

TERMS OF REFERENCE

Selection of Consulting Firm to Develop Digital Strategy, & RFP for SI Selection for Tamil Nadu Urban Habitat Development Board (TNUHDB) Under World Bank funded TNHHD Project.

1. Background

Tamil Nadu is considered a pioneer in India for leading efforts on affordable housing. It was the first state in India to set up an institution dedicated to issues of slum improvement – the Tamil Nadu Urban Habitat Development Board TNUHDB) - and has successfully implemented the Prime Minister Aawas Yojana (PMAY)-Urban, the sites and services program, among others. Despite these efforts, housing shortage in Tamil Nadu was estimated at around 1.2 million units¹; with a burgeoning urban population, and substantial gap in housing for economically weaker section (EWS), the pressure on housing provision for this income group through public institutions such as TNUHDB has only increased.

1.1 Tamil Nadu Housing and Habitat Development Project (TNHHDP)

TNHHDP is a World Bank funded project aiming to strengthen the housing sector institutions of Tamil Nadu for increased and sustainable access to affordable housing. The project is implemented through multiple implementation agencies viz:

- i). Tamil Nadu Urban Habitat Development Board (TNUHDB),
- ii). Tamil Nadu Infrastructure Fund Management Corporation Limited (TNIFMC) and
- iii). Chennai Metropolitan Development Authority (CMDA).

As mentioned above, TNHHDP aims to support innovations in Housing Finance and strengthening of housing sector **institutions in Tamil Nadu to expand access to affordable housing and improve the sustainability of housing institutions and programs.**

Among others, TNHHDP aims to finance technical assistance and capacity building support to state level institutions and their programs. Technical assistance support to TNUHDB include, inter-alia, (i) improving the institutional and regulatory framework, and business procedures; (ii) enhancing sustainability of the existing housing programs; (iii) improving targeting and eligibility criteria; (iv) designing new housing programs; (v) promoting housing finance for EWS households from affordable housing finance companies, small finance banks, non-banking financial companies, and microfinance institutions; and (vi) carrying out additional technical support to improve the performance of housing institutions. More details of the project are available in the Project Appraisal Document (PAD) available at the URL <https://documents1.worldbank.org/curated/en/671411590112928230/pdf/India-Tamil-Nadu-Housing-and-Habitat-Development-Project.pdf>.

1.2 Tamil Nadu Urban Habitat Development Board (TNUHDB)

The TNUHDB is governed by the Tamil Nadu Slum Areas (Improvement and Clearance) Act, 1971 and is functioning under the control of a Chairman, Managing Director and Joint Managing Director. There are three main functional divisions in the organization namely:

¹ As per Housing Diagnostic Study undertaken at the request of the Housing and Urban Development Department (HUDD), Government of Tamil Nadu in 2019-20.

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- 1 Administration & Establishment
- 2 Finance & Accounting and
- 3 Technical.

Since its inception, TNUHDB has constructed 2.65 lakh tenements and provided developed plots to 1.31 lakh families in 504 slums. TNUHDB has invested INR 9777.11 crore to implement various capital works for the urban slum families till March 2019. They have built 1.10 lakh tenements/houses in those 41 years, spending INR 2148 Crores. In addition, provided developed plots to 1.31 lakh families in 504 slums. Whereas, from 2011 to March 2019, they have constructed 1.55 lakh tenements in 9 years with a spend of INR 7622.87 Crores on various programs. In the last 10 years beginning 2009, the number of tenements built is approximately 4 times, more than tenements being built in 41 years from 1970 to 2011. This could be attributable to various reasons including demand. Similarly, in 2019-20, 1.06 lakh tenements/houses were projected to be completed, which is approximately 9 times faster as compared to number of tenements being built in 2011-19. More details about TNUHDB, its functioning and organizational structure are provided in Annexure I.

1.3 Assignment Context

TNUHDB is still providing most of its services in manual format while most of the agencies in the state have embraced e-Governance and digital delivery of public services. TNUHDB now wishes to enhance capacities for online services delivery (OSI) through effective leveraging of Digital platforms and industry 4.0 technologies such as Blockchain, Data Analytics, Artificial Intelligence (AI), Internet Economy, 5G, and the Internet of Things (IoT), etc. Accordingly, TNUHDB proposes to deploy institutional and technical mechanisms to deliver integrated and connected online services for citizens of Tamil Nadu in compliance with the Whole of Governance (WOG) principle.

The backbone of the digitalization initiative would be a state-of-the-art **Digital Platform and ERP system with multichannel service delivery features, Integrated Information Management and Data Analysis capabilities and an interactive citizen engagement and grievance redress system**. The digital platform will be designed to be able to collect data from multiple sources (Government and non-government), seamlessly integrate and analyze the data / information and provide useful information to support 24/7 service delivery, informed decision-making, improve operational effectiveness of project activities and monitor and evaluate performance to facilitate quick corrective action, where required. The system needs to be well-designed and easy to use for smooth functioning of different units of TNUHDB. In addition, multiple mobile and web-based service delivery tools and interfaces will be developed during the project implementation period. These systems will need to be developed to be compliant with Tamil Nadu Government's Information Technology Department Policy note of 2020-2021² and pre-defined open standards and architecture as enumerated in IndEA (India Enterprise Architecture) framework³.

² https://cms.tn.gov.in/sites/default/files/documents/IT_e_pn_2020_21.pdf

³ https://www.meity.gov.in/writereaddata/files/IndEA_Framework_1.0.pdf

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Additionally, the system will need to be compliant with all the cyber security and data privacy guidelines notified by Government of Tamil Nadu and Government of India at the time of implementation of the platform.

2. Scope of Work

2.1 Objectives

The broad objective of the consultancy is to help TNUHDB management & different project stakeholders in conceptualizing, planning, guiding, and monitoring of the Digital Platform & ERP system design, development, deployment and maintenance. The consultant will also support the TNUHDB in development of capacity building and change management strategies to ensure optimum usage of ICT and new media tools developed under the project. The consultant will be responsible for providing following services:

1. Review current systems and processes being followed in TNUHDB throughout the state of Tamil Nadu (partially covered in the As-Is Study Report which will be made available to selected vendor) and develop a comprehensive digital strategy including Government Process Reengineering for implementing new Digital Platform and ERP system Brief details of current organization structure, systems and processes are provided in Annex 1. The consultant will be required to deliver:
 - a. A detailed technical assessment report consisting of all the business processes of TNUHDB, existing ICT systems and applications available with TNUHDB.
 - b. Study and prepare a report on any ICT platforms / systems available with ELCOT, NIC and Center Government sponsored programs (for example e-Office, Enterprise Document Management System, Enterprise Workflow Management System, e-Procurement platform etc.). The report shall map the use of these systems for various TNUHDB and TNHHDP activities and suggest a strategy for reuse / incorporation of these systems in proposed Digital Platform and ERP system.
 - c. Conduct Business Process Reengineering study and provide recommendations for transformation and change management.
2. Prepare a comprehensive Functional Requirement Specifications (FRS) document for the proposed Digital Platform and ERP system including the workflow requirements and CRUD matrix for each of the modules. The vendor will also provide the compliance requirements to be adhered to by the SI based upon prevalent international best practices, e-Governance standards (including data security and data privacy guidelines) notified by GoTN and central government agencies.
3. Prepare Detailed Hardware Requirement (including networking, connectivity & local data backup) specifications report.



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4. Prepare draft request for expression of interest (REoI) and request for bid/proposal (RFB/RFP) documents for selection of System Integrator (SI) in prescribed World Bank format and carry out all the changes in the document as per the inputs received from the World Bank team till the time the document is approved by TNUHDB and the World Bank. The documents will contain the appropriate service-level agreements (SLAs) to ensure quality of delivery as well as the system availability and mechanisms for carrying out User Acceptance Tests for each of the deliverables. In addition, detailed requirements for capacity building of TNUHDB team will need to be assessed and included in the RFP/RFB document.
5. Provide assistance to TNUHDB in developing technical and financial evaluation criteria as per government guidelines and assist in vendor selection.
6. Provide hand holding and technical advisory support in initial digitalization efforts. This activity will require providing following deliverables:
 - a. Plan for convergence/interoperation of all the applications within the proposed state level Digital Platform and ERP System.
 - b. Plan for capacity building and implementation of the system.
 - c. Coordination with various stakeholders for synchronized implementation

2.2 Scope of Work

Task 1: Assessment Studies, Formulation of Digital Strategy, BPR Plan, FRS & SRS Documents

The consulting firm is required to undertake the following activities:

I) **Understanding of Scope of work and Project Components**

- a. Consulting firm shall thoroughly understand the TNUHDB functions, TNHHD project details, the components of various schemes implemented by TNUHDB, the funding mechanism, the implementation framework and the guidelines for implementation associated components of TNHHD project. Consulting team shall be responsible for ensuring efficient communication with State government ICT agencies (ELCOT, NIC and other agencies) on a continued basis and ensure conformity of the digital platform blueprint to all guidelines and frameworks released by the state government and central government.
- b. Study the present organization structure, functions, and services of the associated departments in TNUHDB. The consulting firm shall thoroughly study and document the organization structure, functions and services of the department and allocation of business rules and set of instructions for each department associated with TNUHDB. Some of the information is available in the background note attached as Annexure I. The firm will be required to perform stakeholder's analysis and objectively assess & analyze



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the current state of affairs of the various departments and map the services and associated processes at the Department & their related branches and interlinked organizations.

II) E- Readiness assessment

- a. Identify and assess systems and methodologies currently used by TNUHDB for monitoring and evaluating services delivery and performance, including institution responsibilities at the state, regional, district, block and GP level and existing structures available to monitor and evaluate service levels. This will involve undertaking detailed assessment of all different information and ICT systems available and mapping their use for project objectives. The consultant will review key information captured and the mechanisms currently used to collect, aggregate, validate and process data for decision making. The consultant will identify gaps in existing systems and make recommendations for improvement so that all disparate systems can be used in an interoperable manner through a digital platform and ERP system.
- b. Examine existing and possible barriers to building integrated ICT platform and suite of service apps; and identify the behavioral and structural changes required to enhance service delivery and TNUHDB performance. The consultant will also recommend capacity building measures and tools required for sector wide usage of ensure state of the art service delivery and performance monitoring using ICT based systems.
- c. Review national (India) and state level ICT systems for service delivery, citizen engagement, grievance redress and M & E for the sector and develop a strategy to reuse existing best practice systems with customization and value addition undertaken through TNUHDB digitalization.
- d. Conduct Orientation and deep dive workshops on Proposed ICT platform with participants from various stakeholder groups as advised by TNUHDB and TNHHP teams. Project Management processes, document formats, Roles and Responsibilities of different stakeholders would be finalized and signed off during these workshops.

III) Business Process Reengineering, To- Be and Legal Changes

- a. Redefining goals and objectives with emphasis on TNUHDB digitalization objectives
- b. Suggest reengineering according to the system architecture and environment finalized.
- c. Suggest the required software, middleware, network management solutions and distributed environment based on the redesign.
- d. Design of To-Be processes and Functional Requirement Specifications (FRS) of new system.
- e. Delivery channel architecture, hardware, software and user interface details

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IV) Project Governance requirements

- a. Risk factors impacting implementation of Integrated ICT platform for TNUHDB.
- b. Monitoring and Evaluation framework
- c. Governance Structure for implementation and subsequent management of the system
- d. Financial model and estimates
- e. Cost estimates of the project
- f. Source of funding for Plan period and beyond Plan to ensure sustainability.
- g. Cost benefit analysis with financial models

Task 2: Bid Process Management

- a) **Preparation of RFP:** To prepare REOI (Request for Expression of Interest) followed by Request for Proposal (RFP) using the Standard Bidding Document (SBD) of the World Bank & related documents for selection of System Integrator (SI) for implementation including Application software, testing, application training, hardware/ software & networking requirements, data digitization, operations & management, etc. For preparation of the RFP for selection of SI, the consultant shall obtain guidance from the TNUHDB management and the World Bank Task Team. The consultant shall also be responsible for drafting contract and service level agreements (SLA) between various stakeholders involved in the state level implementation.
- b) **Selection of System Integrator:** After preparing the RFP, provide support to TNUHDB in procurement of specialist ICT services for development of Platform and all associated applications - including pre-qualification, evaluation of bids, preparation of evaluation reports and contract negotiation.

3. Activities and Timelines for the Consulting Firm to Develop Digital Strategy & RFP for SI Selection

S.No.	Activities	Timeline	Payment Terms
1.	Kick Off Meeting	T_0	
2.	Submission of Inception Report	$T_1 = T_0 + 2$ weeks	5%
3.	Submission of AS IS – TO BE Report & Stakeholder Meeting Report	$T_2 = T_1 + 6$ weeks	25%
4.	Submission of Comprehensive Digital Strategy Report.	$T_3 = T_2 + 2$ weeks	10%
5.	Submission of Functional Requirement Specification (FRS) Document.	$T_4 = T_3 + 4$ weeks	10%
6.	Submission of Software Requirement	$T_5 = T_4 + 2$ weeks	10%

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	Specification (SRS) Document		
7.	Submission of Detailed Hardware Requirement Document	$T_6 = T_5 + 2 \text{ weeks}$	10%
8.	Preparation and Submission of REol, RFP and Contract Documents for System Integrator (SI) selection	$T_7 = T_6 + 3 \text{ weeks}$	-
9.	Bid Process Management and assisting TNUHDB in selecting the SI	$T_8 = T_7 + 5 \text{ weeks}$	10%
10.	Hand holding and Technical Advisory Support	$T_9 = T_6 + 10 \text{ weeks}$	20%

Total Time Period of Activity = 36 weeks (9 months)

4. Qualification Criteria and Team Requirements

4.1 Consulting Organization Profile

The successful consultancy firm is expected to have:

S. No	Eligibility Criteria	Supporting documents for fulfilling the Eligibility Criteria
1	Bidder should be a Company registered in India under the Companies Act 1956 / 2013.	a) Copy of the Certificate of incorporation should be submitted. b) Copy of the work order dated on or before 31.03.2016 obtained from the customer or agreement signed dated on or before 31.03.2016 with the customer for any IT Services and Completion Certificate should be submitted.
2	The Bidder should have valid ISO 27001:2011 & ISO 20001:2011 or higher certificate in the name of the bidder.	Valid copy of ISO 27001:2011 & ISO 20001:2011 or higher Certificate should be enclosed.
3	Bidder should have an average annual turnover of Rs.1 Crore and above, in each of the last three (2018—19, 2019-20 & 2020-21) audited financial years.	Copies of the Audited balance sheet for the last 3 financial years should be submitted.
4	The Bidder shall have local office in Chennai.	Copy of the Proof/Rental Agreement/land line telephone bills should be submitted. If the Bidder is not having an Office in Chennai, a necessary Undertaking letter to open the Office in Chennai within 10 days of signing the

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		agreement should be submitted.
5	The bidder should have 75% of the revenue from IT related operations. The bidder should have primary business operations in IT Software development in Tamil Nadu.	Certificate from the Chartered Accountant should be enclosed for the last three ((2018—19, 2019-20 & 2020-21) financial years along with supporting documents.
6	At least 3 nos. of completed projects in development of IT resources in GoTN departments /PSUs for the value of Rs. 50 Lakhs or above in each of the last 3 years.	Completion certificate from the authorized signatory of the Bidder to be submitted.
7	The Bidder should not have blacklisted by any Government / Quasi government agency or any Multi-Lateral Donor Body (World Bank, ADB, JICA, etc.) during the past 3 years (even if blacklisted was subsequently withdrawn).	Self declaration Certificate should be submitted

4.2 Project Team Requirements

It is envisaged that the consultancy project team would consist of professionals with relevant skills with relevant experiences. The team is expected to have at least following key experts:

Sr. No.	Designation	Functional Scope	Education Qualification	Experience
1	Team Lead, Solution/ System architect/ Data architect, RFP / Bid Management Expert	Project Management, define product scope, milestone schedules, stakeholders' meetings to update on project, escalate blockers, system and solution architect, data modelling, Procurement / RFP / Bid planning. Project Management, assist in review of MIS architecture, database architecture and overall system and solution architecture	M.C.A / M.E (Computer Science Engineering) / M.Sc (IT) / M.Tech (IT) M.Sc (Software Engineering)/ M.Sc (Computer Science) (or) equivalent	>15 Years
2	MIS/ERP Architect / Specialist	Data mapping, interoperability of data, data structure, define standard & frequent data requirements to set up processes, development of MIS Design Architecture (MDA), coordination with external stakeholders, documentation, Review of SI with regards to	M.C.A / M.E (Computer Engineering)/M.Sc. (IT) / B.Tech (IT) /B.E (Computer Science Engineering) / M.Sc (Computer Science) (or) equivalent	>5 to <=8 Years

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Sr. No.	Designation	Functional Scope	Education Qualification	Experience
		Implementation of MIS development, assist in conducting UAT and rollout of the application		
3	Functional Business Analyst – Process	Stakeholder workshops, focus group discussions, analyze existing data sets, API requirements, process flow designing, propose workflow, SOW plan for RFP and Bid	M.C.A / MBA / MSW (or) equivalent	>5 to <=8 Years
4	Functional Business Analyst – Domain (Urban)	Stakeholder workshops, domain specific focus group discussions, understand domain requirement, map business process, write domain specific functional/business rules based on the schemes implemented / activities performed, FRS preparation.	M.C.A / MBA/MSW (or) equivalent	>3 to <=5 Years



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ANNEXURE I: BACKGROUND NOTE AND EXCERPTS FROM PRE-FEASIBILITY STUDY REPORT

LEVERAGING ICT & NEW MEDIA TECHNOLOGIES FOR TRANSFORMING SERVICE DELIVERY OF TAMILNADU SLUM CLEARANCE BOARD (TNUHDB)

1. Executive Summary

1.1 Context

Tamil Nadu is considered a pioneer in India for leading efforts on affordable housing. It was the first state in India to set up an institution dedicated to issues of slum improvement – the Tamil Nadu Urban Habitat Development Board (TNUHDB) - and has successfully implemented the Prime Minister Awas Yojana (PMAY)-Urban, the sites and services program, among others. Despite these efforts, housing shortage in Tamil Nadu was estimated at around 1.2 million units⁴; with a burgeoning urban population, and substantial gap in housing for economically weaker section (EWS), the pressure on housing provision for this income group through public institutions such as TNUHDB has only increased.

The World Bank funded “Tamil Nadu Housing and Habitat Development Project (TNHHDP)” is aimed at supporting the Government of Tamil Nadu (GoTN) in strengthening operational efficiencies of key housing-sector implementing agencies towards achieving GoTN’s policy goals of ensuring ‘access to housing for all’ within this decade. The TNUHDB is the nodal implementing agency for the TNHHDP.

TNUHDB is responsible for providing housing, shelter, and livelihood support to slum dwellers either in-situ upgrading and/or through relocation, resettlement and rehabilitation of slum dwellers. TNUHDB Head office is in Chennai and it has 22 divisional offices and 10 estate offices spread across Tamil Nadu. The agency, since its inception in 1970, has been continuously working to enhance its efficiency and carry out Governance Process Reengineering initiatives. However, despite Tamil Nadu being one of the leading states in deployment of e-Governance solutions and provision of Electronic Public Services (EPS), TNUHDB has not embraced the digital and new media technologies the way other agencies in the state have done; most of the backend operations of TNUHDB as well as service delivery remain largely manual.

Effective leveraging of Digital platforms and industry 4.0 technologies such as Blockchain, Data Analytics, Artificial Intelligence (AI), Internet Economy, 5G, and the Internet of Things (IoT), etc. can help TNUHDB transform the delivery of services and enhance its efficiency significantly. TNUHDB proposes to deploy institutional and technical mechanisms to deliver integrated and connected online services for citizens

⁴ As per Housing Diagnostic Study undertaken at the request of the Housing and Urban Development Department (HUDD), Government of Tamil Nadu in 2019-20.

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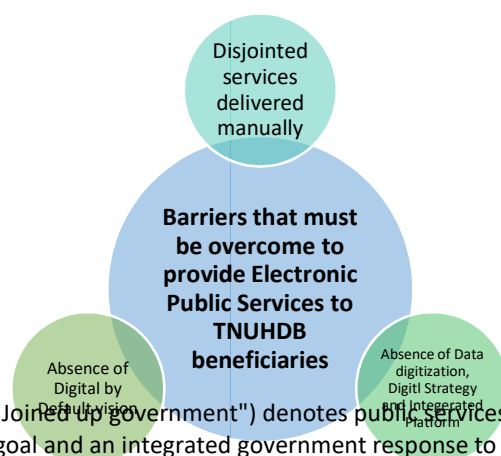
of Tamil Nadu in compliance with the Whole of Governance (WOG) principle.⁵ The digitization initiative will result in development of an integrated digital platform and an Enterprise Resource Planning (ERP) system resulting in delivery of multiple citizen services through a Web Portal and Mobile Applications Suite in line with Digital India mission⁶ and in compliance with India Enterprise Architecture (IndEA) principles⁷.

It is, therefore, proposed that a detailed Functional Requirement Specification (FRS) Report, System Requirements Specifications Report (SRS) and Business Process Reengineering (BPR) report for transition to online system be prepared to clearly articulate the technological architecture, ERP modules descriptions along with workflow and technology standards to be followed to help TNUHDB pro-actively enhance infrastructure, digital strategy, governance processes and capacity to leverage state of the art digital platforms and solutions for orchestrating transformation in service delivery.

Selection of a System Integrator (SI) for developing and deploying an integrated digital platform for multiple units within the TNUHDB is the key objective of this initiative. In order to facilitate the formulation of digital strategy and augmentation of digital infrastructure in TNUHDB, an "As-Is Study" of TNUHDB's current operations was commissioned. This involved meeting 25 stakeholders from TNUHDB and the World Bank, conducting 40+ interviews and discussions as well as collecting documents, reports, website, and published materials. The study of collated information and analysis of interviews and discussions, led to identifying the gaps in TNUHDB for achieving e-Office and e-Governance. This note provides summary of the findings as well as a high-level understanding of the vision for digitalization of TNUHDB services.

1.2 Current Situation

A multitude of services are provided by TNUHDB to its beneficiaries. As the demand of services rendered by TNUHDB has increased manifold, TNUHDB wants to embrace e-Governance and enhance its digital infrastructure. This will also facilitate the Tamil Nadu government's objective to achieve Slum Free Cities by 2023.⁸



⁵Whole-of-Government (also termed as "One stop Government", "Joined up government") denotes public services agencies working across portfolio boundaries to achieve a shared goal and an integrated government response to particular issues (*The Whole-of-Government Approach to Public Sector Reform - Christensen et al 2007*)

⁶Digital India is a flagship program of the Government of India with a vision to transform India into a digitally empowered society and knowledge economy (<https://digitalindia.gov.in/>)

⁷IndEA provides a generic framework (based on The Open Group Architecture Framework -TOGAF) comprising of a set of architecture reference models, which can be converted into a Whole-of-Government Architecture for India (<http://egovstandards.gov.in/sites/default/files/IndEA%20Framework%201.0.pdf>)

⁸[Housing For All – TAMILNADU SLUM CLEARANCE BOARD \(tnscb.org\)](https://tnscb.org/)

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As per findings of “As-Is Study”, it is established that TNUHDB still operates as traditional paper driven office. There is enormous need for coordination between multiple departments, both internal and external. As of today, most of the coordination is done through physical in-person meetings at defined frequency and at scheduled times. All processes and activities within PMU, Architecture Design and Planning, Admin, Finance, Structural Design and Quality Control, Community Development, Divisional Office, Environment and Estate Office are manual, with most of the activities documented in ledger and books. Similar set-up is seen for payroll and pension management, and human resource (HR) management also. The department officers use desktops and Microsoft Excel in some sections for their activities. There is a scope for total transformation and moving from paper based to paperless operations. Current management of TNUHDB is positively inclined to leverage state of the art digital technologies for enabling this transformation.

1.3 Objectives of the Assignment

The TNUHDB needs to hire a consulting firm to develop a clear and concise framework for action outlining the Short, Medium- and Long-Term steps required to advance TNUHDB status in Online Services Delivery. The selected firm may be, inter alia, required to re-organize existing applications into an integrated digital platform for TNUHDB SMEs and ensure that the TNUHDB ERP System (Backend) incorporates current international best practice elements on interoperability and links horizontally to other ministries providing services to slum dwellers.

Accordingly, The TNUHDB is looking at procurement of a consultancy firm(s)⁹ (hereinafter referred to as a Consultant) who can help it develop a digital strategy, including the SRS/FRS/BRS and hardware specifications, as well as support procurement of a System Integrator (SI) for developing an “Integrated Digital Platform and ERP system for TNUHDB”. In particular, following inputs and outputs are expected from the selected Consultant:

7. Review current systems and processes in TNUHDB (partially covered in the As-Is Study Report which will be made available to selected vendor). Brief details of current organization structure, systems and processes are provided in this document. Annex 1.
8. Provide hand holding and technical advisory support in initial digitalization efforts.
9. Prepare a comprehensive Functional Requirement Specifications (FRS) document for the proposed Digital Platform and ERP system including the workflow requirements and CRUD matrix for each of the modules. The vendor will also provide the compliance requirements to be adhered to by the SI based upon prevalent international best practices, e-Governance standards (including data security and data privacy guidelines) notified by GoTN and central government agencies.
10. Hardware (including networking, connectivity & local data backup) specifications.

⁹ Firms can bid on their own, or they can bid in association or a Joint Venture (JV) with other firms, ensuring compliance to the World Bank Procurement Guidelines.

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11. Prepare draft request for expression of interest (REoI) and request for bid/proposal (RFB/RFP) documents for selection of System Integrator (SI) in prescribed World Bank format and carry out all the changes in the document as per the inputs received from the World bank team till the time the document is approved by TNUHDB and the World Bank. The documents will contain the appropriate service-level agreements (SLAs) to ensure quality of delivery as well as the system availability and mechanisms for carrying out User Acceptance Tests for each of the deliverables. In addition, detailed requirements for capacity building of TNUHDB team will need to be assessed and included provided in the RFP/RFB document.
12. Provide assistance to TNUHDB in developing technical and financial evaluation criteria as per government guidelines and assist in vendor selection.

In order to facilitate the prospective vendors in understanding the requirements, brief excerpts regarding the organization and high-level expectations from the proposed system are provided in the sections below.

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1. Introduction

2.1 Tamil Nadu Housing and Habitat Development Project (TNHHDP)¹⁰

TNHHDP is a World Bank funded project aiming to strengthen the housing sector institutions of Tamil Nadu for increased and sustainable access to affordable housing. The project is implemented through multiple implementation agencies viz:

- i). Tamil Nadu Urban Habitat Development Board (TNUHDB),
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- iii). Chennai Metropolitan Development Authority (CMDA).

As mentioned above, TNHHDP aims to support innovations in Housing Finance and strengthening of housing sector **institutions in Tamil Nadu to expand access to affordable housing and improve the sustainability of housing institutions and programs.**

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2.2 Tamil Nadu Urban Habitat Development Board (TNUHDB)¹¹

The TNUHDB is governed by the Tamil Nadu Slum Areas (Improvement and Clearance) Act, 1971 and is functioning under the control of a Chairman, Managing Director and Joint Managing Director. There are three main functional divisions in the organization namely:

- 1 Administration & Establishment
- 2 Finance & Accounting and
- 3 Technical.

The Secretary manages administration and establishment related issues while the Financial Advisor is responsible for finance and accounting. The technical team is headed by four Chief Engineers. The Chief Engineers are assisted by seven Superintending Engineers, who head circles (defined by geographic

¹⁰ Project Appraisal Document (PAD) of TNHHDP available at the URL

<https://documents1.worldbank.org/curated/en/671411590112928230/pdf/India-Tamil-Nadu-Housing-and-Habitat-Development-Project.pdf>

¹¹ <http://www.tnscb.org/>



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limits). There are three Circles in Chennai and one each at Madurai, Salem, Trichy and Coimbatore. There are twenty-two execution divisions and nine estate offices throughout Tamil Nadu, with a separate central Structural and Quality Control (SQC) Wing situated at TNUHDB Head Office.

Since its inception, TNUHDB has constructed 2.65 lakh tenements and provided developed plots to 1.31 lakh families in 504 slums. TNUHDB has invested INR 9777.11 crore to implement various capital works for the urban slum families till March 2019. They have built 1.10 lakh tenements/houses in those 41 years, spending INR 2148 Crores. In addition, provided developed plots to 1.31 lakh families in 504 slums. Whereas, from 2011 to March 2019, they have constructed 1.55 lakh tenements in 9 years with a spend of INR 7622.87 Crores on various programs. In the last 10 years beginning 2009, the number of tenements built is approximately 4 times, more than tenements being built in 41 years from 1970 to 2011. This could be attributable to various reasons including demand. Similarly, in 2019-20, 1.06 lakh tenements/houses were projected to be completed, which is approximately 9 times faster as compared to number of tenements being built in 2011-19.

■ Vision & Motto

TNUHDB Vision	Slum Free Cities in Tamil Nadu by 2023
TNUHDB Motto	GOD WE SHALL SEE IN THE SMILE OF THE POOR

2.2.1 Organizational Structure

The Figure 1 below is TNUHDB's updated organization chart.

■ Roles / Responsibilities

The roles and responsibilities of TNUHDB staff are described below:

- a. CHAIRMAN Head of the Department**
 - Policy decisions relating to the functions of TNUHDB.
 - Appointing Authority for the cadre of Assistant to Estate Officer in Non-Technical subordinate service
 - Disciplinary authority for major punishment for above category of posts.
 - Allotment of plots, tenements and buildings owned by TNUHDB.
- b. MANAGING DIRECTOR – Next to the Chairman of the Board**
 - Controlling Officer both for Technical and Non- Technical functions of the Board.
- c. JOINT MANAGING DIRECTOR – Next to the MD of the Board**
 - Acts as Project Director for Project Management Unit (PMU).
 - Controlling PMU and managing specialists and other support technical staff.
 - Overall responsible for project management and execution of TNUHDB activities.

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d. SECRETARY

- Overall controlling Officer for Non-Technical functions of the Board.
- Review of collection work of Revenue Officers and Estate Officers.
- Sanction of all loans and advances except GPF to all staff of TNUHDB.
- Appointing authority up to the level of Junior Assistant in Nontechnical subordinate service.
- Disciplinary authority for major punishment up to the level of Junior Assistant.
- Sanction of leave and increment to the categories above the Level of Assistant Engineers on technical side and Estate Officers on Non-technical side.
- Responsible for boards legal issues.

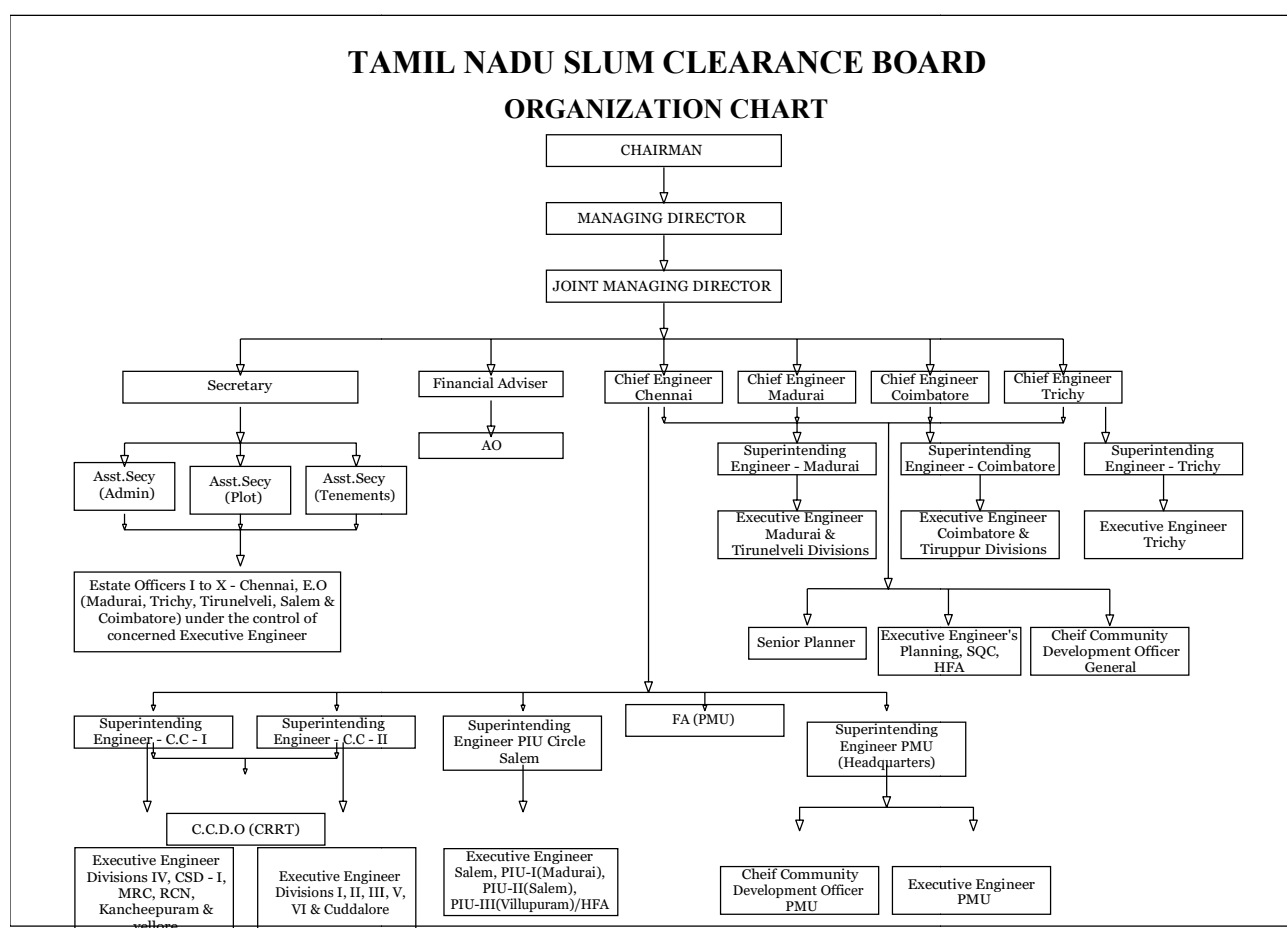


Figure 1 - TNUHDB Organization Chart(Please edit name as- Tamil Nadu Urban Habitat Development Board and add Executive Engineer, SQC under Superintending Engineer, PMU- couldn't edit this fig.)



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e. CHIEF ENGINEER

- Overall controlling Officer for Technical functions of the Board.
- Appointing authority for the post of Assistant Engineer and Junior Architect and Planning Assistant under Engineering Officers service and Junior Engineers under Technical Subordinate service.
- Disciplinary authority for major punishment for the above categories of posts.

f. FINANCIAL ADVISOR

- Overall controlling Officer for Financial Management, Audit ADVISER and Accounts of the Board.
- Preparation of Budget Estimate and Revised Budget Estimate.
- Sanction of GPF to all staff of TNUHDB.
- Reconciliation of Board Account with Bank.
- Release of funds to Divisions with reference to Budget and utilization.
- Payment of all bills.
- Disciplinary authority to impose minor penalties in respect of all members of subordinate and basic services working under his control.

g. FINANCIAL ADVISOR (PMU)

- Handles both ADB and World Bank Funds flowing into TNUHDB

h. SUPERINTENDING ENGINEER

- Overall supervision of functions of Divisions.
- Appointing authority for all posts under Work Charged Establishment.
- Disciplinary authority to impose major penalties to the above staff.
- Calling of Tenders and issue of work order.

i. SENIOR PLANNER

- Preparation of all layouts, Type designs, designing of EWS/LIG units , Office complexes, Community halls, Shopping Complex etc and forwarding the same to CMDA and DTCP and obtain approval.
- Co-ordinating planning approval with other divisions in TNUHDB and other outside agencies like HUDCO, TUFIDCO, CMDA, DTCP etc. Site inspection prior to preparation of layout/design periodical visits to the project site.
- Preparation of designs in compliance with RUDF
- Reviewing the work done in planning cell, finalizing the project and submitting the same to the approval of Chief Engineer.



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- Suggesting colour schemes, landscape, grills compound walls, arches making alterations/revisions as per necessity.
- Preparation of Trade Fair drawings, display drawings and documentation drawings.

j. EXECUTIVE ENGINEER

- Supervision and execution & maintenance of works in respective division.
- Sanction and payment of contractor bills.
- Settlement of all claims of the staff working in Division.
- Management of Finance, Accounts and Audit of Division.
- Disciplinary authority to impose minor penalties in respect of all members of subordinates working in the Division.
- Redressal of beneficial grievances.

k. CHIEF COMMUNITY DEVELOPMENT OFFICER

- Overall Supervision and Monitoring of Community Development activities of the Board Employment training, Elimination of Child Labour, Rehabilitation & Resettlement, Enumeration and Verification Documentation of Activities, Submission of PDI, report to Government.
- Co-ordinating with Government, UNICEF, CRF, Rajiv Gandhi Foundation and other NGOs.

l. ASSISTANT SECRETARY (TENEMENTS)

- Allotment and cancellation of Tenements and allied matters.
- Allotment and cancellation and Regularization of Bunks, Shops, Fireproof Sheds, R.E. Schemes etc. and compilation of DCB.
- Remuneration, Issue of Pass Books and Eviction.

m. ASSISTANT SECRETARY (ADMN.)

- Establishment of Non-Technical and Technical Staff.
- Purchases and Issue of stationery and Furniture.
- Maintenance of Record, Board Meeting, Press & Telephones.
- Sanction of leave and increment to the staff up to the level of Estate Officers, imposing of minor penalties on all members of subordinates.

n. ASSISTANT SECRETARY (PLOTS)

- Allotment and cancellation of Plots in MUDP, TNUDP scheme sand allied matters.
- Acquisition and Alienation of land and allied matters.
- Processing Chief Minister's cell petitions and Grievance Day petitions.

o. ACCOUNTS OFFICER



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-
- Assisting the FINACIAL ADVISER and controlling the Accounts and Audit Wings of the Board office.
 - Verification of Audit replies

p. HEAD SURVVEYOR

- Responsible for surveying during allocation and issue of sale deed
- Submit survey report to court or to the Estate office, based on survey request.
- Handling survey related activities for RTI

2.3 Overview of Functional Units and Workflow for Service Delivery

A) Project Management Unit (PMU)

TNUHDB is in the business of providing housing and shelter for the slum dwellers. The services are provided through the Project Management Unit (PMU). The process described below applies to all projects, regardless of the funding source.

The land for housing is provided by urban local bodies or the Collectorate. Alternatively, TNUHDB can also find lands in the core city within municipal limits and request the collector to allocate the same for TNUHDB. The collector directs the District Revenue Officer (DRO), who in turn asks the Tahsildar of that taluk (or) the Revenue Inspector (RI) to investigate the merits of the request.

Once the land is identified, “Field Measurement Book” and “Survey drawings” are prepared. Based on the survey drawings, a masterplan and relevant architectural drawings are prepared. On obtaining “Enter-upon” permission for the identified resettlement land from revenue authorities, preliminary activities begin. The land measurement is tallied with Field Measurement Book. If there are deviations (e.g., encroachment or existing buildings), the remaining land is measured by the Tahsildar Office Surveyor and team members are asked to prepare different survey sketches for the project.

Once the land is finalized, a soil test is done. To understand the nature and bearing capacity of soil, as this has implications on the built structure (e.g., maximum viable building height). Conformity to planning regulations (such as access road widths) are also verified. This, in turn, impacts the maximum permissible FSI as per the prevailing regulations (i.e., Tamil Nadu Combined Development and Building Rules, 2019).

Land parcel and access road belong to either state or urban local body (ULB). To transfer land/access road from the ULB to TNUHDB, the Commissioner of Land Administration (CLA) will send a recommendation letter to revenue authorities with a copy attached to Secretariat. Subsequently, a Government Order (GO) will be issued. Alternatively, if the land is government owned, the Collector will approve the transfer and send it to CLA. The CLA will then send to Government which will scrutinize the land parcel (of survey numbers for the extent and dimensions). Then, the land will be transferred to TNUHDB for a particular purpose which has to be adhered to, failing which a fresh approval must be

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obtained. GO will be issued by GOTN and land transfer certificate to TNUHDB is issued by Tahsildar. Once the handover process is completed, the Tahsildar and Slum Clearance Board will sign final copies of the documentation.

If a particular project has more than 500 houses and the plinth area of the total project exceeds 20000 Sq mt. environment clearance should be obtained from Tamil Nadu Pollution Control Board (TNPCB). TNUHDB usually engage an environmental consultant to examine and mitigate:

- a) air, noise, and water quality.
- b) environment impact in surrounding areas.
- c) increase in traffic during project lifecycle.

This consultant is also responsible to support TNUHDB obtain clearance from State Pollution Control Board, water board, traffic control and electricity board. Based on the stage of the project there can be checklist to monitor or take stock.

On completion of the soil test, the design team, either in house or external (contracted private firm) will prepare the masterplan. The planning and design team and structural design (outsourced sometimes) team and quality control team will provide the necessary designs. Structural design team will decide on pillars, beams, slabs, and its dimensions. Once the designs are finalized, the project will be tendered out and construction commences.

B) Housing Schemes and Programs

The primary objective of TNUHDB is to provide housing for slum dwellers. There are three types of intervention viz

- Green field development,
- In-situ upgradation,
- Reconstruction.

Some recent housing schemes include JNNURM (Jawaharlal Nehru National Urban Renewable Mission) housing scheme, RAY (Rajiv Awaas Yojana), ETRP (Emergency Tsunami Reconstruction Project), RGRP (Rajiv Gandhi Rehabilitation Package), IAY (Indira Awaas Yojana), also a scheme called VAMBAY (Valmiki Ambedkar Awaaz Yojana). Currently it is called Prime Minister Aawas Yojana (PMAY) under the “Housing for All” program.

C) Enumeration

The people who are economically weak or slum dwellers are the people who should be enumerated and rehabilitated. The enumeration is being done by TNUHDB’s Community Development Office. As of now for PMAY, it is collected manually in Form 4a - 4b and Form 2. These forms are also shown in Appendix G – PMAY Form 4a – 4b and Appendix F – CDW Form 2 There is no app available. This information is then uploaded by the division office onto the PMAY online portal. However, for the proposed Asian

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Development Bank (ADB) project, this information is populated on a tab and uploaded on to the ADB server in Manila, Philippines. In both cases (ADB and PMAY), the information does not reside on TNUHDB's servers.

As data for resettlement and rehabilitation (R&R) projects is collected manually, there is an urgent need to digitize the process with the data being entered on a mobile device on site. This information should be loaded automatically into the portal. The app should have ability to take pictures, store them and load into the application/portal. There should be provision to edit and probably do CRUD (Create, Read, Update, and Delete) operations. There should be provision to upload documents like Aadhaar, DOB Proof, Address and Photo. Geo-Tagging reference needs to be done. For example, if there are 500 houses in a particular pocket, they should be uniquely numbered i.e., one house one tenement.

The web application should have storage capacity to hold enumerated information of all the slum dwellers for entire Tamil Nadu and should serve as the housing demand database across TN for determined target groups. Under the TNHHD, a TNUHDB team was given training for development of a mobile based application called Geo-Enabling Initiative for Monitoring and Supervision (GEMS)¹² which would collect and upload on a server real-time socio-economic data collected on field. The pilot App was developed by this team and testing of this App was successfully carried out. However, its scale-up was not done as the app stores data in a remote location with a third-party, which raised concerns on security of the data collected. However, the exercise was well-received by TNUHDB.

D) Procurement Activities

Procurement of works, goods and services are carried out by TNUHDB. Procurement of works mostly relate to its housing projects, while procurement of services relates to hiring of consultants (firms and individuals) to undertake different types of analytical studies or for operational support. Procurement of goods are mostly done for office upgrading. With the ongoing TNHHD and the proposed ADB project, procurement of services as well as procurement of works is expected to be ramped up. While procurement processes are well-understood, they could be slightly different for GoTN financed activities, and for ADB or World Bank financed activities. Both the World Bank and ADB have their stand-alone procurement interface portals, but beyond this, real-time procurement actions in TNUHDB are time consuming as they are not automated.

¹²The Geo-Enabling initiative for Monitoring and Supervision (GEMS) was launched by the World Bank to systematically enhance Monitoring and Evaluation (M&E) as well as supervision in fragile/conflict settings. This is achieved by building capacity among clients, partners, and Bank teams on the ground, to leverage field-appropriate technology for digital data collection and analysis. Using these tools and methods allows operations to enhance the transparency and accuracy of M&E and increase the accountability of third-party monitoring (TPM). At the same time, GEMS provides platforms for remote supervision, real-time safeguards monitoring, and portfolio mapping for coordination across projects and partners.

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E) Architecture Design and Planning

TNUHDB has an architecture design and planning unit jointly (with Engineering Department) responsible for site selection and architectural design related activities. Brief details are as provided below:

▪ Resilient Urban Design Framework

The TNUHDB Board has approved the Resilient Urban Design Framework (RUDF) in March 2020. The RUDF is a critical planning and design manual for TNUHDB. It can be used as a ready guide to design high-quality, sustainable, and climate-resilient developments. As an exhaustive and customized framework, this document demonstrates sound urban design and architectural design methods and enables TNUHDB to provide site specific, culturally rooted, visually rich, yet cost-effective solutions. The framework enables TNUHDB to:

- i. incorporate environmental considerations in terms of site location and planning, design, and construction,
- ii. promote integrated masterplans where urban design and landscape are intertwined cohesively,
- iii. create diversified housing products in terms of unit layouts and promote mixing of uses,
- iv. improve community participation in the design,
- v. provide inclusive spaces across user groups including youth, women, 3rd gender and the differently abled, to name a few.

▪ Process Overview of Architecture Design and Planning Department (ADP)

Architecture Design & Planning (ADP) department head will get details of approved projects for Affordable Housing Project (AHP). Then they will tentatively prepare the layout and type design, get concept approval, obtain CE's initial approval. On obtaining approval from plan approving authorities namely Chennai Metropolitan Development Authority (CMDA) / Directorate of Town and Country Planning (DTCP), it will be sent to the EE of the respective division.

Based on the layout, divisional head (EE) will prepare a Detailed Project Report (DPR). The layouts and type design are finalized by ADP department head, will check for development regulations of CMDA and regulations for rest of the state coming under purview of the DTCP. Tamil Nadu Combined Development and Building Rules 2019 (TNCDBR) is a revised rule with the amendments in Tamil Nadu Town and Country Planning (TNTCP) Act, 1971 and combined the regulations of CMDA and DTCP. These rules apply to developments, redevelopments, part constructions or reconstructions and to any additions or alterations to a building, as notified by Tamil Nadu Government on 2nd Feb 2019. So, ADP department head is required to verify if the layout and type design are aligned to TNCDBR and RUDF norms. Based on RUDF drawings, EE's will update DPRs and send to HO for State Level Sanctioning-cum-Monitoring Committee (SLSMC) approval. Then sent to Central Government for Central Sanctioning and Monitoring Committee (CSMC) approval. Once CSMC approval is given, the grant is assured to project.

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ADP Department is not involved in Beneficiary Led Construction (BLC). Housing project proposal is prepared based on EE provided survey sketches. Layout and type design are prepared based on instruction checklist, location information and soil strength. ADP Department is also involved in reconstruction. If there are 400 beneficiaries, then all 400 should be accommodated. If there is need beyond that, then they need to look for Floor a Space Index (FSI) permissibility. Depending on the site configuration, they use FSI to the optimal.

Generally, collectors give a list of the number of families to be accommodated in a given parcel of land. There is a base thumb rule, on the number of families that can be accommodated in an acre in line with TNUHDB's density norms. Based on the building heights proposed, (e.g., Ground +3, +4, +5 or +14), the number of families that can be accommodated can be derived.

All the above information is incorporated in the project proposal. Then it is sent to EE for his review and to check feasibility as per the site condition. Once EE finalizes, it is sent to planning authority CMDA in Chennai for approval; if the site is outside Chennai metropolitan area, it is sent to DTCP for approval. Upon obtaining the approval, the building approvals are given to local bodies. Finally, RERA registration is done, RERA is mandatory for Government of India to release funds.

▪ Site Selection Challenges

Prior to commencing the masterplan layout development process, it is imperative for ADP to possess a holistic view of the site selection parameters and challenges foreseen. Regulatory considerations include, but are not limited to (i) masterplan that outlines land use and related implications (ii) TNCDDBR that describes development control regulations and building rules (iii) other constraints imposed by ASI, Coastal Regulation Zones etc. When a site is selected for TNUHDB tenement development, these regulations and its consequent development related constraints must be adhered to. In addition, RUDF outlines a list of site selection parameters which must also be factored in. Funding agencies (such as ADB) may also require specific conditions to be met for site suitability, which must be addressed on a case-to-case basis.

In the current state, all of this information is available in disparate locations and sources, which increases review timelines and consequently impacts the project preparation process. An automated system that provides a comprehensive checklist of relevant regulations (both overall and site specific), with a feature that highlights sites that are amenable for development, will reduce procedural delays, enhance efficiency, and minimize human error in the site selection process. Utilisation of GIS is necessary to integrate the resources available around the site prior to the selection of site.

3. e-readiness assessment of TNUHDB and Recommended Actions

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The study of current mode of administrative functioning and services delivery was carried out through extensive discussions with all stakeholder groups within the department. The current state of readiness may be described as below:

3.1 Digital Infrastructure and Security Solutions

The digital infrastructure present in TNUHDB is very minimal and needs complete transformation. Currently, TNUHDB has a small LAN installed in the HQ that connects a few desktops. Some units use Microsoft Word and Excel for word processing and computation, respectively. In order to ensure continuity during COVID pandemic, basic video conferencing systems have been deployed where required. There is no universal connectivity (Broadband or VPN) across the organization. The TNUHDB has a website which may be described as informational in nature as the website is enabled only for providing information without any interaction and transaction features.

It may be concluded that present digital infrastructure is very minimal and a comprehensive transformation of the same will be required in order for TNUHDB to become at par with other urban agencies and smart cities in the state.

Recommended Actions: There is an urgent need to completely transform the Digital Infrastructure and leapfrog to use Broadband Connectivity and state of the art cloud infrastructure for connecting all the units under the department. Additionally, the service delivery infrastructure to be made paperless with multiple channel service delivery to the users (Web , Mobile, IVR and Physical). The Web presence of the department needs to be upgraded from mere informational website to an integrated service delivery portal as a one stop for all the services in compliance with Whole of the Government (WoG) approach.

3.2 ICT Applications and Stand-Alone Solutions

The department has disparate stand-alone applications used by various departments, with a few new applications under active consideration. A brief overview of the applications and solutions available with various departments is as provided below:

Software and Hardware available with ADP Team

The Architectural Design and Planning Department uses AUTOCAD (for 2D Representations) and 3D Sketch Up (For 3D studies and representations)¹³. These software are used on Stand Alone (In Some cases LAN connected) desktops with i7 processor, 16 GB RAM and graphics card with memory of 8 GB or less. Present configuration of Desktops is not suitable for running High End Applications such as 3D Sketch Up. This severely impacts the efficiency and innovation capacity of the department to delivery services to the beneficiaries in a time bound manner.

ADP works at different locations in the state of Tamilnadu. Stand alone systems are not useful in ensuring the coordination among various offices. A Robust connectivity infrastructure with redundancy is lacking.

¹³The consultant will access the current state of implementation and suggest way forward accordingly.



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Recommended Actions: The developments in the digital technologies have made it possible to completely reengineer the way architectural designs are modelled and tested. A number of applications for design, modelling and testing are available in the market. In order for ADP to catch up with global best practices and state of the art, the department needs to procure high end computer systems along with cutting edge software for architectural design and modelling. It is recommended that the requirements of the department are studied in view of advancement in technologies and appropriate hardware, software, connectivity. The consulting agency hired may suggest modular infrastructure solutions be procured and installed for the department and integration of GIS with ADP Team

Management Information Systems (MIS)

The department has commissioned an MIS expert to study the MIS requirements and coordination of a) IT Development, b) IT Application Support, c) MIS Data Collection and Analysis, d) IT Operations, and e) MIS Reporting. Based upon the inputs provided by MIS specialist, three initiatives are currently in progress. There are:

- **Grievance Redress Management**

The department has assigned the task of implementation of Grievance Redress Management System to ELCOT, a state government organization responsible for providing ICT support to government agencies in the state. ELCOT has identified a vendor to develop Grievance Redressal Management (GRM) application. The access to this application is provided to assistant engineers, junior engineers, executive engineers, assistant executive engineers and one common login to each division. The application contains list of all schemes in TNUHDB and to each scheme, respective AE and JE are mapped. Each of these schemes are mapped to the tenements.

Escalation process is also defined in the application for the grievance redressal. First level of escalation is JE & AE, second level escalation is AEE & EE, and the third level escalation is SE and CE. When any new complaint comes in, it goes to respective EE and then to JE and AE who are mapped for that scheme. The complaint, if not addressed, is escalated to JE and AE, during the first seven days. During the second week, 7 to 14 days old complaint is escalated to AEE and EE and finally complaint which is 14 to 21 days old is escalated to SE and CE. EE has been given highest level access on the application and he/she is the only one who can close grievances.

Data loading for GRM is completed and currently TNUHDB is testing the application and workflow. Mobile app is also being developed, which will be deployed in Google for Android users. The approval process is currently in progress with Google.

GRM, also provides ability to delegate. If an AE looking at a particular scheme, is on medical leave due to emergency. Then another AE, will investigate it as he has been delegated, in place of AE who is on leave. Access to GRM is also provided to EO and data entry operator. Estate Officer (EO) will have similar login and access as that of EE. EO is responsible for demand collection, which is rent and maintenance fee and issuance of sale deed and allotment letter. The type of complaints that are generally received for

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divisions is cracks and leakages and they are responsible for repair work, estimate work and fix repair work. For EO, they generally get request/complaint to issue allotment order, sale deed and any legal heir issues.

EO issues allotment order, then the beneficiary is required to pay rent for 15 to 20 years, on clearance of loan, sale deed will be issued. Sale deed is registered in sub-registrar office.

There can be beneficiaries, who do not know how to use web and mobile to log in a complaint. To address this issue, Estate office has facilitated a system and a data entry operator. Those beneficiaries, who do not know how to log complaints can visit estate office and inform the data entry operator. Further, GRM has a dashboard which will show list of issues, active and closed.

▪ Demand Collection Balance (DCB)

DCB is a web application, facilitates online demand collection of rent and maintenance fee from tenements. This web application is ready for release. The beneficiary is facilitated to do online payment by themselves. Historical data and current data on demand are collected and uploaded to the system.

Individual login created for each beneficiary, which is based on mobile number. Beneficiaries can do the payment themselves, or on their behalf bill collectors can also update these details on the portal. TNUHDB is negotiating with banks to enable payment through them.

The application is in final stages of development. It is currently hosted on vendors server, after successful completion of testing. It can go live for beneficiary usage. The security audit is not completed for application and SSL is not applied.

There are different types of schemes and payment methods to the application. Once the tenements are allocated, they have to pay monthly fees: a) maintenance charges, b) rental charges. Maintenance charges are for electric pipe, water pipe, sanitation pipe that are having issues and to replace them and power charges for water supply, sewer pumping, sewer block removal. There is section called 'B' section which collects fees, and they are responsible for it.

In Economic Weaker Section (EWS) Scheme households are requested to pay rent for a stipulated period (generally 2 or 3 years). On completion they claim sale deed and own the property. EWS Scheme is available only to specific areas.

In another scheme, beneficiary households pay a monthly maintenance fee and their contribution in lump sum while occupying as initial down payment. In this scheme, accommodation is sold initially. The maintenance charges vary from project to project, and also depends on whether it is located in Chennai or outside of Chennai, and whether the development is high rise or low rise – currently, there are three slabs of maintenance charges.

If a property is identified for reconstruction after a specific number of years, maintenance charge collection process is put on hold. The beneficiaries cease to pay the maintenance fee, at least three

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months before vacating the reconstruction site. After reconstruction, the property will be handed back to them along with allocation letter. The rentals and maintenance kick-in again.

Properties which are more than 40 years old and structurally weak are identified for reconstruction. Then a committee comprising of Chief Engineer, Superintending Engineer and Executive Engineer, along with experts from Anna University, will visit the site and inspect the condition of the roof slabs and walls. They will evaluate to see (a) if it can survive and if it's worth repairing the structure. (b) if repair cost exceeds reconstruction cost. If committee decision is to reconstruct, then they will vacate the tenants. Once vacated, they will relocate to places in and around. They will demolish old tenement and reconstruction will begin. On completion of the project, they will reoccupy the respective new tenements.

The beneficiaries are identified by block number and tenement number. The tenement number is the house number or individual flat number. Rental fixation is handled by assistant secretary – tenements. The beneficiary information is verified and along with fixed rental information, is loaded to the system by the MIS department.

▪ Networking and Security

TNUHDB head office, they have laid LAN cable to the left of first floor. So, one small portion of 1st floor is networked. As of now, the executives take individual landline and broadband connection. Networking could not be extended across TNUHDB head office as there was resistance. As of now each of them has their broadband setup individually. Similarly, divisional and estate office has multiple staff working, hence would require LAN setup at both divisional and estate office. MPLS VPN is installed. However, there are issues as the estate office is changed quite frequently. TNUHDB is also thinking of not interconnecting Head office, Divisional office, and Estate office. The recommended solutions are proposed below.

▪ Domain, File and e-Mail Server

Domain servers are setup in TNUHDB, which will have all employees/contractors/consultant's login created. Anybody who needs to login in TNUHDB premises or needs access to TNUHDB server's will have its domain login. Microsoft Windows service has Active Directory (AD) feature. AD simplifies life for administrators and end users while enhancing security for organizations. Administrators enjoy centralized user and rights management, as well as centralized control over computer and user configurations through the AD Group Policy feature.

Recommended Actions: TNUHDB currently has two MIS specialists. However, in order for TNUHDB to manage digitalization and electronic service delivery requirements, the MIS team need to be enhanced with appropriate number of experts available for deployment and maintenance of all the systems. Additionally, a major capacity building drive on digital technologies needs to be undertaken across the department. A comprehensive ERP system may be developed covering all activities including Finance,



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HR , Grievance redress and field operations. The approach needs to change from stand alone solutions to an integrated ERP for all the activities of the department.

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4 Going Digital - Recommendations and Way Forward for TNUHDB

The study of existing ecosystem of TNUHDB including the website and applications clearly brings out the fact the overall digital infrastructure at TNUHDB has become obsolete and needs radical transformation. Some departments within the organization have attempted to create standalone CT application with support from ELCOT and industry vendors. However, the digital infrastructure remains fragmented and minimal with standalone applications for some activities working in silos. This approach has resulted in TNUHDB being left behind in leveraging the digital developments compared to other agencies in the state and country. Despite the department



collecting vast amount of data from various beneficiaries and stakeholders, this data cannot be leveraged for analysis and evidence-based planning owing to not being available in digital format. The data available in the digital format is not useful for analysis in its current form due to a lack of interoperability among various applications used by different units with TNUHDB. For proliferation of digital applications, data will have to be captured and made available using common languages and schemas to ensure that they can be linked and analyzed across sources. Lack of a comprehensive Digital Strategy and an Integrated ERP System is one of the key reasons for this.

The smart approach therefore will be to move beyond the individual applications and dismantling the 'functional silos' to design, develop and deploy a comprehensive ERP system and Digital platform thereby overcoming the individual applications working in watertight compartments without any connection with each other. The study of best practices models adopted by countries on top of ease of doing businesses and e-Governance indices globally makes it abundantly clear that the future is based upon intelligence shared by all agents in the ecosystem, whereby a single agencywide platform works as a facilitator of collaborative solutions and center of an innovative ecosystem. The platform is therefore configured as the technological heart for all the services across the agency.

This assessment note therefore suggests an Integrated Digital Platform and ERP system as a shared public good and an open and sustainable ecosystem that is based on standards and multi tenancy

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principles. The benefits of moving to an Integrated Shared Services Platform (ISSP) against individualized application are brought out in the table below:

Activity	Individual System	Shared Services Platform
Development Period	Long	Short
Development Cost	High	Low
System Integration	Difficult	Easy
Scale Up	Difficult	Easy
Customization	Small	Large
OS Dependency	High	No
UI Extension	Small	Large
System Upgrade	Difficult	Easy
Maintenance Effectiveness	Low	High
Stability	Medium	High

The Long-Term objective of the proposed Digital Strategy is to support TNUHDB leveraging Industry 4.0 technologies and digital economy ecosystem approach to integrate the operations of multiple units providing services to the beneficiaries.

The company will be required to help TNUHDB simultaneously, implement the widen institutional, implementation (strategy & tools) and technological elements for data-based governance to achieve fully transactional and networked digital presence that is open, collaborative and citizen centric.

The development of the digital platform for TNUHDB will require both the domain principles and the technology principles to be covered. Proposed Digital Infrastructure and ERP system will adopt a combination of strategies like taking a minimalistic approach for designing each block, prioritizing and sequencing of the development/ launch of the building blocks, and designing a technology architecture that can scale horizontally and vertically in compliance with the IndEA initiative of Government of India and associated state level frameworks notified by government of Tamilnadu.

As per the framework, following principles for development of sector specific national shared services platforms are prescribed:

Digital Technology Principles for TNUHDB Digital Platform and ERP System
<p>1. Adopt India Enterprise Architecture Framework (Ind EA)</p> <p>The artefacts prescribed by the IndEA Standard will be prioritized and sequenced. The design of the building blocks proposed platform will adopt and conform to Ind EA by default. Other national and international standards will be adopted in areas not covered by IndEA. TNUHDB may, when appropriate,</p>

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adopt the Agile IndEA Framework ¹⁴ , which combines the Vision of IndEA with the speed of agile methodologies of development.
<p>2. Conform to open standards, be interoperable and based on Open Source Software products and open source development</p> <p>The policy of MeitY on open standards and open-source software shall be adopted in designing of the building blocks of the Blueprint and in all procurements relating to its implementation. Interoperability will be inherent to all the building blocks.</p>
<p>3. Adopt Federated Architecture</p> <p>Only the identified core building blocks will be developed and maintained centrally. All other building blocks shall be designed to be operated in a federated model that factors regional, state-level and institution-level platforms and systems to function independently but in an interoperable manner.</p>
<p>4. Open API-based Ecosystem</p> <p>All the building blocks will be architected adopting the Open AP/ Policy notified by MeitY. Security and Privacy will be built into the design and development of the API's, which should be audited for security and privacy before deployment.</p>
<p>5. All the components, building blocks, registries and artefacts shall be designed adopting a minimalistic approach</p> <p>Easy, early, and collective adoption of the Blueprint by majority shall be critical to its success. Hence every component of the Blueprint shall be designed to be minimalistic.</p>
<p>6. All the registries, data hubs and other master databases shall be built as Single Source of Truth and System of Record on different aspects and backed by strong data governance.</p> <p>Rigid validations shall be applied to all mandatory fields, clear ownership and responsibilities shall be defined for all core databases and strong, dedicated data governance structures shall be established at the state and central levels.</p>

¹⁴ https://www.meity.gov.in/writereaddata/files/agile_indea_framework-v.1.0.pdf