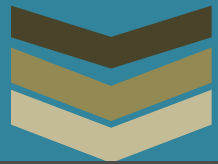


PROJECT MANAGEMENT CONSULTANCY FOR IMPLEMENTATION OF SMART CITY MISSION PROJECTS FOR MANGALURU CITY

DETAILED PROJECT REPORT – IMPLEMENTATION OF ESMART SCHOOLS IN ALL GOVERNMENT SCHOOLS



ISSUE AND REVISION RECORD

Revision	Date	Originator	Checker	Approver	Description	Standard
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0.5	25-June-2018	WTSEL/LBI/DAC			Inclusion of One school and PU College	
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0.7	05 October 2018	WTSEL/LBI/DAC			Document Flow Rearranged.	

DETAILED PROJECT REPORT – IMPLEMENTATION OF ESMART SCHOOLS IN ALL GOVERNMENT SCHOOLS

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ABBREVIATIONS

ABD	Area Based Development
BEO	Block Education Office
DPI	Department of Public Instruction
DPR	Detailed Project Report
GHS	Government High School
GLPS	Government Lower Primary School
GPUC	Government Pre-University College
GUPS	Government Upper Primary School
ICT	Information and Communications Technology
LMS	Learning Management System
MCC	Mangaluru City Corporation
MSCL	Mangaluru Smart City Limited
NCERT	National Council of Educational Research and Training
O&M	Operation and Maintenance
PC	Personal Computer
PMC	Project Management Consultant
RFP	Request For Proposal
SATS	Student Achievement Tracking System
SCP	Smart City Proposal
SI	System Implementer
SPV	Special Purpose Vehicle
ToT	Transfer of Technology
UAT	User Acceptance Testing
USB	Universal Service Bus

LIST OF REFERENCE CODES, STANDARDS, AND GUIDELINES

The following documents have been referred in preparing the document

1. DPR

- http://www.apts.gov.in/procurepdf/DPR_TemplateV1.2%20-7.pdf
- http://mhrd.gov.in/sites/upload_files/mhrd/files/Student-Teacher%20Ratio.pdf
- http://www.ncert.nic.in/programmes/education_survey/index_education.html

2. Educational indicators proposed by National Council of Educational Research and Training (NCERT):

- http://www.ncert.nic.in/programmes/education_survey/index_education.html

3. Sports Infrastructure

- Inputs received from Mr. Pradeep D'Souza, Deputy Director, Department of Youth and Sports.

EXECUTIVE SUMMARY

Government schools need to implement smart cities strategies and approaches to take better advantage of ICT and improve the performance of students and teachers in education domain. The detailed project report aims to address the rationale behind implementation of smart classrooms in government schools under Mangaluru Smart City Project.

The Objective behind the implementation of smart classrooms is to ensure the integration of information and communication technologies (ICTs) in education, especially for improving access to education, enhancing the quality of teaching-learning process, training of teachers and strengthening educational planning and management.

The project will be implemented in all the government schools present in ABD area of Smart City Mangaluru for a period of five years including the operation and maintenance of both hardware and software of eSmart solution. The O&M would also include the training on periodic basis for the academic staff as well as teachers of the school.

The content of the Learning management system would be updated over a period of time based on the change in education syllabus as well as feedback given by teachers and students.

The budget allocated for implementation of eSmart school in government schools which fall under ABD area is 16 crores for a period of five years.

Outcomes of the ICT in classrooms:

- Large repository of education online resources in the classroom.
- Education will be imparted through digital media such as presentations, videos etc.
- Difficult topics can be better understood with the help of multimedia rather than chalk and talk.
- Learning would become more pleasant, especially for the visual learner and better understanding would lead to better performance by the student.
- A Smart School environment helps to democratize education.
- The Smart School programme provides equal access to learning opportunities.
- It may enhance creativity, critical thinking, problem-solving, decision-making and learning along with the communication and collaboration attitude.
- It teaches new tools for working such as ICT and information literacy.
- If the nation requires a well-educated workforce, education has to be delivered to more people and this can happen through education technology.

1. Project Overview

1.1. Title of the Project

Implementation of eSmart schools in all government schools under ABD of Mangaluru Smart City.

1.2. Flagship of the Project

The project falls under the Area Based Development (ABD) Projects of Mangaluru Smart City.

1.3. Eligibility Tests

- There are two types of Schools which run under Government Aid – Primary and Secondary schools.
- The number of primary schools is thirty one and secondary schools are twelve in Mangaluru City.
- The list of schools is obtained from the link <http://www.schooleducation.kar.nic.in/html/binfra.html>. **Navigate to Mysore Division → Dakshina Kannada and the list is downloaded under primary school list and secondary school list. The list is given in Annexure A.**

For the implementation of eSmart school in government schools, a number of critical factors have taken into consideration before investing in hardware and software infrastructure. Following are the educational indicators proposed by ¹National Council of Educational Research and Training (NCERT). The details of each of the indicators are given in Annexure B:

1. Indicators of Demography (School-Age Population)
2. Indicators of Access to Schooling
3. Indicators of Participation
4. Indicators of Equity
5. Indicators of Infrastructure
6. Indicators of Quality Inputs
7. Indicators of Finance
8. Indicators of Efficiency

Survey was carried out based on the following indicators:

1. Indicators of Infrastructure
2. Indicators of Quality Inputs

¹ http://www.ncert.nic.in/programmes/education_survey/index_education.html

1.3.1 Project Initiator Details

Mangaluru Smart City Limited is a public limited company which is a special purpose vehicle for undertaking smart city project in Mangaluru City.

1.3.1.1 Name and Job Title of the Key Contact Person

Managing Director, Mangaluru Smart City Limited (MSCL) and Commissioner, Mangaluru City Corporation (MCC).

1.3.1.2 Contact details

Mangaluru City Corporation
M.G. Road, Lalbagh, Mangaluru - 575003

1.3.1.3 Implementation Agency Details

The implementation agency will be awarded the project of 'Implementation of eSmart school in all government schools' under ABD area of Smart City Project through two bid cover tender process.

1.3.1.4 Project Implementation Location

Project will be implemented in government schools under ABD area of Smart City Project.

1.4. Project Vision

The eSmart solution taught in government schools will be a complete solution intended to help teachers in teaching students so as to improve student's academic performance with the help of eSmart solution through ICT.

The eSmart solution will provide teachers with immediate access to multimedia content and instruction materials in compliance to Karnataka State Board curriculum. It will help teachers to ensure that every child is maintaining interest in studies and student's positive interaction in the classroom is enhanced.

1.5. Project Goal

- To establish and facilitate the environment to promote the usage of ICT Government Schools. Critical factors of such an enabling environment include widespread availability of access devices, connectivity to the Internet and promotion of ICT literacy.
- To enable every student to become "Digitally Literate".
- To train the school teachers in effective delivery of education by using IT tools for teaching with latest methodologies & aids.
- To ensure the availability of quality enrichment of existing curriculum by employing ICT tools for teaching and learning.
- Compulsory ICT Education for all students.
- Promote critical thinking and analytical skills by developing self-learning. This shall transform the classroom environment from teacher-centric to student-centric learning.

2. Project Overview

eSmart School Project is a Smart City Initiative where ICT Infrastructure of the school is to be converted into smart classroom so as to make digital education available to students for improving their learning curve in education.

2.1. Stakeholders

- Students
- Government Schools identified under ABD areas
- Academic Staff of Government Schools identified under ABD areas
- Mangaluru Smart City Limited (SPV)
- Department of Public Instruction
- Block Education Office of Two wards –Mangaluru North and Mangaluru South
- Parents / Guardians

2.2. Improvement Envisaged for the Schools

- Proper Civil Infrastructure for the setup of smart classroom should be in place, the present civil status of government school should be surveyed by civil authorities whether minor repairs can be undertaken so as to do electrical fittings in the school.
- Proper Lighting mechanism should be in place so as the students don't get spectacles at younger age while accessing the computer for long hours.
- The project should be rolled out in phases based on the health condition of the school; readiness of the school as well as block education office.
- The officials of the block education office should keep the record of the ICT inventory issued to school.
- Service and support required for the maintenance of IT infrastructure is to be readied to ensure system reliability and availability.

2.3. Current Scenario

- Lack of civil Infrastructure in the schools.
- Absence of sufficient lighting.
- Lack of basic amenities such as ceiling fan and water purifier. Most of the Computers, water purifier, Ceiling Fans and notebooks are donated by PSU organizations such as State Bank of India, Canara Bank; private organizations Mphasis HP, Educomp and NGO and charitable organizations.
- Poor Student Enrollment and Teacher to Subject to Classroom ratio.

- Multiple e-governance initiatives across entire Karnataka State related to education in different silos where end-user like teachers and education officials need physical visits to upload statistical information.
- Data entry of attendance of teachers, students and students’ performance is done on Student Achievement Tracking System <http://sts.karnataka.gov.in/STS/#> .It is an online Portal where teachers have to periodically update the details about the student’s attendance and student’s performance based on the template given.

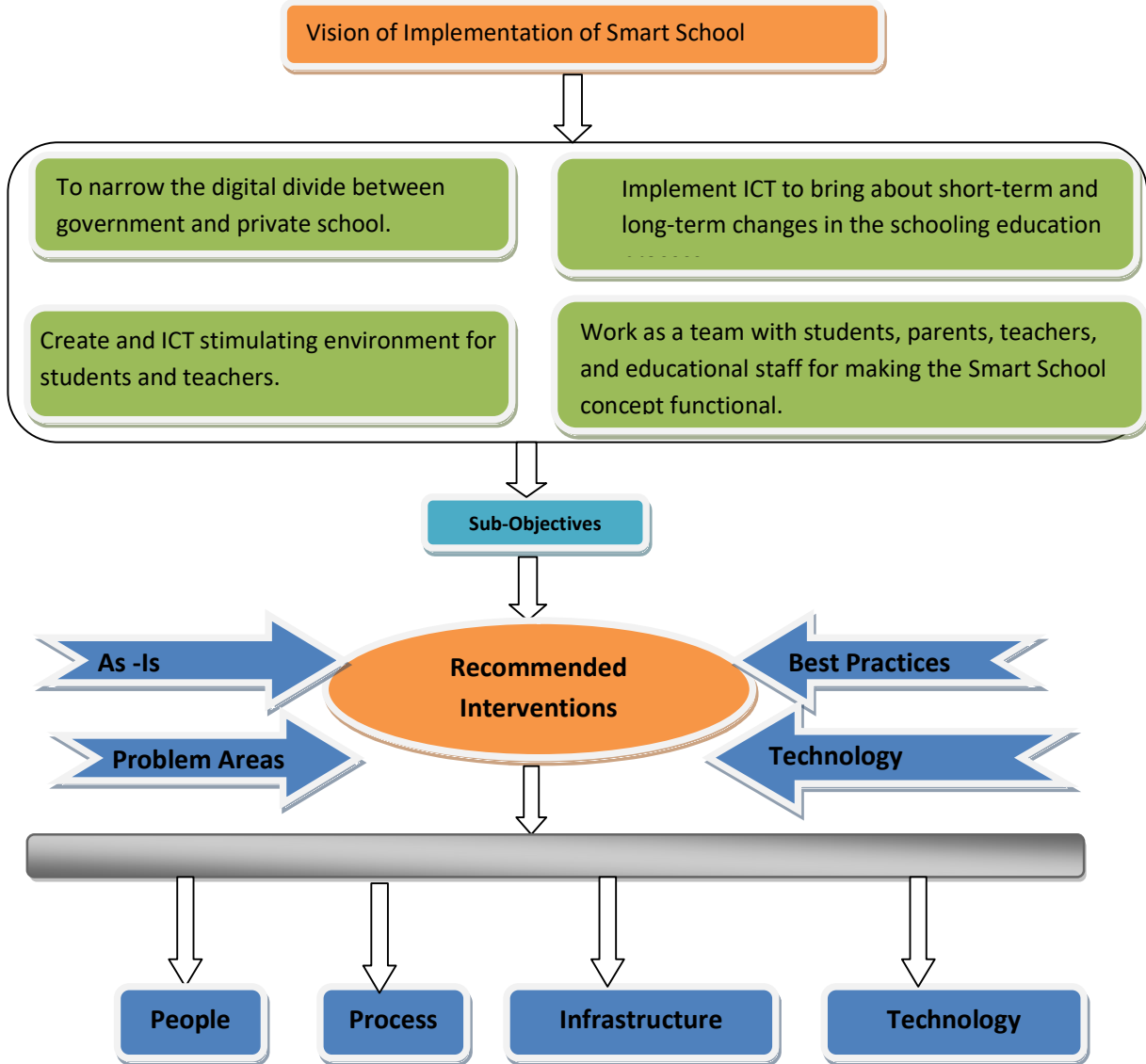
2.4. Sources of Funding

Table 1. Funding Source

Smart City Component ID	Smart City Component Name	Budget Estimated in the Smart City Proposal in INR
14	Implementation of eSmart schools in all government schools	16 Crores

3. Project Details and Implementation Model

3.1. Approach & Methodology



3.2. Proposed Interventions

3.2.1. Process and Technology

Step 1: Approval by MSCL (SPV) in consultation with local Department of Public Instruction and Block Education Offices of both wards - Mangaluru (North) and Mangaluru (South) for selection of government schools where smart classroom are to be setup.

Step 2: Meeting with academic staff including principals, head-master and teachers of the proposed government schools whether they are ready for the acceptance of ICT mode of teaching in the school.

Step 3: Inspection of Physical infrastructure of the school, taking into account external factors such as electrical fittings in the school, the current state of building, water flooding.

Step 4: DPI and BEO should Based on the statistical data of the number of students enrolment and drop out ratio, should give their feedback and note whether the implementation of smart classroom in schools should be done or not.

Step 4: Survey of the new government schools if recommended by MSCL (SPV) based on inputs of DPI and BEO by both PMC and SI.

3.2.2. People

While approving the implementation of ICT in this schools, the local education departments i.e. Department of Public Instruction in Mangaluru and Block Education Offices of both Mangaluru North and Mangaluru South Wards and MSCL(SPV) are to be aware about the following factors :

- Current State Infrastructure of 13 schools identified under ABD area
- Student Teacher Ratio
- Teacher to Subject Ratio
- Enrolment of Students
- Drop out ratio of Students
- Readiness and prerequisite knowledge of how to operate computer by Teachers.

3.2.3. Non-IT Infrastructure

Electrical Wiring and Equipments

The selected SI will have to undertake electrical wiring and earthing for all electrical and IT equipment like PC's, LED Lighting, Fire Extinguishers and a Common UPS catering the capacity for smart classrooms.

3.3. Implementation Strategy

- LMS will make the subjects and topics taught by teacher accessible.
- The education content comprising of animation videos, presentation, worksheets will be hosted in the environment where SI allow the easy updation of the content.
- Internet Connectivity should be available so as to access the digital content.

3.4. Scoping Study

Table 2. Roll out Activities

Sr. No.	Activity name
1.	Identification of Government schools under ABD area for eSmart school implementation.
2.	Approval of the same by Block education Officer of both Mangaluru North and Mangaluru South ward.
3.	Survey of 13 government schools under ABD area for eSmart school implementation.
4.	Quotations from Leading Vendors providing Education software and hardware required for set up of smart classroom.
5.	Preparation of Draft DPR for eSmart school implementation.

Table 3. School Information

S. No	School	Students	Teachers	Grade
1.	GUPS, Basthigarden, Ward No-41	17	2	1,2,3,4,5
2.	GUPS, Neereshwalya, Ward No-45	14	3	1,2,3,4,5,6,7
3.	GUPS, Pandeshwara, Ward No-46	77	4	1,2,3,4,5,6,7
4.	GLPS, Hoigebazar, Ward No-57	16	2	1,2,3,4,5
5.	GHS, Hoigebazar, Ward No-57	40	7	8,9,10
6.	Government Practicing HS, Mangaluru, Ward No-46	37	8	8,9,10
7.	GUPS, Bunder (Urdu), Ward No-44	69	4	1,2,3,4,5,6,7
8.	GHS, Bunder (Urdu), Ward No-44	70	7	8,9,10
9.	Primary School, Jyothi Circle, Balmatta, Ward No-40	35	4	1,2,3,4,5,6,7
10.	Secondary School Jyothi Circle, Balmatta, Ward No-40	103	8	8,9,10
11.	GUPS, Bolar, Ward No-58	52	4	1,2,3,4,5,6,7
12.	GUPS, Bolar West (Urdu), Ward No-58	25	3	1,2,3,4,5,6,7
13.	Govt High School Car Street Ward No-43	44	8	8,9,10
TOTAL		599	64	

Summary	No. of schools	Students	Teachers
Primary School (1,2,3,4,5). One school having 14 student strength has been considered into this category	3	47	4
Primary and Middle (1,2,3,4,5,6,7)	5	258	22
High School	5	294	38
TOTAL	13	599	64

College	Students	Teachers	Grade
GPUC Balmatta Ward No-40	770	19	11,12
GPUC Car Street Ward No-43	226	12	11,12

The survey was done against following indicators:

1. Type of School
2. Standards Taught
3. Subject Taught
4. Total number of Teachers
5. Total number of Students in each school
6. Total number of Boys and Girls in each standard
7. Total number of toilets for boys and girls
8. Drinking water Facility
9. Current status of ICT in schools
10. Observations

Survey for thirteen schools and two girls pre-university colleges was done and is given in Annexure C.

3.5. Process Reengineering

After the survey done by PMC with MD, MSCL and BEO officials it was decided to consider the possible merging of the schools:

1. Merging of GUPS Bolar West (URDU) (Students: 25) with GLPS Hoigebazar (Primary) (Students: 16).
2. Merging of GUPS Basthigarden (Students: 17) with GUPS, Bunder (URDU) (Primary) (Students: 69)

The merging may facilitate the effective upgradation and subsequent use of facilities by the students and teachers. BEO officials to decide based on the government schemes, constraints and guidelines.

Sr. No.	Activity Name	As -Is Process	To- Be Process
1.	Online Education Content	Text books can be downloaded online through http://ktbs.kar.nic.in/New/index.html#!/	With the introduction of e-content in smart classroom, supporting study material such as animation videos will be available to students for tough topics.
2.	Teachers Information Software	Teachers information software http://ktbs.karnataka.gov.in/TeachersInfo/ serves as a repository about teachers where service record of all government teachers is stored.	Student Management Software will provide information about subjects and topics taught by teacher in class.
3.	Student Tracking System	Student Achievement Tracking System http://sts.karnataka.gov.in/STS	System Implementer SI can develop Student management software which will use the same format used by

Sr. No.	Activity Name	As -Is Process	To- Be Process
		/# is an online Portal where teachers have to periodically update the details about the student’s attendance and student’s performance based on the template given in the portal. The portal is an intermediate entity between school academic staff and education	teachers to upload about the student's details, attendance and academic progress report. The portal will act as an intermediate entity between school academic staff and parents and guardians.

3.6. Communication Strategy and Plan

Table 4. Communication Strategy and Plan

Audience	Messages	Channel Media	Frequency	Responsibility	Feedback Mechanism
MSCL	Update the status about the progress implementation of eSmart school	Meetings / Status Update Report	Monthly	PMC, SI	Incorporate the suggestions as received through proper official communication
Head Master / Teacher	Requirement Gathering for developing of education content that is supporting animation videos, worksheets, quiz with respect to Karnataka State Board curriculum	Requirement Gathering Form for Client	During development of the education content software	SI	Incorporate the suggestions as received through proper official communication
Head Master / Teacher	Conducting Training for teachers on how to operate the both Hardware and Software of smart classroom	Presentation/ Hands-on /Training Material	On demand Basis	SI	Training Feedback Form

Audience	Messages	Channel Media	Frequency	Responsibility	Feedback Mechanism
Head Master/Teacher	Update the education content as and when required by school	Change/Update Request Form	On demand Basis	SI	Incorporate the suggestions as received through proper official communication

3.7. Capacity Building and Training Plan

- The SI will arrange training, both initial and later on refresher training on quarterly basis to the teachers of the schools on usage of supplied Multimedia Educational Digital Content, operations of all the hardware installed in the designated schools.
- Provide training on usage of supplied Educational Digital Content, operations of all the hardware installed in the schools to all the subject teachers at the concerned schools and also provide subsequent refreshers training as and when required as per the following details:

Training requirements for the adoption of smart education

- Training to the teachers in each school needs to be provided by the SI. Teachers who will undertake the training will be selected by the principal of the respective school.
- Post the installations of the hardware and software required for the smart classroom, at-least 3 days of initial intensive training should be conducted by the SI covering all schools to ensure maximum adoption of the smart classroom in each school.
- Post these training, independent evaluations will be carried out by Block Education officers to understand the readiness of the teachers in each school in adoption of the smart teaching mechanism.
- In case BEO officers find out there are still training requirements based on the above evaluation, the SI needs to undertake further training.
- In addition to the above, at-least 3 days of refresher training needs to be conducted by the bidder in every quarter.

3.8. Solution Proposed

Learning Management System will include the costing of hardware and software required. Cloud based solution is proposed which is free of cost for a period of three years. No hosting of separate LMS solution is required in CCC.

3.8.1. Smart Classroom setup

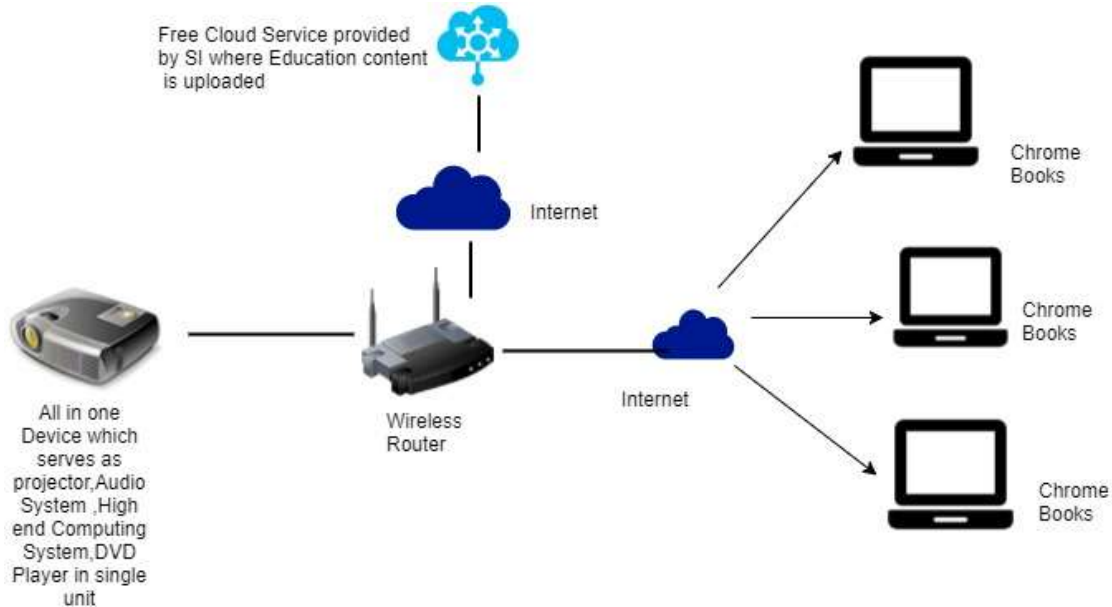


Figure 1 : Smart classroom Setup

- Chromebook with
 - Chrome Management Console (CMC)
 - Education App
- All in One Display Device preloaded with Multimedia Learning Modules
- Access Point cum Wireless router
- Chrome Cart (for safe storage and charging of Chromebooks)
- UPS for power back up of Large Screen Display

There is no dependency of deployment of any smart school devices in Command Control Centre.

3.8.2. Functional Module Description

Chrome Management Console (CMC):

The web-based Chromebook management console makes it easy to deploy Chrome books across organization while maintaining fine-tuned control of these devices.

Key features of Chrome device management, a simple cloud management console are:

Create User Groups: With the user groups feature, one can create different sets of users to which one can then apply policies, apps and settings.

Track Assets: The track assets functionality allows assigning devices to users in order to get configuration and usage reports to see exactly how each user is using their device.

Pre-install and block apps: The management console allows to pre-install apps and extensions on Chromebooks, as well as blacklist or white list specific apps, extensions and URLs.

Control User Access: This feature gives complete control over who uses your organization's Chrome devices. One can prevent outside users from logging in on the devices, disable the Guest Mode feature, or even designate only specific users in your organization to be able to use Chromebooks.

Configure Network Access: Get users connected and secure by setting their network and security settings through the management console.

Customize User Features: This feature allows customizing Chromebooks for different users with settings such as bookmarks and app sync, as well as setting custom Chrome themes.

Education App:

Education App is a core suite of productivity applications that build teamwork and enhance learning. These tools are collaborative, customizable, free, secure, without ads and usable on any device. All of these applications exist completely online (or in the cloud), meaning that all creations can be accessed from any device with an Internet connection.

Online Classroom

Online Classroom is a tool which provides a platform for communicating with students, assigning and collecting work, and providing learning resources. It allows sending messages, assigning, collecting, and grading work, and sharing learning material in one single place. Classroom also integrates with other Google products like Gmail and Google Drive to create a feature-rich toolset.

It provides teachers with avenue to collect assignment effortlessly and provide real time feedback to the students and direct their learning in right direction.

Multimedia Content:

The Solution comprises of a wonderful mix of interactive digital content stored inside the All-in-One Device. These include the following:

2D/3D Content Modules:

A variety of animation and audio-video based modules, which are developed on concepts across multiple subjects in order to enhance interest levels of the students

Educational Videos: A wide collection of educational videos developed to explain concepts of science in a very simplistic and contextual manner. These videos use easily available elements to explain any given concept in science, thereby encouraging the student to explore new concepts with ease and confidence

The above multimedia content is available in a grid format, wherein content has been segregated for every classroom and respective subject area within the class selected. This allows easy navigation through the content across various topics for the teacher while teaching

Hardware Devices Required:

Chromebook: Designed for learning, made for the classroom

- Lightweight, durable laptops designed for students.
- Boot up in less than 10 seconds and battery lasts the whole day.
- Designed to be simple, affordable, secure and shareable.
- Easy to manage - can set up in minutes and centrally manage 10 or 10,000 devices across the school, district and region.
- Students can share a single device but still have a personal experience just by signing in.

All in One Device:

- Learning tool for the proposed solution is based on an integrated and innovative technology platform, called Integrated Community Computer. It combines all these hi-tech innovations into one compact unit, which is portable, single cable device, internet ready and converts any wall into an interactive wall. The teacher is the core of this device and innovations around it. It enables a teacher to focus on teaching rather than technology.

Features of All in One Device

- **Technology Integration** : Multiple Components Integrated into a Single Compact Unit including Large Screen TV
- **Ease of Setup & Use:** Being a Single Cable Plug-in Device, it is very easy to Setup.
- **Interactive Multimedia Content:** Pre-loaded modules of Interactive Multimedia Content
- **Image Size** : Screen Size can go up to 300 inches diagonally
- **Costs and Maintenance** : An Integrated device which requires low maintenance

3.8.3. Network Architecture

- The internet connectivity for the solutions will be provided with through wireless or wired connections.
- The IP of the chrome book used in smart classroom will be white listed in the Wi-Fi router placed in the school.
- No academic staff/ students will have personal access to Internet.

3.8.4. Deployment Architecture

Each Smart classroom will have all in one device and Wi-Fi router, chrome cart and chromebooks.

3.8.5. Security Architecture

- The IT devices used in the solution,

- will undergo hardening.
- will have least privileged access
- latest stable version of the necessary OS and software should be updated and installed.
- Ensure proper backups and system and event logs are generated as per the defined SOP's.
- Monitoring the health of the system
- Report any intrusion/incident occurred while using the system and report to concerned agency.

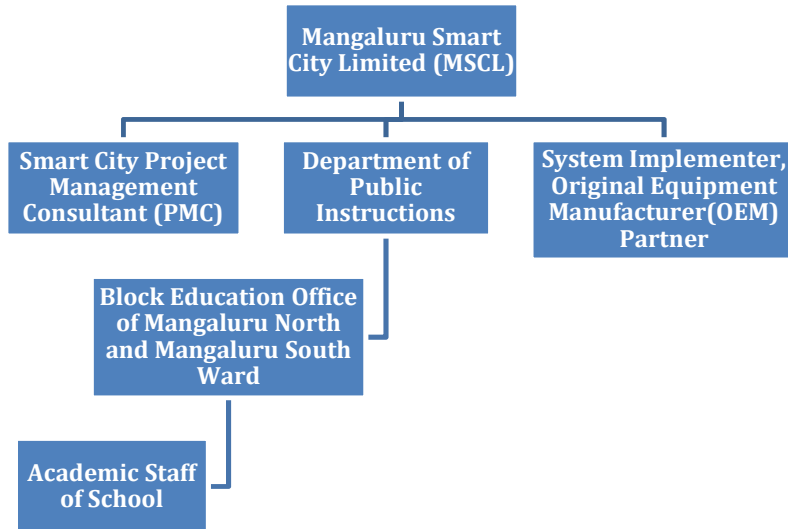
3.8.6. Interfaces

Open API's Interface will have to be exposed by to enable quick and transparent integration with other applications and systems implemented if required by MSCL, thereby providing access to data & services.

- ✓ The internet will be provided through the smart city component 100% IT connectivity in ABD areas.

3.9. Organization Structure

(i) Proposed Organization Structure



(ii) Staffing and Deployment Strategy

The selected SI will have to deploy personnel at site in case of any event related to software and hardware occurs. If any of the IT devices in the classroom becomes non-functional, the SI with his OEM’s support should replace the same within stipulated time.

3.10. Monitoring and Evaluation

Monitoring and evaluation (M&E) is a method that helps improve performance and get results. Its goal is to improve current and future management of outputs, outcomes and impact. It is mainly used to assess the performance of projects, institutions and programs set up by governments. It establishes links between the past, present and future actions.

Table 5. Monitoring and Evaluation

	Indicator	Definition	Target	Data Source	Frequency	Responsible	Reporting
Goal	Percentage of students passing to next standard	Divide the number of students who passed the exam by the number of students who took the exam to find its	100%	Enrollment of students in the school	Annual	Block Education Office	Student Academic Performance Report

	Indicator	Definition	Target	Data Source	Frequency	Responsible	Reporting
		pass rate.					
Outcome	Completion of Syllabus in school on time	Divide the Total number of topics taught by teacher by the total number of topics in each subject as per the syllabus	100%	Time table and subjects taught by Teachers	Every month	Academic Staff of School	Time Table - Work Allotment Report Teacher-wise
Outputs	Number of students attending the classes	Total number of days student present in the school	90%	Attendance report	Every day	Academic Staff of School	Student Attendance report

3.11. Strategic Control

- The system performs functions and acts in conformance with the requirements and provides desired outcomes (deliverables/Service Levels).
- The application system and the databases are designed, developed, installed and managed exactly in conformance with the procedures laid down for delivery of services.
- The security of the overall system is of the appropriate order following international standards.
- Any change required to the solution is with specific approval of competent authority MSCL in this case.
- The outsourced vendor does not have access to the system beyond prescribed authority as defined by MSCL.
- The processes, including legal enablement and capacity within the government are in place to take-over the entire system in case of an exit of the vendor (premature or planned).
- There is an ability to make necessary mid-course changes to the system.

Strategic Assets

- Software application, Data, Databases and Core Infrastructure.
- The data and processes applied during design and implementation.
- Assets and tools that help in managing the application.
- Intellectual Property created during the lifecycle of the project.

For all phases, following common principles should be used to retain Strategic Control,

- Project tracking - For this, project planning tools can be used. The SI should share the tool and status dashboard with the CTT to ensure transparency.
- Review Process – All phases should have peer and management reviews. All documents, design and code should be permitted after critical review of the same.
- Phase-End Approval – Each Phase should be formally approved as completed by the MSCL. The MSCL should monitor these approvals.
- Configuration Management process to ensure that all changes (in code and in documents) are version controlled. All version increments should be marked with name of person making change, reason for change along with date and timestamp.
- Release Management process should be adopted at all suitable phases.
- Use of Standards – Project processes and controls should be based on standards
- Security Provisions – The vendor should abide by well defined security processes. Standards like BS7799 / ISO27001 may be used as benchmarks.
- Documentation – Rigorous documentation should be followed.
- Project repository to store all related documents/artifacts/version control
- During the Bid Evaluation, MSCL should be involved in order to ensure that Strategic Control objectives are met.
- Disaster Recovery and Business Continuity Planning – This should be tracked as a part of development of Strategic Control. Appropriate geographical distribution, backup planning and regular risk assessment should be carried out under this.

3.12. Assumptions & Risk Management

Table 6. Risk Assessment Matrix

Risk	Stakeholders involved	Description of Risk	Risk mitigation measure
Change in Teaching Process	Academic Staff	With the introduction of the concept of smart classroom, teachers might object that it might affect their routine process of teaching.	Proper Capacity Building and Training plan will be in place.
Management of IT assets of smart classrooms in school	Block Education Office of Mangaluru North and South Ward	The officials of the Block Education Offices might object about the maintenance of both IT hardware and software supplied to schools as they will be the common link between the school and the selected SI.	Technical Support Escalation Matrix will be in place so as to contact SI/OEM in case of any disruption or failure in IT service.

Risk	Stakeholders involved	Description of Risk	Risk mitigation measure
Power Outage	Teachers, Students	Due to Power failure, IT devices might not work in smart classroom.	UPS should be provided in school.
Poor Internet Connectivity	Teachers, Students	Due to poor IT connectivity, online access to education content might not be available.	Offline education content should be stored in the device present in the classroom by the SI.
Poor Physical Infrastructure	Block Education Office of Mangaluru North and South Ward and Academic Staff of the school	Repair of infrastructure of the school buildings including leaky roof, water leakage, old electrical wiring and school furniture.	Before setting up of the smart classroom, repair for the necessary electrical fittings of the classroom are to be ensured.
Misuse of the Wi-Fi IT assets issued to school	Academic Staff of the school	Internet and IT assets might be used by staff for personal usage.	White listing of laptop/desktop IP should be white listed in the internet router. Stringent IT policy should be laid down. Logs of the router should be checked by SI so as to check the Internet usage by the school.

3.13. Project Costs and Financing

Table 7. Cost Estimate

Sr. no.	eSmart School Component	Cost (in INR)
1.	Smart School Solution with O&M period of 3 years	2,72,75,700
2.	CCTV Surveillance for 13 schools (Girls PU College and Balmatta not included as CCTV setup already in place)	15,12,329
3.	Sports Facilities Setup in selected schools under shared model	2,00,00,000
4.	Civil Infrastructure Up gradation Cost	
Total		

3.13.1. Cost Breakup for Smart School Solution

Table 8. School Wise Costing

School Category	Schools Covered	No of schools	Costing Solution	Cost in (INR)
Primary Schools	1. GUPS, Basthigarden, Ward No-41 2. GUPS, Neereshwalya, Ward No-45 3. GLPS, Hoigebazar, Ward No-57	3	Component B1	5,13,300
Primary & Middle Schools	1. GUPS, Pandeshwara, Ward No-46 2. GUPS, Bunder (Urdu), Ward No-44 3. Primary School, Jyothi Circle, Balmatta, Ward No-40 4. GUPS, Bolar, Ward No-58 5. GUPS, Bolar West (Urdu), Ward No-58	5	Component B2	1,54,34,400
	High School			
PU College	1. GPUC, Balmatta, Ward No-40 2. Govt PU College Women Car Street, Ward No-43	2	Component B3	1,13,28,000
Total Cost (Capex+Opex) for a period of 3 years				2,72,75,700

Component B1 - For 3 Primary Schools						
Sr. No.	Particulars	Unit Price (Rs.)	Schools	Total cost excluding GST in (Rs.)	GST (18%)	Cost inclusive of GST (Rs.)
1	Digital Classroom Integrated Teaching Learning Device Intel i3 Processor, 1 TB HDD, 4 GB RAM, 3000 Lumens projector with 18000:1 contrast ratio, DVD Rom Drive, 30W speakers, Windows 10 OS, Interactivity with Stylus, Wi-Fi Dongle, Strolley Bag. Multimedia Content in Kannada	1,40,000	3	4,20,000	75,600	4,95,600
2	Teachers Training 2 Days	5,000	3	15,000	2700	17,700
Total Cost (Capex+Opex over period of 3 years)						5,13,300

Component 2 - For 5 Primary & Middle Schools and 5 High Schools							
Sr. No.	Particulars	Qty	Unit Price (Rs.)	Schools	Total cost excluding GST in (Rs.)	GST (18%)	Cost inclusive of GST (Rs.)
1.	Chromebook with a) Chrome Management Console (CMC) b) Education Apps c) Installation and Project Management	20	12,00,000	10	1,20,00,000	21,60,000	1,41,60,000
2.	All in One Device preloaded with Multimedia Learning Modules	1					
3.	Access Point cum Wireless router	1					
4.	Chrome Cart (for safe storage and charging of Chromebooks)	1					
5.	UPS for power back up of Large Screen Display	1					
6.	School Bench	10					
7.	Manpower deputed at school premises for initial period of 6 months with monthly CTC salary of Rs. 20,000	1					
8.	One Project Coordinator for 3 Years for all ten schoo	1	10,80,000		1080000	194400	12,74,400
Total Cost (Capex+Opex over period of 3 years)							1,54,34,400

Component 3 -Costing for Two PUC's one at Balmatta and other at Car Street Both Girl PUC							
Sr. No	Particulars	Qty	Unit Price (INR)	Class	Total cost excluding GST in (INR)	GST (18%)	Cost inclusive of GST (INR)
1.	Chromebook with a) Chrome Management Console (CMC) b) Education Apps c)Installation and Project Management	20	12,00,000	8	96,00,000	17,28,000	1,13,28,000
2.	All in One Device preloaded with Multimedia Learning Modules	1					
3.	Access Point cum Wireless router	1					
4.	Chrome Cart (for safe storage and charging of Chromebooks)	1					
5.	UPS for power back up of Large Screen Display	1					
6.	School Bench	10					
7.	Manpower deputed at school premises for initial period of 6 months with monthly CTC salary of Rs. 20,000	1					
Total Cost (Capex+Opex over period of 3 years)							1,13,28,000

Note: As the number of students is more, recommended to have minimum 8 classrooms in both institutions

3.13.2. CCTV Setup in School Premises

MSCL recommended four CCTV cameras along with DVR to be installed in each school for security surveillance .The DVR would be placed in principal’s room along with monitor for live surveillance. No direct connectivity and sharing of feeds of these CCTV cameras with CCC. Girls PU college in Balmatta and CarStreet have CCTV Surveillance and hence costing for the same is not included.

Item Name	Quantity	Price per unit in INR	Total cost excluding taxes in INR
CCTV Cable per meter	500	40	20,000
16 channel DVR	1	16,800	16,800
Bullet Camera	2	2000	4,000
Dome camera	2	4300	8,600

Item Name	Quantity	Price per unit in INR	Total cost excluding taxes in INR
4TB Hard Disk for CCTV Surveillance DVR	1	16,000	16,000
CCTV Power Supply	1	1100	1,100
LED Display	1	32,333	32,333
UPS	1	2500	2,500
Supporting Connectors BNC and DC for coaxial cables	50	100	5,000
Installation Charges one time	1	10,000	10,000
Total cost per each school			116,333
CCTV Surveillance for 13 schools (Girls PU College and Balmatta not included as CCTV setup already in place)			15,12,329

As observed during the survey of the schools in the ABD areas, the infrastructure is incomplete and requires repair and upgradation. We would like to suggest that a part of the remaining funds to be used to get the schools' basic infrastructure up to the mark so that the eSmart features of the schools could be effectively positioned.

Other initiatives to be considered under eSmart School are:

Effectiveness for the Students	Applicability	Requirements	Approximate Cost in INR (for 5 years)
Sports Facilities Setup in selected schools under shared model	All Government Schools in Mangaluru City	Sports infrastructure + Training Facilities to encourage the Sporting Talent in the Students	2,00,00,000

3.13.3. Sport Facilities Setup

Sport Facilities Setup in the Selected Schools in ABD area under Shared Model:

Table 9. Sports Facilities Costing

Sr. no.	School	Sports Facilities Suggested	Sports Material	Ground Work	Coaching Fees (5 Years)
			In INR		
1.	GUPS, Pandeshwara, Ward No. 46	Kabaddi	5000	100000	1400000
2.	GHS, Hoigebazar, Ward No. 57	Kabaddi	5000	-	1400000
		Badminton	40000	50000	1400000

Sr. no.	School	Sports Facilities Suggested	Sports Material	Ground Work	Coaching Fees (5 Years)
			In INR		
		Basket Ball	40000	200000	1400000
3.	Govt. Practicing HS, Ward No. 46	Basket Ball	40000	200000	1400000
		Volley ball	40000		1400000
		Athletics	5000		1400000
4.	GHS, Bunder (Urdu), Ward No. 44	Football	40000	100000	1400000
		Hockey	40000		1400000
		Athletics	5000		1400000
5.	GPUC, Balmatta , Ward No. 40	Badminton	40000	50000	1400000
		Table Tennis	40000		1400000
Total			3,40,000	7,00,000	1,68,00,000
Total			1,71,40,000		

3.13.4. Civil Infrastructure Upgradation

Table 10. Cost for Civil Up gradation

Sr. no.	School	Civil Infrastructure Upgradation Approved by MCC	Cost Estimate
			In INR
1.	GUPS, Neereshwalya, Ward No. 45	Lighting Condition Upgradation	
2.	GUPS, Pandeshwara, Ward No. 46	Flooring	
		Roof of dining halls	
		Partitions in Classrooms	
		Painting	
3.	GLPS, Hoigebazar, Ward No-57	Electrical Fitting	
		Hand washing facility	
4.	GHS, Hoigebazar, Ward No-57	Water Leakage from Ceiling	
5.	Government Practicing HS, Mangaluru, Ward No. 46	Building of 3 Classrooms + 1 Room (Staffroom + Computer Lab + HM Room)	
		Open Auditorium	
		1 Toilet Each for Boys and Girls	
6.	GUPS, Bunder (Urdu), Ward No. 44		
7.	GHS, Bunder (Urdu), Ward No. 44		
8.	Primary School Jyothi Circle, Balmatta, Ward No.	<ul style="list-style-type: none"> Heritage roof to be given a 	

Sr. no.	School	Civil Infrastructure Upgradation Approved by MCC	Cost Estimate
			In INR
	40	structure.	
9.	Secondary School Jyothi Circle, Balmatta, Ward No. 40	<ul style="list-style-type: none"> • Storm Water Drain on one side + Interlocking 	
10.	GPUC, Balmatta, Ward No. 40	<ul style="list-style-type: none"> • Teacher toilet. 	
Total			

3.14. Technical Specification for Smart Classroom for Smart School Solution

All in One Device with pre-loaded multimedia content

Component	Feature	Standard
High End Computer	CPU	Intel i3 Processor
	Chipset	Intel Chipset
	Memory	4 GB RAM
	Graphics	Integrated Graphics
	Storage	Minimum 1 TB
Advanced Projection System	Brightness	3000 SVGA ANSI Lumens (Short Throw)
	Contrast Ratio	18000:1
	Lamp Life*	5000 Hrs (Standard Mode) 3000 Hrs (Bright Mode)
In-built Interactivity		Image Processing Technology
DVD Player	Optical Drive	DVD-RW
In-Built Audio System	Audio	30W Audio Speakers (also option for connecting external speakers)
I/O	Input	Microphone input
	Ports	Minimum 4 USB Ports
	LAN	1xGbps
Certification		UL Certified

Technical specifications of Chromebook

Feature	Specification
CPU	Celeron Dual Core
Chipset	Intel
Hard Disk	16 GB eMMC
RAM	2 GB DD3
Screen Size	11.6 "
Screen Resolution	1366 x 768
Connectivity	Wi-Fi
Webcam	HD Webcam

3.15. Technical Specifications for CCTV Setup in School

CCTV Cable MTR Cables Suitable For CCTV System (Accessories)



Reference - <https://mkp.gem.gov.in/cables-suitable-cctv-system-accessories/cp-plus-cp-plus-90-mtr-cp-cp/p-5116877-41792886257-cat.html>

Cable Classification	Cat-6 UTP
Armoured	Yes

16 channel DVR

Reference - <https://mkp.gem.gov.in/video-recorder-cctv-system/16-channel-dvr/p-5116877-64068941257-cat.html#>

TYPE	
Type of Recording Device	DVR
IP Camera Support	FALSE
PTZ Camera control Support	FALSE
Housing construction	Plastic
Mounting	Rack Mounted
Rack Mount configuration	1U
Capability of Recorder to Work with Other Makes of CCTV Cameras (ONVIF support)	TRUE
VIDEO	
Number of Video Input Channels	16
Number of Non-IP based Video input Channels for HVR	16
Number of IP based Video input Channels for HVR	NA
Number of Video Output Channels	2
Recording Resolution	Full HD (1920 x 1080)
Supported Compression Technique	H.264,H.265,MPEG-4,MJPEG,H.265+,H.264+
Maximum Number of cameras to be viewed on a single display	16
Total number of simultaneous local views	4
Simultaneous Monitoring Connections for All Cameras (Users in Local Network for Client Connection)	4
Recording Speed for all channels (fps)	25
Minimum Through put (Mbps)	24
Display Image Rate	Real time per channel
AUDIO	
Audio Support	TRUE
Audio Input	4
Audio Output	1
Audio Compression	G.726,G.711,G.722.1,A-

TYPE	
	Law,U-Law,MP2L2,AAC,NA
Minimum Number of Simultaneous Channels for Two-way Audio Support	1
SECURITY	
Type of Encryption	HTTPS (SSL/TSL)
Multi Level User ID / Password	Yes
ALARM	
Alarm Support	FALSE
Alarm Input	NA
Alarm Output	NA
Pre / Post Alarm Buffer	FALSE
Pre-Alarm Recording	0 second
Post-Alarm Recording	0 second
Video Content Analytics (VCA)	NA
NETWORK PROTOCOLS / INTERFACE / OPERATING SYSTEM	
Operating System Supported	Windows
Supported Network Protocols	NA (for DVR)
Supported Interface	Ethernet,Wifi,HDMI,VG A,CVBS,USB
Physical Layer of Ethernet	NA
Number of Ethernet Ports	1
Number of HDMI Ports	1
Number of VGA Ports	1
Number of CVBS Ports	0
Number of USB Ports	2
Number of Serial Ports	0
Number of PoE Ports	0
Supported SIM Slot	NA
Number of SIM Slots	0
FEATURES	
Video Loop Support	FALSE
Video Recorder supports recording on NAS Directly	TRUE
Remote Administration (Remote Configuration And Status Using Web Based Tool)	TRUE
System Update (Remote System Update Over Network Using Web Client)	TRUE
PC Client (PC Application Client With A Channel Recording Feature Support)	TRUE
Web Client (Viewer through HTTP system configuration)	Yes
On Screen Display (In English)	TRUE
Drivers / Compatible Software (Wherever Applicable) Part Of Supply	Yes

TYPE	
Recording schedule support	Yes
Bandwidth Control	Yes
Camera Notification	Spot (POP up Window) on Event
Network transmission Speed	Real time display @ D1 resolution
Other features, if any	NA
PLAYBACK / VIEW / MANAGEMENT	
Search	Date,Time,Motion
Bookmarks	Forward,Backward,adjustable playback speed, Full Screen,Next Camera, Previous Camera, Repeat
Page preview	Multi Monitor Support, Video Window, Electronic Map on two separate monitors
Total Management	Group add,Delete,Group management
Camera	Add,Edit,Delete,Use Master account, Use Specific account
STORAGE	
Internal Hard Drive Interface	SATA II
Number of Hard Disks (inclusive in the scope of supply)	1
Storage Capacity of each Hard Disk (TB)	4
Total Storage Capacity(TB)	4
Internal Storage Expandable upto (TB)	4
Number of Hard Disks supported	1
Redundancy Option	RAID 1
POWER SUPPLY	
Power Input	12 V DC
Power Consumption	10 Watt
Suitable Adapter to be Supplied to Make the Equipment Work on 230 V ± 10 %, 50 Hz	Yes
Redundant Power Supply	TRUE
OPERATING CONDITIONS	
Minimum Operating Temperature	0 degree Celsius
Maximum Operating Temperature	50 degree Celsius
Relative Humidity Non Condensing at 40 deg C	90 percent
WARRANTY / SERVICES	

TYPE	
Warranty	1 year
Time for Replacement of Defective Product During Warranty Period	96 hour
ENVIRONMENTAL / CERTIFICATION	
Availability of facility and infrastructure for verification of all the parameters, features and capability with the Seller	FALSE
Conformity to Dry Heat test at Specified Maximum Operating Temperature for 16 hours as per IS :9000 latest	TRUE
Conformity to Damp heat at 40 degree C - 95% RH (cyclic test): two cycles of 16+8 hours as per IS: 9000 latest	TRUE
Conformity to Cold test at Specified Minimum Operating Temperature for 4 hours as per IS: 9000 latest	TRUE
BIS Registration for safety general requirements as per IS: 13252 (Part 1): latest	TRUE
Availability of Test Report from Central Govt/NABL/ILAC accredited lab to prove conformity to specification	TRUE
Test Report Number and Date	CPP13FC/1.07.13
Name and Address of Test Lab	Royal Cart
Certification	FCC
LIST OF ITEMS	
List of Items and Quantity of each item included in the offer	ADAPTER, WIRED MOUSE, SOFTWARE CD, OPERATING MANUAL.

Bullet Camera



Reference: <https://mkp.gem.gov.in/camera-cctv-system/cp-plus/p-5116877-66834987048-cat.html>

CAMERA TYPE	
Type of Camera Housing	BULLET CAMERA
IP Camera	Yes
PTZ Camera	Yes
IMAGE SENSOR	
Image Sensor Type	CMOS
Image Sensor Size	1 inch
Camera Image Sensing capacity (Picture Mode)	2MP
Resolution	Full HD (1920 x 1080 Pixel)
Day/Night Capable	TRUE

IR illumination Range(mtr)	30
OPTICS	
Lens Type	Fixed
Focal Length(mm)	3.6 - 9
Iris Control	Yes
Focus Mode	Zooming
VIDEO	
Frame Rate (fps)	30
Video Compression	H.264
Video Streaming	Dual compressed stream
PAN / TILT / ZOOM	
Panning Range	0-360
Pan Speed (deg/sec)	180
Tilt Range below horizontal (deg)	0-90
Tilt Range above horizontal (deg)	0-5
Tilt Speed (deg/sec)	90
Optical Zoom	12X
Digital Zoom	16X
AUDIO	
Audio Support	TRUE
Audio Compression	G.726
Audio Streaming	One-Way
Number of Audio Input Channel	1
Number of Audio Output Channel	1
External Microphone Support	TRUE
ALARM	
Alarm Support	TRUE
Number of Alarm Digital Input	1
Number of Alarm Relay Output	1
Pre/Post Alarm Buffer	TRUE
SECURITY	
Multi Level User ID/Password	Yes
IP Address Filtering	TRUE
Encrypted Data Transmission	HTTPS (SSL/TSL)
PERFORMANCE	
Minimum Illumination for Capturing Color Image	0.6 lux
Electronic Shutter Speed(sec)	1/3 to 1/10000
WDR (Wide Dynamic Range)	80 dB
SNR (Signal to Noise Ratio)	50-60
Auto Exposure	Auto Level Control

FEATURES	
White Balance (Indoor/Outdoor/Manual Selectable)	Yes
Auto Gain Control (On/Off selectable)	Yes
Back Light Compensation	Yes
Remote Administration (Remote configuration and status using web based tool)	Yes
Remote System Update Over Network	Yes
PC Client (PC application client with a channel recording feature support)	Yes
Web Client (Viewer through HTTP system configuration)	Yes
On Screen Display in English	Yes
ONVIF Support	Yes
Presets	90
Group Touring	12
Privacy Zones	4
NETWORK AND INTERFACE	
Supported Protocols	HTTP
IP Support	Static
Signal Processing	Digital Signal Process
IPv6 ready	Yes
Wireless	TRUE
Simultaneous Connections	95
STORAGE	
On Board SD Card Support	TRUE
SD Card Memory(GB)	64
HOUSING	
Installation Type	Indoor
Material of the Housing construction	Plastic
Protection	IP 66
Vandal Resistant Housing	No
If Yes, IK rating	NA
Mounting bracket	Ceiling Mounted
Weight	0.38 gram
Dimensions (mm x mm x mm)	Φ70mm × 165mm
POWER SUPPLY	
Power Input	12 V DC
Power Consumption	5.1 Watt
Suitable Adapter Shall be Supplied to Make the Equipment Work on 230 V (+/- 10 %), 50 Hz	Yes
OPERATING CONDITIONS	
Operating Temperature Range	-20 to +50 deg C

Relative Humidity Non Condensing (%)	95
WARRANTY / SERVICES	
Warranty	1 year
Time for Replacement of Defective Product During Warranty Period	48 hour
Supply of Compatible drivers and software included	Yes
ENVIRONMENTAL / CERTIFICATION	
Availability of facility & infrastructure for verification of all parameters, features, and capability with Seller	Yes
Availability of facility to test signal to noise ratio of camera at 0-01 lux	Yes
Conformity to Dry Heat test at 55 degree C for 16 hours as per IS :9000 latest	Yes
Conformity to Damp heat at 40 degree C - 95% RH (cyclic test): two cycles of 16+8 hours as per IS: 9000 latest	Yes
Conformity to Cold test at -10 / -20 degree C for 4 hours as per IS: 9000 latest, as applicable	Yes
BIS Registration for safety general requirements as per IS 13252 (Part 1):latest	No
Availability of Type Test Report from Central Govt /NABL/ILAC accredited lab to prove conformity to specification	TRUE
Test Report Number and Date	MF5G6T14191 26 july 2016
Name and Address of Test Lab	DELHI
Certification	FCC,CE,UL,CB,CSA,N IL

Dome Camera



Reference: <https://mkp.gem.gov.in/camera-cctv-system/cp-plus/p-5116877-99672784948-cat.html>

CAMERA TYPE	
Type of Camera Housing	DOME CAMERA
IP Camera	No
PTZ Camera	No
IMAGE SENSOR	
Image Sensor Type	CMOS
Image Sensor Size	0.67 inch
Camera Image Sensing capacity (Picture Mode)	1MP
Resolution	HD (1280 x 720 Pixel)
Day/Night Capable	TRUE

IR illumination Range(mtr)	15
OPTICS	
Lens Type	Fixed
Focal Length(mm)	3.6 - 9
Iris Control	Yes
Focus Mode	Manual
VIDEO	
Frame Rate (fps)	25
Video Compression	H.264
Video Streaming	Dual compressed stream
PAN / TILT / ZOOM	
Panning Range	NA
Pan Speed (deg/sec)	NA
Tilt Range below horizontal (deg)	NA
Tilt Range above horizontal (deg)	NA
Tilt Speed (deg/sec)	NA
Optical Zoom	NA
Digital Zoom	NA
AUDIO	
Audio Support	FALSE
Audio Compression	NA
Audio Streaming	NA
Number of Audio Input Channel	NA
Number of Audio Output Channel	NA
External Microphone Support	TRUE
ALARM	
Alarm Support	TRUE
Number of Alarm Digital Input	NA
Number of Alarm Relay Output	NA
Pre/Post Alarm Buffer	TRUE
SECURITY	
Multi Level User ID/Password	Yes
IP Address Filtering	FALSE
Encrypted Data Transmission	HTTPS (SSL/TSL)
PERFORMANCE	
Minimum Illumination for Capturing Color Image	0.5 lux
Electronic Shutter Speed(sec)	1/3 to 1/10000
WDR (Wide Dynamic Range)	80 dB
SNR (Signal to Noise Ratio)	40-50
Auto Exposure	Electronic Level Control
FEATURES	
White Balance (Indoor/Outdoor/Manual Selectable)	Yes
Auto Gain Control (On/Off selectable)	Yes

Back Light Compensation	Yes
Remote Administration (Remote configuration and status using web based tool)	Yes
Remote System Update Over Network	Yes
PC Client (PC application client with a channel recording feature support)	Yes
Web Client (Viewer through HTTP system configuration)	Yes
On Screen Display in English	Yes
ONVIF Support	Yes
Presets	50
Group Touring	9
Privacy Zones	4
NETWORK AND INTERFACE	
Supported Protocols	DHCP,HTTP,HTTPS
IP Support	NA
Signal Processing	Digital Signal Process
IPv6 ready	Yes
Wireless	FALSE
Simultaneous Connections	5
STORAGE	
On Board SD Card Support	FALSE
SD Card Memory(GB)	NA
HOUSING	
Installation Type	Indoor
Material of the Housing construction	Plastic
Protection	IP 66
Vandal Resistant Housing	No
If Yes, IK rating	NA
Mounting bracket	Wall Mounted
Weight	280 gram
Dimensions (mm x mm x mm)	11.4 x 11.3 x 10
POWER SUPPLY	
Power Input	12 V DC
Power Consumption	10 Watt
Suitable Adapter Shall be Supplied to Make the Equipment Work on 230 V (+/- 10 %), 50 Hz	NA
OPERATING CONDITIONS	
Operating Temperature Range	-10 to +50 deg C
Relative Humidity Non Condensing (%)	95
WARRANTY / SERVICES	
Warranty	2 year
Time for Replacement of Defective Product During Warranty Period	24 hour
Supply of Compatible drivers and software included	Yes

ENVIRONMENTAL / CERTIFICATION	
Availability of facility & infrastructure for verification of all parameters, features, and capability with Seller	Yes
Availability of facility to test signal to noise ratio of camera at 0-01 lux	Yes
Conformity to Dry Heat test at 55 degree C for 16 hours as per IS :9000 latest	Yes
Conformity to Damp heat at 40 degree C - 95% RH (cyclic test): two cycles of 16+8 hours as per IS: 9000 latest	Yes
Conformity to Cold test at -10 / -20 degree C for 4 hours as per IS: 9000 latest, as applicable	Yes
BIS Registration for safety general requirements as per IS 13252 (Part 1):latest	Yes
Availability of Type Test Report from Central Govt /NABL/ILAC accredited lab to prove conformity to specification	TRUE
Test Report Number and Date	gc12850
Name and Address of Test Lab	globe computer
Certification	CE,NIL

4TB Surveillance Hard Disk Drive for CCTV



Reference: <https://mkp.gem.gov.in/surveillance-hard-disk/seagate-skyhawk-4tb-surveillance-hard-disk-drive-cctv/p-5116877-3018086614-cat.html>

Specifications	
Type	Internal
Form Factor	3.5
Capacity (TB)	4 terabyte
Cameras supported	64
Number of USB 2 Ports	0
Interface	SATA 6 Gb/s
Workload Rating (TB/year)	180
OS Supported	Windows
NVR-Ready	Yes
Bay Count Support	0
Cache (MB)	64
Water Resistant	Yes
Shock Resistant	Yes
Dimension (W x H x D) (mm x mm x mm)	101.85x26.11x146.99

Weight (Grams)	635 gram
Wattage (Watts)	5.5
Standard Accessories to be supplied	Hard Disk
Operating Temperature Range (Degree C)	-40 to 70
Operating Humidity (% RH)	40
Availability of Test Reports from Central Govt / NABL approved / ILAC accredited lab to prove conformity to the specification (Test reports are to be furnished when demanded by buyer)	No
If yes, Test Report Number and Date	NA
If yes, Name of the Lab	FALSE
If yes, Address of the Lab	NA
Warranty (Years)	3

CCTV Power Supply

Reference <https://mkp.gem.gov.in/dc-power-supply/cp-plus-cctv-power-supply/p-5116877-92912069805-cat.html>



FUNCTIONAL	
Maximum Power (Watt)	120 watts
DC Current Output Rating (Ampere)	0 to 4
DC Voltage Output Rating (Volt)	0 to 30
Load Regulation (Voltage) \pm (% of output + offset)	less than 0.01 + 2 (milli volt)
Load Regulation (Current) \pm (% of output + offset)	less than 0.05 + 1.5 mA
Line Regulation (Voltage) \pm (% of output + offset)	less than 0.01 + 1 mV
Line Regulation (Current) \pm (% of output + offset)	less than 0.05 + 0.1 mA
Over Voltage Protection Accuracy	+ - 0.5 + 0.5 V
Over Voltage Protection Response Time (milli sec)	less than 10 milli second
Ripple and Noise Voltage (20 Hz to 20 MHz)	less than 1 mVrms less than 4 mVpp
Ripple and Noise Current (20 Hz to 20 MHz)	less than 4 milli amps rms
Read back Voltage Accuracy	0.05 + 10 mV
Read back Current Accuracy	0.15 + 5 mA
Read back Voltage Resolution (mV)	1
Read back Current Resolution (mA)	0.1
CONSTRUCTIONAL	
PC Interface	USB/GPIB/RS232/LXI
Weight (gms)	less than 12 kg
Warranty (Year)	1
CERTIFICATIONS	
Operating Temperature (Degree C)	-20 to +40

Operating Humidity (RH) (%)	80
Availability of Test Reports from Central Govt / NABL approved / ILAC accredited lab to prove conformity to the specification including environmental tests as under : (a) Dry Heat : For 16 hrs. at a temp. of 55 degree C in accordance with IS:9000/part-3/section-5/1977 (reaffirmed in 2007). (b) Cold Test: For 4 hrs. at a temp. of -20 degree C in accordance with IS:9000/part-2/section-4/1977 (reaffirmed in 2007). (c) Damp Heat (Cyclic) Test: For 2 Cycles of 24 h each at a temp. of 40 degree C & 95% RH in accordance with IS:9000/part-5/section-1/ 1991 (reaffirmed in 2007). After environmental conditioning sequence as above and a recovery period of two hours, the instrument shall be checked for complete functional parameters, which should be within limits.(Test reports are to be furnished when demanded by buyer)	Yes
Test Report No.	RO-RS-1703
Test Report Date	29/03/2017
Name and address of the Lab	CP PLUS international ltd.

LED Display



Reference <https://mkp.gem.gov.in/televisions/led-display/p-5116877-96514461374-cat.html>

GENERIC	
Type	LED TV
Screen Size	32 inch
Resolution (Pixels)	(1366 x 768) HD Ready
Static contrast Ratio (Min 1000:1)	1100
Category	Basic
Mounting	Both table and wall mount
Color Type	black
Screen Mirroring	Not-Available
Power Consumption	34 Watt
Speakers	5W x 2
PORT/CONNECTIVITY	
HDMI Port	Available
USB Port	Available

VGA Port	Available
Ethernet Port	Available
Built-in Wi-Fi	Not-Available
Wi-Fi Direct	Not-Available
INPUT	
Composite Input	Available
Component Input	Available
ACCESSORIES	
Built-in set-top Box	no
Details of accessories (such as remote control, connecting cable, etc included in the scope of supply)	Remote, CD Manual, Cable Etc
SERVICE	
Warranty	3 year
CERTIFICATION	
BIS Registration as per CRS scheme of Meity	yes
Energy Star Rating	5

UPS for CCTV



Reference <https://mkp.gem.gov.in/line-interactive-ups-with-avr/intex-ups-725-ups/p-5116877-70218005805-cat.html>

GENERIC	
Rating in KVA/ min VAH capacity of battery (KVA/VAH)	0.5/168
Technology	MOSFET-PWM
Type of battery	SMF-VRLA confirming to JISC-8702 Pt 1,2 &3
Rated Output (Volt)	Single phase sinewave 230v AC , 50Hz
Degree of protection	IP-21
Inverter Efficiency (%)	> / = 60%
Warranty for the battery from the date of delivery	1 year
Warranty for Line Interactive UPS	2 Years
Installation and commissioning instructions	No
CONSTRUCTIONAL	
Type of enclosure	ABS
AC output for printer (not through inverter)	Yes
Inverter output socket AC output for printer (not through inverter)	3 Three pin
FUNCTIONAL	
Total harmonic distortion (%)	< / = 40%

Input (Volt)	Single phase sinewave(160-280v)
Switching over time (Mili sec)	Maximum 10 milli seconds
Overload Time (Minutes)	> / = 10 minutes
Load power factor	> / = 0.6
Variation in AVR output in AC mode (%) AVR (Voltage regulation) output voltage in AC Mode	230 Volts +/-9%, 50 +/-3 Hz
Overload (%)	>/=10%
Variation in output voltage in battery mode (%) (UPS output voltage in battery mode)	230 Volts +/- 10%
Variation on output frequency in battery mode (Hz)	</=0.5
PROTECTION	
Protection against (over discharge) discharge per 12v battery (Volt)	10.5
Protection for outside input voltage range: If Input voltage goes outside the range 160 to 280 Volts, the system shall switch over to battery mode	Yes
Protection against short circuit of UPS	Yes
Protection for over voltage and over load	Yes
REPORTS AND CERTIFICATIONS	
Damp heat Test at 45 degree , RH -95% for 2-cycle as per IS:9000 pt-5/sec-1	Yes
Dry heat Test at 45 degree for 16 Hrs as per IS:9000 pt-3/sec-5	Yes
Cold Test as per IS:9000 pt-2/sec-4	Yes
Availability of the type test report from central Govt./NABL/ILAC Accredited Lab	Yes
Type Test certificate no. and date	N/L 764398
Name Of Lab	shifali labs
Address of Lab	new Delhi
As per Meity (Government of India) guidelines UPS shall have valid BIS CRS certifications as applicable	Not applicable presently

3.16. Sustainability Plan

The use of ICT in the classroom will lead to participation of students in short term courses of IT. This can be taken under skill development plan where students in vacation can undertake short term courses with nominal fee and completion certification can be awarded to them which can be helpful to students in their future career.

Special post for ICT Teacher or ICT support staff can be created so as to look after the IT infrastructure in school without depending on SI after the ending of O&M period.

The software developed by SI will be in open source hence while the contract of the SI gets over after O & M phase. The data along with the source code should be handed over to the MSCL. Later on it can be customized by the ICT support staff.

Academic staff should be motivated to create the education content like MCQ, quizzes and worksheet in LMS rather than depending on SI to create the same.

3.17. Expected Outcomes and Benefits of the Project

The skills and abilities that smart classroom environment can bring about change in the teaching-learning process. Those learning technologies in general

- have affirmative effects on student achievements in all subject areas
- improve achievement of high skill learners
- assist the teaching and learning of students with special needs
- produce positive effects on attitudes toward learning, team work and high order thinking skills
- help teachers in the use of technology more effectively to enhance learning of their students,

In the environment of Smart Schools, these skills and abilities will lead to a perceptible shift from

- didactic classroom teaching to participatory, decentralized, interactive group learning,
- traditional learning environment to a climate that encourages exploration, problem-solving and decision-making,
- usual instructional methodology to strategies that join knowledge,
- mastery of a fixed body of knowledge to understanding of a network of relations between parts of a whole,
- linear, sequential reasoning to search for patterns and associations, and
- collection of information to processing of information.

Imperative for teachers

The most crucial factor in implementing and maintaining any modernization in the school is the teacher. Smart School teachers will require training so that they,

- are able to link activities done on the computer to the general education of children and
- act as facilitators in the process of learning.

School management

The management policy for Smart Schools will be consistent with the Smart School concept. IT will be used in carrying out the administrative as well as academic functions of the school. Teachers will use computers for evaluation, maintenance of performance report of students and interaction with parents. The entire administrative staff will use IT for storage, management and retrieval of information.

3.18. Detailed Work Plan

Table 11. : Work Plan

Task ID	Task	Duration	Predecessor	Deliverables
Phase I -Deployment				
1	Kick off Meeting and Discussion with Mangaluru Smart City Limited (MSCL) by System Integrator (SI), Project Management Consultant (PMC), Block Education Office, Academic Staff of Government schools regarding implementation of smart classrooms.	1 week	-	Minutes of Meeting
2	School site Survey for set up of ICT classrooms	4 weeks	-	Site Survey Report
3	Customization of LMS incorporating role activity user management, multilingual feature of languages Urdu and Kannada, mapping of course content compliant to Karnataka State Board based on the inputs from academic staff of government schools and block education office	8 weeks	1	User and System/Product Manual
4	Procurement of Hardware Infrastructure components by SI /Approval of Bill of Materials (BOM) by MSCL	2 weeks	2	Asset List/Bill of Material[BOM]
5	Approval of the deployment of final customized LMS product by SI from MSCL, PMC and education authorities	2 Weeks	3	Sign off on Deployment Architecture /Co-Location Forms and Product Manual
6	LMS Installation & Configuration for Training and Production environment	1 week	5	Installation/ Configuration Manual of the Product
7	Deployment and Hosting and Fitting of Hardware Infrastructure in classrooms by SI along with prior permission to host from various local education offices and schools to go	2 weeks	5	Backup /DR plan

Task ID	Task	Duration	Predecessor	Deliverables
	ahead.			
Phase II: Training				
8	Creation of Training and Change Management Plan	2 weeks	8	Training Calendar, Change Management Plan
9	Submission of approved Technical and User Manuals to MSCL and training of personnel	2 weeks	9	User Manual, System Manual, Training Feedback
Phase IV: Operations & Maintenance				
10	3 years Operations (reporting and system issues resolution)	36 months	7	Status Reports
11	3 years of Maintenance (software enhancement e-content updation & bug fixing by System Integrator)	3 months	7	Status Reports

Annexure A: List of Schools



The screenshot shows the Karnataka Education Website interface. The main content area displays a table titled "Drinking water and Toilet facilities provided in schools as per High Court order". The table lists districts and provides links to download school lists for primary schools and high schools.

Sl No	District Name	primary schools list	List of schools with Grants Details (After Court Order)	All High schools list	List of schools with Grants Details (After Court Order)
01	Mysore	School List	download	School List	download
02	Chamarajanagar	School List	download	School List	download
03	Kodagu	School List	download	School List	download
04	Mandya	School List	download	School List	download
05	Hassan	School List	download	School List	download
06	Chikkamagalure	School List	download	School List	download
07	Dakshina Kannada	School List	download	School List	download
08	Udupi	School List	download	School List	download

Figure 2 : Karnataka Education Website

DhakshinaKannadaPrySchools.pdf - Adobe Reader

Sl.No.	Block Name	School Code	School Name	Drinking Water	Boys Toilet	Girls Toilet
377	MANGALORE CITY	2924030410	GLPS, BABUGUDDA, WARD NO-55	Yes	Yes	Yes
378	MANGALORE CITY	2924030430	GLPS, HOIGEBAZAR, WARD NO-57	Yes	Yes	Yes
379	MANGALORE CITY	2924030380	GLPS, KALUVEREGURI, WARD NO-50	Yes	Yes	Yes
380	MANGALORE CITY	2924030370	GLPS, KANKANADY, WARD NO-49	Yes	Yes	Yes
381	MANGALORE CITY	2924030360	GLPS, SUTERPETE, WARD NO-48	Yes	Yes	Yes
382	MANGALORE CITY	2924030040	GMUPS, KAVOOR, WARD NO-15	Yes	Yes	Yes
383	MANGALORE CITY	2924030050	GMUPS, KODICAL, WARD NO-16	Yes	Yes	Yes
384	MANGALORE CITY	2924030020	GMUPS, MARAKADA, WARD NO-13	Yes	Yes	Yes
385	MANGALORE CITY	2924030090	GMUPS, NALYAPADAVU, WARD NO-21	Yes	Yes	Yes
386	MANGALORE CITY	2924030010	GMUPS, PANJIMOGARU, WARD NO-12	Yes	Yes	Yes
387	MANGALORE CITY	2924030280	GOVT. TTI, BALMATTA, WARD NO-40	Yes	Yes	Yes
388	MANGALORE CITY	2924030350	GUPS, ATTAVARA, WARD NO-47	Yes	Yes	Yes
389	MANGALORE CITY	2924030290	GUPS, BASTHIGARDEN, WARD NO-41	Yes	Yes	Yes
390	MANGALORE CITY	2924030150	GUPS, BOKKAPATNA-3, WARD NO-27	Yes	Yes	Yes
391	MANGALORE CITY	2924030150	GUPS, BOKKAPATNA-6, WARD NO-27	Yes	Yes	Yes

Note : School List Generated as 31/03/2012 Page 17

List of Schools Having facilities - Drinking Water, Boys Toilet and Girls Toilet

District Name : DAKSHINA KANNADA Primary Schools

Sl.No.	Block Name	School Code	School Name	Drinking Water	Boys Toilet	Girls Toilet
392	MANGALORE CITY	2924030440	GUPS, BOLAR , WARD NO-58	Yes	Yes	Yes
393	MANGALORE CITY	2924030440	GUPS, BOLAR WEST (URDU), WARD NO-58	Yes	Yes	Yes
394	MANGALORE CITY	2924030320	GUPS, BUNDER (URDU), WARD NO-44	Yes	Yes	Yes
395	MANGALORE CITY	2924030160	GUPS, GANDHINAGAR, WARD NO-28	Yes	Yes	Yes
396	MANGALORE CITY	2924030400	GUPS, JAPPINAMOGARU, WARD NO-54	Yes	Yes	Yes
397	MANGALORE CITY	2924030210	GUPS, KADRI MALLIKATTE, WARD NO-33	Yes	Yes	Yes
398	MANGALORE CITY	2924030310	GUPS, KANDATHAPALLI (URDU), WARD NO-43	Yes	Yes	Yes
399	MANGALORE CITY	2924030190	GUPS, KAPIKAD, WARD NO-31	Yes	Yes	Yes
400	MANGALORE CITY	2924030430	GUPS, KUDROLI (URDU), WARD NO-57	Yes	Yes	Yes
401	MANGALORE CITY	2924030450	GUPS, MAHAKALIPADPU, WARD NO-59	Yes	Yes	Yes
402	MANGALORE CITY	2924030170	GUPS, MANNAGUDDA, WARD NO-29	Yes	Yes	Yes
403	MANGALORE CITY	2924030070	GUPS, MULLAKADU, WARD NO-18	Yes	Yes	Yes
404	MANGALORE CITY	2924030330	GUPS, NEERESHWALYA, WARD NO-45	Yes	Yes	Yes
405	MANGALORE CITY	2924030090	GUPS, PADAVU, WARD NO-21	Yes	Yes	Yes
406	MANGALORE CITY	2924030340	GUPS, PANDESHWARA, WARD NO-46	Yes	Yes	Yes
407	MANGALORE CITY	2924030060	GUPS, PARAPADE, WARD NO-17	Yes	Yes	Yes

Figure 3 : List of Primary Schools in Mangaluru City

DhakshinaKannadaSecSchools.pdf - Adobe Reader							
File Edit View Window Help							
3 / 7 100%							
67	MANGALORE CITY	2924030410	GHS, ATTAVARA, WARD NO-55	Yes	Yes	Yes	
68	MANGALORE CITY	2924030320	GHS, BUNDER (URDU), WARD NO-44	Yes	Yes	Yes	
69	MANGALORE CITY	2924030430	GHS, HOIGEBAZAR, WARD NO-57	Yes	Yes	Yes	
Note : School List Generated as 31/03/2012				Page 3			
List of Schools Having facilities - Drinking Water, Boys Toilet and Girls Toilet							Secondary Schools
District Name : DAKSHINA KANNADA							
Sl.No.	Block Name	School Code	School Name	Drinking Water	Boys Toilet	Girls Toilet	
70	MANGALORE CITY	2924030210	GHS, MALLIKATTE, WARD NO-33	Yes	Yes	Yes	
71	MANGALORE CITY	2924030070	GHS, MULLAKADU, WARD NO-18	Yes	Yes	Yes	
72	MANGALORE CITY	2924030090	GHS, NALYAPADAVU, WARD NO-21	Yes	Yes	Yes	
73	MANGALORE CITY	2924030200	GOVT JUNIOR TECHNICAL SCHOOL, KADRI, WARD NO-32	Yes	Yes	Yes	
74	MANGALORE CITY	2924030340	GOVT. PRACTICING HS, MANGALORE, WARD NO-46	Yes	Yes	Yes	
75	MANGALORE CITY	2924030310	GPUC (WOMENS) CAR STREET, WARD NO-43	Yes	Yes	Yes	
76	MANGALORE CITY	2924030280	GPUC, BALMATTA, WARD NO-40	Yes	Yes	Yes	
77	MANGALORE CITY	2924030150	GPUC, BOKKAPATNA, WARD NO-27	Yes	Yes	Yes	
78	MANGALORE CITY	2924030040	GPUC, KAVOOR, WARD NO-15	Yes	Yes	Yes	

Figure 4: List of Secondary Schools in Mangaluru City

Annexure B: Indicators

B.1 Indicators of Infrastructure

B.1.1. Student Classroom Ratio (SCR)

Definition: Average number of pupils (students) per classroom in primary/upper primary/secondary schools in a given school-year.

Calculation Method: Divide the total number of pupils enrolled in primary / upper primary / secondary schools by the total number of classrooms in primary / upper primary / secondary schools in a given school-year.

Formula:

$$SCR^t = (E^t / C^t)$$

Where:

SCR^t = Student classroom ratio for primary/upper primary/secondary schools in school-year t.

E^t = Total enrolment in primary/upper primary/secondary schools in school-year t.

C^t = Total number of classrooms in primary/upper primary/secondary schools in school-year t.

3.18.2. B.1.2. Percentage of Schools Having x Classrooms

Definition: The number of schools of a given category having x classrooms ($x = 1, 2, 3, \dots, n$; where n is the maximum number of classrooms in a school belonging to given category) expressed as a percentage of total number of schools in that category.

Calculation method: Divide the number of schools of a given category having x classrooms ($x = 1, 2, 3, \dots, n$) by total number of schools in that category, and multiply by 100.

Formula:

$$\%SWC_x^c = (SWC_x^c / TS^c) * 100$$

Where:

$\%SWC_x^c$ = Percentage of schools having x classrooms ($x = 1, 2, 3, \dots, n$) in school category c.

SWC_x^c = Number of schools of category c having x classrooms.

TS^c = Total number of schools in category c.

B.1.3. Percentage of Schools Having Toilets

Definition: The number of schools of a given category having toilet is expressed as a percentage of total number of schools of that category.

Calculation method: Divide the number of schools of a given category having toilet by total number of schools of that category, and multiply by 100.

Formula:

$$\%ST^c = (ST^c / TS^c) * 100$$

Where:

$\%ST^c$ = Percentage of schools of category c having toilet.

ST^c = Number of schools of category c having toilet.

TS^c = Total number of schools in category c.

B.1.4. Percentage of Schools with Girl's Toilet in a Given School Category

Definition: The number of schools of a given category having girl's toilet expressed as a percentage of total number of schools of that category.

Calculation method: Divide the number of schools of a given category having girl's toilet by total number of schools of that category, and multiply by 100.

Formula:

$$\%SGT^c = (SGT^c / TS^c) * 100$$

Where:

$\%SGT^c$ = Percentage of schools of category c having girl's toilet.

SGT^c = Number of schools of category c having girl's toilet.

TS_c = Total number of schools in category c.

B..2. Indicators of Quality Inputs

B.2.1. Percentage of Schools Having Mother Tongue as a Medium of Instruction at a Given School Stage

Definition: The number of schools having mother tongue as a medium of instruction at a given school stage is expressed as a percentage of total number of schools having that stage.

Calculation method: Divide the number of schools having mother tongue as a medium of instruction at a given school stage by total number of schools having that stage, and multiply the result by 100.

Formula:

$$\%SM_c^t = (SM_c^t / S_c^t)$$

Where:

$\%SM_c^t$ = Percentage of schools having mother tongue as a medium of instruction at school stage c (primary or upper primary or secondary) to total number of schools having that stage in school-year t.

SM_c^t = Number of schools having mother tongue as a medium of instruction at school stage c in school-year t.

S_c^t = Total number of schools having school stage c in school-year t.

B.2.1. Pupil-Teacher Ratio

Definition: Average number of pupils (students) per teacher at a specific level of education in a given school-year.

Calculation method: Divide the total number of pupils enrolled at the specific level of education by the number of teachers teaching pre-dominantly at that level.

Formula:

$$PTR_h^t = (E_h^t / T_h^t)$$

Where:

PTR_h^t = Pupil-teacher ratio at level of education h in school-year t.

E_h^t = Total number of pupils or (students) at level of education h in school-year t.

T_h^t = Total number of teachers teaching pre-dominantly at level of education h in school-year t.

Remark: A teacher is to be classified according to the stage at which she/he is predominantly teaching, i.e., the stage of education at which maximum time is devoted. If a teacher is teaching at more than one stage of education and devoting equal time at all the stages, then she/he is to be classified at the highest stage at which she/he is teaching.

****Note only Two indicators are calculated for the implementation of eSmart School as the main stake holders of this program are Teachers and Students.***

Indicative Figures will help in deciding the approval of investment in setting up the ICT infrastructure in each classroom based on the Students Teacher Ratio.

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Press Information Bureau
Government of India
Ministry of Human Resource Development

09-February-2017 16:51 IST

Student-Teacher Ratio

The Right of Children to Free and Compulsory Education (RTE) Act, 2009 in its Schedule lays down Pupil Teacher Ratio (PTR) for both primary and upper primary schools. At primary level the PTR should be 30:1 and at the upper primary level it should be 35:1. The Rashtriya Madhyamik Shiksha Abhiyan (RMSA) framework stipulates that the PTR at secondary level should be 30:1.

As per Unified District Information System For Education (UDISE) the PTR at national level for elementary schools is 24:1 and for secondary schools it is 27:1. The PTR in most of the States and UTs is found to be satisfactory. However, since some schools have lesser teachers than the required number, it is clear that while there are sufficient teachers, the main issue is their correct deployment.

Globally, there are variations in the optimum number of students taught in a particular class and as such the data is not uniformly comparable. Data from the UNESCO Institute of Statistics on PTR in primary schools shows that India has a national PTR comparable to countries with similar social-economic indicators.

The recruitment, service conditions and redeployment of teachers are primarily in the domain of respective State Governments and UT Administrations. However, the Central Government through the flagship programmes of Sarva Shiksha Abhiyan (SSA) at elementary level and Rashtriya Madhyamik Shiksha Abhiyan (RMSA) at secondary level provides assistance to the State Governments and UTs for additional teachers to maintain appropriate PTR as per the prescribed norms for various levels of schooling.

The Central Government has been consistently pursuing the matter of expeditious recruitment and redeployment of teachers with States and UTs at various fora. Advisories on this issue have also been issued to States and UTs from time to time. This information was given by the Minister of State (HRD), Shri Upendra Kushwaha today in a written reply to a Rajya Sabha question.

GG/RT/RK/

Figure 5 : RTE Act Student Teacher Ratio

Annexure C: School Details

C.1. GUPS, Basthigarden, Ward No-41

Total strength of students across 1st to 5th Standard is just 17. Two teachers are teaching five subjects. The time allocation of teacher of teaching one subject to each classroom per standard is problematic. The location of the school is in the area where non-electrical & hardware shops are present, unethical activities are on rise. Fan and Water purifier in this school is donated.

Type of School:	Primary		
Standards Covered:	1 st to 5 th		
Subjects Taught:	Kannada, English, Hindi, Maths, Social Studies, Science		
Total Number of Teachers:	Two -2		
Total Number of Students :	17		
Boys Girls Ratio per standard:	Standard	Boys	Girls
	1 st	1	1
	2 nd	2	5
	3 rd	0	2
	4 th	1	2
	5 th	0	3
	Total -17	4	13
Student Classroom Ratio (SCR):	17/5 = 3.4		
Pupil-Teacher Ratio (PTR):	Standard	Total	PTR = Student / Teacher
	1 st	2	1
	2 nd	7	3.5
	3 rd	2	1
	4 th	3	1.5
	5 th	3	1.5
Toilets:	Boys	Girls	Physically Disabled
	1	1	1
Water Purifier Drinking Water:	Yes Donated		
Computers:	Two Desktops present – One is Working		
Other Observations	CCTV surveillance is required in school premises. A report about miscreants doing illegal activities in school premises is registered in North Police Station.		

C.2. GUPS, Neereshwalya, Ward No-45

Total strength of students across 1st to 7th Standard is 14. Three teachers are teaching five subjects. The time allocation of teacher of teaching one subject to each classroom per standard is problematic. No proper Lighting is present which makes what is written on blackboard difficult to read. Fan and Water purifier in this school is donated.

Type of School:	Primary		
Standards Covered:	1 st to 7 th		
Subjects Taught:	Kannada, English, Hindi, Maths, Social Studies, Science		
Total Number of Teachers in school:	Three - 3		
Total number of students in school:	14		
Boys Girls Ratio per standard:	Standard	Boys	Girls
	1 st	1	1
	2 nd	1	1
	3 rd	2	1
	4 th	2	0
	5 th	2	1
	6 th	0	0
	7 th	2	0
	Total-14	10	4
Student Classroom Ratio (SCR):	14/7=2		
Pupil-Teacher Ratio (PTR):	Standard	Total	PTR = Student/Teacher
	1 st	2	0.67
	2 nd	2	0.37
	3 rd	3	1
	4 th	2	.67
	5 th	3	1
	6 th	0	0
	7 th	2	.67
Toilets:	Boys	Girls	
	1	1	
Water Purifier Drinking Water:	Donated		
Computers:	No		
Other Observations	-		

C.3. GUPS, Pandeshwara, Ward No-46

Total strength of students across 1st to 7th Standard is 77. Four teachers are teaching five subjects. Water purifier in this school is donated. Computers are donated by Canara Bank which is out of AMC warranty.

Type of School:	Primary
Standards Covered:	1 st to 7 th
Subjects Taught:	Kannada, English, Hindi, Maths, Social Studies, Science
Total Number of Teachers in school:	Four -4
Total Number of Students in school:	77

Boys Girls Ratio per standard:	Standard	Boys	Girls
	1 st	5	5
	2 nd	5	7
	3 rd	6	5
	4 th	8	8
	5 th	7	5
	6 th	5	3
	7 th	5	3
	Total -77	41	36
Student Classroom Ratio (SCR):	77/7=11		
Pupil-Teacher Ratio (PTR):	Standard	Total	PTR = Student / Teacher
	1 st	10	2.5
	2 nd	12	3
	3 rd	11	2.75
	4 th	16	4
	5 th	12	3
	6 th	8	2
	7 th	8	2
Toilets:	Boys	Girls	
	1	3	
Water Purifier Drinking Water:	Yes Donated		
Computers:	Yes Donated		
Other Observations	<p>Basic of Computers that is drawing in ms paint, typing in word and excel is taught.</p> <p>Nalli-Kalli method of Teaching is conducted for students from Standard 1st to 3rd.</p> <p>Nali Kali system allows a flexibility which facilitates the shifting of learning units to different levels and grades depending upon the local situation and circumstances. Curriculum is seen as a continuum from classes I-IV – the child can re-enter the learning ladder at the point where she left off.</p> <p>Textual material replaced by learning cards.</p> <p>Learning sequence is broken into the smallest possible units.</p>		

Physical Infrastructure:

- Mini Library and Science Lab needs to be set up.
- Flooring and Roof of Dining Hall needs to be repaired.
- Easy foldable Partition needs to be present between the classes.
- Painting is required.

Sports Infrastructure:

- School has won many accolades in Kabaddi.

Sports Facility Provision Suggestion:

- Kabaddi Ground + Coaching



C.4. GLPS, Hoigebazar, Ward No-57

- Six subjects are taught by two teachers for the strength of 16 students across 1st to 5th standard.

- The time allocation of teacher of teaching one subject to each classroom per standard is problematic.
- No proper Lighting is present which makes what is written on blackboard difficult to read.
- Fan and Water purifier in this school is donated.

Type of School:	Primary		
Standards Covered:	1 st to 5 th		
Subjects Taught:	Kannada, English, Hindi, Maths, Social Studies, Science		
Total Number of Teachers in school:	Two -2		
Total Number of Students in school:	16		
Boys Girls Ratio per standard:	Standard	Boys	Girls
	1 st	1	0
	2 nd	2	2
	3 rd	1	3
	4 th	1	1
	5 th	2	3
	Total -16	7	9
Student Classroom Ratio (SCR):	16/5=3.6		
Pupil-Teacher Ratio (PTR):	Standard	Total	PTR = Student / Teacher
	1 st	1	0.5
	2 nd	4	2
	3 rd	4	2
	4 th	2	1
	5 th	5	2.5
Toilets:	Boys	Girls	Physically Disabled
	1	1	1
Water Purifier Drinking Water:	Yes		
Computers:	No		
Other Observations	School building in dilapidated state		



Physical Infrastructure:

- Electrical fitting needs to be set up.
- Cost of Electrical maintenance was worked out (Rs. 50,000) by the school authorities and proposal was submitted to the block education office.

C.5. GHS, Hoigebazar, Ward No-57

Six subjects are taught by seven teachers. The student teacher ratio is fine compared to other government schools but teachers’ apprehension for introduction of ICT in curriculum was clearly seen while conducting the survey.

Type of School:	Secondary		
Standards Covered:	8 th to 10 th		
Subjects Taught:	Kannada, English, Hindi, Maths, Social Studies, Science		
Total Number of Teachers in school:	7		
Total Number of Students in school:	40		
Boys Girls Ratio per standard:	Standard	Boys	Girls
	8 th	14	3
	9 th	7	5
	10 th	4	7
	Total - 40	25	15
Student Classroom Ratio (SCR):	40/3=13.33		
Pupil-Teacher Ratio (PTR):	Standard	Total	PTR = Student / Teacher
	8 th	17	2.42
	9 th	12	1.71
	10 th	11	1.57
Toilets:	Yes entire building is constructed		
Water Purifier Drinking Water:	Yes		
Computers:	Yes 10 laptops donated by Mphasis HP in 2006-07, out of which 2 are in working condition		
Other Observations	6 th and 7 th Standards are present in Bolar school.		

Physical Infrastructure:

- Water pressure in tap is quite low
- Water leakage from ceiling in Dining room of the school

Sports Infrastructure:

- Badminton and Basket Ball courts setup + Coaching schedule could be established.
- Kabbaddi courts setup + Coaching schedule could be established.



C.6. Government Practicing HS, Mangaluru, Ward No-46

Computer in this school is donated by relative of academic staff. Teachers have to periodically upload the attendance on student tracking system developed by Infosys across Karnataka State. Internet connectivity is provided. Basic of computers are taught to Secondary school students which is way much less than in comparison with private computer course curriculum.

Type of School:	Secondary		
Standards Covered:	8 th to 10 th Standard		
Subjects Taught:	Kannada, English, Hindi, Maths, Social Studies, Science		
Total Number of Teachers in school:	Eight -8		
Total Number of Students in school:	37		
Boys Girls Ratio per standard:	Standard	Boys	Girls
	8 th	7	2
	9 th	19	1
	10 th	6	2
	Total -37	32	5

Student Classroom Ratio (SCR):	37/3=12.33		
Pupil-Teacher Ratio (PTR):	Standard	Total	PTR = Student / Teacher
	8 th	9	1.125
	9 th	20	2.5
	10 th	8	1
Toilets:	Boys	Girls	
	6	6	
Water Purifier Drinking Water:	Yes		
Computers:	Yes		
Other Observations	Total number of classrooms -3 ICT Lab has been setup -10 desktops are allocated out of which four are in working condition. Basics about Computer such as Word, Excel, and Paint are taught to students.		

Physical Infrastructure:

- Proposal for redevelopment of school has been sent to Block Education Office.

Sports Infrastructure:

- Nehru Maidan is used for sports related activities.
- Basket Ball court, Volley ball, and Athletics activities can be setup.



C.7. GUPS, Bunder (Urdu), Ward No-44

Three languages are taught in this school. The school has playground and separate hall for school functions. No computer is present.

Type of School:	Primary		
Standards Covered:	1 st to 7 th		
Subjects Taught:	Kannada, English, Hindi, Maths, Social Studies, Science, Urdu		
Total Number of Teachers:	Four -4		
Boys Girls Ratio per standard:	Standard	Boys	Girls
	1 st	1	4
	2 nd	4	4
	3 rd	6	2
	4 th	6	7
	5 th	1	7
	6 th	6	7
	7 th	8	6
	Total - 69	32	37
Student Classroom Ratio (SCR):	49/7=7		
Pupil-Teacher Ratio (PTR):	Standard	Total	PTR = Student / Teacher
	1 st	5	1.25
	2 nd	8	2
	3 rd	8	2
	4 th	13	3.25
	5 th	8	2
	6 th	13	3.25
	7 th	14	3.5
Toilets:	Boys	Girls	
	1	1	
Water Purifier Drinking Water:	Yes		
Computers:	No		
Other Observations	<p>Total number of classrooms -7 Laptop is required for teacher staff for making data entry about student details in Student Management System.</p>		

C.8. GHS, Bunder (Urdu), Ward No-44

Type of School:	Secondary		
Standards Covered:	8 th to 10 th		
Subjects Taught:	Kannada, English, Hindi, Maths, Social Studies, Science, Urdu		
Total Number of Teachers in school:	Seven -7		
Total Number of Students in school:	70		
Boys Girls Ratio per standard:	Standard	Boys	Girls
	8 th	10	9
	9 th	22	15
	10 th	9	5
	Total -70	41	29
Student Classroom Ratio (SCR):	70/3=23.33		
Pupil-Teacher Ratio (PTR):	Standard	Total	PTR = Student /Teacher
	8 th	19	2.71
	9 th	37	5.28
	10 th	14	2
Toilets:	Boys	Girls	
	5	5	
Water Purifier Drinking Water:	Yes		
Computers:	Yes		
Other Observations	Laptop as well as projector is present. 10 desktops are donated by Educomp which are not in working condition. Students are taught basics in Word, Excel and Paint. Computer Theory and Practical exam each of 50 marks is conducted.		

Physical Infrastructure:

- No proper toilets are present for girl students in GUPS school.
- One can deploy the eLite eToliet.

Sports Infrastructure:

- Common Play ground is present between two schools which is approximately of size 20 m * 50 m.
- Football and Hockey Nets can be set up on either sides of playground.
- Circular Running Track can be constructed.



C.9. Primary School, Jyothi Circle, Balmatta, Ward No-40

School Building Roof is leaky. Buckets are kept in class room so that the water from the roof doesn't make the floor wet. The school building is in very bad state. Water gets choked in

toilet. Current civil work undergoing with iron rods kept in open has made the movement of children across the classroom a risky affair.

There are 35 students across standards 1st to 5th. Four teachers teaching five subjects.

Water purifier is donated by State Bank of India (SBI). There are no chairs for teachers and students are made to sit on ground due to lack of benches. Poor lighting is present in classroom which makes students impossible to see what is written on blackboard.

Type of School:	Primary		
Standards Covered:	1 st to 7 th Standard		
Subjects Taught:	Kannada, English, Hindi, Maths, Social Studies, Science		
Total Number of Teachers in school:	Four -4		
Total Number of Students in school:	35		
Boys Girls Ratio per standard:	Standard	Boys	Girls
	1 st	0	0
	2 nd	2	0
	3 rd	1	3
	4 th	1	4
	5 th	0	9
	6 th	0	7
	7 th	0	8
	Total -35	4	31
Student Classroom Ratio (SCR):	35/7=5		
Pupil-Teacher Ratio (PTR):	Standard	Total	PTR = Student / Teacher
	1 st	0	0
	2 nd	2	0.5
	3 rd	4	1
	4 th	5	1.25
	5 th	9	2.25
	6 th	7	1.75
	7 th	8	2
Toilets:	Boys	Girls	
	1	1	
Water Purifier Drinking Water :	Yes		
Computers:	No		
Other Observations	School Building in dilapidated state		

C.10. Secondary School Jyothi Circle, Balmatta, Ward No-40

Six subjects are taught by eight teachers. The student teacher ratio is fine compared to other government schools. It is a girls' school.

Type of School:	Secondary		
Standards Covered:	8 th to 10 th		
Subjects Taught:	Kannada, English, Hindi, Maths, Social Studies, Science		
Total Number of Teachers in school:	8		
Total Number of Students in school:	103		
Boys Girls Ratio per standard:	Standard	Girls	
	8 th	24	
	9 th	41	
	10 th	38	
	Total	103	
Student Classroom Ratio (SCR):	103/3=34.33		
Pupil-Teacher Ratio (PTR):	Standard	Total	PTR = Student / Teacher
	8 th	24	3
	9 th	41	5.125
	10 th	38	4.75
Toilets:	30		
Water Purifier Drinking Water:	Two		
Computers:	Two		
Other Observations	This school is selected out of 100 schools in Karnataka under National Skill Qualification Framework. Students have to opt for any of the two courses: Course 1 : Hindi Language. Course 2 : Beauty/Wellness and HealthCare.		

C.11. GPUC, Balmatta, Ward No-40

Type of School:	Higher Secondary		
Standards Covered:	11 th to 12 th		
Subjects Taught:	PCM-Physics, Chemistry, Maths, Biology, Kannada, English, Sanskrit, Hindi		
Total Number of Teachers in school:	Nineteen -19		
Total Number of Students in school:	770		
Boys Girls Ratio per standard:	Standard	Girls	
	11 th	770	
	12 th		
	Total -770		
Student Classroom Ratio (SCR):	-		

Pupil-Teacher Ratio (PTR):	Standard	Total	PTR = Student / Teacher
	11 th -	770	40.52
	12 th		
Toilets:	Girls		
	5		
Water Purifier Drinking Water:	Yes		
Computers:	Yes (10-15)		
Other Observations	Special mid term classes are conducted for SC/ST students. Total 15 computers are present. Short term courses are required : <ul style="list-style-type: none"> ✓ English Communication ✓ Personality Development ✓ IT/ITES ✓ Career guidance ✓ Pharmacy ✓ Architecture 		

Physical Infrastructure:



- Teacher's toilet is required. Place for the construction for toilet is identified.

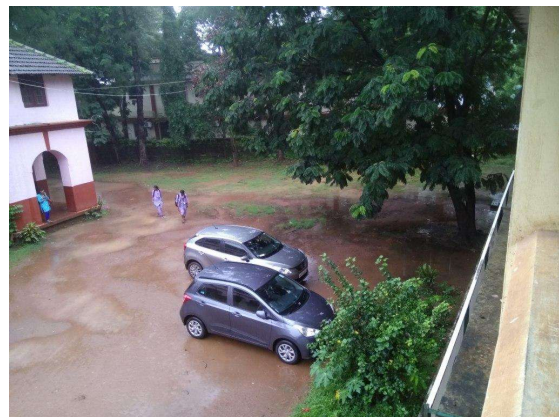


- Dome Roof needs repairing and heritage structure preserved.



- Water clogging issue is common in entire Jyothi Circle Balmatta Area.

- Other playground is bigger and has basketball poles in the ground. The ground could be readied for Basketball, Volleyball and Throw ball along with the proper coaching schedule for the girls.





C.12. GUPS, Bolar, Ward No-58

Six subjects are taught by four teachers. Nali-Kali approach of education is used for Standard 1st to 3rd.

Type of School:	Primary with Upper Primary		
Standards Covered:	1 st to 7 th		
Subjects Taught:	Kannada, English, Hindi, Maths, Social Studies, Science		
Total Number of Teachers in school:	4		
Total Number of Students in school:	52		
Boys Girls Ratio per standard:	Standard	Boys	Girls
	1 st	4	5
	2 nd	0	4
	3 rd	3	3
	4 th	4	3
	5 th	3	7
	6 th	7	4
	7 th	3	2
	Total	24	28
Student Classroom Ratio (SCR):	52/5=10.4		
Pupil-Teacher Ratio (PTR):	Standard	Total	PTR = Student/ Teacher
	1 st	9	2.25
	2 nd	4	1
	3 rd	6	1.5
	4 th	7	1.75
	5 th	10	2.5
	6 th	11	1.57
	7 th	5	1.25
Computers:	Four		
Other Observations	Ground 20m x 30m.		

C.13. GUPS, Bolar West (Urdu), Ward No-58

Six subjects are taught by three teachers. Nali-Kali approach of education is used for Standard 1st to 3rd.

Type of School:	Primary with Upper Primary		
Standards Covered:	1 st to 7 th		
Subjects Taught:	Kannada, English, Hindi, Maths, Social Studies, Science		
Total Number of Teachers in school:	3		
Total Number of Students in school:	25		
Boys Girls Ratio per standard:	Standard	Boys	Girls
	1 st	1	1
	2 nd	3	2
	3 rd	3	2
	4 th	3	1
	5 th	0	4
	6 th	1	2
	7 th	1	1
	Total	12	13
Student Classroom Ratio (SCR):	25/5=5		
Pupil-Teacher Ratio (PTR):	Standard	Total	PTR = Student/ Teacher
	1 st	2	0.67
	2 nd	5	1.67
	3 rd	5	1.67
	4 th	4	1.33
	5 th	4	1.33
	6 th	3	1
	7 th	2	0.67
Computers:	Three		
Other Observations	Ground 20m x 30m.		

C.14. Government Higher Primary School, Car Street, Ward No-43

Type of School:	High School	
Standards Covered:	8 th to 10 th	
Subjects Taught:	Kannada, English, Hindi, Maths, Social Studies, Science, Drawing and Physical Education.	
Total Number of Teachers in school:	8	
Total Number of Students in school:	44	
Boys Girls Ratio per standard:	Standard	Girls
	8 th	6
	9 th	21
	10 th	17
	Total	44

Student Classroom Ratio (SCR):	44/3=14.6		
Pupil-Teacher Ratio (PTR):	Standard	Total	PTR = Student/ Teacher
	8 th	6	0.75
	9 th	21	2.625
	10 th	17	2.125
Computers:	Basic Computer operations how to use MICROSOFT Excel, WORD, PowerPoint is being taught.		
Other Observations	Mid day meal food is provided by ISCKON Foundation Akshay Patra. Drinking Water is available. Volleyball and Kabbadi court is present in premises.		

C.15. Government PU College Women, Car Street, Ward No-43

Type of School:	Govt PU Girls College		
Standards Covered:	11 th and 12 th		
Subjects Taught:	Kannada, English, History, Economics, Political Science, Sociology, Business Studies, Accountancy, Physics, Chemistry, Mathematics, Biology		
Total Number of Teachers in school:	11		
Total Number of Students in school:	226		
Boys Girls Ratio per standard:	Standard	Girls	
	11 th	124	
	12 th	102	
	Total	226	
Student Classroom Ratio (SCR):	226/4=56.5		
Pupil-Teacher Ratio (PTR):	Standard	Total	PTR = Student/ Teacher
	11 th	124	11.27
	12 th	102	9.27
Computers:	Not available for Students		
Other Observations	Volleyball Ground is present. ICT Course is not conducted from the past three years. Dedicated Laboratories for conducting Physics, Chemistry and Biology are available. Library is present on 1 st floor but no librarian is appointed. CCTV Cameras are installed in every classroom and Monitor and DVR is present in Principal Room. 14 Toilets are provided to students. One Toilet for Principal, One toilet for Supporting staff and two toilets for teaching staff. TALP training program was imparted to teachers under State govt initiative which would help teachers in teaching students through projector.		