

National Urban Digital Mission (NUDM)

MUNICIPAL DIGITAL GOVERNANCE

Water & Sewerage

KNOWLEDGE STANDARD

GUIDELINES AND SPECIFICATIONS

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Abbreviations

AMRUT	Atal Mission for Rejuvenation and Urban Transformation
CAA	Constitution Amendment Act
CDG	Centre for Digital Governance
CSC	Common Service Centre
DTMF	Dual Tone Multi-Frequency
ICT	Information and Communication Technology
ID	Identification Document/Number
IVR	Interactive Voice Response
JNNURM	Jawaharlal Nehru National Urban Renewal Mission
KPI	Key Performance Indicators
MoHUA	Ministry of Housing & Urban Affairs
NIUA	National Institute of Urban Affairs
NOC	No Objection Certificate
NUDM	National Urban Digital Mission
NUSP	National Urban Sanitation Policy
PID	Property Identification Number

SLB	Service Level Benchmark
SLG	Service Level Guarantee
SMS	Short Message Service
UFW	Unaccounted-for Water
ULB	Urban Local Body/Bodies
UPYOG	Urban Platform for delivery of Online Governance
W&S	Water & Sewerage

Glossaries

Term	Definitions
Application Programming Interface (API)	The term Application Programming Interface (API) means any mechanism that allows a system or service to access data or functionality provided by another system or service. The API is generally used to interact (like query, list, search, sometimes submit & update) directly with the specific information on a system, to trigger some action on other systems, or to perform some other action on other systems.
Consumer/Customer	A Consumer is a person who purchases a product or avails a service for a consideration, either for his personal use or to earn his livelihood by means of self- employment. It also includes a beneficiary of such goods/services when such use is made with the approval of such person. The term Consumer or Customer may be used interchangeably as per the State/ULB requirement.
Data Elements	Data Element is a Logical definition of Data. Any unit of Data defined for processing is a Data Element. The basic principle of data modelling is the combination of an Object class and an Attribute to form a more specific 'data element concept'. For E.g.: Application ID, name, address, ULB, building details that are associated with a Data Entity (Such as Trade License, W&S, Fire NOC etc.).
Data Entities	Entities were created to help users to locate their data elements from the entire list. However, this grouping should not be confused with data sets. Data sets are list of data elements required for certain program or application to function and should be created choosing relevant data elements from various entities e.g., Fire NOC, Trade License, Property Tax etc.
DigiLocker	DigiLocker means the Government owned and operated web and mobile based hosting of Digital Locker system.
Domain	Knowledge of a specific, specialized discipline or field in contrast to General knowledge. For example, Knowledge in Fire NOC or water & sewerage areas (Domain) in the overall functioning of ULB's.

E-governance	A procedural approach in which the Government and the citizens, businesses, and other stakeholders are able to transact all or part of their activities using Information and Communication Technology tools.
Interoperability	The ability of different information technology systems and software applications to communicate, exchange data, and use the information that has been exchanged.
Metadata	Metadata is data about data. Metadata describes how and when and by whom a particular set of data was collected. Metadata is essential for understanding the information stored

National Urban Digital Mission (NUDM)

Over the past two decades, India has witnessed the role of technology as an enabler for development and progress. India is ready to lead the digital revolution and our cities can be the main recipients. Our ability to openly embrace emerging technologies in urban governance is the key to a powerful story of transformation in India's journey to economic power. Responding to this pressing necessity, Ministry of Housing and Urban Affairs (MoHUA) has launched National Urban Digital Mission (NUDM) in February 2021, which aims to build a shared digital infrastructure that will strengthen the capacity of the urban ecosystem to solve complex problems at scale and speed. Thus improve the ease of living for citizens through accessible, inclusive, efficient and citizen centric governance across India's 4800 towns and cities. National Institute of Urban Affairs has setup the Centre for Digital Governance (CDG), an initiative to convene these digital efforts of the MoHUA. The NUDM inherits the guiding principles of the National Urban Innovation Stack (NUIS) - Strategy and Approach paper, released by MoHUA in 2019 as a vehicle to accelerate the ecosystem for urban transformation.

One of the key deliverables under NUDM is creation/ adoption of standards for municipal digital governance which will enable improved information consistency, analytics, secure data access & transfer, smarter business processes; while also enabling diverse stakeholders to collaborate and their corresponding platforms and processes to interoperate seamlessly. The following Standards (in various stages of development/ adoption) are applicable for NUDM:

1. Municipal Governance Reference Architecture as a reference blueprint for platforms
2. Knowledge Standards (guidelines & specifications) with key data elements and their standardized data interpretation
3. API definitions for standardized integration with the National Dashboard
4. Security Assurance Standards for enabling data privacy controls
5. National Meta-Data Standards for metadata management & data quality enablement at state & national dashboards

Out of these, the [Municipal Governance Reference Architecture](#)¹, [Security Assurance standards](#)² and [Property Tax Knowledge Standard](#)³ have already been published and are available for download. [National Metadata Standard](#)⁴ has been published by the Government of India.

¹ IS 18006 : Part 1 : 2021 - Municipal Governance Reference Architecture available online at https://standardsbis.bsbedge.com/BIS_SearchStandard.aspx?Standard_Number=18006&id=0

² IS 17428 : Part 1 : 2020 - Data Privacy Assurance Part 1- Engineering and Management Requirements and IS17428: Part 2: 2020 - Data Privacy Assurance Part 2 Engineering and Management Guidelines available online at https://standardsbis.bsbedge.com/BIS_SearchStandard.aspx?Standard_Number=IS+17428&id=0

³ IS 18006 : Part 3 : Sec 1 : 2021 - Municipal Governance - Part 3 Property Tax - Section 1 Taxonomy available online at https://standardsbis.bsbedge.com/BIS_SearchStandard.aspx?Standard_Number=18006&id=0

⁴ Data Dissemination: National Metadata Structure (NMDS) For Statistical Products available online at http://mospi.nic.in/sites/default/files/main_menu/citizen_charter/National%20Metadata%20Structure%20-%20v3.pdf

NUDM Knowledge Standard

Need for Knowledge Standard

ULBs and other government service providers (such as State Utility Boards and Parastatals) across India have different terminology and vocabulary for Urban Governance. This is due to inherited state laws and/or rules & regulations and various E-governance systems in ULBs. Lack of uniform knowledge of important data elements and clear vocabulary for urban governance terms, leads to the inability to share & interpret data uniformly and/or compare Urban Local Body (ULB) performances. Thus, the Knowledge Standard will help in

- identifying and categorizing important data elements for a domain
- resolving differences in terminology for Urban Governance
- to analyze current city domain models, processes, reports & KPIs; thus, retrofitting existing data models with missing data

Governing Principles in Design of Knowledge Standard

Normally information taxonomy preparation begins by asking the following questions (Earley, 2015)⁵ (Earley, 2015):

- What are the things that you interact with on a day-to-day basis?
- What are the processes that you engage with, applications you interact with, and people you speak to, both internally and externally?
- How do those people, processes and technologies interact?
- Information linkages identification

To ensure this taxonomy fits the needs of interested stakeholders the following principles have been followed in designing it.

Minimalist: The standards guidelines & specifications are designed to have minimum base elements common across ULBs to ensure interoperability, harmonization and data driven governance. These can then be adopted and built upon by some ULBs with higher process complexities.

⁵ Earley, S. (2015, August 18). Why Information Taxonomy Must Represent the Landscape of the Business. From www.earley.com: <https://www.earley.com/insights/why-information-taxonomy-must-represent-landscape-business>

Evolvable: The standard guidelines and specifications are designed to evolve over a period of time thereby adapting to changing needs and emerging technologies thus making the system comprehensive progressively.

Modular: The classifications and categorizations in the knowledge standards are designed modularly, yet they function together as a whole. They are independent and self-contained and may be combined and configured with similar units to suit separate contexts. E.g., The Property “Use” element and its sub classifications can be easily reapplied in the context of any Building Plan Approval System or Fire NOC System.

Extendible: The standard guidelines and specifications are designed to be exhaustive and the elements of Urban Governance are positioned in a hierarchy which can accommodate both horizontal and vertical additions. This leaves room for wider adoption and innovation to suit contexts of any ecosystem. The end goal is to build a knowledge practice that supports Open Guidelines and Specifications with the Data Element taxonomy as a base.

Open: The standard guidelines and specifications are designed to be ‘open’ to enable wider ecosystem participation and use. The standard guidelines and specifications are intended to be used by State Governments, Urban Local Bodies, industry and technology providers, academia and civil society organizations who are either working in the domain or is providing services to the ULBs in any manner.

Accessible & Inclusive: The standard guidelines and specifications are designed to be inclusive and accessible in nature for all types of stakeholders. The standard guidelines and specifications will enable the technology to reach to every section of society. For e.g.: Interactive Voice Responses and non- digital channels as included in the section 2 will enable the marginalized and differently abled citizen to use the service in more efficient manner. Also, stakeholders such as intermediators can also help in building capacities or creating awareness.

How to Read this Document?

This document has 5 key components,

- Section 2.1 captures Key data elements associated with the Water & Sewerage Data Entity.
- Section 2.2 captures key channels of transactions i.e., new connection/ grievance registration/ payment etc.
- Section 2.3 captures key stakeholders involved in W&S service delivery
- Section 2.4 captures key processes within the W&S domain with clearly defined input & output data elements.

- Section 2.5 captures key Reports and KPIs that ULBs and states/UTs are encouraged to use.


All direct sub-classifications and components captured in the taxonomical hierarchy are shown as normal text (For Ex: “2.1.4.1 Residential/ Household”)

In processes section (section 2.4),

- Input criteria (whether from citizen or ULB) of the process is shown in *italics text* (For Example “2.4.1.1 Applicant Details”)
- Output of the process is shown in **Bold text** (For example “2.5.1.1 Connections Register”)
- Direct sub-classifications or sub-components are shown as normal text (For Example 2.4.3.1.1 Issue of New Connection, which is sub-classification under Section 2.4.3.1 Types Of Assessment)


Diagrams:

Domain is depicted as  for e.g. Water & Sewerage

Data Entities are depicted as  for e.g. Consumer Type

Channels are depicted as  for e.g. W&S Channels

Stakeholders are depicted as  for e.g. Stakeholder Matrix

Processes are depicted as  for e.g. Application Creation, Acknowledgement

Reports & KPIs are depicted as  for e.g. Demand Collection Balance Register

How to Use this Knowledge Standard?

Water & Sewerage Knowledge Standard can be used in 3 different ways:

1. Direct application by storing, generating and using these important data elements (entities, stakeholders, processes & reports) in day-to-day operations

Example 1: Designated ULB official can use this to add channels and ULB type (such as Nagar Panchayat, Municipal Corporation or Municipal Council) in the W&S system. This will help the ULBs to assess the application while acknowledging and processing the Application/ Assessment request.

Example 2: While submitting the application form for the connection, the property Id is also captured. This PID can be used to fetch property details like use, location, ownership, payment details which will help in eliminating redundant or bulky forms. This will also result in re-use and harmonization of data across departments.

Example 3: Monitoring of applications by their status, SLB adherence and channels by which the transaction happens, empowers ULB Officials to take corrective and preventive steps as needed.

Timely updating and monitoring of DCB register also enable ULBs to better plan and revenue management.

2. Indirect application by using these data elements in evidence-based governance and long-term planning

Example: Analyzing W&S applications by the purpose may help the ULB in regulating land use, preventing revenue leakages and planning water conservation subsidy policies. It can also help in planning the inspection schedules better with respect to the types of regulations needed.

3. Information consistency by using these data elements while using and sharing data (via Metadata tags in reports and dashboard)

Example: Consistent use of Data elements, processes, KPIs and their definitions from this Knowledge Standard helps in implementing Information consistency across ULBs. To ensure information consistency, while ULBs may use new or existing platforms for delivering W&S services. They should use Metadata tags from the data elements defined in this knowledge standard.

It may be noted that

1. The data elements described in this knowledge standard are not complete and ULBs may add/ remove data elements as per actual need.
2. ULBs and their technology partners are however against modifying the data elements while using these as Metadata tags i.e., Application ID should be shared as 'Application ID' and not 'App ID' or 'Appln ID' in the ULB reports.

Revisions to the Document

This is planned to be a working document. It will be revised regularly to guarantee that the knowledge standards incorporate learnings from various implementations and learning cycles as they progress and remain relevant. Amendments and regular updates to its text and indicators are to be expected on a continuous basis.

No Sub-License Allowed

W&S Knowledge Standard is developed as open guidelines and specifications under NUDM by NIUA. No part(s) of the document can be sublicensed further by any other organization. Any attempted sublicense, whether voluntarily or otherwise, shall be null and void, and will attract penal actions.

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1 Water and Sewerage

The urban water supply and sewerage (W&S) sector in India is often characterized by inefficient delivery of services (including high-unaccounted water and intermittent water supplies) and inadequate coverage of piped water supply and sewerage connections, especially for the urban poor. In addition, poor cost recovery has rendered most of the water utilities in the country as financially unsustainable⁶ (The Energy and Resources Institute, 2010). Even though the city level function of water supply is to be devolved to municipalities and other urban local bodies under 74th CAA of 1992, very few have been assigned this function by state governments. A few metropolitan cities like Delhi, Chennai, Hyderabad and Bangalore have statutory water supply and sewerage (W&S) boards with limited functional autonomy. In cities of Ahmedabad, Amritsar, Kolkata and Mumbai, separate departments of the ULB handle W&S capital and operations. In some cities like Hubli-Dharwad, Mysore, Varanasi, and Kanpur, the ULBs handle the operations and maintenance of W&S while the capital works are the responsibility of the state level parastatal.

“Sewage” means night-soil and other contents of latrines, urinals, cesspools or drains, and polluted water from sinks, bathrooms, stables, cattle sheds and other like places, and includes trade effluents and discharges from manufactories of all kinds.

“Sewerage” means all the components of a system to collect, transport and treat sewage (including pipes, pumps, tanks etc.).

Fecal sludge (Septage) is the slurry that contains both solid and liquid waste that accumulates in onsite sanitation systems (OSS) e.g., septic tanks. It is raw or partially digested slurry that results from the collection, storage or treatment of combinations of excreta and blackwater, with or without greywater. “Fecal sludge (septage) management” involves collection, treatment and proper disposal/ reuse. Efficient fecal sludge (septage) management include safe disposal of the treated septage.

Water connection includes,

(i) any tank, cistern, hydrant, stand pipe, meter or tap situated on any private property and connected with a water main or pipe belonging to the Municipality; and

(ii) the water pipe connecting such tank, cistern, hydrant, stand pipe, meter or tap with such water main or pipe;

^{6,7} The Energy and Resources Institute. (2010). Review of current practices in determining user charges and incorporation of economic principles of pricing of urban water supply. Ministry of Urban Development, Government of India. From https://mohua.gov.in/upload/uploadfiles/files/TERI_UC_Report26.pdf

“Watercourse” means and includes any river, stream or channel whether natural or artificial; “water for domestic purposes” shall include water for domestic requirement including drinking water purposes and shall not include water for any trade, manufacture or business or for building purposes, or for watering gardens or for fountains or for any ornamental or mechanical purposes;

MoHUA has initiated a number of programs and activities to address the issues in W&S Sector such as;

- Reforms under JNNURM including transfer of Urban W&S functions to ULBs as per 74th CAA
- Atal Mission for Rejuvenation and Urban Transformation (AMRUT) to ensure that every household has access to a tap with assured supply of water and a sewerage connection
- Service level Benchmarks defined in citizen charters to improve efficiency in the functioning of W&S systems, including governance, finance and institutional capacities etc.
- National Urban Sanitation Policy (NUSP) covering all aspects of urban sanitation and sewerage management

1.1 Background

The 74th Constitutional Amendment had substantially broadened the range of functions to be performed by the elected urban local bodies (ULBs). The Constitution envisages urban local bodies as being totally responsible for all aspects of development, civic services, and environment in the cities, going far beyond the traditional role.

Water and Sewerage is an important revenue source for the Urban Local Bodies (ULB) and is maintained by various departments at state and ULB Level. The authorities are responsible to provide water and sewerage connection in the designated territory, issue the demand to the owner for making the necessary payment and collection of water and sewerage charges. Once, water and sewerage charge are accomplished the collection process is followed up through appropriate notifications to the citizens. The implementation of water and sewerage service by ULBs comprises of providing new connection, name transfer, usage change, generating demand notice, defaulter notice. In case the citizen fails to pay the W&S charges, the revenue department can disconnect the W&S connection temporarily. Moreover, if the citizen wishes they can request for disconnection as temporary/ permanent disconnection. If the underground drainage connection is disconnected temporarily by the citizen or disconnected by the revenue department, they can pay the arrear amount & other charges and request for reconnection.

1.2 Who is Responsible?

Water being a state subject, the State Governments has primary responsibility for use and control of this resource. The administrative control and responsibility for development of water shared by

various state departments, parastatals and urban local bodies. For e.g., Delhi Jal Board and Delhi Municipal Corporations.

As part of National Urban Digital Mission (NUDM), NIUA is also offering a platform UPYOG to states which offers Water License Connection Management functionality using Water & Sewerage (W&S) module.

2 Taxonomy for Water and Sewerage

Taxonomy for Water and Sewerage tries to capture the most important entities, their properties, categories, subcategories, parameters, and specifications within this domain as well as other associated areas. Subsections in Section 2 also define all the key terms in the water and sewerage domain comprehensively.

A well-structured W&S taxonomy helps by:

- ✓ Identification and regulation of water supply and sewerage connections enabling effective enforcement and regulation
- ✓ Building accountability and ensuring transparency
- ✓ Identification and process key data elements to enable evidence-based decision & policy making

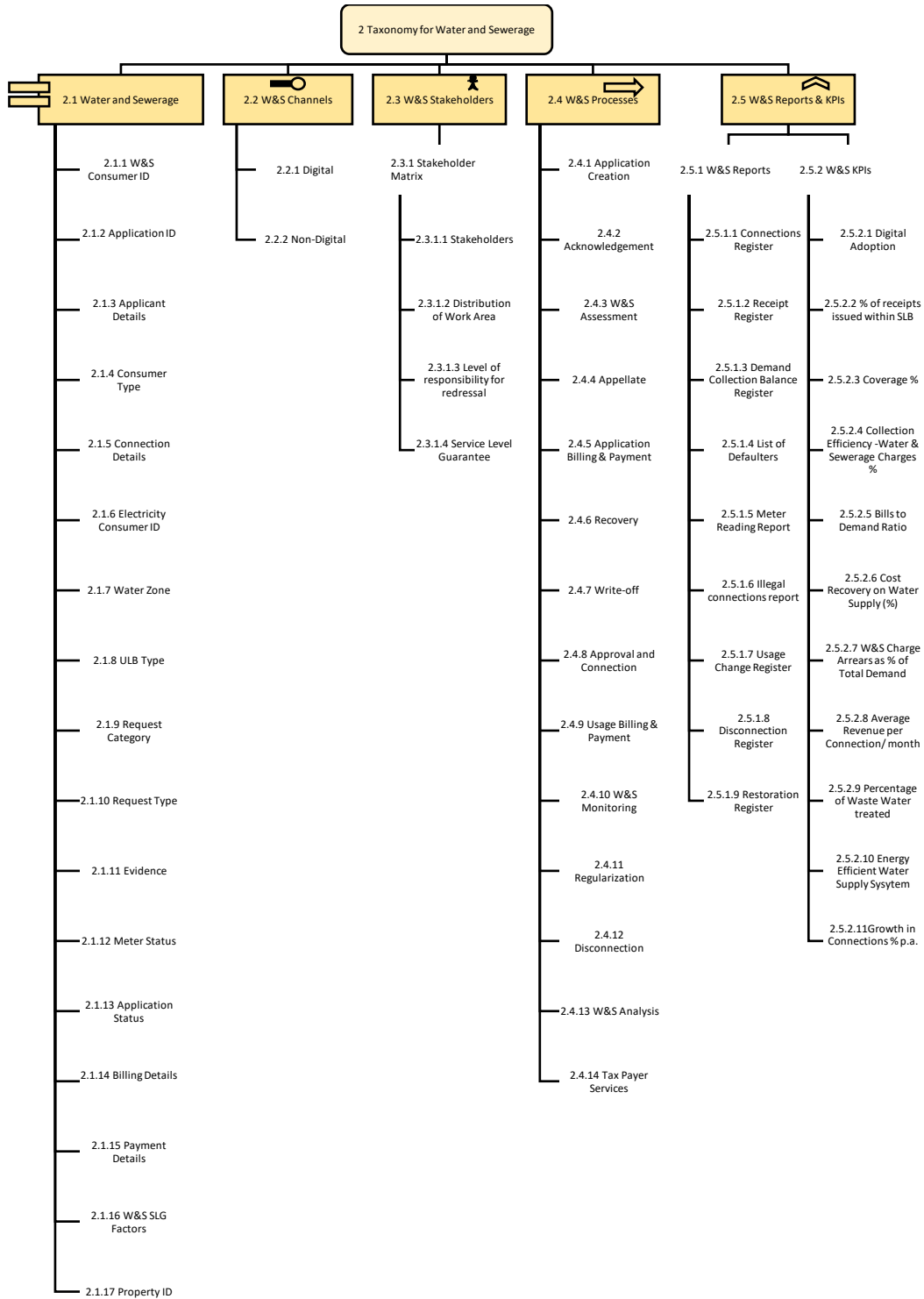


FIGURE 1 TAXONOMY OF WATER & SEWERAGE

2.1 Water and Sewerage

Water & Sewerage is a basic service provided to the citizen by the ULBs or city/state owned parastatals or agencies comprises of providing new connection, disconnection, reconnection, billing and revenue collection etc. according to relevant rules and regulations. Sub-components in this section describe important components of a water & sewerage data entity.

2.1.1 W&S Consumer ID

Water & Sewerage (W&S) Consumer ID is a unique connection identifier for every individual consumer. Consumer ID may be used to check the bill amount or request a duplicate copy of their bill.

2.1.2 Application ID

An Application ID is an automatic unique application number that will be generated after submitting the application form successfully. The Application ID can be used to check status of the filled application (until the sanction of the connection), get duplicate bills, receipts etc.

2.1.3 Applicant Details

Applicant details means the details of the person or organization filling the application form. In terms of water and sewerage connection application, the applicant is the user who needs to fill connection details such as name, age, address, mother's name, father's name, mobile number, email id, billing address, connection address, daily consumption and seasonal peak consumption (in case of organization) etc. There could be applicants for temporary connections during construction of a building or functions or public fairs etc. which are either provided with temporary service connection or supplied by tankers. It is recommended that automated authentication be incorporated with other government documents and services such as Aadhaar, PAN, etc.

2.1.4 Consumer Type

Consumer type is the classification of W&S connection based on property use of the plot/property. This may also be fetched from 'Use' details of the property from the property database using PID.

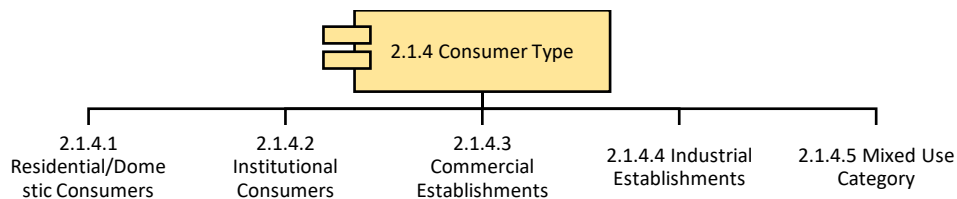


FIGURE 2 TAXONOMY OF CONSUMER TYPE

2.1.4.1 Residential/ Domestic Consumers

Connection to such plot/property which is used purely for residential purpose (human and/or pet consumption) and include following:

- 1) Premises used for residence of families with kitchen facility
- 2) Hostels of Educational Institutions, working women's hostels
- 3) Govt. recognized destitute homes, orphanage homes, charitable homes, blind schools, and schools for physically challenged handicapped persons, spastic children.
- 4) Place of worship, cremation grounds, cemetery, etc.

2.1.4.2 Institutional Consumers

Connection to plot/property having no residential use and/or in all cases where water is used for human consumption such as research institutes, hospitals, schools, public offices, office complexes, railway stations/yards, police stations, airport, bus stand, hostels, dhobi ghats etc. and other similar activities with high footfall.

2.1.4.3 Commercial Establishments

Connection to plot/property having no residential use and/or in all cases where water is used as input either in processing or in manufacturing or intensive use of water or high footfall of public is envisaged such as airports, bus stand, petrol pumps, hostels, restaurants, clubs, marriage halls, and other similar activities with high footfall.

2.1.4.4 Industrial Establishments

Connection to plot/property having no residential use and/or in all cases where water is used as input either in processing or in manufacturing industry like cooling plants, bottle water plants, power plants, chemical industries, factories, aerated water or ice cream factories.

2.1.4.5 Mixed Use Category

A category applicable to such premises where a part of the premises under residential use is also used for commercial purposes provided the water use is for non-intents and purposes such as house with a doctor's clinic, a lawyer's home with practice chambers, a home with a software company, a house of teacher running tuitions, a house with a ground floor groceries or sweet shop etc.

2.1.5 Connection Details

Connection details means the details of the connection which are captured/ created during the lifecycle of the application and W&S connection.

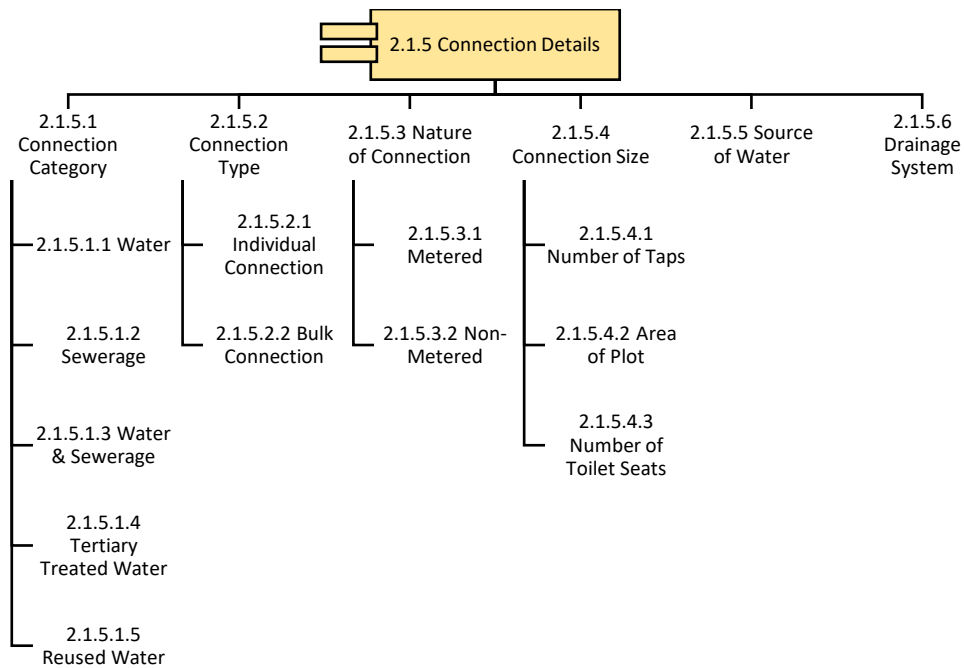


FIGURE 3 TAXONOMY OF CONNECTION DETAILS

2.1.5.1 Connection Category

Connection category is the classification based on type of connection for which an applicant is applying for example, either a water connection or a sewerage connection, or both or tertiary treated water connection.

2.1.5.1.1 Water

Water means service request related to water supply such as new water connection, water disconnection, user charge etc.

Water connection includes,

(i) any tank, cistern, hydrant, stand pipe, meter or tap situated on any private property and connected with a water main or pipe belonging to the Municipality; and

(ii) the water pipe connecting such tank, cistern, hydrant, stand pipe, meter or tap with such water main or pipe;

2.1.5.1.2 Sewerage

Sewerage means all the components of a system to collect, transport and treat sewage (including pipes, pumps, tanks etc.). In context of W&S Knowledge Standard, Sewerage means service request related to sewerage such as new sewer connection, sewer disconnection, etc.

2.1.5.1.3 Water & Sewerage

Water & Sewerage means service request related to both water & sewerage.

2.1.5.1.4 Tertiary Treated Water

Tertiary Treated Water means service request related to supply of tertiary treated water, its disconnection, user charges etc.

2.1.5.1.5 Reused Water

Reused water is the wastewater received at the treatment plant that is recycled or reused after appropriate treatment for various purposes. Here, reused water means service request related to supply of reused water, its user charges etc⁷ (Ministry of Urban Development, 2009).

2.1.5.2 Connection Type

Connection type is the classification of W&S connection based on a property served by the connection.

2.1.5.2.1 Individual Connection

Individual connection is when one water connection is sanctioned per property with an independent house or multiple households sharing the connection.

2.1.5.2.2 Bulk Connection

Any connection of ferrule size of more than three-quarter of an inch (20mm) is technically called a bulk connection. In case of Co-Operative Group Housing Societies, apartments, commercial complexes having multiple units, offices/ properties, hospitals/ institutions etc. requiring high quantity of water, only a bulk connection is provided for all dwelling units/ multiple units in the same complex.

⁷ Ministry of Urban Development. (2009). *Handbook of Service Level Benchmarking*. Retrieved from CPHEEO: <http://cpheeo.gov.in/upload/uploadfiles/files/Handbook.pdf>

2.1.5.3 Nature of Connection

Nature of connection is the classification based on the consumption usage of connection.

2.1.5.3.1 Metered

In a metered connection, your water usage is measured by a mechanical or electronic meter and you are charged based on the amount of water used.

2.1.5.3.2 Non-Metered

In a non-metered connection, you are usually charged a flat fee, regardless of the water consumption level.

2.1.5.4 Connection Size

Connection size is the classification of connection based on size such as pipe size, number of taps, area of plot and sump capacity for which the connection is applied. Some of these parameters help in connection charge calculation while others help in regular usage charge calculation. The general connection sizes are 15mm, 20mm, 25mm, 32mm, 40mm, and 50mm

2.1.5.4.1 Number of Taps

Number of taps means the total number of taps for which the connection is applied.

2.1.5.4.2 Area of Plot

Area of plot means the area of the plot of the property for which the connection is applied.

2.1.5.4.3 Number of Toilet Seats

Number of toilet seats means the total number of toilet seats in the property or an area (in case of community toilets) for which the connection is applied.

2.1.5.5 Source of Water

Source of water means the channel through which water has been supplied to the property such as bore well, tube well, or water supplying agency such as ULB, City Water Board, State Water Board, PHED or any government sanctioned agency.

2.1.5.6 Drainage System

Drainage system refers to the type of system used to collect, treat and discharge waste water from a property. Drainage system in a property could be the sewerage system or storm water drainage

system including surface systems, sub surface systems, natural slope systems or gutters. The type of drainage systems could be defined as follows,

- Natural Drainage - The inlet and outlet point of natural drain system should be maintained with adequate size of channel for ensuring unrestricted flow of water.
- Closed drain - forms a complex network underground. The primary refuse from individual areas is collected and transported to the main network which finally goes to a treatment plant.
- Open-drain - is mostly used to collect wastewater that is not sewage.

2.1.6 Electricity Consumer ID

Electricity Consumer ID is a unique connection identifier for electricity connection of a building. A W&S Consumer ID may be linked with electricity consumer ID to fetch relevant details from municipal electricity registry and vice versa. This linking may also be used to identify revenue leakages and asses electricity consumption.

2.1.7 Water Zone

Water Zone or 'W&S Zone' means the classification of different area or street into value zones for the purpose of determination of unit of measurement value of a water tariff.

2.1.8 ULB Type

Type of Urban Local Body as per the definition of MoHUA such as Nagar Panchayat, Municipal Council or Municipal Corporation⁸ (Ministry of Housing and Urban Affairs, 2014).

2.1.9 Request Category

Request category is the classification of application is applied based on the duration of connection.

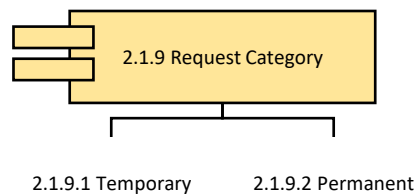


FIGURE 4 TAXONOMY OF REQUEST CATEGORY

⁸ Ministry of Housing and Urban Affairs. (2014). Urban and Regional Development Plans Formulation and Implementation (URDPFI) Guidelines. Ministry of Housing and Urban Affairs.

2.1.9.1 Temporary

Temporary is the request category which is applied for the short duration of time i.e., less than a financial year.

2.1.9.2 Permanent

Permanent is the request category which is applied for a longer duration of time.

2.1.10 Request Type

Request type is the classification of application is applied based on the nature of application.

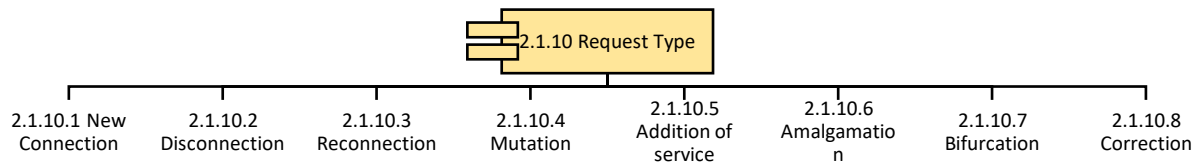


FIGURE 5 TAXONOMY OF REQUEST TYPE

2.1.10.1 New Connection

New connection means an application for registration for new water and/or sewerage connection is to be submitted with requisite documents and registration & processing fee along with applicable one-time fees.

2.1.10.2 Disconnection

The application type to permanently disconnect the water and/or sewerage connection. The disconnection of the connection has to be done in a specific time frame as per the ULB.

2.1.10.3 Reconnection

The application type to restore the previous water and/or sewerage connection. The restoration of the connection has to be done within a specific time frame as per the ULB. Citizen might use their old application ID and consumer ID in their application.

2.1.10.4 Mutation

Mutation means an application type for transfer of title of existing water and/or sewerage connection from one property owner to another.

2.1.10.5 Addition of Service

Addition of service means an application type for addition of any other service into the services provided under a consumer ID.

2.1.10.6 Amalgamation

Amalgamation means an application type for merging two or more consumer connections into a single connection.

2.1.10.7 Bifurcation

Bifurcation means an application type when one consumer connection is split into two or more connections for e.g.: two children can apply for bifurcation of single connection belonging to father into two separate connections.

2.1.10.8 Correction

Correction means an application type for correction of address or applicant related information or usage slabs of an existing water and/or sewerage connection.

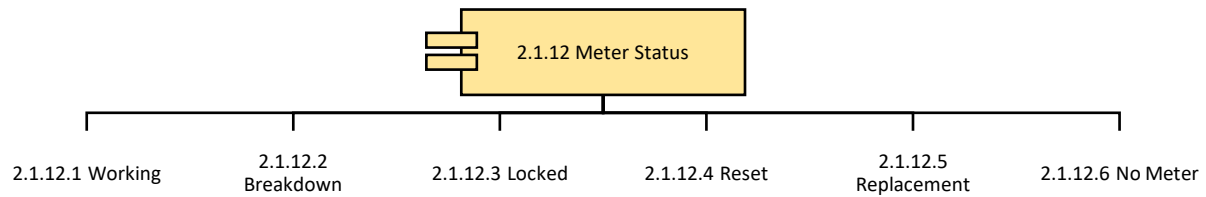
2.1.11 Evidence

Proof of the owner details submitted during application of water and/or sewerage connection. These can be

- Address proof of the property
- ID proof of the applicant
- Aadhaar card
- Electricity bill
- Property tax receipt
- Layout Plan
- Plumber drawings
- Or any other related document

2.1.12 Meter Status

Meter status is the status of meter as per the inspection of the meter. Billing can be different as per the meter status. ULBs may apply specific extra charge in case of meter replacement or it is locked.



2.1.12.1 Working

It is the status applicable when the meter is working and the inspection officer is able to collect the meter reading.

2.1.12.2 Breakdown

It is the status applicable when meter is not functional, not working, damaged, broken, tempered etc. and the inspection officer cannot collect the meter reading.

2.1.12.3 Locked

It is the status applicable when the inspection officer cannot collect the reading due to inaccessibility to meter, meter in the house or occupant not available, etc. This status covers all the scenarios when meter is working fine but the reading cannot be taken.

2.1.12.4 Reset

It is the status assigned by the inspection officer when the max count of meter is reached.

2.1.12.5 Replacement

It is the status applicable when the request for meter replacement is lodged by the citizen.

2.1.12.6 No Meter

It is the status applicable when the connection is not assigned any meter or in case of non-metered connections.

2.1.13 Application Status

This is the current status of water and/or sewerage connection application.

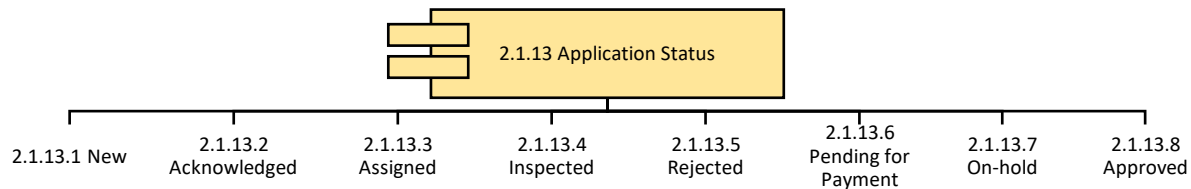


FIGURE 6 TAXONOMY OF APPLICATION STATUS

2.1.13.1 New

It indicates status of water and/or sewerage connection application, which means that a new water and/or sewerage connection application has been filed.

2.1.13.2 Acknowledged

It indicates the status of water and/or sewerage connection application, which means that the water/sewerage connection application has been received and acknowledged by the municipal department.

2.1.13.3 Assigned

It indicates the status of water and/or sewerage connection application, which means that water and/or sewerage connection application is assigned to inspection team and the inspection is in process.

2.1.13.4 Inspected

It indicates the status of water and/or sewerage connection application, which means that the property for which water and/or sewerage connection is applied is inspected.

2.1.13.5 Rejected

It indicates that the application for water and/or sewerage connection is rejected after inspection.

2.1.13.6 Pending for Payment

It indicates the status of water and/or sewerage connection application, which means that the water and/or sewerage connection on inspection is eligible for sanction and the customer is advised to remit the connection charges which is pending for payment.

2.1.13.7 On-hold

It indicates the status of water and/or sewerage connection application, which means that the water and/or sewerage connection application is put on hold for a reason.

2.1.13.8 Approved

It indicates the status of water and/or sewerage connection application, which means that the water and/or sewerage connection application is approved by the ULB or respective water utility on payment of connection charges by the property owner.

2.1.14 Billing Details

These are the details of bills generated against an application ID or consumer ID.

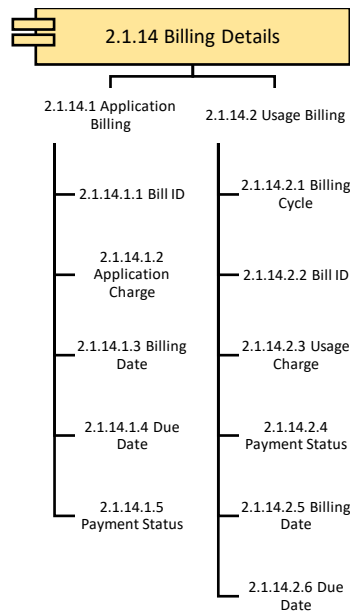


FIGURE 7 TAXONOMY OF BILLING DETAILS

2.1.14.1 Application Billing

These are the details of payment made during the process of application for a new connection or while renewing an old connection. This includes application charge, bill id, billing date, due date and payment status.

2.1.14.1.1 Bill ID

Bill ID is a unique identifier that identifies applicant's bill for accounting purposes.

2.1.14.1.2 Application Charge

This is the amount charged during new application. This may include:

- a. Application fee
- b. Attachment fee
- c. Inspection charges (depending on number of visits)
- d. Sewer connection charge
- e. Connection security
- f. Road restoration charges
- g. Development charges for water & sewer
- h. Meter charge
- i. Disconnection fee

2.1.14.1.3 Billing Date

Billing Date is the date on which bill is generated during the application process.

2.1.14.1.4 Due Date

Due Date is the date on which the bill for a particular application is due for the new application. Upon non-payment of bill by the given due date, a surcharge may be levied on the initial demand by the imposition of a penalty.

2.1.14.1.5 Payment Status

Payment status is the status of payment against raised bill.

2.1.14.2 Usage Billing

These are the details of payment made during regular billing cycle.

2.1.14.2.1 Billing Cycle

Billing cycle means the period for which the bill is issued. It may also be called as billing period.

2.1.14.2.2 Bill ID

Refer section [2.1.14.1.1](#).

2.1.14.2.3 Usage Charge

Usage charge is the amount that an applicant needs to pay in order to avail continuous water and/or sewerage service as per their usage. It may consist of:

- a. Water Consumption Charge: - Based on the volumetric consumption on monthly basis (only for water connection). This may be a fixed value for non-metered connections
- b. Service Charge: - Fixed access charges as per the slabs based on the monthly consumption
- c. Sewerage Charge
- d. Meter Rent if meter has been installed by the ULB
- e. Arrears, if any
- f. Surcharge, if payment is not deposited within stipulated time
- g. Other charges as specified in the bill
- h. Deductions & rebates

2.1.14.2.4 Payment Status

It is the status of payment against the water and/or sewerage connection demand generated.

2.1.14.2.5 Billing Date

Usage bill billing date is the date on which bill is generated during the billing cycle.

2.1.14.2.6 Due Date

Usage bill due date is the date on which the bill for a particular connection is due for the current billing cycle. Upon non-payment of bill by the given due date, a surcharge may be levied on the initial demand by the imposition of a penalty.

2.1.15 Payment Details

These are the details of payment made by the applicant/ consumer to be captured on accounting system.

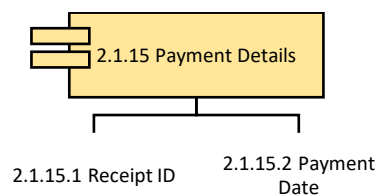


FIGURE 8 TAXONOMY OF PAYMENT DETAILS

2.1.15.1 Receipt ID

Receipt ID is a unique identifier which is generated once payment is completed and payment details are captured on accounting system.

2.1.15.2 Payment Date

The date on which the W&S user charges (application or usage) is paid by the applicant.

2.1.16 W&S SLG Factors

These are important time factors associated with a water and/or sewerage connection application that determine the timeliness aspect of connection request against Service Level Guarantee (SLG) for that ULB. This includes time when application first registered, inspection days, SLG (Service level Guarantee), actual turnaround time, connection installation date and meter reading date.

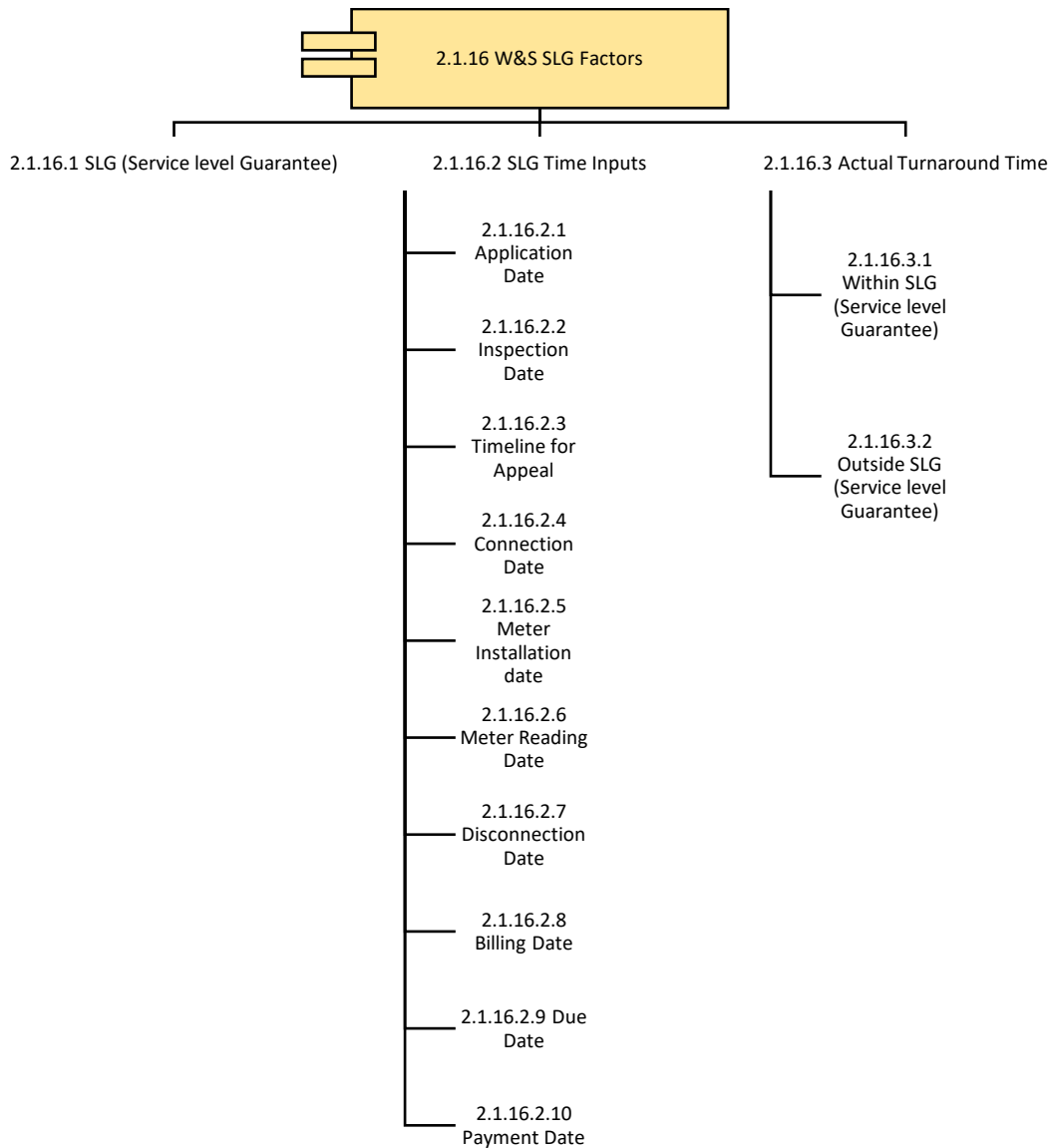


FIGURE 9 TAXONOMY OF W&S SLG FACTORS

2.1.16.1 SLG (Service level Guarantee)

The maximum time that service departments is expected to take for attending W&S service request. Also called expected compliance time set by the ULB in citizen charter or any public disclosed document for a service in which it should be issued or managed. Public sharing of a comparative picture of various SLG in the municipal corporation may ensure accountability introduce competition to improve performance.

2.1.16.2 SLG Time Inputs

These are important dates that help capture service level compliances.

2.1.16.2.1 Application Date

Application date is the date on which the application is first submitted by the citizen.

2.1.16.2.2 Inspection Date

It is the date on which site inspection is conducted by the ULB inspector.

2.1.16.2.3 Timeline for Appeal

This is the timeline mentioned in an assessment notice within which an aggrieved person can appeal to the appellate authority.

2.1.16.2.4 Connection Date

Connection date is the date on which consumer ID is issued to the property owner by the ULBs and other government W&S service providers.

2.1.16.2.5 Meter Installation Date

Meter installation date is the date when a connection is approved and a meter is installed by the plumber as per the request by the ULBs and other government W&S service providers.

2.1.16.2.6 Meter Reading Date

Meter reading date is the date on which the meter reading is captured by the ULB or other government official as per the billing cycle.

2.1.16.2.7 Disconnection Date

Date and time of disconnection means recording the time at which the water and/or sewerage connection is disconnected or the service is discontinued by the ULBs and other government W&S service providers.

2.1.16.2.8 Billing Date

Billing date is the date on which bill is generated during the application process or during billing cycle of service usage (refer section [2.1.14.1.3](#) & [2.1.14.2.5](#))

2.1.16.2.9 Due Date

Due date is the date on which the bill for a particular connection is due during the application process or for the billing cycle as part of regular usage payment. Refer section [2.1.14.1.4](#) and [2.1.14.2.6](#).

2.1.16.2.10 Payment Date

The date on which the W&S application fee or usage charges against a bill is paid by the applicant.

2.1.16.3 Actual Turnaround Time

Actual Turnaround Time is the actual time taken by the ULBs and other government W&S service providers for providing W&S service.

2.1.16.3.1 Within SLG (Service level Guarantee)

When a W&S service is provided by the ULB within the given SLG (Service Level Guarantee) i.e., without exceeding the time period defined.

2.1.16.3.2 Outside SLG (Service level Guarantee)

When a W&S service is provided by the ULB beyond the SLG (Service Level Guarantee) i.e., exceeding the time period defined.

2.1.17 Property ID

A property ID (PID) or property tax identification number (PTIN) or Unique Property Identification Code (UPIC) is the unique identification number allotted to a property by the ULB for the purpose of property tax records. Typically, the PID/ PTIN is generated after the first-time enumeration of the property and its verification by the ULB officials. A water/sewerage connection may link with property ID to fetch relevant details from municipal property register appropriately and vice versa as well as to identify revenue leakages.

2.2 W&S Channels

Channel / Mode / Method through which water/sewerage connection application is being registered by the citizen or information and response is shared by the ULBs.

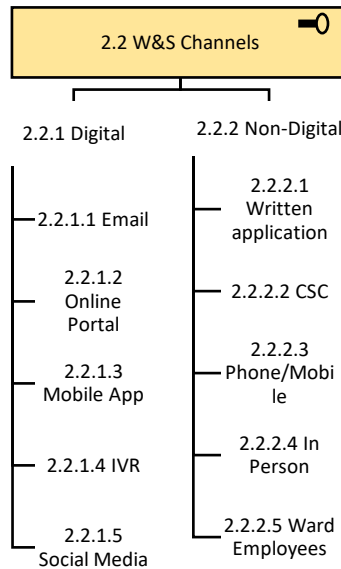


FIGURE 10 TAXONOMY OF W&S CHANNELS

2.2.1 Digital

Digital means an electronic way to collect, store, process and transmit data in the desired form. In the context of water/sewerage connection, this refers to processes and corresponding data used by the authority and the individual for water/sewerage connection which is requested or generated in digital form for the purpose of recording, allocation, assessment, follow up, and appeal.

2.2.1.1 Email

Electronic media for transfer of messages and information through internet.

2.2.1.2 Online Portal

Web portals or web application refers to the websites developed for water/sewerage management. This broadly includes an assessment calculator, W&S data, owner's information and facility to pay the water/sewerage charge through payment gateways linked to the portals. These portals also include the websites developed by the National, State or ULB for e-governance service delivery.

2.2.1.3 Mobile App

A mobile application, also referred to as a mobile app or simply an app, is a computer program or software application designed to run on a mobile device such as a phone, tablet, or watch.

2.2.1.4 IVR

Interactive Voice Response (IVR) is a technology that allows humans to interact with a computer-operated phone system through the use of voice and DTMF tones input via a keypad. The call center operator will listen to the IVR recorded water/sewerage connection request and register the same in the system. The call center operator may contact the citizen in case information provided is insufficient or any clarification required.

2.2.1.5 Social Media

Social media are interactive technologies that allow the creation or sharing/exchange of information, ideas, interests, and other forms of expression via virtual communities and networks such as Twitter, WhatsApp, Facebook etc.

2.2.2 Non-Digital

These are other means (non-digital) by which a request for W&S is captured.

2.2.2.1 Written application

A written application refers to a channel for water and/or sewerage connection which includes an application in a prescribed Form/Format, addressing to Municipal Commissioner, requesting for new or renewal of water and/or sewerage connection.

2.2.2.2 CSC

Common Service centers are the access points for delivery of various services using Information and Communication Technology (ICT). CSCs were created under National E-government Project by the Government of India.

2.2.2.3 Phone/Mobile

Mobile telephone, also called mobile, is a portable device for connecting to a telecommunications network in order to transmit and receive voice, video, or other data.

2.2.2.4 In Person

A person/s can walk in to the municipal office/ ward office to submit their water and/or sewerage connection application.

2.2.2.5 Ward Employees

Ward employees are the employees of municipal council or municipal authority, concerned with administrative wards of the city. In terms of water and/or sewerage connection an application can be submitted through the respective ward employees when they visit an applicant.

2.3 W&S Stakeholders

W&S stakeholders are the stakeholders involved in planning, implementation and maintenance of W&S function. Participation by all relevant stakeholders ensures sharing a common understanding and involvement in the decision-making process as well as accountability in urban governance. Participation by all stakeholders leads to empowerment and to joint ownership and harmonized access to information connecting multiple urban departments to serve citizens better.

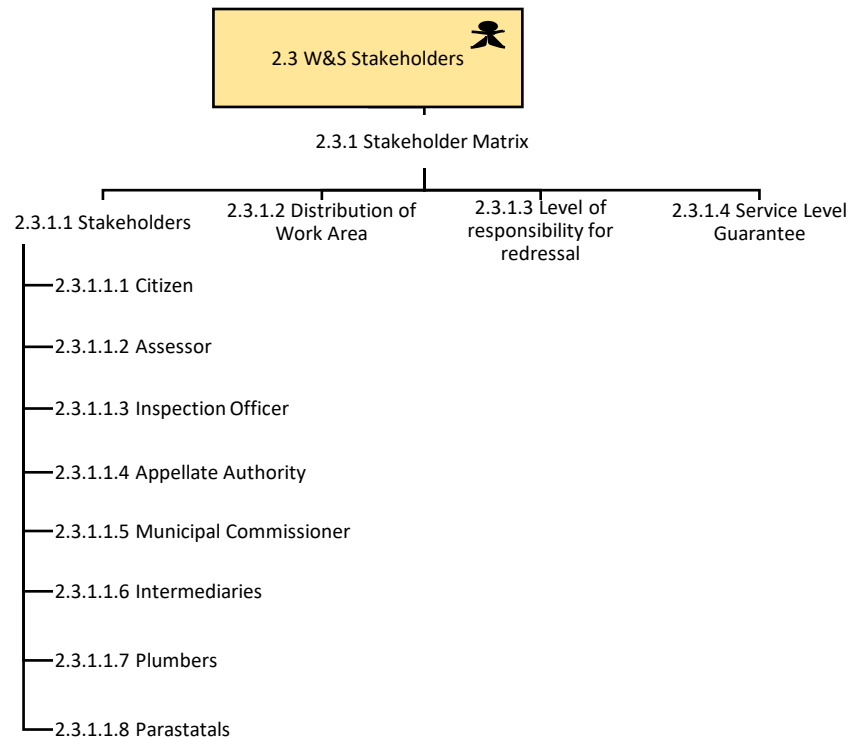


FIGURE 11 TAXONOMY OF W&S STAKEHOLDERS

2.3.1 Stakeholder Matrix

Stakeholder matrix captures distribution of work area, level of responsibility and Service Level Guarantee of various stakeholders within the ULB and/ or contracted organizations based on ward / locality/jurisdiction, service / issue category.

2.3.1.1 Stakeholders

This refers to the types of stakeholders who are involved in a W&S system such as the citizen, assessor, inspectors, appellate authority and Municipal Commissioner.

2.3.1.1.1 Citizen

Citizen means the originator of the water and/or sewerage connection application who requests the service.

2.3.1.1.2 Assessor

An assessor is a ULB official or any other service provider (state government, utility board, parastatal) employee, who determines the value of a water/sewerage charge for revenue purposes. The figures that assessors derive are used to calculate future water/sewerage tariff rate.

2.3.1.1.3 Inspection Officer

Inspection officer is the ULB or any other service provider (state government, utility board, parastatal) official assigned to inspect property with respect to conformance to inspection checklist.

2.3.1.1.4 Appellate Authority

Appellate Authority is the authority or representative of the authority assigned to review the procedures and decisions or assessment of water/sewerage charge to make sure that the proceedings were fair and that the proper law/regulation are applied appropriately.

2.3.1.1.5 Municipal Commissioner

Commissioner of the ULB or municipal body means an officer appointed by the Government, and includes an Additional Director, a Joint Director, Deputy Director, or any other officer of the Government authorized by it to perform the functions of the Commissioner and Director of Municipal Administration.

2.3.1.1.6 Intermediaries

Intermediary is the individual, group of persons (Volunteers) or organizations (NGOs, Trusts etc.) who initiated the W&S request or application on the behalf of the originator who lacks the capacity to use any channels which are provided by the ULB. These Intermediaries should be registered with the ULBs in order to provide their services to the originator (who is either from marginalized section, illiterate or differently abled) and should not charge extra money from the originator.

The application submitted by the intermediaries for the originator who is capable of filling their own request will not be considered by the ULBs.

2.3.1.1.7 Plumbers

Plumbers means a person whose job is to put in or repair water pipes, baths, toilets, meters etc. post approval of connection request. A list of plumbers is maintained by the ULB for day-to-day operations.

2.3.1.1.8 Parastatals

Parastatals are institutions/organizations, which are wholly or partially owned and managed by the government (either autonomous or quasi-governmental).

2.3.1.2 Distribution of Work Area

This refers to the water supply or sewerage zones or ward and/or sectors within ULB or any other government service provider for which each of the stakeholders are responsible for.

2.3.1.3 Level of Responsibility for Redressal

In order to ensure that applications are resolved within the prescribed time norm, escalation levels of responsibility for redressal are mapped.

2.3.1.4 Service Level Guarantee

Refer section [2.1.16.1](#).

2.4 W&S Processes

W&S Processes are a series of actions or steps taken in order to achieve a timely delivery of water/sewerage connections by the ULBs such as water and/or sewerage connection application creation, acknowledgement, assessment, disconnection, restoration, appellate, billing & payment, approval & allocation.

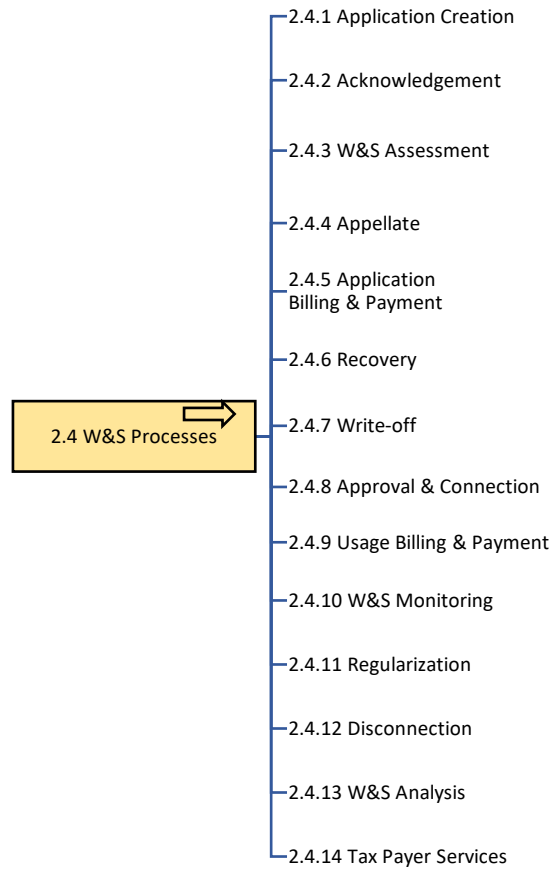


FIGURE 12 TAXONOMY OF W&S PROCESSES

2.4.1 Application Creation

A process by which an application is created for water and/or sewerage connection at the municipal authority such as new water and/or sewerage connection, renewal of water and/or sewerage connection or transfer of water and/or sewerage connection.

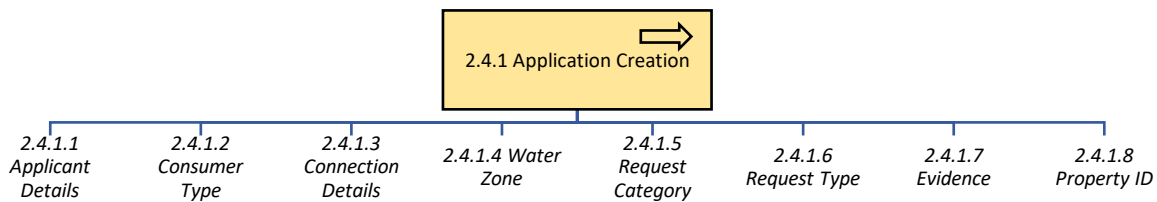


FIGURE 13 TAXONOMY OF APPLICATION CREATION

2.4.1.1 Applicant Details

Refer section [2.1.3](#).

2.4.1.2 Consumer Type

Refer section [2.1.4](#).

2.4.1.3 Connection Details

Refer section [2.1.5](#).

2.4.1.4 Water Zone

Refer section [2.1.7](#).

2.4.1.5 Request Category

Refer section [2.1.9](#).

2.4.1.6 Request Type

Refer section [2.1.10](#).

2.4.1.7 Evidence

Refer section [2.1.11](#).

2.4.1.8 Property ID

Refer section [2.1.17](#).

2.4.2 Acknowledgement

The process to acknowledge the new registration/renewal by the ULBs. An acknowledgement slips or receipt is generated post acknowledgement of the application.

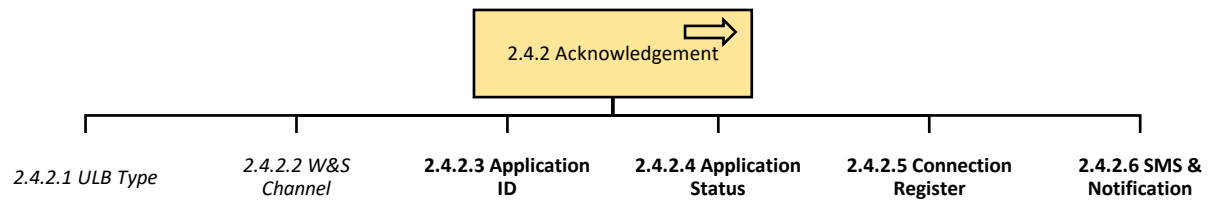


FIGURE 14 TAXONOMY OF ACKNOWLEDGEMENT

2.4.2.1 ULB Type

Refer section [2.1.8](#).

2.4.2.2 W&S Channel

Refer section [2.2](#).

2.4.2.3 Application ID

Refer section [2.1.2](#).

2.4.2.4 Application Status

Refer section [2.1.13](#).

2.4.2.5 Connection Register

Refer section [2.5.1.1](#).

2.4.2.6 SMS & Notification

These are the notifications sent to citizens informing them about the connection request being submitted on system.

2.4.3 W&S Assessment

The process by which the documents were scrutinized by the revenue/water/sewerage department with the support of other related departments.

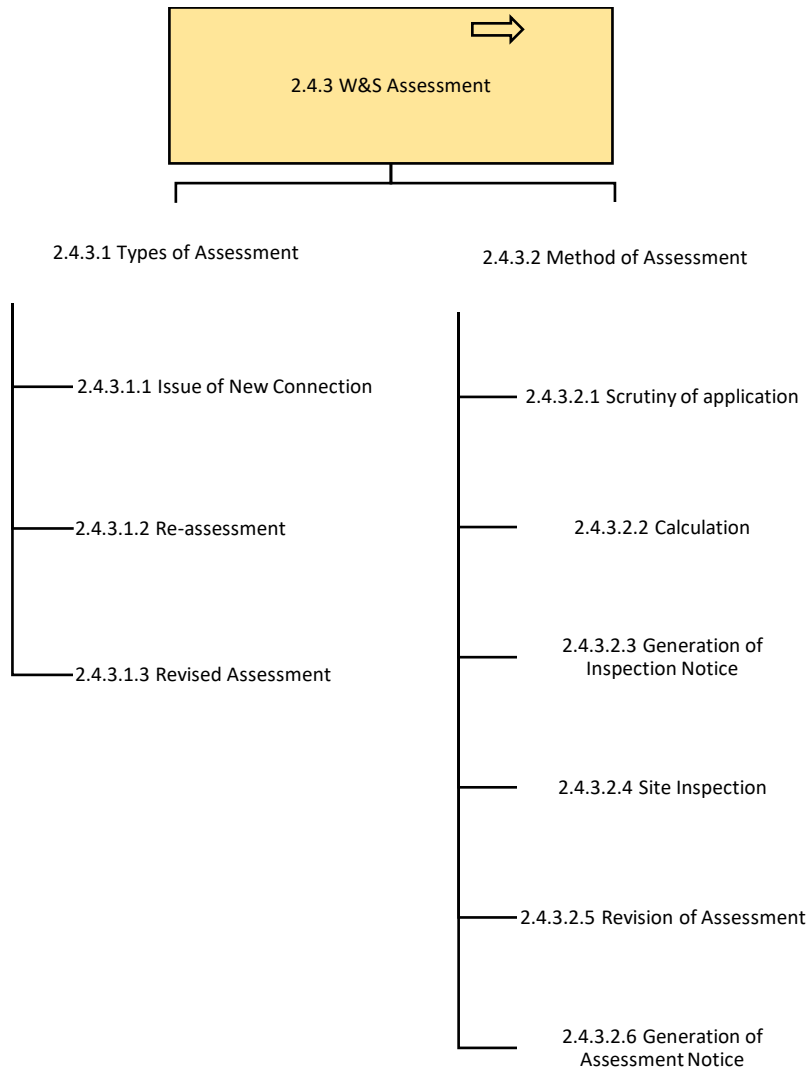


FIGURE 15 TAXONOMY OF W&S ASSESSMENT

2.4.3.1 Types of Assessment

Types of assessment is the classification of assessment processes undertaken to provide water and/or sewerage service.

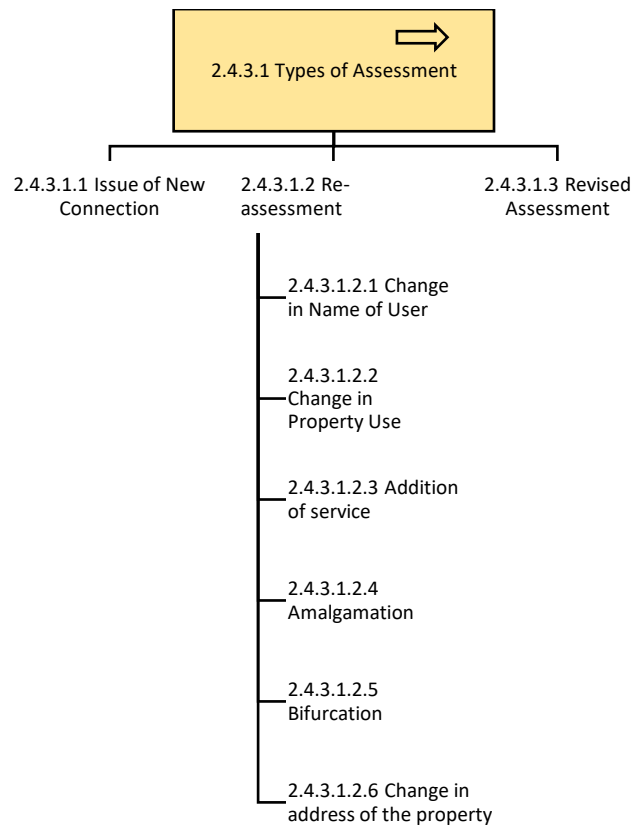


FIGURE 16 TAXONOMY OF TYPES OF ASSESSMENT

2.4.3.1.1 Issue of New Connection

Assessment process undertaken while approving a connection for the first time.

2.4.3.1.2 Re-assessment

Assessment process undertaken to determine new charge based on the change in the usage of an existing connection or change in the applicant details.

2.4.3.1.2.1 Change in Name of User

Assessment process undertaken during change in name of user.

2.4.3.1.2.2 Change in Property Use

Assessment process undertaken during change in type of property use which is mentioned in the application.

2.4.3.1.2.3 Addition of Service

Assessment process undertaken during addition of any other service.

2.4.3.1.2.4 Amalgamation

Assessment process undertaken when two or more consumer connections are merged into a single connection.

2.4.3.1.2.5 Bifurcation

Assessment process undertaken one consume connection is split into two or more connections.

2.4.3.1.2.6 Change in Address of the Property

Assessment process undertaken when there is change in address of the property which is mentioned in the application.

2.4.3.1.3 Revised Assessment

Assessment process undertaken during changing the usage value for a water and/or sewerage connection based on the periodic increase in rates (based on Local acts) or based on noticed changes in the W&S factors. Revised assessment may also take place after appellate decision to change the W&S usage amount.

2.4.3.2 Method of Assessment

This means different methods undertaken by the assessor to assess the water and/or sewerage connection application based on W&S factors.

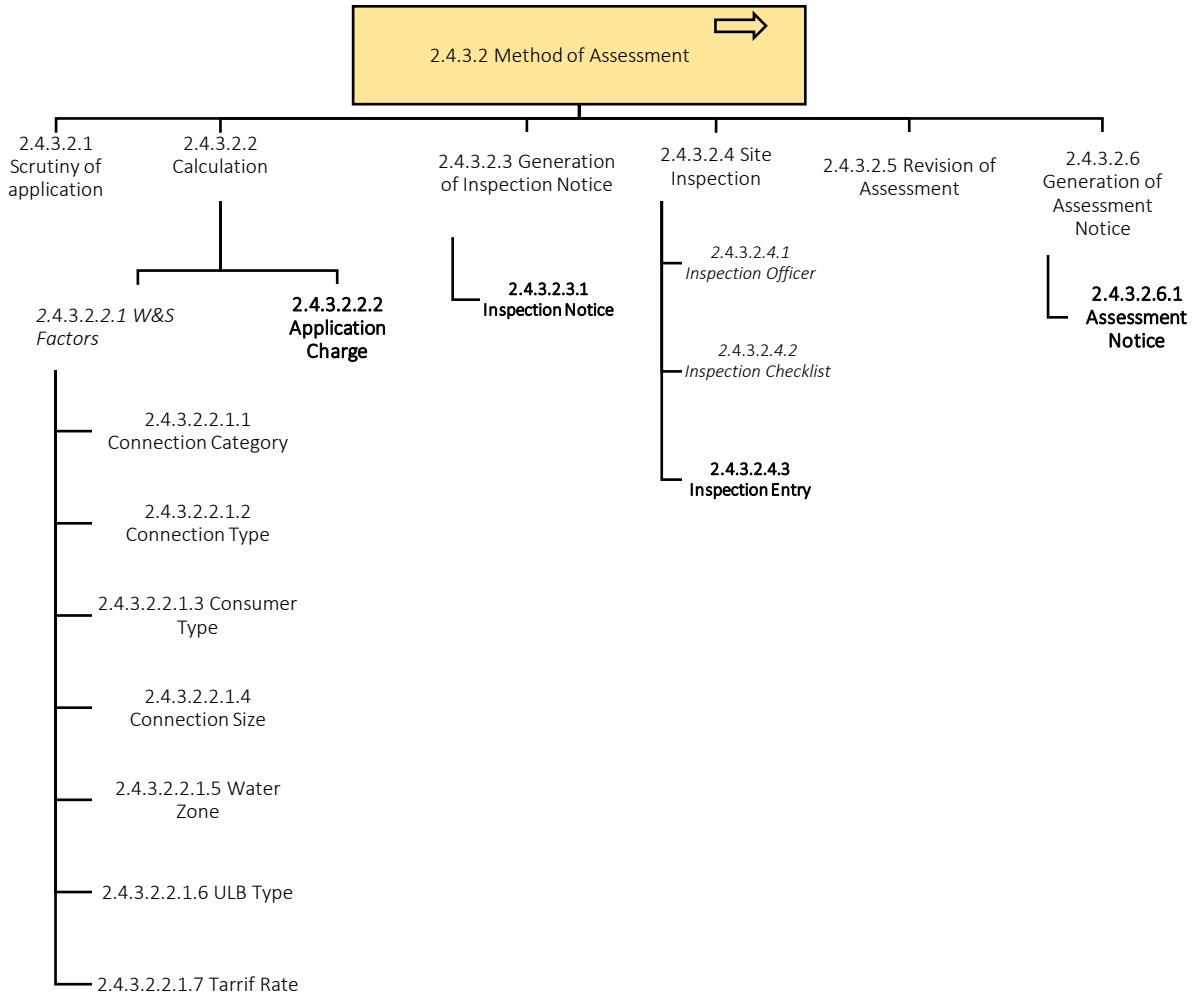


FIGURE 17 TAXONOMY OF METHOD OF ASSESSMENT

2.4.3.2.1 Scrutiny of Application

It is the assessment conducted on the application as soon as it is been applied by the citizen and the scrutiny is conducted by the assessing officer. During the initial assessment, scrutiny of documents may be done by the ULB officials and appropriate inspection fees, application charge and inspection notice are generated.

2.4.3.2.2 Calculation

Calculation is the process of calculating the fees for applied connection based on the specified criteria as mention in their Municipal Act or as decided by the Municipal Commissioner for water and/or sewerage connection requests. W&S calculation process comprises the use of any one or combination of methods using various W&S factors such as connection type, connection size, connection category etc.

2.4.3.2.2.1 W&S Factors

These are the factors associated with a water and/or sewerage connection and used in W&S assessment for calculation of application charge amount.

2.4.3.2.2.1.1 Connection Category

Refer section [2.1.5.1](#).

2.4.3.2.2.1.2 Connection Type

Refer section [2.1.5.2](#).

2.4.3.2.2.1.3 Consumer Type

Refer section [2.1.4](#).

2.4.3.2.2.1.4 Connection Size

Refer section [2.1.5.4](#).

2.4.3.2.2.1.5 Water Zone

Refer section [2.1.6](#).

2.4.3.2.2.1.6 ULB type

Refer section [2.1.8](#).

2.4.3.2.2.1.7 Tariff Rate

Tariff rate is the per unit charge determined for the water and/or sewerage connection. It is one of the factors that determine water and/or sewerage bill.

2.4.3.2.2.2 Application Charge

Refer section [2.1.14.1.2](#).

2.4.3.2.3 Generation of Inspection Notice

This is the process in which Inspection notice is generated and shared with citizen.

2.4.3.2.3.1 Inspection Notice

Inspection notice is the notice served to the citizen notifying them about the planned time of inspection-by-inspection officer.

2.4.3.2.4 Site Inspection

It is the ground inspection conducted post initial assessment, an ULB Inspector (water or sewerage inspector) is assigned to verify the application.

2.4.3.2.4.1 *Inspection Officer*

Refer section [2.3.1.1.3](#).

2.4.3.2.4.2 *Inspection Checklist*

Inspection checklist is used by ULB inspector or any other service provider (state government, utility board, parastatal) to check conformance to relevant rules, safety measures and guidelines, any illegal activity, etc.

2.4.3.2.4.3 Inspection Entry

It means reporting the details of inspection post ground inspection by the inspector such as inspection time, details, notes etc.

2.4.3.2.5 Revision of Assessment

Revised assessment notice is the notice served to the citizen indicating the revised usage value of water and/or sewerage connection assessed on basis of the actual ground inspection. Thereafter a revised assessment notice is shared with the citizen.

2.4.3.2.6 Generation of Assessment Notice

This is the process in which assessment notice is generated and shared with citizen.

2.4.3.2.6.1 Assessment Notice

Assessment notice is the notice served to the citizen indicating the application charge value of water and/or sewerage connection post inspection of property. This notice is not considered as the final bill. The assessment notice is the interim notice to confirm the charges of the water and/or sewerage connection.

2.4.4 Appellate

Appellate is the process followed after the assessment are presented and the citizen is aggrieved by the fixation or the charging of the water and/or sewerage charge. The appeal process is initiated with a simple appeal letter or through grievance redressal application.

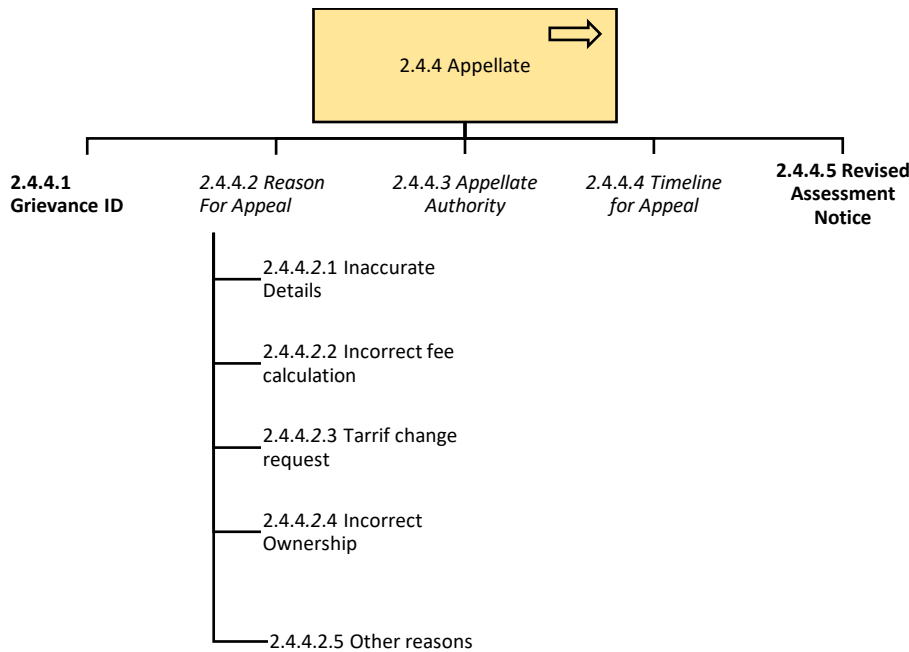


FIGURE 18 TAXONOMY OF APPELLATE

2.4.4.1 Grievance ID

Grievance ID is a unique identification number allotted to the grievance by the ULB for the purpose of grievance recording, allocation, assessment, follow up, and appeal.

2.4.4.2 Reasons for Appeal

Reason for appeal is the reasons as captured in assessment notice or usage bill because of which an aggrieved person appeals to the appellate authority for necessary redressal.

2.4.4.2.1 Inaccurate Details

This means the aggrieved person has appealed given the reason of inaccurate details such as incorrect name, owner name, incorrect address in an assessment notice.

2.4.4.2.2 Incorrect Fee Calculation

This means the aggrieved person has appealed given the reason of incorrect charge calculation in an assessment notice.

2.4.4.2.3 Tariff Change Request

This means the request to change the tariff if the tariff mentioned in the usage bill is different than the tariff published or applicable by the citizen.

2.4.4.2.4 Incorrect Ownership

This means the aggrieved person has appealed given the reason of incorrect ownership in an assessment notice.

2.4.4.2.5 Other Reasons

This means the aggrieved person has appealed given the any other reason as per the assessment notice.

2.4.4.3 Appellate Authority

Appellate Authority is the authority or representative of the authority assigned to review the procedures and decisions or assessment of W&S to make sure that the proceedings were fair and law/ regulation are applied appropriately.

2.4.4.4 Timeline for Appeal

Refer section [2.1.16.2.3](#).

2.4.4.5 Revised Assessment Notice

Revised assessment notice is the notice served to the citizen indicating the revised usage value of water and/or sewerage connection assessed on basis of the revised assessment.

2.4.5 Application Billing & Payment

Application Billing & Payment is the process of generating bill (demand) against the calculated W&S application charge by the ULB and subsequent payment of the same by the citizen.

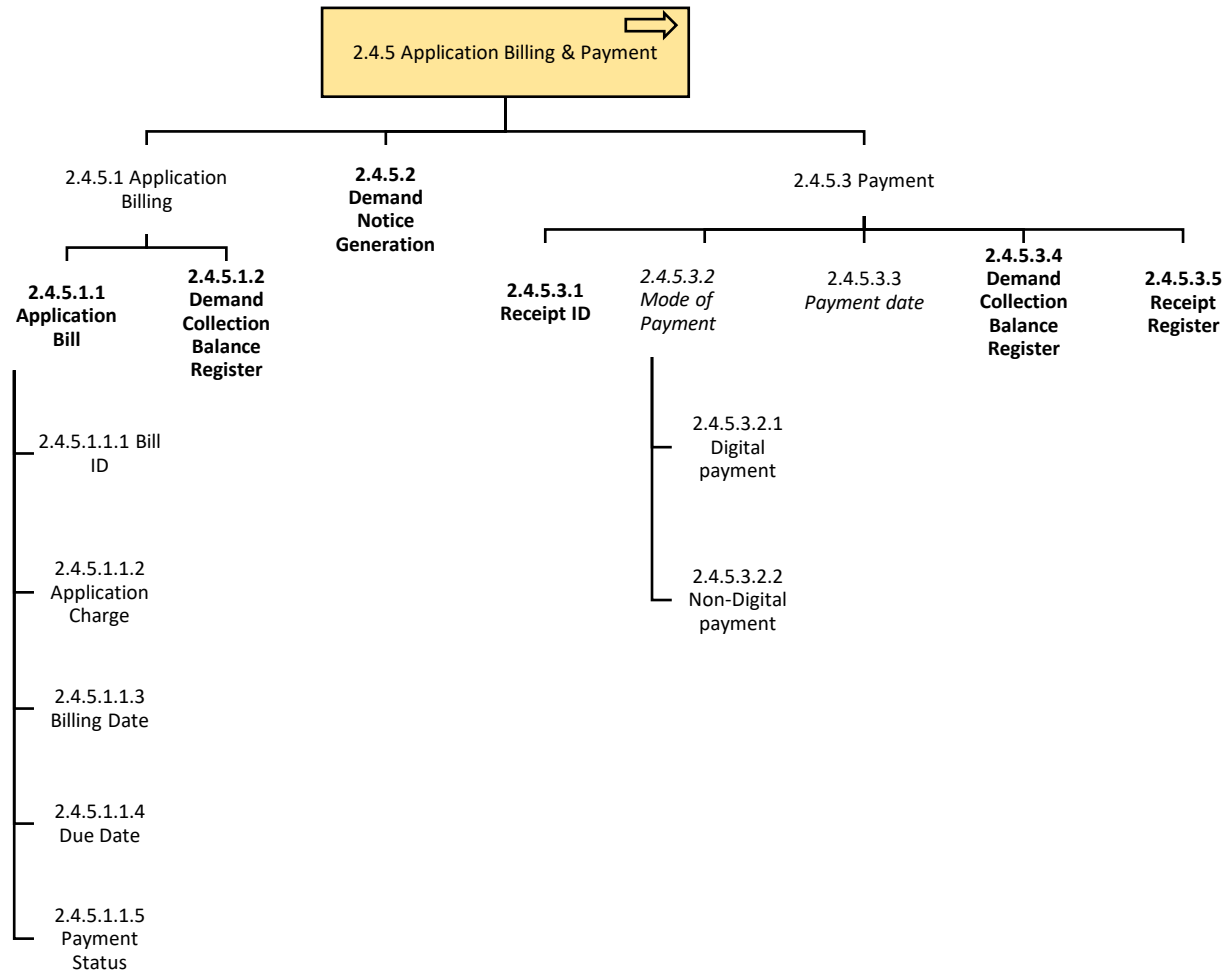


FIGURE 19 TAXONOMY OF APPLICATION BILLING & PAYMENT

2.4.5.1 Application Billing

The process by which a connection fee bill is generated before scrutiny of application.

2.4.5.1.1 Application Bill

It is the initial bill generated for the application/connection for the applied water and/or sewerage connection. Application bill constitutes of application processing fee and inspection fee amount.

2.4.5.1.1.1 Bill ID

Refer section [2.1.14.1.1](#).

2.4.5.1.1.2 Application Charge

Refer section [2.1.14.1.2](#).

2.4.5.1.1.3 Billing Date

Refer section [2.1.14.1.3](#).

2.4.5.1.1.4 Due Date

Refer section [2.1.14.1.4](#).

2.4.5.1.1.5 Payment Status

Refer section [2.1.14.1.5](#).

2.4.5.1.2 Demand Collection Balance Register

Refer section [2.5.1.3](#).

2.4.5.2 Demand Notice Generation

This is the process in which bill (demand) is generated and served to the citizen.

2.4.5.3 Payment

Payment is the voluntary tender of money or its equivalent paid by the citizen against the bill generated.

2.4.5.3.1 Receipt ID

Refer section [2.1.15.1](#).

2.4.5.3.2 *Mode of Payment*

It means mode of payment of bill amount by the citizen.

2.4.5.3.2.1 Digital Payment

A digital payment occurs when the payment for processing the application and water and/or sewerage charge could be done via digital and electronic medium, such as using debit card, credit card, payment gateway etc.

2.4.5.3.2.2 Non-Digital Payment

Non-digital payment refers to the mode of payment of money in physical form like cash, demand draft, cheque etc.

2.4.5.3.3 Payment Date

Refer section [2.1.15.2](#).

2.4.5.3.4 Demand Collection Balance Register

Refer section [2.5.1.3](#).

2.4.5.3.5 Receipt Register

Refer section [2.5.1.2](#).

2.4.6 Recovery

Recovery means, recovery of charge from the citizen or defaulters. In some cases, recovery may be in terms of impounding any movable or immovable asset of the defaulter. Few methods of recovery in water and/or sewerage are:

- by presenting a bill
- by serving a written notice of demand
- by a suit

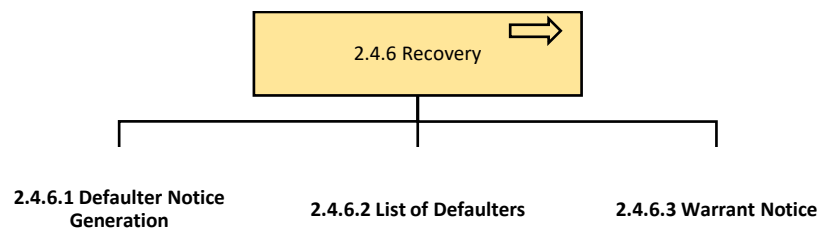


FIGURE 20 TAXONOMY OF RECOVERY

2.4.6.1 Defaulters Notice Generation

This means generation and service of notice to the defaulters who have not paid the bill by the due date. In these cases, bills are amended to include penalties or late fee for defaulting.

2.4.6.2 List of Defaulters

Refer section [2.5.1.4](#).

2.4.6.3 Warrant Notice

Warrant notice is the repeat bill that is served by the authority on the service seeker for recovery.

2.4.7 Write-off

Write-Off of water/sewerage charge is the process of deductions or exemptions of charge, in compliance with any law, or through the guidelines of the ULB or the court of law.

2.4.8 Approval and Connection

The process of approving the applied application for water and/or sewerage connection post assessment and inspection and allocation of connection by the municipal commissioner of the ULBs.

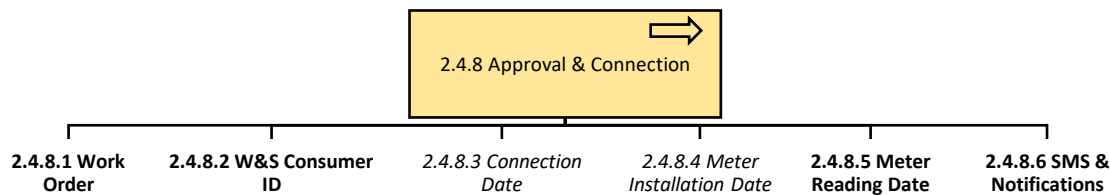


FIGURE 21 TAXONOMY OF APPROVAL & CONNECTION

2.4.8.1 Work Order

A work order is a document describing an authorized task to be completed by a field service, maintenance, or inspection worker. Work orders provide basic information such as a description of the task, the estimated completion date, and the name of the individual assigned to the task. A work order for installation of meter is intimated post approval of water and/or sewerage connection request. It is recommended that the work order should be digitally or manually signed by the relevant ULB officer such as Commissioner or Deputy Commissioner etc. along with water marked with ULB or relevant logo as per the ULB rules and/or regulations. It is also recommended to add digitally signed work orders into DigiLocker⁹ to make it easier to access and integrate with other services.

⁹ "DigiLocker" means the Government owned and operated web and mobile based hosting of Digital Locker system. **Digital Locker System.**— (1) For the purpose of providing preservation and retention of machine readable, printable, shareable, verifiable and secure State or Central department or agency or body corporate issued electronic records, the Government and other service providers to provide a Digital Locker system of limited electronic storage to all users.

(2) The Government through Digital Locker authority and in accordance with the technical standards as laid down by the DeitY from time to time shall provide for the administration of Digital Locker system.

2.4.8.2 W&S Consumer ID

Refer section [2.1.1](#).

2.4.8.3 Connection Date

Refer section [2.1.16.2.4](#).

2.4.8.4 Meter Installation date

Refer section [2.1.16.2.5](#).

2.4.8.5 Meter Reading Date

Refer section [2.1.16.2.6](#).

2.4.8.6 SMS & Notifications

Refer section [2.4.2.6](#).

2.4.9 Usage Billing & Payment

Application Billing & Payment is the process of generating bill (demand) against the calculated W&S application charge by the ULB and subsequent payment of the same by the citizen.

(3) Subject to sub-rule (1), the Digital Locker system shall act as web and mobile based portal for State or Central department or agency or body corporate issued electronic records maintained in a prescribed format.

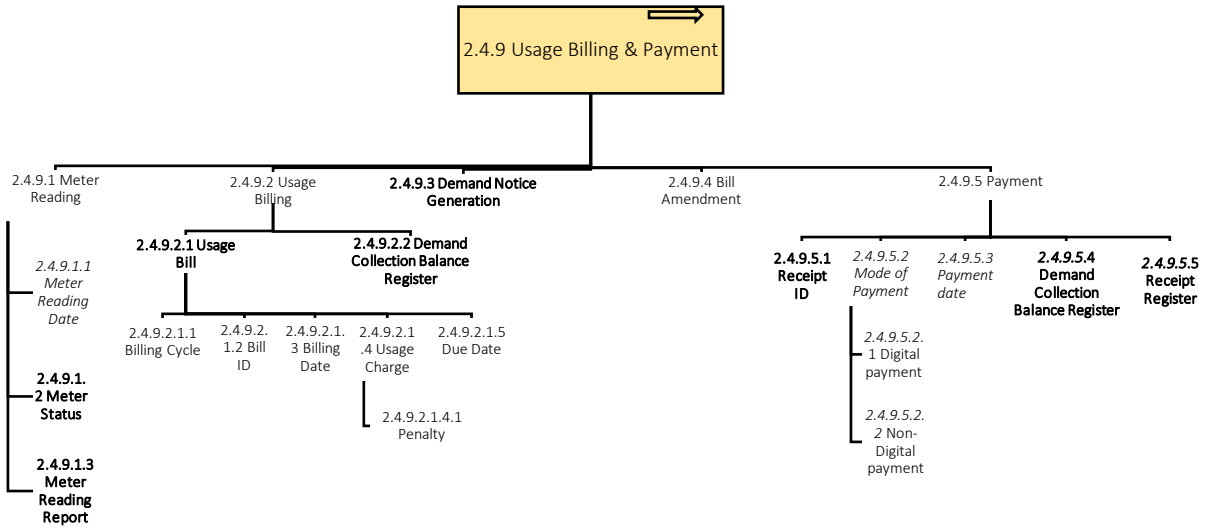


FIGURE 22 TAXONOMY OF USAGE BILLING & PAYMENT

2.4.9.1 Meter Reading

Meter reading means the reading taken by the ULB inspector during their inspections as per the billing cycle. The reading is taken from the meters at the billing address. This may be skipped for non-metered connections.

2.4.9.1.1 Meter Reading Date

Refer section [2.1.16.2.6](#).

2.4.9.1.2 Meter Status

Refer Section [2.1.11](#).

2.4.9.1.3 Meter Reading Report

Refer section [2.5.1.6](#).

2.4.9.2 Usage Billing

The process by which a usage bill is generated based on water and/or sewerage usage post.

2.4.9.2.1 Usage Bill

It means the final bill generated in reference to water and/or sewerage connection based on the usage value for the connection.

Sewerage charge for own water source such as borewell, tube well is calculated based on average discharge (which is calculated based on HP of Motor, Average number of hours the motor is running. Also, the sewerage charge for metered connection is based on the meter status and water usage or as may be defined in specific rules and regulations by the ULBs.

2.4.9.2.1.1 Billing Cycle

Refer section [2.1.14.2.1](#).

2.4.9.2.1.2 Bill ID

Refer section [2.1.14.1.1](#).

2.4.9.2.1.3 Billing Date

Refer section [2.1.14.2.5](#).

2.4.9.2.1.4 Usage Charge

Refer section [2.1.14.2.3](#).

2.4.9.2.1.4.1 Penalty

The amount of extra money the citizen has to pay for failing to adhere to water & sewerage rules and/or/laws, timelines. For e.g.: Misuse of water resources or wastage of water, polluting the sewerage channels such as drains. The challans can be generated at the time of billing or on spot during inspection.

2.4.9.2.1.5 Due Date

Refer section [2.1.14.2.6](#).

2.4.9.2.2 Demand Collection Balance Register

Refer section [2.5.1.3](#).

2.4.9.3 Demand Notice Generation

Refer section [2.4.5.2](#).

2.4.9.4 Bill Amendment

Bill amendment is the process of amending connection user bill when applicant notices a discrepancy in the calculation of the bill and submits a request for amendment or when the ULB realizes discrepancy in the calculation of bill and amends it. There can be following reasons for bill amendments,

- a) Court Case Settlement
- b) Arrear Write-off
- c) DCB Correction
- d) One Time settlement
- e) Use of Rain Water Harvesting

2.4.9.5 Payment

Refer section [2.4.5.3](#).

2.4.9.5.1 Receipt ID

Refer section [2.4.5.3.1](#).

2.4.9.5.2 *Mode of Payment*

Refer section [2.4.5.3.2](#).

2.4.9.5.2.1 Digital Payment

Refer section [2.4.5.3.2.1](#).

2.4.9.5.2.2 Non-Digital Payment

Refer section [2.4.5.3.2.2](#).

2.4.9.5.3 *Payment Date*

Refer section [2.1.16.2.10](#).

2.4.9.5.4 Demand Collection Balance Register

Refer section [2.5.1.3](#).

2.4.9.5.5 Receipt Register

Refer section [2.5.1.2](#).

2.4.10 W&S Monitoring

W&S monitoring is the monitoring process undertaken by the ULB officials from the time a water and/or sewerage connection request application is lodged on system until it's approved and remains valid. The water and/or sewerage charge and associated revenue are monitored based on purpose of water and/or sewerage, Service Level Benchmarks, regulation purpose and need for renewal.

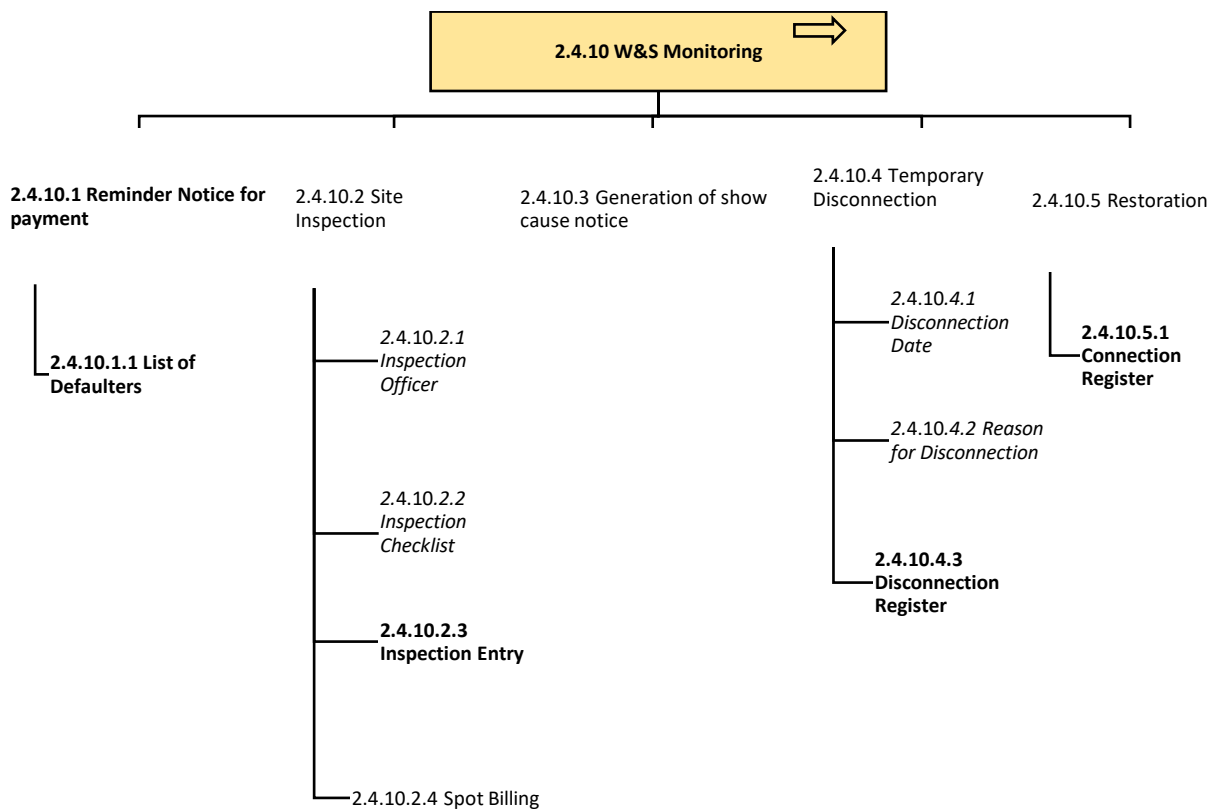


FIGURE 23 TAXONOMY OF W&S MONITORING

2.4.10.1 Reminder Notice for payment

The process of issuing a notice for renewal by the ULBs to the applicant for payment of overdue water/sewerage bills. The notice may be issued via SMS, Email, or by sending physical letter to the citizen.

2.4.10.1.1 List of Defaulters

Refer section [2.5.1.4](#).

2.4.10.2 Site Inspection

Site Inspection is the process by the ULB officials to check that the connection is not illegal and is as per the relevant rules, safety measures and guidelines. This form of inspection may occur whenever the ULB find suitable. Show Cause Notice can be issued to following citizen if citizen violates the rules or if a complaint is raised against it.

2.4.10.2.1 *Inspection Officer*

Refer section [2.3.1.1.3](#).

2.4.10.2.2 *Inspection Checklist*

Refer section [2.4.3.2.4.2](#).

2.4.10.2.3 Inspection Entry

Refer section [2.4.3.2.3.1](#).

2.4.10.2.4 Spot Billing

Spot Billing is done for taking penalty against non-compliance during inspection. Similar bill is generated with its bill ID, bill date and bill amount. This only goes under Miscellaneous Receipts of Receipt Register in ULB Accounts and not in DCB Register. The spot billings can be associated with Meter Status (Section [2.1.11](#)) or/and Penalty (Section [2.4.9.2.1.4.1](#)).

2.4.10.3 Generation of Show Cause Notice

The process of issuing a show cause notice to trade owners who have offended any rule and/or regulations as per the ULB. The notice is served to give an opportunity to defend the charges made against the consumer by explanations and reasons in writing and/or by personal hearing. If the offender justified the charges/actions then the charges will be dropped. Connections of consumer who fail to justify the charges will be suspended by the ULB.

2.4.10.4 Temporary Disconnection

The process by which a water and/or sewerage connection is disconnected for the short period of time as per the rule /law by the ULB or as requested by the citizen. The temporary disconnection can be restored post clearing the reason for disconnection.

2.4.10.4.1 *Disconnection Date*

Time of disconnection means recording the time at which the water and/or sewerage connection is disconnected or the service is discontinued.

2.4.10.4.2 *Reason for Disconnection*

This means recording the reason for which the water and/or sewerage connection is disconnected by the ULB or other water service providers.

2.4.10.4.3 **Disconnection Register**

Refer section [2.5.1.9](#).

2.4.10.5 Restoration

The process by which a disconnected water and/or sewerage connection is restored.

2.4.10.5.1 **Connection Register**

Refer section [2.5.1.1](#).

2.4.11 Regularization

The process by which an unauthorized connection can be regularized, subject to the technical legal feasibility and a payment of following charges: -

- a) Penalty
- b) Average User Charges for the respective Category for the past three years.
- c) Water/ Sewerage Development Charges, as applicable.
- d) Usual initial charges such as opening fee, advance and Road Restoration Charges, dues on property etc.

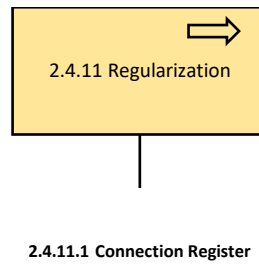


FIGURE 24 TAXONOMY OF REGULARIZATION

2.4.11.1 Connection Register

Refer section [2.5.1.1](#).

2.4.12 Disconnection

The process of disconnection the water and/or sewerage connection for the citizen. The disconnection of the water and/or sewerage connection is done when there is no satisfactory response received from the citizen for which show-cause notice was issued.

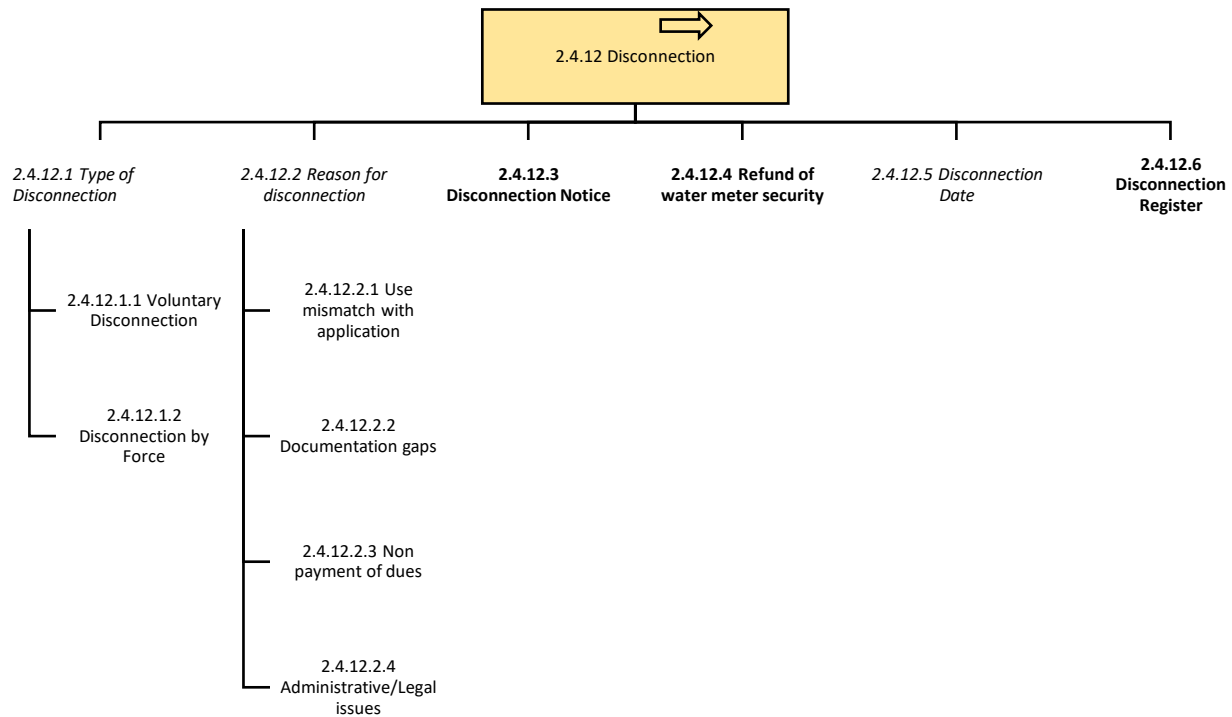


FIGURE 25 TAXONOMY OF DISCONNECTION

2.4.12.1 Type of Disconnection

Type of disconnection captures classification of disconnection such as voluntary cancellation or cancellation by force.

2.4.12.1.1 Voluntary Disconnection

This means disconnection of water and/or sewerage connection by the citizen.

2.4.12.1.2 Disconnection by Force

This means disconnection of water and/or sewerage connection by force by giving reason for disconnection such as non-payment, legal issues, documentation gaps, or any other reason.

2.4.12.2 Reason for disconnection

Refer section [2.4.10.4.2](#).

2.4.12.2.1 Use Mismatch with Application

ULB may disconnect the connection if the use of the property mentioned in application didn't match the use of the property during site inspection.

2.4.12.2.2 Documentation Gaps

ULB may disconnect the connection if there are any documentation gaps in the application submitted post show cause notice.

2.4.12.2.3 Non-Payment of Dues

ULB may disconnect the connection if there are any dues pending as per the bills generated post show cause notice.

2.4.12.2.4 Administrative/Legal Issues

ULB may disconnect the connection if there are any administrative/legal issues.

2.4.12.3 Disconnection Notice

Disconnection notice is issued to defaulters who have not paid the W&S charges within the given time limit mentioned in the defaulter notice. The notice has information about date from which the connection will be disconnected.

2.4.12.4 Refund of Water Meter Security

This means the request to refund the meter security deposit post disconnection by the citizen.

2.4.12.5 Disconnection Date

Refer section [2.1.16.2.7](#).

2.4.12.6 Disconnection Register

Refer section [2.5.1.9](#).

2.4.13 W&S Analysis

W&S analysis is the process through which all water and/or sewerage connection requests are analyzed to check quality of service and become aware of (and eventually rectify) any deficiency

in services. This helps in improving the efficiency, accountability, responsiveness and transparency of a ULB, ultimately leading to improvement in service delivery.

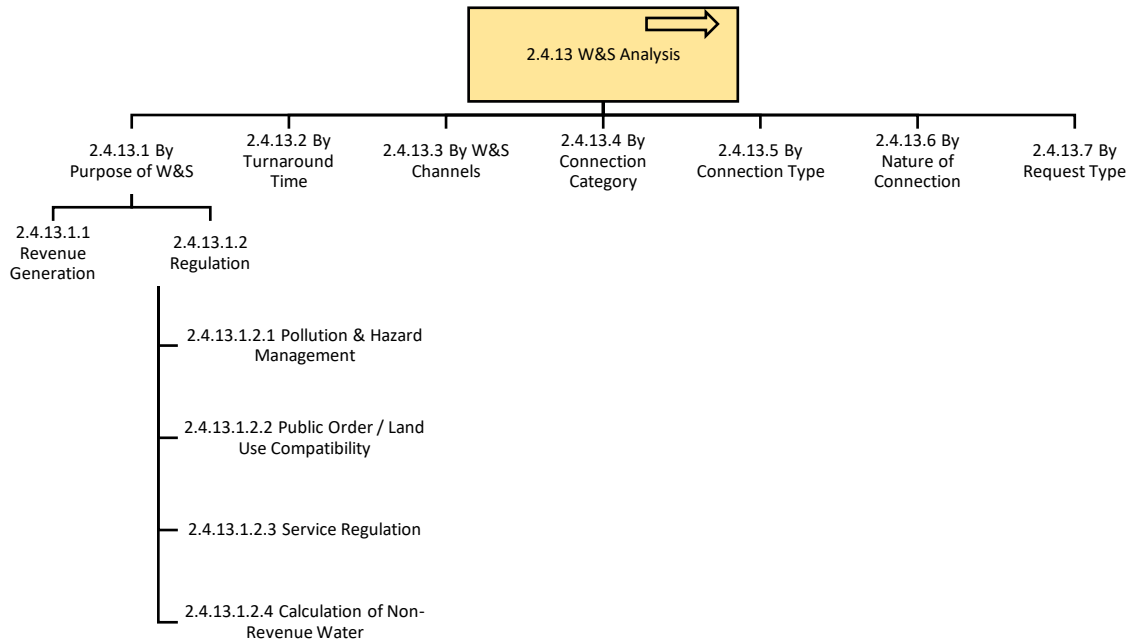


FIGURE 26 TAXONOMY OF W&S ANALYSIS

2.4.13.1 By Purpose of W&S

This means analysis of W&S connection requests based on the aim or intention of issuing connections by the ULBs for e.g., Revenue Generation, Regulation and Service Regulation.

2.4.13.1.1 Revenue Generation

ULBs generate revenue through various sources such as trade license, building plan/license approval fees, rent from shops/markets/commercial establishments, water charges, parking fee, cable laying charges etc. to provide timely services and basic infrastructure. Water and sewerage charges is one of the key sources of revenue generation for the ULB and monitoring user charges from W&S helps ULBs in improving its self-sufficiency.

2.4.13.1.2 Regulation

Regulation is the management of offensive and dangerous practices by the ULBs

2.4.13.1.2.1 Pollution & Hazard Management

Regulating water and sewerage related pollution and hazard management by conducting timely inspections. There are many approaches that could be adopted in water and sewerage pollution control and management. It could be through prevention, practice efforts or join a project/program; Regulation and monitoring or engaging in control measures by reducing or minimizing waste. Prevention of overflow, contamination, dispose of waste, use of chemicals, wastage of water, etc. This analysis is done by mapping inspection entries and grievances with W&S maps.

2.4.13.1.2.2 Public Order / Land Use Compatibility

Regulation and enforcement as per public order and land use defined by the rule of law. This analysis may be done by mapping W&S connections with different land use cartogram maps.

2.4.13.1.2.3 Service Regulation

Regulation of service as per the rule or law of the ULB. This analysis is done by checking ULB performance against different SLB criteria.

2.4.13.1.2.4 Calculation of Unaccounted for Water

Unaccounted-for Water (UFW) is the difference between the quantity of water supplied to a city's network and the metered quantity of water used by the customers. UFW has two components: (a) physical losses due to leakage from pipes, and (b) administrative losses due to illegal connections and under registration of water meters. While every case is different, often both components contribute roughly equally to UFW¹⁰ (The World Bank Group, 2022).

2.4.13.2 By Turnaround Time

Refer section [2.1.16.3](#).

¹⁰ The World Bank Group. (2022). *The World Bank*. Retrieved from Unaccounted for Water: <http://web.worldbank.org/archive/website00857/WEB/OTHER/6C586003.HTM?OpenDocument>

2.4.13.3 By W&S Channels

Refer section [2.2](#).

2.4.13.4 By Connection Category

Refer section [2.1.5.1](#).

2.4.13.5 By Connection Type

Refer section [2.1.5.2](#).

2.4.13.6 By Nature of Connection

Refer section [2.1.5.3](#).

2.4.13.7 By Request Type

Refer section [2.1.10](#).

2.4.14 Tax Payer Services

These are the services availed to all tax payers in a municipality. In the context of water/sewerage service, these are grievance redressal, no due certificate, NOCs, duplicate bills, extension of temp connections, change of defective meter, tariff change request, refund of water meter security, transfer of connection and apply for property creation.

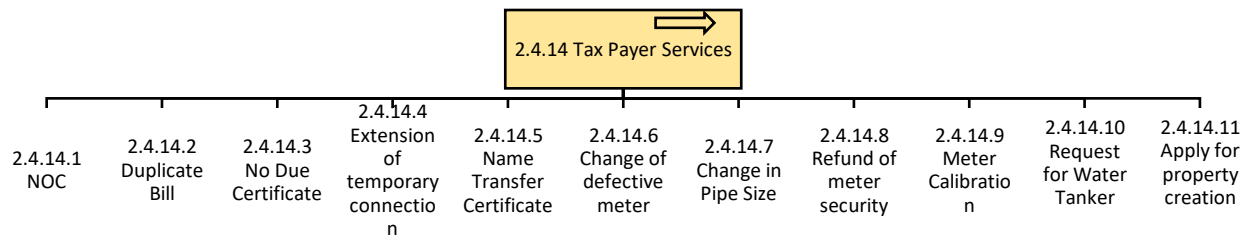


FIGURE 27 TAX PAYER SERVICES

2.4.14.1 NOC

No Objection Certificate (NOC) is a legal document, issued by the ULB or an individual to say that they have no objection to the mentioned details in the document. Following NOCs may be needed for water and/or sewerage connection:

- NOC from finance department
- NOC from landlord
- NOC from property tax department

2.4.14.2 Duplicate Bill

These are duplicate copies of W&S bill that an applicant can ask for.

2.4.14.3 No Due Certificate

This certificate is issued to the consumers who has duly paid their charges for the W&S connection.

2.4.14.4 Extension of Temporary Connection

This is a request to extend the temporary connection, which was approved and is working by the citizen.

2.4.14.5 Name Transfer Certificate

The name transfer certificate is authorized confirmation provided by the ULBs to the consumer on change of ownership from old owner to new owner.

2.4.14.6 Change of Defective Meter

This means the request to change the meter if the meter installed is defective by the citizen.

2.4.14.7 Change in Pipe Size

This means to request the change in installed pipe size if the water pressure is not as per the requirement.

2.4.14.8 Refund of Meter Security

Refer section [2.4.12.4](#).

2.4.14.9 Meter Calibration

Meter Calibration means the act of checking or adjusting (by comparison with the BIS standard for Water Meter Specifications) the accuracy of a meter. This means to request the ULBs for meter calibration if it is not as per the BIS Standards.

2.4.14.10 Request for Water Tanker

This means the request for water tanker by the citizen in case of unavailability of watery supply or usage of source of water other than the piped water. ULBs may charge for providing water tanker as per the prescribed rules and regulations.

2.4.14.11 Apply for Property Creation

This means the request to create a PID in case there is no existing PID against the mentioned address as per the connection application by the citizen.

2.5 W&S Reports & KPIs

W&S Reports and KPIs are document that presents information in an organized format for various stakeholders especially in the form of an official document, after thorough investigation or consideration by an appointed person or body at the ULB.

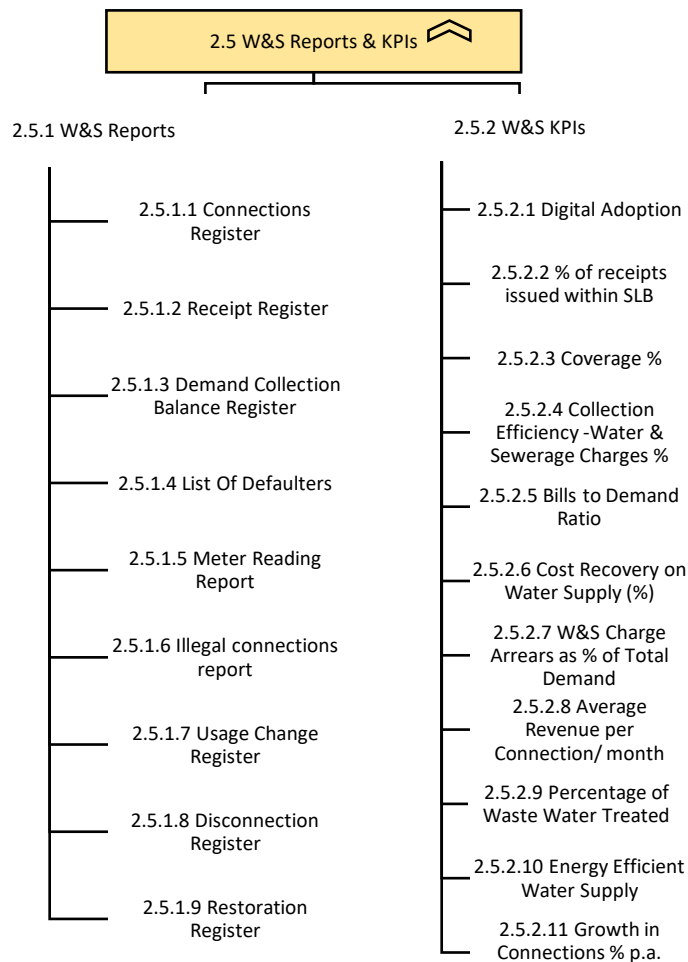


FIGURE 28 TAXONOMY OF REPORTS & KPIs

2.5.1 W&S Reports

The W&S Reports notifies the Urban Local Body or other service providers about the complete information of all water and/or sewerage connection which are applied through various governance channels. These reports should be maintained by the ULBs.

2.5.1.1 Connections Register

Connection Register provides the information about the total number of existing connections that are registered to their respective ULBs or other service providers, the number of new connection applications, and number of connections that are approved but pending installation. The data would be generated category wise, connection size wise, spatial distribution (zone or ward wise). The data shall also include number of disconnections, and new connections. The connections allocated is categorized based on the connection type and this report gives the clear idea about the details like connection type, applicant details, applicant location, total number of connections, pending connections, disconnected connections, temporary disconnections, renewals and amount collected.

2.5.1.2 Receipt Register

Receipt Register provides the detail from all cash receipts, such as deposit date, consumer ID, connection category, request type, amount, status and any information that has been entered in the comments field.

2.5.1.3 Demand Collection Balance Register

This report provides details about demand, collection, balance and collection percentage details of revenue from W&S services.

2.5.1.4 List of Defaulters

List of Defaulters or Defaulters register provides the details of defaulters who have failed to remit the payments due for water or sewerage services within the stipulated due-date.

Defaulter is a person or body that has not paid last or previous years property tax. This covers assessment number, owner details, property details, demand year and arrears

2.5.1.5 Meter Reading Report

This report provides details about meter reading, date of meter reading, unit, usage, number of defective meters etc.

2.5.1.6 Illegal connections report

This report provides details about number of illegal connections by location, size, area, type etc.

2.5.1.7 Usage Change Register

This register enlists the information about the consumers whose usage has been changed.

2.5.1.8 Disconnection Register

The register provided information about the consumers whose W&S connection has been disconnected. The disconnection may be on the request from consumers or the revenue department.

2.5.1.9 Restoration Register

The Restoration Register provides information about the list of restorations in the ULB. The restoration is based on the consumer request.

2.5.2 W&S KPIs

This refers to Key Performance Indicators (KPIs) that should be captured continuously by the water utility management and disclosed through public communication channels.

2.5.2.1 Digital Adoption

Digital Adoption means attaining a state where an individual is capable enough to utilize an application, software, or tools to its fullest capacity or the potential to carry out a variety of digital processes. Digital adoption of W&S can be measured in the following terms:

- % Of citizens using digital channels for W&S charge payment
- % Of citizens using digital channels for accessing services
- % Volume of applications from different channels
- % Of connections allocated digitally within SLG

2.5.2.2 Percentage of Receipts Issued within SLB

This means percentage of receipts (connection usage bills) issued within the agreed SLB parameters (time, priority, others as needed).

2.5.2.3 Coverage Percentage

Total number of households in the service area that are connected to the water supply network with direct service connections, as a percentage of the total number of households in that service area. Service area implies a specific jurisdiction in which service is required to be provided.

This is also referred as 'universal coverage' and is covered as part of ULB service level benchmarking.

2.5.2.4 Collection Efficiency -Water & Sewerage Charges Percentage

This means percentage of revenue collected out of the total amount of bills generated and issued to the consumers/customers for the water and sewerage services during billing period.

2.5.2.5 Bills to Demand Ratio

This means comparing the number of generated bills with respect to number of demands generated for the applied connection request to account collections by the W&S charges.

2.5.2.6 Cost Recovery on Water Supply (percentage)

This means percentage of total annual revenue collected over the total expenditure incurred for operations and maintenance of water and sewerage services within assigned time frame.

2.5.2.7 W&S Charge Arrears as percentage of Total Demand

This mean percentage of water & sewerage charge arrears with respect to total demand raised within assigned time frame.

2.5.2.8 Average Revenue per Connection/ Month

This means average revenue obtained by dividing the total revenue billed by the total number of connections in a month.

2.5.2.9 Percentage of Waste Water-Treated

This means the ratio of amount of waste water treated in a ULB to total amount of waste water generated.

2.5.2.10 Energy-Efficient Water Supply System

Energy efficient equipment for water supply in the city leads to reduction in GHG emissions (CO₂ emissions) per kWh of electricity consumed¹¹ (National Institute of Urban Affairs, 2020).

2.5.2.11 Growth in Connections Percentage Per Annum

This means percentage of increase of water & sewerage connections in a year.

¹¹ National Institute of Urban Affairs. (2020). ClimateSmart Cities Assessment Framework 2.0. New Delhi: Ministry of Housing and Urban Affairs.

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Appendix

Appendix 1 Sample Parameters and Specifications for Location

Attribute Name	Locational Specification	Data Type	Mandatory (Yes/No)
Address	House No, Building Name, Plot/Survey No, Street Name, Locality, Zone/Ward, City/Town, District, Region, State, Country, Pin code	Varchar (256)	No
Geo Location	Latitude, Longitude, Polygon	Numeric (9,6)	Yes
Other evidences	This can include Geo tagged images of Property, DDN, QR codes etc.		No

Address: The address of the property provides the particulars of the place as per the administrative boundaries or norms defined by the local governing body.

Geo Location: Geolocation is the identification or estimation of the real-world geographic location of property. This refers to the latitude and longitude coordinates of a particular location where property is located.

Digital Numbers: Property Numbers defined using scientific methods and often assigned with QR code for traceability and usability.

Appendix 2 Service Level Benchmarks

1	Indicator Benchmark - Water Supply Service	
1.1	Coverage of water supply connections	100%
1.2	Per capita supply of water	135lpcd
1.3	Extent of metering of water connections	100%
1.4	Extent of non-revenue water (NRW)	20%
1.5	Continuity of water supply	24Hrs
1.6	Quality of water supplied	100%
1.7	Efficiency in redressal of customer complaints	80%
1.8	Cost recovery in water supply services	100%
1.9	Efficiency in collection of water supply-related charges	90%
2	Indicator Benchmark - Sewerage Management	
2.1	Coverage of sewage network services	100%
2.2	Collection efficiency of the sewage network	100%
2.3	Adequacy of sewage treatment capacity	100%
2.4	Quality of sewage treatment	100%
2.5	Extent of reuse and recycling of sewage	20%

2.6	Efficiency in redressal of customer complaints	80%
2.7	Extent of cost recovery in sewage management	100%
2.8	Efficiency in collection of sewage charges	90%