

PROFESSIONAL TRAINING REPORT

Submitted in partial fulfillment of the requirements for the award of
Master of Architecture degree in Sustainable Architecture

by

MANJARI. A (39890010)



SCHOOL OF BUILDING AND ENVIRONMENT
DEPARTMENT OF ARCHITECTURE

SATHYABAMA

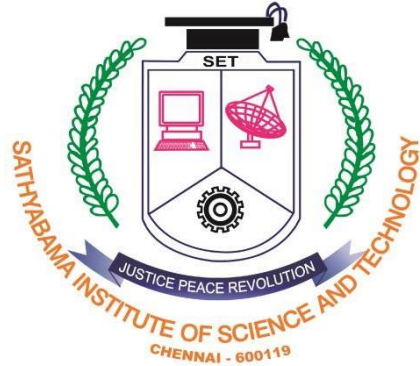
INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)

Accredited with Grade "A" by NAAC

JEPPIAAR NAGAR, RAJIV GANDHI SALAI, CHENNAI - 600 119

DEC 2020

(Annexure I)



SATHYABAMA

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(Est U/s(3) of UGC Act, 1956) Accredited with Grade "A" by NAAC (A Christian Minority Institution)

JEPPIAAR NAGAR, RAJIV GANDHI SALAI, CHEMMENCHERY, CHENNAI – 600119. TAMILNADU.

PHONE: 2450 1443/9941912481 INTERNET: www.sathyabama.ac.in

E-mail: archhod@sathyabama.ac.in



**SCHOOL OF BUILDING AND ENVIRONMENT
DEPARTMENT OF ARCHITECTURE
M. Arch (Sustainable Architecture)**

**PROFESSIONAL TRAINING PORTFOLIO (S89 INT)
DEC 2020**

Name of the Student	:	MANJARI. A	Semester	:	III
Reg No.	:	39890010	Batch	:	2019-2021

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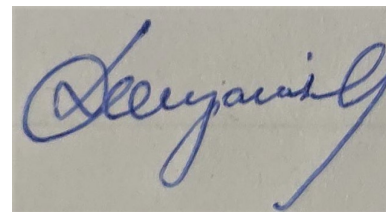
E-mail: archhod@sathyabama.ac.in

DEPARTMENT OF ARCHITECTURE

M. Arch (Sustainable Architecture)

BONAFIDE CERTIFICATE

This is to certify that the professional training (S89 INT) is the work of who had undergone **MANJARI. A (39890010)** training in **GREEN EVOLUTION, Chennai** and has been monitored by the continuous assessment during **Dec 2020 to Jan 2021**



DR. DEVYANI GANGOPADHYAY

DEAN,

School of Building and Environment

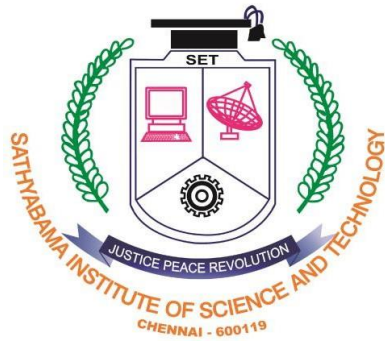
Department of Architecture



Submitted for Viva voce Examination held on

Internal Examiner

External Examiner



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E-mail: archhod@sathyabama.ac.in



DECLARATION

I **MANJARI. A** hereby declare that the Professional Training Report (**Dec 2020 to Jan 2021**) done by me under the guidance of **AR. ANUPAMA MANOHARAM (CO-FOUNDER AND HEAD OF GREEN EVOLUTION, CHENNAI)** is submitted in partial fulfillment of the requirements for the completion of practical training session.

DATE : 30.01.2021

PLACE :

SIGNATURE OF CANDIDATE

ACKNOWLEDGEMENT

I am pleased to acknowledge my sincere thanks to Board of Management of **SATHYABAMA** for their kind encouragement in doing this project and for completing it successfully. I am grateful to them.

I convey my thanks to **Dr. Devyani Gangopadhyay**, Dean and Head of Department , School of building and Environment, Dept. of architecture for providing me necessary support and details at the right time during the progressive training session.

I would like to express my sincere and deep sense of gratitude to **AR. ANUPAMA MANOHARAM (CO-FOUNDER AND HEAD OF GREEN EVOLUTION, CHENNAI)** for his valuable guidance, suggestions and constant encouragement paved way for the successful completion of my project work. My sincere thanks to **Ar.Sheetal Kalamkar**, Professional Training Coordinator for her motivation.

I wish to express my thanks to all Teaching and Non-teaching staff members of the Department of Architecture who were helpful in many ways for the completion of the project.

Also, thanks to **AR.SRINIDHI** (PROJECT LEAD) and **AR. AKSHITHA** for the guidance during this internship.



To,
Ms. Manjari Arivazhagan
Vanagaram, Chennai

December 14th, 2020

Mobile: 9003447678
Email: armanjari07@gmail.com

Dear Ms.Manjari,

We are pleased to offer you an internship with Green Evolution on the following terms and conditions:

1. Designation: Architectural Intern

2. Internship period: December 14, 2020 until January 25, 2021

We welcome you to the organization again and look forward to a mutually rewarding association. Please sign and return the duplicate copy of this letter, as token of your acceptance of this offer of appointment.

Thanking you,

For Green Evolution Architectural Consultancy

Accepted,

Anupama Mohanram

Manjari Arivazhagan



Consolidated Certificate (Experience)

To
The Head of the Department
Sathyabama Institute of Science and Technology
Rajiv Gandhi Salai,
Jeppiaar Nagar,
Chennai-600 119
Tamil Nadu

Sub: Completion Letter for Professional Training reg.

This is to Certify that A. MANJARI, bearing Reg. No: 39890010 of 3rd Semester, M. Arch (SA), Department of architecture in Sathyabama Institute of Science and Technology, has successfully completed one month long professional training by working in our office, Green evolution Architectural Consultancy, Chennai
She was associated as a trainee for the period from 14.12.2020 to 25.01.2021. She excelled in her work as an intern during her period of internship.

Chief Architect Signature:

Office seal:

Green Evolution Architectural Consultancy
No:43/2, 7th Cross Street,
Besant Nagar , Chennai - 600 090
Landline: 044 - 24411245

WORK DIARY

S. NO	PROJECT NAME	WORK DONE
1	Chennai Higher Secondary School, Bunder Garden	Site visit
		Data Collection
		Existing electrical layout
		Manual calculation for Lighting
		Simulation analysis for daylighting and artificial lighting
		Proposal for Solar PV and Rainwater Harvesting
		Water use calculation
		Payback period calculation for proposed LED lighting and Solar PV
2	Chennai Primary School and Chennai Higher Secondary School, Kolathur	Site visit
		Data Collection
		Existing electrical layout
		Manual calculation for Lighting
		Simulation analysis for daylighting and artificial lighting
		Proposal for Solar PV and Rainwater Harvesting
		Water use calculation
		Payback period calculation for proposed LED lighting and Solar PV
3	Chennai Girls' Higher Secondary School, M.H Road	Site visit
		Data collection

Chief Architect Signature:

anupama

Office seal:

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www.sathyabama.ac.in



DEPARTMENT OF ARCHITECTURE M. Arch (Sustainable Architecture)

Continuous Assessment Report for Professional training

(Continuous progress report of the trainee architect/Project Manager for the period of 30 working days in the office to be submitted to HOD by the Trainee attending the training session)

1. Name of the office / organization : GREEN EVOLUTION	
2. Address & Contact Number	: 21/2, Rukmini Road, Kalakshetra Colony, Chennai 600090, Ph: 99400 51499
3. Name of the student	: MANJARI A
4. Duration	: 15/12/2020 To 25/01/2021
5. Total No. of days	: 35
6. Evaluation of Performance criteria shall be on	

* Note: Kindly grade the student as per his/her overall performance in the office during the assessment month; which will be converted to the allotted marks by the department.

Description of works	Excellent	Good	Fair	Poor	NA
Active Participation in the Project activities		✓			
Documentation and tracking of project	✓				
Presentation Skills developed	✓				
Understanding of construction details & techniques					✓
Participation and contribution in project meetings		✓			
Understanding of codes and standards		✓			
Schedule preparation & tracking activities		✓			
Preparation / Management of drawings		✓			
Learning / Application of software in Projects	✓				
Preparation of concept for projects					✓
Site Management / Discussion with clients	✓				
Overall Grading*	A				

(A – 8.0, B – 7.0, C – 6.0, D – 5.5, E – 5.0, F – <5)

7. Any other Remarks :

8. Signature of the

Head of the Office /

Organization (With Seal)

anupama

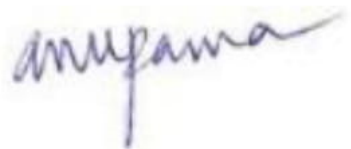
Green Evolution Architectural Consultancy
No:43/2, 7th Cross Street,
Besant Nagar , Chennai - 600 090
Landline: 044 - 24411245

WORK DIARY

S.No	PROJECT NAME	WORK DONE
1	CHSS, BUNDER GARDEN	Site visit
		Existing electrical layout
		Manual calculation for Lighting
		Simulation analysis for Lighting
		Plumbing calculation
		Proposal
2	Chennai Corporation Primary School, Kollathur	Site visit
		Existing electrical layout
		Manual calculation for Lighting
		Simulation analysis for Lighting
		Plumbing calculation
		Proposal
3	CHSS, Kollathur	Site visit
		Existing electrical layout

Chief Architect Signature:

For Green Evolution Architectural Consultancy



Anupama Mohanram,

BUNDER GARDEN SCHOOL

ENERGY & WATER EFFICIENCY

Campus Location

CHSS Bunder Garden is accessed from Bunder Garden Street. Bunder garden is a locality in Perambur area which is known for its Indian Railway coach manufacturing Factory (ICF).



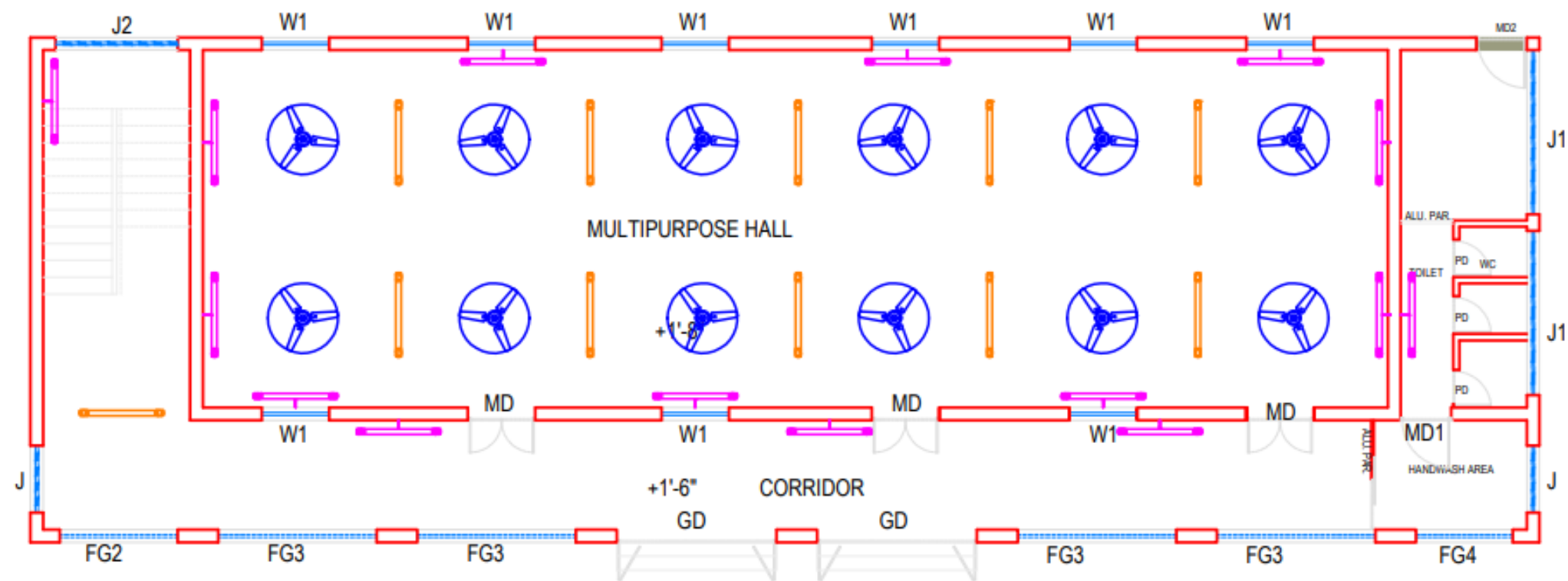
The CHSS Bunder garden campus has a total of 5 blocks apart from a library, auditorium, science lab and language lab and toilet blocks. The campus also has a small kitchen in block 5 where the mid-day meals are served. The central playground houses a football field and a basketball court. Parking space for about 100 bicycles is also available. The open areas near the buildings are well shaded with large existing trees on site





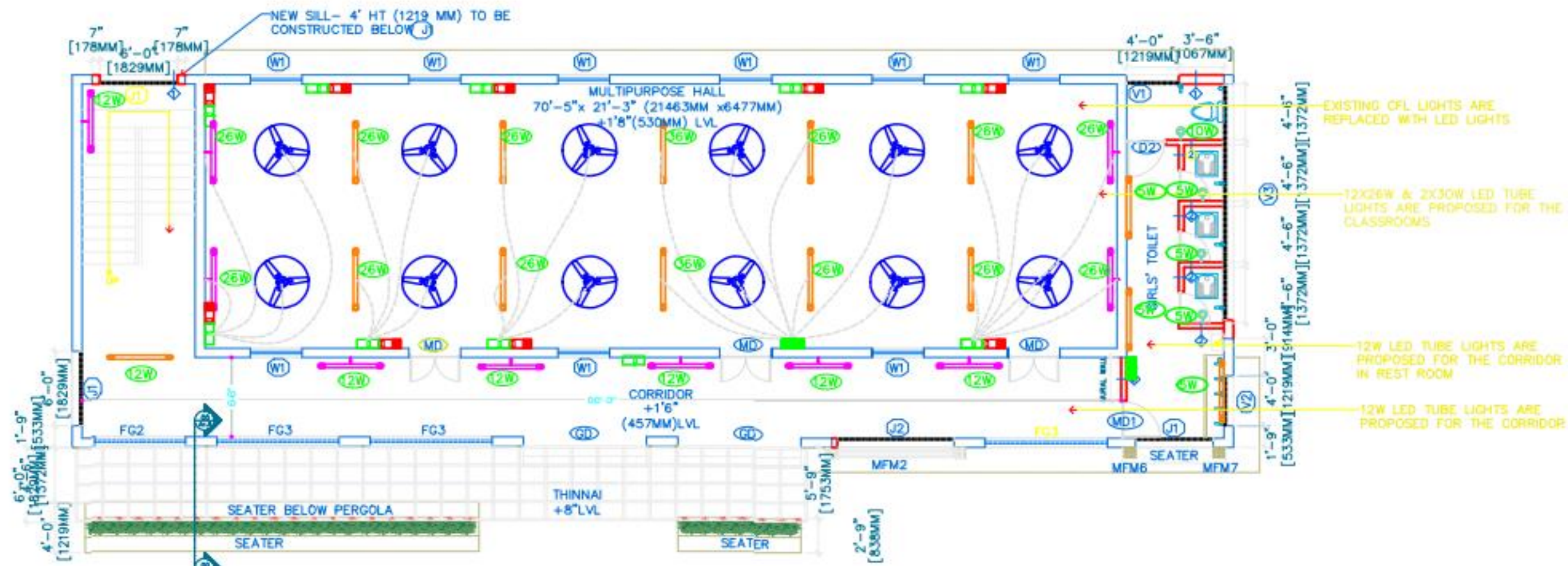
BLOCK – 2 (CLASSROOMS)

BLOCK:2
EXISTING ELECTRICAL LAYOUT



PROPOSED ELECTRICAL LAYOUT

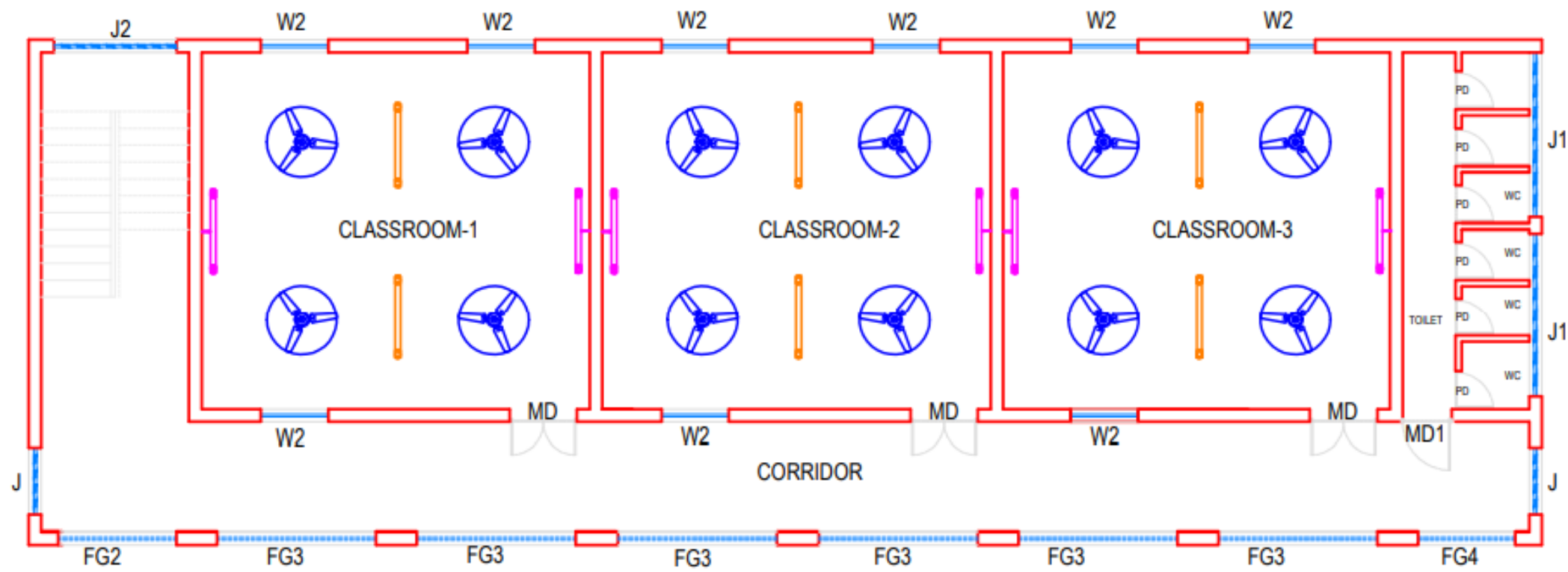
GROUND FLOOR PLAN



EXISTING LAMPS							EXISTING FANS					
SPACES	WATTAGE OF EACH LAMP	NO.OF LAMP	TOTAL WATTS	ELECTRICITY CONSUMTION PER HOUR (kWh)	ELECTRICITY CONSUMTI ON PER DAY (kWh)	ELECTRICITY CONSUMTION PER YEAR (kWh)	NO.S.	WATTS PER FAN	TOTAL WATTS	ELECTRICITY CONSUMTI ON PER HOUR (kWh)	ELECTRICITY CONSUMTI ON PER DAY(kWh)	ELECTRICITY CONSUMTI ON PER YEAR (kWh)
MPH	55	20	1100	11	8.8	1848	12	75	900	0.9	7.2	1512
CORRIDOR	55	5	275	0.275	2.2	462						
R.R	55	1	55	0.055	0.22	46.2						

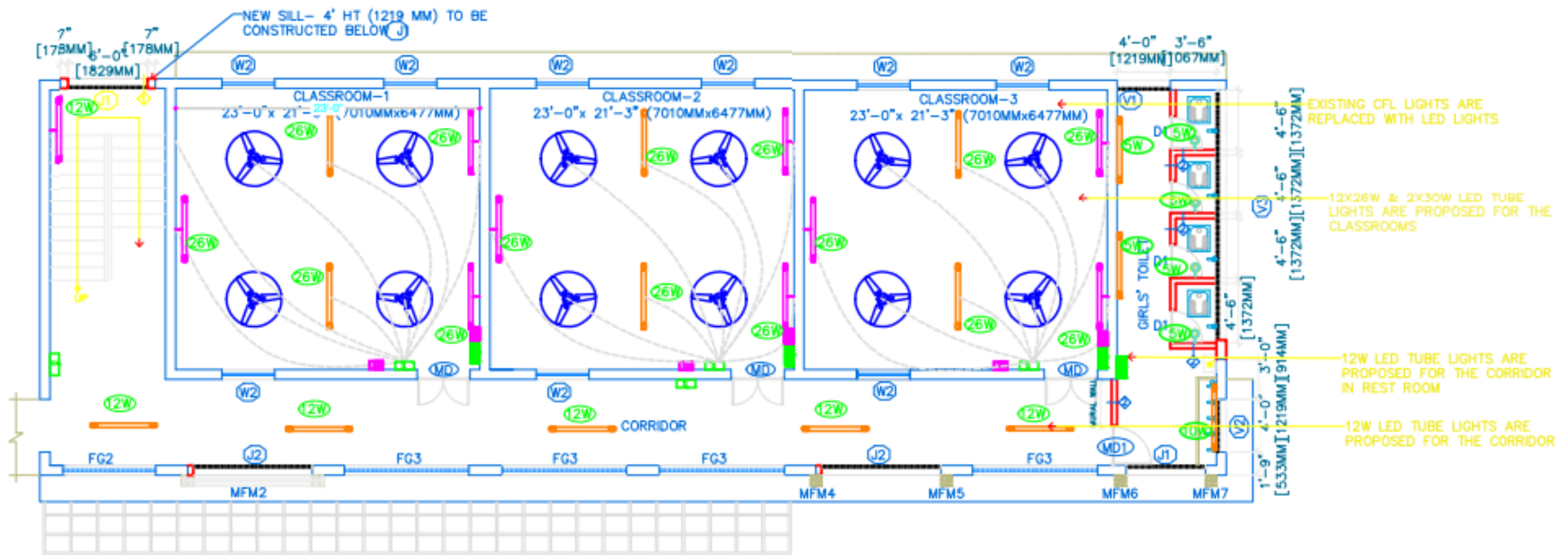
SPACE REF.	AREA(sq.mt)	PROPOSED LED LAMPS								
		LUX	TOTAL LUMEN	LUMEN OF EACH LMAP	WATTAGE OF EACH LAMP	NO.OF LAMP REQUIRED	TOTAL WATTS	ELECTRICITY CONSUMTION PER HOUR (kWh)	ELECTRICITY CONSUMTION PER DAY (kWh)	ELECTRICITY CONSUMTION PER YEAR (kWh)
BLOCK 2										
MULTI PURPOSE HALL: GF	136.96	300	41088	2600	26	12	312			
				3600	36	2	72			
TOTAL							384	0.384	3.072	644.7
CORRIDOR	48.4	100	4840	1000	12	5	60	0.06	0.48	100.8
R.R: HANDWASH	5	150	750	800	10	1	10	0.01	0.04	8.4
PATHWAY	7.2	100	720	400	5	2	10	0.01	0.04	8.4
W.C	11	150	1650	1000	12	1	12	0.012	0.048	10
I.C	5.36	150	804	400	5	4	20	0.02	0.08	16.8
TOTAL							8	0.052	0.208	43.6

EXISTING ELECTRICAL LAYOUT



PROPOSED ELECTRICAL LAYOUT

FIRST FLOOR PLAN

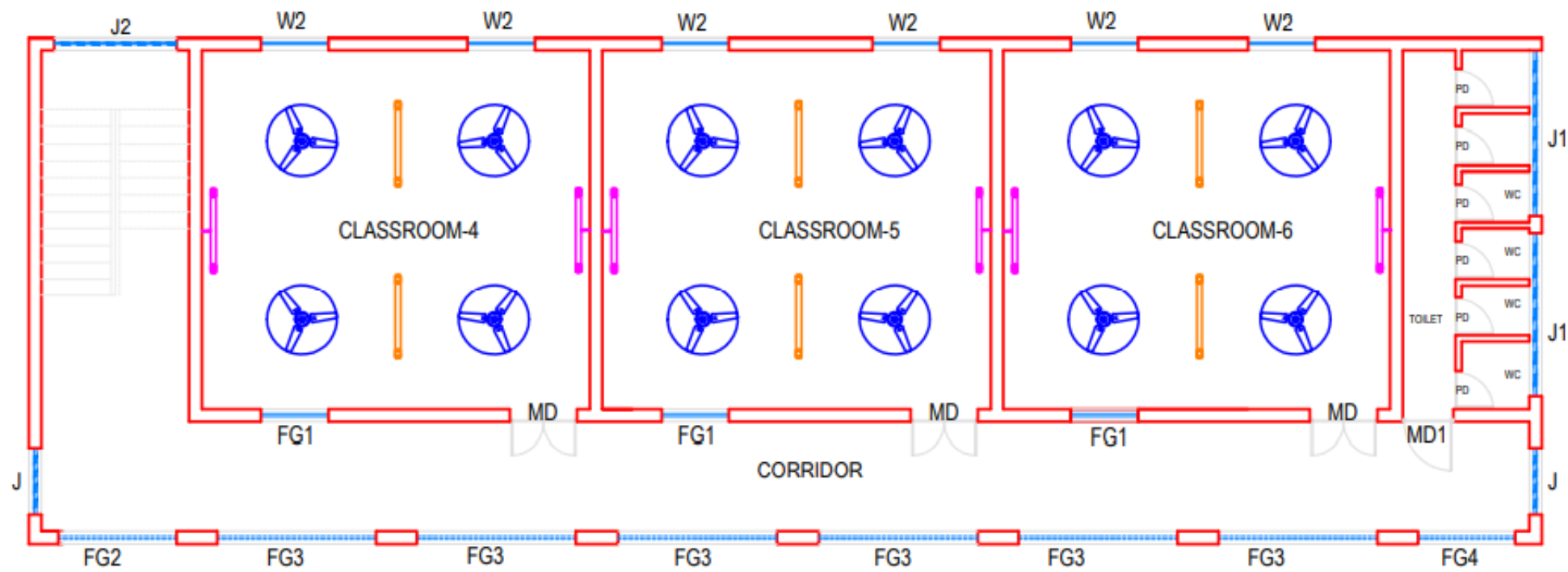


FIRST FLOOR PLAN

EXISTING LAMPS								EXISTING FANS						
SPACES	WATTAGE OF EACH LAMP	NO.OF LAMP	TOTAL WATTS	ELECTRICITY CONSUMTION PER HOUR (kWh)	ELECTRICITY CONSUMTION PER DAY (kWh)	ELECTRICITY CONSUMTION PER YEAR (kWh)		NO.S.	WATTS PER FAN	TOTAL WATTS	ELECTRICITY CONSUMTION PER HOUR (kWh)	ELECTRICITY CONSUMTION PER DAY(kWh)	ELECTRICITY CONSUMTION PER YEAR (kWh)	
CLASS ROOM 1	55	4	220	0.22	1.76	369.6		4	75	300	0.3	2.4	504	
CLASS ROOM 2	55	4	220	0.22	1.76	369.6		4	75	300	0.3	2.4	504	
CLASS ROOM 3	55	4	220	0.22	1.76	369.6		4	75	300	0.3	2.4	504	
CLASS ROOM 4	55	4	220	0.22	1.76	369.6		4	75	300	0.3	2.4	504	
		16	880	0.88	7.04	1478.4		16	300	1200	1.2	9.6	2016	
CORRIDOR	55	5	275	0.275	2.2	462								

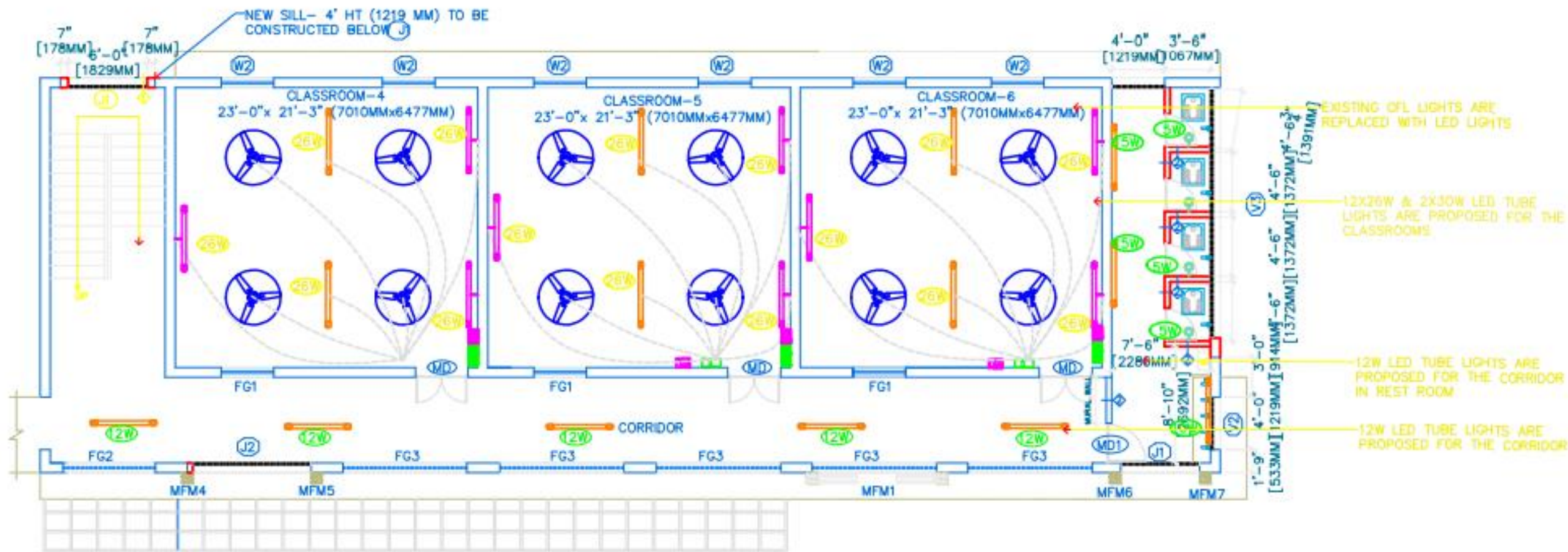
PROPOSED LED LAMPS											
SPACE		LUX	TOTAL LUMEN	LUMEN OF EACH LMAP	WATTAG E OF EACH LAMP	NO.OF LAMP REQUIRE D	TOTAL WATTS	ELECTRICITY CONSUMTIO N PER HOUR (kWh)	ELECTRICITY CONSUMTIO N PER DAY (kWh)	ELECTRICITY CONSUMTION PER YEAR (kWh)	
CLASS ROOM 1	46	300	13800	2600	26	5	130	0.13	1.04	218.4	
CLASS ROOM 2	46	300	13800	2600	26	5	130	0.13	1.04	218.4	
CLASS ROOM 3	46	300	13800	2600	26	5	130	0.13	1.04	218.4	
CLASS ROOM 4	46	300	13800	2600	26	5	130	0.13	1.04	218.4	
	TOTAL					20	520	0.52	4.16	873.6	
CORRIDOR	48.4	100	4840	1000	12	5	60	0.06	0.48	100.8	
R.R: HANDWASH	5	150	750	800	10	1	10	0.01	0.04	8.4	
PATHWAY	7.2	100	720	400	5	2	10	0.01	0.04	8.4	
I.C	8.04	150	1206	400	5	6	30	0.03	0.12	25.2	
	TOTAL					14	110	0.11	0.68	142.8	

EXISTING ELECTRICAL LAYOUT



PROPOSED ELECTRICAL LAYOUT

SECOND FLOOR PLAN

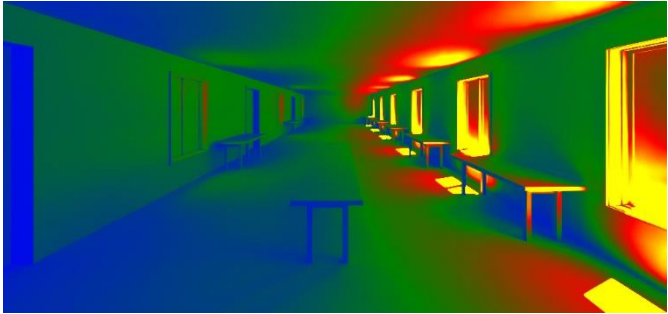
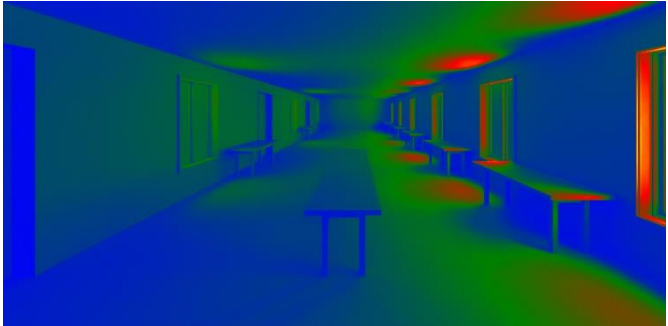
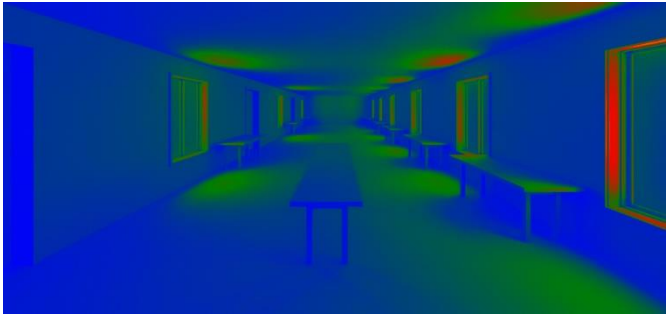
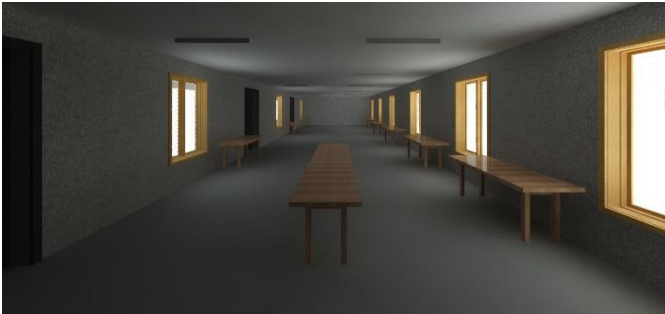
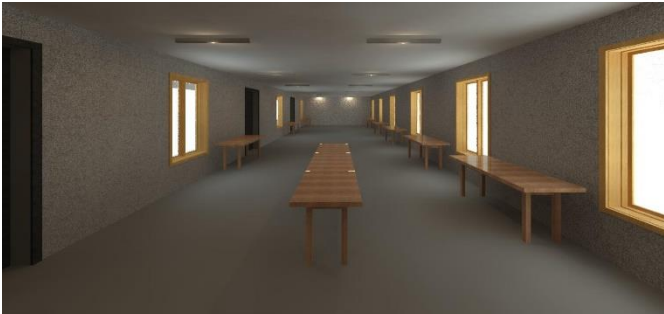


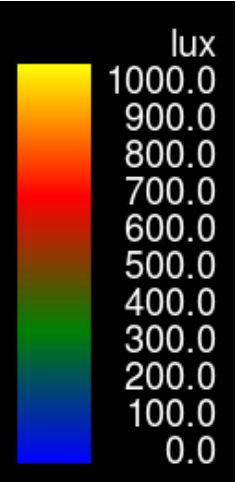
EXISTING LAMPS								EXISTING FANS						
SPACES	WATTAGE OF EACH LAMP	NO.OF LAMP	TOTAL WATTS	ELECTRICITY CONSUMTION PER HOUR (kWh)	ELECTRICITY CONSUMTION PER DAY (kWh)	ELECTRICITY CONSUMTION PER YEAR (kWh)		NO.S.	WATTS PER FAN	TOTAL WATTS	ELECTRICITY CONSUMTION PER HOUR (kWh)	ELECTRICITY CONSUMTION PER DAY(kWh)	ELECTRICITY CONSUMTION PER YEAR (kWh)	
CLASS ROOM 1	55	4	220	0.22	1.76	369.6		4	75	300	0.3	2.4	504	
CLASS ROOM 2	55	4	220	0.22	1.76	369.6		4	75	300	0.3	2.4	504	
CLASS ROOM 3	55	4	220	0.22	1.76	369.6		4	75	300	0.3	2.4	504	
CLASS ROOM 4	55	4	220	0.22	1.76	369.6		4	75	300	0.3	2.4	504	
		16	880	0.88	7.04	1478.4		16	300	1200	1.2	9.6	2016	
CORRIDOR	55	5	275	0.275	2.2	462								

PROPOSED LED LAMPS											
SPACE		LUX	TOTAL LUMEN	LUMEN OF EACH LMAP	WATTAG E OF EACH LAMP	NO.OF LAMP REQUIRE D	TOTAL WATTS	ELECTRICITY CONSUMTIO N PER HOUR (kWh)	ELECTRICITY CONSUMTIO N PER DAY (kWh)	ELECTRICITY CONSUMTION PER YEAR (kWh)	
CLASS ROOM 1	46	300	13800	2600	26	5	130	0.13	1.04	218.4	
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CLASS ROOM 3	46	300	13800	2600	26	5	130	0.13	1.04	218.4	
CLASS ROOM 4	46	300	13800	2600	26	5	130	0.13	1.04	218.4	
	TOTAL					20	520	0.52	4.16	873.6	
CORRIDOR	48.4	100	4840	1000	12	5	60	0.06	0.48	100.8	
R.R: HANDWASH	5	150	750	800	10	1	10	0.01	0.04	8.4	
PATHWAY	7.2	100	720	400	5	2	10	0.01	0.04	8.4	
I.C	8.04	150	1206	400	5	6	30	0.03	0.12	25.2	
	TOTAL					14	110	0.11	0.68	142.8	

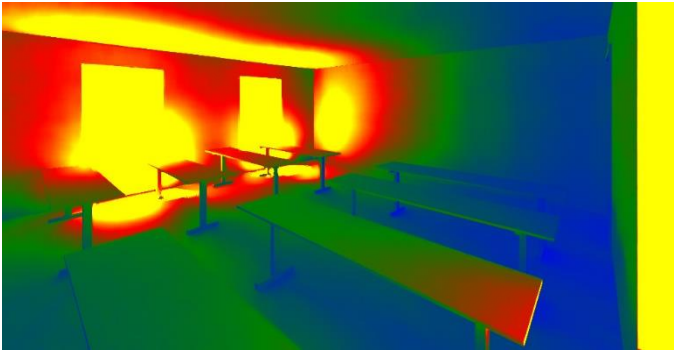
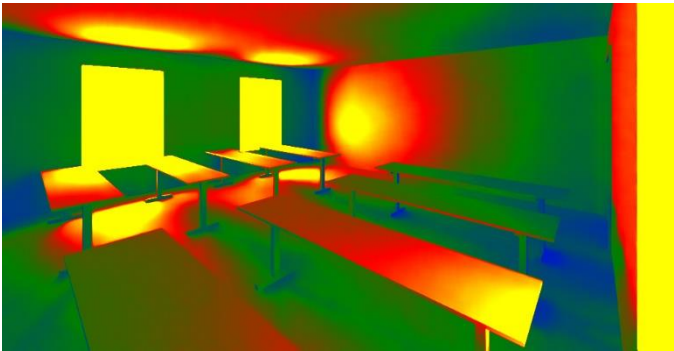
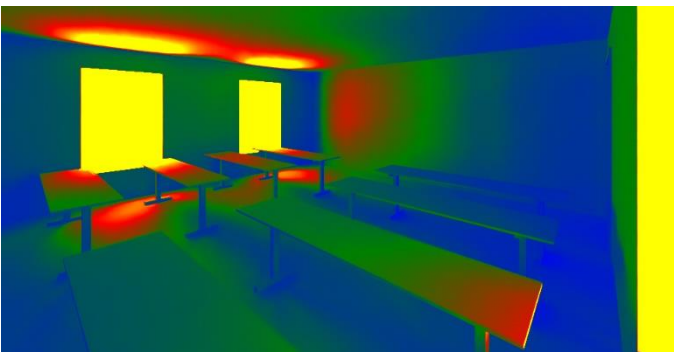
SPACE REF.	AREA(sq.mt)	PROPOSED LED LAMPS								
		LUX	TOTAL LUMEN	LUMEN OF EACH LMAP	WATTAGE OF EACH LAMP	NO.OF LAMP REQUIRED	TOTAL WATTS	ELECTRICITY CONSUMPTION PER HOUR (kWh)	ELECTRICITY CONSUMTION PER DAY (kWh)	ELECTRICITY CONSUMTION PER YEAR (kWh)
BLOCK 2										
MULTI PURPOSE HALL: GF	136.96	300	41088	2600	26	12	312			
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W.C	11	150	1650	1000	12	1	12	0.012	0.048	10
I.C	5.36	150	804	400	5	4	20	0.02	0.08	16.8
TOTAL						8	52	0.052	0.208	43.6
BLOCK 2: FIRST FLOOR										
CLASS ROOM 1	46	300	13800	2600	26	5	130	0.13	1.04	218.4
CLASS ROOM 2	46	300	13800	2600	26	5	130	0.13	1.04	218.4
CLASS ROOM 3	46	300	13800	2600	26	5	130	0.13	1.04	218.4
CLASS ROOM 4	46	300	13800	2600	26	5	130	0.13	1.04	218.4
	TOTAL					20	520	0.52	4.16	873.6
CORRIDOR	48.4	100	4840	1000	12	5	60	0.06	0.48	100.8
R.R: HANDWASH	5	150	750	800	10	1	10	0.01	0.04	8.4
PATHWAY	7.2	100	720	400	5	2	10	0.01	0.04	8.4
I.C	8.04	150	1206	400	5	6	30	0.03	0.12	25.2
	TOTAL					14	110	0.11	0.68	142.8
BLOCK 2:SECOND FLOOR										
CLASS ROOM 1	46	300	13800	2600	26	5	130	0.13	1.04	218.4
CLASS ROOM 2	46	300	13800	2600	26	5	130	0.13	1.04	218.4
CLASS ROOM 3	46	300	13800	2600	26	5	130	0.13	1.04	218.4
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PATHWAY	7.2	100	720	400	5	2	10	0.01	0.04	8.4
I.C	8.04	150	1206	400	5	6	30	0.03	0.12	25.2
	TOTAL					9	50	0.05	0.2	42
ANNUAL ELECTRICITY CONSUMPTION OF BLOCK 2: PL: 8466 ;EL:11873										2922.7

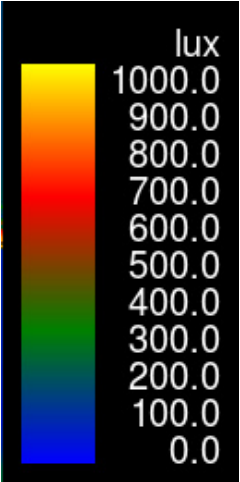
LIGHTING ANALYSIS - BLOCK 2

SKY CONDITION	DAY-LIGHT LUX LEVELS	DAY-LIGHT VIEW	DAY-LIGHT WITH ELECTRIC FIXTURES
CLEAR SKY			
INTERMEDIATE SKY			
OVERCAST SKY			

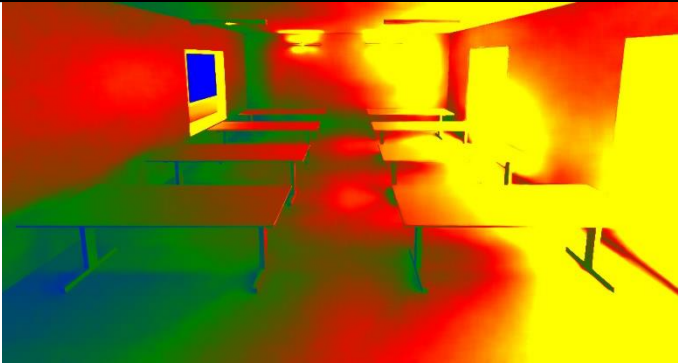
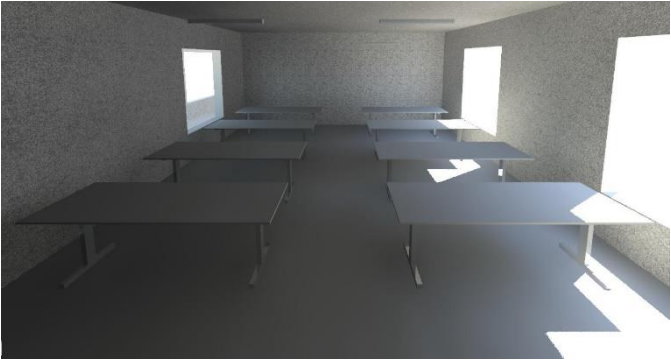
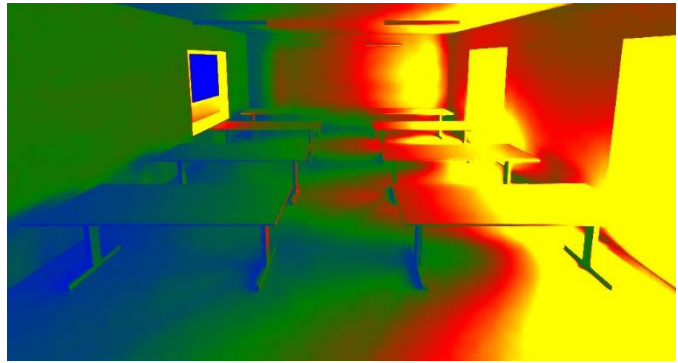
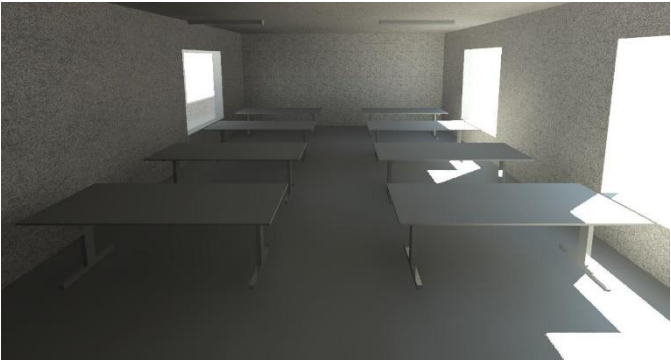
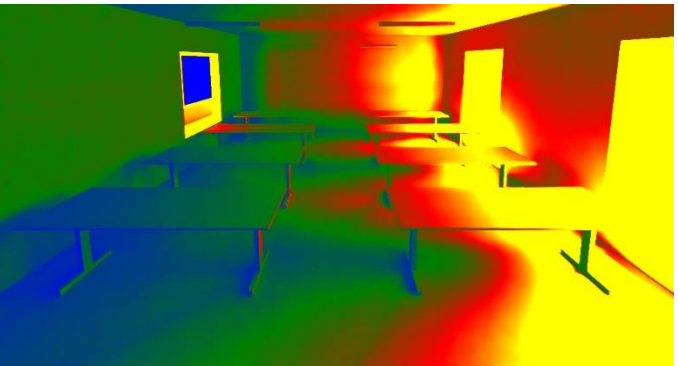
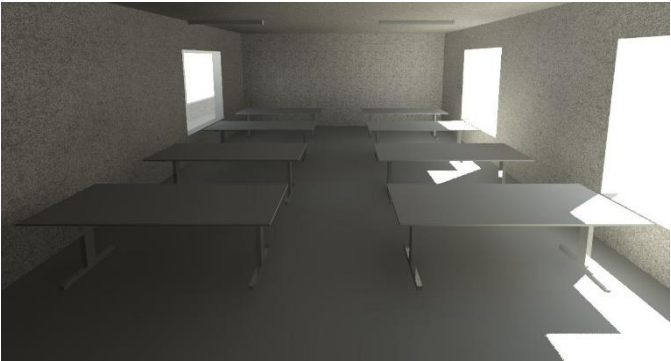


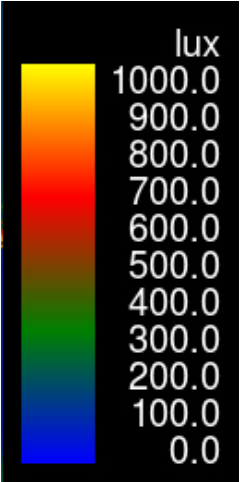
LIGHTING ANALYSIS - BLOCK 2

SKY CONDITION	DAY-LIGHT LUX LEVELS	DAY-LIGHT VIEW	DAY-LIGHT WITH ELECTRIC FIXTURES
CLEAR SKY			
INTERMEDIATE SKY			
OVERCAST SKY			



LIGHTING ANALYSIS - BLOCK 2

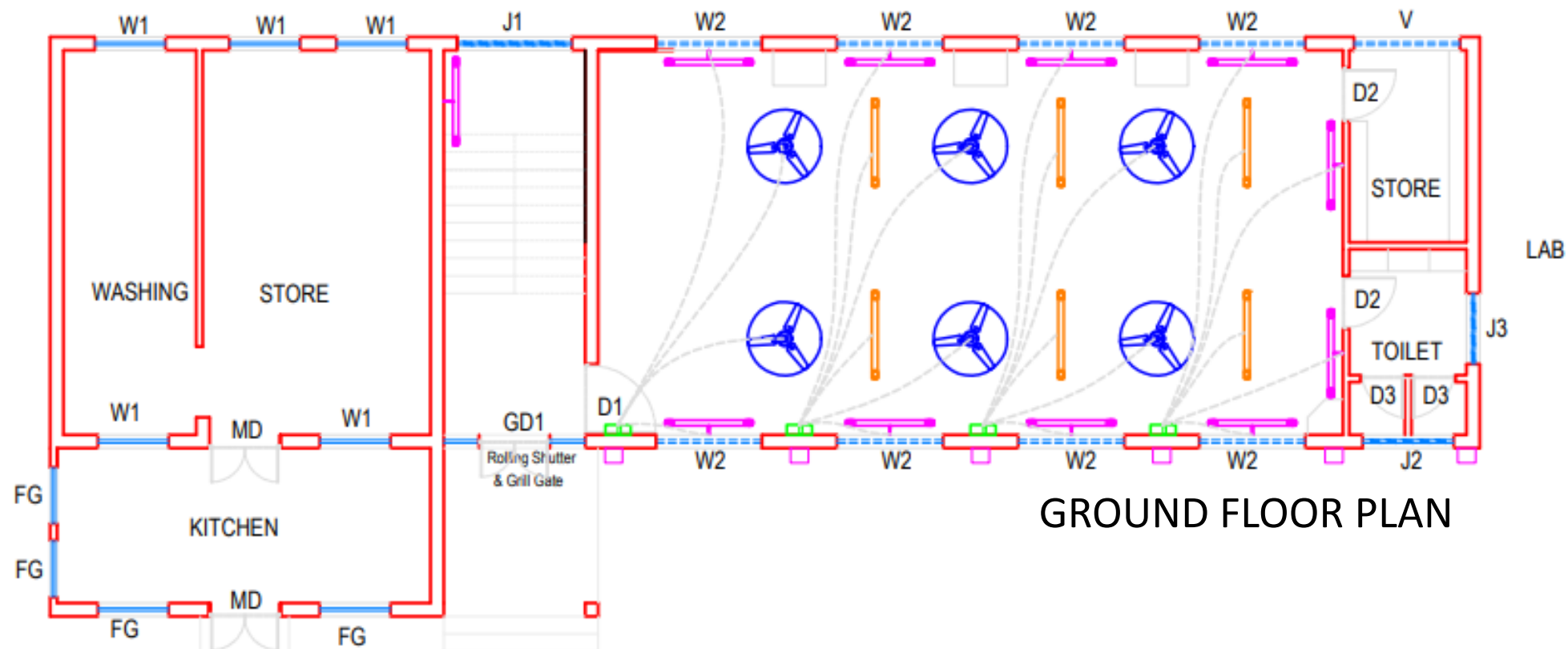
SKY CONDITION	DAY-LIGHT LUX LEVELS	DAY-LIGHT VIEW	DAY-LIGHT WITH ELECTRIC FIXTURES
CLEAR SKY			
INTERMEDIATE SKY			
OVERCAST SKY			



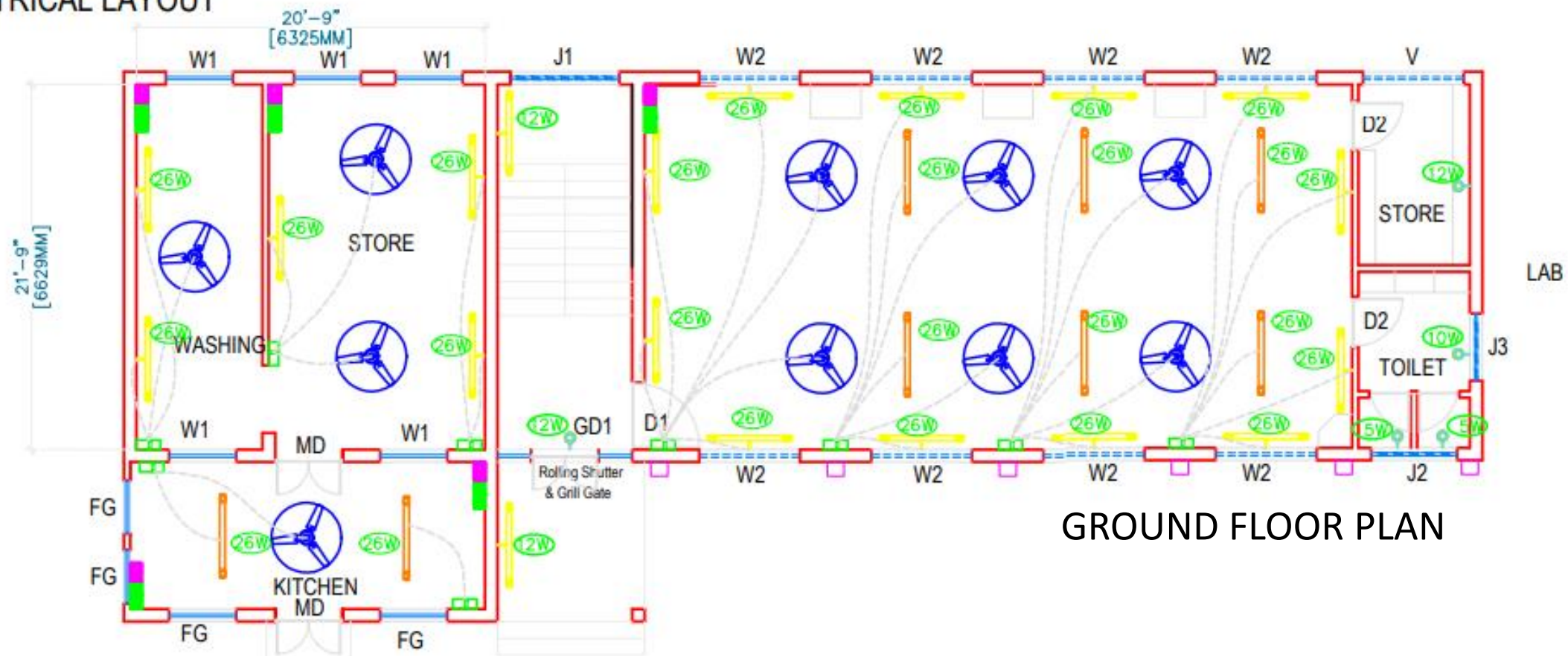
BLOCK - 3
(LABORATORY & CLASSROOM)

BLOCK:3

EXISTING ELECTRICAL LAYOUT



PROPOSED ELECTRICAL LAYOUT



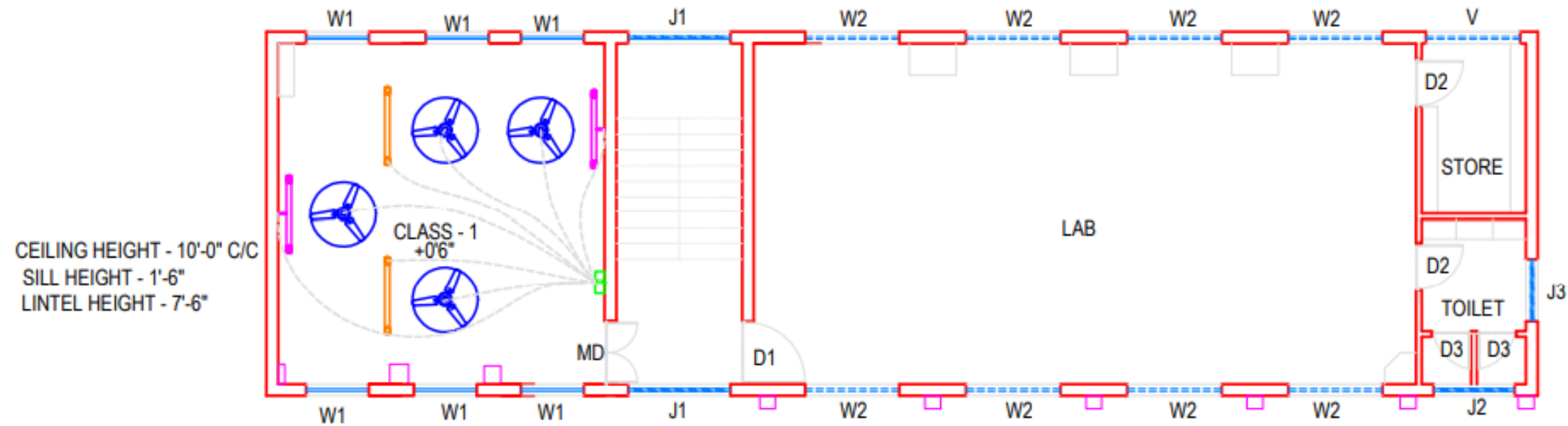
GROUND FLOOR PLAN

CEILING HEIGHT - 10'-0" C/C
SILL HEIGHT - 2'-0"
LINTEL HEIGHT - 8'-0"

EXISTING LAMPS							EXISTING FANS					
SPACES	WATTAGE OF EACH LAMP	NO.OF LAMP	TOTAL WATTS	ELECTRICITY CONSUMPTION PER HOUR (kWh)	ELECTRICITY CONSUMPTION PER DAY (kWh)	ELECTRICITY CONSUMPTION PER YEAR (kWh)	NO.S.	WATTS PER FAN	TOTAL WATTS	ELECTRICITY CONSUMPTION PER HOUR (kWh)	ELECTRICITY CONSUMPTION PER DAY(kWh)	ELECTRICITY CONSUMPTION PER YEAR (kWh)
BLOCK:3	55	16	880	0.88	7.04	1478.4	6	75	450	0.45	3.6	756
LAB:G.F	55	1	55	0.055	2.2	462						
STORE	55	1	55	0.55	2.2	462						
REST ROOM		18	990	1.485	11.44	2402.4						
	55	4	220	0.22	0.88	184.8	1	75	75	0.075	0.3	63
	55	4	220	2.2	8.8	1848	3	75	225	0.225	0.9	189
KITCHEN		8	440	2.42	9.68	2032.8	4		300	0.3	1.2	252
WASH	55	16	880	0.88	7.04	1478.4	6	75	450	0.45	3.6	756
	55	1	55	0.055	2.2	462						
	55	1	55	0.55	2.2	462						
		18	990	1.485	11.44	2402.4						756

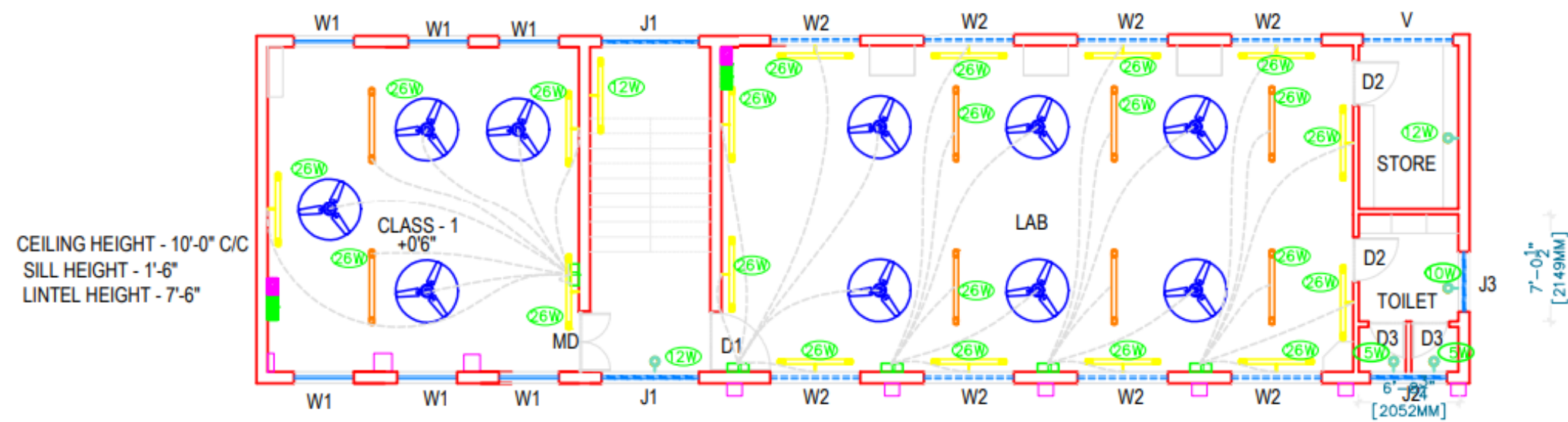
PROPOSED LED LAMPS											
SPACE	AREA	LUX	TOTAL LUMEN	LUMEN OF EACH LMAP	WATTA GE OF EACH LAMP	NO.OF LAMP REQUIRE D	TOTAL WATTS	ELECTRICITY CONSUMTIO N PER HOUR (kWh)	ELECTRICITY CONSUMTION PER DAY (kWh)	ELECTRICITY CONSUMTION PER YEAR (kWh)	
BLOCK:3											
LAB:G.F	91.7	500	45500	2600	26	18	468	0.468	3.744	786.24	
STORE	6.6	150	990	1000	12	1	12	0.012	0.048	10.08	
REST ROOM	4.4	150	660	500	5	2	10	0.01	0.04	8.4	
TOTAL						21	490	0.49	3.832	804.72	
KITCHEN	19	300	5700	2600	26	2	52	0.052	0.208	58.8	
WASH	44	300	13200	2600	26	5	130	0.13	0.52	109.2	
TOTAL						7	182	0.182	0.728	168	

EXISTING ELECTRICAL LAYOUT



FIRST & SECOND FLOOR PLAN

PROPOSED ELECTRICAL LAYOUT

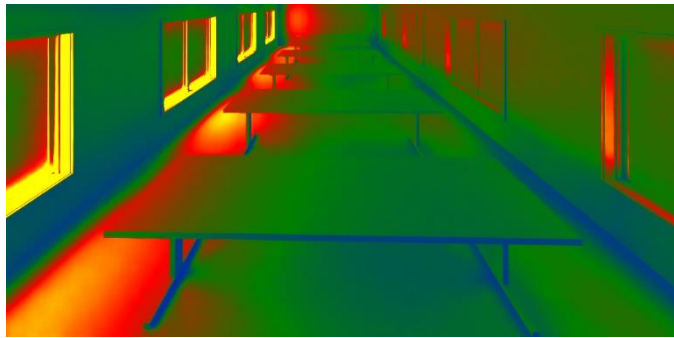
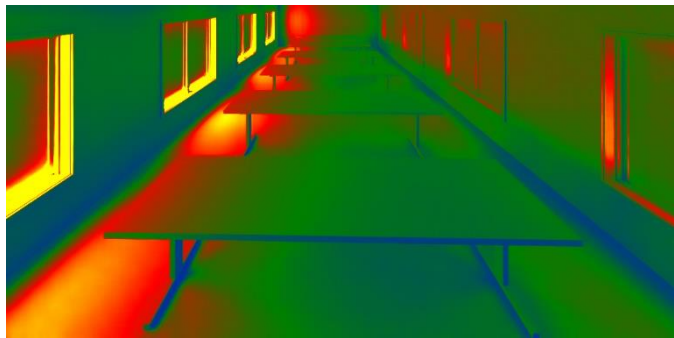
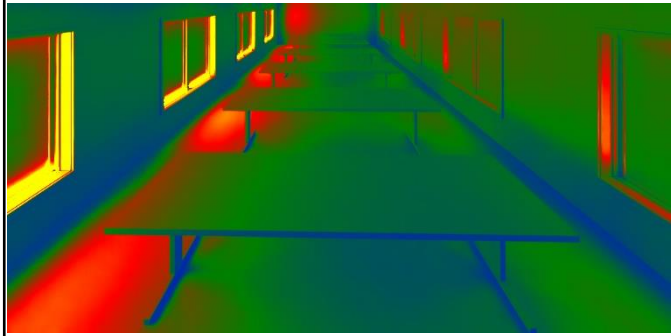


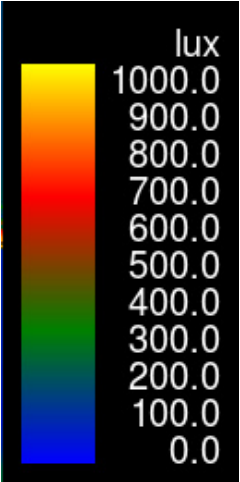
FIRST & SECOND FLOOR PLAN

EXISTING LAMPS							EXISTING FANS					
SPACES	WATTAGE OF EACH LAMP	NO.OF LAMP	TOTAL WATTS	ELECTRICITY CONSUMTION PER HOUR (kWh)	ELECTRICITY CONSUMTION PER DAY (kWh)	ELECTRICITY CONSUMTION PER YEAR (kWh)	NO.S.	WATTS PER FAN	TOTAL WATTS	ELECTRICITY CONSUMTION PER HOUR (kWh)	ELECTRICITY CONSUMTION PER DAY(kWh)	ELECTRICITY CONSUMTION PER YEAR (kWh)
LAB:F.F	55	16	880	880	0.88	1478.4	6	75	450	0.45	3.6	756
STORE	55	1	55	55	0.055	462						
REST ROOM	55	1	55	55	0.55	462						
		18	990	990	1.485	2402.4						756
CLASSROOM	55	4	220	220	0.22	36.96	4	75	300	0.3	2.4	19.2
S.F: CLASSROOM	55	4	220	220	0.22	36.96	4	75	300	0.3	2.4	19.2
		26	1430	1430	1.925	2476.32	14		1050	1.05	8.4	794.4

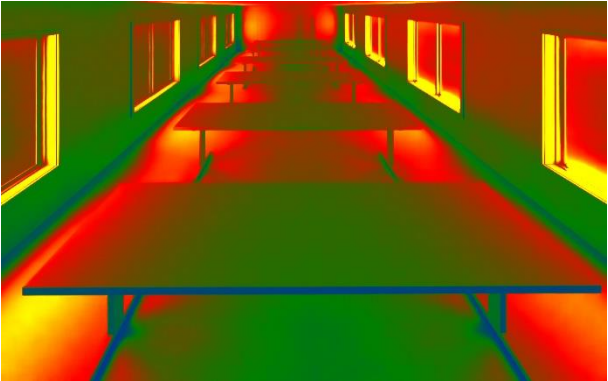
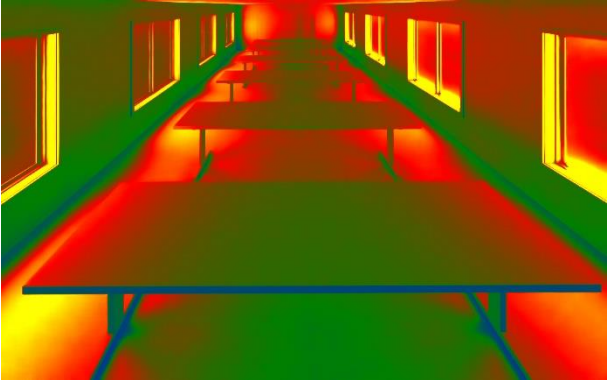
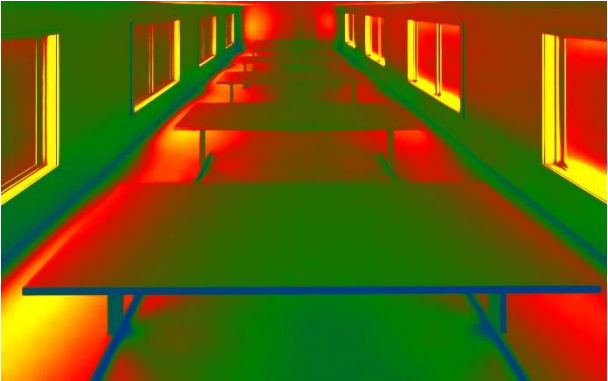
PROPOSED LED LAMPS											
SPACE	AREA	LUX	TOTAL LUMEN	LUMEN OF EACH LMAP	WATTAGE OF EACH LAMP	NO.OF LAMP REQUIRED	TOTAL WATTS	ELECTRICITY CONSUMTION PER HOUR (kWh)	ELECTRICITY CONSUMTION PER DAY (kWh)	ELECTRICITY CONSUMPTION PER YEAR (kWh)	
LAB:F.F	91.7	500	45500	2600	26	18	468	0.468	3.744	786.24	
STORE	6.6	150	990	1000	12	1	12	0.012	0.048	10.08	
REST ROOM	4.4	150	660	500	5	2	10	0.01	0.04	8.4	
TOTAL						21	490	0.49	3.832	804.72	
CLASSROOM	42	300	12600	2600	26	5	130	0.13	1.04	218.4	
S.F: CLASSROOM	42	300	12600	2600	26	5	130	0.13	1.04	218.4	
GRAND TOTAL						31	750	0.75	5.912	1241.52	

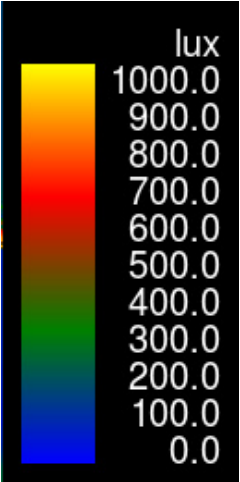
LIGHTING ANALYSIS - BLOCK 3

SKY CONDITION	DAY-LIGHT LUX LEVELS	DAY-LIGHT VIEW	DAY-LIGHT WITH ELECTRIC FIXTURES
CLEAR SKY			
INTERMEDIATE SKY			
OVERCAST SKY			



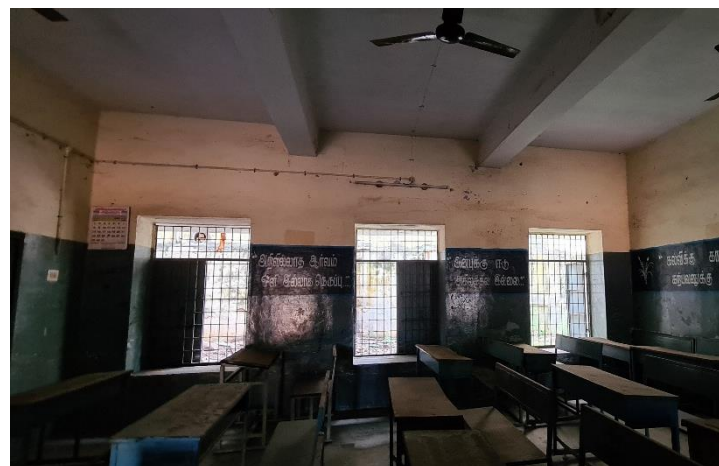
LIGHTING ANALYSIS - BLOCK 3

SKY CONDITION	DAY-LIGHT LUX LEVELS	DAY-LIGHT VIEW	DAY-LIGHT WITH ELECTRIC FIXTURES
CLEAR SKY			
INTERMEDIATE SKY			
OVERCAST SKY			



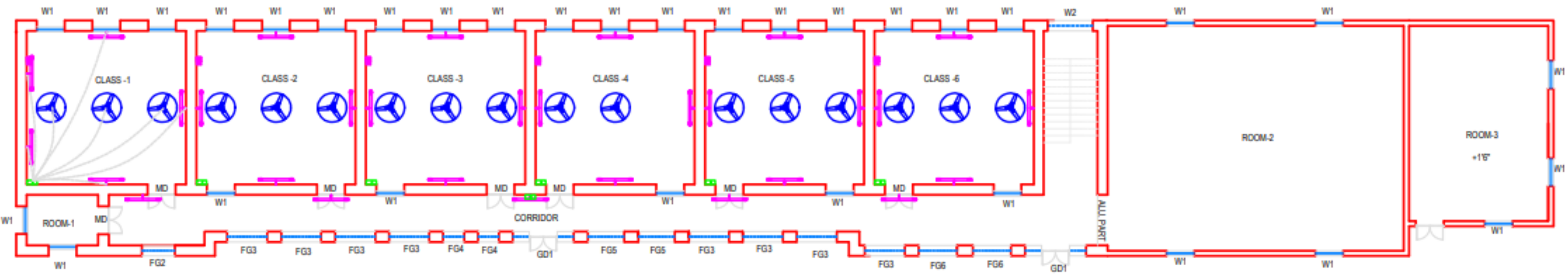
BLOCK – 4

(CLASSROOMS & LAB)



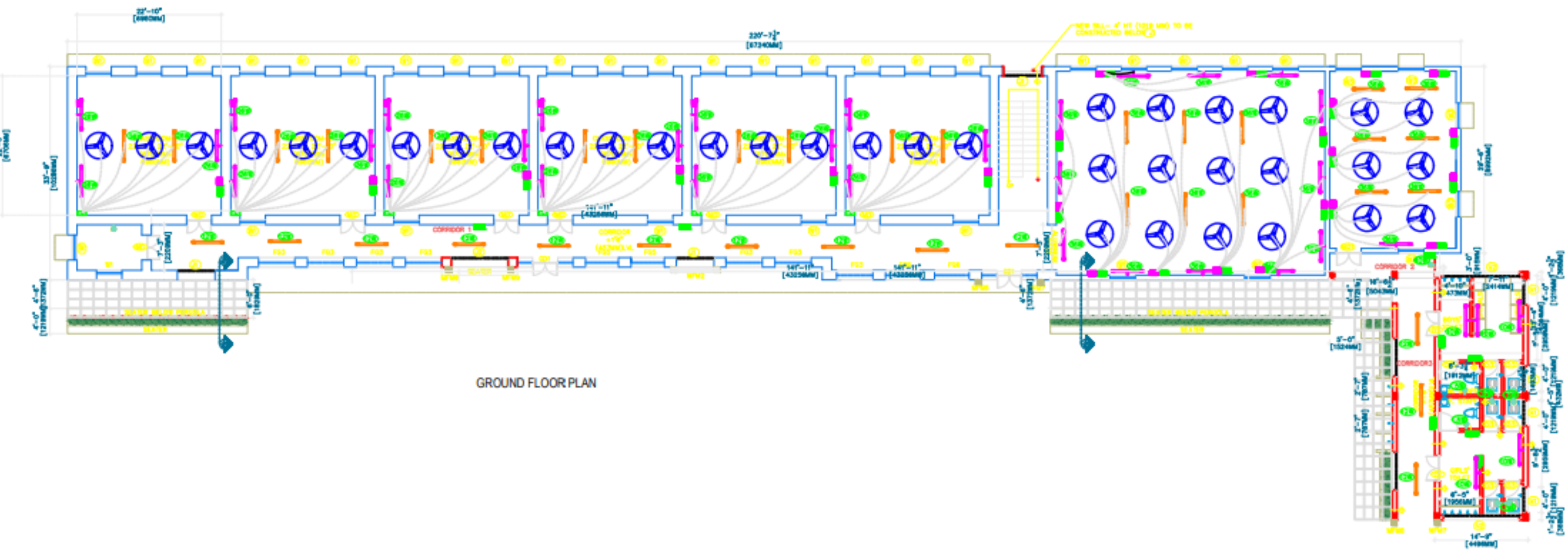
BLOCK:4

EXISTING ELECTRICAL LAYOUT



GROUND FLOOR PLAN

PROPOSED ELECTRICAL LAYOUT

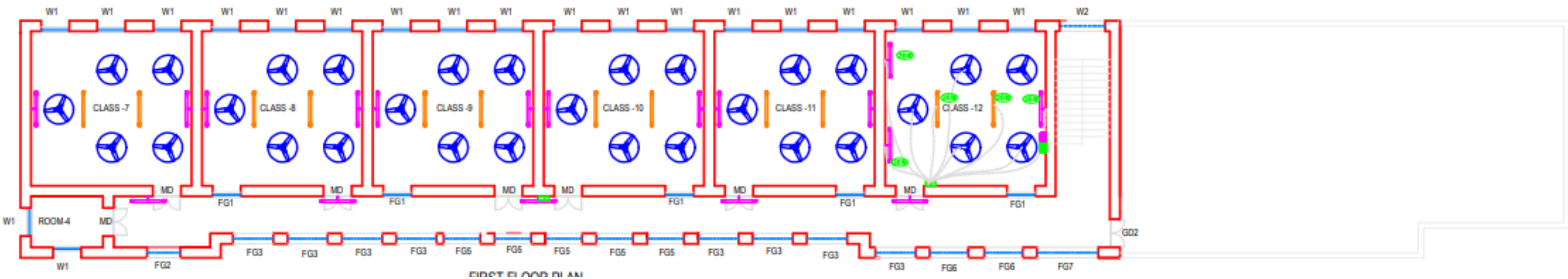


GROUND FLOOR PLAN

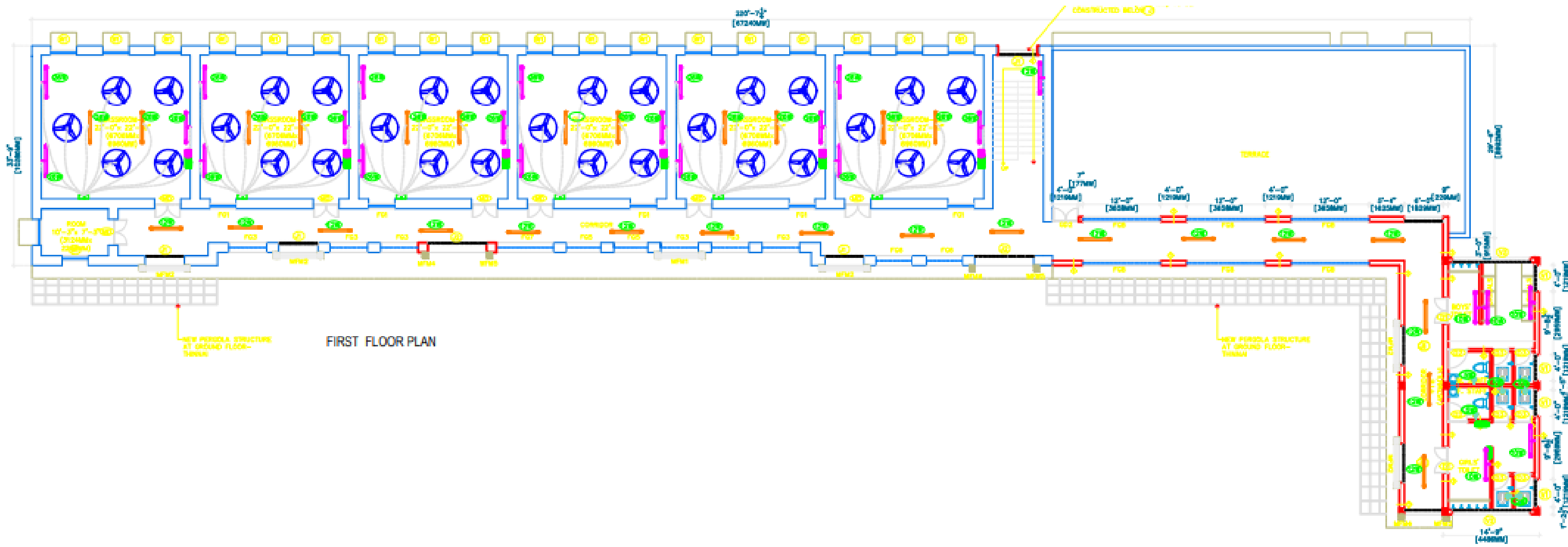
SPACES	WATTAGE OF EACH LAMP	NO.OF LAMP	TOTAL WATT S	ELECTRICITY CONSUMTION PER HOUR (kWh)	ELECTRICITY CONSUMTIO N PER DAY (kWh)	ELECTRICITY CONSUMTION PER YEAR (kWh)	NO.S.	WATTS PER FAN	TOTAL WATTS	ELECTRICITY CONSUMTIO N PER HOUR (kWh)	ELECTRICITY CONSUMTIO N PER DAY(kWh)	ELECTRICITY CONSUMTIO N PER YEAR (kWh)
GF: CLASSROOM	55	3	165	0.165	1.32	277.2	3	75	225	0.225	1.8	378
CORRIDOR	55	5	275	0.275	2.2	462						
LAB	55	20	1100	1.1	8.8	1680	12	75	900	0.9	7.2	1512
REST ROOM	55											
STORE ROOM												
LAB 2							6	75	450	0.45	3.6	756

PROPOSED LED LAMPS											
SPACE	AREA	LUX	TOTAL LUMEN	LUMEN OF EACH LAMP	WATTAGE OF EACH LAMP	NO.OF LAMP REQUIRED	TOTAL WATTS	ELECTRICITY CONSUMTION PER HOUR (kWh)	ELECTRICITY CONSUMTION PER DAY (kWh)	ELECTRICITY CONSUMTION PER YEAR (kWh)	
BLOCK4											
GF: CLASSROOM	45	300	13500	2600	26	5	130	0.13	1.04	218.4	
CORRIDOR	163	150	24450	1000	12	14	168	0.168	1.344	282.24	
LAB	130	500	65000	2600	26	18	468	0.468	3.84	806.4	
REST ROOM	11.2	150	1680	300	5	6	30	0.03	0.12	25.2	
STORE ROOM	7	150	1050	900	10	1	10	0.01	0.04	8.4	
LAB 2	130	500	65000	3600	36	18	648	0.648	5.184	1089	

EXISTING ELECTRICAL LAYOUT



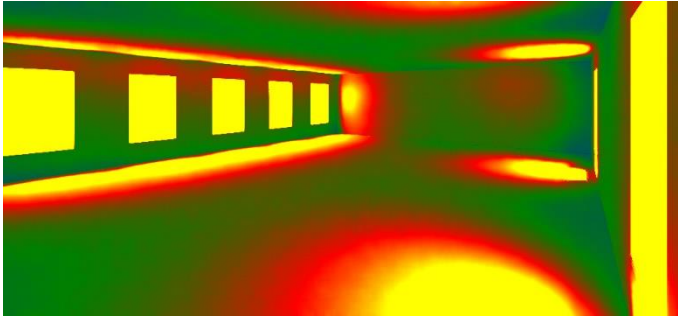
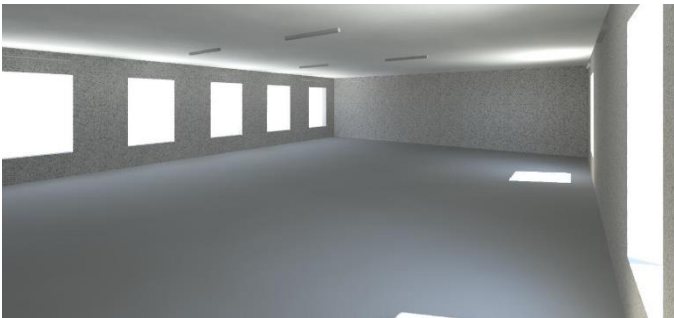
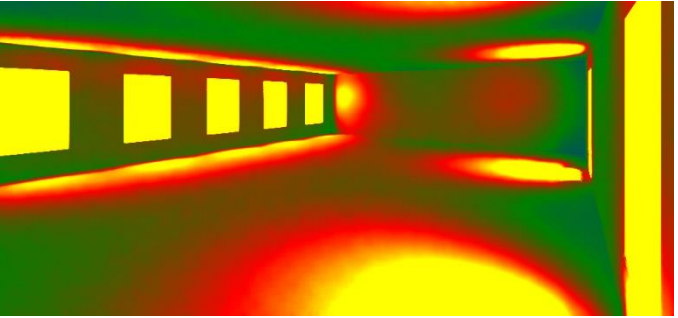
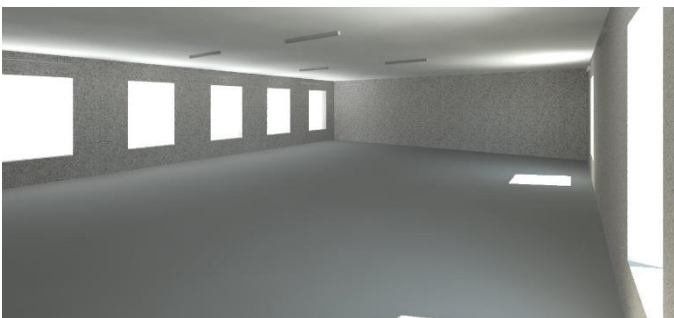
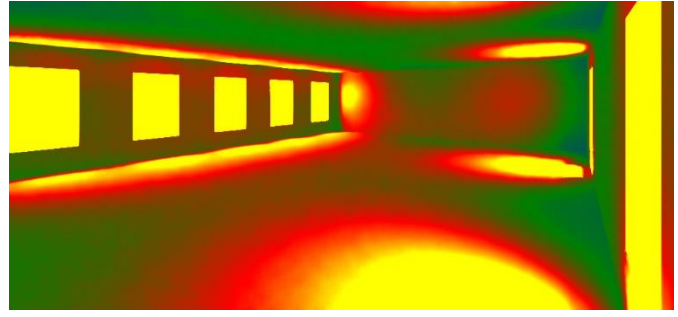
PROPOSED ELECTRICAL LAYOUT

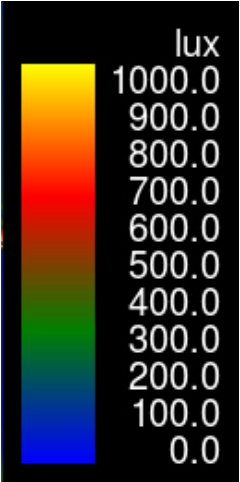


SPACES	WATTAGE OF EACH LAMP	NO.OF LAMP	TOTAL WATT S	ELECTRICITY CONSUMTION PER HOUR (kWh)	ELECTRICITY CONSUMTIO N PER DAY (kWh)	ELECTRICITY CONSUMTION PER YEAR (kWh)	NO.S.	WATTS PER FAN	TOTAL WATTS	ELECTRICITY CONSUMTIO N PER HOUR (kWh)	ELECTRICITY CONSUMTIO N PER DAY(kWh)	ELECTRICITY CONSUMTIO N PER YEAR (kWh)
FF: CLASSROOM	55	3	165	0.165	1.32	277.2	3	75	225	0.225	1.8	378
CORRIDOR	55	5	275	0.275	2.2	462						
REST ROOM												
STORE ROOM	55	1	55	0.055	0.44	92.4						
GRAND TOTAL		37	2035	2.035	16.28	3250.8	24	300	1800	1.8	14.4	3024

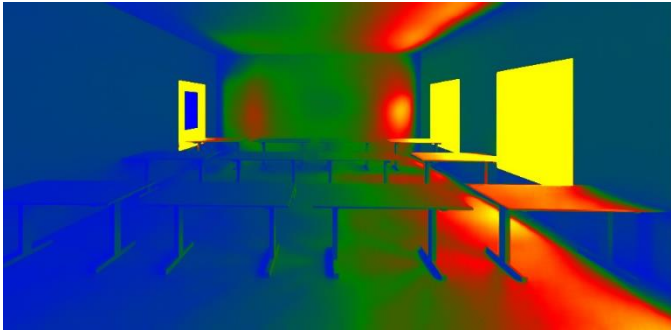
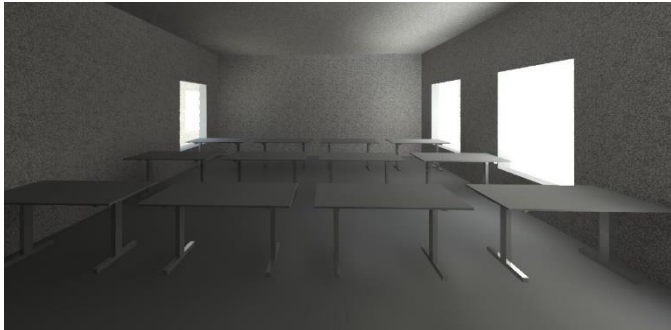
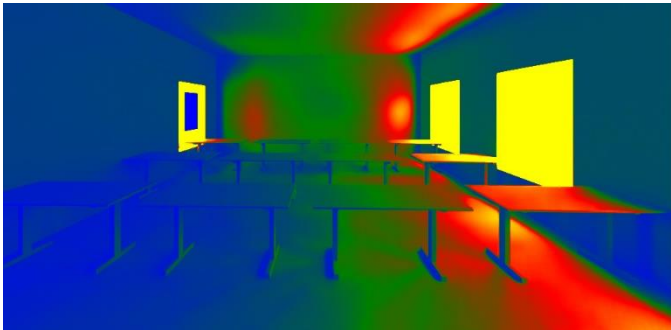
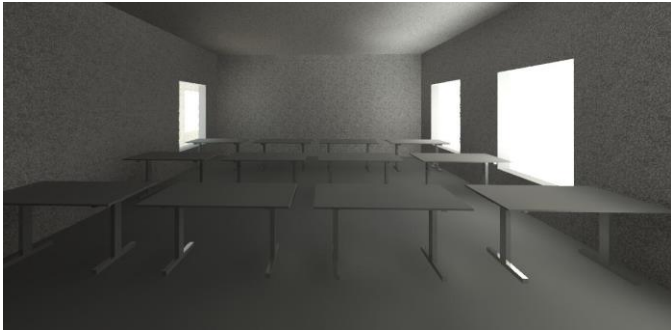
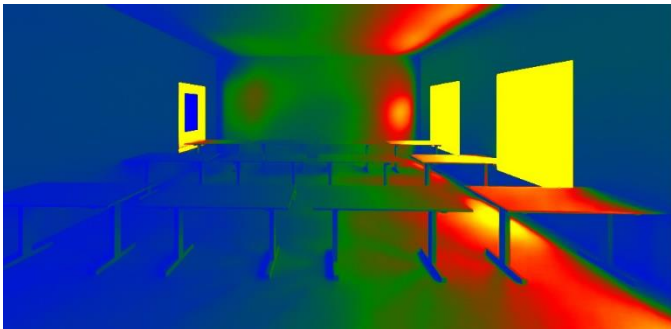
PROPOSED LED LAMPS											
SPACE	AREA	LUX	TOTAL LUMEN	LUMEN OF EACH LAMP	WATTAGE OF EACH LAMP	NO.OF LAMP REQUIRED	TOTAL WATTS	ELECTRICITY CONSUMTION PER HOUR (kWh)	ELECTRICITY CONSUMTION PER DAY (kWh)	ELECTRICITY CONSUMTION PER YEAR (kWh)	
	45	300	13500	2600	26	5	130	0.13	1.04	218.4	
	163	150	24450	1000	12	14	168	0.168	1.344	282.24	
	130	500	65000	2600	26	18	468	0.468	3.84	806.4	
	11.2	150	1680	300	5	6	30	0.03	0.12	25.2	
	7	150	1050	900	10	1	10	0.01	0.04	8.4	
	130	500	65000	3600	36	18	648	0.648	5.184	1089	

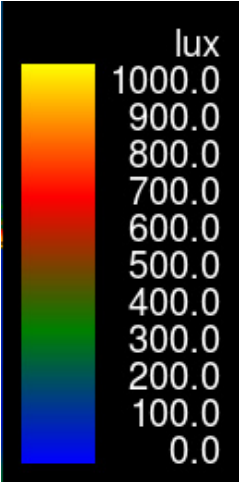
LIGHTING ANALYSIS - BLOCK 4

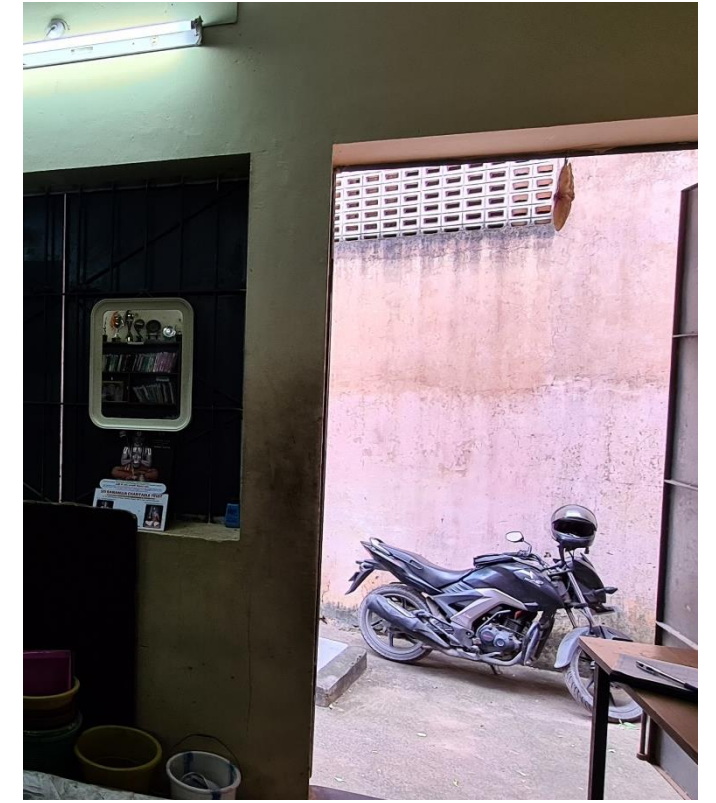
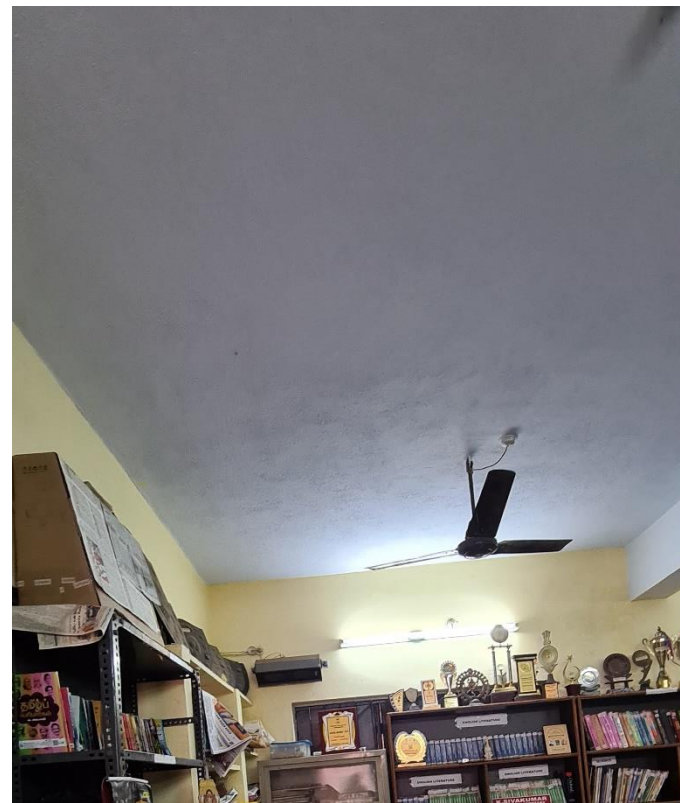
SKY CONDITION	DAY-LIGHT LUX LEVELS	DAY-LIGHT VIEW	DAY-LIGHT WITH ELECTRIC FIXTURES
CLEAR SKY			
INTERMEDIATE SKY			
OVERCAST SKY			



LIGHTING ANALYSIS - BLOCK 4

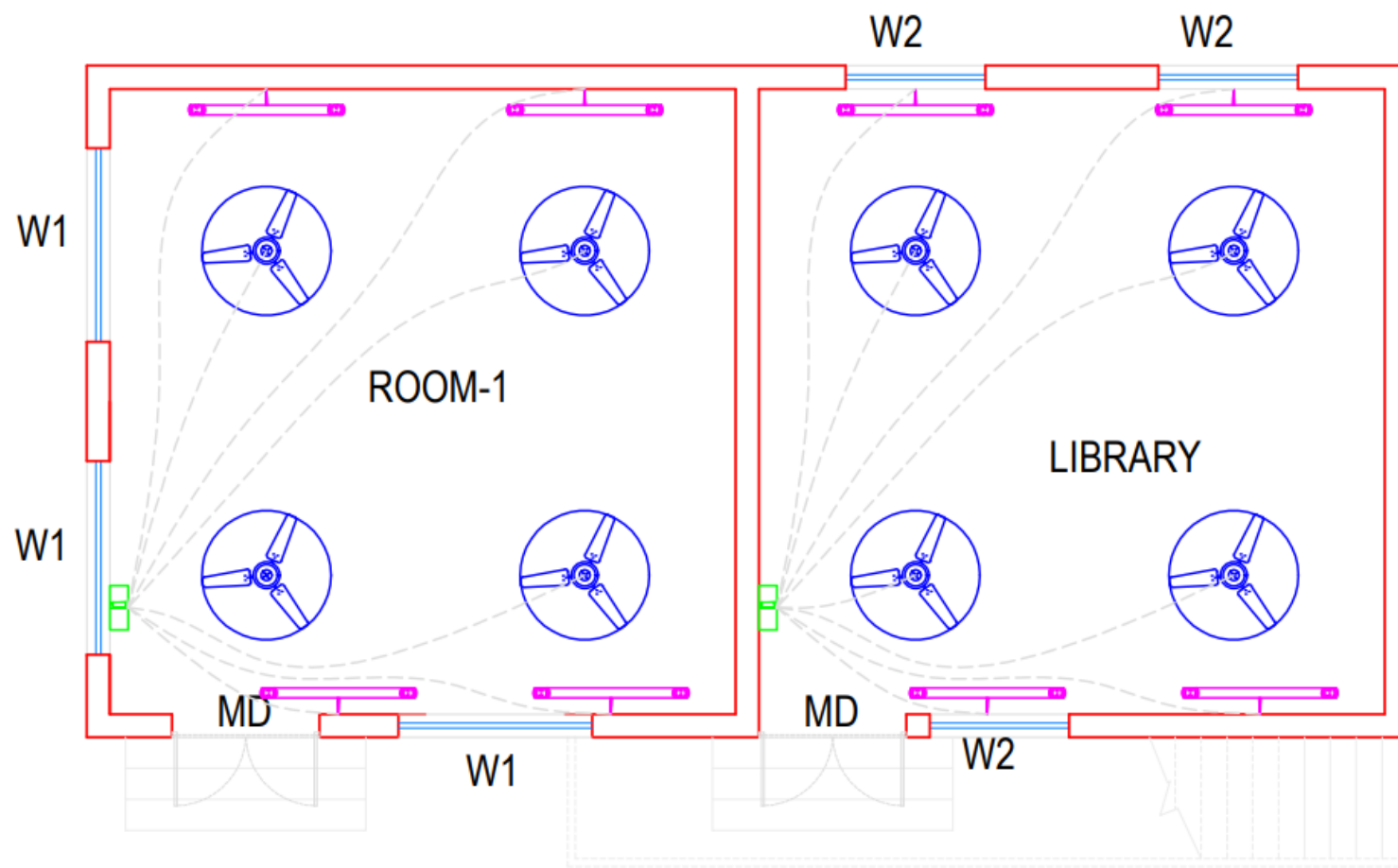
SKY CONDITION	DAY-LIGHT LUX LEVELS	DAY-LIGHT VIEW	DAY-LIGHT WITH ELECTRIC FIXTURES
CLEAR SKY			
INTERMEDIATE SKY			
OVERCAST SKY			



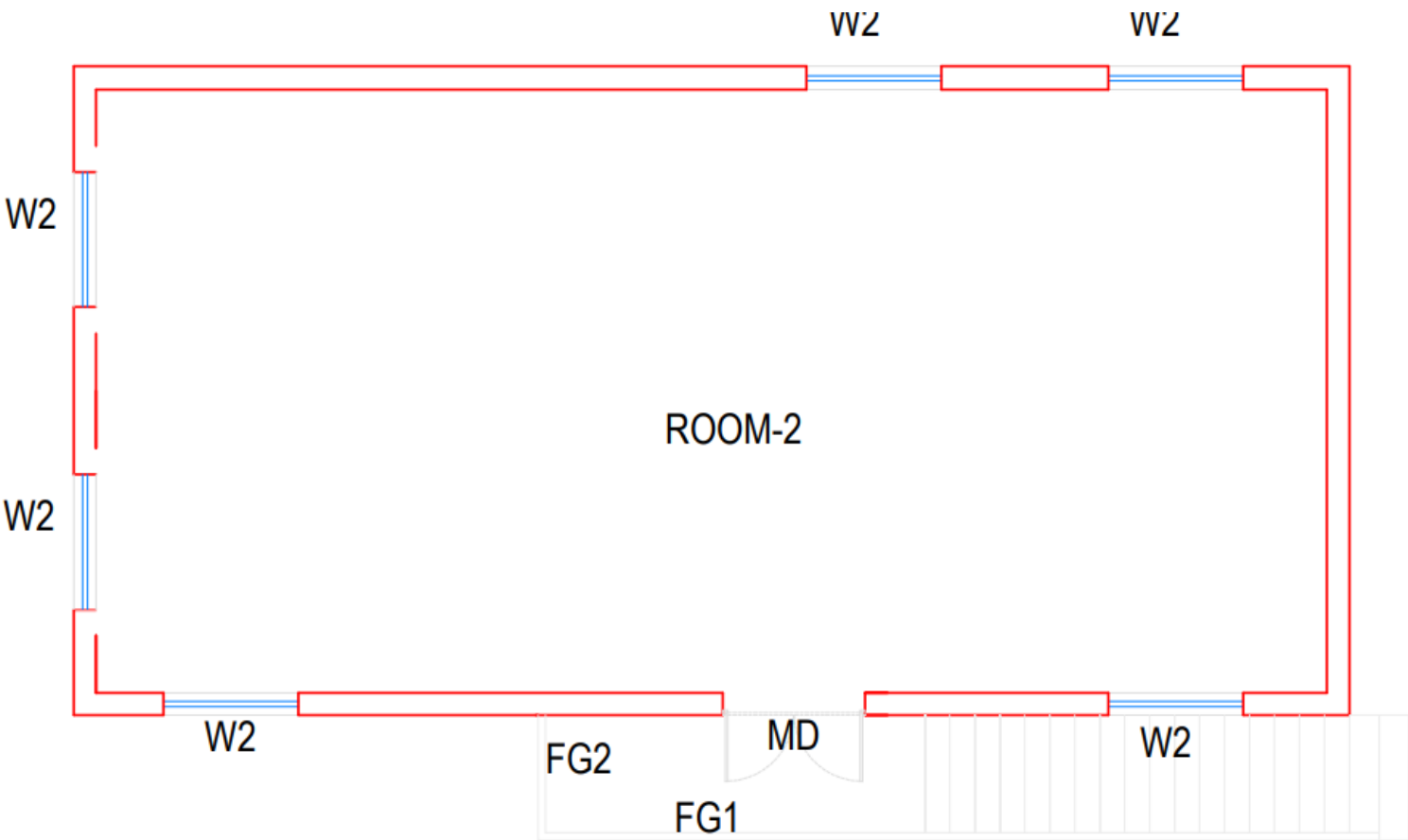


LIBRARY & AV ROOM

EXISTING ELECTRICAL LAYOUT OF LIBRARY

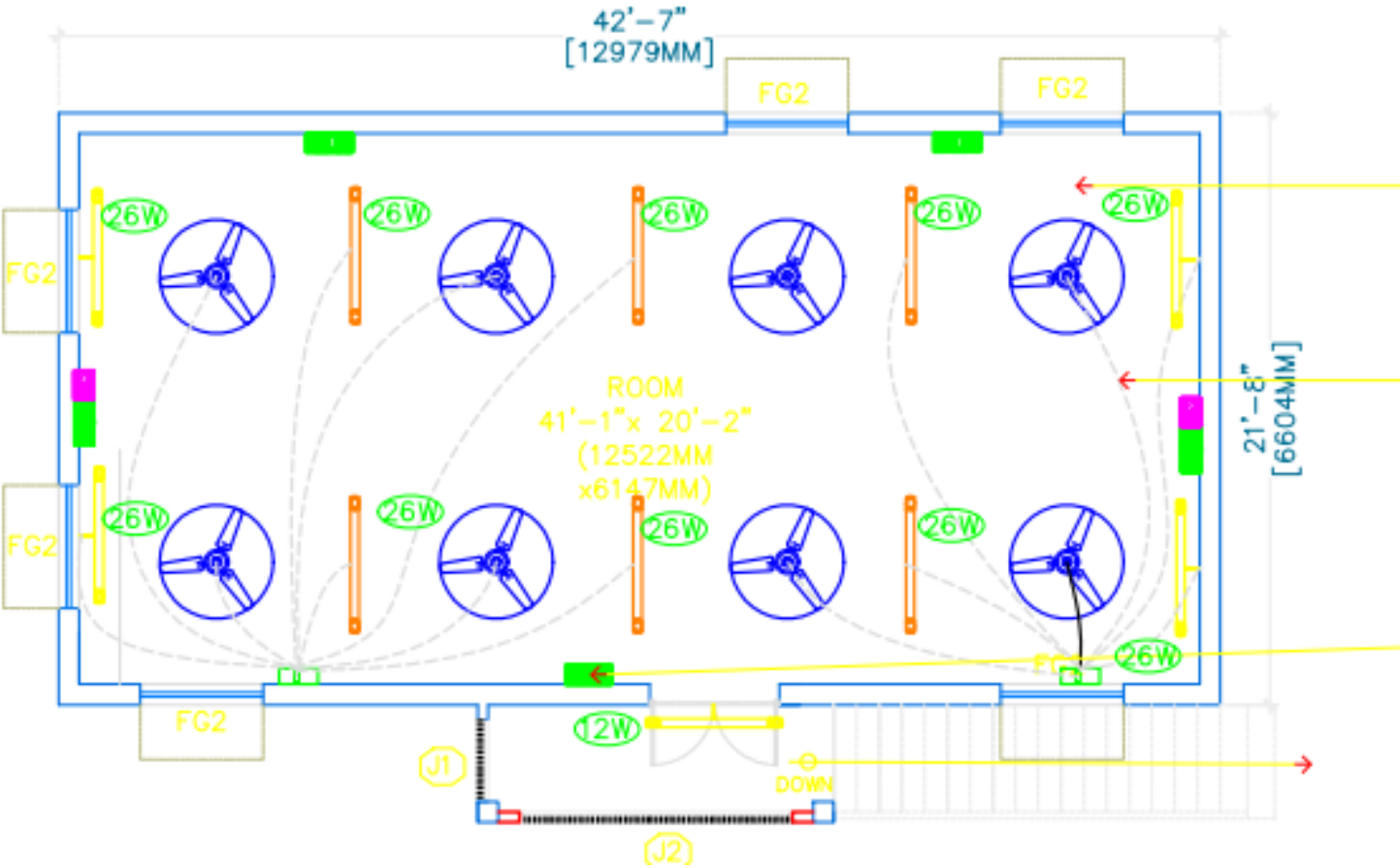
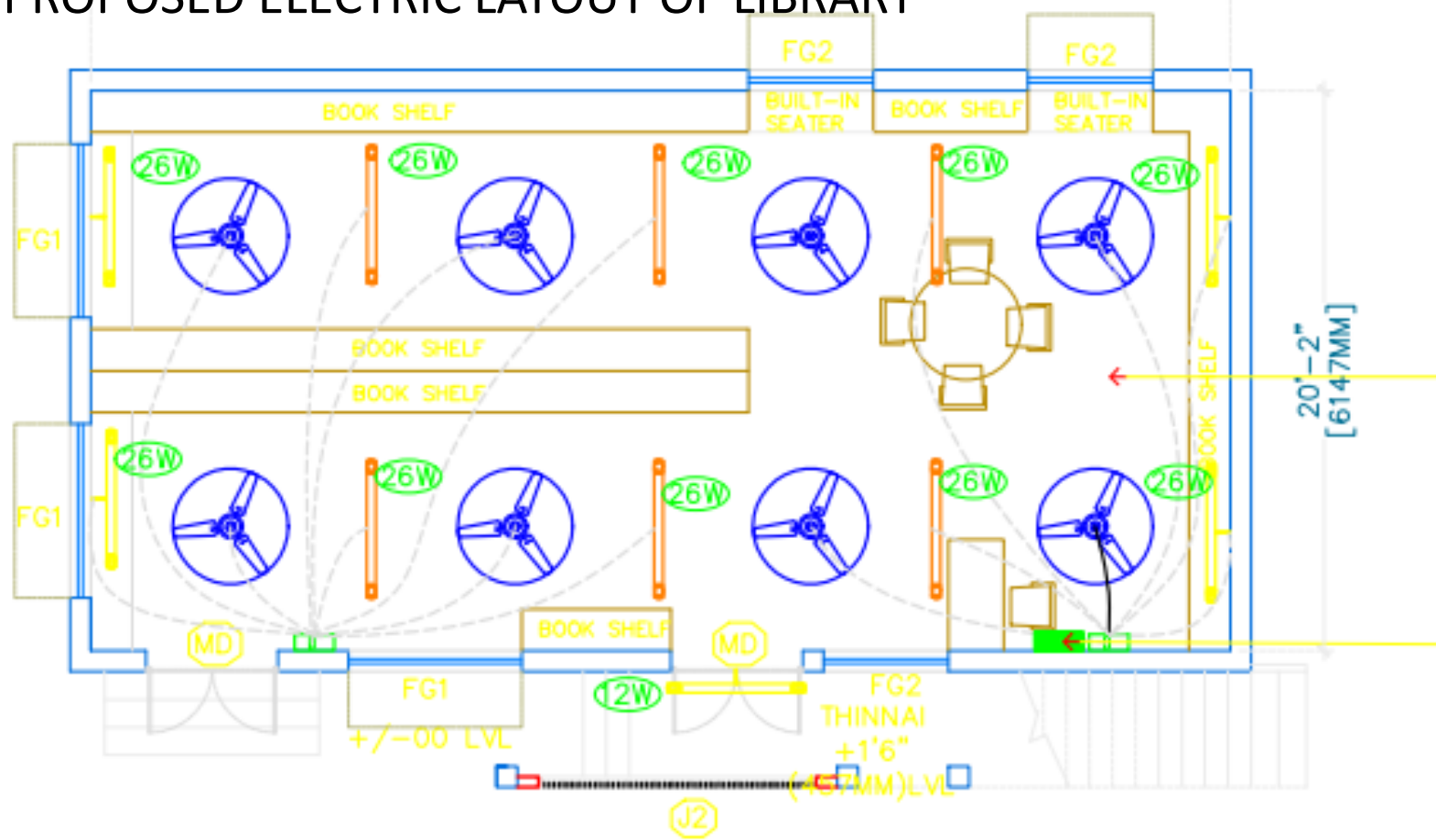


GROUND FLOOR PLAN



FIRST FLOOR PLAN

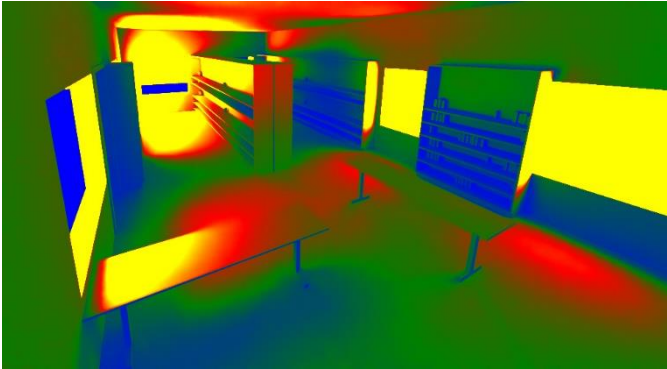
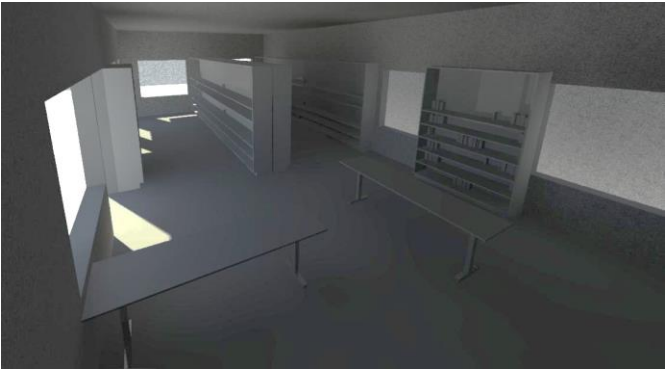
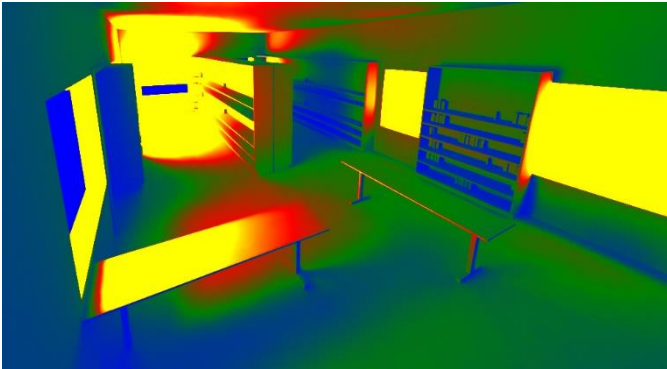
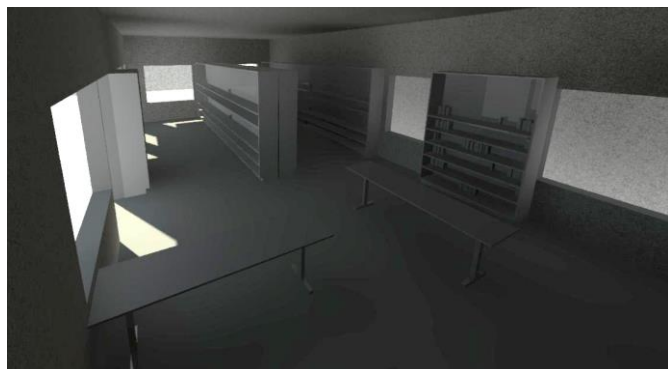
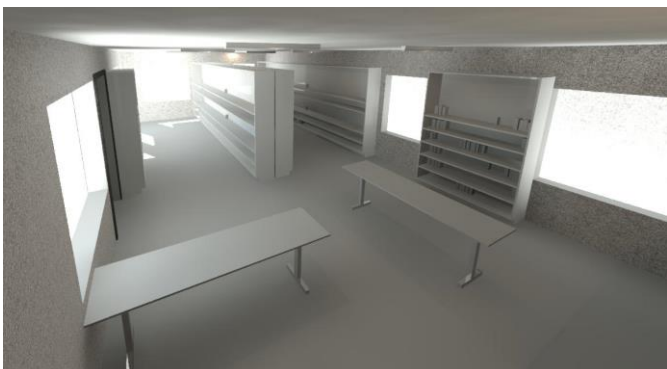
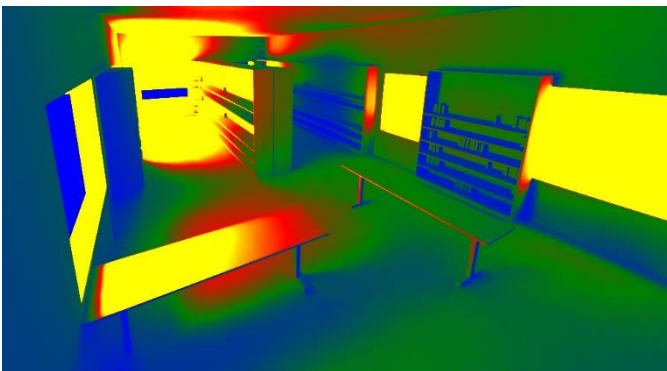
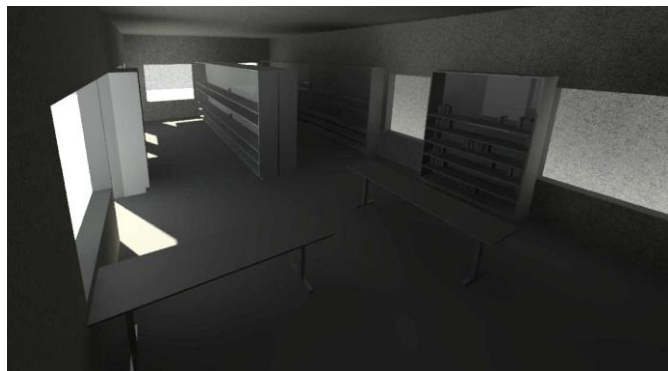
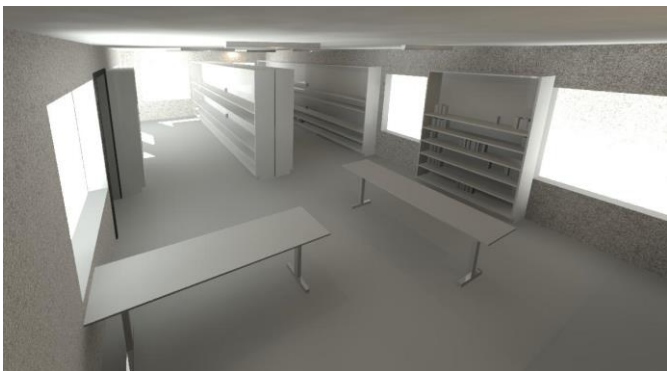
PROPOSED ELECTRIC LAYOUT OF LIBRARY

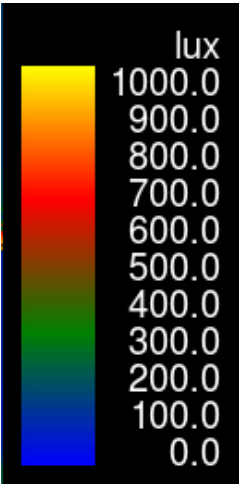


EXISTING LAMPS							EXISTING FANS					
SPACES	WATTAGE OF EACH LAMP	NO.OF LAMP	TOTAL WATTS	ELECTRICITY CONSUMTION PER HOUR (kWh)	ELECTRICITY CONSUMTION PER DAY (kWh)	ELECTRICITY CONSUMTION PER YEAR (kWh)	NO.S.	WATTS PER FAN	TOTAL WATTS	ELECTRICITY CONSUMTION PER HOUR (kWh)	ELECTRICITY CONSUMTION PER DAY(kWh)	ELECTRICITY CONSUMTION PER YEAR (kWh)
LIBRARY: GF	55	8	440	0.44	3.52	739	8	75	600	0.6	4.8	1108
LIBRARY: FF	55	8	440	0.44	3.52	739	8	75	600	0.6	4.8	1108
GRAND TOTAL		16	880	0.88	7.04	1478	16	150	1200	1.2	9.6	2216

PROPOSED LED LAMPS											
SPACE	AREA	LUX	TOTAL LUMEN	LUMEN OF EACH LAMP	WATTAGE OF EACH LAMP	NO.OF LAMP REQUIRED	TOTAL WATTS	ELECTRICITY CONSUMTION PER HOUR (kWh)	ELECTRICITY CONSUMTION PER DAY (kWh)	ELECTRICITY CONSUMTION PER YEAR (kWh)	
LIBRARY GF	78	300	23400	2600	26	10	260	0.26	2.08	437	
LIBRARY: FF	78	300	23400	2600	26	10	260	0.26	2.08	437	
GRAND TOTAL						20	520	0.52	4.16	874	

LIGHTING ANALYSIS - LIBRARY

SKY CONDITION	DAY-LIGHT LUX LEVELS	DAY-LIGHT VIEW	DAY-LIGHT WITH ELECTRIC FIXTURES
CLEAR SKY			
INTERMEDIATE SKY			
OVERCAST SKY			



POWER CONSUMPTION - EXISTING vs PROPOSAL

Annual Power Consumption - EXISTING

S.No	BLOCKS	Annual Power Consumption (Kwh)
1.	BLOCK 2	11873
2.	BLOCK 3	3270
3.	BLOCK 4	6274
4.	BLOCK 5	3694
5.	Miscellaneous	4500
TOTAL CONSUMPTION		29611

Annual Power Consumption - PROPOSAL

S.No	BLOCKS	Annual Power Consumption (Kwh)
1.	BLOCK 2	8466
2.	BLOCK 3	2035
3.	BLOCK 4	6048
4.	BLOCK 5	3090
5.	Miscellaneous	4500
TOTAL CONSUMPTION		24139

PROPOSAL

On-Site Renewable Energy Production
Solar panels of 335Wp can be provided to harvest solar power on-site due availability of space on Flat roof top.

LED – COST REQUIREMENTS & ENERGY EFFICIENCY

S.No	Light Wattage (W)	Cost(Rs)	Total Requirement (No.s)	Total Cost (Rs)	Wattage of CFL bulb of Same Output of Lumens (W)	Energy savings (%)
1.	36W	980	20	19600	70W	48%
2.	26W	760	153	116280	55W	52%
3.	12W	280	49	13720	30W	60%
4.	10W	260	5	1800	28W	64%
5.	5W	160	36	5760	15W	65%

- Total Initial cost for LED light Fixtures : 157160 Rs

Annual Energy Savings : 29611– 24139 = **5472Kwh**

- Cost for Power Consumption

Existing : 29611 * 6.6 = **193912 Rs**

Proposed : 24139 * 6.6 = **157797 Rs**

(*Consumption price taken as Rs.6.6/Unit)

- **Cost Savings (Annual) : 36115Rs**
- **Pay Back period : 4.5 Years**

LED Fixture Life Span : 12Years (20,000hrs)

ON-SITE RENEWABLE ENERGY-PROPOSAL

SOLAR POWER HARVESTING

Average solar irradiation in **TAMIL NADU** state is **1266.52 W / sq.m**

1kWp solar rooftop plant will generate on an average over the year **5.0 kWh** of electricity per day (considering 5.5 sunshine hours)

1. Size of Power Plant	
Feasible Plant size as per your Capacity :	16kW
2. Cost of the Plant :	
MNRE current Benchmark Cost :	Rs. 38000 Rs. / kW
Without subsidy (Based on current MNRE benchmark) :	Rs. 608000
With subsidy 0 (Based on current MNRE benchmark) :	Rs. 608000
3. Total Electricity Generation from Solar Plant :	
Annual :	24000kWh
Life-Time (25 years):	600000kWh
4) Financial Savings :	
a) Tariff @ Rs.8/ kWh (for top slab of traffic) - No increase assumed over 25 years :	
Monthly :	Rs. 16000
Annually :	Rs. 192000
Life-Time (25 years) :	Rs. 4800000

https://solarrooftop.gov.in/rooftop_calculator

Pay Back Period

- Initial Investment Cost : 608000Rs
- Power Consumption Cost

Existing : 24139 * 6.6 = **157797 Rs**

Proposed : 24139 – 24000 = 139Kwh = 78.5Rs

- **Cost Savings (Annual) : 157718Rs**
- **Pay Back period : 4 Years**

Solar Panels Life Span : 20-25Years

RAIN WATER HARVESTING

Avg Normal Rainfall - Chennai				
Year	Peak Rain Month	Rainfall (mm)	Number of Rainy days	Normal Rainfall/Day (mm)
2016	Sept	289	24	12.0416667
2017	Nov	370	23	16.0869565
2018	Nov	313	13	24.0769231
2019	Nov	274	26	10.5384615
2020	Nov	365	24	15.2083333
Average normal rainfall/ day (mm)				15.686002
Average normal rainfall/ day (m)				0.015686

Source : <https://www.worldweatheronline.com/chennai-weather-averages/tamil-nadu/in.aspx>

RWH Calculations - Bunder Garden School				
S.No	Surface type)	Run-off coefficient (c	Area (a) (m2)	Impervious Area (m2) I=c X a
1	Tiled Roof	0.95	1020	969
Total impervious area in sq.m. ($\sum I$)				969
Average normal rainfall/ day (m)				0.015
Total roof and non-roof run-off volume in cu.m ($\sum I \times R$)				14.535

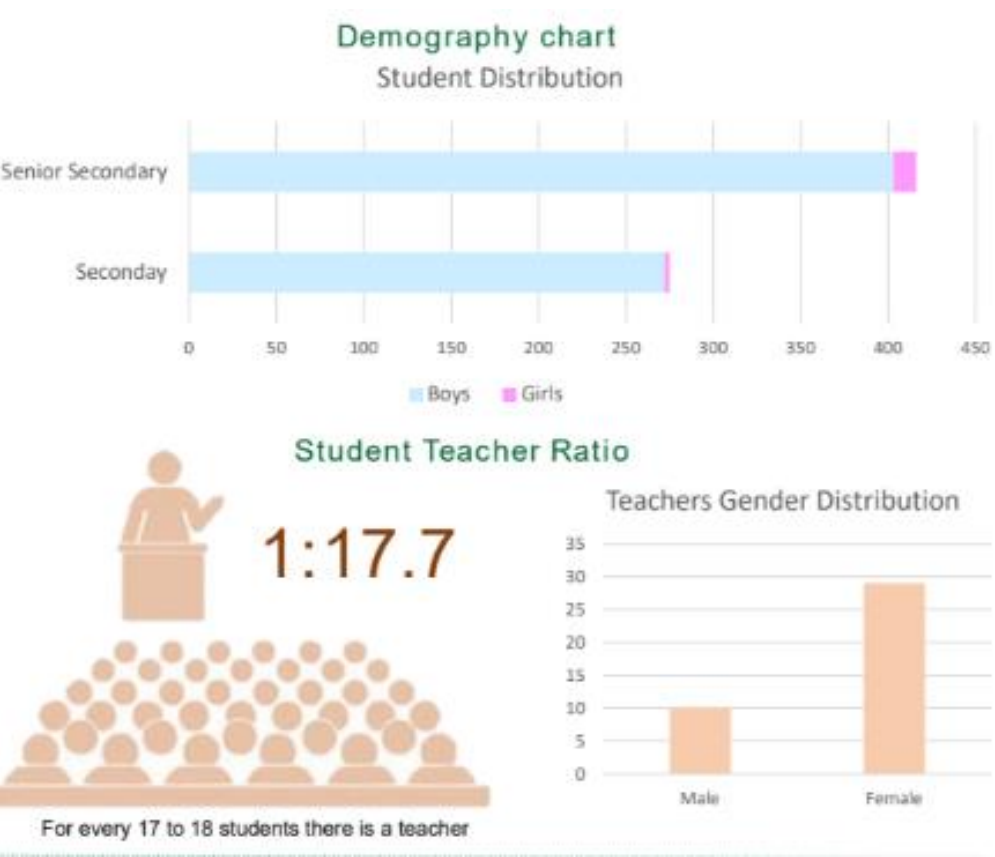
SITE PLAN



RAIN WATER
HARVESTING FROM
ROOF

WATER CONSUMPTION

WC and flush tanks are not present and only faucets(taps) are provided. The flow rate is calculated accordingly based on usage.



Water Usage							
				Baseline		Existing	
					Total Water use (L) Tb = n X fb		Total Water use (L) Tb=nXfb
Fixture Type	Duration	Daily uses per person / per day	Number of Students & Teachers (n)	Flow Rate/ Capacity (fb)		Flow Rate/ Capacity (fb)	
Water Closets	1 Flush (Full Flush)	1 for male	676	6	4056	0	0
	2 Flush (Full Flush)	1 for female	54	6	324	0	0
	2 Flush (Half Flush)	2 for female	54	3	162	0	0
Urinals	1 Flush (Full Flush)	2 for male	676	500	338000	0	0
Faucet/ Taps	0.25	8	730	8	5840	10	7300
Total water use (litres/day)					348392		7300
Number of working days				210			
Total Annual water use in litres (Total water use x Number of working days)				73162320		1533000	
Percentage reduction of water usage from the baseline				98%			

WATER EFFICIENCY - PROPOSAL



Additional Roof Canopy



New Auditorium Block



Proposed Site Plan

RWH Calculations				
S.No	Surface type	Run-off coefficient (c)	Area (a) (m2)	Impervious Area (m2) I=c X a
1	Tiled Roof	0.95	1407	1336.65
2	Metal roof	0.95	79	75.05
3	Play Ground	0.35	7896	2763.6
4	Concrete Pavement	0.95	603	5260
Total impervious area in sq.m. ($\sum I$)				9435.3
Average normal rainfall/ day (m)				0.015
Total roof and non-roof run-off volume in cu.m ($\sum I \times R$)				141.5295

RWH can be done at various possible locations of schools which aids in serving the water requirement of school due to available opportunities in School Campus.

The various opportunities in campus where Rain water could be harvested are

Building Roof

Extended Roof Canopy

Walkable Pavements & Platforms

Play Ground

WATER EFFICIENT FIXTURES

AERATORS

- Aerators are small attachments that are fitted at the end of water taps or can be inserted inside the spout.
- The purpose of an aerator or flow regulator is to maintain a constant rate of water flow, which is not affected by pressure fluctuations.
- Aerators come in the form of mesh screens that divide the flow of water into multiple small streams by adding air in between.



Water Usage							
				Basline		Proposed	
Fixture Type	Duration	Daily uses per person / per day	Number of Students & Teachers (n)	Flow Rate/ Capacity (fb)	Total Water use (L) Tb = n X fb	Flow Rate/ Capacity (fb)	Total Water use (L) Tb=nXfb
Water Closets	1 Flush (Full Flush)	1 for male	676	6	4056	6	4056
	2 Flush (Full Flush)	1 for female	54	6	324	6	324
	2 Flush (Half Flush)	2 for female	54	3	162	3	162
Urinals	1 Flush (Full Flush)	2 for male	676	500	338000	0	0
Faucet/ Taps	0.25	8	730	8	5840	4	2920
Total water use (litres/day)					348401		7462
Number of working days					210		
Total Annual water use in litres (Total water use x Number of working days)					73164210		1567020
Percentage reduction of water usage from the baseline					97%		

CPS & CHSS - Kolathur

ENERGY & WATER EFFICIENCY

Chennai Higher Secondary School (CHSS), Kolathur and Chennai Primary School (CPS), Kolathur share the same compound and managed by the local body but are administrated independently. This campus is located in the Perambur block of Chennai district, Tamil Nadu. Both schools are co-educational and the students are allowed to choose between Tamil and English medium education system. CPSS has adapted Montessori methodology for kindergarten and activity based learning methods for 1st to 5th grades, with around 950 students and 30 teaching staff. On the other hand, CHSS houses around 1100 students from grade 6 to 12 and 35 teaching staff. Unlike many Corporation schools in the city, the number of students getting admissions in this campus has only been increasing. This influx of students has led to a shortage of 29 class rooms on the whole.

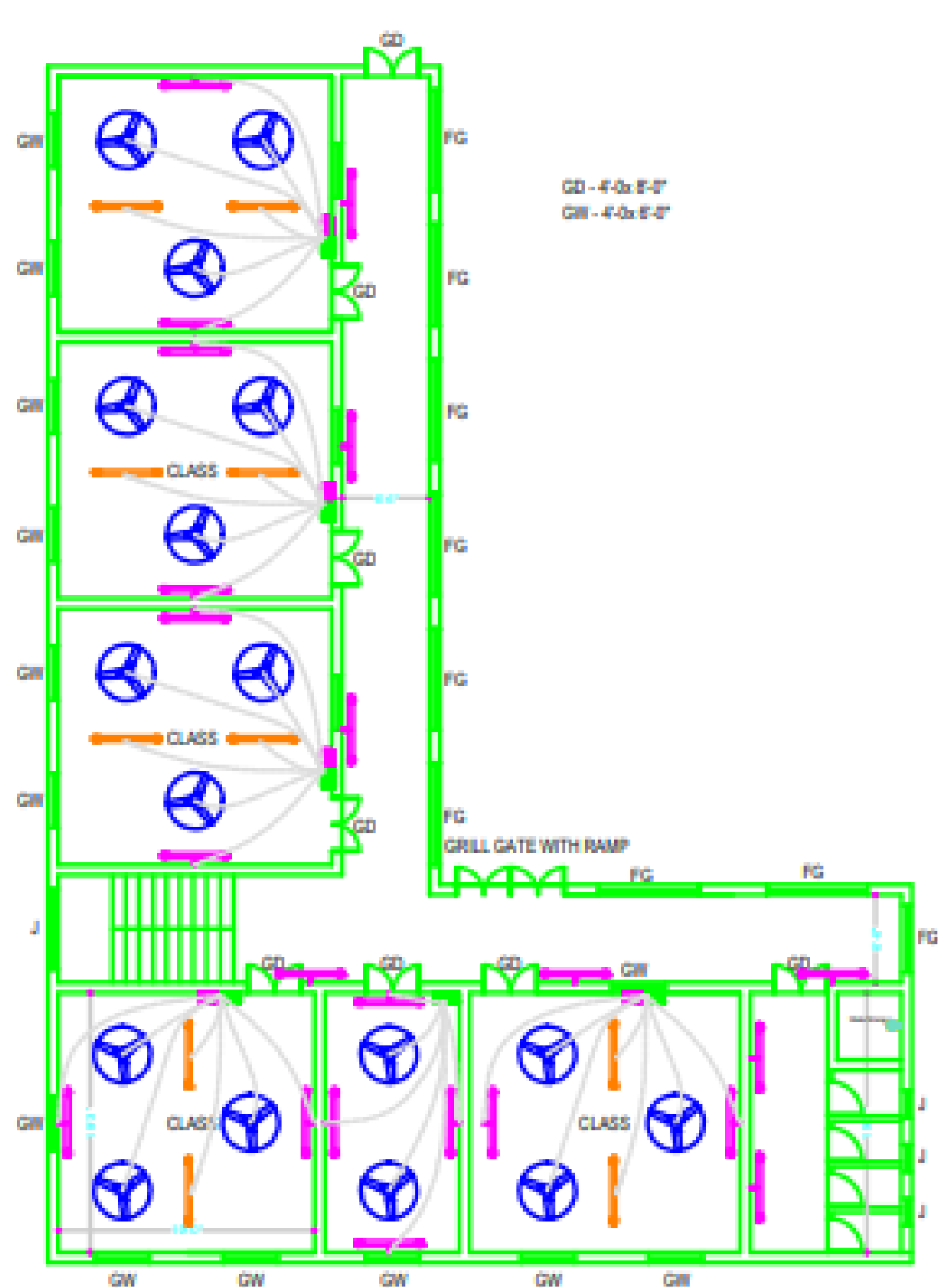
CPS Kolathur and CHSS Kolathur is accessed from Gangai Amman Kool street. Calathus is a developed residential neighbourhood situated in North Chennai known for its local fish farms exporting and importing ornamental fishes



CLASS ROOM BLOCK CHSS

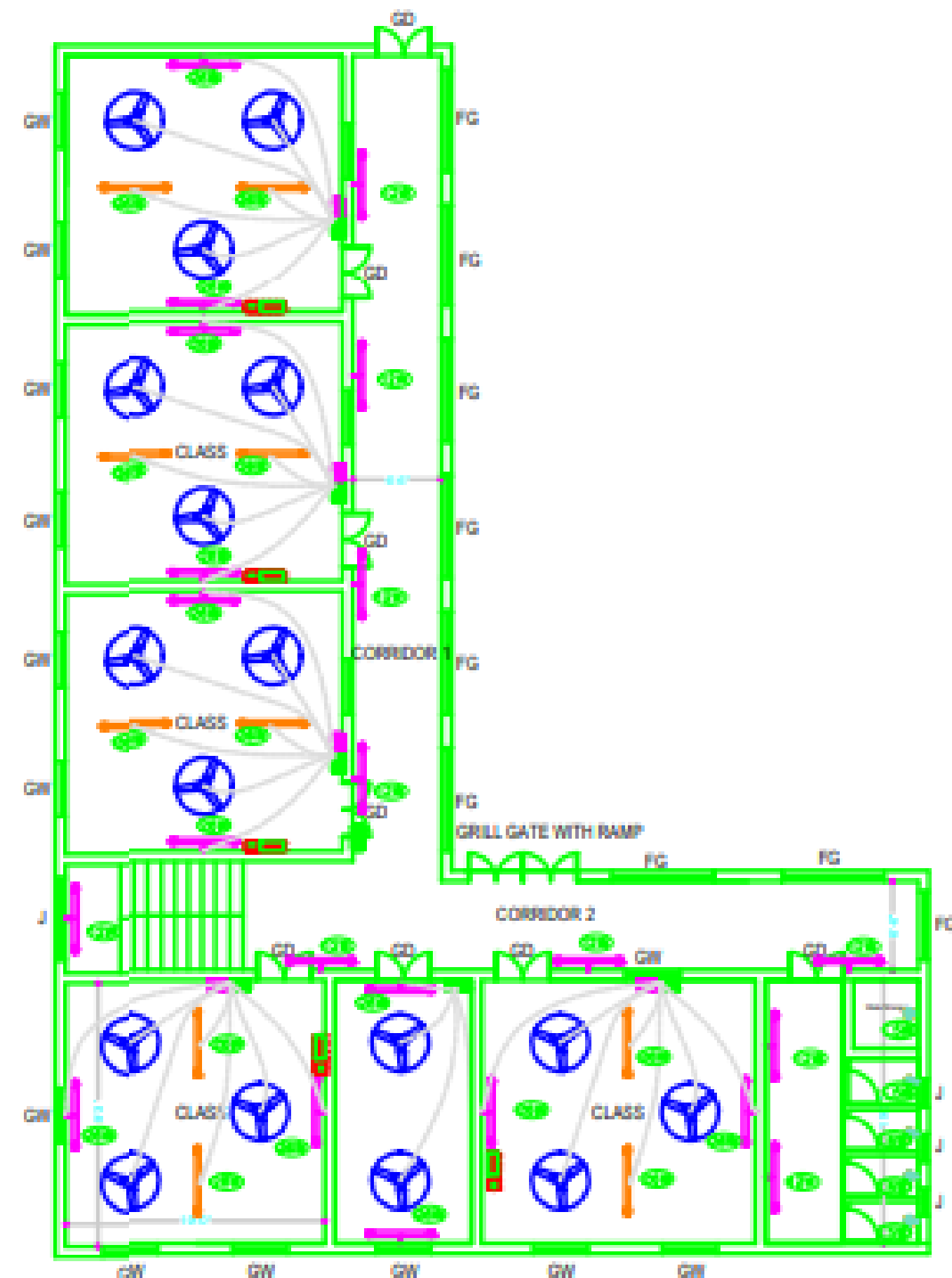


EXSISTING ELECTRICAL LAYOUT OF LIBRARY



GROUND, FIRST & SECOND FLOOR PLAN

PROPOSED ELECTRIC LAYOUT OF LIBRARY

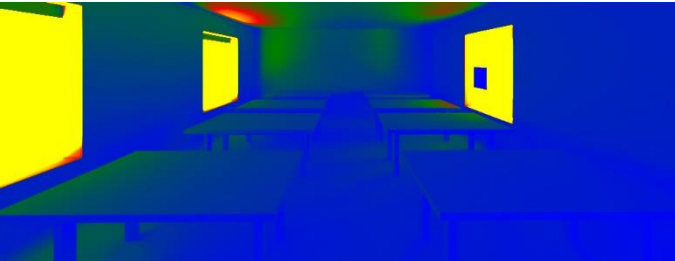
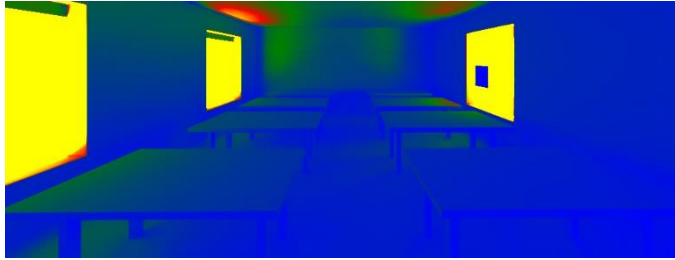
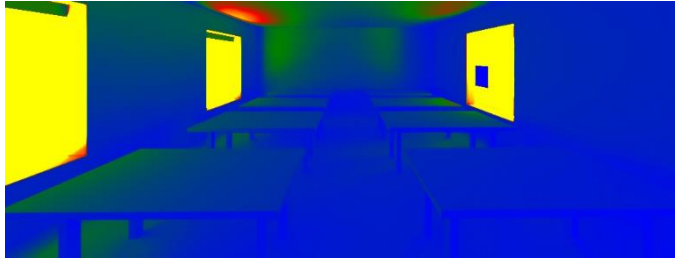


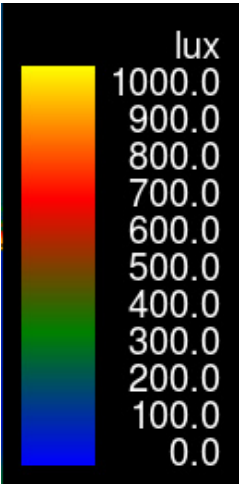
GROUND, FIRST & SECOND FLOOR PLAN

EXISTING LAMPS							EXISTING FANS					
SPACES	WATTAGE OF EACH LAMP	NO.OF LAMP	TOTAL WATTS	ELECTRICITY CONSUMTION PER HOUR (kWh)	ELECTRICITY CONSUMTION PER DAY (kWh)	ELECTRICITY CONSUMTION PER YEAR (kWh)	NO.S.	WATTS PER FAN	TOTAL WATTS	ELECTRICITY CONSUMTION PER HOUR (kWh)	ELECTRICITY CONSUMTION PER DAY(kWh)	ELECTRICITY CONSUMTION PER YEAR (kWh)
L - BLOCK												
CLASS ROOM 1	55	4	220	0.22	1.76	369.6	3	75	225	0.225	1.8	378
CLASS ROOM 2	55	4	220	0.22	1.76	369.6	3	75	225	0.225	1.8	378
CLASS ROOM 3	55	4	220	0.22	1.76	369.6	3	75	225	0.225	1.8	378
CLASS ROOM 4	55	4	220	0.22	1.76	369.6	3	75	225	0.225	1.8	378
CLASS ROOM 5	55	4	220	0.22	1.76	369.6	3	75	225	0.225	1.8	378
		20	1100	1.1	8.8	1848	15	375	1125	1.125	9	1890
NARROW ROOM	55	4	220	0.22	1.76	369.6	2	75	150	0.15	1.2	252
CORRIDOR 1	55	3	165	0.165	0.66	138.6						
CORRIDOR 2	55	3	165	0.165	0.66	138.6						
	110	6	330	0.33	1.32	277.2						
WAITING AREA	55	2	110	0.11	0.44	92.4						
RESTROOM												
	55		110	0.11	0.44	92.4						

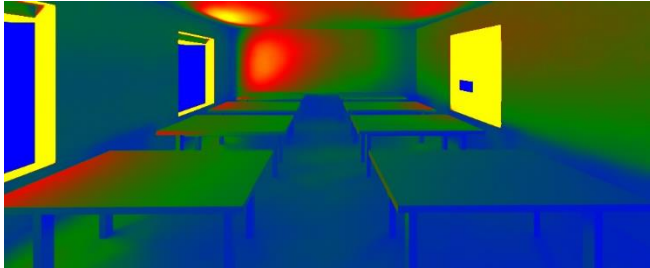
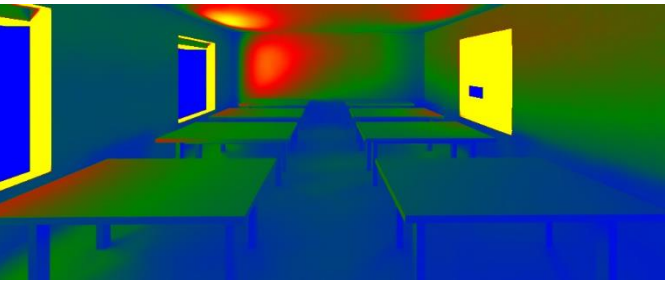
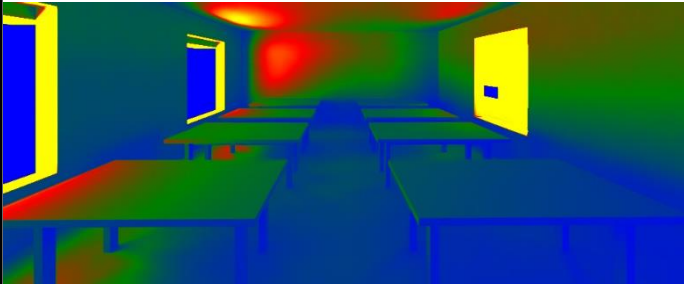
PROPOSED LED LAMPS										
SPACE	AREA	LUX	TOTAL LUMEN	LUMEN OF EACH LAMP	WATTAGE OF EACH LAMP	NO.OF LAMP REQUIRED	TOTAL WATTS	ELECTRICITY CONSUMPTION PER HOUR (kWh)	ELECTRICITY CONSUMPTION PER DAY (kWh)	ELECTRICITY CONSUMPTION PER YEAR (kWh)
L - BLOCK										
CLASS ROOM 1	35.6	300	10680	2600	26	4	104	0.104	0.832	174.72
CLASS ROOM 2	35.6	300	10680	2600	26	4	104	0.104	0.832	174.72
CLASS ROOM 3	35.6	300	10680	2600	26	4	104	0.104	0.832	174.72
CLASS ROOM 4	35.6	300	10680	2600	26	4	104	0.104	0.832	174.72
CLASS ROOM 5	35.6	300	10680	2600	26	4	104	0.104	0.832	174.72
	TOTAL					20	520	0.52	4.16	873.6
NARROW ROOM	18	300	5400	2600	26	2	52	0.052	0.416	87.36
CORRIDOR 1	36	100	3600	1000	12	4	48	0.048	0.192	40.32
CORRIDOR 2	30	100	3000	1000	12	3	36	0.036	0.144	30.24
	TOTAL					7	84	0.084	0.336	110
R.R: WAITING AREA	10	150	1500	800	10	2	20	0.02	0.08	16.8
RESTROOM	1.5	150	225	800	5	4	20	0.02	0.08	16.8
	TOTAL					5	40	0.04	0.16	33.6

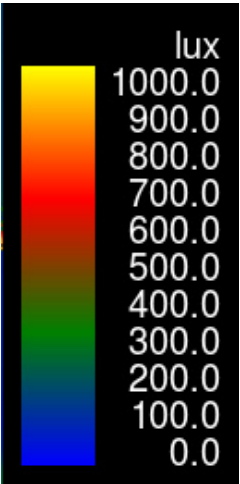
LIGHTING ANALYSIS - FIRST FLOOR (CLASS ROOM BLOCK)

SKY CONDITION	DAY-LIGHT LUX LEVELS	DAY-LIGHT VIEW	DAY-LIGHT WITH ELECTRIC FIXTURES
CLEAR SKY			
INTERMEDIATE SKY			
OVERCAST SKY			

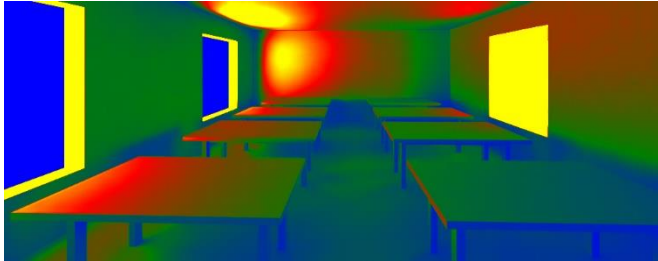
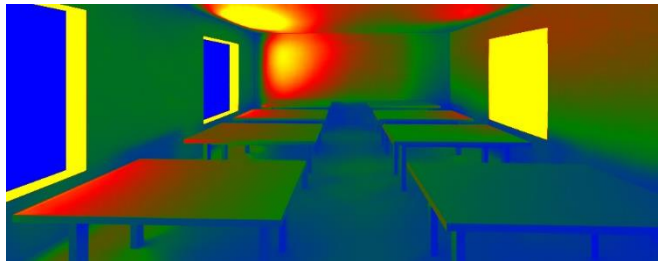
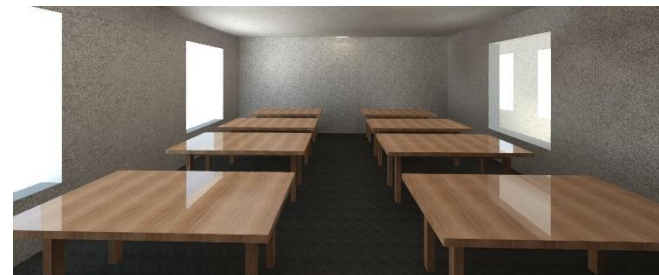
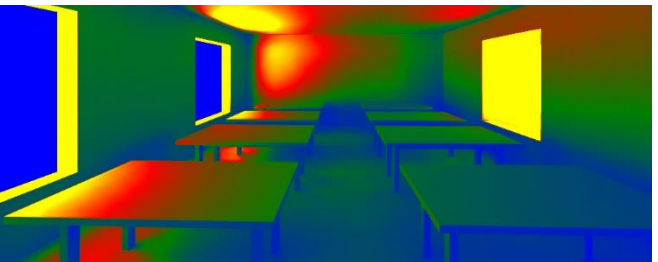


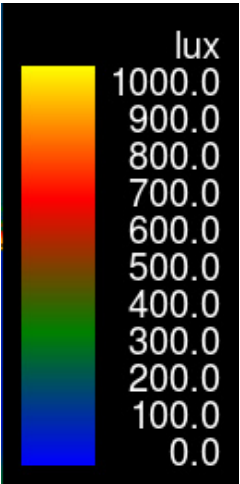
LIGHTING ANALYSIS - FIRST FLOOR (CLASS ROOM BLOCK)

SKY CONDITION	DAY-LIGHT LUX LEVELS	DAY-LIGHT VIEW	DAY-LIGHT WITH ELECTRIC FIXTURES
CLEAR SKY			
INTERMEDIATE SKY			
OVERCAST SKY			



LIGHTING ANALYSIS - FIRST FLOOR (CLASS ROOM BLOCK)

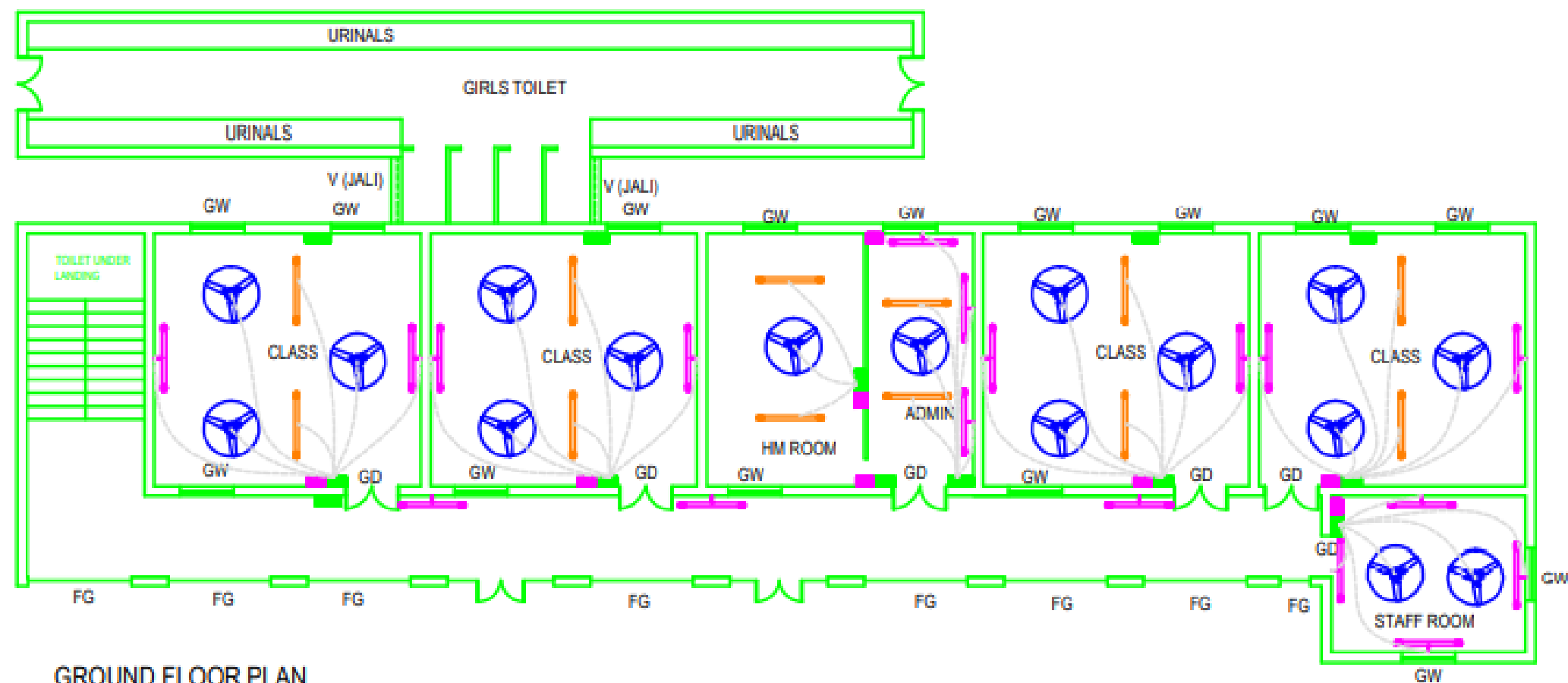
SKY CONDITION	DAY-LIGHT LUX LEVELS	DAY-LIGHT VIEW	DAY-LIGHT WITH ELECTRIC FIXTURES
CLEAR SKY			
INTERMEDIATE SKY			
OVERCAST SKY			



MAIN BLOCK CHSS

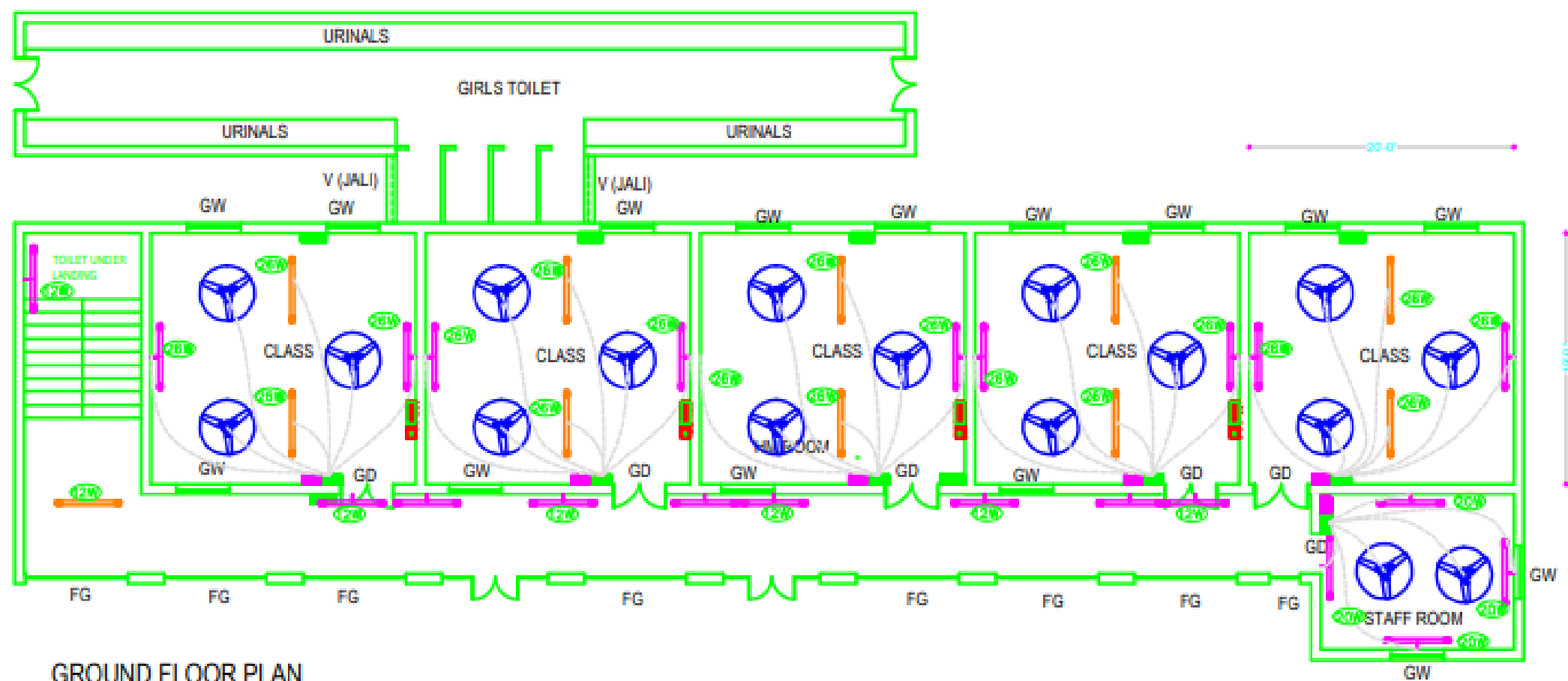


EXISTING ELECTRICAL LAYOUT



GROUND FLOOR PLAN

PROPOSED ELECTRICAL LAYOUT

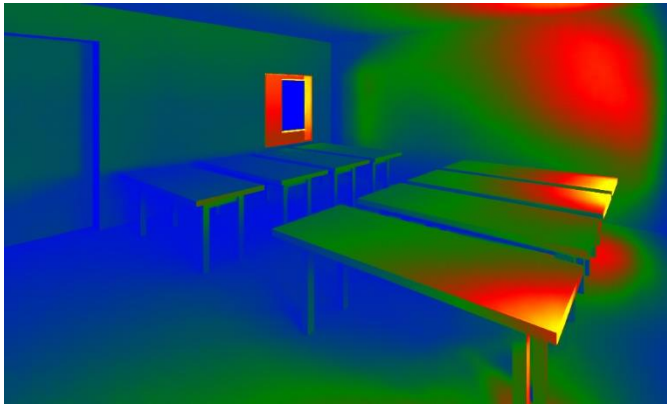
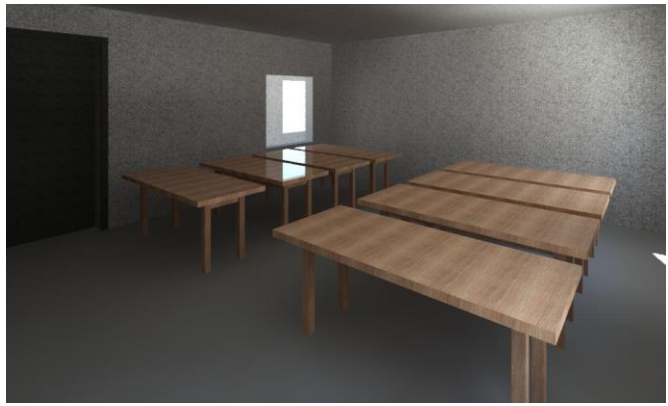
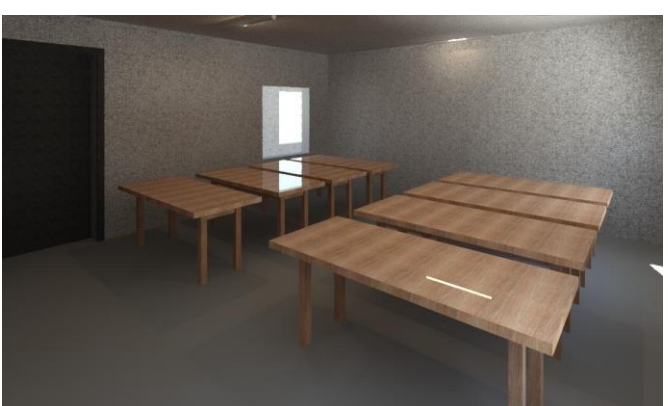
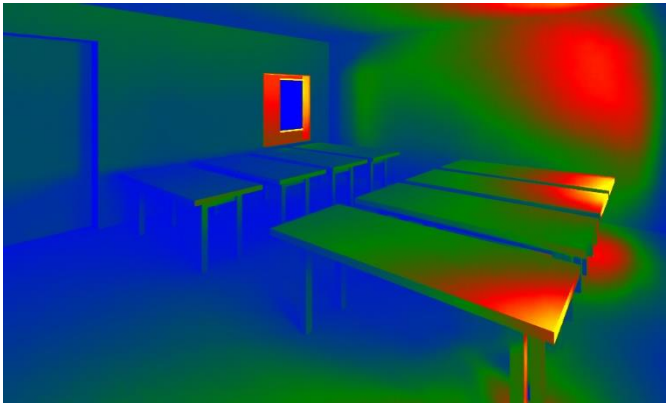
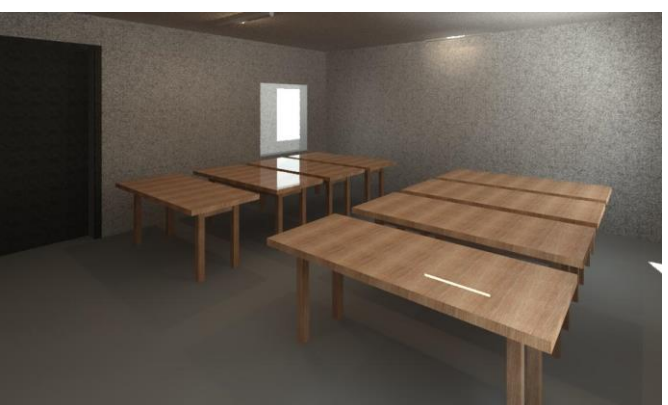
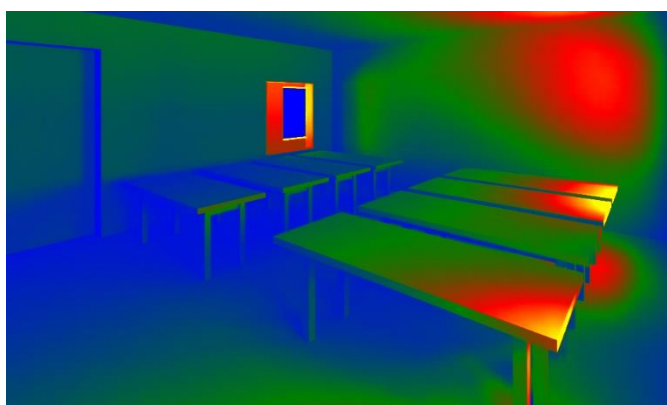
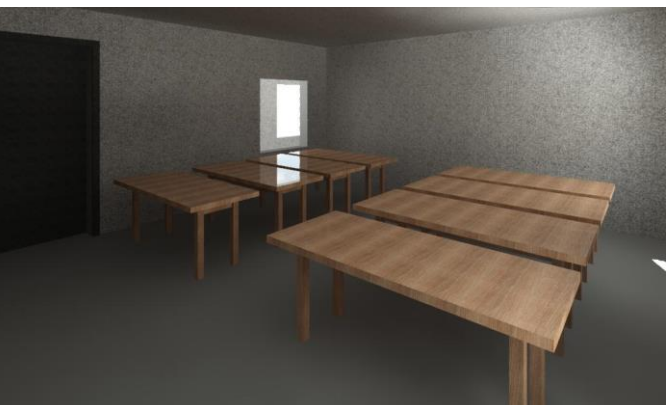
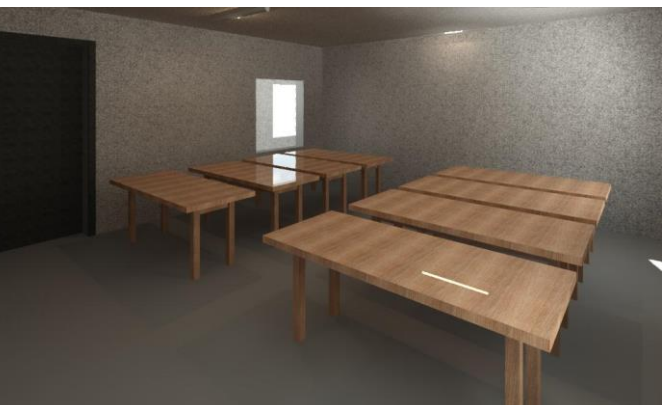


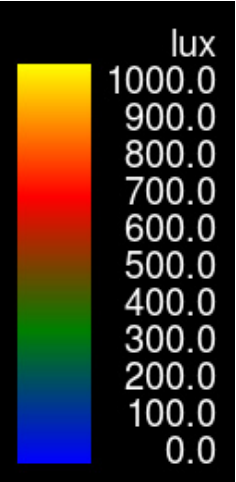
GROUND FLOOR PLAN

EXISTING LAMPS							EXISTING FANS					
SPACES	WATTAGE OF EACH LAMP	NO.OF LAMP	TOTAL WATTS	ELECTRICITY CONSUMPTION PER HOUR (kWh)	ELECTRICITY CONSUMTION N PER DAY (kWh)	ELECTRICITY CONSUMPTION PER YEAR (kWh)	NO.S.	WATTS PER FAN	TOTAL WATTS	ELECTRICITY CONSUMTION PER HOUR (kWh)	ELECTRICITY CONSUMTION PER DAY(kWh)	ELECTRICITY CONSUMPTION PER YEAR (kWh)
CLASS ROOM 1	55	4	220	0.22	1.76	369.6	3	75	225	0.225	1.8	378
CLASS ROOM 2	55	4	220	0.22	1.76	369.6	3	75	225	0.225	1.8	378
CLASS ROOM 3/ HM ROOM	55	6	330	0.33	2.64	554.4	3	75	225	0.225	1.8	378
CLASS ROOM 4	55	4	220	0.22	1.76	369.6	3	75	225	0.225	1.8	378
CLASS ROOM 5	55	4	220	0.22	1.76	369.6	3	75	225	0.225	1.8	378
		22	1210	1.21	9.68	2032.8	15	375	1125	1.125	9	1890
STAFF ROOM	55	4	220	0.22	1.76	369.6	2	75	150	0.15	1.2	252
CORRIDOR	55	3	165	0.165	0.66	138.6						

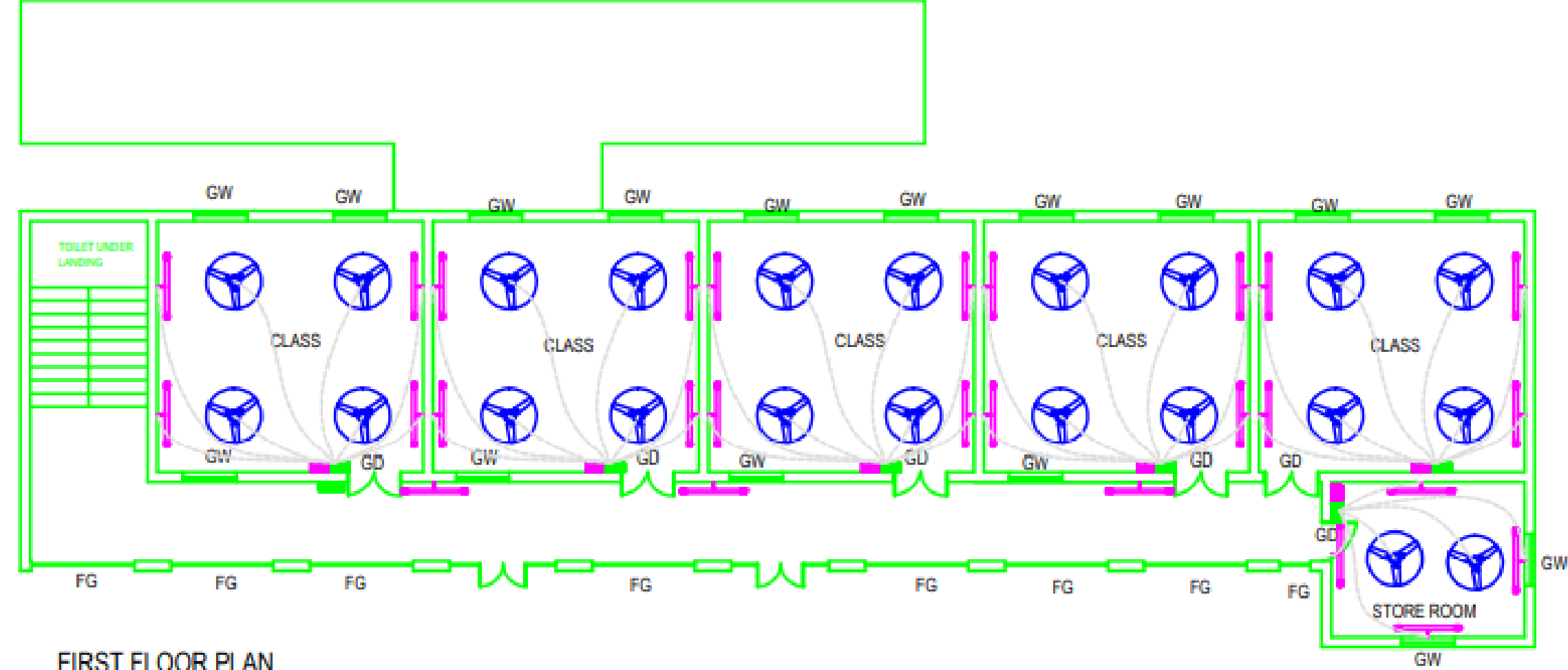
PROPOSED LED LAMPS											
SPACE	AREA	LUX	TOTAL LUMEN	LUMEN OF EACH LAMP	WATTAGE OF EACH LAMP	NO.OF LAMP REQUIRED	TOTAL WATTS	ELECTRICITY CONSUMPTION PER HOUR (kWh)	ELECTRICITY CONSUMTION N PER DAY (kWh)	ELECTRICITY CONSUMPTION PER YEAR (kWh)	
CLASS ROOM 1	35.3	300	10590	2600	26	4	104	0.104	0.832	174.72	
CLASS ROOM 2	35.3	300	10590	2600	26	4	104	0.104	0.832	174.72	
CLASS ROOM 3/ HM ROOM	35.3	300	10590	2600	26	3	78	0.078	0.624	131.04	
CLASS ROOM 4	35.3	300	10590	2600	26	4	104	0.104	0.832	174.72	
CLASS ROOM 5	35.3	300	10590	2600	26	4	104	0.104	0.832	174.72	
	TOTAL					19	494	0.494	3.952	829.92	
STAFF ROOM	16	500	8000	2000	20	4	80	0.08	0.64	134.4	
CORRIDOR	56	100	5600	1000	12	6	72	0.072	0.288	60.48	

LIGHTING ANALYSIS - G.FLOOR (MAIN BLOCK)

SKY CONDITION	DAY-LIGHT LUX LEVELS	DAY-LIGHT VIEW	DAY-LIGHT WITH ELECTRIC FIXTURES
CLEAR SKY			
INTERMEDIATE SKY			
OVERCAST SKY			

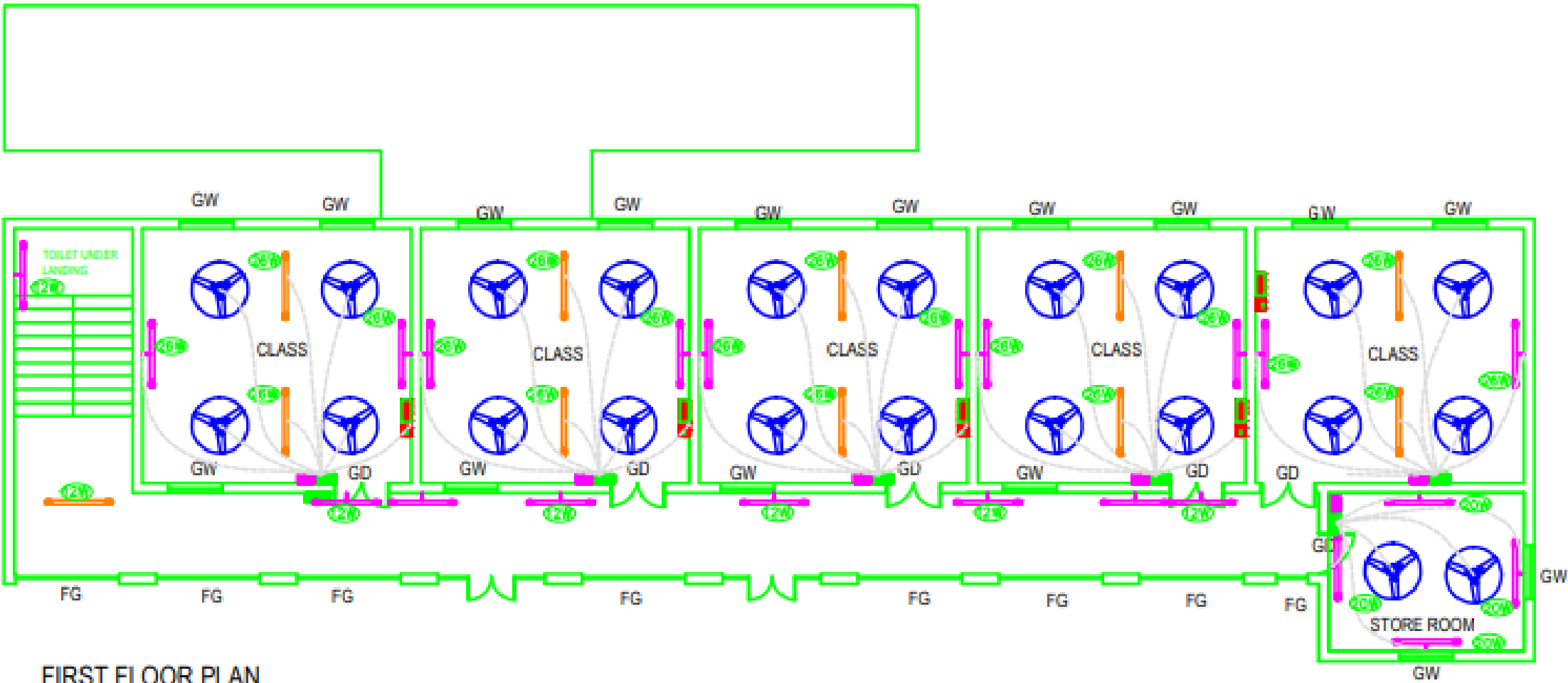


EXISTING ELECTRICAL LAYOUT



FIRST FLOOR PLAN

PROPOSED ELECTRICAL LAYOUT



FIRST FLOOR PLAN

EXISTING LAMPS							EXISTING FANS					
SPACES	WATTAGE OF EACH LAMP	NO.OF LAMP	TOTAL WATTS	ELECTRICITY CONSUMPTION PER HOUR (kWh)	ELECTRICITY CONSUMTION N PER DAY (kWh)	ELECTRICITY CONSUMTION PER YEAR (kWh)	NO.S.	WATTS PER FAN	TOTAL WATTS	ELECTRICITY CONSUMTION PER HOUR (kWh)	ELECTRICITY CONSUMTION PER DAY(kWh)	ELECTRICITY CONSUMTION PER YEAR (kWh)
CLASS ROOM 1	55	4	220	0.22	1.76	369.6	3	75	225	0.225	1.8	378
CLASS ROOM 2	55	4	220	0.22	1.76	369.6	3	75	225	0.225	1.8	378
CLASS ROOM3	55	6	330	0.33	2.64	554.4	3	75	225	0.225	1.8	378
CLASS ROOM 4	55	4	220	0.22	1.76	369.6	3	75	225	0.225	1.8	378
CLASS ROOM 5	55	4	220	0.22	1.76	369.6	3	75	225	0.225	1.8	378
		22	1210	1.21	9.68	2032.8	15	375	1125	1.125	9	1890
STAFF ROOM	55	4	220	0.22	1.76	369.6	2	75	150	0.15	1.2	252
CORRIDOR	55	3	165	0.165	0.66	138.6						

PROPOSED LED LAMPS											
SPACE	AREA	LUX	TOTAL LUMEN	LUMEN OF EACH LAMP	WATTAGE OF EACH LAMP	NO.OF LAMP REQUIRED	TOTAL WATTS	ELECTRICITY CONSUMPTION PER HOUR (kWh)	ELECTRICITY CONSUMTION N PER DAY (kWh)	ELECTRICITY CONSUMTION PER YEAR (kWh)	
CLASS ROOM 1	35.3	300	10590	2600	26	4	104	0.104	0.832	174.72	
CLASS ROOM 2	35.3	300	10590	2600	26	4	104	0.104	0.832	174.72	
CLASS ROOM 3/ HM ROOM	35.3	300	10590	2600	26	3	78	0.078	0.624	131.04	
CLASS ROOM 4	35.3	300	10590	2600	26	4	104	0.104	0.832	174.72	
CLASS ROOM 5	35.3	300	10590	2600	26	4	104	0.104	0.832	174.72	
	TOTAL					19	494	0.494	3.952	829.92	
STAFF ROOM	16	500	8000	2000	20	4	80	0.08	0.64	134.4	
CORRIDOR	56	100	5600	1000	12	6	72	0.072	0.288	60.48	

LIGHTING ANALYSIS - FIRST FLOOR (MAIN

BLOCK)

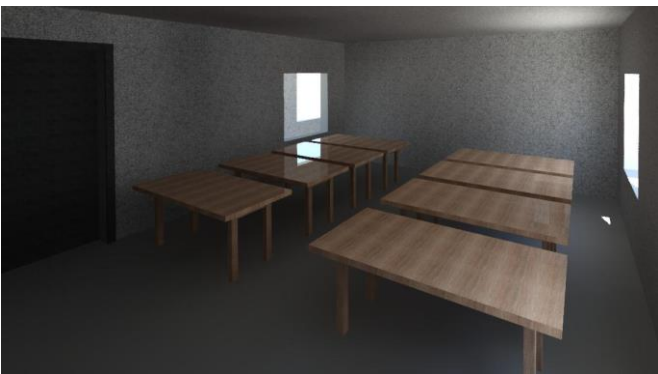
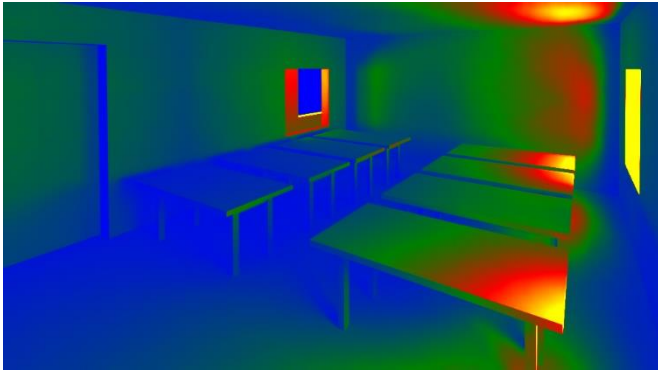
SKY CONDITION

DAY-LIGHT LUX
LEVELS

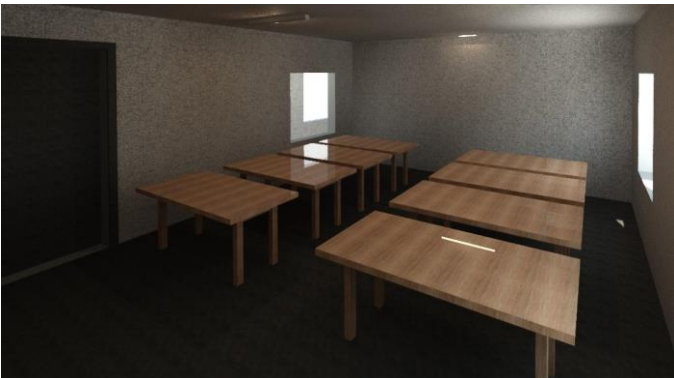
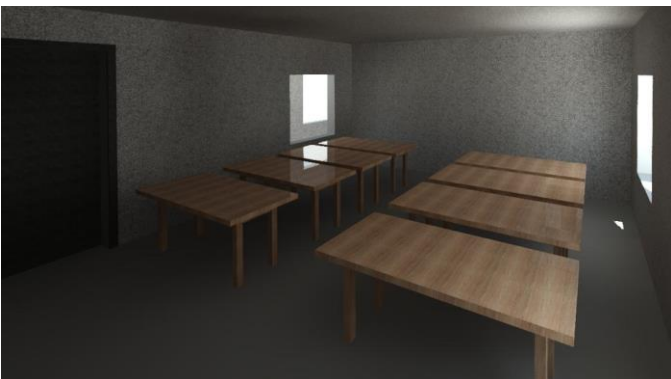
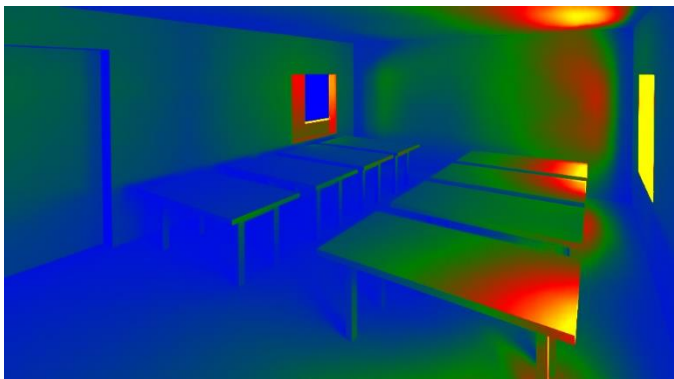
DAY-LIGHT VIEW

DAY-LIGHT WITH
ELECTRIC FIXTURES

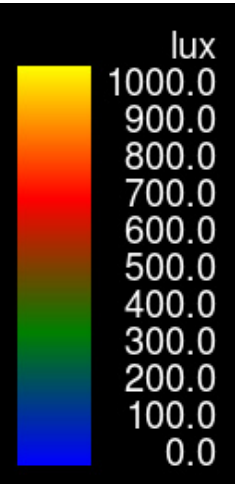
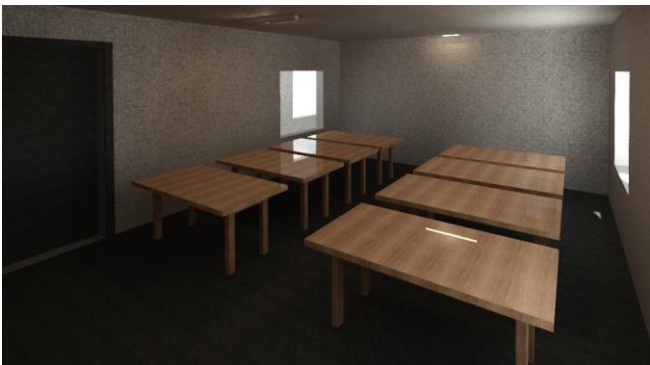
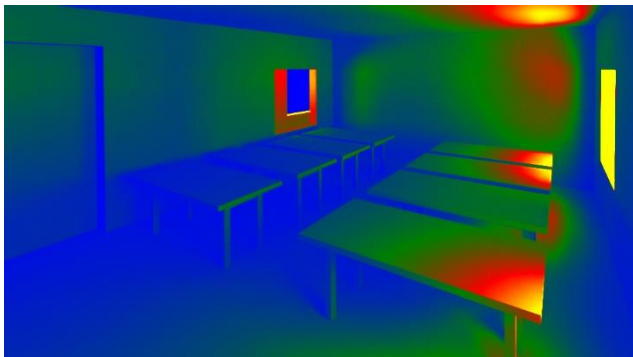
CLEAR SKY



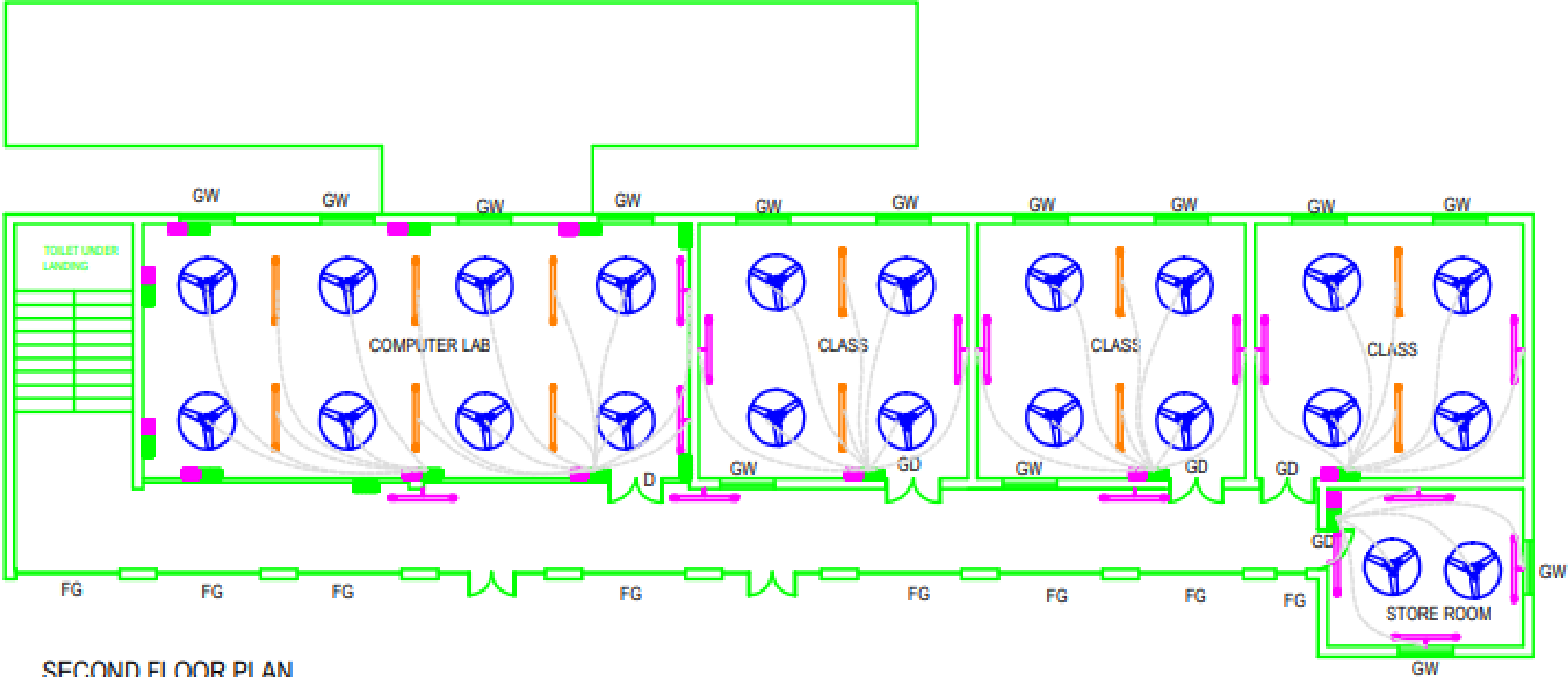
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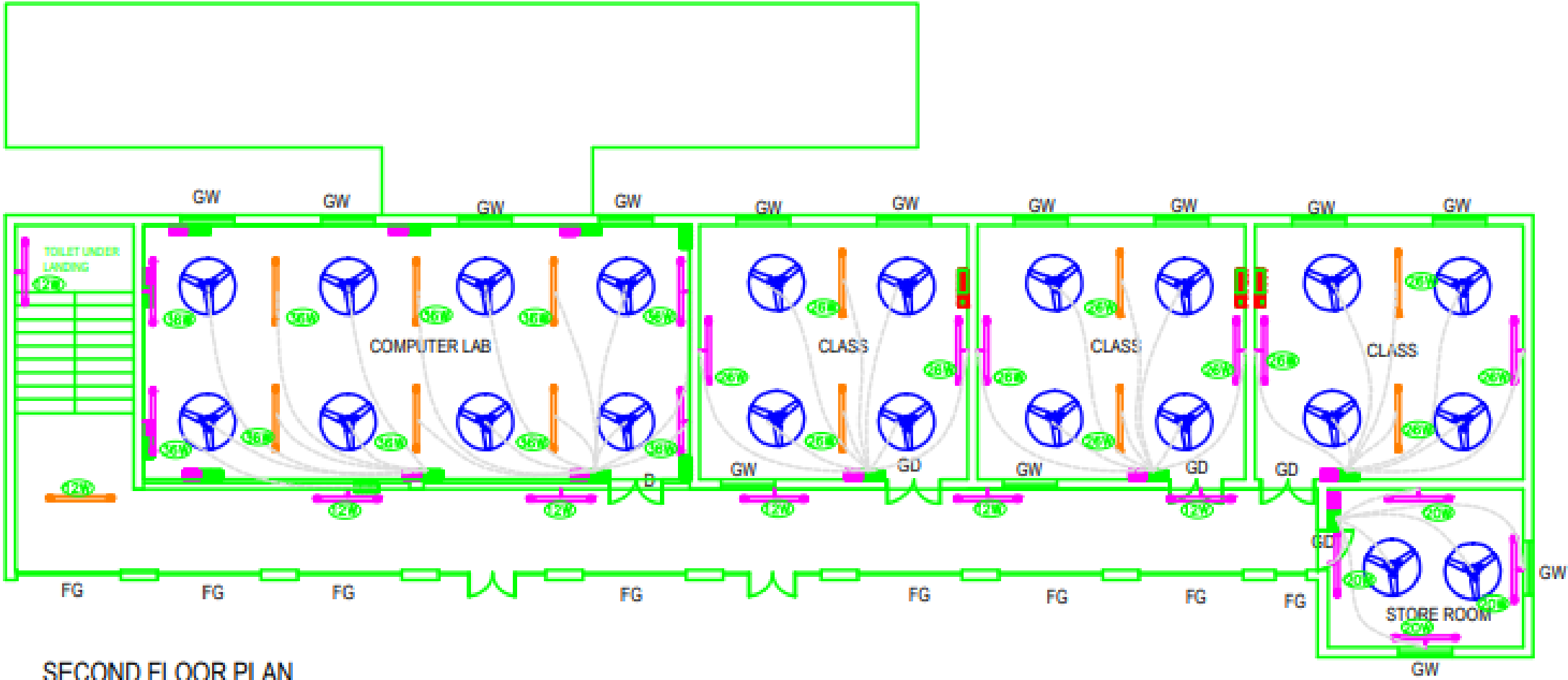


EXISTING ELECTRICAL LAYOUT



SECOND FLOOR PLAN

PROPOSED ELECTRICAL LAYOUT



SECOND FLOOR PLAN

EXISTING LAMPS							EXISTING FANS					
SPACES	WATTAGE OF EACH LAMP	NO.OF LAMP	TOTAL WATTS	ELECTRICITY CONSUMTION PER HOUR (kWh)	ELECTRICITY CONSUMTION PER DAY (kWh)	ELECTRICITY CONSUMTION PER YEAR (kWh)	NO.S.	WATTS PER FAN	TOTAL WATTS	ELECTRICITY CONSUMTION PER HOUR (kWh)	ELECTRICITY CONSUMTION PER DAY(kWh)	ELECTRICITY CONSUMTION PER YEAR (kWh)
COMPUTER LAB	55	8	440	0.44	3.52	739.2	8	75	600	0.6	4.8	1008
CLASS ROOM 1	55	4	220	0.22	1.76	369.6	4	75	300	0.3	2.4	504
CLASS ROOM 2	55	4	220	0.22	1.76	369.6	4	75	300	0.3	2.4	504
CLASS ROOM 3	55	4	220	0.22	1.76	369.6	4	75	300	0.3	2.4	504
		20	1100	1.1	8.8	1848	20	300	1500	1.5	12	2520
	55	4	220	0.22	1.76	369.6	2	75	150	0.15	1.2	252
STORE ROOM	55	3	165	0.165	0.66	138.6						
CORRIDOR		83	4565	4.565	34.54	7253.4	61		4575	4.575	36.6	7686

PROPOSED LED LAMPS											
SPACE	AREA	LUX	TOTAL LUMEN	LUMEN OF EACH LAMP	WATTAGE OF EACH LAMP	NO.OF LAMP REQUIRED	TOTAL WATTS	ELECTRICITY CONSUMTION PER HOUR (kWh)	ELECTRICITY CONSUMTION PER DAY (kWh)	ELECTRICITY CONSUMTION PER YEAR (kWh)	
COMPUTER LAB	72	500	36000	3600	36	10	360	0.36	2.88	604.8	
CLASS ROOM 1	35.3	300	10590	2600	26	4	104	0.104	0.832	174.72	
		300									
CLASS ROOM 2	35.3		10590	2600	26	4	104	0.104	0.832	174.72	
CLASS ROOM 3	35.3	300	10590	2600	26	4	104	0.104	0.832	174.72	
	TOTAL					22	672	0.672	5.376	1128.96	
STORE ROOM	16	500	8000	2000	20	4	80	0.08	0.64	134.4	
CORRIDOR	56	100	5600	1000	12	6	72	0.072	0.288	60.48	

LIGHTING ANALYSIS - SECOND FLOOR (MAIN

BLOCK)

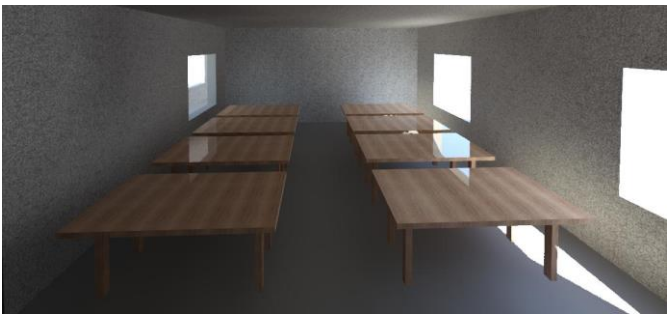
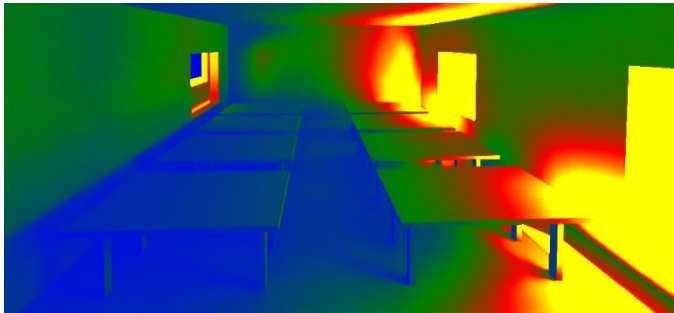
SKY CONDITION

DAY-LIGHT LUX
LEVELS

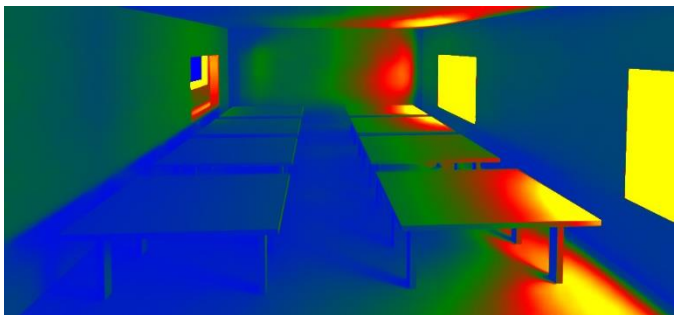
DAY-LIGHT VIEW

DAY-LIGHT WITH
ELECTRIC FIXTURES

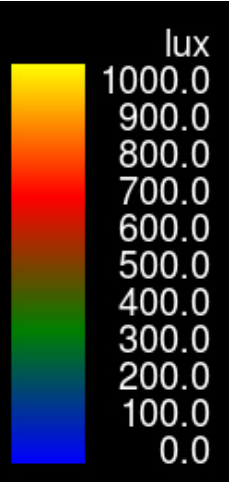
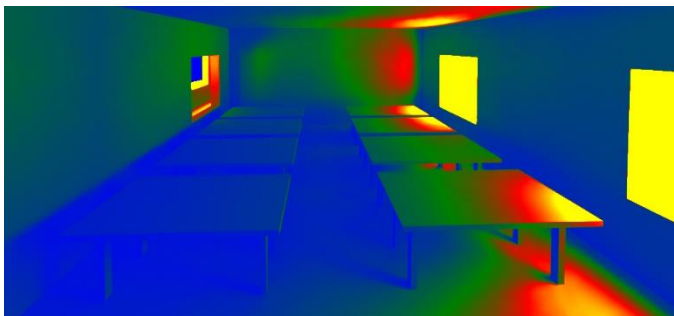
CLEAR SKY



INTERMEDIATE SKY



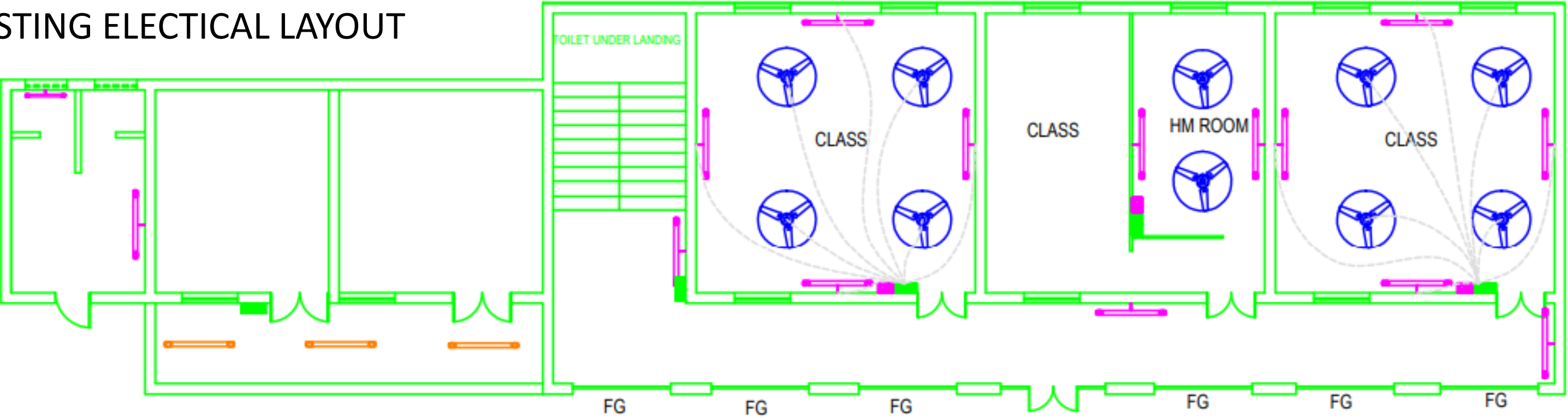
OVERCAST SKY





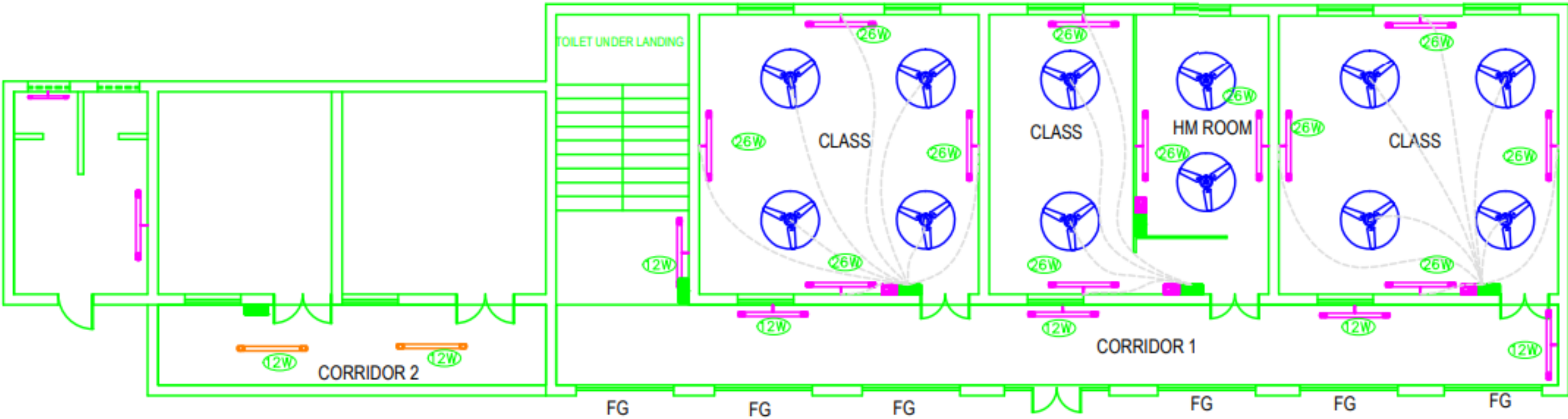
PRIMARY BLOCK CPS

EXISTING ELECTRICAL LAYOUT



GROUND FLOOR PLAN

PROPOSED ELECTRICAL LAYOUT



GROUND FLOOR PLAN

EXISTING LAMPS							EXISTING FANS					
SPACES	WATTAGE OF EACH LAMP	NO.OF LAMP	TOTAL WATTS	ELECTRICITY CONSUMTION PER HOUR (kWh)	ELECTRICITY CONSUMTION PER DAY (kWh)	ELECTRICITY CONSUMTION PER YEAR (kWh)	NO.S.	WATTS PER FAN	TOTAL WATT S	ELECTRICITY CONSUMTIO N PER HOUR (kWh)	ELECTRICITY CONSUMTION PER DAY(kWh)	ELECTRICITY CONSUMTIO N PER YEAR (kWh)
CLASS ROOM 1	55	4	220	0.22	1.76	369.6	4	75	300	0.3	2.4	504
CLASS ROOM 2	55	4	220	0.22	1.76	369.6	4	75	300	0.3	2.4	504
CLASS ROOM 3	55	4	220	0.22	1.76	369.6	4	75	300	0.3	2.4	504
		12	660	0.66	5.28	1108.8	12	225	900	0.9	7.2	1512
CORRIDOR 1	55	2	110	0.11	0.88	184.8						
CORRIDOR 2	55	3	165	0.165	0.66	138.6						

PROPOSED LED LAMPS										
SPACE	AREA	LUX	TOTAL LUMEN	LUMEN OF EACH LAMP	WATTAGE OF EACH LAMP	NO.OF LAMP REQUIRED	TOTAL WATTS	ELECTRICITY CONSUMTION PER HOUR (kWh)	ELECTRICITY CONSUMTION PER DAY (kWh)	ELECTRICITY CONSUMTION PER YEAR (kWh)
CLASS ROOM 1	37.1	300	11130	2600	26	4	104	0.104	0.832	174.72
CLASS ROOM 2	37.1	300	11130	2600	26	4	104	0.104	0.832	174.72
CLASS ROOM 3	37.1	300	11130	2600	26	4	104	0.104	0.832	174.72
	TOTAL					12	312	0.312	2.496	524.16
CORRIDOR 1	38	100	3800	1000	12	4	48	0.048	0.192	40.32
CORRIDOR 2	15	100	1500	1000	12	2	24	0.024	0.096	20.16

LIGHTING ANALYSIS - G.FLOOR (PRIMARY

BLOCK)

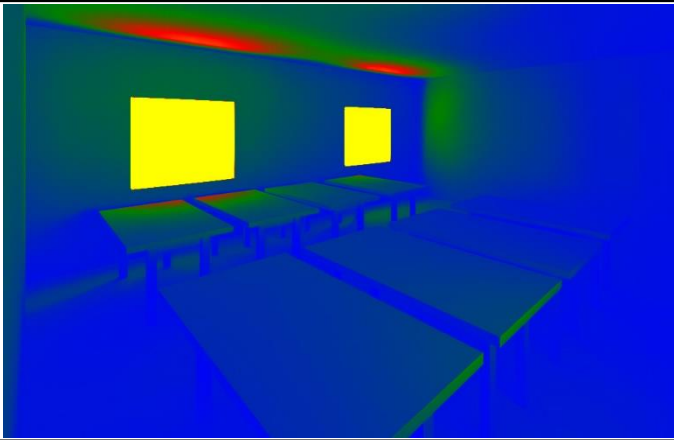
SKY CONDITION

DAY-LIGHT LUX
LEVELS

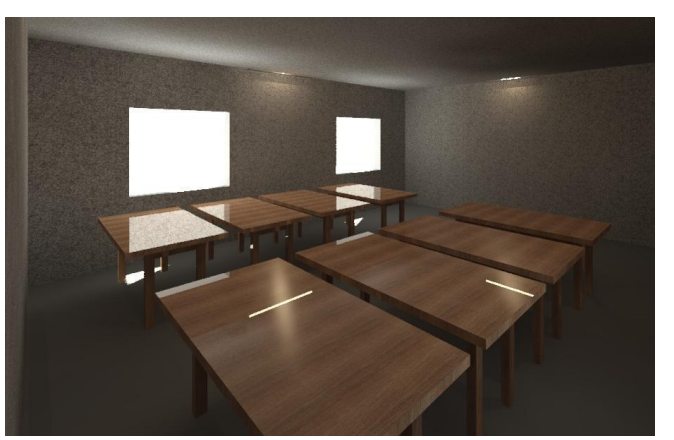
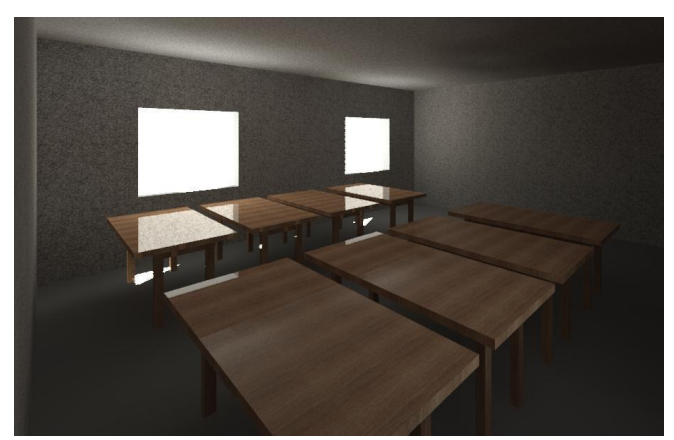
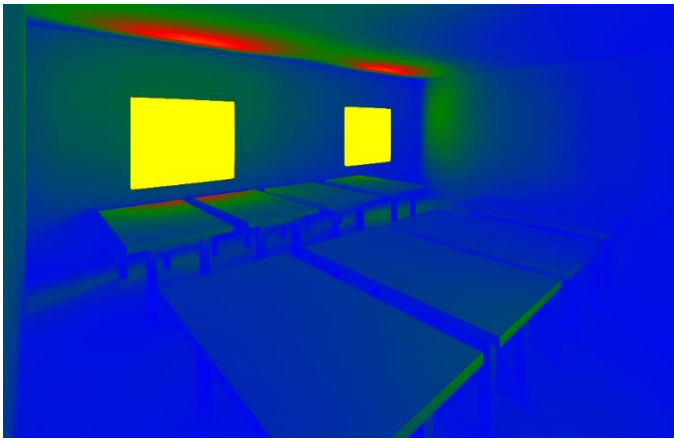
DAY-LIGHT VIEW

DAY-LIGHT WITH
ELECTRIC FIXTURES

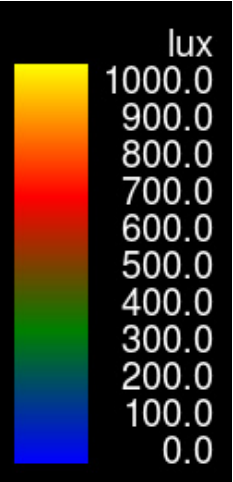
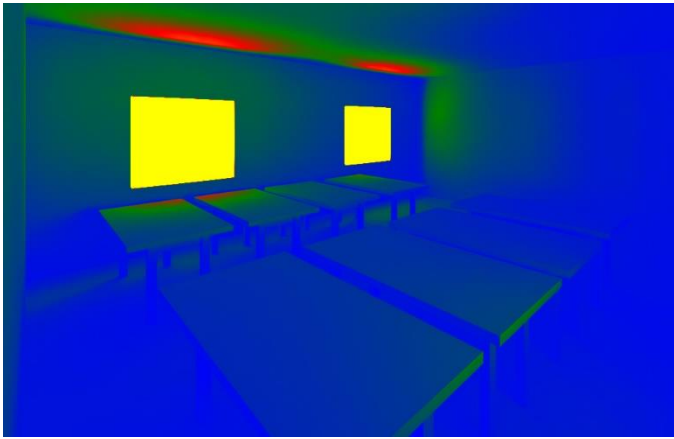
CLEAR SKY



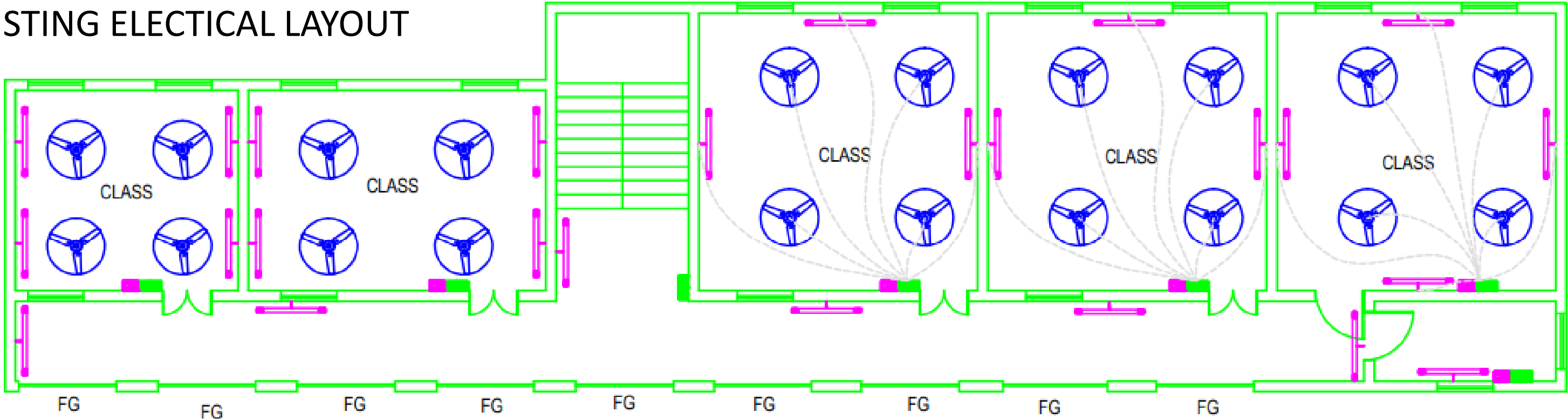
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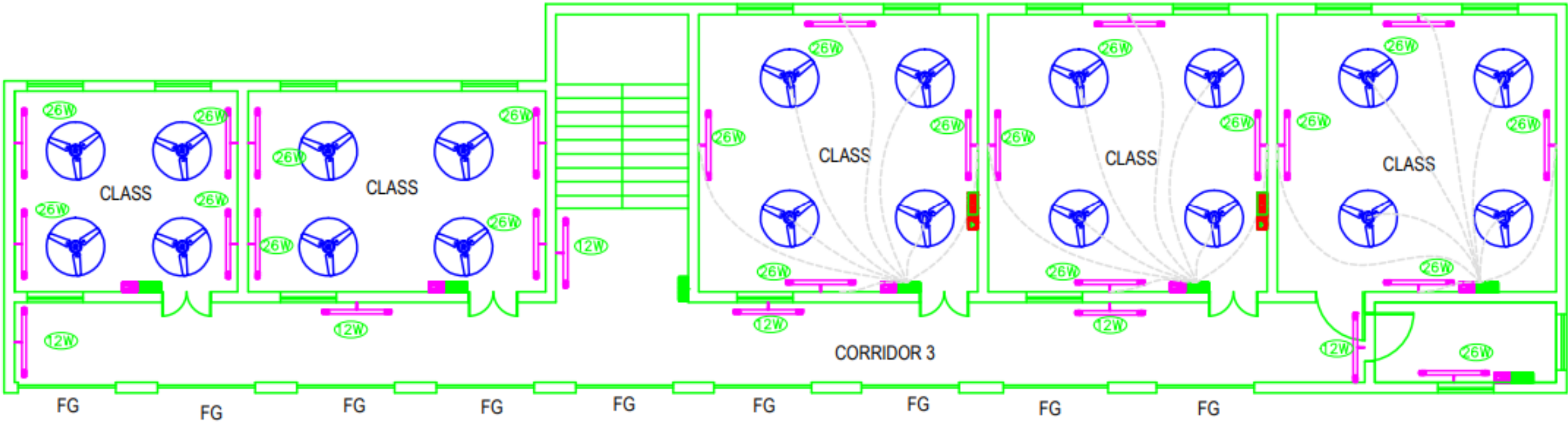


EXISTING ELECTRICAL LAYOUT



FIRST FLOOR PLAN

PROPOSED ELECTRICAL LAYOUT



FIRST FLOOR PLAN

EXISTING LAMPS							EXISTING FANS					
SPACES	WATTAGE OF EACH LAMP	NO.OF LAMP	TOTAL WATTS	ELECTRICITY CONSUMTION ON PER HOUR (kWh)	ELECTRICITY CONSUMTION PER DAY (kWh)	ELECTRICITY CONSUMTION PER YEAR (kWh)	NO.S.	WATTS PER FAN	TOTAL WATT S	ELECTRICITY CONSUMTION PER HOUR (kWh)	ELECTRICITY CONSUMTION PER DAY(kWh)	ELECTRICITY CONSUMTION PER YEAR (kWh)
CLASS ROOM 1	55	4	220	0.22	1.76	369.6	4	75	300	0.3	2.4	504
CLASS ROOM 2	55	4	220	0.22	1.76	369.6	4	75	300	0.3	2.4	504
CLASS ROOM 3	55	4	220	0.22	1.76	369.6	4	75	300	0.3	2.4	504
CLASS ROOM 4	55	4	220	0.22	1.76	369.6	4	75	300	0.3	2.4	504
CLASS ROOM 5	55	4	220	0.22	1.76	369.6	4	75	300	0.3	2.4	504
		12	660	0.66	5.28	1108.8	12	225	900	0.9	7.2	1512
STAFF ROOM	55	1	55	0.055	0.44	92.4						
CORRIDOR 3	55	5	275	0.275	2.2	462						

PROPOSED LED LAMPS											
SPACE	AREA	LUX	TOTAL LUMEN	LUMEN OF EACH LAMP	WATTAGE OF EACH LAMP	NO.OF LAMP REQUIRED	TOTAL WATTS	ELECTRICITY CONSUMTION PER HOUR (kWh)	ELECTRICITY CONSUMTION PER DAY (kWh)	ELECTRICITY CONSUMTION PER YEAR (kWh)	
CLASS ROOM 1	37.1	300	11130	2600	26	4	104	0.104	0.832	174.72	
CLASS ROOM 2	37.1	300	11130	2600	26	4	104	0.104	0.832	174.72	
CLASS ROOM 3	37.1	300	11130	2600	26	4	104	0.104	0.832	174.72	
CLASS ROOM 4	28.7	300	8610	2600	26	4	104	0.104	0.832	174.72	
CLASS ROOM 5	21.5	300	6450	2600	26	4	104	0.104	0.832	174.72	
	TOTAL					12	312	0.312	2.496	524.16	
STAFF ROOM	7	500	3500	2000	20	1	20	0.02	0.16	33.6	
CORRIDOR 3	52	100	5200	1000	12	5	60	0.06	0.48	100.8	

LIGHTING ANALYSIS - F.FLOOR (PRIMARY

BLOCK)

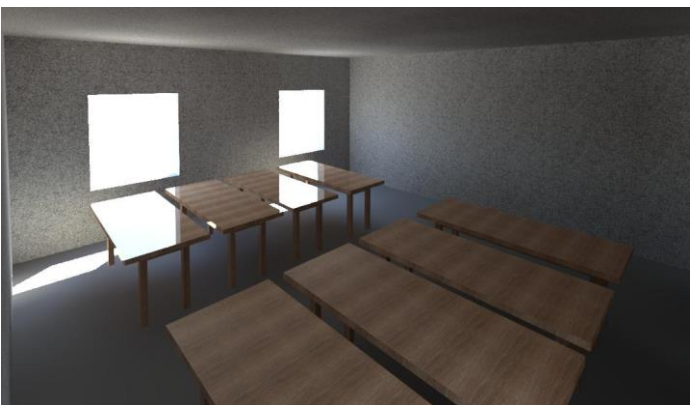
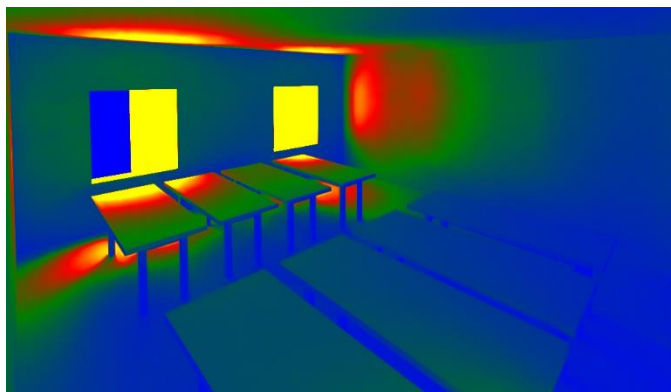
SKY CONDITION

DAY-LIGHT LUX
LEVELS

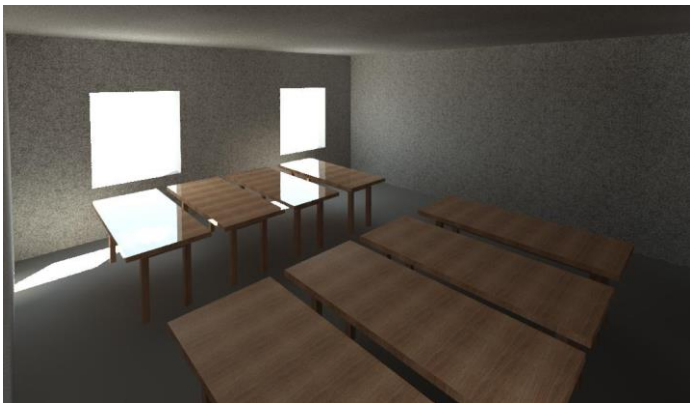
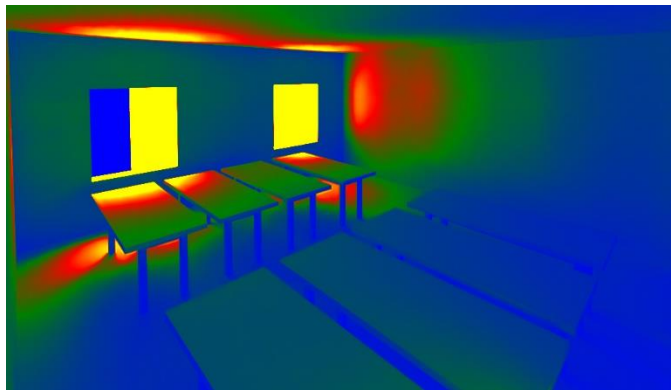
DAY-LIGHT VIEW

DAY-LIGHT WITH
ELECTRIC FIXTURES

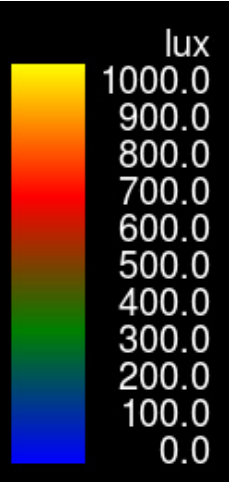
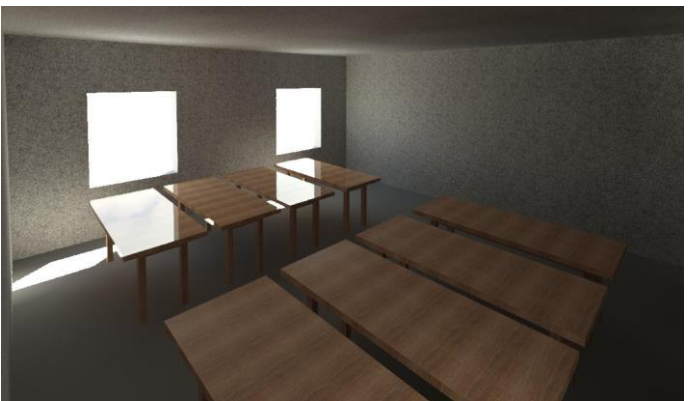
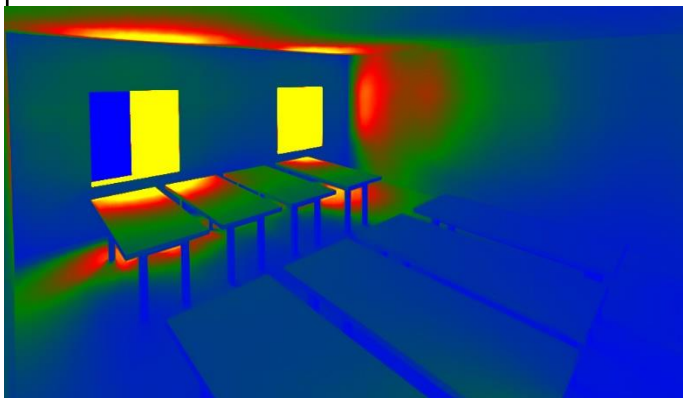
CLEAR SKY



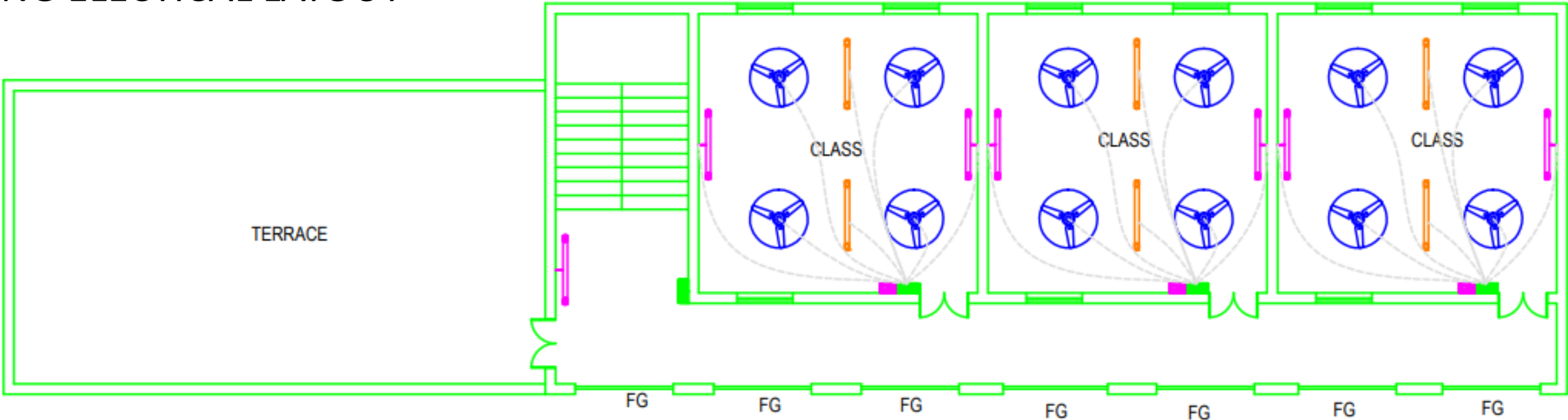
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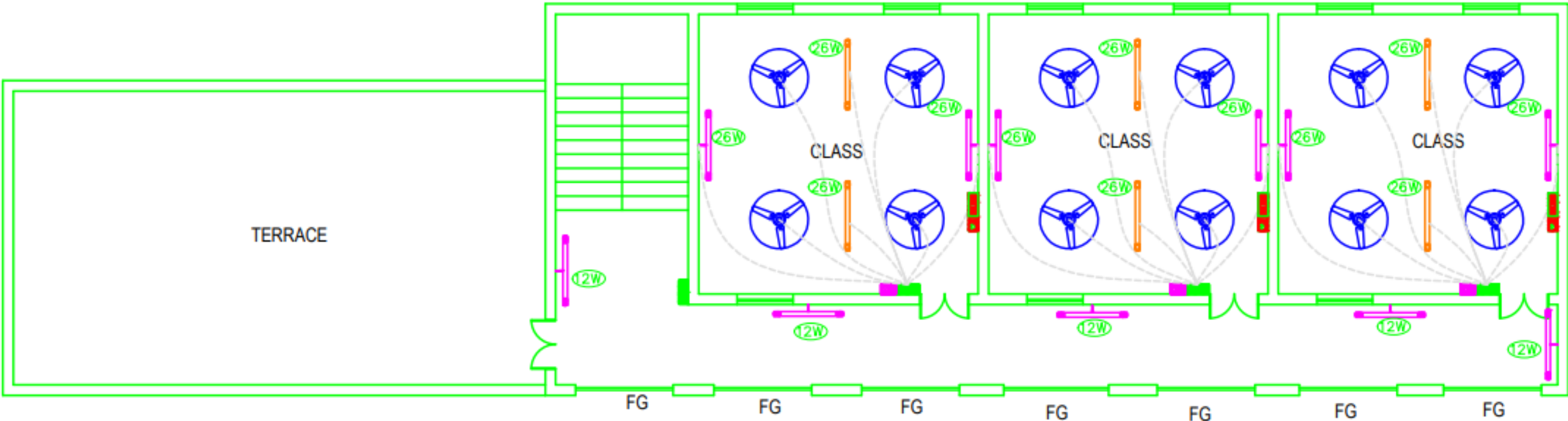


EXISTING ELECTRICAL LAYOUT



SECOND FLOOR PLAN

PROPOSED ELECTRICAL LAYOUT



SECOND FLOOR PLAN

EXISTING LAMPS							EXISTING FANS					
SPACES	WATTAGE OF EACH LAMP	NO.O F LAMP	TOTAL WATTS	ELECTRICITY CONSUMTION PER HOUR (kWh)	ELECTRICITY CONSUMTION PER DAY (kWh)	ELECTRICITY CONSUMTION PER YEAR (kWh)	NO.S.	WATTS PER FAN	TOTAL WATTS	ELECTRICITY CONSUMTION PER HOUR (kWh)	ELECTRICITY CONSUMTION PER DAY(kWh)	ELECTRICITY CONSUMTION PER YEAR (kWh)
CLASS ROOM 1	55	4	220	0.22	1.76	369.6	4	75	300	0.3	2.4	504
CLASS ROOM 2	55	4	220	0.22	1.76	369.6	4	75	300	0.3	2.4	504
CLASS ROOM 3	55	4	220	0.22	1.76	369.6	4	75	300	0.3	2.4	504
		12	660	0.66	5.28	1108.8	12	225	900	0.9	7.2	1512
CORRIDOR 1	55	2	110	0.11	0.88	184.8						

PROPOSED LED LAMPS											
SPACE	AREA	LUX	TOTAL LUMEN	LUMEN OF EACH LAMP	WATTAGE OF EACH LAMP	NO.OF LAMP REQUIRED	TOTAL WATTS	ELECTRICITY CONSUMTION PER HOUR (kWh)	ELECTRICITY CONSUMTION PER DAY (kWh)	ELECTRICITY CONSUMTION PER YEAR (kWh)	
CLASS ROOM 1	37.1	300	11130	2600	26	4	104	0.104	0.832	174.72	
CLASS ROOM 2	37.1	300	11130	2600	26	4	104	0.104	0.832	174.72	
CLASS ROOM 3	37.1	300	11130	2600	26	4	104	0.104	0.832	174.72	
	TOTAL					12	312	0.312	2.496	524.16	
CORRIDOR 1	38	100	3800	1000	12	4	48	0.048	0.192	40.32	

POWER CONSUMPTION - EXISTING vs PROPOSAL

Annual Power Consumption - EXISTING

S.No	BLOCKS	Annual Power Consumption (Kwh)
1.	Class Room Block	14187.6
2.	Secondary Block	14939.4
3.	Primary Block	8925
4.	Miscellaneous	4156
TOTAL CONSUMPTION		42208

Annual Power Consumption - PROPOSAL

S.No	BLOCKS	Annual Power Consumption (Kwh)
1.	Class Room Block	9739.68
2.	Secondary Block	11103.12
3.	Primary Block	6343.68
4.	Miscellaneous	4156
TOTAL CONSUMPTION		31342

2014-2015 – Annual Power Consumption

CPS BLOCK

Avg 2 months Reading – 645Kwh
Annual consumption – 3840Kwh

CHSS BLOCK

Avg 2 months Reading – 1540Kwh
Annual consumption – 9240Kwh

LED LIGHT FIXTURES – ENERGY EFFICIENCY

S.No	Light Wattage (W)	Cost(Rs)	Total Requirement (No.s)	Total Cost (Rs)	Wattage of CFL bulb of Same Output of Lumens (W)	Energy savings (%)
1.	36W	980				
2.	26W	760	153	116280	55W	52%
3.	12W	280	54	15120	30W	60%
4.	10W	260	6	1560	28W	64%
5.	5W	160	12	1920	15W	65%

- Total Initial cost for LED light Fixtures : 134880 Rs
- Annual Energy Savings : 42208 – 31342 = **10866Kwh**
- Cost for Power Consumption

Existing : 42208 * 6.6 = **277052 Rs**

Proposed : 31342 * 6.6 = **205337 Rs**

(*Consumption price taken as Rs.6.6/Unit)

- **Cost Savings (Annual) : 71715Rs**
- **Pay Back period : 2 Years**

LED Fixture Life Span : 12Years (20,000hrs)

ON-SITE RENEWABLE ENERGY

SOLAR POWER HARVESTING

CPS BLOCK

Total No. of Panels – 6

Power output: 325 – 345 Wp (Avg 335Wp)

Total Output per day – $6 \times 335 \times 5.5$ (Sun hours) = **11.05Kwh /Day**

Annual Production : 4033 Kwh

CHSS BLOCK

Total No. of Panels – 15

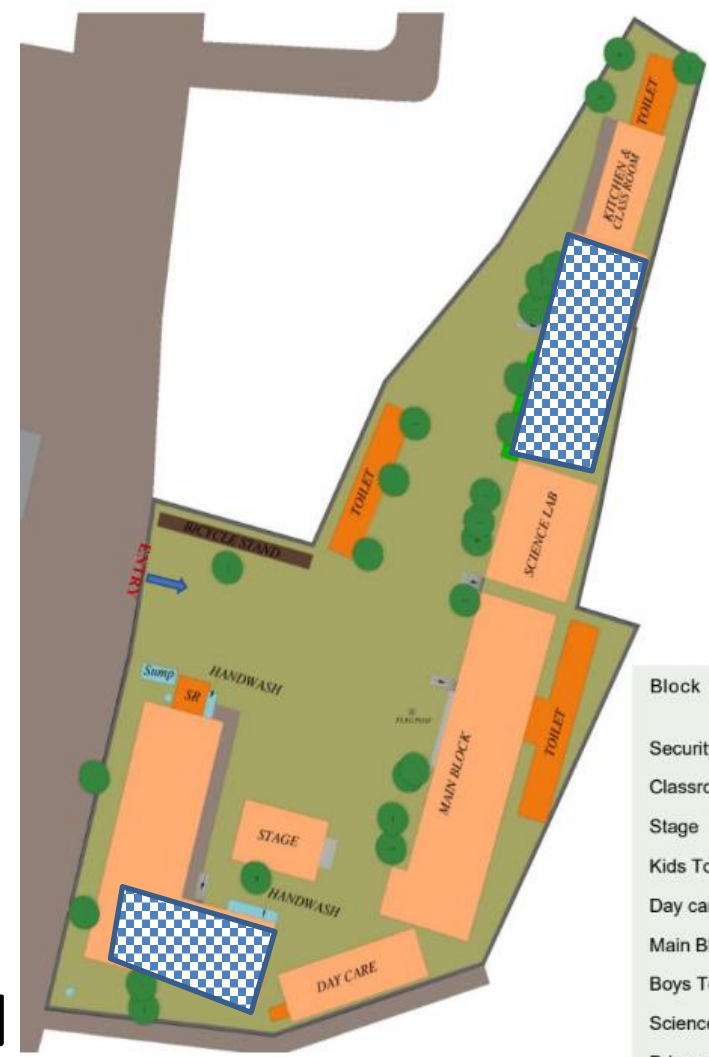
Power output (per panel): 325 – 345 Wp (Avg 335Wp)

Total Output per day – $15 \times 335 \times 5.5$ (Sun hours) = **27.64Kwh**

Annual Production : 10,087.68 Kwh



SITE PLAN



 Solar Panels

Annual Power Consumption
(Proposed) - **31342Kwh**

Annual Power Harvested -
14120Kwh

Annual Power requirement from
Grid – **17222Kwh**

**(46% of Power
Requirement harvested
from Site)**

RAIN WATER HARVESTING

Avg Normal Rainfall - Chennai				
Year	Peak Rain Month	Rainfall (mm)	Number of Rainy days	Normal Rainfall/Day (mm)
2016	Sept	289	24	12.0416667
2017	Nov	370	23	16.0869565
2018	Nov	313	13	24.0769231
2019	Nov	274	26	10.5384615
2020	Nov	365	24	15.2083333
Average normal rainfall/ day (mm)				15.686002
Average normal rainfall/ day (m)				0.015686

Source : <https://www.worldweatheronline.com/chennai-weather-averages/tamil-nadu/in.aspx>

RWH Calculations - CPS, CHSS , MH road				
S.No	Surface type)	Run-off coefficient (c	Area (a) (m2)	Impervious Area (m2) I=c X a
	1 Tiled Roof	0.95	799	759.05
Total impervious area in sq.m. ($\sum I$)				759.05
Average normal rainfall/ day (m)				0.015
Total roof and non-roof run-off volume in cu.m ($\sum I \times R$)				11.38575

SITE PLAN

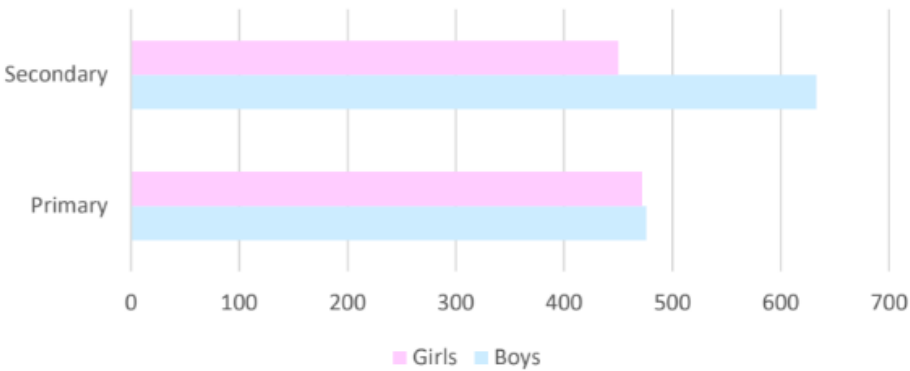


WATER CONSUMPTION

WC and flush tanks are not present and only faucets(taps) are provided. The flow rate is calculated accordingly based on usage.

Demography chart

Student Distribution



Student Teacher Ratio



CPS - 1:31.6

CHSS - 1:30.9

Water Usage							
				Baseline		Existing	
Fixture Type	Duration	Daily uses per person / per day	Number of Students & Teachers (n)	Flow Rate/ Capacity (fb)	Total Water use (L) Tb = n X fb	Flow Rate/ Capacity (fb)	Total Water use (L) Tb=nXfb
Water Closets	1 Flush (Full Flush)	1 for male	1138	6	6828	0	0
	1 Flush (Full Flush)	1 for female	977	6	5862	0	0
	2 Flush (Full Flush)	2 for female	977	3	2931	0	0
Urinals	1 Flush (Full Flush)	2 for male	1138	4	4552	0	0
Faucet/ Taps	0.25	4	2115	8	16920	10	21150
Total water use (litres/day)					37103		21150
Number of working days				200			
Total Annual water use in litres (Total water use x Number of working days)				7420600		4230000	
Percentage reduction of water usage from the baseline				43%			

Thank You....