall state the maximum continuous length of cable that can be delivered. Other lengths may be ordered at tender.
Cable Marking	❏ cable should bear the following markings: *Property of DICT Philippines* *Manufacturer's Name and Fiber Count* *Date of Manufacture* *Length Marker* *Fiber Type: SM ITU-T G.654A* ❏ completed cable must have sequentially numbered length markers at regular intervals of one (1) meter
Fiber Patch Panels	❏ Standard 19" 1U size ❏ Connector type: LC/UPC ❏ Number of Ports: 144 ❏ With at least six (6) splice cassette/tray accepting up to 24 fibers per cassette.
Patch Cords	❏ LC to LC connector, polish type UPC to UPC ❏ Fiber type: Single-mode, 9/125um, ITU-T G.652D ❏ Fiber count: Duplex ❏ Insertion loss: ≤ 0.5dB ❏ Length: 10.0 Meters
FOC Pigtail	❏ Single mode 9/125 um ❏ Tight buffered, 900 um pigtails, 2 m. length, 12pcs/bag ❏ Standard color: TIA-598C color-code specification ❏ Connector LC/UPC
Optical Joint Enclosure	❏ watertight optical joint enclosures must be supplied and installed on FOC joints and/or fiber splices ❏ shall be suitable for installation either in manholes, handholes, concrete or steel poles or in cable rooms ❏ must be suitable for holding and protecting 48 fiber core splices in straight joint and branching applications, must accept a minimum of four (4) mini-FOC cables, and must be designed for

	air-blown fibers in micro ducts **Note**: Enclosure details are provided in Annex C5 - *FOC Closure*
Optical Distribution Frame	❏ must design, supply, and install 19" rack-mounted optical distribution frames (ODF) at the project sites listed below with a minimum capacity of 48 cores ❏ shall be modular, high density, ready for future expansion, with a standard and comprehensive range of accessories, hardware and kits, full front and rear access platform, lightweight frame, and with cable and fiber management ❏ shall be equipped with two (2) 24-port fiber patch panels, LC/UPC, complete with pigtail wires, kits, and accessories ❏ project sites with ODF supply and installation works are as follows: ○ BCDA SFLU Poro Point Management Corporation ○ BCDA Baguio Camp John Hay ○ BCDA National Government Administrative Center ○ BCDA Clark Freeport Zone ○ NGCP Bacnotan ○ NGCP Bantay ○ NGCP Laoag ○ NGCP San Esteban ○ NGCP Cabanatuan ○ NGCP Concepcion ○ NGCP La Trinidad ○ NGCP Clark ○ NGCP Bauang ○ NGCP Subic ○ NGCP Araneta ○ NGCP Balingueo ○ NGCP Mexico ○ NGCP Hermosa ○ NGCP Olongapo ○ NGCP San Jose ○ DICT SFLU_CLS ○ DICT NGDC3 ○ DICT Roces ○ DICT Baguio PoP
Other notes	❏ cable configuration, member strength, core wrapping, moisture barrier, internal

	identification, optical fiber primary coating, and other cable composition and layering are detailed at *Annex C5*.

2.1.5.3 **Detailed Work**

This section outlines the detailed work to be provided by the Winning Bidder:

2.1.5.3.1 must design, supply, and deliver 48core mini-FOC complete with hardware and accessories to the project site. The length per roll/drum of delivery shall be 4.19km;

2.1.5.3.2 must conduct site validation, site staking, etc. along the eight (8) segments of the FOC Build route as required for the detailed design, work familiarization, hazard assessment, and traffic management plan. FOC Build route is defined *in Annex C1.1;*

2.1.5.3.3 must perform on-reel cable testing to confirm the manufacturer's tests before the installation operation begins;

2.1.5.3.4 must install the cable into one of the micro ducts by air-blow using a Blowing Machine;

2.1.5.3.5 must install thirty (30) meters of maintenance loops at every manhole along the fiber route installed 1km apart;

2.1.5.3.6 must join/splice the mini-FOCs on watertight optical joint enclosures and/or patch panels using Splice Machine. Splice loss measurement must not be above 0.1 dB for fusion splices and connectors must have insertion losses of 0.5 dB or less;

2.1.5.3.7 must properly terminate and label all spliced and unspliced fiber ends in ODF splice trays or optical joint enclosures;

2.1.5.3.8 must install the ODF at the following equipment node sites:

- BCDA Baguio Camp John Hay
- BCDA SFLU Poro Point Management Corporation
- BCDA National Government Administrative Center

- BCDA Clark Freeport Zone
- NGCP Bacnotan
- NGCP San Esteban
- NGCP Bantay
- NGCP Laoag
- NGCP Cabanatuan
- NGCP Concepcion
- NGCP La Trinidad
- NGCP Clark
- NGCP Bauang
- NGCP Subic
- NGCP Araneta
- NGCP Balingueo
- NGCP Mexico
- NGCP Hermosa
- NGCP Olongapo
- NGCP San Jose
- DICT SFLU_CLS
- DICT NGDC3
- DICT Roces
- DICT Baguio PoP

2.1.5.3.9 must blow, splice, and terminate the 48core cable from ODF to the optical joint enclosure installed at the service manhole of the following equipment node locations:

- NGCP Bacnotan
- NGCP Balingueo
- NGCP Mexico
- NGCP Hermosa
- NGCP Olongapo
- NGCP San Jose
- NGCP San Esteban
- NGCP Bantay
- NGCP Laoag
- NGCP Cabanatuan

2.1.5.3.10 must test each fiber link for Optical Power Attenuation/Loss Test, Chromatic Dispersion Test, Polar Mode Dispersion Test, and Spectral Attenuation Test with appropriate test equipment and test instruments;

2.1.5.3.11 must provide valid Calibration Certificates for each test equipment/instrument used;

2.1.5.3.12 must invite the DICT NBP personnel during the Provisional and Final Acceptance Testing of newly installed mini-FOCs;

2.1.5.3.13 must maintain documents of all specifications and activities for record purposes.

2.1.6 **7-Way HDPE Microduct**

2.1.6.1 **General Description**. The Winning Bidder must construct the eight (8) fiber optic cable route underground segments with 7-Way HDPE Micro ducts, twenty-six (26) cable entrance facilities, manholes, handholes, and telecommunication poles. The length of the 7-Way Micro ducts per drum of delivery must be 1000m. Refer to Annex C for FOC Build segment routes.

2.1.6.2 **Minimum Technical Requirements**

MICRODUCTS	
General Requirements	❑ suitable for the installation of air-blown mini-FOCs ❑ all micro ducts stubs must be properly capped to prevent water, mud, dirt, and foreign material ingress ❑ assemblies of micro ducts must have a thick outer sheath of HDPE that is easily removed when splicing or branching
Materials	❑ made of high-density polyethylene (HDPE) and have a low friction inner surface for best blowing performance ❑ Temperature Range to EN 60794-1-22-F1: Installation: -10°C to +50°C, Operation: -40°C to +70°C, Storage -40°C to +70°C ❑ Outer diameter (OD): 25 ± 0.3 mm ❑ Inner diameter (ID): 21 ± 0.3 mm ❑ Ovality: max. 5% ❑ Inner coefficient of friction: max. 0.1 ❑ Visual examination: free from defects ❑ Crush resistance: min. 1500 kPa ❑ Impact strength: no cracks, impact energy 132J, -18° C, 10 samples ❑ Thermal expansion: *1.6*10-4 K-1 ISO 11359-2 (-20°C to +70°C)

	❏ Longitudinal reversion: max. 3% ČSN EN ISO 2505 ❏ Weight: 140 kg/km ❏ Installation tensile force: max. 2500N ❏ Minimum bending radius: 250 mm ❏ Blowing pressure max.: 10 bar ❏ Wall thickness (WT): min. 2.0 mm ❏ Color-coding: TIA-598C ❏ 7-Way micro duct assembly arrangement: Center Microduct – Blue, Outer Six (6) Micro ducts – arranged sequentially clockwise as Orange, Green, Brown, Slate, White, and Red. ❏ Outer sheath thickness: 3.0 mm HDPE ❏ Outer sheath color: Orange
Hardwares and Accessories	❏ must have appropriate hardware and accessories for a watertight installation of the eight (8) segments of the 7-Way HDPE Micro ducts
CABLE ENTRANCE FACILITIES (CEF)	
General Requirements	❏ shall be constructed within the property line to accommodate the entrance and termination of FOC to the ODF of the project site's equipment room . The 7-Way Micro ducts are connected from the service manhole to the entrance ducts of the cable room and terminating to the ODF of the equipment room via indoor cable trays and ladders
Service Manholes	❏ must be constructed adjacent to the property line of BCDA, NGCP, or DICT ❏ plan and section view drawings of service manholes are similar to the specifications of manholes as shown in Annex C5
Service Entrance Conduits	❏ the 7-Way Micro ducts must be installed, laid, and terminated from the ports of the service manhole to the ports of the entrance ducts of the cable room
Handholes	❏ handhole/s between the service manhole and entrance ducts are required especially for 90-degree bends ❏ refer to Annex C for specifications

Earthing System	❏ an earthing system at project sites must be designed, supplied and installed following the grounding recommendations of the Philippine Electrical Code ❏ maximum earth resistance requirement of the project from the main busbar is five (5) ohms. The three-point method or fall off potential testing is recommended for measuring resistance to earth or the IEEE Standard 81: Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Grounding System.
Hardwares and Accessories	❏ must install plastic bushings on all spare parts of the service manholes, handholes, and entrance ducts while micro duct plugs shall be properly capped on each of the seven (7) micro ducts stub ends to prevent water, mud, and dirt ingress ❏ cable ladders and cable trays must be 3-8 mils thickened galvanized steel and installed from the entrance ducts of the cable room to the optical distribution frame of the equipment room ❏ cable ladders and cable trays must be earthed via ground busbars with maximum resistance to earth of five (5) ohms
MANHOLES, HANDHOLES AND TELECOMMUNICATION POLES	
General Requirements	❏ must be made of reinforced concrete structure (load-bearing type) constructed at the fabrication site following the plan and section drawings specified on Annex C5 ❏ strength of the manhole, handhole, and telecommunication pole must be sufficient for the intended use and shall conform to ASTM C478, and ASTM A615 Grade 60. ❏ Structural calculations and detailed design drawings to verify the strength of each size of manhole, handhole, and telecommunications pole shall be submitted by the Winning Bidder for Type Approval
Hardwares and Accessories	❏ Manhole and handhole shall be fully equipped with the full complement of hardwares and accessories such as pulling

	eyes, ladder, ladder support, cable brackets, earthing system, cover, etc, ❑ Telecommunication poles shall be fully equipped with pole hardware, 4" dia. Schedule 40 GI Pipe, Steel U-Guard, etc.

2.1.6.3 **Detailed Work**

This section outlines the detailed work to be provided by the Winning Bidder:

2.1.6.3.1 must conduct a site survey, FOC Build route validation, soil investigation, site staking, and other pre-construction works along the eight (8) FOC Build routes and twenty-six (26) cable entrance facilities as required for the detailed design, work familiarization, hazard assessment, and traffic management plan. FOC Build route is defined in Annex C;

2.1.6.3.2 must provide to the DICT all prerequisites, requirements, and essential in securing the appropriate permits;

2.1.6.3.3 shall, in coordination with the DICT, secure the necessary right-of-way (ROW) and permits in the name of DICT or such proper entity as may be allowed. The Winning Bidder shall handle all ROW and permit requirements including processing of documents, conduct of consultations, submission of reports, and payment of fees, and similar tasks. The term, "permits" include those from DPWH, DENR, LGUs, SUDECO, MACEA, etc. (application or renewal, whichever is applicable), access/gate pass from DICT, BCDA, NGCP, etc. and licences to undertake the work necessary for the execution of this FOC Build;

2.1.6.3.4 must abide and comply with the terms and conditions specified in the permits, access/gate pass, licenses obtained from said authorities, agencies, and entities;

2.1.6.3.5 must design, supply, deliver, haul reels of 7-Way HDPE micro ducts, manholes, handholes, and telecommunication poles complete with their respective hardware, kits, and accessories to the project site;

2.1.6.3.6 must install the 7-Way HDPE Microduct assembly along the eight (8) FOC Build routes based on the

Direct Buried Installation approach and must build a cable entrance facility (CEF) at the twenty-six (26) project sites specified in Section 2.1.6.3.14;

2.1.6.3.7 **On Direct Buried Installations**: The Winning Bidder must utilize the appropriate equipment and machinery for test pits, excavation, trenching, laying of micro ducts, placement of warning tapes, compaction, and restoration work. The Winning Bidder must install the micro ducts at a 1.2-meter depth trench;

2.1.6.3.8 **On Shallow Trench (reinforced concrete) Installations**: The Winning Bidder must utilize the appropriate equipment and machinery for test pits, excavation, trenching, laying of conduits, compaction, and restoration works. The Winning Bidder must install the micro ducts encased with reinforced concrete as protection;

2.1.6.3.9 **On HDD Works at City proper, road/railroad crossings, concrete road shoulder, in front of business establishments, bridge crossings, ditches/flood canals, and other roads that open trenches are not allowed or restricted by the LGU, DPWH, and other agencies, organizations, and associations**: The Winning Bidder must protect the micro ducts with a single-run 4" diameter PVC/HDPE pipe and use of HDD machine for installation;

2.1.6.3.10 **On Bridge and Culvert Attachment**: The Winning Bidder must encase the micro ducts with a seamless, Schedule 40, 4" diameter G.I. pipe. The Winning Bidder must use galvanized steel hangers, painting works, appropriate equipment, and machinery, and other necessary bridge or culvert approach, rip-rap, and restoration activities to complete the installation works;

2.1.6.3.11 **On Manhole Installation**: The Winning Bidder must install manholes on approved utility corridors complete with hardware and accessories. The Winning Bidder must keep the duct ports watertight to minimize the ingress of water, mud, and dirt into the conduits;

2.1.6.3.12 **On Handhole Installation**: The Winning Bidder must install handholes at 90 degree bends inside the property line. The Winning Bidder must plug the ports

with appropriate plastic caps to prevent the ingress of water, mud, and dirt into the conduits;

2.1.6.3.13 **On Telecommunication Pole Installations**: The Winning Bidder must install one (1) ten (10) meter telecommunication pole at road sidewalk (open spaces allowed by LGUs and DPWH) nearest to the project site's service manhole (SMH), and one (1) GI pipe 4" diameter, Schedule 40, 3 meter GI Pipe. The Winning Bidder must securely install and fasten the pipe into the telecom pole. The Winning Bidder must install an underground 4" PVC/HDPE telecom pipe connecting the SMH and the pipe. Pipe ends must be securely plugged/capped to prevent the ingress of water, mud, and dirt. The installation sites are as follows:

- NGCP Bacnotan
- NGCP Balingueo
- NGCP Mexico
- NGCP Hermosa
- NGCP San Jose
- NGCP Olongapo
- NGCP San Esteban
- NGCP Bantay
- NGCP Laoag
- NGCP Cabanatuan
- DICT SFLU_CLS
- DICT Baler CLS

2.1.6.3.14 **On Cable Entrance Facilities**: The Winning Bidder must include the construction of cable entrance facility at the following twenty-six (26) project sites:

- BCDA Baguio Camp John Hay
- BCDA SFLU Poro Point Management Corporation
- BCDA National Government Administrative Center
- BCDA Clark Freeport Zone
- NGCP Bolo
- NGCP Nagsaag
- NGCP Bacnotan
- NGCP San Esteban
- NGCP Bantay
- NGCP Laoag
- NGCP Cabanatuan
- NGCP Concepción
- NGCP La Trinidad
- NGCP Clark
- NGCP Bauang

- NGCP Araneta
- NGCP Balingueo
- NGCP Mexico
- NGCP Hermosa
- NGCP Olongapo
- NGCP San Jose
- DICT Baler CLS
- DICT La Union CLS
- DICT NGDC3
- DICT Roces
- DICT Baguio PoP

2.1.7 **Optical Test Equipment**

2.1.7.1 **General Description**: The Optical Test Equipment must be supplied and delivered by the Winning Bidder to DICT NBP. The equipment is for the use of DICT Field Personnel and shall conform to the requirements provided below.

2.1.7.2 **Minimum Technical Requirement**

Optical Time-Domain Reflectometer (OTDR)	❑ all-in-one built-in OTDR, Light Source, Optical Power Meter, and Visible Light Source ❑ Fiber Visualizer display graphical summary of fiber status and Pass/Fail results ❑ Actual trace event displayed with the ability to quickly switch between the Trace view and Visualizer view ❑ OTDR Range: at least 100-250km ❑ Supports Single Mode fiber 1310 nm/1550 nm/1625 nm wavelengths ❑ User replaceable OTDR and Power Meter ports (FC/UPC, SC/UPC, ST/UPC and LC/UPC) connectors ❑ USB Ports for data transfer/remote control, memory stick, and printer
All-in-one unit Optical Power Meter (OPM) and Optical Light Source (OLS)	❑ Supports Single Mode (SM) [1310 nm/1550 nm] and Multi-Mode (MM) [850 nm/1300 nm] fiber ❑ Compact and lightweight ❑ Measures +23 dBm maximum optical power ❑ Battery (dry cell) operation ❑ Connector type: User replaceable (FC/UPC, SC/UPC, ST/UPC and LC/UPC) connectors

2.1.7.3 **Detailed Work**

This section outlines the detailed work to be provided by the Winning Bidder:

2.1.7.3.1 The Winning Bidder must supply, deliver, and transfer ownership of two (2) units of OTDR and two (2) units of All-In-One OPM/OLS test instruments to DICT NBP at Judge Juan Luna DICT Office, Quezon City;

2.1.7.3.2 The Winning Bidder must include the instrument's Warranty Certificates and Calibration Certificates on the delivery.

2.1.8 **Spare Deliverables**

2.1.8.1 **General Description**: This section is provided to guide the Winning Bidder on the minimum spare materials required as part of its deliverables and shall conform to the requirements provided below.

2.1.8.2 **Minimum Requirements**

This Winning Bidder must supply and deliver to DICT designated site or warehouse the following materials:

ITEM	DESCRIPTION	QUANTITY	UNIT
1	48 cores, mini-FOC, SM, 1550nm, air-blown fiber, ITU-T G.654A, 4.19km/drum	1	drum
2	144 cores, mini-FOC, SM, 1550nm, air-blown fiber, ITU-T G.654A, 4.19km/drum	3	drums
3	Fiber Optic Joint Enclosure, 48F, horizontal, underground applications, watertight, with kits and accessories	6	set
4	Patch Cords (LC/LC), UPC, 3m length, 2mm diameter	50	pcs
5	Pigtails (SM) – LC/UPC Connector	50	pcs

6	Underground HDPE 7-Way Microduct, 1km/drum, with kits and accessories	1	drum
7	Fiber Optic Joint Enclosure, 144F, horizontal, underground applications, watertight, with kits and accessories	12	set

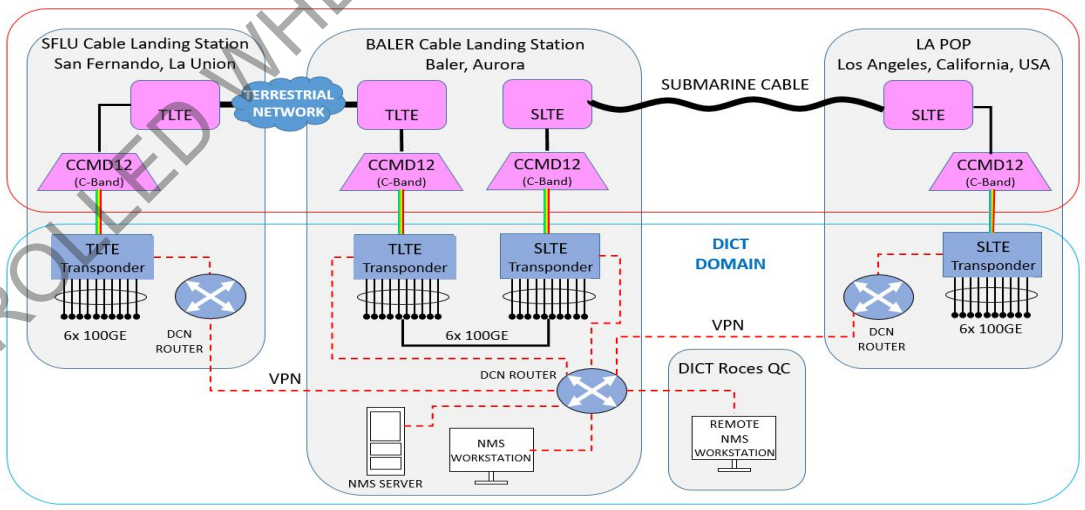
2.1.8.3 **Detailed Work**

This section outlines the detailed work to be provided by the Winning Bidder:

2.1.8.3.1 The Winning Bidder shall provision for sufficient in-country pool of spares for Spare Parts exchange within twenty-four (24) hours in times of non-availability of Spare Parts at DICT side due to non-repair or non-arrival of repaired equipment at DICT's premises;

2.1.8.3.2 Spares must be transported by the Winning Bidder to DICT designated sites or warehouses after delivery acceptance.

2.2 Component 2: Transponder



Proposed Network Architecture indicating DICT's Transponder / Muxponder, Data Communication Network (DCN) and Network Management System (NMS)

2.2.1 The objectives of the Transponder component are:

- To transmit the internet capacity from offshore to its

termination point at the Optical Transport Network component.

- To create international direct access to cheap internet in mainland USA, which will then be used to distribute the content to DICT's national backbone network down to the government beneficiaries of the Project.
- To install the transponder/muxponder system in Baler cable landing stations, San Fernando Cable Landing Stations, and in the Equinix LA4 Data Center, California USA.
- To ensure that the transponders/muxponder system is monitored around the clock, a working data communication network and its network management system will be commissioned on this scope of work.

2.2.2 **Transponder / Muxponder System**

2.2.2.1 **General Description:** The required DICT Transponder / Muxponder system, as an integral part of the bigger system of the Submarine Line Terminal Equipment (SLTE) is prescribing a technology set for transponder / muxponder equipment to be used on the PLCN System. The Submarine Line Terminal Equipment (SLTE) system must support a modular and flexible architecture to allow scalability of the equipment following the future network requirements.

The scope will enable a bandwidth equivalent of 600 Gbps or 6 x 100Gbps spectral channels between San Fernando Cable Landing Station – Equinix LA4 California, U.S.A. link via Baler Cable Landing Station by installing, configuring, powering up, commissioning, testing, provisioning, and integrating the Transponder / Muxponder system utilizing the Submarine Line Terminal Equipment (SLTE) international submarine cable system.

2.2.2.2 **Minimum Technical Requirements**

- The System must comply with the International Telecommunication Union Telecom Sector (ITU-T), and Manufacturers Best Practices Standard
  - ITU-T Rec.G.652 Characteristics of a single-mode optical fiber and cable
  - ITU-T Rec.G.655 Characteristics of a non-zero optical fiber and cable
  - ITU-T Rec. G.709 Interfaces for the optical transport network (OTN)

- The equipment must support redundant / field-replaceable power supply and fan units and traffic interface cards.

- The Transponder/Muxponder must support C – Band with a minimum line rate of 100Gb/s and reach up to 14,000 km.

- The Transponder/Muxponder module must support up to eight (8) QSFP28 ports of 100Gb/s client interfaces per slot.

- To simplify long-term operations and maintenance and network upgrades in the future, it is required that equipment conforming to the following specifications be used:

    - only wavelengths conforming to 35.5 or 95 Gbaud as single channels;
    - due to space limitations each chassis should accommodate 100G up to 250G waves in 1RU for 35.5Gbaud rate or 200G up to 800G in 2RU for 95 Gbaud rate; and
    - transponder must support Service Photonic Layer Interoperability (SPLI) with the planned Submarine Line Terminal Equipment as its native communications protocol.

2.2.2.3 **Detailed Works**

- The DICT Project Management Team representative(s) must conduct a site survey in Baler, Aurora, and San Fernando, La Union Cable Landing Station, Equinix LA4 Data Center in L.A. USA, and DICT Roces in Quezon City. The Winning Bidder will submit the design proposal based on the result of the site survey end-user review, comments, and revisions request before the design approval;

- The Winning Bidder must provide the technical documents, detailed network design, method of procedure, technical specifications, and other related documentation.

- The Winning Bidder together with DICT representatives shall witness and perform Factory Acceptance Test (FAT), Pre-inspection delivery and on-site delivery inventory of the

transponder/muxponder, complete lists of installation accessories at no cost to DICT to ensure completeness of the materials.

- The Winning Bidder must propose an alternative procedure **to be reviewed and subject to approval by the DICT Project Management Team** in the event where travelling such as but not limited to the ongoing pandemic for the onshore and offshore inspection delivery of materials on site, acceptance, other project implementation, and support activities.

- The Winning Bidder shall perform the delivery, installation, power-up, commissioning, acceptance, and integration to be approved by DICT Project Management Team for all transponder/muxponder system, its materials, and installation accessories in Equinix LA4, Data Center, Baler, and San Fernando Cable Landing Stations in the Philippines at no cost to DICT. The Winning Bidder must replace and shoulder any missing or incomplete lists of materials at no cost from DICT.

- The Winning Bidder shall supply, provision, and perform termination of patch cords/pigtails and other interconnections from Submarine Line Terminal Equipment (SLTE) room to Transponder/Muxponder equipment room via the meet me room.

- The Winning Bidder shall install cross-connects in San Fernando and Baler Cable Landing Stations in the Philippines and Equinix LA4 Data Center in California, U.S.A. between the Transponder / Muxponder line interface card to the Submarine Line Terminal Equipment (SLTE) CCMD12 cards and other connectivity requirements to activity a working transponder / Muxponder System.

- The Winning Bidder shall install fiber cable trays, ladders, and spooler from SLTE equipment room to Transponder/Muxponder equipment room at Equinix LA4 Data Center, Baler, and San Fernando Cable Landing Stations in the Philippines.

- The Winning Bidder shall install Optical

Distribution Frame (ODF), Cabinet or Racks, for Transponder/Muxponder equipment client interfaces on all stations.

- The Winning Bidder shall ensure proper cable installation, grounding, equipment labeling, and grooming to be approved and inspected by the end-user during the acceptance tests.

- The Winning Bidder shall ensure a working transponder / muxponder links between Equinix LA4 Data Center, USA, Baler, and San Fernando Cable Landing Stations in the Philippines by performing, traffic provisioning, local node testing, link testing, stability test, and other additional testing procedure that will be required by the end-user.

2.2.3 **Power System**

2.2.3.1 **Minimum Technical Requirements**

- The Winning Bidder must submit a proposed working rectifier design system, according but not limited to AC Supply, Battery Charging, Control and Monitoring, Temperature Control, Low Voltage Disconnect, Battery Protection, Load Distribution, System Sizing, and other parameter requirements to the end-user for review and approval.

- The main and redundant power systems should support a DC output range of -40 Vdc to -72 Vdc at San Fernando and Baler Cable Landing Stations, and Repeater Station in Sta, Maria, Pangasinan for Transponder/Muxponder System, DWDM Systems and other peripheral devices on this project.

- The Winning Bidder must supply a power system that can support future expansion of the DICT Transponder System at a minimum of 2Tbps hardware configuration set-up, and a minimum DWDM power load of four (4) kilowatts at San Fernando, Baler Cable Landing Station, and Sta. Maria Repeater Station.

- The AC input terminal should be equipped with

surge protection devices to meet the requirement of Class-C surge protection. AC input of either 220V single phase or 110V dual wire. AC input voltage range is 100V – 264V.

2.2.3.2 **Detailed Work**

- The Winning Bidder scope includes power tapping of Transponder/Muxponder, DWDM Equipment for Main and redundant rectifier system at (1) San Fernando and (2) Baler Cable Landing Stations and (3) Sta. Maria Repeater Station.

- The Winning Bidder must provide the technical documents, detailed network design, method of procedure, technical specifications, and other related documentation.

- The Winning Bidder shall be responsible for transporting, installing, and commissioning the Power System on all sites.

2.2.4 **Network Management System (NMS)**

2.2.4.1 **Minimum Technical Requirements**

- The Winning Bidder shall provide the NMS to monitor the transponder / muxponder system with the minimum technical specifications and functions below:
    - Web browser-based thin client
    - Rich visualization using HTML 5 and the latest UX/UI tech
    - PM collection & viewing
    - NE backup and restore operation
    - Software and Hardware inventory option
    - Alarm and PM Management / Co-relation
    - Single Sign-On and Centralized User Management
    - 5 levels of user rights for NE and NMS Server

- Minimum Intel 2.3Ghz 16 Core. 64GB Memory, 3x 800GB SSD CPU

- Flat or curved monitor with a minimum aspect ratio of 16:9, DisplayPort, or DMI, or USB-C

2.2.4.2 **Detailed Work**

- The Winning Bidder shall perform hardware and software installation and commissioning of NMS Main Server in Baler Aurora CLS and Client Desktop Application in DICT Roces in Quezon City. Installation of Remote Operator NMS workstation in Baler CLS and DICT Data Roces in Quezon City for provisioning, fault detection, and management of the network elements.

- The Winning Bidder shall install client software applications to operations team laptops for mobile or remote monitoring of the system.

- In the case where transponder/muxponder and DWDM are of the same brand, the monitoring will be integrated to the DWDM NMS with all the necessary licenses to maintain, operate, and perform remote activities on the transponder/muxponder. This will create a single monitoring system for both transponder/muxponder and DWDM of the same brand.

2.2.5 **Data Communication Network**

2.2.5.1 **Minimum Technical Requirements**

- The Winning Bidder shall provide the working DCN network design shall comprise the Out of Band connectivity of the data communications network routers, located at Equinix LA4, Data Center USA, Baler and San Fernando Cable Landing Station in the Philippines.

    - The Internal DCN must provide the connectivity between the Gateway Network Elements (GNE's), subtended Network Elements (NE's) and between SFLU and Baler Cable Landing Stations, and Equinix LA4. The DCN must be part of the Network Management System of the DICT Transponder/Muxponder System.

- The Winning Bidder shall provide all the hardware and necessary software required to realize the outband DCN connectivity requirement including the internet subscription.

- The Winning Bidder must submit the hardware and software configuration network build and design.

2.2.5.2 Detailed Work

- The Winning Bidder shall ensure a working data communication network that will manage DICT Transponder / Muxponder equipment installed at Equinix LA4 Data Center in California USA, Baler and San Fernando Cable Landing Station in the Philippines.

- The Winning Bidder shall supply all necessary hardware and software for the installation, commissioning, and configuration of DCN routers for Out-of-band DCN of Transponder / Muxponder NMS at Baler and San Fernando Cable Landing Station in the Philippines, and Equinix LA4 Data Center in California USA.

- The Winning Bidder shall install and connect LAN cables from Transponder/Muxponder management port to DCN routers.

- The Winning Bidder shall perform the configuration of the DCN Routers, Transponder / Muxponder settings to realize the Network Management System connectivity.

- The Winning Bidder shall provision an internet service in Equinix LA4 as part of the DCN requirement to realize the configuration of the transponder network visibility scope.

2.2.6 Test Equipment Sets

2.2.6.1 Minimum Technical Requirements

The Winning Bidder shall provide the following test equipment with the minimum specifications below:

- Two (2) units of Optical Time-Domain Reflectometer (OTDR) test set.
    - Supports Single Mode (SM) [1310 nm/1550 nm] and Multi-Mode (MM) [850 nm/1300 nm] fiber
    - Must be compact and lightweight
    - Measures +23 dBm maximum optical

power
    - Battery (dry cell) operation
    - Connector type: User-replaceable (FC/PC, SC/PC, ST/PC and LC/PC) connectors

- Two (2) units of Optical Power Meter (OPM) test set
    - Supports Single Mode (SM) [1310 nm/1550 nm] and Multi-Mode (MM) [850 nm/1300 nm] fiber
    - Must be compact and lightweight
    - Battery (dry cell) operation
    - Connector type: User-replaceable (FC/PC, SC/PC, ST/PC and LC/PC) connectors

- Two (2) units of Optical Light Source (OLS) test set.
    - Supports Single Mode (SM) [1310 nm/1550 nm] and Multi-Mode (MM) [850 nm/1300 nm] fiber
    - Must be compact and lightweight
    - Battery (dry cell) operation
    - Connector type: User-replaceable (FC/PC, SC/PC, ST/PC and LC/PC) connectors

2.2.6.2 **Detailed Work**

- The Winning Bidder shall be responsible for the supply, delivery, and other logistical requirements including transfer of ownership of the test equipment to be handed over to the end-user.

- The Winning Bidder shall ensure that all test equipment software versions are up to date. The Winning Bidder must do all necessary software updating at no cost to the end-user.

- The Winning Bidder shall demonstrate functional tests requirements of the test equipment based on end-user approved acceptance test protocols.

2.2.7 **Subscription to One (1) Year Transponder/Muxponder, DCN Router Equipment Power, Internet for DCN Utilization Cost, and Remote Hand Support**

2.2.7.1 **Minimum Technical Requirements**

- The DICT Transponder/Muxponder, DCN Router System Remote Hand Support agreement at

Equinix Data Center in LA, CA, USA must have a minimum of three hundred sixty (360) hours within the year related to the operation and maintenance, project implementations, or other activities required by end-user.

- Minimum of 2KVA of Power and 1- Rack space requirement, cross-connects required to realize a working Transponder/ Muxponder system in Equinix LA4 Data Center in the USA.

- 1-year subscription of the internet with a minimum bandwidth of 5Mbps for the out of band management or Data Connection Network (DCN) configuration for the Transponder/Muxponder Equipment at Equinix Data Center in Los Angeles California USA.

2.2.7.2 **Detailed Work**

- The Winning Bidder shall be responsible for all the required subscription and lease costs (One Time Cost, Monthly Recurring Costs) to facilitate the successful delivery, installation, power-up, commissioning, testing, end-to-end or link integration, of the Transponder/Muxponder to the Submarine Line Terminal Equipment (SLTE) at Equinix LA4 Data Center U.S.A.

- The Winning Bidder shall be responsible for the power consumption costs, cross-connect, and port charges costs that will be incurred within the data center facilities during the project implementation to interconnect the transponder to other equipment based on the project design submitted by the Winning Bidder and approved by the end-user.

- The Winning Bidder must assign a Single Point of Contact (SPOC) for all the project implementation and during the Operations and Maintenance of all the facilities under the Remote Hand maintenance scope.

- The Winning Bidder shall provide Remote Hand Support for all project, operations, and maintenance activities of the end-user.

2.2.8 **Spare Deliverables**

2.2.8.1 **Minimum Technical Requirements**

- The Winning Bidder must provide field-replaceable cards, modules which include chassis, power modules, fan units, transponder daughter cards, and other additional peripherals but not limited to the below lists:

SN	DESCRIPTION	UNIT	SFLU	BALER	EQUINIX	STA.MARIA RS
1	Power Cords	PCS	1	1	1	NA
2	4X25G, WDM, SMF, 1310NM, 10 KM QSFP28 / QSFP28-LR4 100GBASE-LR4 QSFP28 1310nm 10km	PCS	1	1	1	NA
3	2X400G 35/56GBAUD EDFA C-Band 8XQSFP28 Module	PCS	1	1		NA
4	2X400G 35/56GBAUD EDFA C-Band 8XQSFP28 Module	PCS		1	1	NA
5	-48 VDC POWER MODULE	PCS	1	1		NA
6	Transponder Chassis Power Modules, CTRL, Fan Modules	SET	1	1	1	NA
7	Base Software Licenses	SET	1	1	1	NA
8	Brackets	SET			1	NA
9	Installation Kits	SET			1	NA
10	Other control subsystems, access panels, and peripherals	SET	1	1	1	NA
11	LC-LC Optical Patch Cords 10M SM/MM 1310nm	PCS	20	20	20	NA
12	LC-LC Optical Patch Cords 20M SM/MM 1310nm	PCS	20	20	20	NA
13	LC-LC Optical Patch Cords 30M SM/MM 1310nm	PCS	20	20	20	NA
14	LC Optical Attenuators 1dB SM/MM 1310nm	PCS	50	50	50	NA
15	LC Optical Attenuators 3dB	PCS	50	50	50	NA

16	LC Optical Attenuators 6dB	PCS	50	50	50	NA
17	LC Optical Attenuators 10dB	PCS	50	50	50	NA
18	Fused 2x2 LC - LC Couplers	PCS	30	30	30	NA
19	Rectifier Module	PCS	1	1		1
20	Slot Fillers	PCS	1	1		1
21	Other peripherals required to maintain the rectifier system	SET	1	1		1

2.2.8.2 **Detailed Work**

- The Winning Bidder shall hand over the spares to the end-user at Baler Aurora and San Fernando CLS.
- The Winning Bidder shall secure the Transponder / Muxponder System spares at Equinix LA4 Data Center and must be securely mounted at the cabinet/rack which will be installed during the project implementation.
- The Winning Bidder shall provision sufficient in-country pool of spares for spare parts exchange within twenty-four (24) hours in times of non-availability of Spare Parts at the DICT side due to non-repair or non-arrival of repaired equipment at DICT's premises.
- The Winning Bidder shall be able to provide other spares required that may arise during the project implementation and warranty support period to maintain DICT's high network availability period during the specific network outage.
- The Winning Bidder must replace any defects or materials found to be faulty at no cost to DICT.
- The Winning Bidder must hand over all approved spares to DICT on or before the Final Acceptance Testing of the transponder system.

2.3 Component 3: Optical Transport Network

2.3.1 The Optical Transport Network will serve as the domestic fiber backbone or "internet highway" of NBP utilizing the existing fiber

infrastructure of NGCP that will carry high capacity, high-speed internet bandwidth.

The objective of the Optical Transport Network is to ensure that the internet capacity is cascaded/distributed to selected provinces under Regions I, III, NCR, and CAR through the designated tapping points.

Item No.	Nodes	Equipment	Provinces
	DICT		
1	DICT Baler CLS	DWDM/ROADM	Quezon
2	DICT SFLU CLS	DWDM/ROADM	La Union
3	DICT NGDC 3	DWDM/ROADM	Zambales
4	DICT Roces	DWDM/ROADM	NCR
5	Repeater Station	DWDM/ROADM	Pangasinan
	NGCP		
6	Araneta	DWDM/ROADM	NCR
7	Diliman	DWDM/ROADM	NCR
8	Balintawak	DWDM/ROADM	NCR
9	Bauang	DWDM/ROADM	La Union
10	Balingueo	DWDM/ROADM	Pangasinan
11	Bolo	DWDM/ROADM	Pangasinan
12	Nagsaag	DWDM/ROADM	Pangasinan
13	La Trinidad	DWDM/ROADM	Benguet
14	Concepcion	DWDM/ROADM	Tarlac
15	Clark	DWDM/ROADM	Pampanga
16	Mexico	DWDM/ROADM	Pampanga
17	San Jose	DWDM/ROADM	Bulacan
18	San Rafael	Fiber-bypass	Bulacan
19	Hermosa	DWDM/ROADM	Bataan
20	Botolan	ILA	Zambales

21	Olongapo	DWDM/ROADM	Zambales
22	Subic	Fiber-bypass	Zambales
23	Cabanatuan	DWDM/ROADM	Nueva Ecija
24	Bacnotan	DWDM/ROADM	La Union
25	San Esteban	DWDM/ROADM	Ilocos Sur
26	Bantay	DWDM/ROADM	Ilocos Sur
27	Currimao	Fiber-bypass	Ilocos Norte
28	Laoag	DWDM/ROADM	Ilocos Norte

2.3.2 DWDM/ROADM Broadband Communication System

2.3.2.1 Minimum Technical Requirements

- Must be equipped with additional 200 Gbps of spectral capacity between DICT Roces and DICT NGDC3.
- Must have 10GE/o add/drop at the DWDM/ROADM nodes and must be scalable up to 10x10GE/o.
- The SFLU CLS DWDM/ROADM node must be equipped to support an initial interconnection speed of 700 Gbps and scalable to a minimum of 2,000 Gbps.
- The 600 Gbps of spectral capacity must be equipped from SFLU CLS to Concepcion and must branch out to 100 Gbps Clark, 50 Gbps each to Bataan, La Trinidad, DICT Roces, and SFLU CLS. All these branches or spokes must be equipped respectively with these speeds.
- The initial power requirement must serve the initial capacity of the network. The expected growth rate is 10-20% per annum.
- Must support Flex Grid functionality and installed or enabled in Phase 1 implementation.
- Must support a hitless upgrade to CDF (Colorless, Directionless, Flexible Grid) functionality. Upgrading of the System to CDF must not disrupt

any existing services nor introduce changes to any existing interfaces in operation, nor require a forklift upgrade.

- Must support upgrade to Contentionless functionality

- The System must support modular, flexible architecture, and converged platforms to allow scaling of equipment following the network requirements.

- All traffic affecting common equipment must be redundant.

- The System must support line protection and client protection.

- System control and power supply must support 1+1 hot standby protection.

- The equipment delivery shall be based on the approved network design of DWDM/ROADM and Amplifier System including installation materials, required peripherals, and other ancillary materials/facilities.

- For additional technical specifications of the DWDM/ROADM Broadband Communication System, please refer to *Annex B10*.

2.3.2.2 **Detailed Work**

- The Winning Bidder must conduct site surveys/validation of 23 NGCP Substations and 5 DICT sites required for the detailed design, all following the International Telecommunications Union Telecommunication Sector (ITU-T) and best practices, subject to the terms and conditions of the Contract and applicable provisions of Republic Act (RA) 9184 and its Revised Implementing Rules and Regulations (IRR).

- The Winning Bidder is required to complete the site validation and detailed network design and other necessary tasks within forty-five (45) calendar days upon receipt of Notice to Proceed (NTP).

- The Winning Bidder shall provide the design based on a Dense Wavelength Division Multiplexing (DWDM) / Reconfigurable Optical Add-Drop Multiplexer (ROADM) architecture.

- The Winning Bidder must deliver the equipment, materials, and ancillaries from the Winning Bidder's warehouse to designated NGCP and DICT installation sites. The cost of delivery of installation equipment to installation sites should be shouldered by the Winning Bidder.

- The Winning Bidder must provide hard and soft copies of the technical documents, detailed network design, method of procedure, technical specifications, and other related documentation. Refer to Section I-9 for the document requirements of this component.

- The Winning Bidder must secure required permits and type approval certificates from the National Telecommunications Commission and other related permits/clearances (application or renewal, whichever is applicable).

- The Winning Bidder must supply, deliver, install, test, and commission the DWDM/ROADM and Optical Amplifier equipment, materials, and its ancillaries.

- The Winning Bidder must establish a 1x100Gbps link between DICT Roces node and DICT NGDC1 Diliman node. Refer to *Annex B10-Section* 4 for details.

- For additional work details and specifications of the DWDM/ROADM Broadband Communication System, please refer to *Annex B10.*

2.3.3 Support Facilities, Materials and Services

2.3.3.1 Minimum Technical Requirements

- **Power System**
  - The power system should support AC input of either 220/380V three-phase, 220V single phase, or 110V dual wire. The input voltage range is 85V – 300V.

    - DC Power System: The DC power system must be modular, telecommunications industry-grade, long service life, an upgradeable system of Battery Banks and Rectifier, can deliver 1000 ampere-hour of -48VC.
    - The Generator Sets: The generator set must be four-stroke, water-cooled engine, three-phase, environment friendly, full outdoor type, compact structure, silent operation, configurable to run/operate in parallel or alternate mode, will operate within 30 seconds of commercial power failure

- **Air Conditioning Units**: Must be a 5-ton floor standing air conditioning system with controller for simultaneous or alternate operations . The controller must be programmable, with a room-temperature sensor, and shows the current settings of the ACUs in an easy to read display

- **Ancillaries**: AC and DC Breakers, Load Lines, Grounding System, Lightning Arrester, Surge Arresters, Cable Ladders and Trays, Electrical Wires/Cables, DC power distribution board (DCPDB) and other associated components, hardware, ancillary materials of the AC/DC power system needed for the completion of the project.

- AC input terminal should be equipped with surge protection devices to meet the requirement of class-C surge protection.

- The system should have 2 levels of low voltage disconnection function (including Load Low Voltage (LLVD) and Battery Low Voltage (BLVD).

- The system shall monitor and control the AC voltage, current, DC voltage and load current, ambient temperature and humidity, and battery current and temperature for the power system. You can view such information on the LCD and Web UI. The power system should have the function of battery equalized charging and float charging management, including manual and automatic conversion during battery equalize charging or float charging state.

- The system shall respond to a failure of the utility service by starting and paralleling the specified number of generators to restore power to the facility.

- The system shall respond to the failure of a generator by shedding selected loads and restoring normal operation to the extent possible within the capacity of the available source(s).

- The system shall perform a closed transition soft-load power transfer between operating generators and the utility supply once the utility power source has been restored.

- The system shall perform a closed transition soft-load power transfer between the utility power source and selected generators when performing a system load test.

- For additional technical specifications of the Support Facilities, Materials, and Services, please refer to *Annex B10 and Section II - 3 Installations and Maintenance Work Requirements*

2.3.3.2 **Detailed Work**

- The Winning Bidder must supply, design, build, install, and commission a modular, and operable power generation system at DICT Roces equipment node. i.e. AC and DC power and power backup system.

- The Winning Bidder must install two (2) units of 80KVA, at a minimum, outdoor type Generator Sets (Gensets) at DICT Roces.

- The Winning Bidder must supply, design, build, install, and commission a modular and operable 48VDC power system at the NGDC3 equipment node.

- The Winning Bidder shall size the rectifier system to fully charge and administer the 1000AH battery banks and provide DC power to the offered DWDM solution at DICT Roces and DICT NGDC3 sites on protected 5-Tera, 10-Tera, and 15-Tera optical switching capacity of the DWDM.

- The Winning Bidder shall design, supply, and install a dual supply DC distribution panel (DCDP) each on the 42RU equipment ETSI racks of the twenty-five (25) DWDM/ROADM and ILA.

- The AC and DC power and power backup systems are available at all NGCP sites. AC and/or DC circuit breakers and DC power distribution board (DCPDB) must be provided as needed.

- The Winning Bidder must supply, install, and commission two (2) units of brand new air-conditioning system at DICT Roces equipment room.

- The Winning Bidder must ensure the compatibility of all components of the system, such as compatibility of the interface between the paralleling switchgear and the generator, including but not limited to engine components, governor equipment, and automatic voltage regulation components.

- All permit requirements (building permit, mechanical permit, electrical permit, sanitary permit, etc.), installation, and maintenance support of Genset shall be handled by the Winning Bidder, in coordination with the DICT.

- For additional work details and specifications of the Support Facilities, Materials, and Services, please refer to *Annex B10 and Section II - 3 Installations and Maintenance Work Requirements*

2.3.4 Network Management System (NMS)

2.3.4.1 Minimum Technical Requirements

- The System must have a server and client software/hardware for provisioning, monitoring, fault detection, and management of the network

- The System must have a rich Graphical User Interface (GUI). It is required that it will be possible to perform any Network Management operation via GUI without the need for the user to perform Command Line Interface (CLI) commands.

- System architecture must be based on client-server relationships using standard technologies.

- The System must display an optical logical layer showing Logical Elements (Optical cards/ports) and logical optical topology.

- The System must display a graphical lambda availability chart for Optical Multiplex Section (OMS).

- The System must allow the user to see a list of all current alarms for a specific network element (NE) or trail or tunnel or service.

- The alarm severity must be ranking at least four categories: warning, minor, major, critical.

- The highest severity alarm state in a network element must be displayed utilizing different icon colors on the topological map.

- Topological links that are affected by an alarm must be displayed utilizing different link colors on the topological map according to the highest severity alarm affecting the link.

- The Systems must provide a backup, backup schedule, and restore functionality for all collected and generated data, configurations, alarms, and log history.

- The System must have a provision of a backup NMS server.

- The System must have NMS/Controller with an open interface to allow integration to DICT's existing Management Network.

- The System must have a fully resilient DCN using either in-band or out-of-band communications that will support network management even in the event of a fiber break.

- Network Management System (NMS) server and client software/hardware for provisioning, monitoring, fault detection, and management of the network.

- For additional technical specifications of the Network Management System (NMS), please refer to *Annex B10*.

2.3.4.2 **Detailed Work**

- The Winning Bidder must conduct a site survey, site validation at DICT Roces where the NMS will be installed.

- The Winning Bidder must provide detailed NMS design, technical specifications, technical documents, and other pre-requisite documents design (signed by Professional Electronics Engineer (PECE) and duly approved by DICT. The Winning Bidder is required to complete the site validation and detailed network design and other necessary tasks within forty-five (45) calendar days upon receipt of Notice to Proceed (NTP).

- The Winning Bidder must supply, deliver, install, configure, test, and commission the Network Management System (NMS) to include server, workstation, equipment racks, cabling, electrical wiring, software, and its ancillaries, and power and backup systems.

- For additional work details and specifications of NMS and Server, please refer to *Annex B10*.

2.3.5 **Spare Deliverables**

2.3.5.1 **Minimum Technical Requirements**

- At least 10% of the total hardware for service/traffic carrying modules shall be provisioned as spares. This is applicable for each module type.

- At least three (3) units per module type for those non-service/non-traffic carrying modules

2.3.5.2 **Detailed Work**

- Winning Bidder shall provision for sufficient in-country pool of spares for Spare Parts exchange within twenty-four (24) hours in times of non-availability of Spare Parts at DICT side due

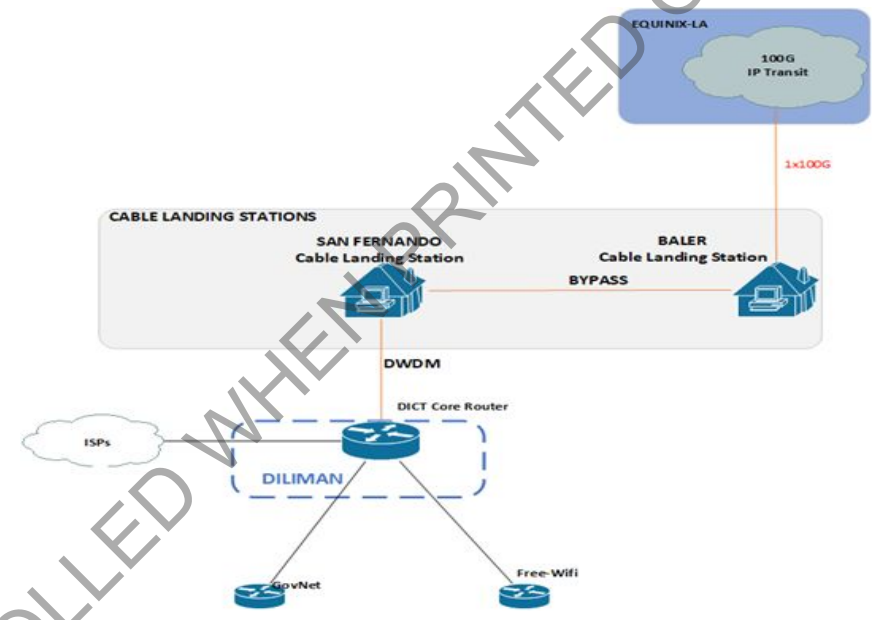
to non-repair or non-arrival of repaired equipment at DICT's premises.

- Spares must be transported by Winning Bidder to DICT designated sites or warehouses after delivery acceptance.

2.4 Component 4: 100Gbps IP Transit

2.4.1 The main objective of procuring the 100 Gbps IP transit is to connect the end-users of the NBP network, e.g. GovNet beneficiaries, Free Public Wi-Fi Program beneficiaries, LGUs, to the internet.

Part of the objective of this component is to ensure that the network is future-proof by being IPv6 compliant.



100 Gbps IP Transit at Equinix LA4 Data Center

2.4.2 Minimum Technical Requirements

- Transit providers must be recognized and proven global top Tier-1 optical IP networks.

- Internet Transit points in the United States (Equinix LA4) must be connected to a Global "Tier-1" ISP Provider's Backbone Network and inclusion of cross-connection cable to DICT Equipment.

- The Winning Bidder must ensure that the DICT Equipment to

Tier-1 equipment handover interface in LA4 is only 1x100GE.

- Must have a Secure Blackhole for DDOS mitigation.
- Must provide Online bandwidth utilization monitoring access to DICT.
- The Transit Provider must allow traffic from DICT Network to cross a service provider network to the rest of the internet.
- Must have Static routing or BGP peering options available.
- Provider(s) who can fulfill and provide all corresponding connectivity, security services, and Service Level Agreement via the provider's wholly-owned network(s) in North America.
- Tier-1 IP transit provider warrants the Master Service Agreements (MSA), Service Level, and Service Credit to be approved by DICT.
- Must guarantee and not exceed Network Service Level Agreement defined in MSA.
    - Packet Success Rate > 99.9%
- Latency adheres to the Service Level Agreement reflected in MSA.
    - North America to Asia < 140 ms
    - North America to Europe < 85 ms
    - Intra-North America < 45 ms
    - Intra-Europe < 35 ms

2.4.3 **Detailed Work**

- The Winning Bidder must cover the maintenance and support of 100 Gbps IP transit, acquiring IPv4/IPv6 Addresses, Autonomous System Number (ASN) to APNIC, and cross-cable connection to DICT Equipment for 12 months in Equinix LA4, Los Angeles, California, USA.
- The Winning Bidder must handle the APNIC application, processing, securing, and sourcing out IP Address Version 4 & 6 (IPv4 & IPv6) for IPv4 Addresses /22 (or equivalent) one thousand twenty-four (1,024) Public IP addresses and IPv6 Addresses /32 sixteen million seven hundred seventy-seven thousand two hundred sixteen (16,777,216) of /56 subnets Public IP addresses and an Autonomous System Number (ASN).
- The Winning Bidder must shoulder any incurred APNIC

transfer, taxes, and other charges in completing and acquiring IPv4/IPv6.

- The Winning Bidder must cover and ensure DICT APNIC's annual membership fee for five-years. Membership fee shall be inclusive on the proposal and subject to the provided DICT payment schedule. The Winning Bidder will determine how APNIC's subscription will be paid, whether annual or one-time payment for 5 years

- The Winning Bidder must provide hard and soft copies of the technical documents, detailed network design, method of procedure, technical specifications, and other related documentation. The detailed design must be approved and signed by a Subject Matter Expert or Equivalent. Kindly refer to *Section I - 9 Data To Be Provided By the Contractor During Contract Implementation* for all document requirements of this component.

- The Winning Bidder must prepare the Installation drawings in advance for the installation references and give complete information necessary for the installation of the structure.

- The Winning Bidder must conduct system reliability testing, commissioning, and acceptance.

- The Winning Bidder must complete the DWDM/Transponder link test from DICT in Quezon City to Equinix LA4, Los Angeles California, USA before IP Transit End-to-End testing.

- The performance and acceptance test must commence after the Winning Bidder has confirmed in writing that all works conform with the terms of the contract and or purchase order and submission of pre-test results.

- The Winning Bidder must comply with the approved test plan for all hardware and software to be delivered and installed.

- The Winning Bidder must provide test equipment and conduct a link test following the approved test procedures.

- The Winning Bidder (or IP Transit provider) must submit a Master Service Agreement between them (the Winning Bidder) and the provider for review by DICT.

- The performance and acceptance test must commence after the Winning Bidder has confirmed in writing that all works conform with the terms of the contract and or purchase order and submission of pre-test results.

- The Winning Bidder must provide the necessary label, documentation, and as-built drawing.

- The Winning Bidder must submit and comply with the approved testing plan. Revisions/modifications if necessary must be approved by the DICT without any additional cost.

- The Winning Bidder must provide other additional materials and peripherals needed to establish a working system for this project. The cost of additional materials and peripherals must be under the expense or cost of the Winning Bidder.

3. INSTALLATIONS AND MAINTENANCE WORK REQUIREMENTS

3.1 The Winning Bidder must have trained personnel, equipment, and vehicles, including the required vehicle fuel supply, facilities, tools and materials/supplies, project office, and warehouse that will be utilized in the installations and maintenance of the network/ system in the duration of the Contract.

3.2 **Manpower**

Personnel must be properly trained to use the necessary equipment, tools, devices, gadgets, and machinery, to do the troubleshooting and restoration. and must be available as needed. Installation and Maintenance team must be composed of at least the following positions:

Minimum Qualifications

Key Personnel	Minimum Qualifications	Min. Qty.
Project Manager Will serve as the focal person/team leader of the project	❏ Preferably a licensed Electronics and Communications Engineer. ❏ With at least three (3) years of experience in the design, engineering, installation, testing, commissioning, operation, and maintenance of any or combination of the following telecommunications infrastructure; - Fiber optics and/or optical transport network system; - Network Management System; - IP/MPLS network and Network Security System ❏ With at least two (2) years of experience in the implementation of underground	1

	utilities and/or support facilities of a telecommunications network; ❏ With at least three (3) years of managerial experience in the build and/or O&M of telecommunications infrastructure; ❏ Bidder must submit proofs (Resume, Licenses, Certificates, etc.).	
Senior Telecommunications Engineers	❏ Supervises, skilled, hardworking, and with at least three (3) years of experience in the installation, testing, commissioning, operation, and maintenance of any or combination of the following telecommunications infrastructure; - DWDM/ROADM and EDFA/ RAMAN equipment - Network Management System - Core/P/PE Router and Network Security System ❏ Bidder must submit proofs (Resume, Licenses, Certificates, etc.) ❏ Must be a licensed Electronics and Communications Engineer.	5
Safety Officers	❏ Must be a graduate of at least any four (4) year technical course with BOSH/COSH qualification certificate (Certificate of Completion). ❏ Must have at least two (2) years of experience as safety officer in the construction of telecommunications / ICT network infrastructure.	1

3.3 **Tools, Equipment and Machinery**

The Winning Bidder must provide to DICT NBP Project Management Office the list of a complete inventory of tools, equipment, and machinery for review and project management references. The Winning Bidder must ensure the availability of appropriate and sufficient inventory matrix per site to properly execute installation works and deliver the project within the timeline of the Project. The Winning Bidder must certify that this equipment shall be used exclusively for the project. If the equipment is owned by a 3rd party contractor, the Winning Bidder must show a lease contract for the duration of the project citing exclusive use of the machines. The following are the minimum inventory

of tools, equipment, and machinery that are expected to be available at the construction sites:

Tools, Equipment, Machinery
Cable Plough / Trenching Machine
Horizontal Directional Drill (HDD) Machine
Crane / Boom Truck
Fiber Blowing Machine and Air Compressor
Arc Fusion Machine
Optical Spectrum Analyzer
Bit Error Rate Test Analyzer
Optical Time Domain Reflectometer
Optical Power Meter / Optical Light Source

3.4 **Project and Maintenance Vehicles**

The Winning Bidder must provide service vehicles in good working condition for each DICT team, such as three (3) units for Optical Transport Network Component and four (4) units for Fiber Optic Cable Build Component, immediately after the issuance of Notice to Proceed to mobilize personnel and necessary tools and materials that will be used in the installations and maintenance of the project's ICT equipment, outside plant, and support facilities in the duration of the project and contract. This shall be effective for the duration of the Project.

3.5 **Personal Protective Equipment (PPE) and Safety Devices**

The Winning Bidder must provide and ensure that all personnel are wearing proper PPEs and safety devices for protection against health and safety hazards.

3.6 **Handling and Storage Procedures**

The Winning Bidder must ensure that all equipment and materials necessary for the project are properly handled and secured. The Winning Bidder must submit Handling and Storage Procedures. This also includes the shipment or transfer of equipment when necessary.

3.7 **Reports and Documentation for Maintenance**

3.7.1 The following documentation must be submitted before the start of the Project warranty:
a. Preventive Maintenance Plan
b. Repair and Restore Maintenance Plan
c. Revised drawings
d. Inventory of Materials

3.7.2 Likewise, the following reports must be submitted after the full acceptance of the Project:
a. Monthly maintenance report
b. Incident Report, in case of problems
c. Repair and Test report after restoration activities

3.8 **Access and Gate Pass**

3.8.1 Access Pass and Gate Pass Requirement
a. The Winning Bidder must comply with the Occupational Safety and Health Standards of the Department of Labor and Employment (DOLE).
b. The Winning Bidder must comply, prepare, and submit the required Job Safety Analysis and Job Safety Plan program of DICT per site.
c. The Winning Bidder must secure Security and Health Clearance specific to each site.

3.9 **Construction Works**

3.9.1 **Design Criteria and Specification**

3.9.1.1 Structural design is based on the minimum design criteria and should be administered/approved by a competent Registered Civil/Structural Engineer. The design of members and connections shall be consistent with the intended behavior of the structure system.

3.9.2 **Standards and Reference**

3.9.2.1 National Structural Code of the Philippines 2015 (NSCP 2015)

3.9.2.2 Philippine Electrical Code 2017

3.9.2.3 American Institute of Steel Construction latest edition (AISC)

3.9.2.4 American Society of Testing and Materials latest edition (ASTM)

3.9.2.5 American Concrete Institute (ACI318-11M)

3.9.2.6 American Society of Civil Engineer (ASCE)

3.9.2.7 American Welding Society latest edition (AWS)

3.9.2.8 British, European and International Standards (BS EN ISO)

3.9.3 **Materials Specification**

3.9.3.1 The materials and installation requirements shall conform to the specifications of standards and reference.

3.9.3.2 Concrete shall have a minimum compressive strength of not less than 35MPa at 28 days. All grout shall be non-ferrous and non-shrink. The concrete cover shall have a minimum thickness of 50mm.

3.9.3.3 Reinforcing steel bars shall have a minimum yielding strength of 415MPa.

3.9.3.4 Welding shall meet the minimum requirement of AWS.

3.9.3.5 Structural materials steel shall meet the minimum requirement of ASTM and AISC.

3.9.3.6 Hot-dip galvanized coating on fabricated iron and steel materials, with a minimum thickness of 86 microns for all members shall be following BS EN ISO 1461.

3.9.4 **Materials Specification**

3.9.4.1 The following documents shall be available for review by the engineer-of-record before fabrication or installation, as applicable.

3.9.4.2 Materials test reports for steel, RSB, connectors, and welding materials

3.9.4.3 Inspection Procedure

3.9.4.4 Installation Procedure

3.9.4.5 Non Conformance Procedure

3.9.4.6 Material Control Procedure

3.9.4.7 Welder performance qualification record (WPQR), including any supplemental testing requirements

3.9.5 **Earthworks**

This includes soil investigation, soil test if any, pilot holes, excavation of the design grade line, width, length, and depth of concrete works in reinforcing bars as per approved plan and specifications.

3.9.6 **Concrete Works**

This includes the installation of reinforced concrete manholes, handholes, telecommunication poles, Genset concrete pads, cable entrance facilities, etc., with a minimum mix of 1:2:3 mixing of concrete as per the approved plan and specifications.

3.9.7 **Reinforced Steel Bar (RSB) Works**

This includes the required setting/installation of standard reinforcing steel bars for solid concrete construction as per the approved plan and specifications.

3.9.8 **Form Works**

This involves the setting/formation of good quality of form for the required concrete foundation design and as per the approved plan and specifications.

3.9.9 **Fabrication / Metal Works**

This involves the fabrication part of cable ladders, cable trays, riser poles, bridge attachments, pole hardware, and other accessories, pre-assembling/installation of the structure should be done by the Winning Bidder in the fabrication yard/site, before hauling at the actual site for final installation as per approved plan and specifications. Fabrication up to proper installation is subject to inspection and monitoring.

3.9.9.1 A pre-arranged schedule of inspection to the Winning Bidder is required during fabrication and pre-installation/assembling and other activities, as well as painting and galvanization process of application, for checking and monitoring purposes.

3.9.9.2 Pre-installation and inspection are required before the delivery/ transport of materials to the site at the Winning Bidder fabrication yard.

3.9.9.3 Affected structures, plants, crops, trees, underground pipes of any kind during trenching works, plough works, HDD works, excavation works, fiber optic cable and 7-Way Microduct installation work, Manhole/ Handhole/ Telecom Pole installation work, movement of machinery, and any other underground works, shall be managed by the Winning Bidder.

3.9.10 **Galvanization/ Painting Works**

This involves the application of primer paint, paint, and adequate micron of hot-dip coated galvanized steel parts, such as for steel racks and ladders, pipes, including nuts and bolts as per approved plan and specifications. After fabrication, application of adequate micron of hot-dip galvanized, a metal primer paint should be applied before the delivery at the site and the final installation and a final coating of the paint should be applied and completed.

3.9.11 **Security and Fencing Works**

This involves the installation of a perimeter fence along with the temporary shelters and site warehouse/s with 2x2 cyclone wires, security cameras, and other accepted industry standard methodologies to protect construction materials, equipment, machinery, gadgets & devices at the project sites/locations from theft, vandals, deterioration.

3.9.12 **Shelter Works**

3.9.12.1 The Winning Bidder shall ensure all temporary/off-site shelters to protect and provide safety to personnel, materials, equipment, machinery, gadgets, and devices are built based on applicable industry standards and practices. All expenses incurred shall be borne by the Winning Bidder.

3.9.12.2 The Winning Bidder shall supply and install a soundproof container-type steel shelter for two (2) 80kVA Gensets at Roces equipment node, resting on a concrete pad or slab. The concrete pad shall be a minimum of 1.5 times the length and breadth of the adequately spaced generator sets and fuel supply. The Gensets and fuel supply must be attached on

heavy-duty concrete anchors and shall be installed before the concrete is poured. Measurement and placement must be exact. The shelter shall safely accommodate a fuel supply system according to plan and specifications.

- The Genset shelter shall be equipped with removable wall sections or with swing-up hydraulic type doors to allow service access, maintenance and repairs. The shelter must be lockable, tamper and vandal resistant, including the ability to lift the shelter off the installation.

- The Genset shelter shall have an adequate incoming air supply to support the generator in full operation and a suitable exhaust system shall be installed to keep the equipment room and personnel away from smoke, pollutants, and noise.

- The Genset shelter shall be provided with a grounding busbar and must be bonded to the premise properly

3.9.12.3 The Winning Bidder shall design, supply, deliver, and install insulated, waterproof, secure, vandal-resistant, steel racks for the Battery Banks per approved plan and specifications to include:

- Supply and install anchor bolts, steel angle supports, grounding busbar, and other accessories necessary for providing a stable battery bank rack

- Supply and install racks for the rectifier system

3.9.12.4 The Winning Bidder shall construct all Genset shelter/s 1 meter above the historical flood line that can withstand wind load as specified at the National Structural Code of the Philippines, NSCP.

3.9.13 **Backfilling and Compaction Works**

3.9.13.1 Backfill shall be placed in thin lifts (maximum 200mm) and compacted to a minimum of 95% of standard proctor maximum dry density. If excavated materials are not suitable for backfill, it shall be the

responsibility of the Winning Bidder to supply and compact suitable clean materials to meet the requirement.

3.9.13.2 Any organic or deleterious material shall be removed and will not be permitted in fills, except as permitted by the geotechnical engineer, no rock or similar irreducible material with a maximum dimension greater than 100 mm shall be buried or placed infills. Gravel bedding shall have a minimum thickness of 200mm and ¾'' coarse aggregates shall be used.

3.9.14 **Earthing System Works**

3.9.14.1 The Winning Bidder must design, supply, install, test the earthing system at project sites following the grounding recommendations of the Philippine Electrical Code.

3.9.14.2 This involves underground wiring and grounding terminals (rods) installation, providing a protective earthing/grounding system for fault current to flow to the earth.

3.9.14.3 All steel shelters, structures, equipment rack, cable trays, and cable ladders, GI pipes, and other steel assemblies to secure and protect the DWDM/ROADM equipment, Gensets, rectifier and battery banks, fiber optic cables, 7-Way Micro ducts, etc. shall be earthed and bonded with the station's grounding system.

3.9.14.4 Specific parts of equipment shelter shall be provided with copper ground busbar as per approved plan and specifications.

3.9.14.5 Equipment grounding system must be maximum of five (5) ohms resistance to ground. The three-point method or fall off potential testing is recommended for measuring resistance to earth or the IEEE Standard 81: Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Grounding System.

3.9.14.6 All grounding mediums shall be bonded together to include Gensets, battery banks and rectifiers, telecommunications equipment, and metallic piping system within the premise of the stations/project sites.

3.9.14.7 Sizing and specifications of grounding terminals (rods), down conductors, air terminals, ground wires, ground busbar, and other earthing & protective systems, shall follow what is specified on the approved plan and specifications.

3.9.15 **Access Road**

This involves the installation of a route between the main roads to the staging site. The access road shall accommodate vehicles that deliver materials to the site area. The road surface and base course are made of compacted aggregates. The total width of the road is 3.2m with a slope grade of 2-3% at each end. The canal has an inclined slope of 5%.

3.9.16 **Electrical Works**

3.9.16.1 The Winning Bidder shall liaise with the electrical cooperative for the installation of electrical post and electrical power meter when required at staging sites.

3.9.16.2 The Winning Bidder shall supply and install all appropriate wire sizes to energize/electrify the project sites to include but not limited to the wiring of DWDM/ROADM equipment, NMS servers, Gensets, and battery banks & rectifiers.

3.9.17 **Quality Control Work**

This includes the testing of materials and factory testing to control the quality of materials and workmanship used in the structures and installation works. Quality Assurance officers shall be provided to verify, audit, and evaluate the quality of work.

3.9.18 **Hauling Works**

3.9.18.1 The Winning Bidder shall undertake hauling activities of equipment and power shelters, perimeter fence parts, and other support materials, in any manner as deemed appropriate to the location of the project sites.

3.9.18.2 The Winning Bidder shall be responsible for securing access pass and construction permits to access roads, temporary & Genset shelter/s and temporary facilities of construction materials, equipment and machinery for underground works, bridge attachment

works, road works, pole installation works, shelter construction works, perimeter fencing works, and other associated local and national permits to properly implement all construction works.

3.9.19 **DWDM/ROADM Equipment Installations**

3.9.19.1 The Winning Bidder shall be responsible for the supply and delivery of all materials, hardware, cables, electrical wires, installation kits, and accessories, tools, and equipment, measuring devices and gadgets, communication expenses, and other items such as sealants, cable ties, ropes, crowbars, slings, hacksaw, power tools, dustbins, etc. for the proper installation of the ICT equipment at all project sites and must have had coordinated with the DICT Project Team for schedule, locations, security, access pass, permits, temporary facilities, etc.

3.9.19.2 The Winning Bidder shall ensure the availability of technical documentation, technical specifications, technical plans, equipment layout, cable layout, wiring layout, shelf layout, installation parameters, installation guides, system hardware internal connections, system configuration, fiber lists and assignment, cable lists, equipment rack installation guide, etc. at all project sites.

3.9.20 **Restoration Works, Damages, and Liabilities**

The Winning Bidder shall be responsible for the restoration of all project sites after the completion of the project. The Winning Bidder shall be answerable to all expenses, damages, and liabilities that will occur during hauling works, earthworks, equipment installation works, fiber optic cable and 7-Way Microduct installation work, shelter construction works, perimeter fencing works, and other associated works of the project.

3.9.21 **Occupational, Safety, and Health**

3.9.21.1 The Winning Bidder must comply with the DOLE's Occupational Safety and Health standards and shall pursue, author, keep and maintain safety manuals of the stated programs to eliminate hazards and reduce risks which may result in personal injury, property damage, fire, security losses, and even loss of life. The Winning Bidder shall pursue a "ZERO ACCIDENT PROGRAM" as a key to a safe, healthy, and productive

workplace and project sites.

3.9.21.2 The Winning Bidder shall have a Construction Safety and Health Program, duly signed by the owner of the company, to accomplish work safely, efficiently, and with regard for the environment.

3.9.21.3 Safety considerations shall be given priority over all others in matters of design, methods, materials, and equipment. Project in-charge, field engineers, team leaders, safety officers will act as officers responsible for checking the safety of the site and workers by installing sufficient signage, traffic cones/barriers, proper lighting, and warning lights during night operations.

4. TESTING, COMMISSIONING, AND ACCEPTANCE

4.1 **General Requirement**

4.1.1 The Factory Acceptance Test (FAT) must be witnessed and accepted by five (5) DICT personnel and must be completed within five (5) calendar days.

4.1.2 The Winning Bidder must conduct system reliability testing, commissioning, and acceptance within thirty (30) calendar days upon completion of installation works.

4.1.3 The Winning Bidder must comply with the approved test plan for all hardware and software to be delivered and installed.

4.1.4 The Winning Bidder must provide test equipment and conduct a link test following the approved test procedures.

4.1.5 The performance and acceptance test must commence after the Winning Bidder has confirmed in writing that all works conform with the terms of the contract and or purchase order and submission of pre-test results.

4.1.6 The Winning Bidder must provide necessary labels, documentation, and as-built drawings per site.

4.1.7 The Winning Bidder must coordinate and submit information on locations and schedule for testing and acceptance within the prescribed period.

4.1.8 The Winning Bidder must submit and comply with the approved testing plan. Revisions/modifications if necessary must be

approved by the DICT without any additional cost.

4.1.9 DICT shall issue a Certification that the Testing, Commissioning, and Acceptance has been conducted.

4.1.10 The Winning Bidder must propose an alternative acceptance procedure to be reviewed and subject to approval by the DICT Project management team.

4.2 **Transponder Component**

4.2.1 All test formats and procedures will be submitted by the Winning Bidder to be reviewed and approved by DICT. In the case where the Submarine Line Terminal Equipment (SLTE) spectrum between Equinix LA4 California U.S.A. - to San Fernando La Union via Baler Cable Landing Station in Baler Aurora Philippines is not yet ready during the scheduled acceptance and final acceptance of the Transponder/Muxponder system, DICT will require the Winning Bidder to make alternative acceptance tests to be submitted for review, comment before approval to avoid any delays on the project implementation plan.

4.2.2 The Winning Bidder shall provide a test plan and method of procedures for approval of DICT including but not limited to the following:

4.2.2.1 NE and NMS performance
4.2.2.2 Optical power measurements
4.2.2.3 Data/Throughput testing in accordance to RFC2544 test
4.2.2.4 Power supply test (Voltage test, power redundancy test)
4.2.2.5 Knock test of rack/cabinet
4.2.2.6 Loopback tests
4.2.2.7 DCN parameter checking
4.2.2.8 One (1) week Link Stability/Confidence test
4.2.2.9 DCN functionality test together with the Network Management System visibility test
4.2.2.10 DCN testing demonstrating transponder network system visibility on the Network Management System
4.2.2.11 Rectifier Main and Redundant Switchover and other testing protocols
4.2.2.12 Transponder client interfaces launch power output measurement
4.2.2.13 Transponder/Muxponder, NMS HW, and SW inventories

4.3 **Optical Transport Network Component**

The Winning Bidder shall provide the test plan and method of procedures for approval of DICT, including but not limited to the following:

4.3.1 Power Redundancy Test
4.3.2 Point to Point Encryption Test
4.3.3 DCN Management Test
4.3.4 Ethernet Circuit Throughput - RFC2544 Test
4.3.5 Ethernet Latency - RFC 2544 Test
4.3.6 Long Time Bit Error Rate Test
4.3.7 Forward Error Correction Test
4.3.8 NMS Performance
4.3.9 Power Supply Level Reliability Test
4.3.10 Wavelength Switching Functions
4.3.11 Manual and Automatic Protection Switching Functions
4.3.12 Protection Switching Priorities
4.3.13 Wavelength Power Test

4.4 **100 Gbps Tier 1 IP Transit Component**

4.4.1 **General Requirement**: Acceptance and Testing will be done after the completion of the Transponder/ DWDM link from Equinix LA4 Data Center, Los Angeles California, USA to DICT NGDC1 Diliman Quezon City.

4.4.2 The Winning Bidder must provide a test plan and method of procedures for approval of DICT, including but not limited to the following:

4.4.2.1 100 Gbps Tier-1 IP Transit Connectivity and Speed Test
4.4.2.2 Integration and Peering with DICT IP Network
4.4.2.3 Perform network performance in compliance with ITU-T Y.1564
4.4.2.4 24 hours Link Stability/Confidence test

4.5 **Fiber Optic Cable and 7-Way HDPE Micro ducts**

4.5.1 The Winning Bidder must provide a test plan and method of procedures for approval of the DICT NBP Project Management Office. The Winning Bidder must comply with the approved test plan for all installation materials to be delivered and installed, including but not limited to the following:

4.5.1.1 7-Way HDPE Micro ducts
- Pressure / Leak Test
- Ball Bearing Test

4.5.1.2 Fiber Characterization Test
- Connector Inspection

- Insertion Loss
- Reflectance
- Optical Attenuation Loss
- Spectral Attenuation
- Chromatic Dispersion
- Polarization Mode Dispersion

4.6 **End-to-End Testing**

4.6.1 **General Requirement**: Network Management System (NMS) in the Optical Network Transport component must be able to capture all circuit testing events during the End-to-End testing.

4.6.2 The Winning Bidder must provide a test plan and method of procedures for approval of the DICT NBP Project Management Office. End-to-End testing must include but not limited to the Link Test and Restoration Test of the following:

4.6.2.1 All ROADM Node Segments

4.6.2.2 All BCDA Circuit

4.6.2.3 1x100 Gbps LA - NGDC1 Diliman IP Transit Circuit

4.6.2.4 All Client Circuits as defined on the Traffic Matrix. Refer to Annex B5 for details.

4.6.2.5 All FOC segments (ODF-ODF) and Micro ducts/Telecom Conduit/Pipes

4.7 **Integration and Cross-Connect**

4.7.1 The Winning Bidder must provide the test plan and method of procedures for approval of the DICT NBP Project Management Office.

4.7.1.1 NGDC1 Diliman Free Wi-Fi Core Router and Optical Transport Network Ph1 link and restoration test

4.7.1.2 NLTE SFLU and Optical Transport Network Ph1

4.7.1.3 NLTE Los Angeles and Tier1 IP Transit Provider equipment

4.8 **Network Management System**

4.8.1 The Winning Bidder must provide a test plan and method of procedures for approval of DICT NBP Project Management Office, including but not limited to the following:

4.8.1.1 Capacity Management Test
4.8.1.2 Change Management Test
4.8.1.3 Configuration Management Test
4.8.1.4 Fault Management Test
4.8.1.5 Incident Management Test
4.8.1.6 Inventory Management Test
4.8.1.7 Order Management Test
4.8.1.8 Performance Management Test
4.8.1.9 Problem Management Test
4.8.1.10 Provisioning Test
4.8.1.11 Resource and Service Management Test
4.8.1.12 System Log Server Test
4.8.1.13 Ticketing Test
4.8.1.14 Traffic Engineering Test

5. Knowledge Transfer and Submission of the Final Project Documents

The Winning Bidder must conduct comprehensive local training and knowledge transfer for DICT nominated personnel before the date of acceptance.

5.1 Training Prerequisites

5.1.1 The Winning Bidder must provide a training plan/syllabus within the prescribed period for approval by DICT specifically, within thirty (30) calendar days upon receipt of the notice to proceed (NTP).

5.1.2 The Winning Bidder shall provide a training plan/program which must include the schedule (date and time), duration of the training, training activities, venue (vicinity and location), method of delivery, course outline, required participants, for approval of DICT.

5.1.3 Prepare the necessary training documents in hard and soft copies for all participants.

5.2 Course Design and Method of Delivery

5.2.1 The training set-up shall be able to demonstrate or at least simulate actual equipment procured by the End-User during the training course. This will enable the DICT to simulate faults that may occur on the equipment during the operation and maintenance phase.

5.2.2 The discussion shall cover both theoretical and practical application and hands-on training with the following minimum course topic:

5.2.2.1 DWDM/ROADM/CDC-F, Transponder/Muxponder, SLTE Basic Technology, OTN Basic Technology, Fiber Optic Cable, OSI Model, IP Transit

5.2.2.2 Hardware Functionalities

5.2.2.3 Commissioning, Provisioning, Configuration, Operation, and Supervision of the training, including the venue, meals, and accommodation of trainers and passion

5.2.2.4 Administration and Maintenance/Troubleshooting

5.2.2.5 Network Management System (NMS) Operation, Administration and Maintenance

5.2.2.6 Advance IP Routing, including but not limited to:

- BGP Basics
- Scaling BGP
- Using Communities
- Deploying BGP in an ISP network
- Practical application and hands-on

5.3 **Logistics**

The Winning Bidder shall cover all expenses related to the participants, transportation, travel expenses, printed materials, supplies, tools, equipment and other requirements to conduct the training.

5.4 **Training Date and Duration**

Specific training date and duration must be provided by the Winning Bidder and must be approved by DICT.

5.5 **Training Venue / Location**

The Winning Bidder shall coordinate and submit the venue for training within the prescribed period. All expenses must be borne by the Winning Bidder.

5.6 **Number of Participants**

The Winning Bidder shall accommodate at least thirty (30) personnel per session as designated by DICT and evidenced by the issuance of Training Certificates to the participants. Airfare of participants from Visayas and Mindanao should be covered by the Winning Bidder.

5.7 The Winning Bidder must submit a digitized and bounded copy of the

Training Plan and materials, thirty (30) days before the conduct of training. Training Plan must include methodologies and a detailed schedule. Materials will be owned by DICT.

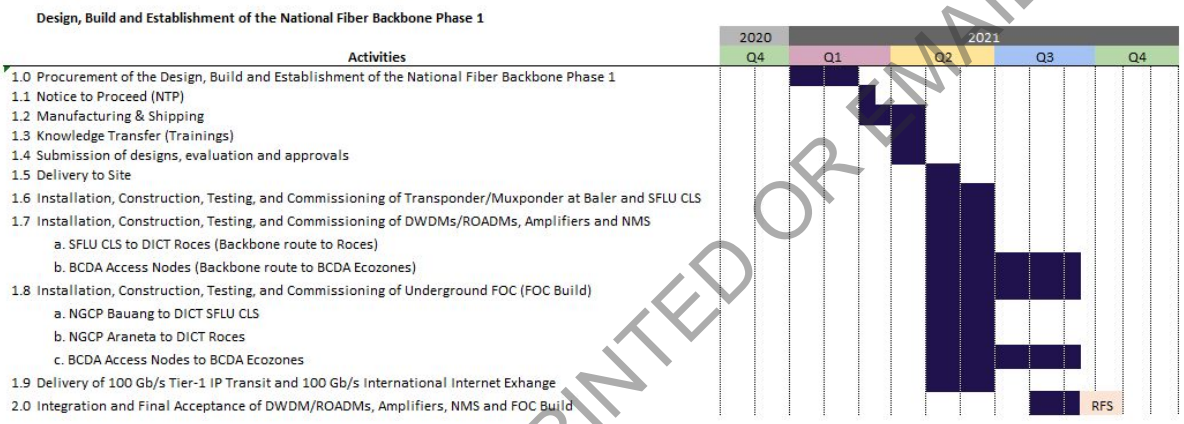
5.8 The Winning Bidder must submit and comply with the training plan as specified in the "Deliverables". Revisions/modifications if necessary must be approved by DICT and without any additional cost.

5.9 The Winning Bidder must provide training certificates to training participants upon completion of the training courses through DICT's Training Division.

SECTION III
PROPOSED DESIGN AND CONSTRUCTION SCHEDULE

The Project shall be completed in no longer than **two hundred (200) calendar days**, including all activities of the Project such as the delivery of the installation, hardware and equipment, and proof of airtime service subscription at the address/es specified by the Procuring Entity.

Below is the high-level timeline of the project:



The Winning Bidder is mandated by BCDA to deliver its proposed services within the mutually agreed Work Plan. In the event that the contractor is not able to deliver within the allowable and acceptable period, BCDA shall impose a Delay Penalty of 1/10 of 1% for every day of delay, based on the Total Contract Value, or the total amount of proposed services and deliverables. This penalty shall be imposed on the basis of the agreed completion dates of each Milestone.

Should the delay/s be due to unavoidable circumstances, i.e. typhoon, earthquakes or other natural disasters, delays caused by the Project Principals (DICT and/or BCDA) and other forms of delays not within the control of the Winning Bidder, the Winning Bidder must provide a written report detailing the cause of delay, impacted deliverables with reasons thereof and a detailed catch up plan and/or updated work plan. This must then be presented to DICT's project team for discussion and acceptance.

In the event that DICT disputes the workmanship of the contractor for reasons of unacceptable work quality, substantial delays due to lack of resources, incorrect equipment sizing, insufficient materials quantity and/or issues pertaining to the work attitude and professionalism of its staff, DICT shall impose a Step-In clause, where DICT will nominate another vendor to resume all unfinished deliverables and the penalized contractor shall pay all expenses to be incurred by the nominated vendor to finish the project. The contractor however will be given three (3) days cure period, where the contractor will be allowed to submit an appeal on why the

"Step-In Clause" should not be imposed, detailed mitigation plans to address the presented issues and a catch-up plan to ensure timely project completion.

1. Warranty and Support

1.1 Transponder Component

1.1.1 During the project deployment and the first five (5) years of the warranty and support, the Winning Bidder must provide at no cost to DICT, the four (4) service vehicles preferably 4x4 pickup trucks including but not limited to fuel, insurance, maintenance and to ensure this, the following Winning Bidder's contractual obligation is as follows:

- Ensuring an efficient project monitoring and the entire duration of the maintenance and warranty support on HW and SW of the procured ICT equipment.

- Maximize the mobility during the crucial deployment of the procured ICT equipment during the installation supervision, acceptance, testing, system integration, and final acceptance of the ICT equipment.

1.1.2 The Winning Bidder warrants that Goods supplied under this Contract are new, unused, of the most recent or current models, and that they incorporate all recent improvements in design materials, except when the technical specifications required by DICT provide otherwise.

1.1.3 The Winning Bidder shall be responsible for the hardware replacement and return within sixty (60) days upon shipment of defective item/ component, otherwise, an advanced hardware replacement will be required. The Winning Bidder should have an advanced hardware replacement available on hand to replace the faulty hardware under warranty within 24-hours.

1.1.4 The Winning Bidder shall provide the End User access to online documents, manuals, and datasheets.

1.1.5 The Winning Bidder shall provide the End User access to an online fault ticketing system.

1.1.6 The Winning Bidder shall provide support to DICT's system upgrades but not limited to hardware, software, additional lambda channel expansion, integration, optimization, and testing.

1.1.7 The Winning Bidder must consider all interruptions in service as an urgent priority. The Winning Bidder must assign competent technical staff to provide technical support upon receipt of call or email and must be available twenty-four (24) hours a day, seven (7) days a week.

1.1.8 The Winning Bidder must provide technical support for all hardware and software system components.

1.1.9 The Winning Bidder further warrants that all goods supplied under the contract have no defect arising from design, materials, or workmanship.

1.1.10 The Winning Bidder warrants to make good, free of charge, fixing of defects which may develop on the equipment due to faulty or improper design, materials, or workmanship.

1.1.11 The Winning Bidder shall be responsible for the replacement of defective parts of the Transponder/Muxponder system. The warranty must cover full replacement of defective items, free of charge, including labor, spare parts, materials, shipping, and transport.

1.1.12 The Winning Bidder shall provide availability of local and overseas technical support for all delivered hardware and software upon receipt of call on a 24/7 basis.

1.1.13 The Winning Bidder shall take the lead on the generation of trouble tickets to ensure prompt action based on the severity of the tickets raised.

1.1.14 The Winning Bidder must provide immediate on-site body support aside from the remote support for Emergency and Critical trouble tickets upon recommendation and assessment of Technical Support at no cost from DICT.

1.1.15 The Winning Bidder warrants the availability of service units for all equipment for free use until the repair is completed or a new supply is ready.

1.1.16 The Winning Bidder warrants the availability of spare parts for at least ten (10) years.

1.1.17 The Winning Bidder must assign a single point of contact for technical and non-technical queries, methods of procedures, and troubleshooting.

1.1.18 The Winning Bidder must consider all interruptions in service as an urgent priority. The Winning Bidder must assign competent

technical staff to provide technical support upon receipt of call or email and must be available twenty-four (24) hours a day, seven (7) days a week.

1.1.19 The Transponder must be supported by any document from the Manufacturer that the equipment to be supplied should not reach its End of Life in the next 5 years.

1.2 Optical Transport Network Component

1.2.1 The Winning Bidder shall provide five (5) years warranty and support for DWDM/ROADM, amplifier, and its components.

1.2.2 The Winning Bidder must have an existing outside plant (OSP) field support services within the identified nodes as defined in this Terms of Reference. The Winning Bidder or through a third-party contractor must show proof of existence by providing locations and addresses of each field support service and a list of personnel with qualifications.

1.2.3 Hardware replacement and return within sixty (60) days upon shipment of defective item/component otherwise an advanced hardware replacement will be required. The Winning Bidder should have an advanced hardware replacement available on hand to replace the faulty hardware under warranty within twenty-four (24) hours.

1.2.4 During the project deployment and the first two (2) years of the warranty and support, the Winning Bidder must provide at no cost to DICT, the three (3) service vehicles preferably 4x4 pickup trucks including but not limited to fuel, insurance, maintenance and to ensure this, the following Winning Bidder's contractual obligation is as follows:

- Ensuring an efficient project monitoring and the entire duration of the maintenance and warranty support on HW and SW of the procured ICT equipment.

- Maximize the mobility during the crucial deployment of the procured ICT equipment during the installation supervision, acceptance, testing, commissioning, system integration, and final acceptance of the ICT equipment.

1.2.5 Access to Winning Bidder's online documents, manuals, and datasheets.

1.2.6 Access to an online fault ticketing system.

1.2.7 Twenty-four hours a day, seven days a week (24/7) Technical Support must be provided by the Winning Bidder.

1.2.8 Replacement of damaged equipment (DWDM/ROADM, Optical amplifier, rectifier, and other parts of the system)

1.2.9 Equipment software upgrade and updates.

1.2.10 Conduct monthly physical inspections for the coverage area

1.2.11 Maintenance of materials and equipment

1.2.12 Secure 24/7 on-call standby maintenance team for immediate response in case of system failure/trouble

1.2.13 The Winning Bidder warrants the availability of spare parts for at least ten (10) years.

1.2.14 The DWDM system must be supported by any document from the Manufacturer that the equipment to be supplied should not reach its End of Life in the next 5 years.

1.2.15 Submission of necessary reports / documentations

1.2.16 Other necessary works/activities required in the operations and maintenance.

1.3 Fiber Optic Cable Build Component

1.3.1 After the completion and acceptance of the FOC segments, the two (2) years warranty and maintenance support will commence.

1.3.2 During the project deployment and the first two (2) years of the warranty and support, the Winning Bidder must provide at no cost to DICT, the four (4) service vehicles preferably 4x4 pickup trucks including but not limited to fuel, insurance, maintenance and to ensure this, the following Winning Bidder's contractual obligation is as follows:

- Ensuring an efficient project monitoring and the entire duration of the maintenance and warranty support of the procured FOC.

- Maximize the mobility during the crucial deployment of the procured FOC during the installation supervision, acceptance, testing, and final acceptance of the FOC.

1.3.3 The maintenance work includes the following services to be rendered only to the eight (8) FOC route segments. The

maintenance works for the 250 km air-blown 144-core miniFOC must not be part of the project;

- Conduct physical inspections and corrections of the network for the coverage area if necessary.
- All routes covering all active agencies connected must be inspected at least every quarter per year.
- Restoration and replacements of damaged and/or stolen fiber optic cable
- Pole replacement/relocation/straightening/ erection.
- Re-tensioning and maintaining separation of fiber optic cable to other facilities.
- Repair/restoration of ODF/patch panel including the splicing closure.
- Repair of broken duct/conduit system and other underground facilities
- Cleaning, dewatering, and leak repair of manholes and hand holes.
- Replacement of FOC pigtail and/or patch cord at the ODF.
- Report of damaged Equipment (Media Converter, Switch, router, and other active devices) part of the project.
- Regular update of fiber core assignment record.
- For new installation, repair, and restoration of telecommunication conduits/pipes/micro ducts and fiber optic cable, the Winning Bidder must submit a revised as-built plan, test results, material consumption, and other necessary documents.
- Maintain its own strategic warehouses capable to store and deploy its materials and machineries during preventive and corrective maintenance.
- Secure 24/7 on-call/standby maintenance team for immediate response in case of network failure.
- All necessary tools, equipment, vehicles, facilities, and materials must be available at all times.

- The Winning Bidder must warrant that Goods supplied under the Contract are new, unused, of the most recent or current models, and that they incorporate all recent improvements in design, materials, except when the technical specifications required by DICT provide otherwise.

- The Winning Bidder further warrants that all Goods supplied under this Contract must have no defect, arising from design, materials, or workmanship. From any act or omission of the Bidder that may develop under the normal use of the Supplied Goods in the conditions prevailing in the country of the final destination.

- The warranty must cover full replacement of defective items, free of charge, including labor, spares, and materials within the warranty period.

2. Service Level Agreement (SLA)

2.1 The Winning Bidder must consider all interruptions in service as an urgent priority. The Winning Bidder must assign competent technical staff to provide online technical support during network outages, technical issues, technical advice, etc. upon receipt of call or email and must be available twenty-four (24) hours a day, seven (7) days a week.

2.2 The Winning Bidder must maintain hardware spare service which enables the DICT to receive a service unit for defective hardware for an agreed period.

2.3 The Winning Bidder shall strictly implement the response time target on the below table to ensure high network reliability and availability for transponder / muxponder system and optical transport network system

SERVICE ITEM		**BASIC SUPPORT**	
Helpdesk		24 hours x 7 days a week	
Emergency Service		24 hours x 7 days a week	
ALARM SEVERITY LEVEL	**CRITICAL**	**MAJOR**	**MINOR**
Response Time (After receipt of advice)	Within 1 hour	Within 8 Business hours	Within 24 Business hours

Restoration Time (Exclude travel time)	Within 6 hours	Not Applicable (non-traffic affecting)	Not Applicable (non-traffic affecting)
Progress Update Time (Escalation)	Update every 1 hour	1 update every day	1 update every week
Resolution Time	15 Business Days	45 Business Days	90 Business Days
Root Cause Analysis (RCA Report)	Within 1 calendar day after final resolution time		

2.4 The SLA template is herewith attached as Annex D. The content and format can be revised as needed by the End User or as required to optimize the SLA.

2.4.1. For the SLA agreement from the Data Center Facility Provider (Equinix), the SLA Agreement must be submitted by the Winning Bidder to the End User for review and approval.

2.4.2. For the Remote Hand Support services at Equinix LA4 Data Center inline with the standard SLA to all co-locators subscriptions, the Winning Bidder shall provide the response time target.

2.5 The Winning Bidder must provide the escalation process matrix.