

GIS Based Municipal Suite

A decision support tool for Municipal Corporations

Introduction

The concept of E-governance fits in where public organizations are concerned with efficiency, effectiveness and transparency in their delivery system. The initiative was taken by Navi Mumbai Municipal Corporation (NMMC) in association with **Resilient Softech Pvt. Ltd.** (RSPL) in bringing about the paradigm shift in the business of governance by leveraging on the opportunities provided by the advancement in information technology.

Navi Mumbai Municipal Corporation (NMMC), the governing body for managing the municipal assets and delivering prompt services to the citizen in the municipal territory spread across 164 Sq. Kms. The system of retrieval of asset data prevalent in municipal territory was through traditional paper maps, engineering drawings and other asset management registers. Needless to say, the data are voluminous and scattered, maps in different formats and scales, difficulty in accessing the statistical information of a map feature etc. were some of the irritants in the prevalent system. A need was increasingly felt in the department to have a more scientific and systematic approach for the retrieval of statistical information.

In this context, the inherent capabilities of the technology offered in a GIS were looked upon as one having a great potential to successfully cater to the specified requirements. A project for utilizing it to develop asset Information and Management System was conceptualized with the objective of creating a digital database of assets that would induce efficiency and accuracy in monitoring, management, planning and development of the asset network.

The primary objectives were:

1. Initiate a GIS centric business solution, which addresses the basic needs various departments in a Municipal corporation.
2. Develop a workflow system, which enables the user to locate the status of each task.
3. A decision support system for the higher authorities.

A high level blue print was conceptualized and as a pilot, the planning maps were digitized and integrated with Works Management.

Salient Features of Works Management:

The Works Management module is divided in to 3 Phase namely –

- I.** Pre-Tender covering Project identification, prioritization, estimation and approval process along with budgetary control.
- II.** Tender covers compiling tender, publishing, technical evaluation, commercial evaluation.
- III.** Post Tender covers approval, letter of Indent to vendor, formal agreements with committees based on the order value, awarding work Contract, Daily measurement and preparation of payment order based on the terms agreed.

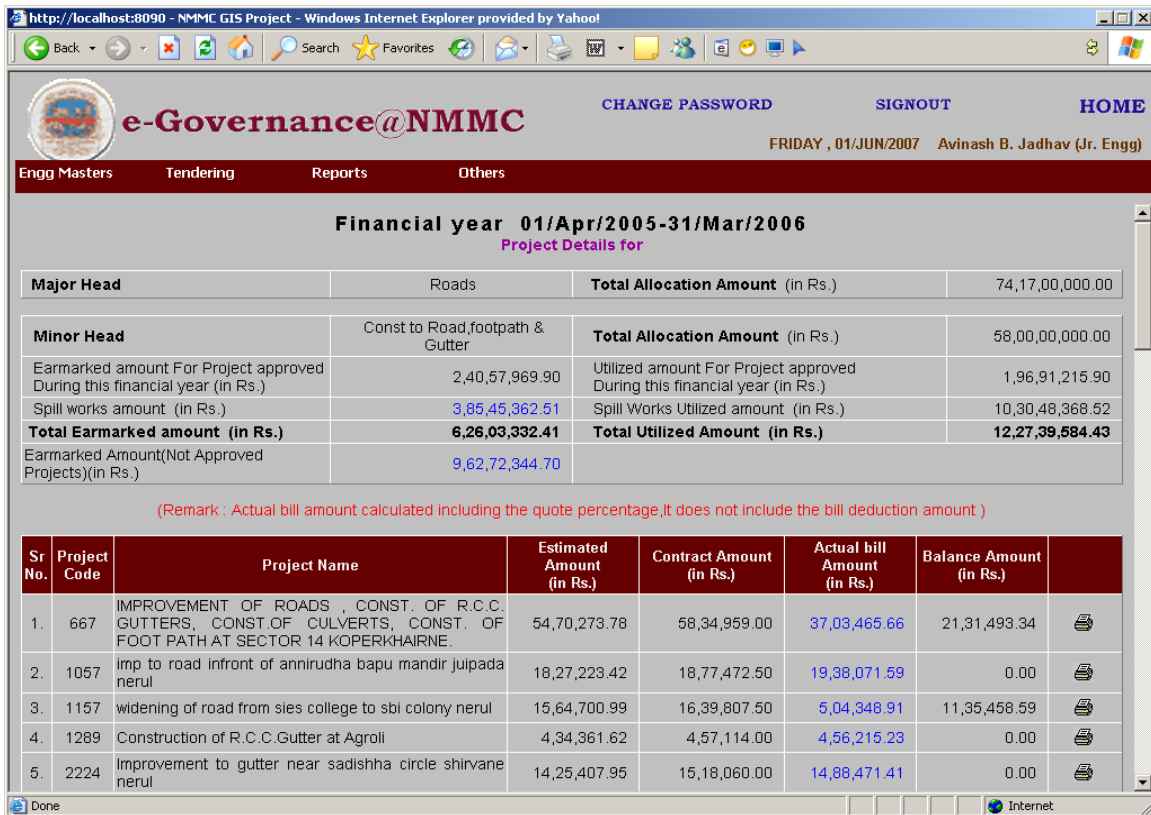
In addition, the works Management covers budget control, earmarked project, expenditures till date and interface with GIS for various queries.

a) Annual Budget Control: Municipal Corporation largely work with annual budget. Budgets are allocated based on the service with major head and minor head.

Ex: Major Head – Road

Minor Head – Repair & Maintenance of Road (Revenue Expenditure)

Construction of Road (Capital Expenditure)



e-Governance@NMMC CHANGE PASSWORD SIGNOUT HOME
 FRIDAY , 01/JUN/2007 Avinash B. Jadhav (Jr. Engg)

Engg Masters Tendering Reports Others

Financial year 01/Apr/2005-31/Mar/2006
 Project Details for

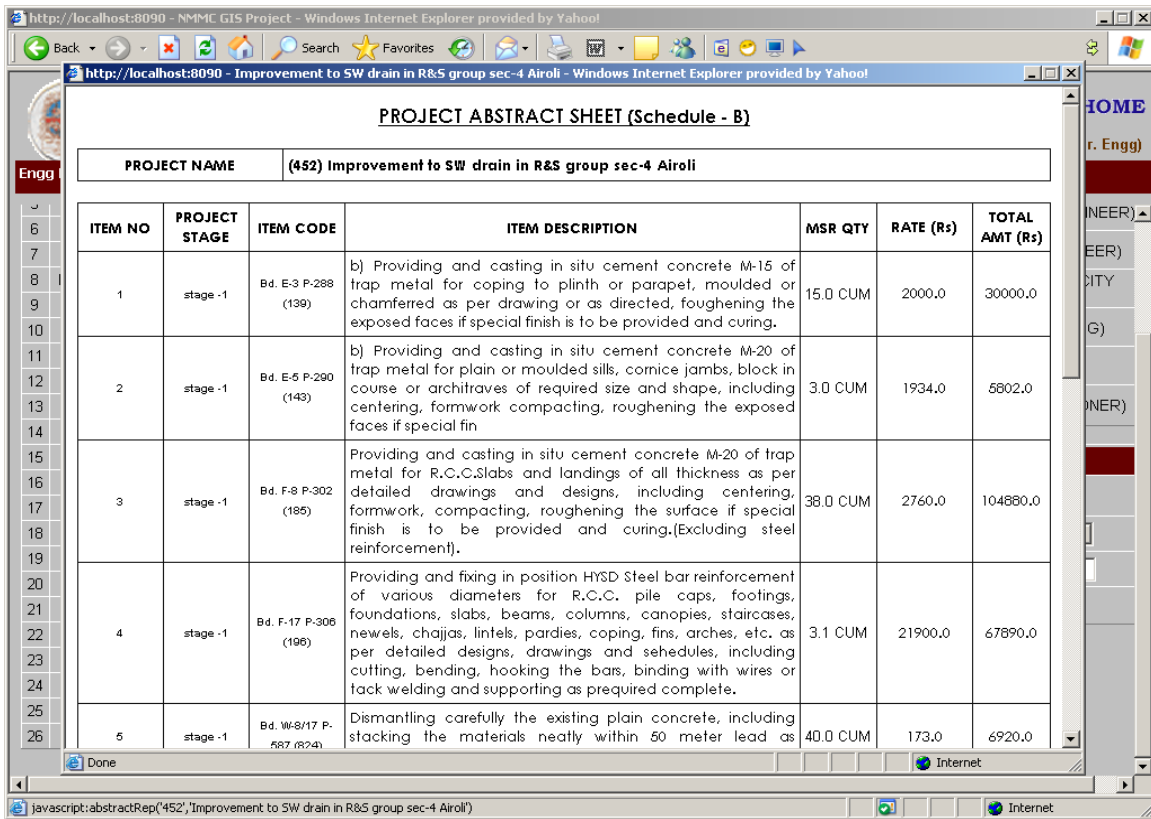
Major Head	Roads	Total Allocation Amount (in Rs.)	
			74,17,00,000.00
Minor Head	Const to Road,footpath & Gutter	Total Allocation Amount (in Rs.)	
			58,00,00,000.00
Earmarked amount For Project approved During this financial year (in Rs.)	2,40,57,969.90	Utilized amount For Project approved During this financial year (in Rs.)	1,96,91,215.90
Spill works amount (in Rs.)	3,85,45,362.51	Spill Works Utilized amount (in Rs.)	10,30,48,368.52
Total Earmarked amount (in Rs.)	6,26,03,332.41	Total Utilized Amount (in Rs.)	12,27,39,584.43
Earmarked Amount(Not Approved Projects)(in Rs.)	9,62,72,344.70		

(Remark : Actual bill amount calculated including the quote percentage,It does not include the bill deduction amount)

Sr No.	Project Code	Project Name	Estimated Amount (in Rs.)	Contract Amount (in Rs.)	Actual bill Amount (in Rs.)	Balance Amount (in Rs.)
1.	667	IMPROVEMENT OF ROADS , CONST. OF R.C.C. GUTTERS, CONST.OF CULVERTS, CONST. OF FOOT PATH AT SECTOR 14 KOPERKHAIRNE.	54,70,273.78	58,34,959.00	37,03,465.66	21,31,493.34
2.	1057	Imp to road infront of annirudha bapu mandir julpada nerul	18,27,223.42	18,77,472.50	19,38,071.59	0.00
3.	1157	widening of road from sies college to sbi colony nerul	15,64,700.99	16,39,807.50	5,04,348.91	11,35,458.59
4.	1289	Construction of R.C.C.Gutter at Agrolli	4,34,361.62	4,57,114.00	4,56,215.23	0.00
5.	2224	Improvement to gutter near sadishha circle shirvane nerul	14,25,407.95	15,18,060.00	14,88,471.41	0.00

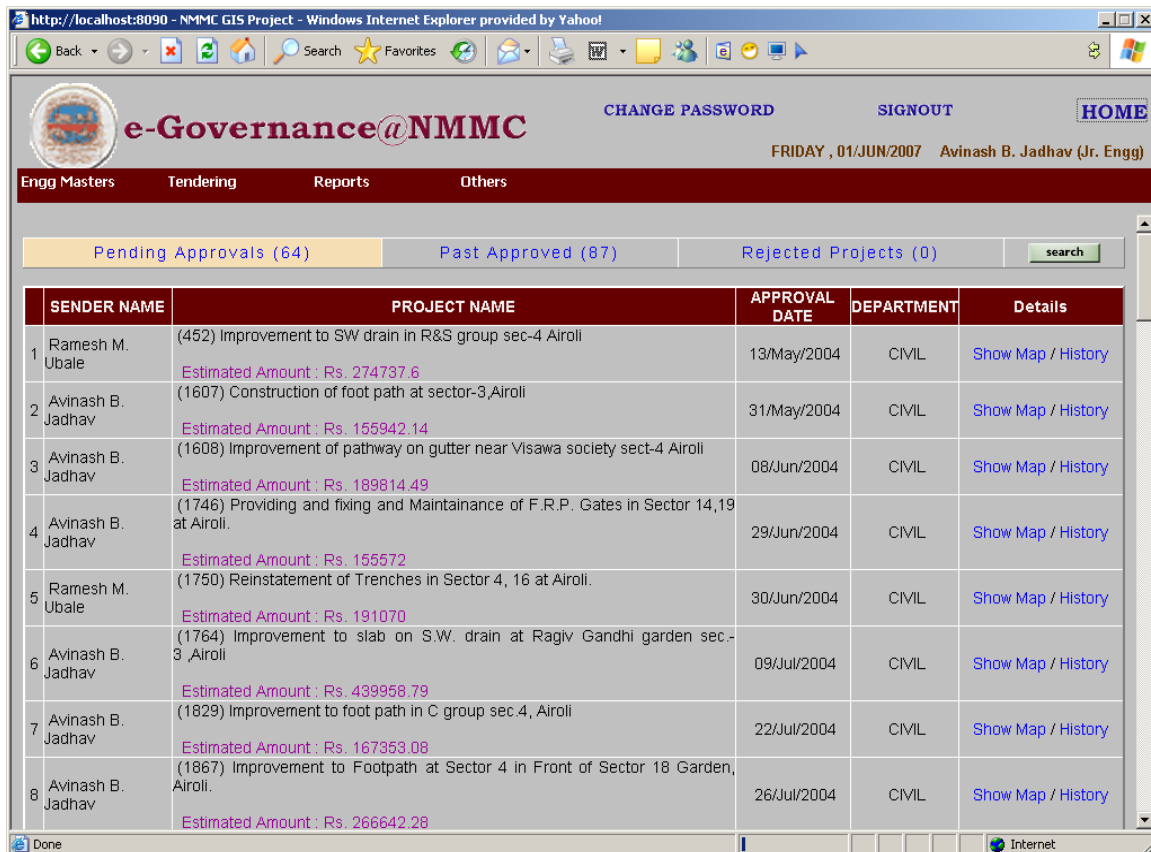
b) Project Prioritization: Projects are identified by the Engineer responsible for the ward or elected member of the zone or Commissioner or citizens in the form of grievance or suggestions. The projects identified are forwarded to the commissioner with area highlighted on the map. After verification of previous history of work on the same land parcel the commissioner or the chief city engineer intimates the Jr. Engineer to proceed with estimation process. The Jr. Engineer generates a unique code for the project, after selection of the asset/assets, which are part of the project.

c) Preparation of Estimation: The estimations are prepared based on the District schedule rates applicable. Authorized user has privilege to update the DSR rates as per the new schedules released by the concerned organization. User can select multiple DSR or DSR pertaining to previous years too. Upon completion the Jr. Engineer forwards the same for various approvals Process.



PROJECT ABSTRACT SHEET (Schedule - B)						
PROJECT NAME		(452) Improvement to SW drain in R&S group sec-4 Airoli				
ITEM NO	PROJECT STAGE	ITEM CODE	ITEM DESCRIPTION	MSR QTY	RATE (Rs)	TOTAL AMT (Rs)
1	stage -1	Bd. E-3 P-288 (139)	b) Providing and casting in situ cement concrete M-15 of trap metal for coping to plinth or parapet, moulded or chamfered as per drawing or as directed, foughening the exposed faces if special finish is to be provided and curing.	15.0 CUM	2000.0	30000.0
2	stage -1	Bd. E-5 P-290 (143)	b) Providing and casting in situ cement concrete M-20 of trap metal for plain or moulded sills, cornice jambs, block in course or architraves of required size and shape, including centering, formwork compacting, roughening the exposed faces if special fin	3.0 CUM	1934.0	5802.0
3	stage -1	Bd. F-8 P-302 (185)	Providing and casting in situ cement concrete M-20 of trap metal for R.C.C.Slabs and landings of all thickness as per detailed drawings and designs, including centering, formwork, compacting, roughening the surface if special finish is to be provided and curing.(Excluding steel reinforcement).	38.0 CUM	2760.0	104680.0
4	stage -1	Bd. F-17 P-306 (196)	Providing and fixing in position HYSD Steel bar reinforcement of various diameters for R.C.C. pile caps, footings, foundations, slabs, beams, columns, canopies, staircases, newels, chajjas, lintels, pardijs, coping, fins, arches, etc. as per detailed designs, drawings and sehedules, including cutting, bending, hooking the bars, binding with wires or tack welding and supporting as prequired complete.	3.1 CUM	21900.0	67890.0
5	stage -1	Bd. W-8/17 P-587 (824)	Dismantling carefully the existing plain concrete, including stacking the materials neatly within 50 meter lead as	40.0 CUM	173.0	6920.0

d) Estimation Approval from Various Authorities: Every user has inbox/Outbox concept. Upon logging in user can access the cases/files allocated to the individual. On verification of the same the user can forward, reject, or accept the same. The approval processes are configured based on the type of project, cost estimation. Project details are approved electronically.

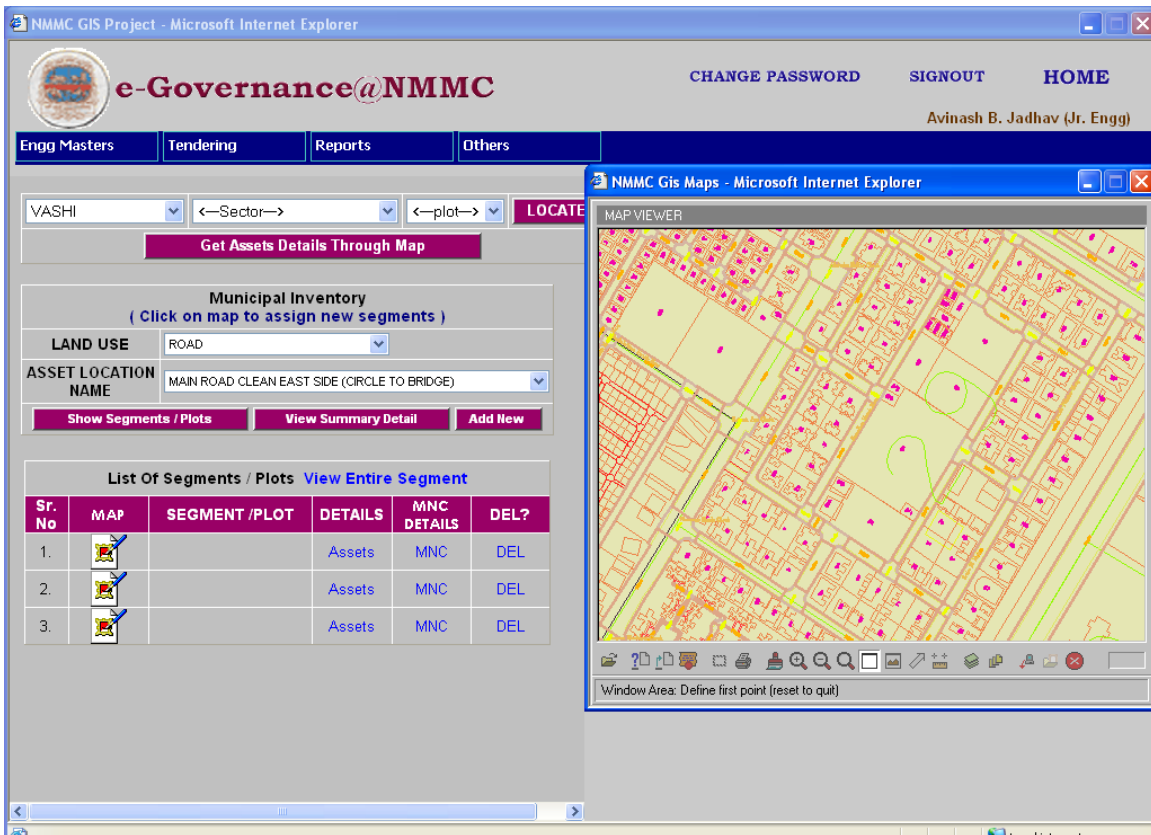


The screenshot shows a web browser window displaying the 'e-Governance@NMMC' portal. The page title is 'http://localhost:8090 - NMMC GIS Project - Windows Internet Explorer provided by Yahoo!'. The navigation bar includes 'CHANGE PASSWORD', 'SIGNOUT', and 'HOME'. The user is logged in as 'Avinash B. Jadhav (Jr. Engg)' on 'FRIDAY, 01/JUN/2007'. The main menu has 'Engg Masters', 'Tendering', 'Reports', and 'Others'. Below the menu, there are tabs for 'Pending Approvals (64)', 'Past Approved (87)', and 'Rejected Projects (0)'. A search button is also present. The main content area displays a table with the following data:

SENDER NAME	PROJECT NAME	APPROVAL DATE	DEPARTMENT	Details
1 Ramesh M. Ubale	(452) Improvement to SW drain in R&S group sec-4 Airoli <i>Estimated Amount : Rs. 274737.6</i>	13/May/2004	CIVIL	Show Map / History
2 Avinash B. Jadhav	(1607) Construction of foot path at sector-3,Airoli <i>Estimated Amount : Rs. 155942.14</i>	31/May/2004	CIVIL	Show Map / History
3 Avinash B. Jadhav	(1608) Improvement of pathway on gutter near Visawa society sect-4 Airoli <i>Estimated Amount : Rs. 189814.49</i>	08/Jun/2004	CIVIL	Show Map / History
4 Avinash B. Jadhav	(1746) Providing and fixing and Maintainance of F.R.P. Gates in Sector 14,19 at Airoli. <i>Estimated Amount : Rs. 155572</i>	29/Jun/2004	CIVIL	Show Map / History
5 Ramesh M. Ubale	(1750) Reinstatement of Trenches in Sector 4, 16 at Airoli. <i>Estimated Amount : Rs. 191070</i>	30/Jun/2004	CIVIL	Show Map / History
6 Avinash B. Jadhav	(1764) Improvement to slab on S.W. drain at Ragiv Gandhi garden sec.-3 ,Airoli <i>Estimated Amount : Rs. 439958.79</i>	09/Jul/2004	CIVIL	Show Map / History
7 Avinash B. Jadhav	(1829) Improvement to foot path in C group sec 4, Airoli <i>Estimated Amount : Rs. 167353.08</i>	22/Jul/2004	CIVIL	Show Map / History
8 Avinash B. Jadhav	(1867) Improvement to Footpath at Sector 4 in Front of Sector 18 Garden, Airoli. <i>Estimated Amount : Rs. 266642.28</i>	26/Jul/2004	CIVIL	Show Map / History

- e) **Budget Approval:** The budget approvals are restricted to the accounting department. Before approval the authorized person can verify various details like past work, available budget, budget earmarked etc.
- f) **Tender Formalities:** On approval of project in the pre tender stage, the engineer can publish the tender for inviting bids. Each tender activities comprises of various attributes, which can be configured based on the project size.
- g) **Acceptance of Bid:** Upon receipt of bid, the user can enter the rates quoted by individual vendor (Material wise/ consolidated). The system identifies the lowest bidder and the percentage variation from the DSR rate.
- h) **Work Order Release:** upon acceptance of bid, municipality awards the work order to the competitive vendor.
- i) **Daily Measurement Book:** daily measurements are captured by the site engineer and bills are released based on the terms agreed.

- j) **Monitor work In progress:** The higher authorities can monitor the work in progress with a click of button. The details comprises of the work name, work order value, Project tenure, cost and project liability period and percentage completion of work.
- k) **Payment Order:** As per the terms agreed municipality releases the payment instruction based on the daily measurement. The Payment orders are forwarded to the Accounting department after updating the same with statutory deductions like work Tax, Tax deduction at Source (TDS).
- l) **Managing R.A & Final Bills:** the bills are largely categorized in to R.A & Final Bill.
- m) **Municipal Inventory:** As the work progresses the system keeps developing a inventory of the assets owned by Municipal Corporation



Property Tax Management:

The property Taxes are levied based on the basis of Rateable Value (RV) of land, buildings, assessable on the expected annual rental value where such properties may get when let out. Property tax contributes to the major source of revenue for a municipal corporation.

Property Taxes are mainly calculated based on the structure and usage of the building:

1. Property Registration
2. Property Assessment
3. Property Re-Assessment
4. Demand Generation
5. Collection
6. Bank Reconciliation
7. Special Notice
8. MIS Reports

New properties are registered based on the inputs received from the town-planning department. The property information's comprises type of plot, usage, structure type etc. Upon registration the information's are verified based on the plan and the physical verification of the structure. The ratable values calculated based on the locality, structure.

Properties are subjected to reassessment based on various parameters like sale of property, lease, change or modification to structure, change in usage. The reassessment is applicable as and when the corporation amends the regulations of the property tax. The demand cycles are generated as per the regulation of the corporations like bi annual demand. User can create new billing cycles based on the amendments. Demands are generated and sent to the property owners for payment of property Tax.

The centralized payment collections process are carried out at various collection centers, designated banks and ward offices of Municipal Corporation in the form of cheque, cash and DD. options to make a payment vide net banking or credit card through payment gateways. In case of delayed payments, the Delayed payment charge (**DPC**) is applicable along with interest component. The system manages the **ledger** for individual property tax payer. Reconciliation are carried out by the accounts department to ensure the realization of cheque received at various bank counters. In case of cheque dishonour, the collection entries are reversed with additional penalty towards Cheque Return. System generates list of defaulters with notices like 15 days notice, 48 Hrs notice etc. The property Tax system generates various MIS reports and control accounts. Control ledgers are maintained to calculate the part of collection towards the State government contribution.

Adequate security and audit trail checks are maintained to capture new and modification to the existing details.

Salient Features:

- Citizen Master Concept
- Integration with GIS
- User Security with roles and privileges
- Individual Ledger
- Scalable to integrate online Payment gateway
- Web enabled with centralized database
- Bank Reconciliation

Water Billing System:

The Water-billing module comprises of the following features.

1. New Connection request
2. Transfer of connection
3. Disconnection & Reconnection
4. Billing Cycle

New Connection: New connection requests are accepted through a single window acceptance concept. Based on the type of connection and the usage (Residential, commercial), applicant need to submit set of documents along with the application. Upon acceptance the documents are sent to the Ward officer (water department) for further scrutiny along with site inspection. The ward officer inspection reports along with demand - supply report reports are further sent to various approvals. On approval from the designated engineer the system generates a challan with details of security deposit, connection charges applicable for the new connection. A new connection number is issued to the applicant with along with meter number and the present reading.

Transfer of Connection: Transfer of connections requests are accepted through a single window acceptance concept. The transfer of connections is subject to verification of all the statutory documents and submission of No due certificate from various department of the municipal corporation.

Disconnection & Reconnection: The water connections are disconnected in case of over due payments for a specific period. The reconnections requests are carried out upon payment of all types of dues to the NMMC including property and other outstanding.

Billing Cycle: Bills are generated based on the connection type, consumption for the period, previous outstanding and other levies applicable. Delayed payments are applicable in case the payments are made before the due date.

Double Entry Accounting System:

The design and workflow of the double entry accounting system complies with the regulations and codification structure recommended by National Institute of Urban affairs (NIUS).

Salient Features:

- Creation of Chart of Accounts (COA)
 1. Creation of Groups
 2. Creation of Sub Groups
 3. Creation of Ledgers
 4. Creation of Sub Ledgers
- Creation of Function and Sub Functions
- Creation of Budgets
- Creation of Funds
- Vouchers
 1. Bank Payments
 2. Cash Payments
 3. Bank Receipts
 4. Cash Receipts
 5. Journal Vouchers
 6. Contra Vouchers
- Statement of Accounts
 1. Trial Balance *
 2. Balance Sheet*
 3. Income & Expense Statement*
 4. Bank Reconciliation*
 5. Fixed Asset Management and Depreciation*
 6. MIS & Statutory Reports*

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