# Expression of Interest (EoI) For

**Sub:-**Implementation of Data warehouse, Business Intelligence & Advance Analytics solution for SWM Dept. of BMC

## Website – portal.mcgm.gov.in/tenders

## Due Date -  11/07/2022

Office of the

**Deputy Chief Engineer (Solid Waste Management) Planning,**

Fourth Floor, Municipal Khatav Market Building,

Opposite Avishkar Building, Khatavwadi, Sleater road,

Grant Road (W), Mumbai-400007

Phone:- 022-23877691/23844450
Email id:-ee1swm.pl@ mcgm.gov.in
dycheswmplanning.swm@mcgm.gov.in

| Sd/- | Sd/- | Sd/- | Sd/- |
|------|------|------|------|
| **SE(SWM)Pl** | **AE(SWM)Pl** | **EE(SWM)Pl** | **Dy.Ch.E.(SWM)Pl** |

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# 1. NOTICE INVITING EXPRESSION OF INTEREST

BMC invites Expression of Interest
(EOI) for "Implementation of Data warehouse, Business Intelligence &Advance
Analytics solution for SWM Dept. of BMC"

The EOI is to be submitted in closed covers at the following address on any working day during office hours on or before 16:00 hrs. On 11.07.2022

**Deputy Chief Engineer (Solid Waste Management) Planning,**

Fourth Floor, Municipal Khatav Market Building,

Opposite Avishkar Building, Khatavwadi, Sleater road,

Grant Road (W), Mumbai-400007

Phone:- 022-23877691/23844450
Email id:-ee1swm.pl@mcgm.gov.in
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EOI document can be downloaded from BMC's Portal (https://portal.mcgm.gov.in) under "Tender" section from 20.06.2022 onwards. Other details can be seen in the EOI document.

Sd/-
**Dy. Ch.E.(SWM)planning**

## 2. Schedule of Events

| Sr. No. | Event | Date of Event | Venue |
|---|---|---|---|
| 1 | Start date for downloading expression of interest (EoI) document | **20.06.2022** | Deputy Chief Engineer (Solid Waste Management) Planning, Fourth Floor, Municipal Khatav Market Building, Opposite Avishkar Building, Khatavwadi, Sleater road, Grant Road (W), Mumbai-400007 Phone:-02223877691/23844450 |
| 2 | Last date for receiving queries and comments | **11.07.2022** | |
| 3 | Last Date of Submission of EoI (hard Copy) | **11.07.2022** | |
| 4 | Date of opening of EoI | **11.07.2022** | |
| 5 | Pre-EoI Meeting | **28.06.2022** | Conference hall of Ch.E. (SWM) office at 15:30, 3rdFloor, Khatav Market, Nausheer Bharucha Marg, Old Sleater Road, Grant road (W), Mumbai- 400 007 |

Note:-The Schedule indicated above is tentative and BMC may change any or the entire schedule under intimation to Suppliers.

# 3. INTRODUCTION

BMC (BMC) is a pioneer urban local body in India. BMC is always ahead in giving the citizens of Mumbai top notch urban services to the fullest of their satisfaction.

For a city of 1.25 Cr. population, management of Solid Waste is a mammoth task which is been aptly handled by Solid Waste Management Department of BMC. The SWM Dept. daily handles 6000 MT of solid waste daily. To handle such huge solid waste, the dept. has got all kinds of resources at its perusal be its manpower or machinery. The dept. has got strength of 28000 of its own employees. Around 1500 nos. of vehicles are utilised 24 x 7 for transportation of waste. We also have a Greenfield waste processing site at Kanjur which daily processes 5000 MT of waste daily in a scientific manner. There are few more projects in the pipeline which will give the opportunity to SWM dept. to process all of the waste of Mumbai in a scientific manner.

BMC is always thriving for new technological innovations best practices in the world to give its citizens a better service. BMC is also taking great precautions to see that the Solid Waste management -2016 rules are followed. Further timely directions given by NGT are always taken in true spirit and implemented scrupulously.

BMC has got many IT Systems and applications in its bag to monitor the performance of all its resources on a real time basis. However, the major hurdle BMC is facing that in spite of having such a large data about the performance of its infrastructure, the data is not related to each other and the upper management is facing some hurdles in analysing the huge data and get tangible results out of it to take timely decisions regarding the smooth management of waste.

For more information, refer BMC's website
website: portal.mcgm.gov.in.

SWM Dept. of BMC intends to deploy an Advance Analytics, Data Management and Business Intelligence Solution at an enterprise level for a variety of use cases and application to use the business information available at its database through various IT applications for in-depth analysis and insight for better understanding of operations and support for decision making.
Proposed System should be capable to:
- Reduce latency between data and deployment
- Explore multiple approaches to find optimal solutions
- Solve complex analytical problems
- Quickly deploy analytics models and on the fly analytics on the staged data

Through this Expression of Interest (EoI), BMC seeks responses from interested OEMs and their system integrators.

# 4. INSTRUCTION TO INTERESTED PARTIES

**4.1** Scope of Interested Party shall be limited to response and suggestions to this EOI only.

**4.2** Scope of work, Deliverables, Timelines, Terms and Conditions, Eligibility/Qualification criteria, NDA defined in this EOI will be applicable for compliance for prospective bidders **at the time of next bidding process**. However, in response to EOI, Interested Party may suggest improvement wherever necessary.

**4.3** Interested parties may submit their response with a Letter of Intent (LOI), detailed concept note/approach paper to address scope of work physically at 4.00 P.M. on or before 11.07.2022 to below mentioned recipient:

> **Dy. Ch.Eng. (SWM) Planning,**
> **Office of Dy.Ch.Eng. (SWM) Planning**
> **4th floor, Khatav Market Bldg.,**
> **Grant Road (W), Mumbai – 400007**
> **Phone - 022-23877691/23844450**
> **Email id:-ee1swm.pl@mcgm.gov.in/**
> **dycheswmplanning.swm@mcgm.gov.in**

The interested parties shall submit their response in a sealed envelope to above address. The envelope shall mention the full subject of this EoI also mention the details about the applicant.

**4.4** The details submitted by the Interested Party shall be complete in all respects and BMC may seek clarifications/additional information as considered necessary. Such clarifications/ additional information must be provided within 3 days of BMC's request.

**4.5** The Interested Parties may be called for interaction and presenting their proposal, if required. Further award of work shall be through the next bidding process as per BMC's normal procedure. The criteria of selection will be detailed later in the next stage of bidding.

**4.6** Any request for further information or clarification on the EOI document may be submitted to the above mentioned official within 7 days from date of issue of EOI. BMC may arrange a pre EoI conference for this purpose. The time and place of this conference will be published later on BMC's portal.

**4.7** Duly authorized representative(s) of the Interested Party shall sign on each page of the document and send document over e-mail to above mentioned recipient. Response to EOI should be prepared in such a way so as to provide a straight forward, detailing proposal for scope of work and concise description on Interested Party's organization and manpower capabilities.

**4.8** Notwithstanding anything contained in this EOI, BMC reserves the right to accept or reject any proposal and to annul the EOI Process in whole or part, at any time without any liability or any obligation for such acceptance, rejection or annulment, and without assigning any reasons thereof.

**4.9** BMC reserves the right to verify all statements, information and documents submitted by the interested party in response to the EOI. Any such verification or lack of such verification by BMC shall not relieve the

Interested Party of his obligations or liabilities hereunder nor will it affect any rights of BMC.

**4.10**   The EOI process shall be governed by, and construed in accordance with, the laws of India and the Courts at Mumbai shall have exclusive jurisdiction over all disputes arising under, pursuant to and/ or in connection with the EOI process.

**4.11**   Interested Parties should provide following details:

   **4.11.1** Detail concept note and approach paper to address scope of work, technical and functional specification of the proposed solution along with project milestone timeline chart, manpower resources required and hardware sizing of solution.

   **4.11.2** Details as per format for Expression of Interest in **Annexure – I**

# 5. PROJECT OBJECTIVE

SWM Dept. of BMC intends to implement Data Warehouse, Business Intelligence (BI) & Advance Analytics solution to enhance and automate the information reporting and decision support system of the organization. The objective of this project is to deploy a scalable & agile advance analytics platform to have the capabilities of predictive analytics and shall cater BI & reporting for the management based on available data. i.e., ensuring the reporting framework has capabilities of high data exploration, slice & dice and availability of the reports on the mobile & tablets for quick decision making.

The Advance Analytics to help in deep insights to higher level management of the dept., key performance indicators (KPIs) and in generating specific targeted results linked to these KPIs. These KPIs to be made available to SWM department in dashboard and it can be further drilled down to derive desired results. Performance monitoring will require clear targets for each of the measures as well as periodic reporting of actual results. The system to enable notification to respective metrics owners in case of exceptions or deviation from the respective targets as well as provisions for providing explanation for the deviation.

Through implementation of this project, SWM Dept. of BMC intends to take initiatives to:

- Implementation of solution for effective decision support for the functional groups and its key stakeholders.
- Enable an automated, secured and robust platform that secure data from identified sources with no manual intervention.
- Management of Data availability for KPIs (Key Performance Indicators) from various sources - SAP, various in-house IT applications, Bio Metric Attendance System etc.
- Deep drill downs of KPIs.
- Comparison of various KPIs of all the administrative wards and strategic sites of SWM Dept. like its Garages, Transfer Stations, Waste Processing Sites etc.
- Effective internal communication based on BI information.
- Provide analytical capabilities through dashboards.
  - Automated tracking and alerts.
  - Building a modernized, new age platform and becoming analytics driven Organization

Following are the primary users of the solution:

| Type of Users | Designations | Details about the reports required |
|---|---|---|
| Top Management Team | Dy. Ch. Engineers in SWM Sections<br>Assistant Commissioner (Wards)<br>Chief Engineer (SWM)<br>DMC (SWM)<br>AMC (W.S.) | Timely availability of reports anywhere and anytime over mobile app/laptop/desktop with drill-down / drill-thru capabilities |
| Business User | Executive Engineers in various SWM Sections, Assistant Engineer (SWM) Wards, | Ability to quickly customize a report for the management without support from the |

| | Transport, Projects, Operations, Planning etc. | technology team |
|---|---|---|
| IT Team | Selected Agency for the work | Ensuring optimal use of IT resources and focusing on evolving the BI platform into valued analytics platform. Deploy Data Analytics and Data mining platform for developing advance analytics use cases. |

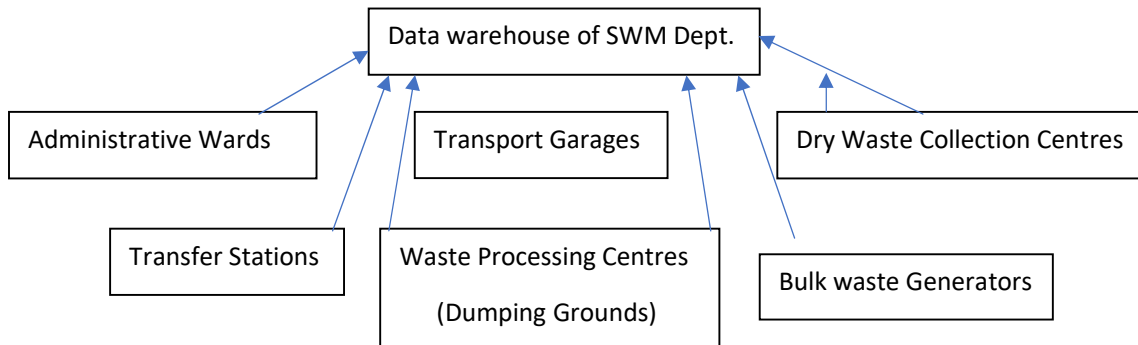Following are the key business benefits expected after enablement of solution:

| | |
|---|---|
| **Accountability** – | Assign department/function responsibility for objectives, key performance indicators, and initiatives. |
| **Alignment**– | Improve performance and interprets initiatives, and metrics in time Series format. |
| **Central KPI repository** – | Leverage a simplified and centralized administration of KPIs. |
| **Collaboration** – | Threaded discussion in meeting view. Dashboard helps organization monitor performance by tying strategy to key objectives and measures. |
| **Exception management** – | Receive automatic notification of below horizon objectives. |
| **Performance comparisons** – | Compare unit wise performance with relevant benchmarks. The software should have features and functionality to compare internal and external benchmarks on KPIs. Primary objective is to compare same KPIs across same types of units of SWM Dept. |
| **Advance Analytics** – | The offered system shall also comply to the industry standard analytics algorithm to include advance predictive analytics. |
| **Mobility**- | Offered platform shall comply to the requirement of mobility for viewing of dashboards without custom development of web pages. The reports shall be accessible through all IOS or Android based devices by installation of the OEM App available free of cost on different online stores or circulate privately. Mobility device should enable users for annotation and share the observation with in closed user group via various multimedia sources. |

Proposed solution should be capable to:
- Reduce latency between data and deployment.
- Explore multiple approaches to find optimal solutions.
- Solve complex analytical problems faster.
- Quickly deploy analytics models and on the fly analytics on the staged data.

## 5.1   DATA SOURCES

Data shall be aggregated from all databases related to various IT applications of BMC and SWM Dept.'s locations to proposed Data warehouse of SWM Dept.



Data shall be available in various formats from following sources:
- SAP – ERP
- In-house developed applications and reporting
- Bio Metric Attendance System
- Vehicle Tracking & monitoring System
- Flat Files
- Other software like MS – Excel etc.

## 5.2   SYSTEM ARCHITECTURE

Solution to be deployed on-premise at Dy. Ch.Eng. (SWM) Planning's office, Grant Road, Mumbai. Indicative architecture of system in 3 layers

1. Bottom layer: Data at different SWM units/ locations spread across Mumbai.
2. Middle layer:
   a) Data Warehouse- data management from different data sources – SAP, Oracle, in-house applications, MS Excel, flat files etc.
   b) Analytics and business intelligence for presentation of data, dashboard, visualization and reporting etc.
3. Top layer: Users accessing the solution.
   a) Business/Function users who will be accessing the analytics and business intelligence reports.
   b) IT Admin users who will be managing the solution configuration, performance, security etc.

# 6. BROAD SCOPE OF WORK

SWM Dept. of BMC intends to implement centralized data warehouse, business intelligence and advanced analytics solution by integrating data from multiple heterogeneous sources across various units of SWM Dept. to support analytical reporting, structured and/or need based queries processing and decision making. Bidder to supply shall require to perform following services as part of the overall scope:

- Supply & Installation of Software
- Supply of hardware- cloud based server, storage
- Sizing of hardware for optimized usage of software
- Implementation of Data Analytics Platform
- Implementation of tentative list of KPIs in **Annexure -II**
- Deploying resources during implementation and support manpower after installation for 5 years period.
- Bidder to supply software solution for Business Analytics, Business Intelligence and Data warehouse/management in compliance with technical specification as mentioned in **Annexure-III.**

# 7. SELECTION PROCESS

- The applicants who are fulfilling the qualification criteria as mentioned in Annexure - I will be asked to give presentation in front of the committee of BMC Officers.
- The applicant's performance will be ranked by means of marking system based on their submissions and presentation.
- The applicants who have scored 70 and above marks in the evaluation of the committee will be selected in this EoI.
- The selected applicants will be subjected to a next stage of a bidding process.
- The lowest responsive applicant in the bidding process will be awarded the work.

The marking system for the evaluation of the applicant's submission and presentation is as mentioned below.

| Sr. No. | Aspect | Criteria | Weightage Marks |
|---|---|---|---|
| **I Past Experience of Firm** | | | |
| 1 | Experience of working with Municipal Corporations of Metro Cities in India | Engagement with the BMC in the last 3 Years – 3 Marks Other Metro Cities – 2 marks | 5 |
| 2 | Past experience of the agency in developing Data Warehousing Solutions for Government of India/ State Governments of India/Urban local bodies / Public Sector Undertakings in the past 10 years of at least one year duration. | <= 2 - 5 Marks >3&<= 5 -10 Marks >6 - 20 Marks | 20 |
| 3 | Nos. of Data Warehousing Projects handled in India for Central Government/State Government/Union Territories/Central Government Agency/State Government Agency/Public Sector Units/Municipal | >3<= 5 projects -03 Marks >5 projects -05 Marks | 05 |

| | | | |
|---|---|---|---|
| | Corporations/ Smart City in India in the last five years. | | |
| **II Presentation and Proposal** | | | |
| 4 | Approach & methodology | Panel Evaluation based on- Approach – 05 marks Methodology –15 | 20 |
| 5 | Understanding of On-ground Challenges and Plan of Execution to address the challenges | Panel Evaluation Understanding – 5 Plan - 15 | 20 |
| 6 | Learning and Innovation: Presented and Proposed outputs and deliverables measures by Firm. | Panel Evaluation – 15 marks | 15 |
| 7 | Technical knowledge and accuracy of the presentation | Panel evaluation – 10 marks | 10 |
| **III Others** | | | |
| 8 | Proactive measures taken by firm / assistance provided to BMC/ Government of India/ State Governments of India/ other Urban local bodies during COVID-19 | Panel Evaluation | 05 |
| Grand Total | | | 100 |

### 7.1 Annexure-I
### Format for Expression of Interest

## 1   Organization Details

| | |
|---|---|
| Name of the organization | |
| Type of Organization (Pvt/ Public /Partnership/ LLP etc.) | |
| Date of Incorporation | |
| Address of Corporate / Head / Registered Office | |
| Phone Number of Registered office | |
| Website | |

## 2   Contact Person for the Applicant

| | |
|---|---|
| Name: | Designation: |
| Address: | Email: |
| Telephone Office: | Mobile No.: |

## 3   Bidder work experience:

| S. No. | Eligibility Criteria | Document(s) to be provided as a proof |
|---|---|---|
| 1 | The Bidder should have Positive Net worth more than of Rs. One Cr for the last three financial years: 2019-2020,2020-2021 & 2021-22 | Audited Balance Sheet and Loss & Profit statement OR Certificate from statutory Auditors |
| 2 | The Bidder should have PAN No. and GST Registration No. | Documentary Proof to be submitted |
| 3 | The Bidder should have a registered office in MMRDA Region. | Documentary proof to be submitted |
| 4 | The Bidder should not be currently black listed / banned for business dealings by any Govt. authority / department / agency or by BMC | Undertaking on Company Letterhead |
| 5 | The interested party should be OEM/SI of | Name of OEM and name of proposed solution. |
| | Data Management/Data warehouse, | |
| | Advanced Business Analytics and Business | |

| | | |
|---|---|---|
| | Intelligence Solution | |
| | The bidder must have supplied at least one | Provide |
| | single work order as an OEM or System<br>Integrator duly authorized by the OEM, in preceding seven (07) years from the date of | value of work in Rs. Lakh<br>Type of Industry |
| | EOI period in industries namely) for | |
| | implementing advance analytics based BI and | |
| | Data Management solution using AI/ ML | |
| | techniques to carry out analysis and | |
| | forecasting based on historical data or any | |
| | other database and perform processing /<br>analysis on that data for generating actionable information | |

## 4 Financial credentials of the Interested Party

| Financial Year | Annual Turnover (Rs.Crores) | Net Profit (Rs.Crores) |
|---|---|---|
| 2019-20 | | |
| 2020-21 | | |
| 2021-22 | | |

## 5 Manpower requirements:

Interested Party may suggest best approach with cost optimization for manpower at the time of installation, configuration, deployment and post implementation support, indicative information are as mentioned below:

### a. Manpower requirement for installation, configuration and deployment:

i.   Project Manager (Interested Parties may provide required experience) – 1 no.
ii.  Data Scientist (Interested Parties may provide required number and experience) with domain expertise

### b. Manpower for post implementation support:
i.   Manpower to be deployed for service support at BMC premises for 5 years with Educational qualification of BCA/ BBA,/MCA/ MBA/ M.Tech/ M.Sc.(IT/CS), B. Tech/ Graduate in any discipline/Diploma/ Post graduate in any discipline with Data Scientist certification.

ii.   Should have 5 years' experience in service support on OEM solution for Analytics, Business intelligence, Data Management

iii.   Responsibility of Deployed manpower shall be to configure future KPIs and administration of solution.

## 6   Proposed Solution

| Particulars | (Provide Responses) |
|---|---|
| Interested party to submit<br><br>a) Response and comments on Technical specifications as per **Annexure-III**<br>b) Propose specifications that needs to be added/deleted/updated<br>c) Suggestive KPIs for SWM Dept. handling waste of the magnitude of Mumbai.<br>.<br>d) Brief approach for implementation, activity with milestone<br>e) Suggestive trainings for BMC employees for proper use and management of solution | |

## 7   Completion Period:

Tentative completion time shall be 3 months from the date of placement of PO.

## 8   Estimated Price

| Activity | Price in Rs. Lakhs (excluding Taxes) |
|---|---|
| Total approximate cost of project with above mentioned scope:<br>(Give break up of individual items wherever possible) | |
| Total approximate Hardware cost for deployment<br>(Give break up of individual items wherever possible) | |

Note: Mention details on taxes.

**9  Hardware:**

**Proposed Hardware sizing of the Data Warehouse based on below indicative information**:
Total Database size: 20 TB

| S. No | Data Volume | Concurrent sessions | Avg. Data size |
|---|---|---|---|
| 1 | <=1GB | 50 | 500 MB |
| 2 | >1 GB &<=10 GB | 20 | 8   GB |
| 3 | >10 GB | 10 | 20 GB |

Average annual growth approximately 10%

**Hardware Sizing – BI shall be based on:**
  i.    No. of Users: 200
  ii.   Concurrent users: 50
iii.    Data Visualization:

| S. No | Data Volume | % of dashboards |
|---|---|---|
| 1 | <=1GB | 50 |
| 2 | >1   GB &<=10 GB |  30 |
| 2 | > GB |  10 |

Average annual growth approximately 10%.

**10 Trainings:**
Vendor shall provide required training and certifications to concerned BMC employees for proper management and usage of Data Warehouse, BI & analytics solution.

**\* use additional sheets wherever required**
I hereby declare that the details furnished in response to this EOI are true and correct to the best of my knowledge and belief. In case any of the above information is found to be false, I am aware that I may be held liable for it.

Place: Name &
Signature: Date:
Designation:
Company Seal

**7.2 Annexure-II**

| Key Performance Indicators | | | |
|---|---|---|---|
| Unit / Location | Parameter | Description | Source of Data |
| **AE(SWM) Ward** | Attendance | - Chowky Wise Attendance<br>- Trend for overall attendance in the ward | Bio Metric attendance system |
| | Traction | - No. of vehicle reported/ shift<br>- Clearance of collection spot clearance summary report. (Shift wise)<br>- Summary Route performance reports<br>- Details about payment certificates. | VTMS |
| | Weight | - Total qty. of waste transported to Transfer Station & Dumping Ground<br>- Average wt. of waste for each type of compactor.<br>- Trend for wt. of the waste collected. | WMS |
| | Dry waste | - Overall collection of Dry waste in a day<br>- Different type of dry waste collected with weight. | Dry Waste App |
| | Bulk Waste Generator | - Waste processing by each BWG<br>- Feedback about the BWG applications for rebate in property tax. | MyWaste App |
| | SMPA | - Exception reports about the daily inspection of SMPA Sanstha.<br>- Penalty imposed<br>- Details of Poorly performing SMPA as per ratings allotted.<br>- Details about the payment certificates. | SMPA Portal |
| | Contract Monitoring | - Budget Consumed<br>- Additional Budget | SAP- MM Module |

| | | | | |
|---|---|---|---|---|
| | | - requirement<br>- Contract created for work in SAP if any. | |
| **A.C. Ward** | Attendance | - Overall percentage attendance of SWM staff | Bio Metric attendance system |
| | Traction of vehicles | - Total percentage(or no.) of vehicle reported in ward<br>- Percentage of attendance of collection spots. | VTMS |
| | Weight of waste | - Total qty, of waste collected from ward.<br>- Total weight of waste collected & transported with its trend. | WMS |
| | Dry waste collection | - Collection of Dry waste in a day | Dry Waste App |
| | Bulk Waste Generator | - Daily performance of BWG about processing of waste at their end. | MyWaste App |
| | SMPA | - Details about poorly performing sansthas | SMPA Portal |
| | Contract Monitoring | - Budget Consumed<br>- Additional Budget requirement. | SAP- MM Module |
| **EE (SWM) Zone** | Attendance | - Overall percentage attendance of SWM staff ward wise /In zone. | Bio Metric attendance system |
| | Traction | - Total no. of vehicle reported in the individual ward in that zone<br>- Percentage of attendance of collection spots in every ward in that zone. | VTMS |
| | Weight | - Ward wise wt. of waste collected & transported<br>- Exceptional reports, trends & alerts for the waste collection. | WMS |
| | Dry waste Collection | - Qty. of Dry waste collected in each ward.<br>- Exceptional reports, trends & alerts for the | Dry Waste App |

| | | dry waste collection. | |
|---|---|---|---|
| | Bulk Waste Generator | - No. of societies comes under BWG in the wards/Zone<br>- Exceptional reports, trends & alerts for the processing of the waste by BWG. | MyWaste App |
| | SMPA | - Exceptional reports, trends & alerts for SMPA in every ward | SMPA Portal |
| | Contract Monitoring | - Total budget required for the work<br>- Budget Consumed<br>- Additional Budget requirement. | SAP- MM Module |
| **Dy.Ch. E.(SWM)** | Attendance | - Consolidated attendance of SWM staff for all the wards.<br>- Exceptional reports, trends & alerts for attendance of the staff. | Bio Metric attendance system |
| | Traction | - Consolidated report about the percentage of vehicles reported for collection & transportation.<br>- Consolidated reports about the attendance of collection spots for all the wards.<br>- Exceptional reports, trends & alerts for the traction reports. | VTMS |
| | Weight | - Waste collected in each RTS.<br>- Waste directed to dumping ground.<br>- Waste directed to processing facility.<br>- Exceptional reports, trends & alerts about the waste collected & transported. | WMS |
| | Dry waste | - Qty. of dry waste collected in all of the wards.<br>- Exceptional reports, trends & alerts about | Dry waste App |

| | | | |
|---|---|---|---|
| | | the dry waste collection. | |
| | Bulk Waste Generator | - Consolidated reports about the Performance of the BWG in all 24 wards.<br>- Exceptional reports, trends & alerts for BWG | MyWaste App |
| | SMPA | - Consolidated report about the inspection carried out<br>- Exceptional reports, trends & alerts about the SMPA | SMPA portal |
| | Contracts monitoring | - Exceptional reports, trends & alerts about the budget allotted & its consumption<br>- Exceptional reports, trends & alerts for different aspects about the contract management. | SAP- MM Module |
| **Ch. E. (SWM)** | Attendance | - Consolidated attendance of SWM staff for all the wards.<br>- Exceptional reports, trends & alerts for attendance of the staff. | Bio Metric attendance system |
| | Traction | - Consolidated report about the percentage of vehicles reported for collection & transportation.<br>- Consolidated reports about the attendance of collection spots for all the wards.<br>- Exceptional reports, trends & alerts for the traction reports. | VTMS |
| | Weight | - Waste collected in each RTS.<br>- Waste directed to dumping ground.<br>- Waste directed to processing facility.<br>- Exceptional reports, | WMS |

|  |  |  |  |
|---|---|---|---|
|  |  | trends & alerts about the waste collected & transported. |  |
|  | Dry waste | - Qty. of dry waste collected in all of the wards.<br>- Exceptional reports, trends & alerts about the dry waste collection. | Dry Waste App |
|  | Bulk Waste Generator | - Consolidated reports about the Performance of the BWG in all 24 wards.<br>- Exceptional reports, trends & alerts for BWG | My Waste App |
|  | SMPA | - Consolidated report about the inspection carried out<br>- Exceptional reports, trends & alerts about the SMPA | SMPA Portal |
|  | Contracts Monitoring. | - Exceptional reports, trends & alerts about the budget allotted & its consumption<br>- Exceptional reports, trends & alerts for different aspects about the contract management. | SAP- MM Module |
| **DMC (SWM)** | Attendance | - Exceptional reports, trends & alerts for attendance of SWM Staff | VTMS |
|  | Traction | - Exceptional reports, trends & alerts for traction of vehicles | VTMS |
|  | Weight | - Exceptional reports, trends & alerts for weight of waste transported. | WMS |
|  | Dry waste | - Exceptional reports, trends & alerts for dry waste collection. | Dry Waste App |
|  | Bulk Waste Generator | - Exceptional reports, trends & alerts for performance of BWG. | My Waste App |

| | SMPA | - | Exceptional reports, trends & alerts about SMPA Sansthas. | SMPA Portal |
|---|---|---|---|---|
| | Contracts Monitoring. | - | Exceptional reports, trends & alerts for budget & other contract related activities. | SAP- MM Module |

## 7.3 Annexure –III

## TECHNICAL SPECIFICATION OF DATA WAREHOUSE, BUSINESS INTELLIGENCE(BI), BUSINESS ANALYTICS (BA) SOLUTION

## TECHNICAL SPECIFICATIONS OF DATA WAREHOUSE, BI AND BA PLATFORM

Following are indicative technical specification of proposed BI and BA solution

| Requirement | Specifications | Compliance (Yes/No) |
|---|---|---|
| **Integrated solution for Data warehouse, Business Intelligence & Business Analytics** | The proposed solution should be an integrated solution for data warehouse, business intelligence and business analytics | |
| | The capabilities should be available in an integrated environment from a single OEM (not as a stitched solution using components from various OEMs). | |
| | ii) Data Quality, | |
| | iii) Advanced Analytics, | |
| | iv) Alerting & Investigation, | |
| | v) Monitoring & Visualization capabilities, | |
| **High-Performance, Scalable, Robust, Enterprise Platform** | The solution should have the BI & BA ability to enable users to conduct Fast, Thorough Explorations and Analysis on data from different data sources across BMC such as SAP, SQL, Any Web Services, Web Links, Mobile Applications, MS Access, MS Excel, Flat files etc. | |
| | The solution should be able to analyze large size data and generate visualizations on the fly, without any performance degradation | |
| | The solution should be scalable to a greater number of dashboards in same function or more functional dashboards in the existing technology platform. | |
| | The solution architecture should allow integration of data sources in future which might come up as part of digitalization in SWM Dept. of BMC | |

| | | |
|---|---|---|
| | The offering should have integrated modules for analytics comprising data preparation, exploration, visualization and administration | |
| | Design specifications of complete solution should ensure minimum latency in the update of data/ refresh of dashboards. The dashboard should not take more than 10 seconds to load on a single user screen. | |
| | Complete solution to provide 99.9% uptime | |
| | Solution should be cloud based | |
| | The solution design should be modular in nature and should allow change of software/hardware in parts without impacting the entire solution. | |
| **Self-Service Exploration and Analysis** | The solution should have the capability to explore and seek correlations on data sets of any size for data analysis | |
| | The solution should provide interactive analytical capabilities | |
| | The solution should provide capability to analyse unstructured data | |
| | The solution should provide a clear explanation of Analytical results by providing "What does it mean" capabilities | |
| | The solution should allow users to produce dashboards with minimum effort/ low-code methodology using little help from IT team. It should be a self-service BI tool, for system integration and publish/share it for the consumption of department/functional users. | |
| | The solution should have capability that the values on dashboard should get updated on pre-defined frequency automatically by sourcing required data from various sources. | |

| BI, Reporting, Dashboards, Analytics, Mobility in a single platform on a unified easy-to-use interface | The solution should provide a user friendly, web based , drag and drop interface for data preparation | |
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| | The solution should provide Auto-charting Based on data selected for analysis, solution should automatically choose best visualization suited to display the type of data selected | |
| | The solution should allow users to change queries by selecting items to be displayed or dynamically filtering and grouping | |
| | The solution should provide viewable descriptive statistics, such as min, max and mean, enabling users to gain an overall sense of a particular measure | |
| | The solution should provide the capability to link to an external URL from a visual object with relevant context | |
| | The solution should allow 'On-the-fly' hierarchy creation for adding drill-down capabilities to visualizations and reports | |
| | The solution should provide capabilities to Slice and Dice multidimensional data by applying filters on any level of a hierarchy | |
| | Customization of reports should also be available as a functionality of the BI tool which will let the user design his/her own report from the data available in the intermediate system. | |
| | The solution should provide capabilities to Drill up and down through hierarchies, or expand and collapse entire levels | |
| | The system should be able to allow users and admin to define alerts and business insights at individual, Business Users or project level. Alerts will be posted via notifications in the App, notifications on Web, Email, SMS. | |

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| | Visualization techniques and framework to empower users/ decision makers to appreciate the reports quickly and take educated decisions including (but not limited to)histograms, bar charts, geographical mapping, donut charts, trend lines, spark lines, heat maps, spider charts etc. | |
| | BI tool should allow the users to create new dimensions, derived metrics etc. preferably with auto charting and dashboard facilities through the keywords | |
| | The solution should provide users the capability to save and share their analysis as exploration, report or PDF | |
| | The solution should provide the capability to export data to Excel and CSV/TSV document formats | |
| | The solution should be capable of read and write of comments in reports to aid in collaboration | |
| | The solution is capable of emailing a report link with comments to users | |
| | The solution should allow users to Capture screenshots and share comments with users | |
| | The solution should provide filtering and selection capabilities to reports with easy-to-integrate common action elements such as radio buttons, drop- down/combination boxes, check boxes and sliders | |
| | Capability to calculate new data items on the fly from existing data items using expressions | |
| | The solution should support distribution of Reports and Dashboards to iOS and Android devices. The Native App should be freely available for iOS devices on App Store and for Android devices on Google Play | |

| Data Warehouse capabilities | Database service offered in solution should have more than 99 % UPTIME and there is no compromise on performance of the application | |
| --- | --- | --- |
| | Secure Data extraction from various sources from systems across organization, SAP, Oracle, SQL,MYSQL, PostgreSQL, Maria DB, Any Web Services, Mobile Applications, Web Links, MS Access, MS Excel, Flat files, unstructured information like email, website information etc. | |
| | Solution architecture should ensure only necessary reportable data should be loaded to data warehouse storage through Extract, Transform and Load (ETL) tool and further used for reporting needs. This is aligned with the bidder's requirement to ensure cost optimization while servicing data | |
| | The solution should be able to connect to SAP-ERP environment and facilitate efficient and faster extraction of data for further processing | |
| | Perform automated extraction, transformation and loading of updated data on a pre-defined frequency from multiple sources into data warehouse. | |
| | Compatibility with different data storages like flat file storage, relational databases and big data storages, etc. | |
| | Ensure seamless integration with all data sources, data warehouse and the BI tool so that integration is smooth for dashboard viewing and thus enable and smoothen user decision making process. | |
| | Provide a layer of data governance for flat file extraction (from multiple data sources) and loading into data warehouse to ensure data is accurate and complete. | |

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| | The Solution should be able to process ETL to provide a pre-built transformation to use SOAP (Simple Object Access Protocol) and REST(Representational State Transfer) to access web service ,standardize data and de-duplication of data. | |
| **Mobility** | The solution should allow the analysis / explorations / reports to be pushed for offline viewing to mobile devices | |
| | The solution should have the ability for Interactive report viewing for information consumers on iOS and Android devices | |
| | The solution should support same dashboard / report created on Web to be accessed from iOS and Android devices without requiring any redesign | |
| | The solution should allow users to securely view reports on mobile devices while online or offline | |
| | Mobile device blacklisting and white listing through the web based security and administration interface | |
| | The solution should have both simple& advance variable aggregation options | |
| | The visualization tool should offer complete access of functionalities on web portal and handheld device in seamless fashion. Screen layouts should be configured to adapt to Desktop, Laptop, Tablet and Mobile phones etc. | |
| **GUI-based Administration** | The solution should provide GUI interface to monitor Resource utilization including CPU, I/O and Memory | |
| | The solution should have capability for Single Sign On (SSO) and/or AD/LDAP authentication, Authorization integration with existing windows active directory | |

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| | The solution should have capability to record session logs, access logs, process logs & design platform logs of all user and system activities. System should be able to report any faults if found in these logs. | |
| | The solution should have capability to monitor Mobile device logging history | |
| | The solution should provide server side logging for user actions – reports downloaded | |
| | The solution should provide usage report of Resource utilization including CPU, I/O, Memory, Data Tables, User sessions | |
| **General** | Should provide Analytics for all the SWM Dept.'s activities from day one (like Integration of Manufacturing Data, Data Management of Corporate Data, Management Dashboards etc.) without the need of any extra license. If any extra license is required, bidder shall provide the same along with the solution | |
| | Perpetual licenses shall be supplied for all the Application Software Modules, Analytics and Management Dash boarding solution. The software should work without any subscription on annual basis. AMC should be optional for BMC and existing application should continue to work without AMC | |
| | Platform licenses should be supplied only for On- Premise & No data should go out of BMC premises. Offered Solution should be on cloud platform. Also the offered solution should be cloud vendor agnostic | |
| | All Application Modules of supplied software should be from single OEM. | |

| | User Interface of the supplied Analytics& Optimization Platform should be Web based i.e. Users should be able to perform all functions from the Web Browser i.e. Chrome or Internet Explorer, Safari, Firefox etc. (All browser) on the Desktop PC without the need of installing any client software. | |
|---|---|---|
| | Supplied platform shall also be accessed by users from Internet / Public Network on PC / Mobile Device (IOS / Android) connected to Internet. | |
| | Should provide Native Mobile App from respective OEM for seamless access of the platform from IOS / Android Mobile Device | |
| | Solution should provide single sign-on with mandatory Active Directory (AD)authentication. | |
| | Solution should allow connection by unlimited number of BMC users | |
| | Offered OEM should have dedicated 24X7 service support centre with industry standard ticket tracking system. | |

**In future if BMC intends to migrate to other OEM solution, the offered solution should support the migration.**

## 8. Request for Expression of Interest (EOI):-

BMC invites Expression of Interest for "Implementation of Data Warehouse, Business Intelligence (BI) & advance Analytics solutions for SWM Dept. of BMC"

## 9. Validity of EOI:-

The EOI shall be valid for a period of not less than 180 days from the EOI due date. BMC reserves the right to reject any EOI which does not meet the requirement.

## 10. EOI Fee:-

EOI should be accompanied by a DD of Rs. 1000/- in favour of BMC payable at Mumbai.