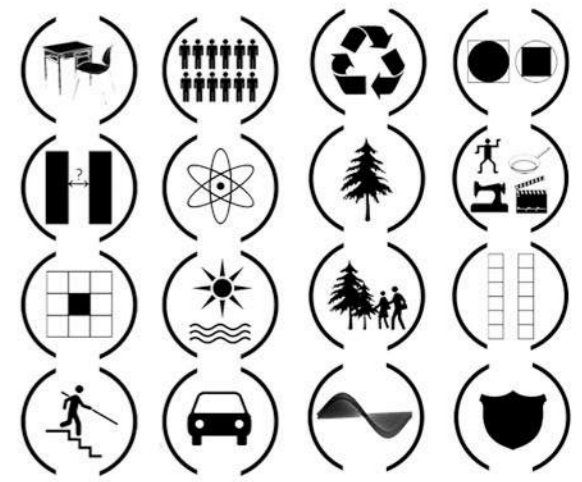




a school by the students, for the students



**FINAL ARCHITECTURAL THESIS
YEAR 5 BATCH 2013**



**UNIVERSITY
OF MALAYA**

The Leader in Research & Innovation

hamilton jay simon | bvh130010

An aerial photograph of a city, likely Istanbul, showing a prominent grid street pattern. A river, the Bosphorus, flows through the city, separating the European and Asian sides. The buildings are densely packed, and the overall scene is captured from a high angle, looking down at the urban landscape.

“the only universal constant is change”
Heraclitus of Ephesos (c. 500 BCE)

acknowledgements

I would like to take this opportunity to express my deepest gratitude to my supervisors most notably Pn Helena Hashim and Miss Naziaty Yaacob. for their full support, expert guidance, understanding and encouragement throughout my study and research. In addition, I would like to express my appreciation Pn. Pushparani, and to the teachers and students of SMK Sultan Abdul Samad, Klang, for allowing me to conduct the interviews easily and for their first hand experience in Malaysians schools. Their thoughtful questions, comments, and tutoring are greatly valued. My gratitude also goes out to the several students who have allowed me to borrow their ideas for the purpose of this design thesis.

Thanks also goes to my fellow ARCHMA studio peers and staff at University Malaya, Kuala Lumpur, who shared their knowledge with me without a moment's hesitation. Special mention also to the numerous friends and family who have helped me throughout this academic exploration.

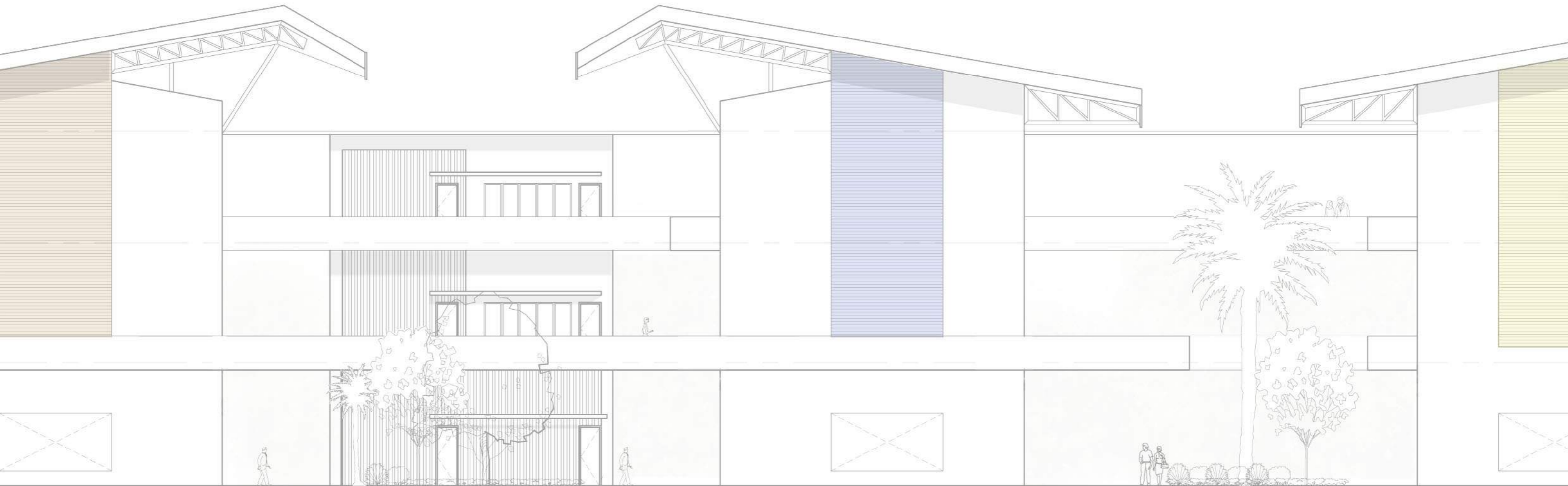
Finally, I would like to thank God, my parents and sisters for their unconditional love and support during this entire period. I would not have been able to complete this design thesis without their continuous love and encouragement.

Thank you.



abstract

The following report would provide background information with regards to the justifications of the design thesis topic, case studies, the history of Malaysian schools, precedent studies, survey results, the proposed site, as well as the overall architectural proposal itself. This architectural thesis is based upon developing a new secondary school typology in Klang, Malaysia. A unique typology that borrows into its architecture the amalgamated inputs of the **real clients** of current schools, the **teachers and students**. The thesis is seen as an attempt to increase motivation in student performance in public schools which subsequently increases the quality of education in Malaysia. This design thesis would also attempt to integrate the community factor into its design, a factor currently lacking in Malaysian public schools. Thus, by involving the community, students and teachers, MYSCHOOL would hope to assimilate a more holistic and design orientated nature to modern schools in Malaysia.



what is a school?

The Oxford dictionary defines the term school as an 'institution for the education of children or students'. This expression can be then dissected and analyzed into two equal parts that are equally important in a any school typology that is focused in fostering successful students and a better Malaysian educational system on a whole.

'an *institution* for *educating* children'

(tangible) (intangible)

The term school is derived by understanding the nature of education. The institution or the built form (tangible aspect), and the syllabus (intangible aspect). In Malaysia, 20% of the National Budget was spent on improving the the intangible aspect of the education system. Owing to the selected newspaper reviews on the left, almost all governmental aid is directed to improving and manipulating the syllabus in hopes to produce students which are able to critically think and apply themselves in the future.

However, the tangible part of the education system is almost entirely neglected. The sorry state of current Malaysian schools has prompted the need for this thesis, in order to elevate the current level of the built form aspect of education to the same level of care as given to the syllabus.

"The poor quality of Malaysia's education system is more worrying than the level of debt in its households."

- Frederico Gil Sanders, World Bank Economist

According to a world student performance assessment test called PISA which had measured how students in 65 countries did in mathematics, science and reading. According to PISA's 2012 results Malaysian students scored below average, or in better terms, we ranked 52 out of 65.

In contrast, Vietnamese students ranked 17 out of 65.

Malaysia's poor PISA results spotlighted the weakness of Malaysia's school system, despite the fact that education gets the largest share of funds every year from the national budget. In a census obtained from the Ministry of Education, which then again ends up improving the syllabus (intangible aspect) portion of education

However, non governmental schools in Malaysia in comparison, continues to have better educational performance based on the census obtained. Perhaps the key to the sustained growth in student performance isn't the quality of training of the teachers, but the mere aspect of motivation behind student performance and their attendance in school. Hence this design thesis would aim to bride the gap between the private and public schools in terms of its schooling facilities as well as cater to the needs of the students, teachers and community.

Jadual 6.10: Perbelanjaan kerajaan persekutuan untuk pendidikan, Malaysia, 2007-2011
Table 6.10: Federal government expenditure on education, Malaysia, 2007-2011

Perkara Item	2007	2008	2009	2010	2011
Jumlah perbelanjaan bagi pendidikan (RM juta) Total expenditure on education (RM million)	22,376	27,268	28,822	28,253	31,180
Peratus dari jumlah perbelanjaan Percentage of total expenditure	17	21	19	20	19
Jumlah perbelanjaan bagi pendidikan per kapita (RM) Total expenditure on education per capita (RM)	1,335	983	1,018	1,000	1,077
Kos semasa bagi setiap murid setiap tahun (RM) Annual recurrent cost per student (RM)					
i. Sekolah rendah Primary school	2,112	3,593	3,632	3,993	4,033
ii. Sekolah menengah Secondary school	2,542	4,403	4,319	4,125	4,321
iii. Sekolah menengah berasrama Secondary residential school	8,475	11,915	12,859	8,060	6,226
iv. Sekolah menengah teknik/vokasional Technical/vocational secondary school	6,256	10,712	20,837	10,220	10,877

Tidak termasuk perbelanjaan bagi Kementerian Pengajian Tinggi Malaysia
Excludes expenditure for Ministry of Higher Education, Malaysia

Sumber: Kementerian Pelajaran Malaysia
Source: Ministry of Education, Malaysia

Jadual 6.7: Keputusan peperiksaan Sijil Tinggi Persekolahan Malaysia bagi calon sekolah kerajaan & bantuan kerajaan dan calon persendirian, Malaysia, 2007-2011
Table 6.7: Results of the Malaysian Higher School Certificate examination for candidates in government & government-aided schools and private candidates, Malaysia, 2007-2011

Calon Candidates	Tahun Year	Bilangan gates Number of candidates	Keputusan peperiksaan Full passes in					% Lulus penuh % Full pass	Lulus sebagai Subsidiary pass	Gagal Fail
			5 mata pelajaran 5 subjects	4 mata pelajaran 4 subjects	3 mata pelajaran 3 subjects	2 mata pelajaran 2 subjects	1 mata pelajaran 1 subject			
Jumlah Total	2007	62,183	3,688	23,110	12,437	9,257	8,472	92	4,094	1,125
	2008	50,200	3,437	18,888	10,871	7,649	6,440	92	3,037	958
	2009	52,384	4,319	20,880	9,806	7,417	6,259	93	3,027	876
	2010	50,590	2,997	20,493	10,082	7,217	6,006	92	2,880	907
	2011	50,661	2,588	20,658	10,204	7,096	6,197	92	3,090	886
Calon sekolah kerajaan dan bantuan kerajaan Candidates of government and government-aided school	2007	55,563	3,597	22,032	11,502	8,301	7,000	71	2,837	474
	2008	44,789	3,245	17,849	9,375	6,794	5,186	71	2,029	311
	2009	47,269	4,109	19,820	9,100	6,636	5,112	73	2,130	382
	2010	45,987	2,842	19,091	9,483	6,533	4,969	71	2,043	426
	2011	45,978	2,449	20,008	9,675	6,601	5,307	70	2,401	447
Calon persendirian Private candidates	2007	6,620	291	1,078	935	856	1,452	94	1,257	651
	2008	5,411	192	830	856	855	1,274	95	1,008	547
	2009	5,095	210	800	706	781	1,147	95	897	494
	2010	4,603	155	602	599	684	1,037	95	845	481
	2011	3,683	139	630	531	455	800	94	689	419

Sumber: Kementerian Pelajaran Malaysia
Source: Ministry of Education, Malaysia

Empat aspek tingkat sistem pendidikan

KUALA LUMPUR 17 Ogos - Raja Muda Perak, Raja Dr. Nazrin Shah mengatakan empat aspek utama sistem pendidikan yang memerlukan perhatian khusus demi memenuhkan keperluan ekonomi bersejarah perindustrian dan inovasi.

"Tahap, strategi dan kaedah pengajaran dan pembelajaran serta budaya belajar,

"Kerangka kita relate pada dengan guru-guru dan tenaga kependidikan memberikan lebih banyak maklumat kepada pelajar yang menerima secara aktif.

"Mungkin sudah tiba masanya untuk mengartikan kandungan bahan yang diberikan dan meningkatkan lebih banyak dan meningkatkan kemahiran dan kecakapan yang diperlukan dalam abad ke-21."



Raja Nazrin Shah

Itah baginda, Raja Nazrin yang juga Pro-Chancellor Universiti Malaysia (UM) berkata, sama-sama merancang Pendidikan Antarabangsa Pendidikan Untuk Semua di Hotel Legend di sini hari ini.

Mengenal sistem pendidikan, baginda menjelaskan, budaya pembelajaran dan pengajaran dan pembelajaran serta budaya belajar.

"Kita mungkin boleh mengurangkan peperiksaan di peringkat menengah tetapi kita harus memastikan bahawa kita mempunyai tenaga kependidikan yang berkualiti dan bersedia untuk menghadapi cabaran abad ke-21."

ka yang merujuk keputusan cemerlang dan memingkatkan mereka yang tidak cemerlang.

"Sistem berorientasikan peperiksaan itu adalah berkesan, tetapi kita harus memastikan bahawa kita mempunyai tenaga kependidikan yang berkualiti dan bersedia untuk menghadapi cabaran abad ke-21."

Mad rush in teaching transformation

The Annual Report of the Malaysian Education Blueprint 2013-2025 (MEB) shows that the Education Ministry is set for a busy year ahead.

"There is progress in the transformation of the education system, especially the Digital Learning and Training (DLT) initiative, which is a key component of the MEB. The government is committed to providing quality education for all, and the MEB provides a clear roadmap for this."

Mad rush in teaching transformation is a term used to describe the rapid pace at which schools are implementing new teaching methods and technologies. This is driven by the government's push for educational reform and the need to prepare students for the challenges of the 21st century.

While there are many benefits to this transformation, there are also concerns about the quality of education and the impact on teachers and students. It is important to ensure that the transformation is done in a way that is sustainable and equitable for all.

Peningkatan dalam sistem pendidikan

Inisiatif untuk rakyat bersaing pada peringkat global



9 - Berita Harian - Wednesday, 28 March 2012

Program Transformasi Pendidikan (PTP) bertujuan untuk meningkatkan kualiti pendidikan dan mempersiapkan rakyat Malaysia untuk bersaing pada peringkat global.

Salah satu inisiatif utama PTP adalah Program Transformasi Pendidikan (PTP) yang bertujuan untuk meningkatkan kualiti pendidikan dan mempersiapkan rakyat Malaysia untuk bersaing pada peringkat global.



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Sistem pendidikan perlu melalui transformasi - Najib

KUALA LUMPUR 13 Mac - Sistem pendidikan negara perlu melalui proses transformasi supaya kumpulan pelajar yang dibahagikan adalah mereka yang mempunyai kemampuan berfikir dan mempunyai idea inovatif serta kreatif bagi menghadapi cabaran masa hadapan.

Pendana Menteri, Datuk Seri Najib Tun Razak berkata, langkah itu juga wajar kerana sebagai alat penerangan yang amat memerlukan transformasi sistem pendidikan negara sektor pendidikan perlu diberikan nafas baharu.

Salah satu inisiatif utama PTP adalah Program Transformasi Pendidikan (PTP) yang bertujuan untuk meningkatkan kualiti pendidikan dan mempersiapkan rakyat Malaysia untuk bersaing pada peringkat global.

Salah satu inisiatif utama PTP adalah Program Transformasi Pendidikan (PTP) yang bertujuan untuk meningkatkan kualiti pendidikan dan mempersiapkan rakyat Malaysia untuk bersaing pada peringkat global.

• 20% of the annual Budget is spent on EDUCATION (intangible)

• No allocation or initiative to better the institution (tangible) portion of schools in Malaysia

KEY RESEARCH OBJECTIVES:

1. To ascertain an alternative approach to current school design by amalgamation of input from teachers and students
2. To create a new school typology that focuses on necessities of its actual clients including the community

An aerial, high-angle photograph of a city street grid. The streets are light gray, and the buildings are dark gray. A yellow taxi cab is visible in the lower right quadrant, moving along a street. The overall image has a slightly blurred, artistic quality.

"We tend to put considerations of family, community, and economy off-limits in education-reform policy discussions. However, we do so at our peril.

The seriousness of this purpose requires that we learn to rub our bellies and pat our heads at the same time."

– Paul Barton, Facing the Hard Facts in Education Reform.

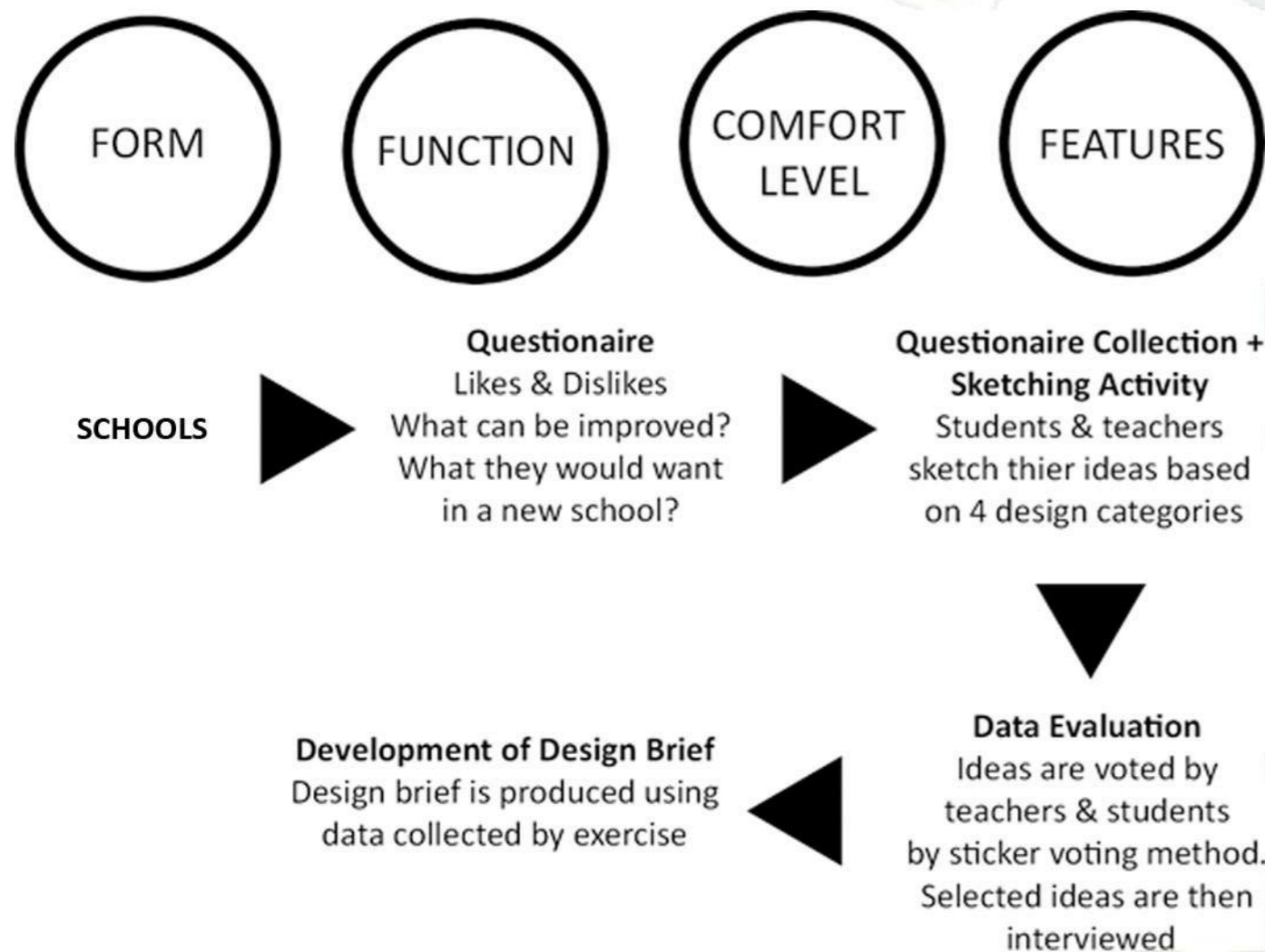
The current public schools in Malaysia does not involve the needs of its students, teachers, as well as the community in its design

This thesis would then attempt to engage students and teachers from a predefined range of schools to discover what can be done to improve on the current school typology as well as gather new ideas that can be implemented in the formation of a new school typology.

The data collection will revolve around the ‘charette system’. The goal of the charette is to generate multiple design ideas quickly. The various designs are then evaluated to determine which ideas are the most effective and appropriate. After the students and teachers discuss the strengths and weaknesses of each idea, the ideas are then evaluated by the design thesis facilitator and the this researcher to find a consensus about what features that could be integrated in the development of a new school typology for Malaysia.

In Malaysia, public schools are government funded and are uniformly designed to suit all students, be it in an urban or rural setting. This uniformity in design has seen schools deemed as institutions that are lacking in overall creativity and in turn poor in cultivating the drive behind student’s regular attendance in school.

Currently, the government and school boards are key decision makers in the school design process. Others who typically play a role are parents, community members, and business leaders. Thus, when the design process focuses solely on the input and opinions of adults, it overlooks the perspective of the school’s true clients—its students and teachers. The fact is, public schools in Malaysia are one of the few buildings that negate the needs of its actual clients in terms of catering to what they want in a school and how it should look or feel like.



Unkempt condition and linear spline design of current Malaysian secondary schools

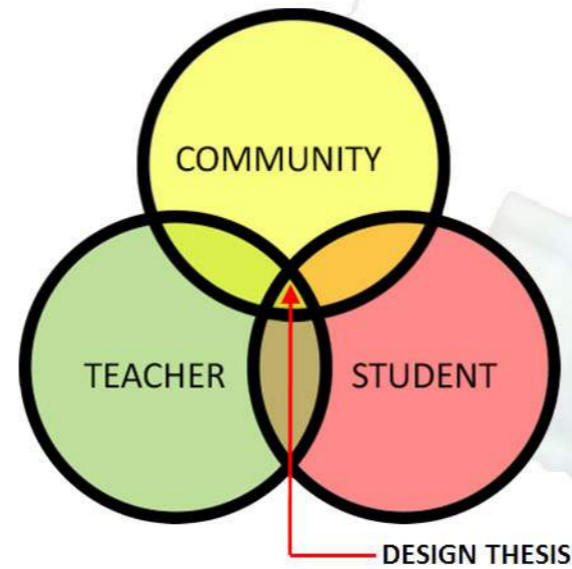


Malaysian Tamil Secondary School in a Shoplot

No single method exists currently for effectively involving students in school design.

Students use buildings differently than teachers and administrators, and they have good ideas about what inspires them and what could be done to improve the current schooling environment. Not surprisingly, schools that are responsive to students’ needs and interests work better as helping to plan or modernize their school also transforms student attitudes in classrooms.

Similar to current practice by schools that allow students to paint murals on school walls, students, when given a voice about what they want in their school, they feel excitement, ownership, and pride. From an educational perspective, involving students and teachers in school design process provides a richer learning experience as they tend to react better to an environment that is designed to cater their needs, rather than the current typical standard design..



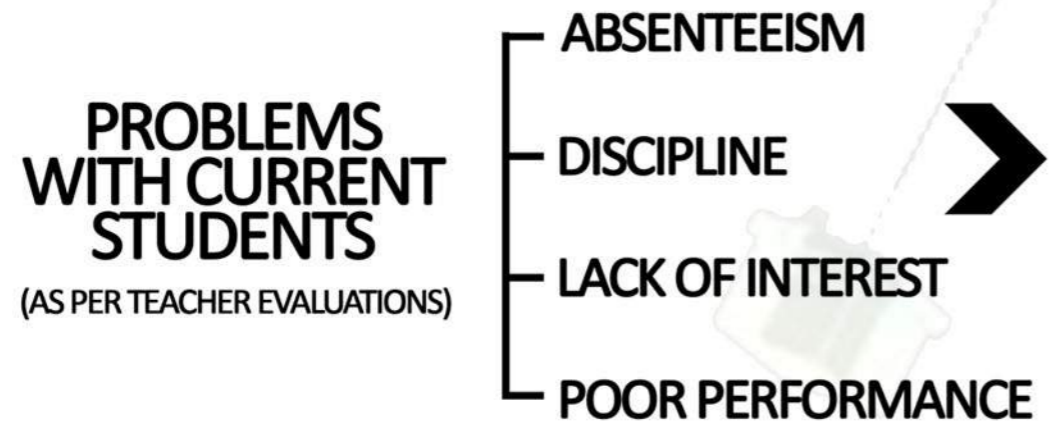
Thus, by integrating the very real needs of the students and teachers, the design becomes more personal to its patrons. The current typologies that exist are structures which are utilitarian in nature, and are completely devoid of character and identity. Hence, by allowing students and teachers to belong, it heightens the motivation effect behind academic performance in schools.

Another factor to consider in the subject matter is the community participation in today's schools. A high percentage of public schools in Malaysia attempt to block out the community component in school designs. This could be due to security reasons and/or the increased vandalism and destruction of public property; rampant in today's Malaysia.

However, by integrating the community factor, schools then become more personal to their site. The contextual response would be that the proposed school would gentrify its surrounding, leading to a more established neighborhood as well as increasing education standards amongst the pertaining community that uses the facility.



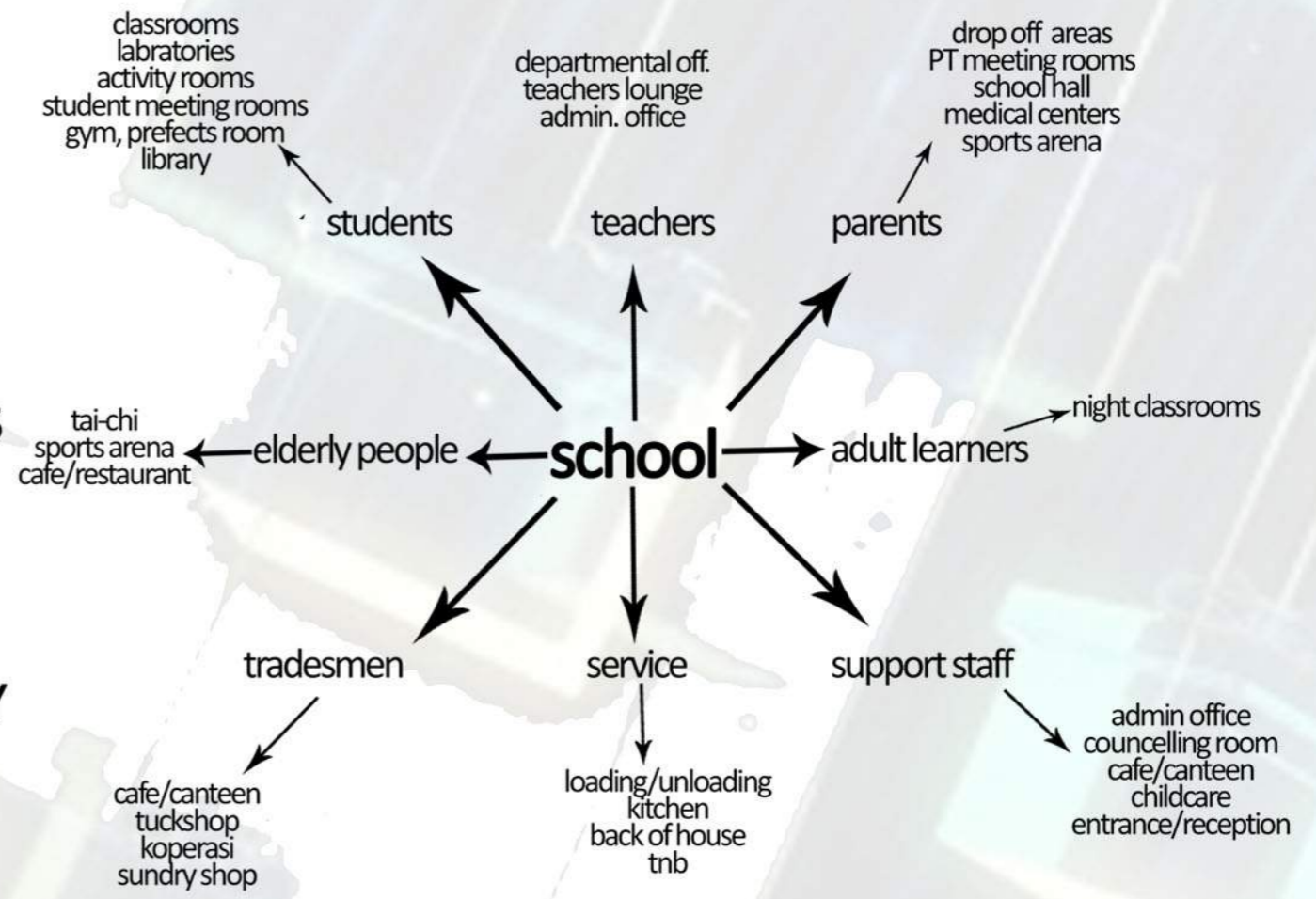
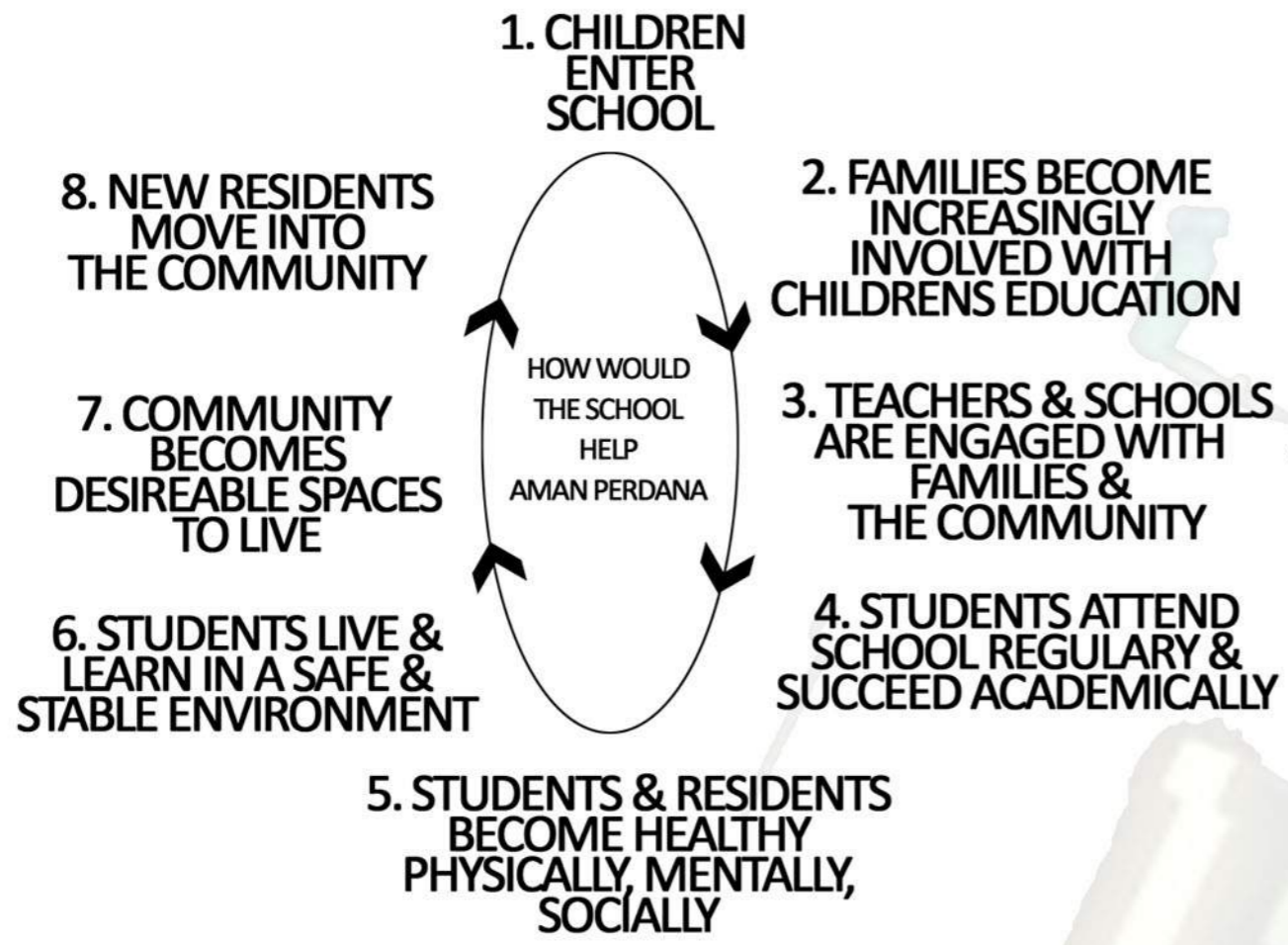
**COMMUNITY APPROACH/CONCEPT MODULE
IN SCHOOL DESIGN** *'SCHOOL BECOMES THE HUB OF THE COMMUNITY,
AND ARE OPEN TO EVERYONE.'*



PARENTAL INVOLVEMENT
THE LACK OF AVENUES
OF COMMUNICATION
FOR PARENTS TO ASCERTAIN
STUDENTS PROGRESS IN SCHOOL

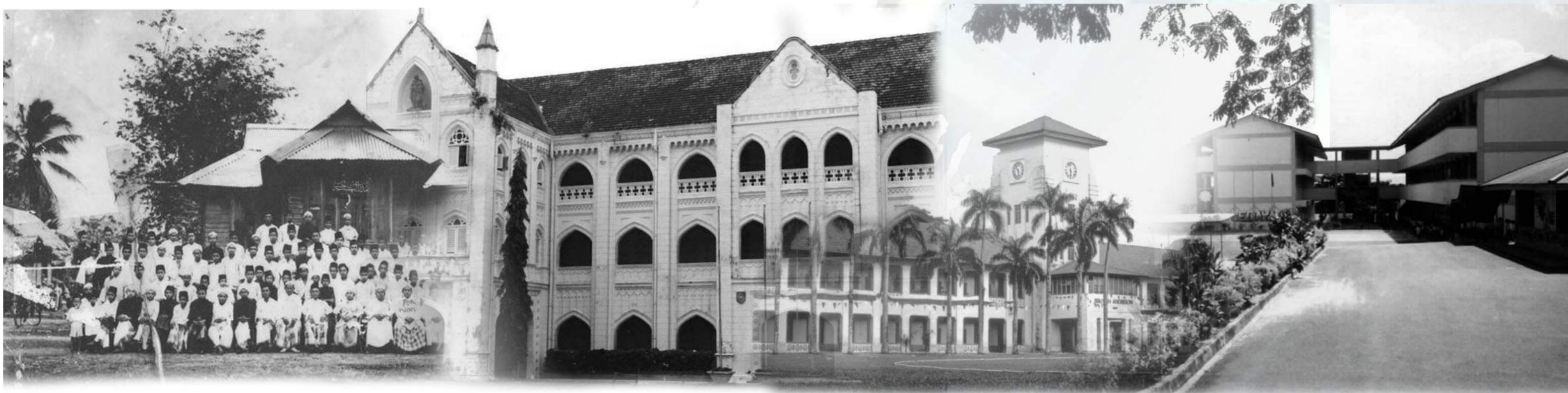
➔

THE SCHOOL BECOMES THE
**MEDIUM
OF
COMMUNICATION**
BETWEEN PARENTS & TEACHERS
IN DEVELOPING STUDENTS
(INFORMAL / FORMAL)





2.0 SCHOOLS IN MALAYSIA



what happened here?

ARCHITECTURAL PROGRESS

ARCHITECTURAL REGRESS



VERNACULAR
the first schools in Malaysia were built in house styles of the various communities and were built using wood and thatch roofing



MISSION SCHOOLS
mission schools were brought in by Christian missionaries and were designed in the courtyard typology. Made from brick and tiles, large windows with ample ventilation



MALAY SCHOOLS
Malay schools were started in response to the mission schools. English medium education. The schools borrowed designs from its predecessor, and was highly successful in educating students

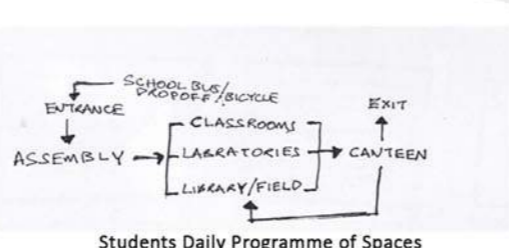
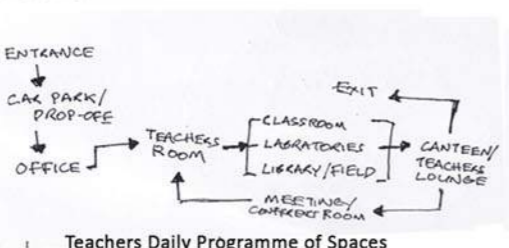
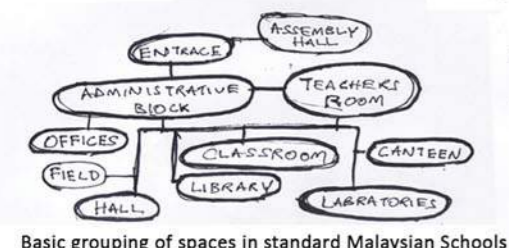
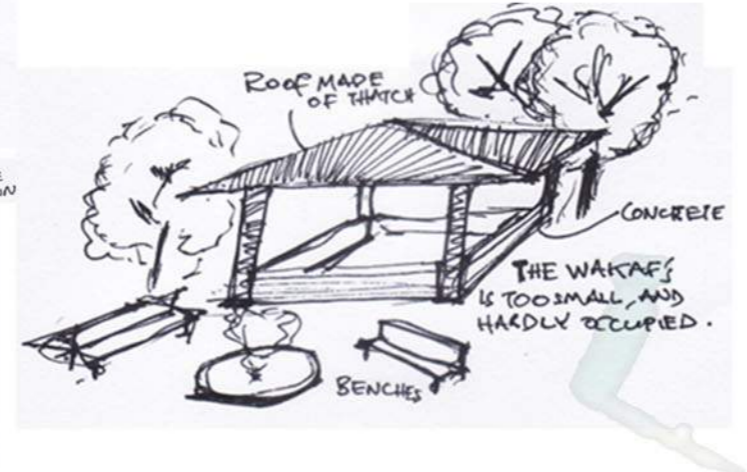
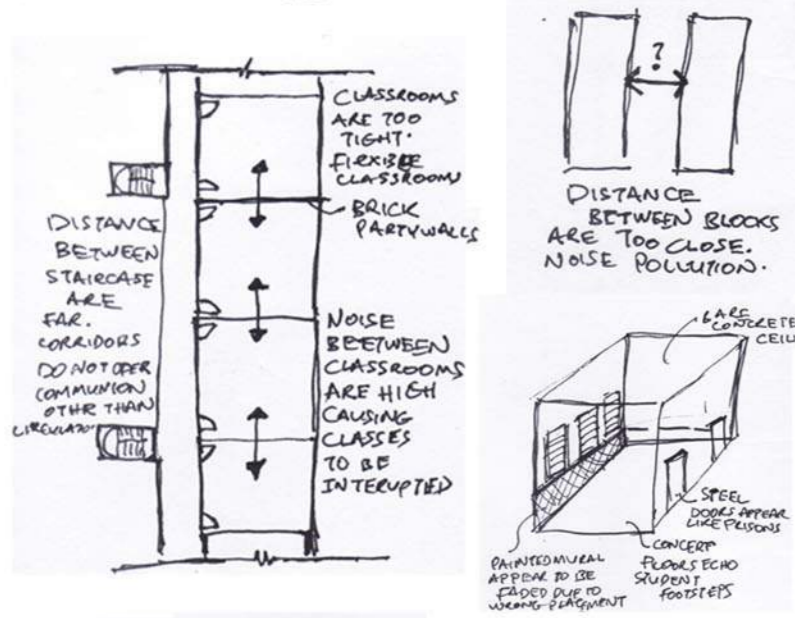
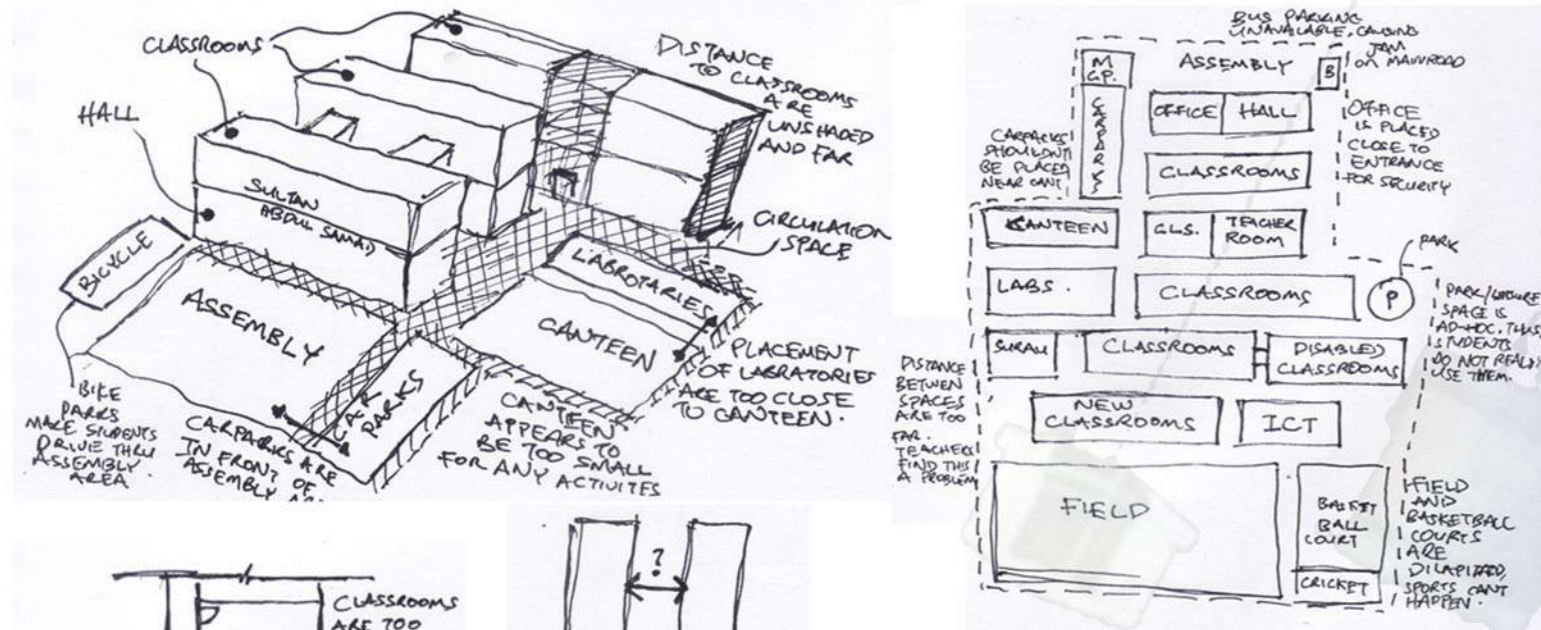


CURRENT SCHOOLS
to meet the rapid expansion of education, schools were designed to be built economically and quickly around the country. Schools usually built using bricks/concrete. Schools are poor in ventilation and suffer from poor attendance rates

A NEW ARCHITECTURAL TYPOLOGY IN MALAYSIAN SCHOOLS
to break away from the utilitarian nature of current Malaysian schools in favor of a typology that integrates the needs of its clients i.e. student and teachers, as well as the community

DT?

2.1 History of Schools in Malaysia

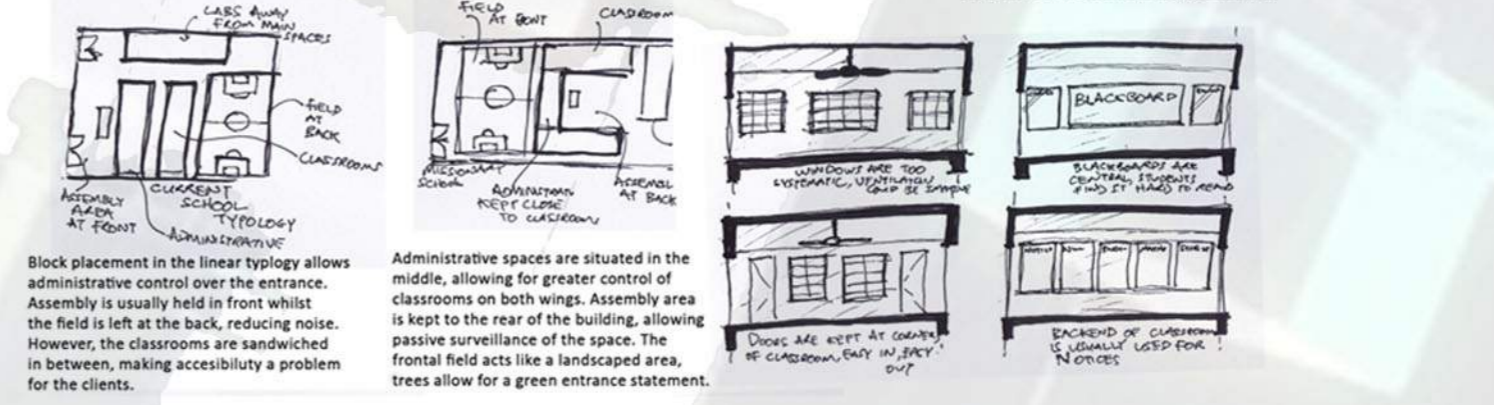
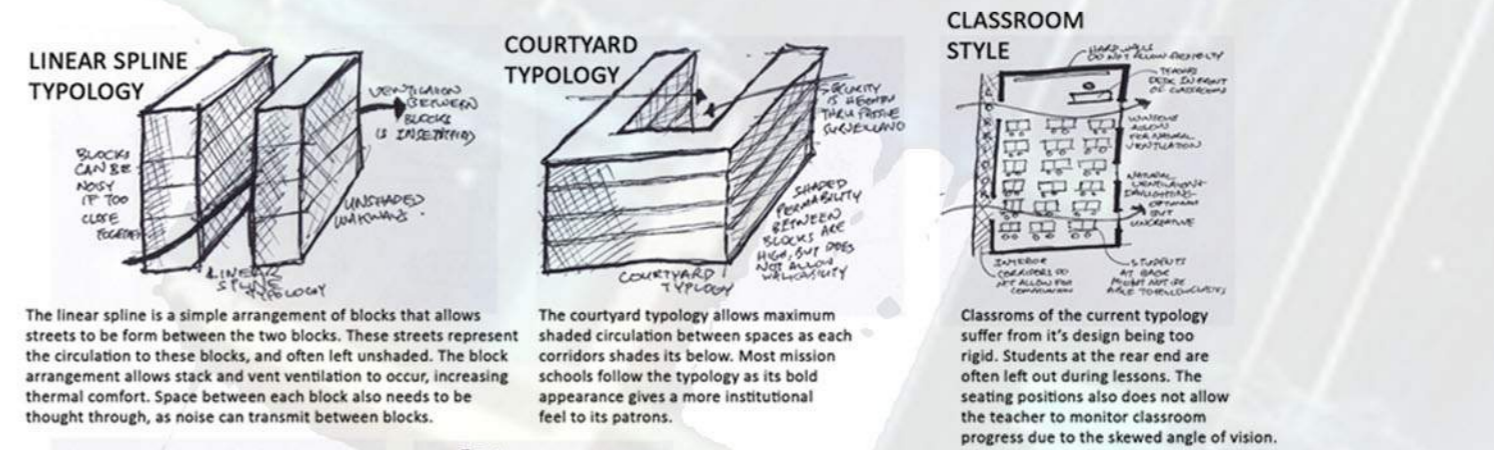


Basic grouping of spaces in standard Malaysian Schools | Teachers Daily Programme of Spaces | Students Daily Programme of Spaces

Schools in Malaysia have gone through a century of improvisations to increase its effectiveness in dealing with the education scarcity during the colonial periods. Before the formal introduction of education in Malaysia, schools were based on the ethnicity of the student, whereby education would be taught based on the creed and language of the particular student. Children of the various ethnic groups attended vernacular schools housed mainly in modest timber structures.

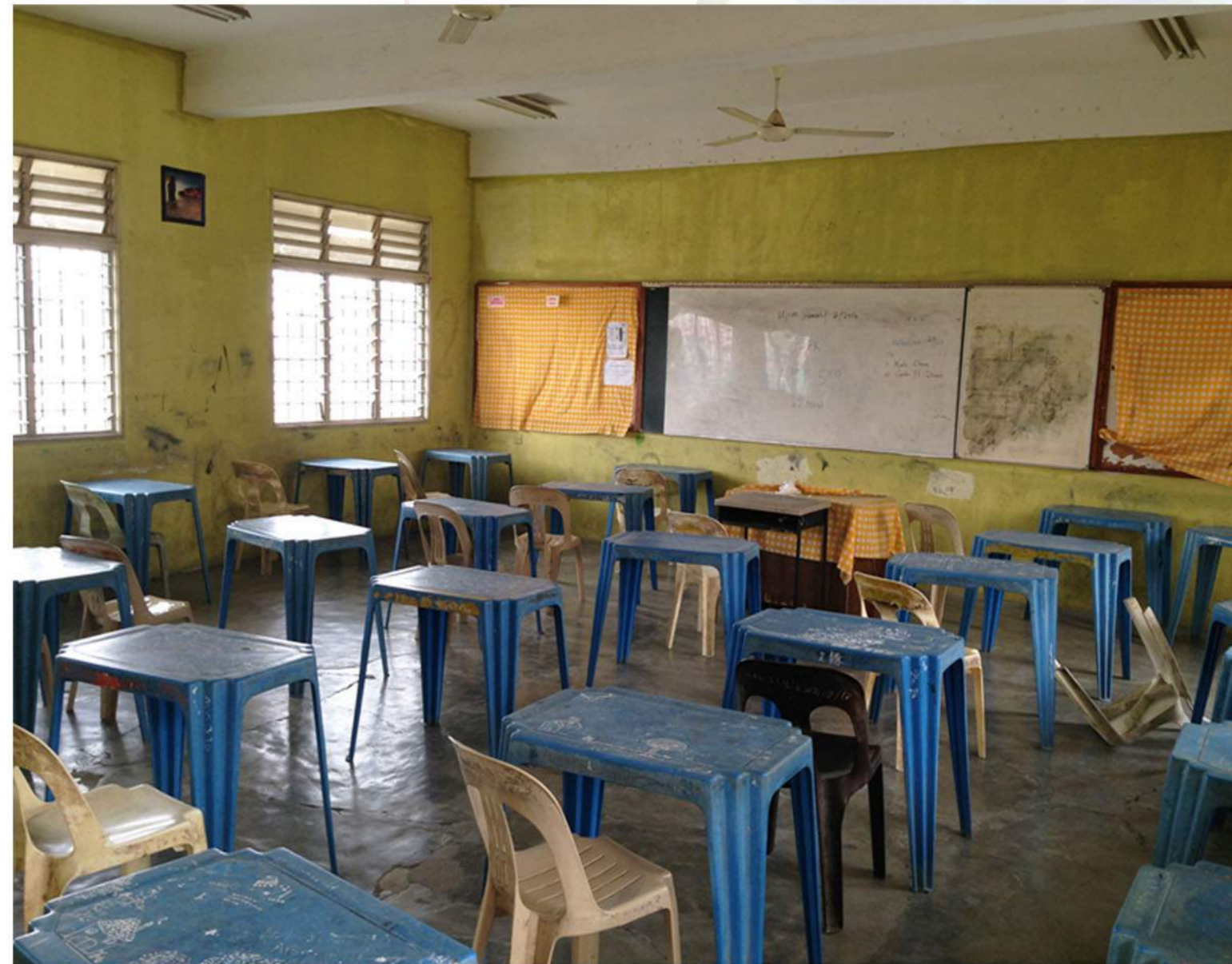
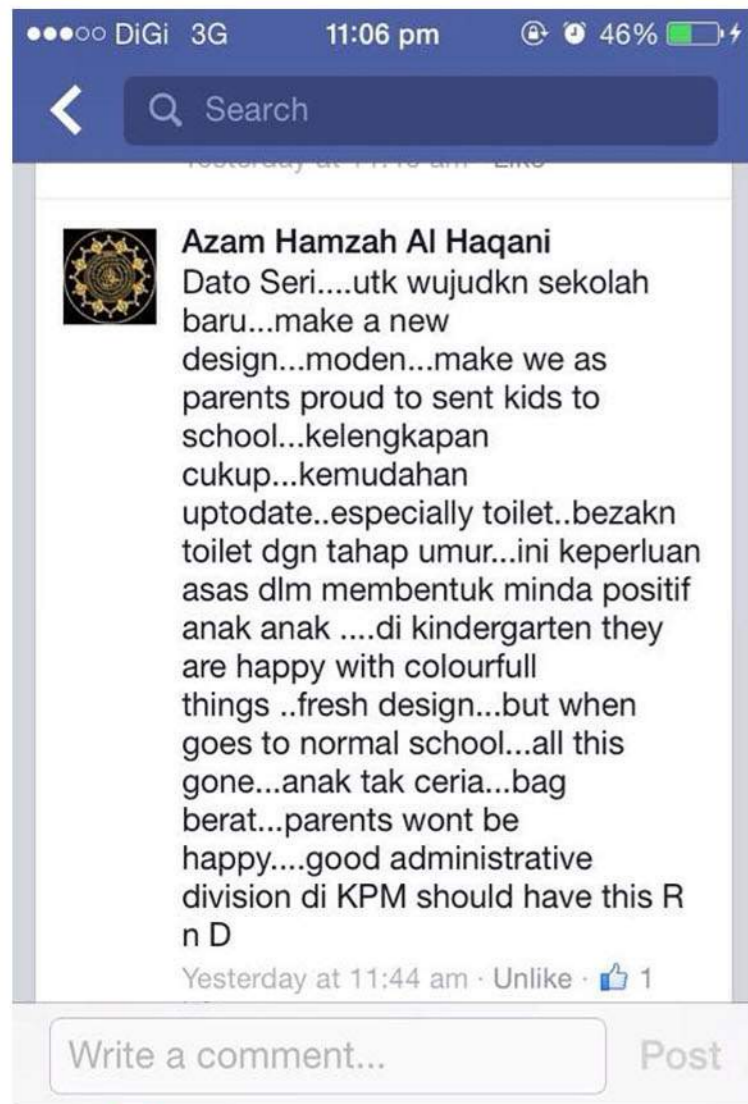
However, with the expansion of construction technology in the West, large prestigious schools began to be constructed in Malaysia in the mid 19th Century due to the impacts of the British Colonial Government and the Christian Missionaries. These schools had one common characteristic, it was designed using the courtyard typology, common in British architecture of the period. The design was then adapted to feature Malay education, as evident in the construction of the Malay College Kuala Kangsar, which was the first brick and mortar school that had its entire syllabus in Malay.

Over time, the colonial courtyard typology was then disregarded in favor of a more cost effective measure, which was the linear spline typology. After Malaya gained independence in 1957, new schools were built in standardized designs that were functional for its built purpose. During this time, there was a rapid expansion to provide education to the masses. To meet this ever increasing demand for more schools, both primary and secondary schools were designed by the Public Works Department, later renamed Jabatan Kerja Raya (JKR), to be able to be built economically and quickly anywhere in the country. Thus, the intent and purpose of schools were lost in the translation as seen of the schools that remain in Malaysia today



Block placement in the linear typology allows administrative control over the entrance. Assembly is usually held in front whilst the field is left at the back, reducing noise. However, the classrooms are sandwiched in between, making accessibility a problem for the clients.

Administrative spaces are situated in the middle, allowing for greater control of classrooms on both wings. Assembly area is kept to the rear of the building, allowing passive surveillance of the space. The frontal field acts like a landscaped area, trees allow for a green entrance statement.



Facebook comment posted on Dato' Seri Najib Tun Razaks wall

Sekolah Menengah Sultan Abdul Samad classroom, the same school that this researcher studied in



DID YOU KNOW ?

300
of all schools in Malaysia
DO NOT HAVE ACCESS TO ELECTRICITY

1500
of all schools in Malaysia
DO NOT HAVE ACCESS TO CLEAN WATER

2000
of all schools in Malaysia
DO NOT HAVE SCIENTIFIC LABS

2700
of all schools in Malaysia
DO NOT HAVE COMPUTER LABS

Source: Senior Malaysian Politician
<https://vimeo.com/112903130>

KM1-4

**KEMUDAHAN PENDIDIKAN :
SEKOLAH MENENGAH**

PIAWAIAN

Tadahan Penduduk (penduduk)	Melebihi 9,000 penduduk.	
Peletakan Lokasi	<ul style="list-style-type: none"> 0.4 - 0.8 km / 5 minit – 10 minit perjalanan daripada rumah terjauh. Jauh daripada persimpangan. Akses terus kepada jalan 20.1m (66') (dalam kawasan perumahan). Mempunyai laluan pengangkutan awam. 	
Keluasan Tapak (Minimum)	Permukaan Rata 3.6 hek (9 ek)	Berbukit 4.5 hek (11 ek)
Saiz Kelas (Maksimum)	1 kelas : 25 pelajar	
Jalan Perkhidmatan	Minimum 20.1m (66')	
Lebar Jalan-Keluar Masuk	Minimum 15.2m (50')	
Anjakan Bangunan	<i>Rujuk Rajah KM2-1(i)</i>	
o Menghadap Jalan	12.2m (40')	
o Sempadan Bersama	6.1m (20')	
Tempat Letak Kenderaan	<ul style="list-style-type: none"> 1.5 petak TLK / 2 kakitangan + tambahan 20% TLK untuk pelawat. Tambahan 1 petak motosikal / 30 pelajar. Tambahan 2% TLK untuk OKU dengan ramp. 	
o Tempat Letak Kereta (TLK)		
o Tempat Letak Motosikal (TLM)		
o TLK OKU		
Komponen Kemudahan	<ul style="list-style-type: none"> Pagar di sekeliling kawasan sekolah. Papan tanda nama dan alamat bangunan. Tandas. Padang permainan/ Gelanggang sukan. Kantin. Dewan. Tiang bendera minima 3 unit (Malaysia, Selangor dan Sekolah). Pusat Sumber / Perpustakaan. Surau. 	<ul style="list-style-type: none"> Wakaf. Pondok Bas. Pencawang elektrik. Laluan pejalan kaki berbumbung. 1 pintu masuk utama. 1 pondok pengawal. Hentian sebelah ('lay-by') (lebar min. 3.5m) untuk 'drop-off' dan 'pick-up' bagi bas sekolah dan kereta. Ruang letak basikal berbumbung.

Sumber : Diolah Dari Kementerian Pelajaran Malaysia, 2010



ILUSTRASI

Rajah KM2-1(i) Anjakan Bangunan Bagi Sekolah Menengah dan Sekolah Rendah.



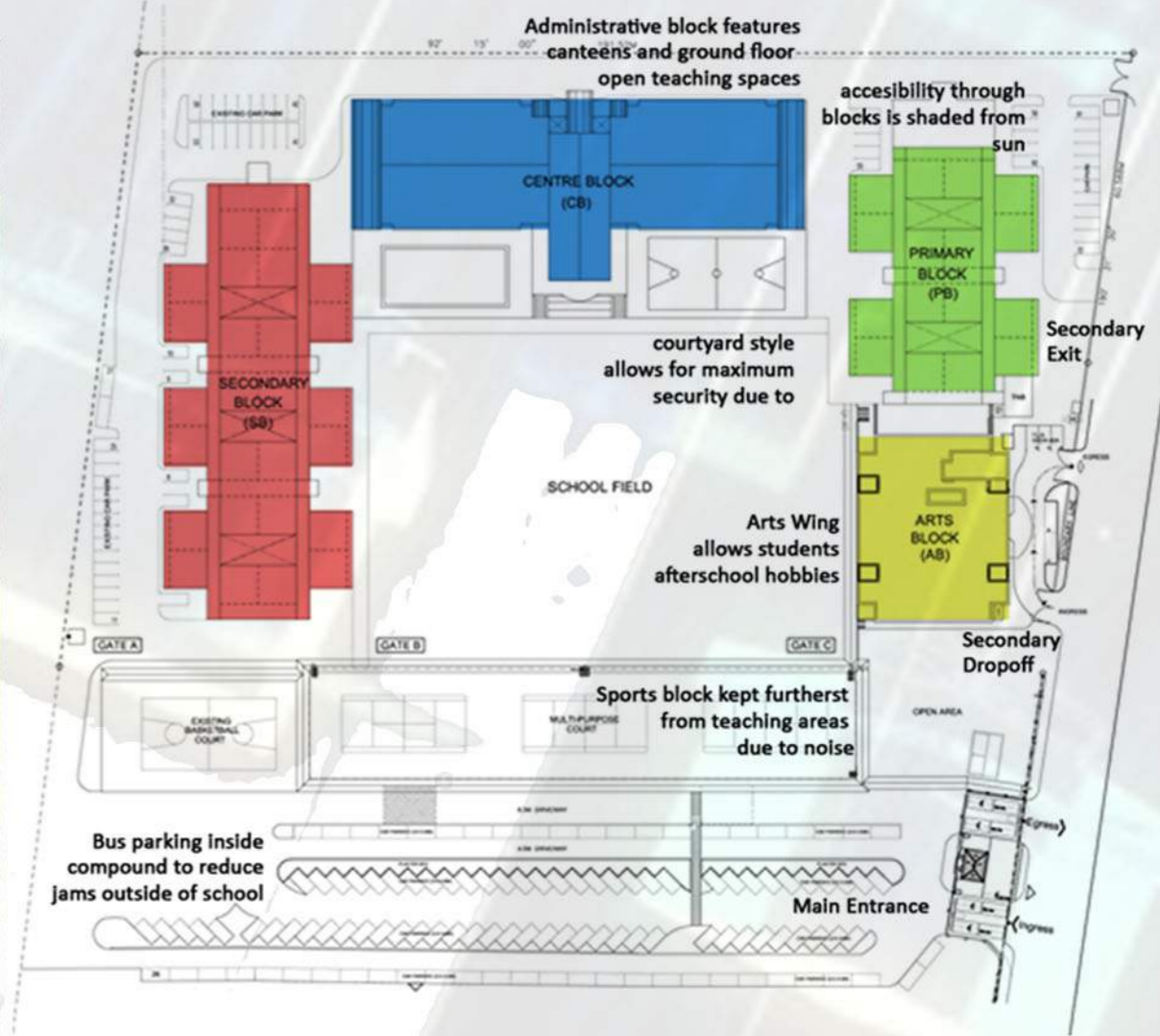
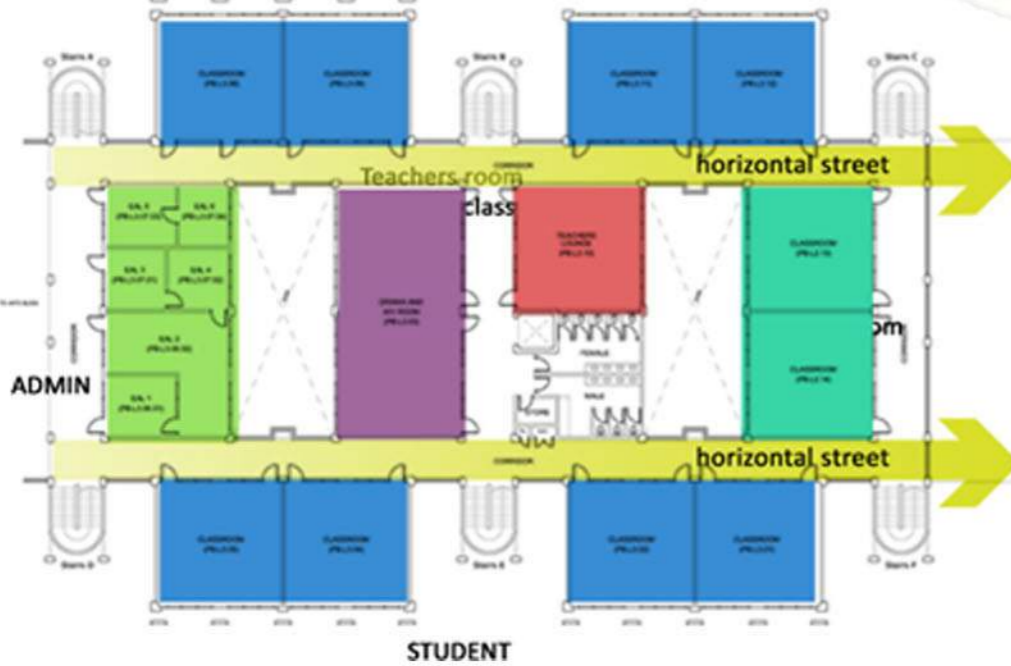
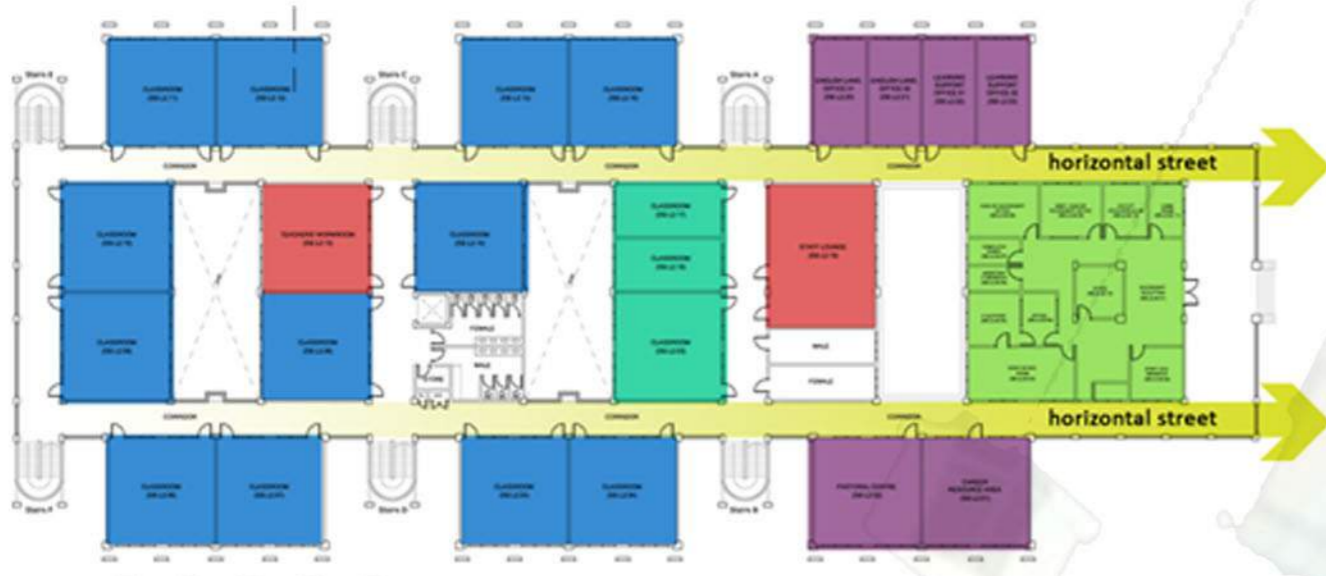
Actual Malaysian School Standards by Jabatan Perancangan Bandar and Desa Negeri Selangor

The Manassas schools have won national awards for exemplary educational design and as it extensively integrated the community and its students in the in its design planning. The school, features classroom in a room typology, which allows pockets of spaces to be formed between the classrooms. These spaces are used for recreational purposes

- 1 TYPICAL PRE-K CLASSROOM
- 2 TYPICAL CLASSROOM
- 3 TEACHER SUPPORT
- 4 CAFETERIA + COMMONS
- 5 MUSIC
- 6 GYMNASIUM + ASSEMBLY
- 7 STAGE
- 8 DELIVERIES
- 9 ADMINISTRATION
- 10 LIBRARY
- 11 ART



2.5 Case Studies - Garden Internatioanal School



Classrooms in GIS follows the double banked corridor style. The corridors hold the classrooms (in blue) close to a security control point, the teachers room (in red) on each floor. Each floor also has a recreational space for students to spend time after school. Activities such as pottery and ICT labs are common in these spaces (in teal)

2.5 Case Studies - Sekolah Kebangsaan Menengah Sultan Abdul Samad, Klang

In order to better understand public school life through the eyes of the clients, a case study was done on Sekolah Menengah Sultan Abdul Samad Klang, a secondary school located in Jalan Bukit Kuda. Sultan Abdul Samad is known in Klang for being a school with poor educational performance, and added to that being a poorly designed school, it was chosen as a case study to analyse the impact of student performance against building design.

The students performance in the SPM results from 2006-2011 AT 68.29%, falls far short of the Ministry of Education's suggested percentages, 80%, which describes a school of academic excellence. The stuttering performance could be attributed to the poor educational facilities in the school. However, what are the facilities and features that make a school motivating enough for students to improve their performance?



PERBANDINGAN % LULUS SPM

THN	LL SEMUA MTP		LL 1MTP (RM)		LL (LAIN2)		GG 1MTP (RM)		GG SEMUA MTP		GG (LAIN2)		JUM TH	HD	LULUS	
	BIL	%	BIL	%	BIL	%	BIL	%	BIL	%	BIL	%			BIL	%
2006	27	13.50	0	0.00	80	40.00	0	0.00	13	6.50	79	39.50	1	200	107	53.50
2007	50	22.83	2	0.91	90	41.10	0	0.00	14	6.39	63	28.77	3	219	142	64.84
2008	42	20.59	0	0.00	92	45.10	0	0.00	12	5.88	58	28.43	4	204	134	65.69
2009	28	16.47	1	0.59	77	45.29	0	0.00	22	12.94	42	24.71	11	170	106	62.35
2010	44	23.66	0	0.00	85	45.70	0	0.00	16	8.60	41	22.04	4	186	129	69.35
2011	48	22.97	0	0.00	78	37.32	0	0.00	14	6.70	69	33.01	7	289	126	68.29

A total of 36 students of SMK SAS were invited to take part in a survey and sketching exercise to find out what do students and teachers really want out of their experience in school.

The students and teachers were placed in a hall in which they filled surveys related to their experiences within the school and what they would like improved and added into newer schools. The survey attempted to understand their needs in terms of FORM, FUNCTION, COMFORT LEVELS AND FEATURES in a school.

The students were then asked to sketch their ideas of a new typology of schools based on the aforementioned design criteria. The results are then collected and analyzed to inform the design of the client-centric school



2.5 Case Studies - Student Input Sketch and Questionnaire Session



Name: _____ Age: _____ Gender: _____
 Design Thesis – Proposed Secondary High School



Please answer the following survey questions with scale (1:Very Poor, 2:Poor, 3:Moderate, 4:Good, 5:Very Good)
 Sila jawab soalan-soalan berikut dengan skala (1:Kurang Memuaskan, 2:Memuaskan, 3:Sederhana, 4:Baik, 5:Sangat Baik)



1.0 Form (Reka Bentuk)	1	2	3	4	5
Is the design of your current school stimulating to your education? <i>Adakah reka bentuk sekolah anda merangsangkan kepada pembelajaran anda?</i>					
Is your current school designed for ease of accessibility to get to your classes? <i>Adakah rekabentuk sekolah anda memudahkan anda mengikuti kelas-kelas anda?</i>					
Rate your current classroom layout in terms of seating arrangement and visibility to the blackboard <i>Nilai prestasi reka bentuk kelas anda dari segi jarak penglihatan anda ke papan hitam dan susuratur meja kelas</i>					

- a) What do you like about the design of your current school and classroom?
Apakah yang anda sukai mengenai ciri-ciri reka bentuk sekolah dan kelas anda?

- b) What do you dislike about the design of your current school and classroom?
Apakah yang anda tidak sukai mengenai ciri-ciri reka bentuk sekolah dan kelas anda?

- c) Name some ways you would improve the design/form of your school and classroom for a more conducive learning experience? *
*Nyatakan beberapa ciri-ciri mengenai reka bentuk sekolah dan kelas yang anda rasa akan membantu anda untuk pembelajaran yang lebih merangsangkan? **

Design Thesis – Proposed Secondary High School



2.0 Function (Fungsi)	1	2	3	4	5
Do you think that your current school is suitable for your education and upbringing? <i>Adakah sekolah anda sesuai untuk kegunaan pembelajaran dan pembangunan akhlak anda?</i>					
Do you feel responsible in maintaining your current school? <i>Adakah anda berasa bertanggungjawab terhadap penyelenggaraan sekolah anda?</i>					
If you were to be given a space to maintain such as a pond or garden, would you maintain it? <i>Jika anda diberikan ruang seperti kolam atau taman untuk anda selenggara, mampukah anda memastikan kebersihan ruang itu?</i>					
Besides the canteen, does your current school have enough spaces for social interaction with your friends? <i>Selain kantin, cukupkah ruang-ruang di sekolah anda untuk anda bertemu-sapa dengan kekawan?</i>					

- a) How can your school help improve in your upbringing and increase the quality of your education?
Pada pendapat anda, bagaimanakah sekolah anda dapat membantu anda menjadi insan yang berakhlak dan juga dalam menaikkan mutu pendidikan anda?

- b) In terms of social interaction, describe a space that would you like to have in your school for you to socialise with your friends? *
*Huraikan jenis ruang yang anda rasa patut didirikan di sekolah anda untuk tujuan bertemu-sapa dengan kekawan anda? **

Design Thesis – Proposed Secondary High School



3.0 Comfort Levels (Tahap keselesaan)	1	2	3	4	5
Do you feel comfortable when classes are being held? <i>Adakah anda berasa selesa sewaktu sesi pembelajaran diadakan?</i>					
Rate the current ventilation levels in your classroom. <i>Nilai tahap pengudaraan di kelas anda</i>					
Rate the current natural lighting levels in your classroom <i>Nilai tahap pencahayaan semulajadi dalam kelas anda</i>					
Do you agree that more trees/shrubs in your school would make you feel more comfortable? <i>Adakah anda setuju pembelajaran anda akan lebih selesa jikalau terdapat lebih banyak pokok/pohon di sekolah anda?</i>					

- a) How do you feel about the comfort levels in your classroom?
Apakah perasaan anda mengenai tahap keselesaan dalam kelas anda?

- b) In your mind, how can your classroom be improved? Describe an comfortable classroom *
*Dalam minda anda, bagaimanakah tahap keselesaan kelas anda boleh dipertingkatkan? Huraikan ciri-ciri kelas yang anda gambarkan sebagai selesa **

Design Thesis – Proposed Secondary High School



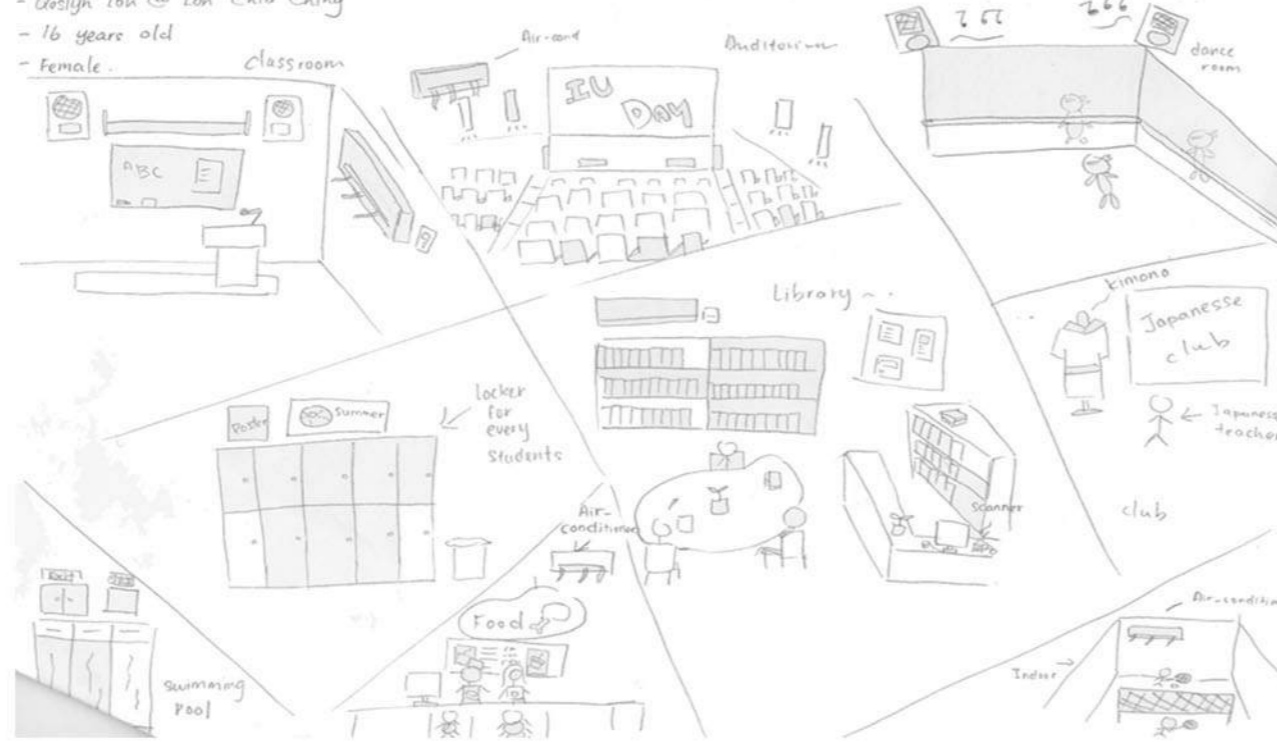
4.0 Features (Kemudahan)	1	2	3	4	5
Are you satisfied with the features and facilities of your current school? <i>Adakah anda berpuas hati dengan kemudahan di sekolah anda?</i>					
Would added features and facilities help your performance in school? <i>Adakah tambahan kemudahan dapat membantu prestasi anda di sekolah?</i>					
Do you agree that if there were more features in your school, would you attend school and co-curriculum more regularly? <i>Jikalau terdapat lebih banyak kemudahan di sekolah anda, adakah anda akan lebih berminat untuk menghadiri sekolah dan kokurikulum?</i>					

- a) What do you feel about the current facilities and features in your school?
Apakah perasaan anda terhadap kemudahan-kemudahan yang sedia ada di sekolah anda?

- b) How would you improve the current facilities and features in your school?
Bagaimanakah kemudahan-kemudahan yang sedia ada dapat dinaiktarafkan di sekolah anda?

- c) Name features/facilities that you would like to see in your school to increase your performance *
*Gambarkan kemudahan-kemudahan yang ingin anda lihat dalam sekolah anda yang dapat membantu meningkat prestasi anda di sekolah **

- Qeslyn loh @ Loh Chio Ching
- 16 years old
- Female



Nama : Muhammad Arif Fahmi bin Zuraini
Age : 16
Gender : M



music room
mohd. arif fahmi, 16

* Semua orang menyukai muzik. Sekolah boleh menyediakan bilik muzik dan murid boleh mengisi masa lapang selepas habis sekolah dengan bermain muzik. Sekolah juga perlu menambah satu lagi subjek tambahan iaitu muzik.

interest based activities qeslyn loh, 16

b) What do you dislike about the design of your current school and classroom?
Apakah yang anda tidak suka mengenai ciri-ciri reka bentuk sekolah dan kelas anda?

The designs are old-fashioned. There is no speciality in the school design. Classrooms are too mainstream. There is nothing to attract students. The field and the courts are just too dull.

b) In your mind, how can your classroom be improved? Describe an comfortable classroom *
Dalam minda anda, bagaimanakah tahap keselesaan kelas anda boleh dipertingkatkan?
Huraikan ciri-ciri kelas yang anda gambarkan sebagai selesa *

- i) cat warna yang atrak minat pelajar untuk belajar.
- ii) susunan meja yang lebih strategik
- iii) papan putih digantikan skrin komputer

b) In terms of social interaction, describe a space that would you like to have in your school for you to socialise with your friends? *
Huraikan jenis ruang yang anda rasa patut didirikan di sekolah anda untuk tujuan bertemu-sapa dengan kekawan anda? *

Menyediakan pondok dengan lebih banyak peria meletakkan kerusi di sepanjang tembok lima dan di kawasan yang lapang.

b) What do you dislike about the design of your current school and classroom?
Apakah yang anda tidak suka mengenai ciri-ciri reka bentuk sekolah dan kelas anda?

Kedudukan tingkatan empat berada di aras yang tinggi. Kedudukan aras kedua tidak mempunyai kelas.

c) Name some ways you would improve the design/form of your school and classroom for a more conductive learning experience? *

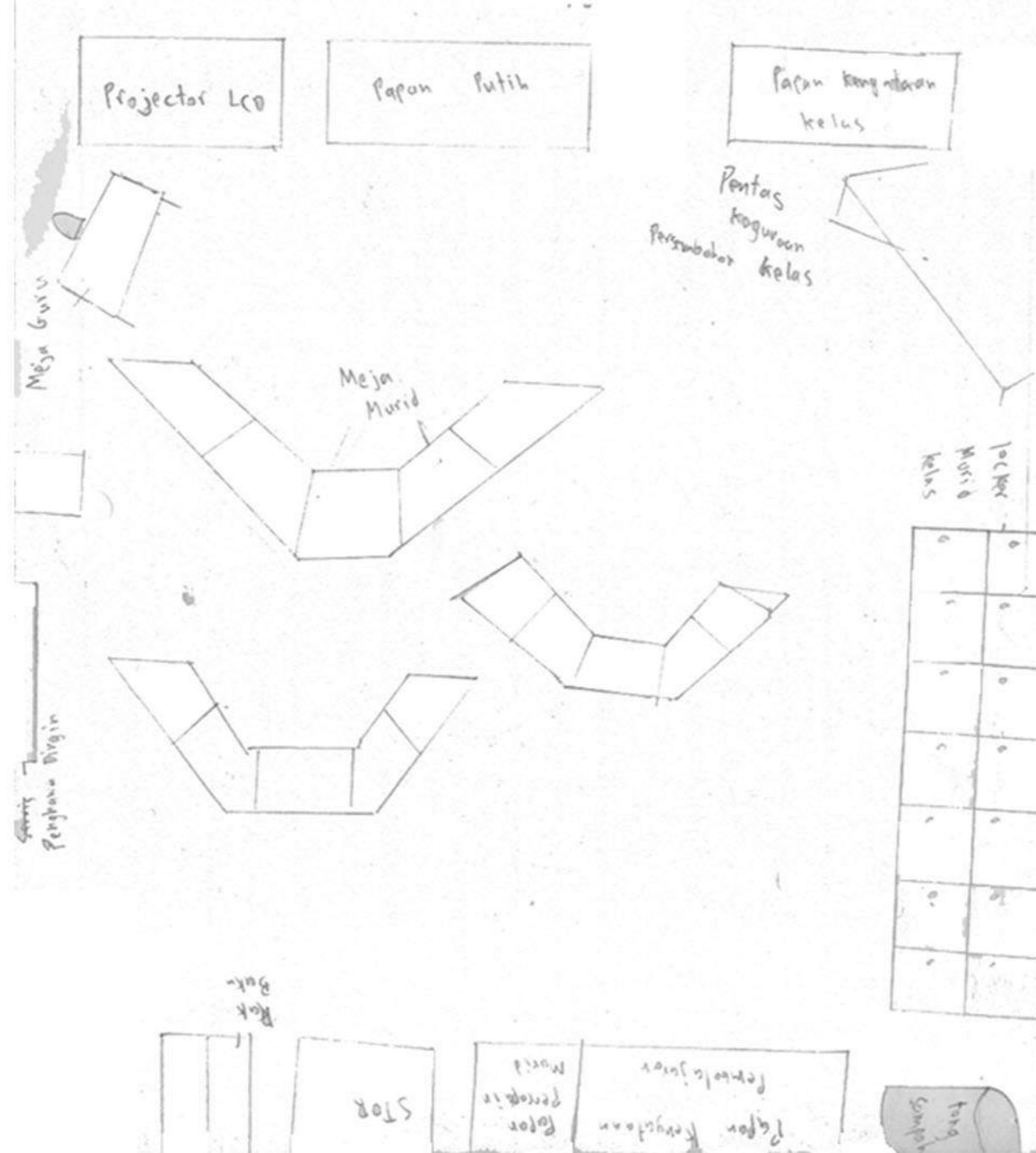
Nyatakan beberapa ciri-ciri mengenai reka bentuk sekolah dan kelas yang anda rasa akan membantu anda untuk pembelajaran yang lebih merangsangkan? *

Makmal Fizik, kimia, biologi terletak pada bangunan yang berhampiran.

2.5 Case Studies - Student Ideas Data Tabulation

Muhammad Adja bt. Chomel	16	M	Surau dan basketball court yang baik			Kurang selesa kerana meja berlubang
			Kelas yang besar dan luas			Kelas dikelilingi dengan tumbuhan hijau
			Kerusi yang empuk, meja bulat			Meja mempunyai laci
			Suasana yang nyaman dan kelas yang menarik			Penghawa dingin
			Bilik Rehat dan Gymnasium			
Tahap penyelesaian kelas sederhana						
Kelas yang lebih luas diperlukan						
Gunakan peralatan elektrik untuk sesi pembelajaran						
Terlalu sedikit kemudahan dan perlu ditingkatkan jumlah kemudahan dan cepat rosak						
Muhammad Fahmi Fakhruallah b Abdul Rahim	16	M	Surau dan basketball court yang baik			Tidak suka warna dinding kelas
			Kelas yang besar dan luas			Tandas yang lebih selesa
			Pintu yang besar			Bina bumbung di tapak perhimpunan
			Bilik rehat(lounge)			Tahap penyelesaian yang sederhana
Tahap penyelesaian yang boleh tahan						
Pendingin hawa						
Peralatan elektrik semasa pembelajaran						
Menjaga kemudahan dengan baik dan rapi						
Sridharan	16	M	Makmal ICT mempunyai AC			Mempunyai tingkap cermin yang besar untuk pengudaraan dan pencahayaan
			Tidak mempunyai kemudahan awam yang perlu diganti seperti tiang gol, bola dan kayu kriket			Bumbung di tapak perhimpunan
			Saya suka kelas yang kecil, mempunyai pelajar yang sedikit dan guru perlu mengajar berdiri di tengah-tengah dalam kalangan pelajar dalam bentuk bulat			
			Sebuah pondok yang berhampiran dengan kolam ikan			
			Kelas terlalu kecil dan terlalu ramai orang, macam pasar			
			Menyediakan kerusi yang baru, kelas selalu kena bersih dengan penyapu dan penyodok dan tong sampah			
Kemudahan di sekolah kurang memuaskan						
Menukarkan meja baru dan lebih elok						
Trek olahraga, papan putih, tiang gol, padang yang cantik						
Uveraj s/o Gunasegaran	16	M	Canteen, basketball court			Library needs to be attractive with posters for students
			Good quality table and chairs, closed classroom with good air ventilation			Toilets are important
			Spacious classroom			Bigger classrooms, air condition and high class chairs and table
			Have a classroom with clean and good tables and chairs			If my school can provide laptop, aircondition and swimming pool I will make sure I become smart student
			Have garden with has ponds, lots of plants			Garden and swimming pool for all to socialize
			A cooling, green environment which is comfortable for the students and helps the environment			Not comfortable classrooms because its dirty and surrounding air is not clean
			Comfort levels are moderate			Air-conditioning and WIFI
Good tables, quality chairs, and air-conditioning	Gardens and parks, air-conditioning, WIFI and laptops					
Compact class with limited number of students						
Reinvent the whole classroom						
Clean and functional washrooms, better library						
Muhammad Farhan bin Shahrul Azlan	16	M	Makmal Fizik, Kimia, Biology terletak pada bangunan yang berhampiran			Dinding yang menarik perhatian pelajar-pelajar
			Kedudukan tingkatan empat berada di aras yang tinggi sedangkan aras kedua tidak mempunyai kelas			Tandas yang baik
			Surau dibesarkan, meja, kelas seperti dewan kuliah			ICT, big classroom and air-conditioning
			Setiap dinding yang kerap orang lalu hendaklah dipenuhi dengan poster masalah/gejala social dan cara menanganinya			Swimming pool to keep heat down
			Bangku dan wakat di taman bunga			Gardens and parks
Kurang selesa kerana meja berlubang						
						Not comfortable and classrooms are dirty
						Air-conditioning and WIFI
Tommy Lim	17	M	The canteen is long with many chairs and tables allow interaction			Ang Yik Tat
			The current block and class are too old-fashioned and dirty			Tandas yang baik
			A bigger classroom is needed, with ICT capabilities			ICT, big classroom and air-conditioning
			Lockers			Swimming pool to keep heat down
			Technology and paperless teaching to improve quality of education			Gardens and parks
			Garden and parks to socialize			Not comfortable and classrooms are dirty
			Current classroom is hot, uncomfortable and dark so comfort level is low			Air-conditioning and WIFI
Change of windows, chairs, tables and lamps						
Technology and gardens						
Studies to be held in a cool room and with better teachers						
How Kok Chian	16	L	Design of windows to be improved			Tommy Lim
			Private rooms where I can stay back and do my work without being bothered			The canteen is long with many chairs and tables allow interaction
			Comfort levels are normal			The current block and class are too old-fashioned and dirty
			School to provide air-conds, WIFI, snack zone and vending machines			A bigger classroom is needed, with ICT capabilities
Vending machines, clean toilet with proper doors, computer with good specs (for programming activity and ICT lessons)						
Hor Sher Yin	16	F	Facilities of school needs to be improved			How Kok Chian
			Dance club with professional coaches, proper dance rooms			Design of windows to be improved
						Private rooms where I can stay back and do my work without being bothered
						Comfort levels are normal
						School to provide air-conds, WIFI, snack zone and vending machines
						Vending machines, clean toilet with proper doors, computer with good specs (for programming activity and ICT lessons)
						Facilities of school needs to be improved
						Dance club with professional coaches, proper dance rooms
						Auditorium to replace halls

nama: MOHD TANVIER BIN classroom design
 Age: 16
 Gender: Male
 mohd. tanvier, 16



a) What do you like about the design of your current school and classroom?
 Apakah yang anda sukai mengenai ciri-ciri reka bentuk sekolah dan kelas anda?

① Satu bangunan dgn satu blok bangunan yg lain tidak begitu jauh jaraknya.

c) Name some ways you would improve the design/form of your school and classroom for a more conducive learning experience? *
 Nyatakan beberapa ciri-ciri mengenai reka bentuk sekolah dan kelas yang anda rasa akan membantu anda untuk pembelajaran yang lebih merangsangkan? *

Susunan dlm bentuk kumpulan, berwarna-warna, terkawan dgn berbentuk bulatan (bangunan)

c) Name some ways you would improve the design/form of your school and classroom for a more conducive learning experience? *
 Nyatakan beberapa ciri-ciri mengenai reka bentuk sekolah dan kelas yang anda rasa akan membantu anda untuk pembelajaran yang lebih merangsangkan? *

1. Susun atur yang lebih berak interaktif.
2. Moden dan dilengkapi peralatan canggih eg: LCD projektor, komputer, dll.
3. Kelas tidak begitu besar & tidak begitu kecil.
4. Ceria dan pancat warna-warni.

b) What do you dislike about the design of your current school and classroom?
 Apakah yang anda tidak sukai mengenai ciri-ciri reka bentuk sekolah dan kelas anda?

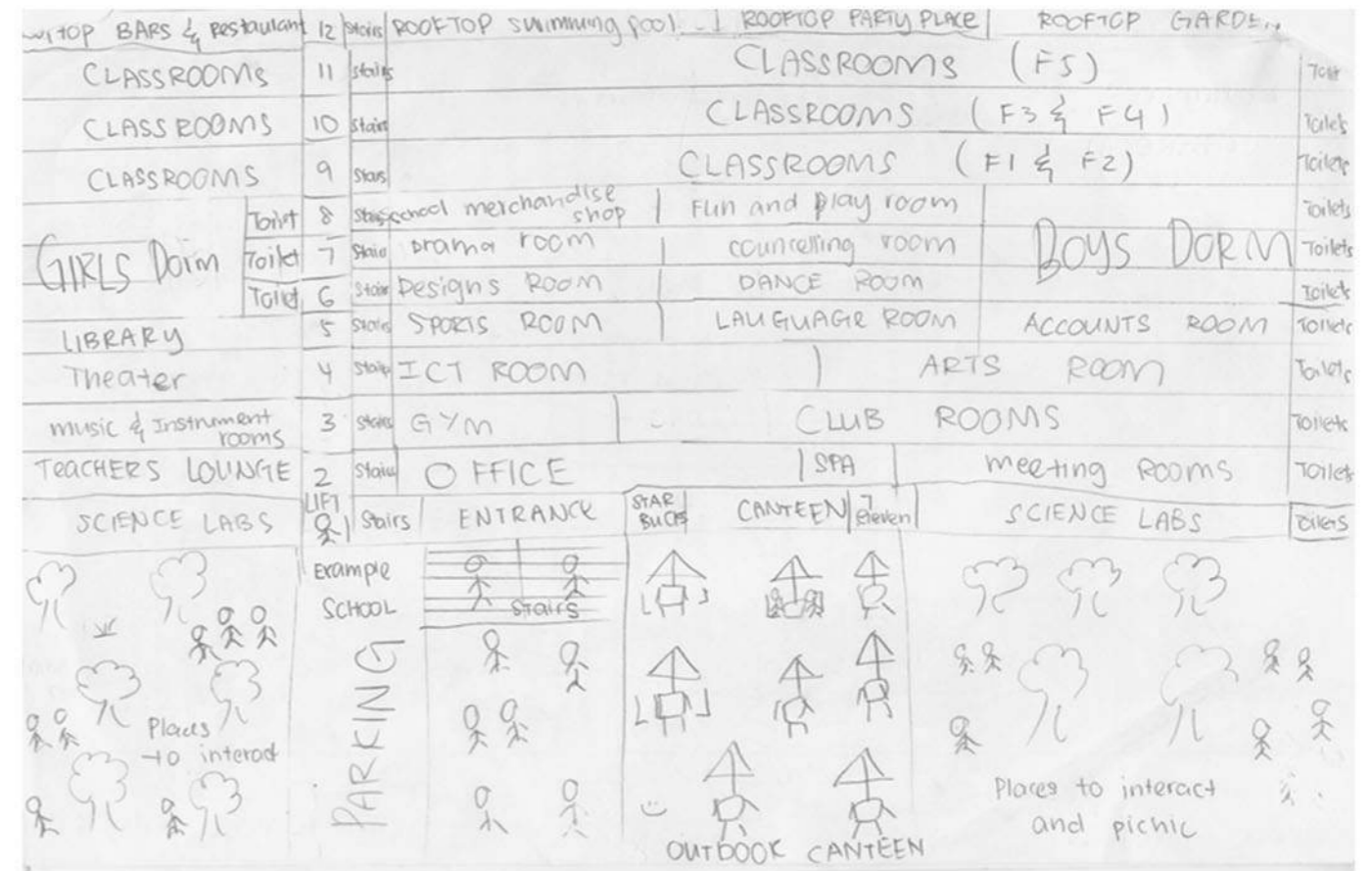
Bangunan tiga tingkat, bila penat rasa malas nak naik pulak.

c) Name some ways you would improve the design/form of your school and classroom for a more conducive learning experience? *
 Nyatakan beberapa ciri-ciri mengenai reka bentuk sekolah dan kelas yang anda rasa akan membantu anda untuk pembelajaran yang lebih merangsangkan? *

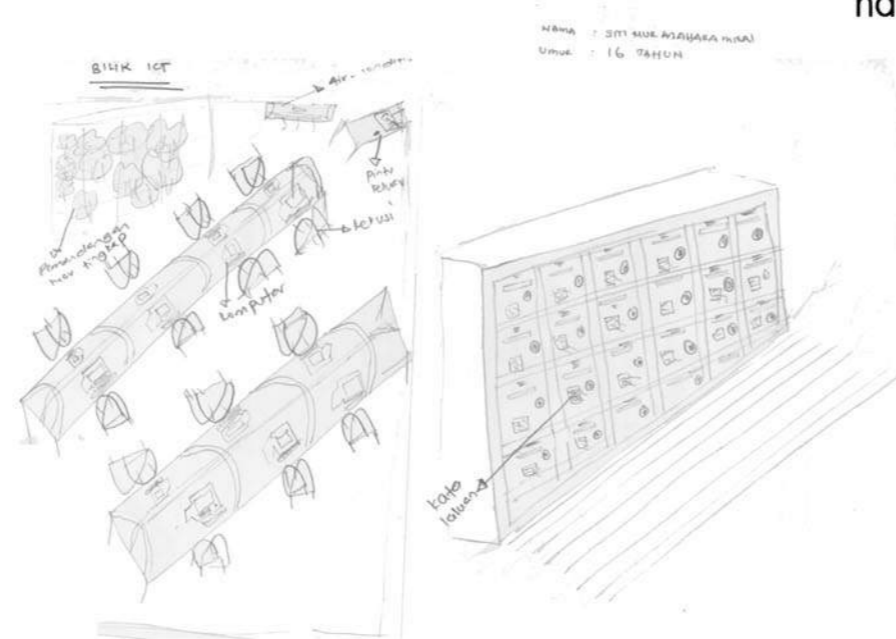
- i) Bangunan yang tak terlalu tinggi
- ii) Kantin lebih besar so tak payah sempit?
- iii) dan lain-lain

2.5 Case Studies - Student Ideas Data Tabulation

Muhammad Adja bt. Chomel	16	M	<p>Surau dan basketball court yang baik</p> <p>Kelas yang besar dan luas</p> <p>Kerusi yang empuk, meja bulat</p> <p>Suasana yang nyaman dan kelas yang menarik</p> <p>Bilik Rehat dan Gymnasium</p> <p>Tahap keselesaan kelas sederhana</p> <p>Kelas yang lebih luas diperlukan</p> <p>Gunakan peralatan elektrik untuk sesi pembelajaran</p> <p>Terlalu sedikit kemudahan dan perlu ditingkatkan jumlah kemudahan dan cepat rosak</p>			<p>Kurang selesa kerana meja berlubang</p> <p>Kelas dikelilingi dengan tumbuhan hijau</p> <p>Meja mempunyai laci</p> <p>Penghawa dingin</p>
A. Gunasegaran	16	M				<p>Tidak suka warna dinding kelas</p> <p>Tandas yang lebih selesa</p> <p>Bina bumbung di tapak perhimpunan</p> <p>Tahap keselesaan yang sederhana</p> <p>Mempunyai tingkap cermin yang besar untuk pengudaraan dan pencahayaan</p> <p>Bumbung di tapak perhimpunan</p>
Muhammad Fahmi Fakruhullah b Abdul Rahim	16	M	<p>Surau dan basketball court yang baik</p> <p>Kelas yang besar dan luas</p> <p>Pintu yang besar</p> <p>Bilik rehat(lounge)</p> <p>Tahap keselesaan yang boleh tahan</p> <p>Pendingin hawa</p> <p>Peralatan elektrik semasa pembelajaran</p> <p>Menjaga kemudahan dengan baik dan rapi</p>			<p>Toilet, basketball court, canteen and classroom need improvement</p> <p>WiFi, aircond, ICT and gyms are lacking</p> <p>Experienced teachers required</p> <p>Classroom is not comfortable because classroom is always dirty</p> <p>Fans to be replaced, air-conditioning</p>
Sridharan	16	M	<p>Makmal ICT mempunyai AC</p> <p>Tidak mempunyai kemudahan awam yang perlu diganti seperti tiang gol, bola dan kayu kriket</p> <p>Saya suka kelas yang kecil, mempunyai pelajar yang sedikit dan guru perlu mengajar berdiri di tengah-tengah dalam kalangan pelajar dalam bentuk bulat</p> <p>Sebuah pondok yang berhampiran dengan kolam ikan</p> <p>Kelas terlalu kecil dan terlalu ramai orang, macam pasar</p> <p>Menyediakan kerusi yang baru, kelas selalu kena bersih dengan penyapu dan penyodok dan tong sampah</p> <p>Kemudahan di sekolah kurang memuaskan</p> <p>Menukarkan meja baru dan lebih elok</p> <p>Trek olahraga, papan putih, tiang gol, padang yang cantik</p>			<p>Library needs to be attractive with posters for students</p> <p>Toilets are important</p> <p>Bigger classrooms, air condition and high class chairs and table</p> <p>If my school can provide laptop, aircondition and swimming pool I will make sure I become smart student</p> <p>Garden and swimming pool for all to socialize</p> <p>Not comfortable classrooms because its dirty and surrounding air is not clean</p> <p>Air-conditioning and WIFI</p> <p>Gardens and parks, air-conditioning, WIFI and laptops</p>
Uveraj s/o Gunasegaran	16	M	<p>Canteen, basketball court</p> <p>Good quality table and chairs, closed classroom with good air ventilation</p> <p>Spacious classroom</p> <p>Have a classroom with clean and good tables and chairs</p> <p>Have garden with has ponds, lots of plants</p> <p>A cooling, green environment which is comfortable for the students and helps the environment</p> <p>Comfort levels are moderate</p> <p>Good tables, quality chairs, and air-conditioning</p> <p>Compact class with limited number of students</p> <p>Reinvent the whole classroom</p> <p>Clean and functional washrooms, better library</p>			<p>Dinding yang menarik perhatian pelajar-pelajar</p> <p>Tandas yang baik</p> <p>ICT, big classroom and air-conditioning</p> <p>Swimming pool to keep heat down</p> <p>Gardens and parks</p> <p>Not comfortable and classrooms are dirty</p> <p>Air-conditioning and WIFI</p>
Muhammad Farhan bin Shahrul Azlan	16	M	<p>Makmal Fizik, Kimia, Biology terletak pada bangunan yang berhampiran</p> <p>Kedudukan tingkatan empat berada di aras yang tinggi sedangkan aras kedua tidak mempunyai kelas</p> <p>Surau dibesarkan, meja, kelas seperti dewan kuliah</p> <p>Setiap dinding yang kerap orang lalu hendaklah dipenuhi dengan poster masalah/gejala social dan cara menanganinya</p> <p>Bangku dan wakat di taman bunga</p> <p>Kurang selesa kerana meja berlubang</p>			<p>The canteen is long with many chairs and tables allow interaction</p> <p>The current block and class are too old-fashioned and dirty</p> <p>A bigger classroom is needed, with ICT capabilities</p> <p>Lockers</p> <p>Technology and paperless teaching to improve quality of education</p> <p>Garden and parks to socialize</p> <p>Current classroom is hot, uncomfortable and dark so comfort level is low</p> <p>Change of windows, chairs, tables and lamps</p> <p>Technology and gardens</p> <p>Studies to be held in a cool room and with better teachers</p>
How Kok Chian	16	L				<p>Design of windows to be improved</p> <p>Private rooms where I can stay back and do my work without being bothered</p> <p>Comfort levels are normal</p> <p>School to provide air-conds, WIFI, snack zone and vending machines</p> <p>Vending machines, clean toilet with proper doors, computer with good specs (for programming activity and ICT lessons)</p>
Hor Sher Yin	16	F				<p>Facilities of school needs to be improved</p> <p>Dance club with professional coaches, proper dance rooms</p> <p>Auditorium to replace halls</p>



multi level activity
hans willard, 17



- a) How do you feel about the comfort levels in your classroom?
Apakah perasaan anda mengenai tahap keselesaan dalam kelas anda?

Saya akan rasa nyaman ada dalam pasar kerana ke kelas saya kecil dan mempunyai ramai orang

- b) In terms of social interaction, describe a space that you would like to have in your school for you to socialise with your friends? *

Huraikan jenis ruang yang anda rasa patut didirikan di sekolah anda untuk tujuan bertemu-sapa dengan kekawan anda? *

Tidak terlalu besar dan kecil kerana mungkin akan buat kami perit untuk pergi dari satu tempat ke satu tempat.



▲ Students enjoying their lunches in the presence of vehicles parked in the teachers car parks



▲ Students and teachers attend open aired assembly



▲ The same assembly area is then used as parking



▲ Murals and encouraging statements in bike parking

Corridors that is used to get to staircases, and then to classrooms



▼ Dilapidated basketball court and sports facilities





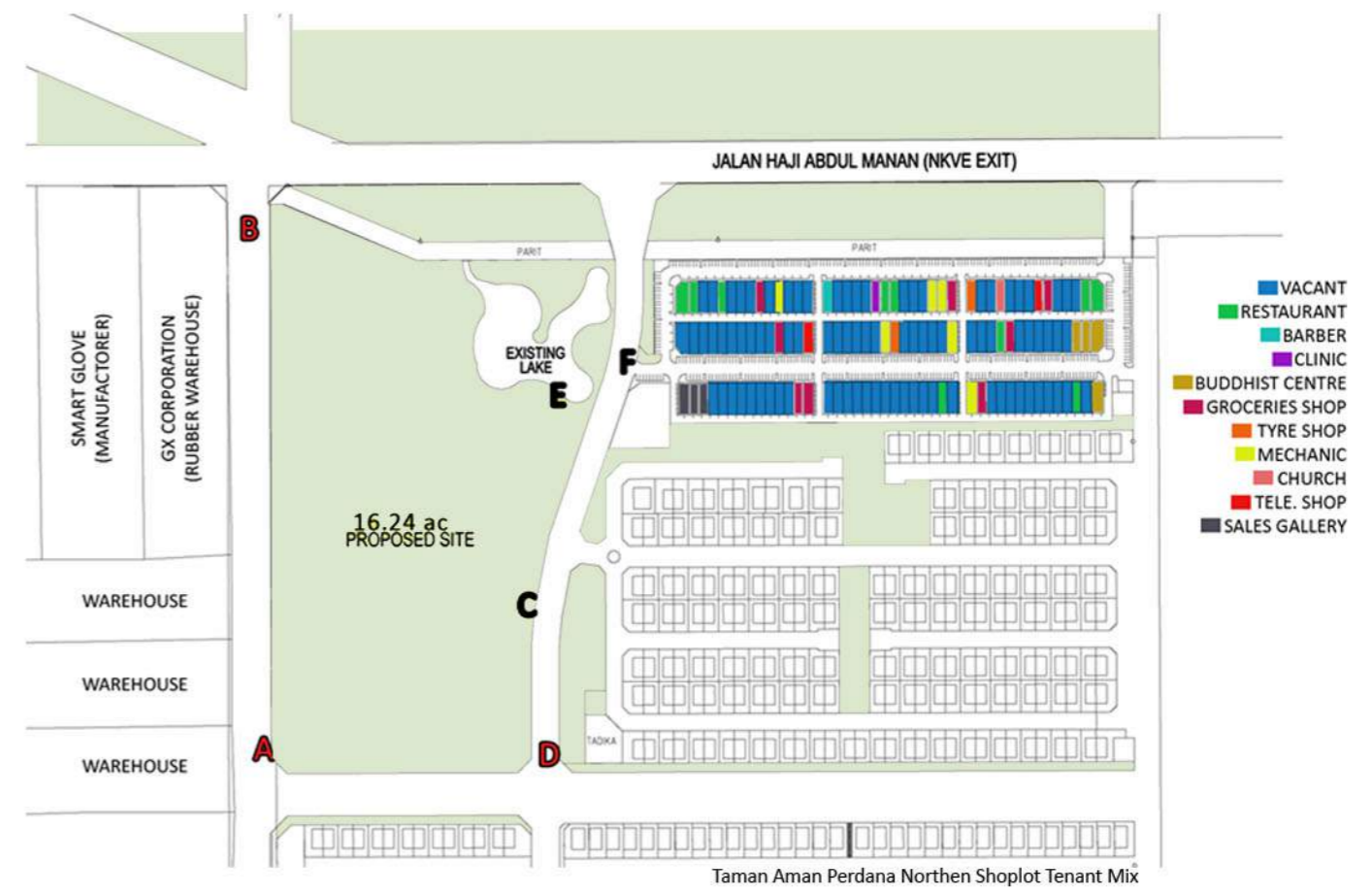
3.0 THE SITE - TAMAN AMAN PERDANA, KLANG



Taman Aman Perdana neighbourhood is roughly 4-5 years old and consists of freehold mixed development properties such as bungalows, semi-detached houses, 2-storey terrace houses as well as shop lots. The shop lots are located at both far ends of the development, where there also several mini markets where residents can shop for their basic necessities like 7-11, 99 speed marts and various restaurants. The shop lots also on the southern end serves mostly the residents of the medium cost apartments.

The shop lots in the north however, which is close to the site, are mostly vacant. Thus, it by form of gentrification, the school would allow many businesses to open up and thrive in these shop lots. The site is also close to the Klang Central bus station, which is the main bus and taxi transport hub for Klang. Taman Aman Perdana is located amongst the lush greenery which is hard to come by in the bustling Klang township.

Access to the site is mainly through Jalan Abdul Manan and Jalan Haji Abdul Manan 1, which leads to the Setia Alam NKVE exit, which is located 10 minutes away. The site was chosen due to the lack of high schools in the vicinity, although many primary schools are located within a 10 minutes short drive away from Taman Aman Perdana like SK Meru, SK Sungai Kapar Indah and SK Sementa and a Chinese Primary School located within the compounds of Taman Aman Perdana. There is however, SMK Taman Klang Utama, a high school which is located 15 minutes away from the site. By observation, it is by opinion that a new secondary public school be located in the compound to better serve the community of Aman Perdana





A

The site, highlighted in red was submitted to the planning department as Sekolah Awam, and is 6 acres. The site is currently and the plots around it are vacant and left unkempt. As the site is located right next to the main entrance into Aman Perdana, it would therefore require a certain type of architecture that would gentrify the site. However, according to the Piawaian Perancangan Negeri Selangor, the land size required for secondary school purposes is 9 acres. Therefore an amalgamation of vacant plots around the site would need to occur.



B

- Vacant Sekolah Awam : 6.00 acres
- Vacant Balai Bomba: 1.06 acres
- Vacant Lot Perniagaan: 1.08 acres
- Vacant Lot Perniagaan: 1.19 acres
- Vacant Lot Perniagaan: 2.14 acres
- Vacant "Pam Minyak": 1.56 acres
- Total Site Area: 13.03 acre
- Unknown site Area : 3.21 acres

Total Development Area: 13.03 acres + 3.21 acres =16.24 acres



C



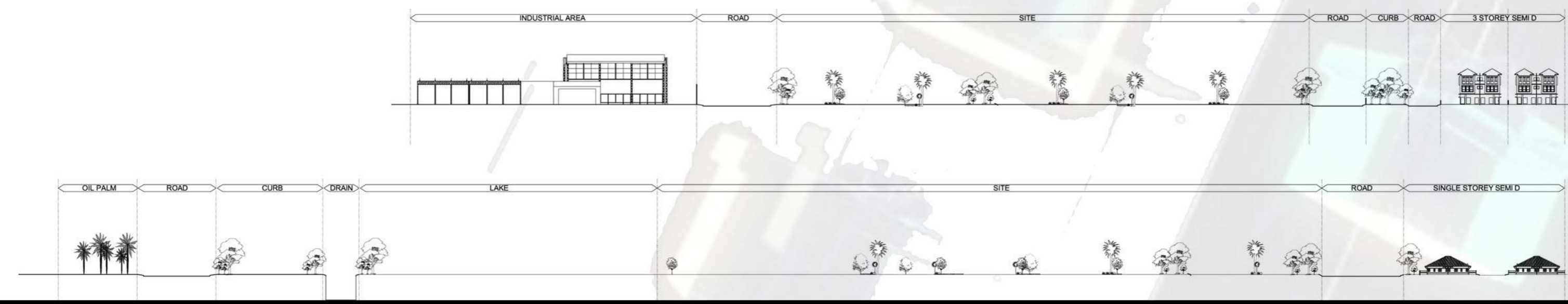
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D



F





4.0 THE DESIGN PROPOSAL



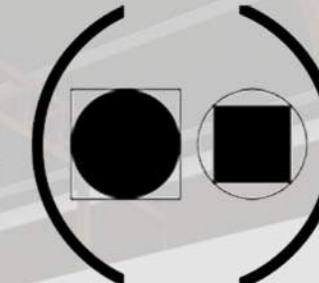
FURNITURE
better tables/chairs,
classroom arrangement,
lockers, storage



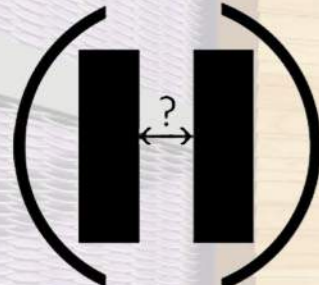
**PEER TO PEER
LEARNING**
group approach to
student learning & teaching



**GREEN & SUSTAINABLE
TECHNOLOGY**
SUSTAINABILITY
the lack of sustainable features
i.e. rainwater harvesting could
decrease school running
costs each fiscal year



**SITE CONTEXT
INTEGRATION**
current schools are not
site aware and can be plotted
into a site and totally disregard
its contextual response



BLOCK DISTANCE
reduced noise pollution
between adjacent blocks



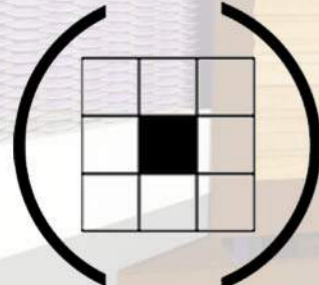
PERSONALIZATION
students tend to cherish
something they identify with,
why not indulge their creativity?



LANDSCAPE
lack of tranquil landscaped
spaces for outdoor learning



**INTEREST BASED
ACTIVITY ROOMS**
activity rooms for extra
curricular activities such
as sports, dance, sewing,
culinary and a mini-cinema



**DEPARTMENTAL
TEACHER AREAS**
reduced walking distance
between teachers &
classrooms



SPECIAL STUDIES
**THERMAL COMFORT
& DAYLIGHTING**
thermal comfort and daylighting
simulation results



**INFORMAL
LEARNING**
subconscious informal
learning opportunities
around the school



CLASS ARRANGEMENT
teachers find it difficult to control
students, playing truant & 'class
jumping'



CIRCULATION
2-3 storeys for improved
vertical circulation &
improvement of corridors
& staircases with more efficient &
comfortable circulation, eliminate
areas of crowding & congestion



**VEHICULAR
CIRCULATION**
parking spaces and dropoff
areas for school buses which
are safe and child friendly



**FLEXIBLE
CLASSROOMS**
classrooms to be able
to adapt to cater to a wide
range of learning situations,
activities & group sizes



SAFETY
offer pupils much safer, less congested
routes around the school and site

Proposed Facilities for the High School

The proposed high school is designed to operate as an educational institution for students. However, when the school is not being used for educational purposes, the facilities within the school will then be shared with the community, allowing for greater cohesion amongst the residents of the proposed site. Facilities such as the sports hall, canteen, libraries and the multi-purpose hall would intend to socially integrate the community, students and teachers as well as the residents of the site alike.

Primary Spaces

Spaces	Description
Classrooms	The current classrooms in school typologies in Malaysia do not allow for more robust teaching methods. This sees the current classrooms as rather backwards, as students in the 21 st century are more receptive to technology rich and collaborative learning methods. In order to break away from the standard classroom typology, the new proposed school would attempt to liberate teachers and students from the constraints of the bounded classroom. The proposed classroom will also include an individual storeroom and IT facilities. According to the case study (survey), ambience within the classroom is also in dire need of change in order to encourage a more holistic learning experience.
Scientific Laboratories	In the current school programme, students are asked to leave their classrooms and gather at the laboratories for science lessons that are to be conducted. In most schools, the laboratories are only used sporadically during lessons and are kept nearer to the administrative blocks. The labs are designed in this way to reduce unwanted risk of students breaking an entry into the labs and making way with dangerous chemicals. However, the proposed school will attempt to mitigate this problem, by designing the laboratories as a self-sufficient science classroom.
Canteen(s)	Canteens in Malaysian schools are usually rented by one vendor to serve the entire student/teacher population. This increases waiting time for students to get their food, as well as reduced variation in food offered to them. The canteens design also does not allow the vendor to profit by selling food to the public/community. However, the canteens could be designed to cater to students and teachers, as well as the community, but at the same time not neglecting the security between the two.
Library	The library would include spaces for students to read a variety of fiction and non-fiction collection of books. Spaces include study chambers, seminar and meetings rooms, IT facilities and a small educational movie theatre. The library would also approach a more lounge-like feel, encouraging a more full-bodied educational experience. Besides the students/teachers, the facility would also double up as a community library for public to borrow educational material.
Administrative Office + Teachers Room	The administrative offices will house the staffs of the institution and will include conference rooms for meetings between the principal, teachers and parents. The teachers wing will house individual teachers workstations for clerical tasks as well as a break-out space/pantry.

single session co-ed public high school
54 classrooms(36 students p.c),
1944 students

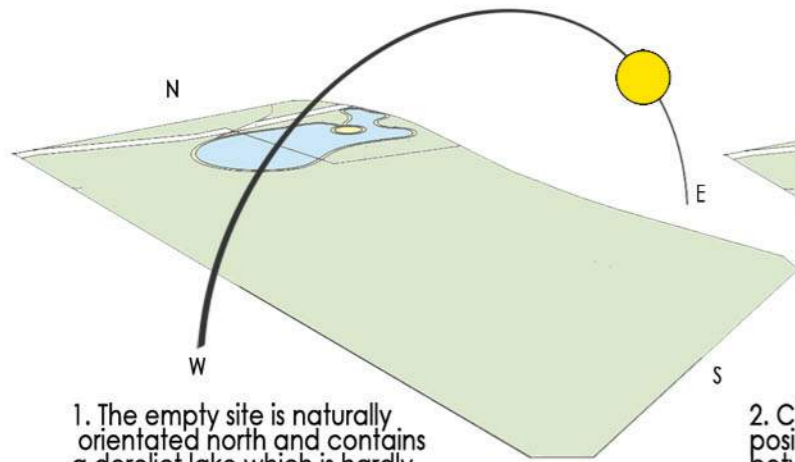
	Kap.	Unit	Luas (m. p.)
PENTADBIRAN			
Bilik Pengetua		1	28.00
Bilik Penolong Kanan		1	18.00
Bilik Ketua Bidang		1	13.50
Bilik Guru	66	3	396.00
Bilik Alat Bantu Mengajar (ABM)		1	45.00
Bilik Mesyuarat Utama	80	1	128.00
Bilik Penguru-san Peperiksaan (ruang kerja)		1	67.50
Pusat Sumber (ruang buku/ bacaan)	370	1	560.00
Bilik Pergigian		1	11.25
Bilik Pemeriksaan Kesihatan		1	11.25
Bilik Bimbingan dan Kaunseling		1	63.00
Kedai Koperasi		1	67.50
Bilik Pengawas		1	56.25
Bilik Keselamatan		1	67.50
AKADEMIK			
Bilik Darjah	36	54	2835.00
Surau (ruang solat dan wuduk)	350	1	351.00

	Kap.	Unit	Luas (m. p.)
Bilik Sejarah dan Geografi		1	67.50
Bilik Pendidikan Seni (ruang seni lukis)		1	114.00
Bengkel Kemahiran Hidup		1	370.50
Bengkel Ekonomi Rumah Tangga		1	399.10
Bilik Muzik		1	67.50
Makmal Komputer		3	342.00
Makmal Kimia		2	285.00
Makmal Sains Integrasi			
Makmal Sains		3	427.50
Makmal Fizik		2	285.00
Makmal Biologi		2	285.00
Bilik Matematik		1	67.50
Makmal Bahasa		1	85.50

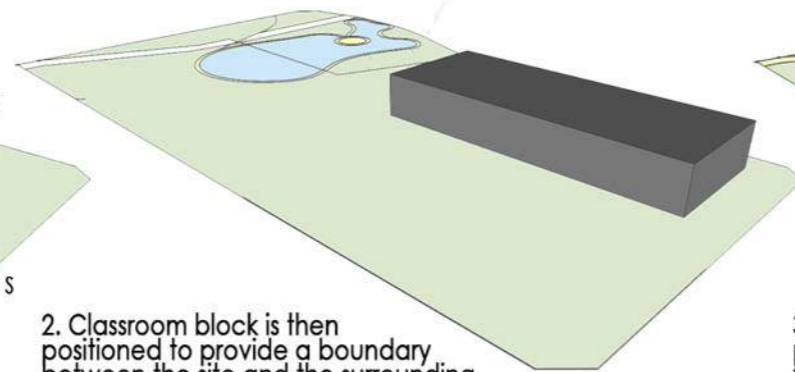
	Kap.	Unit	Luas (m. p.)
KEMUDAHAN-KEMUDAHAN LAIN			
Bilik Persalinan Murid (L)		1	90.00
Bilik Persalinan Murid (P)		1	45.00
Bilik Pengurusan Sukan		1	78.80
Bilik Gerakan Ko-Kurikulum		1	67.50
Bilik Operasi Buku Teks		1	67.50
Ruang Serba guna		1	270.00
Kantin		1	504.50
RUANG OPSYEN			
Dewan Sekolah	-	1	738.80

Secondary Spaces

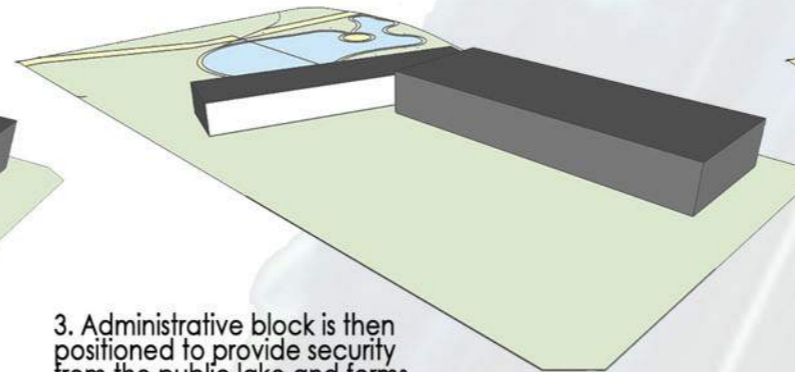
Sports Centre	The sports centre would include fitness equipment (gym) for students to use for personal training as well as school-related sporting exercises. Features of the sports centre would consist of futsal courts, badminton and basketball courts as well as aerobics/dancing studios. The facility will also be opened to the community after school hours.
Music Centre	The centre aims to inculcate music competence within students. The space would include training spaces for bands/orchestras as well as performance space for the children to invite their parents to watch them perform. The component would also house musical instruments for the school band (pancaragam).
Infirmary	Infirmary to treat student injuries. It will also contain an small dentist office for periodical dental check for students
School Hall & Amphitheatre	Space for students to have performances such as debates or speeches and is open for community to rent
Tuckshop/ Koperasi	A small shop which sells books, stationary and small snacks for students



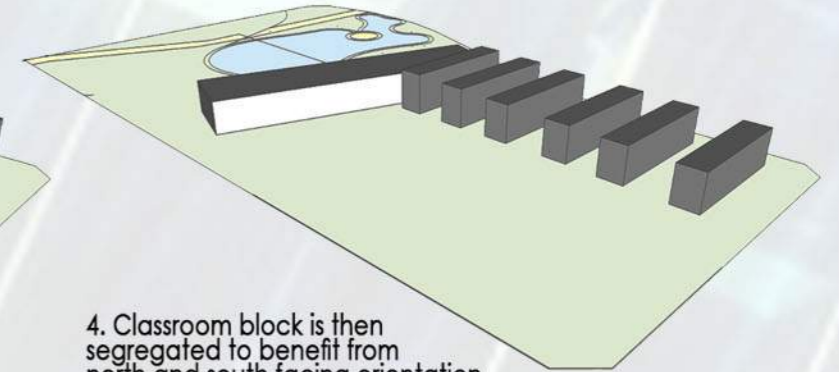
1. The empty site is naturally orientated north and contains a derelict lake which is hardly used by the neighbourhood



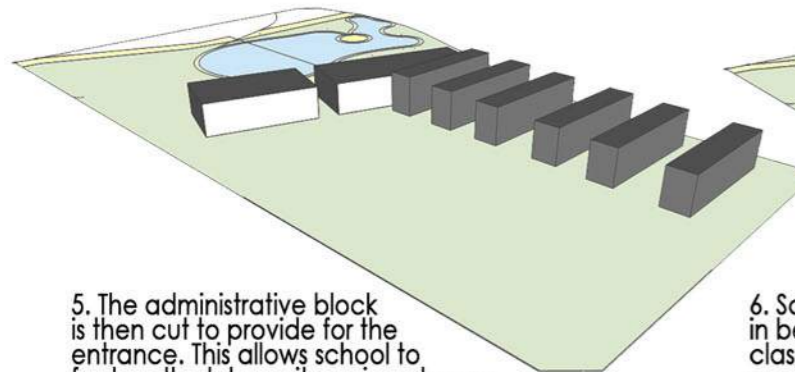
2. Classroom block is then positioned to provide a boundary between the site and the surrounding neighbourhood



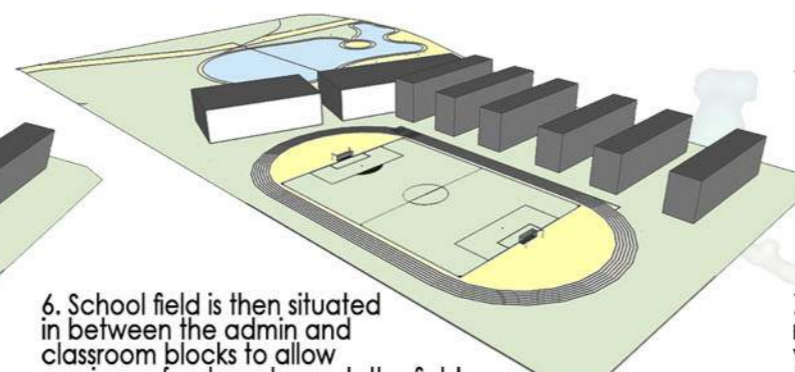
3. Administrative block is then positioned to provide security from the public lake and forms a courtyard within the site



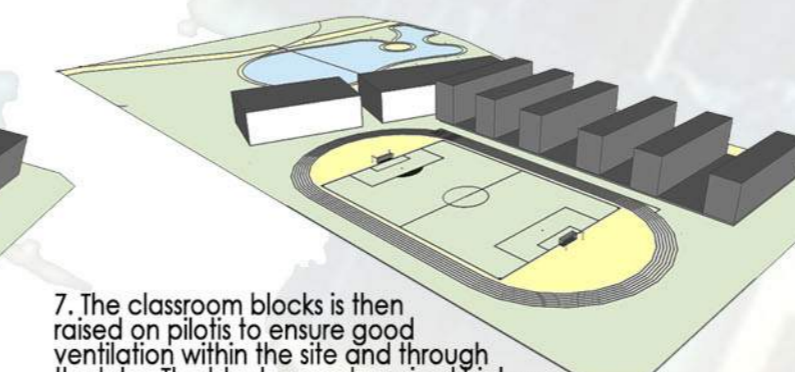
4. Classroom block is then segregated to benefit from north and south facing orientation, reducing heat gain on facades



5. The administrative block is then cut to provide for the entrance. This allows school to feature the lake as its main entrance statement



6. School field is then situated in between the admin and classroom blocks to allow maximum frontage towards the field

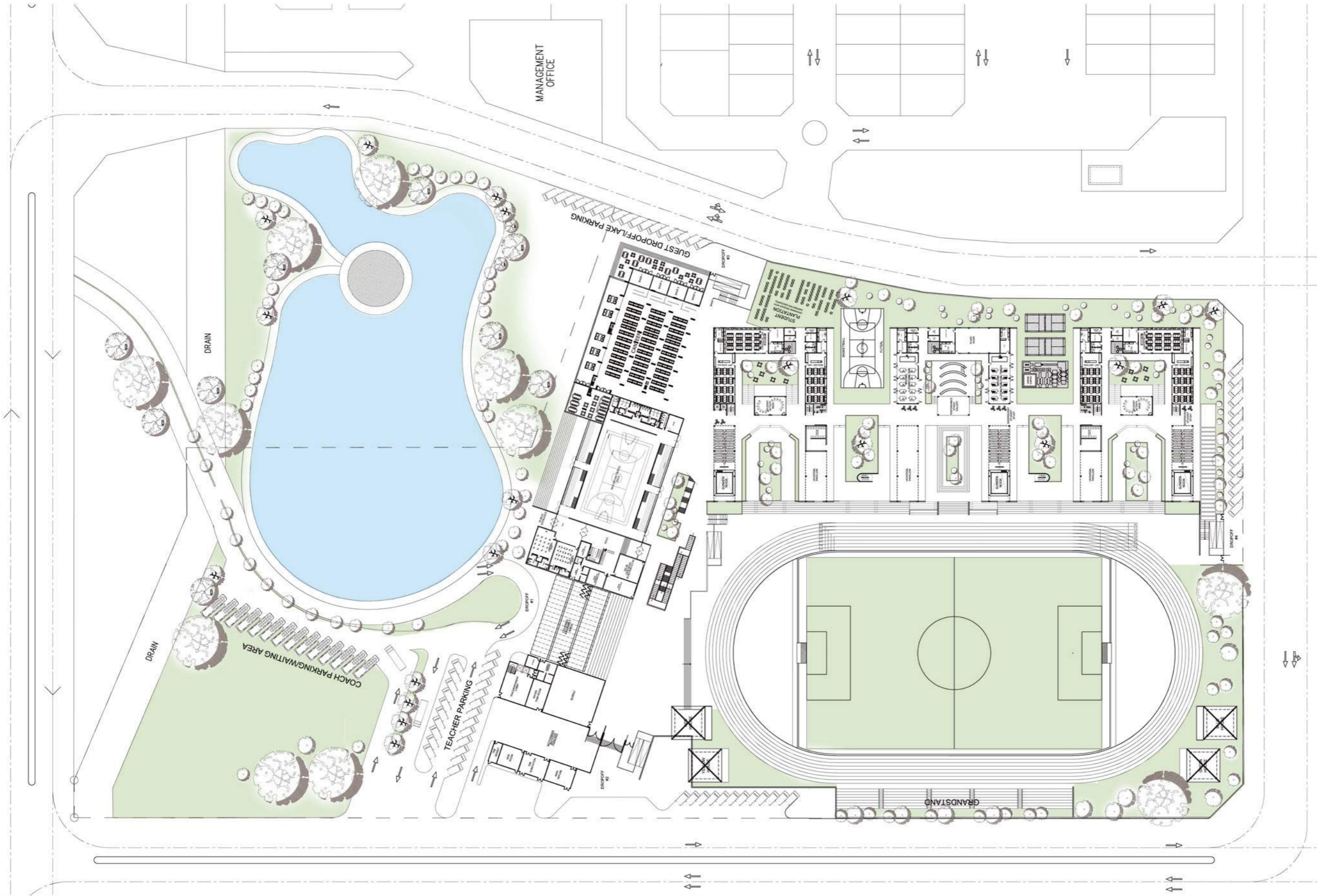


7. The classroom blocks is then raised on pilotis to ensure good ventilation within the site and through the lake. The blocks are also raised higher than the field to gain spatial hierarchy



8. Classroom blocks and the administrative block is then connected through a series of covered corridors to ensure maximum accessibility within the site

DESIGN DEVELOPMENT



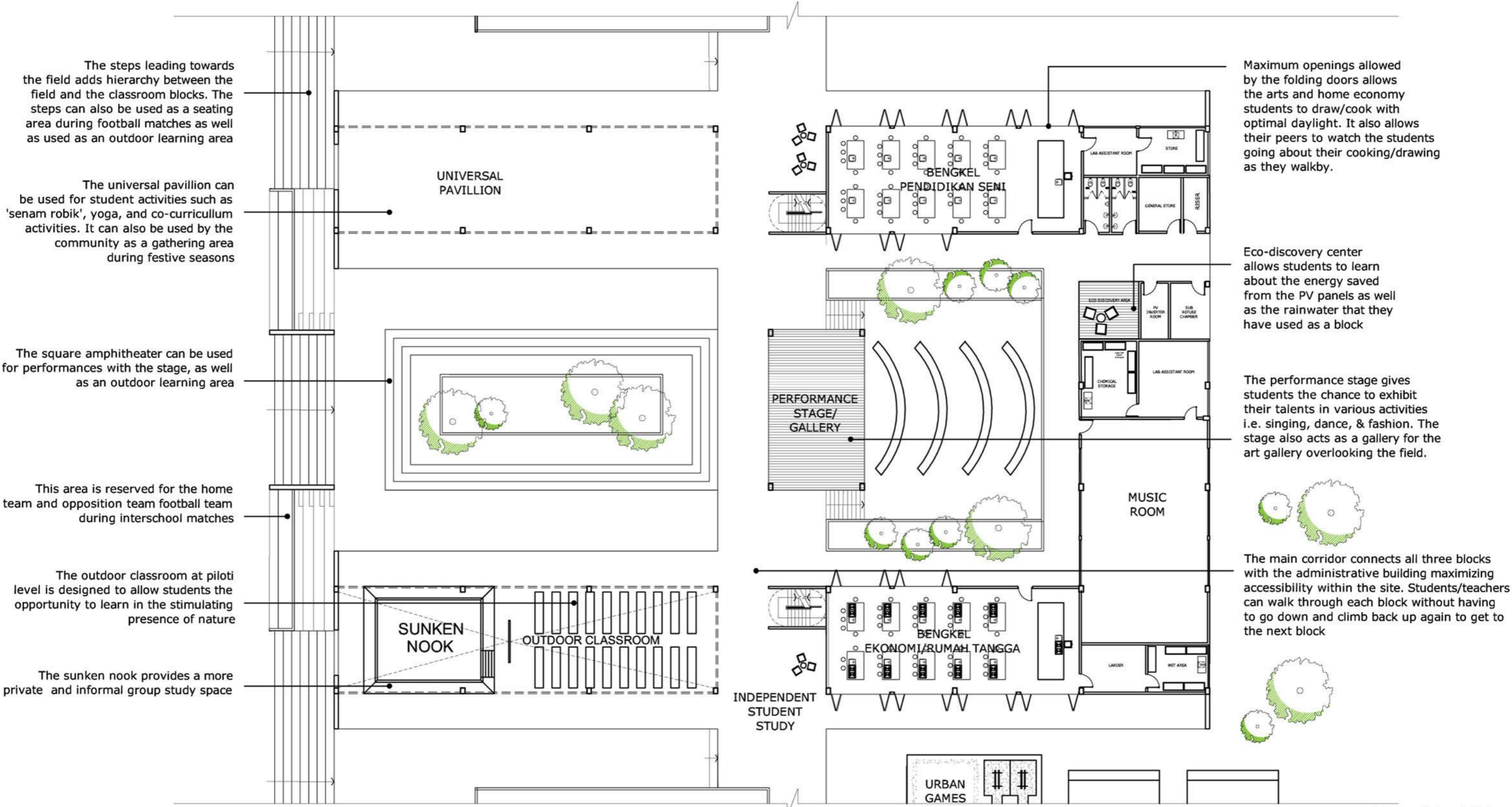
4.4 Ground Floor Plan



4.4 First & Second Floor Plans



4.7 Typical Block Blowup - Ground Floor



The steps leading towards the field adds hierarchy between the field and the classroom blocks. The steps can also be used as a seating area during football matches as well as used as an outdoor learning area

The universal pavillion can be used for student activities such as 'senam robik', yoga, and co-curriculum activities. It can also be used by the community as a gathering area during festive seasons

The square amphitheater can be used for performances with the stage, as well as an outdoor learning area

This area is reserved for the home team and opposition team football team during interschool matches

The outdoor classroom at piloti level is designed to allow students the opportunity to learn in the stimulating presence of nature

The sunken nook provides a more private and informal group study space

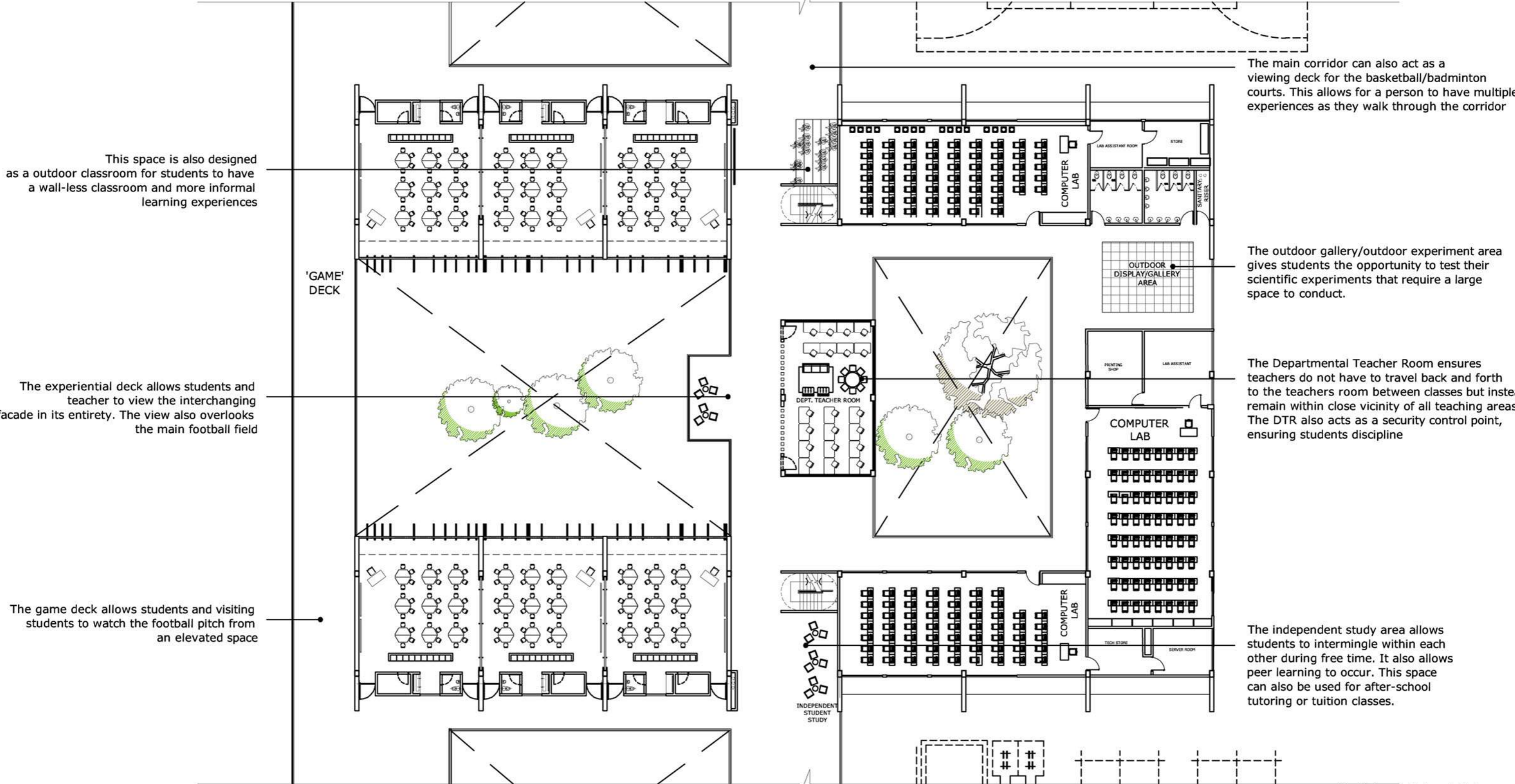
Maximum openings allowed by the folding doors allows the arts and home economy students to draw/cook with optimal daylight. It also allows their peers to watch the students going about their cooking/drawing as they walkby.

Eco-discovery center allows students to learn about the energy saved from the PV panels as well as the rainwater that they have used as a block

The performance stage gives students the chance to exhibit their talents in various activities i.e. singing, dance, & fashion. The stage also acts as a gallery for the art gallery overlooking the field.

The main corridor connects all three blocks with the administrative building maximizing accessibility within the site. Students/teachers can walk through each block without having to go down and climb back up again to get to the next block

4.7 Typical Block Blowup - First Floor



This space is also designed as a outdoor classroom for students to have a wall-less classroom and more informal learning experiences

The experiential deck allows students and teacher to view the interchanging facade in its entirety. The view also overlooks the main football field

The game deck allows students and visiting students to watch the football pitch from an elevated space

The main corridor can also act as a viewing deck for the basketball/badminton courts. This allows for a person to have multiple experiences as they walk through the corridor

The outdoor gallery/outdoor experiment area gives students the opportunity to test their scientific experiments that require a large space to conduct.

The Departmental Teacher Room ensures teachers do not have to travel back and forth to the teachers room between classes but instead remain within close vicinity of all teaching areas. The DTR also acts as a security control point, ensuring students discipline

The independent study area allows students to intermingle within each other during free time. It also allows peer learning to occur. This space can also be used for after-school tutoring or tuition classes.

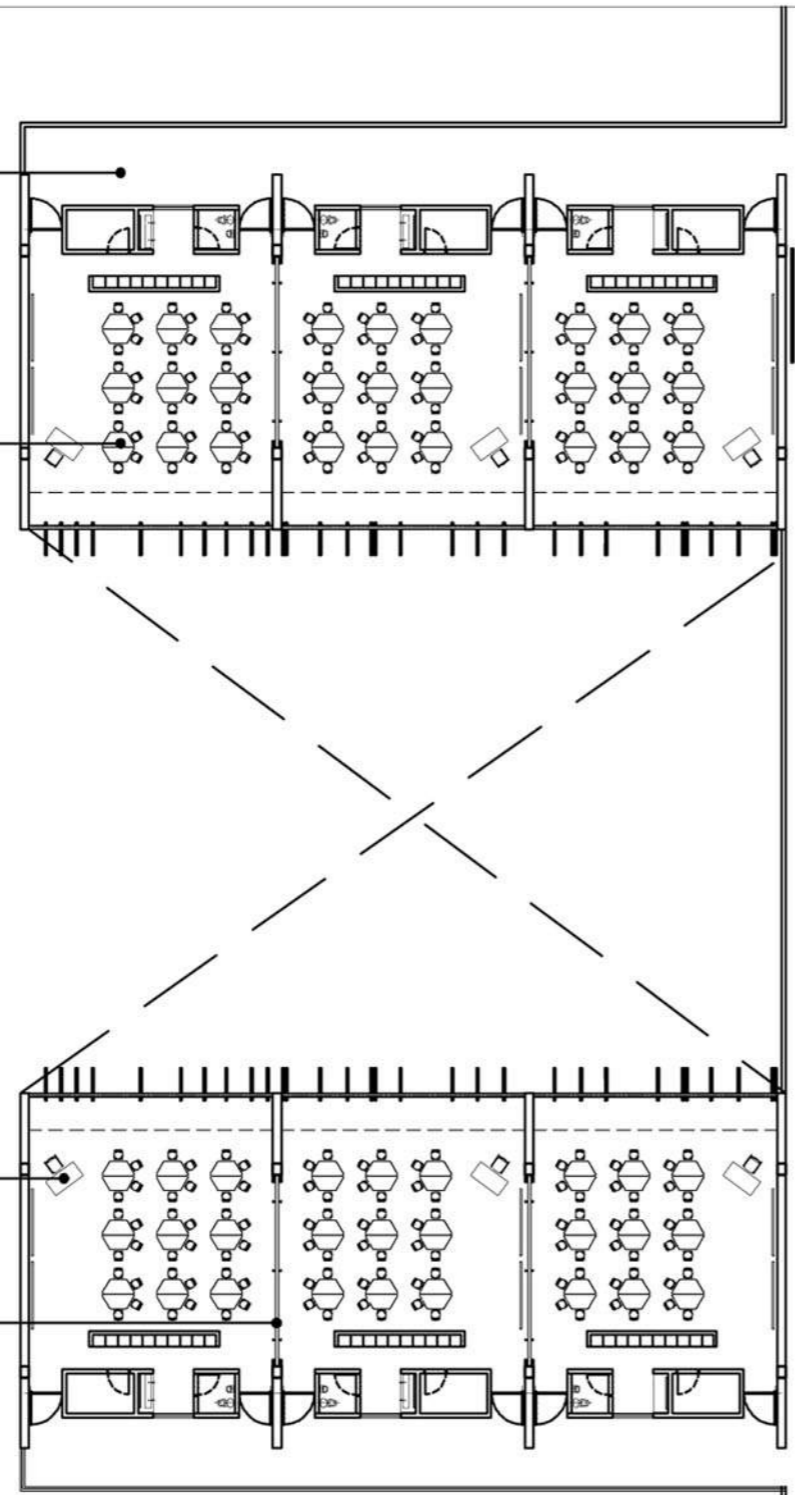
4.7 Typical Block Blowup - Second Floor

The secondary corridor splits the circulation space from the main corridor. This allows less noise from the corridors to penetrate into the classrooms. The entrance facade of the classrooms are kept solid to reduce distraction of students walking through the corridors

The tables within the classrooms are orientated in a group to encourage peer learning (students learning from each other)

The teacher table is angled to ensure that the teacher can have an eye on both exits of the classroom, reducing students playing truant

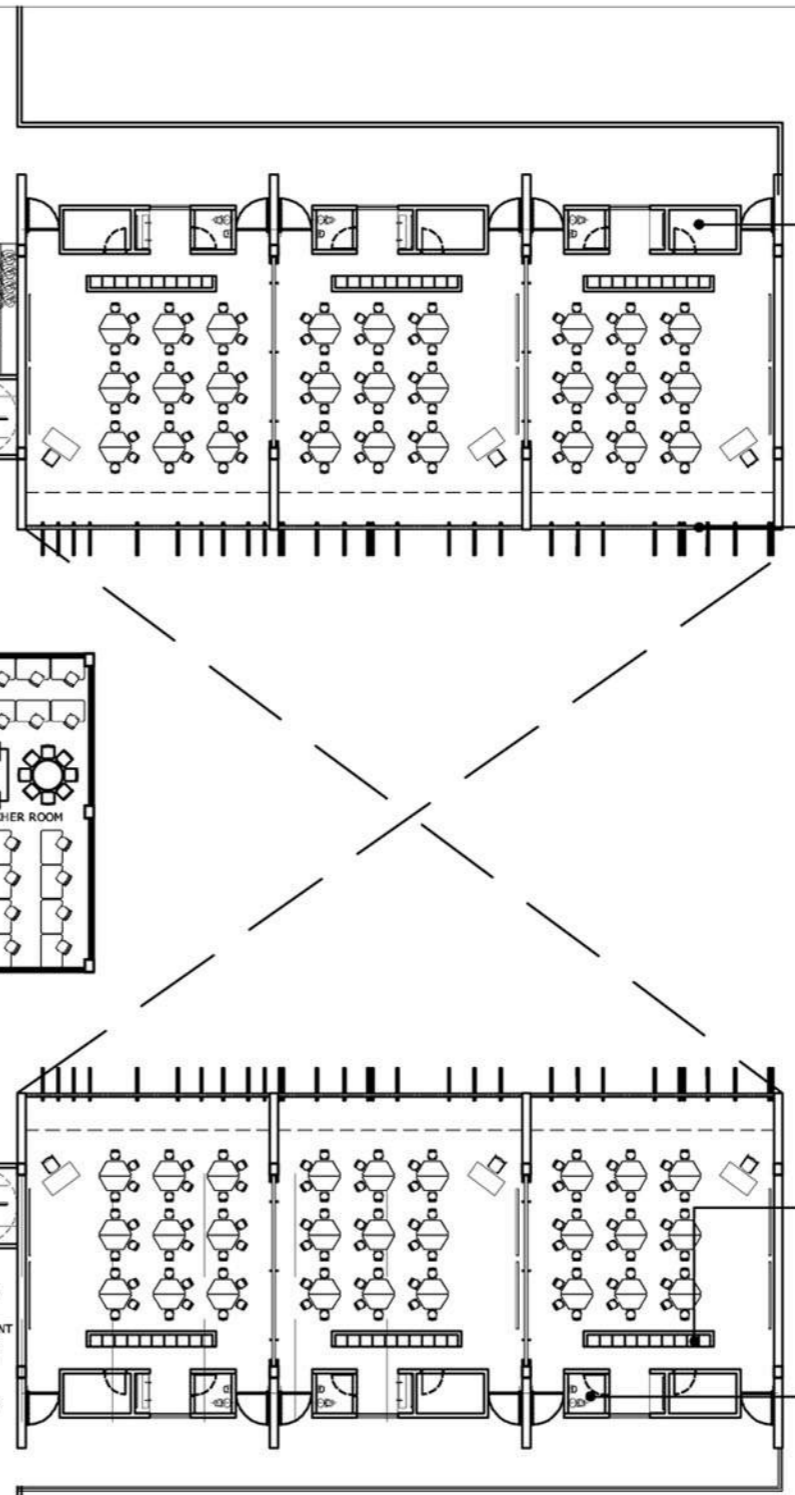
The classrooms are able to adapt to various sizes or groups of students by use of the sliding panel between classes. This allows monthly exams to be easily monitored by one teacher



OUTDOOR CLASSROOM

DEPT. TEACHER ROOM

INDEPENDENT STORAGE



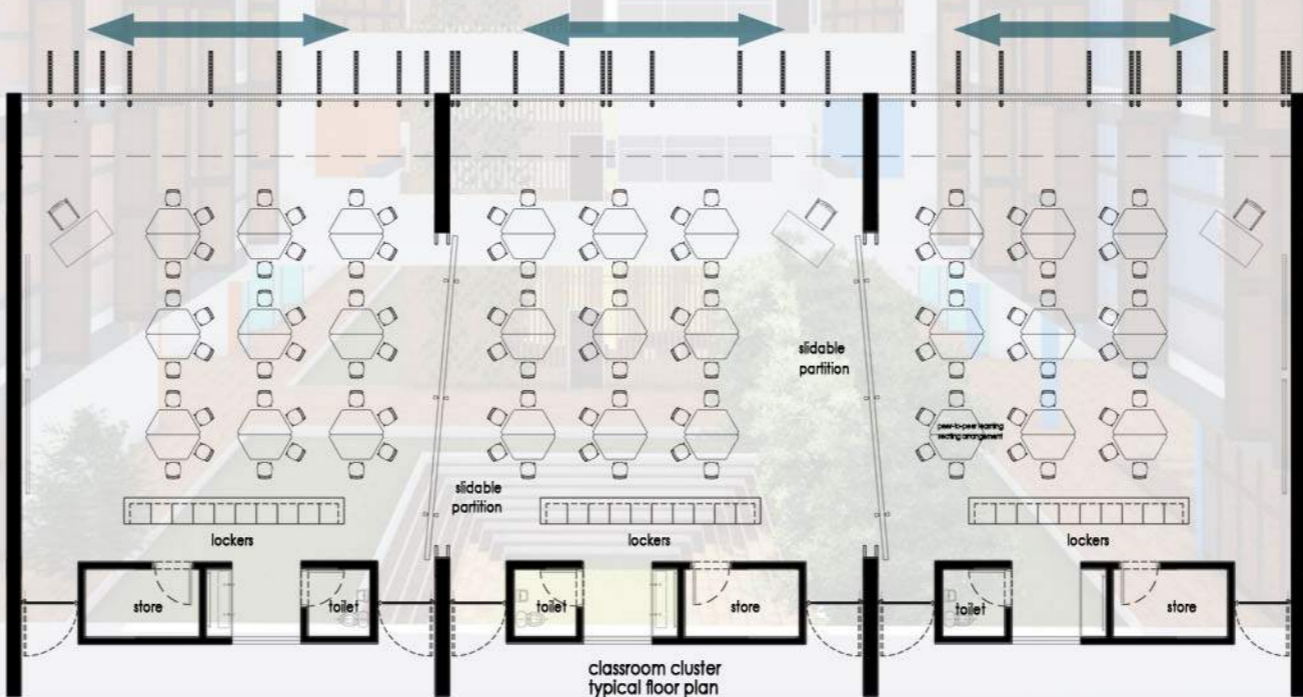
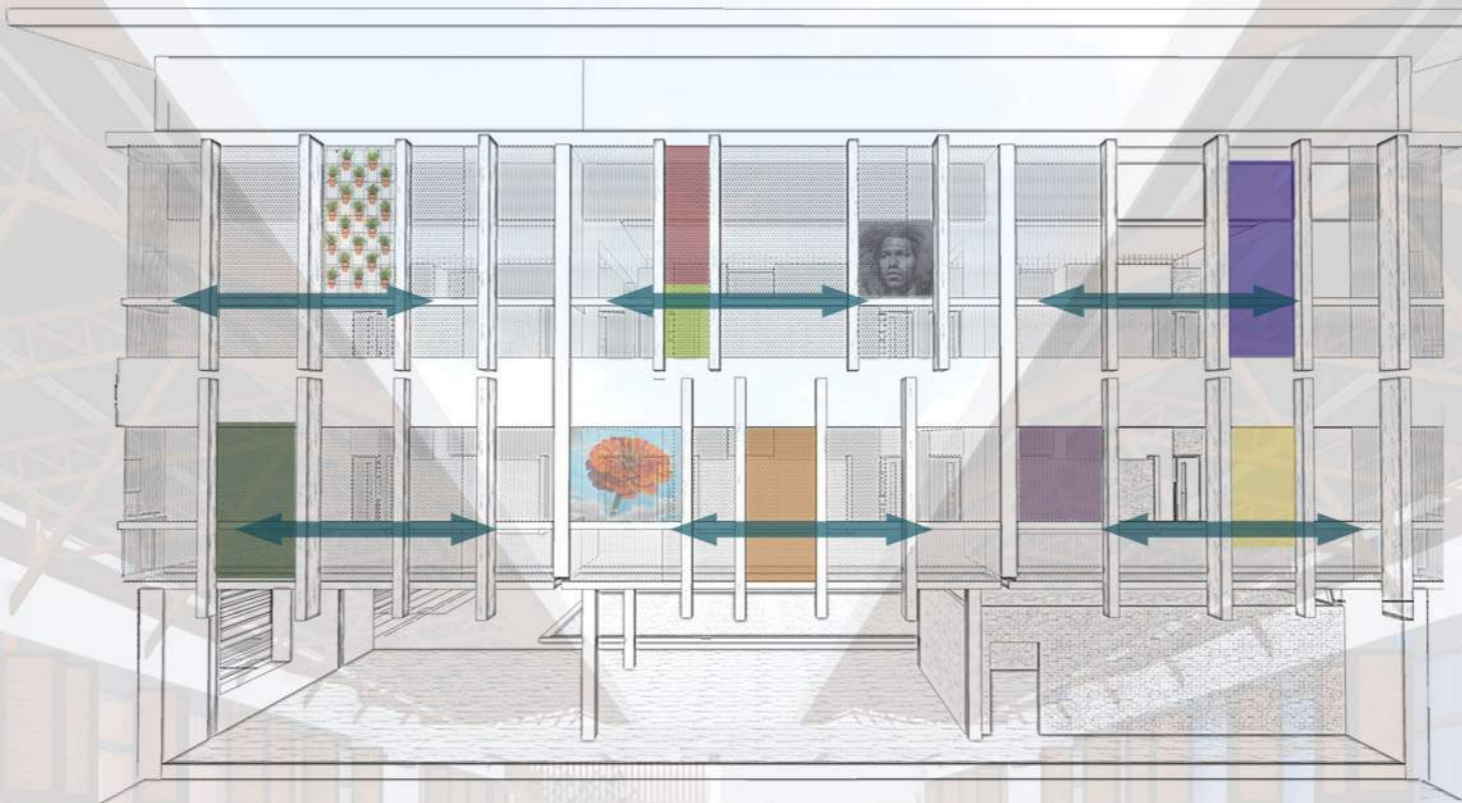
Each classroom is allocated a storeroom for them to store education materials as well as other equipments.

The personalizable facade allows students to exhibit their best works on the facade of the building or even play sudoku/tictactoe within classrooms. Competitions can then take place on the best looking classroom facade

The classrooms are equipped with lockers for students to store their books and other school necessities in the class. This reduces the heavy school bag syndrome in schools as well as removes the risk of students forgetting to bring books to school

Each classroom is also allocated a separate toilet. This reduces the 'dirty toilet' situation in most schools as students would be ask to maintain their own toilets ala life skills taught in Japanese schools. It also reduces the risk of students wasting time walking around the school when they go to the toilet.

4.8 Typical Classroom Cluster Blowup



permable facade
 owing to the flexibility of wiremesh, students can enjoy sunlight natural wind, allowing the classroom to feel less stuffy and claustrophobic

personalizable facade
 each classroom is equipped with moveable fins that allow students to display artwork, hang potted plants or even play sudoku/tictactoe between blocks

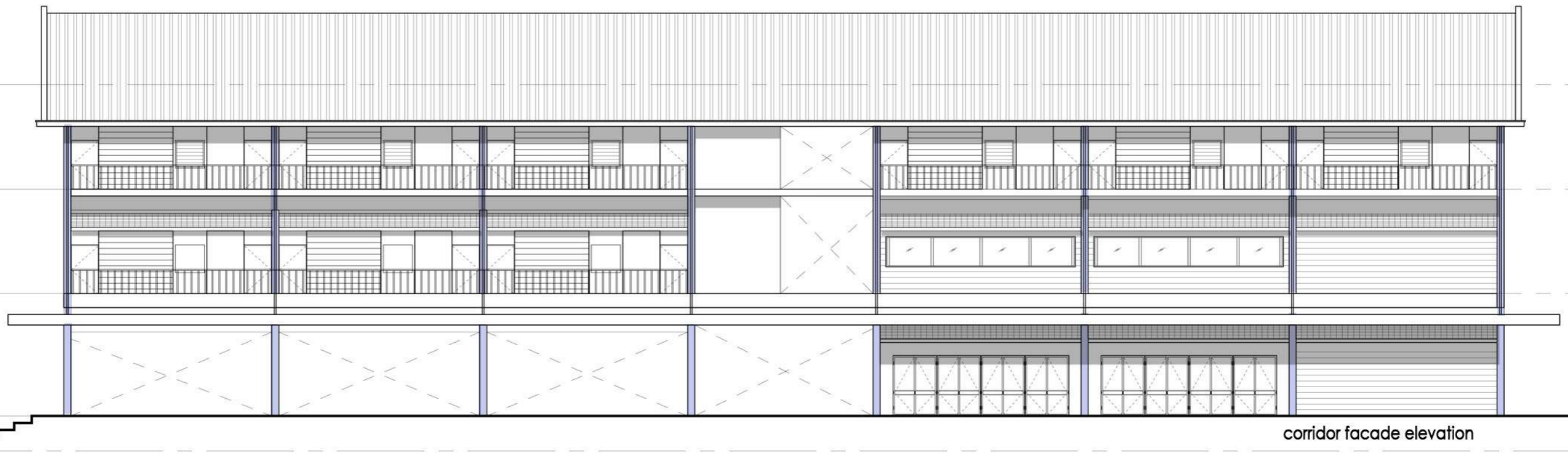
sliding partition
 the classroom clusters come with slidable moveable partition panels that allow for the classroom space to cater to wider range of pedagogical activities

group learning
 students are seated in groups of 4, allowing them to intermingle and learn from each other. It also allows teachers to easily integrate and manage the groups in various learning activities

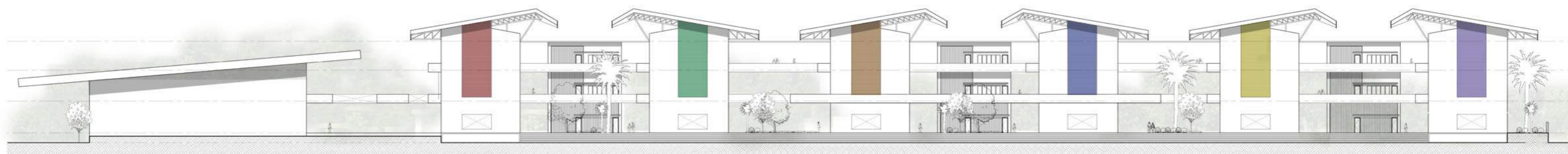
informal features
 each classroom is equipped with a store and lockers for students. a small toilet is also provided to reduce truancy among students when they take long trips to the toilets.

distraction reduction
 the front facade of the classrooms are intentionally kept solid with reduced windows to reduce interference from the corridor into the classroom

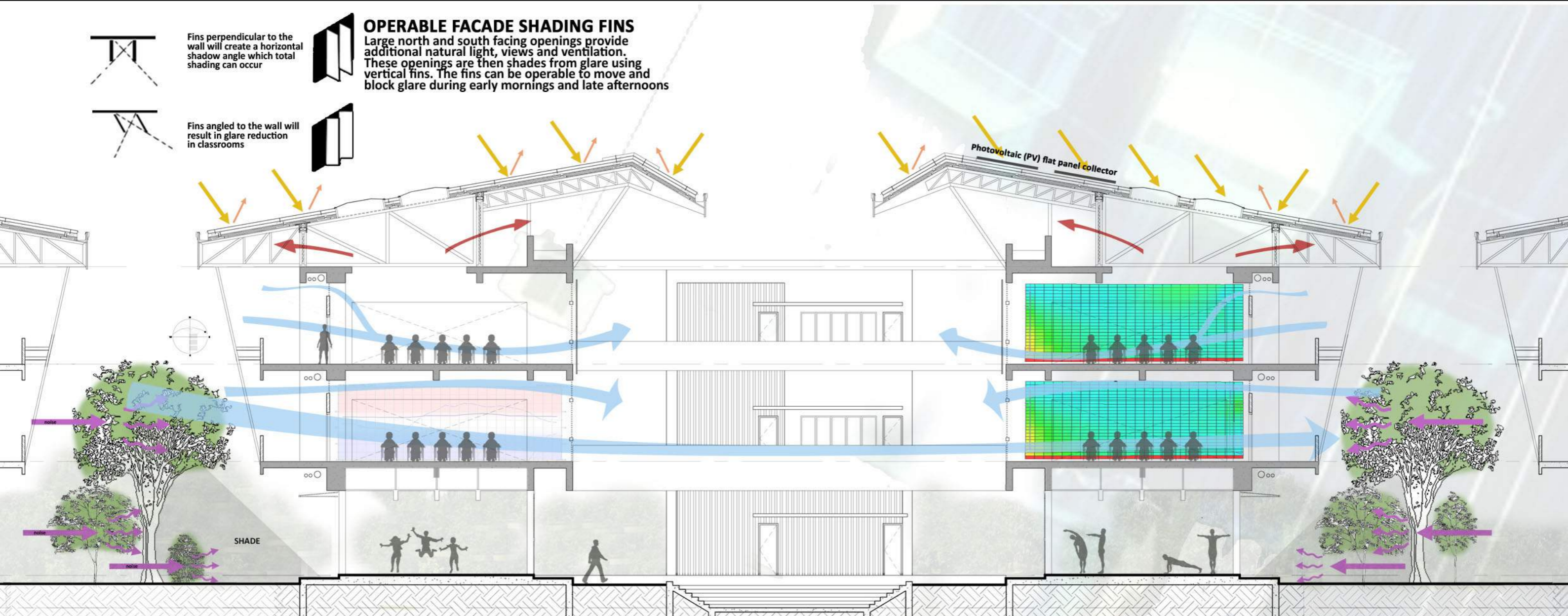
4.9 Side Elevations



4.9 Frontal Elevation



front elevation



OPERABLE FACADE SHADING FINs
 Large north and south facing openings provide additional natural light, views and ventilation. These openings are then shades from glare using vertical fins. The fins can be operable to move and block glare during early mornings and late afternoons



Fins perpendicular to the wall will create a horizontal shadow angle which total shading can occur



Fins angled to the wall will result in glare reduction in classrooms

LOW THERMAL MASS
 JKR schools use large facades of concrete/brick with high thermal masses. The heat stored in the facades is only released in the morning when the outside temperature reduces. Due to the slow heat dissipation, the interior of classrooms do not cool down enough before the next day of lessons.

STUDENT COMMUNAL MIGRATION & MICROCLIMATES
 The lower and upper courts provide a variety of shaded or sunny spaces that breakout from the interior of the individual blocks. Trees and garden reduce solar heat gain and provide a variety of shaded exterior courts for students to commune

SKYLIGHTS
 Skylights on both wings of the block provide additional natural daylighting into the upper classrooms. Over reliance on electrical lighting methods can be reduced.

GREEN COURTYARDS
 There are three levels of exterior gathering and circulation spaces that provide a diversity of exterior breakout spaces and microclimates.

RAINWATER COLLECTION, MISTING & GREY WATER REUSE
 Rainwater storage cisterns collect rainwater runoff from the large expanse of metal deck roof. This water can be used to irrigate the landscaped microclimates and for early morning misting (inducing the "fresh" atmospheric ambience)

PV PANELS
 Although costly to implement, government schools are rarely torn down. Therefore, the initial investment cost can be repaid by the surplus of electricity generated throughout the years. Surplus can also be sold back to the grid or to the community

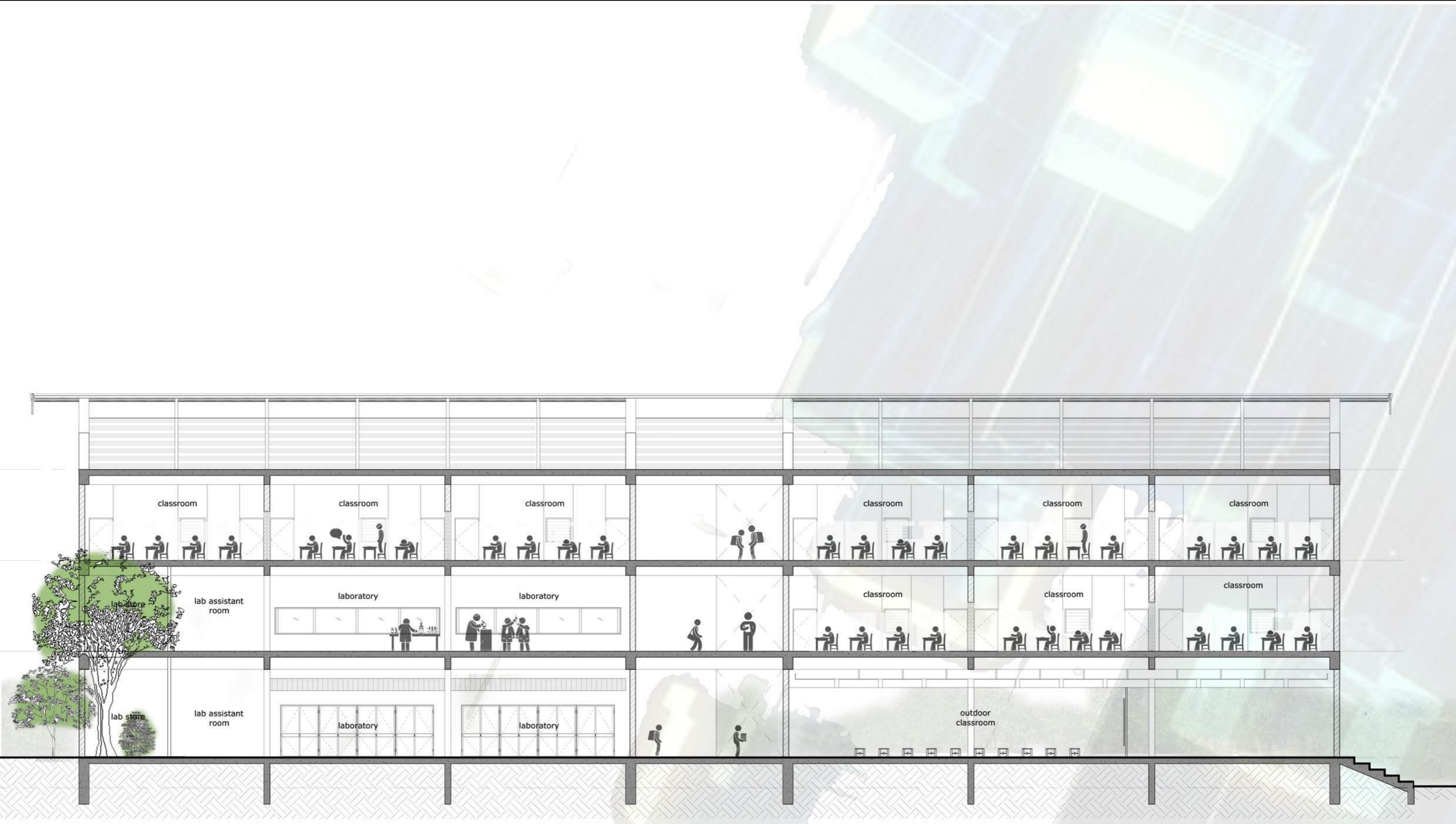
EXPOSED STRUCTURE & SERVICES
 The structure of the building as well as the piping layout is intentionally left exposed to allow students to understand and comprehend the building that they occupy.

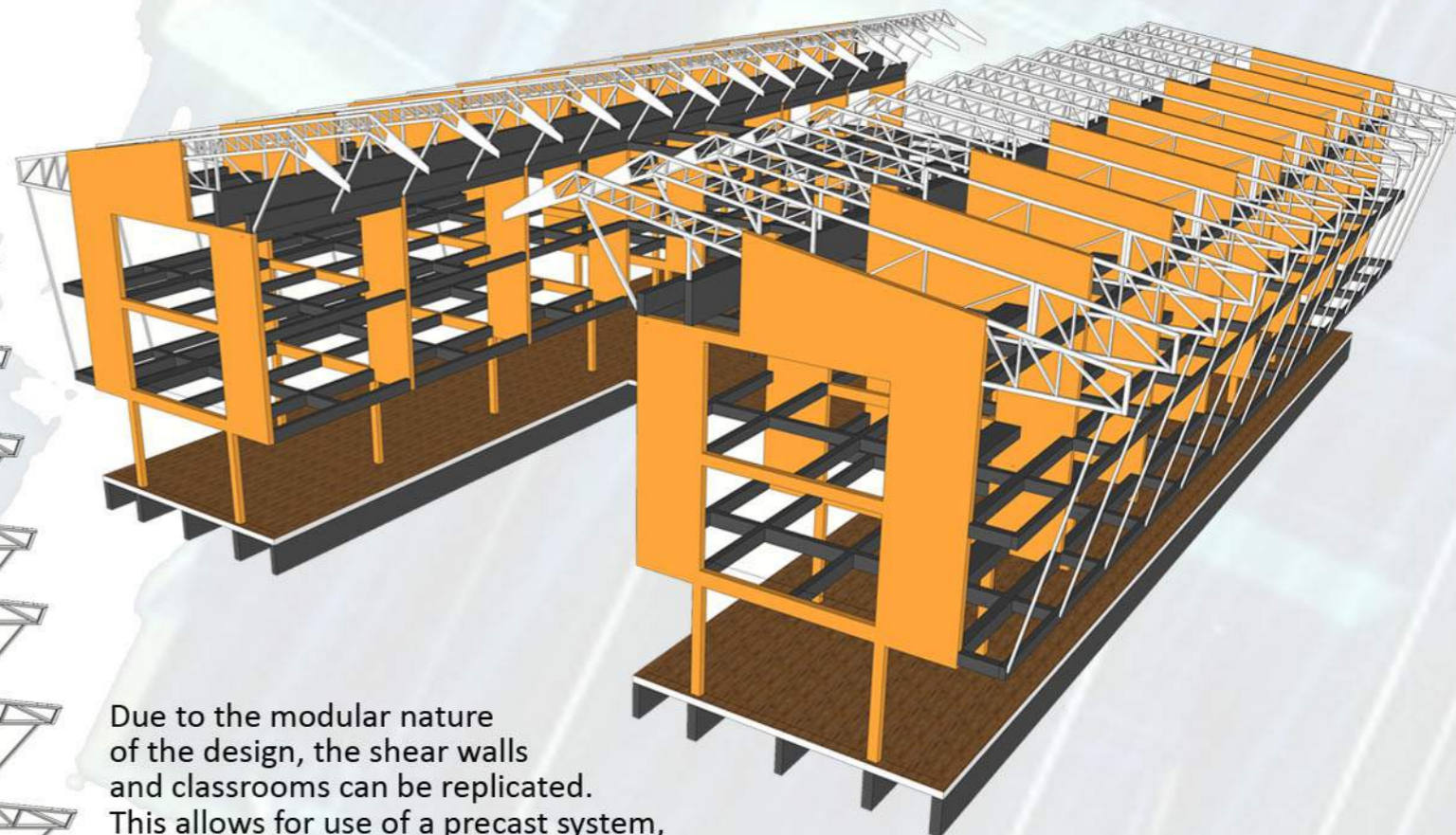
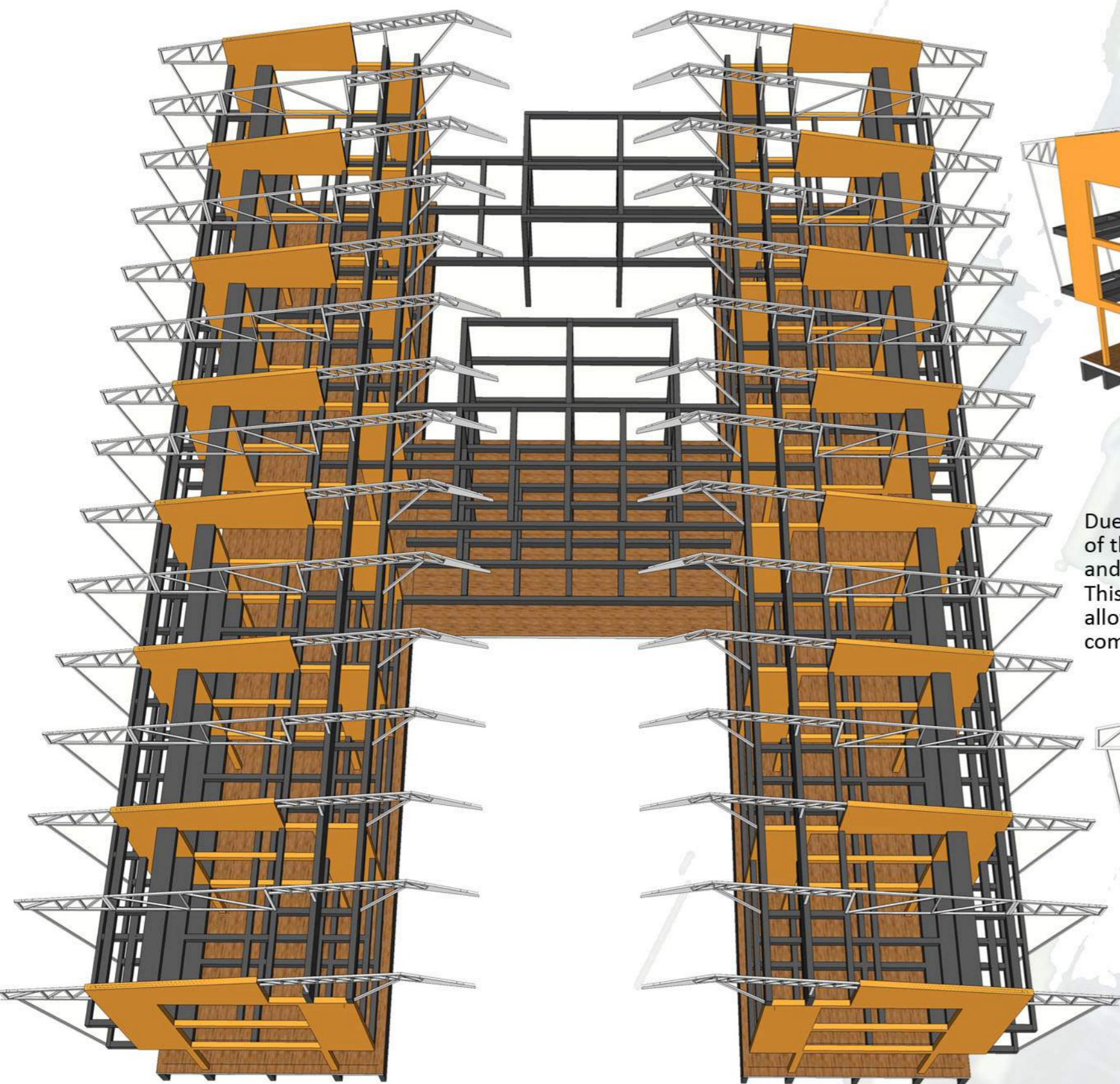
TIERED FOILAGE
 Layered planting acts as a noise reduction buffer, preventing noise from disrupting lessons

INTERIOR PASSIVE VENTILATION
 Passive cross (ground & first floor) and passive stack ventilation (second floor) further cools the building.

Pilotis on the ground floors enables the breeze from the lake to move within the site

EXTERIOR PASSIVE VENTILATION
 The building mass is broken into two major units, classrooms and secondary study areas. The breaks within east and west facades reduces the amount of heat penetrating into the building
 As the large wire mesh openings only face north and south, thermal comfort is significantly improved.

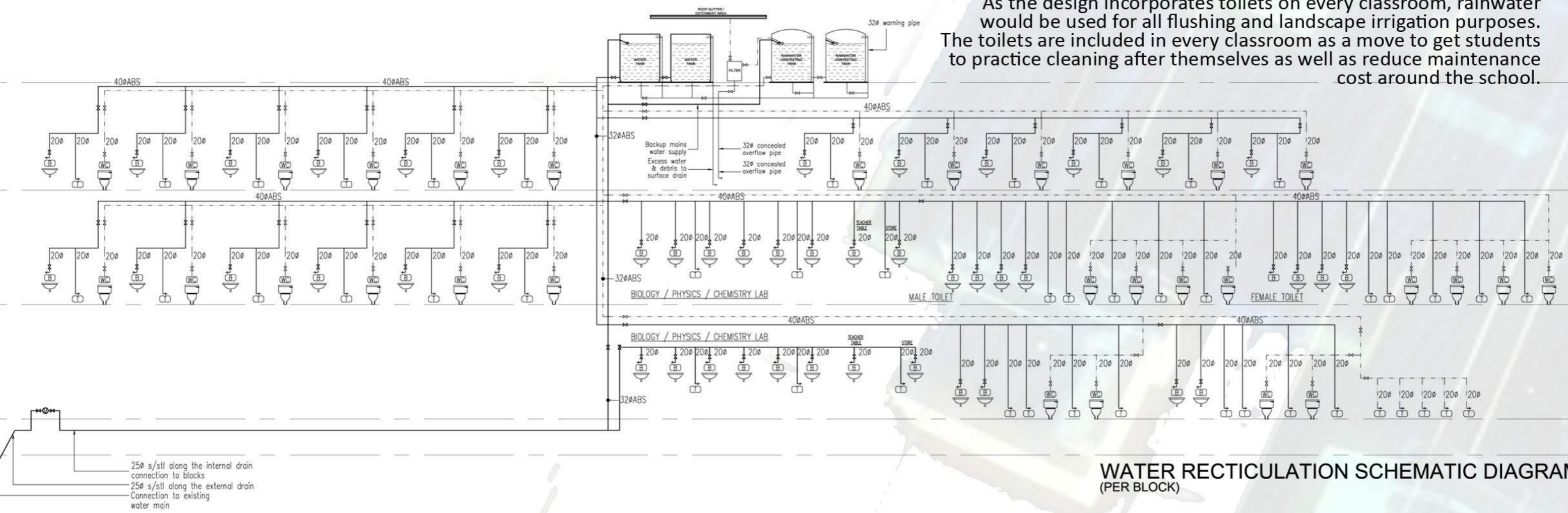




Due to the modular nature of the design, the shear walls and classrooms can be replicated. This allows for use of a precast system, allowing multiple shear walls and other building components to be casted, maximizing economies of scale.

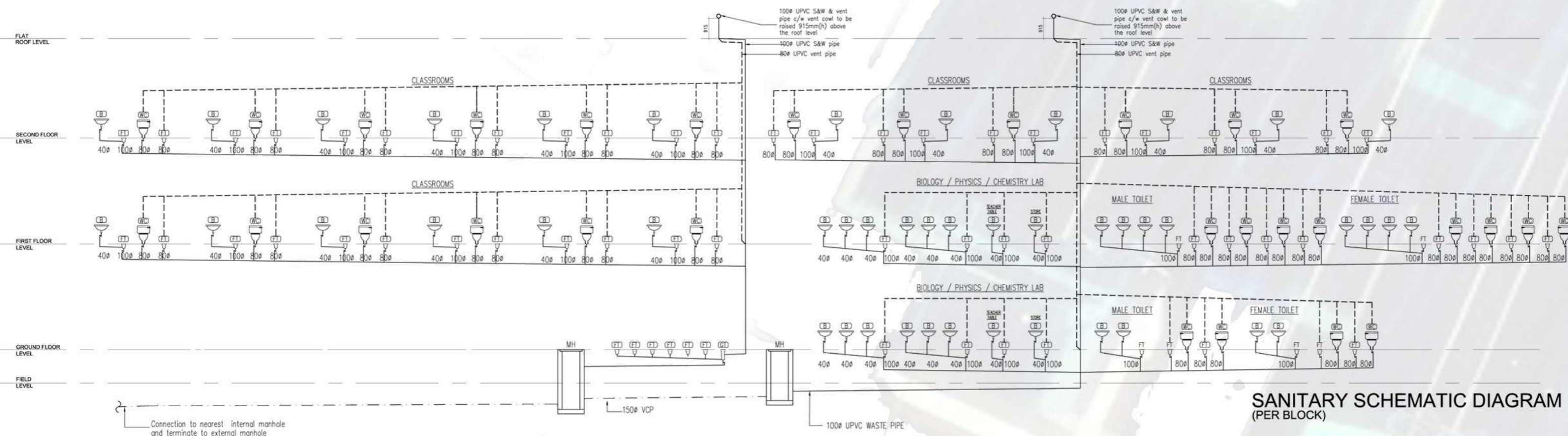


As the design incorporates toilets on every classroom, rainwater would be used for all flushing and landscape irrigation purposes. The toilets are included in every classroom as a move to get students to practice cleaning after themselves as well as reduce maintenance cost around the school.



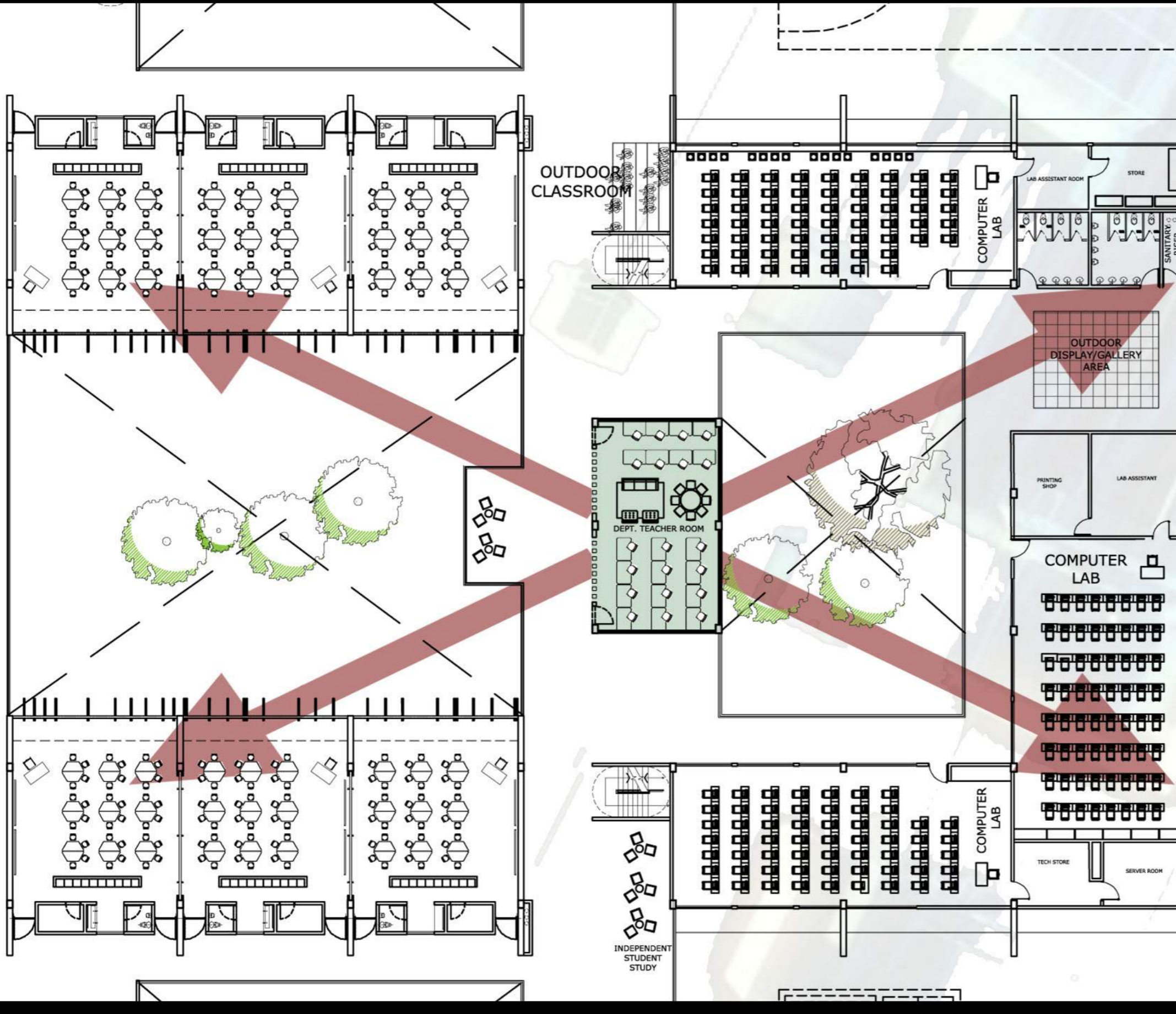
WATER RETICULATION SCHEMATIC DIAGRAM (PER BLOCK)

All toilets & sanitary wares feed to a common stack that runs through the main corridor aof of the proposed design. Keeping this stack exposed allows students to understand building services through infromal experience. This linear stack then feeds into a manhole before being discharged at the nearest external manhole and subsequently to the main treatment pond



SANITARY SCHEMATIC DIAGRAM (PER BLOCK)

5.0 School Features



b) What do you dislike about the design of your current school and classroom?
 Apakah yang anda tidak suka mengenai ciri-ciri reka bentuk sekolah dan kelas anda?

Bangunan tiga tingkat, bila penat rasa malas
 nak nak pulak.



Teachers find it difficult to get to classes on time resulting in time delays between periods. Hence the design incorporates a department teachers between all blocks to allow teachers to be placed to classes where they are more likely to be teaching.

The DTA also allows for a better security control between blocks on all four corners of the building as well as the on the main corridor

LANDSCAPE
lack of tranquil landscaped
spaces for outdoor learning



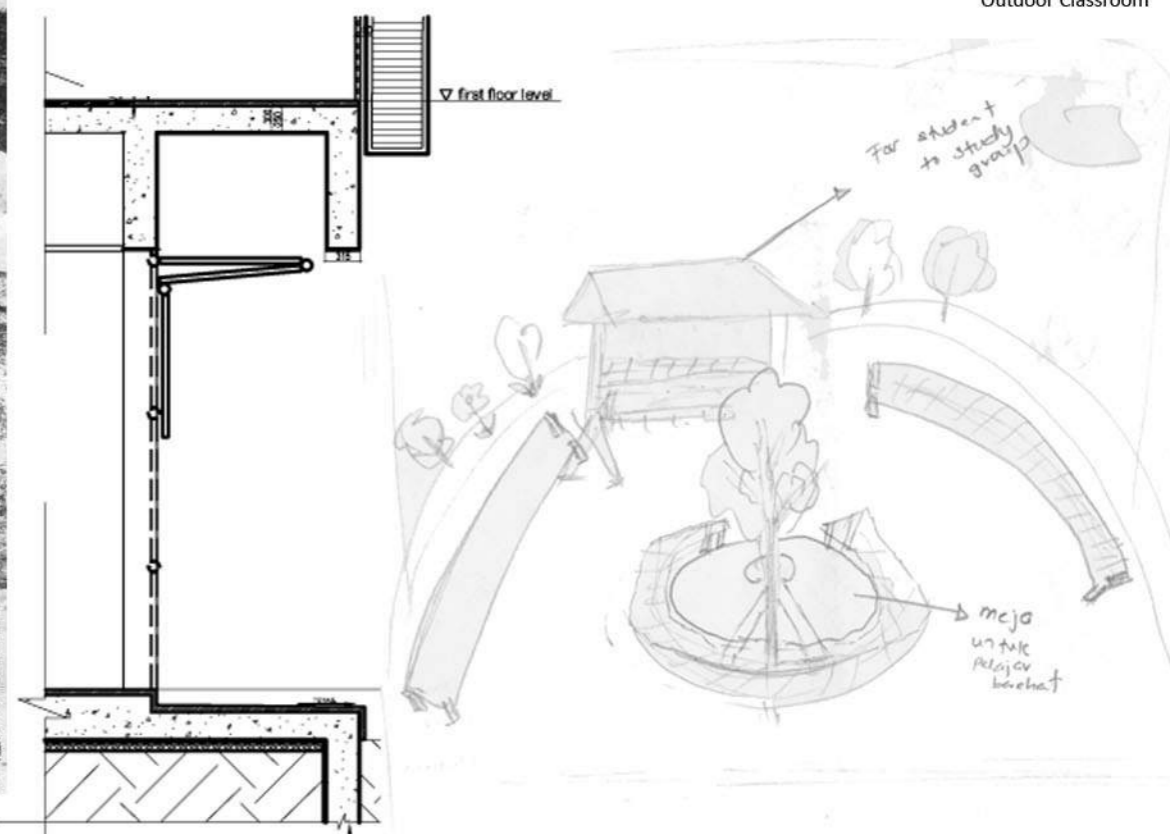
The outdoor classroom is a supplement to the upper floor classrooms but with a distinct difference. The entire enclosure of the facade can be lifted and to allow the nature to envelope the space.



Outdoor Classroom



Student outdoor art class, Anglo Chinese School Teluk Anson





**INTEREST BASED
ACTIVITY ROOMS**

activity rooms for extra curricular activities such as sports, dance, sewing, culinary and a mini-cinema

Students are able to use the I-BAR for a variety of purposes such as after school studying, discussions, farewell parties. It can be also used for after school tuition classes by teachers. With WIFI being prominent in most schools today and for the future, students can bring their laptops/ipads for their educational and for planning their interest based activities

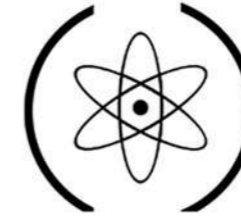


CLASS ROOMS	10	Stairs	CLASSROOMS	(
CLASSROOMS	9	Stairs	CLASSROOMS	(
Toilet	8	Stairs	school merchandise shop	Fun and play room
Toilet	7	Stairs	drama room	counselling room
Toilet	6	Stairs	Designs Room	DANCE ROOM
LIBRARY	5	Stairs	SPORTS ROOM	LANGUAGE ROOM
Theater	4	Stairs	ICT ROOM	ART
music & Instrument rooms	3	Stairs	GYM	CLUB ROOM
TEACHERS LOUNGE	2	Stairs	OFFICE	SPA
SCIENCE LABS	LIFT	Stairs	ENTRANCE	STAR BUCCS
				CANTEEN
Example SCHOOL				





INFORMAL LEARNING
subconscious informal learning opportunities around the school



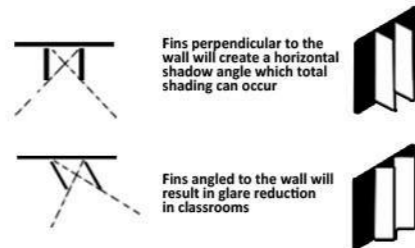
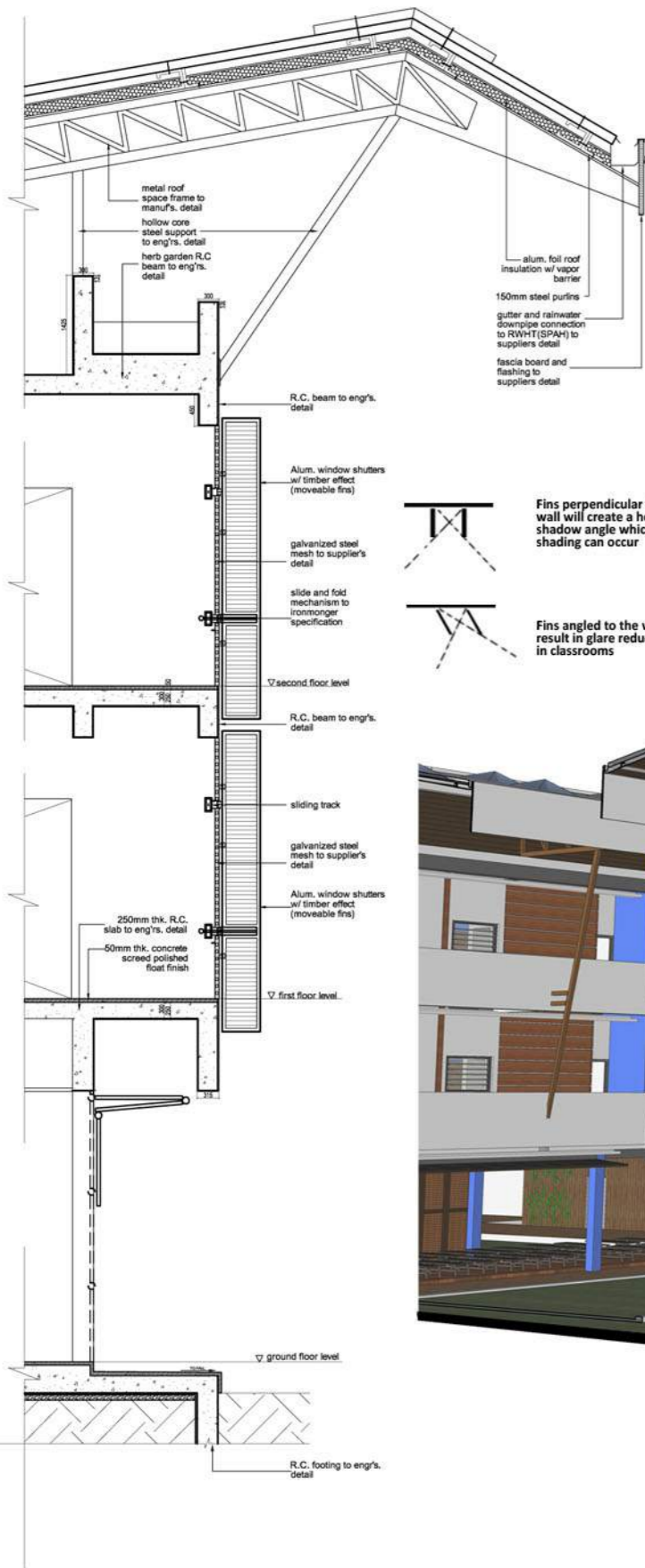
PERSONALIZATION
students tend to cherish something they identify with, why not indulge their creativity?



PEER TO PEER LEARNING
group approach to student learning & teaching

The personalizable facade allows students to display their proudest artworks and hang potted plants on the galvanized steel mesh. This makes each block different than the other. The students can use the facade to teach other students about various interests subconsciously, enhancing the peer to peer learning objective. The facade can also be used to play inter-block games such as sudoku or even tic tac toe. All work and no play makes Jack a Dull boy!

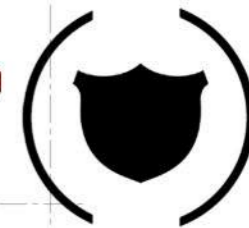
The blocks are also color coordinated to allow students to identify easily with their respective blocks. This allows a far better competitiveness among students in wanting to achieve competitions set up by the teachers, like the block with the best display on the facade, or the cleanest block, or even the smartest block. The 3 sided nature of the classrooms allow for maximum ventilation and allows students to feel that they are not indoors but



5.0 School Features



VEHICULAR CIRCULATION
parking spaces and dropoff areas for school buses which are safe and child friendly

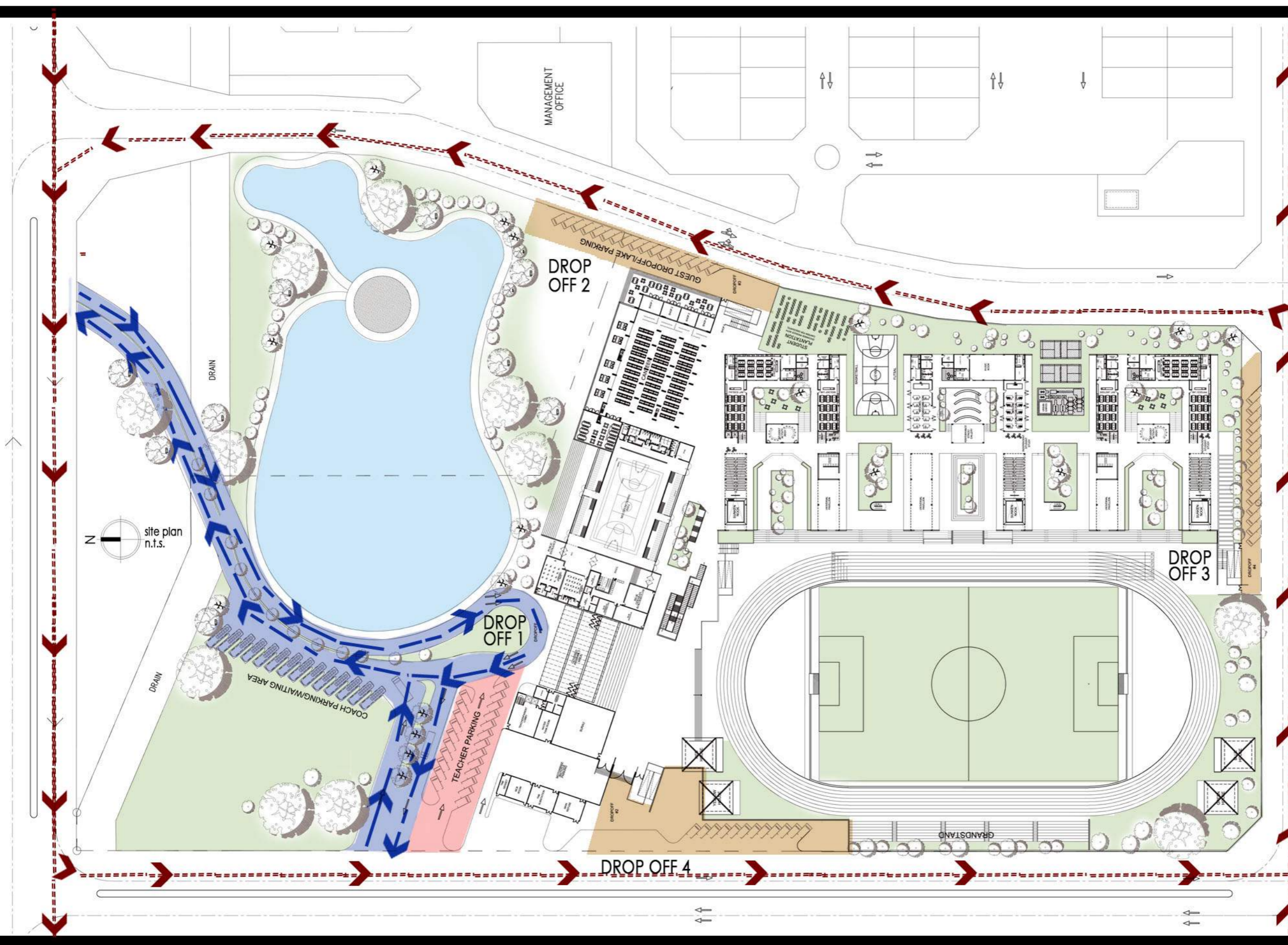


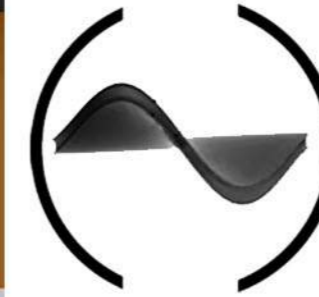
SAFETY
offer pupils much safer, less congested routes around the school and site

Schools often cause massive traffic congestion within its site. Owing to the traffic island feature of the selected site, drop offs have been located on all four corners of the school. These drop offs will be monitored by prefects in the morning.

The undivided traffic circulation for parents, teachers and students in school buses are the main cause for traffic congestion within schools. Thus, the design separates the school busses from the main traffic road. Due to its curvature in length, traffic caused by school busses can be avoided using the inner circulation.

- STUDENT DROP-OFFS & PARENT PARKING
- TEACHERS & VIP ONLY PARKING
- SCHOOL BUS DROPOFF AND PARKING





FLEXIBLE CLASSROOMS

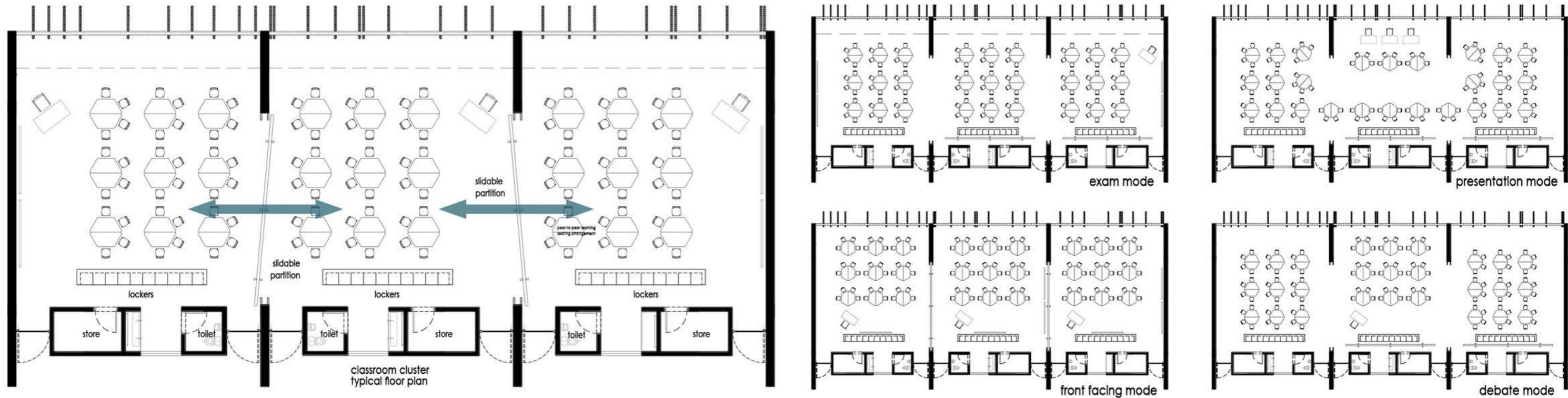
classrooms to be able to adapt to cater to a wide range of learning situations, activities & group sizes

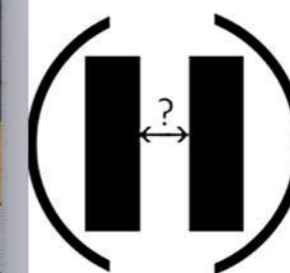
All classrooms are able to be flexibly adjusted to suit various teaching groups and sizes, allowing the classrooms to combine together to form a smaller hall. This allows the space to be used as examination spaces for montly, yearly or governmental examinations.

c) Name some ways you would improve the design/form of your school and classroom for a more conductive learning experience? *

*Nyatakan beberapa ciri-ciri mengenai reka bentuk sekolah dan kelas yang anda rasa akan membantu anda untuk pembelajaran yang lebih merangsangkan? **

suasan dalam berkelompok, berwarna-warna, terbuka dengan, berbentuk bulatan





BLOCK DISTANCE
reduced noise pollution
between adjacent blocks

In the current school typologies, block distances are kept very close in order to maximize space. This causes noise control between blocks to suffer. Hence, by use of foliage and a greater distance between blocks at 20m, noise pollution can be reduced. The use of various heights of foliage allows natural noise protection to occur

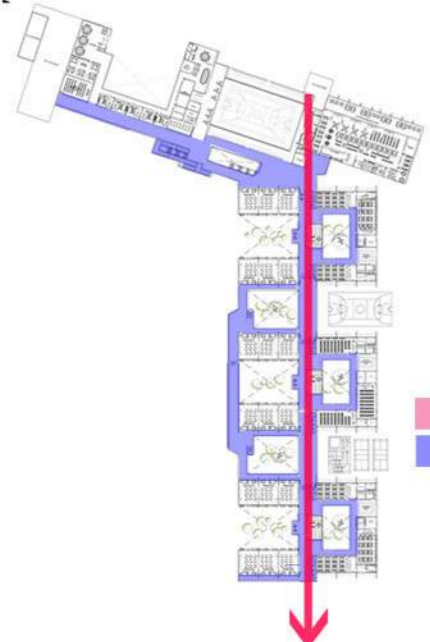




CIRCULATION

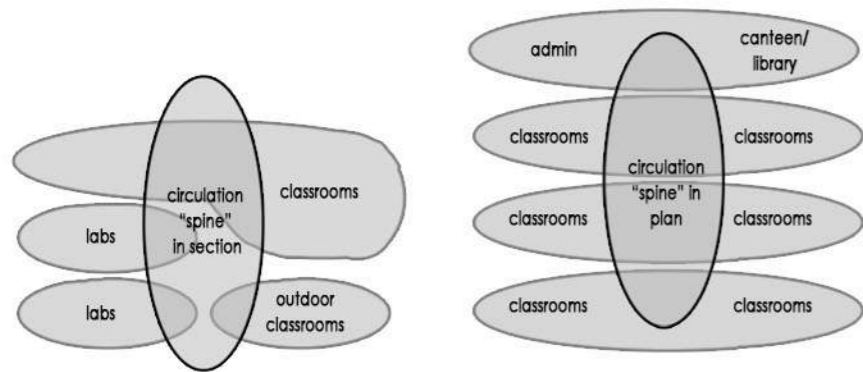
2-3 storeys for improved vertical circulation & improvement of corridors & staircases with more efficient & comfortable circulation, eliminate areas of crowding & congestion

The entire school is connected through a series of primary and secondary corridors, allowing for faster access to classes and areas around the school. The primary corridor is the unifying component in the design, connecting all blocks and facilities together. Teachers would not need to up and down staircases to get to between classes but only one staircase to get to any class. Unlike the current corridors, the proposed design allows for maximum views between the personalizable facade/towards field and towards the basketball courts and performance stages. The corridor would then be highly interactive and ever-changing, full of character and identity compared to its current counterpart



PRIMARY CORRIDOR
SECONDARY CORRIDOR

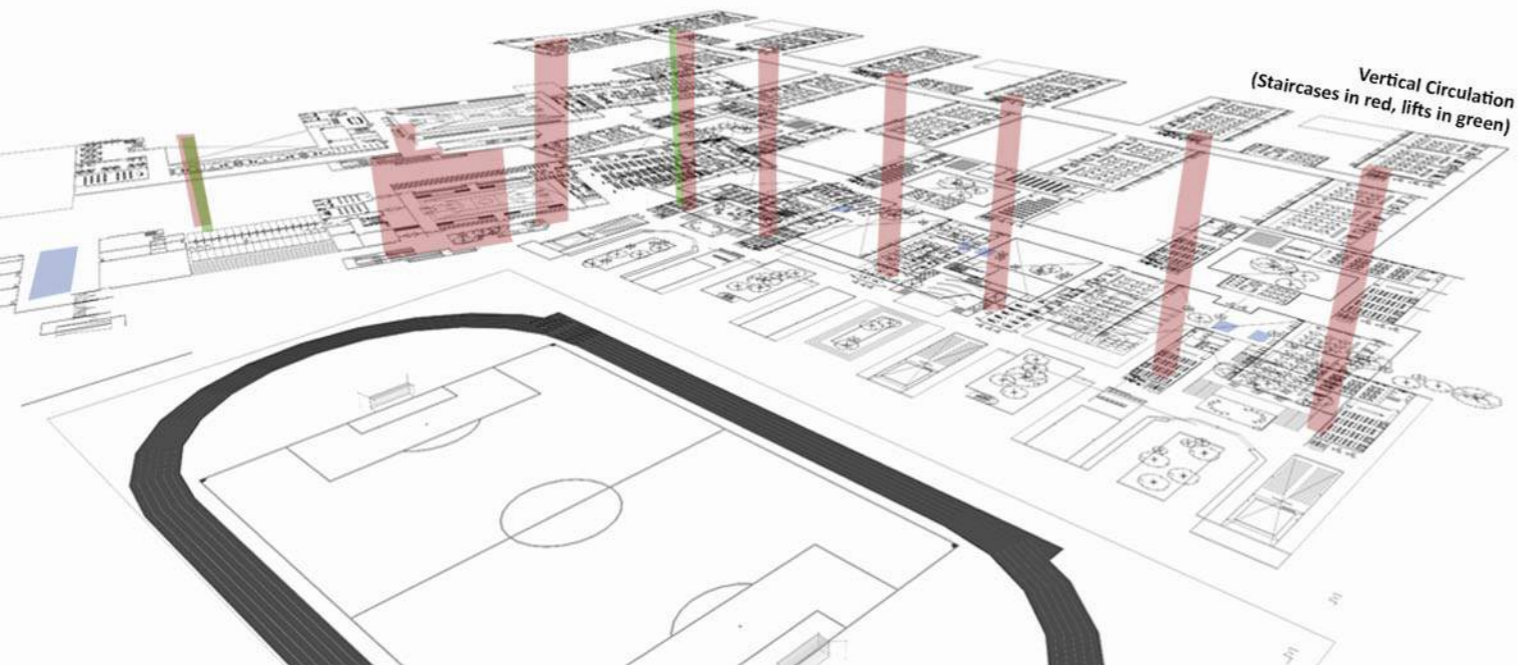




The corridor integrates with the activities surrounding the main corridor. Students can watch the football match or basketball match whilst on the corridor as it also functions as a game deck. Besides that, the corridor can also act as a stage for performances to occur below.

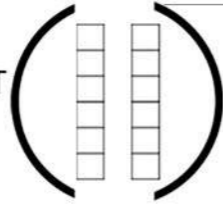
a) What do you like about the design of your current school and classroom?
 Apakah yang anda sukakan mengenai ciri-ciri reka bentuk sekolah dan kelas anda?

blok
 ① Satu bangunan dgn satu blok bangunan yg. lain tidak begitu jauh jaraknya.



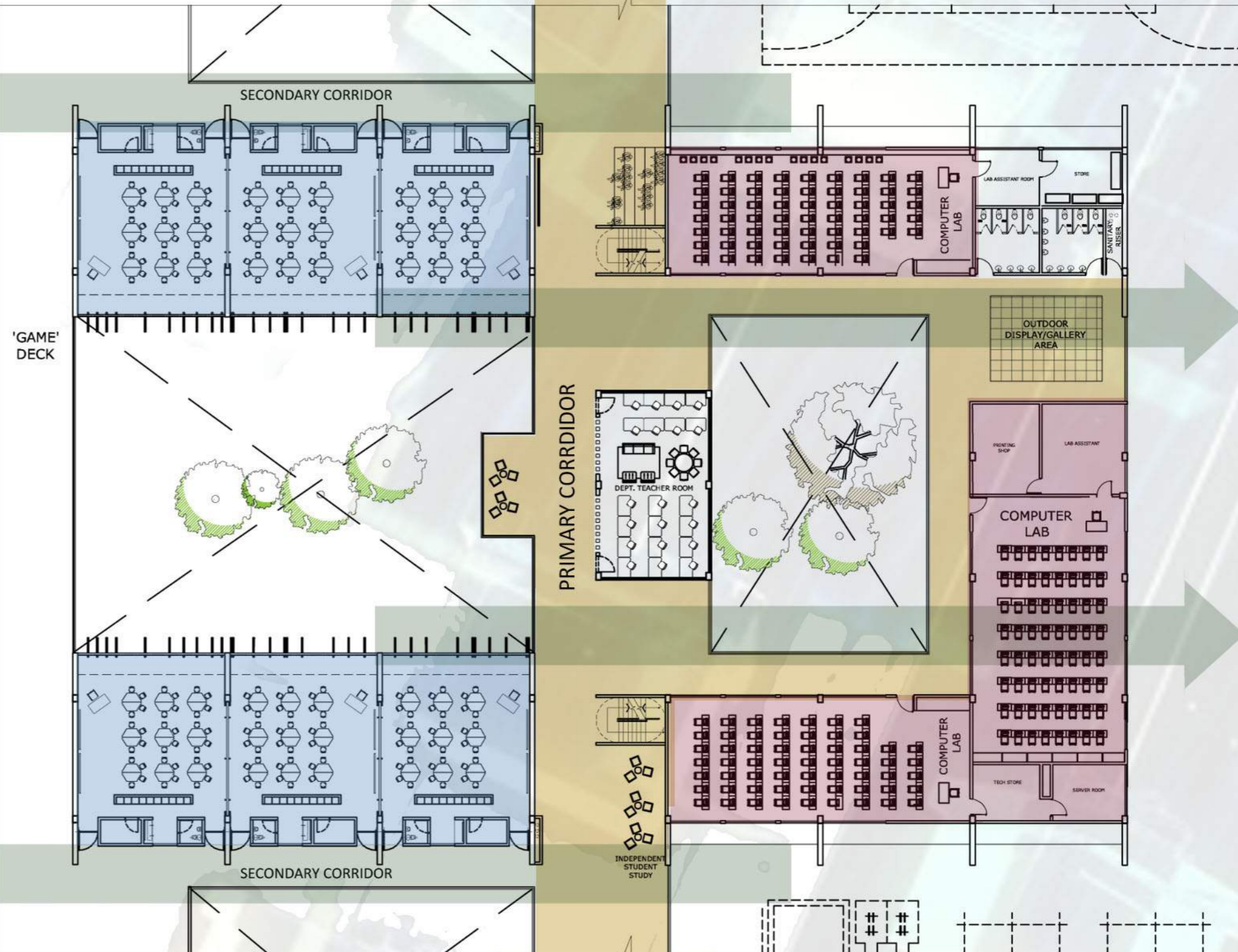
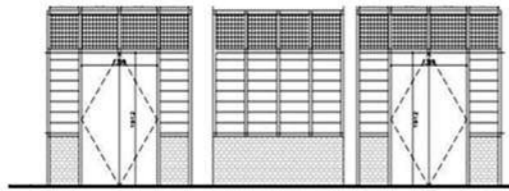
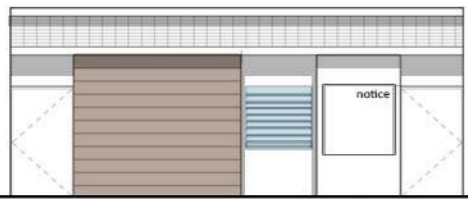
CLASS ARRANGEMENT

teachers find it difficult to control students playing truant & 'class jumping'



In homage to the Malaysian schools of yesteryear, the proposed design combines the linear spline and quadrangle block styling. The inverted corridor nature of the block causes the classrooms (in blue) to be split from the secondary teaching spaces i.e labs (in red). By doing this, distraction does not occur in front of the classrooms when laboratory sessions are occurring.

To further enhance this effect, the entrance facade of the classrooms are kept solid, removing the potential of students in the classroom to be distracted by thier friends or events at the corridor.





SPECIAL STUDY THERMAL COMFORT & DAYLIGHTING

thermal comfort and daylighting simulation results

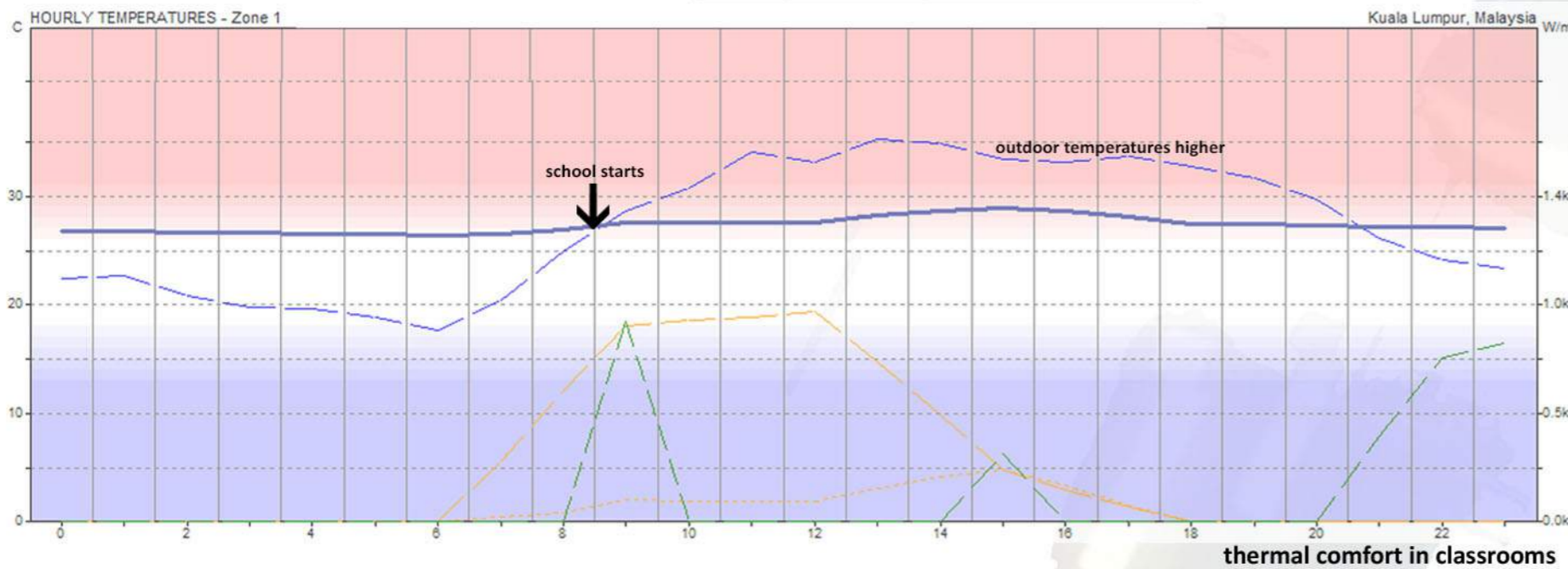
The special study undertaken for the proposed school was to ensure efficient daylighting and thermal comfort using passive design strategies. The study concluded that JKR schools, although well lit (above 6% DTF) it suffers from high levels of glare whilst MYSchool has an average of 4-5% DTF with significant glare reduction due to the use of the operable facade fins.

The thermal comfort of the classroom can be assessed by the graph below.

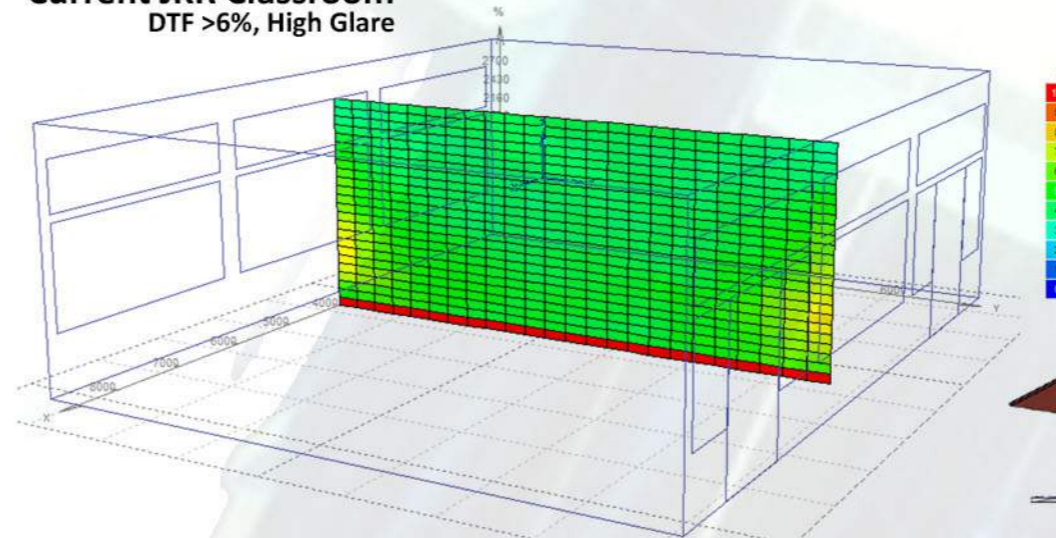
The thermal mass stored by the structure of the classroom is dissipated in the night and is effectively cool before school period. The dotted line represents outdoor temperatures while the connected line represents the temperature within the classroom. The temperature on the inside is significantly cooler than the outdoor

Task	the teacher	the student	Standard Illuminance	
			In the class (vertical)	In general
1	Writing on blackboard	Reading on blackboard	500 lux	200 lux
2	Talking to the students	Paying attention to the teacher	300 lux	300 lux
3	Showing a presentation (slides, powerpoint, television program, etc.)	Looking onto the screen	300/10 lux	10 lux
4	Paying attention to working students	Writing, reading drawing, etc.	300 lux	300 lux
5	Coaching computer activities	Looking to the computerscreen and the paper	50 lux	300 lux above the computer
6	Preparing lessons	Not present	300 lux	50 lux

Zone	Daylight Factor (%)	Distribution
Very Bright	>6	Very large with thermal and glare problems
Bright	3-6	Good
Average	1-3	Fair
Dark	0-1	Poor



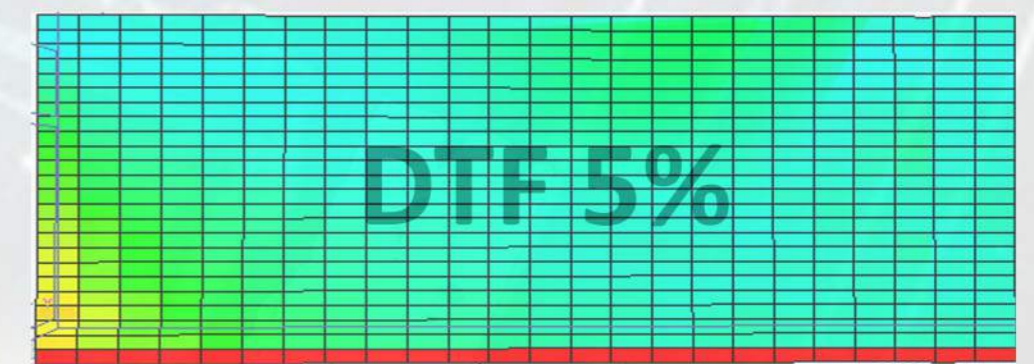
Current JKR Classroom
DTF >6%, High Glare



Current JKR Classroom
Walls on all four sides
(lack of thermal displacement)



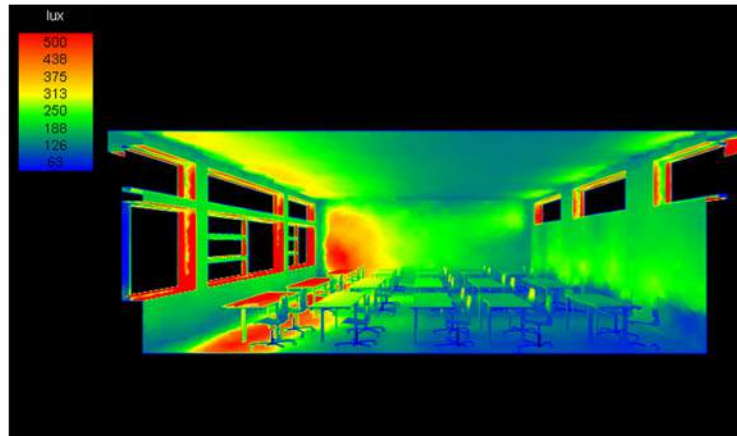
Proposed Classroom
DTF 4-5%, Glare Reduced
Student Distance to Facade Increased



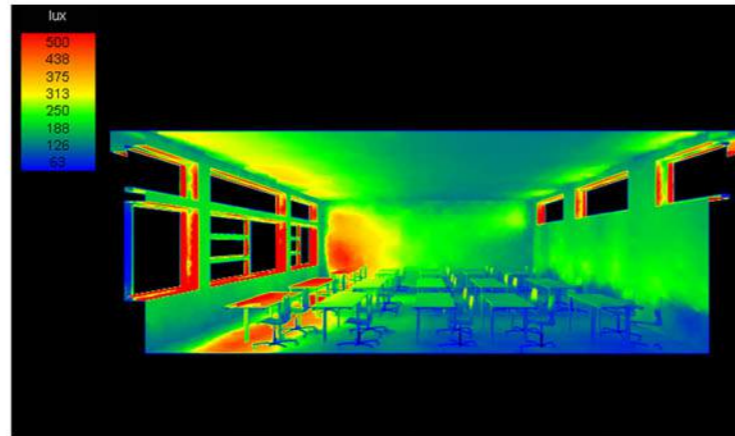
daylight distribution at second floor classroom



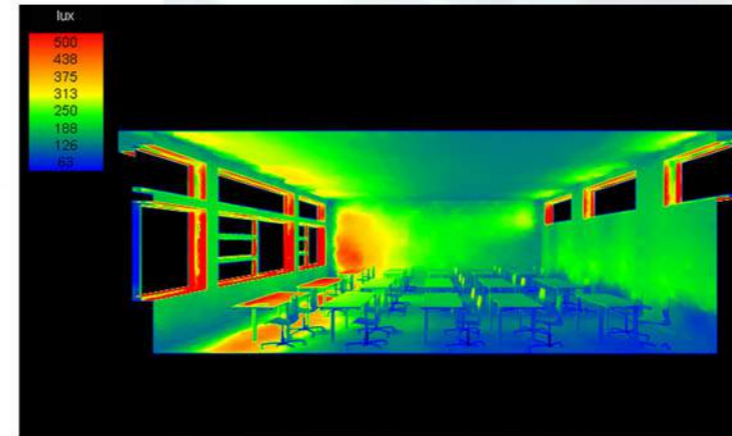
daylight distribution at first floor classroom



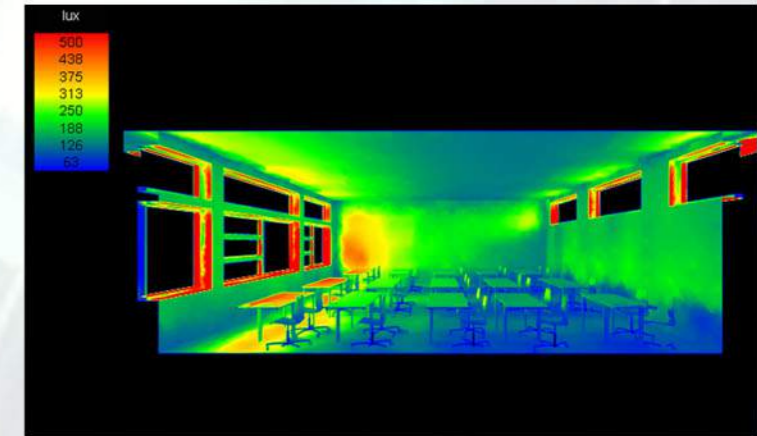
january



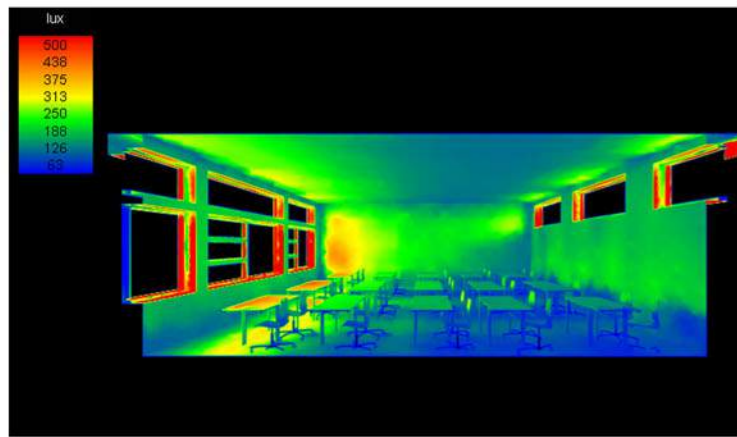
february



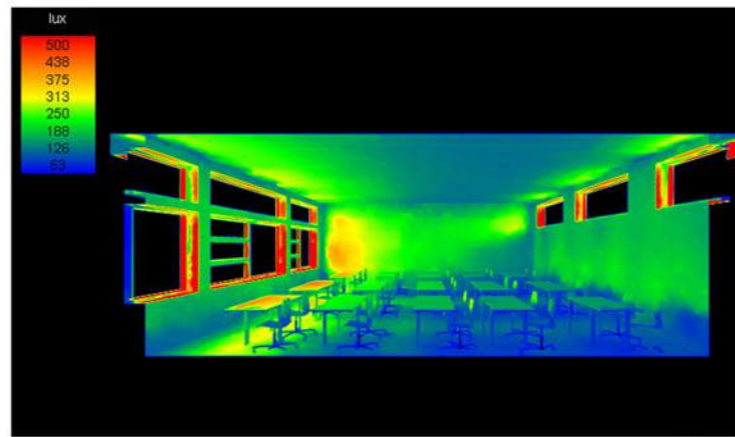
march



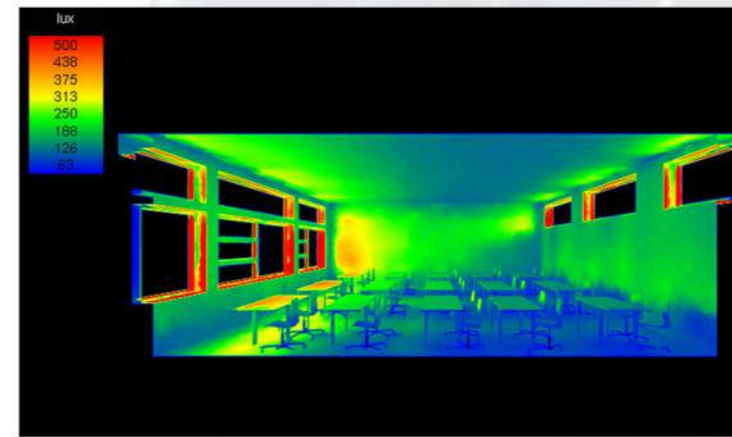
april



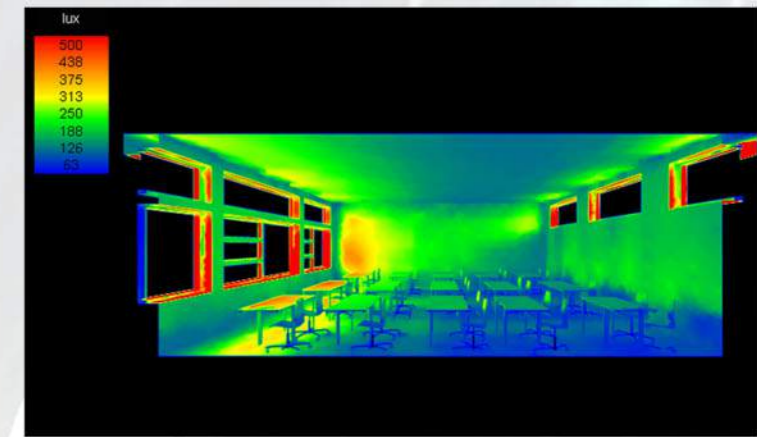
may



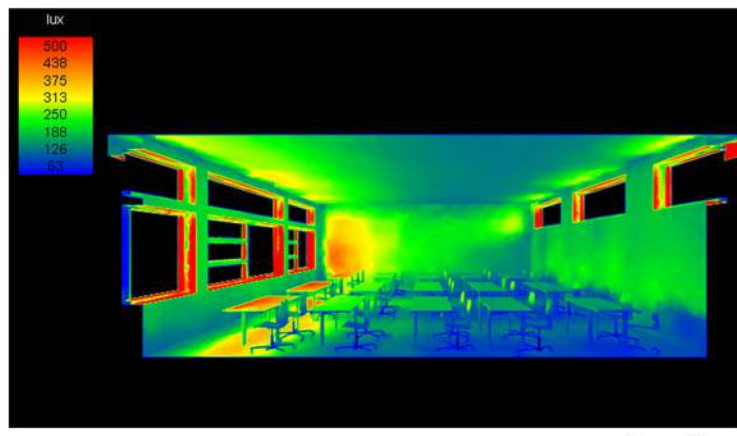
june



july



august

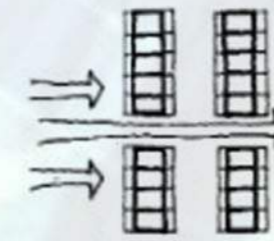


september



Building Materials (Thermal Mass)

The current JKR schools extensively use materials with high thermal mass such as concrete and brick which are directly exposed to the elements. These materials store up heat and reradiate it into the classrooms. Thus, the use of a thermal gap between classroom toilets and the exterior reduces this effect considerably. The customizable facade side of the classrooms is built without using high thermal mass materials (steel mesh). Besides that, using metal deck roofing instead of clay tiles allow quicker cooling periods compared to clay tiles due to its low thermal mass. This is due to the ability of the material to hold little heat and cool adequately at night.



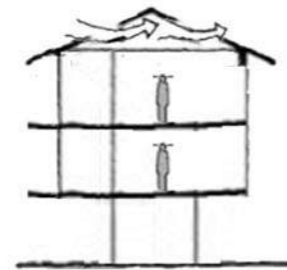
Layout

The proposed school is orientated to allow a tunnelling wind effect. The break between the classroom cluster allows wind to flood through primary corridor. Rigidly planned spaces in the proposed design block the passage of wind forcing it to tunnel into the interior spaces



Wind Velocity Gradient

Vernacular schools were built tall and with large roof expanses to capture high wind velocity that occurs at higher altitudes. Higher altitudes of the structure promote easy passage of air and a more effective cross ventilation.



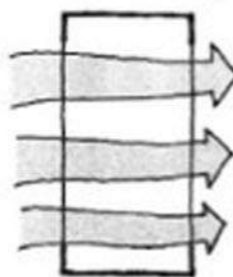
Ventilation of Roof Spaces

The roof spaces in the proposed design borrows elements from the vernacular schools. The openings on the roof allow proper ventilation of hot air that rises. JKR schools do not allow for this due to the low ceiling heights. The trapped air causes discomfort among students



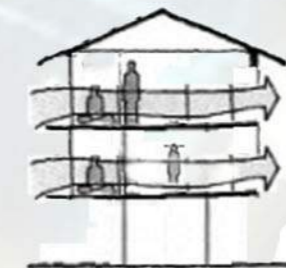
Vegetation (Foilage)

The use of a mix of tall, medium, and short trees are used to provide shade and dampen noise levels. The use of these vegetation also provides for the breezy and cool environment, increasing thermal comfort within the site.



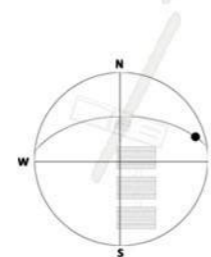
Cross Ventilation

The new classroom design allow easy passage of air and cross ventilation. There are minimal partitions (lower than full height) to allow unobstructed air flow. Wire Mesh fitting on each side of the classrooms also allow efficient natural ventilation



Ventilation at Body Level

The body level is the most vital area for ventilation for thermal comfort. The new typology allows natural ventilation at body levels through the design by having full length openings. The openings at the classrooms are able to pivot and slide, allowing a great deal of customization options for the students



Orientation

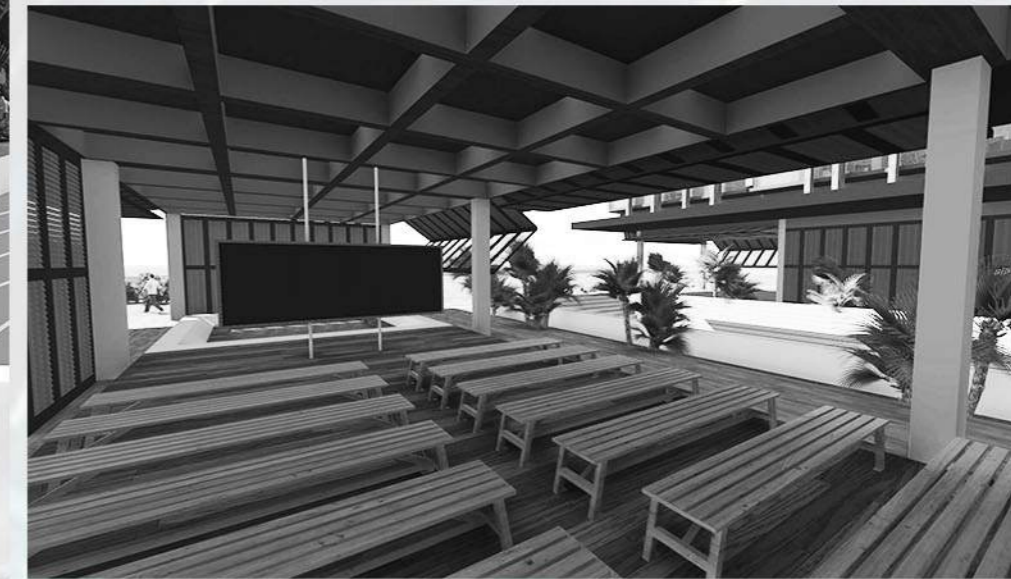
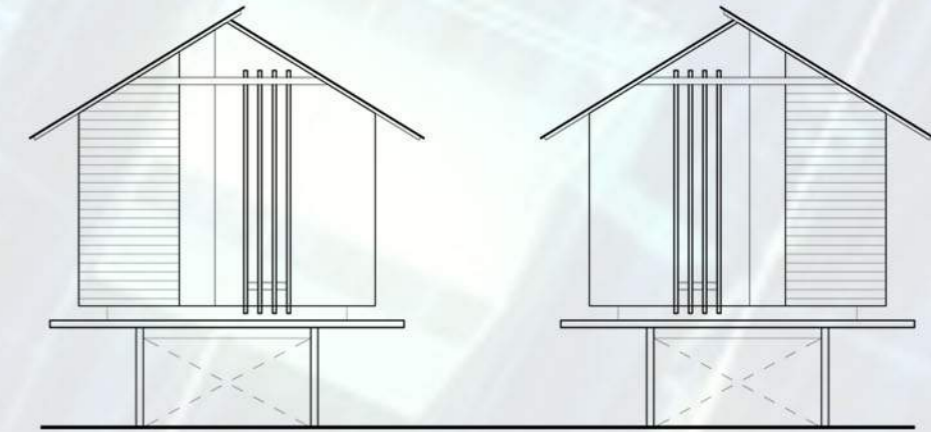
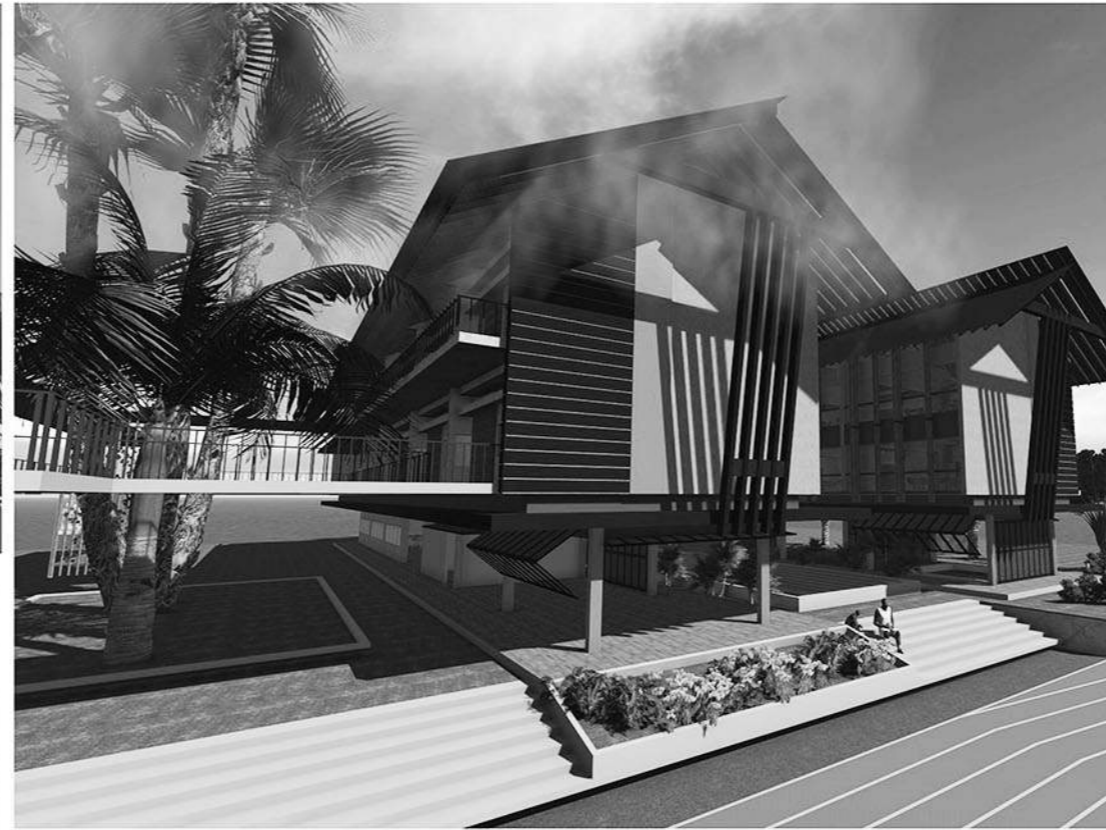
The proposed new school is orientated to face north-and south to ensure minimal heat gain from the east and west facing sun. This reduces solar radiation drastically and allow the interior spaces to remain cool and at a steady temperature through school periods. Current JKR schools often disregard passive orientation and end up with uncomfortable students during lessons.



Operable Facade Shading Fins

The large north and south facing openings provide additional natural light, views and ventilation. These openings are then shaded from glare using vertical fins. These pivoting and sliding fins are operable to move and block glare during mornings and late afternoons. These fins also allow for greater facade customizability

5.4 Vernacular Facade Option



VERNACULAR SCHOOL FACADE STYLING

For rural schools, the design of the school can adapt for a more traditional vernacular facade styling, This also allows the school block to blend in architecturally in to he deployed within the culturally diverse states of Malaysia